THE YELLOWSTONE BANK CACHE SITE (24YE355): A LATE ARCHAIC PELICAN LAKE OCCUPATION ON THE UPPER YELLOWSTONE RIVER, MONTANA

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In 2007, the University of Montana (UM) conducted archaeological excavations at the Yellowstone Bank Cache site (Area A, 24YE355) along the upper Yellowstone River, Gardiner, Montana. The work was conducted within the northern-most portion of Yellowstone National Park (YNP) as part of the Montana Yellowstone Archaeological Project (MYAP), a cooperative program of UM and YNP. The Yellowstone Bank Cache (YBC) was one of 14 archaeological sites studied within the 700-acre MYAP study area in 2007 (MacDonald 2008).

The YBC contains an intensive series of Pelican Lake occupations, suggesting patterned subsistence and land-use in the Upper Yellowstone River Valley. Data collected from the University of Montana excavations at the YBC site support prior work in the region, which shows active use of the Yellowstone ecosystem during the Pelican Lake phase of the Late Archaic period (Arthur 1966; Foor 1998; Hale 2003; Johnson 2001; Sanders 2000, 2001:219; Shortt 1998; Vivian 2008). This paper provides results of lithic, x-ray fluorescence (XRF), ethnobotanical, and faunal analyses from the Pelican Lake features.

BACKGROUND AND SETTING

The study area is located adjacent to the Yellowstone River in Gardiner, Montana, a few miles north of the famous North Entrance arch to YNP (Figs. 1 and 2). The Yellowstone Bank Cache site is in the northern portion of the MYAP project area. Overall, site 24YE355 measures more than 60 acres, including two significant historic site areas (Areas B and C), which are associated with the abandoned town of Cinnabar, YNP’s Northern Pacific railroad station between 1883-1903. The prehistoric portion of the site measures approximately 20 acres, encompassing approximately 950 m of river terrace landform in the northern portion of the prehistoric site area. The historic portions are in the southern part of site 24YE355; there is no indication that historic use of the southern areas impacted the prehistoric archaeological remains in the northern portion of the site.

The project area is within the Montana portion of the Yellowstone Plateau physiographic province. While the Rocky Mountains surround the river valley on all sides, the valley proper and the project area are in a High Plains setting,
dominated by sagebrush and short-grass prairie. The MYAP project area is part of the Gardiner Basin, which represents the lowest and driest portion of Yellowstone National Park (Hektner 2005). The elevation of the MYAP ranges between approximately 5,150 and 5,430 ft. amsl, much lower than the majority of the Yellowstone Plateau, which averages 8,000 ft. amsl. The elevation of the YBC site is 5,205 ft. amsl. Precipitation averages slightly over 10 inches annually, with 33 percent of the total received from March through June. Snowfall averages around 40 inches annually, but is patchy and intermittent and seldom persists throughout the winter months (Hektner 2005).

Various researchers have established a baseline of paleoenvironmental data for northern portion of YNP (Beiswaenger 1991; Bright 1966; Meyer et al.)

Figure 1: Project Location and Lithic Sources Referred to in the Text.
These studies have helped provide a reasonable approximation of the prehistoric environment in the Yellowstone Valley. The Late Archaic period — ca. 3000 to 1500 B.P. — was a period of active Native American use of the Yellowstone Valley, coinciding with a mesic climatic period of cooler and moister conditions, favorable to grasslands in the northern Plains and vicinity. In confirmation of these mesic conditions, Sanders (2000:58-60) and Albanese (1999) documented two paleosols at site 24YE14, approximately three miles south of the current study area in Gardiner, Montana. The two paleosols dated to ca. 1600 and 2300 B.P., similar to the dates achieved on the four prehistoric features in this study (discussed below). Overall, Native American use of the northwestern Plains increased during this period, reflecting abundant and diverse resource availability due to the comparatively moist and cool climate (Frison 1991; Husted and Edgar 2002; Lahren 1976; Reeves 2006).

Habitation of the upper portions of the Yellowstone Plateau by prehistoric peoples was likely seasonal due to the heavy winter snows that blanket most of YNP and surrounding areas. The current project is within portions of the winter range of bison, elk, mountain sheep, deer, and antelope, which extends down-valley along the river to Livingston, Montana, where the Yellowstone River exits the mountains (YNP 1997). This winter range for large ungulates provided good hunting for prehistoric hunter-gatherers, as well as sheltered areas for winter camps due to the limited snowfall in comparison to the nearby mountains.

Referred to as the Lamar Valley Subphase by Reeves (2006) for YNP sites, the Pelican Lake phase of the Late Archaic period (3,000-1,500 B.P.) was a time of active use of the Yellowstone ecosystem by Native Americans (Johnson 2001; Sanders 2000, 2001).

Of particular interest to the current study was the excavation by Sanders (2000) of site 24YE14,
Figure 3: Map of Area A, 24YE355, Showing the Locations of Jerde's Cache and MYAP Survey and Excavations.
approximately three miles south of the YBC. At site 24YE14, Sanders (2000) recovered Pelican Lake projectile points and diverse faunal remains, including deer and elk, in two components dated to between 1600 and 2400 B.P., precisely the period of occupation of the Yellowstone Bank Cache. As discussed in more detail below, the YBC fits many of the Late Archaic site type criteria, including use of basin-shaped rock-filled hearths.

