A GIS COMPILATION OF FIELD DATA FROM THE SMITH'S FORK ARCHAEOLOGICAL SITE (23CL223), CLAY COUNTY, MISSOURI

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by

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A GIS COMPILATION OF FIELD DATA FROM THE SMITH'S FORK

ARCHAEOLOGICAL SITE (23CL223),

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Douglas Edward Shaver, Candidate of the Master of Science Degree

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ABSTRACT

The Smith's Fork (23CL223) archaeological site, located in Clay County, Missouri was investigated using pedestrian survey, ground penetrating radar, shovel testing, archaeological excavations and a geologic study of river terraces. Used in concert and compiled in a Geographic Information Systems (GIS), these techniques help to delimit the location and use of prehistoric archaeological settlement patterns that favored river terrace and flood plain locations along the Missouri River Valley system, such as Steed-Kisker phase agricultural communities, to time- and cost-effectively characterize deposits buried in these locations.

APPROVAL PAGE

The faculty listed below, appointed by the Dean of the College of Arts and Sciences have examined a thesis titled "A GIS Compilation of Field Data From the Smith's Fork Archaeological Site (23CL223), Clay County, Missouri" presented by Douglas E. Shaver, candidate for the Master of Science degree, and certify that in their opinion it is worthy of acceptance.

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ILLUSTRATIONS

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Thanks must also be given to Dr. Neal Lopinot of the Center for Archaeological Research in Springfield, Missouri for hiring me for a summer to do archaeological survey work on the U.S. Army Corps of Engineers lakes in Missouri, which included the Smith's Fork site. It was an educational summer with a great crew including Dr. Gina Powell, David Cain, Stephanie Smith, along with two crew members from Statistical Research, Inc. of California and Arizona.

Any omissions or errors in this thesis are my responsibility and not those of any of the individuals mentioned here.

Of course, I have to thank my wife and children for their patience with me sitting in front of a computer screen pecking away or off on a survey, dig, conference, or conducting research.

CHAPTER 1

INTRODUCTION AND PURPOSE

The purpose of this study is to map in Geographic Information Systems (GIS) a series of archaeological techniques at different scales, used independently or in concert, to better understand and predict the location and use of river valley landscapes by prehistoric cultures in the study area. The study focuses on the Smith's Fork (23CL223) archaeological site, a Steed-Kisker phase (950-1400 CE) archaeological site in Clay County, Missouri. The Steed-Kisker phase represents a part of the broader Central Plains tradition and are a locally prehistoric culture that were one of the first to utilize domesticated plants through the sustained agricultural development of landscapes in the eastern Great Plains (Roper 2006). These cultural developments appear to have created a dependence on river valley depositional settings that could be targeted for agricultural production. Accordingly, understanding the specific soils and geomorphic characteristics of settlement patterns may allow a better prediction of Steed-Kisker phase archaeological sites, and assist in the planning of their evaluation.

Past research into the Steed-Kisker phase has been predominantly accomplished through traditional methods of archaeological investigation, including site excavation, trenching, and coring (Angelbeck 2001; Logan 2000; O'Brien 1977; Shippee 1960; Wedel 1943). All of these methods involve extended periods of time and person-hours to excavate, record, and map a site. These methods can also be relatively destructive to a site. To date, investigation of Steed-Kisker phase sites has involved little use of less destructive technologies including Ground Penetrating Radar (GPR), Remote Sensing and GIS mapping. These methods can aid in the understanding and interpretation of Steed-Kisker phase sites and other pre-European contact sites that may be buried at shallow depths. To understand the spatial distribution of landscape usage of a Steed-Kisker phase site, this study used a multi-faceted approach combining GIS and Remote Sensing, along with pedestrian survey, river terrace coring and ground truthing excavation. These combined techniques are much more informative regarding landscape usage and can be a less destructive, cost effective way to investigate a site. The use of some of these techniques also requires fewer person-hours than earlier archaeological methods of the past necessitated.

In this study, I introduce the Steed-Kisker Cultural phase and how it fits into the larger archaeological record of early agricultural societies found in the Mississippian Cultures of eastern and southeastern North America. A description of the Smith's Fork site and the suite of archaeological methods that have been utilized to collect data follows the Steed-Kisker phase introduction. I have mapped the methods used and data collected, through the various archaeological methods, in GIS in order to give clearer comprehension to the site and groups like the Steed-Kisker. This will be followed by an interpretation of the field data collected in this study, concluding with how well the suite of archaeological methods worked at the Smith's Fork site and how the suite of methods compare with similar sites.

CHAPTER 2

THE STEED-KISKER CULTURAL PHASE

Archaeological Terms

Before a description of the Steed-Kisker Cultural phase can be described in any detail, it is important to address some archaeological terminology. This will aid in the understanding of site locations and historical context.

Prior to the 1960's, many state archaeological projects were recorded using what each university or research museum had created for itself as a data recording system. On a national level, this became very confusing and impossible to use. The Smithsonian Institution, working as a federal agency in many states, created a simple numbering system that enabled them to have control over all collected data. This is the system that is used today. In the Smithsonian Institution system each state is listed alphabetically and is then assigned a number. This became the first part of the archaeological trinomial system. Next, each county within a state was given a two or three letter identification as the second part of the trinomial. The final identification in the trinomial system is the site identification number that is given in a numerical sequence by order of the recording of sites in the county of that origin. The Smith's Fork site is 23CL223. This means that the Smith's Fork site is located in the State of Missouri (23), the County of Clay (CL) and was the 223 archaeological site that was recorded in Clay County.

To better understand the Steed-Kisker, it is necessary to appreciate what is meant by the word "phase" when referring to the Steed-Kisker Cultural phase. It is also important to understand where the Steed-Kisker phase fits in with prehistory of the region and with the Eastern North American agricultural groups along with the terminology of the groups that may have interacted with and existed at the same time as the Steed-Kisker.

Within the same region that the Steed-Kisker phase people occupied, the region was occupied, earlier in history by a Late Archaic group called the Nebo Hill phase. The Nebo Hill phase activity in the region dates from 3,000 until 1,000 BCE. Though they were not sedentary farmers, like the Steed-Kisker phase, they were early agriculturalists. The Nebo Hill people grew *Chenopodium* (goosefoot) and produced fiber-tempered pottery. Unlike the Steed-Kisker phase, the Nebo Hill phase did not utilize river valleys or alluvial terraces. The majority of all Nebo Hill phase sites are located along bluffs and hilltops located 120 to 220 feet above river floodplains (Shippee 1948: 29).

Like the Steed-Kisker phase, the Kansas City Hopewell lived on the margin of the woodland/prairie ecotone and were influenced by groups from the east. The Kansas City Hopewell are representative of the Middle Woodland period that lasted from 100 BCE until 700 CE. The Kansas City Hopewell grew a slightly larger variety of domesticated plants than the Nebo Hill phase people had. In addition to the *Chenopodium* the Kansas City Hopewell added *Cucurbita* (squash) and *Iva annua* (marshelder or sumpweed). This increased plant domestication allowed them to establish small villages along the Missouri River and its tributaries, including Line Creek. Though the Kansas City Hopewell were cultivating domesticated plants, it appears that most of their diet came from the collection of seeds, nuts, and wild game.

It was not until "between A.D. 800 and 1100, a shift in food production economies occurred and a single non-indigenous species (maize) came to dominate the fields and diets of farming societies" (Smith 1989: 1566). This occurred during the Mississippian tradition throughout the Southeast and Midwest of North America. It was during this period that the Steed-Kisker phase adopted maize agriculture, adding it to their gardens along with *Chenopodium, Iva annua, Cururbita, Hordeum pusillum* (little barley), *Phalaris caroliniana* (maygrass), *Helianthus annuus* (sunflower), and common bean, which has been recovered from the Steed-Kisker phase Cloverdale site (23CL164), though not at Mississippian tradition sites, like Cahokia, in the American Bottom until centuries later (Angelbeck 2001: 87).

The Steed-Kisker phase has long been considered to have been on the western edge of the Middle Mississippian tradition. Steed-Kisker phase sites have been recorded between Kansas City and St. Joseph, Missouri, extending on both the east and west sides of the Missouri River in both Missouri and Kansas. Many sites have also been found on tributaries to the Missouri River. Radiocarbon dates place the culture between 950 to 1400 CE (Logan and Ritterbush 1994: 1-25). The ceramic vessel shape and projectile point technology and style are contemporaneous with the early Moorehead, Lohman, and Sterling phases at Cahokia (O'Brien 1993: 61-96). These phases from Cahokia, the largest Native American city in the pre-European contact period of the United States, appears to have had extended contact and trade with the Steed-Kisker as did sites from the Central Plains tradition (O'Brien 1993: 61-96).

Both the Middle Mississippian tradition and the Central Plains tradition timelines overlap with the Steed-Kisker phase. The Middle Mississippian tradition lasted from 700 to 1500 C.E. It is often referred to as the Temple Mound Builder Period, showing a Mesoamerican influence in its shift in agricultural practices, and is generally represented by Cahokia.

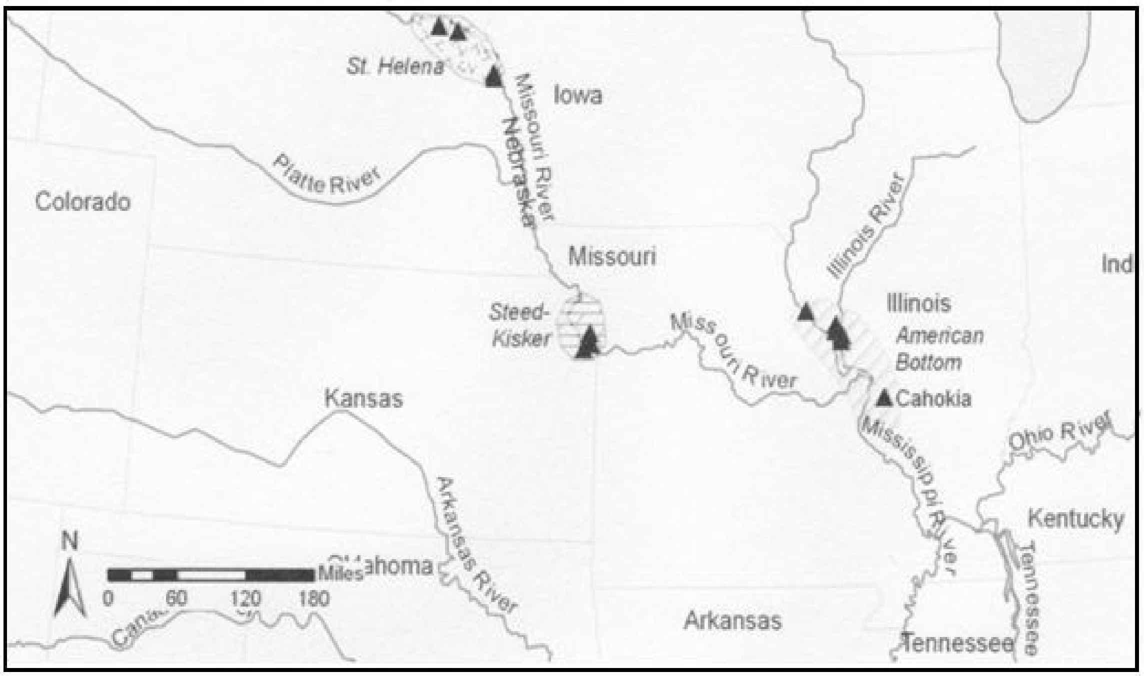

Figure 1: The Steed-Kisker phase in relation to Cahokia and the American Bottoms.

The Central Plains tradition, a period that lasted from 1000 to 1400 CE, is divided into several geographically separated phases that have many similarities in technologies, house structures, and artifact types. All are distinguished by ceramic style variations. The Central Plains tradition includes the Upper Republican phase in south-central Nebraska and north central Kansas, the Itskari phase in central Nebraska, the

Smoky Hill phase in northeastern Kansas and southeastern Nebraska, and the St. Helena phase in northeastern Nebraska along the Missouri River.

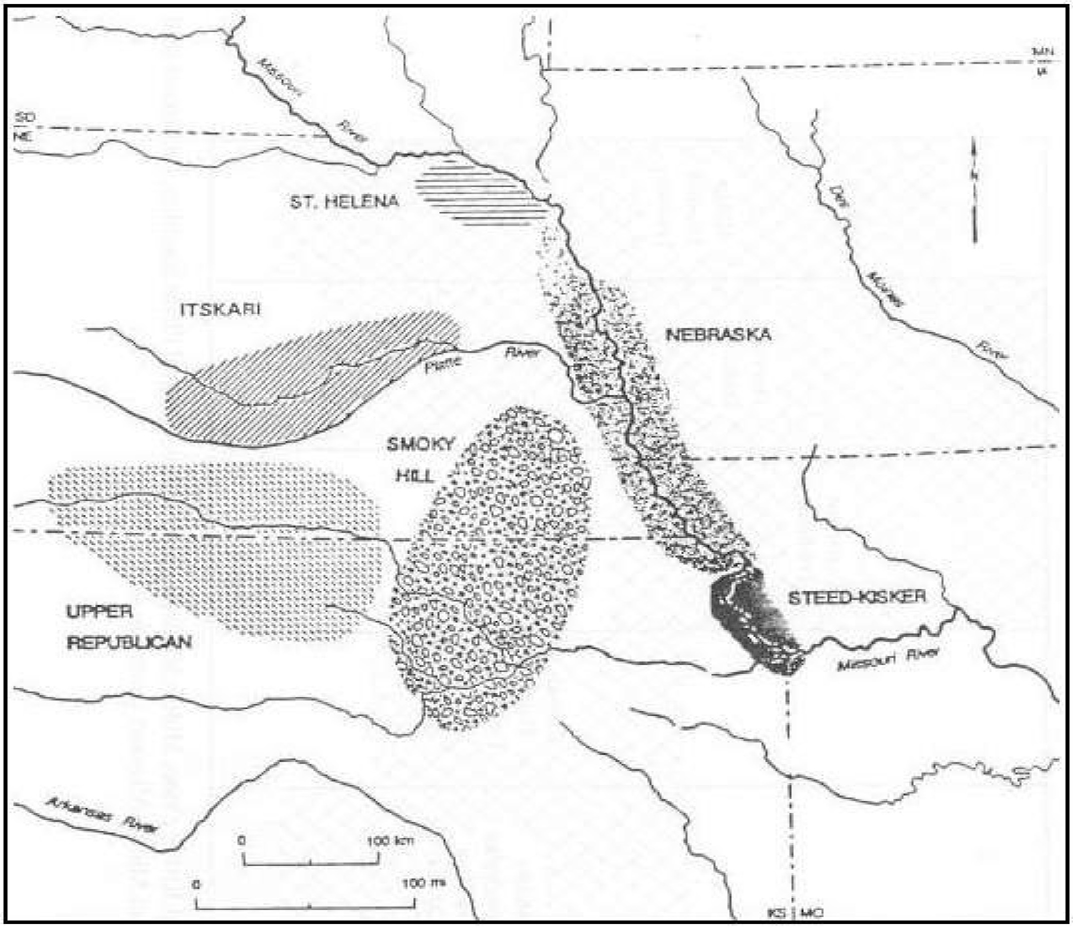

Figure 2: The Steed-Kisker phase in relation to the CPt locations
(Adapted from Billeck 1995: 12).

There is a hierarchy that archaeologists use to describe and classify various cultural relationships. These organizational terms are used to "define on a basis of similarities in cultural traits, geography, and time. A phase, the smallest unit, has a series of similar cultural traits and is restricted in time and space. A series of similar phases form a tradition, which has greater variability in cultural traits and spans a longer period of time and a larger geographic range" (Billeck 1995: 8). A variant refers to a transitional period between a phase and tradition.

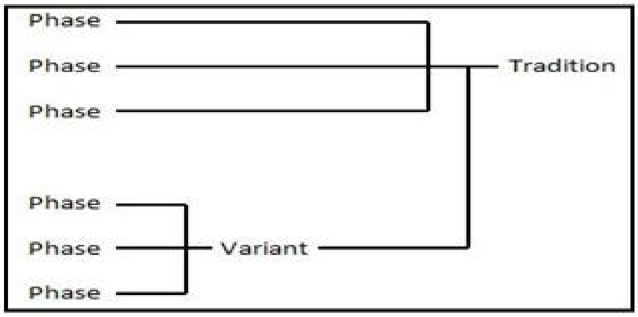

Figure 3: Phase, Variant, and Tradition Key (Billeck 1995: 9)

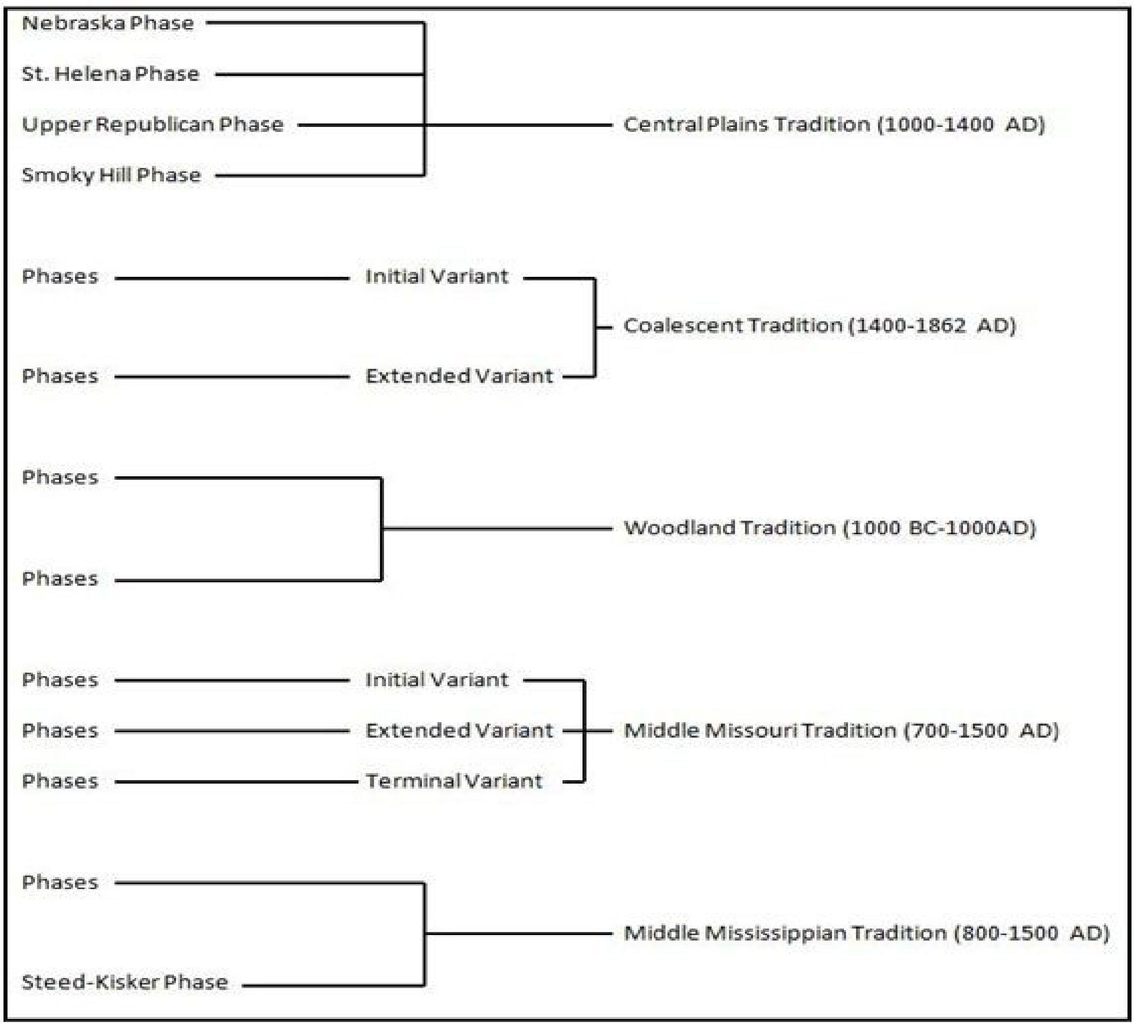

Figure 4: Archaeological terms used to delineate the cultural hierarchy in the Central Unites States (Billeck 1995: 10)

The Steed-Kisker Archaeological Record

What was to be later identified as Steed-Kisker Cultural phase mounds were first recorded in the 1870's. This was during the earliest interest in the pre-history of the Kansas City region, when members of the Kansas City Academy of Science first began to excavate and write about the American Indian mounds located around the area. During this period, the members of the Kansas City Academy of Science had no way of determining that groups of different cultural phases constructed the various mounds they found and that no single group had constructed them all (Chapman 1981: 1).

