LITHIC ARTIFACTS OF THE FIREHOLE BASIN SITE (48SW1217)

by

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ABSTRACT

Despite the central role of the Firehole Basin site in the conception of the Firehole phase in the Wyoming Basin, the lithic assemblage has never been reported. Excavated in 1976 and 1977, the site yielded chipped and ground stone, pottery, abundant faunal remains dominated by pronghorn, and two radiocarbon dates (625 ± 50 and 645 ± 45 RCYBP). Identifiable projectile points from the excavations consist of two trinotched, two side-notched, and three unnotched arrow points. A Rose Spring point was found on the surface in 1999, and is presumed unrelated to the excavation. Points, a possible Shoshone knife, other tools and debitage were composed of a variety of raw materials, including chert, chalcedony, quartzite, and a trace amount of obsidian from the Teton Pass source. In general the Firehole Basin site lithics conform to the expectations for the Firehole phase.

INTRODUCTION

The Firehole Basin site (48SW1217) was the inspiration for the Firehole phase, the terminal prehistoric period of Wyoming Basin Prehistory as proposed by Metcalf (Zier et al., 1983, Metcalf 1987). At the time the chronology was proposed, the site was one of the few excavated sites dating between 1000 and 300 RCYBP in the Wyoming Basin. Despite the obvious relationship of the site to the proposed phase, the lithic artifacts have never been analyzed, and the goal of this paper is to provide that description.

The Firehole Basin site is about ten miles southwest of Rock Springs, Wyoming near Flaming Gorge Reservoir in Sweetwater County. It lies at about 6800 foot elevation, on a low ridge between the Green River and Little Bitter Creek. The ridge is mantled with aeolian sand, and covered with sparse sagebrush and juniper. Surface artifacts, including chipped and ground stone, bone, and pottery, cover an area more than 100 by 50 m in size.

The site was discovered by the late George Babel, and brought to professional attention by Mr. Babel and the late Joe Bozovich, both members of the Wyoming Archaeological Society. It was originally recorded in 1976 as Firehole Basin #11 by a crew from Western Wyoming College while they were conducting a nearby coal sampling survey (Metcalf 1977). Test excavations were conducted in the fall of 1976 and fall of 1977 by the Sweetwater Chapter of the Wyoming Archaeological Society and the Western Wyoming College Archaeological Field School. Mike Metcalf directed the field work, and an initial discussion was provided by Metcalf and Treat (1979). After completion of the 1977 field season, no work was undertaken until 1999. The 1999 investigation consisted only of a surface inspection and collection of one projectile point and two ceramic sherds from the surface.

In total, about 34 test units were excavated to a maximum depth of 5 to 50 cm. All exca-
Excavated sediments were quarter inch screened. The excavated portion of the site consisted primarily of a bone midden exposed at the surface and shallowly buried in aeolian sands. Artifacts recovered from the excavations included a large number of bone fragments, plus ceramics, projectile points and other chipped stone tools, chipped stone debitage, ground stone, and bone artifacts. Although there were several charcoal stains and possible posts, no definitive indicators of structures or firepits were found.

Two historic artifacts (SW1217-789 and 790), both Winchester 9 mm Luger bullet cartridges, were collected near surface (0-3cm and 3-10cm, respectively) in Test Pit 4.

Two radiocarbon dates were obtained. One was based on a charcoal sample from the bone midden, while the other was based on a charcoal sample from the main ceramic concentration. The bone midden sample returned an estimate of 625 ± 50 RCYBP (UGa-2049), and the ceramic concentration sample returned an estimate of 645 ± 45 RCYBP (UGa-2048).

The recovered fauna is dominated by pronghorn (*Antilocapra americana*), with a minimum of 433 specimens and 26 individual animals specifically identified as pronghorn, and an additional 5397 specimens in the size range of pronghorn. Other identified specimens include four jackrabbit (*Lepus* sp.) bones, three pocket gopher (*Thomomys* sp.) mandibles, one cottontail rabbit (*Sylvilagus* sp.) humerus fragment. An initial discussion of the fauna has been provided (Lubinski 2000; Lubinski and Metcalf 1996), and a fuller discussion is in preparation.