**GEOMORPHOLOGY**

The MYAP team conducted geomorphological reconnaissance to determine the depth and type of sediments at the site, as well as determine the archaeological potential of deeply-buried components. A hand auger was utilized to excavate nine 15x15 cm probes to contact with basal gravels in a southeast-northwest transect parallel to the Yellowstone River within Area A, the prehistoric component of site 24YE355 (Fig. 3). Soils were recorded using standard soil science nomenclature and a Munsell color chart (Albanese 2000).

Results of augering indicated the presence of A-Bw-Ab-Bwb horizons above a series of poorly-developed sandy C-horizons to contact with Late Pleistocene gravels approximately 1.5-2.4 m below ground surface (bgs). The upper portion of the soil package, containing the archaeological component, includes a surface A horizon, a poorly-developed Bw horizon, above a paleosol (Ab-Bwb horizons) to a depth of approximately 50 cm bgs. A series of 10-15 sandy C horizons underlay this upper soil package to contact with basal gravels. Late Archaic artifacts are concentrated largely within the upper soil package and, in particular, within the paleosol, which likely corresponds with the two identified at the nearby site 24YE14 (Albanese 1999; Sanders 2000). At YBC, the elevation of the surface soil slopes gently from the glacial moraine edge from west-to-east toward the river edge; thus, the paleosol containing Late Archaic artifacts and features is approximately 25-40 cm bgs near the moraine and 15-30 cm bgs near the Yellowstone River edge.

Overall, the terrace development of the Yellowstone Bank Cache site appears to conform to the model of southwest Montana proposed by Eckerle (2007). Based on this model, the site rests upon an Ht1 alluvial terrace which dates to the middle-late Holocene, with footslope (early-middle Holocene) and gravel-capped terrace/moraine (Pleistocene) landforms upslope to the west (Fig. 4).

While surface survey of site 24YE355 yielded artifacts dating back to the Paleoindian period (MacDonald 2008), the geomorphological assessment did not yield evidence for deep archaeological site potential. Artifacts on the ground surface date predominantly after 5,000 B.P. A probable Clovis point recovered on the ground surface was likely recycled by later peoples and does not signify the presence of a Paleoindian component at site 24YE355 (Fig. 5). Nevertheless,
while there does not appear to be the potential for deeply-buried site components, that hypothesis remains to be tested by deep excavation. The current study focused on excavation of the near-surface Late Archaic component and did not extend beyond 75 cm bgs.

**ARCHAEOLOGICAL SURVEY**

During 2007, the entire site was pedestrian surveyed by the MYAP team spaced at ca. 1.5 m intervals. Shovel test pits were also excavated at 15-30 m intervals to determine sub-surface artifact and feature distributions. Survey results indicate long-term use of the site since the middle Holocene, with most active use during the Late Archaic and Late Prehistoric periods. In total, Phase I survey (n=46) and shovel testing (n=89) yielded 135 lithic artifacts, not including the 19 additional artifacts donated by Tom Jerde from his 1986 surface collection (Table 1). As discussed in more below, an additional 2,871 prehistoric artifacts were recovered during Phase II test unit excavation, including 1,490 lithic artifacts and 1,381 faunal remains, largely associated with the intensive series of Late Archaic occupations within the near-surface buried soil.

As introduced above, Tom Jerde identified the Yellowstone Bank Cache site during the summer of 1986 when he observed several concentrations of fire-cracked rock (FCR) and lithic artifacts on the ground surface and eroding from the banks of the Yellowstone River. Jerde collected 58 artifacts from the site, including a total of 19 lithic artifacts donated to YNP in 2007. Of those 19 artifacts, two are from the cache, while an additional four bifaces from the cache were previously donated to YNP, but were unavailable for study.

Analysis of Jerde’s 1986 site form map indicates that the vast majority of his surface-collected artifacts occur in Area A of site 24YE355, as defined for the current project (Fig. 3). The cache location was along the river bank near the dividing line between Sections 8 and 17. A comparison of Jerde’s site map, USGS quadrangle maps, as well as the locations of MYAP surface finds indicates that Jerde’s cache was located within 1-2 meters of this study’s hearth Feature 3.

In further corroboration of this close proximity, Jerde’s description and map of the project location matches the current project location both in terms of its provenience along the river bank, and in terms of its depth below surface (ca. 15-30 cm). As reflected in Figure 2, Jerde’s cache was located approximately 15-30 cm bgs, similar to the depth of the Pelican Lake component of the site. In addition, although we did not recover large

**Table 1. Summary of Artifacts Recovered During Phase I and Phase II Work at Area A, (Prehistoric) 24YE355.**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Jerde Lithics</th>
<th>STP Lithics</th>
<th>Surface Lithics</th>
<th>Unit Lithics</th>
<th>Total Lithics</th>
<th>Total Faunal</th>
<th>Total Artifacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>19</td>
<td>89</td>
<td>46</td>
<td>0</td>
<td>153</td>
<td>0</td>
<td>154</td>
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<tr>
<td>Phase 2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1490</td>
<td>1490</td>
<td>1381</td>
<td>2871</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>89</td>
<td>46</td>
<td>1490</td>
<td>1643</td>
<td>1381</td>
<td>3025</td>
</tr>
</tbody>
</table>
bifaces like those from Jerde’s cache, we collected abundant and large biface thinning and pressure flakes of similar lithic raw materials as those recovered in the original cache.

