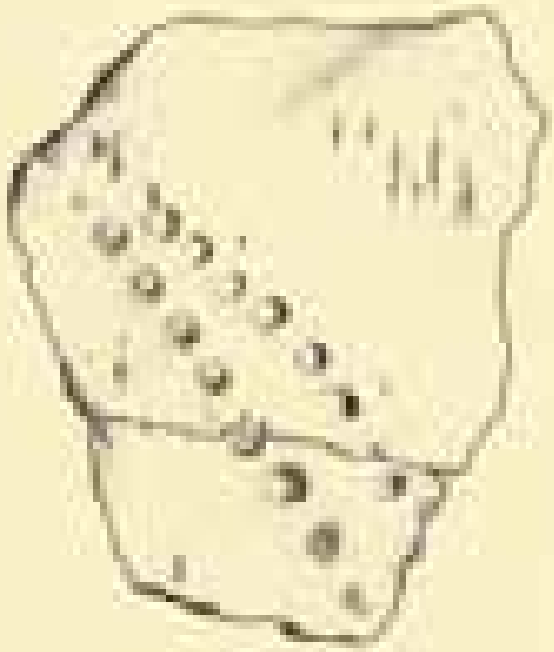
2007

UTAH ARCHAEOLOGY

Utah's Journal of Archaeological Research



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Cover: Drawing of an early brown ware sherd from 42PI275 (Zevon II Site). Original from "The Zevon II Site (42PI275) in Piute County, Utah" by Richard K. Talbot and Lane D. Richens. See page 31 this volume. Drawing by Scott M. Ure.

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UTAH ARCHAEOLOGY

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Message from the Editors

Another issue of *Utah Archaeology* has rolled off the press. Looking at the diverse topics, authors, regions, and peoples covered in these three articles, we are reminded of the fascinating variety of the archaeological record in the state of Utah we are fortunate to study. We also recognize the importance of continuing publication of the journal, which provides a forum in which the various stake holders of Utah's history and prehistory can share their research.

We commend outgoing editor Jason Bright for his service and the recent publication of the 2005 issue of Utah Archaeology, his final issue as editor. We also extend our thanks to all those that submitted articles and served as reviewers for the current issue. Like Volume 19, Volume 20 of Utah Archaeology is a bit shorter than we have grown accustomed to. Although this issue may be short in length, it is rich in content. We are regularly receiving new submissions to the journal, and future issues will be of a length that readers have seen in previous volumes. Your patience as readers of the journal has also been most appreciated as we have worked to catch-up publication of the journal to the current year.

The look of the journal continues to evolve, and we are pleased to have Scott Ure, a graduate student and employee of the Brigham Young University Anthropology Department, as technical editor. We acknowledge BYU's assistance in the publication of this issue, and appreciate their continued support.

We are pleased to continue our service as editors of Utah Archaeology, and look forward to the publication of the 2008 and 2009 issues in the coming year.

Chris N. Watkins
David T. Yoder

An Intermittent, Linear Diamond-Shaped Pattern of Dots in Aerial Photographs of Range Creek Canyon, Utah

Steven J. Manning
Utah Archaeological Research Institute

A linear feature consisting of a repeating pattern of dots in a diamond shape exists in aerial photographs of Range Creek, Utah. It appears in the photographs only on the sagebrush-covered floor of the canyon and it follows an intermittent, northwest-southeast line for over 8 kilometers (~5 miles). Each diamond pattern is roughly 30 meters long. No explanation has been found for the creation or the purpose of this feature. The previous owner of the property for the past 50 years, Waldo Wilcox, was unaware of its existence. Cursory investigations found no evidences of it the canyon. The feature is described and reasons provided concluding that it is an actual physical entity and not a defect in the film.

One of the more interesting, unusual, and controversial features discovered in Range Creek, since the acquisition of the Wilcox Ranch by the State of Utah, is an intermittent, linear diamond-shaped pattern of dots that appear in aerial photographs (Figures 1 and 2). This existence of this feature was introduced in a poster at the 2006 Utah Professional Archeological Council semiannual meeting in Salt Lake City (Manning 2006), and it is described in detail here. The linear pattern appears to run intermittently for 8.31 kilometers (~5 miles) through a segment of Range Creek. Nearly everyone's initial impression when viewing this pattern in the aerial photographs is that they are a photographic anomaly, i.e., they were created during the photographic process, either when the film was exposed or when it was developed, or they are the result of a manufacturing defect in the film. The intent of this paper is to provide information demonstrating that this intermittent, linear diamond-shaped pattern of dots is not a defect in the film, etc., but is an actual on-the-ground physical feature. The linear pattern was discovered in 2002 while plotting archaeological sites on aerial photographs following the initial reconnaissance of the Wilcox property. The source of these aerial photographs was www.terraserver-usa.com. The linear diamond pattern was (and is) clearly visible in these aerial photographs from the Internet.

To determine if the linear feature was an artifact in the film, an attempt was made to obtain aerial photographs taken by a different government agency. The reasoning behind this was that if the same pattern did not exist in another agency's aerial photographs, the images would be proven to be a defect in the film or a problem with the photographic process. Discovering that the US Department of Agriculture possessed aerial photographs of agricultural lands in the U.S., and since Range Creek Canyon contained agricultural lands, a digital black & white scan of a 10 cm by 10 cm photographic negative of the canyon was obtained from the USDA office in Salt Lake City, Utah (USDA/FSA 1993). The same diamond pattern of dots was evident in this aerial photograph. The date of exposure of the negative was 7-20-1993. The scan provided a significantly greater degree of clarity and a higher resolution than the photographs from the Internet. This scan is the source for all but one of the aerial photographs illustrated below.

Description

The feature consists of a linear arrangement of a repeating pattern of parallel rows of dots in

a diamond shape. There is one dot followed by two, then three, then four, then three, then two, then one (Figure 1). The black line in Figure 1 is the dirt road in the canyon. The road provides a scale for the linear feature. Two cars cannot pass each other in this area because the road travels through a dense stand of encroaching big sagebrush (*Artesmisia tridentoto*), which has been given the more appropriate name of "killer sagebrush", as those who have had to fight their way through it will attest. The road is roughly 3 meters (9–10 feet) wide in this area, suggesting that each diamond shape is roughly 30 meters long.

The north end of the pattern originates (or terminates) across from the mouth of Nelson Canyon (Figure 2, segment A). The northern most end of the feature is almost precisely at the point of a ridge that enters the canyon from the northeast. From this point, the pattern transects the valley floor in an almost exact northwest–southeast alignment. This segment is roughly 200 meters long. The old road that travels around the point in the photograph is no longer used and it is partly overgrown with vegetation.

The pattern of dots then appears again on the opposite side of a ridge that comes into the canyon from the west (Figure 3). These two sections are in a nearly perfect linear alignment. The feature then appears again on the opposite side of a broader ridge that comes into the canyon from the east (Figures 4 and 5). Here the pattern crosses Billy Slope Canyon near the mouth. It then heads into the toe of another ridge entering the canyon from the east. This ridge is the south side of Billy Slope Canyon.

The pattern appears again on the other side of the ridge that forms the south side of Billy Slope Canyon (Figure 6). This point is opposite the mouth of Calf Canyon. It then traverses a straight section of the canyon that is again covered in thick sagebrush. As the linear feature reaches the tip of a ridge coming into the canyon from the west, it also intersects the old road, the newer road and Range Creek. As it encounters this juncture, the pattern is not evident; perhaps it was destroyed by the road and the creek. On the southern side of the juncture, the feature again becomes visible (Figures 7 and 8).

Range Creek traverses this large sagebrush flat and crosses the linear feature (Figure 8). There are two peculiarities of the linear feature in segment E. The first is the presence of a single larger diamond pattern on the northeast side of the main linear feature (Figures 7 and 9).

The second peculiarity is that the linear feature does not cross Range Creek in a straight line. It follows the northeasterly curve of the creek for a short distance, and then resumes its southeasterly path, where it curves slightly to the south, ending at a low ridge. The feature once again becomes visible on the downstream side of the low ridge (Figure 10). It is visible here in a field of sagebrush. It disappears again as it enters a grove of trees and where it crosses a grassy field, which is shown by the lighter area.

The feature appears again on the other side of a broad ridge on the west side of the canyon where it crosses the mouth of Cherry Meadows Canyon (Figure 11). The curving dirt road crosses the linear feature twice. The feature is not visible as it crosses grass-covered Cherry Meadows, but it reappears again on the opposite side of the canyon as it crosses the mouth of Lighthouse Canyon (Figure 12).

The linear feature is not clearly visible in photographs again for roughly 2,000 meters. It reappears north of the mouth of Dilly Canyon in a sagebrush area (Figure 13). Between segments H and I, the environment consists of rocky soil with Pinyon/Jupiter trees—sagebrush is sparse. The linear feature in segment I is not straight. It somewhat follows the stretched S-shaped eastern edge the floor of the canyon where there is sagebrush. Below this point the canyon floor again becomes rocky with little sagebrush and the elevation drops until it becomes level again near the ranch where the floor of the canyon has been farmed. No evidence of the linear feature appears below the mouth of Dilly Canyon.

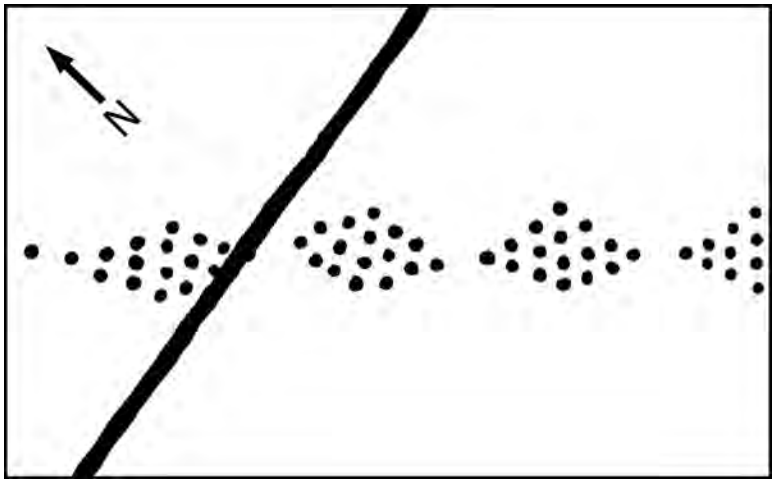

Figure 1. A tracing of part of a section of the repeating pattern of dots. The black line is the dirt road, which is roughly 3 meters (9-10 feet) wide.

Figure 2. Segment A: The diamond pattern of dots is first visible in the north at the point of a ridge across from the mouth of Nelson Canyon. It transects the canyon floor running northwest–southeast.

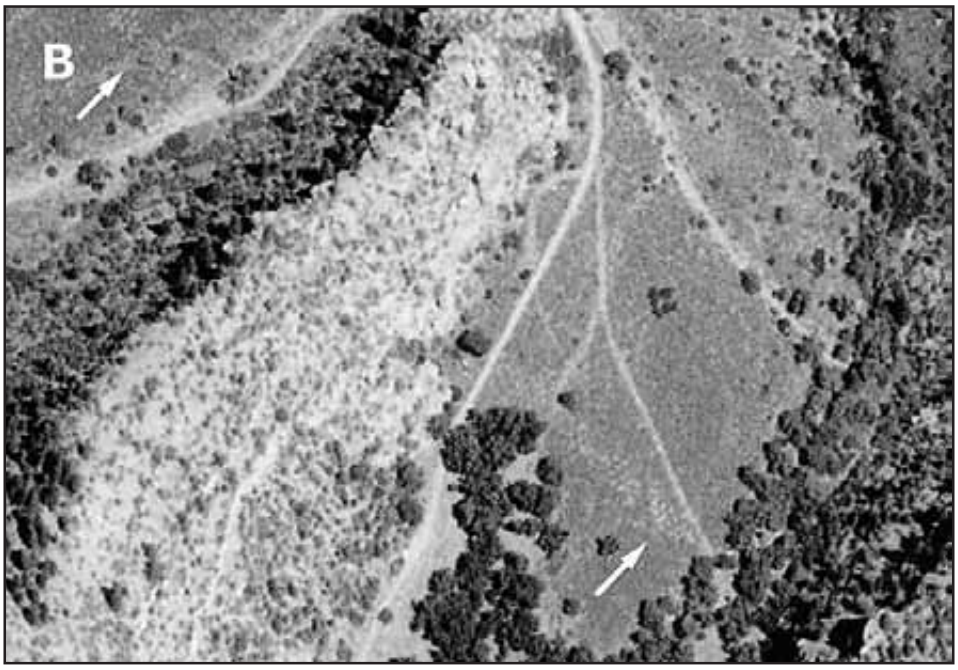

Figure 3. Segment B: The pattern of dots is again visible on the opposite side of the ridge, where it traverses the canyon floor and heads into another ridge on the opposite side of the canyon.

Figure 4. Segment C: The pattern of dots is visible again on the opposite side of a longer ridge, where they traverses the canyon floor crossing the mouth of Billy Slope Canyon. The scale of this picture is smaller to show the previous segment of the pattern.

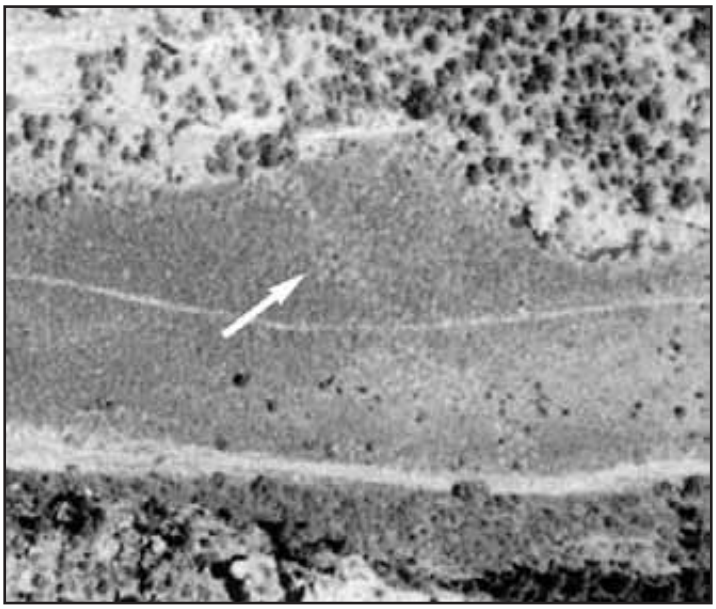

Figure 5. Segment C: Detail of the linear pattern as it crosses above the mouth of Billy Slope Canyon.

Figure 6. Segment D: The linear feature traverses the upper part of a large sagebrush flat that is opposite the mouth of Calf Canyon. This segment is roughly 450 meters long.

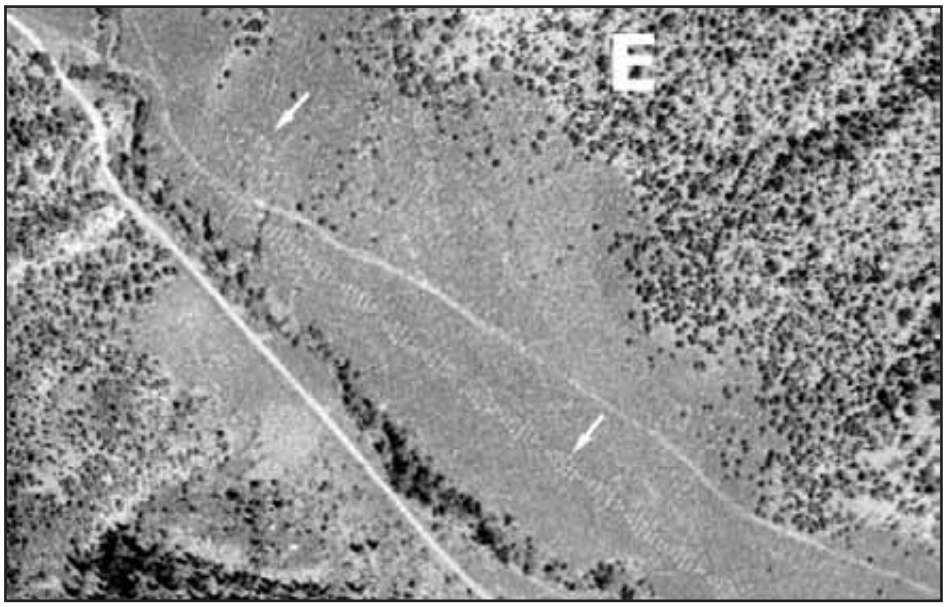

Figure 7. Segment E: The northern half of segment E passes through a large sagebrush flat. Note the presence of a larger diamond shaped pattern at the top of this photograph.

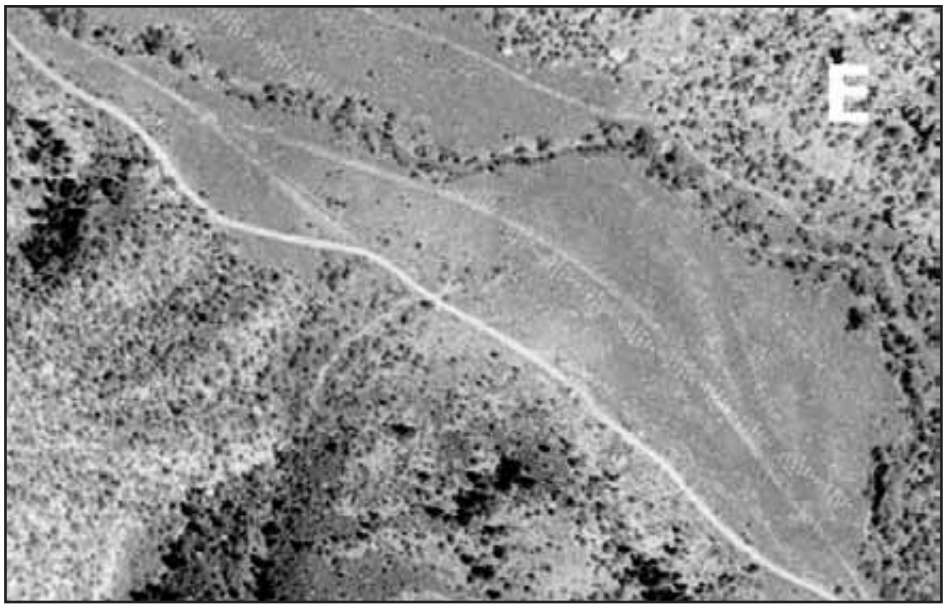

Figure 8. Segment E: The southern half of segment E passes through the large sagebrush flat. The total length of segment E is roughly 1,500 meters. Notice that an old road crosses the pattern twice.