According to Chapman (1981: 2), the next recorded interest in the prehistory of the Kansas City region began around 1910 when physical anthropologist Ales Hrdlicka, of the Smithsonian Institution, examined the human remains removed from some of the Kansas City mounds. During the time that Hrdlicka was working on the skeletal analysis, Gerald Fowke and L. Houck were both working on the first full scale archaeological survey of the Kansas City region. Chapman (1981: 2) notes that in Houck's 1908 publication, the *History of Missouri Vol. 1,* Houck recorded 26 mounds in Jackson County, 22 in Clay County, and nine in Platte County. In 1910, Faulk recorded and excavated mounds located along the bluffs above Line Creek, the Brenner mounds in what is now Riverside, Missouri, and the Klamm mound, which was located along the border of Platte and Clay Counties north of the Brenner mound site (Fowke 1910: 1-102).

It would be another 20 years before any interest in Kansas City's pre-European history would become of interest again. In the mid-1930's, amateur archaeologist J.

Mett Shippee became interested in the pre-history of the region. In 1934 and 1935, Shippee excavated the Renner (23PL1) and the Avondale Mound (23CL1), the latter having been one of the mounds first recorded by the Kansas City Academy of Science in the 1870's. Archaeologists later indentified the Avondale Mound as a Steed-Kisker phase site. The Renner site is the type-site for the Kansas City Hopewell tradition. Although he never recorded his findings, Shippee did contact the Smithsonian Institution. In 1937, the Smithsonian sent Dr. Waldo Wedel to Kansas City to examine Shippee's findings. Wedel worked alongside his assistant, Marvin Kivett, and also employed Shippee as a field hand. Their work, in 1937 and 1938, led to the 1943 Smithsonian Institution publication *Archaeological Investigations in Platte and Clay Counties Missouri* (Wedel 1943). In this publication Wedel became the first archaeologist to recognize Steed-Kisker as a unique archaeological cultural phase. The name, Steed-Kisker, comes from the type-site (23PL13), located on property owned by C.A. Steed and William Kisker that Wedel excavated and recorded in the town of Farley in Platte County, Missouri (Wedel 1943).

The Steed-Kisker people lived in small hamlets of only two to five house structures that were constructed of timber, grass, and daub. Daub is a building material mix of mud or clay with grass and is used to cover a simple dwelling of a wooden pole frame and interwoven twigs or laths. Most were located along the Missouri River and its tributaries, in what is now Buchanan, Clay, Clinton, and Platte counties in northwestern Missouri and Leavenworth and Wyandotte counties in northeastern Kansas (Shippee 1972). The Steed-Kisker phase was one of the earliest intensive sedentary farmers in this region. From the excavated Steed-Kisker burials, it is known that they had a single-tiered society in which individuals within the group appear to have been equal, contrary to the nearby Mississippian culture and the multi-levels of status in their society (Logan 1988: 3-26, Shippee 1972).

As mentioned earlier, the Steed-Kisker people were farmers and the cultigens they grew were all very similar to those grown by other groups associated with the Central Plains tradition, including in the Initial Coalescent, Itskari, Nebraska, Smoky Hill, St. Helena, and Upper Republican phases. Cultigens identified at the Crabtree Site (23CL164), another Steed-Kisker site, include 10-and 12-row maize, sunflower, common bean, maygrass, squash, marshelder, sumac, chenopod, little barley, nightshade, wild grape, and tobacco (Angelbeck *et al*. 2001).

"The Steed-Kisker phase settlement pattern is characterized by dispersed houses. They do not appear in compact clusters of houses forming villages. This is similar to the settlement pattern of the Central Plains tradition" (Billeck 1995: 23). Of all of the Steed-Kisker Cultural phase sites, there are thirteen known house structures that are similar in construction to those of the Central Plains tradition earthlodges. Their construction consisted of a four-post roof support system and a central interior fire pit. The structures are square, like the Central Plains tradition houses, or rectangular, semi-subterranean, and a few of them have an extended entrance. There are three exceptions to this: a house found at the McClarnon site (23PL37) in Platte County was constructed above ground, and two houses, one at the Gresham site (23PL48) (Shippee 1972) near present day Parkville, Missouri and one at the Coon site (23PL16) that were constructed with a wall-trench similar to the Mississippian style of lodges at Cahokia (O'Brien 1993).

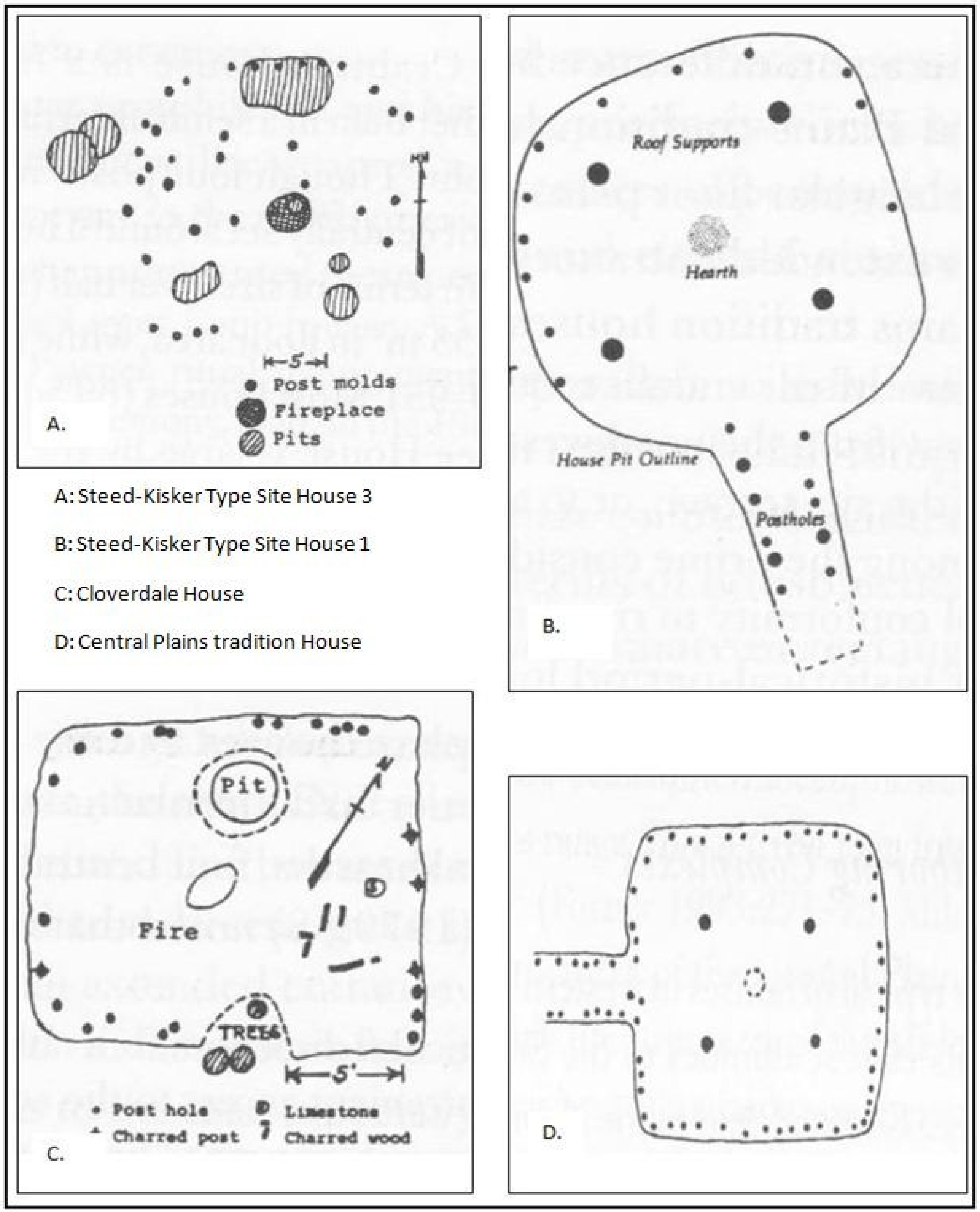

Figure 5: Examples of Steed=Kisker structure remains and an example of a Central Plains tradition structure (Adapted from Angelbeck 2001).

The construction style of the Gresham (23PL48) and Coon (23PL16) structures is not the only feature that has similarities in common with all Mississippian cultures to the east. Projectile points found at Steed-Kisker sites are small triangular, un-notched or single- and double-side notched which are similar to Cahokia, Harrell, and Madison points found throughout Middle Mississippian sites. The Steed-Kisker ceramics also have a basic affinity to the Mississippian ceramic traditions.

The pottery designs are similar to the Mississippian Ramey Incised pottery. Calabrese (1969) has categorized two distinct types of Steed-Kisker pottery. The first is what he referred to as the Platte Valley ware and the second an unnamed ware. The Platte Valley ware is generally smooth and shell tempered. The incision on the pottery is either a rectilinear design or a curvilinear design along the shoulder of the vessel that may also have lug handles or animal effigies. The Platte Valley Plain was later subdivided into the Platte Valley Plain and the Steed-Kisker incised ware. The other unnamed ware is predominantly grit tempered and has a surface treatment that is either smoothed or cord marked.

The similarities between the Mississippian cultures to the east and the Steed-Kisker culture have caused many archaeologists researching the Steed-Kisker Cultural phase to believe that the Steed-Kisker people were migrants from Cahokia who brought their cultural traits and technologies with them (Chapman 1980; O'Brien 1993). It was also believed that the Steed-Kisker were on the outermost western trade outpost for raw materials going into and out of Cahokia (O'Brien 1978; Wedel 1943).

It is now generally accepted that the Steed-Kisker Cultural phase is a part of the Central Plains tradition group, but they were influenced by Mississippian cultural traits and technology. There have also been studies on the skeletal remains of Steed-Kisker individuals who were removed from burial mounds, which reveal more physical commonality with the Central Plains tradition groups, located in the Great Plains of North America, than with the Mississippian groups along the Mississippi River floodplains of Southern Illinois in what is called the American Bottoms (Baier 2009: 42). Nonetheless, cultural similarities to both the Mississippian and the Central Plains tradition groups are evident, based on previous research that has focused on the ceramics, projectile points, house structures, and burials.

Smith's Fork Location and Geomorphology

In order to protect the Smith's Fork site, its exact location cannot be disclosed, but a focus will be placed on its site setting. The Smith's Fork site is located on the south side of the Little Platte River. The valley floor has an average elevation of 247 meters to 250 meters (m) above sea level. The Little Platte River flows along the north and west sides of the site's floodplain and its alluvial terrace. The "valley floor consists of a narrow modern floodplain (T-0) and a broad alluvial terrace (T-1). The modern floodplain is the lowest geomorphic surface in the valley landscape and, as an active floodplain, is flooded frequently and at fairly consistent recurrence intervals. A 2-3-m-high scarp separates the T-O surface from the T-1 surface" (Mandel 2011: 300). The north side of the floodplain has a manmade earthen levy constructed between the Little Platte River and the Smith's Fork site.

"The T-1 terrace is a paired geomorphic surface that dominates the valley floor. It has a gently sloping tread and subtle to distinct alluvial features, including natural levees, abandoned channels, meander scars, and flood chutes. The T-1 terrace is occasionally flooded" (Mandel 2011: 300).

The site sits on the T-1 terrace three to six meters below an elevated terrace (T-2) on its southern side. The current length of the site measuring east to west at its widest points is approximately 479 meters. The measurement from south to north is approximately 298 meters. These measurements were different during the Steed-Kisker occupation due to the lateral migration, to the west, of the Little Platte River. Due to the elevation of the T-2 terrace, the site is secluded from its southern side and protected by a water barrier on its north and west sides.

The highest elevation in the field is near its center. The lowest elevation is located in the west of the field. This lower elevation is likely the abandoned channel of the Little Platte River. The site has been continually utilized as an agricultural field for about one hundred years, when early plat maps show land ownerships. The 1961 United States Geologic Survey (USGS) topographic maps shows that there are still two houses on the T-2 terrace, both houses have since been razed. A plat map is a map drawn to scale and showing the divisions of an area of land.

The site is a predominantly level terrace located on a fertile floodplain; it can be assumed that during pre-contact American Indian as well as European occupation, it would have been an ideal location for agricultural fields.

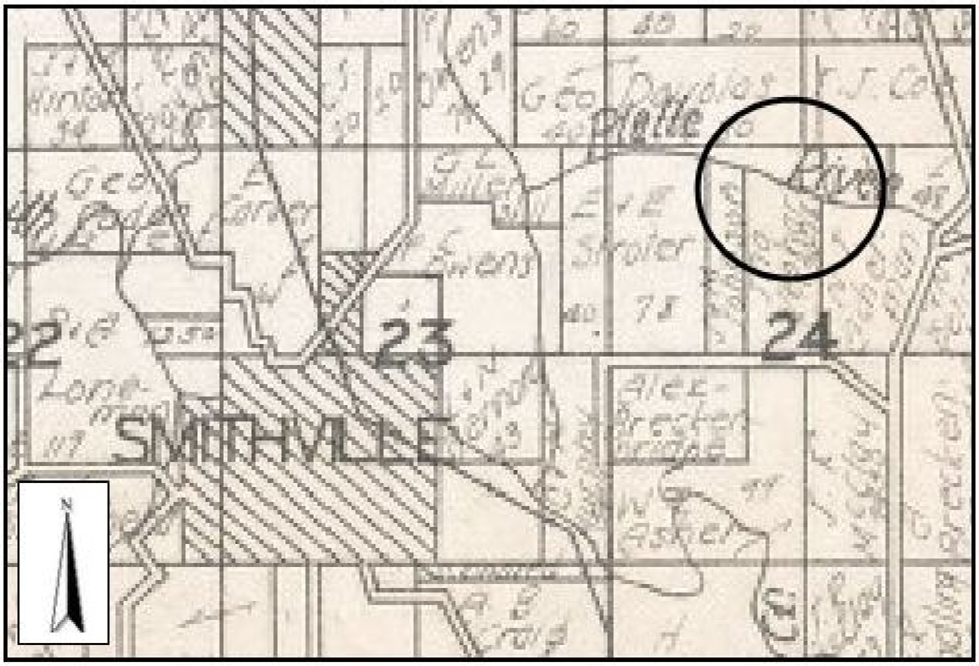

Figure 6: A 1930 plat map of Smithville showing the Little Platte River. (Missouri Digital Heritage, accessed 2011)

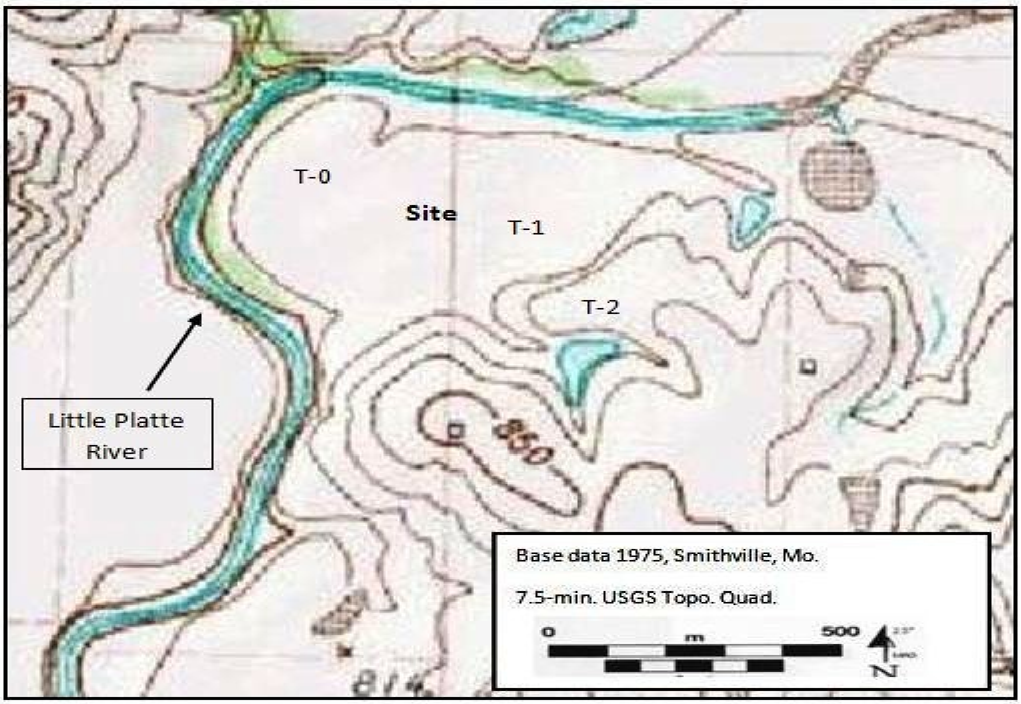

Figure 7: USGS topographic map of the Smith's Fork site from 1961 with T-0, T-1, and T-2 floodplain and terraces located. The maps contour intervals are 10 feet. The two squares to the south of the site represent modern house structures that were there in 1961 and are now gone. The map is 1:24,000 scale. (USGS 1961)

The Smith's Fork site is divided into three soil types. The active floodplain (T-0) in the west half of the site, 13563 in Figure 8, can be categorized as a Nodaway silt loam that is 0 to 2 percent slopes and is occasionally flooded. While the alluvial terrace (T-1) that dominates the eastern half of the site, 12505 in Figure 8, is made up of a Wiota silt loam with 0 to 2 percent slopes. The upper terrace (T-2) along the south of the site is an eroded Sharpsburg silt loam with 5 to 9 percent slopes (http://websoilsurvey.nrcs.usda.gov). Wiota silt loam has a "natural fertility that is high and organic matter content is moderate. The soil is suited to corn (maize), soybeans, small grains, and grain sorghums" (www.soils.missouri.edu).

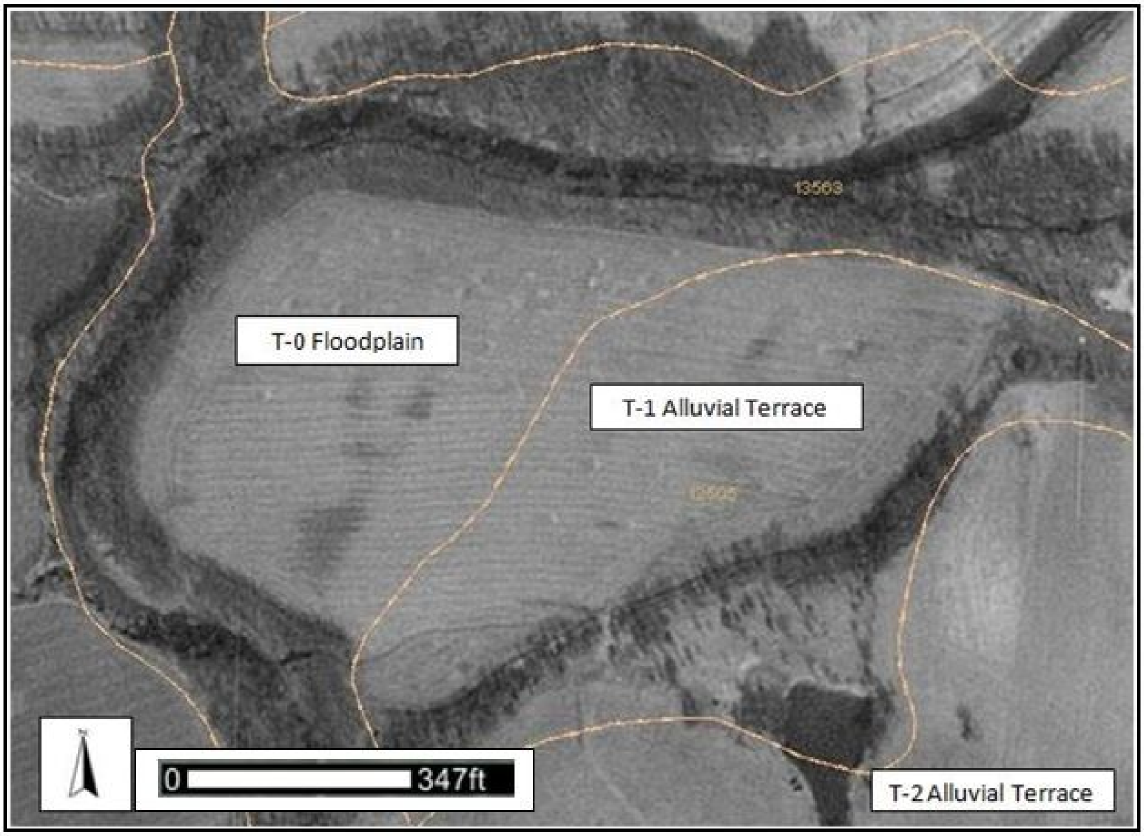

Figure 8: Smith's Fork Soils Map using spatial data from June 2008 and showing the locations of the three major soil types on the site.
(http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx)

Previous Site Work at Smith's Fork

The United States Army Corps of Engineers (USACE) contracted Dr. Patricia J. O'Brien of Kansas State University to survey the site in 1976 as part of the Smithville Lake Project. Crew member B. O'Neill, recorded the site on June 9, 1976. The landowner at the time of survey was listed as Mr. Buddy Summers. The 1976 survey met the requirements for a Missouri Phase I pedestrian survey which "requires ground visibility of 25 percent or greater with the appropriate transect interval at 5 meters" (Missouri Department of Natural Resources). The 1976 survey crew consisted of five individuals who spent one hour on the site. The County Survey Sheet for the site listed the site as an agricultural field that was planted almost completely with milo sorghum. The survey crew located over thirty artifacts in five distinct clusters. The artifacts collected included eight thin bifaces, one thick biface, one drill, one scraper, one hammerstone, bone, fresh water marine shell, ceramics and chert flakes. Also found, but not collected, were fire cracked and rough rock. The ceramics were identified as Late Woodland and Platte Valley ware. One of the lithics was identified as a Paleo-Indian Hell Gap point, while the others were listed as Kansas City Hopewell and Steed-Kisker points. Dr. O'Brien concluded that the site was "probably a Steed-Kisker farmstead" and she recommended further testing (O'Brien 1977: 10).