While most bifaces from the cache were not available for study, we were able to analyze two large bifaces, both of which are remarkably similar in morphology and technology of production (Fig. 6). Both bifaces were produced by removal of large biface thinning flakes to produce high width-to-thickness ratios of 5.43 and 5.05, respectively. Both bifaces weigh between 48-49 gr and measure 90-95 mm long, 46-48 mm wide, and 8-10 mm thick. The bifaces were also both produced from high quality cherts. FS 543 was produced from material that matches hand samples from the Crescent Hill source within YNP. FS 544 was produced from moss agate, available in south-central Montana and north-central Wyoming (although more proximate sources are possible). Use-wear is present along the lateral margins of both bifaces, suggesting their use as knives or other cutting tools. In particular, FS 543 was clearly hafted as a knife. Both bifaces in the cache are reminiscent of knife forms shown in Frison (1991:129) dating to the Late Archaic from other sites in the northwestern Plains.

RESULTS OF EXCAVATIONS

Based on the high concentration of features and artifacts in the northern portion of site 24YE355, as well as Tom Jerde’s cache location, Area A was deemed a high-priority area for test unit excavations. In particular, YNP was interested in the excavation of three of the prehistoric features, Features 3, 4, and 6, which were in danger of eroding from the edge of the Yellowstone River terrace escarpment (Fig. 3).

During the excavation of those three features, an additional prehistoric fire feature, Feature 36, was identified in Test Unit (TU) 3. As such, four prehistoric features were excavated, each of which was identified approximately 20-25 cm below ground surface (bgs) within the buried soil. Each of the features yielded radiocarbon dates and Pelican Lake artifacts which place occupation of...
Figure 7: Two Large Bifaces from Jerde’s Cache at Site 24YE355.
the buried surface between 500 B.C. and A.D. 400 (Table 2).

In association with the four features, the MYAP team recovered 2,871 prehistoric artifacts at the Yellowstone Bank Cache site, including 1,381 faunal and 1,490 lithic artifacts (Table 2; Fig. 7). In particular, excavations yielded a flintknapping feature adjacent to Features 36 and 3, which matches the general provenience of Jerde’s original cache location (Fig. 3). Nearly 75 percent of all prehistoric artifacts, including faunal and lithic materials, are from Feature 36. Excavations revealed a concentration of faunal and lithic debris within this densely-packed rock-lined fire feature.

**Feature 36 Excavation Results**

In the northern portion of Area A of site 24YE355, the MYAP team focused on the excavation of the three features eroding from the Yellowstone River terrace. The furthest north of these three features was Feature 3, a concentration of fire-cracked rock and charcoal in close proximity to the location of Jerde’s original cache. MYAP excavated TU 3 adjacent to Feature 3 to provide a platform for excavation of the feature, which was on the steep river bank. During the excavation of that initial test unit, a very dense layer of fire-cracked rock, charcoal, debitage, and faunal remains was encountered approximately 15-20 cm bgs. The feature, identified as Feature 36, extended across the entire western half of the test unit and was clearly a separate feature from Feature 3 on the river bank (Fig. 8). The feature extended between approximately 25 and 40 cm below datum (15-30 cm bgs).

The excavated portion measured approximately 90 cm north-south and 45 cm east-west within TU 3. This represents an estimated half of the original feature, with the other half remaining unexcavated to the south and west. The feature is a basin-shaped pit packed with river cobbles, some fire-cracked and some not. A large, fairly smooth rectangular cobble lay in the center of the feature. Soils were reddened around the basin, indicating the presence of a hot fire. Excavation of Feature 36 and its associated perimeter yielded more than 2,000 lithic and faunal artifacts, including 966 lithic artifacts and 1,181 bone fragments (Table 2). Given the association of faunal remains, it is likely that the feature was utilized as a roasting pit for a variety of medium and large game.

While the rock-lined roasting pit Feature 36 lacked large charcoal fragments, enough smaller fragments were collected from feature matrix for an AMS radiocarbon date (Beta-250835). The wood charcoal sample returned a conventional radiocarbon age of 2280±40 B.P. with a 2-sigma calibration of Cal B.C. 400 to 350 and Cal B.C. 300 to 210. This date places use of Feature 36 squarely within the latter portion of the Late Archaic period.

In direct association with the Late Archaic radiocarbon date, MYAP recovered two Pelican Lake projectile points within feature matrix (Table 4; Fig. 9). The points were produced from high quality varieties of Crescent Hill chert from the Crescent Hill basalt formation. The Crescent Hill formation is within the Sunlight Group of the Absaroka Volcanic Supergroup. Crescent Hill chert precipitated as large blocky nodules within the columnar basalt formations and can be found in two contexts: (1) eroding from hill tops or knobs; and (2) eroding out of the columnar basalt formation itself.