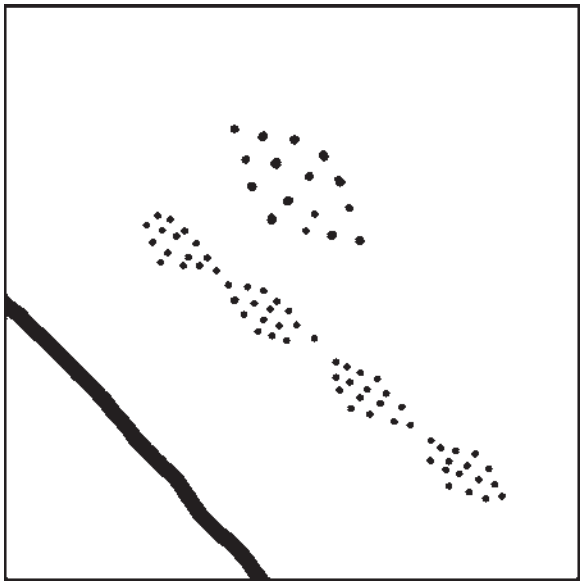

Figure 9. A tracing of the north end of segment E. Northeast of the linear feature is a larger diamond pattern of dots. The black line is the main dirt road.

Figure 10. Segment F: Only a small segment of the feature is visible where it crosses a low ridge.

Figure 11. Segment G: The linear feature crosses the mouth of Cherry Meadows Canyon

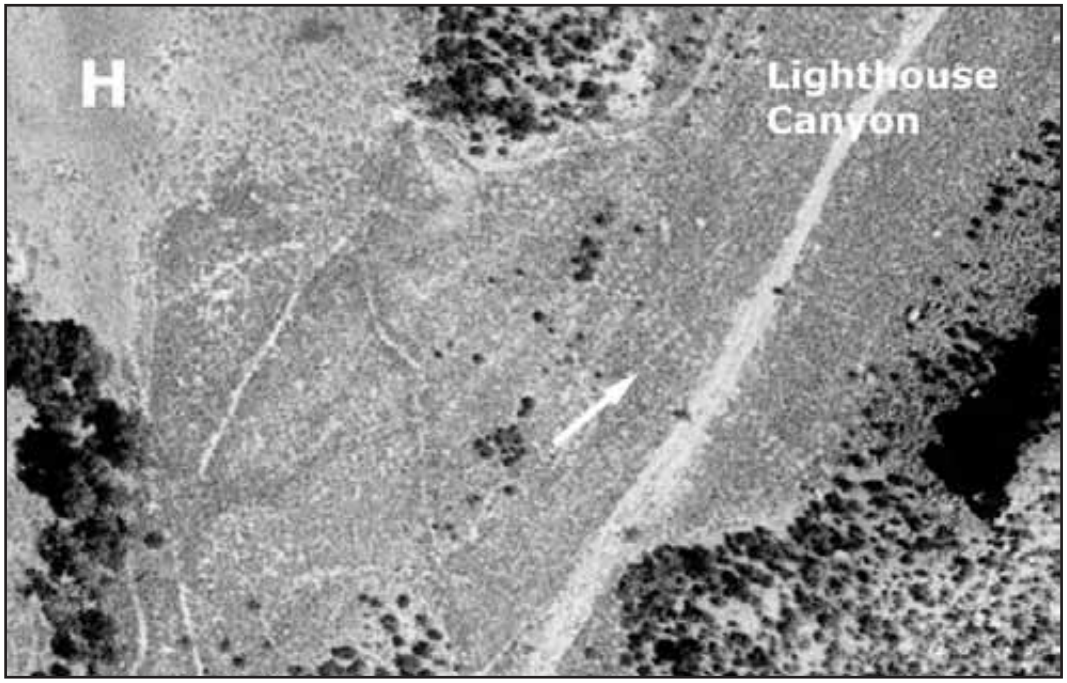

Figure 12. Segment H: The linear feature crosses the mouth of Lighthouse Canyon.

Evidences that the Linear Pattern Exists

There are several evidences that indicate that the linear diamond pattern of dots is an actual on-the-ground feature and not a defect in the film or in the exposure or development process of the film:

1) The linear feature is dependent on vegetation. It only appears in areas of dense sagebrush. It is not visible in rocky areas, plowed fields, meadows, roads or trees, which would be the situation if the feature were caused by a defect in the film or in the exposure.

2) The linear feature varies with topography. It is only visible in the canyon bottom. It is not visible where it crosses ridges (large or small) that protrude into the canyon. Furthermore, segment 'E' changes course where it crosses Range Creek. Segment 'I' changes course where it encounters what appears to be the toe of a rockslide. If the feature were caused by a defect in the film or in the exposure, the pattern would not vary with topography.

3) Each diamond pattern contains variations. The pattern repeats itself, but each dot is not located precisely in the same place in various patterns, as it would be if they were created by something like a reflection from a revolving mechanical object. The random variation indicates that the pattern was created by a non-mechanical effect, i.e., a person or persons.

4) There is one larger diamond dot pattern located adjacent to segment 'E'. This cannot be explained by a mechanical process that would produce a linear defect. The second larger pattern suggests that it and the rest of the feature were created by someone on the ground.

5) The pattern throughout the canyon does not follow an overall strictly straight or curving line as it would if the pattern resulted from a mechanical effect. Individual sections are straight—most of the time—but the overall pattern follows the general curvature of the canyon and some of the individual sections are not precisely in line with adjacent sections.

6) The images appear in aerial photographs from two different government agencies. However, despite being informed that the photographs were from two different exposures, no one was able to unconditionally confirm this, so weigh this evidence accordingly.

These observations argue that the linear feature is not a defect in the film or in the exposure or development process, but indicate that it is a constructed on-the-ground surface feature.

Investigations

Following the discovery of the linear feature, copies of all the areal photographs were sent to the previous owner, Waldo Wilcox. During a subsequent interview, Mr. Wilcox stated that he was not aware of this diamond pattern or anything like it in the canyon. The only land disturbing activity that he was aware of was when a seismic test was conducted in the canyon. Mr. Wilcox indicated that explosive charges were attached to wooden stakes at several points in the canyon then exploded. This would not account for the creation of the linear feature.

Joel Bloomgarden, graduate student from the University of Utah, and I walked directly through segments B and G, which we accurately accomplished because the aerial photographs showed precise locations of individual trees. We noted that some of the trees were larger now than when the photographs were originally taken and some had died. We could find no evidence of any surface features that might account for the linear features, nor was there any obvious differential plant growth. However, this judgment was hampered because of the "killer sagebrush." I also walked through segment A several times with the same result. Additionally, Kevin Jones and Joel Bloomgarden attempted to view the linear feature in section E by walking up a ridge

Figure 13. Segment I: The linear feature is visible in a narrow sagebrush-covered area of the canyon above the mouth of Dilly Canyon. This is apparently the southern terminus of the linear feature.

on the side of the canyon, but were unable to see any pattern. Others have searched with the same result.

Suppositions

Numerous questions have been asked about the linear feature and many suppositions for its existence have been proposed. Some examples are: 1) was the linear feature at one time continuous? It is easy to connect all of the parts into one continuous line. To illustrate this, all of the segments visible in the aerial photographs are shown on the topographic map in Figure 14 and in the photograph—the USDA scan—in Figure 15 (The black lines in the photograph are to the left of the linear pattern). 2) Was the feature created by someone removing circular areas of sagebrush? If this is the situation, surface disturbance may not be evident. To determine if ground modification exists, like a pit or a mound of soil or rocks, the vegetation will need to be removed by manual means. Perhaps another lightning-caused wildfire will clear it away naturally. 3) There is an airport at the ranch that is somewhat in line with the linear feature. Did someone create the linear feature as an aerial guide to the airport? 4) Was it a prehistoric trail system; were the diamond patterns supports for a walkway crossing what was once a wet marsh? 5) Was it a modern art project? 6) In considering art, one interesting cultural attribute that might be associated with the linear feature is prehistoric rock art. At the northern-most point, there is a high concentration of petroglyphs and pictographs. Here also are several unique images. The most prominent is the pictograph that has been named "The Upside-down Man" (Figure 16). It is located at site 42EM2842. This is one of the largest pictographs found to date in the canyon and the only recognizable anthropomorph that is inverted. Adjacent to it is a petroglyph, which is

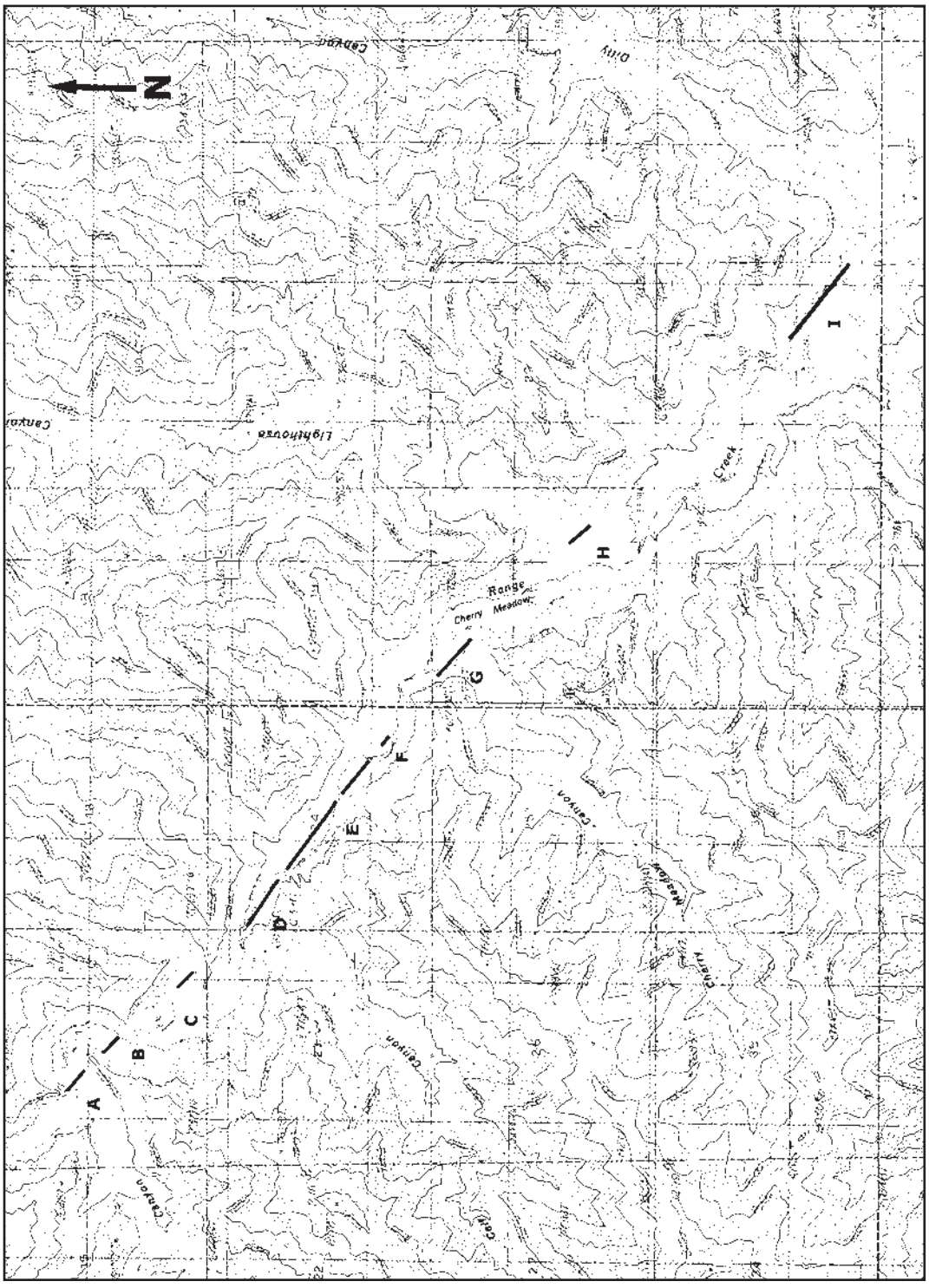

Figure 14. USGS 7.5' topographic map depicting visible segments of the linear diamond pattern.

Figure 15. Aerial photograph of Range Creek showing the locations of the linear diamond patterns. The added black lines are southwest of the feature. The top of the photograph is north.

Figure 16. The Upside-down Man located at the northern extent of the linear feature and are unique in Range Creek Canyon.

also the only one of its type found to date in Range Creek (Figure 17). The petroglyph appears older than the pictographs because it exhibits a higher degree of weathering. Likely, this is because the figure is at ground level and thus more exposed. Site 42EM3107 is also at this point and it contains a unique polychrome pictograph depicting an anthropomorph (Figure 18). All of these images are typical Fremont style and were likely constructed around the time of Fremont occupation of Range Creek, as indicated by current radiocarbon dates, which cluster around 1040 A.D. (personal communication, Duncan Metcalfe). If the images are associated with the linear feature, the feature would have been constructed at the same date. This association is, of course, extremely tentative. It is unlikely that evidence for the removal of sagebrush would still be visible after about 900 years. If, however, the linear feature is found to be the result of ground modification, then it is possible that the these images are associated with the linear feature because surface features resulting from ground disturbing activities would have endured for a much longer time.

7) It is significant that Waldo Wilcox, who lived in the canyon for 50 years, was unaware of the linear pattern's existence. Apparently, everyone else that Mr. Wilcox knew, including the previous owner, was also unaware of their existence. This suggests that the linear feature is older than 50 years. Efforts to physically date the feature can only be initiated if a segment of the pattern can be identified on the ground. 8) The segments of the pattern are in an amazingly straight line for being created in the bottom of a winding canyon where various segments are not visible from other segments. Would it be possible to accomplish this without the use of surveying equipment or a map and a compass? If it were possible to answer this question, the feature could be placed in a more specific temporal context. (9) One last supposition, offered by an undergraduate student at the Wilcox Ranch, is interesting. Range Creek

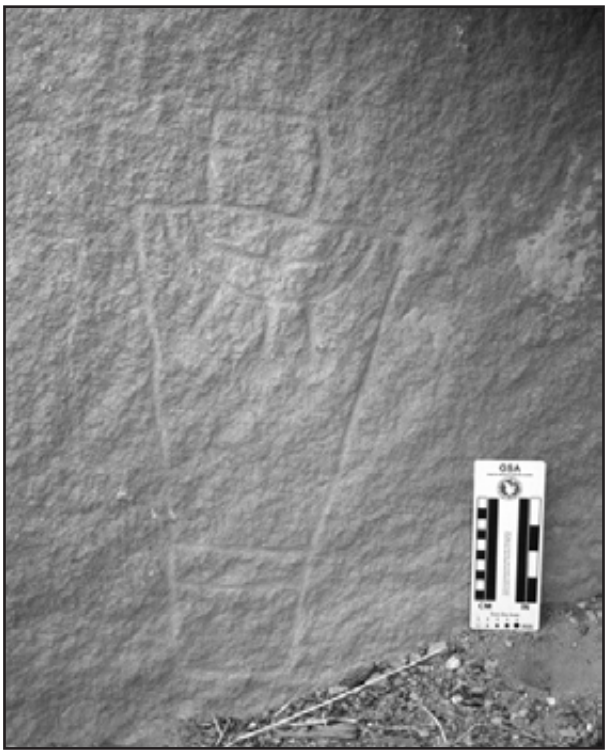

Figure 17. Unique anthropomorph at the northern extent of the linear feature in Range Creek Canyon.

has always been an isolated place. Access in its early history was by horse over the high ridge of the Tavaputs plateau and the Book Cliffs that separate Range Creek from the town of Price, Utah. Isolation has been known to drive some people crazy. One reason Mr. Wilcox sold the property was its isolation. Perhaps an early homesteader suffering from the stress of isolation created the linear feature.(10) Could the feature be a variation of the crop circle phenomenon? There are more suppositions than this, but these are sufficient to demonstrate their diversity, and to illustrate the problems in responding to or investigating the conjectures concerning the linear feature.

Conclusion

The principal intent of this paper is to demonstrate that the intermittent, linear diamond-shaped pattern of dots in aerial photographs of Range Creek is an actual on–the–ground physical feature and not a defect in the film or in the exposure or development of the USDA negative, as it initially appears. Apparently, this has been accomplished, given the comments by the reviewers. Beyond this, the feature remains a mystery, or perhaps more appropriately, a puzzle.

There are many unanswered questions. One of the most prominent is: what physical modification created the pattern? Was it a modification of the earth, such as digging a pit or mounding up soil and rocks, or was it the modification (cutting down) of the sagebrush? The physical inspection of several different locations along the length of the linear pattern, which was conducted by different people on different dates, has not revealed visible evidence of the feature's existence. Neither differential sagebrush growth or ground modification has

Figure 18. a unique polychrome pictograph depicting an anthropomorph at the northern extent of the linear feature in Range Creek Canyon.

yet to be observed. No one flying over the canyon recently has reported seeing this pattern. Additionally, those of us who are recording archaeological sites in the canyon have fought our way through the dense sagebrush, which is three meters high in some locations, crossing the linear feature numerous times and not one person observed its existence.

Another question is: who would have put so much time and effort into constructing this linear pattern? Consider the work involved. If the pattern was continuous, it would have been at least five miles long. The length of each repeating dot pattern is approximately 30 meters, and the rough size of each dot is roughly 1.5–2 meters in diameter. This is a substantial amount of sagebrush to cut and/or a substantial amount of soil and rocks to mound up. In addition, the person(s) constructing the pattern would have had to maintain a nearly consistent direction and would have had to measure each diamond pattern because they are about the same overall size and they are about equally spaced. (The individual dots show variations in size, placement and shape suggesting that they were constructed by hand.) All of this represents a considerable investment in time and labor.

One of the reviewers provided a plausible explanation for the linear feature being the result of seismic testing, something previously considered. While this may be possible, there are, however, as many explanations in opposition

to this proposal as there are arguments for it. For example: no one at the well-attended UPAC meeting where the poster was shown recognized the linear feature as a pattern they had seen before, despite their extensive work around seismic lines. If this feature resulted from seismic testing, it should exist somewhere else, since seismic testing has occurred almost everywhere in Utah. Someone certainly would have seen it before. If it resulted from seismic testing, it seems unlikely that Range Creek would be the only place where this pattern exists.

Then there are the final questions. Why was the linear pattern constructed and what purpose did it serve? This might be answered if an association with cultural features could be substantiated. As of this date, only intuitive and limited surveys of the Wilcox acquisition have been conducted. When more complete information is available, an association with other cultural features, i.e., habitations, storage facilities, agricultural fields, etc., may become apparent, and perhaps contribute to understanding the significance and origin of the linear feature, or they may not. Plans are being developed by the University of Utah to obtain more detailed aerial photographs of Range Creek. These could be used to study the linear feature.

In conclusion, no explanation for the existence of the linear pattern is readily apparent, nor likely will be until the actual feature is observed on the ground and physical testing can be accomplished. Once this occurs the dense sagebrush can be removed to determine if any ground disturbing activity has taken pace that would account for the linear pattern and tree ring data might provide information on differential sagebrush growth in various areas. Currently with land and resource management policies and regulations in a state of controversy, it may be some time before this can occur.

It is hoped that publishing this information will lead to the discovery of similar features in other locations—if they exist—and possibly someone who knows what they are and who created them will read this and solve the puzzle. Research on these enigmatic features will continue. ■

Acknowledgments: I thank the reviewers David Jacobs, Boma Johnson, and one anonymous person for helpful suggestions. I would also like to thank Dr. Kevin Jones, Utah State Archeologist, for interest in and many conversations about this linear feature. I am going to reserve thanking Dr. Jones and others for calling them the "Manning Lines" for a later date.

