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THE ANALYSIS OF A FOURHCE MALINE MOUND SITE: TROY ADAMS (34LF33)

A THESIS APPROVED FOR THE
DEPARTMENT OF ANTHROPOLOGY

BY THE COMMITTEE CONSISTING OF

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Abstract

The Fourche Maline archaeological culture is a group of people that have constructed a series of mound sites that are located along the Fourche Maline creek in eastern Oklahoma with other similar sites in Arkansas, Louisiana, and Texas. The Fourche Maline archaeological culture is identified by the large dark-earth mounds, distinct ceramic wares, varieties of Gary points and presence of various bone and stone tools. A large number of these mounds were excavated in the 1930s and 1940s by the Works Progress Administration. Many of these sites were to be destroyed by the construction of Lake Wister and in order to prevent the complete loss of important cultural resources, many Fourche Maline sites were excavated. After the excavations were complete, very little analysis of those collections were conducted. Over the years, various sites received material analysis, but many continue to go unanalyzed. This thesis presents an analysis of materials collected from the Troy Adams site – 34LF33 – one of the sites that has received very little, if any analysis and interpretation.

In order to gain a better understanding of how this site fits into the broader ideas of Fourche Maline, a landscape approach is taken. This approach will help to encapsulate both the physical setting of these sites on the landscape while also accounting for the human influence on that environment and the things that took place on that landscape, especially with regard to the tools that they used and the activities in which they participated.

In addition to presenting a material analysis, this thesis will also take a comparative look at what other sites identified as Fourche Maline look like and how these general ideas about Fourche Maline compare to what was found at Troy Adams (34LF33). The main question that I will be addressing for this research is regarding the use and significance of the landscape in which these sites are located. It is my goal to gain a better understanding of what the artifacts can

tell us about the landscape and how it was being used and manipulated by people in the past. I will also answer questions about the production and use of ceramic materials, the acquisition of raw materials for stone tools and the uses of those stone tools; this will all tie into landscape usage.

This thesis demonstrates that Troy Adams (34LF33) was part of a series of mound sites along the creek that depict landscape modification. Through an examination of archaeological materials, I conclude that this area and these sites were highly modified by the people in the past that occupied them. They were only constructing and mounds and burying their dead within them, but they prepared the landscape for cultivation, manufacturing tools and other daily lifestyle activities.

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Chapter One: Introduction

The Fourche Maline archaeological culture is comprised of mound sites and associated artifacts that tend to be found along the Fourche Maline creek in eastern Oklahoma and western Arkansas. Some similar sites and artifacts have also been found in parts of Texas and Louisiana. The people that modified this landscape were not only constructing these mounded structures, but they were also participating in other types of land modification. The early Oklahomans in this region were likely hunters, gatherers, fishers. This is based on artifact studies from sites in both Oklahoma and Arkansas (Leith 2011; Schambach 1984). Additionally, there is also evidence to suggest they were participating in plant cultivation on some scale.

Landscape modification is not only tied to subsistence, but it is also related to the social and political organizations of these groups and how they incorporate the landscape into their daily practices. It is likely that groups were living in this region for many generations and returning over time to bury their dead within these mounds. They were also able to participate in other culturally significant practices that keep people returning to these sites and occupying these areas for long periods of time.

The mounds excavated at these Fourche Maline sites were generally referred to as middens or midden-mounds (Leith 2011; Rogers 1978). This word ‘midden’ was generally associated with deposits of unwanted materials or food scraps and the like. The contradiction with Fourche Maline mounds is that while there does appear to be tools and other deposited materials, there is also likelihood that these deposits were placed there purposefully and meaningfully. Recent interpretations of mounds challenged these preconceived ideas about (midden) mound construction. These newer ideas foreground socially significant explanations

for why a group might construct a mound. These social perspectives are focused both on the functionality of the mound and also on what it meant to the people that built it (McNiven 2012; Marquardt 2010; Nodine 1987; Randall 2015). These same new interpretations could also be applied to the mounds that were found at Fourche Maline sites.

The majority of the information that is known about the Fourche Maline mound builders comes from excavations by the Works Progress Administration (hereafter WPA) in the 1930s and 1940s and the subsequent analysis and surveys of those sites in the later 1900s and early 2000s. Radiocarbon dates from the 1970s indicate that Fourche Maline sites were occupied in that region for around 1390 years (Galm 1978; Irvine 1980). However, more recent analysis of Fourche Maline materials has limited the Fourche Maline period to a shorter period of time than previously thought. No longer are later Phases now identified as Evans, Harlan and Spiro considered to be part of Fourche Maline (Fauchier 2009) (Table 1.1). It is likely that sites that contain materials associated with those periods are multi-component sites with multiple phases of occupation. Therefore, the range of occupation at Fourche Maline sites fits into the Late Archaic to Woodland period (around 2300 BP – 1200 BP) (Bell 1951; Leith 2011; Schambach 2002).

