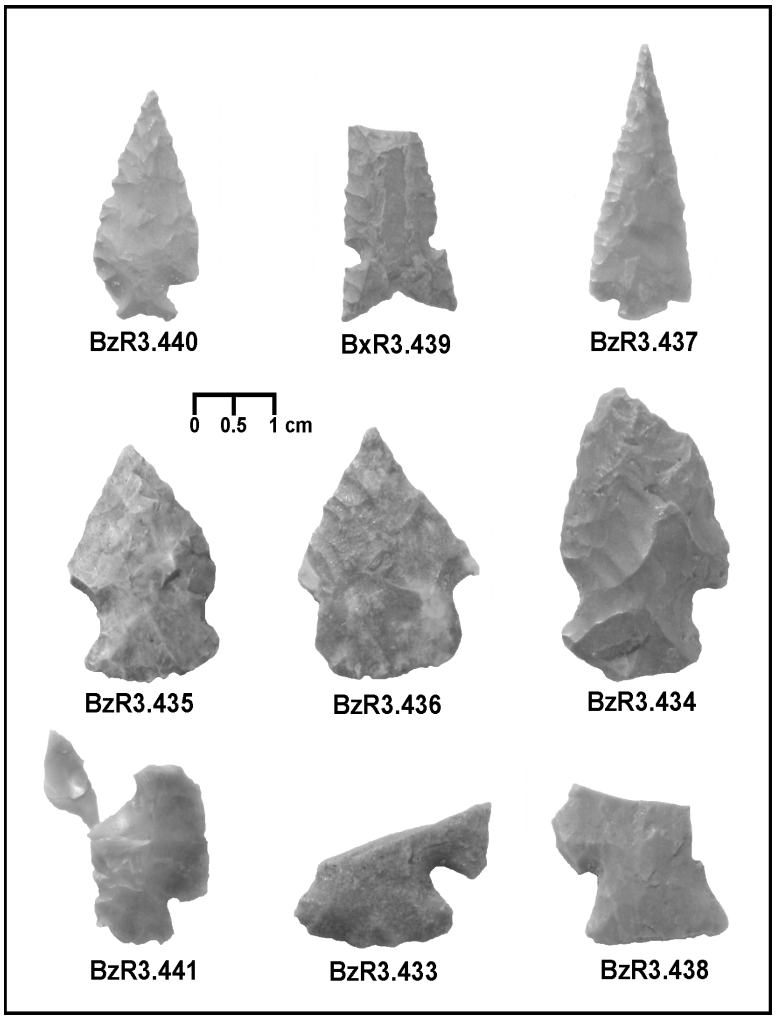
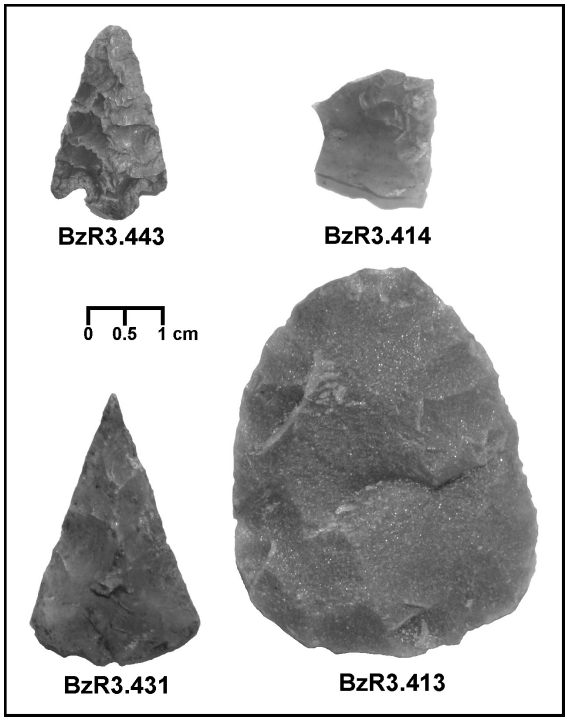
THE WYOMING Archaeologist

VOLUME 58; NUMBER 1; 2014





ISSN: 0043-9665

[THIS ISSUE PUBLISHED
March 2016]

THE WYOMING Archaeologist

On the Cover:

Lithic tools from the Pathfinder Ranch Site.
See article by Brent A. Buenger this issue.

Information for Contributors

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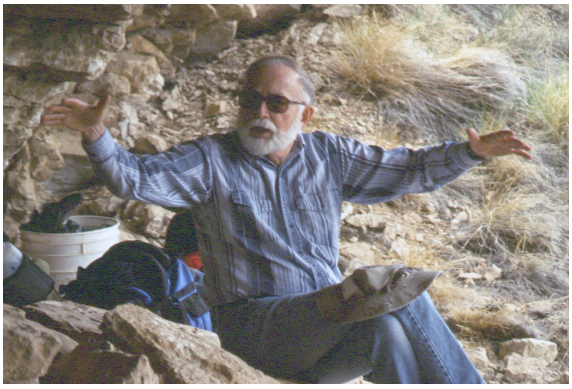
IN MEMORIUM



WILFRED "WIL" HUSTED
1928-2015

Wilfred M. Husted passed away peacefully at Riverstone Hospice Home in Billings, Montana on August 11, 2015. He had battled coronary problems since a heart attack in January 1981 and cancer since 2011. Wil was born October 27, 1928 to Wilfred B. and Irene McAllister Husted in Bridgeton, New Jersey.

He grew-up among the fields, woods, marshes and seashores of southern New Jersey and especially "down back," the land around the upper end of East Lake in Bridgeton. He graduated from Bridgeton High School in June 1947. As a young boy Wil enjoyed fishing in East Lake and Delaware Bay and surf fishing down at the shore.

Wilfred was proud of his more than seven years of military service in the United States Air Force from September 1947 until February 1955. Following basic training in Texas, he was trained as an airport traffic controller at Scott AFB, Illinois. Subsequent assignments took him to Puerto Rico, the Canal Zone, Texas, and the University of Colorado-Boulder where he began a love affair with the Rocky Mountains. An early summer cruise via troopship to Japan in 1953 and a few hours flight soon thereafter found Wil at K-14 Airbase (Kimpo) northwest of Seoul, Korea. It was here he witnessed the unannounced arrival of No Kum-Sok in his MiG-15 from Andong, Manchuria on September 23, 1953. Following the obligatory one-year tour in Frozen Chosen, Wil received his first choice for reassignment and reported to Lowry AFB in Denver, Colorado where he was honorably discharged in early February 1955.

Wil entered the University of Colorado-Boulder in September 1955. He briefly studied pre-medicine but gradually maneuvered himself into anthropology, concentrating in archaeology. While at CU, Wilfred met his lifetime partner Beth Watson. They were married in Santa Fe on September 7, 1957. Two of their sons, Kenneth Gordon and Gary David were born in Boulder. Wil graduated with an M.A. in anthropology in 1962 and garnered a position with the Smithsonian Institution, River Basin Surveys in Lincoln, Nebraska in April 1962. Beth's and Wil's third son, Bruce Alan, was born in Lincoln in 1965.

His first project was excavating prehistoric archaeological sites in the upstream or southern portion of Bighorn Canyon on the Bighorn River in Montana and Wyoming.

Wilfred was preceded in death by his parents Wilfred Blew and Irene (McAllister) Husted and son Gary David Husted. He is survived by his wife Beth, son Kenneth Gordon and grandchildren Ross and Hannah of Lincoln, Nebraska and son Bruce Alan of Winder, Georgia.

Cremation has taken place and Wilfred's ashes will be placed by the family at a time and location yet to be determined. Memorials may be made to the National Museum of the United States Air Force, the Wyoming Archaeological Society or the charity of your choice.

IN MEMORIUM

EUGENE "GENE" KAY GALLOWAY
1934 - 2015

Eugene Kay Galloway passed away in Council Bluffs, Iowa, Dec. 20, 2015, at age 81.

Eugene (Gene) was born Aug. 27, 1934, in Wheatland to Edith D. and Franklin D. Galloway. They lived north of Torrington on a farm homesteaded by Gene's grandfather in 1911.

The family moved to other Goshen County farms during WWII and Gene attended rural schools and Lingle Elementary. In 1950, they moved to the UM Ranch in Johnson County, then managed by Greely Hughes. His father subsequently bought the Bison Taxi Service in Buffalo.

Gene served three years in the U.S. Army Chemical Corps and was discharged in 1955. He received a bachelor's of arts degree in anthropology from the University of Wyoming in 1962. By that time, he had an unusually extensive background in archaeological fieldwork with the University of Wyoming, Smithsonian Institution and Wyoming Archaeological Society. He authored or co-authored a number of published student-level reports on small Wyoming archaeological sites, discovered the 9,600-year-old Sisters Hill archaeological site near Buffalo and initially brought the 11,000-year-old Colby Mammoth Site, near Worland, to professional attention.

In 1966, Gene married Bonny Shambaugh in Buffalo, and they moved to Fort Laramie where he worked as a seasonal ranger historian until the end of the year. He then worked as curator of anthropology at the Wyoming State Museum in Cheyenne for three years.

By 1970, Gene was becoming more interested in the management of museums, historic sites and parks than in digging holes. In 1971, he completed requirements for a master's degree in outdoor recreation and parks administration at the University of Wyoming. He then accepted a mid-level position offered by the U.S. Army Corps of Engineers. After two years at Albuquerque, New Mexico, he was promoted to a review level position at the Missouri River Division in Omaha, Nebraska. He retired from there after one more promotion and credit for 27 years of federal service.

Gene was preceded in death by his parents, Frank and Edith Galloway; and one sister, Winifred Galloway.

He is survived by daughters, Lisa (Rocky) Marquiss of Gillette, and Helen Hoffman of Lincoln, Nebraska; son, William Galloway of Atlantic, Iowa; five grandchildren, David, Joel and Isaiah Marquiss, and Nolan and Gavin Hoffman; and two great-grandchildren, Roslyn and Teagan Marquiss.

It was Gene's wish to be cremated with no services. Donations in his memory may be made to The Museum of the Fur Trade, 6321 Highway 20, Chadron, NE 69337.

Buffalo (Wyoming) Bulletin. Posted on-line: Wednesday, February 3, 2016 12:04 pm
http://www.buffalobulletin.com/obituaries/article_06038728-caa9-11e5-978b-7fc04b6c7042.html

ARCHAEOLOGICAL EXCAVATION AT THE CONFLUENCE HOUSEPIT SITE (48NA4588)

by
Brent A. Buenger

ABSTRACT

The archaeological excavation at the Confluence Housepit site yielded a single housepit feature, two associated subfloor thermal basins internal to the housepit substructure, one thermal basin exterior to the housepit substructure, and associated artifacts. The deposit is dated to the Opal phase of the Early Archaic period through four conventional radiocarbon age estimates ranging between 5000 ± 40 and 5390 ± 40 years B.P. The housepit, associated features, and cultural materials are viewed as representing the use of the site locality by a small group of hunter-gatherers as part of an adaptive strategy influenced by Late Middle Holocene environmental conditions. The proximity of the Confluence Housepit site locality to Horse Creek and Fish Creek was likely a contributing factor conditioning the occupation, and potential reoccupation, of the site locality by Archaic period hunter-gatherers.

INTRODUCTION

Archaeological excavation at the Confluence Housepit site (48NA4588) was conducted by Western Archaeological Services (WAS) pursuant to cultural resource requirements stipulated for the Sinclair Pipeline Company Pathfinder 16" Pipeline project. The general site area is situated in central Wyoming within the Sweetwater Arch at an elevation of approximately 6000 ft (1829 m). Prominent physiographic features include Black Rock Mountain, the Pedro Mountains, the Rattlesnake Hills, and the Granite Mountains. Significant hydrologic features located in the general vicinity of the site include the Sweetwater River, Fish Creek, Horse Creek, Pino Draw, and Shell Creek. The immediate site locality is situated along a low-lying relatively flat area near (0.25 mi / 0.4 km) the confluence of Horse Creek and Fish Creek (Figure 1). The site is bounded by Fish Creek and Horse Creek to the west, and an ephemeral drainage and the footslope of a low ridge to the east. The site is situated within a rolling sagebrush steppe ecoregion (Chapman et al. 2004). Local surficial geology includes residuum mixed with alluvium, eolian deposits, slopewash, and bedrock outcrops (Case et al. 1998). Soil consists of Ryan Park loamy sand occurring along terraces, footslopes, and alluvial fans which is formed in alluvium and derived primarily from sandstone (Malnor and Arnold 1997).

The excavation block at the site consisted of a 9 m long x 3 m wide grid within which 25 m² of intact sediment were excavated during the project (Figure 2). The excavated cultural deposit at the Confluence Housepit site consisted of a single component comprised of one housepit feature, one thermal basin exterior to the housepit substructure, and associated cultural materials. The deposit dated to the Opal phase of the Early Archaic period (Wyoming Basin Chronology). The housepit, associated features, and cultural materials are viewed as representing use of the site locality by a small group of hunter-gatherers as part of an

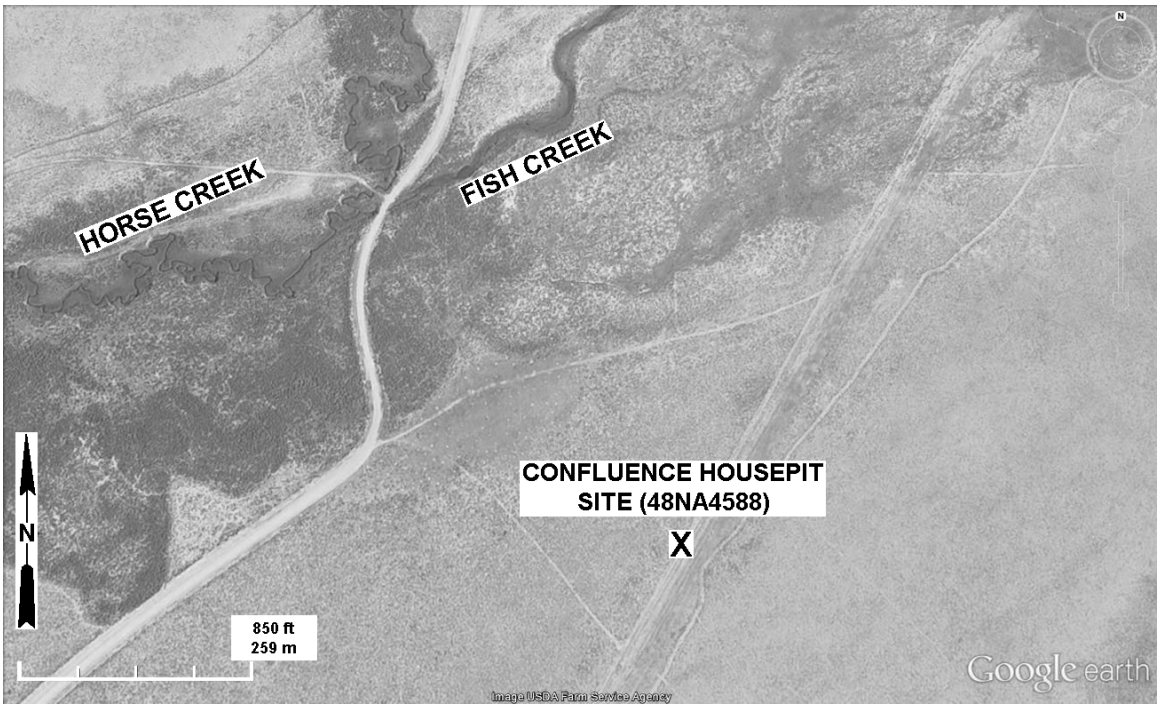


Figure 1: Aerial image of Confluence Housepit site (48NA4588) locality (adapted from Google Earth).

adaptive strategy influenced by regional Late Middle Holocene environmental conditions. Hunter-gatherer adaptive strategies developed through time and expressed during the Archaic period within the region likely included high residential mobility, broad-based resource procurement, and re-use of productive/attractive site localities and existing site facilities such as housepits and slab-lined thermal pits. The proximity of the Confluence Housepit site to Horse Creek, Fish Creek, and the Sweetwater River were likely contributing factors conditioning the occupation(s) of the housepit and the use of the site locality by Archaic period hunter-gatherers.

The cultural materials recorded during the excavation at the Confluence Housepit site were comprised of a single housepit feature, one associated subfloor thermal basins internal to the housepit substructure, one thermal basin external to the housepit substructure, 25 lithic reduction specimens, two chipped stone tools, five groundstone specimens, two anvil stones, one tested cobble, 234 faunal specimens, and one freshwater mussel shell artifact. Thermally altered stone recovered from the site included 28 granitic fragments weighing approximately 9.5 kg. Four conventional radiocarbon age estimates of 5000 ± 40, 5270 ± 40, 5340 ± 40, and 5390 ± 40 years B.P. were returned for the housepit and thermal basins. The 5000 ± 40 year B.P. date was derived from organic sediment obtained from fill sediment collected from the upper occupational zone of the housepit (10-20 cm above the substructure floor), and is interpreted to be skewed by introduction of post-occupational fill sediment. As a result, the 5000 ± 40 years B.P. age estimate is considered to be of low validity and is not used for site interpretation purposes. The remaining conventional radiocarbon age estimates were obtained from charred material samples collected from Feature 2, a thermal basin located external to the housepit, and Feature 1A and 1B, subfloor thermal basins located within the housepit substructure. Statistical analysis of these three dates using the sample significance module in

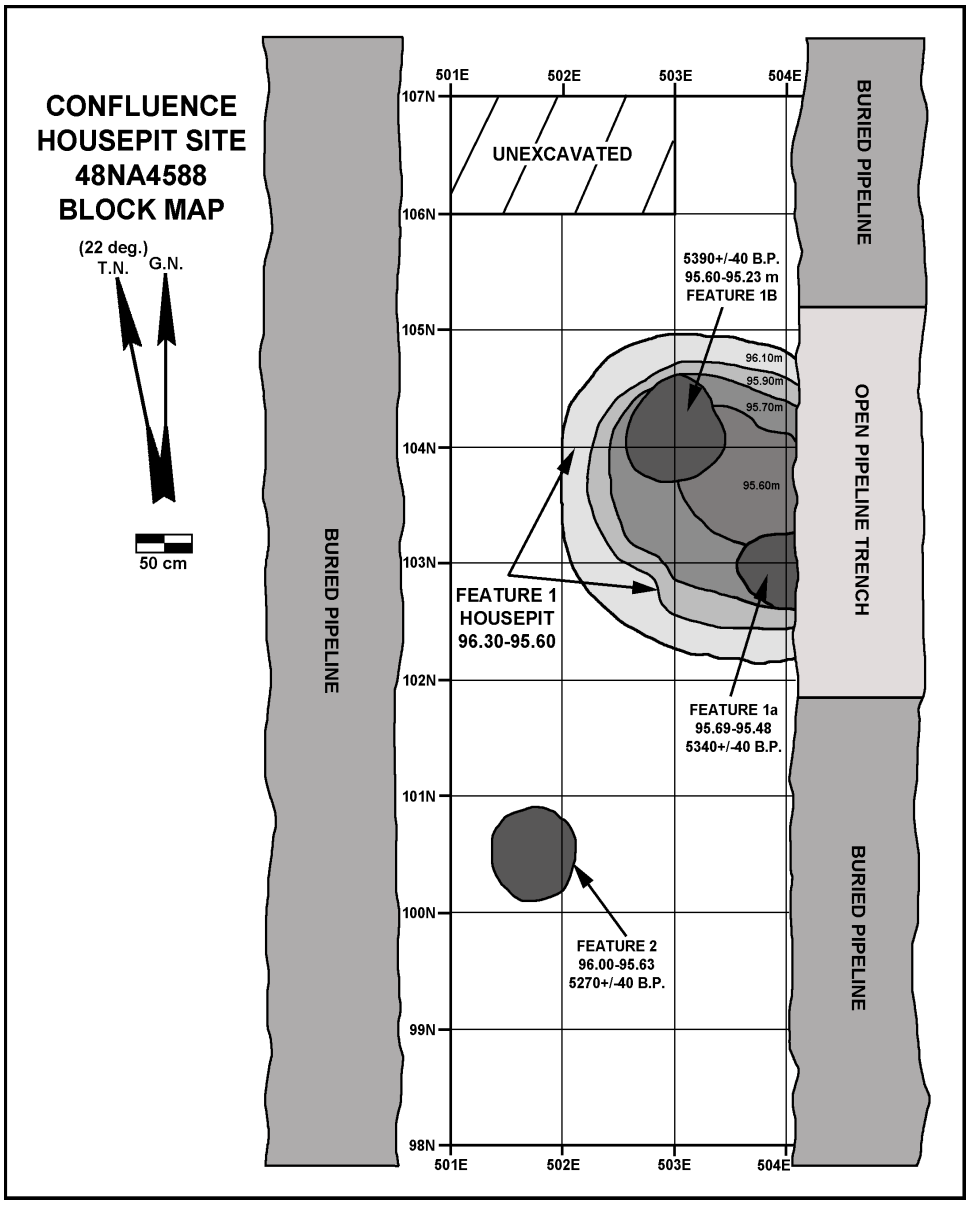


Figure 2: Excavation block map of Confluence Housepit site (48NA4588).

CALIB 6.0.1 suggest they are statistically the same (Stuiver et al. 2011). The radiocarbon data for the Confluence Housepit site suggest the housepit was occupied at least once around 5360 B.P., and the thermal basin located external to the housepit is most likely contemporaneous with the housepit occupation.

FEATURES

Four archaeological features were recorded during the excavation at the Confluence Housepit site. These include a single housepit feature (Feature 1); two associated internal subfloor thermal basins recorded within the housepit substructure (Feature 1A and Feature 1B); and one thermal basin located external to the housepit substructure (Feature 2). The morphological characteristics, associated artifacts, and sampling results for the features are summarized (Table 1).

The overall extant maximum dimensions of the housepit substructure measured 275

Table 1: Feature attribute summary table for features excavated at Confluence Housepit site (48NA4588).