The ceramic assemblage of 180 sherds has been reported by Middleton et al. (2007). The ceramics are plain or finger tip-impressed and exhibit grit or sand tempering. They are similar to Uncompahgre Brown Ware, typically identified in Colorado and eastern Utah (Buckles 1971; Reed and Metcalf 1999) and the Waltman Brown Ware proposed for the Carter site in central Wyoming (Martin 2000). They are not Intermountain Ware as originally conceived (Coale 1963; Mulloy 1958).

The lithic assemblage includes all of the extant material collected during the 1976-1977 field season (n=194), and a surface collection made in 1999 (n=1). An additional four chipped stone artifacts collected from the surface and analyzed in 1983 (catalog numbers FB11-31 through 34), including a preform, a biface, and two flakes, could not be found and are not included here. The total here includes 35 chipped stone tools/tool fragments, 150 pieces of chipped stone debitage, six pieces of possible ground stone, one piece of fire cracked rock (FCR), one perforated fossil, and two unmodified stones for a total of 195 lithic artifacts. Chipped stone tools include 13 projectile points, 14 bifaces and bifacial fragments (when conjoined), three unifacial scrapers, one drill (conjoined from two fragments), and one core.

Firehole Basin lithic material was analyzed and placed into categories of chipped stone and ground stone. Chipped stone tools were described in terms of morphology, completeness, metric dimensions, and raw material. Morphological traits were used to place chipped stone tools into categories of projectile point, biface, scraper, and drill. Where possible, projectile points were assigned to arrow or dart class by comparison to the neck width data from Shott (1997), which also includes the data from Thomas (1978). Artifacts with neck widths of less than 8.6 mm were categorized as arrows (outside the 95% confidence interval for 39 darts) and more than 15 mm as darts (outside the 95% confidence interval for 130 arrows). All measurements were taken to the nearest 0.1 mm using digital calipers. Raw material was recorded as chert (opaque cryptocrystalline rock), chalcedony (translucent cryptocrystalline rock), quartzite (visible grain), or obsidian.

**PROJECTILE POINTS**

All bifaces and bifacial fragments with hafting elements were considered projectile points in this analysis. The projectile points were clas-
sified according to temporally defined projectile point styles from the Great Plains, Great Basin, and Intermountain regions as appropriate. Measurements used for projectile points were taken as described in Table 1 and Figure 1.

The 13 projectile points from the Firehole Basin site include two small tri-notched, two small side-notched, three small unnotched, and one Rose Spring point (see Figure 2 and Table 2). All eight points are considered arrow points based on overall size and, if notched, by comparison of neck width with measurements in Shott (1997), and Newton (2006). Five other specimens either do not fall directly into a defined type, or were broken in such a way to prevent classification.

Two specimens (FB11-13, FB11-27) are tri-notched arrow points, with side-notches and pronounced central basal notches. In southwestern Wyoming, such points are commonly referred to as “tri-notched” (McNees 1992:30-42; Thompson and Pastor 1995) and sometimes as Desert Side-Notched (Hoefer et. al 1992:56). In Northern Utah such points are referred to as Desert Side Notched (Wilson 1997:46; Holmer and Weder 1980:57). Small side-notched points and tri-notched points both are referred to as Desert Side-Notched (DSN) in the Great Basin, northern Utah, and western Colorado (Holmer 1986:107; Holmer and Weder 1980:60; Jen-

Figure 1: Measurements used for describing projectile points. See Table 1 for explanation of abbreviations.

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEASUREMENT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML</td>
<td>Maximum Length</td>
<td>Length from the most proximal to most distal end of the tool</td>
</tr>
<tr>
<td>MW</td>
<td>Maximum Width</td>
<td>Taken at maximum width at a point perpendicular to the long axis</td>
</tr>
<tr>
<td>MT</td>
<td>Maximum Thickness</td>
<td>Taken at maximum thickness in plane perpendicular to ML and MW</td>
</tr>
<tr>
<td>NW</td>
<td>Minimum Neck Width</td>
<td>Most minimum width of projectile point neck or stem taken perpendicular to the long axis</td>
</tr>
<tr>
<td>MBW</td>
<td>Maximum Basal Width</td>
<td>Most maximum width of point base measured perpendicular to the long axis</td>
</tr>
<tr>
<td>MSL</td>
<td>Maximum Shoulder Length</td>
<td>Maximum length from the NW position to the lateral shoulder or barb corners, taken parallel to the proximal shoulder or barb margin</td>
</tr>
<tr>
<td>HL</td>
<td>Haft Length</td>
<td>Measured along the long axis from the most proximal margin of the base to the position of the MW</td>
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</table>

