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THE IDAHO ARCHAEOLOGIST

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ARTICLE

Boots Made for Walking: Two Late Nineteenth Century Burials from Walters Ferry, Idaho

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Abstract

Though there are many historical accounts of travel along the Oregon Trail toward the Pacific Northwest with a scattering of marked and clandestine graves along the way and reports from mining towns near trail destinations, very little bioarchaeological evidence of life along these trails and in western mining towns exist. Two skeletons were salvaged from Walters Ferry along the Snake River in southwest Idaho. This report re-examines osteological and archaeological remains from the site and uses bioarchaeological analysis combined with historic documentation. Results reveal that these remains were of two adult Euroamerican women interred between December 1888 and March 1889. Skeletal indicators of health reflects a harsh lifestyle resulting in workload-related bony growths and infection. These remains provide a unique glimpse at life, death, and the roles of women along the Boise-San Francisco Stage Route in late nineteenth century Idaho.

KEYWORDS: Bioarchaeology, Oregon Trail, mining, pioneer women, burial, stage routes

Introduction

Human skeletal remains from two shallow graves were found near the heavily-burrowed crest of a sand dune along the Snake River near Walters Ferry (10CN140), Idaho in 2006. Cooperative investigation by the Archaeological Survey of Idaho and Canyon County Sheriff's Department under the terms of Chapter 5 of the Idaho Code "Protection of Graves" Act of 1984 resulted in the salvage excavation of two unmarked primary burials.

In 2008, the remains were first analyzed and curated at the University of Idaho for the Western Repository for the Archaeological Survey of Idaho. Presentations at regional meetings were made, yet no formal report was written (Derbidge and Harrod 2008). The remains were subsequently transferred to Boise State University and in August, 2015 the

Department of Anthropology was contacted by the Archaeological Survey of Idaho's Western Repository for a comprehensive analysis and report. At that time, the skeletons were cataloged as F101608-A and -B (hereafter referred to as Burials A and B).

There are relatively few bioarchaeological investigations focusing on historical burials in the Pacific Northwest (Connelly 2010; Loflin and Weathermon 2013; Rogstad 2015; Weathermon 2001, 2008). There are even fewer accounts from bioarchaeological accounts of lifestyle and disease within mining settlements (e.g. Meyer and Steyn 2015; Ramaroli et al. 2010) or along stage or wagon routes in which to compare this sample. Most accounts of hardships in the American frontier are from diaries, letters, and news reports. Among all travelers along the Oregon Trail, deaths are estimated to be about 65,000, averaging about 10 graves per mile in the 2,000 mile stretch, yet less than 100 are archaeologically known (Mattes 1987; Weathermon 2008). This report re-analyzes the skeletal and mortuary remains recovered from Walters Ferry and aims to 1) correct initial misinterpretations from the earlier analysis, and 2) give a contextual, bioarchaeological glimpse of what life was like along the stage coach routes and between the mining towns in late nineteenth century southern Idaho.

Walters Ferry

Walters Ferry (10CN140) is in southernmost Canyon County, 17 miles south of Nampa, in the southwestern corner of Idaho above of the Snake River and Highway 45. The region consists of sand dunes along river banks with the Owyhee Mountains in the west (Figure 1). The dunes are home to large populations of bank swallows (*Riparia riparia*). The male swallows peck out burrows in the dunes up to five feet deep for females to nest. There may be as many as 2,000 birds in a single colony, so the burrowing activity alone is especially detrimental to the stability of the sand dunes (Taylor 1989). The sand dunes have also been quarried for highway projects for many decades. The combined impacts of mining and quarrying resulted in the accidental exposure of two undocumented burials, discovered teetering on the rim of a sandy cliff.

Many of the ferries and trails in this area of the Northwest were completed and used long after the completion of the transcontinental railroad in 1869, when most westward trails fell into disuse. Based on diaries and other accounts, segments of trails were still used into the first decades of the twentieth century (Weathermon 2001). From 1863 to 1921, near the wane of the trail era, Walters Ferry served as an important link in the Boise-San Francisco stage route. At a time when crossing rivers was one of the most significant dangers of pioneering families, ferries supplemented natural fords and prevented drownings and financial loss from overturned coaches and wagons. Walters Ferry is historically significant as it was one of the most direct routes between the Boise Basin, Fort Boise, and the Owyhee mining camps to the south, and more distant destinations in Nevada and California (Durning 1996; Huntley 1979). Travel surged when silver mining in Idaho peaked in the 1860s and prospectors began to settle in the Treasure Valley and Boise Basin (Durning 1996). In 1863, after the discovery of gold in the Owyhee Mountains, Major Pinckney Lugenbeel at nearby Fort Boise ordered soldiers to secure the landing that would later become the ferry. That same year John Fruit and George Blakenbecker purchased a one-year license for \$100 to establish and run what would be known as Snake Ferry, later Walters Ferry (Jones 1982).

Ownership continued to change hands. In 1874, Perry Munday established a public house and eatery adjacent to the river bank. At that time the ferry was known as Munday's Ferry (Jones 1982). Despite the General Mining Act of 1872, prospecting in the region began to slacken (Durning 1996), and many instances of violent interactions with Native Americans

were reported. Munday soon sold the ferry. In 1879, at the behest of his wife and “trouble about the Indians,” he settled for half what he had paid for it. At one point Munday had advertised his willingness to accept a few head of cattle to get the property off his hands (Jones 1982). The next partnership ended with the death of the partners, after which Lewellyn R. Walter bought the ferry and properties for \$4000. In 1888, he established a post office there (Huntley 1979). Walter owned the ferry until 1901, when he sold it to his tenant, but not before enhancing the business by replacing the ferry with the “Great Easterner,” a 70 x 16-foot ferry barge. By this time, gold and silver had been discovered along the Coeur d’Alene River, drawing the mining rush far to the north of Walters Ferry. Finally, Edwin Meek owned and operated the ferry until 1921, when a bridge was built over the Snake near the ferry, which then lost nearly all of its use (Jones 1982). Today a boat ramp sits on the site of the ferry and is maintained by the Idaho Department of Fish and Game as a sportsman's access.

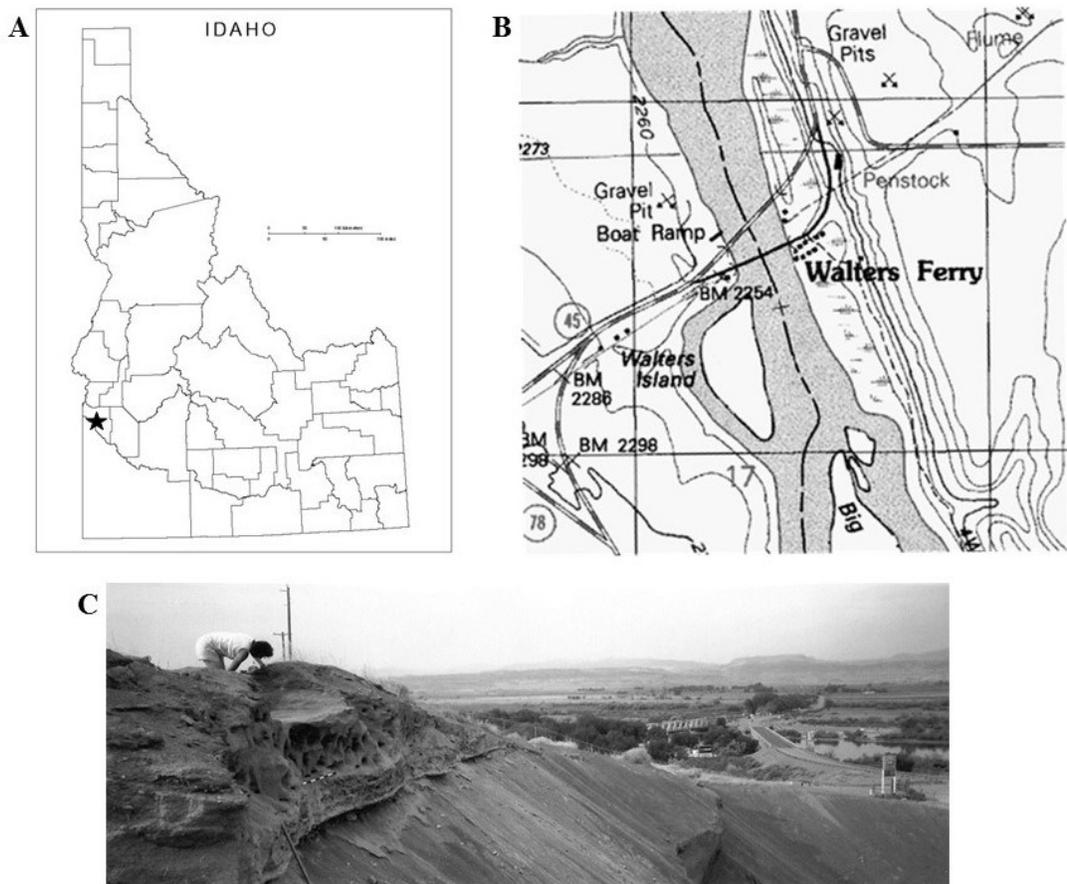


Figure 1. A) Map of location of site within Idaho; B) Location of site along Snake River; and C) Photograph of excavation on top of sand dune cliffs (note the channeled nests of the Bank Swallows).

Osteobiography

The recovered human remains consist of two fairly well-preserved individuals. Both burials had been interred in wooden coffins and lay in extended and supine positions (Figure 2).

Sediments were wind-accumulated sands. Post-depositional erosion and fractures to some of the remains may reflect the shallowness of the graves. The bodies were positioned with the crania facing the cliff to the south. The coffins were parallel to one another, oriented north-to-south and less than two meters apart. The eastern coffin was encountered 80 cm below the surface, while the western coffin was 40 cm deeper. Given the ease of excavation in these sands, we doubt if these differences in depth have much chronological significance. In both cases, the northern ends of the coffins had been breached and burrowed by bank swallows. Destabilization caused by this highly colonial species was more destructive of the graves than mechanical quarrying. Cranial elements had eroded out from the coffins and tumbled down the face of the quarry pit. In 2006, isolated bones found at the bottom of the sand dune were initially thought to belong to Burial A. These included three cervical vertebrae and a mandible and maxilla, which seemed to align with one another. However, upon reexamination at the Boise State University laboratory, cranial remains were absent from the collection. No explanation could be found for the missing cranial fragments, but it appears they were never received by Boise State prior to the current analysis. From descriptions in the initial reports, these very fragmentary cranial remains would not have altered our reporting here. The initial analysis reports that overall the two burials and loose remains yielded 325 identifiable bones, two teeth, and 83.6 g of bone fragments, and presents demographic results dissimilar from the current analysis, ignoring the pathologies (Derbidge and Harrod 2008).

One goal of this analysis was to estimate ancestry of the remains in order to determine the applicability of potential NAGPRA repatriation. Though cranial analysis would be the most accurate means to assess ancestry, in their absence two other analytical procedures were pursued. First, the mortuary practices and burial goods were compared to other data sets from the region. Work along the lower Snake River (Rodeffer 1973) and in the neighboring northwestern plains (Sprague 1967) has shown that by the mid-nineteenth century, Native American burials began to resemble those of Euro-Americans in positioning and in the use of coffins or boxes. To resolve the ethnic/racial origin of the burials, grave goods associated with the remains were evaluated. Burial artifacts (discussed below) were limited to clothing-related items with few personal objects. This is more consistent with burials of individuals of Euro-American descent than nineteenth century Native Americans (Derbidge and Harrod 2008; Weathermon 2001).



Figure 2. Coffin of Burial B. Note that half of the coffin has eroded out of the sand dune and fallen.

Second, femoral neck axis length (FNAL) was assessed as an alternative to observing cranial morphology in order to classify ancestry. The method is relatively new, but has correctly classified up to 86 percent of femurs by known ancestry (Christensen et al. 2014; Meeusen et al. 2015). This measurement was taken between the axis of the neck and long axis of the shaft. The angle of this measurement was originally used in determining the proper medical treatment for hip fractures, since there are substantial differences in fracture occurrences between populations, perhaps due to bone density or geometry differences (Christensen et al. 2014). In summary, both individuals were consistent with European ancestry.

Sex, age, stature, and body mass estimates of Burials A (Figure 3) and B (Figure 4) followed slightly different methods due to the differences in their completeness. For Burial A, which was mostly complete, sex was estimated using nonmetric traits of the pelvis (Krogman 1962; Phenice 1969). The pelvis was wide, with a wide sciatic notch, an oval outlet, and concave subpubic concavity, consistent with a female. However, postcranial metric analysis indicated ambiguous sex. Since the results of standardized methods were unclear, discriminant function analysis of the calcaneus (Introna 1997) were also included, indicating that this individual was a female. Next, age was estimated from epiphyseal fusion (Buikstra



Figure 3. A) Excavated photograph of Burial A in situ; and B) Anatomical reconstruction of Burial A remains.

and Ubelaker 1994), sternal rib ends (Iscan 1985), and the surfaces of the auricular (Lovejoy et al. 1985) and pubic symphysis (Brooks and Suchey 1990). Summary of these multiple traits established the most accurate age range of 39-58.6 years. Finally, for Burial A, body mass was estimated from femoral head breadth (Auerbach and Ruff 2004; Ruff et al. 2012) and stature using the upper and lower limbs (Ruff et al. 2012) and Raxter et al.'s (2006) revision of Fully's anatomical method of combining those with the vertebral heights. Combining the results, stature ranged from 162.56-170.18 cm tall and mass of about 48.98 kg.

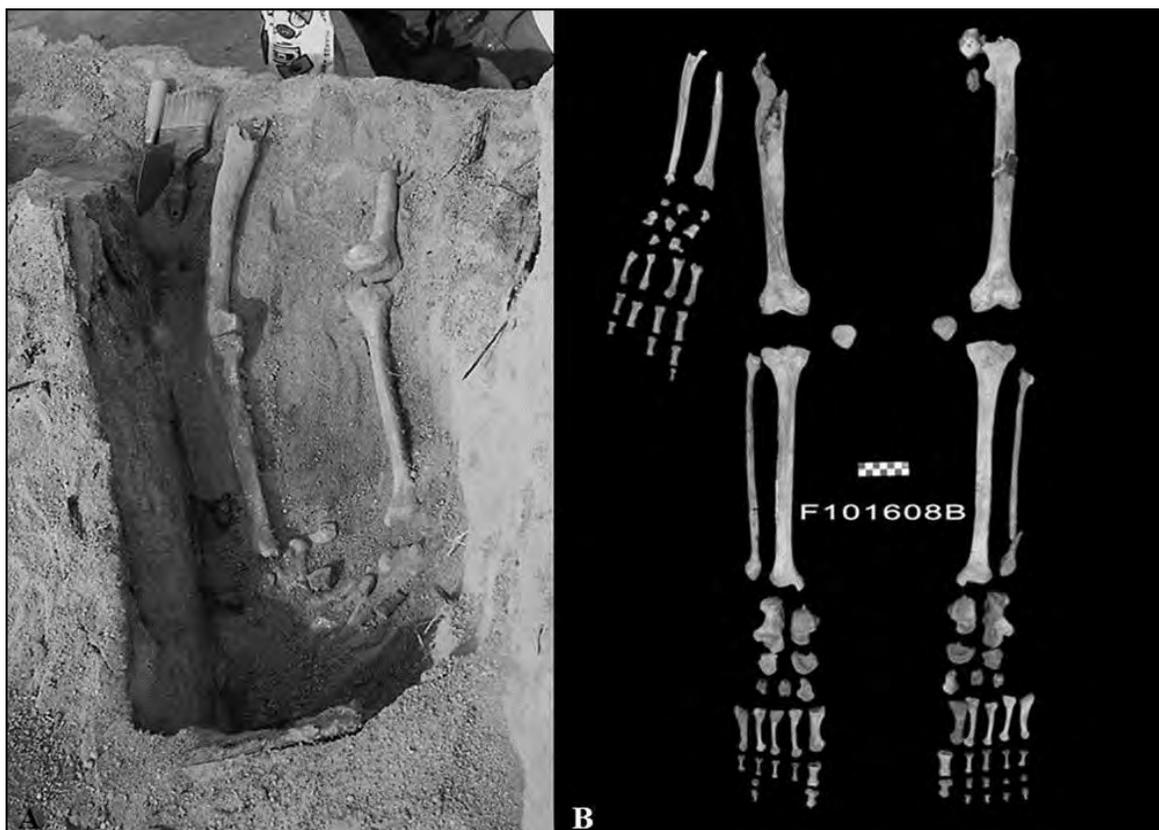


Figure 4. A) Excavated photograph of Burial B in situ; and B) Anatomical reconstruction of Burial B remains.

Burial B was much less complete, with only the right forearm and hand, and the right and left legs and feet recovered. Due to poor preservation, sex was estimated from femoral head breadth (Milner and Boldsen 2012) and FNAL (Christensen et al. 2014; Meeusen et al. 2015). Both methods gave results consistent with a female. Age could only be estimated broadly from epiphyseal fusion (Buikstra and Ubelaker 1994) to be over 30 years. Stature was estimated from tibial length (Ruff et al. 2012) to range from 154.94-162.56 cm and body mass estimated from femoral head breadth (Auerbach and Ruff 2004; Ruff et al. 2012) and the proximal dorsoplantar and distal mediolateral diameters of the first metatarsals of both feet (De Groote and Humphrey 2011) was approximately 47.17-63.50 kg.

Skeletal Pathology

Both skeletons were examined to assess macroscopic signs of disease and trauma (Aufderheide and Rodriguez-Martin 1998; Ortner 2003). As in all bioarchaeological analyses of skeletal disease, it is important to recognize the Osteological Paradox to make interpretations (Cohen et al. 1994; Goodman 1993; Wood et al. 1992). First, most diseases do not impact bone, and those that do exist for some time in tissues other than the skeletal. Second, lesions observed in the skeleton as signs of disease or trauma are usually normal physiological and immunological reactions that only occur when a body is healthy enough to accommodate them. In short, skeletons without lesions are not necessarily bodies free of disease and trauma. Many people die before their diseases register in their bones. We will never know the full scope of disease in any population.

Burial A had minimal abnormal bony lesions, and one incidence of bony trauma (Table 1). The sternal end of the fourth, left rib showed evidence of cartilage ossification. This reaction had completed healing at the time of death and therefore is consistent with an antemortem (occurring prior to death) rib fracture at the sternal end. After the injury, the bone strengthened itself by fusing to the sternum rather than remaining attached via flexible cartilage.

Burial A also showed evidence of Schmorl's nodes in the lower thoracic and lumbar vertebrae (Figure 5). These nodes present as depressions on either or both the superior or inferior aspect of vertebral bodies. They are the result of protrusion of the softer intervertebral tissues into the bony tissue (Aufderheide and Rodriguez-Martin 1998; Ortner 2003). Aetiologically, Schmorl's nodes have commonly been associated with stress-related trauma, but can also be present due to metabolic diseases or represent developmental defects. Some individuals may also have genetic predisposition toward node development (Aufderheide and Rodriguez-Martin 1998; Ortner 2003; Williams et al. 2007). Clinical reports indicate that individuals with these lesions can present either as asymptomatic or with chronic pain, depending on their location and association with stress fractures (Resnick and Niyawama 1978; Wagner et al. 2000). These bony lesions become more common with age. While we cannot know the specific symptoms this woman had, the lesions indicate that she



Figure 5. Pathologies from individual A. A) Fourth, right rib with antemortem fracture and ossification at sternal end (arrow); and B) Lumbar vertebrae with Schmorl's node (arrow).

did exert her lower back.

Burial B exhibited signs of more extensive bony disease even though there were fewer remains to analyze (Table 1). The skeleton displayed bilateral osteophytes of the talus and navicular in the ankle and foot. Osteophytes, commonly referred to as bone spurs, are bony projections resulting from degeneration and/or inflammation that can cause pain and limit mobility (Aufderheide and Rodriguez-Martin 1998; Ortner 2003). Together with the inactive, healed (antemortem) infection which caused a lytic reaction in her left calcaneus, possibly the result of planta fasciitis, osteophytes suggest she was often on her feet, and perhaps even longer in the saddle, as these injuries are common among equestrians. The distal hallux of both feet had inferior lytic lesions and osteophytes (Figure 6). Such lesions have been identified as resulting from fractures, infections, diabetes, tuberculosis, and cancer. Since there are no other indications of tuberculosis or cancer in the skeleton to indicate them as causative. We suspect that a crushing injury may have resulted in ankylosis of the intermediate and distal phalanges of the left foot. This foot also exhibited osteophytes, known as Heberden's and Bouchard's nodes, likely the result of antemortem fracture and/or osteoarthritis, although diabetes cannot be ruled out (Alexander 1999; Aufderheide and Rodriguez-Martin 1998; Ortner 2003).

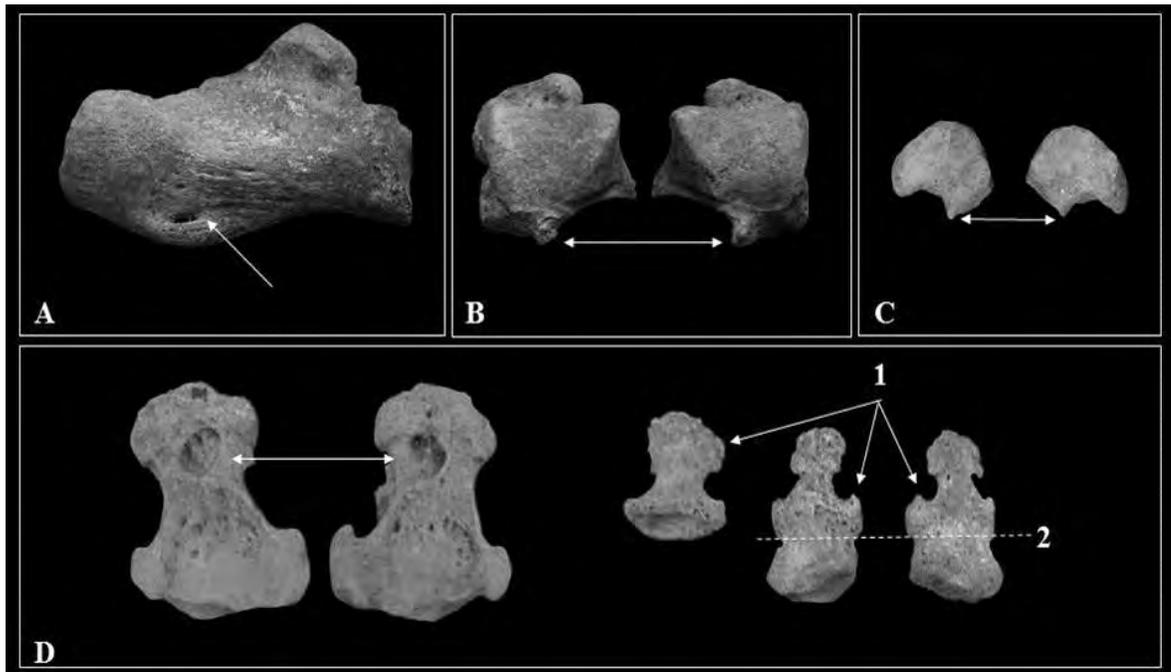


Figure 6. Pathologies from Burial B. A) Lytic response on calcaneus heel; B) Osteophytes on posterior left and right talus; C) Osteophytes on left and right navicular; D) Image to left are the left and right hallux with lytic response indicated by arrow and image to the right are the foot phalanges. 1 indicates osteophyte formation and 2 indicates the area of ankylosing of the intermediate and distal phalanges.

Most significantly, perimortem infection (active/occurring near the time of death) occurred in her right femur. Though the head of the femur is missing postmortem, probably due to its fragile diseased condition, the postero-proximal end to the mid-shaft of her femur exhibited periostitis (referring to general active bone lesions), cloaca on the greater trochanter, an inflamed and bulging appearance of the anterior shaft, dense trabecular bone in the medullary cavity and a necrotic bony tissue inferior to the cloaca. These lesions are

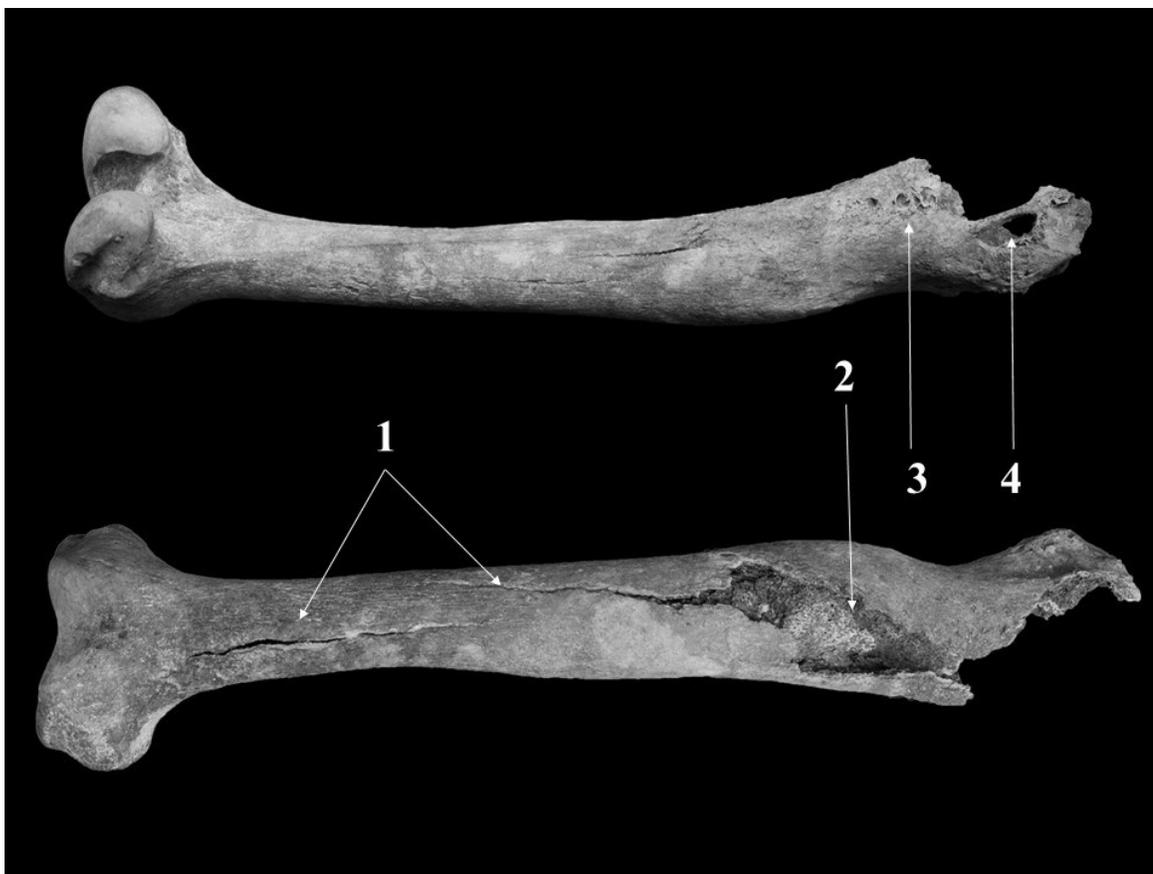


Figure 7. 1) Anterior (bottom image) and postero-lateral (top image) views of the right femur from Burial B depicting perimortem osteomyelitis morphology (numbers 2-4) and postmortem fracturing of the shaft; 2) Dense trabecular sequestrum; 3) Active involucrum (periostitis) involvement inferior to greater trochanter; and 4) Cloaca on the greater trochanter.

consistent with acute and chronic osteomyelitis (Figure 7). Diagnostic evidence of osteomyelitis is the presence of a canal (cloaca) through which the body can drain and dislodge the infected fluids and necrotic bone (sequestrum) along with periosteal bone formation or involucrum (Aufderheide and Rodriguez-Martin 1998; Ortner 2003). Osteomyelitis results from the introduction of pyogenic bacteria into bone. The infectious vector may reach bone directly through open wounds, indirectly through contact with adjacent infected tissues, or through a hematogenous route via sepsis. Generally, infection resulting from trauma is localized and can often become chronic, while hematogenous infection presents in more than one location and is most common in the ribs, vertebrae, and tibia (Aufderheide and Rodriguez-Martin 1998; Ortner 2003).