Table 1.1: Periods of Site Occupation in Fourche Maline Area (adapted from Leith 2011 and Regnier et al. 2019)

Phase	Date Range
Spiro	650 – 550 BP
Harlan	900 – 700 BP
Evans	1050 – 900 BP
Fourche Maline	2300 – 1100 BP
Akers	1400 – 1100 BP
Scott	2000 – 1400 BP
Williams	2300 – 2000 BP
Wister	3500 – 2300 BP

Almost all of the research that has been conducted on Fourche Maline sites has taken place at these mound sites. Very few non-mound sites related to Fourche Maline have been identified and/or thoroughly studied. While non-mounded Fourche Maline-related sites exist, many of the interpretations about the people that are associated with Fourche Maline artifacts come from investigations into these mound sites in particular.

The main goal of this thesis is to compare the Troy Adams Fourche Maline mound site to other previously studied Fourche Maline sites and to determine if there is any similarities between the components of the various associated Fourche Maline sites with specific attention paid to landscape use and manipulation – which includes, but is not limited to mound construction and interpretations. The overarching and guiding method for this thesis is to demonstrate how a full site artifact analysis grows and shapes the current understanding of mounded Fourche Maline sites and the surrounding landscapes.

The main focus of this thesis is on the human-landscape interactions at these sites. More specifically, the focus is to gain a better understanding of how the landscape of this region was utilized and modified by the people occupying it and what meaning that could have with the people that occupied this landscape. In order to do this, several hundred individual artifacts were analyzed and compared to other sites that have been analyzed as a way to aid in the interpretation of the possible activities taking place on this landscape.

Conceptualizing the activities that took place on this landscape involves taking a landscape theoretical approach. This method considers the physical environment and the socially constructed environment. This approach accounts for the human influence on the landscape and the activities that took place on this landscape during occupation – especially with regard to the tools and materials that were used and manufactured at this site (Gamble 2017; McNiven 2012).

Artifact studies are the best way to grow the current understanding of the Fourche Maline. This is due to the fact that many mound sites that were excavated by the WPA in the 1930s and 1940s were destroyed and inundated by the construction of Wister Lake. Few Fourche Maline mound sites still exist today and the ones that do are privately owned or managed by the U.S. Army Corps of Engineers. Therefore, access to these sites is limited and the possibility of doing work at them is slim and difficult. This make artifact studies the perfect avenue for gaining better understanding into Fourche Maline-related sites. Furthermore, since very little archaeological work has been conducted on areas adjacent to these mounds, analyzing these materials can provide a better understanding of how people living near these mounds were using these tools and how they came to be deposited in these mounds.

Several different types of analyses were conducted on this collection of artifacts from 34LF33. There are separate analyses for the pottery, chipped stone, bone materials, and various other artifacts that were excavated at this site. All artifacts were measured and examined for anomalies and various characteristics and features. In addition to artifact analysis, the GIS program, ArcMap 10.7 was used to create a digitized and georeferenced version of the site map that outlined the locations of burials, features and various artifacts. Different analyses were conducted with this data in order to identify any possible patterns or anomalies that could be present at the site.

Chapter two of this thesis discusses the history of the Fourche Maline tradition, what exactly is Fourche Maline, where these sites sit on the landscape geographically, how the "Fourche Maline" terminology came to be used, what it meant in the past, and what it means today. This chapter also describes the theoretical approach that was used for the development

and interpretations of this thesis. It gives an overview of what landscape archaeology is and why it is relevant and being applied to this research.

Chapter three is an overview of all of the archaeological work that was done at 34LF33 WPA and otherwise. This includes all of the excavations by the WPA as well as the survey and excavations in the 1970s. Also discussed in this chapter are all of the challenges that come along with studying a site the was excavated around 80 years ago, such as the lack of accurate maps, lack of a detailed documented excavated, and lack of reliable field records.

Chapters four and five discuss the analysis of some of the materials in this collection. The first part of both of each chapter is a description of the types of artifacts that occur in various Fourche Maline contexts. Then, there is a description of the methodology used for the analysis, a discussion of the results and a conclusion that discusses some interpretations of the findings of that chapter. Chapter four presents the analysis of the ceramic artifacts and chapter five discusses the chipped stone materials. Chapter six contains an analysis of bone tools, cobble stones, hematite, and other materials All of these chapters ask similar questions with regard to understanding the practices taking place that this site.