Table 1: Measurements used for projectile points.
Specimen FB11-13 is a nearly complete tri-notched arrow point made of black obsidian. The distal point appears to be snapped off. One lateral edge is damaged or broken, resulting in a missing barb, yet the arrow point still displays evidence of a side notch on this lateral broken edge. Artifact FB11-27 is a proximo-medial fragment of a tri-notched arrow point; the distal tip has been snapped off. It is composed of a lustrous, semi-translucent dark brown chert and exhibits finely controlled pressure flaking.

Two other projectile points (FB11-05, FB11-22) are small side-notched arrow points, with moderately high side notches and straight bases. In Wyoming, such points are referred to as small side-notched (Frison 1971:271, 1973:251; McNees 1992:30-42), DSN (Pastor and Thompson 1995:59, Hoefer et al. 1992:56), or Plains side-notched (Martin 2000:307).
These points are referred to as DSN arrow points in the Great Basin, northern Utah, and western Colorado, but we use the term “small side-notched” to avoid confusion with tri-notched types. On the Great Plains, Kehoe (1966:833) names a similar arrow point: Plains side-notched.

FB11-05 is a near complete small side-notched arrow point made of an opaque gray chert. It exhibits a very subtle basal indentation (less than 0.3mm), too subtle to be considered a tri-notched point. The distal tip has been snapped off, and the barbs have been damaged. FB11-22 is a complete small side-notched arrow point made of lustrous, translucent brown chalcedony with some very small black inclusions. The base of FB11-22 is straight but the blade portion is slightly asymmetrical.

Tri-notched and small side-notched arrow points broadly similar to those from Firehole Basin are found throughout the Rocky Mountains, Great Basin, and Great Plains in late prehistoric times. In Wyoming, such points are associated with the Firehole phase from approximately 650-250 RCYBP (Pastor and Thompson 1995:59), but small side-notched points also are recovered in a few earlier assemblages, such as Wardell at 1580-990 RCYBP (Frison 1973). In western Colorado, these points occur from 2050 to 200 RCYBP based on C14 dated components reported by Reed and Metcalf (1999:147-148). In northern Utah, they occur from about 800-200 RCYBP (Holmer 1986:105) or 1000-250 RCYBP (Johnson and Loosle 2002:271). All of these age ranges are consistent with dates reported for Firehole Basin at 645 and 625 RCYBP. On the Great Plains, similar Plains side-notched points may occur somewhat