Her infection would have been seeping and painful and open to further infections, but there is no sign either of treatment, or inhibited mobility (Aufderheide and Rodriguez-Martin 1998; Ortner 2003). Nevertheless, walking must surely have been painful. Though the femoral head is missing, the infective reaction appears to originate at the neck or trochanters of the bone. This is consistent with a traumatic injury (minor or major), active at the time of death, and perhaps contributing to her death. Given the location of the osteomyelitis and possible traumatic cause of her other pathologies, the osteomyelitis infection is probably subsequent to either an open fracture or septic trochanteric bursitis. Also, known as greater

trochanteric pain syndrome (GTPS), because the disease involves more than the femoral bursa tissue, trochanteric bursitis is caused by acute or repetitive trauma, such as running, direct impact, and horse riding to the soft tissue surrounding the femoral head and trochanters. In life, GTPS presents as a lateral pain in the thigh with swelling, fever, and reduced flexion of the leg. It occurs in 1.8 individual per 1000 today, and has a higher frequency in women than men (Strauss et al. 2010; Williams and Cohen 2009).

TABLE 1. Osteobiographical and Pathological Data from each Burial

<i>Burial</i>	<i>Ancestry</i>	<i>Sex</i>	<i>Age (years)</i>	<i>Stature (cm)</i>	<i>Mass (kg)</i>	<i>Pathology</i>	<i>Timing</i>
A	European	Female	39-58.6	162.56- 170.18	48.98	Fracture, 4 th rib (sternal end)	Antemortem
B	European	Female	30+	154.94- 162.56	47.17 - 63.50	Schmorl's noded	Antemortem
						Osteophytes on Navicular	Antemortem
						Osteophytes on Talus	Antemortem
						Lytic reaction on calcaneus	Antemortem
						Ankylosing and osteophytes on foot phalanges	Antemortem
Osteomyelitis of right femur, pos- sibly secondary	Perimortem						

Mortuary Goods

As mentioned above, the preserved artifacts for both burials were limited primarily to clothing items within the coffins. A full listing of the mortuary goods is listed in Table 2. The coffins themselves were rectangular with lids and completely encased the bodies. Samples of the coffin wood of both burials were sent for microscopic analyses at the University of Ohio. The coffin of Burial A is consistent with *Pinus strobus*, while that of Burial B is a cedar wood, most likely a *Juniperus* species. Both woods appear to be the eastern North American species of the genera. Burial B has evidence of inactive insect burrows and brown rot that has softened and darkened the wood (Paul Patton, personal communication 2017). At least some of the external surface of the coffin is painted with an unidentified red pigment, underlying quartz-heavy sand encrustations.

The coffin panels were held together with cut nails and wood screws (with flat, slotted heads), 10 rusted fragments of which were recovered. Coffin manufacture in the nineteenth

century intermountain west was often improvisational. Coffins were sold at trading posts or carpentered from salvaged wagon parts or furniture, which may explain the eastern origins of the wood species in this case (Hafen and Hafen 1961). Often the dead were merely wrapped in a blanket or canvas without a wooden box and some bodies were only partially buried (Hafen and Hafen 1961).

Copper rivets and iron loops for pants, synthetic flat buttons for a shirt, and shank buttons for a coat were recovered from Burial A (Figure 8). Among these was a single, 1 cm diameter, plastic button that stood apart and a white four-hole China button with a pink stippled pattern of diagonal crossing lines. Also, left with her body was a fragmented strand of red cotton ribbon about 15 cm in length (though the material has not been identified). Her most prominent possessions were leather mid-calf boots containing the bones of her feet inside gray woolen socks (Figure 9). The boots were 22.5 cm in length, equivalent to a U.S. size six boot. These boots were first thought to be men's, but the soles of both were decorated with inclusions or small tacks made of oxidized copper and an unidentified white material in a floral-like pattern suggestive of Victorian femininity.

Mortuary goods associated with Burial B were limited to a white wool textile made with copper rivets, which appeared to be from a pants pocket, and an identical white and pink stipple-patterned button to that found in Burial A. Whether this button indicates a relationship between these women is unknown. Other evidence of clothing or ornaments that

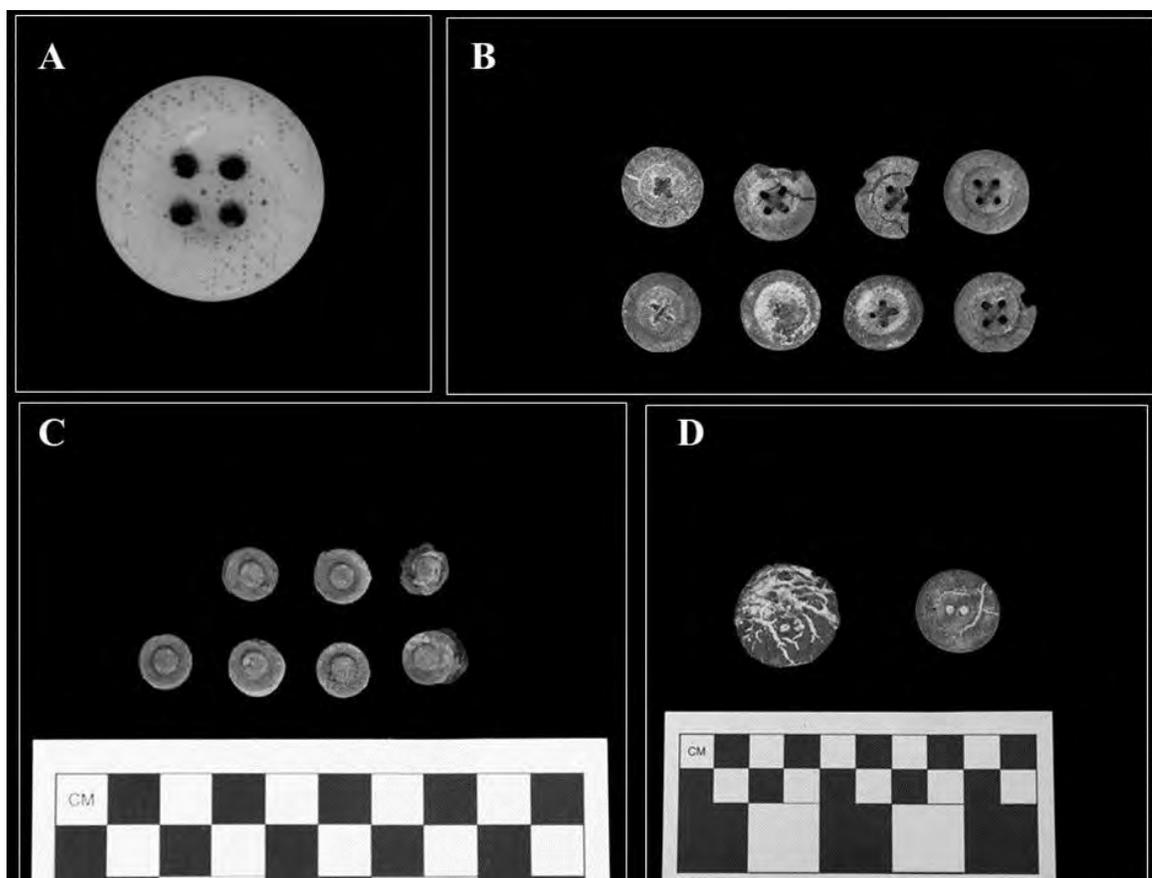


Figure 8. Buttons and rivets from Burial A. A) Enlarged image of the pink stipple-patterned, four-hole China button. The identical artifact is also found with Burial B; B) four-hole, flat ink-well buttons; C) copper rivets from denim jeans; and D) black shank buttons.



Figure 9. Sole of the left leather boot from Burial A. Note the pattern of rivets/inclusions.

were placed in the coffin came from bone staining. Though both skeletons exhibited multiple stain colors, Burial B exhibited obvious green copper staining on her right distal forearm and wrist, perhaps from decomposed buttons or jewelry.

The most valuable artifact in narrowing down the timeline in which these women died and were interred were fragments of a newspaper clipping. This was found below the left clavicle of Burial A, in an area suggestive of a shirt pocket (Figure 10). The fragments were lightly cleaned, digitally photographed, and reconstructed in a montage using a raster graphics editor. Keywords and phrases from the clippings were then searched in digital archival collections.

All text in the newspaper clippings were associated with different published editions of the *San Francisco Chronicle*, though not organized as they were in the *San Francisco Chronicle* itself. None of the articles were published earlier than December 25, 1888. On one side, columns dating to December 20-24, 1888, addressed subjects like leadership changes in post offices around the Northwest, to contested land surveys and Idaho Land District claims, and results of United States Versus Oregon and Washington Territory Railroad Company regarding use of timber in the region to build the railroad. In the later section, Secretary of Interior William Villas was mentioned. Villas served from 1888-1889, further confirming the dates represented by the paper. On the opposite side of the fragments, a columnist described in some detail, the natural history and art collection at the Palais Longchamps, Marseille, France. The columnist later mentioned an 'unnamed' San Francisco millionaire (most likely Michael H. de Young, the co-founder of the *San Francisco Chronicle* who would later found the de Young Museum in 1895), and recommended he include scale models (like those the

columnists saw in Marseille) as part of his exhibits. Though the newspaper clipping may clarify the year and season in which Burial A most likely died, it is not exactly clear where either originated or what their intentions in the area were; to stake land claims, become a postmistress, or simply interest in visiting France.

TABLE 2. Description and Count of Mortuary Goods by Provenience.

<i>Provenience</i>	<i>Object Type</i>	<i>Raw Material</i>	<i>No.</i>	<i>Description</i>
<i>Burial A</i>	Bottle Shard	Glass	2	Brown glass
	Cloth	Cotton	2	
	Cloth	Leather	7	
	Cloth	Wool	1	
	China Button	Plastic	8	
	China Button	Plastic	1	
	China Button	Plastic	1	Large white
	China Button	Plastic	4	Medium white
	China Button	Plastic	1	White/pink pattern
	Ribbon	Unknown	1	Red
	Rivet	Copper	7	
	Rivet/Leather	Copper/Leather	1	
	Shank Button	Synthetic	2	Jacket button
	Shell	Calcium Carbonate	1	White (bivalve mollusk)
	Twine	Hemp	1	
<i>Burial B</i>	Cloth	Unknown	1	
	China Button	Plastic	1	White/pink pattern
	Rivet/Cloth	Denim/Copper	1	Clothing (pant pocket)
	Cloth	Unknown	1	
<i>Unknown</i>	Bottle Shard	Glass	2	Brown glass
	Rivet	Copper	1	
	Shard	Glass	1	Frosted glass

It is likely that both women died and were interred around December 25, 1889 and before March 6, 1889. Since the paper is from Burial A, both the burials seem likely to have been dug at the same time given their close proximity and exact alignment. Here, wider comparisons are helpful. Thus, diary entries from Abigail Roeloson near Box Elder, Wyoming talk of her mother's sudden death of cholera and burial beside a fresh grave of an unknown woman (Holmes et al. 1997; Rogstad 2015). It was certainly not unheard of to bury

unrelated individuals beside one another. This date range is significant because it coincides with the winter of 1888-1889 which was one of the region's coldest on record with an average temperature of 31.9 degrees (United States Signal Service 1888). This might have encouraged digging graves in the sand dunes preferable to digging through frozen clays and silts along the river plain. Detailed analysis of the composition of plastic used in the buttons may alter the date. If they are celluloid which was in production by the 1870s then the date will hold, however if they are Bakelite, which was not developed until 1907 (Davis 1946), the newsprint may have served as a sort of nostalgic grave good.

Discussion

Osteological analysis of pioneer era skeletal remains is scanty. Analysis of Euroamerican women before the closing of the frontier are especially scarce (Scheiber and Gill 1997). Much of the available evidence for women is restricted to dental caries rather than the postcranial skeleton. Historic accounts tell of emigrant injuries and deaths from cholera, flu, measles, smallpox, diarrhea, mountain fever, mumps, tuberculosis, snakebites, mechanical accidents, drowning, exposure, starvation, fires, explosions, violent attacks, and suicide (Holmes et al. 1997; Rieck 1991). The few skeletal reports that exist offer a dark picture of the life and health of the pioneers. Particularly, work by Rick Weathermon (2001, 2008; Loflin and Weathermon 2013) on pioneer skeletons and cemeteries from Wyoming is especially revealing. A man in his thirties interred at Fort Casper, Wyoming exhibited Schmorl's nodes, ankylosing of the toes, perimortem Parry's fracture, and perimortem blunt force trauma to the face and a possible .44/.45 caliber gunshot wound to the head. Weathermon (2001) identified the individual as a previously unaccounted for soldier from the 11th Kansas Volunteer Cavalry. Two Euroamerican individuals, one of which was a child under 16 months old, were recovered from the banks of the Green River in Sweetwater County, Wyoming. The young male had several antemortem pathologies including among other things hyperostosis, cribra orbitalia (both associated with malnutrition and anemia), and fractures of the sacrum, humerus, and ulna (Loflin and Weathermon 2013). A family plot in western Oregon, used from 1854 to 1879, revealed the reality of a frontier settlement, as seven of the burials were of children (six of which were under the age of five) all interred in coffins, lacking decorative elements, and with



Figure 10. Reconstructed front side of the newspaper clipping

similar clothing goods to those at Walters Ferry (Connolly 2010).

In another example reported in a local newspaper (Rogstad 2015), Weathermon excavated three burials (two women and an adolescent boy) that lay next to each other near Glendo, Wyoming dating between the 1850s and sixties. These individuals had some skeletal attributes of Native Americans, but their mortuary goods were European. Weathermon states in an interview that from this site and others, like the Box Elder Cemetery, he believes that pioneers were selective about burial site scenery and preferred not to leave their dead in isolation. It was also common to plant vegetation near graves either as a symbol of remembrance and to make relocation of the grave easier. The bodies of these three were laid in the ground without coffins, but one was wrapped in buffalo hide and feathers and all were covered with wooden lids. One woman, estimated to be in her forties, showed evidence of having many difficult births, one of which required symphysiology surgery (the practice of sawing the pubes apart during obstructed birth).

Bioarchaeological analyses of these two women allows a unique glimpse of women during the pioneer emigration and the mining rush. In 1888, though some women certainly maintained traditional roles, others took part in mining and other frontier businesses in Idaho and throughout the pioneer west (Binheim and Elvin 1928; Scharff 2003; Scharff et al. 2015). Many women assisted their husbands and fathers during the gold and silver rushes in California, Colorado, Idaho, and even Alaska. There is much documentation of women who owned and supervised their own mines and mining companies too (Binheim and Elvin 1928). Mrs. E.C. Atwood, for example, the vice president of Banacord Mining and Milling Company, asserted that mining would, “be made to pay by an energetic woman who will pursue it in an intelligent way” (Mining and Scientific Press 1900:771). Fed up with traditional female labor at the mining camps, she studied geology and surveying on her own. Many other companies were also run by women during this time. In fact, a small population of women in nearby Silver City, Idaho, were documented as behaving like male cowboys and wearing men’s clothing, similar to the clothing found with these women (*The American Journal Examiner* 1904; Mackell and Noel 2009). Pathology incidences from a skeletal collection of early 20th century Chinese indentured miners in South Africa (Meyers and Steyn 2016) showed that high frequency of injuries associated with mining accidents were fractures of the limbs and cranium and Schmorl’s nodes of the vertebrae. This pattern may be similar in the Northwest for both Chinese and European miners, but future analyses would be needed.

In addition to working in mining, women also owned and labored in other businesses like printing shops, brothels, flour mills, hotels, brick kilns, as well as professionals in law, medicine, and labor unions. While the nation did not accept women’s suffrage for another 24 years, Idaho, yet to be a state, embraced it (Scharff 2003).

Though the region was most successful in attracting travelers due to the gold and silver rushes, many mining disputes and riots were occurring in Idaho during the 1890s. The price of silver dropped, many mines closed, and miners were lost their income. Toll costs for Walters Ferry decreased with every owner, reflecting the appearance of new ferries along the Snake River and decline of the silver rush in the region (Jones 1982). In Wallace, Idaho, several mines were destroyed in sabotaged explosions, leading to military intervention imprisonment of many miners in Ada County Jail (Lukas 1997). It seems less likely then, that these two women were in the region to claim some fresh mines or pan the rivers in 1888 riotous climate. Rather, they may have lived in the Boise Basin or simply have intended on ferrying over the Snake River for other pursuits like many others.

Conclusion

These burials at Walters Ferry offer a unique glimpse into the lives of two adult, hard-working and bone-weary Euroamerican women. Burial A occurred sometime after December 25, 1888 and before March 6, 1889. Burial B is assumed to be approximately the same age. In future investigations, isotope analysis from these remains might determine their diets and origins. Their masculine, work-worthy clothing and evidence of disease and trauma provides evidence for the changing and difficult working lives of women in nineteenth century rural Idaho. Osteological analysis reveals the women worked hard and suffered chronically from infection and degenerative disease. However, the pathological conditions they endured do not seem out of the ordinary for the context. The broader anthropological importance of these burials lies in the cultural-historical significance of Walters Ferry itself. Designed to serve as a crossing for people traveling between Boise City, Fort Boise, and mining towns such as nearby Silver City in the Owyhee Mountains, Walters Ferry was both an important transportation node in the late 19th and early 20th century, and representative of life in general along stage/wagon and ferry routes and nearby boom towns in the intermountain west.

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ARTICLE

The Archaeology of High Prairie, Idaho

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Abstract

A largely unstudied archaeological area, the High Prairie in south-central Idaho provides a unique opportunity to study residency patterns as proposed by Kelly's work in the Carson Desert in Nevada (Kelly 2001). Located 16 km northwest of Hill City, the area sits along the landscape seam which separates the hillside of the northern part of the quadrant with the area that gives this part of Idaho its namesake, the Prairie. In a sagebrush steppe context, the sites in the area, known collectively as the High Prairie, were excavated four times between the years 1989 and 1999. The few publications released about High Prairie have provided very little in the way of inventory or environmental conditions. In the four excavations, archaeologists from the Boise National Forest recovered 39,051 pieces of lithic debris remains, 517 artifacts, 31 faunal remains, and 2 carbon samples. The artifacts are typical of the Middle to Late Archaic period. The functional analysis reveals a high residential mobility pattern that is consistent with Kelly's mobility matrix, showing a pattern commonly associated with sites from the southern Idaho Snake River Plain.

KEYWORDS: High residential mobility; X-Ray florescence; Late Archaic; Middle Archaic; Kelly Mobility Index; Use-wear analysis; Idaho archaeological excavations; High Prairie, Idaho

Introduction

During the 2016 academic year, Boise State University (BSU) reorganized and reanalyzed the excavations conducted in High Prairie, Idaho during four archaeological seasons from 1989-1999. Located in the northern-northeastern section of the High Prairie quadrangle, approximately 11 km southeast of Anderson Ranch Reservoir and 16 km northwest of Hill City, Idaho the resulting excavations investigated seven archaeological sites (see Figure 1). They sit on several upward thrusting sagebrush hills that move northward from the southern

flatlands of the High Prairie grassland floor. All seven sites are located on land owned and maintained by the Boise National Forest.

Guiding the post-excavation study is a research design that sought to answer questions about prehistoric human mobility. Previously recorded archaeological sites from southern Idaho such as 10-EL-215 (Plew and Willson 2013), Swenson sites (Willson et al. 2007), King Hill Creek (Willson et al. 2007), 10-EL-216 (Plew 2010), and 10-CN-6 (Plew 2006) and 10-EL-438 contained cultural material consistent with a foraging strategy (Binford 1979). However, the Knox Site demonstrated a lower residency mobility that is consistent with Binford's collector continuum (Binford 1979). This study utilizes Kelly's tool assemblage as a means to measure whether or not the residency patterns were high mobility or low mobility (Kelly 2001).

In our study, we compare the High Prairie's residency pattern with other Late Archaic sites from the Snake River Plain. Prior studies on the High Prairie are surprisingly silent on residency. Richard Brisland's *Camas Processing or Upland Hunting* investigated evidence of camas processing from High Prairie (of which he found none), but it did not analyze nor investigate mobility, even at a shallow level (Brisland 1994). Nelson and Plew published findings from Moore's Spring (this inventory is considered here) but found very little evidence of long-term residency in the area (Nelson and Plew 1990). Previously, Brisland, Nelson and Plew both found the sites to be Middle to Late Archaic with only a forager site configuration but came to those conclusions without considering Kelly's study of residency patterns (Brisland 1994; Kelly 2001; Nelson and Plew 1990). Considering the lack of publications or analyses of High Prairie, short of Brisland's and Nelson's analyses, more research is needed for further analysis of residency patterns in the region. Therefore, as a secondary research design, this study compares the research conducted by Brisland and Nelson and Plew from the analysis results found from the post-excavation study conducted here.

Our study demonstrates a site area that has a turbulent stratigraphic context with mixed weapon technology ranging from the Middle to Late Archaic Period. Functionally, the site area demonstrates a retooling and possible tool construction context. Sediment analysis revealed one stratum but disturbed from tectonic movements due to its proximity to fault lines. Use-wear analysis revealed little use of artifacts or worked flakes before retooling in the area. Finally, the application of the High Prairie tool assemblage to Kelly's residence mobility correlated evidence for a high mobility residence in the area.



Figure 1. Geographical context of the High Prairie.

For this analysis of the High Prairie, the first section regards the theoretical framework of the study. Previous archaeological research is addressed next, followed by the archaeological assemblage with unit descriptions. Then, the environmental context for understanding and interpreting the climate, geology, sediment, faunal and floral context, and ethnography of the area. Afterward, the study addresses the archaeological methods in previous and current research for answering the research design. Then, this report analyzes each unit and cultural material item before analyzing lithic debris material and flake size, the functionality of the site, use-wear, and x-ray fluorescence of select samples of the obsidian artifacts. Finally, the report makes conclusions regarding the site formation, the temporality of the site, and the technological context of the site before finally tying it all together to analyze the collection's fit within Kelly's residency matrix.

Theoretical Framework

Technological framework as it relates to tool processing assemblages and their measure of mobility or living patterns, finds origins with Binford, Kelly, and even Andrefsky's work with lithic reduction assemblages (Andrefsky 1991; Binford 1977, 1979; Kelly 2001). "Assemblages" here refer to remains of lithic tool manufacturing and maintenance resulting from either the long-term residential mobility or short-term residential mobility. Using Binford's collector-forager continuum and Wagner's gatherer-collector dichotomy, foragers are using local resources and specific locations from a tethered location to latch on to those locations for resources on daily passes, thereby creating a highly mobile residency for those groups. In opposite form, groups with specialized tasking qualities demonstrate a more settled residency strategy (Andrefsky 1991; Binford 1980; Wagner 1960). It is important to note that within both groups, the traits of either group mobility can be present within one group (Chatters 1987).

In highly mobile residency patterns, groups with specific tasks accrue resources from outside the daily foraging pattern and then transport those resources to the more settled residential groups making them the collectors while the foragers are the groups that typically move the groups to the resource (Binford 1980).

One of the challenges facing the archeological discipline regarding the residency continuum is what the material evidence will look like when those specific residency patterns are used. Further, it must be framed as the proper question as to what exactly archaeology and archaeological science can and cannot study. Binford's work helps shed some light on this situation whereby organizational strategies are measured using curated and expedient technologies in certain residency contexts (1979). As mentioned by Binford, the curated tools or assemblages are manufactured and maintained for the purpose of extracting specific resources, thereby used in the collector context. Expedient assemblages are produced largely in the forager context with opportunistic material (Binford 1979).

Binford's study is directly connected to Kelly's work with lithic tool remains left behind as it directly links to patterns of behavior tied to residency. Noted is Kelly's matrix as it references residential mobility and lithic material and forms (Kelly 2001). From this matrix (see below), we can measure with some degree of accuracy the lithic remains left behind when certain residency patterns are used. Kelly's study focused on fourteen site characteristics to determine if the site demonstrates low or high mobility residency patterns. The first is the use of raw material as a reflection of movement patterns. What Kelly found is that for the Carson Desert, local, high occurrence rate material like CCS would demonstrate a high-mobility residential pattern (Kelly 2001). Meanwhile, a more remote source such as basalts and siltstones would apply to a low-mobility residential pattern (Kelly 2001). This

lithic material matrix alternates for the Great Basin area, where the volcanic glass sources are more common, and the siltstones, rhyolites, and tuffs are less common than the Carson Desert sites analyzed by Kelly.