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Manning, Steven J.
2006 *What is This? A Linear, Diamond-Shaped Pattern of Dots in Aerial Photographs of Range Creek Canyon, Utah*. Poster at the winter meeting of the Utah Professional Archaeological Council, February 24, Utah State History, Salt Lake City.

The Zevon II Site (42PI275) in Piute County, Utah

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[1]*Office of Public Archaeology, Brigham Young University*

The Zevon II site (42PI275), though small, contains tantalizing fragments of one of the most interesting time periods in Utah, the early Formative. Located in the foothills near Circleville in south-central Utah, the site in fact shows evidence of periodic occupation from Archaic through Late Prehistoric times. But recent testing and limited archaeological excavation at the site revealed a temporary structure dating to about A.D. 500. These Formative period site residents hunted large game and collected a variety of wild plants. A single sherd found in the structure represents one of the earliest evidences for pottery use in the region. At least three, and possibly four, individuals are represented based on human teeth found in the structure. Stable carbon isotope analysis, as well as phytolith and starch analysis were performed on those teeth. The site offers an intriguing though very limited look into a seasonal hunting-gathering strategy at a time when farming was beginning to dominate regional subsistence economies.

In the fall of 2003 a crew from the Office of Public Archaeology (OPA) at Brigham Young University (BYU) carried out archaeological research at two sites in Piute County, Utah, on Fishlake National Forest land. The work was required because of damage to the sites from vegetation clearing beneath a PacifiCorp 345 kV transmission line. One of the sites was found to contain the remains of a small temporary habitation dating to the early Fremont period. That site, named Zevon II (42PI275), was initially recorded by surveys along the transmission line, first in 1975/1976 at which time limited artifact collections were made (Nielson 1976), and then revisited in 1985 (Talbot 1986). The current work was guided by a data recovery plan developed prior to site excavation (Talbot 2002), and the project results were reported in technical format by Richens et al. (2004).

Environmental Setting and Previous Research

The site is located a few miles to the west of Circleville, Utah, in the lower eastern foothills of Circleville Mountain (Figure 1). The area is one of thick pinyon and juniper trees, with relatively coarse soils on often steep ridges and in deep drainages. The ground surface generally slopes from the northwest downward to the southeast, and is quite rocky except for a small clearing where most of the excavation work occurred. Zevon II is situated on a small terrace or bench on the northeast side of a deep, unnamed drainage at an elevation of 6,680 feet (asl). Projectile points reported from previous site recording efforts include Pinto Series, Elko Series, Rose Spring Corner-notched, and a possible Desert Side-notched point. During the 1976 recording of the site 33 pieces of debitage, seven modified lithics, and four projectile points were collected.

Beyond the inventories referenced above for the power line corridor, there has been comparatively little archaeological research completed in the project area. What has been done demonstrates a rich variety of prehistoric sites including Archaic, Fremont, and Southern Paiute camp sites. Additional significant research in the region has dealt primarily with Fremont residential sites to the north around Marysvale (Gillin 1941) and in Clear Creek Canyon (Janetski et al. 2000, among others); across the

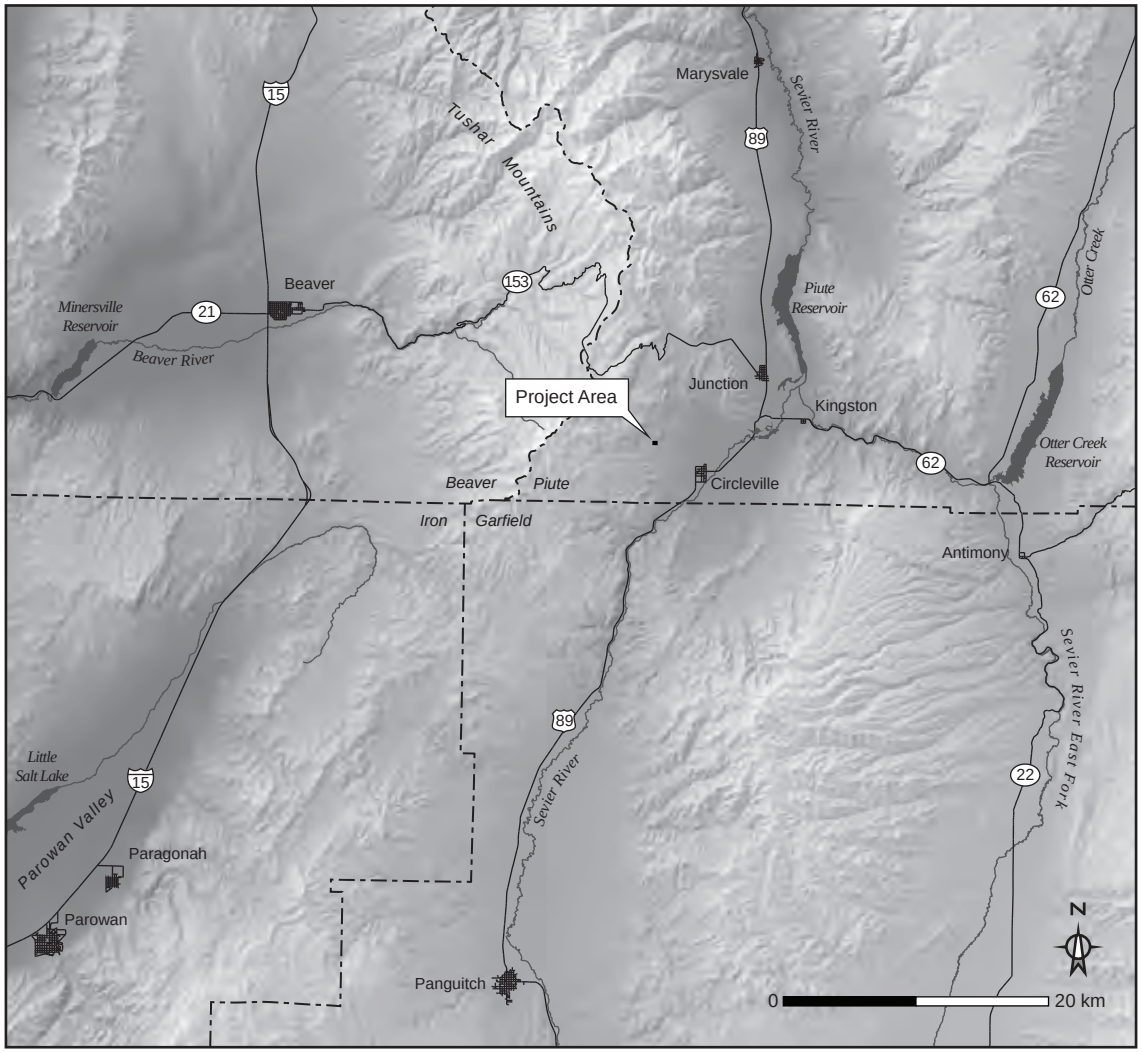

Figure 1. General location of the Zevon II Site.

mountains to the west at Beaver (Judd 1926), and to the southwest in the Parowan Valley (Berry 1972, 1974; Dodd 1982; Judd 1926; Marwitt 1970; Meighan et al. 1956; and others). These excavations have helped to define in particular the residential part of late Fremont settlement strategies, though the Clear Creek work also examined one residential and numerous non-residential sites with earlier Fremont occupations, and many non-residential sites from the Archaic and Late Prehistoric periods.

Of particular interest to this report is the early Formative or agricultural period. The agricultural period, as the name implies, is characterized by the spread of domesticate agriculture throughout the region and its consequent significant influence on native lifeways. Corn farming is present in the central Colorado Plateau, in northern Arizona, as early as 2000 B.C. However, it appears to have made little impact to or headway into Utah until about 300–100 B.C. After A.D. 1, corn production is accompanied by greater emphasis on the construction and use of larger storage

facilities. The earliest corn north of the Anasazi region to date was discovered near Elsinore, in the Sevier Valley north of Circleville, where corn and an adult female human burial were found in a deep bell-shaped pit dating to about A.D. 1, or perhaps slightly earlier (Wilde and Newman 1989). Stable carbon work on the human remains indicated a C_4 value of -10.6% , indicative of a diet high in maize for that individual (Coltrain 1996:121). After this time pithouses, in use since Archaic times, become more permanent in construction, and are accompanied by other changes in behavior and technology, including the replacement of the atlatl with the bow and arrow, and the onset of pottery production, all of which take place within the first few centuries thereafter. Of course, the best-known expressions of agricultural period development in western North America occur in the Southwest, among the Mogollon, the Hohokam, and the Anasazi.

The same general pattern in Utah is demonstrated by the Fremont. The early patterns that evolved into the Fremont strategy were in part a consequence of a transition out of an Archaic settlement/subsistence system, and toward a horticultural based subsistence strategy (Janetski 1993; Talbot 2000a; Wilde and Newman 1989). In many respects, this period is comparable to the Basketmaker II period among the Anasazi (Janetski 1993). As with the Anasazi, change occurred at a differential rate depending on localized environmental and cultural factors. Reviewing the archaeological data from central Utah and dated to the period between 500 B.C. and A.D. 500, Janetski (1993) argued for a gradual accumulation of the traits that eventually mark the Formative strategy. However, recent dietary carbon isotope studies from Fremont burials indicates that the transition to agriculture was not as gradual as previously thought (Coltrain 1995, 1996,1997), and Talbot (2000a; also Talbot and Richens 1996) has suggested that farming technology was brought by small groups of Basketmaker farmers moving northward into the northern Colorado Plateau and eastern Great Basin.

Early agricultural period pit structures in central Utah (Gruebel and Chandler 1994; Janetski 1993; Talbot 2000b) are typically round and quite shallow, with internal pits and external work areas not unlike Late Archaic houses. Through time, and in particular in village settings, they become more labor intensive and consistent with permanent residence, while architecture in the smaller settlements away from the population centers tends toward less effort in construction and maintenance. Early settlements do not appear to be large, but rather typically contain one to three pit structures and associated features. Through time population aggregation is evident in the most resource rich regions. No Fremont habitations have as yet been reported for the Circleville area, though they are to be expected given the availability of water and the abundance of arable land. The general project area is also on what one would expect to be a travel route between the resource rich Parowan Valley to the southwest, across the Fremont Pass to the Sevier River drainage that passes through the Circle Valley, continuing northward past Marysvale and into the Sevier Valley.

Methods

The initial excavation methods included creation of a site contour and surface artifact distribution map, and the establishment of six surface collection swaths 1 meter wide and 15 meter long spaced 10 meters apart (T1–T6 in Figure 3). The swaths were staggered to place them over the flattest, least rocky area of the site (which also fell within the powerline corridor). After collecting all surface artifacts from these swaths, we then excavated a shovel-width (ca. 35 cm) trench along the eastern side of each. Trench depth varied but was sufficient to confirm the presence of either cultural deposits or of sterile, undisturbed deposits. Only two trenches (T3 & T4) produced evidence for a subsurface cultural level, and we added a seventh surface collection swath and shovel-width trench just east of Row 4 to explore shallow buried cultural deposits in that

area (see below). Subsequently a 17 m^2 area was excavated into those deposits. Excavation was by 10 cm levels, with deposits screened through ⅛ inch mesh screen. Other methods followed during the excavation are outlined in Richens et al. (2004).

Site and Feature Descriptions

The Zevon II site is ca. 205 by 40 meters in size (Figure 2). A site map (Figure 3) shows the general ground contours, the surface artifact distribution, and the test trenches and excavation block. The site surface contained a significant number of tools, including 10 metates or metate fragments, two manos, 11 bifaces or biface fragments, a drill, a spokeshave, and a scraper. Nine projectile points or point fragments were found, including Elko Series and Gypsum types. The projectile points were collected but other tools were left in situ after field analysis, except within the seven sample swaths, as described previously. Surface artifacts found in sample swaths T3, T4 and T7 corresponded to subsurface cultural deposits. No artifacts were found in T1, T2 or T5, which covered some of the rockier parts of the clearing below the power line. A small number of flakes were collected from one segment of T6, which is on the east edge of the site.

Three fairly discrete surface tool concentrations along with small amounts of lithic debitage were noted. Two were outside the brush clearing area on shallow, rocky soils with little potential for buried cultural deposits. The main surface artifact concentration was located in the brush-cleared portion of the site near the excavated area, and likely was disturbed by that work. It is not known if, or how, any of the concentrations may have been affected by previous archaeological recordings and partial surface collections.

Four general strata were defined in the excavation area. Stratum 1 is the natural substratum below the thin cultural deposits and the structure. It is a deposit of light tan sandy clays containing a lot of gravels and occasional larger rounded rocks. Stratum 2 is a medium gray/brown silty loam containing light artifacts and sparse charcoal flecks. It overlays Stratum 1 both inside and outside the structure, and is ca. 10–18 cm thick, being thickest inside the structure and forming the cultural level lying directly on the structure floor. Stratum 3 is a dark gray/brown silty loam containing moderate artifacts and more charcoal and ash than Stratum 2. It is up to 22 cm thick, and appears to be primarily a zone of structural collapse and subsequent soils accumulation. Stratum 4 is the upper 5–8 cm of light tan, unconsolidated silts, or essentially the trample zone across the site surface.

Excavation Results

Excavation at Zevon II was initiated when a thin cultural midden was found in T4. T7 was placed 3 meters to the east and parallel to the earlier trench to explore this midden area. Within that trench we found a charred beam resting in the midden deposits, and a metate resting at the bottom of that midden level, at the contact with sterile soils. The deposits seemed to slope slightly downward to the east, so we opened up a three by five meter block area on the east side of the trench. Here we found that the cultural level did indeed get deeper, and that there was an abundance of rock mixed in the deposits. We were able to define the outline of a shallow depression in this block area, with associated subfloor features and other indicators that this was a structure. We also probed to the west, south and north and found the outlines of what was probably a use surface associated with this structure.

Structure

The structure is a moderate-sized circular, but shallow, basin feature located on a flat area in the eastern part of the site (Figures 4 and 5). It measured 4.1 m northwest-southeast by 3.7 m southwest-northeast. Although the northern and southern edges were not fully excavated, the structure is generally circular except that the southeast wall swings farther out away from a

Figure 2. The Zevon II Site looking northeast, Circle Valley in background.

rock alignment following the northeast wall (see below). The cultural fill within and above this feature consisted of an artifact-bearing, dark lightly ash stained silty loam. Lithic debitage, bone, and both unburned and fire-cracked volcanic rock were scattered throughout the fill. Significant bioturbation was evident throughout this fill. Several small segments of burned beams were found, at least one on the floor, with others in the structure fill or just outside the structure.

The structure floor was a maximum of 50 cm below modern ground surface, but only ca. 15 cm deep below the prehistoric ground surface. The floor was unprepared but the somewhat clayey soils into which the floor was constructed appeared moderately use compacted. The floor was pockmarked by rodent burrows and roots, but was not quite as rough as the prehistoric ground surface around it. The floor sloped very gradually up to its western edge, and appeared to do the same toward the north and south sides. However, in the eastern half of the structure there was an abundance of rock in the Stratum 3 fill. After removing the rock debris we located the northeastern wall steeply basining down to the floor. Similarly in the southeastern floor area we found another segment of wall with about the same height and slope as the northeastern wall.

Along the same wall alignment and between the northeastern and southeastern wall segments we found an area of crudely stacked rock 2–3 courses high but still relatively low, at only 10–20 cm above the floor, and ca. 1.5 m long, clearly the remnants of a rock wall set onto or into the prehistoric ground surface along and just outside the floor/wall junction. This rock alignment angled away from the southeast wall nearly a meter farther, suggesting a possible entrance to the structure. A one by one meter

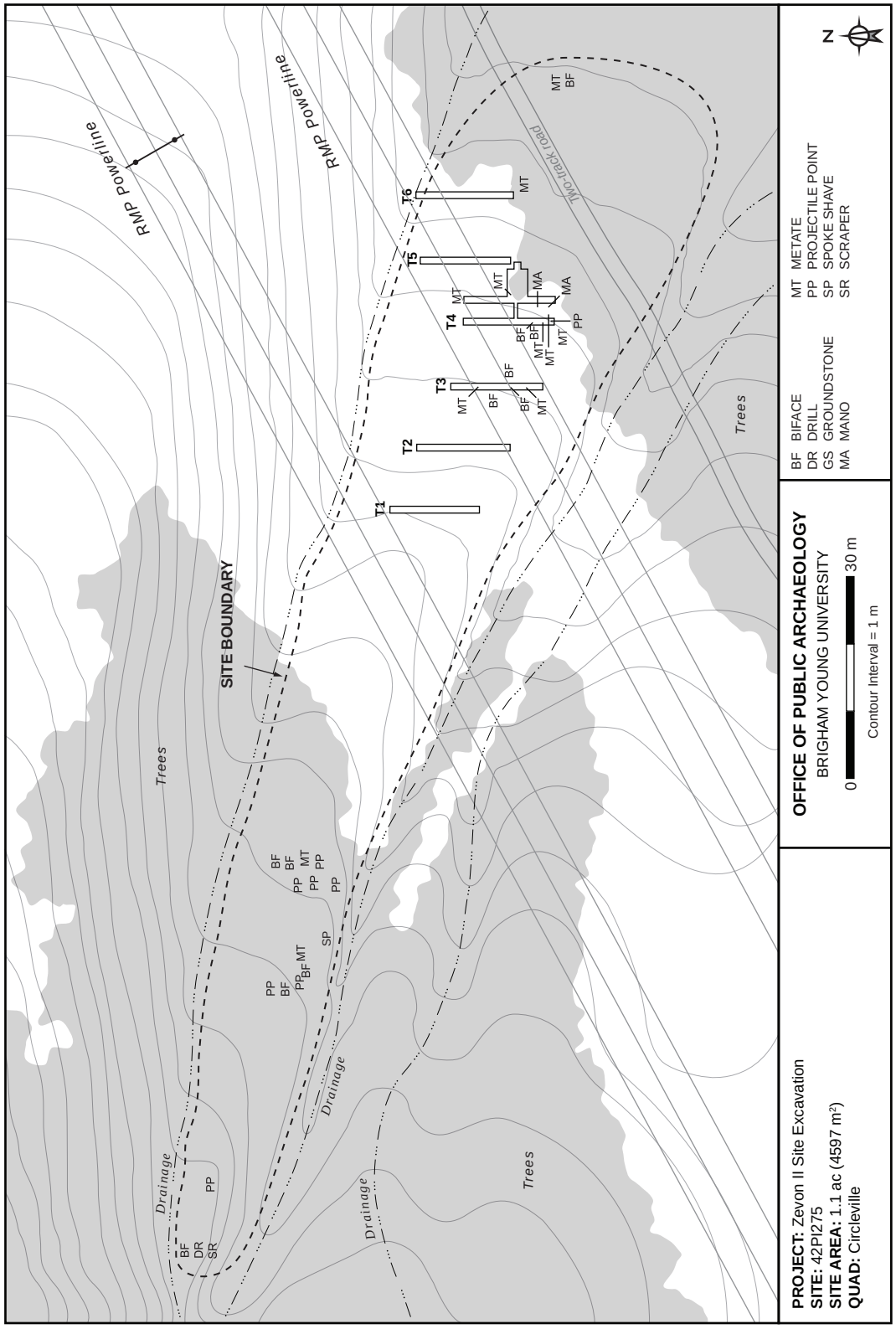

Figure 3. Contour Map of the Zevon II Site (T= Surface collection swath, with shovel width trench placed within the eastern side of each).