Crescent Hill chert occurs in a wide range of colors and qualities (Table 3). With an ARPA permit, the first author was able to collect a representative sample of chert material from the northern portion of the feature. Centuries of use for the production of projectile points and other tools are well documented from this area. Features were excavated systematically and recorded using detailed plans and cross sections. 

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Table 2. Summary Data from Features, 24YE355.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Conventional C14 (B.P.)</th>
<th>Faunal (NISP)</th>
<th>Lithics</th>
<th>Total</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1670 ± 50</td>
<td>85</td>
<td>96</td>
<td>181</td>
<td>6.4</td>
</tr>
<tr>
<td>36</td>
<td>2280 ± 40</td>
<td>1181</td>
<td>966</td>
<td>2147</td>
<td>76.0</td>
</tr>
<tr>
<td>4/37</td>
<td>1600 ± 70</td>
<td>84</td>
<td>280</td>
<td>364</td>
<td>12.9</td>
</tr>
<tr>
<td>6</td>
<td>2530 ± 40</td>
<td>31</td>
<td>101</td>
<td>132</td>
<td>4.7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1381</td>
<td>1443</td>
<td>2824</td>
<td>100.0</td>
</tr>
</tbody>
</table>
of the quarry. Based on this collection, 11 types of high-grade chert were identified in the outcrop.

Based on these observations of Crescent Hill chert, both Pelican Lake points from Feature 36 of the Yellowstone Bank Cache site are likely from that nearby source (Table 4). FS 128 was produced from a bluish black chert with red inclusions, while FS 140 was produced from a dark red chert/jasper with white inclusions.

In addition to the two Pelican Lake projectile points, lithic artifacts from Feature 36 include a high density concentration of flaking debris. The flake concentration represents an intensive episode of lithic tool production, apparently oriented toward the manufacture of middle and
late stage bifaces and projectile points. Based on an analysis of lithic raw materials, as well as their close provenience, Feature 36's intensive lithic reduction area appears to be associated with Jerde's cache. The presence of these lithics support the hypothesis that individuals produced large bifaces and Pelican Lake projectile points while seated adjacent to Feature 36.

Among the lithic assemblage recovered in association with Feature 36 are 945 flakes, including 599 indeterminate flake fragments. Of the typed flake assemblage (n=346), biface reduction (n=151, 43.6%) and pressure/shaping flakes (n=138, 39.9%) are the dominant varieties, indicative of the middle-late stages of biface and projectile point manufacture. Of these middle and late stage flakes (n=289, 84% of typed flakes), the majority (n=167, 58%) are the byproducts of Crescent Hill chert biface manufacture (Fig. 10). Other lithic materials recovered from Feature 36 include obsidian (discussed below) and an assortment of other materials in low quantities, including dacite (n=1), orthoquartzite (n=11), jasper (possibly Crescent Hill chert; n=49), and untyped chert (n=35).

While these data from the cache and Feature 36 clearly indicate an intensive episode of Crescent Hill chert biface and projectile point manufacture, obsidian is present in large numbers in the feature as well, accounting for 42% of the typed flake assemblage. In order to better understand their source origin, a sample of 11 obsidian biface-reduction flakes from Feature 36 were submitted for energy dispersive x-ray fluorescence (EDXRF) analysis (Hughes 2008b). As expected, trace element analysis of each of the 11 flakes indicated their origin from the Obsidian Cliff source (Table 5; Fig. 11), approximately 20-25 miles south of the site in YNP. Three additional flakes were submitted for analysis from the adjacent Late Archaic Feature 3, each of which also yielded an Obsidian Cliff source designation. Further discussion of the lithic technological organization of Late Archaic Native Americans at the site is included in the conclusion.

Faunal remains from Feature 36 included 1,181 bone fragments, including mostly small pieces of indeterminate size and species (n=1084). Of the 1181 fragments, 666 of them are burned and most are extremely fragmentary, indicative of their having been processed fairly intensively. Due to the fragmentary nature of the faunal remains, we were able to determine genus for only four fragments, all Odocoileus sp. (deer), and family for an additional ten specimens, all artiodactyl (e.g.,

Table 3. Descriptive Characteristics of Crescent Hill Chert.

<table>
<thead>
<tr>
<th>Material Code</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.10</td>
<td>Chalcedony, milky luster, fine-grained, fully translucent, white inclusions</td>
</tr>
<tr>
<td>2.20</td>
<td>Red chert/jasper with white linear/ovoid inclusions in matrix, occasional pinkish sections and occasional black stringers</td>
</tr>
<tr>
<td>2.30</td>
<td>Bluish-black chert with red inclusions and orange striations, opaque, dark</td>
</tr>
<tr>
<td>2.40</td>
<td>Waxy tan chert, small red and black inclusions, semi-waxy, opaque</td>
</tr>
<tr>
<td>2.60</td>
<td>Tan chert (not all waxy) with lighter white/tan inclusions, occasional chalcedonic sections</td>
</tr>
<tr>
<td>2.70</td>
<td>Coarse grained gray-tan chert with black mottles; verging on quartzite</td>
</tr>
<tr>
<td>2.81</td>
<td>Red chert/jasper, opaque, linear black and orange striations</td>
</tr>
<tr>
<td>2.90</td>
<td>Light olive green, fine-grained chert with occasional black stringers, opaque</td>
</tr>
<tr>
<td>3.00</td>
<td>Blackish-brown chalcedony, moderate translucence, white cortex, black stringers, some reddening and orange sections</td>
</tr>
<tr>
<td>3.20</td>
<td>Red chert with white and tan sections, opaque, very fine grained, slight translucency on edges</td>
</tr>
<tr>
<td>3.30</td>
<td>White chert/chalcedony with pink/reddening, opaque except for slight translucency on edges</td>
</tr>
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</table>
Table 4. Descriptive Traits, Pelican Lake Projectile Points, Feature 36, 24YE355.