Kelly's second analysis of the residency matrix is the use of bifaces as cores. According to Kelly, a study by Raven and Elston showed that bifaces were commonly used as either a tool or a flaking source whenever needed (Raven and Elston 1988). The practicality of a biface is its ability to act as an expedient tool or as a core whenever cores are not abundant. Moreover, their lower weight allows easy carrying capacity for when a flaking source is needed. Concurrently, if bifaces are discovered as stored lithic tools then they can show long-term processing investment. As a result, a low mobility residency pattern is assumed since the material is being stored or kept nearby (Kelly 2001).

Next, Kelly analyzed the use of bipolar knapping versus scavenging. Kelly suggested that bipolar knapping, given the high investment in process and material, would be consistent with a low mobility residency pattern. Knapping requires an extra set of lithic material to act as an anvil for the knapped material to be held against for striking. Whereas high mobility residency patterns would be consistent with a more lap-knapping technique, which typically is evident from a lack of angular knapping on recovered cores (Kelly 2001). The presence of flake tools (non-biface reduction) is also suggestive of a high mobility residency pattern since most flake tools such as scrapers, worked, or modified flakes are expedient tools that are not intended for a long tool life (Kelly 2001).

The fifth element for Kelly's matrix is the presence of fire-cracked rock (FCR) within a site. Plew and Willson's quantification of the priorities set for the presence of FCR established a measuring guideline considering the high rate of FCR in almost all sites along the Snake River Plain (Plew and Willson 2013). Therefore, using this measuring standard, a site is considered to have a rare element of FCR if the site's assemblage consists of less than 20% of the total non-artifactual assemblage (Plew and Willson 2013).

Next, Kelly analyzes the site size/density. Site size and density is measured by the size of the artifact and non-artifact assemblage, then measuring density by total assemblage by cubic meters. Standardized by Plew and Willson's 2012 study of 10-EL-215, artifact assemblages range from 200 (small)-500+ (large). Non-artifactual assemblages range from 5,000 (small)-20,000+ (large) (Plew and Willson 2013). Kelly's matrix calls high site size/density numbers to reflect a low mobility residency strategy while low site size/density numbers reflect a high mobility residency strategy.

The seventh element of the matrix is the use of tool/debitage ratio which is calculated by the standardized tools per meters³ and dividing it by the lithic debitage per meters³. The ratio is considered high when it exceeds .05, from which Kelly assumes a high number to reflect high mobility. The next elements include complete flakes, proximal flakes, and distal flakes. Complete flakes are indicative of a long-time investment in knapping whereas proximal and distal flakes are indicative of an expedient flaking process (Kelly 2001).

Finally, the assemblage size is factored in a site regarding its assemblage rate divided by meters³. Although assembly could be considered high for a long period when in fact the residency was repeated over time. Therefore, careful consideration must be used when using the last element in the matrix (Kelly 2001).

After publication, Kelly's matrix was put under testing for application in the Great Basin with additional variables (Roberts 2015). Added categories included ceramics and fire hearths combined with features such as groundstone. The added categories were a test to determine if the categories needed to be adjusted for non-lithic site material. What the test determined was that the original matrix still accurately determined if a site is low or high mobility residency even without non-lithic cultural material. Roberts's added variables are addressed below.

This study takes into account three additional site variables including sediment analysis, use-wear analysis, and XRF analysis results. Accordingly, it is presumed that if a long-term residency pattern is present in site locations, then a sediment analysis would reveal some staining or changes in soil coloration from FCR or activity areas (Binford 1979). Use-wear analysis of artifacts assemblage is also measured for relatedness of the artifacts as they connect with mobility. It follows that a long-term residence pattern will show a consistent and higher percentage of use-wear patterning on artifacts. Finally, XRF analysis can speak to the uniformity of the lithic material recovered from the High Prairie. Here, it is presumed that a more commonly collected source (not necessarily closer) of material would correlate with a lower residence pattern.

Previous Archaeological Research

The application of Southern Idaho's archaeological sites with Kelly's residence pattern matrix started after Kelly's publication in 2001. The focus of Kelly's index of residential mobility previously surrounded Late Archaic sites along the Snake River Plain. In this context, Late Archaic sites are characterized by bow and arrow technology and presence of ceramics.

Regionally, with two noted exceptions, studies conducted within the High Prairie have gone unpublished. This may be in part due to the nature of land ownership in the area. The National Forest owns a large part of the area, limited ability for publishable results aside, the contemporary ability for excavations on public land is limited due to tight restrictions for archaeological excavation from federal rules and regulations. In fact, a large part of the archaeological studies moved to private landowners due to fewer restrictions. Therefore, the limited excavation studies conducted in the High Prairie area have gone largely unpublished.

The first published exception is the Simon site; a Clovis Point cache found 6 km northwest of Fairfield, Idaho. The site is a cachment traditionally seen as a distinct Pleistocene-period set of points has been more recently seen as being more typologically tied to the East Wenatchee and Fenn sub-regions (Buchanan 2014). Second is the Danskin Rockshelter, situated along the South Fork 28 km northwest of the High Prairie, which documented a mixed technological assembly that included everything from Early to Late Archaic points such as Northern Side-Notched, Desert Side-Notched, Humboldt, and even Bliss points. A large degree of ground disturbance and complete reversal of stratigraphy was noted, making stratigraphic context irrelevant (Hale and Plew 1989).

However, High Prairie went largely unstudied except with occasional papers on ethnography or geological studies (Link and Hackett 1988; Murphy and Murphy 1986; Steward 1970). Even regional studies such as ethnography simply talked about the High Prairie region as a simple footnote or side-remark (Brisland 1994).

The early 1980s saw some surveying work done on High Prairie resulting from land exchanges between private parties and the Boise National Forest. The surveys documented lithic debris and several artifacts present in the region but no truly extensive or systematic study was conducted (Pleasant et al. 2013). The surveys typically consisted of one to three persons walking within the area of study semi-randomly looking for artifacts or bigger lithics for collection. Those items were noted and bagged to be placed in storage with other collections.

In 1989 excavations conducted by Boise State University revealed limited archaeological evidence of the prehistoric presence in High Prairie. The excavations revealed Bliss and Desert Side-Notched Points along with a small scatter of pottery and historical evidence showing a Late Archaic to the early Proto-Historic presence in the Moore's Creek area. However, no consideration was made regarding the residency patterns or mobility. The assemblage

recovered is included in our study's inventory and results (Nelson and Plew 1990).

In 1990 Richard Brisland, a graduate student from the University of Calgary investigated the High Prairie area for prehistoric evidence of Camas processing in and around the Southwestern Idaho area adjacent to the Little Camas Prairie twenty miles southeast of Anderson Ranch Reservoir. During the summer field season, Brisland conducted seven archeological surveys and excavations of the area. His crew consisted of Boise National Forest personnel as well as area volunteers. The crew recovered some 32,000 pieces of lithic material, sorted and counted the material, then finally released the material with Brisland for further processing in the Calgary labs. After some rather unfocused analysis of use-wear on the artifacts, Brisland determined that the artifacts that were tested contained no evidence of camas processing (Brisland 1994). Brisland found the High Prairie reflecting a Middle to Late Archaic time frame with probable high mobility patterns (Brisland 1994). However, Brisland's lack of standardized analysis made the results inconclusive. Moreover, the inventory and artifacts recovered during Brisland's 1990 study have gone unpublished. Therefore, this excavation and their resulting inventory are the focus of this study.

In 1998 and again in 1999, a field crew consisting of mostly volunteers and headed by Mark Münch excavated several 1x1 and 1x2 units for evidence of prehistoric and historic occupation of the area surrounding Moore's Spring's natural warm springs. The area had been previously altered to make improvements of the springs for cattle draws. The resulting spring excavation piles were excavated for archaeological evidence. The crew found considerable evidence of both prehistoric and historic occupations of the area going back to the middle-late archaic period. No write-up was ever considered, nor was a formal analysis of the results ever made regarding mobility or temporality. Therefore, our study includes these inventories in the inventory and results here.

Since the excavations of the 1980s and 1990s, there have been no major studies done of the High Prairie area. In fact, with the arrival of the previously mentioned regulations with excavating on public lands, the archaeological studies of High Prairie have largely been downgraded to the previously established simple 1-3 person unsystematic triennial survey.

Ethnographic Research

Historically, ethnographic research notes the traditional inhabitants of southern Idaho being Northern Shoshone and Northern Paiute, of which are separated by language (Murphy 1960; Murphy and Murphy 1986). Geographically, the Northern Shoshone occupied what is today southcentral Idaho, and the Northern Paiute occupied what is southeastern Oregon and northwestern Nevada (Berreman 1969; Ebihara 1955; Liljeblad 1957; Lowie 1924; Meatte 1990:17; Steward 1941, 1970). Both the Shoshone and Paiute were divided into subgroups. The Northern Shoshone divided into the Boise, Bruneau, and Weiser subgroups (Murphy 1960; Murphy and Murphy 1986; Steward 1970). The Paiute pertinent to this study were further subdivided into the Payette and Weiser subgroups (Liljeblad 1957; Meatte 1990).

Socially, the tribes of the Northern Paiute and Northern Shoshone are similar in economic lifeways and socio-political organization (Murphy 1960; Murphy and Murphy 1986). The early research noted striking similarities between the Northern Shoshone and Western Shoshone based on large overarching cultural similarities such as economic, political, even social behaviors (Meatte 1990; Murphy 1960; Steward 1970). Noted cultural traits observed historically included a lesser interest in the use of horses, as they did not participate in bison hunting activities, and warfare was limited (Murphy 1960). The socio-political organization was limited to "coordinators" of limited tasks rather than chiefs or seasonal headmen (Steward 1970). In fact, most social cohesion was centered around families or family clusters

temporarily camping in proximity to each other. However, those temporary living conditions were not the observed standard; these family-centered households were semi-independent economically and fully independent socially and politically for most of the year (Steward 1970).

Seasonally, observed living patterns included what is typically called a transhumant settlement pattern (Binford 1982). This pattern of group movement centered around resources based on seasonal conditions. Although movements always returned to their winter camps, groups would routinely move to areas such as the Camas Prairie, adjacent to this study area's focus, to collect camas root and other roots to dry and store for later consumption as well as take small mammals or game when the energy return was sufficient (Steward 1970). Many tribes were observed moving through Camas Prairie; it was noted to be a place where historically, groups would meet for various social interactions (Murphy 1960; Murphy and Murphy 1986; Steward 1970; Stratham 1982).

Traditionally in the ethnographic record, fishing and shell food strategies have also been considered as important food strategies for Aboriginal peoples in southern Idaho (Meatee 1990; Steward 1970). However, recent publications have criticized this commonly held understanding of human subsistence, showing that not only were fishing/shelling strategies probably not done as commonly as previously thought but that the caloric and macronutritional return of those strategies make them a food strategy of value in this region (Plew and Gould 1991).

Archaeological Assemblage

Unit Descriptions

10-EL-658

This site, more commonly called Moore's Spring, is one of the more intensely studied sites in the High Prairie. It resides on the lower slopes of the extreme northern side of the High Prairie Quadrant. No previous excavations exist before the 1989 excavation conducted by Boise State University. Only limited survey work exists that revealed small amounts of cultural material on the surface.

1989 Excavation (see Figure 2)

Unit 1:901-S 0-2W

This unit was excavated to a depth of 50 cm below pit datum (bpd). Lithic flakes are common through the first three layers, then trails off during the 30-40 cm depth. Concentrations cluster greatly to the surface, 0-10 cm (n=38). The

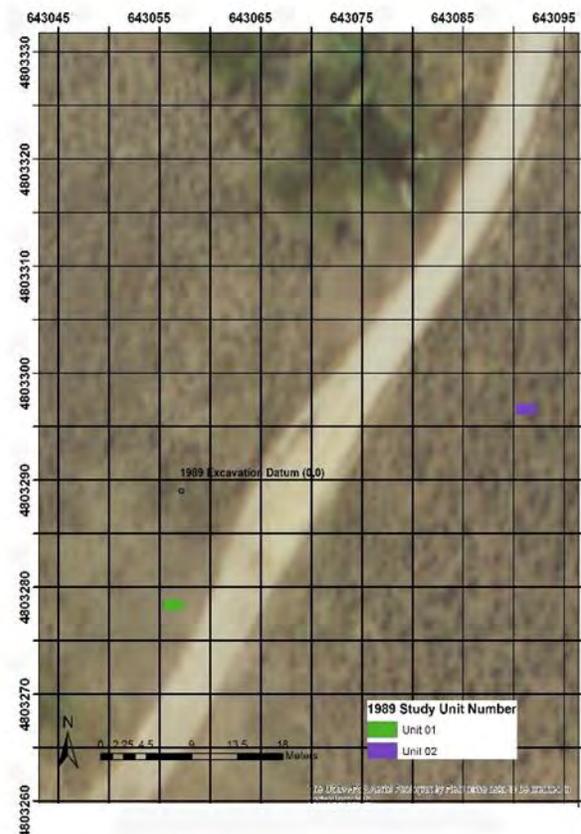


Figure 2. 10-EL-658, 1989 excavation.

sediment was largely untouched from any faunalurbation, aside from the human influence throughout the entire site. All sediment from this site was a uniform black/gray until 40 cm, then the crew encountered a red-brown colored clay (Nelson and Plew 1990). All materials recovered within the first section of Unit 1 included ceramics (#28), one biface fragment (#114), one battered cobble (#93), one scraper (#46), one modified flake (#12), one Rose Spring Point (#68), a core (#64), and one Bliss Point (#38). The points in particular point towards a Late Archaic cultural period.

Unit 2: 7-8N 30-32E

This unit was excavated to a depth of 40 cm bpd until cobbles were encountered. Lithic flakes are common through the first three strata (0-30 cm) and the material recovered is greater in number both throughout the unit and in each stratum than the first unit. The site's sediments were a uniform brown silt-sand to 40 cm bpd. Recovered from this unit included two modified flakes (#45 and 65), a biface fragment (#115), an exhausted core (#11), and a lanceolate point (#55). The lanceolate point form may suggest an earlier time frame in the site's chronology; however, as it was pointed out by Nelson, these forms are known to survive even into the Late Archaic Period (1990).

1990 Excavation (see Figure 3)

Surface Units

Six 10m² units were surveyed in the Moore's Spring area. No lithic debris was recovered from the surface surveys, and only one Bliss obsidian point (#78) was recovered from the surface surveys.

Augers

The 1990 study conducted six auger tests, each about the greatest cluster of artifacts found on the surface units in the north-central and eastern portion of the surface unit. The auger tests recovered 79 lithic flakes, 73% of them obsidian (n=58) and 87% 1 cm or less in length. Total artifacts recovered from the auger tests included one projectile point tip (#29), found within the first level. The greater amounts of lithics recovered clustered around augers 2,3, and 6 (n=25, 22, and 12 respectively) while in depth, the largest cluster of flakes congregated around levels 3-4 (n=12 and 11 respectively) with outlier peaks in amounts found in levels 1 and 7.

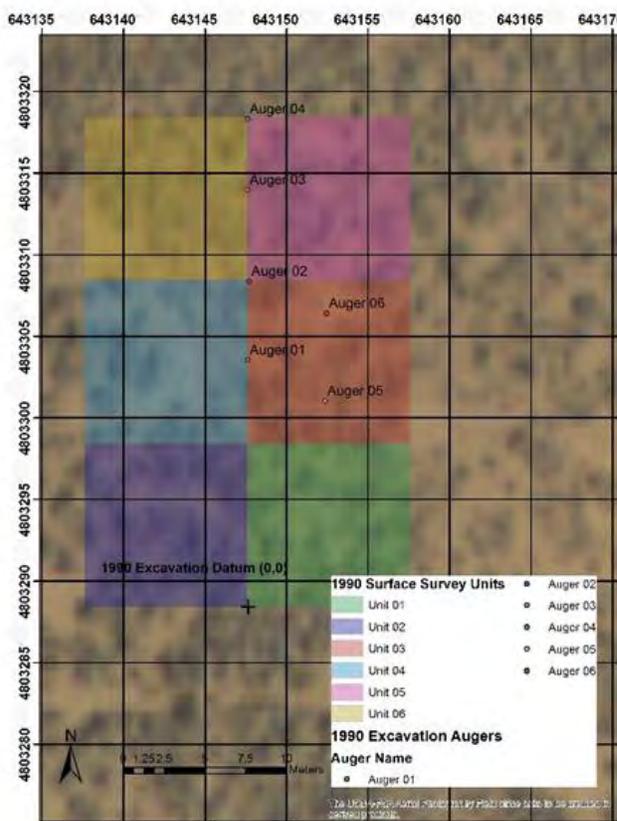


Figure 3. 10-EL-658, 1990 excavation.

1998/1999 Excavations (see Figure 4)**Unit 1: 44-46N 0-1E**

This unit was excavated to 50 cm with sediments being uniform between levels. Roots and rodent burrows were noted throughout the site until the lower floor of the unit when the excavation uncovered a hard compact calcium carbonate level. The lithic debris included 318 obsidian, 176 basalt, and 39 CCS flakes with the majority (n=377) being ≤ 1 cm in length. From the first level (0-20 cm), Unit 1 recovered one worked flake (#279), a core (#253), two ceramic fragments (#171 and 309), one base (#125), and one tip (#365). Level 20-30 cm recovered one scraper (#278), a ceramic fragment (#310), a core (#254), and a tip (#336). Level 30-40 cm recovered one biface (#245), three ceramic fragments (#321, 322, and 331), one cobble (#249), and a worked flake (#360). One leather fragment was recovered from level 40-50 cm.

Unit 2: 3-4N 0-2E

This unit was excavated to 70 cm bpd. Organic staining was noted between level 20-30 cm with no noted stratigraphy existing within the unit matrix. Unit 2 stopped at a calcium carbonate level starting 40 cm bpd (see soil analysis). Lithic debris recovered from Unit 2 included 135 basalt, 489 obsidian, and 30 CCS flakes with the majority of the flakes being less than 1 cm in length (n=512). Artifacts included one tip (#366) from 20-30 cm, two scrapers (#371 and 379) from 40-50 cm and 50-60 cm bpd, and one cobble (#250) from 40-50 cm bpd. Historic artifacts were recovered including glass and can fragments (n=14) from 0-30 cm bpd.

Unit 3: 0-2N 50-51E

This unit was excavated to 90 cm bpd before uncovering calcium carbonate. Flakes of charcoal were found throughout levels 0-40 cm; soil was described as being clay-based and uniform throughout the unit with organic staining 70-80 cm bpd in the northern corner of the unit. The lithic debris included 93 basalt, 528 obsidian, and 51 CCS flakes, the majority of which were ≤ 1 cm in length (n=504). Artifacts recovered from Unit 3 included two tips (#265 and 266) from 0-30 cm and 30-40 cm bpd, two worked flakes (#287 and 202) from 30-40 cm and 40-60 cm bpd, one base (#170) from 40-60 cm bpd, one biface (#246) from 40-60 cm bpd, and one fragmented Desert Side-Notched (#311) from 40-60 cm bpd.

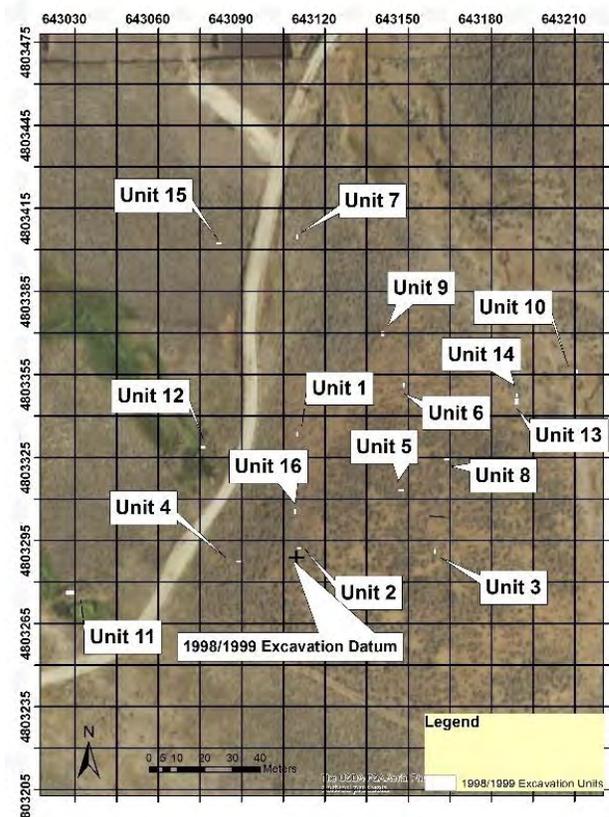


Figure 4. 10-EL-658, 1998/1999 excavations.

Unit 4: 0-1S 20-22W

This unit was excavated to 60 cm bpd before stopping with calcium carbonate. Gravel was noted from 30 cm bpd down to the final level at 50-60 cm bpd. Noted large cobbles in the southern portion of the unit between 40 cm to 60 cm bpd, no profile was created. Sediment was uniform throughout as a moist clay-based stratum from 0-60 cm bpd. The total lithic debris included 334 basalt, 1336 obsidian, and 121 CCS flakes with the majority of the flakes sized ≤ 1 cm in length (n=1434). Artifacts recovered include one midsection (#258) from 0-20 cm, three tips (#267, 377, and 268) from 0-20 cm and 30-40 cm bpd, three ceramic fragments (#332, 333, and 247) from 20-30 cm, 30-40 cm, and 50-60 cm bpd respectively, one cobble (#251) from 30-40 cm bpd, two fragmented lanceolate bases (#340 and 181) from 30-40 cm and 40-50 cm bpd, one fragmented Elko point (#261) from 30-40 cm bpd, one fragmented Western-Stemmed point (#235) from 50-60 cm bpd, and one fragmented Corner-Notched point (#264) from 40-50 cm bpd. Finally, various historic artifacts were recovered including can and modern ceramic fragments (n=10) from 0-40 cm bpd.

Unit 5: 23-24N 37-39E

This unit was excavated to 70 cm bpd when cultural material trailed to none and large cobbles made excavation impossible. Root intrusions present throughout most of the unit until 40 cm bpd, with gravel appearing around 45 cm bpd which turned to larger cobbles from 50-70 cm bpd. Sediment was noted as being quite uniform throughout the unit. Lithic debris recovered included 18 basalt, 193 obsidian, and 18 CCS flakes, the majority of which are ≤ 1 cm in length (n=178). No artifacts were recovered.

Unit 6: 61-63N 39-40E

This unit was excavated to 39 cm bpd before stopping at calcium carbonate. Sediment was uniform throughout the site, with a strong rock (noted as bedrock but analyzed as a dissolving basalt or calcium carbonate) level starting at 5 cm until 40 cm bpd. The lithic debris included 15 basalt, 50 obsidian, and 3 CCS flakes mostly ≤ 1 cm in length (n=54). Artifacts recovered included one obsidian base (#212) from the surface.

Unit 7: 116-118N 0-1W

The unit was excavated to 30 cm bpd before stopping due to the absence of any cultural material in the unit. Sediment uniform throughout and sagebrush root intrusion was noted through until 30 cm bpd. Lithic debris recovered included 0 basalts, 1 obsidian, and 1 CCS flake. No artifacts were recovered.

Unit 8: 34-35N 54-56E

This unit was excavated to 80 cm bpd before stopping due to calcium carbonate which started at 40-50 cm. Root, insect, and rodent intrusion was noted between 0-50 cm bpd. Sediment was uniform throughout the unit, creating only one stratum. Gravel was noted from 30-40 cm until bedrock was uncovered. Lithic debris recovered included 25 basalt, 260 obsidian, and 17 CCS flakes mostly ≤ 1 cm in length (n=259). Various historic artifacts were recovered in this unit between levels 0-40 cm bpd as well as 15 identifiable green fauna (rodent skull) from 0-30 cm bpd.

Unit 9: 80-82N 31-32E

This unit was excavated to 80 cm bpd before stopping due to calcium carbonate and absence of cultural material. Sediment is uniform throughout the unit, but described as “sandy,” a distinct difference in texture compared to the other sites that describe a clay-based sediment. Root intrusion and rodent burrows are common throughout the unit. Gravel is present starting at the 20-30 cm level, which turns to larger cobbles in the 60-70 cm level. Lithic debris includes 45 basalt, 215 obsidian, and 25 CCS flakes mostly ≤ 1 cm in length (n=221). Two artifacts were recovered including one fragmented Corner-Notch point (#273) from 70-80 cm bpd and one Bliss point (#191) from 70-80 cm bpd. Also recovered were ten identifiable green faunal remains (#231 and 228) and one unidentifiable green fauna remain (#233) from 50-60 cm, 30-40 cm, and 60-70 cm bpd respectively.

Unit 10: 64-66N 102-103E

This unit was excavated to 80 cm bpd due to large cobbles. Munsell tests revealed a 10 YR 3/2 range throughout. Root and insect intrusions are noted until 40 cm bpd with organic staining noted through to the same level. Gravel was noted in the 50-60 cm level along with flakes of charcoal existent throughout the same level. Lithic debris includes ten basalt, eight obsidian, and eight CCS flakes mostly 2 cm in length (n=12). One Northern Tri-Notch (#280) was recovered from 70-80 cm bpd.

Unit 11: 12-13S 79-81W

This unit was excavated to 70 cm before stopping from the absence of cultural material. Before excavation, the unit was noted to be in a position where high amounts of stratigraphic alterations would be occurring since the site was chosen in the backfill of a modern-built spring from cleaning out the spring every year. The choice was made to analyze the types of material that were being pulled out of the spring every year. Lithic debris recovered includes 202 basalt, 158 obsidian, and 24 CCS flakes with the majority of the flakes either ≤ 1 cm or 2 cm in length (n=120 and 122 respectively). Artifacts recovered from this unit includes one base (#339), one midsection (#343), one cobble (#159), seven worked flakes (#299, 300, 301, 312, 313, 314, and 315), and two bifaces (#277 and 185), all within the upper levels of the site’s modern sediment resettling events (Surface/0-70cm bpd).