FEATURE #	TYPE	MAX L (cm)	MAX W (cm)	MAX D (cm)	VOL* (L)	SURFACE AREA** (cm^2)	CULTURAL MATERIAL (n=)	FCR (kg) (n=)	POLLEN FTIR	DATE (yrs. B.P.)
1	Housepit *Truncated*	275	225 *275 Est.*	70	2278.02 *2784.25 Est.*	48571.88 *59365.63 Est.*	Bone (198) Debitage (21) Tools (1) GS (4) BC (2)	8.5 kg (27)	**Pollen:** Cheno-am (saltbrush fruits or goosefoot seeds); *Opuntia* (prickly pear cactus)	5000±40†
1A	Subfloor Thermal Basin Within Housepit *Truncated*	72	48 *75 Est.*	21	38.17 *59.64 Est.*	2712.96 *4239.0 Est.*	Bone (6)	None	**FTIR: No matches**. ***Possible***: Amino acid glutamate (animal remains). Alanine (nuts, seeds and/or meat residue).	5340±40
1B	Subfloor Thermal Basin Within Housepit	90	83	37	145.37	5863.95	Bone (26)	None	**FTIR: No matches**. ***Possible***: Calcium oxalate crystals (prickly pear cactus). Polysaccharides (saltbush). Alanine (nuts, seeds and/or meat residue).	5390±40
2	Thermal Basin External to Housepit	83	77	37	124.37	5016.94	None	None	**FTIR Matches**: *Helianthus* (sunflower) seeds, ground Cheno-am seeds, Poaceae (grass family) seeds. *Pinus* (pine nuts) *Opuntia* (prickly pear cactus).	5270±40

*Volume (Liters) = ⅔ ¶ (D)(L/2)(W/2)/1000 **Surface Area (cm^2) = ¶ (W/2)(L/2). *Est.* = Estimated intact dimensions.
FTIR = Fourier Transform Infrared Spectroscopy.
† Radiocarbon sample derived from organic sediment, and skewed by introduction of younger sediment post-occupation.
GS = Groundstone. BC = Battered Cobble.

cm long x 225 cm wide x 70 cm deep with a corresponding volume of approximately 2278.02 L and surface area of 48571.88 cm^2 (Figures 3 and 4). The housepit was partially truncated during construction of the pipeline trench, impacting approximately 50-70 cm of the eastern margin of the housepit substructure. Pipeline trench construction also truncated the eastern portion of one of the subfloor thermal basins located within the housepit (Feature 1A). Overall, approximately 20-25% of the housepit is estimated to have been impacted by the mechanical excavation of the pipeline trench. The estimated intact dimensions of the housepit are 275 cm long x 275 cm wide x 70 cm deep with an estimated volume of 2784.25 L and surface area of 59365.63 cm^2. The housepit substructure was excavated into Stratum I, consisting of light gray gravelly loamy sand with carbonates derived from alluvium (Figure 5). No evidence of posthole molds was observed during excavation of the housepit. The Feature 1 housepit exhibited steep walls dropping relatively precipitously approximately 70 cm from outer boundary of the substructure to the floor of the housepit. Buenger's (2011a) sample of excavated Wyoming housepits showed the average depth of housepit substructures was

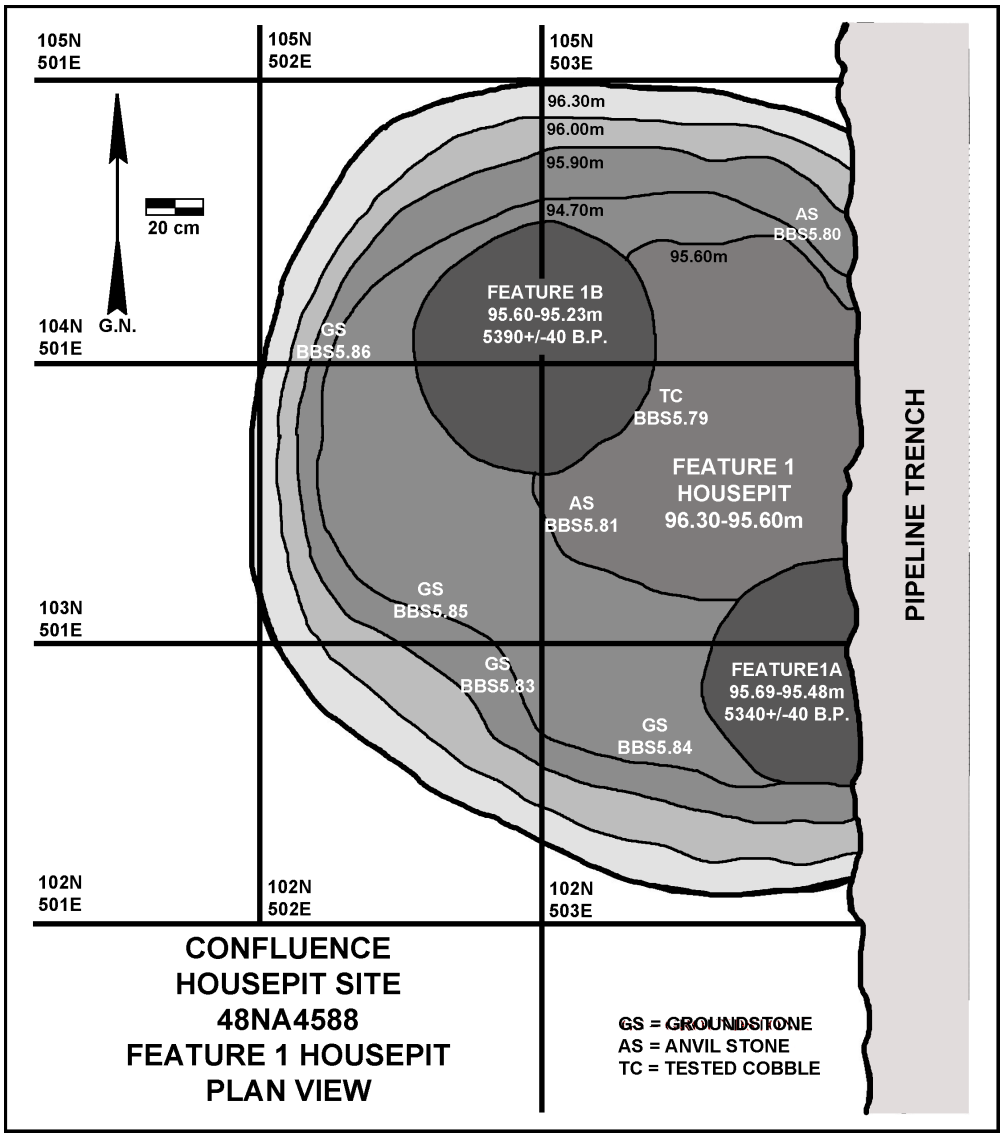


Figure 3: Planview map of Feature 1 housepit from Confluence Housepit site (48NA4588).

Figure 4: Post-excavation photograph of Feature 1 housepit from Confluence Housepit site (48NA4588).

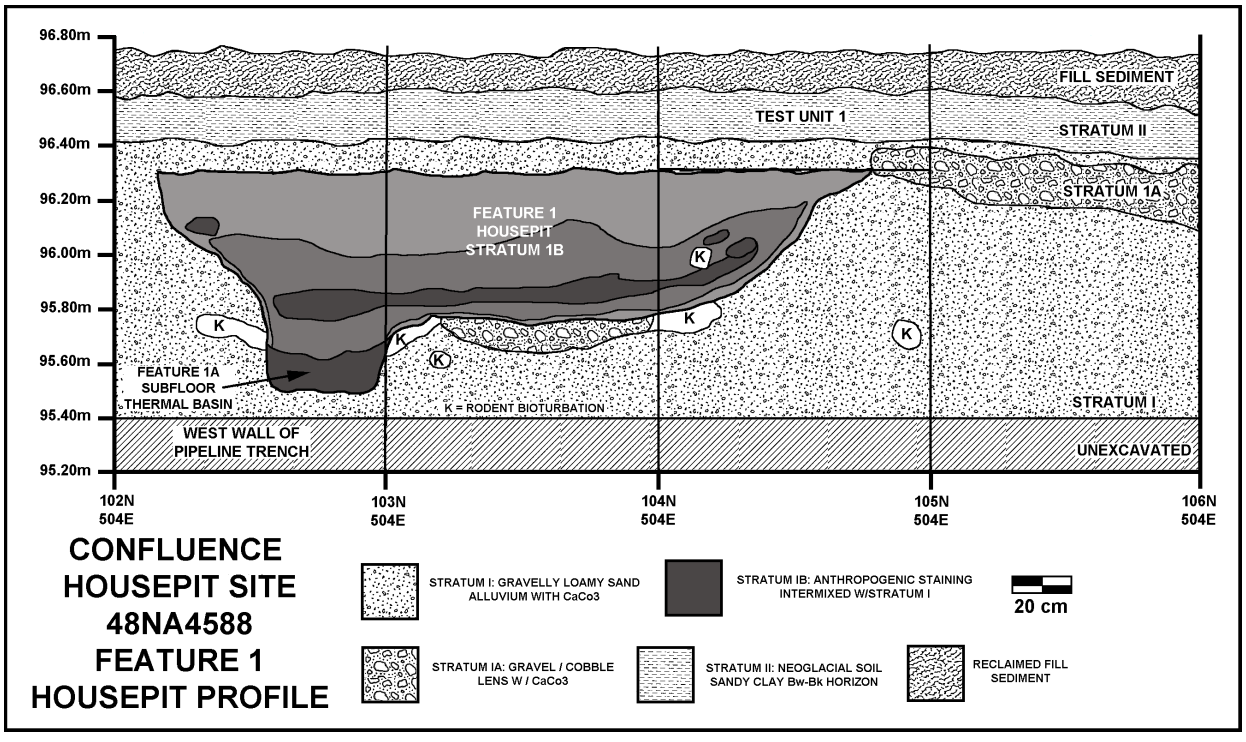


Figure 5: Stratigraphic profile of Feature 1 housepit at Confluence Housepit site (48NA4588) as viewed from northwest wall of pipeline trench.

40 cm. The combination of steep walls and significant floor depth may indicate the housepit substructure was potentially subject to multiple cleaning or re-excavation. This may have occurred over the course of multiple, temporally punctuated, hunter-gatherer occupations of the structure. Evidence of housepit reuse and reuse of housepit site localities over time has been discussed for several Wyoming housepit sites (Buenger 2011a; McNees 2005a; Smith 2003; Smith and McNees 2011; Smith and Peterson 2012). Post-occupationally, the housepit was filled with Stratum Ib sediment, which consisted of an mixture of post-occupation slopewash deposition and dispersed organics associated with the cultural occupation(s) of the housepit structure. However, no discrete evidence of stratified cultural lenses or distinct soil horizons indicative of multiple, temporally punctuated cultural occupations of the structure was observed during excavation of the housepit.

Cultural materials recovered from the Feature 1 housepit during excavation included 198 faunal specimens, 21 lithic reduction specimens, one flake tool, one tested cobble, three groundstone fragments, one mano, two anvil stones, and 27 thermally altered granitic fragments with a combined mass of 8.45 kg. The thermally altered stone consisted of four <3 cm (0.25 kg), six 3-6 cm (1.75 kg), and 17 >6 cm (6.45 kg) specimens. The faunal specimens consisted predominately of Size Class II (squirrel-sized) and Size Class III (rabbit-sized) mammal remains as well as some specimens identified as jackrabbit (*Lepus* sp.) and rabbit (Family Leporidae) (76.77%). Few Size Class V (deer-sized) specimens were recovered during excavation of the housepit (13.64%). The lithic debitage was entirely comprised of tertiary flakes, secondary flakes, flake fragments, and shatter suggesting the limited lithic reduction activity associated with the housepit occupation consisted of early to middle stage lithic reduction. General non-fossiliferous chert and dendritic chert were the most prevalent (88.0%) lithic raw material types recorded for the debitage recovered from the housepit.

Microfloral pollen data derived from samples collected beneath two of the metate fragments from the floor of the housepit showed elevated Cheno-am pollen frequencies indicative of potential saltbush fruit or goosefoot seed processing (Cummings et al. 2011). The recovery of fragmentary *Opuntia* pollen suggests processing prickly pear may have also occurred within the structure. These floral resources may have been derived from stored or cached sources before being further processed for food within the housepit. However, no evidence of storage was recorded during the excavation of the housepit.

Feature 1A represents an internal subfloor thermal basin located within the southeastern portion of the Feature 1 housepit substructure. The general morphology of the extant portion of the feature was semi-hemispherical in planview, and basin-shaped with steep sides and an undulating bottom. Approximately 30% of the eastern extent of the feature was truncated during construction of the pipeline trench. The overall extant dimensions of the feature measured 72 cm long x 48 cm wide x 21 cm deep with volume of 38.17 liters and a surface area of 2712.96 cm^2. The intact overall dimensions for Feature 1A are estimated at 72 cm long x 75 cm wide x 21 cm deep with an estimated volume of 59.64 liters and surface area of 4239.0 cm^2. The thermal basin was excavated below the occupational floor of the housepit substructure further into Stratum I. The lower portion of the basin contained darkly stained sediment representing a greater concentration of organics associated the combustion of fuels within the feature during the housepit occupation(s). Radiocarbon analysis of a sample of fill sediment collected from the Feature 1A yielded a conventional radiocarbon age estimate of 5340 ± 40 years B.P.

No artifacts or thermally altered stone were recovered from within Feature 1A during exca-

vation. Six faunal specimens were recovered from the feature, consisting of two Size Class II mammal long bone fragments, an ulna fragment from a Size Class II mammal, two Size Class III mammal long bone fragments, and a long bone fragment from a Size Class III mammal. All but one of these specimens exhibit evidence of thermal alteration. These limited data suggest small mammals such as rodents and rabbit were processed within Feature 1A during the housepit occupation. Fourier Transform Infrared Spectroscopy (FTIR) analysis of a sample of fill sediment collected from Feature 1A did not produce any specific matches (Cummings et al. 2011). However, peaks representing alanine suggest possible presence of nut, seed, or meat residue. Peaks representing the amino acid glutamate suggest the potential presence of animal remains within Feature 1A.

Feature 1B consisted of an internal subfloor thermal basin located within the northwestern portion of the Feature 1 housepit substructure. The overall maximum dimensions of the feature were approximately 90 cm long x 83 cm wide x 37 cm deep with an approximate volume of 145.37 liters and surface area of 5863.95 cm^2. The morphology of the thermal basin was hemispherical in planview and basin-shaped in profile with sloping sides and a concave bottom. The feature was excavated into Stratum I. The upper and lower portions of the basin were filled with an admixture of gray anthropogenically-stained sand and post-occupational slopewash sediment. Radiocarbon analysis of sediment collected from the feature yielded a conventional radiocarbon age estimate of 5390 ± 40 years B.P.

No thermally altered stone or artifacts were recovered from within Feature 1B during excavation. However, excavation of the feature yielded 26 faunal specimens. These include 16 Size Class II-III mammal long bone fragments, two Size Class II-III mammal rib fragments, seven Size Class III mammal long bone fragments, and one long bone fragment from a Size Class V mammal. Evidence of thermal alteration was observed for 88.46% of faunal specimens recovered from Feature 1B. Similar to the other subfloor thermal basin recorded within the Feature 1 housepit substructure, it appears small mammals such as rodent, rabbit and possibly larger mammals were also processed within Feature 1B. FTIR analysis of a sample of fill sediment from Feature 1B did not produce any specific matches (Cummings et al. 2011). However, peaks representing calcium oxalate crystals suggest the potential for prickly pear cactus processing within the feature, and peaks representing polysaccharides indicate possible saltbush processing. In addition, peaks representing the amino acid glutamate were also recorded suggesting the potential presence of animal remains within Feature 1B.

Feature 2 represents a thermal basin located external to, and approximately 1.25 m to the south-southwest of, the Feature 1 housepit substructure. The general morphology of the thermal basin was hemispherical in planview and basin shaped in profile. The profile of the basin exhibited one gently sloping wall, one relatively steep wall, and an undulating concave bottom. The overall maximum dimensions of the feature were approximately 83 cm long x 77 cm wide x 37 cm deep with an approximate volume of 124.37 liters and surface area of 5016.94 cm^2. The feature was excavated into Stratum I gravelly loamy sand. Darkly stained anthropogenic sediment representing some of the remaining organics associated with combustion of fuels within the thermal basin was observed within the middle to lower portion of the basin. Radiocarbon analysis of a sediment sample collected from the feature produced a conventional radiocarbon age estimate of 5270 ± 40 years B.P.

No artifacts, faunal remains, or thermally altered stone were recovered from within Feature 2 during excavation. Cultural materials recovered near Feature 2 included a freshwater mussel shell artifact, a mano, one flake fragment

with cortex derived from general non-fossiliferous chert, one long bone shaft fragment from a Class V-VI sized mammal, and one thermally altered granitic fragment (>6cm; 1000g). FTIR analysis of a sample of fill sediment collected from Feature 2 produced matches for *Helianthus* (sunflower) seeds, ground Cheno-am seeds, and uncooked Poaceae (grass family) seeds, indicating seeds may have been processed within the thermal basin (Cummings et al. 2011). In addition, weak matches for raw and roasted Pinus (pine) nutshells, and baked/dried Opuntia (prickly pear cactus) fruit suggest these resources may also have been processed within the thermal basin.

CHIPPED STONE TOOLS

Only two stone tools and one tested material specimen were recorded during the excavation of the Confluence Housepit site. The tool assemblage includes one early-stage biface fragment, one retouched flake, and one tested cobble specimen. No definitive temporally or stylistically diagnostic stone tools were recorded during the excavation of the housepit component. A summary of stone tool, groundstone, and stone implement attributes and proveniences for the Confluence Housepit site artifact assemblage is presented (Table 2).

The biface fragment specimen represents the terminal-medial portion of a biface derived from grayish green semi-translucent chalcedony. It consists of an early stage biface showing limited bifacial reduction and edge retouch along one lateral margin. The blade shape is irregular and lenticular in cross section. The overall maximum dimensions of the fragment are 33.8 mm long x 35.5 mm wide x 9.8 mm thick. The specimen was likely fractured medially during the initial thinning stage because of inclusions in the raw material, and subsequently discarded. The retouched flake consists of a large, complete tertiary flake derived from grayish green semi-translucent chalcedony. The flake exhibits retouch along two lateral edges of the dorsal side, as well as, retouch on a portion of a lateral margin on the ventral side. Dimensions of the specimen are 43.0 mm long x 25.5 mm wide x 8.5 mm thick.

DEBITAGE

Excavations yielded only 25 lithic reduction specimens. Most (84.0%) of specimens were recovered from the occupational floor of the Feature 1 housepit. Two specimens were recovered outside of the housepit substructure and two were recovered from the upper housepit fill sediment. Overall, the assemblage is comprised primarily of tertiary flakes representing 44.0% of the assemblage, and flake fragments without cortex (20.0%0. Secondary flakes and shatter represent an additional 16.0% and 12.0% of the assemblage respectively, and flake fragments with cortex represent the remaining 8.0% of the debitage assemblage. The limited size of the debitage sample precludes any substantive analysis of lithic reduction activities; however, these limited data suggest early to middle stage lithic reduction was the primary stone working activity conducted within and around the immediate spatial extent of the housepit. Evidence of thermal alteration in the form of potlid fractures, thermal fractures, and mineral oxidation was seen on most (64.0%) of the debitage sample. This is most likely attributable to lithic debitage being discarded within or directed towards the two interior subfloor thermal basins located within the housepit. The debitage may have been further dispersed during thermal basin clean-out intervals.

The composition of lithic raw material types for the Confluence Housepit site debitage assemblage consists primarily of non-fossiliferous general chert, which represents 48.0% of the 25 specimens. This is followed by the dendritic chert specimens (of 40.0%). Combined, non-fossiliferous general chert and dendritic chert specimens comprise 88.0% of the debitage assemblage for the site. Specimens derived from fine grained quartzite, banded chert, and

Table 2: Summary of flaked stone tool, groundstone, and stone implement characteristics from Confluence Housepit site (48NA4588).

CATALOG NUMBER	PROVENIENCE	ELEVATION	ARTIFACT TYPE	LITHIC TYPE*	DIMENSIOONS L x W x TH (mm)	CONDITION	MODIFICATION
BBS5.33	Pipeline trench fill/truncated housepit intersect	96.10 m	Early-Stage Biface	CH	33.8 x 35.5 x 9.8	Terminal-medial Fragment	Limited edge retouch on lateral margin.
BBS5.34	103N 502E F1 Housepit Floor	95.80-95.75 m	Retouched Flake	CH	43.0 x 25.5 x 8.5	Complete	Edge retouch on two lateral margins dorsal side, and one lateral margin ventral side.
BBS5.79	103.78N 503.35E F1 Housepit Floor	95.95 m	Tested Cobble	QZ	89.7 x 90.3 x 80.3 (1089.6 g)	Complete	Limited heavy percussive flaking dorsal/ventral sides
BBS5.82	100.50N 506.56E F2 Activity Area	96.06	Mano	GR	117 x 79 x 19 (363.2 g)	Complete	Unifacial grinding, pecking, shaping. Split longitudinally.
BBS5.86	104.11N 502.18E F1 Housepit Floor near F1B	95.60	Mano	GR	106 x 84 x 59 (397.4 g)	Complete	Unifacial grinding and polish. Expedient cobble grinding tool.
BBS5.83	102.75N 502.75E F1 Housepit Floor	95.82	Metate	SST	103 x 74 x 35 (225.2 g)	Fragment	Unifacial grinding and striations. Possible conjoin with BBS5.85 and BBS5.85
BBS5.84	102.68N 503.33E F1 Housepit Floor	95.81	Metate	SST	111 x 69 x 36 (254.1 g)	Fragment	Unifacial grinding and striations. Possible conjoin with BBS5.85 and BBS5.85
BBS5.85	103.13N 502.56E F1 Housepit Floor	95.69	Metate	SST	104 x 72 x 35 (237.2 g)	Fragment	Unifacial grinding and striations. Possible conjoin with BBS5.85 and BBS5.85
BBS5.81	103.42N 503.11E F1 Housepit	95.97	Anvil Stone	GR	265 x 156 x 147 (5811.2 g)	Complete	Bifacial battering.
BBS5.80	104.53N 503.86E F1 Housepit Wall	95.99	Anvil Stone/ Battered Cobble	GR	185 x 112 x 92 (3450.4 g)	Complete	Unifacial battering.