<table>
<thead>
<tr>
<th>FS</th>
<th>Point Descriptions</th>
<th>Material Source</th>
<th>Material Descriptions</th>
<th>L (mm)</th>
<th>W (mm)</th>
<th>T (mm)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>128</td>
<td>Pelican Lake; no tip</td>
<td>CR Hill</td>
<td>Bluish-black chert w/ red inclusions, opaque</td>
<td>--</td>
<td>16.23</td>
<td>2.58</td>
<td>0.6</td>
</tr>
<tr>
<td>140</td>
<td>Pelican Lake Whole</td>
<td>CR Hill</td>
<td>Red chert/jasper w/ white linear/ovoid inclusions</td>
<td>34.29</td>
<td>26.55</td>
<td>6.03</td>
<td>4.2</td>
</tr>
</tbody>
</table>

deer, pronghorn, elk, or bison). The remainder of the assemblage could be typed only to animal size, with large mammal (n=72) clearly dominating the assemblage compared to medium mammal (n=6) and small mammal (n=1). Among the likely large mammals utilized at the site are bison and elk, while medium mammals are likely deer and/or pronghorn. While the species data are scarce, these general identifications support the hypothesis that a variety of medium and large game was the focus of Pelican Lake hunters. Given the abundance of ungulates in and around the project area, the taking of a diverse suite of fauna is not unexpected.

Feature 3 Excavation Results

Subsequent to excavation of Feature 36 in TU 3, the MYAP team moved on to excavate Feature 3 in the adjacent 1x1-m test unit to the east (TU 7). Feature 3 was eroding into the river and the ultimate goal was to salvage its contents prior to its complete disappearance. While Feature 36 contained more than 2,000 artifacts, Feature 3 yielded only 181, including 96 lithic and 85 faunal artifacts. Figure 12 is a profile of the cut bank showing the eroding cross-section (north-south) of Feature 3.

While its overall artifact densities were less than the adjacent Feature 36, Feature 3 contained a very high density of FCR and charcoal, the latter of
which was collected for radiocarbon dating (Beta-238180). A single conventional radiocarbon date of 1670±50 B.P. (2 sigma calibration of Cal A.D. 250-450, A.D. 450-460 and A.D. 480-530) was assayed from wood charcoal from Feature 3. The charcoal was identified as non-resinous conifer, likely true fir (subalpine fir, Abies lasiocarpa) native to the area, although at higher elevations.

This date provides a direct age for the obsidian Pelican Lake projectile point base found in the feature matrix (Fig. 13). In contrast to the two Crescent Hill points in the nearby Feature 36, the Pelican Lake point from Feature 3 was produced from obsidian and was serrated along its only intact lateral edge. Its intact lateral tang is also more strongly pronounced than the two in Feature 36, although it is within the range of variation of Pelican Lake points found elsewhere in the northwestern Plains and vicinity (Foor 1998; Frison 1991: 104). The Pelican Lake point fragment (FS 472) was sourced to Obsidian Cliff in YNP (Hughes 2008a), similar to the 11 flakes from nearby Feature 36 and three flakes from Feature 3 (Table 5).

Of the 96 lithic artifacts collected from Feature 3, flaking debris comprise a majority (n=91), with only two bifaces, two unifacial tools (both sidescrapers), and a single core comprising the remainder. Both sidescrapers were produced from obsidian and show extensive use along their lateral margins for cutting/scraping. The single core is a large fragment of red ochre or hematite, perhaps used in a ritual or other purpose by Native Americans at the camp site. The flake assemblage (n=91) from Feature 3 is comprised largely of obsidian flake fragments and indeterminate flakes (n=45), with Crescent Hill chert flakes (n=19) not nearly as abundant. These lithic data contrast with those
Table 5. Quantitative EDXRF Data for Biface Reduction Flakes, Features 3 and 36, Yellowstone Bank Cache Site (Hughes 2008b).

