Odyssey Archaeological Research Fund

Report of Investigations, Summer and Fall, 2016

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INTRODUCTION

This document summarizes investigations conducted in the summer and fall of 2016 with support from the Odyssey Archaeological Research Fund (OARF). The two OARF-supported field investigations completed during this period are as follows:

1. Test excavations at the Two Rivers site (23SH101): A multicomponent Paleoindian through Historic period site Sherman County, Kansas

2. Test excavations at Scheuerman mammoth site (14SC327) in thee Ozark National Scenic Riverway, Shannon County, southeast Missouri.

Dr. Jack Hofman (Department of Anthropology, University of Kansas), Jack Ray (Missouri State University), and Kale Brunner (Department of Anthropology, University of Kansas) provided the information presented in this document. The following K.U. students provided assistance in the field: Barb Crable, Josh Collins, Laura Krische, Bradly Saint, and R. Mason Niquette. Also, Chris Hord, Stephen Dyle, and Jeff Sheldon, temporary Research Aids at the Kansas Geological Survey, participated in the field investigations. Volunteers who assisted with excavations at the Two Rivers site include Kevin Drees, Marvin Nash, Kim Nash, and Billie Woods. We are especially grateful to Allison Young (National Park Service) for providing logistical support and other forms of assistance at Two Rivers. Finally, thanks goes to Mike and Deb Scheuerman (Scheuerman site) for allowing us to conduct excavations on their property and for providing assistance.

Excavations at the Two Rivers Site (23SH101), Southeast Missouri

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Introduction

The Two Rivers site (23SH101) is located approximately 100-300 m east-southeast of the confluence of the Jacks Fork and Current rivers in east-central Shannon County, Missouri (Figure 1). Large portions of the Jacks Fork and Current rivers are part of Ozark National Scenic Riverways (U.S. National Park Service), the first national park in the United States that was designed to protect a river system.

Prior to the incorporation of the Jacks Fork and Current rivers into the National Park Service, the Two Rivers site and an adjacent site (23SH49) were plowed. During the mid-1960s, Alan Banks collected artifacts at both sites. A review of Banks' collection revealed Paleoindian, Early Archaic, Middle Archaic, Late Archaic, and Late Woodland diagnostic artifacts (Figures 2 and 3). In 1979, Mark Lynott (National Park Service's Midwest Archeological Center) recorded the Two Rivers site.

Previous test excavations were conducted at the Two Rivers site in 1987-1988 during a joint effort by Historic Preservation Associates and the American Archaeology Division at the University of Missouri (Klinger et al. 1989). These investigations were initiated because of the proposed construction of a leach field at the Two Rivers campground. Although hand excavations were conducted in three areas (Areas A-C), the bulk of the excavations at 23SH101 were within the direct impact area of the proposed leach field (Area B). Area B, which is located approximately 70–90 m to the northeast of the restrooms/shower house, measured approximately 20-x-70 m (Klinger et al. 1989:Figure 4). Hand excavations in Area B consisted of 70 post-hole tests, two 1-x-2-m units, one 1-x-3-m unit, one 1-x-12-m trench, and one 4-x-4-m block, hereafter referred to as "B Block."

The depth of the cultural deposits in the block excavation varied between 50 and 160 cm. Recovered diagnostic artifacts from Area B included Paleoindian, Early Archaic, Middle

Archaic, Late Archaic, Woodland, and Late Woodland/Mississippian projectile points/knives (Klinger et al. 1989:77–78, Figure 10). Also, a light scatter of Historic artifacts was found across Areas A-C. These artifacts date from the middle nineteenth century to the middle twentieth century. Indentified Historic components include a farm community, blacksmith shop, and tourist cabins (Klinger et al. 1989:81–82).

The earliest diagnostic prehistoric artifact that was recovered from the Two Rivers site in 1987–1988 was reported to be a fluted Clovis (Early Paleoindian) point found in the northeast corner of the 4-x-4-m block (Klinger et al. 1989:56–59, Figure 10u). However, this small point fragment (blade midsection) appears to be a Sedgwick (Middle Paleoindian) point, more akin to Folsom points on the Plains than to Clovis (see Ray 2016:134–135, 160–162). This specimen is small, thin (5 mm), and exhibits controlled full facial flutes (personal observation) (Klinger et al. 1989:Figure 10u), unlike larger, thicker, and less accurately fluted Clovis points. This Sedgwick point was manufactured from exotic Pitkin chert from the Boston Mountains of northern Arkansas (Ray 2007:278). Also, a Late Paleoindian Dalton point was found in the northeast corner of the 4-x-4-m block excavation (Klinger et al. 1989:59, Figure 10s). Unfortunately, the specific depths at which these Paleoindian points were found is unknown since they were recovered from a deposit that was identified as a natural stratum and dug as a thick unit between 50 and 120 cm bs (below surface) (Klinger et al. 1989:56–59). Although he was not positive, Jim Price (personal communication 2016) seemed to remember that the Sedgwick point was found at a depth of approximately 75 cm.

Over the past decade, the Odyssey Archaeological Research Program, has intermittently conducted geoarcheological research at Ozark National Scenic Riverways (ONSR) (Mandel 2006). This research has focused on finding and testing landforms and archaeological sites that have high potential for containing Early Paleoindian and pre-Paleoindian cultural deposits. In 2011, Dr. Rolfe Mandel and Erin Dempsey initiated a park-wide project to study landscape evolution in the Current River valley through the targeted analysis of landform sediment assemblages and determination of the alluvial chronology of the river. These data were used to identify the potential for pre-Paleoindian-age deposits in the valley (Dempsey 2012). The project resulted in a reevaluation of a landscape evolution model proposed earlier for the valley by Saucier (1987, 1996), and determined numerical ages of valley fills through radiocarbon and optically-stimulated luminescence (OSL) dating.

The 1987–1988 investigations at Two Rivers by Klinger et al. (1989) revealed the presence of potentially stratified Paleoindian deposits. Given its location at the confluence of two major streams, the potential for pre-Paleoindian deposits at this site appeared to be high. The goals of the 2016 Odyssey investigation at Two Rivers were to: (1) reexamine the deepest fine-grained sediments in Area B to potentially identify discrete stratified Paleoindian components, and (2) explore the coarse-grained sediments below 160 cm in order to determine if they sealed pre-Clovis deposits.

Geomorphic Setting

Area B of the Two Rivers site is situated on an alluvial landform approximately 25–30 ft above the Current River. This area appears to be located just beyond the distal end of an alluvial fan situated at the mouth of a small drainage that parallels State Route V. Klinger et al. (1989: 14–18) indicated that 23SH101 is located on a T-3 terrace. However, in their scheme, the floodplain consists of both T-0 and T-1 geomorphic surfaces. We would classify the landform at Two Rivers as a T-2 terrace. Based on the testing results by Klinger et al. (1989), the depth of fine-grained alluvial sediments is generally shallow (<90 cm) across most of Area B. However, deeper fine-grained sediments were found in the northeast corner of B Block.

Based on Odyssey's excavations bordering the northeast corner of B Block, a brief summary of the sediments are as follows. A shallow (13-cm thick) eroded plowzone (Ap) overlies Bw1 and Bw2 horizons to a depth of 42 cm. Below the Bw2 horizon is the A horizon of a buried soil spanning a depth of 42 to 58 cm. The buried A horizon (A1b + A2b) contains the highest concentrations of artifacts at the site. Below the buried A horizon is an 8-cm thick BAb horizon, then a thick Btb horizon (Bt1b + Bt2b + Bt3b) that extends to a depth of 130 cm. Below the Btb horizon is a very gravelly BC1b horizon that is 18 cm thick and contains approximately 40% subangular to subrounded alluvial pebbles and cobbles by volume. An extremely gravelly 2C1 horizon (paleo-gravel bar) that contains approximately 75% subangular to subrounded alluvial pebbles and cobbles extends from 172 cm to more than 220 cm below surface. Cobbles measuring >8 cm in diameter increase in number below a depth of approximately 190 cm bs.

Methodology

The 2016 field investigations at the Two Rivers site were conducted between June 6 and June 29. The excavation crew consisted of Josh Collins, Barb Crable, Stephen Dyle, Dr. Jack Hofman (project supervisor), Chris Hord, Laura Krische, R. Mason Niquette, Jack Ray (project supervisor), Bradly Saint, and Jeff Shelton. Kevin Drees, Marvin Nash, Kim Nash, Billie Woods, and Allison Young periodically served as volunteers at the site. The soils and stratigraphy of the site were described by Dr. Rolfe Mandel.