*Lithic Type: CH = Chalcedony; GN = Granitic; QZ = Quartzite; SST= Tabular Sandstone.

chalcedony were recorded at significantly lower observed frequencies with each comprising only 4.0% of the assemblage respectively. Each of these material types is represented by single specimens only. Based on the distribution of raw material types for the Confluence Housepit site debitage assemblage, it appears regionally/locally available chert and fine-grained quartzites were the most readily used raw material for tool production. Again, the limited debitage sample size precludes substantive analysis; however, the lithic raw materials were most likely procured in the form of locally available secondary lag cobbles rather than from a primary geologic source located a significant distance from the site.

GROUNDSTONE

Five groundstone specimens and two anvil stones were recorded during excavation of the Confluence Housepit. The groundstone specimens consist of two complete manos and three fragmented specimens representing a portion of a single slab metate (see Table 2). Specimen BBS5.82 represents a complete mano recovered in situ near Feature 2 (thermal basin) within an activity area located external to the Feature 1 housepit. The mano is a greenish black, coarse-grained granitic cobble. The cobble has been split longitudinally resulting in a flattened interior surface representing the ventral portion of the mano. The ventral portion exhibits pecking and shaping at the distal margins and limited evidence of grinding along the central portion. The distal side of the specimen does not exhibit evidence of modification or use wear. The mano was likely used to process floral or faunal resources in conjunction with a metate or anvil stone in association with the use of the Feature 2 thermal basin.

Specimen BBS5.86 consists of a complete mano made from a dark brown to greenish-gray granitic cobble, and represents an informal groundstone implement as opposed to a formal, shaped specimen. The mano exhibits evidence of limited unifacial grinding and polish only. The specimen was recovered in situ from the floor of the Feature 1 housepit, along the northwest wall of the housepit and west of the Feature 1B subfloor thermal basin. The mano was likely used as an expedient implement, possibly in tandem with a slab metate or anvil stone, to process floral or faunal resources in association with the use of the Feature 1B thermal basin during the occupation(s) of the housepit.

Specimens BBS5.83, BBS5.84, and BBS5.85 consist of slab metate fragments likely representing portions of a single slab metate. Each specimen is derived from tan, tabular sandstone and was recovered in situ from the floor of the Feature 1 housepit. The fragments were scattered along the southwest wall of the housepit, west of Feature 1A and south of Feature 1B. None of the specimens exhibit shaping or pecking along the outer margins, suggesting each is representative of the interior portion of the metate as opposed to any portion of the lateral margins of the extant metate. Each specimen exhibits evidence of unifacial grinding on the ventral surface. The fragments, as part of an extant slab metate, were likely used to process floral or faunal resources in association with one or both of the subfloor thermal basins within the housepit during the occupation(s) of the structure.

SHELL ARTIFACTS

One freshwater mussel shell artifact was recorded during excavation of the Confluence Housepit site. The specimen was recovered in situ near Feature 2 within a hearth-centered activity area located external to, and approximately 1.25 m south-southwest of the Feature 1 housepit substructure. It consists of an indeterminate portion of a freshwater mussel shell, possibly representing either *Lampsilis cardium* (plain pocketbook) or *Lampsilis silquoidea* (fatmucket). No evidence of lateral teeth or a beak is observable on the specimen. The artifact is nearly complete with maximum dimensions

of 80.2 mm long x 39.5 mm wide x 3.1 mm thick. The specimen has been worked into an elongated teardrop shape, exhibiting abrasion and potential cutting along the lateral margins, and abrasion and convex shaping along the proximal and distal ends of the artifact (Figure 6). The larger convex end portion of the artifact appears to represent the posterior portion of the mussel shell, while the smaller end represents the anterior portion of the shell. The modified lateral portions of the artifact consist of the lateral portions of the shell. The slightly concave interior portion of the artifact represents the nacre, or pearly shell layer of the mussel shell, and exhibits polishing as well as abrasion. The exterior portion of the artifact represents the lamellar and prismatic layers of the mussel shell, and also exhibits polishing and abrasion. The specimen does not exhibit evidence of a hole or drilling, and the precise intent or function of the specimen is unknown. Before being culturally modified, the freshwater mussel shell may have been initially collected from the nearby Horse Creek and Fish Creek area, or at a greater distance to the south-southwest of the site locality along Dry Creek and the Sweetwater River.

Figure 6: Freshwater mussel shell artifact recovered from Confluence Housepit site (48NA4588).

Evidence for exploitation of freshwater mussels as a food resource has been recorded from several Wyoming archaeological contexts; most notably the McKean (Mulloy 1954), River Bend (McKee 1988; Lippincott 2005), and Butler-Rissler (Miller and Waitkus 1989) sites. However, few shell artifacts are known from Wyoming archaeological contexts, and the present specimen is relatively rare with regard to its condition and antiquity. Other known freshwater shell artifact specimens include a single shell artifact fragment recovered from the ED1 Twin housepit site (Buenger 2011b). This shell fragment likely represents *Lampsilis cardium* (plain pocketbook) or *Lampsilis silquoidea* (fatmucket). It exhibits an extant hinge, long and short margins exhibiting abrasion and polish, and a thin groove cut parallel to a straight break or ground-off end. The specimen does not exhibit evidence of an extant hole or drilling. Another similar fragment of worked mussel shell was recovered during the excavation at the Late Prehistoric-aged Buffalo Hump site (48SW5057; Bergstrom et al. 1989:Figure 4). This artifact also exhibited an extant hinge along the long margin; however, it did exhibit a partial drilled hole in the larger distal portion of the specimen, and may represent an ornamental shell artifact. One shell disc bead was recovered from the Flying A Ranch site, and Archaic period housepit site (Martin et al. 1999). In addition, an incised shell fragment was also recovered from a Plains Woodland occupation at the Butler-Rissler site (Miller and Waitkus 1989). Two fragmentary Western Pearlshell

(*Margaritifera falcata*) shell artifacts are also know from a Late Prehistoric site (48LN3642) and undated site (48LN3409) in far southwestern Wyoming; however, the function of the artifacts was determined as unknown (Warren 2000). The specimens recovered from the Confluence, ED1 Twin, and Flying A Ranch sites share similar occupational contexts, with each represent Archaic period housepit occupations.

FAUNAL MATERIALS

The excavation at the Confluence Housepit site yielded 234 culturally associated faunal specimens. The results of the faunal analysis are provided in the following section (Table 3). Most (98.29%) of the site faunal assemblage was recovered from the housepit substructure. These include 198 specimens recovered primarily from the housepit occupational floor, six recovered from internal subfloor Feature 1A, and 26 recovered from internal subfloor Feature 1B. Evidence of thermal alteration was observed for 79.06% of specimens, primarily in the form of blackening (73.08%) with few (5.98%) calcined specimens. Only 3.85% of the assemblage exhibits evidence of green bone breakage.

Identified taxa include jackrabbit (*Lepus* sp.) and unidentified rabbit (Family Leporidae). In addition, one small (<1 cm) shell fragment, presumably representing an unknown species of freshwater mussel, was also recovered from the housepit. At least two individual jackrabbits were processed within the housepit during the hunter-gatherer occupation(s) of the structure. Because of the highly fragmented nature of the assemblage, most (82.05%) of the specimens were identifiable only to size class or as unidentified mammal. The remainder of the faunal remains recovered from the site include: 15 (5.47%) Size Class II (squirrel-sized) specimens; 56 (20.44%) Size Class II-III (squirrel to rabbit-sized) specimens; 89 (32.48%) Size Class III (rabbit-sized) specimens; 28 (10.22%) Size Class V (deer-sized) specimens; 1 (0.36%) Size Class V-VI (deer-to bison-sized) specimen; and 2 unidentified mammal specimens.

Overall, the Confluence Housepit site faunal assemblage is comprised primarily of jackrabbit, unidentified rabbit, and rabbit-sized remains (55.98%). When squirrel-sized and squirrel to rabbit-sized specimens are added to the rabbit specimens, the combined number represents 86.32% of the culturally derived faunal assemblage. The combined number of deer-sized and

Table 3: Summary of faunal remains from Confluence Housepit site (48NA4588).

ORDER	TAXON	COMMON NAME	CULTURAL		INTRUSIVE	
			NISP	MNI	NISP	MNI
Class Mammalia (mammals)						
Lagomorpha	Family Leporidae	Unidentified rabbit or hare	16	-	-	-
	Lepus sp.	Jackrabbit	26	2	-	-
Unknown						
Size Class I-II		Mouse to Squirrel-sized	-	-	1	-
Size Class II	Squirrel-sized	15	-	8	-	
Size Class II-III		Squirrel to Rabbit-sized	56	-	26	-
Size Class III	Rabbit-sized	89	-	-	-	
Size Class V	Deer-sized	28	-	-	-	
Size Class V-VI		Deer to Bison-sized	1	-	-	-
Unidentified	Unidentified mammal	2	-	5	-	
Class Bivalva (bivalves)						
Unknown	Unknown	Unknown	1	-	-	-
Total			234	2	40	0

deer to bison-sized specimens comprise only 10.58% of the overall faunal assemblage. These data suggest rabbits were the primary faunal resource processed by hunter-gatherers during the occupation(s) of the housepit. Smaller, squirrel-sized mammals also appear to have been processed in association with the housepit occupations at relatively high frequencies. Large mammal remains are not well represented within the assemblage and appear to comprise only a small proportion of the faunal resources processed during the housepit occupation(s). As compared to small mammals, which were likely transported back to the housepit residential base as whole carcasses, the differential transport of high utility portions of large mammals by hunter-gatherers occupying the structure may have contributed to the limited representation of these remains in the faunal assemblage. In addition, the composition of skeletal remains recorded for the Confluence Housepit site faunal assemblage consists predominately of the highly fragmented portions of longbone elements. Longbone flakes, shaft fragments, and other portions thereof represent 88.89% of the faunal assemblage. This is indicative of highly processed carcasses whereby longbones were fractured for bone marrow extraction to derive additional caloric and nutritional content from procured faunal resources.

SPATIAL ORGANIZATION

Information regarding the spatial distribution of cultural materials recovered from within the housepit and adjacent surrounding area at the site illustrates the potential for understanding the spatial organization and type of activities conducted within or near the structure during the hunter-gatherer occupation(s) manifested at the Confluence Housepit site. Most (98.29%) of the site faunal assemblage was recovered from within the Feature 1 housepit. These remains were concentrated within excavation units 102-103N, 502-503E, between the Feature 1A and Feature 1B subfloor thermal basins. The density map of faunal remains (Figure 7) shows the concentration of faunal remains between the two features and additional less dense concentrations of faunal remains emanating outward toward the western margin of the housepit substructure. These data suggest each of the thermal basins were used to process faunal resources, and processed and post-consumption remains may have been swept to the outer margins of the housepit. The faunal data indicate squirrel-sized, rabbit/rabbit-sized, and to a lesser extent deer-sized faunal resources were processed within each of the thermal basins.

Unfortunately, the paucity of lithic debitage (N=25) recovered during excavation precludes the ability to make substantive assessments regarding lithic reduction activities conduction during the occupation(s) of the housepit and site locality. The spatial distribution of the limited quantity of recorded debitage was concentrated between the two internal subfloor features, and to a lesser extent along the western margin of the housepit substructure. In addition, evidence of thermal alteration was observed for 64.0% of the debitage specimens from the assemblage. This is most likely attributable to lithic debitage being discarded within or toward the two interior subfloor thermal basins. The thermally altered debitage may have been further dispersed during thermal basin clean-out intervals.

Additional artifacts recovered in situ within the housepit include three metate fragments, two anvil stones, an expedient mano, and a tested cobble. The metate fragments likely represent portions of a single slab metate discarded before final abandonment of the housepit structure. They appear as probable refuse along the southwestern margin of the housepit substructure. The microfloral pollen data associated with the metate fragments indicate the intact metate may have been used to process Chenoam and prickly pear cactus. The intact metate was likely used in association with one or both of the internal subfloor thermal basins within the housepit. The two anvil stones and mano

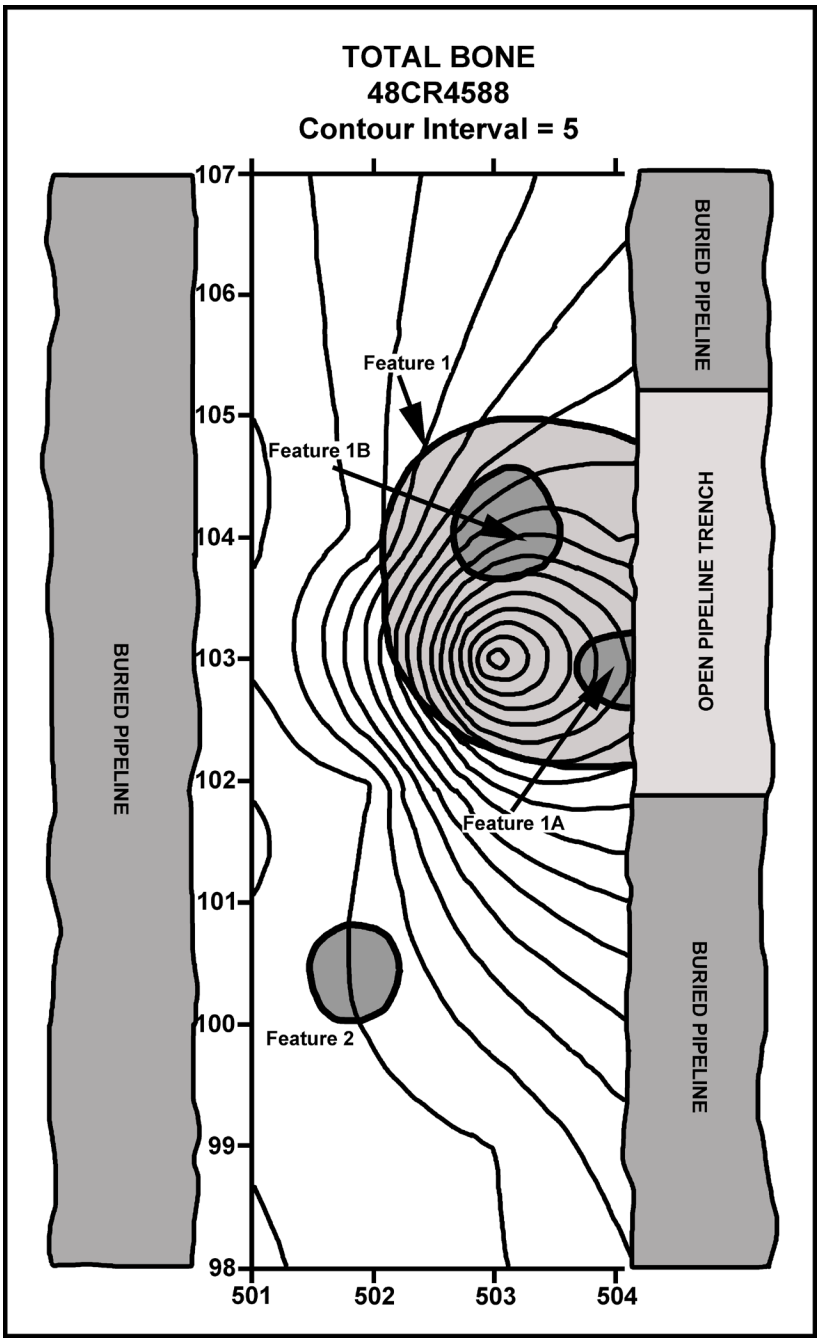


Figure 7: Contoured density map for total faunal remains recovered from Confluence Housepit site (48NA4588).

recovered near the Feature 1B thermal basin in the central portion of the housepit may have been used to process faunal and floral resources in association with Feature 1B or within both of the thermal basins. In addition, a retouched flake tool was recovered from the central portion of the housepit, between Feature 1A and Feature 1B. The flake tool was likely used as an expedient cutting implement for faunal resource processing conducted in association with one or both of the subfloor thermal basins. Overall, the combined artifact and density data indicate a full range of hunter-gatherer activities including lithic reduction and stone tool production/use,

faunal processing, and floral resource processing occurred within the housepit during at least one occupation of the housepit structure.

THE CONFLUENCE HOUSEPIT SITE AND OTHER NEARBY HOUSEPIT SITES

The housepit excavated at the Confluence Housepit site is similar in morphology and material culture to other Archaic period housepits recorded within Wyoming (Buenger 2011a; Harrell et al. 1997; Larson 1997; McNees 2005a; Smith 2003). The estimated intact dimensions of the Confluence housepit are 275.0 cm x 275.0 cm x 70.0 cm, with two associated internal basins. The substructure morphology is most consistent with what is defined by McNees (2005a) as a Type B housepit, being semi-ovate/elliptical planview and containing two large thermal basins positioned differentially at the outer margins of the substructure. The Confluence site housepit dimensions and general morphology are within the range of variation of other Archaic period housepits recorded in Wyoming (Buenger 2011a). However, although the diameter of the Confluence housepit was relatively consistent with the sampled data, the depth was 70 cm as compared to an average of 40 cm for the sampled housepits. The additional depth of Confluence Housepit site substructure, combined with steep wall angles suggests it may have been more intensively occupied and was potentially subject to repeated cleaning/re-excavations of the floor and walls, perhaps over the course of multiple hunter-gatherer occupations.

The Confluence site housepit was probably used as part of seasonal, short-term occupation of the Fish Creek, Horse Creek, and Pino Draw drainage system by members of a group of Archaic period hunter-gatherers. This occupation(s) may have occurred during cold/low-biomass periods of the seasonal round in which the proximity to perennial water and a comparatively diverse ecozone was important for sustaining small hunter-gatherer groups which may have consisted of familial units with children. As is generally purported for other Wyoming housepits, the Confluence housepit was likely occupied as a short-term residential structure from which to conduct a range of subsistence orientated and domestic activities (Smith 2003). Temporally punctuated reoccupation of the housepit structure at the Confluence Housepit site is not supported by statistically different radiocarbon data or discernible stratigraphic evidence within the floor of the substructure. However, as discussed previously, the increased floor depth and wall steepness of the substructure may be indicative of multiple occupations of the structure over time. One or more of these occupations may have been organized around simultaneous use of additional, spatially proximate housepit structures by a related group of hunter-gatherers.

Twenty Archaic period housepit sites have been excavated within approximately 60 mi (96 km) of the Confluence Housepit site (Figure 8). General information for the housepits excavated at these sites is summarized (Table 4). The Confluence Housepit site is located near the confluence of Horse Creek and Fish Creek, which discharge into the Sweetwater River approximately 10 mi (16 km) south. Several Archaic period housepit localities have also been recorded near the Sweetwater River or near tributaries which form portions of the broader drainage system in central Wyoming. These site include: the Horton site (48NA884; Buenger 2011c); Sweetwater Terrace site (48NA3800; Buenger 2011d); Beef Gap site (48NA3801; Buenger 2011e); Dry Creek site (48NA3805; Buenger 2011f); Sheep Mountain site (Buenger 2011g); Split Rock Ranch site (48FR1484; Eakin 1987; Eakin et al.1997); Headlining site (48FR4464; Fleming 2005a); Two-Fisted Manos site (48FR4516; Fleming 2005b); Jeffrey City site (48FR4398; McClelland and Smith 2001); Sheep Mountain site (48FR5125; Buenger 2011f); Crooks Gap site

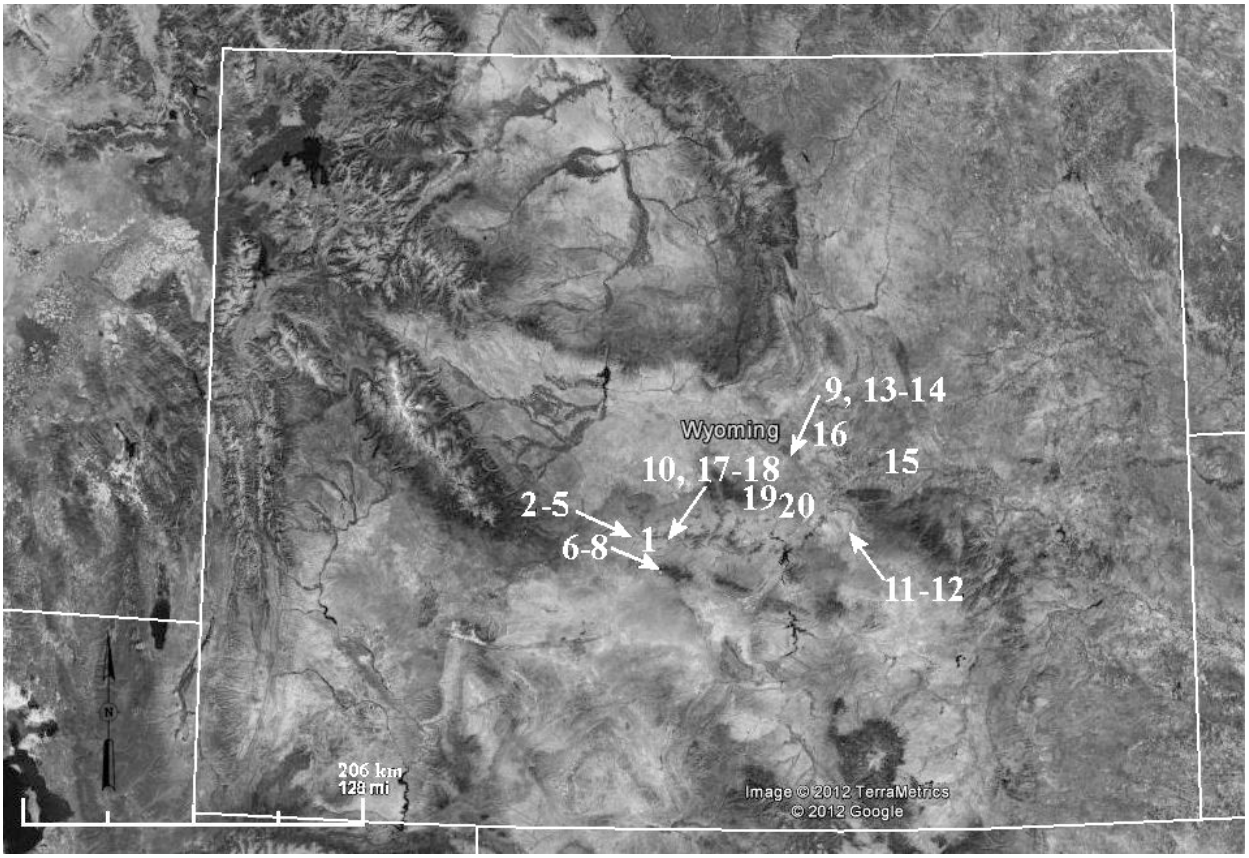


Figure 8. Aerial image of selected Wyoming housepit site locations (from Google Earth).