<table>
<thead>
<tr>
<th>FS</th>
<th>Feature</th>
<th>RB</th>
<th>Sr</th>
<th>Y</th>
<th>Zr</th>
<th>Nb</th>
<th>Fe/MN Ratio</th>
<th>Source</th>
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<td>239</td>
<td>4</td>
<td>79</td>
<td>165</td>
<td>49</td>
<td>66</td>
<td>Obsidian Cliff, WY</td>
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<td>36</td>
<td>240</td>
<td>3</td>
<td>78</td>
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<tr>
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<td>251</td>
<td>3</td>
<td>82</td>
<td>169</td>
<td>48</td>
<td>70</td>
<td>Obsidian Cliff, WY</td>
</tr>
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<td>3</td>
<td>83</td>
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<td>65</td>
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</tr>
<tr>
<td>134</td>
<td>36</td>
<td>244</td>
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<td>78</td>
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<td>67</td>
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from the nearby Feature 36, which had a higher proportion of Crescent Hill chert than obsidian.

In addition to the 96 lithic artifacts, the MYAP team recovered 85 faunal remains from Feature 3. As with the adjacent Feature 36, Feature 3 is dominated by very small and fragmentary faunal remains that were largely unidentifiable (90.6%). Of the identifiable fragments, only three could be identified to Family, all of which are Artiodactyl (e.g., deer, pronghorn, elk, bison). The remainder of the Feature 3 faunal remains are large mammal (n=3), small mammal (n=1) and unidentified mammal (n=1). As with Feature 36, a high proportion (n=31, 37%) of the remains were burned. One mammal bone fragment from Feature 3 also contained cut marks indicative of processing. In general, while of a much lower density than Feature 36, the overall composition of the faunal assemblage from Feature 3 is similar to Feature 36. Feature 3 contained well-processed mammal remains, including in all likelihood deer and other game.

Ethnobotanical analysis was conducted for soil samples from Feature 3 (Puseman 2008), yielding a charred Chenopodium seed fragment. The charcoal record was dominated by Juniperus, with a few fragments of Pinus, Pseudotsuga menziesii, conifer, and Acer charcoal present.

**Feature 4/37 Excavation Results**

Approximately 8.84 m (28 ft.) south of Features 3 and 36 discussed above, upstream along the Yellowstone River, the MYAP team excavated another burn feature, Feature 4/37, within TUs 4 and 6. As with the two test units to the north, the team excavated the initial 1x1-m unit (TU 4) inset from the terrace edge to provide room to excavate Feature 4 on the edge of the steep terrace escarpment in TU 6. Within the initial 15-20 cm bgs, it was apparent that a cluster of cobbles and FCR, originally identified as Feature 37, was present in the far southwestern corner of TU 4. This feature was comprised of an extremely dense FCR deposit intermixed with large charcoal fragments within the southern half of TU 4 and 6. Upon excavation, it was clear that this feature extended across the entire floor of TU 4 and was a part of Feature 4 on the river’s edge in TU 6. This feature overlap is clearly visible in Figure 14.

In profile in the cutbank, Feature 4/37 appeared as a dark black (10YR2/1) silt and charcoal-filled basin with abundant FCR. Upon excavation, the feature measured approximately 75 cm north-south and 30 cm east-west. Based on the intact portion still remaining in the terrace age, Feature
4/37 was basin-shaped and approximately 20 cm deep.

FCR was packed with charcoal throughout Feature 4/37 fill. As with Features 3 and 36, Feature 4/37 dates to the terminal portion of the Late Archaic period, as determined by a radiocarbon date of 1600±70 B.P. with a 2-sigma calibration of Cal A.D. 260-290 and A.D. 320-610 (Beta-238179). The date was derived from wood charcoal identified as non-resinous conifer (likely subalpine fir Abies lasiocarpa) and resinous conifer (likely lodgepole pine, Pinus contorta) (Burke 2007).

The overall artifact counts from Feature 4/37 are low compared to Features 36 to the north, but fairly similar to Feature 3. In total 346 lithic and faunal artifacts were recovered in Feature 4/37, including 280 lithics and 66 faunal remains. The lithic assemblage from Feature 4/37 is comprised largely of flaking debris from the manufacture of obsidian (79.6%) bifaces. Compared to Feature 36 to the north, Crescent Hill chert (15%) is infrequent in Feature 4/37, but compares favorably with Feature 3, which also had higher ratios of obsidian than Crescent Hill chert. As such, it appears as if several individuals used obsidian predominantly at this site, while one or more preferred or simply carried with him or her more Crescent Hill chert to Feature 36.

The lithic assemblage from Feature 4/37 yielded predominantly flaking debris (n=273, 97.5%), with the only stone tools being five bifaces and two unifaces. Typed flakes are dominated by middle-late-stage biface reduction (n=28/75, 37.3%) and pressure/shaping flakes (n=28/75, 37.3%). Clearly the emphasis of flintknappers at this location was the reduction of middle and late stage bifaces and projectile points, predominantly from obsidian. These data match favorably those from Features 3 and 36 to the north as well.

Among the bifaces are three obsidian projectile points, including a midsection/tip fragment (FS 214) and two untyped notched base and midsection fragments (FS 213). Each of the projectile points was recovered from feature fill. Each of the points is broken, with only one of the points possibly diagnostic. FS 214 is a small obsidian point base that resembles the Pelican Lake form in size and shape; however the fragment is the very proximal
base and lacks most of the notching and the entire blade. The lone other lithic artifact of note from Feature 4/37 is a well-used thumbnail endscraper produced from Crescent Hill chert.