The Odyssey excavations were organized around the 1987–1988 investigations, especially the 4-x-4-m block in Area B (i.e., B Block). Initial work consisted of removing disturbed backfill from two exploration test units in B Block. Test Unit A was placed in the northeast corner of B Block and Test Unit B was placed in the southwest corner of B Block (Figure 4). Both exploration test units measured approximately 1.0-x-1.5-m wide and were dug to a depth of approximately 1 m below where the 1987–1988 excavations ended near the top of an alluvial gravel deposit (i.e., 1.3 m in the northeast corner and 0.9 m in the southwest corner). The Odyssey team dug into these dense alluvial gravel deposits to depths of 2.2 m in Test Units A (Figure 5) and 1.9 m in Test Unit B, which revealed that no fine-grained sediments occur below the top of the gravel deposit that Klinger et al. (1989) encountered.

A site datum (100N, 100E) was established 1.2 m east and 4 m south of the southeast corner of B Block. Twelve 1-x-1-m test units were excavated north of site datum (Figure 6). The southwest corner of each unit was assigned northing and easting coordinates, as well as consecutive test unit numbers (Table 1). Seven of contiguous units (Test Units 1–5 and 11–12) were excavated at the northeast corner of B Block (Figure 7) where the fluted Sedgwick point and the Dalton point were found in Klinger et al.'s (1989) Test Unit 64N, 36E. Four test units (Test Units 6, and 8–10) were emplaced 22–31 m north of site datum (Figure 8), and one test unit (Test Unit 7) was excavated 8 m north of the northwest corner of B Block. At approximately 3 m north of Test Unit 8 at the north end of Area B, a short trench profile was dug into the steep bank adjacent to State Route V (Figure 9).

Two units, Test Unit 3 located at the extreme northeast corner of B Block and Test Unit 8 located 22 m to the north, were treated as control units excavated to sterile deposits in 10-cm levels, with all sediments dry screened through one-quarter-inch mesh. The other units were carefully shovel skimmed to a depth of 50 cm below surface, whereas sediments in subsequent levels were either screened or shovel skimmed. All artifacts encountered in shovel-skimmed levels were collected. All tools, preforms, and charcoal fragments that were encountered in the field were piece plotted in three dimensions with a Topcon GTS 313 Total Station. Each piece-plotted artifact was given a piece-plot number and shot number. Ending depths for each test unit at the end of the project are presented in Table 1.

Excavation Results

A limited analysis was conducted on the artifacts collected from 23SH101. All recovered artifacts were washed and processed, but only a sample was analyzed in detail. These artifacts include all bifacial and unifacial piece plots and all tools and debitage from the two control units (Test Units 3 and 8). Chipped-stone artifacts are divided into debitage and tools sections below.

Debitage

The vast majority of the artifacts from Test Units 3 and 8 represent debitage from the manufacture of chipped-stone tools. All core and flake debitage was analyzed as to artifact type, chert type, and cortical surface type. Core and flake debitage from Test Units 3 and 8 consisted of 2,529 items. Flake debitage measuring less than 1 cm^2 in size (n=1,046) was designated small flakes and considered too small for accurate identifications of platform type, raw material type, and cortex type. Accordingly, they are excluded from the analyses below. Shatter fragments are also excluded because many of these items may have been produced by factors unrelated to chipped-stone tool manufacture (e.g., incidental or accidental thermal fracture associated with stone boiling and exposure to direct heat in hearths). Of the remaining 1,483 items, only two are tested cobbles that represent core debitage, whereas the rest consist of flake debitage. Accordingly, the analyses below focus on flake debitage.

Four flake types have relict platforms (i.e., platform flakes) that are generally indicative of staged core- or biface-reduction. Primary flakes and secondary flakes are decortication flakes removed during early-stage core or biface reduction. These flakes exhibit high-angle, non-faceted platforms and varying percentages of cortex on dorsal surfaces. Tertiary flakes that also exhibit high-angle, non-faceted platforms were removed during early-to-middle stage reduction but lack any cortical surfaces. Biface flakes with faceted low-angle platforms, on the other hand, were removed during the reduction of early-to-late-stage bifaces or preforms. In general, the size of biface flakes decreases from early-stage bifaces to late-stage bifaces. Flake fragments are broken flakes that lack platforms and are generally nondiagnostic as to reduction stage.

All flake types are presented in Table 2. Nearly two-thirds (63.5%) of the flakes from both test units are composed of nondiagnostic flake fragments, more than a quarter are composed of biface flakes, and relatively few are decortication flakes and interior flakes (i.e., tertiary flakes). Although not quantified, the relative thickness of the majority of the flake fragments suggests that most of the thin flakes are probably broken biface flakes.

If nondiagnostic flake fragments are excluded from the analysis (Table 3), nearly three-quarters of the platform-bearing flakes are biface flakes that have faceted and lipped platforms indicative of biface thinning. The large number of biface flakes indicate that the thinning of bifacial preforms and the rejuvenation (resharpening) of dulled bifacial tools were the primary flintknapping activities that were conducted at the Two Rivers site. The relative small numbers of primary, secondary, and tertiary flakes and the lack of core debitage indicates that the majority of decortication and early-stage reduction of chert cobbles and nodules occurred elsewhere, presumably at local chert or rhyolite sources.

A sample of all platform-bearing flakes (i.e., exclusive of flake fragments) and small flakes (measuring <1 cm^2) from Levels 4–7 of Test Unit 8 (n=550) was size graded in increments of 1 cm^2 (Figure 10) to determine relative percentages of medium and large flakes relative to small flakes. In general, the size of flakes is directly related to the size of the objective piece (i.e., core or preform) that is being reduced. As the size of the core or preform decreases, it follows that the flakes removed from the core or biface during reduction also become progressively smaller (Andrefsky 1998:96). Given that very few cores were recovered from the site and that biface flakes predominate in the assemblage, the relative percentages of size-graded flakes are indicative of early-stage, middle-stage, and late-stage reduction of bifaces.

As indicated in Table 4, the vast majority (95.5%) of the flake debitage in the sample from Test Unit 8 is comprised of relatively small flakes that measure less than <1 cm^2 and <2 cm^2 in size. This indicates that the bulk of the lithic reduction in the vicinity of Test Unit 8 appears to be related to the rejuvenation or resharpening of dulled edges of curated bifacial tools and probably to the reduction of several middle- or late-stage bifacial preforms into finished tools. The same appears to apply across the rest of Area B since small flake size was noted by crew members as they recovered artifacts from nearly every Odyssey test unit. As noted above, most initial decortication of cobbles and early-stage reduction of preforms must have occurred at other locations. The only exception to this pattern appears to be related to the deepest deposits. Several large flakes, including decortication flakes, were noted in the lowest levels (9–16) of Test Units 1–3.

Tools

Twenty-three tools and 52 bifaces were analyzed. This sample consisted of piece plots and all tools and bifaces recovered from control Test Units 3 and 8. The 52 bifaces are comprised of two primary bifaces (equivalent to early-stage preforms), 18 secondary bifaces (equivalent to middle-stage preforms), and 32 tertiary bifaces (equivalent to late-stage preforms and/or medial and distal fragments of projectile points/knives).

The relative lack of aborted or broken primary bifaces supports the results of the debitage analysis, i.e., that relatively few early-stage preforms were reduced (thinned) at 23SH101. On the other hand, several middle- and late-stage preforms were thinned at the site. More than half (61.5%) of the bifaces are tertiary bifaces. The majority of these, however, appear to be medial, distal, and edge fragments of finished bifacial tools, such as projectile points/knives, rather than late-stage preforms.

Seventeen projectile points/knives were recovered from the site. Of these, two are unidentifiable fragments of arrow points and eight are unidentifiable fragments of dart points/knives. The fragmentary condition of these points and the large number of tertiary biface fragments, many of which also appear to be projectile point fragments, indicates intensive resharpening and recycling of hafted bifaces at Two Rivers. This intensive resharpening and recycling of bifacial tools appears to be related to the overall poor quality of chert resources in the Current River valley (see Raw Material Procurement and Use section below). Once a bifacial tool was successfully manufactured from poor quality local chert resources, it was typically used and reused to exhaustion and often fractured in the process.