<table>
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<tr>
<th>CATALOG NUMBER</th>
<th>FORM</th>
<th>MATERIAL</th>
<th>RAW</th>
<th>FRAGMENT MATERIAL</th>
<th>COLOR</th>
<th>ML</th>
<th>MW</th>
<th>MT</th>
<th>MNW</th>
<th>MBW</th>
<th>MSL</th>
<th>HL</th>
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<td>FB11-05</td>
<td>small side-notched</td>
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<td>chert</td>
<td>Near Complete</td>
<td>Gray</td>
<td>18.4*</td>
<td>11.5</td>
<td>2.7</td>
<td>5.7</td>
<td>2.7</td>
<td>2.3</td>
<td>5.6*</td>
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<td>FB11-10</td>
<td>unnotched arrow</td>
<td>unknown side notched</td>
<td>chert</td>
<td>Near Complete</td>
<td>Chalcedony</td>
<td>21.7</td>
<td>17.5</td>
<td>5.7</td>
<td>5.5</td>
<td>4.3</td>
<td>5.3</td>
<td></td>
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<tr>
<td>FB11-13</td>
<td>unknown side notched</td>
<td>unknown side notched</td>
<td>chert</td>
<td>Complete</td>
<td>Obsidian</td>
<td>10.4</td>
<td>14.2</td>
<td>5.1</td>
<td>5.5</td>
<td>5.1</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
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<td>unknown side notched</td>
<td>chert</td>
<td>Complete</td>
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<td>14.2</td>
<td>5.1</td>
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<td>5.1</td>
<td>5.3</td>
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<td>chert</td>
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<td>Obsidian</td>
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<td>Near Complete</td>
<td>Quartzite</td>
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<td>12.3</td>
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<td>chert</td>
<td>Near Complete</td>
<td>Quartzite</td>
<td>24.3</td>
<td>12.3</td>
<td>3.1</td>
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<td>chert</td>
<td>Complete</td>
<td>Chalcedony</td>
<td>17.5</td>
<td>14.1</td>
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<td>FB11-22</td>
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<td>unknown side notched</td>
<td>chert</td>
<td>Complete</td>
<td>Brown</td>
<td>17.5</td>
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<tr>
<td>SW1217-774</td>
<td>unnotched arrow</td>
<td>unknown side notched</td>
<td>chert</td>
<td>Proximo-Medial</td>
<td>Quartzite</td>
<td>31.4</td>
<td>15.5*</td>
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<tr>
<td>SW1217-830</td>
<td>Rose Spring</td>
<td>unknown side notched</td>
<td>chert</td>
<td>Complete</td>
<td>Chert</td>
<td>31.4</td>
<td>15.5*</td>
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* = incomplete in this dimension
NA = not applicable to this specimen
later, from approximately 400 to 200 RCYBP (Kehoe 1966:833).

Three unnotched triangular arrow points (FB11-16, FB11-17, SW1217-774) were recovered from the site. In Wyoming, these points are sometimes referred to as unnotched arrow points (McNees 1992:30-42; Frison 1971:270), and sometimes as Cottonwood Triangular arrow points (Martin 2000:307; Pastor and Thompson 1995:59), based on favorable comparison with Cottonwood Triangular projectile points originally defined by Lanning (1963:252-253) for California. Throughout northern Utah, western Colorado, and the Great Basin, these points are commonly named Cottonwood Triangular (Holmer 1986; Jennings 1986; Reed and Metcalf 1999:143).

Cottonwood Triangular points generally are associated with the Firehole phase in southwestern Wyoming from 650-250 RCYBP (Pastor and Thompson 1995:59), although some occur in assemblages as early as 1020 RCYBP (McNees 1992:Table 30.15). Such points occur in western Colorado from 2130-560 RCYBP, based on radiocarbon-dated components reported by Reed and Metcalf (1999:147-148). In the Great Basin, Holmer (1986:106) identifies Cottonwood triangular points as occurring from 1000-200 RCYBP, while Johnson and Loosle (2002:271) note they occur from approximately 1000-250 RCYBP in the Uinta Mountains. All of these age ranges are consistent with dates reported at Firehole Basin.

Specimen FB11-16 is a complete unnotched arrow point composed of an opaque gray chert. It exhibits slightly convex blade margins and a concave basal margin. FB11-17 is nearly complete, with one of the basal lateral margins missing. It is composed of a lustrous gray quartzite and exhibits slightly convex blade margins and a concave basal margin. SW1217-774 is a proximo-medial fragment with the distal tip snapped off, slightly convex blade margins and a straight base. It is composed of a lustrous gray quartzite.

Specimen SW1217-830 compares favorably with Rose Spring projectile points originally reported by Lanning (1963) for California. In Wyoming and northern Utah, these points are referred to as Rose Spring (Hakiel et al. 1987; Pastor and Thompson 1995:59; Schock et al. 1982; Wilson 1997:46), and sometimes simply as corner-notched (Frison 1971:270). Rose Spring points are considered one end of the Rosegate series (Rose Spring and Eastgate continuum) in the Great Basin (Thomas 1981), and this term is used in western Colorado (Reed and Metcalf 1999). These are broadly similar to Avonlea style points in the Great Plains (Kehoe and McCorquodale 1961) but do not closely resemble them. The SW1217-830 specimen exhibits serrations along the blade edge and is made from brown and tan mottled chert.

UNTYPED PROJECTILE POINTS

Five points from the Firehole Basin site are not placed into types due to fragmentation preventing identification or due to a form unusual in the region. Two of these specimens (FB11-18, FB11-21) are broken arrow points based on overall size and estimated neck width. The remainder include a reworked dart point (FB11-10), an anomalous “turkey tail” (FB11-15), and an unidentified fragment (FB11-23).