Faunal remains from Feature 4/37 were of a similar character to those in Features 3 and 36 to the north, but of considerably lower densities. While those latter two features yielded greater than 1,000 faunal remains, only 75 bone fragments were recovered in Feature 4/37. Of this small faunal assemblage, only four were identifiable to Family, all Artiodactyl (e.g., deer, pronghorn, elk, bison), with another five identified as large mammal. The remainder (n=66) are small, heavily-processed bone fragments unidentifiable to element or animal. Of the 75 bone fragments, 58 are burned, including each of the five large mammal fragments. Clearly, individuals cooked medium-large game animals within the roasting pit Feature 4/37.

As with Feature 3 above, Feature 4/37 yielded a single seed of chenopodium, perhaps indicating use of this wild plant for food. A variety of charcoal types were present in Feature 4 as well, co-dominated by Acer (maple) and Juniperus (juniper), including a piece of vitrified Juniperus twig charcoal. Fewer pieces of conifer, Alnus (alder), Pinus (pine), and possible Populus
Figure 13: Pelican Lake Projectile Point (FS 472), Feature 3, 24YE355.

(aspen) also were present. Western mountain maple or box elder, juniper, alder, pine, another type of conifer, and probable aspen wood appear to have been burned as fuel in this hearth.

**Feature 6 Excavation Results**

As with Features 3, 36, and 4/37, Feature 6 is another FCR-laden fire pit eroding from the Yellowstone River terrace in the northern portion of Area A of site 24YE355. Feature 6 is approximately 4.4 m (14 ft.) south, upstream along the river from Feature 4/37. As with the other pairs of test units to the north, TU 2 was excavated initially one meter inset from the river edge to provide room during excavation of Feature 6 which was perched dangerously on the terrace escarpment.

As with the other three features, Feature 6 is a basin-shaped fire feature with a high density of FCR and charcoal (Fig. 15). The feature measures approximately 80 cm across and 35 cm deep at its center, with gently tapered edges. Charcoal collected from the feature received an AMS conventional radiocarbon date (Beta-250834) of 2530±40 B.P. with a 2-sigma calibration of Cal B.C. 800-530. This date is in close correspondence to Feature 36 (ca. 2300 B.P.), an indication of long-term use during the entire terminal portion of the Late Archaic period, between approximately 500 B.C. and A.D. 400.

The MYAP team recovered 130 artifacts from Feature 6 and associated excavation levels, including 99 lithics and 31 faunal artifacts. The lithic artifact assemblage from Feature 6 is comprised entirely of flaking debris. No bifaces, projectile points, or other stone tools were recovered in Feature 6. The flake assemblage is comprised of obsidian (60.6%) and Crescent Hill chert (31.3%), with small amounts of red jasper (4%) and untyped chert (2%). As with Feature 3 to the north, small nodules of hematite (red ocher) were also recovered in Feature 6. The hematite was likely used for ritual or other decorative purposes. Most of the recovered flakes are indeterminate fragments (72.8%), with biface reduction and shaping flakes appearing in higher counts (n=15) than early-stage-reduction flakes with cortex (n=4). These data confirm similar lithic reduction strategies for individuals at Feature 6 as those at the other three features excavated at the site.

As with Features 3, 36, and 4/37, most bone fragments recovered in Feature 6 were extremely fragmented and too small for identification of species or element. Of the 31 bone fragments in Feature 6, 22 were unidentifiable to element, while 21 were unidentifiable to animal. Of the identifiable fragments, eight were placed in the Artiodactyl family, one identified as large mammal, and one was identified only as mammal. Of the 31 bone fragments, seven were burned but none revealed cut marks or other indications of modification. These data largely mirror those from the other features from the site, suggesting a similar emphasis on the intensive processing and cooking of large and medium-sized artiodactyls (e.g., deer, pronghorn, bison) at the site.

Ethnobotanical remains from Feature 6 included a charred Pinus cone scale fragment (Puseman 2008). Cones might have been heated to release the inner seeds, or a cone might have been adhering to pine branches burned as fuel. A charred Pinus needle fragment again probably reflects burning pine branches as fuel, although it also is possible that pine needles were used to brew a tea or as a medicinal resource. The charcoal record was dominated by Artemisia, reflecting sagebrush wood burned as fuel. Fewer fragments of Pinus, and Juniperus charcoal, including a vitrified piece of Juniperus root charcoal, reflect pine and juniper wood that was burned. Given the similar feature morphology, depth below surface (~20-30 cm), and lithic and faunal artifacts, Feature 6 represents another in the series of four Late Archaic hearth/roasting pit features found at the Yellowstone Bank Cache site.
SUMMARY AND CONCLUSIONS

Excavations within the four roasting pit features indicate the presence of multiple occupations of the Yellowstone Bank Cache site during the latter portion of the Late Archaic period, between 500 B.C. and A.D. 400. Features 36 and 6 indicate an occupation ca. 500-300 B.C., while Features 3 and 4/37 indicate another occupation toward the terminal portion of the Late Archaic period, approximately A.D. 400. This period of occupation is supported by four radiocarbon dates and the direct association of three Pelican Lake corner-notched projectile points. Late Archaic Native Americans conducted intensive lithic reduction activities, including middle-late stage reduction of obsidian and Crescent Hill chert bifaces. Assorted other tool production activities are noted by the presence of low numbers of scraping and cutting tools, including utilized flake tools, sidescrapers, and an endscaper. Each of the features was densely-packed with FCR and local vegetation (sagebrush, juniper, pine, alder, and maple) was used for fuel in the hearths. Food processing activities are indicated by the presence of heavily-processed medium and large-sized artiodactyl remains (including deer and several other indeterminate game) and plant debris (including chenopodium seeds and pine cones). Faunal and ethnobotanical data from these features are similar in character to those recovered from the nearby Late Archaic site 24YE14, including the presence of deer and chenopodium (Sanders 2000).