Seven projectile points were classified as to type. Two are corner-notched Scallorn arrow points (Figure 11a-b). This arrow point type, which is very common in the Current River valley (Lynott 1991), dates to the Late Woodland/Mississippian period ca. 1300–600 rcybp (A.D. 650–1350) (Ray 2016:30–32). Both Scallorn arrow points and the two unidentifiable arrow point fragments were found in Levels 3 and 4 (20–40 cm bs) of Test Units 8 and 10 located at the north end of Area B.

One small dart point fragment with a slightly expanding stem and straight base and a short barb on one shoulder appears to be an extensively resharpened Kings point (Figure 11c). It was found in Level 1 of Test Unit 8. Kings is a Late Archaic point type that dates to ca. 3800–3000 rcybp (1850–1050 B.C.) (Ray 2016:25–27).

Another dart point appears to be a Saratoga point that was recycled into a hafted end scraper (Figure 11d). This specimen exhibits a relatively straight stem and an irregular base that appears to be the striking platform of the original flake blank. A short small flake scar on one face of the stem that emanates from the base is a characteristic attribute of Saratoga points (Ray 2016:113). This point was found at a depth of 49 cm near the middle of the buried A horizon in Test Unit 3. Saratoga is a Late Archaic point type that dates to ca. 4100–3400 rcybp (2150–1450 B.C.) (Ray 2016:113–114).

A medium-sized side-notched point with straight (unground) base appears to be a White River point (Figure 11e). A failed attempt was made to recycle/reshape the transverse fracture on the blade into a hafted end scraper. This specimen was recovered from Test Unit 4 at a depth of 70 cm bs. White River points are Middle Archaic in age and date to ca. 6300–5500 ^{14}C yr B.P. (4350–3550 B.C.) (Ray 2016:82).

Two stemmed point fragments were found at depths of 79 cm in Test Units 1 and 2. One large stem fragment from Test Unit 1 exhibits a straight stem and a straight base. The base is lightly ground. The proximal portion of the blade exhibits straight shoulders and slightly serrated blade edges. This specimen is a Hidden Valley point (Figure 11g). Hidden Valley is an Early Archaic point type that dates to ca. 7900–7200 ^{14}C yr B.P. (5950–5250 B.C.) (Ray 2016:95–97). A small stem fragment from Test Unit 2 exhibits a straight stem and concave base. One side of the stem is lightly ground. Although fragmentary, this specimen appears to be a Taney point (Figure 11f). Taney points are Early Archaic in age and date to ca. 7800–6900 ^{14}C yr B.P. (5850–4950 B.C.) (Ray 2016:126–129). It is sometimes difficult to differentiate between Hidden Valley and Taney points, although several attribute discrepancies are apparent (Ray 2016: 128–129). These two point types may represent contemporary regional variations on a panregional theme for contracting-stemmed to straight-stemmed socketed bifaces. The discovery of these two point types at the same depth support this possibility.

The remaining six tools consist of two utilized flakes, one bit fragment of a drill, and three scrapers. Two small scrapers were recovered from the upper portion of the fine-grained sediments (Levels 3 and 4). One large end scraper made from unheated nonlocal Undifferentiated Osagean chert (Figure 11h) was found in the northeast corner of Test Unit 1 at a depth of 133 cm. This depth is near the base of the fine-grained sediments and approximately 5 cm above the coarse paleo-gravel bar deposits. Although not diagnostic, the depth at which the scraper was found suggests that it may be a Paleoindian end scraper. The recovery of Early, Middle, and Late Paleoindian points from 23SH101 and adjacent 23SH49 by Alan Banks and Klinger et al. (1989) support the presence of multiple Paleoindian occupations at the confluence of the Jacks Fork and Current rivers.

The deposits in the extreme northeast corner of Klinger et al.'s (1989) B Block and Odyssey's Test Units 1–3 are the deepest anywhere in Area B and appear to be in a depression formed in the upper part of the paleo-gravel-bar deposits. The exact depths at which Klinger et al. (1989:56–59) found the thin fluted Sedgwick (Middle Paleoindian) point and Dalton (Late Paleoindian) point are uncertain due to the coarse manner in which the deposits in the northeast corner of B Block were excavated (i.e., as a single unit 50–120 cm thick). However, it is possible that they were also found near the contact between the fine-grained sediments and the underlying paleo-gravel-bar deposits.

Non-Chipped-Stone Lithics

Thirty non-chipped-stone artifacts were recovered from Test Units 3 and 8. The only ground-stone tools consisted of one multipurpose pitted stone/mano and one mano from Levels 1 and 2 of Test Units 3 and 8, respectively. Three additional piece-plotted ground-stone artifacts were recovered from the buried A horizon. These include one mano/pitted stone from Test Unit A, one mano from Test Unit 10, and one large chunk of faceted hematite from Test Unit 11. These ground-stone tools from depths of 10–62 cm bs indicate that plant foods and hematite were processed at the site.

The rest of the non-chipped-stone lithics from Test Units 3 and 8 are comprised of fragments of fire-crack rock. Most of the fire-cracked rock is comprised of Undifferentiated Ordovician chert and Roubidoux quartzite, but five pieces of fire-cracked rock are rhyolite.

Features

Feature 1

This feature consists of a rock concentration in Level 4 of Test Unit 6. The feature included two unmodified sandstone rocks, two unmodified quartzite rocks, one small piece of unmodified chert, and one fractured chert cobble (fire-cracked rock or tested cobble). The function of this rock concentration is unknown.

Feature 2

This feature consists of a concentration of charcoal and other artifacts within the lower portion of the buried A horizon in Level 5 of Test Unit 11. The feature may be a hearth or possibly the base of a shallow pit.

Raw Material Procurement and Use

The bedrock in the vicinity of Two Rivers is Precambrian, Cambrian, and Ordovician in age. Unlike the igneous-dominated St. Francois Mountains to the northeast, Precambrian igneous deposits in the upper Current River valley are localized and relatively limited in extent (Middendorf 2003). All of the igneous outcrops in the upper Current River valley are extrusive volcanic deposits of rhyolite. Most of these rhyolite outcrops are downstream of Two Rivers and clustered within or near the valleys of Blair Creek and Rocky Creek. However, smaller localized rhyolite outcrops also occur as far as 6 km upstream of Two Rivers in the Current and Jacks Fork river valleys.

Three isolated rhyolite outcrops are present within 3 km of 23SH101. One small outcrop is located just north of the Jacks Fork-Current river confluence and only 300–700 m north of the site. Another small outcrop is located at the mouth of Matthews Branch approximately 1.0–1.6 km east of the site. A third much larger outcrop, known as Coot Mountain, is located 0.9–3.0 km to the southeast of 23SH101. Although not an exhaustive survey, reconnaissance sampling of bedrock outcrops and stream deposits on the west sides of the first two small outcrops revealed rhyolite deposits that exhibit poor to very poor knapping qualities.

However, one localized source of rhyolite with good knapping quality was discovered during the work at Two Rivers. This source is located on a small knob at the northwest end of Coot Mountain and on the west side of Prairie Hollow Gorge. A lithic-reduction workshop recorded as Little Coot Knob Workshop (23SH1611) is located on the northwest flank of this small knob. The workshop contains many medium-to-large initial- or early-stage reduction flakes, tested cobbles, and early-stage preforms. The rhyolite at this workshop is aphanitic (fine grained) and relatively homogenous with few inclusions, although the groundmass of a few pieces was interrupted by occasional very small (<1 mm) feldspar phenocrysts and very narrow (<1 mm) veins of quartz. The rhyolite is dark reddish gray (10R 4/1, 3/1), weak red (10R 4/2), and/or dusky red (10R 3/2) in color.

Most of the Two Rivers area is underlain by Cambrian-age Potosi and Eminence dolostones (Middendorf 2003). Both dolostones are massively bedded and contain appreciable quantities of quartz druse (Hayes and Knight 1961:19–20). Chert also occurs in these rock formations, but the vast majority is laden with quartz druse and vugs that reduce or prohibit conchoidal fracture, rendering the chert unknappable (Ray 2007:74). Outcrops of chert-bearing Ordovician-age dolostones (i.e., Gasconade and Roubidoux formations) are rare in the Two Rivers area because these deposits have been eroded from this portion of the upper Current River valley. However, redeposited alluvial cobbles of Gasconade chert, Roubidoux chert, and Roubidoux quartzite are abundant in the gravels of the Current and Jacks Fork rivers.