Unit 12: 41-42N 33-35W

This unit was excavated to one-meter bpd and stopped due to standing spring water. Before excavation, the unit was noted to be in a position where high amounts of stratigraphic alterations would be occurring since the site was chosen in the backfill of a modern-built spring from cleaning out the spring every year. The choice was made to analyze the types of material that were being pulled out of the spring every year. The unit was not analyzed by level until 70 cm bpd. The remaining three were analyzed in 10 cm increments for pre-fill cultural material. Sediment was stratified by a mixed fill dark gray color until 70 cm bpd, which turned to a drier clay until 90 cm bpd, then turned to a damp clay. Large cobbles started at 90 cm bpd and standing spring water at 100 cm bpd. The lithic debris included 43 basalt, 267 obsidian, and 52 CCS flakes mostly less than 1 cm in diameter (n=191). Artifacts recovered include six bifaces (#193, 294, 271, 378, 123, and 133) two from 0-70 cm and four from 70-80 cm bpd. Also recovered were two ceramic fragments (#134 and 157) from 0-70 cm bpd, two midsections (#356 and 357) from 0-70 and 70-80 cm bpd respectively, one tip

(#142) from 0-70 cm bpd, two worked flakes (#327 and 328) from 0-70 cm bpd, one core (#342) from 70-80 cm bpd, and two scrapers (#283 and 284) from 70-80 cm bpd. Points recovered from the unit include two Corner-Notched points (#367 and 196) from 70-80 cm and 80-90 cm bpd, one side-notched point (#326) from 70-80 cm bpd, one Humboldt point (#368) from 70-80 cm bpd, one Elko point (#160) from 70-80 cm bpd and one Desert Side-Notched Point (#135) from 70-80 cm bpd. High levels of collection from the spring sites are a result of cleaning out the spring due to yearly buildup; artifacts are noted as being outside the stratigraphy context.

Unit 13: 54-56N 80-81E

This unit was excavated to 40 cm bpd before stopping because of the hard compact carbonate level was uncovered. Munsell test revealed a 10YR 4/3 soil test from levels 0-30 cm until 30-40 cm revealed a brighter yellow-tinted 10YR 3/4 layer being revealed from the disintegration of the carbonate level below. Lithic debris recovered includes three basalts, nine obsidian, and one CCS flake, with the majority ≤ 1 cm in length (n=10). No artifacts were recovered.

Unit 14: 56-58N 80-81E

This unit was excavated to 30 cm bpd before stopping at cobbles in the unit floor. Root and insect intrusion is noted throughout the site with a slight color shift from 0-20 cm to 20-30 cm levels to a darker brown (Munsell test 10YR 4/3 compared to 10YR 3/3). Gravel is noted from level 20-30 cm bpd. Lithic debris recovered includes two basalts, nine obsidian, one CCS flake with the majority ≤ 1 cm in length (n=7). No artifacts were recovered.

Unit 15: 115-116N 27-29W

This unit was excavated to 40 cm bpd before stopping due to a lack of cultural material. Sediment is uniform throughout the site, Munsell test revealing a 10 YR 4/1 color through every level of the unit. Noted root intrusion through level 0-20 cm bpd. Lithic debris recovered includes no basalt, nine obsidian, and two CCS flakes, of which a majority are ≤ 1 cm in length (n=10). No artifacts were recovered.

Unit 16: 17-19N 0-1W

This unit was excavated to 80 cm bpd before stopping at a calcium carbonate level starting at 50 cm bpd. Large cobble is noted from 40-80 cm. Munsell tests are mostly uniform throughout the unit, moving between 10YR 5/3 to 3/3 at various levels, but never revealing anything more than hydration of the soil. Root and insect intrusion is noted from 0-40 cm bpd as well as historical objects present below prehistoric levels, revealing a disturbed stratigraphy. Lithic debris includes 459 basalt, 968 obsidian, and 86 CCS flakes which are mostly ≤ 1 cm in length (n=1008). Artifacts recovered included one scraper (#286) from 20-30 cm bpd, one base (#199) from 30-40 cm bpd, two tips (#168 and 173) from 50-60 cm bpd, one cobble (#341) from 50-60 cm bpd, one worked flake (#369) from 50-60 cm bpd, one stemmed point (#282) from 30-40 cm bpd, one small Elko point (#182) from 40-50 cm bpd, two fragmented Elko points (#165 and 167) from 50-60 cm bpd, and one fragmented Eastgate point (#146) from 60-80 cm bpd.

10-EL-645

This site is one of five sites that sit on the hills toward the northern section of the High Prairie area. Overall, the 1990 surface survey and excavations recovered no ecofacts, 190 basalt, 352 obsidian, and 86 CCS flakes with Late Archaic weapon technology. Previous surveys recovered small amounts of surface cultural material with small clusters of lithic flakes.

1990 Excavation (see Figure 5)

Surface Units

The 1990 excavation surveyed 49 surface units, each ten m² in area. As the other southern-lying sites within High Prairie are situated, they are subject to the Sagebrush Steppe ecological context from the top of and the side of the upward thrusting hills that line the northern section of the High Prairie area. Brisland noted the highest concentration of lithic scatter seems to be confined to within the fence line that runs the length of the western part of the site, where the survey stopped at the point where the sagebrush meets the grasslands at the southern point of the site. Lithic debris recovered from the unit includes 154 basalt, 214 obsidian, and 72 CCS flakes with a large majority of them 2 cm in length (n=215). Artifacts recovered includes one Northern Side-Notched basalt base (#39), one CCS tip (#42), and one obsidian base (#46). Carbon was also recovered from unit 19 (20-30N 40-50E), probably due to a modern-era brushfire.

Augers

The augers from 1990 were excavated down to a maximum depth of roughly 180 cm bpd. The soil was uniformly a medium brown color mostly of a silt-texture matrix with a larger degree of gravel as the augers went deeper. The sediment changed from a medium brown to a lighter brown-yellow at level 5 (~75 cm-1 m bpd), probably from uncovering calcium carbonate that is uniform throughout the area. A total of 20 auger tests were conducted and each with varying levels of depth, depending on the level of which rock stopped the auger or cultural material recovery tailed off. Lithic debris recovered from the augers includes 36 basalt, 138 obsidian, and 14 CCS flakes with the large majority of flakes being ≤ 1 cm in length (n=176). Artifacts recovered include one Northern Side-Notched basalt base (#104) from auger 11 (30N 70E), level 3 (~45-60 cm bpd).

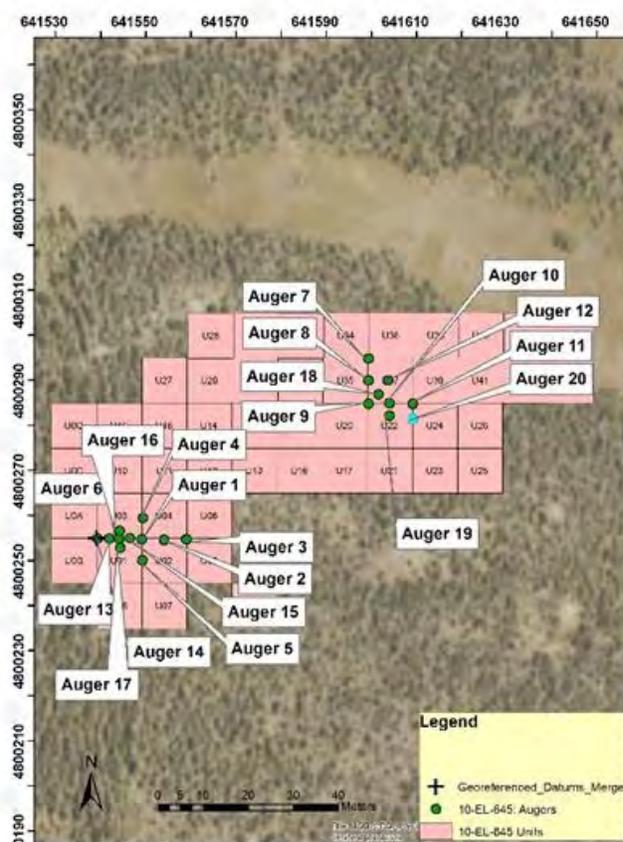


Figure 5. 10-EL-645 site map.

10-EL-647

One of two sites that was more extensively studied in this excavation—10-EL-647—recovered no ecofacts, no features, and featured a mix of Middle to Late Archaic weapon technology. Further, high rates of flake recovery in the site demonstrates expedient tool manufacturing/retooling. This site is also subject to the hills on the upper regions of the High Prairie and is subject to the same environmental conditions.

1990 Excavation (see Figure 6)

Surface Units

The 1990 excavation surveyed 97 surface units each ten m² in area. The site area sits atop a large north-south heading ridge that flattens out at the top. It was noted that the largest collection of artifacts and lithics are from the top of the ridge. Surface surveying recovered 863 basalt, 776 obsidian, and 247 CCS lithic flakes, the majority of which are 2 cm in length (n=849). Artifacts recovered from the surface units include six bases (#12, 17, 46, 51, 60, and 113), six bifaces (#38, 40, 66, 75, 135, and 72), fourteen cores (#21, 22, 32, 34, 47, 69, 70, 105, 109, 129, 144, 157, 158, and 159), two exhausted cores (#28 and 79), five midsections (#24, 48, 80, 89, and 141), three Desert Side-Notched points (#9, 147, and 23), one Eastgate point (#78), six Humboldt points (#10, 14, 99, 100, 106, and 153), three scrapers (#18, 26, and 52), two tips (#92 and 110), and thirteen worked flakes (#11, 42, 54, 55, 57, 67, 76, 93, 96, 111, 121, 130, and 138).

Augers

There were 74 auger tests conducted during the 1990 excavation on average down to five levels (~75cm-1m bpd). Here, as with the augers conducted in 10-EL-645, sediment was a silt matrix with the dark brown color lasting until level four or five showed a change to the yellow-brown color of the dissolving calcium carbonate common throughout all the sites in the area. The only exception to the recovery was a change in soil type from auger test 58, which changed to a more iron-rich red-brown sand in level four. Gravel was common through all of the auger tests. Lithic debris recovered from the auger tests included 196 basalt, 459 obsidian, and 48 CCS flakes with a large majority (n=638) being ≤ 1 cm in length.

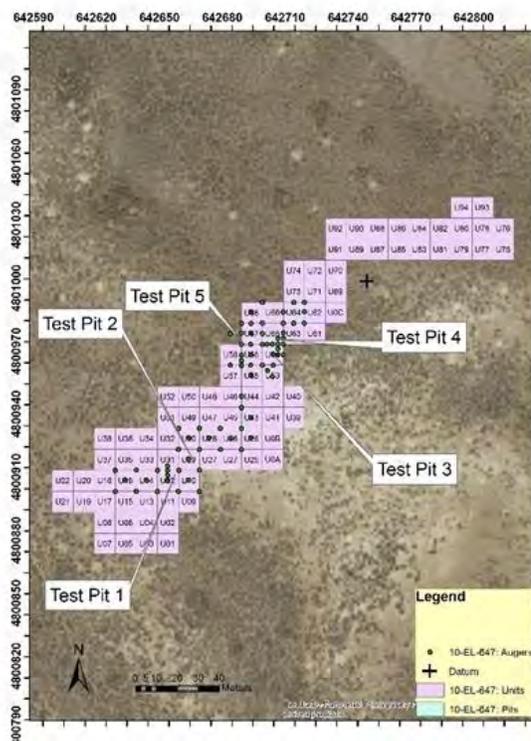


Figure 6. 10-EL-647 site map.

Test Pits

Test Pit 1: 90-92S 90-91W

This test pit was excavated to 70 cm bpd, stopping when the unit revealed a base layer of granite gravel particles that halted excavation from going any further. Root intrusion continued in the southwestern corner of the unit until 40 cm bpd. Insect intrusion is highly active to 60 cm bpd. Cobbles uncovered during the excavation were at 50-60 cm bpd level. Granite gravel particles were present from 40-70 cm bpd. Lithic debris recovered includes 437 basalt, 845 obsidian, and 259 CCS with a majority being ≤ 1 cm in length (n=1267). Artifacts recovered include two exhausted cores (#404 and 417) from 0-10 cm and 40-50 cm bpd respectively, one side-notched point (#408) from 10-20 cm bpd, one Desert Side-Notched point (#422) from 60-70 cm bpd, four red ochre (#407, 412, 415, and 423) from 10-20 cm, 20-30 cm, 30-40 cm, and 60-70 cm bpd respectively, one base (#410), two cores (#411 and 419), and two tips (#413 and 420) from 20-30 cm and 50-60 cm bpd respectively.

Test Pit 2: 84-85S 83-85W

This test pit was excavated down to 56 cm bpd, halting when reaching crumbling granite gravel. Color reflects a medium brown from 0-30 cm bpd, changing to a dark brown in 20-30 cm bpd. The soil was observed changing to a dark compact brown at 40 cm bpd and being mixed in with gravel particles from the crumbling granite gravel particles. Lithic debris recovered include 223 basalt, 529 obsidian, and 156 CCS flakes, the majority of which are ≤ 1 cm in length (n=727). Artifacts recovered include four cores (#426, 431, 433, and 434) from 0-10 cm, 10-20 cm, and two from 20-30 cm bpd respectively, one midsection (#427) from 0-10 cm bpd, one tip (#428) from 0-10 cm bpd, two worked flakes (#429 and 435) from 0-10 cm and 20-30 cm bpd, and one scraper (#438) from 40-50 cm bpd.

Test Pit 3: 34-36S 44-45W

This test pit was excavated to 50 cm bpd before stopping when the crew uncovered cobbles and the hard, compact granite gravel common throughout the site first observed in 30 cm bpd. The soil is medium brown colored from the top of the unit until reaching the 35 cm bpd level where it changed to a dark brown color. Lithic debris recovered include 235 basalt, 346 obsidian, and 81 CCS flakes that are a majority ≤ 1 cm in length (n=516). Artifacts recovered include three worked flakes (#443, 446, and 448) from 10-20 cm, 20-30 cm, and 30-40 cm bpd respectively, one midsection (#445) from 20-30 cm bpd, and one biface (#450) from 40-50 cm bpd.

Test Pit 4: 27-28S 41-43W

This test pit was excavated to 60 cm bpd, stopping when reaching cobbles. Root, insect, and rodent intersection was noted from 0-40 cm bpd. Rock and gravel are noted between 20 cm bpd until cobbles appear at 35 cm bpd. Sediment color is observed to be a dark silty brown from 0-10 cm until 25 cm bpd when the soil changed to a lighter brown. Lithic debris recovered include 218 basalt, 424 obsidian, and 72 CCS flakes, the majority of which are ≤ 1 cm in length (n=589). Artifacts recovered include one midsection (#454) from 0-10 cm bpd, one core (#456) from 10-20 cm bpd, and two Desert Side-Notched points (#457 and 459) from 10-20 cm and 20-30 cm bpd.

Test Pit 5: 29-31S 58-59W

This test pit was excavated to 60 cm bpd, stopping when reaching cobbles that stopped further excavation. Sediment was uniform throughout, a dark brown color. Root and rodent intrusion were common through levels 0-35 cm bpd. Gravel and rock (including the crumbling granite gravel particles) were uncovered on level 45 cm bpd. Lithic debris recovered include 222 basalt, 471 obsidian, and 76 CCS flakes that are a majority ≤ 1 cm in length (n=593). Artifacts recovered include one tip (#464) from 0-10 cm bpd, one exhausted core (#467) from 20-30 cm bpd, one Humboldt point (#468) from 20-30 cm bpd, one red ochre (#469) from 20-30 cm bpd, one base (#471) from 30-40 cm bpd, one drill (#472) from 30-40 cm bpd, and one midsection (#473) from 30-40 cm bpd.

10-EL-646

Subject to the hillside turbulence and change in environmental conditions of the High Prairie, site 10-EL-646 recovered little in the way of cultural material. No ecofacts were recovered. The lithic debris included 263 basalt, 156 obsidian, and 103 CCS flakes from the entire site with a consistent Late Technology Weapon technology. The extensive lithic debris with a relatively small amount of lithic artifacts is consistent with Kelly’s definition of a high mobility residence pattern (Kelly 2001).

1990 Excavation (see Figure 7)

Surface Units

The 1990 excavation surveyed 47 surface units ten m² in area. The surface and the site, in general, sits upon a high ridge that is 10-20 m higher than the prairie floor. The lithic debris and artifacts were recovered at the greatest rate along the flattest part of the ridge top. Lithic debris recovered include 231 basalt, 98 obsidian, and 89 CCS flakes that are mostly 2 cm in length (n=200). The artifacts recovered from the surface units include two side-notched points (#50 and 14) from units 2 and 12 respectively, two Desert Side-Notched points (#10 and 24) from units 9 and 18 respectively, three bases (#49, 19, and 23) from units 2, 16, and 18 respectively, one midsection (#20) from unit 16, and one drill (#51) from unit 30.

Augers

In total, there were twenty-three auger tests conducted on the site, with a

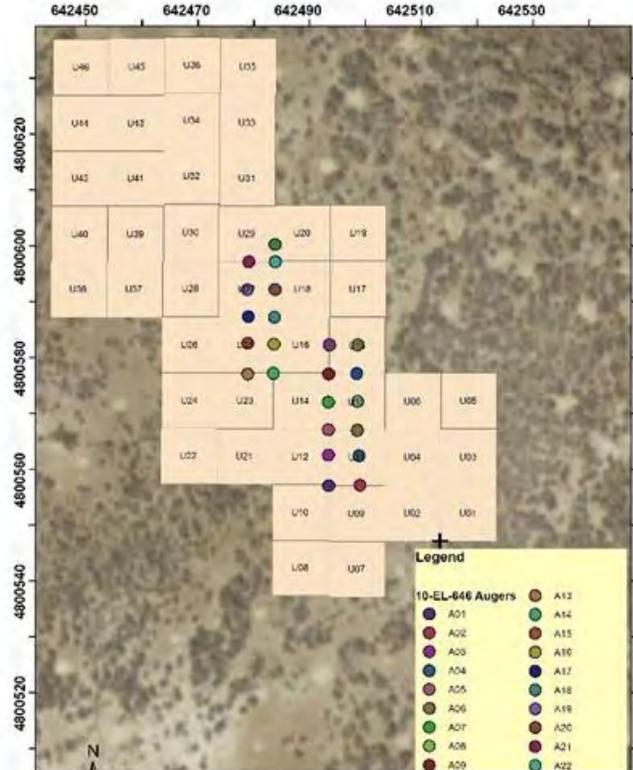


Figure 7. 10-EL-646 site map.

maximum depth of ~220 cm bpd. Color across all augers was uniform between them, but then when digging, the sediment turned from a dark brown with gravel noted to a lighter brown at levels nine or ten (~135 cm-200 cm bpd). Lithic debris recovered from the site includes 32 basalt, 58 obsidian, and 14 CCS flakes mostly ≤ 1 cm in length ($n=100$). One tip was recovered (#115) from auger 22, level 10 (~150-200 cm bpd)

10-EL-650

The largest and most in-depth analysis conducted by Brisland, site 10-EL-650 showed a rich tool assemblage with Late Archaic weapon technology with general utility tools and fabricating tools. Ecofacts included one unidentifiable green bone. The lithic debris included 5252 basalt lithic flakes, 14,792 obsidian flakes, and 2858 CCS flakes. The high count of lithic debris about the artifacts collected is consistent, again, with the high mobility residency pattern in Kelly's Mobility matrix. Previous research revealed little for artifacts but did note some clustering of artifacts on the surface (Pleasant et al. 2013).

1990 Excavation (see Figure 8)

Surface Units

The 1990 excavation surveyed 104 surface units each ten m² in area. The site sits on top of a north-south ridge within the boundaries of a gated corral area in the western-most region of the study area. The area is characterized as being thoroughly covered in lithics and lithic artifacts even on the surface. The surface has physical evidence of deflation, erosion, and highly active with insect intrusions (see faunal context), therefore making surface recovery easily identifiable. The total lithic debris recovered from the surface units include 1541 basalt, 2228 obsidian, and 520 CCS flakes that are mostly 2 cm in length ($n=2080$). Artifacts recovered from the surface units include ten bases (#19, 27, 178, 47, 50, 97, 113, 148, 151, and 157), three bifaces (#144, 187, and 138), six cores (#14, 17, 28, 67, 109, and 172), two drills (#68 and 100), four exhausted cores (#25, 33, 44, 84), five midsections (#185, 86, 110, 131, and 176), five Desert Side-Notched points (#24, 118, 40, 134, and 142), four Elko points (#73, 124, 161, and 20), six non-diagnostic points (#31, 107, 119, 164, 43, and 170), two Humboldt points (#78 and 85), four Lanceolate points (#184, 11, 74, and 60), two Northern Side-Notched points (#5 and 57), two Rose Spring points (#70 and 89),

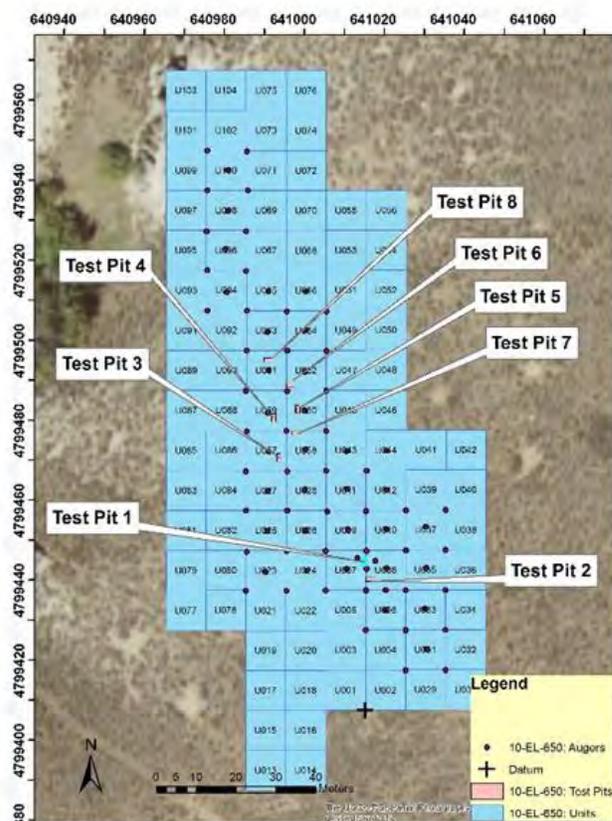


Figure 8. 10-EL-650 site map.

one Western-Stemmed point (#180), two scrapers (#173 and 174), eleven tips (#6, 15, 51, 52, 54, 61, 90, 116, 136, 149, and 167), two utilized flakes (#22 and 188), and five worked flakes (#55, 58, 105, 120, and 168).

Augers

The 1990 excavation conducted 86 auger tests for the site, focused on the highest concentration of artifacts resulting from the surface surveys. Dark brown sediment with a silty matrix was noted throughout the auger tests until between levels 66-120 cm bpd, where the sediment turned a lighter yellow-brown reflecting the most yellow sediment recovered closer to calcium carbonate. Charcoal and gravel were noted but not collected in augers 16 and 17. Lithic debris recovered from the auger tests include 268 basalt, 937 obsidian, and 79 CCS flakes that are mostly ≤ 1 cm in length (n=1164). Artifacts collected from the auger tests include one base (#226) from auger 17 level 1, two tips (#227 and 306) from augers 17 and 35 and levels 1 and 2 respectively, and one Desert Side-Notched point (#334) from auger 41 and level 1.

Test Pits

Test Pit 1: 36-38N 0-1W

This test pit was excavated to 80 cm bpd before stopping due to a halt in cultural material. Root, insect, and rodent intrusion is noted throughout the site until 60 cm bpd. Charcoal is noted in 30-40 cm level but only in flakes and never attached to any artifact or feature. Two Munsell tests were conducted in the unit, a shift from 10 YR 6/4 to a 10 YR 5/2 shade of brown is noted from the surface to level 50 cm bpd. Lithic debris collected from this unit include 257 basalt, 628 obsidian, and 150 CCS flakes mostly ≤ 1 cm in length. Artifacts recovered from the unit include two bases (#585 and 591) from 40-50 cm and 50-60 cm bpd, five cores (#573, 586, 587, 592, and 593) from levels 0-10 cm, two from 40-50 cm, and two from 50-60 cm bpd respectively, one exhausted core (#589) from 40-50 cm bpd, one midsection (#582) from 30-40 cm bpd, two Desert Side-Notched points (#576 and 580) from 10-20 cm and 30-40 cm bpd, one Elko point (#588) from 40-50 cm bpd, one Northern Side-Notched point (# 577) from 10-20 cm bpd, and two Pinto points (#574 and 594) from 0-10 and 50-60 cm bpd respectively, one side-notched point (#581) from 30-40 cm bpd, one tip (#583) from 30-40 cm bpd, on fire-broken rock (#645) from 0-10 cm bpd and two worked flakes (#595 and 597) from 50-60 cm and 60-70 cm bpd.

Test Pit 2: 32-33N 0-2E

This test pit was excavated to 50 cm. No observations were conducted on this unit. Lithic debris recovered included 522 basalt, 1202 obsidian, and 285 CCS flakes mostly ≤ 1 cm in length (n=1618). Artifacts recovered include two bases (#605 and 614) from 20-30 cm and 30-40 cm bpd, one core (#606) from 20-30 cm bpd, one exhausted core (#607) from 20-30 cm bpd, two midsections (#603 and 609) from 10-20 cm and 20-30 cm bpd respectively, one side-notched point (#602) from 10-20 cm bpd, one Humboldt point (#616) from 40-50 cm bpd, one corner-notched point (#610) from 20-30 cm bpd, two tips (#600 and 611) from 0-10 and 20-30 cm bpd respectively, and one worked flake (#612) from 20-30 cm bpd.

Test Pit 3: 61-63N 21-22W

This test pit was excavated to 50 cm bpd until cultural material stopped in the archeological context. Root and insect intrusion was noted throughout the unit. Sediment was noted as uniform, except where organic staining occurred between 20 cm and 45 cm bpd. Gravel is common throughout the unit, becoming bigger and more intrusive between 40-50 cm bpd. Lithic debris recovered include 408 basalt, 1434 obsidian, and 269 CCS flakes mostly ≤ 1 cm in length (n=1660). Artifacts included six bases (#618, 621, 625, 631, 638, and 639) from 0-10 cm, 10-20 cm, 20-30 cm, 30-40 cm, and two from 40-50 cm bpd, one core (#632) from 30-40 cm bpd, two midsections (#623 and 640) from 10-20 cm and 40-50 cm bpd, one Desert Side-Notched point (#622) from 10-20 cm bpd, one Elko point (#633) from 30-40 cm bpd, one corner-notched point (#634) from 30-40 cm bpd, one side-notched point (#635) from 30-40 cm bpd, and one Western Stemmed point (#629) from 20-30 cm bpd, one red ochre (#626) from 20-30 cm bpd, one scraper (#627) from 20-30 cm bpd, four tips (#619, 628, 636, and 641) from 0-10 cm, 20-30 cm, 30-40 cm, and 40-50 cm bpd, and one utilized flake (#642) from 40-50 cm bpd.