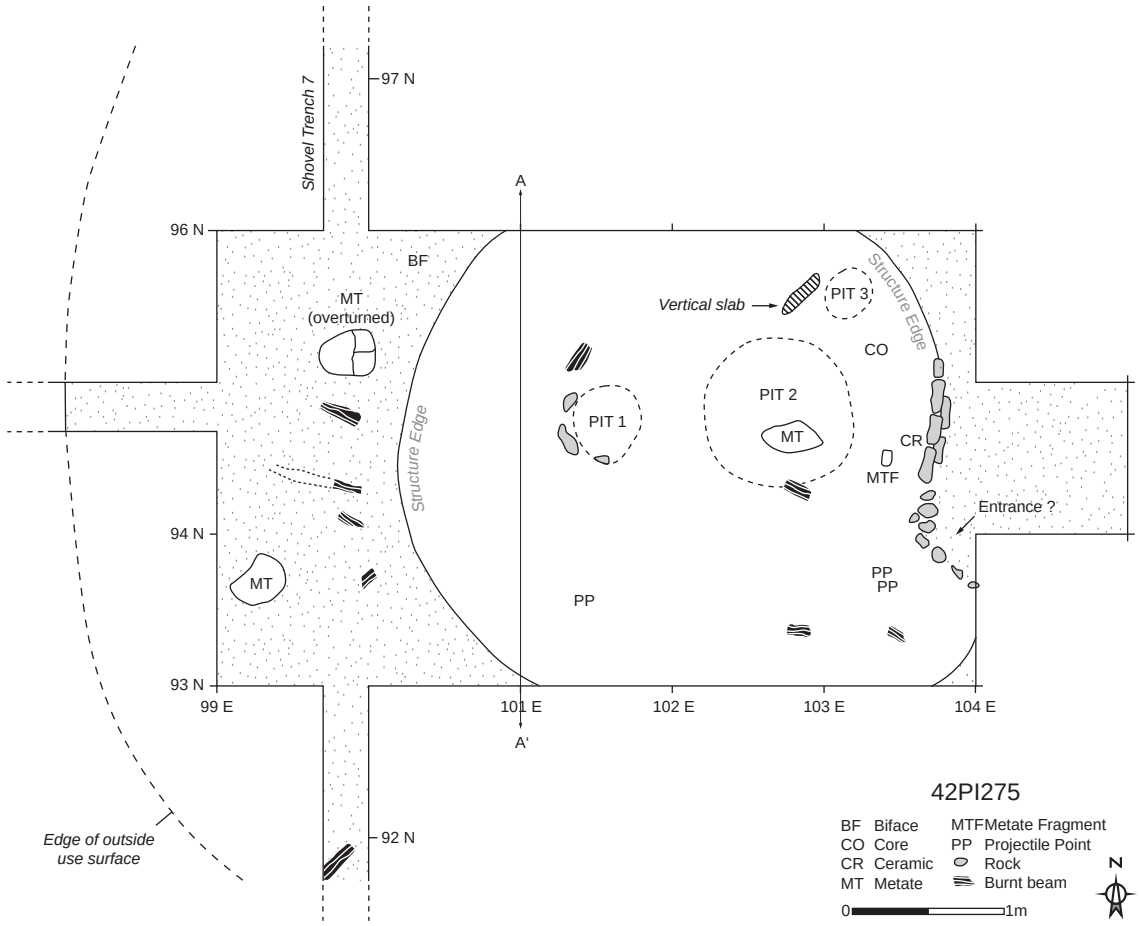

Figure 4. Plan map of the structure at Zevon II site.

excavation unit to the east of the rock wall located additional significant rock fall, which appeared to be on and above the outside use surface. The rocks were the same general size as those in the rock wall, suggesting its collapse outside as well as inside the structure. This rock wall is only on the eastern, down-slope side of the structure.

Artifacts associated with the structure floor included Elko Series projectile point fragments, a small contracting stemmed point, a complete metate and a metate fragment, a hammerstone, a core, and the only ceramic sherd recovered from the site. In addition to the artifacts described above, three features were located on the structure floor:

Pit 1

A circular pit measuring 55 by 45 cm in size was located in the structure floor slightly west of center. It had been dug into the rocky substratum up to ca. 17 cm deep, and numerous rocks protruded from the sides and into the pit. It had a roughly basin profile, though some portions of the wall were more steeply sloping that others. Fill was composed of homogeneous, moderately ash stained and rocky, rodent disturbed sediments which contained an unidentified mammal bone and a heavily burned rib fragment from a large artiodactyl. There was very little charcoal and no significant fire-reddening noted. This was the best preserved of the three subfloor pits.

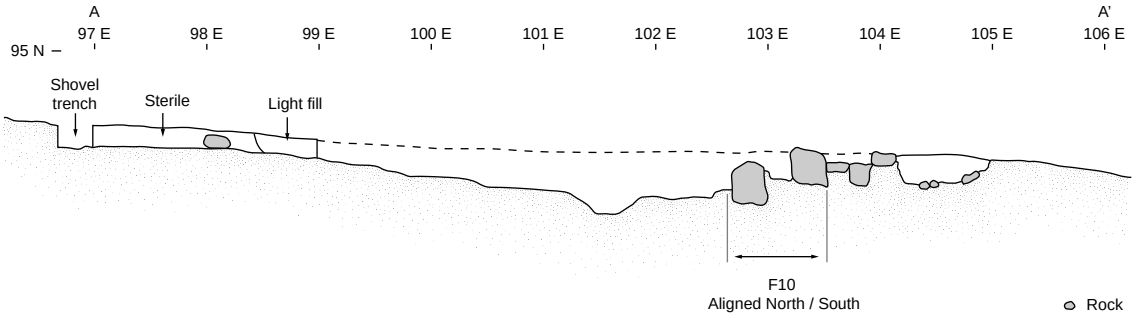

Figure 5. Profile of the structure at Zevon II site.

Pit 2

A large circular pit measuring ca. 98 cm in diameter was found just east of Pit 1. While the outer diameter was defined with confidence, the interior of the feature was very badly churned by rodents, and probably had functioned as a rodent den in the past. Consequently it was impossible to confidently define the true depth and interior construct of this pit. It lacked visible oxidation, charcoal pieces, ash, or dark ash/charcoal-stained sediments.

Pit 3.

The third pit in the structure was small and circular, measuring ca. 35 by 32 cm in size, and 10 cm deep with a basin profile and with a lightly charcoal-stained but otherwise clean sandy fill. It was located just north of Pit 2, and abutted the end of a large vertical slab that appeared to be set into the structure floor. There was, however, considerable rodent disturbance around this slab and within the pit itself, and it was impossible to better define the relationship between the two. No overt pit function was apparent.

The structure is clearly a shelter intended for temporary use. The shallow basin construction gives it a distinct circular boundary, while the small burned beam fragments and burned fill suggest that it had some form of superstructure, with a low rock wall on the east side. At the very least the structure functioned as some sort of ramada or covered work area. More likely, it was a brush structure, with a framework of small diameter poles leaning inward and covered by sage or other light material. There was probably an entrance on the east side, on the south side of the rock wall. Although Pit 2 is larger and more centrally placed, there was no clear indication that it functioned as a hearth, and it is possible that the larger size is due in part to the rodent den and burrowing. Pit 1 is better defined and at least contained some ash-stained soils, and we posit this pit to be the more likely candidate for a structure hearth. However, the lack of significant oxidation might suggest only limited use.

Site Dating

A large mammal (possible elk) bone that was found on the structure floor in good, apparently undisturbed, context was submitted for radiocarbon dating. The sample returned an AMS date of 1580±40 B.P. (Beta-187680). This produces a calibrated 2 Sigma range (Stuiver and Reimer 1993, 2005) of A.D. 404–597, and a 1 Sigma range of A.D. 432–532.

As mentioned, Elko series projectile points were found in the lower fill of the structure. These included an Elko Eared point, an Elko Series basal fragment, and an almost complete contracting stem point. The range of use of Elko series points in the eastern Great Basin continues into the early Formative period (Holmer 1986:101), so their presence at this site is not

unusual. However the projectile points found on the site surface indicate a much longer period of site use. In fact, the range of point styles could be used to argue for general site use beginning in the Early Archaic and continuing into Late Prehistoric times.

Artifact Analysis

Artifact types primarily consisted of chipped stone detritus and tools, as well as ground stone. Other artifact types recovered in small amounts included worked bone, and one ceramic. Several hundred unmodified faunal remains were also recovered. Table 1 summarizes all of the recovered artifacts and their proveniences.

Chipped Stone and Debitage

A total of 692 pieces of lithic material were recovered. Seventy-one chipped stone artifacts were identified as formal tools. Thirty-one tools came from the general site surface and 40 were recovered from the excavation, only five of which were found within the structure. Seven of the chipped stone tools from the site surface, including six projectile points and one drill, were collected previously by other site recorders, but re-examined for this project and are included in the total. Most of the tools are composed of chert or chalcedony with obsidian being the next most common material. A few tools are made from volcanic rock. Quartzite and siltstone are uncommon, accounting for one tool each.

Projectile Points

A total of 24 projectile points or point fragments are represented (Figure 6). Nine were classified as Elko Series, including one Elko Corner-notched, four Elko Side-notched, one Elko Eared, and three general Elko Series point bases. All were made of chert. The Elko Eared point and one of the Elko Series points were recovered on or near the structure floor. Two others were found in the general structure fill and the remaining five points were found on the site surface.

Additional points included a large chert Gypsum point and a possible Pinto Single-shouldered point made from obsidian, both recovered from the site surface, while a smaller siltstone contracting stem point was found near the structure floor. Five Rose Spring Corner-notched points, three chert and two obsidian, were found, with four in general fill in the vicinity of the structure and one on the site surface. A single obsidian Desert Side-notched point had also been previously recovered from the site surface. The remaining six point fragments were made from chert and located on the site surface. These were all clearly dart points but could not be otherwise classified.

Bifaces

Twenty-two chert and obsidian bifaces were identified, including four complete and 18 fragments. One was an early stage, eight were intermediate stage, and 13 were late stage bifaces. Four of the late stage bifaces are possible projectile point tips or midsections. One of the complete bifaces is a large, well-formed lanceolate obsidian biface with a square base. A slight constriction on either side of the blade near the base indicates that it may have been hafted as a knife although there is no evidence of edge grinding. This tool was recovered from the prehistoric ground surface just outside the edge of the structure and was submitted for protein residue analysis but with negative results.

Other Chipped Stone Tools

Four drills were recovered from the site. The only complete specimen was recovered from the site surface in 1985, and is long, thick, and slender with a slightly convex base. The three fragments include one base portion recovered from the surface, a basal portion found in the general structure fill, and a midsection recovered from the structure floor. Additional chipped stone tools include: four scrapers, one recovered from

Table 1. Artifact Types and Provenience from the Zevon II Site

Provenience	Surface	Test Trenches	General Fill	Structure Floor zone/ Structure Floor	Hearth/ Subfloor pits	Total
Chipped Stone						
Projectile point	15	–	6	3	–	24
Biface	11	–	11	–	–	22
Scraper	1	–	3	–	–	4
Drill	2	–	1	1	–	4
Utilized Flakes	1	2	7	–	–	10
Spokeshave	1	–	–	–	–	1
Chopper	–	–	1	–	–	1
Hammerstone	–	–	2	–	1	3
Core	–	–	1	1	–	2
Debitage	–	55	404	152	10	621
Ground Stone						
Metate	10	3	5	2	–	20
Mano	2	–	2	–	–	4
Lapstone	–	–	1	–	–	1
Ceramics	–	–	–	1	–	1
Worked Bone	–	–	3	3	–	6
Unmodified Bone	–	1	319	225	8	553

the site surface in 1985, and the others during the current project; one chopper made from volcanic rock and found in the structure general fill; a single spokeshave found on the surface of the site near the structure; two basalt hammerstones from structure fill and one stream cobble hammerstone from Pit 2 within the structure; two basalt cores, one from the general fill and the other on the structure floor; and 10 utilized flakes.

Debitage

A total of 621 pieces of debitage was recovered from the site. This included 514 (83 percent) chert, 60 (10%) obsidian, 45 (7%) unspecified, and 2 (<1%) quartzite. Flake types include 452 (73%) interior flakes, 30 (5%) bifacial thinning flakes, 9 (1%) primary decortication flakes, 17 (3%) secondary decortication flakes, and 113 (18%) pieces of shatter. The entire assemblage combined for a total flake weight of 1203.5 grams with an average flake weight of 1.9 grams.

The majority of the debitage is composed of micro-flakes (66%). Interior flakes are the dominant flake type and account for 72 percent of the debitage. This coupled with a low average flake weight indicate that lithic reduction at the site was focused on late stage tool manufacture and maintenance. Evidence of early core reduction is present but minimal, as cortical flakes account for only 5 percent of the debitage.

Obsidian Sourcing

Fifteen obsidian flakes were selected from the debitage and submitted for sourcing (Nelson 2004). Nine are from the general Stratum 3 fill

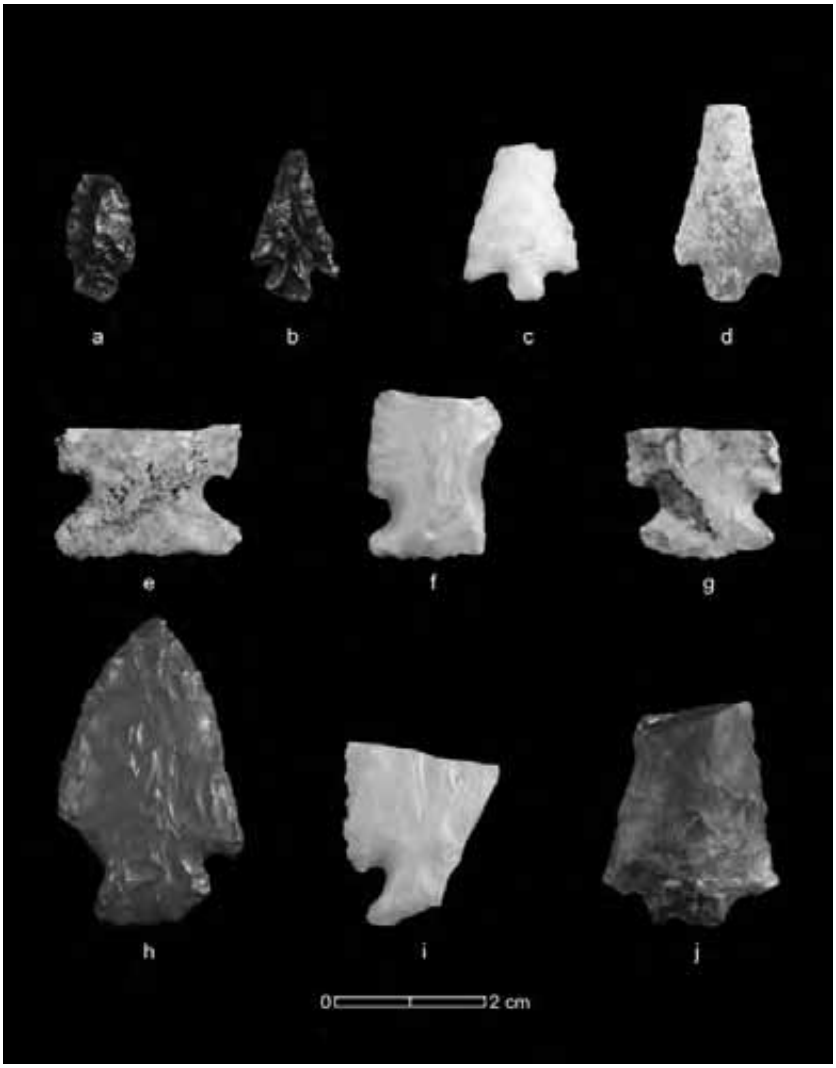

Figure 6. Selected projectile points from Zevon II: a-d) Rose Spring Corner-notched, e-g) Elko Side-notched, h) Elko Eared, j) Gypsum.

and six are from the lower Stratum 2 fill/floor zone of the structure. All are inferred to be debitage from the structural occupation. Three main source locations were identified. Eight flakes (53%) are from the Mineral Mountain Range (seven from Wild Horse Canyon, one from Pumice Hole), five (33%) are from the Modena (Panaca Summit) source, and two (13%) are from the Marysvale source. The Mineral Mountains, Modena/Panaca, and Marysvale sources are all part of the Marysvale volcanic field that covers much of central and southwestern Utah (Rowley et al. 2002)

The Mineral Mountains was a significant obsidian source in the region during the Archaic and Fremont periods (see Janetski 2000:121), and we would expect it to dominate the assemblage. Obsidian from the Modena/Panaca source, on the other hand, is also well represented and yet is some distance from the site—more than three times farther than the Mineral Mountain sources. It is most commonly found in Archaic, Formative, and

Late Prehistoric sites in southwestern Utah, and the fact that it represents one-third of the samples from Zevon II suggests a strong connection with that area.

The Marysvale source was reported by Nelson and Holmes (1979; see also Nelson 1984), from two samples taken near Marysvale, Utah, ca. 20 miles north of Zevon II/Circleville. Both Marysvale and Circleville are on the eastern edge of the Tushar Range. Recently Hughes (2009) reported a Marysvale source for three samples from a site north of Beaver, on the west side of the Tushar Mountains and ca. 20 miles west of the Marysvale source. There and elsewhere across the western slope of the Tushars the obsidian occurs as small nodules, and all three of reported samples were nodules, two culturally modified. The two Zevon II site samples were small flakes, and very likely also came from small, locally obtained nodules. Nelson and Holmes (1979:78) do not include the Marysvale source as part of the "at least five areas that have implement-grade obsidian (Modena, Mineral Mountains, Black Rock Desert, and Topaz Mountain in Utah; and Malad, Idaho)." It appears, then, that with the Marysvale, Zevon/Circleville, and Beaver County samples, the Marysvale source is actually a generalized Tushar Mountains source consisting mostly of smaller nodules that are less likely to be implement grade, at least size-wise and perhaps quality-wise, than the better known Mineral Mountains sources to the west.

Ground Stone

Ground stone is well-represented at this site and includes a total of 25 artifacts. Twelve ground stone artifacts were observed on the site surface and another 13 were recovered during excavation. Surface finds include one complete unshaped boulder metate, six slab metate fragments, two boulder metate fragments, one basin metate fragment, one complete one-handed mano, and one mano fragment. Ground stone artifacts encountered during the testing and excavation phase of the project include four complete metates, six metate fragments, one complete one-handed mano, one mano fragment, and a lapstone. The latter is a small shaped tabular piece of quartzite that exhibits a flat, moderately ground surface that is heavily stained with red hematite. The complete metates are comprised of two boulder metates, one basin metate, and one slab metate. Eighty percent of the ground stone artifacts exhibit moderate to heavy use. Three metates were found in an inverted position suggesting that they were deliberately overturned and left for future use. One was found on the surface of the site, the other two were found in test trenches. One of the subsurface metates was located just outside the edge of the western edge of the structure, the other two were 3 to 5 m southwest of the western edge of the structure. The near lack of manos at the site could reflect seasonal mobility, with the metates left at the site while the manos were carried or cached away.