Though the 1976 survey is not part of the recent research and analysis at the Smith's Fork site, it is relevant to include the approximate locations of artifacts collected from the site. Figure 9 shows the locations, as drawn on a field map by O'Brien's team, of the five projectile points, a lithic tool, and a pottery sherd that the O'Brien crew collected from the site. A total of 38 artifacts were collected during the 1976 O'Brien survey, all of which predominantly relate to the Steed-Kisker Cultural phase. Currently, the artifacts collected by O'Brien are in curation at Kansas State University (KSU) in Manhattan, Kansas. See Appendix C for a catalog of all 1976 artifacts.

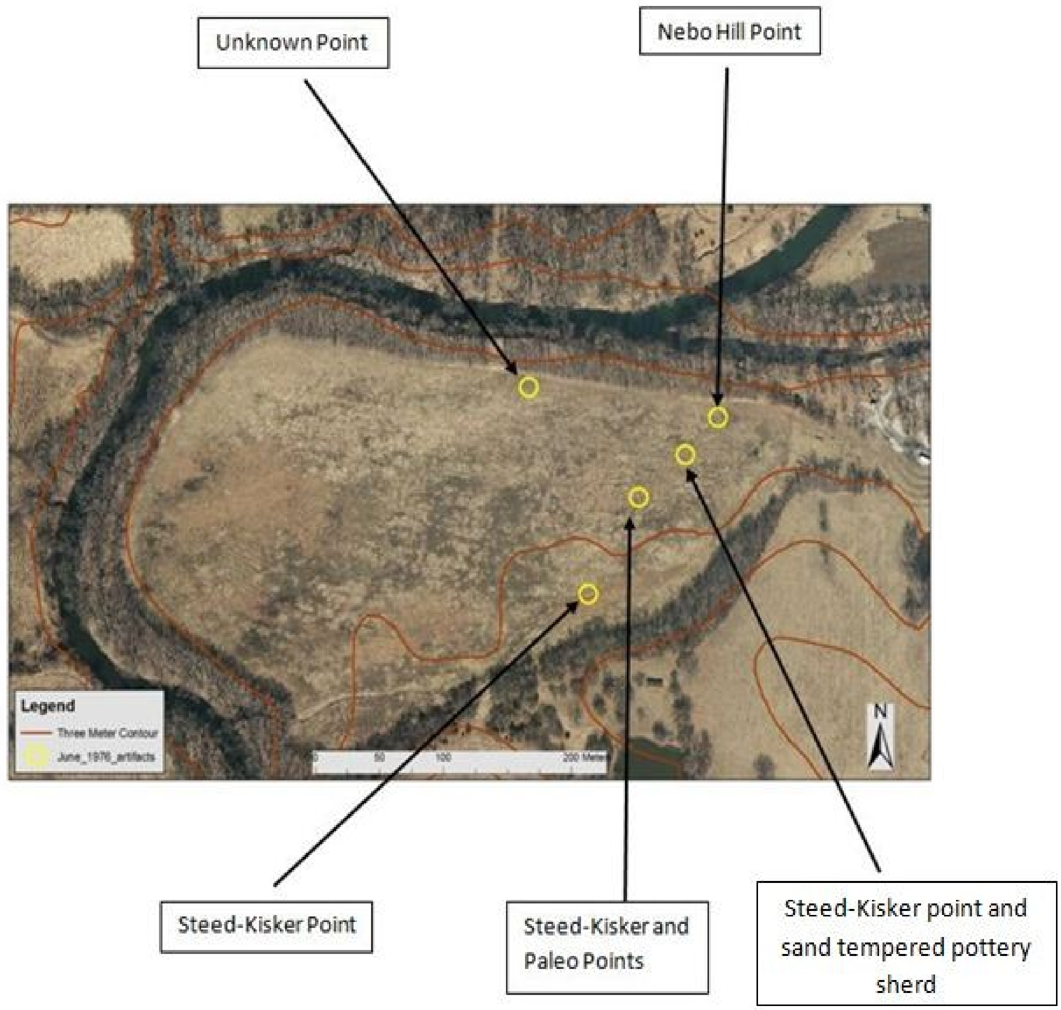

Figure 9: Artifact Locations from the 1976 survey.

1976 Mapped Artifacts and Coordinates	
Artifact	Coordinates
1. Nebo Hill	W34/N28
2. Steed-Kisker and sherd	W56/0
3. Steed-Kisker and Paleo-Indian	W95/S31
4. Unknown	W181/N50
5. Steed-Kisker	W136/S103

Figure 10: 1976 artifacts description and coordinates.

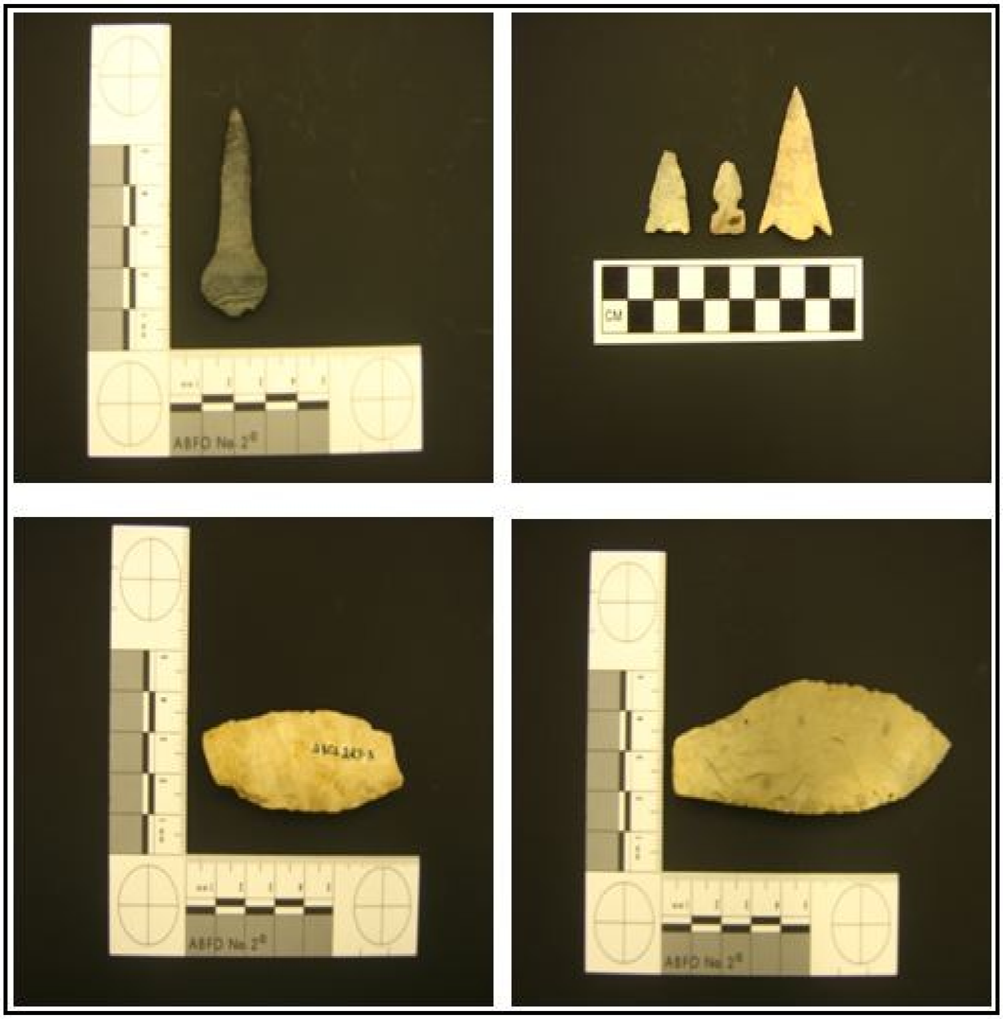

Figure 11: Artifacts from the 1976 survey. The upper left photo is a lithic drill while the projectile points in the upper right are all Steed-Kisker points. The bottom left is an unknown scrapper or point and the lower left is a possible paleo-point that shows signs of basal grinding. (Photos taken by the author from the 1976 collection in curation at Kansas State. 2010)

In 1978-79 GAI Consultants, Inc. of Monroeville, Pennsylvania, were contracted by the USACE to archaeologically and geologically investigate locations around the Little Platte River between the cities of Smithville and Plattsburg, Missouri. Though their investigations did not include the Smith's Fork site, their two-part report extensively covers the Smithville Lake area. Data collected by GAI Consultants are very relevant to the Smith's Fork site in helping to understand the Little Platte River valley (McHugh 1982).

In 2000, the city of Smithville proposed the placement of soccer fields on the site. USACO archaeologist, Robert J. Ziegler, along with Park Ranger Sam King, resurveyed the site on March 7, 2000. This resurvey was also a Missouri Phase I archaeological surface survey. Ziegler and King found "chipped-stone debris and a possible hearthstone in four localities within the proposed project area." In his single page response, Ziegler recommended that the city would have to provide detailed plans that specified that the project would not go below eight inches of the surface. If the project exceeded the eight inches granted, then a Phase II archaeological investigation would then have to be conducted on the site (Ziegler 2000).

In 2007, the city of Smithville once again renewed their interest in placing soccer fields on the landform. USACE archaeologist for the Kansas City District Tim Meade met with city officials on the site. He performed a series of shovel probes and found ceramics, a point, and charcoal within his second probe. Mr. Meade contacted Dr. L. Mark Raab of UMKC and proposed further site testing (Meade personal communication 2010).

CHAPTER 3

METHODS AND DATA

Site Testing and Methodology

The current site testing and mapping of 23CL223 was carried out using eight methods: placement of site datum along with the establishment of a site grid, GPR survey, soil auger testing, a test excavation of Tim Meade's positive shovel test, shovel testing by the Center for Archaeological Research, deep coring, ArcGIS, and Remote Sensing mapping.

Site Datum and Grid

Datum location, grid layout and site mapping were supervised by Dr. L. Mark Raab of UMKC's Geosciences Department. On March 23, 2009, a site datum was established roughly two meters west of the USACE Survey Marker. A site datum can be a permanent feature on a site or set by the crew surveying the site. The site datum is the arbitrary "00,00" point from which the entire site will be measured and recorded. For the Smith's Fork site, the datum was placed along with three concrete footings as a reproducible position with which to set the theodolite and tripod on. A calibration due north using a mapping compass was used to set a second datum point approximately 50 meters north. From this second point, the theodolite was set at 90 degrees west and 100 meters long. A pen flag was placed every two meters. All measurements of the Smith's Fork site were made from this established grid and datum points.

Ground Penetrating Radar

On April 7, 2009, members of the UMKC Geosciences Department met to survey a section of the site using GPR along the north and south transect lines starting on the northeast corner of the gridded survey area. The survey ended on the 19th transect due to mechanical issues and poor weather conditions. The team returned approximately two weeks later to scan another 30 transect lines surveying from the east to west and continuing from where they had previously left off.

GPR was invented in the 1960's, but its use in archaeology did not come about until the 1980's. GPR is a non-destructive technique that utilizes electromagnetic radiation in the microwave band (10-1000 MHz). It uses two antennas, one for transmitting the radio waves and one for receiving the radio waves. GPR signals come into contact with various objects with different physical properties and reflect back to the receiver where the information is recorded by its time and distance. A single channel RAMAC/GPR system mounted in a "boat" using 200 MHz antennas and pulled over the transects was used at the Smith's Fork site. GroundVision GPR Measurement software was used to record and manipulate the data. A brief field examination of the GPR results indicated a strong likelihood of anomalies located one and a half meters below the surface directly to the west of the "00,00" site datum in transect number nine. An addition of two more anomalies were located in transects 13 and 18. The GPR data acquisition was spread over a six-day period due to weather and soil conditions. During the GPR study a total of ten surface artifacts were collected and recorded. The field data were then analyzed in the lab using RAMAC GroundVision software.

Unfortunately, because the site remained under agricultural lease, there were only short periods that the UMKC crew could perform the GRP method.

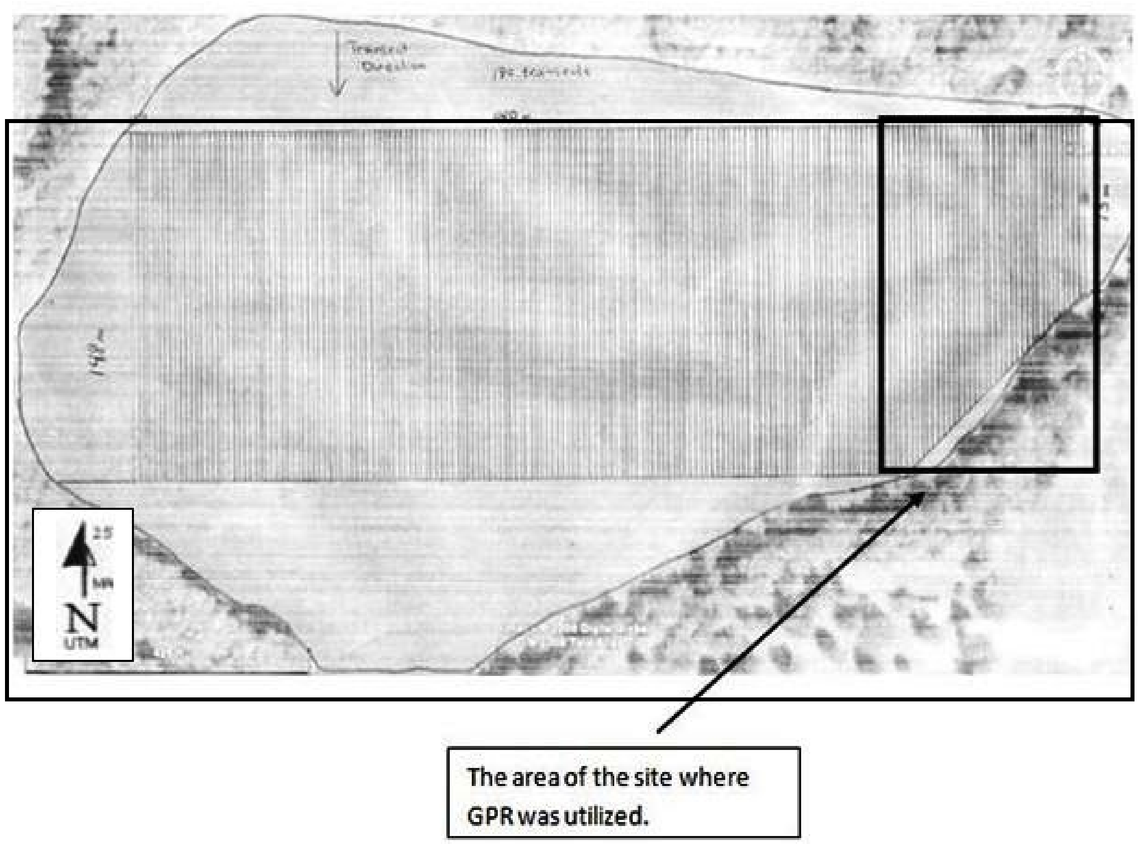

Figure 12: Field map of GPR transects set at 2-meter intervals running from the Northeast corner.

Of the area that we performed the GPR survey, the most interesting anomaly came from transect #9. At a depth of one and a half meters, there were three anomalies located in a row running north to south and evenly spaced from one another, each of which was roughly one meter across. There were also two other transects that had an anomaly in each one. These transects are row 13 and 18. Both anomalies were located to the west of transect nine and were a little over a meter below the surface, with the anomaly from transect 13 at 1.06 meters below the surface and transect 18 at 1.09 meters below the surface.

One of the effects of a GPR image is that when the wave leaves the antenna, it leaves it in all directions. In doing so, when it comes into contact with an anomaly, the image of the anomaly will tend to have a “plate” effect to it if the anomaly is wide. The edges of the anomaly will slant inwards on its underside. This effect can be seen in the image for transect nine in figure 11.

The anomalies were mapped in GIS by digitalizing the hand drawn field map, which was originally created by overlaying a transparency over an image of the site from Google Earth, and then importing the digitalized map image over the 2-foot resolution aerial image in GIS and using reference points to align the two. The anomaly points were then recreated in GIS and their coordinates recorded.

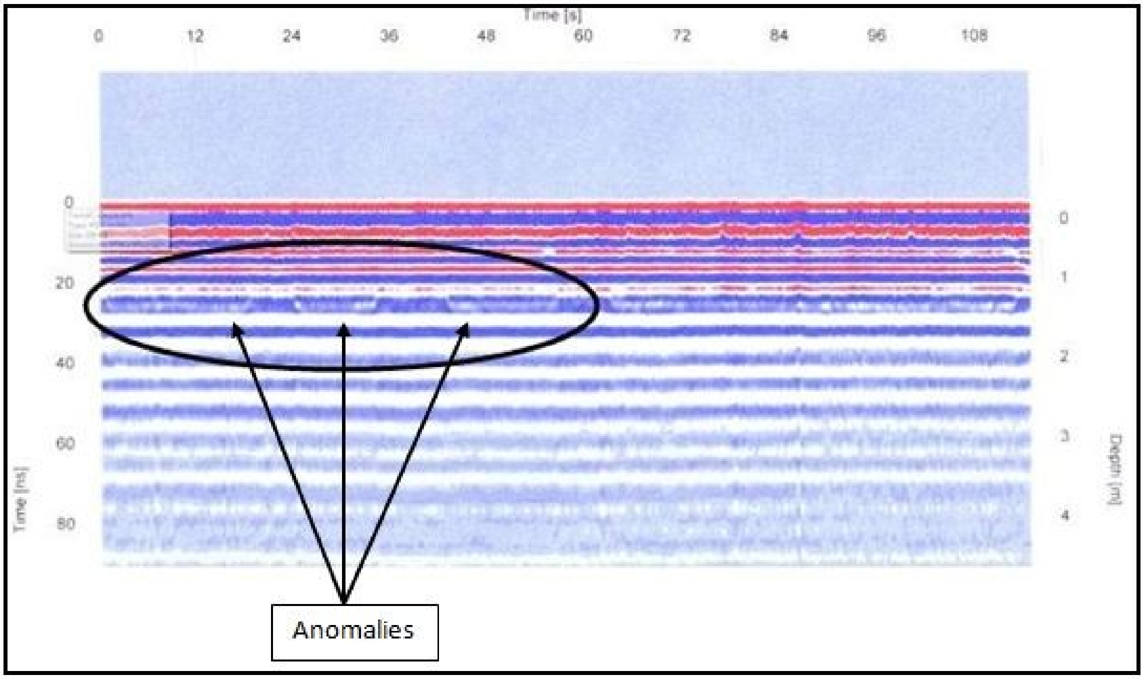

Figure 13: Transect Nine's anomaly results.

Figure 14: The locations of the anomalies detected by GPR.