Gasconade chert is a rugged chert that occurs in thin and thick beds, in nodules of various sizes and shapes, and in irregular stromatolite masses (Ray 2007:77–79). Much of the chert is of poor knapping quality due to the presence of vugs, quartz druse, and abundant incipient fracture planes. Nevertheless, a small percentage of Gasconade chert (especially chert that occurs in ellipsoidal nodules) exhibits fair to good knapping quality. Roubidoux chert also is a rugged chert that occurs in the same forms as Gasconade chert. The knapping quality of the vast majority of Roubidoux chert is compromised by the presence of vugs, quartz druse, sand grains, and many incipient fracture planes (Ray 2007:81–83).

It is often very difficult to distinguish between Gasconade and Roubidoux cherts due to considerable overlap in the physical characteristics of each. Both Ordovician cherts are essentially nonfossiliferous (with the exception of rare gastropods), and they occur in a variety of colors. Because of these physical similarities, it is often necessary to combine cherts from the Gasconade and Roubidoux formations into a generic Undifferentiated Ordovician chert type (Ray 2007:116).

Roubidoux quartzite is composed of sand grains so tightly cemented by silica that fractures pass through individual sand grains rather than around them. It occurs in bedded deposits, and the matrix is usually white, light gray, or gray (Ray 2007:83). The quartzite is generally homogeneous with relatively few flaws and if strongly cemented approximates the knapping quality of some cherts. Roubidoux quartzite occurs in the gravels of the Current and Jacks Fork rivers. Although rare, redeposited cobbles of Undifferentiated Osagean chert also occur in the gravel deposits of the Jacks Fork and Current rivers (Ray 2007:219).

A test of alluvial cobbles on a gravel bar of the Current River at Log Yard (located 28 km downstream of Two Rivers) revealed the following percentages of available chipped-stone resources: Undifferentiated Ordovician chert (65.5%), rhyolite (18.2%), and Roubidoux quartzite (16.4%). Similar percentages of these raw materials are probably located in the gravel bars of the Current River near the Two Rivers site. In fact, a cursory examination of redeposited rhyolite cobbles on a gravel bar of the Current River 2 km downstream of Two Rivers revealed that approximately 10–15% of the river cobbles are comprised of rhyolite.

Ninety-two river cobbles (>8 cm diameter) collected from highly weathered paleo-gravel deposits in the northeast and southwest corners of B Block were also tested for raw-material type and quality. Nineteen were composed of unknappable quartzose and sandstone cobbles. Of the remaining cobbles, 50.7% were comprised of Undifferentiated Ordovician chert, 46.6% were comprised of Roubidoux quartzite, and 2.7% were comprised of Undifferentiated Osagean chert. A lack of rhyolite cobbles in the paleo-gravel bar sample was unexpected. Its absence may be related to the source of gravel deposition. Most of the cobbles in the paleo-gravel bar at Two Rivers may have been deposited by the Jack Fork River, which has fewer rhyolite outcrops in its watershed upstream of Two Rivers compared to that of the Current River.

Only two of the chert cobbles and four of the quartzite cobbles from the paleo-gravel bar were assessed as knappable. This reflects the overall poor quality of the Ordovician-age chert and quartzite resources in the Current River valley. Nevertheless, Undifferentiated Ordovician chert cobbles are so abundant in the local gravel bars that an intensive survey will generally yield a handful of knappable (i.e., fair-to-good quality) chert cobbles.

All of the flake debitage from the two control units (Test Units 3 and 8) were analyzed as to raw-material type (Table 5). Practically all of the flake debitage appears to have been knapped from local chipped-stone resources. Exceptions may be some of the flakes knapped from Undifferentiated Osagean chert (see below). Of the local resources, the vast majority (94.3%) of the flakes was knapped from Undifferentiated Ordovician chert. A slightly greater percentage of this chert was found in Test Unit 3 than in Test Unit 8. An overwhelming use of Undifferentiated Ordovician chert (or Gasconade and Roubidoux cherts, if differentiated) is typical for sites located in the eastern portion of the Salem Plateau and the Current, Jacks Fork, Eleven Point, Black, and Meramec river valleys (Ray 2007:79, 85–87, 118; Ray and Mandel 2015:23). Klinger et al. (1989:Figure 15) reported that chert comprised 95% of the chipped-stone artifacts from 23SH101, whereas quartzite comprised 3.3% and rhyolite comprised 1.7%.

Only small quantities of rhyolite, Roubidoux quartzite, and Undifferentiated Osagean chert were recovered from Test Units 3 and 8 (Table 5). Of the 30 rhyolite flakes, 27 are of the fine-grained aphanitic variety and three are of the coarser porphyritic variety. A close inspection of the flakes knapped from aphanitic rhyolite revealed that two-thirds (n=18) were knapped from the dark reddish gray aphanitic rhyolite found at Little Coot Knob Workshop site (23SH1611), located approximately 900 m to the southeast. All but one of these flakes are small (<2 cm^2) biface flakes or thin flake fragments, indicative of the reduction of middle-to-late-stage preforms. One aborted secondary biface (or middle-stage preform) found in Test Unit 8 (Figure 11i) was also made from the dark reddish gray aphanitic rhyolite found at the Little Coot Knob Workshop. Thus, it appears that at least a few middle- to late-stage rhyolite preforms manufactured at 23SH1611 were transported to 23SH101 for further reduction. Since only two flakes were recovered from

Test Unit 3, most of the reduction of these aphanitic rhyolite preforms occurred in the vicinity of Test Unit 8.

Thirty-five flakes were knapped from fossiliferous Undifferentiated Osagean chert. This Mississippian-age chert, some of which may be Burlington chert from the St. Louis area, is higher-quality than the bulk of the local Ordovician cherts. Although some of these flakes of Undifferentiated Osagean chert could have been knapped from relatively rare redeposited stream cobbles in the Current and Jacks Fork rivers, some could have been knapped from middle-to-late-stage preforms made from nonlocal sources and transported into the Current River valley either as a trade commodity and/or as curated tools. This is a plausible explanation for at least 18 distinctive thin flakes (biface flakes and flake fragments) found in Levels 7–10 of Test Unit 8. Based on color, texture, and fossil content, all 18 flakes appear to have been knapped from a single middle- or late-stage preform of Undifferentiated Osagean chert. The transportation of Burlington chert in the form of middle-to-late-stage preforms and subsequent reduction was documented in the nearby upper Black River valley (Ray 2011:342).

A total of 108 cortical flakes (i.e., primary and secondary flakes) was collected from Test Units 3 and 8. Of these, 91 could be reliably identified as having either smooth rounded alluvial cortex or rough angular residual cortex. Eighty-eight cortical flakes were knapped from Undifferentiated Ordovician chert and three cortical flakes were knapped from Roubidoux quartzite. Of the 91 cortical flakes, 92.3% were procured from alluvial sources whereas only 7.7% appear to have been procured from residual sources. It is clear that the vast majority of the Undifferentiated Ordovician chert that was recovered from the Two Rivers site was procured from the gravel bars of the Current and Jacks Fork rivers. The large alluvial gravel bars that line both rivers (see Ray 2007:Figure 3.4) provided easily accessible sources that could be carefully examined, and from which occasional choice cobbles of Undifferentiated Ordovician chert, Undifferentiated Osagean chert, Roubidoux quartzite, and aphanitic rhyolite could be procured.

Summary and Conclusions

The 2016 Odyssey excavations expanded our knowledge of the prehistoric occupations at the Two Rivers site (Figure 12). The site, located at a strategic location overlooking two major rivers, appears to have functioned primarily as a seasonal or short-term field camp for more than 13,000 years. Many activities associated with hunting and gathering and processing of plant and animal resources were conducted at the site. Chipped-stone tools were made primarily from locally available Undifferentiated Ordovician chert cobbles selected from nearby gravel bars; however, most of the flint knapping that was conducted on site consisted of the reduction of middle-to-late-stage preforms and resharpening/recycling the dulled edges of projectile points, knives, and other bifacial tools.

Prehistoric artifacts occur in a relatively thin package of fine-grained Holocene alluvial deposits across most of Area B. Coarse-grained late Pleistocene paleo-gravel-bar deposits underlie the fine-grained alluvium everywhere across the landform. The package of fine-grained alluvial deposits is 40 to 90 cm thick, with an average thickness of about 70 cm. Based on the depths of diagnostic artifacts that were recovered from shovel tests and test excavations in Area B by Klinger et al. (1989:59–63) and from plowzone deposits by Alan Banks in the middle 1960s, multiple Paleoindian, Archaic, Woodland, and Mississippian components are mixed (via bioturbation) within this relatively thin package of fine-grained alluvium. Although discrete features are probably present in Area B, the potential for any discrete stratified cultural deposits within the fine-grained alluvium appears to be limited.