Two specimens (FB11-18, FB11-21) are
arrow points broken so the hafting element is missing but with remnant distal notch or stem edges permitting neck width estimates less than 8 mm, consistent with arrow points by comparison to Shott (1997), and Newton (2006). Both are broken across the haft so it is unclear if they are notched or stemmed. FB11-18 is a medial fragment retaining small shoulder barbs, while FB11-21 is a medio-distal fragment retaining small right-angle to oblique shoulders.

A complete, reworked, large side-notched point (FB11-10) is made of brown chalcedony. With a neck width of 14.2 mm, this projectile point falls into the dart class rather than the arrowhead class when compared to Newton’s (2006) small Plains sample, but among large arrows and small darts in Shott’s (1997) larger national sample. This point appears reworked due to the thickness, large neck width, small blade size, and evidence of rejuvenation. Artifact FB11-10 may be a case of Firehole phase reuse of an earlier point (c.f. Flenniken and Wilke 1989).

Artifact FB11-15 is much different than the rest of the hafted bifaces from the site. Its outline broadly resembles the Turkey Tail point defined in the Great Lakes region (Justice 1987:175-178), but it is not a finely flaked specimen as is typical there. While it is bipointed and side-notched to provide a “turkey tail” base, it is strongly plano-convex, almost triangular, and thick in cross section. The flaking on the convex side (depicted in Figure 2) extends over all of the artifact face, but on the flat side, flaking is limited to the margins. The artifact also exhibits an arcuate longitudinal section, probably a remnant of the large flake from which it was made. It is composed of an opaque gray chert with streaks or bands of gray and brown resembling petrified wood. With a neck width of 12.8 mm, the point falls among large arrows and small darts when compared to Shott’s (1997) sample, but its plano-convex cross section and large size seem more consistent with a knife form. All edges of the blade are heavily worn or ground (even flattened up to 1.7 mm wide at the edge), while the base is apparently unworn. Similar hafted bifaces, with the distinctive low side notches and pointed bases, often resharpened and thought to be knives, occur rarely in southern Idaho (Lohse 1993, personal communication 2007).

**OTHER STONE ARTIFACTS**

Other chipped stone tools recovered from the site include six complete bifaces, eight biface fragments, three unifacial scrapers, a drill, and a core (see Tables 3 and 4). The bifaces (Table 3) are mostly finished or nearly finished specimens, although there is also a flat river-rolled pebble with edge modification (conjoined from SW1217-798, 800, and 806). Included are five specimens which may be projectile point fragments, including two possible arrow point tips (FB11-01, SW1217-829), two possible arrow point bases (SW1217-778, SW1217-828), and a possible dart tip (FB11-19). The three scrapers all exhibit steep, unifacially retouched semicircular ends, but range from a small, finely made piece (FB11-02) to more expedient, battered, split quartzite pebble (SW1217-803). The single drill, conjoined from two pieces (FB11-20 and SW1217-826), is made by bifacial flaking of the projection on an otherwise minimally modified wide flake.