Ceramics

A single small sherd was recovered from the lower structure fill. It is a decorated rim fragment from a small or miniature seed jar that probably had an aperture of 10 cm or less (Figure 7). The sherd is just less than 5 mm thick and has a thin rounded lip. The exterior surface is only lightly smoothed, if at all. Decoration consists of two diagonal parallel lines composed of tiny circular punctations that begin at or near the lip and extend diagonally across the body of the sherd, gradually becoming somewhat larger and farther apart. They vary in size from about 1 mm to 1.5 mm and are separated by a space of about the same size. The sherd core consists of a crumbly oxidized yellowish red (5YR 5/6) paste that is tempered with unsorted dark and light rock fragments and fine frosted grains.

The sherd does not appear to be part of the Fremont gray ware pottery tradition and various technological, chronological, and morphological aspects of it suggest that it corresponds to the widespread yet scattered production of early brown and gray/brown wares on the Colorado Plateau produced between A.D. 200 and 600 (Skibo and Blinman 1999:183; Reed 2000). Few

early brown or gray/brown ware sherds have been reported for the Fremont region and they include both quartz and rock tempered sherds found at sites in Capitol Reef National Park (Janetski et al. 2005), the Bull Creek sites (Phil Geib, personal communication 1997), and the Escalante Valley area (Jordan and Talbot 2002).

Worked Bone

Six bones collected from subsurface excavation show evidence of working beyond that associated with butchering. One is a complete tubular bead found in the general fill, made from a jackrabbit long bone and measuring 12 by 6 mm, with polished, cut and smoothed ends. A piece of bead residue found in the structure floor zone is made from a jackrabbit tibia fragment with one end cut for bead construction, and measures 21 by 6 mm. A third worked bone, found in the general fill, is a polished and fire-hardened rectangular flat bone fragment from a large mammal that has been cut on two ends, one of those ends beveled and smoothed. Numerous diagonal abrasions are present on both faces. It measures 34 by 16 by 3 mm.

Two canid long bones found in the structure floor zone were sawed around their circumference and snapped off, leaving the proximal ends and a short section of the shaft. One is a portion of a tibia and the other is part of a radius. Finally, one fragile bone fragment found in the general fill consists of a long large mammal shaft splinter with several lengthwise striations.

Unmodified Vertebrate Faunal Remains

The site's faunal assemblage consists of 553 bone fragments with all but two identified as mammal. The majority of the faunal assemblage is too fragmentary to identify and only about 6 percent of the assemblage was identifiable to the species level. Of the mammal remains identified, 11 taxonomic categories are represented. Identified taxa include different species of artiodactyls, carnivores, small mammals, and unidentified bird.

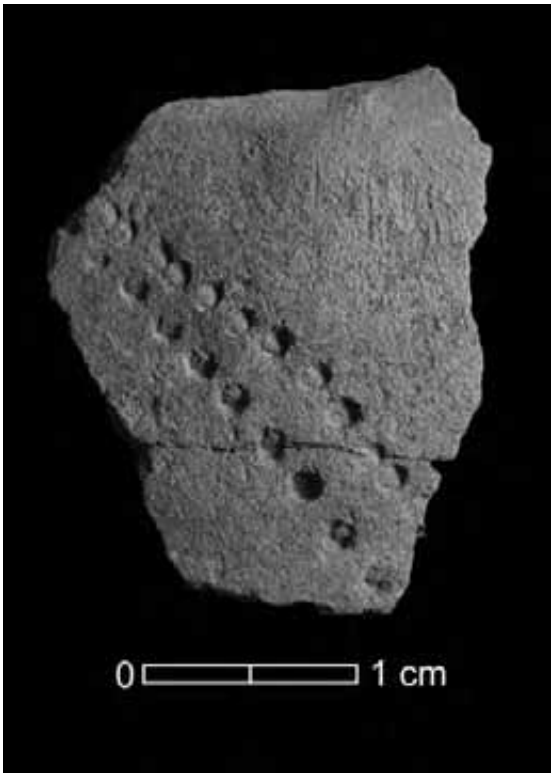

Figure 7. Early brown ware sherd from the structure at Zevon II.

At least nine different species of mammals are represented in the faunal assemblage, which accounts for 5.7 percent of the total NISP. Rabbits are the most common identified species and account for 2.7 percent of the faunal assemblage. Both jackrabbit and cottontail are represented. Artiodactyl remains comprise 2.1 percent of the total assemblage. Only one bone fragment was identified as large artiodactyl which is probably elk (the bone that was radiocarbon dated) while the smaller artiodactyl bones are either mule deer or mountain sheep. Rodent bones comprise 1.4 percent of the assemblage with kangaroo rat, gopher, and rock squirrel being represented. Carnivore remains comprise 0.9 percent of the total assemblage and include both coyote/dog and badger.

The vast majority of the faunal assemblage is unidentifiable mammal bone (92 percent of the total) of which 32 percent could be categorized

according to size class (large, medium, and small). Large mammal bones are the most abundant size category and comprise 24 percent of the unidentified mammal remains. These are followed by small mammal bone (7%) and medium mammal (1%).

A high degree of bone fragmentation is present and indicative of intensive processing, which includes breaking up the bone for marrow extraction and stewing/cooking. Evidence of butchering is limited, as only two specimens exhibit cut marks. One is an unidentifiable burned mammal long bone that has a series of small cut marks. The other is a medium mammal skull fragment that has two cut marks as well as some gnaw marks in the same general area. The first is from the structure; the second is from the fill above the structure.

Evidence of burning was apparent on 41 percent (n=229) of the bone. About 47 percent of the bone from the structure is burned compared to 37 percent for the general fill. It is difficult to determine how much of the bone was burned as a result of cultural processes related to processing and consumption, and how much was associated with post-depositional processes (there was no distinctive ash or charcoal deposit in the structure to indicate an intense conflagration).

Human Remains

Human remains found at the site included four teeth, including two incisors, a canine, and a premolar. All were within the structure. One was lying on the structure floor, one was just slightly above the floor (floor zone), and two were a little bit higher in the general fill but still within ca. 20 cm of the floor). All are permanent teeth exhibiting moderate to heavy wear. These are summarized in Table 2.

The sample 181 canine appears to be from an older individual (>30 years), while the remaining three teeth are from younger individuals (late teens-20s). Samples 176 and 247 appear to both be left lower first incisors, with differing degrees of wear and coloration, suggesting two individuals are represented. Sample 121 exhibits moderate wear similar to sample 176, but a light coloration similar to sample 247. Finally, association through provenience is unlikely to have much relevance to these samples, given the extensive bioturbation present throughout the structure. If we assume there is no significant impact, we might conclude that samples 181 and 176 (both with dark coloration) are the most likely to be directly associated with the structure occupation, while samples 121 and 247 might have been deposited post-occupational, or perhaps are wash-in from outside deposits.

In sum, there appear to be at least three individuals represented, and possibly four. Samples 176, 247 and 181 appear to be discrete persons. Sample 121 could be the same individual as either Sample 176 or 247, or a fourth distinct individual.

Stable Carbon Isotope Analysis

Stable isotope analysis was performed on enamel from the four human teeth described above by Jackie Rabb (2005) of the University of Utah under the direction of Joan Coltrain. Sampling focused only on intact enamel. It should be emphasized that there is a much higher fractionation between diet and tooth enamel than between diet and bone collagen (Joan Coltrain, personal communication 2005), so the $\delta^{13}C$ values appear different. A caveat to the isotope values is a reminder that tooth enamel forms during the juvenile years (for example, enamel on incisors forms between about 6 months and 4 years of age, and does not turn over thereafter). The measured ratios therefore reflect juvenile diets, and not the final adult diet.

The isotope values confirm that at least two individuals are represented (Table 3). Measured isotope values from three of the teeth (samples 121, 176 and 247) are indicative of individual(s) with a diet comprised of about 35–45 percent maize. The fourth tooth (sample 181) was significantly different, and is from an individual with a diet comprised of less than 10 percent maize. Rabb

Table 2. Human Teeth found in the Structure at the Zevon II Site

Sample	Type	Age	Comments	Provenience
FS121	Lower right second Premolar	Young adult	Moderate wear, light coloration	General Fill 94N 103 E (east side of structure) Depth: 40–50 cmbd
FS176	Left lower first Incisor	Young adult	Moderate wear, dark coloration	Floor Zone 94N 101E (west side of structure) Depth: 50–60 cmbd
FS247	Left lower first Incisor	Young adult	Heavy wear, light coloration	General Fill 94N 101E (west side of structure) Depth:40–50 cmbd
FS181	Right lower canine	Old adult	Heavy wear, dark coloration	Floor 95N 101E (west side of structure) Depth: 60–63 cmbd

Table 3. Stable Isotope Analysis of Human Enamel from 42PI275 (from Rabb 2005)

Sample	$\delta^{13}C$	$\delta^{18}O$	$\%C_4$ in diet
FS121	-5.2	-8.1	~35–45
FS176	-5.6*	-7.0*	~35–45
FS247	-6.2	-6.6	~35–45
	(avg -5.7 SD 0.5)	(avg -7.2 SD 0.8)	
FS181	-10.2	-1.6	<10

*Data for FS176 are the average of two samples

(2005) interprets sample 181 as an outlier with interpretation of the analysis as follows: "if we again take into consideration the fact that enamel retains a juvenile dietary signal, FS 181 appears to have been born in a different geotemporal context from individual(s) represented by the other teeth from site 42PI275."

Pollen, Macrobotanical, Phytolith and Starch Analyses

Several macrofloral and pollen samples were taken from the structure floor, from one of the subfloor pits, and from the outside use surface, while additional pollen washes were taken from a metate inside and a metate outside the structure. These were submitted to Paleo Research, Inc. for analysis (Cummings et al. 2004). The results are consistent with the general pinyon-juniper environment, which includes not only those woodland remains, but also Gambel oak, sagebrush, and various smaller plants. The Circle Valley environment below the site is primarily sage with a riparian component along the Sevier River. Identified charcoal indicates that both juniper and pine were burned for fuel, or used in the structure construction. The pollen and/or macrofloral remains indicate possible use or processing of numerous plants, with goosefoot and possibly other Cheno-ams and ricegrass probably the most common. The processing of

other grasses, members of the umbel and mint families, and possibly cattail and some fleshy fruit, berry, or succulent plants are also indicated by the analyses.

Analysis for recovery of phytoliths and starches was carried out on the tooth calculus from two of the human teeth (FS 121 and FS247) found in the structure fill. The results suggest the individual(s) ate or at least chewed on *Typha* (cattail), probably the roots. A legume pod, possibly a cultivated bean pod or perhaps a native pod such as vetch, gray, or licorice was also eaten. Interestingly, a few human hair fragments were also recovered from the calculus of FS 121, which was interpreted as probably related to grooming.

Discussion

Zevon II, located in the pinyon-juniper zone overlooking Circle Valley, contains surface evidence for occupations in the Archaic, Formative and Late Prehistoric periods. However, subsurface excavation located only an early Formative occupation, and it was on this use that most of the field work was focused. The radiocarbon date from the pit structure indicates occupation sometime between A.D. 400–600, but we use A.D. 500 as a convenient reference date.

Site Function/Season of Use

Structure function and season of use are addressed to some degree by the available data. Site elevation and setting argues against winter use, but given the context of the pinyon-juniper zone, a fall occupation during the pinyon harvest would be a logical assumption. Architecture consists of a ca. 3.5 meter diameter structure of moderate investment, having been roofed by a pole superstructure, with an expedient rock wall and apparent entrance on the east side, and a possible interior hearth. While shelter and interior heating could imply occupation during the cooler months, occupation anytime between spring and fall could be argued, especially given the site setting at an elevation of 6,660 feet and on the lower slope of a high mountain (which typically has a heavy snow cover in the winter). In an area stretching outward about two meters away from the structure the prehistoric ground surface is flattened and trampled, suggesting at least moderate use. As neither of the two choices for an interior hearth (Pits 1 and 2) exhibit more than circumstantial evidence for burning, we might posit that interior heating was not a critical function, and that outside hearths would have been used for most processing/cooking functions. This interpretation supports a warm season occupation.

The chipped stone and debitage remains are suggestive of a short to moderate length structure use. Lithic reduction appears to have been focused on late stage tool manufacture and maintenance. Minimal early core reduction is evidenced. Tools in and around the structure include numerous projectile points, bifaces, drills, scrapers, hammerstones, and a chopper. This diverse tool kit also included a number of well-utilized metates and a couple of manos. Overall the lithic and ground stone data suggest both hunting and plant processing as primary economic activities at the site.

Several pollen and macrobotanical samples were submitted for analysis, including two metate washes. These indicate that a number of wild plants may have been processed. Most prominently exhibited were goosefoot and ricegrass. Other plants that may have been used by the structure inhabitants include a member of the umbel family, a member of the mint family, other grasses including little barley grass or wild rye, other Cheno-ams, cattail, and possibly a fleshy fruit or berry resource or a succulent plant. The botanical samples do not necessarily narrow down the season of site use. Ricegrass, which was relatively abundant in the samples, is a cool season plant most likely obtained in the early summer. Cheno-Ams are available from late summer through fall. The rest of the plant remains also occur within this spring to fall time span.

A large amount of bone was recovered from the excavation area, but most was small, very fragmented, and suggestive of intensive processing. The sample was dominated by unidentified mammal bone, but almost two-thirds (64%) of the identifiable bone was large mammal. Approximately 41 percent of the recovered bone was burned, and small fragments of burned bone were also recovered from the macrofloral and pollen samples. The faunal remains reveal little about season of occupation. There were no deer skulls/antlers in the faunal assemblage. There were a few artiodactyl mandibles and maxillae, but none with adequate characteristics to indicate seasonality. Neither were there any egg shells found.

Together with the phytolith and stable carbon isotope analyses (see below), these data all lend support to the hypothesis that the occupants used the site as a base camp for both hunting and plant gathering/processing. Occupation could have been anytime between spring and fall, but the plant remains and the lack of a heavily used structure interior hearth suggest an early summer to early fall occupation as the most likely period of use.

Early Formative Lifeways

Three very limited data sets offer further potentially significant insights into early Formative lifeways. First, the finding of a single early brown ware ceramic is intriguing because it appears to be part of the pan-southwestern tradition of expedient pottery production during the transitional period between Basketmaker II and III and prior to regional differentiation and the development of Anasazi gray wares (Phil Geib, personal communication 2008; Skibo and Blinman 1999; Wilson and Blinman 1993). Petrographic analysis of the paste and temper inclusions could help determine whether it is part of a vessel that was brought to the site or was locally produced, but in any case, the sherd offers direct evidence of the introduction of early Anasazi pottery (and technology?) into the southern Fremont area ca. A.D. 500.

Second, the site dates to a period when both the atlatl and bow and arrow were in use. Points near the structure floor included an Elko Eared point and general Elko Series points, along with an interesting small siltstone contracting stem point. Rose Spring Corner-notched points were also found in the general structure fill.

Finally, the site residents were quite mobile in their obtaining of non-local obsidians, or had connections to sustain trade for such. Over half of the sourced obsidian sample came from the Mineral Mountains source to the west, and one third came from the very distant Panaca Summit source to the southwest. A small amount of obsidian, probably opportunistic use of smaller nodules, was obtained locally from the slopes of the Tushar Mountains.

Diet and Adaptive Variability

Lines of evidence discussed above suggest 1) an early Formative period context, ca. A.D. 500; 2) transitional indicators of early ceramics and concurrent atlatl and bow and arrow use; 3) the exploitation of both close (Marysvale and Mineral Mountains) as well as long-distance (Panaca Summit) obsidian sources, the former more reasonably seen as direct access and the latter more likely to be from trade; 4) a local context suggesting warm season focus on uplands plant and animal resources but with close proximity to, and probable use of, plentiful lowland water and plant/animal resources; and 5) a regional context suggesting that farming had been the principal dietary strategy for some people in the area as much as 500 years prior to this site's occupation (ca. A.D. 1 at the Elsinore site; see Previous Research, above).

Given these lines of evidence, it seemed alternatively possible that the site occupants were either Fremont farmers whose logistical strategy involved accessing the higher elevations for animal and/or plant resources, or hunter-gatherers using those same resources and who were co-resident with the farmers or perhaps passing through the area as part of a seasonal round. We found no evidence for maize at the

site, and even if there had been, one could argue that the maize might have been secondarily obtained, such as through trade. Therefore our hope was that direct analysis of human remains might be possible. This opportunity presented itself with the finding of four human teeth in the structure. Two of those teeth, including an incisor and a premolar, were submitted to Paleo Research, Inc. for phytolith and starch analyses. That study showed both cattail (probably the roots) and a legume pod were being chewed, but whether the legume was a cultivated bean pod or a native plant was not revealed.

All four teeth were then were submitted for stable carbon isotope analysis. The results in some ways raise as many questions as they answers. It appears that during their juvenile years (by about age 4) two and possibly three of the site occupants/visitors (represented by three of the four teeth submitted) had a diet of around 35–45 percent maize. Another site occupant/visitor (represented by the fourth tooth), had a juvenile diet that included only a minor amount of maize (<10 percent). Alternatively one or more of these individuals (e.g., perhaps the teeth in the general fill) may post-date the site occupation. While budget constraints precluded dating each of the four teeth at this time, the samples are available for future analysis.

For discussion purposes, we here assume that the teeth are representative of a contemporaneous population (which we believe is the most likely scenario). We cannot, unfortunately, speak to the adult diet of those individuals. It is very possible that juvenile and adult diets for this particular sample were completely different. *If*, however, we further assume either that the juvenile diet of those individuals mirrored that of their parents, or that the juvenile diet remained the same into adulthood for these individuals, we can speculate about the 2–3 juvenile maize eaters (or their parents). A diet of 35–45 percent maize is not representative of committed horticulturalists, even at this early date. At best it represents a "mixed" diet similar to those Coltrain and Stafford (1999; also Coltrain and Leavitt 2002) report for many of the burials in the Great Salt Lake wetlands (see Simms 1999). One possible explanation for this mixed diet is that 2–3 individuals were "switching" strategies, at a time when social constraints were sufficiently lax to allow that adaptive option to occur (see Madsen and Simms 1998). Barlow's (2002) model might imply that these individuals were using maize agriculture as a secondary or fall-back strategy. These models assume a casualness to maize production such that one strategy can be employed one year, and another the next. Neither model is testable with the current data, and neither fully accounts for the sociocultural complexities associated with maize production and with alternating risk management and risk buffering strategies.

Equally explanatory to this situation, and probably more defendable, are options that center around hunter-gatherer strategies aimed at gaining the accoutrements of farming, most particularly maize and other domesticates. Some of those options might be mutually beneficial, such as established trade relationships, with exchange that includes maize. Others might be very adversarial, such as raiding farmers' fields or stores, or possibly more violent encounters. Again, unfortunately, these models are not testable with the current data.