Thicker and deeper fine-grained alluvial deposits occur in two areas of Area B. The sediments thicken to approximately 115–135 cm in the vicinity of Test Unit 8 and the profile trench at the north end of Area B. Even thicker fine-grained deposits occur in the northeast corner of B Block and Odyssey's Test Units 1–3. Fine-grained, artifact-bearing alluvial deposits dip to depths of 140–160 cm below surface in those areas. Mounded gravel deposits (50–60 cm bs) are located on the south and west sides of this depression in the paleo-gravel-bar deposits. Klinger et al. (1989:70–71) believed that the "extraordinary relief" of the surface of the paleo-gravel bar deposits (maximum of 110 cm) is “unexplainable in terms of natural fluvial processes” or other natural disturbances such as tree throws. Accordingly, Klinger et al. (1989:69–71) designated three of these gravel undulations (or “areas of mounded gravel”) in B Block as cultural features and tentatively suggested that they served as “some sort of primitive windbreak.” They also tentatively associated these features with the deepest and oldest (Paleoindian) cultural components.

The Odyssey excavations also revealed a depression in the paleo-gravel-bar deposits at the northeast corner of B Block. In Test Units 1–3, the top of the paleo-gravel bar deposits dipped to 136–160 cm bs, forming a notable depression up to 80 cm deeper than in other parts of Area B that Odyssey tested. Several large flakes and one large flake end scraper (at 133 cm bs) were found near the base of this depression. Although not certain, the fluted Sedgwick point and the Dalton point found by Klinger et al. (1989) in the northeast corner of B Block (50–120 cm bs) may also have been located near the base of the depression. At this point, the origin of the depression (i.e., natural vs. cultural) and the presence of potentially undisturbed Paleoindian deposits near its base are unclear. Additional excavations focused in this area would be necessary to clarify its true origin. Nevertheless, we offer two scenarios that differ somewhat from Klinger et al.’s conclusions. If we assume that the large flake scraper is a Paleoindian scraper and that the Sedgwick and Dalton points were recovered from the base of the depression in the paleo-gravel bar, it is possible that Paleoindians may have occupied the depression. The Paleoindians may have adopted a pre-existing large scour hole in the top of the paleo-gravel bar or enlarged a huge tree-fall divot as a semi-subterranean basin, over which they may have constructed a skin-covered tent for temporary shelter. A relative lack of heat-treated flakes in the lower 40–50 cm of the sediments in the depression appears to support a Paleoindian age for these sediments.

On the other hand, if the large flake scraper is not Paleoindian and the Sedgwick and Dalton points were found in the upper half of the depression, then the depression and adjacent gravel mounds may represent little more than natural inverted divot-and- mound topography of a very large tree throw. Jim Price’s recollection that the fluted (Sedgwick) point was recovered from a depth of only approximately 75 cm, and one apparent Late

Archaic point found by Klinger et al. (1989:60, Figure 10e) may support this scenario. The Late Archaic point identified as Stone Square Stemmed (Etley) was recovered from the northeast corner of B Block at a depth of 121 cm, which is not far above the presumed Paleoindian level. If future excavations are to be conducted in Area B, we recommend that they be located on the east side of Test Units 1–3 and on the north side of Test Units 4–5. Test Units 4 and 5, which were not completed by Odyssey, also should be excavated to the top of the paleo-gravel-bar deposits.

The Odyssey excavations also identified a buried A horizon in Area B. It is well expressed in the vicinity of Test Units 1–5 and 11–12 but less so in Test Units 6–10 to the north. The buried A horizon dips slightly to the north along the same gentle slope (approximately 1–2º) as the present ground surface. The darkest (most organic) part of the buried A horizon occurred at a depth of approximately 42–51 cm along the east wall of Test Unit 2 (Figure 13) but thickened to 40–53 cm along the north wall of Test Unit 3 (Figure 14). It was at a depth of approximately 51–61 cm below surface in the profile trench at the north edge of the site. The densest concentration of artifacts occurred within this buried A horizon and slightly less dense concentrations were found in the levels directly above and below it. The age of this buried A horizon is unknown, but based on the recovery of one diagnostic (Saratoga) point, it appears to represent a Late Archaic living surface (ca. 4000–3000 ^{14}C yr B.P.).

Two radiocarbon samples have been submitted for radiometric assay, but the results have not been reported. A small piece of elm wood charcoal from a depth of 44 cm below surface should provide a reliable AMS age for the buried A horizon, whereas a piece of unidentified deciduous wood charcoal from a depth of 112 cm should provide an age that will date the upper increments of the lower third of the depression and indicate whether the deposits in the depression are undisturbed or mixed.

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Table 1. Grid Coordinates and Ending Depths of Test Units.

Test Unit Number	Grid Coordinates	Ending Depth
1	106N, 99E	130
2	107N, 99E	140
3	108N, 99E	160
4	108N, 98E	90
5	108N, 97E	100
6	123N, 100E	90
7	115N, 94E	80
8	130N, 100E	115
9	122N, 100E	90
10	129N, 100E	70
11	109N, 99E	90
12	110N, 99E	60

Table 2. All Flake Types from Test Units 3 and 8.

	TU-3		TU-8		Total	
Flake Type	N	%	N	%	N	%
Primary Flake	16	1.9	11	1.7	27	1.8
Secondary Flake	38	4.6	42	6.4	80	5.4
Tertiary Flake	21	2.6	12	1.8	33	2.2
Biface Flake	220	26.8	180	27.3	400	27.0
Flake Fragment	526	64.1	415	62.9	941	63.5
Grand Total	821	100.0	660	100.0	1481	100.0

Table 3. Diagnostic Flake Types (excluding flake fragments).

	TU-3		TU-8		Total	
Flake Type	N	%	N	%	N	%
Primary Flake	16	5.4	11	4.5	27	5.0
Secondary Flake	38	12.9	42	17.1	80	14.8
Tertiary Flake	21	7.1	12	4.9	33	6.1
Biface Flake	220	74.6	180	73.5	400	74.1
Grand Total	295	100.0	245	100.0	540	100.0

Table 4. Size Grades of Platform-Bearing Flakes in Levels 4–7 of Test Unit 8.

	Level 4		Level 5		Level 6		Level 7		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Size 1	73	60.8	164	70.1	74	64.9	59	72.0	370	67.3
Size 2	37	30.8	64	27.4	34	29.8	20	24.4	155	28.2
Size 3	8	6.7	5	2.1	6	5.3	2	2.4	21	3.8
Size 4	1	0.8	1	0.4	0	0.0	1	1.2	3	0.5
Size 5	1	0.8	0	0.0	0	0.0	0	0.0	1	0.2
Total	120	100.0	234	100.0	114	100.0	82	100.0	550	100.0

Table 5. Raw Material Analysis of Flakes from Test Units 3 and 8.