Auger Testing

Auger testing was carried out was within the GPR surveyed area during May 2009 with auger tests 3 and 4 focusing on the anomalies in transect nine. A 10 cm diameter hand turned AMS soil auger was utilized for the auger testing. We sampled the auger tests in 10 cm increments and passed each increment through a ¼-inch mesh screen. Thirteen auger tests were taken at a maximum depth of 150 cm. Each test and its contents were then recorded in the field notes describing soil changes and artifacts, if any were found, for each 10-cm level. Of the thirteen auger tests taken, eleven of them had charcoal through the 110-120 cm levels and eight of the eleven auger tests had a layer of charcoal at the 30-60 cm levels. The larger charcoal concentrations appear to have been denser in the 110 cm level. See Appendix D for auger results.

Figure 15: The location of the 13 hand augers.

Feature 1 Test Excavation

The crew opened a test unit on April 9, 2010 over the site of Tim Meade's positive shovel test. Distance was established from the feature, W46/S31, to the datum. The following day a crew consisting of individuals from UMKC, Missouri State Historic Preservation Office (SHPO), along with Tim Meade from the USACE, returned to the site and established a datum corner within the feature recorded as W46/S31, which placed it in the southwest corner of the one-meter test unit. The top surface vegetation and soil were removed and screened through a ¼-inch mesh screen. The crew excavated the test unit to a 10 cm depth. In the 0-10 cm depth, only a few artifacts were found: two sandstone rock fragments and one lithic debitage flake. The 0-20 cm levels were located within the plow zone and would have very likely been disturbed numerous times due to the agricultural use and bioturbation from animals. At the 10-20 cm level a total of nine ceramic sherds were excavated. Two of the sherds were incised with cross-hatching while the other seven can be classified as shell-tempered Platte Plain ware. As the test excavation moved into the 20-30 cm level, it was no longer in the agricultural plow zone. Large clusters of artifacts were found at this level and it was determined by the types of artifacts discovered to be a household storage pit. The crew decreased the excavation to 5 cm increments due to the recovery of a large cluster of artifacts. At the 20-25 cm level, a quantity of pottery began to appear. Also recovered were a hammer stone and a sandstone abrader. The initial excavation was done over a single weekend. Due to the time restrictions involved, the crew only excavated the feature to a depth of 30 cm. At the end of the second day, the crew placed a tarp in the feature to protect the next layer. At this point, the crew buried the feature. On April 20, 2010, the author recorded Global Positioning System (GPS) coordinates for the site datum and the site back datum.

Figure 16: Feature 1 (W46/S31) vessel with 30 cm North Arrow.

Shovel Testing and Mapping

In May 2010, contract archaeological cultural testing was initiated by the Center for Archaeological Research (CAR) of Missouri State University in Springfield, Missouri. Dr. Neal Lopinot managed the project as subcontracted by Statistical Research, Inc. (SRI) of California and Arizona. During this time, the USACE requested that all Missouri and Kansas USACE managed lakes be surveyed for any cultural heritage. The Smith's Fork site was one of the areas slated for this testing. The Principle Investigator for this project was Dr. Gina Powell. The crew chief was David Cain, who operated a handheld Trimble GeoXH Handheld GPS with decimeter accuracy for mapping and recording positive shovel probes. There were two representatives from SRI along with two other crewmembers, including the author.

Transects were established on a south to north axis working from east to west with a shovel probe at every 15 meters. Shovel probes establish the absence or the presence of a site and are fundamental in determining a site boundary. When a probe tested positive for ceramics, lithic tools or any diagnostic, then shovel testing around the positive shovel probe would be placed at five meters in the cardinal directions until there was a negative shovel probe. Shovel probes were at least 25 cm in diameter down to archaeologically sterile soil, more than meeting the requirements for a Missouri Phase I archaeological survey (Missouri Department of Natural Resources).

In the case of the Smith's Fork site, shovel probes were dug through the plow zone and into the subsurface. All material from the shovel probes were screened using a 1/4 inch mesh screen. The location of the artifacts, including ceramics, lithic tools, lithic debitage, projectile points, and daub were recorded using the Trimble GeoXH. The artifacts were then bagged and labeled with the coordinate locations, site number, date and the crewmember whose shovel test the artifact came from.

Continued Test Excavation

On June 5, 2010, a small crew from UMKC returned to continue the test excavation of Feature 1 and to open a second test unit near the center of the site. This second area was selected due to the results of the shovel probes done by the crew from CAR showing a horizon of a dark midden. The UMKC crew established a second datum for the second test area, which was roughly 200 meters from the primary site datum, placing it at W192/S27. The midden test unit was excavated to a depth of 70 cm. Soil samples were bagged for future pollen testing. Figure 14 illustrates the midden test unit. The measurement rods is segmented into 5 cm lengths and the north arrow is 30 cm.

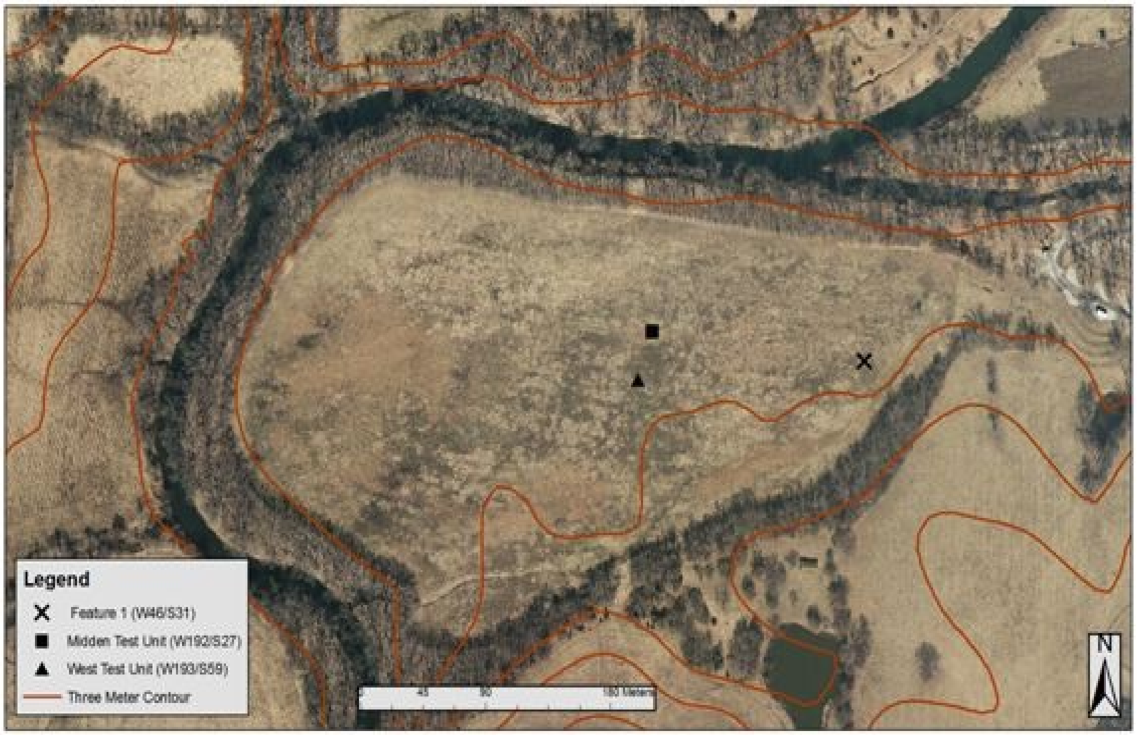

Figure 17: Feature 1 (W46/S31), Midden (W192/S27) and West (W193/S59) test units.

Figure 18: Photograph of the Midden test unit (W192/S27) profile with a 30 cm North arrow and scale pole divided into 5 cm increments.

The back fill was removed from Feature 1, W46/S31, and it was returned to its previous depth. The crew then excavated the Feature to a depth of 30 cm. The crew decided to expand the test unit and opened three additional meter test unit adjoining Feature 1. These included W47/S31, directly adjacent to the west, W46/S32 to the south, and W47/S32 to the southwest. The crew excavated all three of the new test units to a depth of 20 cm on June 6, 2010. The continued excavation of the storage pit revealed an abundance of pottery sherds and lithics, large stones, scrapers, a hammerstone, two projectile points, a uniquely shaped limestone metate (grinding stone) and beneath it, at the bottom of the storage pit, was a deer jaw tool. Through analysis of dental wear, the deer appears to have been harvested when the deer was approximately 2 ½ years old. During the excavation, soil and charcoal samples were taken for floatation and radiocarbon dating, respectively. Beta Analytical performed the radiocarbon dating. The USACE funded the radiocarbon dating from which three dates were collected. The crew recorded the bottom of the storage feature at 41 cm.

Laboratory number: **Beta-281424** Submitter #1

Conventional radiocarbon age: **790±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1170 to 1280 (Cal BP 780 to 670)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1260 (Cal BP 700)

1 Sigma calibrated result: (68% probability) Cal AD 1220 to 1270 (Cal BP 730 to 680)

Laboratory number: **Beta-281425** Submitter #2

Conventional radiocarbon age: **870±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1040 to 1260 (Cal BP 910 to 700)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1170 (Cal BP 780)

1 Sigma calibrated result: (68% probability) Cal AD 1160 to 1220 (Cal BP 800 to 730)

Laboratory number: **Beta-281426** Submitter #3

Conventional radiocarbon age: **750±40 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1220 to 1290 (Cal BP 730 to 660)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1270 (Cal BP 680)

1 Sigma calibrated result: (68% probability) Cal AD 1260 to 1280 (Cal BP 700 to 670)

Figure 19: Radiocarbon Dates

The two sigma radiocarbon dates from the Smith's Fork site are C.E. 1235 ± 55, C.E. 1084 ± 44, and C.E. 1255 ± 35. The radiocarbon dates from the Crabtree site (23CL164) are C.E. 1060 and C.E. 1100 while the single date from the Katz site (23CL163) is A.D. 1060 (Angelbeck et al. 2007). The DB site (14LV1071) on the Kansas side dates at C.E. 1286-1397 (Logan 2000: 245).

On June 7, 2010, during the excavation of test unit #2 (W47/S31), artifacts including lithics, pottery, and another projectile point were discovered. In addition, a second feature was uncovered in the northern section of test unit #2. At a depth of roughly 25 cm, charcoal flecks and modeled soil began to appear and persisted to a depth between 30 and 40 cm.

On June 8th and 9th, the UMKC group excavated W192/S27, the dark midden shovel probe from the CAR survey. Levels 0-20 cm contained a small amount of stone debitage and small pottery sherds. The dark soil layer began at 25 cm and continued to 60 cm. It was found that levels 25-60 cm were sterile of artifacts. The test unit was excavated to a depth of 70 cm with no further artifacts or dark soil.

On June 10, 2010, the UMKC crew returned to Feature 1 and excavated test unit #6 (W47/S30) to a depth of 30 cm. Between the 20 and 30 cm level, a few sherds were recovered as was a small amount of debitage. At approximately 24 cm, a large amount of charcoal was recorded. Also noted was an area of darker soil located between 5 and 8 cm on the east (test unit #5) wall. The following day the crew excavated test unit #5, (W46/S30) to a depth of 30 cm and uncovered a hearth between 17 and 30 cm that contained fire-cracked stone, charcoal, and fire burnt clay. The crew determined that the bottom of the hearth was at 30 cm. Below that depth there was no longer an abundance of charcoal or artifacts. In the 0-20 levels, there were small amounts of debitage flakes and small pottery sherds.

In summary, the location of Feature 1 and the hearth are found within the six test units associated with Feature 1. The majority of the storage pit was located in test unit #1, W46/S31, with sections in test units 2 and 3 (W47/S31 and W46/S32) and a small section in test unit #4 (W47/S32). The hearth was primarily split between test units #5 and #6 (W46/S30 and W47/S30). All artifacts were bagged, recorded, and then processed in the lab at UMKC

Figure 20: Photograph of the Feature 1 storage pit.

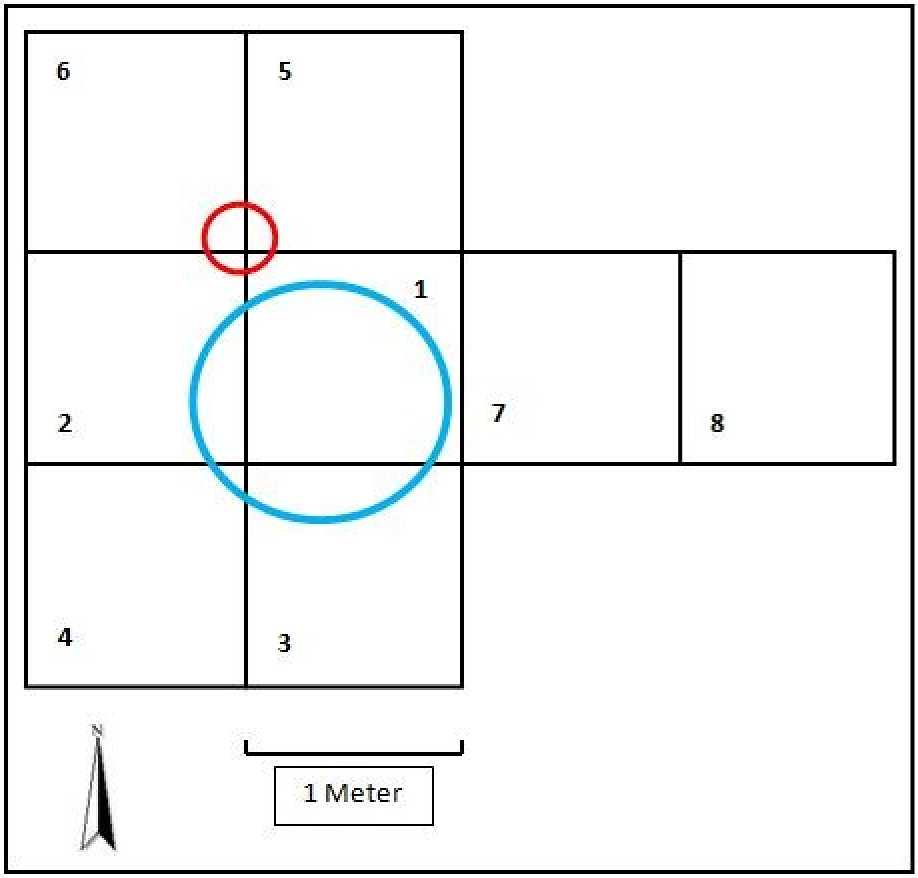

Figure 21: Feature 1 (colored blue), hearth (colored red), and the associated test unit locations.

Feature 1 test units coordinates	
Unit 1	W46S31
Unit 2	W47S31
Unit 3	W46S32
Unit 4	W47S32
Unit 5	W46S30
Unit 6	W47S30
Unit 7	W45S31
Unit 8	W44S31

Figure 22: Feature 1 test unit coordinates.

Initially, it was suspected that Feature 1 was a trash pit due to the fact that no complete ceramic vessels were uncovered during excavation. However, considering that everything else in the pit was functional, it is possible that the broken ceramics were there to be used as temper material for the manufacture of future vessels. Most of the sherds found in Feature 1 had shell temper, another Steed-Kisker quality, and a few had grit temper. Some had incised cross-hatchings for decorations and the remaining sherds were undecorated.

Giddings Core Testing

In August 2010, Dr. Rolf Mandel, Dr. Gina Powell, and the author returned to the Smith's Fork site with a Giddings trailer-mounted coring machine. Dr. Mandel extracted two cores from the site, which he took to the University of Kansas in Lawrence, Kansas, for analyses. Core 1 (W233/S35) was taken from the

> "tread of the T-1 terrace. It measured 3.1 m in length and consisted of moderately oxidized, fine-grained alluvium typical of the Gunder Member of the DeForest Formation. The surface soil has a thick, strongly expressed A-AB-Bt-BC profile (fig. 24). The core terminated in water-saturated silt loam composing the C horizon. No buried soils occur in the upper 3.1 m of the T-1 fill at this locality. Although the numerical age of the T-1 fill at the Core 1 locality is unknown, the magnitude of soil development, especially the presence of a thick argillic (Bt) horizon, suggests that the T-1 surface has been stable for 1,500-2,000 years "(Mandel 2011: 300).

The second core was taken from the floodplain along the west side of the site.

> "Core 2 (W352/S2) was taken to a depth of 2 m in floodplain (T-0). The surface of the soil has a thin, weakly expressed A-AC profile developed in silty alluvium (fig. 16).

Faint bedding occurs in the AC horizon at a depth of 38-65 cm below the T-0 surface, and stratified alluvium (C horizon) was intercepted at a depth of 65 cm. Weak soil formation and shallow bedding are of the Camp Creek Member of the DeForest Formation. It is likely that all of the alluvium in Core 2 accumulated over the last 150 years (Mandel 2011: 298).

Figure 23: Gidding core test locations.

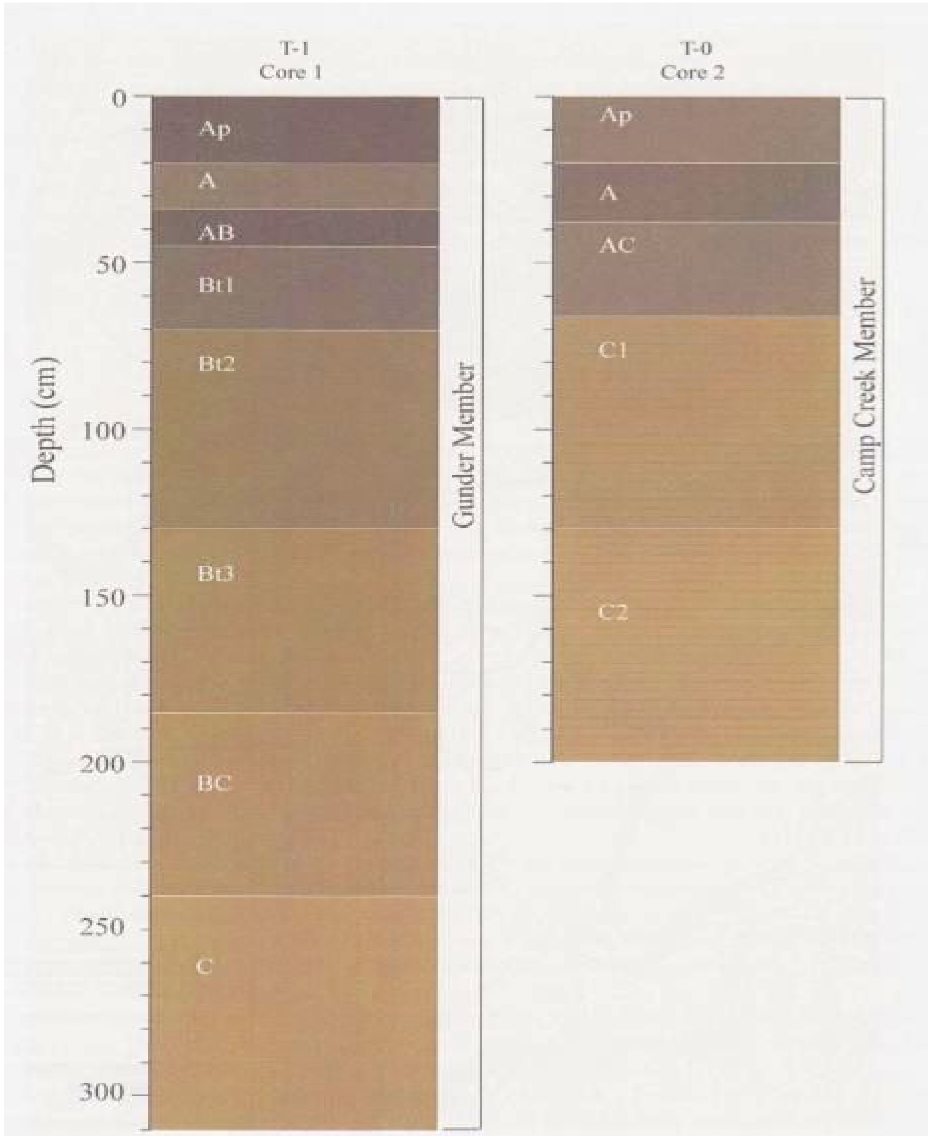

Figure 24: Gidding core sample profiles

Final Site Excavation and Testing

On August 16th and 17th, 2010, individuals from UMKC, Johnson County Community College, Longview Community College, and the University of Kansas, along with professional archaeologists Tim Meade of the USACE, Dr. Gina Powell, and John Peterson, archaeologist for Jackson County, Missouri, met at the Smith's Fork site to continue with the site testing. The focus of this group was to finish testing Feature 1 by extending the study area by excavating more two additional test units (W45/S31 and W44/S31) in order to establish that the edge of a house could be located and to open a test unit (W34/S00) over one of the anomalies identified by the previous GPR study. Also planned was to open one test unit (W193/S59) over a positive shovel probe that had been done by the crew from CAR in which a projectile point, ceramics, daub and charcoal were recovered. In addition, the group also hand auger cored along a north-south axis in two-meter increments over the black midden to establish its length. The coring was done using a 10 cm diameter, hand-turned soil auger taking samples in 10 cm increments. See Appendix E for Auger log. All screening from the August 16th and 17th session was done with a ¼" mesh screen. All artifacts recovered were bagged, labeled and recorded.