The lone individual with little or no maize in his/her diet raises additional questions. The discrepancy suggests that as a juvenile he/she was not part of the same social group as the others; if he/she was, then the dietary discrepancy would need to be explained. The significantly different oxygen isotope number further suggests that he/she was raised in a different location that the other individuals (Joan Coltrain personal communication 2005), joining the maize diet social group sometime after permanent tooth enamel formation. Perhaps this individual was only a visitor to, but never an integral part of, that social group. We know that mixed diet individuals apparently coexisted with full-time foragers in the GSL wetlands, and in close proximity to full-time farmers, so in that sense the Zevon II population

might actually be modeled as a microcosm of these types of intergroup social and economic relationships, though much earlier than most of the GSL wetlands sample population.

Summary

Documentation work, including mapping, testing, and limited excavation at the Zevon II site demonstrates seasonal camping episodes by Archaic, Formative, and Late Prehistoric groups in the eastern foothills of Circleville Mountain. Archaic and Late Prehistoric hunter-gatherers probably visited the site area repeatedly but their visits were brief, leaving no recognizable features (though we do not doubt that their camp features such as hearths did, and very possibly still do, exist at the site). Alternatively, Formative or Late Prehistoric period people may have collected some of the earlier points and transported them to the site.

Formative occupation dating to ca. A.D. 500 is evident at Zevon II in the form of diagnostic artifacts, and an intriguing and apparently seasonally used structure and associated use surface. The structure occupants apparently consisted of a mixed gender task group (possibly a nuclear or extended family) that included at least three and possibly four individuals. Those occupants were hunting large game in particular but a variety of animals of all sizes. They were also collecting and processing wild plants such as Cheno-ams, ricegrass, berries and others. The phytolith analysis indicates at least one individual was consuming cattail and probably legumes from the nearby valley (the site is within 5 km of the Sevier River). In addition, stable carbon isotope studies indicate that two or three of the site occupants had a mixed diet that included maize for a portion (35–45 percent) of their juvenile diets, while another did not. The structure residents were obtaining obsidian from a variety of sources including to the west, southwest and locally. They also were using some pottery.

The Zevon II site was a surprise, with buried deposits in what appeared on the surface to be nothing more than a large lithic and ground stone scatter. Indeed the site has revealed information on a particularly intriguing time period not well understood in Utah prehistory, when the earliest ceramics began to be manufactured, and when farming was beginning to dominate subsistence strategies. This site, on the other hand, appears to represent a social group of economically mixed origins, whose primarily focus was on hunting and gathering, and who may have lived peripheral to the farming strategy. In this socially complex situation a myriad of options might be postulated for how this small, intriguing socioeconomic group came to be, how and why early pottery is showing up, and how diverse and some quite distant obsidian sources were being used. More importantly, the site is representative of small temporary sites in similar contexts that too often are underestimated for their research potential, and which deserve much closer attention and protection. ■

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The Prison Site: Evidence for Late Archaic Housepits in the Salt Lake Valley

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The Antiquities Section of the Utah Division of State History conducted data recovery excavations in 2007 at 42SL186, an Archaic-age archaeological site in the south end of the Salt Lake Valley. The excavation and analyses for the site, commonly known as the Prison Site, were centered on the acquisition of data related to chronology, subsistence, seasonality, and mobility of the prehistoric inhabitants of the Salt Lake Valley. These excavations resulted in the discovery of three buried cultural features (two habitation structures and a roasting pit), a possible activity area, and the recovery of nearly 30,000 prehistoric artifacts. Radiocarbon estimates and diagnostic artifacts indicate occupations that began sometime before 3000 years ago and continued to roughly 1600 years ago.

Archaeological Site 42SL186 (the Prison Site) is a large prehistoricv site located adjacent to the Jordan River in the southern end of the Salt Lake Valley, near the Utah State Prison (Figures 1 and 2). It covers an area roughly 80 acres in size and contains Archaic and Fremont components. The Fremont components, however, consist only of a few artifacts (<0.04 percent of the total assemblage) from the surface or the top 15 centimeters of soil and are comprised of seven (7) grayware sherds and three (3) projectile points (see Yentsch et al. 2008). During 2006 and 2007, the Antiquities Section of the Utah Division of State History conducted limited testing and data recovery at the Prison Site. This work included backhoe testing and the excavation of 59 square meters from five block excavation areas (Yentsch et al. 2008). Fortunately for preservation and research efforts, the site is within an area designated by the Utah Legislature as critical open space.

The site was initially discovered and recorded in 1991 during a cultural resources survey prior to the construction of the Bangerter Highway (Polk et al. 1994). It was identified as a large prehistoric lithic scatter and camp site comprised of lithic flakes and a few pieces of groundstone covering an area of roughly 100,875 square meters (807 meters north-to-south, 125 meters east-to-west). Sub-surface testing was conducted in 1993 which included three 1-meter by 1-meter excavation units and five backhoe trenches. This testing revealed subsurface cultural deposits of up to a meter in depth, as well as a buried cultural feature. Carbon-stained sediment recovered from this feature was radiocarbon dated to 3040 B.P., making it one of the earliest dated sites in the Salt Lake Valley. The alignment of the Bangerter Highway was re-routed to avoid any adverse impacts to the site or to the wetlands below.

During subsequent construction along the Bangerter Highway in 1998, excavated waste materials were deposited on the southern third of the site, adversely affecting the site. A cooperative agreement between the Utah Department of Transportation (UDOT) and the Antiquities Section of the Utah Division of State History was reached in 1999 in which several state agencies involved in the management of the site provided funding for the Antiquities Section to conduct data recovery and to establish a venue for providing public information about the Prison Site.

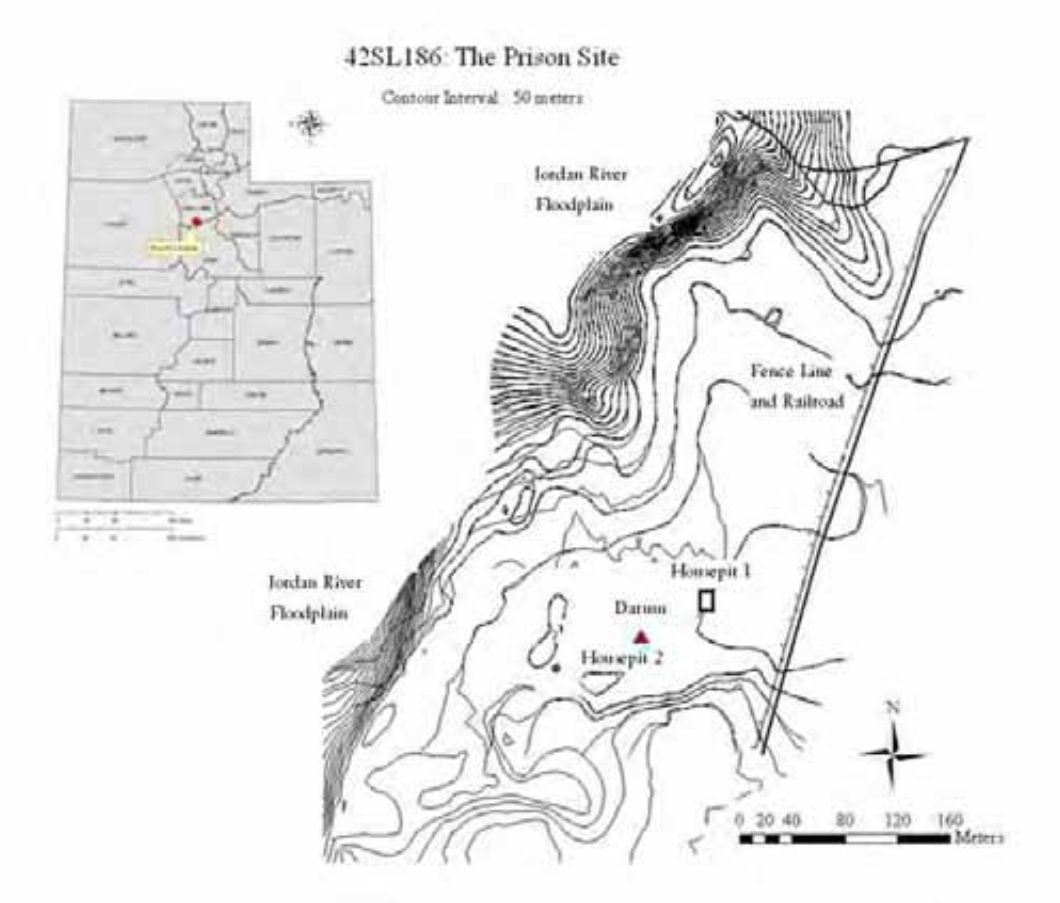

Figure 1. General Site Location and Site Map of Housepit 1 and Housepit 2 Locations.

The data recovery project at 42SL186 was designed to accomplish a number of goals, centered on the acquisition of data related to chronology, subsistence and settlement patterning, seasonality and mobility, site structure and function. An additional goal of the project involved public outreach and education to increase local knowledge of the region's rich archaeological heritage, as well as to increase public awareness of the prehistory of the area. Thirty-seven university-level archaeology students (University of Utah, B.Y.U., the University of Arizona), local avocational archaeologists (Utah Statewide Archaeological Society), high school students (East High School and Woods Cross High School), and professional archaeologists from other state agencies volunteered to assist with this project. An Archaeological Field School comprised of twelve 4th and 5th graders from local schools also took place on the site in early June.

The data recovery project at 42SL186 resulted in the discovery of three buried cultural features dating to the Archaic Period, a possible activity area, and the recovery of nearly 30,000 lithic, ceramic, and bone artifacts. Non-portable cultural features encountered during the course of investigations at 42SL186 were the remains of two structures or housepits, a localized use-area surface, and the remains of a probable roasting pit (see Yentsch *et al*. 2008). This paper focuses on data relevant to the two structures.

Figure 2. Site overview of 42SL186. View is to the southeast.

Archaic Housepits

In their most general form, Archaic dwellings can be described as semi-subterranean features, with no prepared floor, roughly round or oval in plan view and roughly basin-shaped in profile. Fill within the features tends to be stained dark from charcoal and with very few exceptions contains a high frequency of cultural materials. Most dwellings are small and shallow, averaging less than 4.0 meters in diameter and 60 centimeters in depth (Larsen 1997). Evidence of superstructures or postholes is not frequent, and when they are observed they lack clear patterning (Smith 2003; Larsen 1997; Thompson *et al*. 1996; Stiger 2001; Steward 1941, 1943; Simpson 1876; Dutcher 1893).

Frequently observed are internal fire hearths. These hearths are rather simple, not often with a prepared surface, consisting mainly of a charcoal-stained basin containing large amounts of fire-cracked rock. Large quantities of animal bone are also common, from both internal and external features. Most of this bone is highly fragmented, presumably from intensive processing for marrow extraction. Also frequently recovered are bone tools, awls presumably for sewing, and ornaments of stone, bone beads, and drilled shells (Larsen 1997).

The variation in Archaic dwellings has been explained as reflecting a relationship between the energy invested and the expected amount of time spent in one locality (Larsen 1997; Smith 2003; Thompson *et al.* 1996). Thompson *et al*. (1996) describe three classifications of dwellings as a result of time invested in the structure as well as the density and variety of cultural remains and

associated features. The first class, "Temporary Shelter", is in essence just a temporary sun and wind break, made of brush or wood. This has the least time investment and as a result has the least density of cultural remains. The next class, "Housepit", requires a greater time investment. While it may not have a prepared surface, Housepits are basin-shaped, shallow and oval in plan view. Internal and external features are often present, occurring with a higher frequency of cultural material. A Housepit may also be brush covered, but the materials and construction are made for the longer term. The final classification is "Pithouse." According to Thompson *et al*. (1996) a Pithouse consists of a more circular, deep basin. Interior features, such as storage pits, and other architectural features are important classifiers, as is the presence of middens, as they indicate a longer occupation.

Descriptions of shelters from the ethnographic record include those used by the "Panamint Indians" (Southern Paiute) of the Inyo area of California. They are described as being small, circular structures eight to ten feet in diameter, with enough room to accommodate one family. The walls were merely the broken branches of pinyon, as well as small bushes, piled up into loose rows two or three feet thick, and just as high. The circle was broken where entrance was needed. They seemed primarily to function as privacy and windbreaks for the occupants. A fire hearth was located in the center of the structure, and the floor was smooth, clear of debris, and carpeted by a layer of thick, fine, gray dust (Dutcher 1893). Fireplaces within these structures were not intentionally dug, but a slight pit was left from repeated cleaning (Steward 1943). Similar descriptions of shelters and houses are provided by Simpson (1876) for Gosiute structures near Deep Creek, Utah. Willow, sagebrush, and cattail were used in the construction of these structures, often used as temporary shelters (Steward 1943; Simpson 1876). All of these materials are found in the vicinity of the Prison Site.

In Utah, Archaic age housepits exist but they are rare. Outside of Utah, Archaic housepits are well documented and many (perhaps hundreds) dating throughout the Archaic have been excavated in Wyoming, Idaho and Colorado (see Larson 1997, Smith 2003, Metcalf and Black 1991, Plew 2000). Archaic housepits in Utah have been discovered (see Janetski *et al*. 1985, Talbot and Richens 1993, Louthan 1990, Richens *et al*. 1997, Tipps 1988, Lupo and Wintch 1998, Allison 2002) but only a few structures or possible structures are described. Janetski *et al*. (1991) describe features they call house basins from within Aspen Shelter, and Shroedl and Coulam (1994) describe four "pit structures" from Cowboy Cave that date to the early Archaic. Backer and Pfertsh (2003) describe a well defined basin house from the Cisco Inferno Site (42GR1548). This structure is very similar in age to Housepit 1 at the Prison Site, and dates to roughly 2500 B.P. Sampling error likely accounts for the low number of Archaic structures in Utah, but recognition is also an important factor to consider. Archaic housepits can be very difficult to see, and in fact, the structures at the Prison Site were best defined after the backhoe trenches were left open for several days. The record clearly demonstrates open-air Archaic houses are present in Utah, so archaeologists must consider and anticipate their presence during project scoping and planning.

Housepit 1 (Feature 25)

The first structural feature identified at 42SL186 (Housepit 1) was interpreted as a dwelling unit on the basis of size, shape, fairly well-marked floor, and a centrally located basin-shaped hearth, as well as by the recovery of various implements from the floor and fill. During backhoe exploration for buried cultural features, a roughly basin-shaped carbon-stained layer of sediment was discovered in one of the trenches. This stain was visible in the profiles of both trench walls at a depth of 49 centimeters below present ground surface (cm bpgs). The stain measured 3.54 meters in length, had a maximum thickness (depth of fill) of 21 centimeters, and contained numerous pieces of lithic debitage,

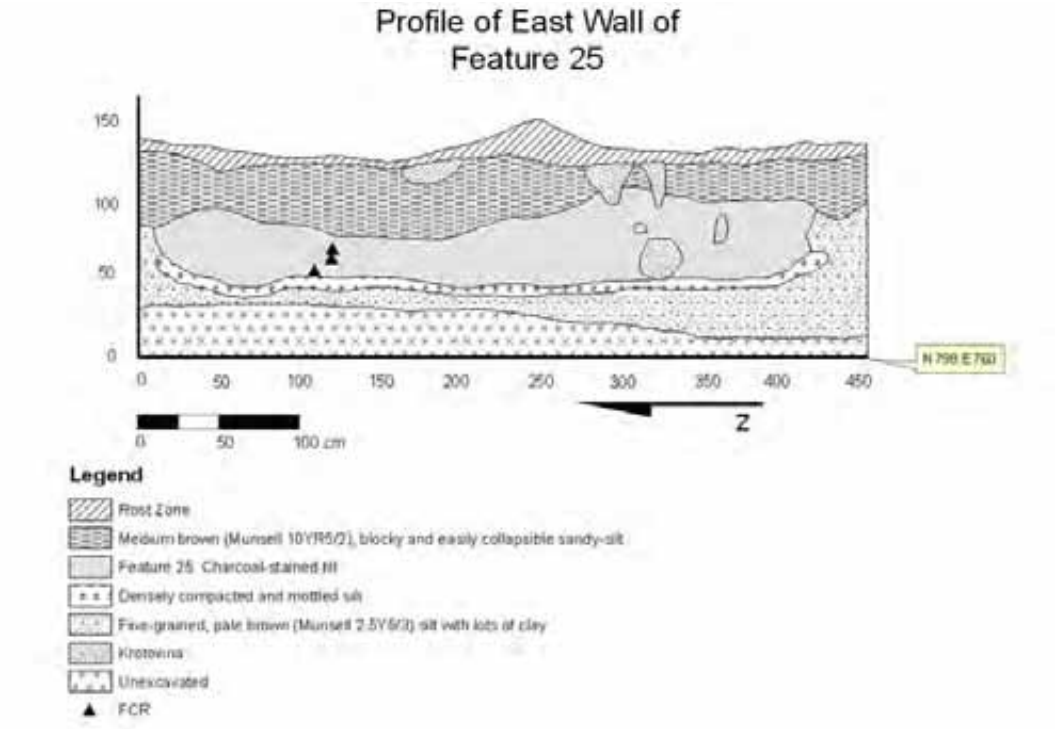

Figure 3. Profile of Housepit 1 as exposed in backhoe trench.

groundstone fragments, and fire-cracked rock that were protruding out of the exposed surface (Figure 3).

Excavation revealed a roughly elliptical, basin-shaped depression associated with the layer of stained sediment (Figures 4, 5, 6). The feature measured 4.5 meters north-to-south and 3.9 meters east-to-west. This structure was cut into a layer of fine-grained, pale brown sandy-silt by its prehistoric occupants, the level of origin being between 40–50 cm bpgs. The fill sediment was considerably darker in color than that surrounding the feature. The entire fill was removed, revealing a highly compacted floor approximately 55–65 cm bpgs that was not visible in profile. The floor was very hard, somewhat structured, and pocked with insect cases containing fill of both lighter and darker color, giving the sediment a mottled appearance. Three bulk samples (Beta- 235165, 235166, 235167) were obtained from the floor/fill interface of this feature and returned Late Archaic dates of 2320±40 B.P., 2410±40 B.P., and 2450±40 B.P. respectively.