	TU-3		TU-8		Total	
Raw Material	N	%	N	%	N	%
Undifferentiated Osagean chert	14	1.7	21	3.2	35	2.4
Undifferentiated Ordovician chert	797	97.1	599	90.8	1396	94.3
Roubidoux quartzite	3	0.4	17	2.6	20	1.4
Aphanitic rhyolite	5	0.6	22	3.3	27	1.8
Porphyritic rhyolite	2	0.2	1	0.2	3	0.2
Total	821	100.0	660	100.0	1481	100.0

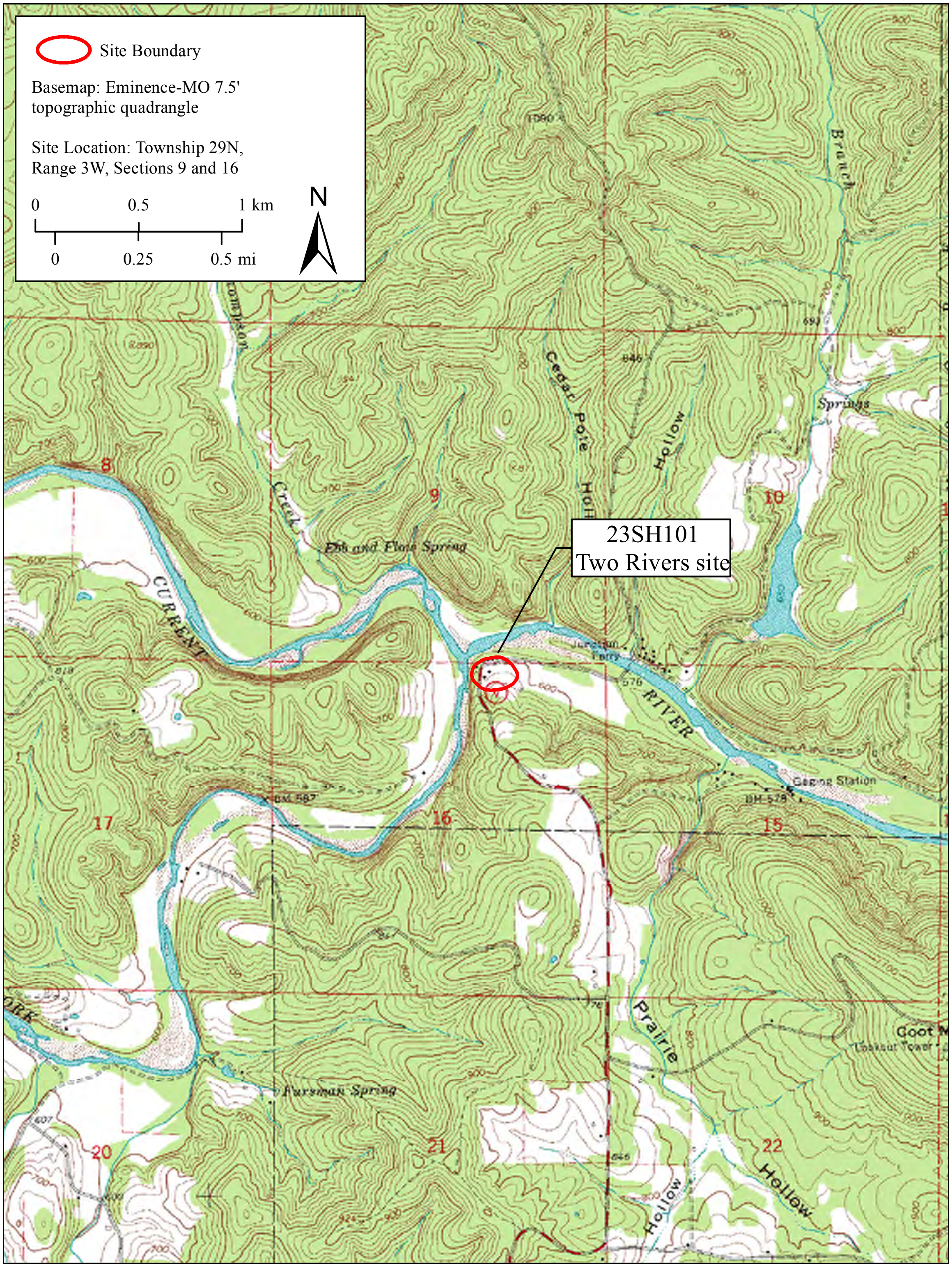

Figure 1. Location of the Two Rivers site at the confluence of the Jacks Fork and Current Rivers.

Figure 2. Alan Banks collection from 23SH49 and 23SH101: (a) Clovis, (b) Packard, (c-d) Jakie.

Figure 3. Archaic and Woodland points from Alan Banks collection from 23SH49 and 23SH101.

Figure 4. Location of exploration Test Unit A (right) and Test Unit B (left) in the northeast and southwest corners of 1988 B Block (view to the west).

Figure 5. Profile of the north wall of Test Unit A in the northeast corner of 1988 B Block (note plastic at end of 1988 excavation and reddish paleo-gravel bar deposits in lower portion of the profile).

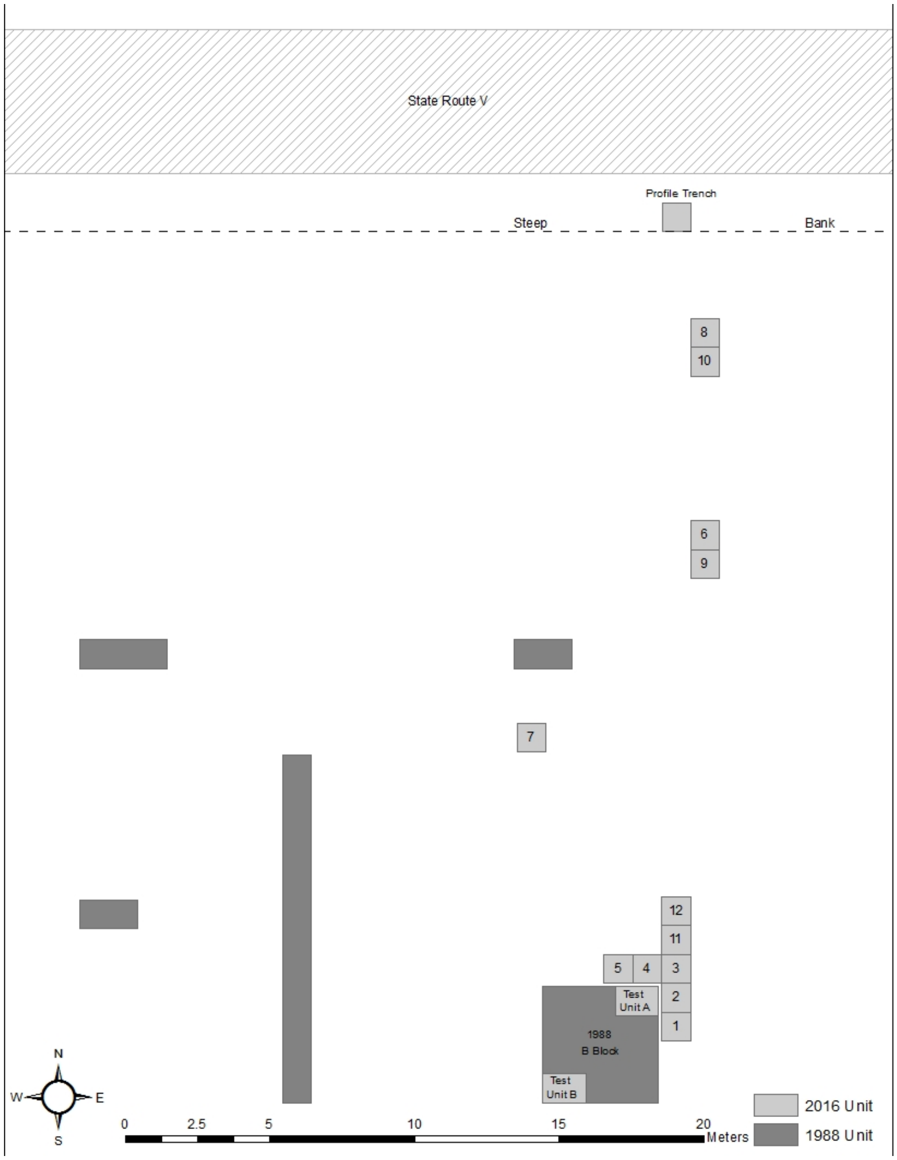

Figure 6. Location of 1988 excavation units, Odyssey Test Units 1-12, and profile trench at the north end of Area B.

Figure 7. Test Units 1-5 and 11 located at the northeast corner of Test Unit A and previously excavated B Block (view to the north).

Figure 8. Test Units 6 and 9 (foreground) and 8 and 10 (background) at the north end of Area B (view to the north).

Figure 9. Narrow stepped trench excavated into the steep bank adjacent to State Route V (scale 80 cm). Note dense alluvial gravel at a depth of approximately 1.3 m in the lower section of the profile (view to the south).

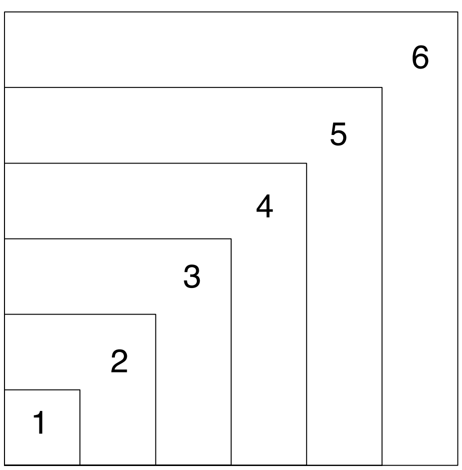

Figure 10. Size grades (cm^2) used for measuring flake debitage.