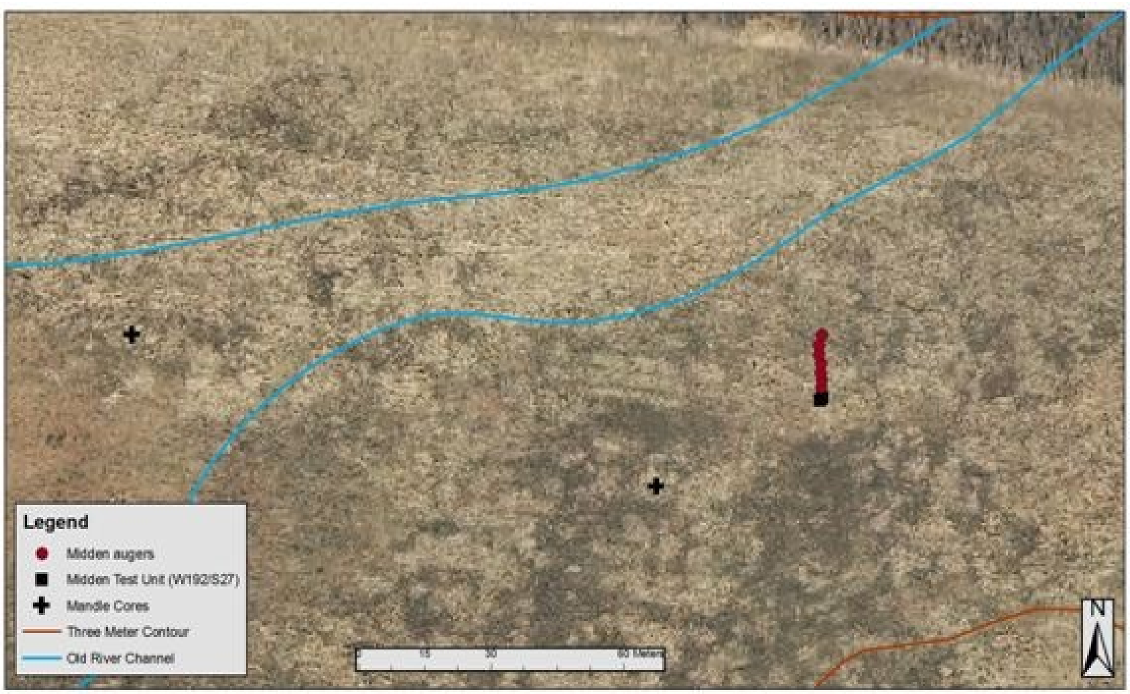

Figure 25: Location of Mandel cores, Dark Midden test unit (W192/S27) and Midden hand auger tests.

Remote Sensing and GIS Mapping

The coordinate field data collected was then mapped using ArcGIS 9.3.1 Software. An aerial photo of the State of Missouri that focused on the Smith's Fork site has been used as the base layer. The image is a two-foot resolution digital orthophotographic quarter quadrangles aerial taken during a leaf off period in early spring 2008 from a remote platform (www.msdis.missouri.edu). Because there are no leaves on vegetation and no crops in the aerial image, it allows the viewer to analyze the ground surface more accurately. A three-meter contour interval that was derived from a 1/3 arc second National Elevation Dataset DEM layer was then placed over the aerial layer to show elevations of and around the site. The shovel test field data from CAR was then added to the Smith's Fork database and then the individual artifact types were separated by type and shape files for each were created. Next, all GPS coordinates recorded in the field for the excavation test units, datum, GPR anomalies, hand turned auger cores, and cores extracted by Dr. Mandel were then added. Lastly, the original 1976 field drawings of the approximate locations of artifacts collected during the pedestrian survey were mapped. Then a shape file was created for the path of the Little Platte River during the Steed-Kisker occupation of the landform.

The mapping of the Little Platte River's pre-historic location was done using both a visual analysis of tonal variation, along with the appearance of channel scaring, and by converting the base aerial image to a hillshade image, as represented in Figure 26.

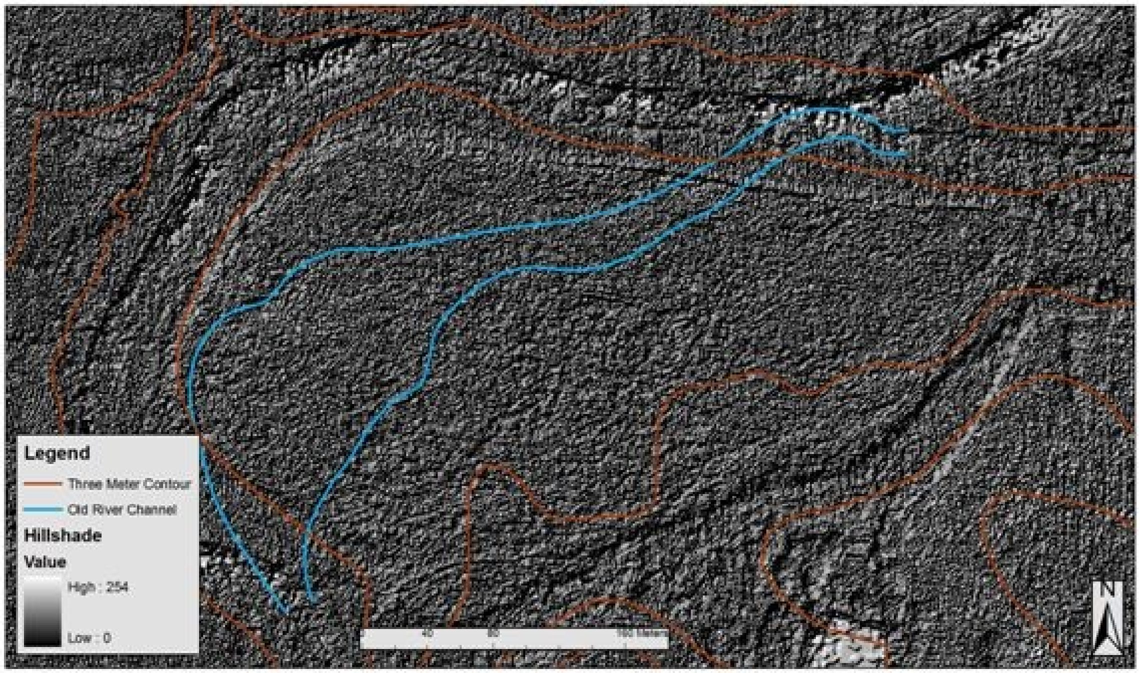

Figure 26: The Smith's Fork site with the "Hillshade" spatial analysis tool utilized to help identify location of the Little Platte River channel scars.

Figure 27 shows the locations of the surface artifacts located during the 1976 survey, all the positive shovel probes performed by the crew from CAR (which have been separated by artifact type), and the probable location of the Little Platte River during the Steed-Kisker phase occupation of the site.

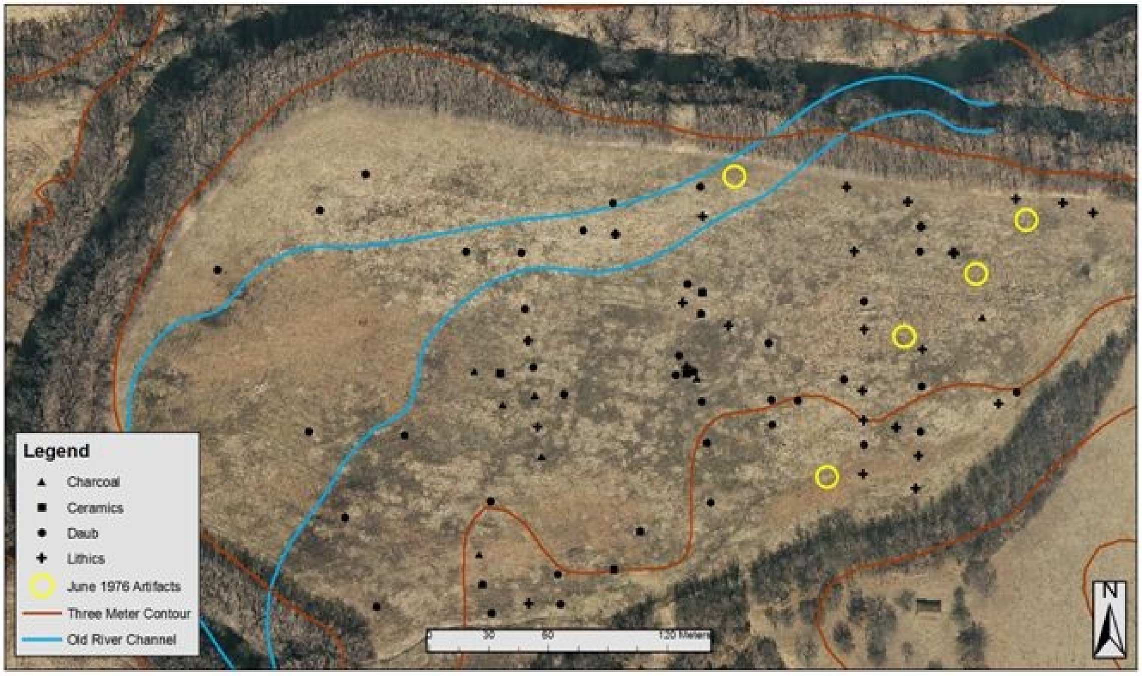

Figure 27: All positive shovel probes separated by artifact type and 1976 artifact locations

CHAPTER 4

INTERPRETATION

The Smith's Fork site has proven to be a great resource for the application of the different types of archaeological methods that can be used to understand and interpret an archaeological site. Other than the slope and lower elevation in the west, the occupation area of the site is relatively level with artifacts at shallow depths making it a good template for research at similar sites. To date, the utilization of GIS and remote sensing tools have not been applied to other Steed-Kisker sites. At the Crabtree site (23CL164), "GPR was used to isolate geophysical anomalies that could indicate prehistoric human activities" (Angelbeck, 2001). In Leavenworth, Kansas, at the DB site, (14LV1071), spatial analysis of small-scale debris was applied to the excavated focus area (Logan, 2000). Many of the earlier Steed-Kisker sites were excavated in a style very similar to what is termed "Salvage Archaeology." An example of this would be the predominant use of shovels to excavate the Steed-Kisker phase type-site (23PL13) in Farley, Missouri.

The base for this research lies in the initial identification of a site. In the Steed-Kisker phase, the Smith's Fork site's initial identification in the site report, as mentioned in Chapter 2, occurred in 1976 by the O'Brien's survey. However, this early survey did not establish the full extent of the site. It is for this reason that the work and associated discoveries from the CAR group are valuable. The combination of the shovel probes, screening, and recording using the Trimble help to establish the overall site boundary and the artifact distribution by location and type. Through the maps that I have generated from the data collected in this study, it is apparent that the majority of artifacts are located on the upper T-1 terrace while there are very few artifacts, other than daub, on the lower T-0 terrace. The two cores that were taken by Mandel corroborate this claim (Mandel 2011: 300). Both methods tell the researcher that the Steed-Kisker phase occupation existed only on the T-1 terrace.

There are a few factors with regard to artifact distribution at the Smith's Fork site that must be taken into consideration when examining the distribution maps. The first is the possible movement of artifacts cause by bioturbation, the movement of artifacts in a subsurface soil by plants or animals, in which artifacts tend to move in both vertical and horizontal directions. Another is the movement of artifacts by agricultural plowing. Roper (1976) tested the movement of fragments from five bifaces that could be reconstructed. That site, located in Springfield, Illinois, was a "Late Archaic mortuary component represented by at least 12 burials with 13 chipped stone bifaces. The site is shallow and has been badly disturbed by plowing for at least 20 to 30 years" (Roper 1976: 372). Roper's results found that lateral movement was minimal and concluded that "archaeologists working in areas of intensive agricultural activity, such as the Midwest, should be able to use surface scatter as a reliable indicator of subsurface distributions" (Roper 1976: 374). The final consideration of artifact movement that should be considered is erosion. In the case of the Smith's Fork site, it can be concluded that the Little Platte River migrated westward from near the center of the site to its current location. This movement resulted in the drop in elevation from the T-1 terrace to the T-0 floodplain. Plowing combined with erosion is more likely the cause for the small distribution of daub in the western portion of the site along the lower floodplain.

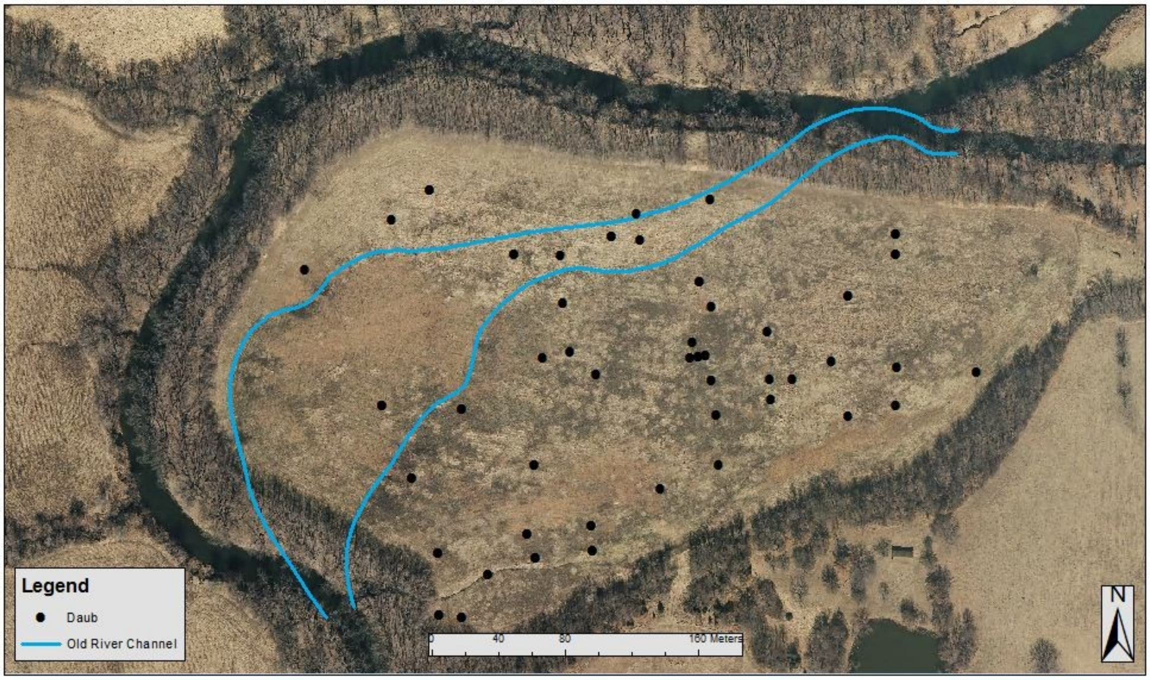

Figure 28: Daub Distribution and Little Platte River channel.

In order to understand the use of the T-1 alluvial terrace by the Steed-Kisker phase, the results from Mandel's core samples need to be examined more closely. It is clear from the T-0 core, within the site's floodplain, that the Little Platte River was located in this area during the Steed-Kisker phase occupation; it is because of the prehistoric location of the Little Platte River that there are very few artifacts located in the T-O section. The floodplain is made up of the Camp Creek member of the DeForest Formation and consists of "stratified, calcareous to noncalcareous, very-dark-grey to brown silt loam to clay loam. The T-1 terrace appears to have been stable for at least 1,500 years "(Mandel 2011: 298). It is comprised of the Gunder member of the DeForest Formation (fig. 29). The Gunder member "occurs beneath low terraces and consists of oxidized, dominantly silty and loamy alluvium lacking a loess cover; lower parts of this member may be reduced and/or coarse grained. Surface soils are thick Mollisols with brown or yellowish-brown Bw or Bt horizons" (Mandel 2011: 298).

	DeForest Formation Members			
Cultural Period	**Corrington**	**Gunder**	**Roberts Creek**	**Camp Creek**
Historic	-	-	+-	++
Late Prehistoric	+-	-	++	+-
Woodland	++	-	++	-
Late Archaic	++	+	++	-
Early/Middle Woodland	++	++	-	-
Paleo-Indian	++	++	-	-

-not possible; +-low potential; +moderate potential; ++high potential

Figure 29: The DeForest Formation and Relative Periods

(Adapted from Bettis 1984: 211-228)

There are similarities between the Smith's Fork site and the Crabtree site (23CL164), concerning the landscape that the Steed-Kisker people utilized and the soils that made up these two landforms. The Crabtree site (23Cl164) is located on a relic terrace along a modern floodplain of the Missouri River. Geomorphic and soil investigations indicate that the soils correspond to the DeForest Formation. The Deforest Formation is made up of four members: Camp Creek, Roberts Creek, Gunder, and Corrington. At the Crabtree site (23CL164) three of the four members of the

Deforest Formation, excluding the Corrington member, are present in the excavation profiles (Andelbeck et al. 2001: 14).

The recovery of daub from the Smith's Fork site and an examination of its relevance and spatial distribution are important. As, stated earlier, there are only thirteen known Steed-Kisker phase houses. If a house is located at the Smith's Fork site, its identification and excavation will lead to a better understanding of the phase and the type of landscapes the Steed-Kisker people preferred to occupy.

Member	Lithology	Landscape Position	Age
Camp Creek	• very dark grayish brown to yellowish brown (10YR 3/2-5/4) • silt loam to loam (sandy loam if sandy source materials are common) grading to sand and gravel in the channel belt; • horizontally stratified where greater than 0.25 m in thickness; • surface soils are Entisols (A-C profiles)	• unit often buries pre-settlement surface soil; • thickest in and adjacent to modern channel belt and at the base of steep slopes.	400 years before present to modern
Roberts Creek	• very dark gray to dark grayish brown (2.5Y3/0 to 10YR 3/1-3/2) • silt loam; silty clay loam and loam grading downward to sand and gravel • thick sections are stratified at depth • detrital organic matter in lower part • relatively thick Mollisol (A-C or A-Bw-C) profile developed in upper part • strong brown and yellowish red mottles may occur throughout unit	• found within modern floodplain • usually parallels modern channel	4000 to 500 years before present
Gunder	• brown to yellowish brown to grayish brown (10YR 4/3-5/4 to 2.5Y5/2) • silt loam; clay loam; or loam grading to sand and gravel at depth • lower part may be stratified • detrital organic matter ofter present in lower, stratified, coarse part of unit • moderately well to somewhat poorly drained Mollisols and Alfisols (A-Bw-C, A-Bt-C, or A-E-Bt-C profiles) developed in upper part • C horizons usually contain strong brown, yellowish red or dark brown mottles	• usually comprises low terrace that merges with valley wall sideslope in smooth concave upward profile	10,500 to about 3,000 years before present
Corrington	• Dark grayish brown to yellowish brown to olive brown (10YR 4/2-5/4 to 2.5Y4/2-4/4) loam and silty clay loam with sandy loam; pebbly sandy loam and gravelly interbeds • upper part of unit has thick Mollisol or Alfisol (A-Bw-C, A-Bt-C, or A-E-Bt-C profiles) • at least one and often several buried paleosols within unit • units consists of several fining-upward sequences, most having paleosols developed in their upper part • brown mottles common	• found in alluvial fans and colluvial slopes along the margins of large to moderate-sized valleys	about 9000 to about 2500 years before present

Figure 30: General Characteristics of Members of the DeForest Formation.

O’Brien (1978: 10-11) has identified “four functionally different types of sites,” related to the Steed-Kisker phase: “1) habitation areas with houses, storage test units and trash areas; 2) storage sites with test unit facilities; 3) hunting and butchering camp sites (located in the Ozark region); 4) burial mound/cemetery areas.” The first two have daub associated with them (O’Brien 1978: 10-11). In an analysis of O’Brien’s Steed-Kisker phase storage type-site, Logan (2000) concluded that the theory was flawed. There is no explanation as to why large pits would be dug some distance from their settlement. Logan (2000: 253) believes that a “more reasonable interpretation of the archaeological record is that daub concentration marks the location of modest, surface-built shelters of light stick and pole framework that were covered in grass and patched with clay.” This would explain a lack of post molds at a few Steed-Kisker phase sites in which daub has been found.