(48FR6260; Peterson and Smith 2012); White Stallion site (48FR6261; Rood et al. 2012); and Site 48FR2330 (Reiss 1990). Together these housepit sites include 26 individual housepit features represented within an approximately 60 mi (96 km) randomly sampled segment of the Sweetwater River drainage system along the Sweetwater Arch in central Wyoming.

Seven additional Opal phase housepit sites containing thirteen excavated housepit features located outside of the Sweetwater River drainage system, but relatively near the Confluence Housepit site within Natrona County, Wyoming have also been recorded. These sites include: the ED1 Twin housepit site (48NA226; Buenger 2011g); Two Toads site (48NA1079; Darlington et al. 1995); Powder River site (48NA2779; Lubinski 1999); Sites 48NA963 and 48NA964 (Waitkus et al. 1988); the Sixmile Draw site (48NA2529; McClelland et al. 1999); and the Natrona Housepit site (48NA2526; McClelland and Martin 1999b). The ED 1 Twin and Two Toads sites are located approximately 17 mi (27 km) north of the Confluence Housepit site, along Poison Spider Creek and the South Fork of Casper Creek respectively. The Two Toads site contained one Opal phase housepit feature and an external hearth centered activity area, and the ED1 Twin site contained two spatially proximate housepits. The Powder River site represents an Opal phase, multi-housepit site located approximately 30 mi (48 km) north of the Confluence Housepit site. The excavated portion of the site contained two housepits located near Wyatt Draw, an ancient playa, and the south fork of the Powder River. The Sixmile Draw site, located approximately 38 mi (61 km) northeast of the Confluence housepit site, represents a single Opal phase housepit located along Sixmile Draw, and within close proximity

Table 4: Summary information for selected excavated Archaic Period housepits from Wyoming.

MAP No.*	SITE	HP NO. †	DIMENSIONS L x W x D (cm)			OL.** (L)	SURFACE REA*** (cm^2)	^{14}C DATE RANGE (#) (yrs. B.P.) [Range Average]	INT. FEAT. No. ‡	TOPOGRAPHIC LOCATION / WATER SOURCE	REFERENCE
1†	Split Rock Ranch (48FR1484)	1	550	400	70	8099.6	172700.0	4430 ±60-6180 ±170 (5) [4850 ±50]	4	Terrace/Uplift Sweetwater River	Eakin (1987) Eakin et al. (1997)
		2	280	280	40	1649.3	61544.0	5630 ±180 (1)	3		
		3	-	-	-	N/A	N/A	5730 ±190 (1)	2		
		4	345	380	48	3309.7	102913.5	3400 ±90-5870 ±170 (7) [4970±90]	6		
		6	-	-	-	N/A	N/A	5080 ±160-5760 ±160 (2) [5420 ±160]	2		
2	48FR2330	16	460	440	125	13306.5	158884.0	5390 ±100-5950 ±100 (2) [5670±100]	7	Basin Interior Sweetwater River	Reiss (1990)
3	Jeffrey City (48FR4398)	2	362	323	60	3689.8	91786.9	5220 ±40-5320 ±40 (2) [5270 ±40]	3	Basin Interior Crooks Creek	McClelland and Smith (2001)
4†	Headlining (48FR4464)	A	320	250	16	673.2	62800.0	5520 ±40 (1)	3	Terrace Sweetwater River	Fleming (2005a)
		B	250	200	23	604.8	39250.0	5250 ±40 (1)	1		
		C	330	330	43	2462.9	85486.5	5390 ±40 (1)	3		
		D	280	280	30	1237.0	61544.0	5330 ±40 (1)	1		
5†	Two-Fisted Manos (48FR4516)	A	270	220	30	937.2	46629.0	5240 ±40 (1)	1	Terrace Sweetwater River	Fleming (2005b)
		B	277	250	31	1129.1	54361.3	5190 ±40 (1)	3		
6	Sheep Mountain (48FR5125)	1	350	350	35	2255.0	96162.5	4650 ±50-5040 ±50 (3) [4883 ±50]	3	Foothills/Basin Crooks Creek/ Tributaries	Buenger (2011g)
		15	310	305	35	1740.5	74221.8	5850 ±40-6100 ±40 (2) [5975 ±40]	3		

Table 4: (continued).

7†	Crooks Gap (48FR6260)	36	310	240	30	1173.9	58404.0	5170 ±30-5260 ±40 (2) [5215±35]	9	Terrace/ Foothills Crooks Creek	Peterson and Smith (2012)
		39	320	184	20	619.36	46220.8	5420 ±40 (1)	4		
		59	368	300	30	1741.95	86664.0	5200 ±30-5330 ±40 (4) [5265±40]	15		
8†	White Stallion (48FR6261)	1	450	200	23	1088.72	70650.0	5600 ±30 (1)	7	Terrace/ Foothills Crooks Creek	Rood et al. (2012)
		6	220	255	10	295.06	44038.5	5290 ±30-5290 ±30 (2) [5290±30]	2		
		9	300	300	25	1380.62	82425.0	5620 ±30 (1)	5		
9†	ED1 Twin (48NA226)	1	260	242	62	2051.8	49392.2	5020 ±60-5230 ±40 (2) [5125 ±50]	3	Basin/Uplift Poison Spider Creek	Buenger (2011b)
		2	300	295	40	1861.9	69472.5	5190 ±40-5320 ±40 (2) [5255 ±40]	4		
10	Horton (48NA884)	2	306	382	46	2087.7	67739.2	5480 ±50-5570 ±50 (2) [5525 ±50]	3	Terrace Sweetwater River	Buenger (2011c)
11	48NA963	3	284	228	90	3065.1	50830.3	2680 ±95-3470 ±115 (2) [3075 ±105]	4	Basin/Terrace Bates Creek	Waitkus et al. (1988)
		4	210	200	38	839.4	32970.0	5570 ±115-5850 ±105 (2) [5715 ±110]	3		
		34	300	245	35	1353.0	57697.5	5685 ±100 (1)	5		
12†	48NA964	11	315	315	50	2609.4	77891.6	5200 ±100-5570 ±100 (2) [5385 ±100]	3	Basin/Terrace Bates Creek	Waitkus et al. (1988)
		53	344	290	18	944.4	78311.6	5465 ±95-5688 ±100 (2) [5577 ±98]	5		
		165	207	207	45	1014.1	33636.5	5510 ±105-5555 ±105 (2) [5533 ±105]	2		

Table 4: (continued).

13	Two Toads (48NA1079)	1	365	330	51	3230.9	94553.3	5170 ±60-5260 ±130 (2) [5215 ±95]	2	Basin Interior Casper Creek	Darlington et al. (1995)
14	Natrona (48NA2526)	4	313	235	57	2205.1	57740.7	3820 ±50-4080 ±70 (6) [3912±53]	3	Basin/Uplift Casper Creek	McClelland and Martin (1999a)
15	Sixmile Draw (48NA2529)	3	324	290	44	2174.4	73758.6	5200 ±60-5430 ±170 (5) [5400±80]	8	Basin Interior Casper Creek	McClelland et al. (1999)
16	Powder River (48NA2779)	3	312	223	28	1024.6	54617.16	5260 ±60 (1)	3	Basin Interior South Fork Powder River	Lubinski (1999)
		4	225	275	29	943.8	48571.88	5490 ±60 (1)	1		
17	Sweetwater Terrace (48NA3800)	1	310	350	40	2282.6	85172.5	5470 ±50-5540 ±50 (2) [5505 ±50]	2	Valley/Terrace Sweetwater River	Buenger (2011d)
18	Beef Gap (48NA3801)	1	375	325	40	2564.0	95671.8	5240 ±40-5370 ±40 (2) [5305 ±40]	2	Valley/Gap Sweetwater River	Buenger (2011e)
19	Dry Creek (48NA3805)	1	375	375	25	1849.0	110390.6	3910 ±60 (1)	1	Basin/Terrace Dry Creek/ Cottonwood Creek	Buenger (2011f)
20	Confluence (48NA4588)	1	275	275	70	2784.3	59365.6	5340 ±40-5390 ±40 (2) [5365 ±40]	2	Basin/Terrace Fish Creek Horse Creek	Buenger (2013)

*Map No. = Corresponding housepit site location number on Figure 1 Map.
HP No. = Recorded number for excavated housepit feature.
Int. Feat. No. = Number of internal features recorded within excavated housepit.
**Volume (Liters) = 0.67 π (D)(L/2)(W/2)/1000.
***Surface Area (cm^2) = π (W/2)(L/2).
†Multi-housepit site containing at least two housepits that share a minimum of one statistically similar radiocarbon date (CALIB 6.0.1).

to Casper Creek. Sites 48NA963 and 48NA964 represent spatially proximate housepit sites which contained five Opal phase housepit features. The housepits were located along Bates Creek, approximately 15 mi (24 km) southeast of the Confluence Housepit site. The Natrona Housepit site is located approximately 22 mi (35 km) northeast of the ED1 Twin site, and represents a single Pine Spring phase housepit located near the Middle Fork of Casper Creek. The Dry Creek housepit site is located approximately 15 mi (24 km) to the west-northwest of the Confluence Housepit site. The site contained a single Pine Spring phase housepit located near the confluence of Dry Creek and Cottonwood Creek. Additional Archaic period housepit sites located in the Wind River Basin include: the Opal phase housepit at the Black and Red housepit site (48FR4457) located near Muskrat Creek (Karpinski 2005); the two Opal phase housepits at the Moneta Divide site (48FR4459) also located near Muskrat Creek (McNees 2005b); and the two Pine Spring phase housepits excavated at the Flying A Ranch site (48FR1431; Martin et al. 1999). These sites are located approximately 55 mi (88 km) to the northwest of the Confluence Housepit site.

Buenger (2011a) has discussed the Sweetwater River drainage system sites in terms of the potential patterned use and reuse of housepits and housepit sites in low-lying well-watered areas along the Sweetwater River and associated tributaries. The sites were interpreted as representing an adaptive strategy in which hunter-gatherers mitigated an overall reduction in ecological diversity and carrying capacity within the region during the Late Middle Holocene (4500-6500 B.P.) since these areas would have supported more year-round access to resources compared to marginal portions of basin interiors. Regional environmental conditions during the Late Middle Holocene are believed to have been relatively arid and marginal (Ahlbrandt 1974; Ahlbrandt et al. 1983; Eckerle 1989, 1990, 1994, 1997; Forman et al. 2001; Gaylord 1982, 1990; Halfen et al. 2010; Mayer and Mahan 2004; Stokes and Gaylord 1993). Buenger (2011a) has shown >60% of excavated Wyoming housepits from a sample of 75 were dated to between 4500-6500 B.P. The use of the sites in the Sweetwater River drainage system was viewed as a seasonally-conditioned land use pattern in which predictable resources were procured through a combination of logistical forays and foraging from the residential focal point of the housepit.

Combined, the Sweetwater River drainage system and the additional Natrona County housepit sites show a propensity for hunter-gatherer selection of housepit localities situated near major creeks and drainages systems. These areas were likely associated with sheltered topography and access to important resources such as water, fuel, and game animals, particularly during cold/low biomass portions of the season. Housepit sites located near perennial water sources were viewed as affording greater encounter based hunting and foraging success rates. These locations would likely have been ranked higher by hunter-gatherer groups compared to more exposed, shorter-term, open camp localities used for various purposes during other times of the seasonal round.

SUMMARY

The Confluence Housepit site contained a single housepit feature, two subfloor thermal basins internal to the housepit substructure, and a small hearth-centered activity area located to the exterior of the housepit substructure. The site is located along a relatively flat area between the floodplains of Horse Creek and Fish Creek. The occupation of the site dates to the Opal phase of the Early Archaic period. Cultural materials associated with the occupation(s) of the Confluence Housepit site include 25 lithic reduction specimens, two chipped stone tools, five ground stone specimens, two anvil stones, one tested cobble, 28 thermally altered stone fragments, 234 faunal specimens, and one

freshwater mussel shell artifact. Together, the cultural materials recovered from the site represent a range of hunter-gatherer activities including localized lithic raw material procurement (secondary lag cobbles) and testing, early to mid-stage lithic reduction, stone tool use/maintenance/manufacture, groundstone implement use and procurement and processing of floral and faunal resources. Overall, the composition of the Confluence Housepit artifact assemblage is generally consistent with most housepit sites known from the Wyoming Basin and surrounding region (Buenger 2011a; McNees 2005a; Smith 2003).

The housepit, associated features, and cultural materials recorded at the Confluence Housepit site are viewed as representing the use of the site locality by a small group of hunter-gatherers as part of an adaptive strategy conditioned by xeric Late Middle Holocene environmental conditions. The proximity of the site to Horse Creek and Fish Creek likely conditioned the occupation of the housepit and site locality by Archaic period hunter-gatherers. The location of site setting within a low-lying area near a perennial water source and riparian zone is consistent with many housepit sites known from Wyoming, and has been interpreted as forming a component of a broader housepit adaptation expressed among hunter-gatherers during the Late Middle Holocene (Buenger 2011a). The housepit at the Confluence site was used as part of a seasonally-conditioned occupation and reoccupation of the drainage system by culturally related groups of hunter-gatherers. The occupation(s) probably occurred during cold/low-biomass periods of the seasonal round in which the proximity to perennial water and an ecologically diverse ecozone was important for sustaining small hunter-gatherer groups. Occupying hunter-gatherer groups may have consisted of familial units with children which organized housepit residential bases around reduced mobility during cold/low biomass periods of the seasonal round. In addition, food resources may have been cached nearby or stored within the housepit in the late summer or fall in anticipation of a semi-protracted housepit occupation. Housepit-tethered strategies served to mitigate risk for groups during inclement and unproductive times of the year. Periodic short-term reoccupation of housepits may also have been organized around exploitation of targeted seasonal resources available near the site. This may have been particularly relevant during the Late Middle Holocene when environmental conditions may have been ameliorated by reduced effective precipitation and biomass during a period of regional aridity.

ACKNOWLEDGEMENTS

The excavation at the Confluence Housepit site was conducted by Western Archaeological Services as part of the Sinclair Pipeline Company Pathfinder 16" Pipeline project. We would like to thank the Sinclair Pipeline Company for funding the excavation and their support throughout the project. The author would like to thank Colin Lawson, Mark Leisz, and Sean Currah for their assistance during the excavation of the site.

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ARCHAEOLOGICAL EXCAVATION AT THE PATHFINDER RANCH SITE (48CR332): A STRATIFIED MULTICOMPONENT SITE LOCATED NEAR THE FERRIS MOUNTAINS OF CENTRAL WYOMING

by
Brent A. Buenger

ABSTRACT

The excavated cultural deposit at the Pathfinder Ranch site (48CR332) yielded five cultural components dating to the Uinta phase of the Late Prehistoric (Component 1), the Deadman Wash phase of the Late Archaic (Components 1-2), and the Pine Spring phase of the Late Archaic (Components 3-5). The cultural materials recovered from the five components suggests the occupations represent temporally punctuated short-term hunter-gatherer camps likely characterized by large mammal faunal resource procurement, seasonally-conditioned broad spectrum resource procurement, and in at least one instance, specialized resource procurement related to bison hunting/processing. The location of the Pathfinder Ranch site in close proximity to a perennial water source, associated riparian zones, large meadows and grassland expanses; as well as a foothill/mountain ecozone, likely conditioned the repeated use of the area by hunter-gatherers throughout a significant part of Wyoming Basin prehistory.

INTRODUCTION

The Pathfinder Ranch site is located in central Wyoming within the northeastern portion of the Wyoming Basin physiographic province. The site lies at an elevation of around 6250 ft (1905 m). Prominent physiographic features within the surrounding area include the Ferris Mountains located immediately to the west; Sand Creek Canyon located immediately to the south; Bear Mountain located immediately to the southeast; and the Ferris Dune Field located ab out four mi to the south-southwest. The site is situated at the point where Sand Creek emerges from Sand Creek Canyon (Figure 1). The cultural deposits at the site were observed within a large eolian deposit located on the north side of the creek. Sand Creek Canyon is formed between the Ferris Mountains to the west-southwest and Bear Mountain to the south-southeast. Immediately to the north-northeast of the site, beyond the opening of Sand Creek Canyon, the area opens into a small basin area containing areas of sagebrush steppe, grassland, meadows, and a riparian zone located along Sand Creek.

In total, 150.5 m² of intact sediment was excavated to a maximum depth of 2.6 m below the present ground surface within a contiguous excavation block. The excavated cultural deposit yielded five cultural components dating to the Uinta phase of the Late Prehistoric (Component 1), the Deadman Wash phase of the Late Archaic (Components 1-2), and the Pine Spring phase of the Late Archaic (Components

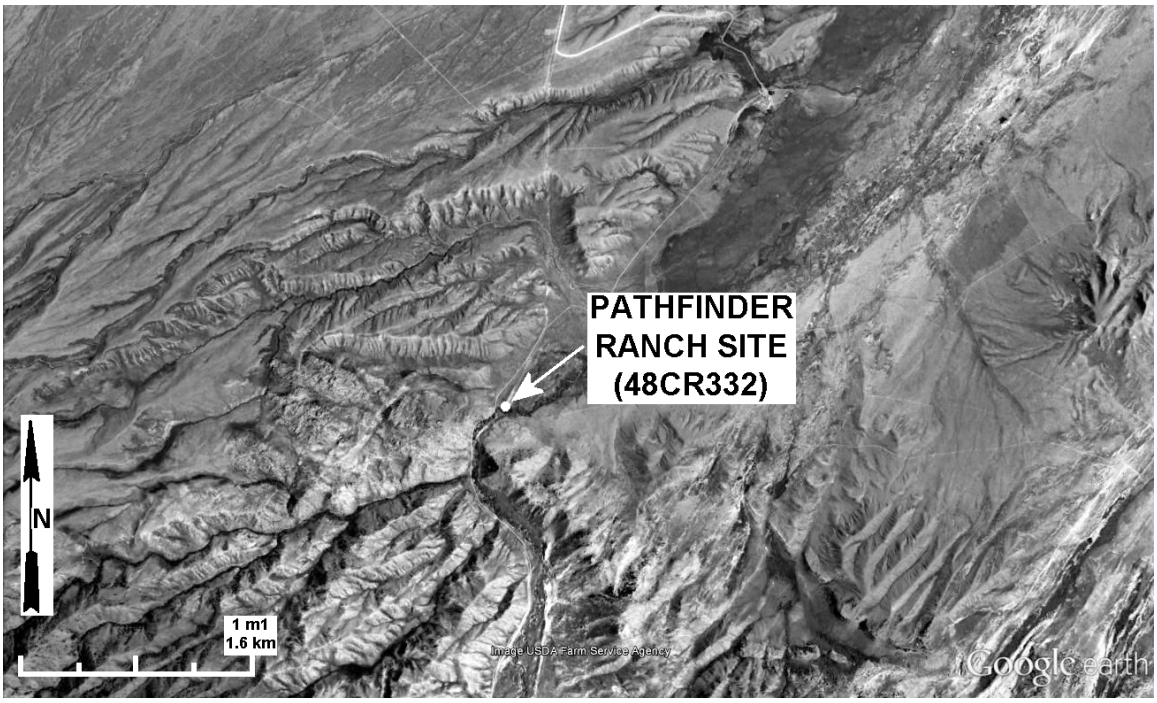

Figure 1: Aerial image of Pathfinder Ranch site locality (adapted from Google Earth).

3-5)(Wyoming Basin Chronology). Radiocarbon age estimates for Component 1 ranged between 1290 ± 30 and 2260 ± 30 years B.P. Component 2 is represented by radiocarbon age estimates ranging between 2620 ± 30 and 2710 ± 30 years B.P. Radiocarbon age estimates for Component 3 ranged between 2880 ± 30 and 3000 ± 30 years B.P. One radiocarbon age estimate of 3180 ± 30 years B.P. was established for Component 4. Component 5 is represented by two radiocarbon age estimates ranging between 3440 ± 30 and 3450 ± 30 years B.P. Most cultural materials recovered during the excavation are associated with Component 1. In sum, the excavation at the site yielded eight features, 79 chipped stone tool specimens, 8861 lithic reduction specimens, four groundstone specimens, ten ceramic specimens, five bone tools specimens, and 13,790 faunal specimens. The cultural materials recorded within the five cultural components suggests the occupations likely represent multiple temporally punctuated short-term residential camps, including a bison processing camp contained within the oldest component. The most intensive hunter-gatherer occupations of the site occurred during the Uinta phase of the Late Prehistoric.