During the removal of the fill, several concentrations of fire-cracked rock and bone were encountered at the floor contact (Figure 7). Four such features were identified within the structure and one of these is likely a centralized hearth (Figure 8). It was a fairly simple, expediently-constructed feature immediately on the occupation surface, consisting of an amorphous, roughly circular area of charcoal-stained sediment. This stain was basin-shaped in profile, with no apparent modification of the ground surface (no intentionally excavated pit or rock lining). This feature measured 83 centimeters in length, was 72 centimeters wide, and had a maximum depth of 6 centimeters. Three bulk sediment samples were obtained from this feature for radiometric analysis (Beta- 235168, 235169, 235170), as

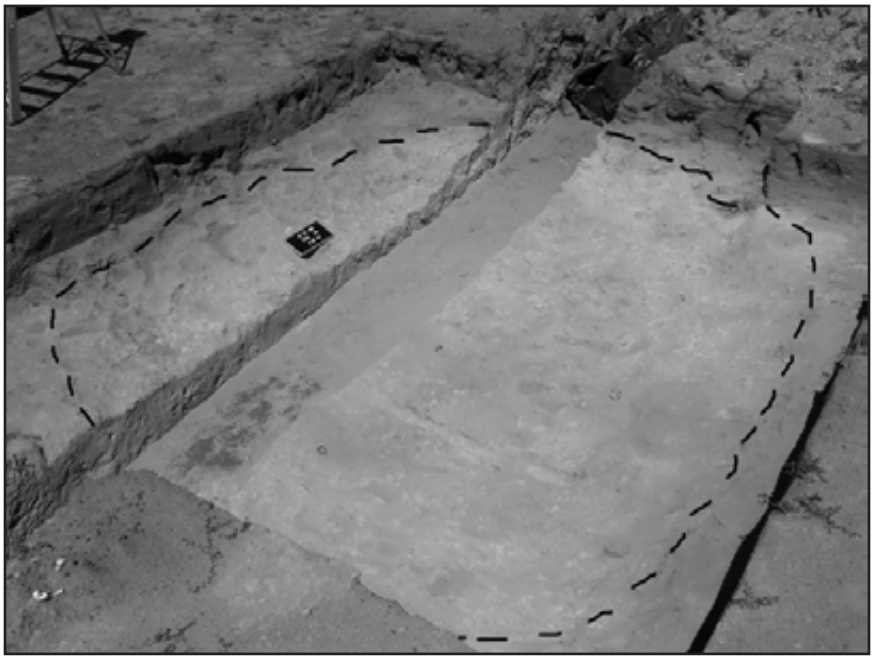

Figure 4. Housepit 1 post excavation. Black lines mark the extent of the housepit.

well as one bulk sample for flotation analysis. Radiocarbon analysis returned dates of 2330±40, 2360±40, and 2280±40 B.P. respectively. Five pieces of lithic debitage and one piece of faunal bone were recovered during the excavation of the hearth feature.

Evidence from excavation suggests that this feature was a habitation structure. The shallow, basin-shape, along with the presence of a central fire hearth, and artifacts on the floor (Figures 9, 10) support this conclusion. The size and shape of the basin are consistent with both the excavated remains of house structures and those described in the ethnographic, ethnohistoric and archaeological record (Larson 1997; Smith 2003; Stiger 2001; Simpson 1876; Dutcher 1893; Steward 1941, 1943).

Profiles show an irregular and uneven, shallow-sloping floor. Cross-section views across the long axis of the feature show that the slope of the floor is fairly consistent, although the basin-shaped slope is more gradual on the eastern side of the structure. This may be the result, however, of the point through which the backhoe trench truncates the structure. No definite break was observed around the perimeter of the basin that would indicate a door or entryway. Such access features are noted in both the archaeological (Shields 1980) and historic/ethnohistoric literature (Simpson 1876; Dutcher 1893). There is the possibility, however, that any type of entrance (if present) may have been destroyed during excavation of the trench by the backhoe. No pits or other internal features that could be interpreted as storage facilities were identified. No post molds were found within or immediately adjacent to the feature, therefore it is not possible to make any statements about a possible superstructure. There is no evidence to suggest that the structure had burned. The calibrated dates obtained from six bulk sediment samples strongly cluster around an age of 2340 B.P., suggesting a temporal placement for this structure to the Archaic.

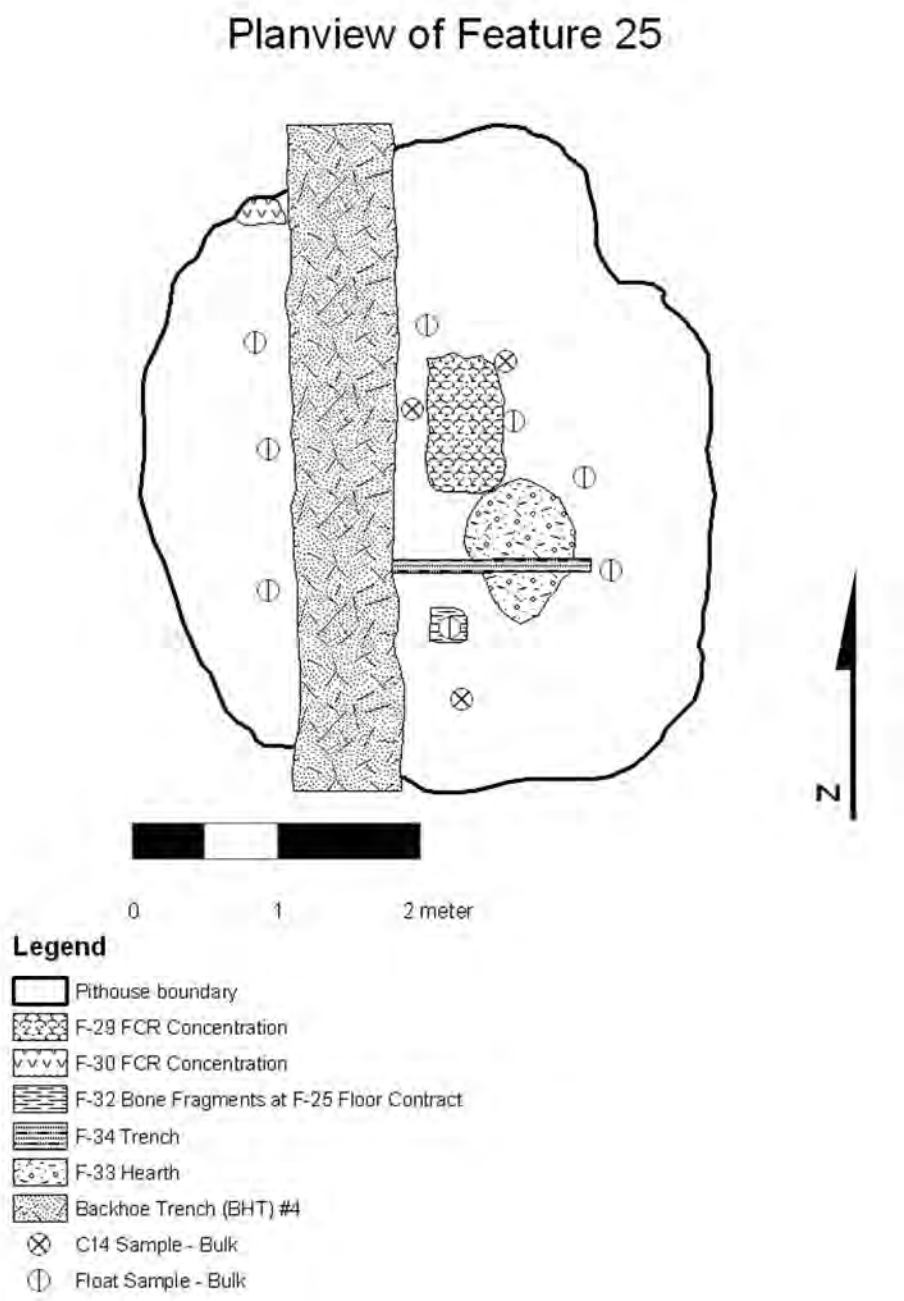

Figure 5. Plan view of Housepit 1 showing backhoe trench and interior features.

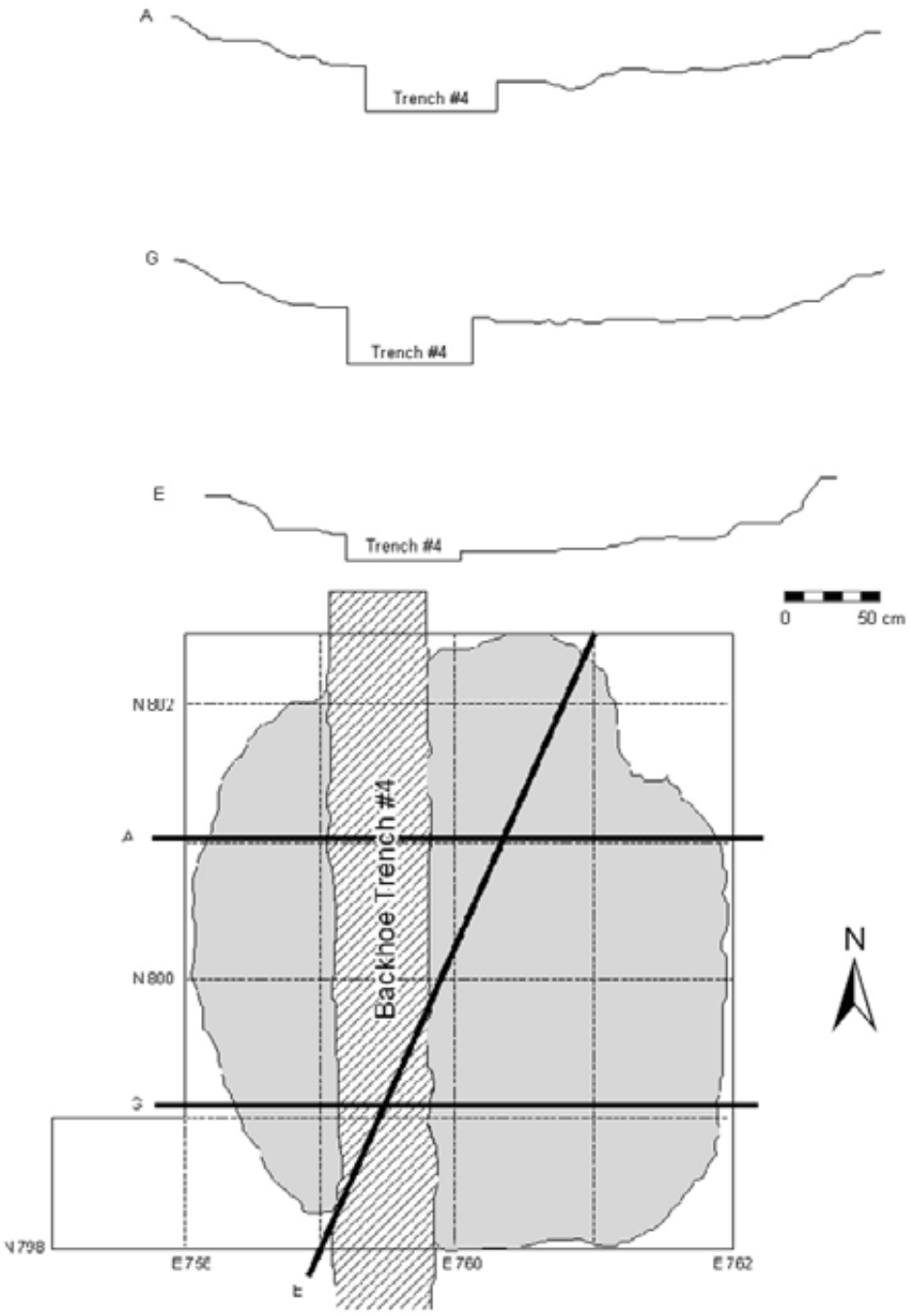

Figure 6. Plan view and profiles of Housepit 1.

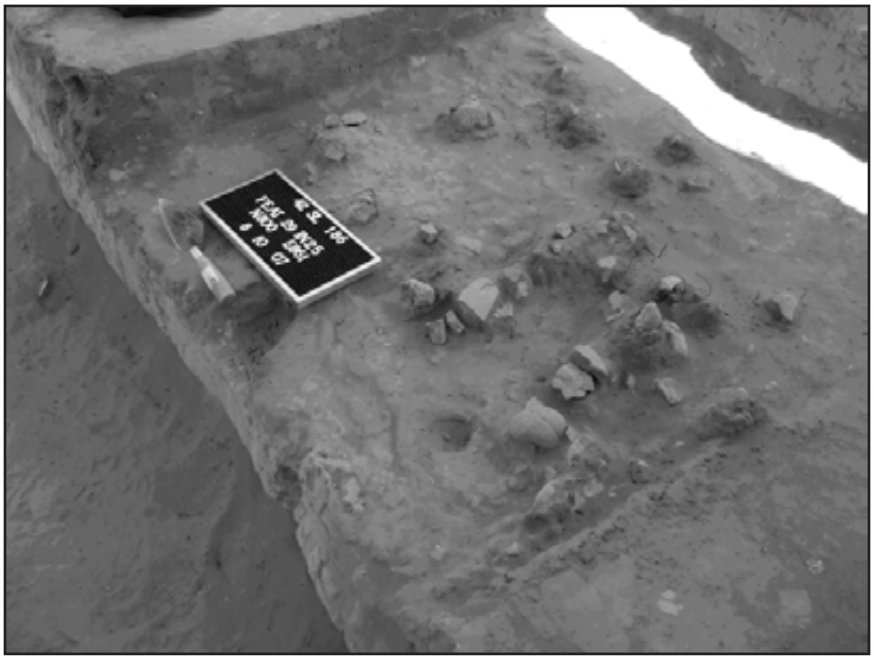

Figure 7. Fire-cracked rock concentration (Feat. 29) within Housepit 1 (Feat. 25).

Figure 8. Central hearth area in Housepit 1 marked with dashed line.

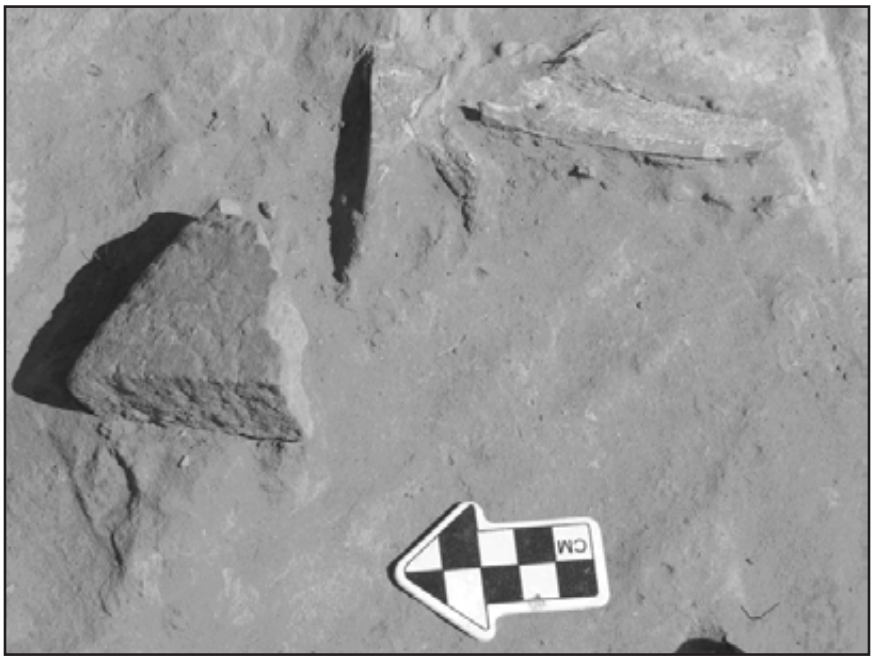

Figure 9. Groundstone and fragmented animal bone on the floor of Housepit 1.

Artifacts

Housepit 1 produced numerous artifacts from both the fill and the floor contact (n=5,333). Artifacts included flaked stone tools (n=7), lithic debitage (n= 844), groundstone (n= 1), one stone bead, FCR (n= 1,855), bone tools (n= 3), and faunal remains (n= 2,622), the majority of which were heavily processed and fragmented. One large corner-notched biface, likely a knife, was recovered from the floor contact (Figure 10).

Identified faunal remains from Housepit 1 include no real surprises in that mule deer, jackrabbit, cottontail rabbit, bighorn sheep, an unknown snake (vertebra only), a vole mandible and one canid tooth fragment were identified. What is lacking from this assemblage is very interesting and worthy of additional consideration. First, there is a lack of fish bone from this site and given the proximity of the site to the Jordan River, this is interesting because we know that fish were intensively procured from the Jordan River further south during the late prehistoric period (see Janetski and Smith 2007). Second, given the current population of pocket gophers and ground squirrels on the site, the lack of intrusive rodent bone from this feature is interesting, and a topic for some additional research.

Faunal material on the floor contact of Housepit 1 is primarily highly fragmented mammal bone and much of the bone is burned/calcined. Just over 2,600 bone fragments were recovered from the floor contact and the distribution of this bone is shown in Figure 11. The small size of the bone fragments, the concentration of bone fragments and the association of bone fragments with fire-cracked rock features suggests rather intensive bone processing within the structure. More detailed faunal analyses are ongoing.

Housepit 2 (Feature 26)

Located approximately 130-meters to the south-southeast of Housepit 1 is another possible structure. Although only exposed and sampled from the backhoe trench, the consistency of

Figure 10. Corner-notched biface on the floor contact of Housepit 1.

the fill and the general size is very similar to Housepit 1. Housepit 2 (Feature 26) was discovered during backhoe trenching across the site and consists of dark gray carbon-stained sediment that was visible in the profiles of both trench walls at a depth of 81 cm bpgs (Figure 12). The stain measured 3.95 meters in length, had a maximum depth of fill of 21 centimeters, and numerous pieces of lithic debitage and fire-cracked rock (FCR) were protruding out of the exposed surface. A complete quartzite metate and a mano fragment were revealed in a test trench at roughly 50 cm bpgs, approximately a meter-and-a-half away from this feature during excavation.

This feature was sampled in order to extract samples for chronological analyses. Two bulk sediment samples were obtained from the western portion of the stain as exposed in the profile of the north trench wall. These samples (Beta- 235171 and 235172) returned dates of 2000±50 B.P. and 1720±40 B.P. respectively. While this feature was only minimally tested during this project, it does hold potential for future research, as it lies in close proximity to two other buried cultural features: a very dense artifact concentration consisting of chipped stone at the same stratigraphic level as Housepit 2, and the hearth feature tested in 1993 (Polk *et al*. 1994).

Radiocarbon (AMS) Dates

Radiocarbon dates from our work at 42SL186 are presented in Table 1. One date (Beta-69460) was recovered in 1993 (Polk *et al.* 1993) from a feature near Housepit 2. Our dates are all AMS dates on organic sediments recovered from fill and floor contexts in the housepits

Multiple dates on Housepit 1 from the floor and from the hearth indicate an occupation(s) between 2720 and 2300 years B.P. Housepit 2 appears to be somewhat younger, and the roasting pit excavated by Sagebrush Consultants and re-exposed in 2007 represents the oldest dated feature on the site.