The Smith’s Fork site data collected by CAR and later mapped by the author, shows that a large portion of the site is covered in daub (fig. 28), with the largest concentration near the center of the site on the highest elevation of the T-1 terrace. This daub scatter also places it close to the Steed-Kisker phase occupational location of the Little Platte River. All of the daub recovered was within the 0-20 cm layers and each sample varied in size. The daub was generally light brown to orange in color and some of the larger pieces had visible grass impressions.

The only known spatial analysis for locating a Steed-Kisker phase house was made by Logan (2000) at the DB site (14LV1071). The DB site analysis only involved the excavated areas of the site in determining house location. At the Smith’s Fork site, there may be difficulties in determining the location of a house through the use of spatial analysis. This conclusion is drawn from the known movement of daub along the western half of the site. Originally, the daub would have been located on the surface of the habitation zone when the house collapsed. This would currently place it within the 0-20 cm level, the current plow zone, unlike the storage pit and hearth from Feature 1, which were located beneath the plow zone and were protected from the plow blades by their depth. Figure 31 includes two examples of the daub recovered.

Figure 31: Artifacts collected by the Center for Archaeological Research.
(Photo courtesy of CAR, 2010)

An examination of the location of the recovered charcoal and the ceramics indicate most of these two artifacts are concentrated on the highest elevation of the alluvial terrace (T-1) near the center of the site; this evidence, positions the Steed-Kisker phase occupation near the edge of the Little Platte River (fig. 32). In contrast, the distribution of the lithic materials, including projectile points, debitage, and abrading materials, appears to be concentrated in the eastern half of the site away from the higher elevation of the T-1 alluvial terrace near the center of the site (fig. 33). This correlates with the lithics that were collected from the 1976 survey as seen previously in Figure 27. From the lithic date it is possible to hypothesize that lithic tool making was done along the east of the site away from the occupational setting near the Little Platte River.

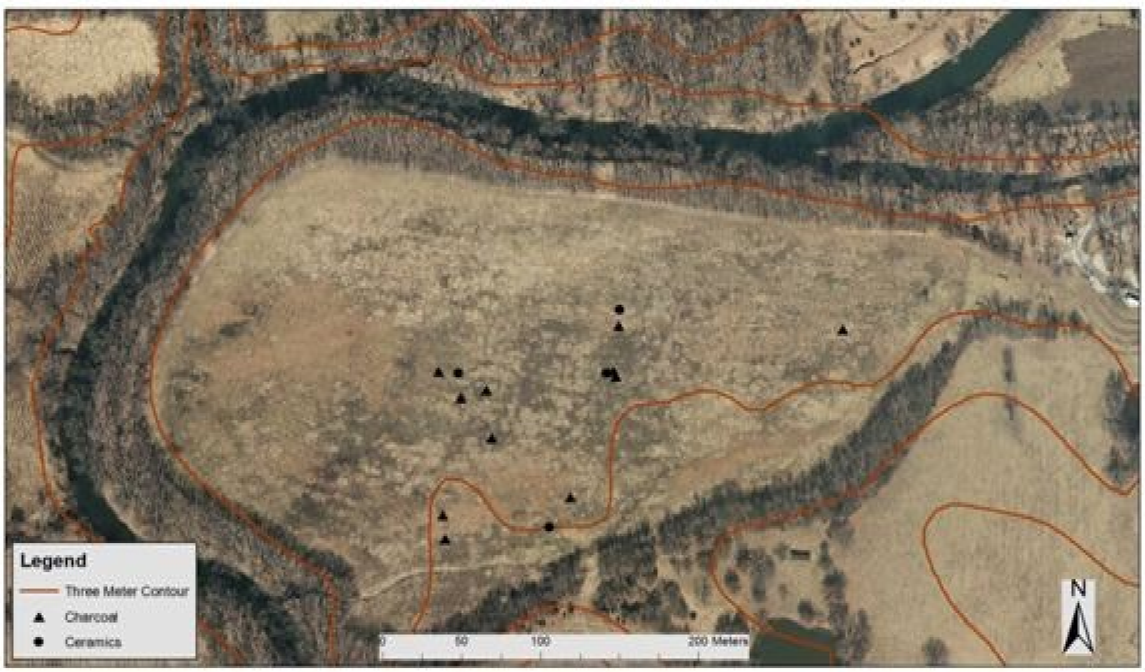

Figure 32: Charcoal and Ceramics distribution across the site.

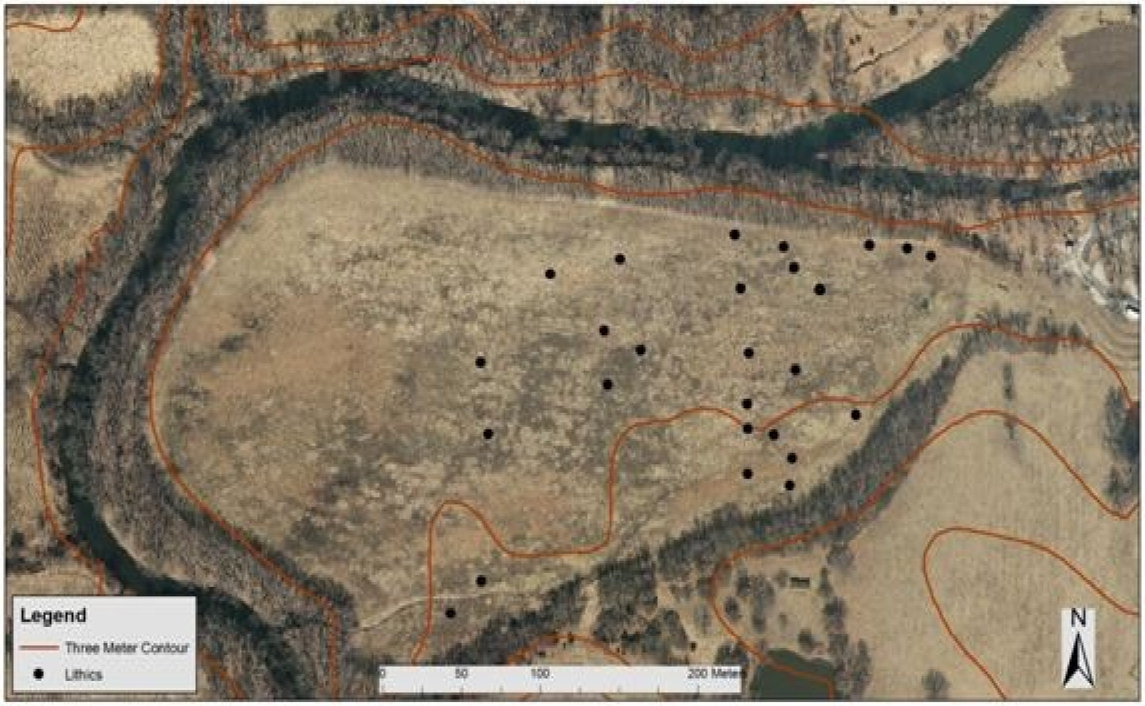

Figure 33: Lithics distribution across the site.

Analysis of the GPR results were not conclusive other than establishing the three anomalies in transect nine and the two individual anomalies in transects thirteen and eighteen that were mentioned in Chapter Three. Because the GPR shows the anomalies of transect nine at a meter and a half below the surface and the other two anomalies are at a little over a meter below the surface, it is difficult to tie it to the Steed-Kisker phase occupation which appears much shallower. A relationship, or lack of, between the anomalies of transects nine, thirteen, and eighteen and the Steed-Kisker phase occupation can not be fully ruled out without a test excavation for comfirmation. The results from the Smith's Fork GPR survey should not discount the use of GPR at an archaeological site.

The hand-coring findings provide more of an understanding of the site when combined with the GPR results. The cores established that there were at least two distinct levels of burning across the eastern section of the site. The upper level at 30-60 cm can possibly be associated with the Steed-Kisker phase while the deeper level of charcoal at 110 cm may not. But, this deeper level of charcoal, at 110 cm, can possibly be associated with the GPR anomalies. Both the anomalies in transects thirteen and eighteen are at realitively the same depth and the anomalies are not much deeper then the charcoal found at 110 cm.

The aerial image of the Smith's Fork has been valuable for the mapping process of the site and as a method for site investigation and interpretation. During the coordinant mapping and analysis, it was noted that the location of Feature 1 was visible in the aerial image. In the image a light colored circle is visible as is a darker square shape around the circle. Both are larger than Steed-Kisker structures. But, due to the location of these visible shapes, a connection between them and Feature 1 can not be ruled out and further investigaction is warranted. The tonal variance could also be caused by changes in the soil, vegetation or agricultural practice. The test unit excavations did not reach the edges of the square shape. Because of the ground disturbance caused by the test unit excavations, the utilization of GPR may not have a definitive result. It is possible that other geophysical survey methods, for example, magnetomety (MM), Electrical Resistivity, and Electromagnetic Conductivity, will have better results in defining the overall boundaries of the feature.

Figure 34: Enlargement of Feature 1 aerial photograph.

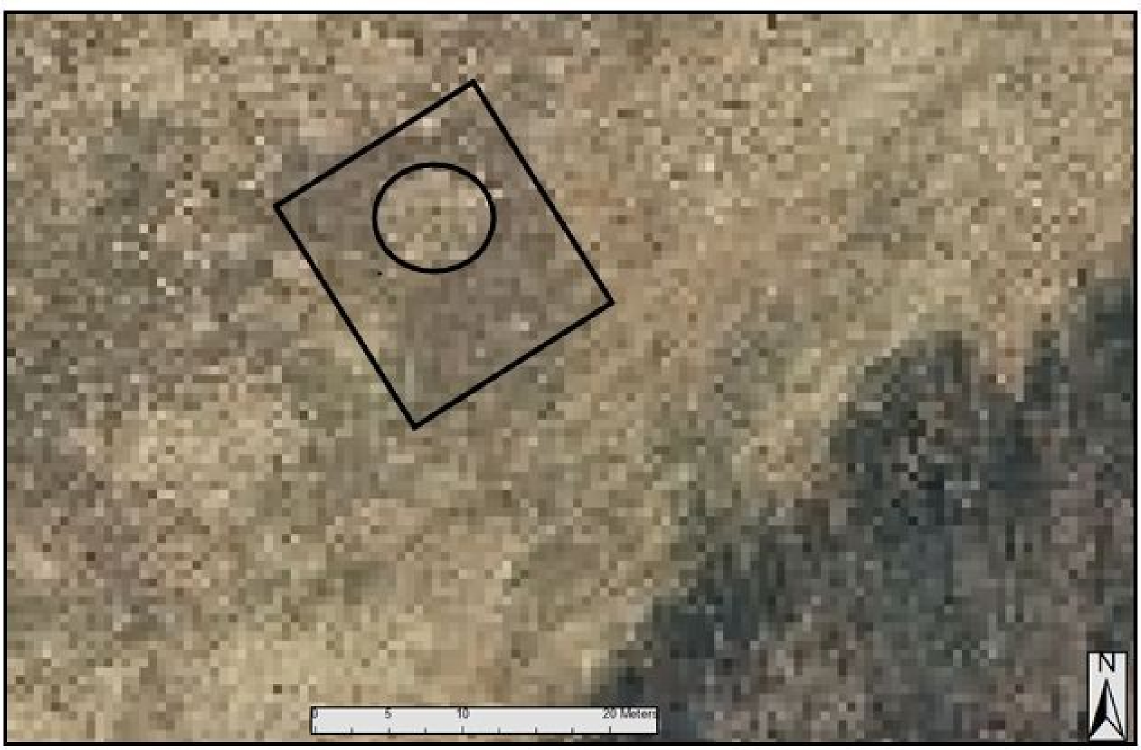

Figure 35: Feature 1 aerial photograph with circle and square shape outlined.

Analysis of the remainder of the T-1 terrace reveals that there are many areas that can be interpreted as circles and, as with Feature 1, these areas are worthy of further investigations. Unlike Feature 1 it is possible that the area may be suitable for GPR. Results with other methods of geophysical survey may have better results.

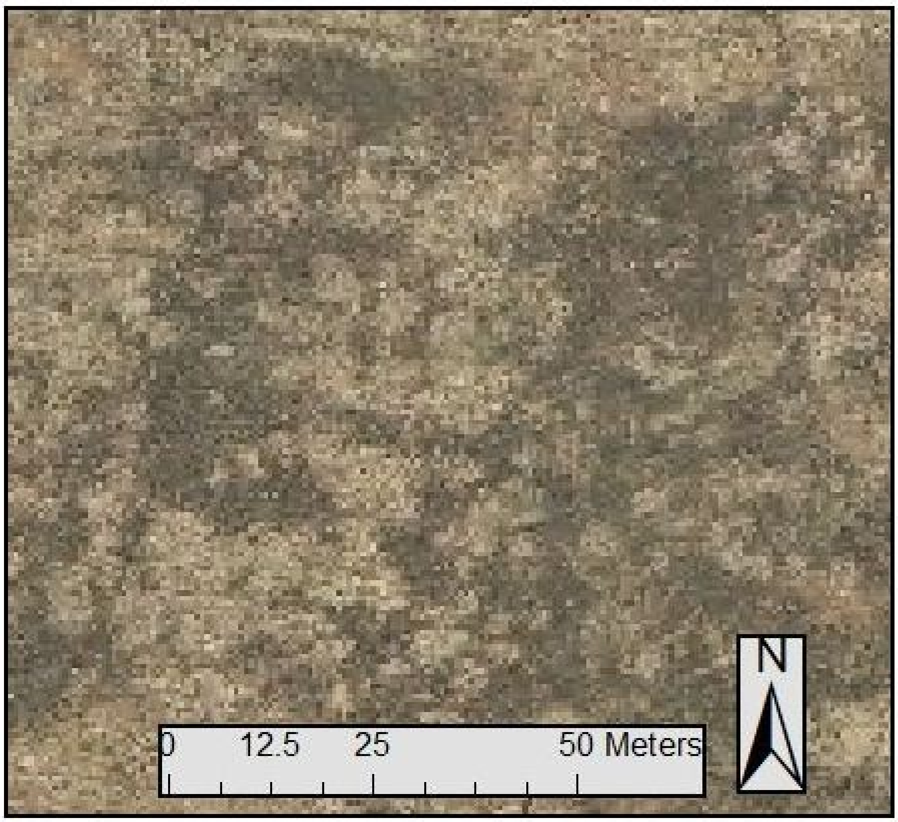

Figure 36: Aerial photo of the center of the field showing circles.

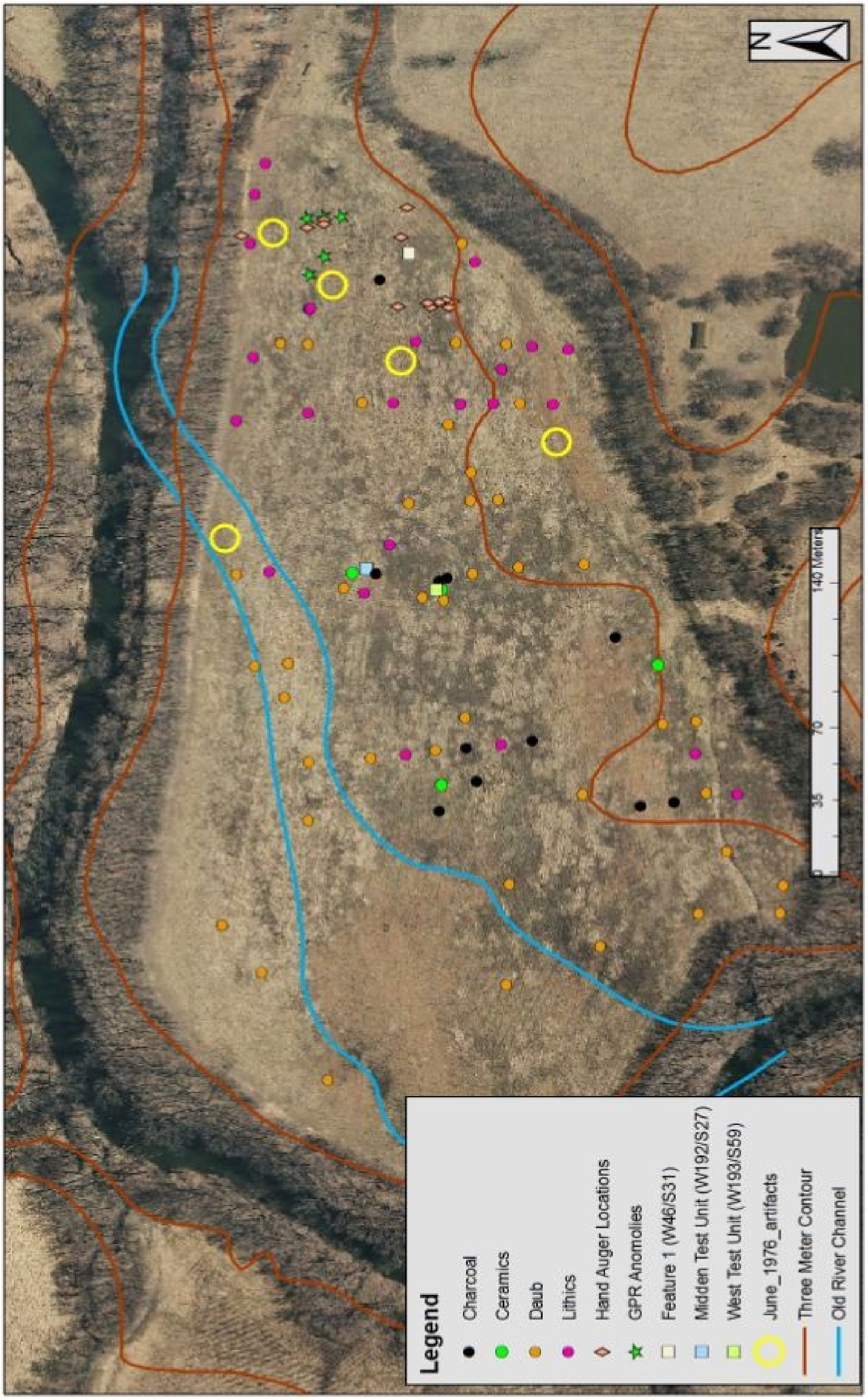

Figure 37: All GIS mapping at Smith's Fork.

CHAPTER 5

DISCUSSION AND CONCLUSION

The projectile points and pottery, both diagnostic artifacts, recovered from the Smith's Fork site along with the three radiocarbon dates of C.E. 1235 ± 55, C.E. 1084 ± 44, and C.E. 1255 ± 35 evidences from the Smith's Fork site all support it as being a Steed-Kisker phase site. The geophysical, geological, and field data compiled in GIS used help to further define this Steed-Kisker phase landscape and its usage beyond the artifact assemblage. A better understanding of the methods used, along with their spatial distribution, can also lead to better planning and execution of research done on similar archaeological sites.

The primary purpose of this thesis was to assess the effectiveness of the suite of archaeological methods compiled in a GIS format for the Smith's Fork site. Some methods utilized provide ample and valuable information lending to an overall understanding of the site. It is possible that other archaeological methods, not employed at the Smith's Fork site, would produce additional information and insights about the site. The methods that provided the best results leading to a better comprehension of the Steed-Kisker phase Smith's Fork site include the coring and analysis performed by Mandel (2011), and the shovel probes combined with GIS mapping.

The two cores recovered from the T-0 and T-1 terraces described by Mandel (2011) helped to determine the probable location of the Little Platte River during the Steed-Kisker phase occupation of the site. Mandel's cores are also important because they have helped to clarify why the Steed-Kisker people occupied the specific location. One reason the Steed-Kisker people settled at Smith's Fork is because the river would have supplied a fresh supply of drinking water. It has been determined the terrace surfaces are stabile and contain fertile soils that potentially allow for a longer occupation and sedentism, the construction of houses for long term use, and the planting, tending and harvesting of crops. Another possible reason the Smith's Fork was chosen as a habitation site by the Steed-Kisker people is that along the southern side of the site the upper T-3 terrace offered both protection and seclusion.