Test Pit 4: 71-73N 22-23W

This test pit was excavated to 50 cm bpd. Gravel was observed from the upper levels of the unit until 35 cm bpd. Sediment was uniform throughout unit until 45 cm bpd when it changed from a Munsell test of 10 YR 2/2 to 10 YR 4/4. Root intrusion is noted along the northern wall from 40-50 cm bpd. Also present were charcoal flakes between 30-40 cm bpd. At 50 cm bpd, the unit bottomed out with calcium carbonate/crumbling granite exposed. The lithic debris recovered from the site include 465 basalt, 1428 obsidian, and 276 CCS flakes mostly ≤ 1 cm in length (n=1986). Artifacts recovered include six bases (#644, 648, 649, 655, 657, and 661) from 0-10 cm, two from 10-20 cm, 20-30 cm, 30-40 cm, and one unprovenienced respectively, one exhausted core (#650) from 10-20 cm bpd, one midsection (#651) from 10-20 cm bpd, two Desert Side-Notched points (#658 and 662) from 30-40 cm and another unprovenienced respectively, a Northern Side-Notched point (#652) from 10-20 cm bpd, one red ochre (#653) from 10-20 cm bpd, and one worked flake (#646) from 0-10 cm bpd.

Test Pit 5: 74-76N 17-18W

This test pit was excavated to 60 cm bpd. Sediment recorded was a dark brown in color from the surface to 40 cm bpd, where the sediment color changed to a lighter brown/yellow-brown in the southwest corner until the change spread throughout the unit. Rodent burrows are noted below 50 cm bpd through to the end of the unit's floor. Vegetation was thicker at the surface to 25 cm bpd, where gravel became common from 30 cm bpd to the bottom of the unit. Lithic debris recovered include 471 basalt, 1827 obsidian, and 334 CCS flakes, the majority of which are ≤ 1 cm in length (n=1945). Artifacts recovered include two bases (#671 and 689) from 20-30 cm bpd and one unprovenienced respectively, one biface frag (#665) from 10-20 cm bpd, three cores (#675, 676, and 679) two of which are from 30-40 cm bpd, and the last one is from 40-50 cm bpd. Also recovered are two exhausted cores (#680 and 681) from 40-50 cm bpd, one midsection (#672) from 20-30 cm bpd, one Desert Side-Notched point (#666) from 10-20 cm bpd, four tips (#667, 677, 682, and 683) from 10-20 cm, 30-40 cm, and two from 40-50 cm bpd respectively, and six worked flakes (#668, 669, 673, 684, 685, and 687) two of which are from 10-20 cm, one from 20-30 cm, two from 40-50 cm, and one from 50-60 cm bpd respectively.

Test Pit 6: 81-82N 18-20W

This pit was excavated down to 40 cm bpd, stopping when the excavation uncovered calcium carbonate on the floor of the unit. The surface was excavated down to the 20 cm bpd and noted with roots and heavy vegetation with a dark brown sediment coloration and small sub-angular gravel. From 20-40 cm, the unit was noted to have a compacted, hard matrix with a yellow-brown coloration from the influence of the crumbled calcium carbonate. Lithic debris recovered from the unit included 377 basalt, 1349 obsidian, and 271 CCS flakes mostly ≤ 1 cm in length (n=1618). Artifacts recovered include two cores (#700 and 707) from 20-30 cm and 30-40 cm bpd, one exhausted core (#708) from 30-40 cm bpd, one knife (#709) from 30-40 cm bpd, two midsections (#696 and 712) one from 10-20 cm bpd and the other unprovenienced respectively, one Bliss point (#694) from 10-20 cm bpd, one side-notched point (#701) from 20-30 cm bpd, one Lanceolate point (#695) from 10-20 cm bpd, one Pinto point (#702) from 20-30 cm bpd, one scraper (#697) from 10-20 cm bpd, four tips (#691, 692, 698, and 703) two of which are from 10-20 cm, one from 10-20 cm, and one from 20-30 cm bpd respectively. Finally, recovered were three worked flakes (#704, 705, and 710) two of which are from 20-30 cm and one from 30-40 cm bpd respectively.

Test Pit 7: 69-70N 16-18W

This unit was excavated to 70 cm bpd, then stopped when reaching the yellow calcium carbonate which started at 60 cm bpd. The unit was excavated further than previous units to test evidence of cultural material below the carbonate level. As seen from the inventory, the cultural material is present even throughout the carbonate level. Charcoal is noted throughout the site's top-most layers but only as flakes and was not collected. Due to its proximity to the higher levels, it is considered to be within the historical context. Sagebrush root intrusion is noted between 0-25 cm bpd and soil coloration to be a dark brown within the same levels. The soil changes to a yellow-shaded brown when reaching the disintegrating calcium carbonate level mixing with the dark brown sediment at 55 cm bpd. Large cobbles and rodent burrows are common between 30-70 cm bpd. Lithic debris recovered includes 657 basalt, 2834 obsidian, and 479 CCS flakes mostly ≤ 1 cm in length (n=3329). Artifacts recovered include three bases (#714, 715, and 726) two of which are from 0-10 cm and one from 20-30 cm bpd, one core (#732) from 30-40 cm bpd, one drill (#727) from 20-30 cm bpd, one exhausted core (#719) from 10-20 cm bpd, one Desert Side-Notched point (#745) which is unprovenienced, one Eastgate point (#733) from 30-40 cm bpd, one fragmented point midsection and tip (#740) from 50-60 cm bpd, one Humboldt point (#737) from 40-50 cm bpd, two Lanceolate points (#720 and 741) from 10-20 cm and 50-60 cm bpd respectively, four Northern Side-Notched points (#721, 728, 729, and 730) from 10-20 cm and three from 20-30 cm bpd respectively, two red ochre (#716 and 722) from 0-10 cm and 10-20 cm bpd respectively, four tips (#717, 723, 734, and 735) from 0-10 cm, 10-20 cm, and two from 30-40 cm bpd respectively, and two worked flakes (#724 and 742) from 10-20 cm and 50-60 cm bpd respectively.

Test Pit 8: 86-87N 23-25W

This pit was excavated 40 cm bpd before stopping when uncovering calcium carbonate. The unit was noted as being heavy with gravel and sagebrush roots. Rodent burrows are common throughout the unit. The soil is common as with other units where sediment color is a dark brown, turning to a yellow-brown color at 38 cm bpd reflecting a mix of dark brown sediment with the crumbling calcium carbonate at the bottom of the unit. Lithic material recovered

from the unit includes 286 basalt, 925 obsidian, and 195 CCS flakes mostly ≤ 1 cm in length ($n=1003$). Artifacts recovered from the unit include two cores (#756 and 762) from 30-40 cm bpd and one unprovenienced respectively, three exhausted cores (#749, 752, and 757) from 10-20 cm, 20-30 cm, and 30-40 cm bpd respectively, three side-notched points (#758, 738, 747) from 30-40 cm and 0-10 cm bpd respectively, three tips (#750, 753, and 763) from 10-20 cm, 20-30 cm bpd and one unprovenienced respectively, and three worked flakes (#754, 759, 760) from 20-30 cm and two from 30-40 cm bpd respectively.

10-EL-604

One of the most extensively studied sites before this analysis, 10-EL-604, demonstrated extensive cultural material on the surface, possibly displaying high elements of site disturbance from erosion and deflation. More excavations occurred in this site *after* the 1990 excavation and revealed limited data, mostly lithic debris such as is reported here (Pleasant et al. 2013). The 1990 excavation recovered no ecofacts, 197 basalt flakes, 179 obsidian flakes, and 32 CCS flakes from the surface and subsurface studies. Weapon technology included Late Archaic points with pottery fragments and one scraper. Except pottery, most of the artifactual makeup is consistent with Kelly's definition of a high mobility residency pattern.

1990 Excavation (see Figure 9)

Surface Units

The 1990 excavation surveyed thirty surface units 10m^2 in the area. The site is situated on a south-facing slope that ends the extreme south border of the protruding hills that tops the High Prairie area before connecting with the prairie floor that gives the area its name. The total quantity of cultural material recovered from this excavation is noted as being quite low. However, this site had been excavated since by the Boise National Forest and recovered more subterranean material than is reflected here. Lithic debris recovered from the surface units include 183 basalt, 149 obsidian, and 31 CCS flakes with most of them being 2 cm in length ($n=165$). Artifacts recovered included one base (#18), one biface (#20), one core (#21), one exhausted core (#35), one midsection (#8), one Rosegate point (#36), one Desert Side-Notched point (#41), two stemmed points (#33 and 42), three pottery fragments (#30, 46, and 47), one scraper (#49), and two tips (#22 and 26).

Augers Tests

Auger tests conducted in the 1990 excavation were concentrated in the levels of cultural material from the surfaced units. The tests

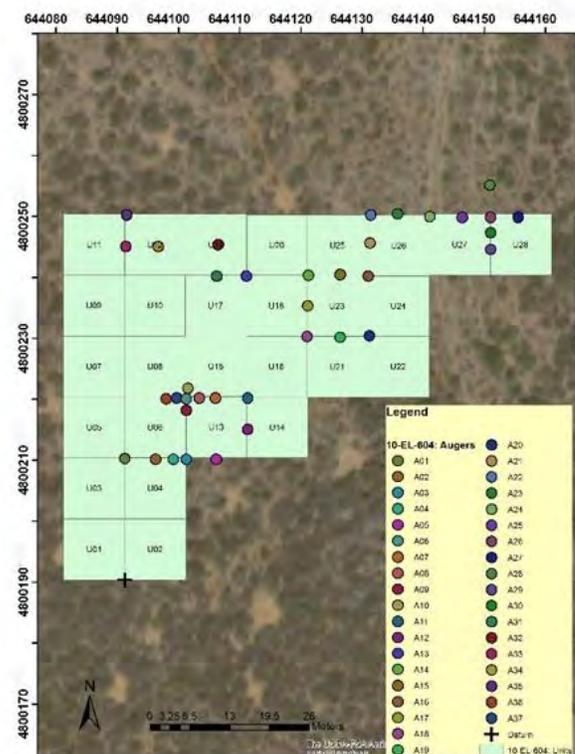


Figure 9. 10-EL-604 site map.

were taken down as deep as seven levels (~105 cm-140 cm bpd) in some areas. Sediment coloration was noted as the typical dark brown with a silty matrix common in the area, turning a lighter brown with the inclusion of rough gravel particles. Lithic debris recovered from the augers included 14 basalt, 30 obsidian, and one CCS flake, mostly ≤ 1 cm in length (n=37). One base was recovered from the auger tests, a base (#58) from auger 16, level 1 (~0-15/20 cm bpd).

10-EL-605

The 1990 crew excavated this site the least, which was not even mapped for accuracy, site 10-EL-605 showed very limited cultural material on the surface and showed little potential for subsurface recovery in future excavations. Total lithic debris recovered included eight basalt, 33 obsidian, three CCS lithic flakes, and no ecofacts. The survey also recovered no artifacts. A thorough analysis of this site specifically will require more testing for subsurface potential. However, taken in conjunction with the other sites in the area, it is assumed that this site's cultural makeup will reflect much of the rest of the sites.

1990 Excavation

Surface Units

The 1990 excavation conducted fifteen surface survey units at 10-EL-605 but conducted no auger tests. Further, no field notes were taken nor any mapping done on the site due to low cultural material recovery. The lithic debris recovered from the surface units included 8 basalt, 33 obsidian, and 3 CCS flakes either ≤ 1 or 2 cm in length (n=18 and 19, respectively). No artifacts were recovered from the surface units.

Environmental Context

Environmentally, the collection's disturbances due to tectonic shifts, faunalurbation, and cryoturbation reveal an altered stratigraphy, making the dating of the sites within a close period nearly impossible. The change in altitude creates a sagebrush landscape compared to the lower grasslands characteristic of the prairie lands surrounding the hills of which the collection sits, a change in ecological context that started roughly 3500 years B.P. Therefore, the relatively long-term steady environmental conditions in the area is conducive to aboriginal groups that are moving with tethered resource strategies (Binford 1977). This is consistent with a forager resource strategy where groups will more likely move into and use resources in areas that have a reliable environmental condition. Further, Aboriginal groups would move to winter areas with a consistently mild climate pattern (Plew 1986). The High Prairie area's climate pattern (as seen below), where winters are cold and wet, would not be conducive for a long-term residence location.

Modern and Paleoecological Climate

The climate of the area is characterized by colder, harsher winters with longer periods of winter precipitation (Brisland 1994). Typically, snow lands during the months of November through until middle to later part of March (\bar{x} =5cm/month), and can last on the ground even as late as middle to late April (Brisland 1994). Temperatures during this period averages

between -9.2° - 3.5° C. Even areas slightly downhill or slightly outside of the site perimeter will have no snow or slight snow thawed into late March. Summers are typically mild but dry. The average temperature for the months from May to October range from 3.5° - 23.7° C (Brisland 1994). Average rainfall for the same period is 2cm/month, with the greatest drop happening during the summer periods between July until mid-October when the dry season breaks (Brisland 1994; Meatte 1990).

Paleoecological studies of the Snake River Basin showed repeated shifts of climate conditions from colder, wetter climates to warmer, drier climates measuring from 10,300 B.P. (Henry 1984). The latest change, a hotter and drier period, starting from 7000 B.P. to the historical period has shown a steady change from a more forested area to a sagebrush steppe ecological niche (Butler 1978).

Geology

The High Prairie sits along the southern end of the southernmost hill cluster of the Sawtooth Range which are themselves part of the northwestern quadrant of the Rocky Mountains (Maley 1987). The overall elevation of the site area ranges from 1640-1680 m, with the Moore's Spring site (10-EL-658) being on the lower end of the elevation spectrum and site 10-



Figure 10. Geological context of the High Prairie (note proximity to fault line in the northeastern corner).

EL-646 being on the higher level of the spectrum. The southernmost site (10-EL-604) is situated at the threshold from the hill-laden sagebrush steppe to the flatter grasslands which reflects a change in elevation to 1550 m.

The area is heavily laden with hills protruding from the prairie floor. In fact, most if not all of the artifacts lie on the hills and ridges that rise above the high prairie grasslands, the only exception being on the low flats of Moore's Spring at the extreme north of the High Prairie area. The hills that predominate the landscape of each of the sites are a result of Eocene and Cretaceous-period granite and basaltic pluton intrusions being thrust upward into the neighboring Pleistocene and Pliocene-period bedrock (see Figure 10). Further, the area shows evidence of the neighboring Willow Creek Fault and Trinity Mountain Faults, which are simply minor fractures resulting from the Trans-Challis Intrusive Fault Zone (Maley 1987; Johnson et al. 1988). Overall, the area sits on the easternmost edge of the Pacific Tectonic Plate and its conflicting movement against the Caribbean Plate resulting in the

typical characteristic Rocky Mountain upward thrust (Maley 1987; Johnson et al. 1988). In the end, it is suspected that many of the artifacts and archaeological remains have gone through at least minimal post-depositional shifting simply due to gravalturbation and cryoturbation because of the volatile nature of the hillside thrusts.

Analysis of Sediments

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The long-term reach of sediment analysis in the context of archaeological research is limited; some geological context is helpful when analyzing any stratigraphic changes through the site (Myra 2012). In regards to the High Prairie Study Area, the geological context seems to be quite uniform across almost all sites except three areas (see Figure 11). The first area is site 10-EL-658, which is situated on a terraced landscape north of the upthrusting hills that characterize the southern portion of the study area. The sediment has been noted as being much more shallow in sediment and highly subject to the calcium carbonate floor that stops all units of excavation in the area. The third distinct area, where sites 10-EL-650 and 10-EL-645 are situated is the most western section of the study area and are situated just southeast of the same upthrusting hills that characterizes most of the sites in this study. They are situated on a deep slope that ends the eastern section of hills moving into the prairie floor that is characteristic of the High Prairie area. Finally, the third geological context encompasses the rest of the sites all located in the hills at the northern-most section of the High Prairie area. Therefore, it was considered extensive enough to collect three sediment samples from the three geological contexts represented in this study.

Field collection of sediment in previous excavations were not retained. Three samples were collected, two from early November 2015 (10-EL-658 and 10-EL-645) and the last from mid-April 2016 (10-EL-604). As no auger was available at the time, 1m² shovel probes were

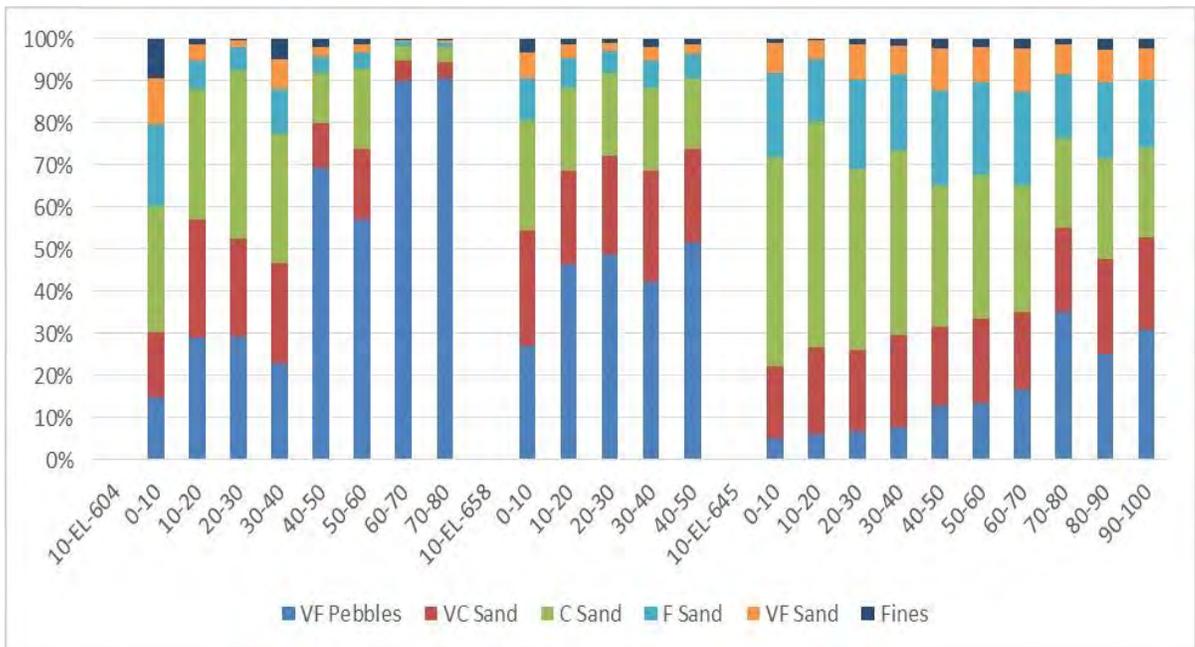


Figure 11. Weight of particle sizes separated by site and level (note the separated patterns between three groups of soil types).

conducted measuring at 10 cm interval levels for each collection of the roughly 5-10cm³ matrix. Each level was bagged and labeled according to site and level.

In the laboratory, a Munsell Chart Test was conducted first for coloration of each level; then the matrix was dry sieved through US Standard sieves with sizes 10, 18, 35, 60, 120, and 230 to analyze the sediment particle size of each site. The particle sizes were noted by percentage of the total grams of sediment analyzed. Finally, a ribbon test was conducted for a qualitative analysis of the results. Each sieve percent was categorized into three distinct categories: percent gravel, percent sand, and percent fine sediment. The results of these tests are seen in Figure 11.

Munsell Tests

Sites 10-EL-604 and 10-EL-645 showed very similar Munsell test ratings between each. The overall tone of each of the sites is similar in their slightly yellow-colored brown matrix of 10 YR that becomes considerably brighter as the unit moves down in levels. Site 10-EL-604 did test for a slight red coloration (7.5 YR) at level 20-30 cm and again at 30-40 cm bpd, however, this can be contributed to the subjectivity of the overall test.

Meanwhile, 10-EL-658 showed a more iron-influenced clay soil coloration (7.5 YR) in the upper levels of the site (0-40 cm bpd), turning a brighter shade towards the lower reaches of the shovel probe resulting from crumbling calcium carbonate that is common throughout all the units' lower levels excavated in the site.

Sieve/Ribbon Test

The sieve test conducted on site 10-EL-658 showed a majority sand composition throughout with slightly elevated levels of gravel at 10-20 cm, 20-30 cm, and again at 40-50 cm bpd. In the upper levels of the shovel probe, medium sand was the most common sediment particle size, while the lower levels become coarse or very coarse the closer the pit came to the calcium carbonate. Afterward, the ribbon test confirmed these findings, suggesting the entire unit was of a sandy clay quality. Regardless, the quality of the sediment seemed uniform throughout the unit with little variation of color or shade, suggesting a single stratum in the site within the first geological context.

The sieve test conducted in site 10-EL-645 showed a sandy-sandy loam consistency, with the highest levels being sand. There was a slight gradual rise in gravel percentage as the depth of the shovel probe increased (0-10 cm was 3% while at 1 m bpd was at 25%) but never becoming the majority over sand. Afterward, a ribbon test also confirmed these findings as they did in 10-EL-658, demonstrating a sandy loam quality to an already determined sieve test. In the end, this analysis concludes what is also seen in the other sites and from the unit descriptions given from the excavations, the sediment is quite uniform throughout, suggesting a single stratum exists in the sites within the second geological context.

Finally, the sieve test conducted on site 10-EL-604 also revealed a bifurcated sediment matrix within the site. The levels from 0-40 cm bpd consisted of a coarse sand consistency while the levels from 40-80 cm bpd consisted of a very fine pebble consistency. The change in particle ratio can be contributed to the hilltop geological context to which the sites belong. The lower levels of these sites are highly subject to cobbles and larger rocks and descriptions of disintegrating granite particles that contribute to their coarse, more pebble-filled matrix. However, the ribbon test afterward still gave a consistent quality test of a sandy clay loam throughout the site. Therefore, it can be concluded that the sites within the hillside geological context have a uniform matrix until the levels of which cobbles or compacted rock are

recovered, where which the units would stop excavating, therefore creating a single stratum for the majority of the sites excavated within the third geological context.

In the context of the archaeological study, the sediment here shows a uniform consistency throughout the unit matrix. From surface to the site's activity floor, there seems to be a straight uniform stratum that runs throughout each unit. The lack of any formal staining (changes in Munsell coloration) or compaction (changes in sandy or clay soil consistency) reveals no long-term residency patterns in the area. This residency pattern is consistent with a high mobility forager strategy (Kelly 2001).

Modern Floral and Faunal

Ethnographically, the native diet was observed consisting of deer, rabbits, ground squirrel, anadromous fishes (see note below), Great Basin wildrye, shadscale, Indian ricegrass, and miscellaneous berries (Steward 1970). Also included were willow and sagebrush used for construction. More contemporary studies have looked at sagebrush as it relates to fuel as well (Bishop and Plew 2016). Contemporarily, the floral landscape of the area immediately surrounding the High Prairie is characterized as being a sagebrush steppe. Each site consists predominantly of Big Sagebrush *Artemisia tridentate*, Threetip sagebrush (*Artemisia tridentate*), and Silver sagebrush (*Artemisia cana*). Overall, shrubs make up the majority (60%) of the floral population in the region.

Growing within the understory of the dominant sagebrush include grasses and invasive species, most notably Cheatgrass (*Bromus tectorum*), which dominates (70%) the total understory growth and consists of 20-30% of the total floral growth in the area. While Sandberg bluegrass (*Poa secunda*), Brome fescue (*Festuca bromoides*), Perennial Bunch Grass (*Agropyron spicatum*), and Bluegrass (*Poa pratensis*) exists as 10-20% of the regional floral landscape of the High Prairie study area. This steppe context exists in conjunction with the elevated High Prairie region, which contains the High Prairie. Outside of the elevated region is grassland which starts only 20-30 meters southwest of the southernmost site in the region - 10-EL-604.

Most of the sites listed in this report have a large amount of faunalurbation resulting from rodent and insect burrowing. In fact, many of the recovered surface artifacts correlate heavily with where there is the greatest number of anthills, resulting in an elevated recovery rate, but also artifact recovery outside of the archaeological context of which it was located. The areas surrounding the anthills are clear of any flora, and each hill site is at least one meter squared in diameter, and therefore creating one meter squared areas that have total (100%) visibility.

Other faunal species in the High Prairie area include rodents such as ground squirrels (*Urocitellus brunneus*), Desert Wood rats (*Neotoma lepida*), Townsend's Pocket gophers (*Thomomys townsendii*), Yellow-bellied marmots (*Marmota flaviventris*), Sagebrush voles (*Lagurus curtatus*), and Western Harvest mice (*Reithrodontomys megalotis*). Ungulate species are also common in the High Prairie area including Mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra Americana*), and elk (*Cervus Canadensis*) which prefer the colder, more snow-packed months of the year in the region. Other mammals include badgers (*Taxidea taxus*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), Nuttall's Cottontail (*Sylvilagus nuttallii*), and Black-Tailed Jackrabbits (*Lepus californicus*) (Meatte 1990).

Birds are common in the region, including common species of crows or ravens, Golden eagles (*Aquila chrysaetos*), Red-tailed hawk (*Buteo jamaicensis*), Rough-legged hawk (*Buteo lagopus*), Ferruginous hawk (*Buteo regalis*), Sage grouse (*Centrocercus urophasianus*), Burrowing owl (*Seotyto cunicularia*), Sage thrasher (*Oreoscoptes montanus*), Grasshopper

sparrow (*Ammodramus savannarum*), and the Sage sparrow (*Amphispiza belli*) (Meatte 1990).

In much of the literature of Southern Idaho archaeology, some discussions have stated that bison (*Bison bison*) and Bighorn sheep (*Ovis canadensis*) as being common in the Southwestern Idaho (Butler 1978; Meatte 1990). However, their presence in the archaeological context of this study is non-existent.

Archaeological Methods

A records search has indicated that erratic and unsystematic surveying by the Boise National Forest occurred in the study area going back to the early 1980s. More systematic and exhaustive studies started in the High Prairie regions in 1989 with Nelson and Plew's study of Moore's Spring (1990). Their excavation consisted of excavating two 1 x 2 meter test units. The first unit was placed in the northeast corner of the Spring's location. The second unit was placed east of the existing roadway. The deposits were excavated using arbitrary 10 cm levels which sifted all sediments through 1/4" hardwire mesh. All material was processed in-field using laboratory standards where all lithics and artifacts were typed, sized, and counted as well as bagged separately by unit and level.