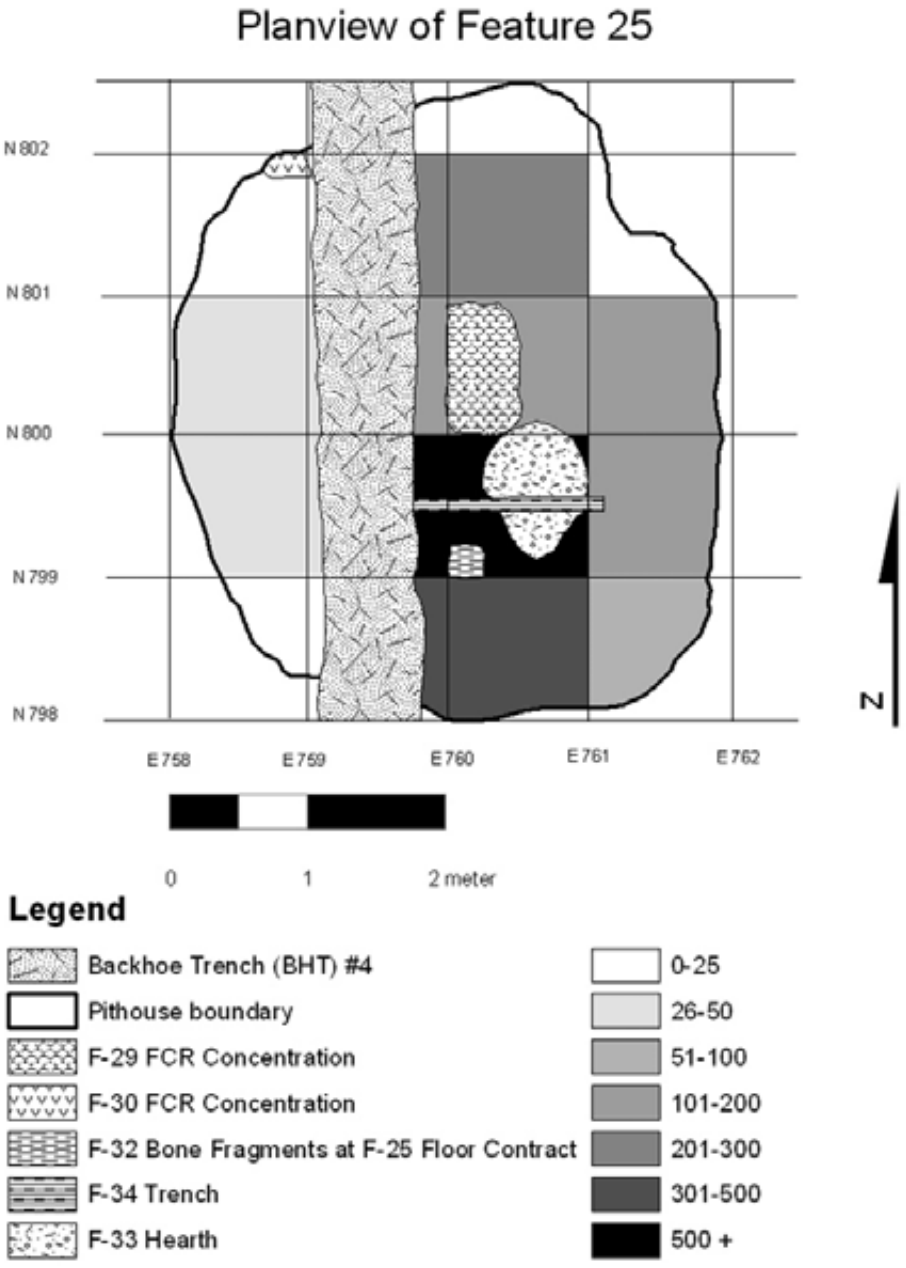

Figure 11. Distribution of animal bone in Housepit 1.

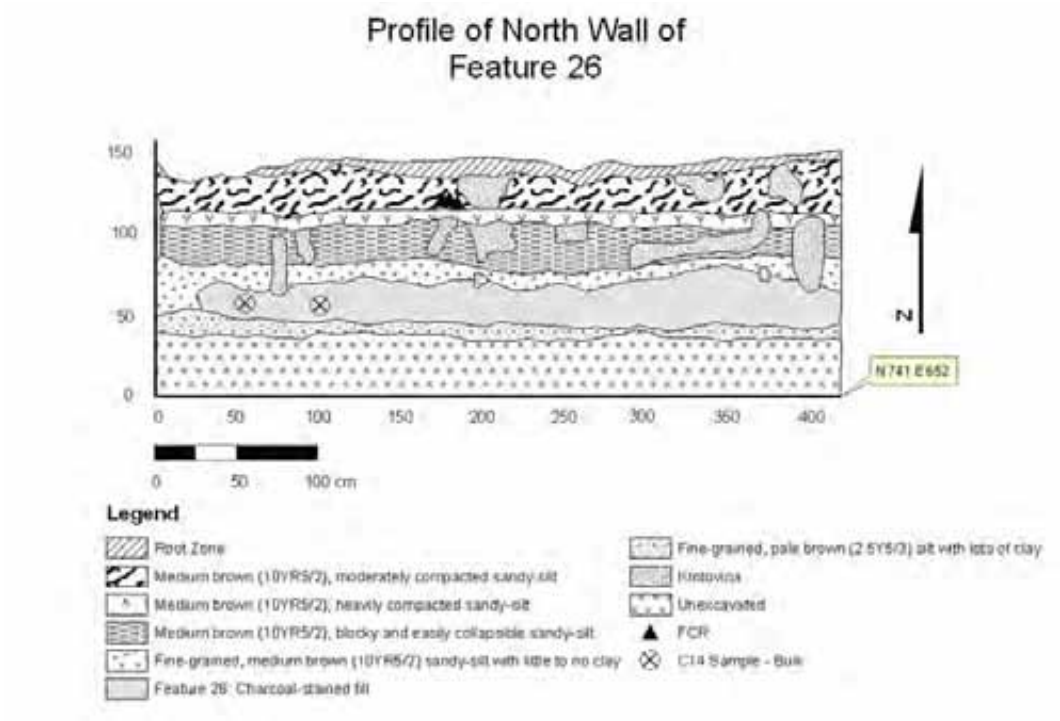

Figure 12. Housepit 2 exposed in north wall of backhoe trench.

Summary

Archaeological site 42SL186 represents an extensive open air Archaic site covering 80 acres above the Jordan River in Salt Lake County. The Archaic component includes housepit features and specialized activity areas associated with food procurement and processing. Activities occurring on-site included the processing of medium and small-sized mammals for food, as well as vegetal materials that were most likely obtained from the wetlands below. The recovery of numerous groundstone implements and immense volume of FCR indicate a significant task undertaken at this site was the processing of food resources. Ongoing macrobotanical, starch and pollen analyses have the potential to contribute significant details to food procurement and processing strategies during the Archaic, as well as allowing us to address questions related to subsistence and seasonality more thoroughly. The projectile points, bifaces, and amount of lithic detritus observed during survey and excavation at 42SL186 represents utilization of this site over time that included the maintenance and repair of hunting tools, as inferred from the artifacts. The identification of two structures indicates rather intensive, possibly seasonal occupations (cf. Kent 1992).

The large amount of highly fragmented and burned animal bone and the association of a shallow hearth feature and fire-cracked rock from the interior of Housepit 1 suggest bone processing was an activity conducted within the excavated house. The fragmentation of some very low-utility bone (namely mule deer phalanges) may indicate some degree of food stress or insecurity, leading to questions about the seasonality of occupation being during either the winter or early spring when food stores may be depleted (Rood 1991).

Table 1. Radiocarbon Dates

Sample Number	^{14}C Age Conventional	2 Sigma Range (Cal) B.P.	Context
Beta- 235165	2320±40 BP	2360 to 2310	Housepit 1
Beta- 235166	2410±40 BP	2610 to 2590	Housepit 1
Beta- 235167	2450±40 BP	2720 to 2350	Housepit 1
Beta- 235168	2330±40 BP	2360 to 2320	Housepit 1 Hearth*
Beta- 235169	2360±40 BP	2470 to 2330	Housepit 1 Hearth
Beta- 235170	2280±40 BP	2350 to 2300	Housepit 1 Hearth
Beta- 235171	2000±50 BP	2100 to 2090	Housepit 2
Beta- 235172	1720±40 BP	1720 to 1540	Housepit 2
Beta- 236619	2910±40 BP	3210 to 2940	Roasting Pit
**Beta-69460	3040±80 BP		Roasting Pit

* This is the central hearth feature within Feature 25

** Sample Beta-69460 obtained by Sagebrush Consultants in 1993. Beta-236610 is our date on the same feature.

Archaic archaeological sites in the Salt Lake Valley are rare (Allison 2002; also see Aikens and Madsen 1986 for review of the Eastern Great Basin); however, two similar sites (open sites in dune settings) of roughly contemporary ages have been reported in the Salt Lake Valley (Madsen 1976), but no housepits or other habitation features are reported. Archaeological site 42SL186 will add valuable data in a region in which most research on Archaic habitation areas tends to be focused on large caves and shelters.

The open nature of 42SL186, and the presence of a prehistoric structure (probably two) in the Salt Lake Valley, regardless of age, is a significant discovery in itself. Archaic sites with structural evidence are a rare but exciting avenue for continued research. Sites having the potential to produce Archaic houses may be ephemeral on the surface (e.g. Metcalf and Black 1991), or dense scatters of debris as in the case of the Prison Site. Archaic structures can be difficult to distinguish in the archaeological record but as we discover more of them, we'll be able to better address the more interesting questions about human use of the region for the 5,000 plus years we call the Archaic. ■

Acknowledgements: Test excavations at the Prison Site could not have been done without the efforts of so many volunteers who helped with the excavations. Thank you all for your hard work! Thank you Lindsay Fenner for all of your hard work throughout the course of this project. We would especially like to thank Kevin Jones and Joel Janetski for helpful comments on this paper, as well as two anonymous reviewers who provided insightful comments. Special thanks to the Utah Office of Forestry Fire and State Lands and the Utah Department of Transportation. Any errors are our own.

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Book Reviews

Chaco's Northern Prodigies: Salmon, Aztec, and the Ascendancy of the Middle San Juan After A.D. 1100. **PAUL REED**. 2008. The University of Utah Press, Salt Lake City, UT. 442 pages, 117 illustrations. $55.00 (coth). ISBN 978-0-8748092-5-1

Review by Matthew A. Peeples
Arizona State University

The chapters in this edited volume stem from the Salmon Working Conference, organized by Paul Reed, in Farmington, New Mexico in April of 2004. This conference was developed as part of a multi-year research collaboration known as The Salmon Project, initiated by the Center for Desert Archaeology and the Salmon Ruins Museum in 2001. This collaborative project has already led to the publication of a detailed, three-volume technical report, *Thirty-Five Years of Archaeological Research at Salmon Ruins, New Mexico*, also edited by Paul Reed (2006). *Chaco's Northern Prodigies* is meant to provide a more synthetic view of the project and its goals, as well as to position the research within the broader context of research on the Chacoan and post-Chacoan periods across the northern Southwest and beyond. In order to accomplish this goal, this volume includes chapters by many members of the Salmon Project team as well as a number of other scholars with expertise across the Southwest.

As the sub-title suggests, a majority of the chapters focus on the archaeology of Salmon, Aztec, and the Middle San Juan, particularly in northwestern New Mexico. Many of the authors note that, despite the importance of the Middle San Juan region in the Chacoan and post-Chacoan periods, this area has largely been peripheral to synthetic discussions of the Chaco world. This neglect is likely due to the fact that the Middle San Juan region lies between the intensively studied Mesa Verde region to the north and impressive Great Houses of Chaco Canyon to the south. The chapters in this volume outline the unique trajectory of the Middle San Juan and make a strong case for the more complete inclusion of this region into our picture of the Southwest as a whole.

Aztec and Salmon, initially constructed in the last decades of the 11th and first decades of the 12th centuries, are two of the largest Chacoan Great Houses outside of Chaco Canyon. The construction of these Great Houses in the Middle San Juan region likely represented a major northward shift in Chacoan power at this time as Chaco Canyon proper apparently waned. Importantly, a number of chapters in the current volume present data which suggest that Salmon and Aztec were *continuously* occupied (or used) from their construction in the last decades of the Chacoan era (ca. A.D. 1090–1130), and well into the period typically thought of as the post-Chacoan

era (up until the last quarter of the 13th century). This picture differs somewhat from earlier interpretations that implied the immigration of new social groups, presumably "Mesa Verdean," between the Chacoan and post-Chacoan periods. Although the authors differ on the specifics, this reevaluation has major implications for both the chronology of the Middle San Juan region as well as the important role that this region likely played in the Southwest after the decline of Chaco's political influence.

The volume consists of 20 chapters focusing on a wide range of topics and working from a variety of theoretical perspectives. More than half of the chapters present the results of analyses focused on material culture and settlement patterns at Salmon, Aztec, and the Middle San Juan region. This includes overviews of recent archaeological survey and excavations in the Middle San Juan as well as detailed studies of architecture, construction methods, ceramics, perishable materials, plant and animal remains, human remains, and human parasite pathoecology at Salmon, Aztec, and other Chacoan Great Houses. These studies highlight a number of interesting similarities and differences between Chacoan and post-Chacoan subsistence, health, resource use, and technology as well as contrasts between small and Great Houses in the Middle San Juan. Many of these chapters present data that also appear in the 2006 technical report from The Salmon Project. Those who are interested in very detailed descriptions and raw data relating to these studies will need to consult the technical report. For those who are interested in a concise and general treatment of the results of The Salmon Project, this synthetic volume fits the bill nicely.

Although not always explicitly, many of the material culture studies in this volume evaluate issues relating to social identity and cultural affiliation through considerations of technological style (i.e., specific technological choices among functional equivalents defined by social contexts). Several of these studies work under the general theoretical perspective that similarities in technological aspects of style provide evidence of shared social learning patterns, and presumably cultural identity. For example, Lori Stephens Reed identifies two technologically defined ceramic traditions (Northern San Juan and Cibola) that were both produced locally in the Middle San Juan region. Importantly, Reed's data suggest that local varieties of Cibola pottery, associated with the Chacoan region, appear *prior* to the construction of Salmon and Aztec. This has major implications for interpretations of the timing of proposed migrations of Chaco-Cibola people into the region. Further, Windes and Bacha compare architectural wood use at Salmon to and other Chacoan Great Houses and argue that the initial construction of this structure would have required detailed technological knowledge of Chacoan planning and construction methods, implying the presence of "Chacoan" skilled workers. As they argue, later constructions at Salmon more likely reflect the work of "locals." Beyond this, Laurie Webster's comparison of fiber perishable materials from Aztec, Salmon, and Chaco Canyon Great Houses suggests strong similarities in technological practices between the inhabitants of the Middle San Juan Great Houses and those in Chaco Canyon which may indicate cultural connections. Together, these studies provide an intriguing perspective on the cultural relationships among the populations of the Middle San Juan, the inhabitants of the Great Houses, and Chaco Canyon proper. These studies suggest the great potential of technological characterizations for untangling the complex social relationships across a northern Puebloan landscape that was certainly multi-cultural. A more synthetic treatment of the technological findings presented in this volume and similar considerations at outlier communities in other parts of the Southwest would undoubtedly produce novel and important insights into the social and political organization of the Chaco world.

The remaining chapters in the volume consist primarily of synthetic perspectives on the relationships between Aztec, Salmon, the rest

of the Pueblo world, and beyond. As Paul Reed notes in his introductory chapter, there is by no means a consensus among the authors on many important issues relating to the archaeology of the Middle San Juan region or the Chaco world. The differences in opinion among researchers become particularly apparent in these synthetic chapters. For example, authors vary drastically in their assessments of the affiliation of those who established the Middle San Juan and other Great Houses. Washburn sees evidence, in her symmetry analyses of certain vessel forms from Chacoan Great Houses, of Mesoamerican derived populations, possibly arriving via the Hohokam region. Irwin-Williams, Paul Reed, Toll, Cameron, Van Dyke, and others see the origins of the Great Houses in the greater Puebloan region, but they differ in their interpretations of the historical roles that populations from the Chaco, Mesa Verde, and the Middle San Juan regions might have played in these developments. Major differences are also evident in interpretations of the residential or non-residential use of Great Houses. Paul Reed and Gwinn Vivian argue for the need to reconsider the view of Great Houses as exclusively ritual and primarily non-residential during the Chacoan era. Other authors, in particular Toll, disagree with the residential interpretation of Salmon and other Great Houses based on alternate interpretations of features, architecture, burials, and trash deposits. The lack of consensus in this volume, however, is a strength rather than a weakness in that these disagreements highlight important topics that are ripe for future research.

Overall, this volume provides a concise summary of the work completed by The Salmon Project, a historical perspective on research in the Middle San Juan region, and many new and interesting perspectives on the Chacoan and post-Chacoan periods across the Southwest and beyond. For Chacoan and post-Chacoan specialists, this volume provides a variety of essential data, perspectives, and avenues for future research. For non-Chacoan specialists, this volume provides an important case study in linking local and regional scales of analyses and also encapsulates many of the most important and current debates regarding the nature of political, demographic, and social organization across the Chaco world. ■

Remembering Robert "Bob" Hackney, Duane Taylor, and Jack Roe

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Three members of the Utah Statewide Archaeological Society and three long-time supporters and participants in the archaeology of Utah died during 2007. Robert "Bob" Hackney died on May 29th, 2007 and Duane Taylor died on November 7, 2007. Jack Roe, long-time member of the Salt Lake Davis Chapter of USAS passed away in July of 2007. Both Bob and Duane were members of Castle Valley Chapter of USAS and both had been active participants in the archaeology of Utah for many years. Both were soft-spoken, often on the sidelines, never in search of attention and always ready to pitch in and get the job done. Duane worked at the CEU Museum taking care of the collections and assisting researchers visiting the collections. Duane worked in the field in both archaeology and paleontology. Bob worked in the field assisting in CRM surveys, emergency projects and leading tours into Nine-Mile Canyon. Both men were curious, full of information, and always willing to help out. Both were active in USAS and in paleontology circles and served in the Nine Mile Canyon Coalition. Jack Roe was a member of the Salt Lake / Davis Chapter and had participated in projects along the Wasatch Front.

Several years ago a colleague of mine from Colorado brought a group of students to Utah for a tour of archaeological sites. I asked Bob and Margene if they would be willing to take these college undergraduate students into Nine Mile and they both agreed. The students told me their time in the canyon with Bob was the highlight of their trip. Bob had an ability to talk to people on their terms and his enthusiasm for the archaeology of Nine Mine was contagious.

I did not know Duane as well as I knew Bob, but the first thing that always struck me about Duane was his smile. His knowledge of the museum in Price and the collections was amazing, and when I was doing some research there a couple years ago, Duane was there to help retrieve the collections I needed and the documentation. He tolerated my many requests with a smile and professionalism.

Jack Roe was a skilled knife-maker and he had a wealth of knowledge about the prehistory and history of Utah. Jack assisted us in November of 2006 in recording a lithic scatter near Danger Cave even though he had to use crutches to get from the truck to the site. His ailments never stopped him from attending a class or a meeting or a fieldwork event. Before Jack died he brought me his collection of mammal skulls that included everything from a mouse to a black bear. He said "I figured you could use these" and I do. In September of 2007, Jack was posthumously awarded an Outstanding Achievement award by the Utah State Historical Society for his many years of service to the archaeological community.

We can consider Bob, Duane, and Jack as "avocational" archaeologists with the added bonus of just being great guys, inspirational mentors and great friends. The archaeological community needs more people like these no matter if they are on the professional side or amateurs. The goals are the same and Bob, Duane, and Jack understood that. For knowing Bob and Duane, I'm a better person and the archaeology and paleontology of Utah has benefited from their participation. ■