The use of shovel probing at the Smith's Fork site, along with the field data collected and mapped using GIS, established the site boundaries, the spatial distribution of artifacts, and the types of artifacts that can be found at this Steed-Kisker phase site. The only drawback to shovel testing is that it is labor-intensive and may "damage the very resources they were designed to protect" (Kvamme 2003: 452). Kvamme's analysis of shovel test practices through computer simulations reveals "the grim statistic that shovel test sampling can discover only a small percentage of archaeological sites." Kvamme's conclusions are debatable. One item that he does not address in his analysis is at what depths does shovel probing become impractical and no longer a method that can be used to identify a site. It is doubtful that shovel probes would be useful in identifying a deeply buried paleo or archaic site. The Smith's Fork site along with a majority of the indentified Steed-Kisker phase sites are shallow. If the Steed-Kisker phase group occupied a site for any extended period of time, it can be assumed that there would be a concentrated artifact scatter across the site. If the artifacts are no more than 20 to 30 cm under the surface, it is likely that they would be uncovered by systematic shovel testing.

Kvamme (2003: 453) states that “given the cost, time, and labor associated with this relatively unproductive, slow, and primitive form of prospecting, rapid, wide-area geophysical surveys could offer more informed guidance to the placement of expensive excavations in places more likely to yield cultural features of interest.” Once again, the depth of a site and the resulting productivity of shovel testing is unaddressed by Kvamme and remains an item up for debate. However, some sections of Kvamme’s analysis are difficult to argue with. Systematic shovel testing is costly and labor intensive, it can possibly cause damage to a site, and there is the added issue of the curation of any artifacts collected during the survey. Regarding the expense, the crewperson cost is not the only factor to be considered; once the artifacts are taken to a lab to be processed, there will be the costs associated with the cleaning, recording, and storage of the artifacts.

Kvamme’s arguments for “wide area geophysical surveys” are valid and worthy of review. There are a variety of geophysical methods: GPR, magnetomety which makes subsurface archaeological changes visible by their magnetic variations, Electrical Resistivity, and Electromagnetic Conductivity; the final two methods are practical for locating rock, foundations and changes in soils and sediments. All techniques are applicable to archaeological sites and some may give better results than others depending on specific site conditions.

At the Smith's Fork site, GPR was utilized over a relatively small percentage, less than 20 percent, of the area (fig. 12) yielding only five positive results (fig. 14) within three transect lines. There were a variety of factors at the Smith's Fork site that limited the overall success of GPR and the amount of area that could be covered. One of these factors was the site's agricultural usage. The GPR study could only be scheduled once the crops had been harvested. Even after the harvest, there were the cornstalk stubs to physically maneuver around.

The Smith's Fork GPR results are similar to the results that were experienced by Hargrave (2007) during GPR testing at the Archaic Period mound site at Poverty Point, Louisiana, in which his survey was hampered by site conditions. Angelbeck et al. (2001: 17) also concluded, "in terms of identifying cultural features, the investigations at the Cloverdale site (23CL164) reveal that the usefulness of GPR on clay rich landforms is limited." Similarly, Hargrave (2007) did not rule out GPR as a useful tool in identifying archaeological sites. In other conditions, GPR has been the perfect archaeological tool for understanding subsurface features as determined by Holley (1993) when GPR was used to identify deep-test unit burrows at Cahokia's Grand Plaza.

The use of aerial photography or satellite imagery should never be ruled out in an archaeological survey. In fact, depending on the type of site and its vegetation conditions, aerial imagery combined with topographic maps should be one of the first steps in site examination. It is non-invasive and grants the individual performing the analysis ample opportunity to become familiar with the general landscape. Following the use of aerial photography or satellite imagery, site-specific decisions need to be made as to what method would be most effective next.

The purpose of this study was to examine different archaeological methods that have been used at the Steed-Kisker phase Smith's Fork site in Clay County, Missouri, through their mapping in GIS, in order to see which techniques worked best and offered the most results in determining site usage. The analysis has concluded that some methods are more effective and generate better results than others do, while some work best in tandem with another method. Each method used at the Smith's Fork site contributed to the overall understanding of the site. It is important to note that each site is unique and will have methods that will function better then may be the case at another location. To have cost effective site analyses without causing unwanted damage to a site, it is extremely important to establish a suite of methods that will yield the most useful results.

Appendix A: Complete Artifact Catalog for the Smith’s Fork Site

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
1	W46/S31	25 cm	1	arrow point	chert	1	3.51	37.25	20.35	5.01
2	W46/S31	25 cm	1	scraper	chert	1	22.32	39.68	31.46	16.74
3	W46/S31	30-40 cm	1	metate	limestone	1				
4	W46/S31	30-40 cm	1	abrader	sandstone	1	182	90	71.3	29.1
5	W46/S31	30-40 cm	1	grinding palette	quartzite	1	569.3	83.4	61.7	65.7
6	W46/S31	30-40 cm	1	hammer stone	quartzite	1	620.5	93.6	93.8	59.3
7	W46/S31	30-40 cm	1	bulk debitage	chert and quartzite	23	61.4			
8	W46/S31	30-40 cm	1	hematite	hematite	3	3.9			
9	W46/S31	30-40 cm	1	daub	daub	2	2.8			
10	W46/S31	30-40 cm	1	sandstone	sandstone	2	4.6			
11	W46/S31	30-40 cm	1	sherds	sherds	3	1.8			
12	W46/S31	30-40 cm	1	limestone fragment	limestone	1	11.9	35.2	28.8	11.53
13	W46/S31	20-30cm	1	sherd	ceramic	1	38.7	54.3	78.8	27.6
14	W46/S31	20-30cm	1	sherd	ceramic	1	41.9	74.6	54	6.5
15	W46/S31	20-30cm	1	sherd	ceramic	1	7.4	47.4	34.2	4.5
16	W46/S31	20-30cm	1	sherd	ceramic	1	22.4	61.1	55.2	4.9
17	W46/S31	20-30cm	1	sherd	ceramic	1	83.4	96.7	67.1	9.9
18	W46/S31	20-30cm	1	sherd	ceramic	1	31.3	87.8	61.6	5.7
19	W46/S31	20-30cm	1	sherd	ceramic	1	16.4	68.4	43.7	4.7
20	W46/S31	20-30cm	1	sherd	ceramic	1	9.2	47	43.6	3.9
21	W46/S31	20-30cm	1	sherd	ceramic	1	10.6	55.6	48.5	3.7

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
22	W46/S31	20-30cm	1	sherd	ceramic	1	7.8	52.8	49.6	2.9
23	W46/S31	20-30cm	1	sherd	ceramic	1	4.2	37	26.6	3.6
24	W46/S31	20-30cm	1	sherd	ceramic	1	6.4	51.1	33.9	3.5
25	W46/S31	20-30cm	1	sherd	ceramic	1	1.6	27.3	20.2	3.1
26	W46/S31	20-25cm	1	sherd	ceramic	4	2.9			
27	W46/S31	20-25cm	1	sherd	ceramic	1	30.2	65.8	50.3	6.3
28	W46/S31	20-25cm	1	sherd	ceramic	1	35.9	81.2	57.8	6.4
29	W46/S31	20-25cm	1	sherd	ceramic	1	26.8	72.4	52	6.6
30	W46/S31	20-25cm	1	sherd	ceramic	1	32.4	73.6	55.8	6.3
31	W46/S31	20-25cm	1	sherd	ceramic	1	33.9	80.6	47.6	6.5
32	W46/S31	20-25cm	1	sherd	ceramic	1	87.5	122.6	112.4	5.5
33	W46/S31	20-25cm	1	sherd	ceramic	1	40.1	79.5	79.8	4.6
34	W46/S31	20-25cm	1	sherd	ceramic	1	57.8	117.4	75.8	5.4
35	W46/S31	20-25cm	1	sherd	ceramic	1	14.7	64.6	44.9	5
36	W46/S31	20-25cm	1	sherd	ceramic	1	10.1	53.8	43.9	4.2
37	W46/S31	20-25cm	1	sherd	ceramic	1	11.8	56.7	32.1	5.8
38	W46/S31	20-25cm	1	sherd	ceramic	1	13.5	69.9	38.3	4.8
39	W46/S31	20-25cm	1	sherd	ceramic	1	7.2	53.9	31.6	4
40	W46/S31	20-25cm	1	sherd	ceramic	1	17.1	56.8	49.5	7.1
41	W46/S31	20-25cm	1	sherd	ceramic	1	9.8	50.1	34.9	6.8
42	W46/S31	20-25cm	1	sherd	ceramic	1	4.9	54.1	22.9	3.3
43	W46/S31	20-25cm	1	sherd	ceramic	1	4.6	38.7	28.7	5
44	W46/S31	20-25cm	1	sherd	ceramic	1	4.3	42.3	23.3	3.5
45	W46/S31	20-25cm	1	sherd	ceramic	1	4.5	35.5	23.7	5.6
46	W46/S31	20-25cm	1	sherd	ceramic	1	9.4	35.5	32.8	6.3

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
47	W46/S31	20-25cm	1	sherd	ceramic	1	2.4	32.4	25.7	4
48	W46/S31	20-25cm	1	sherd	ceramic	1	2.3	32.3	14.8	3.7
49	W46/S31	20-25cm	1	sherd	ceramic	1	3	26.7	22.7	5
50	W46/S31	20-25cm	1	sherd	ceramic	1	2.2	31.3	17.7	4.1
51	W46/S31	20-25cm	1	sherd	ceramic	1	2.9	30.5	15.9	6
52	W46/S31	20-25cm	1	sherd	ceramic	1	1.7	23.6	13.7	4.3
53	W46/S31	20-25cm	1	sherd	ceramic	1	1.5	29.8	14.2	3.8
54	W46/S31	20-25cm	1	sherd	ceramic	1	1.2	19.4	19.9	3.5
55	W46/S31	20-25cm	1	sherd	ceramic	1	0.8	19.3	20.4	2.4
56	W46/S31	20-25cm	1	sherd	ceramic	1	4	26.8	13	9.1
57	W46/S31	20-25cm	1	sherd	ceramic	1	2.8	29.3	15.5	6.3
58	W46/S31	20-25cm	1	sherd	ceramic	1	2.9	31.2	16.2	5.9
59	W46/S31	20-25cm	1	sherd	ceramic	1	4.4	34.6	16.9	8.6
60	W46/S31	20-25cm	1	sherd	ceramic	1	4	34.7	19.4	6.1
61	W46/S31	20-25cm	1	sherd	ceramic	1	8	49.3	25.8	5.4
62	W46/S31	20-25cm	1	sherd	ceramic	1	4.2	33.9	19.2	5.8
63	W46/S31	20-25cm	1	abrader	sandstone	1	331.9	99.31	75.5	49.5
64	W46/S31	20-25 cm	1	hammer stone	quartzite	1	310.5	83.3	66	39.2
65	W46/S31	30-40 cm	1	sherds	ceramic	10	128.7			
66	W46/S31	30-40 cm	1	sherd	ceramic	1	11.7	45.2	38.6	6.2
67	W46/S31	30-40 cm	1	sherd	ceramic	1	26.8	64.7	53.6	6.5
68	W46/S31	30-40 cm	1	sherd	ceramic	1	36.3	107.7	55	6.6
69	W46/S31	30-40 cm	1	sherd	ceramic	1	9.2	54	39.5	5.2

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
70	W46/S31	30-40 cm	1	sherd	ceramic	1	15.3	44.8	49.7	7.2
71	W46/S31	30-40 cm	1	sherd	ceramic	1	4.7	30.4	26.7	5.7
72	W46/S31	30-40 cm	1	sherd	ceramic	1	37.8	79.9	78.7	5.6
73	W46/S31	30-40 cm	1	sherds	ceramic	7	50.6			
74	W46/S31	30-40 cm	1	sherd	ceramic	1	6.8	51.3	37.8	4.3
75	W46/S31	30-40 cm	1	sherd	ceramic	1	20.6	61	43.3	7.1
76	W46/S31	30-40 cm	1	sherd	ceramic	1	29.7	73.6	57.9	7
77	W46/S31	30-40 cm	1	sherds	ceramic	7	58			
78	W46/S31	20-30 cm	1	abrader	sandstone	1	350.6	95	74.3	55.7
79	W46/S31	20-30 cm	1	hammer grinding slab	quartzite	1	478.1	78.7	66.5	
80	W46/S31	20-30 cm	1	core	chert	1	56.7	56.9	43	24.3
81	W46/S31	20-30 cm	1	core	chert	1	71	56.7	48	23.7
82	W46/S31	20-30 cm	1	pigment	hematite	1	9.5	48.4	24.5	7
83	W46/S31	20-30 cm	1	debitage	chert	9	13.3			
84	W46/S31	20-30 cm	1	clay billet	clay	1	310.7	85.1	71.5	45.4
85	W46/S31	20-30 cm	1	daub	clay	1	<.5	5	3	2
86	W46/S31	20-30 cm	1	mano/grinding slab	quartzite	1	1359.4	124.3	100.5	69.2

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
87	W46/S31	20-30 cm	1	mano	quartzite	1	1835.3	140.9	106.9	75.3
88	W46/S31	20-30 cm	1	charcoal sample	wood carbon	1	7.2			
89	W46/S31	20-30 cm	1	debitage	chert	2	1.6			
90	W46/S31	20-30 cm	1	sherds	ceramic	3	4.7			
91	W46/S31	0-10 cm		rock frags	sandstone	2	1.9			
92	W46/S31	0-10 cm		debitage	chert	1	1.1	22.8	12.5	3.9
93	W46/S31	20-25 cm	2	core	chert	1	41	48.6	43.5	23.8
94	W46/S31	20-25 cm	2	core	chert	1	33	41.8	36.9	23.6
95	W46/S31	20-25 cm	2	debitage	chert	11	14.2			
96	W46/S31	20-30	1	rock	limestone	1	761.4	117.7	96.3	56.7
97	W46/S31	20-30 cm	1	hammer stone	quartzite	1	508.2	99.1	88	37
98	W46/S31	20-30 cm	1	rock	limestone	1	107.8	68	65.5	50.3
99	W46/S31	20-30 cm	1	rock	sandstone	1	57.4	62.3	42.1	31.5
100	W47/S31	20-30 cm	1	arrow point	chert	1	0.5	17.9	11.6	2.6
101	W47/S31	20-30 cm	1	scraper	chert	1	5.5	32.9	19.8	6.3
102	W47/S31	20-30 cm	1	arrow point	chert	1	0.8	21.1	10.4	3.9
103	W47/S31	20-30 cm	1	debitage	chert	6	1.6			
104	W47/S31	20-30 cm	1	deer mandible tool	bone	1	29.6	115	27	17
105	W46/S31	20-	1	pigment	hematite	1	5.5	43.1	18.4	3.6

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
		30 cm								
106	W47/S31	30-40 cm	1	debitage	chert	14	13			
107	W47/S31	30-40 cm	1	sherd	ceramic	1	0.3	14.3	9.9	2.2
108	W47/S31	30-40 cm	1	core	chert	1	21.643.8	33	25.3	19
109	W47/S31	30-40 cm	1	core fragment	chert	1	5.9	34.4	16.2	11.3
110	W47/S31	30-40 cm	1	bipolar core	chert	1	3.7	19.2	17.9	12.3
111	W47/S31	30-40 cm	1	fragment	sandstone	1	2.7	17	14.1	13
112	W47/S31	30-40 cm	1	fragment	limestone	1	1.5	17.2	10.8	8.3
113	W47/S31	30-40 cm	1	abrader	sandstone	1	72.6	75	30.8	25.2
114	W47/S31	30-40 cm	1	ornament?	hematite	1	77.6	56.5	52.1	13.2
115	W46/S32	0-20 cm	1	pigment	hematite	1	14.4	26.4	14.6	13.7
116	W47/31S	30-40 cm	1	scraper	chert	1	13.4	53	25.7	7.2
117	W47/31S	30-40 cm	1	arrow point	chert	1	0.7	23.5	12.7	2.3
118	W47/31S	30-40 cm	1	debitage	chert	7	16.8			
119	W46/S31	20-30 cm	1	arrow point	chert	1	0.5	17.4	12.3	3.4
120	W47/S30	20-30 cm	1	rim sherd	ceramic	1	3.7	30	28	5
121	W47/S30	20-30 cm	1	sherds	ceramic	7	0.6			
122	W47/S30	20-30 cm	1	debitage	chert	1	<.1	6.4	4.5	1

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
123	W46/S31	20-30 cm	1	rim sherds	ceramic	2	63.1	113	94	7
124	W46/S31	20-30 cm	1	sherds	ceramic	11	62.9			
125	W46/S30	20-30 cm	1	hammer stone	quartzite	1	212	63.4	54.7	35
126	W46/S30	20-30 cm	1	fragments	sandstone	3	204.9			
127	W46/S32	30-40 cm	1	pigment	hematite	1	1.6	19.8	14.4	7.9
128	W46/S31	30-40 cm	1	rim sherd	ceramic	1	1.6	27.1	27.3	3.3
129	W46/S32	30-40 cm	1	sherds	ceramic	5	16.7			
130	W46/S32	30-40 cm	1	fragments	sandstone	2	1.9			
131	W47/S31	30-40 cm	1	sherds	ceramic	5	19.7			
132	W46/S31	10-20 cm	1	sherds	ceramic	9	17.8			
133	W192/S27	40-50 cm	1	sherds	ceramic	2	4.1			
134	W192/S27	50-60 cm	1	firecracked	quarzite	1	57.2	43.63	30.41	36.99
135	T.Meade Sp #2	20-30 cm	1	sherds	ceramic	11	75.7			
136	T.Meade Sp #2	20-30 cm	1	debitage	chert	1	0.5			
137	T.Meade Sp #2	20-30 cm	1	rim sherd	ceramic	1	18.1	50.9	36.91	7.35
138	T.Meade Sp #2	20-30 cm	1	fragments	limestone	2	0.8			
139	W47/S30	0-10 cm	1	sherds	ceramic	3	2.9			
140	W46/S31	30-40	1	sherd	ceramic	1	1.3	29.69	17.32	2.76

Cat.	Unit	Depth cm	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
141	W46/S31	30-40 cm	1	debitage	chert	3	3			
142	W46/S32	10-20 cm	1	sherd	ceramic	1	0.4	15.29	9.6	3.09
143	W47/S31	30-40 cm	1	sherd	ceramic	1	0.7	18.93	15.88	2.41
144	W47/S31	30-40 cm	1	fragments	sandstone	2	0.6			
145	W46/S30	0-10 cm	1	fragment	sandstone	1	8.6	34.56	23.47	17.81
146	W46/S30	0-10 cm	1	sherd	ceramic	2	1.3			
147	W46/S31	20-30 cm	1	debitage	chert	5	13.5			
148	W185/S28	0-20 cm	1	sherd	ceramic	1	0.8			
149	W185/S28	0-20 cm	1	debitage	chert	4	1.4			
150	W47/S30	20-30 cm	1	fragment	sandstone?	1	0.6			
151	W46/S31	0-20 cm	1	debitage	chert	1	0			
152	W192/S27	10-20 cm	1	debitage	chert	2				
153	W47/S31	20-30 cm	1	sherds	ceramic	7	12.1			
154	T.Meade Sp #2	20-30 cm	1	?	limestone	1	698.5	107.53	54.52	9.98
155	Surface Collected			fragment	sandstone	1	21			
156	Surface Collected			fragment	sandstone	1	93			
157	Surface Collected			fragment	sandstone	1	14.7			
158	Surface Collected			fragment	sandstone	1	164.2			
159	Surface Collected			fragment	chert/sandstone	1	111.1			
160	Surface Collected			debitage	chert	1	3.5			
161	Surface Collected			Celt Frag.	?	1	14.2	50.78	27.54	9.08

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
162	Surface Collected			fragment	sandstone	1	156.2			
163	W185/S27	20-30 cm		sherd	ceramic	5	0.8			
164	W185/S27	20-30 cm		debitage	chert	1	3.6			
165	W192/S27	40-50 cm		debitage	chert	1	1			
166	W47/S30	10-20 cm	1	debitage	chert	7	4.8			
167	W47/S30	10-20 cm	1	fragment	Quartzite/sandstone	1	12.2			
168	W47/S30	10-20 cm	1	fragment	sandstone	1	4.2			
169	W47/S30	10-20 cm	1	sherd	ceramic	1	2.1	22.87	14.39	5.17
170	W192/S27	30-40 cm	1	debitage	chert	1	2			
171	W46/S30	10-20 cm	1	daub	clay	6	3.6			
172	W46/S30	20-30 cm	1	sherd	ceramic	1	2.7	32.57	21.12	4.84
173	W192/S27	20-30 cm		sherd	ceramic	3	1.8			
174	W192/S27	20-30 cm		daub	clay	2	0.7			
175	W192/S27	10-20 cm		daub	clay	3	0.4			
176	W. Sq. #3	0-10 cm		fragment	Quartzite/sandstone	2	8.4			
177	W. Sq. #3	0-10 cm		fragment	chert	3	17.3			
178	W. Sq. #3	0-10 cm		daub	clay	1	3.5			
179	W. Sq. #3	0-10 cm		fragment	limestone	1	55.7			