Brisland's 1990 excavation conducted a survey/augering/excavation method whereby they first conducted a 10m² survey of the site area for artifacts and debris found on the surface. The crew then augered the corners and center of each 10m² square wherever the greatest amount of archaeological debris or artifacts were found. The augers were excavated in ~15-20 cm increments. Once the augering was complete, the site was further evaluated for continuing investigation based on a number of artifacts, types of artifacts, or amount of lithic debris coming out of the augers. If the site was considered worthwhile to investigate further by the principle investigator (based on subjective interpretation of artifact recovery), then test pits were proposed and excavated using arbitrary 10 cm increments (weather and time permitting). The units were screened using either 1/8" or 1/4" screen mesh (depending on availability). Then they processed all recovered artifacts in-field by type and material (Brisland 1994). All remains were bagged separately by unit, auger, or pit, then by level. Brisland's lab technique in 1990 consisted of categorizing lithic tool types and utilizing use-wear analysis on the artifacts.

In the 1998 and 1999 excavation of Moore's Spring, Munch's group excavated 16 test pits, whereby units were opened at the discretion of the crew leader based on landform evidence of possible artifacts. The units were excavated in 10 cm increments after the initial 20 cm surface level. The sediment was screened using 1/8" hardwire mesh. All remains were processed in-field by type and material

For our study, all artifacts from the three contributing excavations were collected and separated by site, unit, then level. Each of the lithic debris bags was searched through for possible artifacts not found in the field. Then, the material was counted and separated by material and size using a size matrix consisting of >1 cm, 2 cm, 3 cm, 5 cm, and >5 cm increments with notations for cortex. Artifacts were then separated by site, unit, and level then typed using functional forms and sized. All artifacts, any faunal remains, and lithic debris were bagged separately by unit, level, functionality, and material. All maps were adapted with ArcGIS software by the existing maps made either during or after excavations.

Material Culture

James H. Eschenbrenner and Erica Jaeger

Material remains were typed and functionally categorized using the organization matrix used by Winter's riverine organization scheme for lithic tools types (Winters 1969). The categories present in this site include weapons (projectile points), domestic tools (ceramics and drills), fabricating (cores), and general utility tools (knives, bifaces, worked flakes, cobbles, and scrapers). This organization process is consistent with a thorough analysis and application of Kelly's residence matrix.

10-EL-658

Weapons (Projectile points)

The projectile points mentioned here are ordered chronologically, starting with the most recent forms, followed by the earlier forms.

Bliss Point (n=3). Small contracting stem point, with absent shoulders and squared bases. Bisections are elliptic. Points are in a size range of 2.5-3.1L x 1-1.5W x .3-.7T. Two of the points are obsidian while one is CCS.

Rose Spring Points (n=2). Small, rounded blade point with a plano-convex cross-section. Convex base with an expanding stem. Points are in a size range of 2.3-2.65L x 1.6-1.7W x .49-.5T, all of which are made of basalt.

Desert Side-Notched Point (n=3). Two triangular pointed and one rounded blade, concave and flat based with horizontal shoulders (see Figure 12(e)). Cross-sections are plano-convex. One specimen is partial, with a broken proximal tang. Points are in a size range of 1.7-2.81L x 1.3-1.9W x .32-.46T. Two of the points are obsidian; one is CCS.

Eastgate Points (n=2). Small, triangular points with deep inset notch with rounded tangs. They also have expanding bases, specimens are plano-convex and are partials, being broken at the midsections. Point sizes range from 1.59-1.89L x 1.14-1.58W x .24-.35T. All points are obsidian.

Elko Corner-Notched Points (n=5). Specimens are varied in sizes and forms. All are biconvex and fragmented with concave, expanding bases (see Figure 12 (d)). Point sizes range from 2.2-4.2L x 1.57-3.9W x .41-.67T. Three points are obsidian, and two are basalt.

Humboldt Points (n=1) Specimen is a small, concave stem with pronounced and pointed tangs with a chipped tip (see Figure 12(c)). Point size is 3.2L x 1.73W x .51T and made of obsidian.

Corner-Notched Points (n=4) Point sizes range from 1.15-2.24L x 1.19-2.68W x .25-.52T. Two

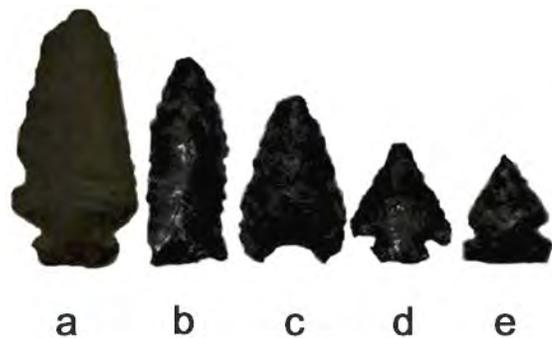


Figure 12. 10-EL-658: a. Western-stemmed; b. Lanceolate point; c. Humboldt point; d. Elko point; e. Desert Side-Notched point.

points are obsidian, and two are basalt.

Corner-Notched Concave Base Points (n=1) Point size is 3.3L x 2W x .5T and is made of obsidian.

Corner-Notched Convex Base Points (n=1) Point size is 2.7L x 1W x .4T and is made of basalt.

Side-Notched Points (n=1) Point size is 1.78L x 1.28W x .3T and is made of obsidian.

Side Notch Concave Base Points (n=4) Point sizes range from 1.3-2.74L x 1.11-2.3W x .28-.56T. All points are obsidian.

Northern Tri-Notched Points (n=1) Point size is 3.54L x 1.87W x .5T and is made of obsidian.

Lanceolate Points (n=6) Four specimens are split basalt points cracked clean at the shoulders with concave bases. One is a biconvex obsidian point, the other a plano-convex split obsidian point (see Figure 12 (b)). Point sizes range from 1-3.93L x 1.28-1.9W x .3-.7T. Four points are obsidian, one of basalt and one of the CCS.

Western Stemmed Points (n=1) Point is a rounded edge with worn facing, pronounced blade and a convex, expanding base, biconvex cross-section (see Figure 12 (a)). Point size is 4.94L x 2.07L x .59T and is made of CCS.

Stemmed Convex Base Points (n=2) Point sizes range from 1.73-2.79L x 1-1.93W x .53-1.23T, all of which are made of basalt.

Expanding Convex Base Points (n=1) Point size is 1.87L x 1.14W x .25T and is made of basalt.

Domestic Tools (Ceramics and drills)

Ceramics (n=25) Ceramic sizes range from 1.4-3.9L x .6-9.4W x .4-1.8T (see Figures 13 (a-e)).

Fabricating (Cores)

Cores (n=7) Specimens are varied in size and shape (see Figure 14). Core sizes range from 3.1-5.7L x 2.9-4.7W x 1.5-4T. Three cores are made of obsidian, three of basalt and one of the CCS.

Exhausted Cores (n=1) Core size is 5.3L x 5W x 2.1T, and it is made of basalt.

General Utility Tools (Knives, bifaces, scrapers, worked flakes, and cobbles)

Worked Flakes (n=19) Flake sizes range from 1.48-3.75L x .82-2.52W x .2-1.22T. Eleven



Figure 13. 10-EL-658: a-e. Ceramics.



Figure 14. 10-EL-658: Cores.

worked flakes are made of obsidian, four of basalt, and four of CCS.

Bifaces (n=14) Biface sizes range from 2.5-7.8L x 1.4-3W x .4-1.2T. Four bifaces are made of obsidian, seven of basalt and three of CCS (see Figure 15(b)).

Scrapers (n=8) Scrapers are various sizes and forms, looks to be part of larger biface fragments (see Figure 15(a)). Scraper sizes range from 2-3.8L x 1.1-3.4W x .4-.9T. Three scrapers are made of basalt and five of CCS.

Cobbles (n=7) Cobble sizes range from 2.23-13.72L x 3.65-8.53W x 3.03-5.8T. One cobble is basalt, and six are CCS.

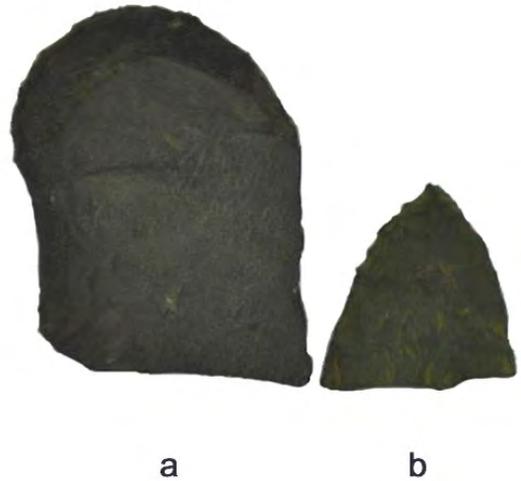


Figure 15. 10-EL-658: a. Scraper; b. Biface fragment.

10-EL-645

Weapons (Projectile points)

Northern Side-Notched Points (n=2) Cracked point along the blade width with a concave base. Point sizes range from 1.1-1.4L x 1.4-1.6W x .3-.4T, all of which are basalt.

10-EL-647

Weapons (Projectile points)

Desert Side-Notched Points (n=6) Specimens have deep inset notches, revealing reduced necks, and all are fragmented, two along the blade and one missing just the tip (see Figure 16(a)). Points sizes range from .9-2.4L x 1.2-1.6W x .3-.4T. Two points are made of obsidian, one of basalt and three of CCS.



Figure 16. 10-EL-647: a. Desert Side-Notched; b. Eastgate; c. Lanceolate Base.

Eastgate Points (n=1) Point size is 2.1L x 1.5W x .3T and is made of CCS (see Figure 16 (b)).

Humboldt Points (n=7) Point sizes range from 1.3-2.7L x 1.3-1.7W x .5-.6T. Five points are made of obsidian and two of CCS (see Figure 16 (c)).

Side Notch Concave Base Points (n=1) Point size is 1.7L x 1.5W x .4T and is made of obsidian.



Figure 17. 10-EL-647: a. Drill.

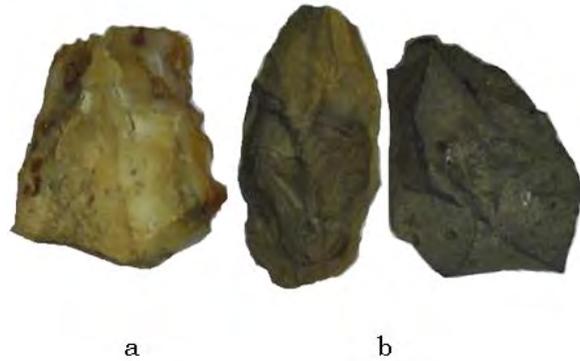


Figure 18. 10-EL-647: a-c. Drills.

Domestic Tools (Ceramics and drills)

Drills (n=1) Drill size is 2.2L x .8W x .4T and is made of CCS (see Figure 17 (a)).

Fabricating (Cores)

Cores (n=21) Specimens are similar in size, with only one core being in the smaller range than the other 20. Most are angular across the distal ends, none showing angular knapping or bipolar processing (see Figure 18 (a-c)). Core sizes range from 2.7-5.2L x 1.8-4.3W x 1-2.3T. One core is made of obsidian, twelve of basalt and eight of CCS.

Exhausted Cores (n=5) Core sizes range from 1.7-3.3L x 1.6-2.7W x .9-1.4T. Two cores are made of obsidian and three of CCS.

General Utility Tools (Knives, bifaces, scrapers, worked flakes, and cobbles)

Worked Flakes (n=18) Flake sizes range from 1.4-4.8L x .6-2.2W x .2-1.1T. Ten flakes are made of obsidian, five of basalt and three of CCS.

Bifaces (n=8) Biface sizes range from 1.4-5.5L x 1.2-3.2W x .5-1.2T. One biface is made of obsidian, two of basalt and five of CCS (see Figure 19 (b)).

Scrapers (n=4) Scraper sizes range from 2.9-5.3L x 2.7-4.2W x .5-1.3T. Three scrapers are made of basalt and one of the CCS (see Figure 19 (a)).



Figure 19. 10-EL-647: a. Scraper; b. Biface fragment.

10-EL-646

Weapons (Projectile points)

Desert Side-Notched Points (n=2) Point sizes range from 1.4-1.6L x 1-1.2W x .3-.4T. One point

is made of obsidian and one of the CCS.

Side-Notched Points (n=1) Point size is 1.6L x 1W x .3T and is made of basalt.

Side-Notched Wide Base Points (n=1) Point size is 1.6L x 1W x .3T and is made of basalt.

Domestic Tools (Ceramics and drills)

Drills (n=1) Drill size is 2.3L x 2W x .4T and is made of CCS.

10-EL-650

Weapons (Projectile points)

Bliss Point (n=1) Bliss Point is small, biconvex, reduced blade, and straight base. Point size is 2L x 1W x .7T and is made of basalt.

Desert Side-Notched Points (n=13) Points are highly various in sizes, and some show reduction or exhaustion. All are Plano-convex with some being fragmented along diagonal lines (see Figure 20 (c)). Point sizes range from 1.4-2.8L x .8-1.9W x .2-.5T. Eleven points are made from obsidian, one from basalt and one from CCS.

Rose Spring Points (n=2) Specimens are biconvex, all fragmented, two missing tips or hafted and the other is fragmented along the blade on a diagonal line. Point size is 2-2.6L x 1.2-1.4W x .4T and made of obsidian.

Eastgate Points (n=1) Specimen is plano-convex with fractures running along the inside of the ventral side (see Figure 20 (d)). Point size is 1.7L x 1.7W x .3-T. Point is made of obsidian.

Elko Corner-Notched Points (n=6) Five points are biconvex, one being plano-convex. Two specimens are broken halfway down the blade, other at the tip, and another is missing a tang. Point sizes range from 1.5-3.5L x 1.9-2.1W x .4-.6T. Five points are made of obsidian and one of the CCS (see Figure 20 (b)).

Northern Side-Notched Points (n=8) All Northern Side-Notches in this collection are just shoulders that have been broken at the stem. Two have concave bases; the rest follow the more traditional flat base. Point sizes range from .6-1.2L x .8-1.9W x .3-.5T, all of which are made of obsidian.

Humboldt Points (n=5) Two points are biconvex, one is plano-convex. One of the specimens is halved, showing a clean break across the width of the blade (see Figure 20 (e)). Point sizes range from 1.9-3.3L x 1.4-1.6W x .3-.5T, all of which are made of obsidian.



Figure 20. 10-EL-650: a. Western Stemmed; b. Elko; c. Desert Side-Notched; d. Eastgate; e. Humboldt Base.

Lanceolate Points (n=7) Points on this site are bases, halved to reveal only the bottom, stemmed bases. All points are biconvex with slightly extended tangs. Point sizes range from 1-2.7L x 1.1-1.6W x .3-.5T, Six points are made of obsidian and one of basalt.

Pinto Points (n=3) Point sizes range from 2.5-3.3L x 1.7-2.1W x .5-.8T. One point is made of obsidian, one of basalt and one of the CCS.

Side-Notched Straight Base Points (n=4) Point sizes range from 1.7-2L x 1.6-1.7W x .4T, all points are obsidian.

Corner-Notched Points (n=5). Point sizes range from 2.2-2.7L x 1.5-1.8W x .4T, all points are obsidian.

Side-Notched Concave Base Points (n=3). Point sizes range from 1.9-2.5L x 1.4-1.6W x .4-.5T. Point materials include two obsidian and one CCS.

Side-Notched Points (n=2). Point sizes range from 1.8-2.8L x 1.1-1.4W x .3-.4T. Both points are obsidian.

Side-Notch Convex Base Point (n=1). Point is 2.6L x 1.5W x .4T and obsidian.

Western-Stemmed Points (n=2). One specimen has a convex expanding stem with reduced shoulders and the other has reduced shoulders with a pointed but rounded stem (see Figure 20 (a)). One is biconvex; the other is plano-convex. Points range from 4.1-5.4L x 2.2W x .8-1.3T and both made of basalt.



Figure 21. 10-EL-650: a. Knife; b-c. Biface fragments.



Figure 22. 10-EL-650: a-b. Drills.

Domestic Tools (Ceramics and drills)

Drills (n=1). Drill size is 1.7L x 2.2W x .3T. The drill is basalt (see Figure 22 (a-b)).

Fabricating (Cores)

Cores (n=21). Cores from this collection are irregular in shape and size (see Figure 23 (a-c)). Sizes range from 3.2-8.9L x 1.9-5.5W x 11-134T. Core materials are fourteen basalts, six CCS, and one obsidian.

Exhausted Core (n=14). Exhausted core sizes range from 2-4L x 1.5-3.2W x .6-2.2T. Exhausted core material includes seven basalts, four CCS, and three

obsidian.

General Utility Tools (Knives, bifaces, scrapers, worked flakes, and cobbles)

Scrapers (n=4). Scraper sizes range from 2.5-5.2L x 2.9-4.3 x .4-1T. Two scrapers are basalt, and two are CCS.

Bifaces (n=4). Specimens are varied in sizes and shapes. Some appear to have breakage from retooling or have been resulted from some other form. Sizes range from 2.1-4.8L x .9-3.8W x .4-9.3T. Biface materials include two basalts, one obsidian, and one CCS (see Figure 23 (a-c)).

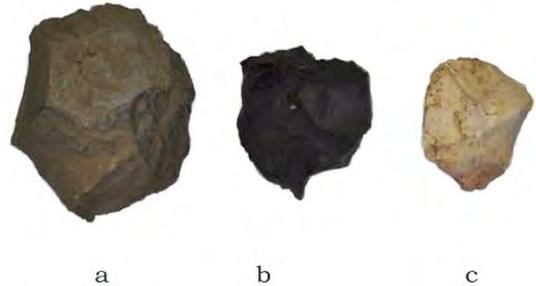


Figure 23. 10-EL-650: a-c. Cores.

Knife (n=1). Specimen is a unifacial, leaf-shaped, and convex in cross-section. It is pointed but rounded at both the distal and proximal ends. Knife is 10.5L x 3.5W x 1.1T and made of obsidian (see Figure 21 (a)).

Utilized Flakes (n=3). Flake sizes range from 1.3-2.6L x 1.1-1.4W x .3-1.7T. Flakes are all obsidian.

Worked Flakes (n=24). Flake sizes range from 1.1-4L x .7-2.5W x .3-1.1T. Flakes are split between eighteen obsidian, three basalt, and three CCS.

10-EL-604

Weapons (Projectile points)

Desert Side-Notched Point (n=1). Points are slanted, showing some wear and slight exhaustion (see Figure 24(b)). One is broken half-way down the blade. Point size is 2L x 1.3W x .3T and obsidian.

Rosegate Point (n=1). Small, triangular point with a pronounced edge and point, wide shoulders and a flat, pronounced base. Point size is 1.8L x .9W x .2T and obsidian.



Figure 24. 10-EL-604: a. Stemmed; b. Desert Side-Notched; c. Lanceolate Base.

Stemmed Points (n=2). Rounded, worn specimens that show a high reduction on the blade and along the stem and shoulders as well as biconvex (see Figure 24(a)). Points size range is 2-3.1L x 1.6-2.6W x .5-.7T and both are obsidian.

Domestic Tools (Ceramics and drills)

Ceramics (n=3). Ceramic size range is 2-3.1L x 1.5-3W x .6-1T.

Fabricating (Cores)

Core (n=1). Irregular knapping, rounded shape, shows no sign of bipolar knapping or angular chips. Core size is 3.9L x 3W x 1T and obsidian.

Exhausted Core (n=1). Core size is 1.9L x 1.4W x 1.2T and made of obsidian.

General Utility Tools (Knives, bifaces, scrapers, worked flakes, and cobbles)

Biface (n=1). The pointed but rounded end split along the width of the blade. Biface size is 2.2L x 2.3W x .5T and basalt.

Scraper (n=1). Specimen is rounded along the edges with a convex proximal end, pointed at the distal end. Scraper size is 4.4L x 3.5W x .5T and basalt.

Results

Lithic Raw Material and Flake Size Analysis

Although there are small examples of frequency variations between the sites, they can be viewed as being quite similar in almost every capacity including raw material ratios and flake size analysis. For weapons, the High Prairie was mostly obsidian, taking up 72% of the assemblage (n=92), while basalt is second (n=20), and finally CCS at a close third (n=15). Domestic tools were mostly ceramics (79%) with the drills evenly basalt and CCS (n=7). Fabricating category was mostly basalt with 58% (n=29), next was CCS with 30% (n=15), and Obsidian the least common at 12% (n=6). Finally, the general utility was predominantly obsidian with 39% (n=45), with CCS and basalt having 30% each (n=35) of the collection (see Table 1). Lithic flakes were mostly obsidian, making up of 63% of the total lithic flakes (n=24,427), second to basalt at 26% (n=10,066) and finally CCS with 12% (n=4,558).

TABLE 1. Artifact Categories by Material

Material Culture Category	Basalt	Obsidian	CCS	Ceramic	Total
Weapons	20	92	15	0	127
	16%	72%	12%	0%	39%
Domestic Tools	3	0	4	26	33
	9%	0%	12%	79%	10%
Fabricating	29	6	15	0	50
	58%	12%	30%	0%	15%
General Utility Tools	36	45	34	0	115
	31%	39%	30%	0%	35%
Total	88	143	68	26	325
	27%	44%	21%	8%	100%

Overall, the raw material for every site for every category was overwhelmingly obsidian at 62% of the total assemblage (n=24,678), next was basalt at 26% of the total assemblage (n=10,188) and CCS at 12% (n=4660). The raw material varied very slightly between units of sites, but overwhelmingly the dominant material type for entire sites was consistent between sites (see Figure 25). Furthermore, the size analysis of the entire assemblage reflected a similar breakdown where the dominant size analysis was overwhelmingly ≤ 1 cm in length at 72% (n=27,957), next being 2 cm in length at 24% (n=9311). As with material, there was seen a slight change between units of sites where some units had a dominant size of 2 cm in length, but the dominant size of ≤ 1 cm in length is uniform in all High Prairie sites.

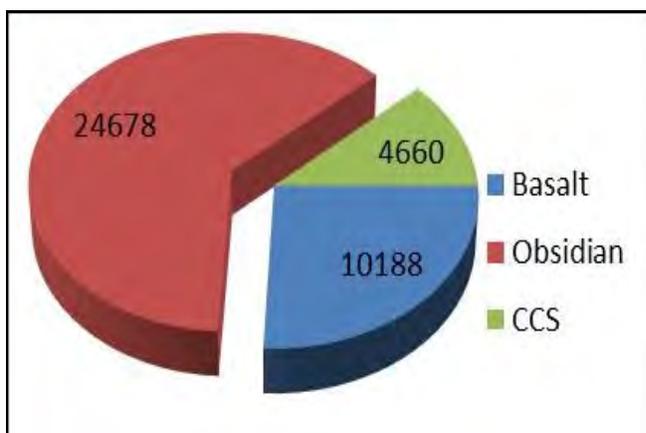


Figure 25. Total lithic pie chart by material.

Functional Analysis

The collections of artifacts from across the High Prairie, while showing some variation, are quite uniform both between and within sites. Artifacts recovered cross-laterally between all the sites include Late Archaic Period Desert-Side Notch, Eastgate, Rose Spring, and Bliss points. Early to Middle Archaic points such as lanceolate points, Humboldt (or Humboldt-like points), and stemmed points are also present (see Table 2). However, both Early to Late Archaic site tool types is present in the entire unit matrix, regardless of unit stratigraphy. As stated earlier in the geology and sediment analysis (see the section in this paper), a turbulent stratigraphy is present in the collection. Analysis of the assemblage displays a predominance of fabricating and weapon categories. Lithic tools in this study consist of 39% weapons (n=127). The domestic tools category consists of 10% of the area assemblage (n=33), fabricating category is 15% of the assemblage (n=50), and general utility tools take up 35% of the area study assemblage (n=115).

Use-Wear Analysis

James H. Eschenbrenner, Joe Hall-Holton, Royce Johnson, and Cody Walton

Use-wear analysis as it applies to the mobility matrix looks to see the expediency of the artifact assemblage. According to Kelly's matrix, expedient tool creation is consistent with a high mobility residency pattern (Kelly 2001). This study looks to the wear on tools as a means to determine previously used tools within the site's area. This study posits that if the area is a low mobility residency, then there should be considerable use-wear on the artifacts, especially on the domestic items. If the sites are on the low mobility pattern, then there should be little to no use-wear (<3% of the assemblage).

This collection of artifacts was inspected for use-wear associated with a variety of activities. The artifacts were first examined with a hand lens (2x). The artifacts were inspected for a variety of use-wear including fracturing, polish, striations, abrasions, and crushing.

Those artifacts that exhibited some visible signs of use-wear were set aside and a detailed description of the artifact and its possible use-wear was documented. The artifacts with possible use-wear were then reexamined under a light microscope (10-15x) to verify the use-wear found with the hand lens. Finally, those artifacts with wear attributed to manufacture were eliminated.

Out of the 475 lithic tool artifacts in this collection spanning several sites, only four artifacts had possible wear attributed to use and not manufacture. Of the four artifacts, two are projectile points from two different sites while the other two are both utilized flakes from the same site. All four of the artifacts are obsidian in composition. The observed use-wear was consistent across all four of the artifacts. All four had pronounced crushing along one edge in a marginal asymmetric pattern as described by Ahler (1979). This type of use-wear could be possibly attributed to sawing activity through contact with harder material. It is also possible that the crushing was produced intentionally as retouching the edge in an attempt to sharpen it. Further, post-depositional shifting or archaeological recovery cannot be ruled out. Therefore, results of this study demonstrate the inability to count use-wear analysis in the study of the artifacts recovered from High Prairie.

The results found here are in sharp contrast to the results found in Richard Brisland's study of the High Prairie. Accordingly, Brisland found no less than 300 artifacts that demonstrated use-wear on the edges and the face (Brisland 1994). This study found that there was a *total* lithic tool artifact count of 475 between all three excavations, demonstrating a gross over-count and misinterpretation of the use-wear process.