Artifact FB11-08 is a gray chert biface with some unusual characteristics, including unifacial resharpening along the upper half of one lateral edge resembling beveling as is common in some knife forms. It compares favorably with a beveled biface reported by Frison (1971:Figure 4b) from the Eden-Farson site. The reworked Firehole Basin specimen has hints of a shoulder, but does not exhibit the pronounced shoulder and extensive resharpening characteristic of Shoshone knives reported by Eccles (1997). However, given its similarity to the Eden-Farson specimen found with classic resharpened forms by Frison (1971), it could represent a lightly used Shoshone knife.
<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>PORTION</th>
<th>RAW MATERIAL</th>
<th>COLOR</th>
<th>ML</th>
<th>MW</th>
<th>MT</th>
<th>DESCRIPTION</th>
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<tbody>
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<td>FB11-01</td>
<td>Tip</td>
<td>Chert</td>
<td>Gray</td>
<td>15.8*</td>
<td>10.7*</td>
<td>3.4*</td>
<td>Finely flaked tip fragment, nearly unifacial; probably arrow point tip</td>
</tr>
<tr>
<td>FB11-07</td>
<td>Complete</td>
<td>Chert</td>
<td>Mottled gray &amp; brown</td>
<td>89.9</td>
<td>70.0</td>
<td>12.6</td>
<td>Near-circular preform with lightly polished edges</td>
</tr>
<tr>
<td>FB11-08</td>
<td>Complete</td>
<td>Chert</td>
<td>Gray</td>
<td>88.9</td>
<td>34.3</td>
<td>9.9</td>
<td>Lanceolate shape with heavy edge use; possible Shoshone knife (see text)</td>
</tr>
<tr>
<td>FB11-09</td>
<td>Complete (?)</td>
<td>Chalcedony (moss agate)</td>
<td>White &amp; black</td>
<td>26.2*</td>
<td>19.0</td>
<td>6.9</td>
<td>Near-finished, pointed distal tip with opposite end flat cortex or rock flaw</td>
</tr>
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<td>FB11-19</td>
<td>Medio-Distal</td>
<td>Chert</td>
<td>Mottled gray &amp; brown</td>
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<td>17.4</td>
<td>5.0</td>
<td>Finely flaked, pointed finished biface; probably point fragment</td>
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<td>SW1217-222</td>
<td>Medial</td>
<td>Chert</td>
<td>Blue/Gray</td>
<td>27.3*</td>
<td>28.6*</td>
<td>7.0*</td>
<td>Preform or finished biface exhibiting heat damage and lateral use-wear</td>
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<td>SW1217-772</td>
<td>Complete</td>
<td>Chalcedony (moss agate)</td>
<td>Gray &amp; black</td>
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<td>Near-finished biface with pebble cortex on tip and one lateral margin</td>
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<td>Chert</td>
<td>Brown</td>
<td>26.5*</td>
<td>17.2*</td>
<td>6.3*</td>
<td>Straight finished biface edge</td>
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<td>SW1217-778</td>
<td>Medio-distal</td>
<td>Chalcedony (moss agate)</td>
<td>Gray &amp; black</td>
<td>16.8*</td>
<td>14.0*</td>
<td>3.5</td>
<td>Finely flaked square base of arrow point perform or unnotched arrow point; snapped diagonally into 2</td>
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<td>SW1217-784</td>
<td>Edge</td>
<td>Chert</td>
<td>Purple-gray</td>
<td>19.8*</td>
<td>21.2*</td>
<td>9.6*</td>
<td>Shatter fragment with minimally bifacial edge flaking.</td>
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<td>Complete (?)</td>
<td>Chert</td>
<td>Gray</td>
<td>43.3</td>
<td>29.6</td>
<td>9.3</td>
<td>Flat, cortex-covered and potlid damaged piece with irregular margin retouch leaving significant cortex</td>
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<td>Quartzite</td>
<td>Gray</td>
<td>71.8</td>
<td>70.5</td>
<td>20.4</td>
<td>Flat, cortex-covered pebble with crudely flaked margins</td>
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<td>SW1217-800</td>
<td>(3 pieces)</td>
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<tr>
<td>SW1217-806</td>
<td>Proximal</td>
<td>Chert</td>
<td>Gray</td>
<td>7.6*</td>
<td>13.0*</td>
<td>2.3*</td>
<td>Possible arrow point base fragment</td>
</tr>
<tr>
<td>SW1217-829</td>
<td>Medio-distal</td>
<td>Chalcedony</td>
<td>Brown</td>
<td>14.6*</td>
<td>12.7*</td>
<td>2.7</td>
<td>Finely flaked tip fragment; probably arrow tip</td>
</tr>
</tbody>
</table>

* = Incomplete in this dimension.
Shoshone knives have been found throughout Wyoming, Nevada, and Utah in dated contexts from 700-200 RCYBP (Eccles 1997), overlapping the age of the Firehole Basin site.