The lithic source data indicate that the primary lithic raw materials used by site occupants — Crescent Hill chert and Obsidian Cliff obsidian — derive from sources within approximately 20-30 miles east and south of the site, respectively (Fig. 16). The Obsidian Cliff source would have been
Figure 15: Planview and Profile of Feature 6, TUs 2 and 5, Site 24YE355.
most easily accessed following the Yellowstone River-Gardiner River-Obsidian Creek route, which is approximately the path of Route 89 through YNP today. For Crescent Hill chert, Native Americans had a slightly easier route of procurement, following the Yellowstone River upstream for approximately 20 miles eastward through the Black Canyon of the Yellowstone, then traversing feeder streams into the uplands. The trip from the site to Obsidian Cliff would have required an increase in elevation some 2,200 ft. from the valley floor (5,200 ft. amsl) to the top of the Yellowstone Plateau (ca. 7500 ft. amsl), while the trip to the Crescent Hill chert source (ca. 6500-7500 ft. amsl) required a climb of between 1,300-2,300 ft., depending on the location of procurement within the outcrop itself (Fig. 13).

In corroboration of these likely routes of travel, multiple prehistoric sites have been investigated along the Black Canyon of the Yellowstone River (ca. 10 miles upstream of 24YE355), with several occupations dating to the Late Archaic period.
(Arthur 1966; Hale 2003; Sanders 2001, 2005; Shortt 1998; Vivian 2008). Davis et al. (1995) and Hale (2003) confirm that the Late Archaic was one of the most active periods of procurement of Obsidian Cliff obsidian. Based on data from these sources, in consort with that collected from lithic artifacts from the Yellowstone Bank Cache site, the route of travel from the stone sources on the Yellowstone Plateau back into the northern Plains was along these probable routes.

Travel to either source would likely not have occurred in winter, given the abundant snowfall in the Yellowstone Plateau; however, the presence of Jerde’s obsidian and chert cache at the site suggests the possible storage of bifaces at the site for use during the winter, when both sources would have likely been inaccessible. Alternatively, occupancy of the Yellowstone Bank Cache site occurred in spring, summer, or fall when both Obsidian Cliff and Crescent Hill were accessible. If this were the case, then individuals may have cached material at the site for future use (during winter perhaps), but simply never returned to the site to retrieve their stored lithic material.

Debitage collected in association with the Pelican Lake features also clearly shows an emphasis on the later stages of biface and projectile point manufacture. Sanders (2000: 65-67) recovered similar obsidian and chert lithic refuse within the Late Archaic component of the nearby site 24YE14, upstream three miles along the Yellowstone River. There, biface and core reduction dominated the Late Archaic lithic assemblage. In addition, in 2008, the MYAP team identified another Late Archaic lithic-reduction site, RJP-1 (24YE190), approximately one mile southwest of YBC (MacDonald 2008).

In summary, MYAP excavations suggest that the Upper Yellowstone River Valley near Gardiner, Montana, functioned as a perennial seasonal camp through which Late Archaic Native Americans traveled from the Yellowstone Plateau to the northern Plains beyond. MYAP excavated four well-dated Late Archaic features at the site, which show repeated use of the site landform between 500 B.C. and A.D. 400. Late Archaic Native Americans sat next to the roasting pits to cook medium and large game animals, process wild plant seeds, and produce Obsidian Cliff obsidian and Crescent Hill chert bifaces, both with sources in uplands ca. 20-25 miles south and east, respectively. Three of the hearths (Features 3, 6, and 4/37) excavated at the Yellowstone Bank Cache site show an emphasis on Obsidian Cliff obsidian use, while one shows a heavy reliance on Crescent Hill chert.

Materials of both varieties were transported to YBC, as well as to other Late Archaic sites in the valley (RJP-1 and 24YE14), as middle-late stage bifaces. The valley also provided a wintering ground for Native Americans moving out of the Yellowstone Plateau and northward into the Plains. The storage of obsidian and chert bifaces at valley sites was a risk minimization measure, due to the restricted access to upland lithic material sources in winter.

In consort with other prior studies, the Yellowstone Bank Cache site provides a window into the subsistence and land-use patterns of Late Archaic Native Americans within the Yellowstone River Valley and northern Yellowstone National Park between approximately 500 B.C. and A.D. 400. The site contains abundant and intact archaeological remains and will be of value to future archaeologists seeking to understand Pelican Lake lifeways in mountainous regions of the Northwestern Plains and Rocky Mountains.

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