TABLE 2. Diagnostic Points by Level

	Sur- face	0- 10	10- 20	20- 30	30- 40	40- 50	50- 60	60- 70	70- 80	80- 90	Totals
Non-Diagnostic Point Totals	19	1	2	2	5	1	1	0	3	1	35
Bliss Point Totals	1	1	1	0	0	0	0	0	1	0	4
Desert Side-Notch Point Totals	14	0	4	1	2	1	0	1	2	0	25
Eastgate Point Totals	2	0	0	0	1	0	0	1	0	0	4
Elko Point Totals	4	0	0	0	2	2	2	0	1	0	11
Humboldt Point Totals	8	0	0	1	1	2	0	0	1	0	13
Lanceolate Point Totals	6	0	2	2	1	1	1	0	0	0	13
Northern Side-Notch Totals	4	0	3	3	0	0	0	0	0	0	10
Pinto Point Totals	0	1	0	1	0	0	1	0	0	0	3
Rose Spring Point Totals	3	0	0	1	0	0	0	0	0	0	4
Western-Stemmed Point Totals	1	0	0	1	0	0	1	0	0	0	3
Rosegate Point Totals	1	0	0	0	0	0	0	0	0	0	1
Northern Tri-Notch Totals	0	0	0	0	0	0	0	0	1	0	1
Point Totals	63	3	12	12	12	7	6	2	9	1	127

TABLE 3. Results from High Prairie, Idaho

	Brown's Bench	Owyhee	Big Southern Butte	Cannonball Mountain	Timber Butte	Unknown	Malad	Bear Gulch	Walcott Tuff
10-EL-645	1			1					
10-EL-647	3			6	1	2	1	1	
10-EL-650	11	4	1	32	6	3			
10-EL-646				1					
10-EL-658	3	1	1	9	1				1
10-EL-604	1								
10-EL-605				2					
Total	19	5	2	51	8	5	1	1	1

XRF Analysis

A total of 93 specimens were submitted to Geochemical Research. The collection included 49 formal tools and 44 lithic flakes. The results show 51 specimens from Cannonball Mountain, 19 from Brown’s Bench, 8 from Timber Butte, and the remaining from various sources (see Table 3). The Brown’s Bench material is considered common with other sites south of the High Prairie area, especially in sites the Snake River Plain. Its common occurrence in this collection is of some interest given its distance (~92 miles). However, Cannonball Mountain’s presence in the collection is also of interest given its proximity to the source (~28 miles difference).

Conclusions

Site Formation

Sediment analysis suggested aeolian and alluvial deposit events in the High Prairie. Early spring snow runoff and summer wind erosion contribute to deflated and exposed sites across the entire High Prairie area. The erosion resulting from upward thrusting hillsides, combined with the erosive nature of wind and water result in the high concentration of surface artifact recovery and complete stratigraphy reversal and intrusion, as is demonstrated in each of the High Prairie sites. However, of noted worth is the sediment analysis’s lack of multiple residency patterns. No staining resulting from a long-term residency pattern is present in the site’s stratum. Further, no compacting of the activity floor demonstrates a short-term residency pattern that is also consistent with Kelly’s residency matrix (Kelly 2001).

Sediment analysis of the area reveals a semi-uniform geological event occurring from the lowest level of recovery in these archaeological excavations. Although some changes in clay formation or silty-loam sediment are noted for each of the sites, all the sites are consistently one stratum going straight down to the lowest level, usually stopped due to cobbles/boulders or the calcium carbonate. The boulders are a result of the tectonic shifting of the fractures in

the area northeast of the High Prairie region, resulting in the Sawtooth Mountain Range with the extreme southern hills on which the High Prairie assemblage sits (Maley 1987; Link and Hackett 1988; Ross 1967).

Further, high degrees of faunalurbation in the area has resulted in the movement of artifacts and lithic debris vertically, out of the stratigraphic context. These movements are a result of rodents burrowing and moving artifacts either out of the burrowing areas or down further into the sediment matrix. Another faunalurbation movement is a result of anthills tunneling through the sites' matrices, resulting in lithic flakes and artifacts being pulled up out of the archaeological stratigraphic context and on the surface. Both intrusions would be observable in the archaeological context by a high degree of surface recovery for archaeological artifacts, which is present in this study.

Temporal Analysis

The prehistoric periods are separated by a Paleoindian Tradition (12,000-9000 B.P.), and an Archaic Tradition was broken into Early Archaic (8000-5000 B.P.), Middle Archaic (5000-2000 B.P.), and Late Archaic (2000-250 B.P.). Points are usually the chronological material by-products that are highly prized by archaeologists, and probably less so by prehistoric peoples, for measuring site stratigraphy. In this matrix, Paleoindian Tradition is typically characterized by Clovis, Folsom, and Plano forms, Early to Middle Archaic are characterized by lanceolate and stemmed forms while Late Archaic are characterized by notched or specialized forms for arrows or atlatls.

In the High Prairie erosion, tectonic manipulations, and faunalurbations altered the sites' stratigraphy to the point of a mix of differing lithic tool forms in many different levels. Therefore, the stratigraphy of the sites is unreliable for dating. However, given the high number of Late Archaic forms in the collection (n=88) at every level (see Table 2) compared to the Early to Middle Archaic forms also present throughout the site matrix (n=29) (see Table 2), it is concluded that the sites are Middle to Late Archaic sites used continuously through yearly residency patterns. More, the noted lanceolate and stemmed points in the site could have been transported to the site or possibly represent a duplication of a form used in an earlier temporal context. Regardless of the temporal application into the Middle Archaic, as the climate stabilized around 3500 B.P., the highly mobile residency pattern would stay consistent from a stable resource.

TABLE 4. Artifact Category Frequencies for Six Area Sites

	Weapons	General Use	Domestic Tools	Fabricating Tools	Totals
10-EL-215	71	65	20	56	212
Three Island	385	153	800	53	1391
Clover Cr.	119	106	325	63	613
Knox	207	102	108	143	560
King Hill Cr.	87	14	107	36	244
High Prairie	127	115	33	50	325
Totals	1000	560	1393	422	3375

Technological Analysis

The technological conclusions resulting from the artifact and lithic assemblage here demonstrate that the High Prairie is characteristic of a fabricating or retooling site. Moreover, the sites show consistent evidence of retooling happening concurrently with other behaviors in a high mobility camp. Taken as a whole, for which the characteristics are uniform across all High Prairie sites, the high levels of weapons (39%) and general tools (35%) coupled with the relatively elevated level of fabricating tools (15%) demonstrate that weapons and general tools were taken with these aboriginal groups to these areas and being retouched (see Table 1). This is consistent with sites such as 10-EL-215, 10-EL-216, and the King Hill Creek sites, wherein evidence was consistent with a high mobility residency pattern.

Further, given the high level of lithic debris ($n=39,051$) as it relates to the assemblage of artifacts, it can be assumed that some new tool fabrication occurred at the same time as artifact retouches. The proximity to several obsidian sources such as Camas Prairie and Cannonball Mountain coupled with high occurrence of cortex on the lithic debris (40%) shows a high probability of specialized groups collecting lithic material and stopping to retouch or fabricate new lithic tools in the area, but more importantly, groups out retouching or fabricating as a secondary behavior while moving toward a primary behavior, such as camas collecting. In fact, the proximity to the Camas Prairie, known from ethnographic data to be a periodic and very unsynchronized social meeting area, may be an important aspect of the site's interpretation (Murphy 1960). As Brisland determined, there was in all likelihood no camas processing evidence on the artifacts in the High Prairie because Brisland did not take into account that camas collecting and lithic retooling may be happening together, but that retooling may be happening *before* the collecting (Brisland 1994). Not to mention the fact that a more detailed and systematic analysis may be needed for the future study of camas processing on any of the High Prairie sites from what was conducted with Brisland's analysis (Brisland 1994).

The retooling/fabricating conclusion is further backed up by the size analysis of the lithic debris. The debris is predominantly < 1 cm in length ($n=27,957$, 72%) and when combined with 2 cm in length, make for a total of 96% of the total lithic flakes ($n=37,268$). Comparable, when analyzed against contemporaneous studies such as 10-EL-215 (Plew and Willson 2013), 10-EL-216 (Plew 2010), Knox site (Plew et al. 2002), and Swenson sites (Willson et al. 2007), they show the same pattern of lithic tool material as other sites that show signs of high residential mobility.

A chi-square test run for the related sites mentioned revealed a high correlation for artifact category frequencies as well as lithic size analyses (see Tables 1 and 2). The artifact categorization for all six sites shows a strong relationship between the sites and their lithic tool remains ($X^2=704.92$, $df=23$, $p<.001$). These results are in line with the results Plew and Willson found with their findings in 10-EL-215, the lithic tool categories are specific to the sites themselves.

Lithic flake size analysis results give the same result. When the flakes from High Prairie are analyzed against the flakes from the same sites, we see a strong correlation of flake sizes in comparison with the sites (see Table 2). A chi-square test revealed a strong relationship between flake sizes within sites and across ($X^2=253.64$, $df=14$, $p<.001$). Therefore, we can say with some degree of confidence that the site assemblage in the High Prairie follows the same line of site composition as the contemporaneous sites in Southern Idaho that show behaviors of temporary residency patterns.

TABLE 5. The Frequency of Flake Sizes (adapted from Plew and Willson 2013)

Size Analysis Percents	<1 cm	>1-<3 cm	>3->5 cm	Totals
10-EL-215	33039	11735	6711	51485
10-EL-216	5564	1202	0	6766
Knox	33152	12608	5311	51071
Swenson	5039	0	0	5039
High Prairie	27957	10810	276	39051
Totals	99561	34358	12223	146142

A word needs to be mentioned on the lack of faunal remains in the collection. Out of the total 40,000+ pieces of cultural material in the assembly, the total pieces of faunal remains were less than 1% of the collection (n=31). Aside from suspicious problems in the collection, it is concluded that the lack of faunal remains is consistent with a high mobility residence pattern (Roberts 2015).

Prehistoric Lithic Tool Organization as an Indicator of Residential Mobility

To assess the residential mobility of the site assemblage, Kelly's Residential Mobility Index matrix was used, which used 14 variables that measured whether sites display either low or high residential mobility qualities (Kelly 2001). The matrix was applied previously to all sites in the Middle Snake River including 10-EL-215, Knox, Swenson, King Hill Creek, 10-EL-216, 10-CN-6, and 10-EL-438. All sites except Knox fell into the high residential mobility matrix. Knox was more characteristic of a collector residency pattern.

Analysis of the High Prairie taken as a whole and individually display characteristics that typically follow a high residency pattern. The qualities of the 14 variables are met by 13 of them with the High Prairie collection (see Table 6). The same qualities are met by 10-EL-216 and 10-EL-215 (Plew and Willson 2013).

The first category of Kelly's analysis is the use of predominantly volcanic rock or CCS as the source of any tool or knapping used in the sites. Lithic debris from the High Prairie is 75% CCS and volcanic glass, both lithic material that is consistent with a high mobility residence pattern (see Table 6). The second category in Kelly's matrix includes bifaces as cores, which is common through the sites, representing 35+% of the core assemblage demonstrating flaking bilaterally across the rock face. There is no presence of high-investment flaking on any biface tools or angular knapping, consistent with bipolar knapping in the artifact assemblage, all of which demonstrate characteristics of high mobility residency patterns.

Flake tools, as represented by worked flakes or utilized flakes in the artifact assemblage is medium (13%), which is also consistent with a high mobility residence pattern. The presence of FCR, as measured by the percentage of assemblage is <1%, therefore falling under the previously standardized rate of a low count of FCR at <30%. With site size/density measured at 39,051 lithic debris and 475 artifacts revealing a small site size and low density. Tool/debitage ratio is .03, which falls into the low mobility category of Kelly's mobility matrix. However, this can be explained by the nature of the site's function. Although many activities are occurring in the same area, evidence of retooling is prevalent in the area, which can explain a high debitage ratio, therefore, making the ratio lower than it should.

Complete flakes are rare in this assemblage and mostly consist of proximal and distal flake fragments, demonstrated an expedient lithic retooling or fabricating site, which matches a high mobility residency pattern. Assemblage size/diversity ratio has a low slope, consisting of a relatively common tool diversity throughout the site (n=11 tool types), in comparison to a small assemblage size (n=475). The low slope is indicative of a high mobility residential pattern; that is about the forager strategy.

Use-wear analysis found very little use-wear (1.1% of the total artifact assemblage). Sites 10-EL-215 showed similar use-wear analysis results (Plew and Willson 2013). Mobility from site 10-EL-215 determined the site to be of a high mobility pattern consistent with a forager strategy, as it does here as well.

Sediment analysis concluded that the site demonstrates no strata changes throughout the unit matrix. Further, lack of staining or compaction of the activity floor is also consistent with any short-term residency patterns, revealing a high mobility forager strategy.

Finally, Roberts's treatment of Kelly's matrix looked at non-lithic artifacts present in the assemblage (Roberts 2015). Roberts analyzed the presence of ceramics, fire hearths, groundstone, or storage as indicative of low mobility residency pattern consistent with a collector strategy. The High Prairie contains 28 pieces of ceramic, no fire hearths recorded, groundstone, or evidence of storage. Ceramic, which can be interpreted in many ways as lithic tools are with longer-time investment ceramics (depending on material and form), but also as expedient ceramics (sediment taken from areas where there is clay consistency, which is much of the southern Idaho landscape). Therefore, although there are some amounts of ceramic, overall the site reflects a high mobility residency pattern, even by Roberts's variables.

TABLE 6. Kelly's (2001) Index of High and Low Residential Mobility

	High Residential Mobility	Low Residential Mobility	High Prairie
Lithic Raw Material	CCS/Volcanic Glass	Siltstone, Tuff, Rhyolite	Volcanic Glass
Bifaces as Cores	Common	Rare	Common
Bifaces as By-Products	Rare	Common	Rare
Bipolar Knapping/Scavenging	Rare	Medium to Common	Rare
Flake Tools	Rare to Medium	Common	Medium
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	High
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

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ARTICLE

Difficulties Pertaining to and Relevance of a Western Stemmed Tradition Paleoarchaic Bifacial Point/Knife Recovered from the Pend Oreille River near Seneacquoteen, Bonner County, Idaho

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Abstract

A large Paleoarchaic dual function stemmed bifacial point/knife recovered from a lag deposit on the banks of the Pend Oreille River near Seneacquoteen, Idaho, is described and compared with other stemmed points from the Columbia Plateau and northern High Plains. Although unique in its form and typology for the inland Northwest, it metrically compares most closely with Alberta Complex points. The cryptocrystalline siliceous chert from which the point/knife was flaked macroscopically resembles Knife River Flint from North Dakota. Fluorescence testing suggests it is more closely aligned with similarly appearing chert from Alberta, Canada or Montana. The lithic source may indicate a post-glacial exchange with the northern High Plains. The artifact has not been identified with any known Paleoarchaic typology from this region and is more generally included in this paper within the larger Western Stemmed Point Tradition as it was expressed in combination with a northern High Plains complex known as Alberta-Cody. Its size and shape indicate it was hafted to a thrusting or throwing spear shaft. The recovery along the Pend Oreille River in Idaho near the Seneacquoteen Crossing of a large stemmed lanceolate bifacial point/knife with a convex base that gives indication of having been manufactured from an Alberta or Montana siliceous chert resembling Knife River Flint from North Dakota informs on incipient trade networks in the process of being established proximal in time to retreat of the Purcell ice lobe of the Cordilleran ice sheet.

KEYWORDS: Alberta-Cody, Bifacial Point, Paleoarchaic, Pend Oreille, Seneacquoteen

Introduction

Background Information

The Seneacquoteen Crossing on the Pend Oreille River at the mouth of Hoodoo Creek, 19 km downstream from Sandpoint, Idaho, has long been documented as a Native American river crossing location stretching back to prehistoric times as well as an area of encampment for the Kalispel Tribe within historic times (Bonner County Planning Dept. 2002). In 1988 an “old spear point” was donated to the Bonner County History Museum from the estate and private collection of John Fox. A description of this artifact as having come from the south banks of the Pend Oreille River 1.6 km (1 mile) upstream from Seneacquoteen would place the location of recovery of this projectile point on the homestead property of John Fox’s father, August Fox, near the mouth of Tanner Creek and the conjunction of Sec. 32 and Sec. 29 in T.56N, R.3W. A recent re-evaluation of this artifact led to the realization that this flaked biface represents a point/knife regionally unique in its metrics and style of manufacture as well as being formed from a chert material exotic to this region. Chronology for this artifact based on form and function attributes fall within the Paleoarchaic, a Paleo-transitional or Initial Archaic span, and thus serve to inform on the timing of Native American occupation of the Pend Oreille River and Lake Pend Oreille region of Bonner County, Idaho, following retreat of the glaciers.

The Pend Oreille River flows westward to Albeni Falls Dam from its outlet at Lake Pend Oreille and then commences a northwesterly flow to its confluence with the Columbia River in British Columbia. For its initial westward flow, it is bounded by the Selkirk Range on its north shore and by valleys and prairies formed by Ice Age floods on its south shore. Gough (1997) reports on geological evidence that there was rapid dissection of glacial drift following deglaciation of the Pend Oreille River Valley ca. 11,200 B.P. leaving in its wake a low gradient stream subject to flooding and deposition of thinly laminated silty and clayey floodplain alluvium. His research indicates that there is little vertical elevation difference in the Holocene surfaces upstream of the Albeni Falls Dam. Gough further indicates that the Pend Oreille River had established a post-glacial north flowing channel by 10,000 B.P. Miss and Hudson (1987) place the timing of prehistoric occupation of the Pend Oreille Valley to be soon after deglaciation, approximately 11,000-12,000 B.P.

Prior Research

Although the bifacial point/knife BCHM 1988.049.005 does not fully comply with forms of regionally known points of the Paleoarchaic, it is similar enough to two types of a stemmed tradition, the Alberta and Windust, to warrant providing information on representative known specimens and locations of these forms. Western Stemmed Tradition has been summarized by Chatters et al. (2012) as encompassing an area from Banff in the Northern Rockies to the northwestern coast of Oregon and extending southward into the Great Basin.

One High Plains manifestation of a stemmed point is the Alberta point associated with the Cody Complex. Frison (1998) describes the Alberta as a stemmed and shouldered projectile point first recognized in Alberta, Canada, associated with *Bison antiquus* but better represented at Northern Plains Paleoindian cultural group sites such as the Hell Gap site in Wyoming and a *Bison bison* kill site in western Nebraska. Frison (1998) places the Alberta Complex in a time frame of approximately 9750 to 9250 B.P., overlapping with the preceding Hell Gap Complex and succeeding Cody Complex (Alberta points are sometimes referred to as part of the Alberta-Cody Complex.) Interestingly, Alberta points show up far afield, such as the

Glacial Lake Peace and Peace River Valley in British Columbia. Fladmark (1981) describes the Peace River Valley as forming about 10,000 years ago by initial rapid incision of the stream into the former lake basin with upper alluvial terraces becoming available for human occupation around 8000 B.P. From the Fort St. John area of the Peace River District, Fladmark (1981) describes a complete Alberta point of dark gray chert, measuring 11.6 x 4.03 x 1.0 cm, and a broken lanceolate point of Knife River Flint measuring over 9.7 x 3.0 x 7 cm. Cody Complex includes a distinctive asymmetrical knife form with a notch on one side of the stem. Scott (2016) summarizes hypotheses concerning the relationship of these forms as “Alberta points are considered by some to be ancestral to the Cody Complex” and “Alberta/Cody (types I and II) and classic Alberta points are likely a chronological precursor to Scottsbluff and Eden points...” (Scott 2016:12). In her conclusions regarding the history of exchange for Western Stemmed Tradition points, Scott (2016:57) suggests that one line of descent of the Western Stemmed Tradition consists of the Cody Complex with possible borrowing from Windust and Hell Gap points. Scott further concludes (2016:59) that considering evidence for migration through the Idaho-Wyoming region and evidence of west-to-east movement of points across North America coupled with similarities in style of the Buhl Burial point and Windust points, there is indication of continuity in style of hafting techniques between Western Stemmed and Cody Complex technology.

The chronological label Windust phase is used for a Columbia Plateau manifestation of the Western Stemmed Tradition (WST), also referred to as the Western Stemmed Point Tradition (WSPT). “Components attributable to this tradition range from 13,350 cal B.P. at the Cooper’s Ferry Site in northern Idaho to as late as 9000 cal B.P.” (Chatters et al. 2012:40). The Windust Caves (45FR46) are located along the lower Snake River in Franklin County, southeast Washington. From 1959 to 1961 sequences of tools excavated there indicated a transition of stone tools beyond the large concave-based fluted Clovis point utilized by and diagnostic of a late Pleistocene culture for exploitation of Ice Age mammals such as mammoth or mastodon (Rice 1972). Instead, leaf-shaped stemmed points that were utilized by a late Pleistocene/early Holocene culture for predation of large game animals, most notably deer, elk, and pronghorn antelope, were noted in the Windust Cave assemblage (Leonhardy and Rice 1970; Rice 1972). In a later Cascade phase sequence dated ca. 8000 to 6500 B.P., projectile points became smaller in size, ranging from 2 to 7 cm in length (Rice 1972).

Subsequent research in the Northwest further defined the dating of stemmed points associated with the Windust phase. For instance, a large stemmed obsidian biface typed as Windust phase and measuring 9.66 cm in length was associated with the burial of a young woman at the Buhl site, radiocarbon dated 10,675 +/- 95 B.P., near the Snake River in south-central Idaho (Green et al. 1998). A variety of stemmed points were found within a cache of tools discovered at the Cooper’s Ferry site along the lower Salmon River Canyon. Radiocarbon assays assigned dates of 11,370-11,410 B.P. to one artifact cache that included four Windust points at the base of Pit Feature A2 (Davis 2014). At Kelly Forks (10CW34) within Idaho’s Clearwater National Forest, research conducted by Lee Sappington of the University of Idaho uncovered Windust age implements among artifacts ranging in age from 12,000 B.P. to about 200 years ago. Among these were spear points shaped from exotic lithic sources, such as obsidian and green vitrophyre, implying connections with Native American tribes living in southern Idaho, Oregon, and Montana (Sappington and Longstaff 2014; Longstaff and Sappington 2014). Also located in the Clearwater drainage is the Hatwai site (10NP143) with an early Windust assemblage dated 10,800 and 8599 B.P. (Ames et al. 2010). The Granite Point assemblage (45WT41) on the Snake River includes artifacts dating to the Windust phase (Leonhardy and Rice 1970). At Marmes Rock Shelter (45FR50) dated 11,230 +/- 50 B.P. near the confluence of the Snake and Palouse Rivers, a lanceolate projectile point composed of

material resembling Knife River flint, Artifact 3162, was among the artifacts recovered, measuring approx. 7.5 cm. by 2 cm. (Hicks 2004). A projectile point embedded in the Kennewick Man's right hip (ca. 8358 +/- 21 B.P.) was analyzed and determined to be either a Haskett phase WSPT or Cascade phase, dating to the transition between Western Stemmed and Old Cordilleran traditions (Owsley and Jantz 2014). At Paisley Caves in the Summer Lakes region of central Oregon, WSPT shouldered points were found to be commensurate in age or older than the Clovis Culture (Jenkins et al. 2012). This has led to the suggestion that Clovis may have developed in the Plains and Southeastern United States whereas the Western Stemmed Tradition was an indigenous development in the far western United States (Jenkins et al. 2012). The debate continues and questions the hypothesis that the Clovis Paleoindian Tradition predated the Paleoarchaic Tradition in the far west, posing instead the hypothesis that a Paleoarchaic culture characterized by a lithic reduction sequence notable in the WSPT was not descendant of the Clovis lithic reduction sequence but rather contemporaneous with or precedent to that sequence (Davis et al. 2012).

Although the artifact reported here typologically resembles Columbia Plateau manifestations of Windust points of the Western Stemmed Point Tradition in some aspects, it does not comply metrically. Most notably, its greater blade width, greater stem width, and convex base separate it from typical Windust points. For instance, Ames et al. (2010) report on eleven Windust points from the Hatwai site near Lewiston, Idaho, with a mean width of 1.95 cm, a mean thickness of 0.62 cm and a mean neck width of 1.36 cm. These measurements indicate non-compliance of BCHM 1988.049.005 with the accepted Windust assemblage.

Of particular interest to the present study are artifacts recovered in the vicinity of a reach of the Pend Oreille River in northern Idaho that stretches for 47 km from its outlet at Lake Pend Oreille to the Albeni Falls Dam. In a comprehensive compilation, Robert C. Betts and James C. Bard have summarized the prehistoric archaeology of the Upper Pend Oreille River Archaeological District in a manuscript prepared for the Idaho Transportation Department (Bard et al. 2014). Likewise, C.J. Miss and L. Hudson (1987) of Cultural Resources Consultants undertook for the United States Army Corps of Engineers (USACE) an extensive survey and analysis of 1000 artifacts recovered from ten private collections along both shores of the Pend Oreille River within an area stretching from above Sandpoint to the Albeni Falls Dam and reported a synthesis of this information with results of systematic excavation and systematic surface collection from the same area. Cut banks and lag deposits caused by fluctuating levels of reservoir water had increased the contribution and importance of information available from private collectors for their 1987 study. Within a 4.48 km stretch encompassing the Hoodoo Creek outlet, Miss and Hudson recorded the distribution of large stemmed, shouldered lanceolate, lanceolate, and side-notched points. Large stemmed or shouldered lanceolate points had been recovered from 10BR437, 10BR94, 10BR16, 19BR286, 10BR10/20, 10BR494, 10BR503, 10BR516, 10BR519, 10BR22, 10BR522, 10BR525, 10BR14, and 10BR532. However, none of the stemmed or shouldered lanceolate points reported on exceed 9.9 cm (the majority were smaller) and all were designated an age of less than 8000 B.P. (Miss and Hudson 1987). For non-shouldered lanceolate points, fifteen were reported as being 8 to 10 cm in length. Nonetheless, Miss and Hudson (1987) concluded from their body of evidence that the Albeni Falls Dam Project Area was occupied soon after de-glaciation, ca. 11,000 B.P.-12,000 B.P. It was reported in 1970 (Leonhardy and Rice) that there are 30 early Holocene surface assemblages around Lake Pend Oreille that bear close resemblance to the Windust. Weisz (2006) reports that, following completion of the Albeni Falls Dam on the Pend Oreille River in 1955, upstream erosion ensued and cultural materials were collected by local residents that included bola stones and large-stemmed and shouldered projectile points similar to varieties associated with the Pleistocene/Holocene transition.