Chipped stone debitage analysis included placing each specimen into a flake type, raw material category, and size class. Flake type followed Sullivan and Rozen’s (1985) technological attribute key, while size classes were recorded using the Western Wyoming College system (Sennett et al. 1991) as I (0-6.99mm), II (7-14.99mm), III (15-29.99mm), or IV (30 or more mm). The assemblage included 150 pieces (see Table 5). The most common raw material type was quartzite (43%) followed by chert (35%), chalcedony (15%), and obsidian (8%). The 12 obsidian flakes were all small (too small for X-ray fluorescence source analysis) and from a single surface collection of an anthill. Most of the debitage (n=111, 75%) was debris or flake fragments lacking proximal ends. The size class distribution of the debitage was: 9% in the 0-7 mm class (n=14), 27% in the 7-15 mm class (n=40), 43% in the 15-30 mm class (n=64), and 21% in the 30 mm or larger class (n=32).

Other stone artifacts collected from the site include a perforated fossil, ground stone and fire-cracked rock. The fossil artifact (FB11-24) is a near-complete, disk-shaped gastropod (snail) with a hole perforated at the central origin point of the shell body whorls. Except for the hole itself, there is no sign of modification. The specimen is 15 x 13 x 4 mm in size, with a hole 1.7 mm in diameter.

Six specimens of sandstone or quartzite were considered probable stone grinding slab fragments based on their smoothed, flattened surfaces (Table 6). These include one definite sandstone mano fragment, four probable sandstone grinding slab fragments, and a possible quartzite mano or slab fragment. Four of these artifacts show classic thermal cracking. Another blocky quartzite fragment (SW1217-801) with fire cracking exhibited two parallel, flat but not apparently smoothed surfaces. Two other
quartzite fragments collected in the excavations do not show signs of modification: SW1217-812 is an angular pebble with a river-rolled, crazed cortex, while SW1217-814 is a rounded pebble or cobble fragment with relatively fresh planar breaks.

**OBSIDIAN USE**

There was very little obsidian from the site. In the chipped stone debitage, only 12 of 150 specimens (8%) were obsidian, and these were all small flakes recovered from an anthill surface, rather than the ¼” screen from the excavation. None were recovered from the excavations. Among the 35 chipped stone

<table>
<thead>
<tr>
<th>Table 5: Chipped stone debitage.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RAW MATERIAL</strong></td>
</tr>
<tr>
<td>Quartzite</td>
</tr>
<tr>
<td>N=64</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Chert</td>
</tr>
<tr>
<td>N=52</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Chalcedony</td>
</tr>
<tr>
<td>N=22</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Obsidian</td>
</tr>
<tr>
<td>N=12</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 6: Ground stone.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CATALOG NUMBER</strong></td>
</tr>
<tr>
<td>SW1217-783</td>
</tr>
<tr>
<td>SW1217-795</td>
</tr>
<tr>
<td>SW1217-804</td>
</tr>
<tr>
<td>SW1217-807</td>
</tr>
<tr>
<td>SW1217-808</td>
</tr>
<tr>
<td>SW1217-809</td>
</tr>
</tbody>
</table>

*= covered with tan soil precipitate
tools/tool fragments, only a single point was obsidian (3% of assemblage). Single digit percentages like these are typical of the southwest Wyoming archaeological record. For example, Wyoming Cultural Records Office files show artifacts made of obsidian compose only 1% of the isolated finds in Sweetwater county (n=4864), with higher percentages in counties to the north and west as one moves closer to northwest Wyoming and Idaho obsidian sources (Sutter and Young 2007)

The single obsidian artifact from Firehole Basin amenable for x-ray fluorescence source analysis was a tri-notched projectile point (catalog FB11-13). Analysis of this artifact by Skinner and Thatcher (2008) indicates it derives from the Teton Pass locality in Teton county, northwestern Wyoming. This source is approximately 170 miles north-northwest of the Firehole Basin site.

The Teton Pass source occurs in variable quantities in Wyoming Basin sites. Three earlier study samples provided a wide range of results. At the lower end of the spectrum, Teton Pass obsidian comprised only one of a sample of 35 obsidian artifacts (3%) from nine excavated southwest Wyoming sites analyzed by Ray Kunselman (Thompson et al. 1997:Table 1). In this study sample, Wright Creek (near Malad, Idaho) and Green River pebble obsidian dominated. In a sample of southwest Wyoming surface artifacts from the same study, the Teton Pass and undistinguished Teton Pass/Fish Creek source composed 14 of the 97 samples (14%), with Wright Creek the single most-common source. At the other end of the spectrum, Smith (1999:Table 1) reports Teton Pass was the single most common source in a sample of Sweetwater county sites analyzed by Kunselman and Skinner. Teton Pass composed 13 of 35 artifacts (37%) from two of the six sites (33%) in this study. The samples from these two sites were comprised of 25 to 75% Teton Pass obsidian (1 of 4 of 48SW211 samples and 12 of 16 of 48SW6324 samples).