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
180	W. Sq. #3	0-10 cm		arrow point	chert	1	0.6	15.42	11.32	3.17
181	W193/S59.5	10-20 cm		thumb scraper	chert	1	6	37.94	24.66	5.92
182	W193/S59.5	10-20 cm		bulk debitage	chert	8	2.2			
183	W193/S59.5	10-20 cm		bulk sherds	ceramic	3	1.4			
184	W193/S59.5	10-20 cm		daub	clay	1	0.3			
185	W5/5N	20-30 cm		sherd	ceramic	1	0.5			
186	W. Sq. #3	20-30 cm		bulk debitage	chert	2	2.5			
187	W45/S31	0-10 cm	1	sherd	ceramic	4	2.2			
188	W45/S31	0-10 cm	1	debitage	chert	1	0.3			
189	W45/S31	0-10 cm	1	fragment	sandstone	6	32.2			
190	W. Sq. #3	0-10 cm		sherd	ceramic	1	7.2	23.23	32.89	6.05
191	W. Sq. #3	0-10 cm		sherd	ceramic	1	5	40.92	20.73	4.91
192	W5/5N	10-20 cm		debitage	chert	13	12.6			
193	W5/5N	10-20 cm		fragment	sandstone	4	3.5			
194	W5/5N	10-20 cm		fragment	Quartzite	3	4.1			
195	W45/S31	20-30 cm	1	fragment	Quartzite	1	233.8	95.15	61.64	36.4
196	W45/S31	10-20 cm	1	Knife	chert	1	11.6	59.79	20.92	7.05
197	W45/S31	10-	1	debitage	chert	4	1.5			

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
		20 cm								
198	W45/S31	10-20 cm	1	sherd	ceramic	7	7			
199	W5/5N	20-30 cm		fragment	Quartzite	2	26.3			
200	W5/5N	20-30 cm		fragment	sandstone	1	1.2			
201	W5/5N	20-30 cm		fragment	chert	5	3.5			
202	W. Pit #3	10-20 cm		fragment	ceramic	8	2.5			

Appendix B: Feature 1 Artifact Catalog

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
1	W46/S31	25 cm	1	arrow point	chert	1	3.51	37.25	20.35	5.01
2	W46/S31	25 cm	1	scraper	chert	1	22.32	39.68	31.46	16.74
3	W46/S31	30-40 cm	1	metate	limestone	1				
4	W46/S31	30-40 cm	1	abrader	sandstone	1	182	90	71.3	29.1
5	W46/S31	30-40 cm	1	grinding palette	quartzite	1	569.3	83.4	61.7	65.7
6	W46/S31	30-40 cm	1	hammer stone	quartzite	1	620.5	93.6	93.8	59.3
7	W46/S31	30-40 cm	1	bulk debitage	chert and quartzite	23	61.4			
8	W46/S31	30-40 cm	1	hematite	hematite	3	3.9			
9	W46/S31	30-40 cm	1	daub	daub	2	2.8			
10	W46/S31	30-40 cm	1	sandstone	sandstone	2	4.6			
11	W46/S31	30-40 cm	1	sherds	sherds	3	1.8			
12	W46/S31	30-40 cm	1	limestone fragment	limestone	1	11.9	35.2	28.8	11.53
13	W46/S31	20-30cm	1	sherd	ceramic	1	38.7	54.3	78.8	27.6
14	W46/S31	20-30cm	1	sherd	ceramic	1	41.9	74.6	54	6.5
15	W46/S31	20-30cm	1	sherd	ceramic	1	7.4	47.4	34.2	4.5
16	W46/S31	20-30cm	1	sherd	ceramic	1	22.4	61.1	55.2	4.9
17	W46/S31	20-30cm	1	sherd	ceramic	1	83.4	96.7	67.1	9.9
18	W46/S31	20-30cm	1	sherd	ceramic	1	31.3	87.8	61.6	5.7
19	W46/S31	20-30cm	1	sherd	ceramic	1	16.4	68.4	43.7	4.7
20	W46/S31	20-30cm	1	sherd	ceramic	1	9.2	47	43.6	3.9
21	W46/S31	20-30cm	1	sherd	ceramic	1	10.6	55.6	48.5	3.7

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
22	W46/S31	20-30cm	1	sherd	ceramic	1	7.8	52.8	49.6	2.9
23	W46/S31	20-30cm	1	sherd	ceramic	1	4.2	37	26.6	3.6
24	W46/S31	20-30cm	1	sherd	ceramic	1	6.4	51.1	33.9	3.5
25	W46/S31	20-30cm	1	sherd	ceramic	1	1.6	27.3	20.2	3.1
26	W46/S31	20-25cm	1	sherd	ceramic	4	2.9			
27	W46/S31	20-25cm	1	sherd	ceramic	1	30.2	65.8	50.3	6.3
28	W46/S31	20-25cm	1	sherd	ceramic	1	35.9	81.2	57.8	6.4
29	W46/S31	20-25cm	1	sherd	ceramic	1	26.8	72.4	52	6.6
30	W46/S31	20-25cm	1	sherd	ceramic	1	32.4	73.6	55.8	6.3
31	W46/S31	20-25cm	1	sherd	ceramic	1	33.9	80.6	47.6	6.5
32	W46/S31	20-25cm	1	sherd	ceramic	1	87.5	122.6	112.4	5.5
33	W46/S31	20-25cm	1	sherd	ceramic	1	40.1	79.5	79.8	4.6
34	W46/S31	20-25cm	1	sherd	ceramic	1	57.8	117.4	75.8	5.4
35	W46/S31	20-25cm	1	sherd	ceramic	1	14.7	64.6	44.9	5
36	W46/S31	20-25cm	1	sherd	ceramic	1	10.1	53.8	43.9	4.2
37	W46/S31	20-25cm	1	sherd	ceramic	1	11.8	56.7	32.1	5.8
38	W46/S31	20-25cm	1	sherd	ceramic	1	13.5	69.9	38.3	4.8
39	W46/S31	20-25cm	1	sherd	ceramic	1	7.2	53.9	31.6	4
40	W46/S31	20-25cm	1	sherd	ceramic	1	17.1	56.8	49.5	7.1
41	W46/S31	20-25cm	1	sherd	ceramic	1	9.8	50.1	34.9	6.8
42	W46/S31	20-25cm	1	sherd	ceramic	1	4.9	54.1	22.9	3.3
43	W46/S31	20-25cm	1	sherd	ceramic	1	4.6	38.7	28.7	5
44	W46/S31	20-25cm	1	sherd	ceramic	1	4.3	42.3	23.3	3.5
45	W46/S31	20-25cm	1	sherd	ceramic	1	4.5	35.5	23.7	5.6
46	W46/S31	20-25cm	1	sherd	ceramic	1	9.4	35.5	32.8	6.3

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
47	W46/S31	20-25cm	1	sherd	ceramic	1	2.4	32.4	25.7	4
48	W46/S31	20-25cm	1	sherd	ceramic	1	2.3	32.3	14.8	3.7
49	W46/S31	20-25cm	1	sherd	ceramic	1	3	26.7	22.7	5
50	W46/S31	20-25cm	1	sherd	ceramic	1	2.2	31.3	17.7	4.1
51	W46/S31	20-25cm	1	sherd	ceramic	1	2.9	30.5	15.9	6
52	W46/S31	20-25cm	1	sherd	ceramic	1	1.7	23.6	13.7	4.3
53	W46/S31	20-25cm	1	sherd	ceramic	1	1.5	29.8	14.2	3.8
54	W46/S31	20-25cm	1	sherd	ceramic	1	1.2	19.4	19.9	3.5
55	W46/S31	20-25cm	1	sherd	ceramic	1	0.8	19.3	20.4	2.4
56	W46/S31	20-25cm	1	sherd	ceramic	1	4	26.8	13	9.1
57	W46/S31	20-25cm	1	sherd	ceramic	1	2.8	29.3	15.5	6.3
58	W46/S31	20-25cm	1	sherd	ceramic	1	2.9	31.2	16.2	5.9
59	W46/S31	20-25cm	1	sherd	ceramic	1	4.4	34.6	16.9	8.6
60	W46/S31	20-25cm	1	sherd	ceramic	1	4	34.7	19.4	6.1
61	W46/S31	20-25cm	1	sherd	ceramic	1	8	49.3	25.8	5.4
62	W46/S31	20-25cm	1	sherd	ceramic	1	4.2	33.9	19.2	5.8
63	W46/S31	20-25cm	1	abrader	sandstone	1	331.9	99.31	75.5	49.5
64	W46/S31	20-25 cm	1	hammer stone	quartzite	1	310.5	83.3	66	39.2
65	W46/S31	30-40 cm	1	sherds	ceramic	10	128.7			
66	W46/S31	30-40 cm	1	sherd	ceramic	1	11.7	45.2	38.6	6.2
67	W46/S31	30-40 cm	1	sherd	ceramic	1	26.8	64.7	53.6	6.5
68	W46/S31	30-40 cm	1	sherd	ceramic	1	36.3	107.7	55	6.6
69	W46/S31	30-40 cm	1	sherd	ceramic	1	9.2	54	39.5	5.2

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
70	W46/S31	30-40 cm	1	sherd	ceramic	1	15.3	44.8	49.7	7.2
71	W46/S31	30-40 cm	1	sherd	ceramic	1	4.7	30.4	26.7	5.7
72	W46/S31	30-40 cm	1	sherd	ceramic	1	37.8	79.9	78.7	5.6
73	W46/S31	30-40 cm	1	sherds	ceramic	7	50.6			
74	W46/S31	30-40 cm	1	sherd	ceramic	1	6.8	51.3	37.8	4.3
75	W46/S31	30-40 cm	1	sherd	ceramic	1	20.6	61	43.3	7.1
76	W46/S31	30-40 cm	1	sherd	ceramic	1	29.7	73.6	57.9	7
77	W46/S31	30-40 cm	1	sherds	ceramic	7	58			
78	W46/S31	20-30 cm	1	abrader	sandstone	1	350.6	95	74.3	55.7
79	W46/S31	20-30 cm	1	hammer grinding slab	quartzite	1	478.1	78.7	66.5	
80	W46/S31	20-30 cm	1	core	chert	1	56.7	56.9	43	24.3
81	W46/S31	20-30 cm	1	core	chert	1	71	56.7	48	23.7
82	W46/S31	20-30 cm	1	pigment	hematite	1	9.5	48.4	24.5	7
83	W46/S31	20-30 cm	1	debitage	chert	9	13.3			
84	W46/S31	20-30 cm	1	clay billet	clay	1	310.7	85.1	71.5	45.4
85	W46/S31	20-30 cm	1	daub	clay	1	<.5	5	3	2
86	W46/S31	20-30 cm	1	mano/grinding slab	quartzite	1	1359.4	124.3	100.5	69.2

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
87	W46/S31	20-30 cm	1	mano	quartzite	1	1835.3	140.9	106.9	75.3
88	W46/S31	20-30 cm	1	charcoal sample	wood carbon	1	7.2			
89	W46/S31	20-30 cm	1	debitage	chert	2	1.6			
90	W46/S31	20-30 cm	1	sherds	ceramic	3	4.7			
91	W46/S31	0-10 cm		rock frags	sandstone	2	1.9			
92	W46/S31	0-10 cm		debitage	chert	1	1.1	22.8	12.5	3.9
93	W46/S31	20-25 cm	2	core	chert	1	41	48.6	43.5	23.8
94	W46/S31	20-25 cm	2	core	chert	1	33	41.8	36.9	23.6
95	W46/S31	20-25 cm	2	debitage	chert	11	14.2			
96	W46/S31	20-30	1	rock	limestone	1	761.4	117.7	96.3	56.7
97	W46/S31	20-30 cm	1	hammer stone	quartzite	1	508.2	99.1	88	37
98	W46/S31	20-30 cm	1	rock	limestone	1	107.8	68	65.5	50.3
99	W46/S31	20-30 cm	1	rock	sandstone	1	57.4	62.3	42.1	31.5
105	W46/S31	20-30 cm	1	pigment	hematite	1	5.5	43.1	18.4	3.6
119	W46/S31	20-30 cm	1	arrow point	chert	1	0.5	17.4	12.3	3.4
123	W46/S31	20-30 cm	1	rim sherds	ceramic	2	63.1	113	94	7
124	W46/S31	20-30 cm	1	sherds	ceramic	11	62.9			
128	W46/S31	30-40 cm	1	rim sherd	ceramic	1	1.6	27.1	27.3	3.3

Cat.	Unit	Depth	Feat.	Artifact	Material	No.	Weight	Length	Width	Thickness
132	W46/S31	10-20 cm	1	sherds	ceramic	9	17.8			
140	W46/S31	30-40 cm	1	sherd	ceramic	1	1.3	29.69	17.32	2.76
141	W46/S31	30-40 cm	1	debitage	chert	3	3			
147	W46/S31	20-30 cm	1	debitage	chert	5	13.5			
151	W46/S31	0-20 cm	1	debitage	chert	1	0			

Appendix C: 1976 Survey Artifact Catalog

Cat. No	Depth	Artifact	Material	Number	Weight	Length	Width
1	Surface	Spear Point	Chert	1	30.8	9.3	2.4
2	Surface	Hammer Stone	Quartzite	1	285.4	8.6	6
3	Surface	Drill	Chert	1	4.5	5.1	
4	Surface	Arrow Point	Chert	1	1.1	2.2	1.4
5	Surface	Arrow Point	Chert	1	4.7	4.7	2.7
6	Surface	Arrow Point	Chert	1	1.4	2.4	1.7
7	Surface	Bone	Bone	2	11.9		
8	Surface	Scrapper	Chert	1	2.6	4	1.5
9	Surface	Daub	Clay	1	5.9	2.4	
10	Surface	Bulk Debitage	Chert	15	83.6		
11	Surface	Shell	Shell	1	16	4.5	2.8
12	Surface	Sherds	Ceramic	7	1.61		
13	Surface	Bi-face	Chert	1	19	6.2	2.4
14	Surface	Bi-face	Chert	1	7.8		3.1
15	Surface	Core	Lithic	1	185.6	11.5	
16	Surface	Bi-face	Chert	1	11.4		3.3
17	Surface	Bi-face	Chert	1	10.4		3.5

Appendix D: The Hand Auger Log

with all charcoal levels highlighted.

Depth	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10	Test 11	Test 12	Test 13
0-10cm	Brown silty	Brown silty	Brown silty	Brown silty	Brown silty	Dry loose	Brown silty	Brown silty	Brown loam	Dark brown	Dark brown	Dark brown	Dark brown
	Loam	Loam	Loam	Loam			Loam	Loam	Vegetation		Silty	Silt	Silt
		Surface Vegetation	Surface Vegetation	Surface vegetation				Vegetation				Vegetation	
10-20cm	Brown silty	Brown silty	Brown silty	Brown silty	Very silty	Charcoal	Loose, silty	Brown loam	Brown loam	Silty	Dark brown	Small white flakes	Dark brown
	Loam	Loam	Loam	Loam						Slight modeling	Silty		Silt
20-30cm	Some grey modeling	Brown silty	Some mineral decomp.	Silty loam	More clay	Modeling	Loose, silty	Brown loam	Red & White Modeling	Dark brown	Dark brown	Red & Grey	Blocky
		Some clay	Charcoal		Still silty				Modeling	Some modeling	Silt	Modeling	
											Charcoal		
30-40cm	Grey modeling	More clay	Brown silty	Some modeling	Modeled	Modeling	White/grey	More clay	Red & White Modeling	More clay	Charcoal	Red & Grey	Dark freckles
		Modeling	Loam				Modeling	Some reddish	Modeling	Modeled	Red & White	Modeling	Res/white freckles
									Charcoal		Modeling		
40-50cm	Grey modeling	Clay	Modeling	Some charcoal	Change in	White	Some Clay	White modeling	Red & White Modeling	Light brown/red &	Lighter brown	Red & Grey	Blocky
					texture	modeling	Cont. modeling		Modeling	White modeling char.	Red & white	Modeling	Modeled charcoal
					Brittle				Charcoal		Modeling, char.		
					Tightly packed								
50-60cm	Texture change	High in clay	Clay	Some charcoal	Some charcoal	Silty	Some charcoal	Charcoal	Charcoal	Tan/grey/red	Tan/grey/red	Red & white	Not as blocky
	Brown clay loam		Charcoal			Some charcoal				Modeling	Modeling	Modeling	Charcoal
	Denser												
60-70cm	more clay like	High in clay	Clay	Some charcoal	Some charcoal	Silty	Increase clay	Charcoal	Red modeling	Grey & Red	Tan/grey/red	Red & white	Denser
			Charcoal			Some charcoal	Charcoal			Modeling	Modeling	Modeling	Charcoal
70-80cm	Small amt. of charcoal	Slightly siltier	Increase in charcoal	Some charcoal	Some charcoal	Stiffer	Grey modeling	Charcoal	Red modeling	Grey & Red	Tan/grey/red	Dark brown silt	More compact
						No Charcoal	Charcoal			Modeling	Modeling		Grey modeling
80-90cm	Brown clay loam	More silt	Charcoal	Heavy Charcoal	Some charcoal	No Charcoal	Charcoal	Large charcoal	Red modeling	red/grey modeled	Charcoal	Blocky	More compact
					Unknown brown substance		Grey modeling		Charcoal	silty clay	moist	Silty	Grey modeling
							Less clay, drier					Some charcoal	
90-100cm	More charcoal	More silt	Charcoal	Heavy Charcoal	Some charcoal	More charcoal	Drier		Charcoal	Large charcoal	Small charcoal	Large piece of	Very homogeneous
					Unknown brown substance		Less clay, drier	Large charcoal				Charcoal	

Depth	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 10	Test 11	Test 12	Test 13
100-110cm	Silty	Charcoal	Charcoal	Silty	Less clay	Lots of charcoal	Drier, less clay	Charcoal	Charcoal	Some charcoal	Lots of charcoal	Blocky	Homogeneous
	Some charcoal								Red modeling		Mixed with red	Some charcoal	
110-120cm	Lighter colored silty	Slightly more clay	Decrease in charcoal		Less clay	Lots of charcoal	Dry, crumbly	Charcoal	Charcoal	Some charcoal	More homogeneous	Large charcoal	Homogeneous
								Silty					Silty
120-130cm	Silty	Silty again	Silty		Less clay	Lots of charcoal		Silty		Silty clay	More homogeneous	Charcoal	Very silty
	similar to surface											Silty	
												Homogeneous	
130-140cm						Silty		Silty		Silty clay			
140-150cm													

Appendix E: Midden Hand Auger Log

Midden Auger tests

	2 meters	4 meters	6 meters	8 meters
10cm	Dark Brown Mix clay/loam	Brown silt	Dark Brown loam	Brown silt
20cm	Dark Brown/Black Loam	Black silt	Black loam	dark brown/ black-loam/clay
30cm	Black Clay like	brown/black silt	black loam/clay	black loam/clay
40cm	Dark brown/black Clay/loam	brown/black silt/loam	black loam	black/brown loam
50cm	Dark Brown/Black Clay loam	brown w/ black modeling loam	brown clay	brown clay
60cm	Light brown Clay	brown clay	brown clay	

	10 meters	12 meters	14 meters
10cm	Dark Brown Silt	dark brown silt/clay	dark brown/black silt/clay/loam
20cm	Dark Brown/Black Silt/clay	dark brown/black silt/clay	dark brown/black silt/clay
30cm	Black Clay/loam/silt	dark brown/black silt/clay	black silt/clay
40cm	dark brown clay	med. brown silt/clay	med. to dark brown clay
50cm			med. to light brown Clay/some silt

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Vita

Douglas Edward Shaver was born on May 4, 1968, at Florence Crittenton's Home for Unwed Mothers, in Kansas City, Missouri. He was educated, from grades 1-4 in public school. Grades 5th and 6th were at a private school in Jeddha, Saudi Arabia. Upon return to the United States, he completed his education in public schools and he earned a GED in 1986. After serving in the United States ARMY he attended college for a short period of time before entering the construction field.

After working in the construction and building trades, he returned to college after a seventeen-year break. Upon finishing his B.L.A. with Anthropology as a minor, at the University of Missouri-Kansas City, he entered the Cultural and Urban Geography, Master of Science program.

Mr. Shaver is currently the Vice President of the Kansas City Archaeological Society and on the Board of Trustees for the Missouri Archaeological Society. The same month and year that he completes his Master's he will also complete a certificate in GIS. The following semester he will complete a graduate certificate in Native American Studies from Montana State University.

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