The Bonner County History Museum was recipient of additional artifacts recovered from the shore of the Pend Oreille River near the mouth of Tanner Creek on the August Fox property proximate to the Seneacquoten Crossing. These artifacts are comprised of donations by the sister of John Fox, Leona Judge, who donated a “jadeite” adze and a sharpening stone in 2009 and six stone pestles in 2012. It is beyond the scope of this paper to date and analyze these artifacts other than noting that nephrite adzes recovered in Bonner County are discussed in Bard, Betts and Lahern (2014) with indication from research by Darwent (1998) that nephrite celt (aka. adze) use in the Columbia Plateau is dated no earlier than 2400 B.P. and that the lithic source of nephrite was from the Frazer River area of British Columbia in the Lytton and Lillooet region. In addition, jadeite occurs in northwestern British Columbia but is thought to be an unlikely source for Bonner County adzes.

Bard, Betts and Lahern (2014:96) report a synopsis of an unpublished chronology prepared for the USACE by Salo (2008) in Appendix D, titled *Proposed Cultural Chronology for the Pend Oreille River Valley*. The following early time periods are included:

Phase Purcell: Before 8000 B.P.: Human use was sparse and not focused on the relatively unstable and unproductive shoreline of the lake and river. Large lanceolate forms like Hell Gap, Agate Basin, Alberta, and Windust; no fluted point tradition is evident. Highly mobile large game hunters adapted to the cold steppe environment of the recently de-glaciated Pend Oreille region.

Phase Hoodoo: 8000 B.P.-4500 B.P.: Cascade-style lanceolate points are common as well as dart-sized side-notched points. Broad spectrum foragers exploited the sagebrush steppe-woodland mosaic of the early Holocene epoch. Earlier focus on large game like deer, elk, woodland caribou, and possibly bison continued. People used variety of microhabitats and diverse plant and animal resources. The subsistence pattern was not focused on riverine settlement or resources.

Phase Cocolalla: 4500 B.P.-2500 B.P.: The cooler climate, increased forest cover, and eventual closure of forest canopy decreased landscape productivity. This process began as early as 6000 years ago and was complete by 2500 B.P. Regional population increased and innovations in procurement, processing, and storage technologies became widespread; settlement patterns changed profoundly. Exploitation of riverine habitats became more pronounced. Camas was established as an important staple along with local game and other resources. Dependence on stored resources began, as did population aggregation along the Pend Oreille River. Points are more commonly made of local materials, suggesting smaller foraging radii with dart-sized corner-notched and poorly formed stemmed points. Pelican Lake Corner-Notched from the northern Great Plains and short-bladed stemmed forms similar to interior British Columbia styles suggest contact with other groups.

Artifact BCHM 1988.049.005 is not likely derived from or associated with later inhabitants of this region. Semi-sedentary people such as the Kalispel are not indicated as present in the Pend Oreille Valley until at least 5000 B.P. Most dated camas ovens post-date 3500 B.P. commensurate with an inferred more concentrated population. “Based on radiocarbon dates from camas ovens documented during the Calispell Valley Archaeological Project (CVAP) on the lower Pend Oreille River near the Kalispel Reservation, the earliest use of camas ovens extends back to around 5000 B.P. According to archaeological evidence, use of camas ovens increased around 3500 B.P.” (Bard, Betts and Lahern 2014:93).

Artifact Description

The completeness of the bifacial point/knife reported on here coupled with its size adds to information for a tentative chronology of human presence in the Upper Pend Oreille River Archaeological District. Though lacking in controlled stratigraphic information, it nonetheless has the potential to add significantly to knowledge of the nature of occupation during the Paleoarchaic time frame of the upper Pend Oreille River.

The point/knife assigned the BCHM catalog no. 1988.049.005 is described as follows (see Figures 1, 2, 3, 4 and 5):

Condition: Complete.

Measurements: Weight: 157.05 gm. Maximum Length: 14.9 cm. Max. Blade Length: 12.3 cm. Maximum Width: 7.3 cm. Shoulder Width: 6.5 cm. Neck Width: 4.03 cm. Maximum Stem Width: 4.2 cm. Maximum Stem Length: 2.6 cm. Approximate Maximum Thickness: 1 cm.

Morphology: A bifacial shouldered point/knife with an abrupt shoulder that exhibits a distinct asymmetric stem edge that is straight on one edge and widely curved (notched) on the opposite stem edge and that exhibits a slightly convex base and a lanceolate shaped blade.

Lithic Reduction Pattern: Multi-directional random percussion flaking pattern with fine, even pressure flaking on the edges. Conchoidal fracture is prevalent.

Optical Properties: Translucent on feathered edges, opaque to translucent body towards the center. White inclusions are opaque.

Typology: Unique in its metrics. Shares traits with but is not completely compatible with Alberta points and Windust points of the Buhl form. An asymmetrical stem indicates potential use as a knife.

Chronology: Estimated 12,000 to 9000 B.P. (post deglaciation Paleoarchaic).

Source Material: A cryptocrystalline silicate, more specifically a siliceous chert that resembles Knife River Flint macroscopically but not by fluorescence testing. Finely textured, waxy, dark brown in color (root beer or caramel colored) with white inclusions, formed from interaction of silica rich groundwater with organic material.

Quarry Location: Unknown. Possibly from flint or chert quarries in Alberta or British Columbia or Montana. If fluorescence testing is incorrect, possibly from Knife River Flint quarries in western North Dakota.

Flouresence: Artifact did not fluoresce when it was irradiated with a Raytech 254 nm, 115 v short wave UV lamp.

Discussion

Lithic Source

Murphy (2014) provides the following information concerning Knife River Flint (KRF). Quarries have been identified in Dunn, Mercer, and Oliver Counties of western North Dakota near the Knife River and Spring Creek. Quarrying KRF dates to over 13,000 years, and Paleoindians valued it for its conchoidal fracture pattern. Projectile points, blades, and scrapers of KRF were distributed great distances from North Dakota. KRF is a high quality, glass to waxy, finely textured, uniform, nonporous, translucent, brown to dark brown chert (flint). The brown color derives from evenly distributed organic material. The presence of white fossil plant fragments in the brown translucent flint helps distinguishes KRF. Stems of the silica-rich plant *Equisetum* (horsetail) are known from KRF beds (Murphy 2014). Suggestions for distinguishing KRF from similarly appearing lithic material are provided by Kirchmeir (2011). His KRF flaked scar samples fluoresced a yellowish-gray and a pale to strong orange on patinated surfaces when irradiated with a 254 nm, 115 v ultraviolet light, whereas his samples from three Alberta ecozones of “Look-Alike” chert obtained from the Royal Alberta Museum did not fluoresce. Laura Evilsizer (2016) examined 22 archaeological assemblages from Montana using UV light to determine the accuracy of identification of KRF artifacts in these assemblages and found that KRF was identified correctly only 46.9% of the time. In her study, depiction of materials mistaken for KRF included Fort Union Formation (Glendive, MT), Flaxville Gravels (Flaxville, MT), Brown Chert (New Buffalo, SD), Silicified Wood (Baker, MT), Chert (Horton, MT), Dark Brown Chert (Dunn County, ND), Translucent Chert (Slope County, ND), Chert (Hodges, MT), and Brown Chert (Slope County, ND) (Evilsizer 2016:179-183). One assemblage examined by her that might be linked to BCHM 1988.049.005 lithic material was the MacHaffie Site (24JF4), dated from charcoal as far back as 10,390 and 10,090 B.P, and which is associated with several major quarries including a red brown chert quarry (Evilsizer 2015:69).

Top of the World Chert was a lithic source for Native American stone artifacts dating back to 9000 B.P. Located in the Von Nostrand Range of the Rocky Mountains of eastern British Columbia, quarries of this chert have ties to the Top of the World Pass as both a human and ungulate travel route (Choquette 1981). Although Top of the World Chert exhibits qualities similar to KRF, color ranges that grade from white to gray to black do not correspond to the brown translucent shades of KRF. Other cryptocrystalline silicates identified by Choquette (1984) are Avon Chert from the Nevada Creek Valley in western Montana and Red and Gold Dendritic Chert from the Madison Formation in western Montana. Proximity of Avon Chert locations to the Clark Fork River drainage suggests possible travel links to Lake Pend Oreille. Of sites that Riley (2004) includes in a Southwest Montana Chert Area, the Avon Valley Quarry (24PW346), the South Everson Creek and Black Canyon Creek Quarry and Workshop Complex (Beaverhead County), and the Palmer Quarry (24JF266) might be linked by age, lithic attributes, and accessible travel routes to BCHM 1988.049.005.

Links to Former Research

Nomadic hunters and foragers may have exploited the Pend Oreille River area at an early date. Weisz (2006) reports that bola stones (pendant shaped plummets girdled around the long axis) are considered diagnostic artifacts dating from the terminal Windust and early Cascade phases. Those from Hornby Creek (10BR522 and 10BR14) are typologically among the earliest groundstone tools recovered from the Northwest. “The majority of the (Hornby Creek)



Figure 1. BCHM 1988.049.005, side 1 depicting shape, size, opacity, white inclusions, and flaking pattern.



Figure 2. BCHM 1988.049.005, side 2 depicting shape, size, opacity, white inclusions, and flaking pattern.



Figure 3. BCHM 1988.049.005, side 2 depicting translucence and color.



Figure 4. BCHM 1988.049.005, side 1 depicting translucent edge wear.



Figure 5. BCHM 1988.049.005, side 1 stem enlargement exhibiting modification of flake scars.

projectile points, flake knives, and associated tools including all the bolas are reminiscent of Windust-like assemblages, especially those found at Marmes Rockshelter.” (Weisz 2006:21). Weisz concludes that the occurrence of bola stones indicates small game and bird procurement and the presence of line weights suggests procurement of fish. Lithic sources for the steatite bola stones have been linked to a soapstone quarry 14 miles northwest of Baker City, Oregon, and bola stones are known from a site on Pilcher Creek (35UN147), a tributary of the North Powder River in Oregon (Weisz 2006). Likewise, Keo Boreson (Landreth et al. 1985) reports on obsidian flakes recovered below a Mazama ash temporal marker during a systematic excavation at the Cabinet Landing Site (10BR413) along the Clark Fork River. The source for this obsidian was linked to the Wallowa Mountains near Baker City in northeastern Oregon. Another obsidian source, Timber Butte in southwest Idaho, is assigned the point base LC# 45015 with a channel flake scar recovered from the Sandpoint Archaeology Project Site 10BR978 OP-1 (Bard et al, 2014:139). This point base has a 1.83 cm neck width (Bard et al., 2014:124).

Choquette (1983) spoke of evidence for prehistoric occupation of the McArthur Lake locality north of Sandpoint, associated with the Purcell Trench. Charcoal from a Pacific Gas Transmission line trench was radiocarbon dated over 9000 years B.P. and associated with a McArthur Lake site stone artifact assemblage of large knives and stemmed points that may have been hafted as large spears. These artifacts are characterized by black siliceous siltstone or black metamorphical siltstone that Choquette sources to the divide between the Moyie drainage and Goat River drainage and more specifically to the Goatfell Quarry in the Purcell Mountains of British Columbia (Choquette 1983, 1984, 1997). Choquette (1983) proposed a link between southeastern British Columbia and Lake Pend Oreille Paleoarchaic cultures.

Metrical Comparison with Selected Stemmed Point Traditions

It is of interest that the combination of length, width and stem shape of BCHM 1988.049.005 eludes adherence to and identification with other regional manifestations of a stemmed point. Table 1 compares some published metrics. Thus BCHM 1988.049.005 appears to represent a unique category of bifacial point/knife. It appears to be most similar to Alberta points known to be used in bison hunts during the Paleoarchaic period (Vickers 1986). Large width dimensions of BCHM 1988.049.005 separate this artifact from both Windust and Alberta artifacts. Length dimension is commensurate with but exceeds the length of points associated with Windust and Alberta-Cody Complex. The shoulders are straighter and more pronounced.

Although the stem is straight on one edge, it exhibits on the opposite stem edge a widely curved corner notch (Figure 5). This curved notch suggests hafting characteristic of a knife. Adding to the concept that artifact BCHM 1988.049.005 exhibits both knife and point characteristics is research by Lafayette and Smith (2012). Endeavoring to clarify use of Paleoarchaic points, Lafayette and Smith (2012) conducted experiments to replicate use-wear on Great Basin points (Cougar, Parman, Windust) and found evidence for multiple uses of these artifacts, most notably as both knives and projectiles. An asymmetric stem form for BCHM 1988.049.005 coupled with modified pressure flaking on the stem suggests use as a knife. Dual purposes as both a spear point and as a knife are suggested for this artifact. The convex stem base is commensurate with Alberta points. A convex stem base is commensurate with the Buhl manifestation of Windust points, but does not comply with the concave base distinguishing most manifestations of Windust points. The convex stem base does not comply with the concave stem base of Cascade Points or Lind Coulee Points.

TABLE 1. Size Comparison (cm) of BCHM 1988.049.005 with Selected Alberta and Windust Shouldered, Stemmed Lanceolate Points with Convex to Straight Base

	BCHM Pend Oreille This Study	WINDUST Mean* Rice 1972	WINDUST Buhl Green et al. 1998	WINDUST Hatwai 1** Ames et al. 2010	ALBERTA Peace River Fradmark 1981	ALBERTA Range *** USDI
Length	14.9	4.9	9.66	7.1	11.6	12.0 to 5.0
Max Width	7.3	2.4		1.6 1.95	4.03	3.0 to 1.5
Shoulder Width	6.5					
Neck Width	4.0			1.0 1.36		
Stem Length	2.6	1.8				
Stem Width	4.2	2.0		1.1		
Thickness	1.0	0.8		0.62	1.0	0.8 to 0.5

* = Mean measurement for 23 specimens from Windust Caves, Marmes Rock Shelter and Granite Point.

** = One of largest specimens from 11 specimens from Hatwai I as compared to combined means for Western Great Basin and Hatwai points.

*** = Range of measurements published by U.S. Department of the Interior, Billings Curation Office, based on H.M. Wormington reports.

Chronological Constraints

Although there is evidence for an increasingly ancient human occupation in the Northwest, human presence along the Pend Oreille River and Lake Pend Oreille in Bonner County, Idaho, is constrained chronologically by the timing of the retreat of the Purcell sub-lobes of the Cordilleran ice sheet. Spanning a time period of ca. 17,000 to 12,000 years ago, well documented multiple sudden break-ups of the Purcell ice lobe as it diverged up the Cabinet Gorge is associated with catastrophic Ice Age floods (Breckenridge et al. 2013; Bjornsted and Kiver 2012). Late outburst floods and glacial meltwater from the Lake Pend Oreille sub-lobe diverged off the main path of the outburst floods into the Hoodoo Channel that eventually flowed north to enter the Pend Oreille River near Seneacquoteen (Breckenridge and Garwood 2014; Bjornstad and Kiver 2012). Human presence in this region would have been restricted by geology and geography to ca. 12,000 (a date of 11,200 B.P. is used by Gough). Once the break-up occurred, the region might have initially been characterized by a sparsely vegetated cold steppe environment that changed to more diverse vegetation and diverse animal presence as the climate continued to warm sporadically and the glaciers continued to retreat (Gough 1997; Landreth et al. 1985). However, pollen analysis suggests the area was already sparsely forested shortly after the final glacial retreat (Miss and Hudson 1987).

Implications and Inferences

What drove the possessor of this temporally indicative bifacial point/knife to traverse the Seneacquoteen area soon after deglaciation and the final catastrophic Ice Age floods? The artifact's function as a spear point implies protection from prey or pursuit of prey, especially large game species that would have been quick to colonize available land. Proximal in time to expansion and colonization of prey species onto newly exposed land, Native Americans in their pursuit of food would have extended their territory. Newly exposed land also implies newly available quarry sources, an essential element for an economy based on stone tool technology.

During a Paleoarchaic time frame, routes following corridors formed from a combination of glacial gouging and catastrophic flood stripping of the landscape were probably established as fore-runners to the historic trail system. A network of Native American trails documented in historic times spread in all directions from the Seneacquoten Crossing eventually connecting with a much larger network of trails utilized for long-distance trade and mobility in the pursuit of prey species. David Thompson noted these trails on his 1823 map of North America from 84 (degrees) West (Nisbet 2005). The “Skeetshoo Road” followed ice age flood channels across Rathdrum Prairie with the now Twin Lakes being the divide between the Pend Oreille and Spokane drainages (Breckenridge and Garwood 2014), thus eventually connecting with Columbia River tributaries such as the Snake River, Clearwater River, Palouse River, or John Day River. Across from Seneacquoten an established east-west trending trail led west to the Kettle Falls on the Columbia River where Shonitkwu artifacts dated 8800-9600 B.P. have been excavated (Chance 1986). In an easterly direction, the “Saleesh Road to the Buffalo” led to the Missoula Valley following the Clark Fork River drainage that had been gouged by glaciers and ice-age outburst floods to its confluence with the Flathead River. Thompson’s “Great Road of the Flatheads” or “Lake Indian Portage” later referred to as the Wild Horse Trail diverged from east-west oriented trails and headed north along the Purcell Trench, enlarged and deepened by glaciers, to the Kootenai River and into British Columbia (Nisbet 2005).

From a geoarchaeology perspective relating the environment to tool technology, the Western Stemmed Point Tradition indicates a culture that had adapted its tool assemblage to a transitioned environment where survival dictated successful exploitation of large game animals such as bison, deer, elk, caribou, pronghorn antelope, and bighorn sheep. This post-glacial environment was a departure from one demanding successful exploitation of Ice Age mammals such as mammoth and mastodon. The presence of a WSPT bifacial point/knife along the Pend Oreille River suggests that during the Paleoarchaic the user of this artifact was exploiting the presence of large game animals in this region or was establishing paths or following animal trails to or from other regions where such animals were in greater abundance.

Conclusion

Morphology and typology of the bifacial point/knife BCHM 1988.049.005 leads to differing hypotheses. Nomadic hunters traversing the Pend Oreille River area may have derived from populations utilizing the Western Stemmed Point Tradition in the Snake River region of north central Idaho, the Columbia Plateau, or central Oregon. Presence of Knife River Flint or a similar appearing chert at Marmes Rock Shelter adds credence to this hypothesis as well as presence of bola stones recovered from the Pend Oreille River banks that indicate an eastern Oregon lithic source. Alternatively, the population source may have derived from a region to the north and east where the Alberta complex of stone tools included large bifacial points sharing traits with BCHM 1988.049.005 that were used as spear points for large game hunting and that also included Knife River Flint or a similar appearing chert as lithic material. Lithic source identification indicates the creator of this artifact was linked to or accessed this region from the northern High Plains. The Seneacquoten Crossing on the Pend Oreille River served as a crossroads linking nomadic hunters to the bison fields of Montana, Wyoming, and other northwestern Plains sites as well as to the salmon rich Kettle Falls on the Columbia River in Washington. The BCHM artifact 1988.049.005 may have arrived at this location from a circuitous route that first went southwest from the Alberta, North Dakota, or Montana region to population centers characterized by use of Paleoarchaic tool assemblages in central Idaho or the Columbia Plateau and then took a northerly route following mega-flood induced and

ravaged channels; alternatively this artifact may have arrived here from an eastern route through the Clark Fork River corridor from groups associated with the Alberta-Cody Complex. Furthermore, presence of similar artifacts in British Columbia suggests a northerly route that followed the Purcell Trench southward past McArthur Lake to the Lake Pend Oreille region. Thus, just as in historic times, the Pend Oreille River crossing point near Sandpoint may have been a location for the interaction, confrontation and/or assimilation of diverse cultures proximal to the Pleistocene/Holocene time boundary.

Timing of the deposition of BCHM 1988.049.045 is constrained by timing of the deglaciation the Pend Oreille River, thus rendering human presence possible. All these considerations combined with observed point/knife attributes suggest a date of ca. 12,000 B.P. to 9000 B.P. for the deposition of this artifact, thus complying with Salo's Phase Purcell and separating it from later occupants of this region dating from Phase Hoodoo and Phase Cocolalla to the Historical time frame (Salo 2008). The recovery along the Pend Oreille River near the Seneacquotteen Crossing of a large stemmed lanceolate bifacial point/knife with a convex base that was manufactured most likely from a siliceous Alberta chert or Montana chert resembling North Dakota's Knife River Flint informs on incipient trade networks in the process of being established proximal in time to retreat of the Purcell ice lobe of the Cordilleran ice sheet.

The asymmetric stem shape of BCHM 1988.049.005 is of particular interest being straight on one stem edge as in Alberta points and notched on the opposite stem suggestive of facilitating its use as a hafted knife. A recognized typology has not been identified for this artifact that would add exacting information on Native American occupiers of the Pend Oreille River vicinity during the Paleoarchaic. Comprehensive former attempts in this endeavor have recognized the importance of information derived from private collectors of surface finds pending further systematic excavation of the Pend Oreille River upriver from Albeni Falls Dam. Reevaluation of museum collections can be informative. This artifact contributes to understanding the dual function of large Paleoarchaic points both as a point and a knife. The artifact described here serves to enlarge understanding of Native American presence in this vicinity during the Paleoarchaic.

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BOOK REVIEW

Late Prehistoric Big Game Hunting in Curlew Valley: Archaeological Investigations at 100A275

Brooke S. Arkush

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Reviewed by CHRISTOPHER L. HILL

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This study provides a state-of-the-art examination of the late Holocene archaeology and environmental context for the foothill region separating the northern Bonneville Basin from the Snake River Plain, in southeast Idaho. Research questions addressed center on developing a site chronology and evaluating the materials in terms of site function, seasonality, and assemblage diversity associated primarily with bison and pronghorn hunting and processing. The nicely produced volume provides the research results from excavations during 2009-2011 by Weber State University in collaboration with the Caribou-Targee National Forest, and analysis of the materials recovered by a team of specialists. The monograph consists of five sections (Introduction, Site Stratigraphy and Dating, Artifacts Assemblage, Site Fauna and Flora, Discussion and Conclusions) along with a list of references by Arkush, and a set of excellent appendices (Zoological, Macrobotanical, Raw Materials, Residue and 14C, and XRF) by the multidisciplinary team.

The first section provides a very good overview of the environmental setting and a summary of the regional prehistoric sequence and ethnographic/historic context. Previous research in the area at the Rock Springs, Twin Springs, and Peterson Spring sites are summarized, providing the basis for developing a late Holocene settlement model. Land-use within the foothill ecozone is associated with freshwater sources and the opportunity to use resources from a variety of ecozones. After 2,500 B.C. the sites appear to reflect activities during the late winter to late summer; no winter camps have been discovered. The chapter concludes with a discussion of the research orientation and description of the field methods. While it is reported that no stratigraphy was visible throughout the sites deposits, at least 11 occupational surfaces ("Living Floors") were documented.

Site stratigraphy and dating are described in more detail in the second section. The evidence for a set of "Living Floors" apparently consists of zones composed of concentrations

of lithic artifacts and bones that follow the slope of the stream terrace. Images appear to show several strata, based perhaps on soil moisture content and textural characteristics, although it is reported that there was no visible stratigraphy. The chronology rests on measurements from "bone collagen," ceramic residues, and charcoal and range from A.D. 890 on "Living Floor" 11 to A.D. 1670-1780 for "Living Floor" 1. It is interesting to consider whether the presence of krotovina and the reported absence of stratigraphy is an indication of site formation processes at the site and the possibility of some vertical mixing.

The artifact assemblage, consisting of bone artifacts, ceramics, lithics (projectile points, drills, bifaces, unifaces, edge modified flakes, worked "quartz schist", cores, debitage, and ground stone) is described in the third section of the volume. This section also includes summary of the geochemical and residue analyses of the ceramics and sourcing results of obsidian lithic. It is notable that, in terms of the vertical distribution of the ceramics within the depositional sequence at the site, Promontory Gray is found within the top 10-90 cm and Great Salt Lake pottery is found from 0-80 cm. It might be suggested that this overlap could also be a potential indication of vertical mixing at the site, since elsewhere Promontory Gray is sometimes younger than Great Salt Lake (A.D. 500-1300, A.D. 1250-1650, respectively). Arkush suggests that the raw materials used for the ceramics may reflect seasonal use of four distinct areas within the northern Great Salt Lake region or, alternatively, geochemical similarities from several raw material sources. Residue analysis shows the presence of maize and *Sporormiella*. Over 80% of the 47 projectile points (Desert Side-Notched, Cottonwood Triangular, Bear River Side-Notched, Uinta Side-Notched, and Rose Spring Corner-Notched) are composed of obsidian. Larger sized photographs as well as line-drawings of the projectile points would perhaps have been made this section somewhat more useful. Debitage is also dominated by obsidian (66%) and chert (34%) is also present. XRF analyses show that all the obsidian sources can be attributed to localities in southeast Idaho, with the local Malad source dominating the assemblage. The highest concentration of flakes is in the top section of the sequence from about 10-60 cm below surface.

A succinct summary of the plant and animal remains recovered from the excavations is presented by Arkush in the next section of the volume. Remains of large mammals include bison, pronghorn, elk, and deer. Interestingly, the fauna suggests that an extensive grassland habitat may have existed before the 1800s. The sagebrush landscape developed since the 1800s; the prehistoric ecosystem may have had higher amounts of native grasses and can be viewed as a grass-dominated steppe. Flotation provided seeds of charred goosefoot, saltbrush and grass and the botanical and faunal remains are linked to the human activities and possible season of use.

A final section of the report by Arkush presents a discussion and conclusion focusing on the co-occurrence of two distinct pottery types within the deposits at the site and what this information might suggest regarding Promontory/Fremont interaction.

Most of the monograph is composed of a set of exceptional appendices which will undoubtedly be of great value to other researchers. It might have possibly improved the overall usefulness of the monograph to include these contributions as chapters, with Arkush's summaries at the end, but their presence in any format adds to the quality of the volume. Notable in this group is the report by M. Hill et al. on the analysis of the zooarchaeological material. Besides providing a detailed documentation of the taxa present, the appendix provides excellent information on site formation and interpretations of the human activities, especially butchery activities and seasonality. Another important contribution is provided by S. Hill who reports on the macrobotanical remains, suggesting that most of the recovered remains (such as goosefoot) were used for food. Equally valuable are the two contributions by Heff on the LA-ICP-MS analyses of ceramics and ceramic raw materials, by Yost, Cummings,

and Varney on the radiocarbon dating and residue analysis of ceramics, and by Hughes on the XRF analysis of obsidian. Overall, the volume represents an exceptional effort by a multidisciplinary team led by Arkush, resulting in a valuable contribution to the late Holocene ecological dynamics of the Snake River-northern Great Salt Lake region.