GEOARCHAEOLOGICAL AND PALEOENVIRONMENTAL ASSESSMENT

The stratigraphy of the Pathfinder Ranch site is relatively complex and consists of eolian deposits, multiple buried cultural horizons, associated buried soils, lamellae formation, and underlying alluvial deposits. The stratigraphic sequence of the site comprises seven strata sequences and ten substrata exposed in profile to a depth of ca. 260 cm during excavation. The stratigraphic sequence represents around 2160 years eolian activity spanning from 1290 to 3450 years B.P., and an undetermined period of alluvial deposition occurring after 3450 years B.P. (Table 1). The stratigraphic profile of the east excavation block wall is illustrated (Figure 2). The stratigraphic sequence as viewed from southwest corner of the excavation block is provided (Figure 3).

Table 1: Pathfinder Ranch site stratigraphic profile.

STRATUM	COLOR (Munsell)	STRUC-TURE	TEXTURE	SOIL HORIZON	CULTURAL HORIZON	DEPOSIT-ITIONAL CONTEXT	THICK-NESS (cm)	AGE (B.P.)
VII	Light brownish gray (10YR6/2)	Massive	Fine-Medium Sand	C	-	Eolian	15-20	<1290
VIb	Dark gray (10YR4/1)	Massive	Fine-Medium Sand	Ab1	Comp. 1	Eolian	30-55	1290-2260
VIa	Dark yellowish brown (10YR4/6)	Massive	Oxidized Fine Sandy Clay	Btb1	-	Eolian	7-10	>2260
V	Light brownish gray (10YR6/2)	Massive	Fine-Medium Sand	Cb1	-	Eolian	40-50	>2260
IVb	Dark gray (10YR4/1)	Massive	Fine-Medium Sand	Ab2	Comp. 2	Eolian	15-20	2620-2710
IVa	Dark yellowish brown (10YR4/6)	Massive	Oxidized Fine Sandy Clay	Btb2	-	Eolian	2-3	>2710
III	Light brownish gray (10YR6/2) Dark Yellowish Brown (10YR4/4) Reddish Yellow (7.5YR6/8)	Massive	Fine-Medium Loose Sand w/ Thin Wavy Illuvial Sandy Clay Lamellae and Mottled Iron-Oxide	C&Btb1	-	Eolian w/ Illuvial	30-35	>2710
IId	Dark gray (10YR4/1)	Massive	Fine-Medium Clayey Sand (w/in II)	Btb3	Comp. 3	Eolian	5-8	2880-3000
IIc	Dark gray (10YR4/1)	Massive	Fine-Medium Clayey Sand (w/in II)	Btb4	Comp. 4	Eolian	5-8	3180
IIb	Dark grayish brown (10YR3/2)	Massive	Multiple Semi-Thickened, Semi-Wavy Sandy Clay Lamellae (w/in II)	Btb5	-	Illuvial	1-2	>3180
IIa	Black (10YR2/1)	Massive	Thick Sandy Clay Lamella (w/in II)	Btb6	-	Illuvial	3-4	>3180.
II	Light tan (10YR7/1) White (10YR8/1) Dark Grayish Brown (10YR3/2) Reddish Yellow (7.5YR6/8)	Massive	Fine-Medium Loose Sand w/ Thicker Semi-Wavy Illuvial Sandy Clay Lamellae and Mottled Iron-Oxide	C&Btb2	-	Eolian w/ Illuvial	70-80	>3180
Ib (w/in I)	Grayish brown (10YR5/2)	Massive	Slightly Gravelly Coarse Sand Overbank	Cb2	Comp. 5	Fluvial	5-8	3440-3450
Ia	Black (10YR2/1)	Massive	Thick Sandy Clay Lamella (w/in I)	Btb7	-	Illuvial	3-4	>3450
I	Dark grayish brown (10YR4/2)	Massive	Gravelly Coarse Clayey Sand	Cb3	-	Fluvial Marginal	10+	>3450

The Pathfinder Ranch site was occupied periodically by various groups of hunter-gatherers over the course of 2300 years beginning around 3500 years B.P. through at least 1200 years B.P. The most intensive human occupation of the locality occurred over a 1000 year interval between 2200-1200 years B.P. Local paleoenvironmental information is available from stratigraphic pollen samples collected at the site, site geoarchaeology, and the lithostratigraphy and geochronology of the Ferris Dune Field.

Stokes and Gaylord's (1993) study of the Ferris Dune Field showed interdune layers containing organic material were relatively thin and discontinuous within a 28 m deep profile, indicating eolian deposition was relatively continuous throughout the Holocene over the past 10,000 years. Where present, the organic layers are representative of reduced eolian activity and wetter environmental conditions. Periods of relative stability within the Ferris Dune Field occurred between 7400-6700 B.P. and again between 5300-5000 B.P.

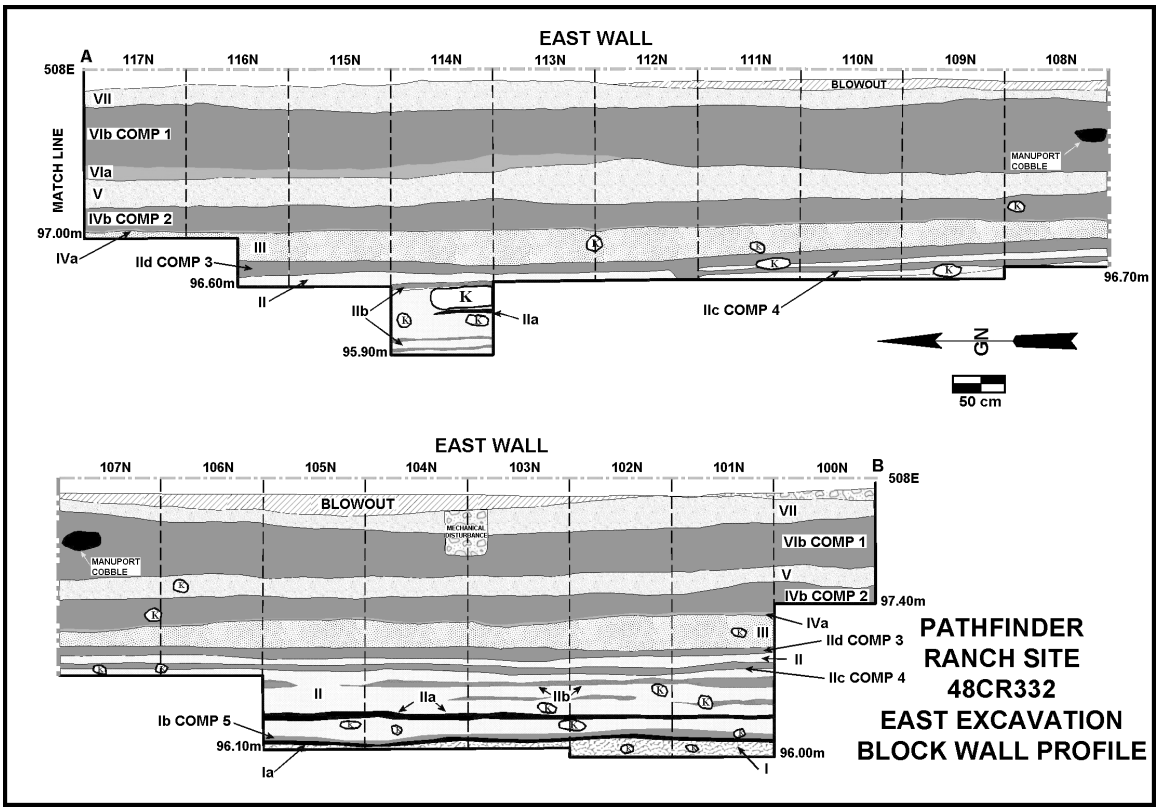

Figure 2: Stratigraphic profile of east wall of excavation block at Pathfinder Ranch site.

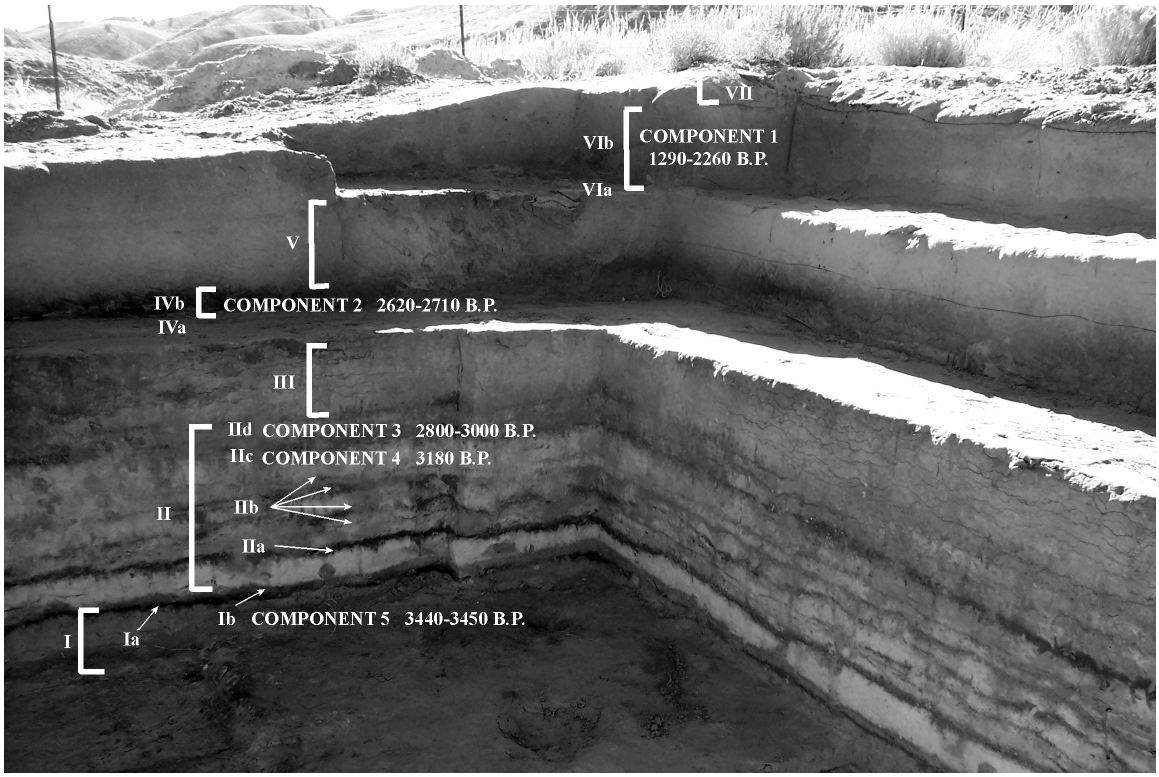

Figure 3: Photograph of stratigraphic profile in southwestern portion of excavation block at Pathfinder Ranch site.

Episodes of major dune activity occurred between 8200-7400 years B.P. and later between 4300-4000 years B.P. In addition, the researchers observed evidence of at least one period of dune remobilization occurring after 2000 years B.P.

The geoarchaeology of the Pathfinder Ranch site supports the assertion of Stokes and Gaylord (1993) for renewed dune activity after 2000 years B.P. The stratigraphic profile within the excavated portion of the site represents 2.25 m of eolian sand, of which 1.75 m (77.80%) was deposited after 2700 years B.P. This sand was derived from the Ferris Dune Field, transported through Sand Creek Canyon by prevailing paleowinds, and deposited on the leeward side of Sand Creek at the site. Periods of increased eolian activity within the dune field appear to correspond with greater eolian deposition at the site. In turn, dune remobilization is attributed to xeric environmental conditions characterized by reduced effective precipitation, soil moisture content, and vegetative cover. The most intensive human occupation of the Pathfinder Ranch site also corresponds with this period of eolian activity, and may represent hunter-gatherer adaptive strategies in which favorable locations with perennial water and relative resource abundance were used with greater frequency and intensity during times of environmental stress.

Additional stratigraphic information from the Pathfinder Ranch site related to potential paleoenvironmental conditions includes lamellae formation. Lamellae were recorded within the profile for strata dated older than 2710 years B.P. and younger 3440 years B.P. The precise origin of lamellae has been a topic of debate, and has generally been attributed to one of three processes: 1) primary deposition; 2) pedogenesis; 3) pedogenesis controlled by sedimentary characteristics (Rawling 2000). In eolian deposits, lamellae have been shown to form pedogenically as clay is illuviated downward through the profile by water from precipitation in clean, well-drained sands (Holliday and Rawling 2006; Schaetzl 2001). The variable Bt horizons in the Pathfinder Ranch profiles most likely formed pedogenically as clay was illuviated downward through the eolian sand profile by water derived from precipitation. The presence of lamellae deeper within the stratigraphic profile may suggest environmental conditions were more mesic after 2700 years B.P. to at least 3440 years B.P. The local level stratigraphic data from the Ferris Dune field and the Pathfinder Ranch site roughly correspond with this general trend, but with significant eolian activity occurring between 4300-4000 years B.P. and at some point around 2000 years B.P. in association with xeric environmental conditions. The stratigraphic data from the Ferris Dune Field and the Pathfinder Ranch site suggest the mesic environmental conditions near the site were most likely prevalent between 4000-2000 years B.P. The human occupation of the site was much more limited between 2710-3450 years B.P. However, the presence of a bison processing camp within Component 5, dated to 3440-3450 years B.P., suggests the local environment was likely mesic and capable of supporting bison ecology during at least part of the Early Late Holocene.

Pollen data from the Pathfinder Ranch site suggests notable change in local vegetation through time in association with climactic variability (Cummings et al. 2011). The period between 2880-3450 years B.P. showed elevated *Pinus* pollen frequencies when compared with stratigraphically younger sediments. Increased *Pinus* pollen frequencies suggest pines may have grown at lower elevations in areas supporting sagebrush during the Late Prehistoric up to the present. Grasses also appear to have been generally more abundant during this time interval. In addition, the meadow area near the site was likely somewhat expanded during this interval based on elevated pollen frequencies from birch (*Betula*), willow (*Salix*), cattails (*Typha*), plants in the chicory tribe of the sunflower family (Liguliflorae), and a variety of ferns

represented by monolete and trilete spores. The pollen data suggest paleoenvironmental conditions were mesic between 2880-3450 years B.P., consistent with other local and regional paleoenvironmental data.

Beginning at some time between 2880-2710 B.P., frequencies of *Pinus* pollen began to decline and *Artemisia* pollen began to rise. Between 2710-1290 B.P. frequencies of Liguliflorae and Poaceae pollen declined abruptly indicating a drying trend, and the largest quantities of *Artemisia* and *Juniperus* pollen were recorded, marking an expansion of sagebrush and juniper on the landscape. In addition, limited quantities of Poaceae and Liguliflorae pollen reflect a reduction of grass and chicory tribe species in the local environment. Increased eolian activity in the local environment may be reflected by increases in Low-spine Asteraceae and Cheno-am pollen frequencies, typically associated with ground disturbance and dry conditions. *Sarcobatus* pollen also appears for the first time during this interval, indicating local growth of greasewood. In addition, Fabaceae pollen appears as well, suggesting legumes became more abundant on the landscape as it dried. Species significantly reduced on the landscape during this interval include *Betula* and Apiaceae, birch and members of the umbel family. Species which disappeared from the record during this interval include *Salix* and *Typha* pollen, willow and cattails. Overall, the pollen data from the Pathfinder Ranch site suggests the interval between 2710-1290 B.P. was associated with xeric paleoenvironmental conditions when compared with the previous interval of 2880-3450 years B.P., which appears typical of more mesic paleoenvironmental conditions. These data are consistent with the above mentioned paleoenvironmental data marking a local and regional drying trend, particularly after 2000 B.P.

LITHIC RAW MATERIAL

The overall lithic assemblage (including all stone tools and debitage) from the Pathfinder Ranch site is comprised of 8940 specimens, most of which are lithic reduction materials (99.12%). Seventy-nine stone tools representing 0.88% of the assemblage were recorded during the excavation. The frequencies of lithic raw material types recorded for debitage and stone tools are summarized (Table 2). Eleven raw material types are represented in the assemblage. These include: fossiliferous general chert; other fossiliferous cherts (algalitic, ostracod, and oolitic); non-fossiliferous general chert; fossilized wood; chalcedony/opaline chert; phosphoria chert; general quartzite; quartz crystal; and obsidian. Formal tools derived from non-fossiliferous general chert were most prevalent, comprising 50.63% of the tool assemblage. Many of the recorded stone tools were likely transported to the site rather than manufactured on-site based on the distribution of debitage raw material types and tool raw material types. Specifically, fossiliferous general chert debitage was the dominant debitage type, comprising 54.53% of the assemblage; however, only 8.86% of tools were derived from fossiliferous chert. Similarly, non-fossiliferous general chert tools were recorded at an observed frequency of 50.63%, but flakes derived from the same raw material type account for only 13.67% of the assemblage.

Based on the composition of raw materials represented in the lithic assemblage, it is probable the various groups of prehistoric hunter-gatherers who used the site through time primarily exploited regionally available secondary sources as part of their lithic technological organization. It is also probable these groups may have also curated and transported chert cores, bifaces, and formal tools derived from regionally available raw material sources. Obsidian tools may also have been transported to the site in limited quantity and reworked during the site occupations. Sources of chert and quartzite lag and fluvial cobbles near the site may have included Quaternary alluvial

Table 2: Cross tabulation of lithic reduction stage by lithic raw material type for total chipped stone tool/debitage assemblage from Pathfinder Ranch site.

TYPE	LITHIC RAW MATERIAL TYPE											
	CH	**CN**	**CO**	**FG**	**FA**	**FO**	**FW**	**PH**	**ON**	**QG**	**QZ**	**Total**	**%**
Stone Tools	3	40	0	7	0	0	9	2	0	18	0	70	0.88%
Primary Flake	0	6	0	5	0	0	10	0	0	3	0	24	0.27%
Secondary Flake	2	58	0	98	1	0	63	2	0	51	2	277	3.10%
Tertiary Flake	4	78	0	124	7	0	49	2	3	98	12	377	4.22%
Bifacial Thinning w/ Cortex	0	0	0	0	0	0	2	0	0	0	0	2	0.02%
Bifacial Thinning w/o Cortex	2	10	1	11	5	0	3	0	0	14	0	46	0.51%
Finishing/ Maintenance Flake	20	351	0	1952	22	1	85	2	16	519	4	2972	33.24%
Flake Fragment w/ cortex	0	138	0	590	0	0	152	0	0	97	6	983	11.00%
Flake Fragment w/o cortex	21	533	0	2074	16	5	271	4	4	1150	38	4116	46.04%
Shatter	3	8	0	14	2	0	12	2	1	21	1	64	0.72%
Total	55	1222	1	4875	53	6	656	14	24	1971	63	8940	100.00%
%	0.62%	13.67%	0.01%	54.53%	0.59%	0.07%	7.34%	0.16%	0.27%	22.05%	0.70%	100.00%	

KEY:

CH = chalcedony	FA = chert fossiliferous algalitic	ON = obsidian
CN = chert non-fossiliferous general	FO = chert fossiliferous ostracods	QG = quartzite general
CO = chert oolitic	FW = silicified wood	QZ = quartz crystal
FG = chert fossiliferous general	PH = phosphoria chert	

deposits along Sand Creek, the Sweetwater River, and the North Platte River; Post-Eocene conglomerate along Bear Mountain; areas within the Ferris Mountains; and pediment areas on Arkansas Flats. Other more distant sources include Tertiary aged Crooks Gap conglomerates surrounding Green Mountain and Crooks Peak, and Tertiary aged Battle Springs Formation conglomerates underlying much of the northern portion of the Great Divide Basin. In addition, primary and secondary sources of toolstone are also located at a greater distance from the site along the southern and western margins of the Great Divide Basin (Love 1997; Michaelsen 1983; Miller 1991). Various toolstone quality quartzites are also potentially available from the Casper Arch and Wind River Basin located of the site. Primary sources for Phosphoria chert are known from the Big Horn Mountains north of the site (Miller 1991).

OBSIDIAN SOURCING ANALYSIS

Obsidian artifacts recovered during the excavation consist of 24 small, late-stage lithic reduction flakes. Sixteen of these specimens were submitted for sourcing analysis (Hughes 2012). The results of the obsidian analyses for specimens obtained from Component 1 show a relatively wide range of obsidian source areas are represented. These include: Teton Pass, WY; Obsidian Cliff, WY; Malad, ID; Bear Gulch, ID; and Wildhorse Canyon, UT. The Wyoming sources are located 285-380 miles

northwest of the Pathfinder Ranch site, with Obsidian Cliff being the most distant. The Idaho sources are 350-390 miles west-northwest of the site. The Utah source is the most distant obsidian source area, and is located 460 miles southwest of the Pathfinder Ranch site.

The remaining obsidian specimens were recovered from Components 2, 3, and 5. One Component 2 obsidian specimen was sourced to Obsidian Cliff, Wyoming while another was sourced to the Malad, Idaho area. Component 3 is represented by a single obsidian flake (6.25 %), sourced to the Bear Gulch, Idaho area. The single obsidian flake (6.25 %) recovered from Component 5 was sourced to the Teton Pass, Wyoming area. Overall, as observed for the samples recovered from the Late Prehistoric component, the samples associated with Late Archaic components were sourced to a variety of source areas. The only exception would be the Wildhorse Canyon source area represented in Component 1, but absent from the Component 2, 3, and 5 samples.

Although the obsidian sample is small (16 specimens), it appears there is similarity in source areas between these southwest Wyoming and northwest Wyoming samples described by Scheiber and Finley (2011). The only clear exceptions are the absence of Green River Pebble obsidian and the presence of Wildhorse Canyon, Utah obsidian in the Pathfinder Ranch sample. It is conceivable highly mobile hunter-gatherers inhabiting sites in Wyoming procured obsidian from regional primary sources over the course of the seasonal round; however, it is also probable local hunter-gatherer obtained obsidian through trade with other groups (Smith 1999; Thompson et al. 1997). Obsidian artifacts derived from Greater Yellowstone area obsidian have been recovered from Hopewell archaeological sites in the Midwest, up to 1700 miles to the east (Hatch et al. 1990). Hunter-gatherers inhabiting the Pathfinder Ranch site during the Late Archaic and Late Prehistoric could have obtained obsidian from primary source areas in Wyoming and Idaho over the course of seasonal migrations. This is conceivable given most source areas are located 300-390 miles from the site. Alternatively, obsidian from these sources may have been obtained secondarily from other geomorphic contexts, through trade with other groups, or scavenging lithic material from abandoned sites. Based on the few (24 out of 8861 debitage specimens) obsidian flakes recovered from the site, it seems most of the obsidian transported to the site was in tool form. This suggests procurement of obsidian was not an important activity during any of the hunter-gatherer occupations of the site.