Figure 11. Selected chipped-stone artifacts from Odyssey's excavation: (a-b) Scallorn arrow points, (c) Kings projectile point/knife, (d) Saratoga hafted end scraper, (e) White River projectile point/knife, (f) Taney projectile point/knife, (g) Hidden Valley projectile point/knife, (h) end scraper, (i) secondary biface (aborted middle-stage preform) knapped from aphanitic rhyolite.

Figure 12. Ending depths of Test Units 1-5 and 11-12 (view to the north).

Figure 13. East wall profile of Test Unit 2 (scale: 140 cm) (note buried A horizon near the middle at 42-51 cm bs and the top of paleo-gravel-bar deposits at 140 cm bs).

Figure 14. Buried A horizon in the north wall of Test Unit 3 at 40-53 cm bs.

The Scheuerman Mammoth Site (14SC327), Western Kansas

Introduction

The Scheuerman site (14SC327) is located on the uplands near the southern margin of the Smoky Hill River valley in Scott County, Kansas (Figure 1). In July 2011, the skeletal remains of a mammoth were exposed by heavy machinery during the construction of earth berms and ditches for agricultural contour terraces. The bones are 40-50 cm below the land surface and contained in late-Wisconsin Peoria Loess. Collagen from a limb bone yielded an AMS radiocarbon age of 13,468±40 yr B.P. and, therefore, is pre-Clovis in age.

Odyssey–supported investigations at Scheuerman began in 2011 and continued in each summer of 2012-2015. During the 2016 field season, 12 additional mammoth bone and bone fragments were recovered, including a partial crania (with maxilla) and a tibia, bringing the total count of identifiable mammoth bones from the site to 74. The identification of a bison (*Bison* spp.) element during the 2016 field season, as well as newly acquired evidence for a probable second mammoth, indicate that multiple animals are present at the site.

The 2016 field investigations at the Scheuerman site were conducted July 5-15. The excavation crew consisted of Josh Collins, Barb Crable, Steven Dyle, Chris Hord, Laura Krische, and Mason Niquette. Excavations were directed in the field by Dr. Jack Hofman.

History of Research

Two mammoth bones (scapula and ulna) were initially exposed during the construction of earthen berms and ditches for agricultural contour terraces on the Scheuerman property in July 2011. Natural Resources Conservation Service (NRCS) workers immediately notified the Kansas State Historical Society (KSHS) of the discovery, and the KSHS fielded a small crew for two days to expose additional associated bones. Odyssey crew joined these efforts and worked for four days to expose, map, cast, and remove ten mammoth bones, including a scapula, ulna, and eight rib bones. Two permanent site datums were established along the fence line approximately 80 m north of the excavation area. Mike Scheuerman (landowner) agreed to take the mammoth locality and a 50-m buffer around the as-then exposed mammoth out of cultivation for at least two years. In the summers of 2012-2015 more extensive excavations were conducted by Odyssey, with additional mammoth bones recovered each season. In the course of investigations in 2011-2015, a total of 277 m^2 were uncovered at the site. As of 2015, 72 identifiable mammoth elements had been recovered, representing only a fraction of what was thought to be the remains of a single, adult mammoth.

In 2011, a dense concentration of lithic artifacts was documented (Feature 1) 50 m north of the mammoth-bone excavations. The top of this feature was clipped by heavy machinery (pan scraper) during contour terracing. The bulk of the artifacts (>1000) represent early-to-late-stage reduction flake debitage and angular shatter, but several fragments of early- and middle-stage failed preform fragments were also recovered from the feature. At least four biface fragments were refitted (representing two refit cases). All lithic artifacts are Smoky Hill Jasper. This discrete knapping feature measured approximately 30-x-40 cm wide and approximately 5-7 cm thick. Although Feature 1 cannot be directly associated with the mammoth remains, the base of the knapping feature was only 1 cm above the base of Bone 6 of the mammoth. This suggests that the knapping feature was deposited on the same surface as the mammoth remains. In addition to this lithic concentration, two artifacts were mapped in the area that had been disturbed by terracing operations: a basal (corner) fragment of a possible Folsom point or a late-stage failed Folsom preform, also Smoky Hill Jasper, and a fragment of an early-stage preform knapped from trachyte.

A sample of mammoth long bone from Bone 4 (sample 4.1) was submitted for AMS radiocarbon dating and yielded an age of 13,468±40 (NZA 39694), or 16,782 to 16,550 calibrated years B.P. This date indicates a pre-Clovis age for the mammoth and is within the age spectrum of other potential pre-Clovis cultural sites in the region (Waters et al. 2011; Holen 2007). Laboratory analyses of weathering and spatial patterning of the mammoth bone assemblage were completed after the 2015 field season (Crable 2015; Crable et al. 2015). Heavy calcium carbonate accumulation on bone undersides indicates long term stability of the landscape and relatively slow burial of the mammoth bone by loess deposition. Movement of bone by slope wash remains a possible explanation for the distribution of bone across the site and is supported by the consistent northwest orientation of the long axes of many bones (Figure 2).

Although a definitive association of prehistoric artifacts with the Scheuerman mammoth, or other evidence implicating human involvement with this animal, cannot be determined based on current information, the nearby presence of lithic artifacts is intriguing. The possibility remains that people were in the Great Plains contemporary with the Scheuerman mammoth and may have contributed to its demise or utilized bone material from the skeleton. Archaeological fieldwork continued at the Scheuerman mammoth site in 2016 in order to further investigate the possibility of cultural association with the mammoth bones.

Prior research indicated the bones to be distributed in a generally northwest trending direction. Field research in 2016 was focused on the areas north and west of the previously documented bones. Goals for 2016 excavations included locating and recovering additional cranial components, long-bone elements (particularly the femurs), and smaller elements thus far unaccounted for in the site assemblage.

Methodology

Investigations at the Scheuerman site in 2016 followed the same field methodologies established in 2011-2015. The main focus of the 2016 excavations was to expand north from the 2015 excavation block and west from the 2014 excavation block where a series of bone, including portions of the vertebral column and a shallowly buried mandible had been recovered. In 2016, excavation of the North Block expanded the contiguous block formed from excavations in 2011-2015. Two additional excavation blocks (with southwest corners at N113, E93 and N109, E91) were placed west of the established site perimeter to determine if mammoth bone was present in locations that had not been impacted by terrace construction and to gain a better understanding of site formation and bone distribution across the landform. Excavation in these areas also enabled the description and documentation of a complete soil profile for the site, i.e., one that had not been truncated by heavy excavation equipment during modern terracing operations.

A Topcon GTS 226 Total Station was used to set in grid pins and to piece-plot mammoth bone. Two permanent site datums established in 2011 are located along the fence line approximately 80 m north of the excavation area. In addition, two sub-datums (Datum 2-2013 and Datum 3-2013) were placed in the vicinity of the excavation area in 2013. These sub-datums were the control points from which all spatial data were collected in 2016.

Within the three excavation blocks, a total of 29 m^2 was excavated in 2016. Shovels were used to remove overburden (2-25 cm) from the North Block, and the area was then shovel skimmed in order to determine the location of additional bones. As bones were exposed, a 1 x 1 meter unit was placed around them for hand excavation. In the two blocks placed west of the main excavation area, 40-45 cm of overburden and *in situ* A-horizon material was removed with shovels, and shovel skimming was initiated at the top of the Bk horizon. The North Block, consisting of 19 m^2, was excavated using a combination of shovel skimming and hand excavation with trowels, bamboo and brushes. Shovel skimming alone was employed in the two western blocks, but no mammoth bones were encountered.

Excavation of the North Block expanded west of the 2014 Main Block and north of the 2015 Main Block. The North Block consists of a contiguous 19 square meter block between N109 and N113 and between E104 and E109. The two West Blocks excavated in 2016, which were not connected to previous excavations, are 9-13 m west of the North Block. A 2 x 2 square meter block was placed with southwest corner at N109, E91 and a 3 x 2 square meter block was placed with southwest corner at N113, E94.