THE FIREHOLE PHASE RECONSIDERED

The Firehole phase was originally conceived (Zier et al., 1983, Metcalf 1987) as a temporal unit placed after a dramatic decline in radiocarbon-dated components ca. 1000 RCYBP and before the Protohistoric period at 300 RCYBP. Since this time period corresponded with the disappearance of Rose Spring and other corner-notched points in favor of side-notched arrow points (already present in the preceding Uinta phase) and the appearance of tri-notched points (Metcalf 1987:249), it was considered a provisional phase in the classic sense of Willey and Phillips (1958). There has been little discussion of the validity of the Firehole phase concept (c.f. Creasman and Thompson 1997; McNees 1999), although there has been considerable debate on its proper bracketing ages (e.g., McKibbin et al. 1989; McNees 1992; Thompson and Pastor 1995), particularly whether it should begin ca. 1000 or closer to 700 RCYBP. We favor a 700/650 RCYBP starting date as best representing the time when the individual characteristics (some with earlier dates of initial appearance) coalesce into a distinct entity, and an end date of 300 RCYBP for the onset of the Protohistoric period.

To some degree, the disagreement on the Firehole phase starting date reflects a common issue for the phase concept, which by its nature has somewhat fuzzy boundaries. As a concept strongly tied to attributes of form, which may be time-transgressive across space, it should not be expected to have the crisp dates of a defined chronological period. In the region, the Firehole phase term is used both as a phase with implications for material culture, and as a period with implications only for a set length of time. In this latter use, it clearly is preferable to have a single date ending the Uinta phase and starting the Firehole phase, rather than a transitional period reflecting the loss of distinctive Uinta characteristics and prior to the aggregation of distinctive Firehole characteristics, which might
be preferable for its use as a phase per se.

Regardless of these larger theoretical concerns, the continuing use of the Firehole phase concept indicates its utility. The concept has held up well in light of archaeological research in the past quarter century, as it is marked by a suite of characteristics which seem distinct from the characteristics of the preceding Uinta phase. The clearest change in the region is the replacement of small corner-notched points (e.g., Rose Spring) by side-, tri-, and un-notched forms. The small excavated lithic assemblage from the Firehole Basin site generally reflects this change, with no Rose Spring points and 7 of 7 of the identified assemblage side-, tri- or un-notched arrow points. On the other hand, ceramics, initially thought to be dominated by Intermountain Ware (Metcalf 1987), appear widely variable and not dominated by a single ware in this period (Middleton et al. 2007).

Other aspects of Firehole phase identity are more arguable. Diagnostic tools and site types could include distinctive rib tool hafts, tipi-ring type stone circles and rockshelters (McNees 1992). There may be a shift in land-use patterns from open basin dunal environments of the Uinta phase in favor of wooded uplands and wet drainages. This proposed change is supported by the finding of Desert Side Notched points entirely within juniper/pinyon-juniper or wet drainage environments, rather than sagebrush or dry drainage environments, in the Uinta Basin Lateral Pipeline project (Metcalf and McFaul 2006). Another possibility is a subsistence focus on large mammals, particularly bison (see also McNees 1992:30-44).

All comparisons of the Firehole phase with the preceding Uinta phase are hampered by the relative lack of Firehole phase samples compared to the robust Uinta phase record, with the very real possibility apparent differences are simply due to the limited sample for Firehole phase. But the sample size disparity itself is one of the biggest and most significant differences between the phases. This disparity could indicate a population decline (reflected in fewer radiocarbon dates), reduced use of storage and plant processing (reflected in less dateable pit features), and/or shift in land use (e.g., shift to areas with less intensive archaeological investigation). This relative dearth of information and significant changes in the archaeological record continue to make the Firehole phase a compelling time period for future archaeological research.

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