COMPONENT 1

Component 1 was a stratigraphically discrete 30-55 cm thick anthropogenically-stained horizon (Stratum VIb) contained within eolian sand. The radiocarbon data for Component 1 suggests the cultural deposit represents at least four temporally discrete hunter-gatherer occupations of the site during the Uinta phase of the Late Prehistoric period and the upper boundary of the Deadman Wash phase of the Late Archaic period. However, several additional occupations are also likely represented within the component. Most Component 1 archaeological materials are associated with Late Prehistoric hunter-gatherer use of the site. Only the lowest portion of the Component 1 cultural horizon was dated to beginning of the Deadman Wash phase of the Late Archaic. Each of the occupations represents ephemeral hunter-gatherer open camps with associated cultural materials indicative of a range of activities, including procurement of large mammal faunal resources. The component yielded five radiocarbon age estimates of 1290 ± 30 years B.P.; 1410 ± 30 years B.P.; 1450 ± 30 years B.P.; 2000 ± 30 years B.P.; 2260 ± 30 years B.P. Cultural materials associated with the Late Prehistoric occupations of the site include three thermal basins, one manuport cluster, 7237 lithic reduction specimens, 61 stone tools, four groundstone specimens, two bone tool/artifact

specimens, and 6552 fragmented faunal specimens.

FEATURES

Four cultural features were recorded for Component 1. These consisted of two wind-deflated rock-filled thermal basins, one wind-deflated hemispherical thermal basin, and one manuport cluster (Table 3).

CHIPPED STONE TOOLS

The Component 1 chipped stone tool assemblage is comprised of 34 specimens (Table 4). Twelve projectile points and point fragments are present including three complete specimens, one nearly complete specimen, two proximal-medial fragments, five proximal fragments, and one lateral fragment (Figure 4). Two of the projectile point specimens (BzR3.440 and BzR3.437) recovered from Component 1 share attributes similar to the Rose Spring type which has a wide ranging distribution across the Great Basin and Rocky Mountain West. Five final biface fragments consisting of one medial-distal fragment, one medial fragments, a conjoining medial fragment and distal fragment, and one lateral fragment are also in the assemblage. Other biface specimens include six preforms, seven bifacial blanks and blank fragments, and five bifacial preblanks and preblank fragments. Flake tools from the Component 1 assemblage included eight retouched flakes and six utilized flakes. In addition, seven cores and four tested material specimens were recovered.

DEBITAGE

The Component 1 lithic debitage assemblage consists of 7237 specimens. Flake fragments without cortex represent the largest proportion of the assemblage (45.46%), followed by finishing/maintenance flakes (33.87%). Eleven arieties of lithic raw material types are represented in the Component 1 lithic reduction assemblage. These include non-fossiliferous general chert, fossiliferous general chert, phosphoria chert, chalcedony/opaline chert, algalitic chert, oolitic chert, ostracod chert, silicified wood, obsidian, quartz crystal, and general quartzite. Fossiliferous general chert specimens were recorded at the highest observed frequency (52.44%). Quartzite was the second most prevalent raw material type (23.20%), and non-fossiliferous general chert was third (12.97%). The combined debitage data suggests later stage lithic reduction activities and final-stage tool manufacture and re-tooling were the primary stone-working activities conducted during the multiple Late Prehistoric hunter-gatherer occupations represented within Component 1. It is probable the groups of Late Prehistoric hunter-gatherers occupying the site curated, and transported partially reduced raw material and prepared early-stage bifaces to the site where additional bifacial thinning and tool production/finishing and maintenance activities were performed.

BONE TOOLS/ARTIFACTS

One bone bead and one bone tool fragment were recorded for Component 1. The bead specimen is a Size Class III long bone shaft fragment cut and ground on both ends. The specimens appear to represents a bone bead manufactured using a groove-and-snap technique. The bone tool fragment is a Size Class V long bone shaft fragment exhibiting grinding and polish along most surfaces. It has been ground to a point and most likely represents a portion of a bone awl.

FAUNAL ANALYSIS

The Component 1 faunal assemblage is comprised of 6552 cultural specimens, representing 47.51% of the faunal remains recovered from the site (Table 5). Because of the highly fragmented nature of the assemblage, most of the specimens (97%) were identified only to a mammal size class or as unidentified mammal. Identified taxa include mink (*Mustela vison*), elk (*Cervus elaphus*), deer (*Odocoileus* sp.), pronghorn (*Antilocapra americana*), sheep (*Ovis* sp.), bison (*Bison bison*), chipmunk (*Tamias* sp.), marmot (*Marmota* sp.), ground squirrel (*Spermophilus* sp.), pocket gopher (*Thomomys* sp.), pocket mouse (*Perognathus* sp.), deer mouse (*Peromyscus* sp.), Kangaroo rat

Table 3: Pathfinder Ranch site feature attribute summary.

FEATURE NUMBER	COMPON-ENT	TYPE	MAX L (cm)	MAX W (cm)	MAX D (cm)	VOL* (L)	SURFACE AREA** (cm^2)	CULTURAL MATERIAL (n=)	FCR (kg) (n=)	FILL MATRIX	FTIR	DATE YRS B.P. Uncalib
1	1	Thermal basin; rock-filled (deflated)	54	53	16	24.08	2246.67	Flakes (3) Flake Tool (2) Bone (15)	43kg (73)	Eolian Sand	Glutamine (possible animal processing)	1410 ± 30
2	1	Thermal basin (deflated)	55	60	17	29.51	2590.50	Flakes (3) Bone (4)	<500g (8)	Eolian Sand	Glutamine (possible animal processing)	1290 ± 30
3	1	Manuport cluster	350	160	10	N/A	N/A	Biface (1) Flakes (4)	98kg (17)	Eolian Sand	Glutamine (possible animal processing)	N/A
4	1	Thermal basin; rock-filled (deflated)	42	36	23	18.29	1186.92	Bone (8)	20kg (21)	Eolian Sand	Glutamine (possible animal processing)	1450 ± 30
5	2	Thermal basin; rock-filled (deflated)	36	63	10	11.93	1780.38	None	10kg (9)	Clayey Sand	Glutamine (possible animal processing)	2630 ± 30
6	2	Thermal basin (deflated) Truncated Excavation	40 †48	47 †47	10 †10	9.89 †11.8	1475.80 †1770.96	None	0	Clayey Sand	Glutamine (possible animal processing)	2620 ± 30
7	3	Thermal basin (deflated)	55	59	8	13.65	2547.33	None	0	Clayey Sand	Glutamine (possible animal processing)	2880 ± 30
8	5	Thermal basin (fluvial displacement)	46	40	9	8.71	1444.40	Bone (2)	0	Sandy Clay w/ Gravel	None	3440 ± 30

*Volume (Liters) = ⅔ ¶ (D)(L/2)(W/2)/1000 **Surface Area (cm3) = ¶ (W/2)(L/2). †Estimated intact metrics. FTIR = Fourier Transform Infrared Spectroscopy.

(*Dipodomys* sp.), muskrat (*Ondatra zibethicus*), jackrabbit (*Lepus* sp.), cottontail rabbit (*Sylvilagus* sp.), duck (Family Anatidae), sage grouse (*Centrocercus urophasianus*), passeriform, snake (Family Colubridae), garter snake (*Thamnophis* sp.), Western rattlesnake (*Crotalus viridis*), Tiger salamander (*Ambystoma tigrinium*), toad (*Bufo* sp.), and sculpin (*Cottus* sp.). Faunal specimens classified to size class only from Component 1 are dominated by Size Class V, V-VI, and IV-VI medium to large mammal remains. Specimens from these size classes totaled 4895 and represent 87.02 % of the cultural faunal assemblage from Component 1. Faunal specimens classified to Size Class I, II, I-II, III, and I-III totaled only 464 specimens (8.25%).

Overall, the identified specimens from Component 1 represent a wide range of species. Such diversity in faunal assemblage composition is relatively rare among Wyoming Basin archeological sites. Components 1-4 at the Sheep Mountain site (48FR5125) (Buenger 2011); Component IV at the McGinnis site (48SU1499) (Pastor and Thompson 2001); and Component 5 of the Harrower site (48SU0867) (Thompson 1991) are similar. In addition, the assemblage is comprised predominantly of medium to large mammal remains. The composition of the Component 1 faunal assemblage contrasts with other Late Prehistoric Wyoming Basin archaeological sites. Many contemporaneous interior basin sites

Table 4: Component 1 chipped stone tool characteristics from Pathfinder Ranch site.

CATALOG #	PROVENIENCE	ELEVATION	TOOL TYPE	LITHIC TYPE	DIMENSIONS L x W x TH (mm)	CONDITION / PORTION	EDGE RETOUCH/ CROSS SECTION/ MORPHOLOGY/ COMMENT
BzR3.440	Component 1 116N 502E	97.90- 97.80m	Projectile Point	Reddish Gray Chert General	25.4 x 12.7 x 3.0	Complete	Bifacial/All / Lenticular Corner-notched, Short/Narrow Stem, Concave Base
BzR3.437	Component 116N 503E	97.73- 97.70m	Projectile Point	Weak Red Phosphoria Chert	27.5 x 11.3 x 2.6	Complete (Nearly)	Bifacial/All / Lenticular Corner-notched, Short Stem, Fractured Base
BzR3.435	Component 1 114N 504E	97.70- 97.60m	Projectile Point	Red/Brown/ Black Chert General	26.7 x 18.2 x 4.9	Complete	Bifacial/All / Biconvex Side-notched, Short/Wide Stem, Convex Base/ Reworked
BzR3.436	Component 1 109.95N 504.80E	97.83m	Projectile Point	Red/Tan Quartzite	28.2 x 21.8 x 4.4	Complete	Bifacial/All / Beveled Unilaterally Corner-notched, Short/Wide Stem, Convex Base/ Reworked
BzR3.434	Component 1 115N 503E	97.80- 97.70m	Projectile Point	Weak Red Phosphoria Chert	30.6 x 19.7 x 6.0	Medial-Proximal	Bifacial/All / Plano-convex Side-notched, Long/Wide Stem, Convex Base
BzR3.439	Component 1 115N 501E	98.00- 97.90m	Projectile Point	Black Chert General	22.4 x 14.5 x 3.0	Medial-Proximal	Bifacial/All / Lenticular Corner-notched, Short/Narrow Stem, Concave Base
BzR3.441	Component 1 114.03N 507.45E	98.03m	Projectile Point	Weak Red/Tan Chert General	19.1 x 14.8 x 3.4	Lateral	Bifacial/All / Lenticular Corner-notched, Expanding Stem
BzR3.433	Component 1 115N 503E	98.00-97.90m	Projectile Point	Reddish Gray Quartzite	14.6 x 21.5 x 4.2	Proximal	Bifacial/All / Lenticular Corner-notched, Wide Expanding Stem, Convex Base
BzR3.438	Component 1 111N 501E	98.00-97.90m	Projectile Point	Gray Quartzite	16.1 x 19.6 x 4.1	Proximal	Bifacial/All / Lenticular Corner-notched, Wide Expanding Stem, Flat Base
BzR3.425	Component 1 101.31N 507.18E	98.25m	Projectile Point	Pinkish White Fossiliferous Chert	13.8 x 23.9 x 4.1	Proximal	Indeterminate / Lenticular Wide Expanding Stem, Convex Base
BzR3.442	Component 1 116N 507E	98.00-97.90m	Projectile Point	Light Reddish Brown Chert General	7.8 x 10.2 x 3.0	Proximal	Indeterminate / Indeterminate Narrow Expanding Stem, Flat Base
BzR3.444	Component 1 113N 505E	98.0-97.90m	Projectile Point	Reddish Brown Chert General	12.2 x 9.4 x 2.9	Proximal	Indeterminate
BzR3.428	Component 1 104N 500E	98.10-98.00m	Final Biface	Light Tan Chert General	28.8 x 12.6 x 3.8	Medial-Distal	Bifacial/Some/Biconvex Triangular Blade Shape
BzR3.426	Component 1 101N 504E	98.25-98.10m	Final Biface	Pink-Red Semi-Translucent Chert	10.1 x 9.5 x 2.5	Distal	Bifacial/All/Beveled Unilaterally *Conjoins with BzR3.427

Table 4: (continued)

BzR3.427	Component 1 103N 504E	98.30-98.20m	Final Biface	Pink-Red Semi-Translucent Chert	9.0 x 13.3 x 3.0	Medial	Bifacial/All/Beveled Unilaterally *Conjoins with BzR3.426
BzR3.429	Component 1 111N 506E	97.90-97.80m	Final Biface	Grayish White Quartzite	8.9 x 7.6 x 2.7	Medial	Bifacial/All/Biconvex
BzR3.411	Component 1 101N 501E	97.90-97.80m	Final Biface	Brown Quartzite General	24.4 x 13.2 x 5.7	Lateral	Bifacial/All/Biconvex
BzR3.430	Component 1 101N 505E	97.90-97.80m	Preform	Light to Reddish Brown Chert	25.9 x 11.2 x 2.9	Complete (Nearly)	Bifacial/All/Lenticular Acuminate Blade Shape
BzR3.398	Component 1 105N 505E	98.10-98.00m	Preform	Light Gray Quartzite	25.2 x 19.8 x 4.9	Complete	Unifacial/Some/Beveled- Unilaterally Triangular Blade Shape
BzR3.399	Component 1 102N 505E	98.20-98.10m	Preform	Gray-Gray Brown Quartzite	23.6 x 26.6 x 6.6	Medial-Distal	Bifacial/Some/Beveled- Bilaterally
BzR3.399A	Component 1 106N 504E	98.20-98.10m	Preform	Greenish Gray Quartzite	27.8 x 19.8 x 6.7	Medial-Terminal	None/Biconvex
BzR3.412	Component 1 101.78N 507.98E	97.67m	Preform	Greenish Gray Quartzite	31.4 x 26.9 x 7.7	Medial-Terminal	Bifacial/Some/Beveled- Alternately Bipointed Blade Shape
BzR3.411	Component 1 111N 501E	97.90-97.80m	Preform	Brown Quartzite	24.4 x 13.2 x 5.7	Medial	Bifacial/Some/Biconvex Associated with BzR3.401?
BzR3.400	Component 1 109N 505E	98.30-98 .20m	Blank	Reddish Gray Quartzite	61.9 x 37.2 x 8.7	Complete (Nearly)	None
BzR3.402	Component 1 108.52N 504.43E	98.30m	Blank	Dark Red Chert	26.3 x 20.3 x 6.9	Medial-Terminal	None
BzR3.410	Component 1 108N 502E	98.00-97.90m	Blank	Orangish Brown Dendritic Quartzite	27.8 x 24.1 x 6.5	Medial-Proximal	None
BzR3.405	Component 1 108.63N 501.84E	98.03m	Blank	White Chert	30.7 x 39.9 x 7.5	Medial-Proximal	Unifacial/Some Associated with BzR3.415?
BzR3.406	Component 1 101.03N 500.10E	98.19m	Blank	Dark Gray Chert	27.9 x 23.8 x 9.0	Medial-Proximal	None
BzR3.415	Component 1 111N 501E	98.00-97.90m	Blank	White Chert	21.4 x 10.2 x 7.2	Lateral	None Associated with BzR3.405?
BzR3.401	Component 1 113.59N 504.61E	98.05m	Blank	Brown Quartzite	22.6 x 22.5 x 5.9	Lateral	Bifacial/Some Associated with BzR3.411?
BzR3.403	Component 1 106.50N 507.40E	98.05m	Preblank	White Fossiliferous Chert	65.6 x 44.9 x 18.4	Complete	None Associated with Feature 3
BzR3.404	Component 1 107N 503E	98.10-98.00m	Preblank	Reddish Brown Fossilized Wood	28.4 x 24.8 x 8.9	Medial-Terminal	None

Table 4: (continued)

BzR3.409	Component 1 115.73N 503.69E	97.61m	Preblank	Grey Chert w/iron-oxide inclusions	71.4 x 48.7 x 15.6	Medial-Terminal	None
BzR3.408	Component 1 108N 505E	98.00-97.90m	Preblank	Reddish Brown Fossilized Wood	20.6 x 16.2 x 5.3	Lateral-Terminal	None
BzR3.407	Component 1 115.59N 503.72E	97.86m	Preblank	Light Gray Semi-translucent Chert	31.3 x 24.6 x 5.9	Terminal	None
BzR3.432	Component 1 114.03N 507.54E	98.03m	Indet. Biface	Brown Semi-translucent Chert	10.9 x 8.4 x 2.5	Lateral	Bifacial/Some/Lateral Indeterminate
BzR3.386	Component 1 117N 505E	97.40-97.30m	Retouched Flake	Semi-translucent Chalcedony	30.6 x 27.9 x 8.4	Complete	Unifacial Lateral and Distal/ Possible Graving Tip
BzR3.384	Component 1 113N 504E	97.80-97.70m	Retouched Flake	Reddish Brown Quartzite	33.1 x 28.5 x 3.5	Complete	Unifacial Lateral and Proximal/ Usewear Lateral/ Proximal Margins
BzR3.378	Component 1 107.61N 506.56E	98.15m	Retouched Flake	Reddish Brown Fossilized Wood	29.2 x 27.8 x 7.7	Complete	Unifacial Distal/Usewear Distal Margin
BzR3.387	Component 1 117.60N 502.85E	97.86m	Retouched Flake	Dusky Red Chert General	22.1 x 19.4 x 4.3	Proximal-Medial	Unifacial Lateral/Usewear Lateral Margin
BzR3.379	Component 1 113N 501E	98.10-98.00m	Retouched Flake	Brown-Tan Dendritic Chert	15.8 x 28.4 x 3.6	Distal-Medial	Unifacial Lateral and Distal/ Usewear Lateral and Distal Margin
BzR3.376	Component 1 105N 505E	98.10-98.00m	Retouched Flake	Orange Brown Dendritic Quartzite	22.8 x 23.6 x 3.1	Medial-Terminal	Unifacial Lateral/Usewear Lateral Margin
BzR3.375	Component 1 100N 507E	98.30-98.20m	Retouched Flake	Reddish Pink Chert General	25.2 x 15.1 x 6.6	Lateral	Unifacial Lateral/Usewear Lateral Margin
BzR3.380	Component 1 106N 505E	97.70-97.60m	Retouched Flake	Reddish Brown Fossilized Wood	18.9 x 20.2 x 7.9	Lateral	Unifacial Lateral/ Usewear Lateral Margin
BzR3.385	Component 1 105N 502E	97.90-97.80m	Utilized Flake	Dusky Red Chert General	16.2 x 15.4 x 3.0	Complete	None/Spokeshave (semicircular depression with usewear distal end)
BzR3.377	Component 1 106N 506E	98.20-98.10m	Utilized Flake	Brown/Tan/Gray Trans. Foss. Chert	25.8 x 21.6 x 2.6	Complete	None/Usewear Lateral Margin
BzR3.382	Component 1 106N 500E	98.10-98.00m	Utilized Flake	Light Brown/Tan/ White Chert	19.2 x 28.9 x 8.5	Complete	None/Usewear Proximal and Lateral Margin
BzR3.383	Component 1 113N 504E	98.00-97.90m	Utilized Flake	Mottled Brown/Tan Chert	26.9 x 26.4 x 3.5	Complete	None/Usewear Lateral Margin
BzR3.381	Component 1 108N 500E	98.10-98.00m	Utilized Flake	Dusky Red Chert General	11.9 x 20.6 x 2.6	Medial-Distal	None/Usewear Lateral Margin
BzR3.388	Component 1 114N 507E	97.90-97.80m	Utilized Flake	Dusky Red Chert General	12.6 x 8.6 x 3.0	Lateral	None/Usewear Lateral Margin
BzR3.418	Component 1 109N 501E	98.10-98.00m	Core	Semi-Translucent Chalcedony	53.3 x 47.9 x 38.5	Complete	Unidirectional Core

Table 4: (continued)

BzR3.421	Component 1 107.77N 505.76E	98.02m	Core	Dark Red-Brown Fossilized Wood	91.5 x 55.8 x 30.3	Complete	Discoidal Core
BzR3.420	Component 1 117N 503E	98.10-98.00m	Core	Yellow-Orange Fossilized Wood	83.5 x 37.6 x 20.3	Lateral	Discoidal Core/Fragmented
BzR3.419	Component 1 114.19N 503.86E	97.92m	Core	Reddish Brown Fossilized Wood	47.6 x 32.9 x 26.8	Complete	Residual Core
BzR3.417	Component 1 109N 504E	98.20-98.10m	Core	Orangish Brown Quartzite	47.9 x 23.5 x 19.3	Complete	Residual Core
BzR3.423	Component 1 113N 508E	97.60-97.50m	Core	Gray Semi-translucent Chert	56.3 x 33.4 x 16.4	Indet.	Residual Core/Fragmented
BzR3.422	Component 1 111.65N 501.40E	97.82m	Core	Greenish Gray Fossilized Wood	46.7 x 40.3 x 24.9	Indet.	Residual Core/Fragmented
BzR3.356	Component 1 114N 501E	97.80-97.70m	Tested Material	Brown-Gray Fossilized Wood	55.7 x 39.3 x 6.1	Indet.	None/Fragmented/Tabular
BzR3.3465	Component 1 115.33N 507.10E	98.06m	Tested Material	Grayish Brown Fossiliferous Chert	29.5 x 26.8 x 6.5	Indet.	Bifacial some/Fragmented
BzR3.3472	Component 1 100.86N 507.04E	98.12m	Tested Material	Brown to Gray Fossiliferous Chert	75.9 x 64.7 x 28.1	Indet.	None/Fragmented
BzR3.3474	Component 1 117N 501E	97.90-97.80m	Tested Material	Dark Red to Black Chert General	25.8 x 21.2 x 8.4	Indet.	None/Fragmented

from the Wyoming Basin are associated with faunal assemblages which include larger proportions of small mammals such as jack rabbit, cottontail rabbit, various rodents, and to a lesser extent, larger mammals predominately consisting of pronghorn (Byers et al 2005; Lubinski 2000). The geographic setting of the site adjacent to Sand Creek, a large meadow area, and the lower slopes of the Ferris Mountains and Bear Mountain likely influenced the diversity of the assemblage and the prey choices for the Late Prehistoric hunter-gatherers occupying the site.