Test units were excavated to a depth 10-15 cm below bone level, with final excavation extending into the Bk horizon of the surface soil. Because the paleosurface on which the bones rest slopes gently to the northwest (Figure 2), final depths of excavation ranged from 99.0 to 98.9 m below datum in the North Block and 98.95 to 98.8 m below datum in the West blocks. When encountered, bone was exposed with bamboo tools and brushes and pedestaled. Each bone was measured and drawn on a unit level form and photographed. The location of the bones within the site grid was recorded in three coordinates using the Total Station. Orientation and dip were determined using a hand-held Brunton compass and recorded on the level form along with notation of the bone's condition and taphonomy. After *in situ* documentation was completed, the bones were cast for removal. Sediments from test units with bone were dry-screened through one-quarter inch hardware mesh.

Excavation Results

Two identifiable elements and 10 bone fragments were encountered during the 2016 field season. A mammoth partial crania with maxilla and molars intact (Bone #77) was recovered approximately 2 m northwest of the unit from which a mammoth mandible (Bone #56) was recovered in 2014. No tusks or tusk fragments were articulated to or in spatial association with the crania. A second identifiable element, a tibia (Bone #76), was also located and recovered in 2016 (Figure 3). Both the crania and tibia were cast and removed from the site. The remainder of mammoth bone found in 2016 consists of unidentified fragments ranging from 2 to 25 cm in size. These were either cast or collected in foil and sealed bags. A single, complete, post-cranial element from *Bison* spp. was found in the West Block (N109, E91). The bone was stratigraphically positioned within the Bk horizon and within the same depositional context as the mammoth bones found throughout the main portion of the site. The bone lacked sufficient length to determine an orientation or dip for comparison to that of other bones documented at the site. It was collected in foil and a sealed bag for further analysis.

As in previous excavations at this site, the bones were positioned nearly horizontal and at a consistent elevation. The base level of the bones dips slightly to the north and west at a slope of 2 to 11 degrees, roughly following the contours of the modern surface. Consistent with previous observations, mammoth bone was found within a carbonate-rich Bk horizon of a surface soil formed in Peoria loess. A soil profile was described in the east wall of the N113, E94 block (Figure 4). No cultural materials were found among the mammoth bones.

Summary and Findings for 2016

Twelve mammoth bones and bone fragments, including a collapsed crania, and a single bison element were uncovered, documented and removed during the 2016 field season. Excavations in 2016 extended north and west of previous excavations, forming a continuous excavation block composed of more than 260 m^2. Two additional blocks were placed approximately 10 m to the west and outside the established site perimeter. No mammoth elements were encountered in those blocks. Mammoth bone was found scattered over a 5 x 4 meter area within the Main Block. The total count of identifiable elements recovered from the site is 74, representing only a fraction of the mammoth skeleton (Figure 5).

The discovery in 2016 of the maxilla with both molars intact is a significant find. Because the molars of both the maxilla and the mandible are complete and undamaged, the presence of enamel fragments approximately 30 m to the south, as documented during field work in 2012, strongly suggests that there are two probiscidian carcasses in this depositional context. Prior to 2016, excavations had not revealed duplicates of any skeletal elements. Comparison of age and wear patterns between the molars of the mandible and the maxilla will determine if these elements indeed belong to a single animal or if they represent separate carcasses. In addition, the tibia recovered in 2016 is only partially fused. Age analysis of this element, and that of the long bones already recovered, as well as the two sets of molars, may provide answers as to the minimum number of mammoth present in the assemblage. Also, a single bone representing *Bison* spp. was recovered and collected in 2016, providing additional evidence that multiple animals are buried in late-Wisconsin Peoria Loess in this upland setting.

Taken together, evidence recovered in 2016 points to a complex history of site formation and to a dynamic landscape, possibly utilized by animals and people alike as a natural point of travel between this upland location and the valley bottom. Though no direct evidence for cause of death or for human involvement with the mammoth has yet been uncovered, a trail would serve as an ideal place to ambush prey. Interestingly, despite the extensive area excavated, no femurs have been found,. Additional excavations should target the area immediately west of the contiguous excavation block in order to further investigate site formation and the potential role of people in the mammoth's demise. This area currently lies beneath a contour terrace that was being rebuilt when mammoth bones were first encountered in 2011. Effort to locate and excavate the missing mammoth skeletal elements, particularly the femurs, should focus on this uninvestigated location.

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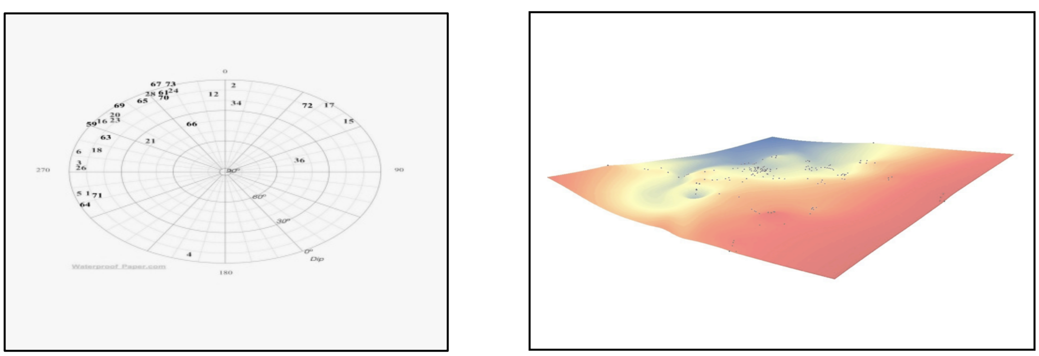
Figure 1. Location of the Scheuerman mammoth site (14SC327) on Google Earth image.



A B

Figure 2. Orientation and dip (A) and bone level topography (B – view northwest) of the Scheuerman mammoth elements recovered 2011-2015 (Crable et al. 2015).

Figure 3. Mammoth tibia (Bone 76) in the North Block.

Figure 4. Soil profile in the East wall of west block (N113, E94).

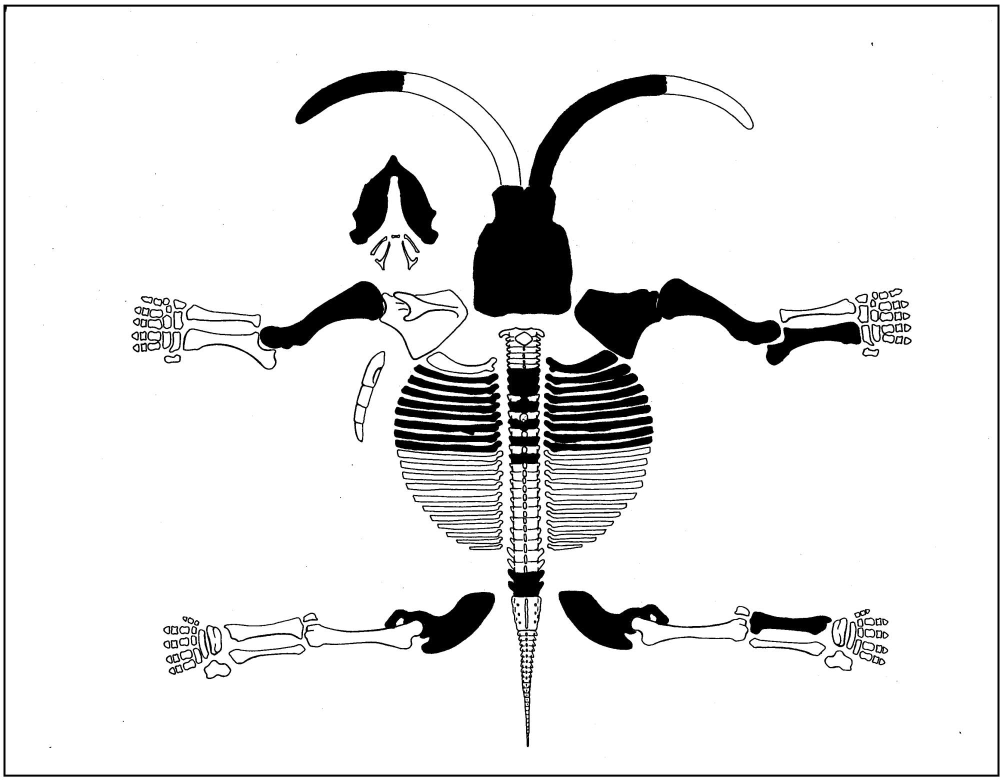


Figure 5. Identified skeletal elements of the Scheuerman mammoth recovered by Odyssey in 2011-2016.