COMPONENT 2

Component 2 was recovered from within a 15-20 cm thick anthropogenically-stained horizon contained in eolian sand. The radiocarbon data for Component 2 suggests the cultural deposit represents at least two temporally discrete hunter-gatherer occupations of the site during the Deadman Wash phase of the Late Archaic period. The occupations were ephemeral hunter-gatherer open camps with associated thermal basins and cultural materials. The component yielded three conventional radiocarbon age estimates of 2620 ± 30, 2630 ± 30, and 2710 ± 30 years B.P. The cultural materials associated with the Component 2 Late Archaic occupations of the site included two thermal basins, three chipped stone tool specimens, 589 lithic reduction specimens, three bone tool/artifact specimens, and 4268 fragmented faunal specimens.

FEATURES

Two cultural features consisting of a wind-deflated rock-filled thermal basin and a wind-deflated hemispherical thermal basin were recorded for Component 2 (Table 3).

CHIPPED STONE TOOLS

The Component 2 chipped stone

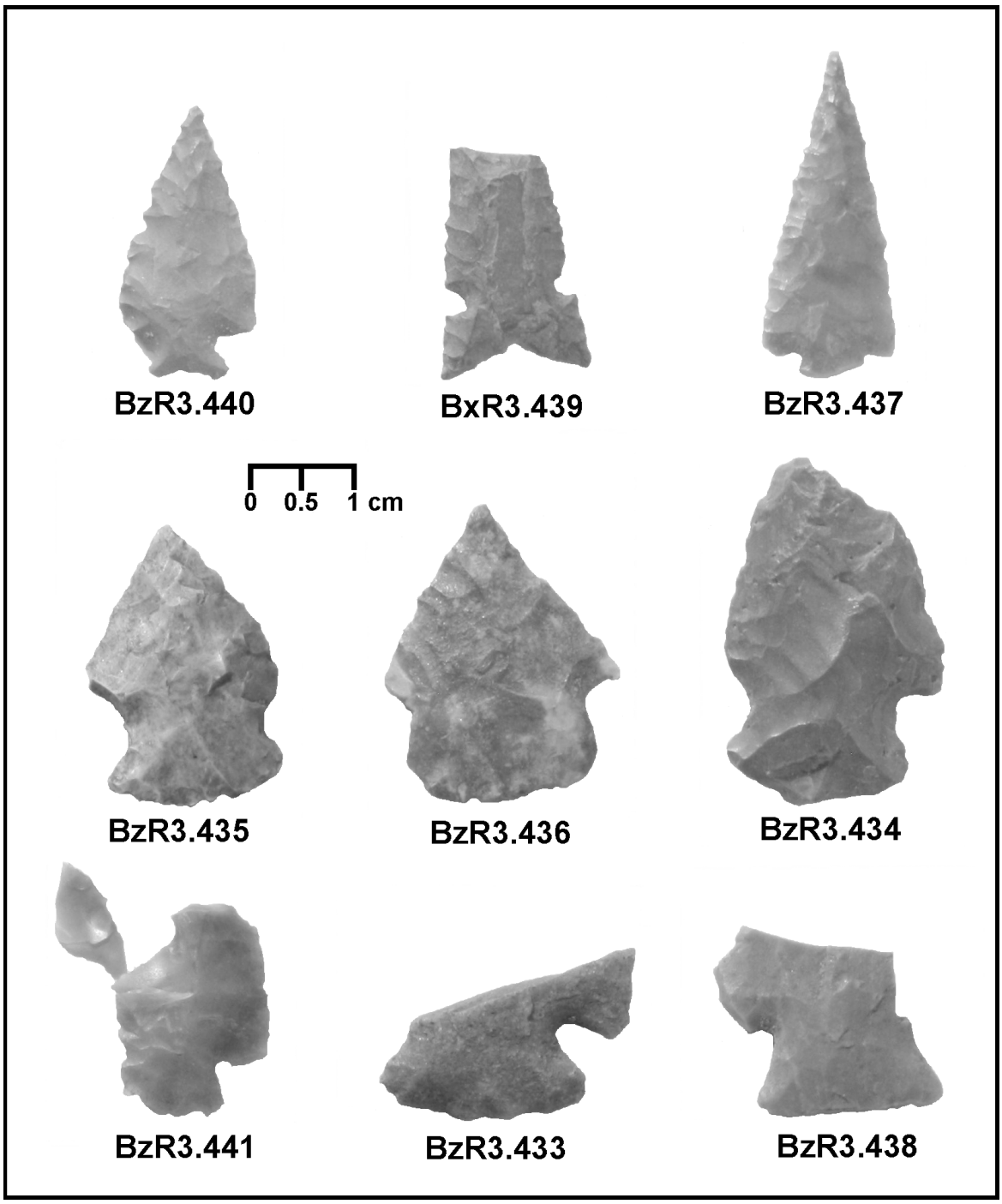

Figure 4: Selected projectile points specimens from Component 1, Pathfinder Ranch Site.

tool assemblage is comprised of only three specimens: one final biface fragment, a single retouched flake, and a tested material specimen. The biface is a proximal-medial portion of final biface made from a gray-light brown non-fossiliferous general chert. The flake tool is the medial-distal portion of a fragmented side and end-worked retouched flake made from dendritic chert. The specimen appears to represent a fragmented end scraper with unifacial edge retouch along both lateral margins and the distal end. The tested material specimen

Table 5: Component 1 faunal remains from Pathfinder Ranch site.

ORDER	TAXON	COMMON NAME	ALL REMAINS NISP	ALL REMAINS MNI	CULTURAL[1] NISP	CULTURAL[1] MNI
Class Mammalia (mammals)						
Carnivora	*Mustela vison*	Mink	1	1	1	1
Artiodactyla	*Cervus elaphus*	Elk	1	1	1	1
	Odocoileus sp.	Deer	2	1	2	1
	Antilocapra americana	Pronghorn	15	1	15	1
	Ovis sp.	Sheep	1	1	1	1
	D/S/P	Deer, sheep, or pronghorn	352	--	352	--
	Bison bison	Bison	9	2	9	2
	Bos/Bison sp.	Domestic cattle or Bison	37	--	37	--
Rodentia	Family Sciuridae	Squirrels	1	--	1	--
	Tamias sp.	Chipmunk	10	1	--	--
	Marmota sp.	Marmot	2	1	2	1
	Spermophilus sp.	Ground squirrel	10	2	10	2
	Cynomys sp.	Prairie dog	1	1	1	1
	Thomomys sp.	Pocket gopher	129	13	116	13
	Perognathus sp.	Pocket mice	1	1	--	--
	Dipodomys sp.	Kangaroo rat	1	1	--	--
	Family Muridae	Mice and Rats	1	1	--	--
	Peromyscus sp.	Deer mice	3	1	1	1
	Vole	Unidentified vole	10	5	10	5
	Ondatra zibethicus	Muskrat	42	2	42	2
	Unidentified	Unidentified rodent	2	--	2	--
Lagomorpha	*Sylvilagus* sp.	Cottontail rabbit	14	2	13	2
	Lepus sp.	Jackrabbit	5	1	4	1
Unknown	Size Class I	Mouse-sized	36	--	34	--
	Size Class II	Squirrel-sized	114	--	97	--
	Size Class I-II	Mouse to squirrel-sized	27	--	23	--
	Size Class III	Rabbit-sized	169	--	165	--
	Size Class I-III	Mouse to rabbit-sized	149	--	145	--
	Size Class IV	Coyote-sized	1	--	1	--
	Size Class V	Deer-sized	1,960	--	1,943	--
	Size Class V-VI	Deer to bison-sized	1,494	--	1,490	--
	Size Class IV-VI	Coyote to bison-sized	1,464	--	1,462	--
	Size Class VI	Bison-sized	62	--	62	--
	Unidentified	Unidentified mammal	204	--	203	--
Class Aves (Birds)						
Anseriformes	Family Anatidae	Waterfowl (ducks)	3	1	1	1
Galliformes	*Centrocercus urophasianus*	Sage Grouse	2	1	2	1
Passeriformes	Unidentified	Unidentified	3	2	3	2
Unknown	Unidentified	Unidentified bird	3	--	3	--
Class Reptilia (Reptiles)						
Squamata	Family Colubridae	Racers, Gophers, Garters	46	1	45	1
	Thamnophis sp.	Garter snake	1	1	1	1
	Crotalus viridis	Western rattlesnake	22	1	22	1
Unknown	Unidentified	Unidentified reptile	2	--	2	1
Class Amphibia (Amphibians)						
Caudata	*Ambystoma tigrinium*	Tiger salamander	1	1	1	1
Anura	*Bufo* sp.	Toad	14	2	1	1
Class Osteichthyes (Bony Fishes)						
Scorpaeniformes	*Cottus* sp.	Sculpin	2	1	--	--
Total Identified to Class		6,429	50	6,318	43	
Unidentified			244	--	234	--
Total			6,673	50	6,552	43

was fragmented and is a blackish gray non-fossiliferous general chert. The original chert lag cobble was likely tested for quality, with the present specimen being discarded during the process.

DEBITAGE

The Component 2 lithic reduction assemblage consists of 589 specimens. Flake fragments without cortex represent the largest proportion of the assemblage (56.88%). Finishing/maintenance flakes and flake fragments with cortex comprise the second and third most prevalent lithic reduction categories (23.43% and 12.56%) respectively. Six general varieties of lithic raw material types are represented in the Component 2 lithic reduction assemblage. These include non-fossiliferous general chert, fossiliferous general chert, silicified wood, quartz crystal, general quartzite, and obsidian. Fossiliferous general chert was the most prevalent raw material type recorded for Component 2 (52.29%). Quartzite was the second most prevalent raw material type recorded (27.16%), and non-fossiliferous general chert was third (16.13%). The debitage assemblage suggests later stage lithic reduction activities and final-stage tool manufacture and re-tooling were the primary stone-working activities conducted during the multiple Late Archaic hunter-gatherer occupations represented within Component 2. It is probable the groups of Late Archaic hunter-gatherers occupying the site curated, and transported partially reduced raw material and prepared early-stage bifaces to the site where additional bifacial thinning and tool production/finishing and maintenance activities were performed.

BONE TOOLS/ARTIFACTS

Three bone tools/artifacts were recorded for Component 2. These include a single bone bead, a bone tool fragment, and an antler fragment. The bead consists of a Size Class III long bone shaft fragment which has been cut and ground on both ends. The tool fragment appears to represent an awl fragment derived from a pronghorn ulna trochlear notch and shows grinding along the shaft and a distal end narrowing into a fine point. The antler specimen exhibits polish and grinding on the fragmented end. The precise usage of the artifact is unknown.

FAUNAL ANALYSIS

The Component 2 faunal assemblage is comprised of 4212 cultural specimens. These specimens comprise 30.54 % of the faunal remains recovered from the site (Table 6). Because of the highly fragmented nature of the assemblage, most of the specimens (99%) were identified only to a mammal size class or as unidentified mammal. Identified taxa for Component 2 include elk (*Cervus elaphus*), deer (*Odocoileus* sp.), pronghorn (*Antilocapra americana*), bison (*Bison bison*), marmot (*Marmota* sp.), ground squirrel (*Spermophilus* sp.), pocket gopher (*Thomomys* sp.), Kangaroo rat (*Dipodomys* sp.), muskrat (*Ondatra zibethicus*), jackrabbit (*Lepus* sp.), snake (Family Colubridae), and toad (*Bufo* sp.). Faunal specimens classified to size class only from Component 2 are dominated by Size Class V, V-VI, and IV-VI large mammal remains. Specimens from these size classes totaled 3749 and represent 89.01 % of the entire cultural faunal assemblage recovered from the component. Faunal specimens classified to Size Class I, II, I-II, III, and I-III totaled only 140, and represent a significantly lower proportion of the overall assemblage (3.32%). Similar to Component 1, the identified specimens from Component 2 represent a wide range of species and the assemblage is dominated by medium to large remains. Again, this was largely conditioned by the geographic setting of the site near perennial water, meadows, and foothills.

COMPONENT 3

Component 3 was a 5-8 cm thick and somewhat discontinuous anthropogenically-stained horizon (Stratum IId) and yielded two radiocarbon age estimates of 2880 ± 30 B.P. and 3000 ± 30 B.P. The radiocarbon data for

Component 3 suggest the cultural deposit represents at least one hunter-gatherer occupations of the site during the Pine Spring phase of the Late Archaic period. The occupation(s) was a ephemeral hunter-gatherer open camp and associated cultural materials. The archaeological remains associated with the Component 3 Late Archaic occupation at the site consisted of a single thermal basin, 372 lithic reduction flakes, and 301 fragmented faunal specimens.

FEATURES

One cultural feature consisting of a wind-deflated hemispherical thermal basin was recorded for Component 3 (Table 3).

DEBITAGE

The Component 3 lithic reduction assemblage consists of 372 specimens. Flake fragments without cortex represent the largest proportion of the Component 3 debitage assemblage (46.51%). Finishing/maintenance flakes were the second most prevalent lithic reduction type recorded for the component (38.98%). Six general varieties of lithic raw material types are represented in the Component 3 debitage

Table 6: Component 2 faunal remains from Pathfinder Ranch site.

ORDER	TAXON	COMMON NAME	ALL REMAINS		CULTURAL[1]	
			NISP	MNI	NISP	MNI
Class Mammalia (mammals)						
Artiodactyla	*Cervus elaphus*	Elk	3	1	3	1
	Odocoileus sp.	Deer	4	1	4	1
	Antilocapra americana	Pronghorn	17	1	16	1
	D/S/P	Deer, sheep, or pronghorn	73	--	73	--
	Bison bison	Bison	6	1	6	1
	Bos/Bison sp.	Domestic cattle or Bison	16	--	16	--
Rodentia	*Marmota* sp.	Marmot	7	2	7	2
	Spermophilus sp.	Ground squirrel	7	2	5	1
	Thomomys sp.	Pocket gopher	22	3	20	2
	Dipodomys sp.	Kangaroo rat	10	1	--	--
	Ondatra zibethicus	Muskrat	2	1	2	1
Lagomorpha	*Lepus* sp.	Jackrabbit	1	1	1	1
Unknown	Size Class I	Mouse-sized	5	--	--	--
	Size Class II	Squirrel-sized	45	--	25	--
	Size Class I-II	Mouse to squirrel-sized	4	--	4	--
	Size Class III	Rabbit-sized	74	--	72	--
	Size Class I-III	Mouse to rabbit-sized	40	--	39	--
	Size Class V	Deer-sized	1,308	--	1,306	--
	Size Class IV-VI	Coyote to bison-sized	1,453	--	1,452	--
	Size Class V-VI	Deer to bison-sized	782	--	782	--
	Size Class VI	Bison-sized	209	--	209	--
	Unidentified	Unidentified mammal	95	--	93	--
Class Reptilia (Reptiles)						
Squamata	Family Colubridae	Racers, Gophers, Garters	9	1	2	1
Class Amphibia (Amphibians)						
Anura	*Bufo* sp.	Toad	4	1	4	1
Total Identified to Class			4,196	16	4,141	13
Unidentified			72	--	71	--
Total			4,268	16	4,212	13

[1] Excludes complete specimens from Size Class I-II taxa, taxa with skeletal completeness, and specimens with digestive or carnivore modification (see text for explanation).

assemblage. These include non-fossiliferous general chert, fossiliferous general chert, silicified wood, quartz crystal, general quartzite, and obsidian. Fossiliferous general chert was the most prevalent raw material type recorded for the component (56.72%). Quartzite was the second most prevalent raw material type recorded (21.51%). Non-fossiliferous general chert was third most frequently recorded raw material type (20.16%). The composition of the debitage assemblage suggests later stage lithic reduction activities and final-stage tool manufacture and re-tooling were the primary stone-working activities conducted during the Component 3 hunter-gatherer occupation of the site.

FAUNAL ANALYSIS

The Component 3 faunal assemblage is comprised of only 301 cultural specimens, significantly fewer than Components 1 and 2. Only eight specimens from Component 3 were identified to taxa. These include D/S/P (deer, sheep, or pronghorn), ground squirrel (*Spermophilus* sp.), pocket gopher (*Thomomys* sp.), cottontail rabbit (*Sylvilagus* sp.), and toad (*Bufo* sp.). Because of the highly fragmented nature of the assemblage, most of the specimens (84%) were identified only to a mammal size class or as unidentified mammal. Faunal specimens classified to size class only from Component 3 are dominated by Size Class V, V-VI, and IV-VI large mammal remains. Specimens from these size classes totaled 250 and represent 83.06% of the entire Component 3 cultural faunal assemblage. Eight specimens were classified to Body Size Class I, II, I-II, III, and I-III (2.66%). Although limited, the composition of the Component 3 faunal assemblage is comprised of largely of medium to large sized mammals, which was likely conditioned by hunter-gatherer prey choice and the geographic setting of the site.

COMPONENT 4

Component 4 was a thin (5-8 cm) and somewhat discontinuous anthropogenically-stained horizon. The cultural deposit likely represents a single, short-term hunter-gatherer occupation of the site during the Pine Spring phase of the Late Archaic period. Component 4 yield a single radiocarbon age estimate of 3180 ± 30 years B.P., derived from a stratigraphic sample taken from the cultural horizon associated with the component. The cultural materials recovered from Component 4 include only 23 lithic reduction specimens and 128 fragmented faunal specimens.

DEBITAGE

The Component 4 debitage assemblage consists of only 23 specimens. The paucity of lithic reduction flakes from the component precludes any substantive analysis of lithic technology. The assemblage consist of 13 (56.52%) finishing/maintenance flakes, seven (30.43%) flake fragments without cortex, two (8.10%) tertiary flakes, and one (4.35%) flake fragment with cortex. Only three lithic raw material types are represented in the assemblage, consisting of fossiliferous chert (69.57%), quartzite (21.74), and non-fossiliferous chert (8.70%).

FAUNAL ANALYSIS

One hundred and two cultural faunal specimens were recovered from Component 4. The assemblage was highly fragmented with 88% of specimens measuring < 2cm in length. Identified taxa include deer, sheep, or pronghorn (DSP), pocket gopher (*Thomomys* sp.), and cottontail rabbit (*Sylvilagus* sp.). Size Class V, V-VI, and IV-VI large mammal remains, and those identified as deer, sheep, or pronghorn (DSP) totaled 66 and represent 64.71% of the component cultural faunal assemblage. Thirty faunal specimens were classified to Size Class I, II, I-II, III, and I-III, and identified as cottontail rabbit (*Sylvilagus* sp.) (29.41%). Although the small sample size of faunal assemblage precludes any substantive analysis of faunal resource procurement during the Component 4 Late Archaic hunter-gatherer occupations of the site, the composition of the assemblage is generally consistent with those described for Components 1-3.

COMPONENT 5

Component 5 was a bison processing camp dating to the Pine Spring phase of the Late Archaic. The radiocarbon data from Component 5 suggests the cultural deposit represents a single occupation. The two dates obtained yielded conventional radiocarbon age estimates of 3440 ± 30 years B.P., and 3450 ± 30 years B.P. The cultural deposit was associated with Substratum Ib, comprised of grayish brown, massive, slightly gravelly, coarse grained sand, derived from overbank alluvium. It was not associated with a visible lens of anthropogenically-stained sediment and was relatively thin (ca. 5-8 cm). The data obtained during excavation suggests Component 5 represents a Late Archaic bison processing camp occupation situated close to the northern bank of Sand Creek. The faunal remains are dominated by bison specimens (>97%), and at least four individual bison are represented. The chipped stone tool assemblage is also consistent with faunal processing. The archaeological remains associated with the Component 5 occupation of the site consisted of one thermal basin, 15 chipped stone tools, 640 lithic reduction specimens, and 2199 fragmented faunal specimens.

FEATURES

One cultural feature consisting of a hemispherical thermal basin was recorded for Component 5 (Table 3).

CHIPPED STONE TOOLS

The Component 5 chipped stone tool assemblage is comprised of eleven specimens. These include one projectile point, one preform, one final biface, one bifacial blank fragment, one uniface, six retouched flakes, three utilized flakes, and one core. None of the recovered tool exhibit clearly discernable attributes indicative of specific temporal/cultural typologies (Table 7; Figure 5).

DEBITAGE

The Component 5 debitage assemblage is comprised of 640 specimens. Flake fragments without cortex represent the largest proportion of the Component 5 debitage assemblage (48.59%), and finishing/maintenance flakes were the second most prevalent flake type (35.16%). Five general varieties of lithic raw material types are represented in the Component 5 debitage assemblage. These include non-fossiliferous general chert, fossiliferous general chert, quartz crystal, general quartzite, and obsidian. Fossiliferous general chert was the most prevalent raw material type recorded for the component (84.06%). Non-fossiliferous general chert was second, although significantly less prevalent (11.09%). The debitage data suggest later stage lithic reduction activities and final-stage tool manufacture and re-tooling were the primary stone-working activities conducted during the Component 5 site occupation. It is probable the occupying hunter-gatherers curated and transported partially reduced raw material to the site where additional bifacial thinning and tool production/finishing and maintenance activities were performed.

FAUNAL ANALYSIS

The Component 5 faunal assemblage is comprised of 2198 cultural specimens. Compared to Components 1 and 2, Component 5 has much less variety in taxa. Identified taxa include taxa include deer (*Odocoileus* sp.), bison (*Bison bison*), and cottontail rabbit (*Sylvilagus* sp.). Component 5 is dominated by bison (and bos/bison size) and bison-sized specimens (97.68%). Component 5 stands out in the Pathfinder Ranch faunal assemblages because it is dominated by bison and bison-sized mammal remains and represents a bison processing camp. Bison and bison-sized skeletal part representation from this assemblage suggests mostly complete bison were deposited at the site, although few phalanges were recovered. At least four individual bison are represented within the assemblage. A contoured density distribution map shows a distinct spatial association of these remains with the single thermal basin represented within the component, indicating bison were processed

Table 7: Component 5 chipped stone tool characteristics from Pathfinder Ranch site.

CATALOG	PROVENIENCE	ELEVATION	TOOL TYPE	LITHIC TYPE	DIMENSIONS L x W x TH (mm)	CONDITION / PORTION	EDGE RETOUCH/ CROSS SECTION/ MORPHOLOGY/ COMMENT
BzR3.443	Component 5 101N 504E	96.20-96.10m	Projectile Point	Reddish Black Chert General	24.7 x 15.1 x 3.2	Complete (Nearly)	Bifacial/All / Lenticular Corner-notched, Short/Expanding Stem, Base (missing)/ Triangular
BzR3.431	Component 5 101N 502E	96.20-96.10m	Preform	Reddish Gray Semi-trans. Chalcedony	31.5 x 19.9 x 4.8	Complete	Bifacial/All / Beveled Unilaterally/ Triangular
BzR3.413	Component 5 103.47N 506.54E	96.05m	Final Biface	Pinkish Gray Quartzite General	50.4 x 38.7 x 7.6	Complete	Bifacial/All / Lenticular/ Ovate/Usewear Lateral Margins
BzR3.414	Component 5 103.70N 504.10E	96.11m	Blank	Dark Reddish Gray Chert General	16.4 x 15.9 x 5.2	Lateral	Bifacial/Lateral/ Indeterminate/ Usewear Lateral Margin
BzR3.3473	Component 5 103N 506E 103N 505E	96.90-96.00m	Uniface	Reddish Orange-Brown Fossiliferous Chert	37.6 x 19.2 x 7.1	Complete (conjoined)	Unifacial/Lateral and Lateral Distal *Recovered separately in 2 pieces, conjoined in the laboratory
BzR3.397	Component 5 105.99N 506.04E	96.03m	Retouched Flake	Dusky Red Dendritic Chert	33.2 x 21.3 x 11.5	Complete	Unifacial Lateral and Distal/ Usewear Lateral/Distal Margins
BzR3.395	Component 5 102N 506E	96.20-96.10m	Retouched Flake	Reddish Brown Fossiliferous Chert	38.6 x 22.5 x 7.4	Complete	Unifacial Lateral/ Usewear Lateral/Distal Margins
BzR3.396	Component 5 104N 502E	96.20-96.10m	Retouched Flake	Tan-Brown Mottled Dendritic Chert	52.0 x 37.0 x 10.4	Complete	Unifacial Lateral/ Usewear Lateral/Distal Margins
BzR3.390	Component 5 101N 505E	96.20-96.10m	Retouched Flake	Brown Semi-trans. Chert General	24.1 x 25.8 x 10.2	Medial-Distal	Unifacial Lateral/ Usewear Lateral/Distal Margins
BzR3.389	Component 5 101N 505E	96.20-96.10m	Retouched Flake	Brown Semi-trans. Chert General	27.8 x 26.6 x 10.7	Medial-Distal	Unifacial Lateral/ Usewear Lateral (right)/Distal Margins
BzR3.391	Component 5 102N 505E	96.20-96.10m	Retouched Flake	Brown Dendritic Chert General	27.1 x 21.1 x 3.3	Lateral	Unifacial Lateral (left)/ Usewear Lateral (left) Margin
BzR3.392	Component 5 102N 505E	96.20-96.10m	Utilized Flake	Dark Brown and Tan Banded Chert	37.7 x 24.2 x 3.9	Complete (nearly)	Usewear Lateral (right)/Margin "Tiger" chert (banded pelagic chert)
BzR3.393	Component 5 101.69N 504.92E	96.15m	Utilized Flake	Brown Semi-trans. Chert General	33.7 x 35.2 x 16.8	Complete	Usewear Distal Margin
BzR3.3464	Component 5 103.42N 504.30E	96.13m	Utilized Flake	Whitish Gray Quartzite General	55.8 x 22.2 x 11.4	Complete	Usewear Lateral Margins
BzR3.424	Component 5 101N 504E	96.20-96.10m	Core	Reddish Brown Chert General	42.0 x 25.9 x 19.5	Fractured/ Indet.	Residual Core Fractured/Exhausted

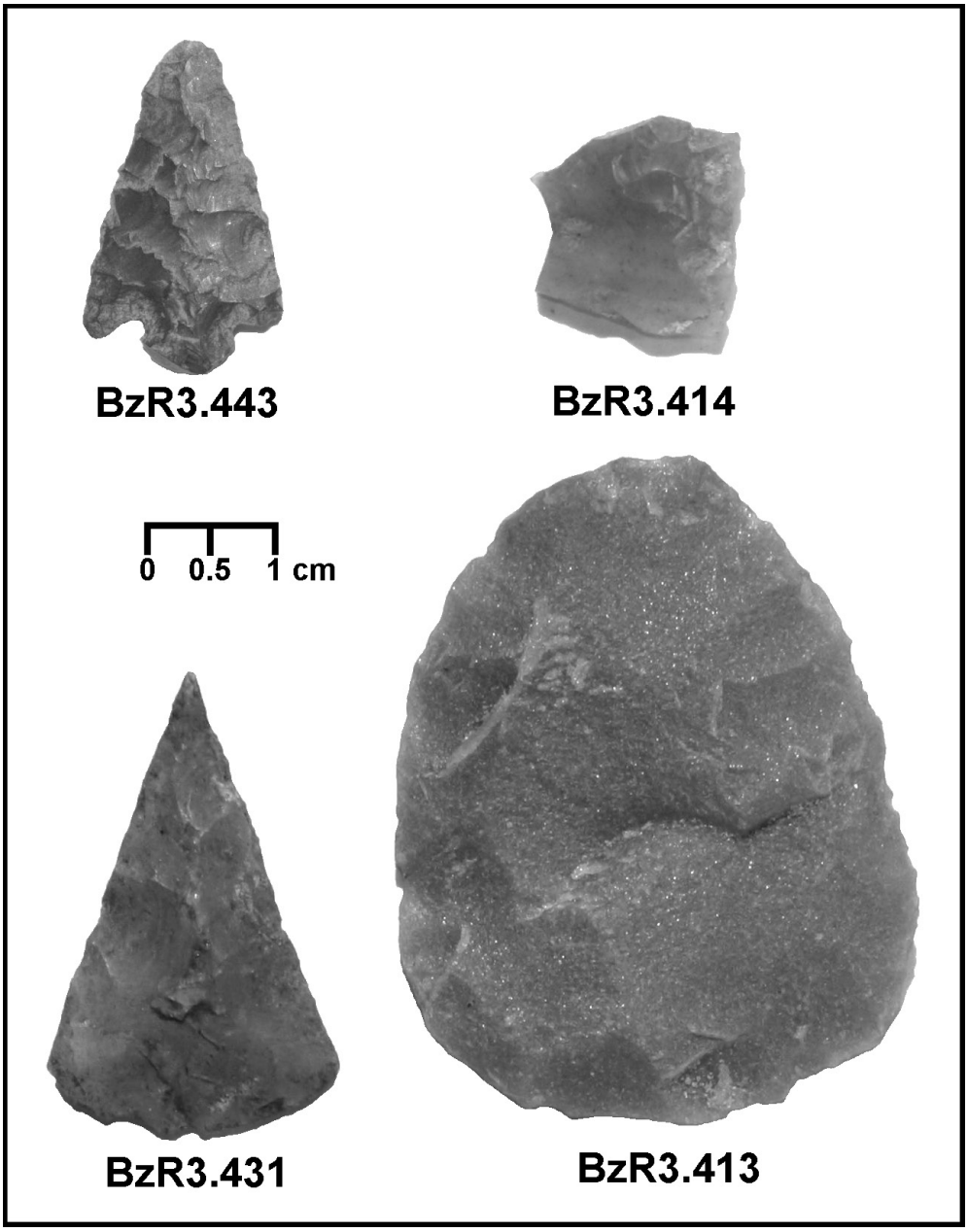

Figure 5: Selected projectile point and biface specimens from Component 5, Pathfinder Ranch Site.

and discarded in association with the feature use (Figure 6).

Cutmarks on ribs and the thoracic vertebra are similar to those reported for bison remains at the Late Archaic Kaplan-Hoover bonebed (5LR3953) in northern Colorado (Todd et al. 2001), as well as the Late Prehistoric Cache Hill Site (48CA61) bonebed in northeastern Wyoming (Miller and Burgett 2000). Component 5 dates to the Late Archaic, a time associated with many bison kill sites on the Plains, but there is less evidence of a bison-focused strategy in the Wyoming Basin interior (Frison 1991; Thompson and Pastor 1995).

Archaic Period bison processing sites located near the Pathfinder Ranch site include the Scoggin site (48CR304) and Graham Ranch site (48FR4442). The Scoggin site represents a

McKean Middle Archaic bison kill/processing site located 25 miles south of the Sheep Mountain site (Lobdell 1973, 1974). The proximity of the Scoggin site to the Pathfinder Ranch site establishes the presence of the McKean technocomplex within the area. On the Northern Plains, McKean occupations are often associated with bison procurement (Frison 1991). Component I at the Graham Ranch site, located within the Sweetwater River valley 40 miles north-northwest of the Pathfinder Ranch site, was dated between 4310-4410 B.P. and contained Oxbow-type projectile points and the remains of two bison (Smith et al. 2008). In addition, a small Late Prehistoric bison processing camp was also excavated at the Ferris Dune site (48CR310), located four miles south of the Pathfinder Ranch site along Sand Creek (Buenger 2013).

The meadow area near the Pathfinder Ranch site and grassy areas along Sand Creek likely provided sustainable grazing for small bison herds during the Early Late Holocene (4500-1800 years B.P.). The presence of localized

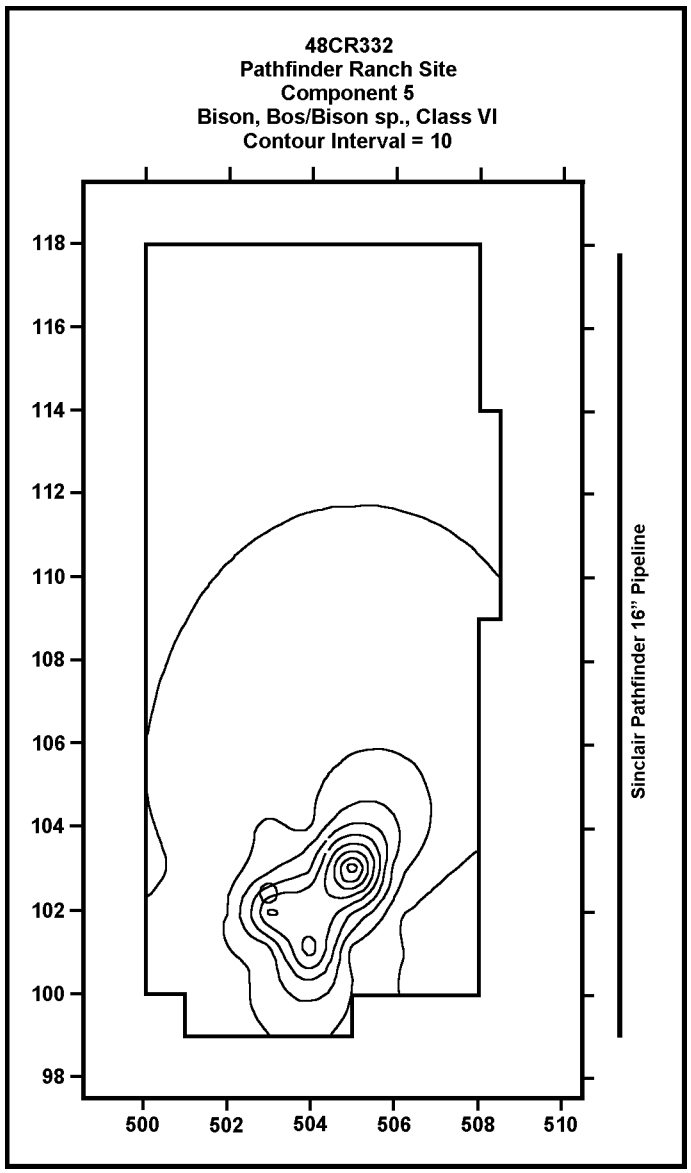

Figure 6: Component 5 Size Class VI and bison remains contoured density distribution map from Pathfinder Ranch site.

bison kill/processing sites suggests Archaic and Late Prehistoric period hunter-gatherers procured bison when available as part of a subsistence strategy which may have included specialized large mammal hunting in combination with broad-based floral and faunal resource procurement.

SUMMARY AND DISCUSSION

The Pathfinder Ranch site is unique to the region on two levels; site geomorphology and geographic setting. The geomorphological context surrounding the site contributed to the preservation, accumulation, and stratification of the cultural deposits. The significant eolian deposit in which the cultural components were recorded has promoted preservation through relatively continuous and rapid deposition of sand throughout much of the Late Holocene. The geographic location of the site within close proximity to a perennial water source (Sand Creek), associated riparian zones, large meadows, and a foothill/mountain (Ferris Mountain and surrounding foothills) ecozone conditioned the repeated use of the area by hunter-gatherers throughout a significant proportion the Late Prehistoric and Late Archaic periods. The excavated portion of the Pathfinder Ranch site yielded five cultural components dating to the Uinta phase of the Late Prehistoric (Component 1), the Deadman Wash phase of the Late Archaic (Components 1-2), and the Pine Spring phase of the Late Archaic (Components 3-5). Radiocarbon age estimates established for the five cultural components ranged from 1290 ± 30 to 3450 ± 30 years B.P. The excavation at the site yielded eight features, 79 chipped stone tool specimens, 8861 debitage specimens, four groundstone specimens, ten ceramic sherds, five bone tools, and 13,790 faunal specimens.

Component 1 represents the most intensive hunter-gatherer use of the site. The Component 1 artifact assemblage represents 61.12% of the artifacts recovered from the five cultural components recorded. These materials are associated with repeated use of the site by hunter-gatherers groups and include three thermal basins, one manuport cluster, 7237 lithic reduction specimens, 61 stone tools, four groundstone specimens, two bone tool/artifact specimens, and 6552 fragmented faunal specimens. The Component 1 faunal assemblage is composition and diversity of species. Size Class V, V-VI, and IV-VI comprise 87.02% of the entire cultural faunal assemblage, and identified large mammal taxa also include Elk (*Cervus elaphus*), deer (*Odocoileus* sp.), pronghorn (*Antilocapra americana*), sheep (*Ovis* sp.), bison (*Bison bison*).

The anthropogenically stained cultural horizon associated with Component 1 measured ca. 30-55 cm in thickness, indicating superimposed cultural occupations are represented within the horizon. Radiocarbon age estimates established during excavation for Component 1 ranged between 1290 ± 30 years B.P. and 2260 ± 30 years B.P., and suggest at least four temporally discrete hunter-gatherer occupations are represented. However, based on the thickness of the cultural horizon, several additional occupations are also likely represented within Component 1. These occupations occurred during the Uinta phase of the Late Prehistoric period, the upper boundary of the Deadman Wash phase of the Late Archaic period, and perhaps during a younger Firehole phase occupation. Only the lowest portion of the Component 1 cultural horizon was dated to beginning of the Deadman Wash phase. Each of the Component 1 hunter-gatherer occupations appears to be representative of short-term open camps in which a variety of subsistence related activities were conducted. Based on the evidence, these activities included faunal processing (primarily large mammal), final and late stage stone tool production, and tool maintenance. However, other activities such as floral resource processing and domestic activities were also likely conducted during some of the occupations.

Component 2 represents at least two hunter-

gatherer occupations during the Deadman Wash phase of the Late Archaic period with radiocarbon age estimates between 2620 ± 30 and 2710 ± 30 years B.P. Artifacts associated with the Component 2 occupations of the excavated portion of the site include two thermal basins, three chipped stone tool specimens, 589 lithic reduction specimens, three bone tool/artifact specimens, and 4268 fragmented faunal specimens. Similar to Component 1, the faunal assemblage from Component 2 is also notable for its diverse species composition and predominance of large mammal remains. Size Class V, V-VI, and IV-VI medium to large mammal remains represent 89.01% of the assemblage, and identified large taxa include elk (*Cervus elaphus*), deer (*Odocoileus* sp.), pronghorn (*Antilocapra americana*),and bison (*Bison bison*). The Component 2 hunter-gatherer occupations are representative of short-term open camps with associated cultural materials indicative of a range of subsistence activities. The activities included, but not limited to, the procurement of large mammal faunal resources and late stage tool production/maintenance.

Component 3 represents at least one occupation of the site during the Pine Spring phase of the Late Archaic period. The radiocarbon age estimates for Component 3 ranged between 2880 ± 30 and 3000 ± 30 B.P. Artifacts associated with the Component 3 occupation(s) of the excavated portion of the site include one thermal basin, 372 lithic reduction specimens, and 301 fragmented faunal specimens. Size Class V, V-VI, and IV-VI medium to large mammal represent 83.06% of the faunal assemblage for Component 3. The Component 3 cultural occupation(s) is representative of an ephemeral open camp in which basic hunter-gatherer subsistence activities were conducted. The activities included, but were likely not limited to, the procurement of faunal resources and late stage tool production/maintenance.

Artifacts recovered from Component 4 include only 23 lithic reduction specimens and 128 fragmented faunal specimens. The single conventional radiocarbon age estimate of 3180 ± 30 years B.P. established for Component 4 was derived from a stratigraphic sample. The component appears to represent a single, ephemeral hunter-gatherer occupation of the site during the Pine Spring phase of the Late Archaic period. Size Class V, V-VI, and IV-VI large mammal remains, and those identified as deer, sheep, or pronghorn (DSP) represent 64.71% of the faunal assemblage. However, the limited quantity of recorded cultural materials precludes any substantive analysis of hunter-gatherer activities conducted during the Component 4 occupation.

Component 5 represents a Pine Spring phase Late Archaic bison processing camp situated near the bank of Sand Creek. Radiocarbon age estimates for Component 5 ranged between 3440 ± 30 and 3450 ± 30 years B.P. Recovered artifacts included one thermal basin, 15 chipped stone tools, 640 lithic reduction specimens, and 2199 fragmented faunal specimens. The Component 5 faunal assemblage is comprised of 97.68% bison and bison-sized specimens, and at least four individual bison are represented. Bison and bison-sized skeletal part representation suggests mostly complete bison were processed on-site. This suggests the kill locality may have been in the immediate area, perhaps at the narrow inlet of Sand Creek Canyon. The Component 5 chipped stone tool assemblage is comprised primarily of flake tools, consistent with faunal processing activities. In addition, the debitage type and size grade data suggest later stage lithic reduction activities and final-stage tool manufacture and re-tooling were the primary stone-working activities conducted during the occupation. The presence of localized bison kill/processing sites suggests Archaic and Late Prehistoric period hunter-gatherers procured bison when available as part of a subsistence strategy which may have included specialized large mammal hunting in combination with broad-based floral and faunal resource

procurement.

The desirable geographic location of the site most likely influenced the repeated use of the site by hunter-gatherer groups during the Late Prehistoric and Late Archaic. Moreover, Sand Creek Canyon creates a natural travel corridor between the Ferris Mountains and Bear Mountain, providing access to the Sweetwater River to the north, and the sub-basins located north and south of the mountain ranges. Hunter-gatherer groups and wildlife likely used this corridor to gain access to necessary resources during prehistory. In addition, the narrow inlet and walls of Sand Creek Canyon may have been used to drive or entrap bison during bison hunts (as evidenced by the Component 5 bison processing camp). Lastly, the ecological setting surrounding the site conditioned hunter-gatherer prey choices, and subsequently the composition of the faunal assemblages recovered from each of the excavated components. The recorded archaeofaunal assemblages from the site were comprised primarily of large mammal remains to include sheep, pronghorn, deer, elk and bison remains. Few Wyoming Basin sites have recorded similar faunal assemblages, as most trend towards greater representation of rabbit-sized mammals and pronghorn-sized remains (Lubinski 2000).

The Pathfinder Ranch site affords a unique opportunity to study hunter-gatherer adaptive strategies in which a foothill-mountain ecozone was repeatedly used through time, as a part of a more generalized adaptation to the high altitude, xeric environment of the Wyoming Basin. Late Prehistoric and Late Archaic hunter-gatherer groups most likely established seasonally-conditioned base camps at the sites for the purpose of foraging available floral resources and conducting logistical forays for large mammal s along the surrounding well-watered drainages and mountain slopes. Although no definitive seasonality data is available for the Late Prehistoric and Late Archaic components at the site, the hunter-gatherer camps may have been organized in the summer through the fall when ungulate populations were possibly more plentiful/healthy and various floral resources became exploitable in terms of maturity and caloric return.

ACKNOWLEDGEMENTS

The data recovery excavation at the Pathfinder Ranch site (48CR332) was conducted by Western Archaeological Services pursuant to cultural resource requirements stipulated for the Sinclair Pipeline Company Pathfinder 16" Pipeline project.

We would like to thank the Sinclair Pipeline Company for funding the excavation and their support throughout the project. The author would like to thank Bob Ficenec, Chris Whitten, Cody Newton, Colin Lawson, Dan Bush, Dan Green, David Lamb, Jacob Riis, Keith Nykaza, Lorine Edwards, Ryan Barner, Scott Lamb, Scott Yost, Sean Currah, and Zak Bolender for their assistance during the excavation of the site. The author would also like to thank Megan Partlow for conducting the faunal analysis and the laboratory staff at Western Archaeological Services for cataloging and processing the artifacts from the site.

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VOLUME 58; NUMBER 1; 2014

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