Chapter six presents a discussion of the other materials that are neither ceramic nor chipped stone materials. Similar to chapters four and five, it contains a description of these materials in other Fourche Maline contexts, a methodology for the analysis, a discussion of the results and a conclusion that discusses the interpretations. This chapter contains an analysis of bone tools, cobble stones, hematite and other materials.

The final chapter, Chapter seven, contains a summary of the findings from each chapter. It also contains the concluding remarks for this thesis. The ultimate conclusions that this thesis comes to is that individual artifact studies on Fourche Maline sites can tell a lot about landscape

usage. Given that the burial mound is arguably the most important aspect of the site, I would also argue that this site is likely the location of significance for the people that were using it in the past, for example, as a feasting location or a place for community gatherings. They were burying their dead at these sites and then likely returning time after time to live, hunt for food, grow plants, and engage in culturally significant activities.

Artifact assemblages derived from the mound provide insights into non-mounded landscapes. They were making tools to assist them in hunting and cultivating. The Fourche Maline community members were making specific ceramic pots that were likely utilitarian to a certain extent. They were also developing and furthering generations of social ties to specific places on the landscape by returning to these places over long periods of time.

Chapter Two: Understanding the Fourche Maline Archaeological Culture and the Theory Behind it

The Fourche Maline Creek is located in Eastern Oklahoma in Le Flore County. This area is also known as the Wister Valley. The Fourche Maline Creek is a tributary of the Poteau river. The Poteau River and the Fourche Maline Creek converge at what is now Lake Wister. In the 1930's the valley was going to be inundated with the construction of the Wister Dam. With the creation of the Wister Dam and Lake Wister, many archaeological sites would be inundated and destroyed. In an attempt to salvage all of the archaeological resources that they could, supervising archaeologists for the Works Progress Administration (WPA) (Clements 1940; Newkumet 1940, and others), along with crews working for the WPA, excavated many of the sites that would potentially be impacted by the lake construction. Most of these sites were located near the Fourche Maline Creek, and the Poteau River, both which are now under Lake Wister. Many of these sites are now underwater and inaccessible for research. Additionally, many of the sites excavated by the WPA during this time had very little research done on them after the excavations ended. Furthermore, due to the inaccessibility of many of the sites, and the minimal amount of research that has been conducted on these sites there are still a lot of unanswered questions about the people that occupied this area and other aspects of their culture.

In a recent installment of Fourche Maline research in Oklahoma, Leith, in his 2011 dissertation, set out to understand what Fourche Maline is by "reconceptualizing" the previous associations and idea that surrounded it (Leith 2011:1). In order to understand this reconceptualization of Fourche Maline, it is first important to discuss where the term Fourche Maline came from, what the original associations with this term were, and how it developed over time. This chapter will break down some of these original ideas of Fourche Maline and the

development of that term over time. This chapter will also discuss some of the theoretical perspectives that have been applied to Fourche Maline research in the past. Furthermore, this chapter will elaborate on the theoretical perspective that has been applied to the interpretations made in this thesis.

Understanding Fourche Maline

"Fourche Maline" is generally associated with sites that have dark-earth midden-mounds that typically contain human burials. These mounds also contained thick, grog tempered, flat-bottomed pottery, various stone technologies like contracting and non-contracting stem bifaces of all sizes, chipped-stone hoes, and others. Also, within these mounds were various bone tools, decorative items, and other polished or worked artifacts. The Fourche Maline archaeological culture refers to the categorization of the archaeological remains of a site that seem to be recurring in eastern Oklahoma and Arkansas during the Woodland period. In this case, it represents a material culture that appears across a landscape that seem to be physically similar. The implication is not explicitly that the same exact people or groups of people made these items but that there does seem to be similarities between the artifacts and features identified at these sites.

Fourche Maline sites are typically found on bottom lands that were privately owned and used as farmland. However, soon after excavations of these sites were finished, this area was inundated by the construction of Lake Wister, located in the Wister valley. Before the lake was constructed, the WPA quarterly reports state that along the banks of the creek these low mounds could be spotted around every mile or so (Newkumet 1940). The early archaeological work that was conducted on these mounds involved surveys and excavations. Based on these activities,

these mounds were thought to be cemeteries. During the excavations, many other objects and features, in addition to the burials were found. The excavators found an abundance of pottery sherds, a variety of stone tools, like arrow points, spears, knives, and other types of worked stone tools. They also found a variety of ground stones, bone tools, and other faunal items.

During these excavations and even before, there were a lot of questions circulating about these archaeological sites. Newkumet, Orr and other archaeologists questioned whether or not these mound sites were all a part of the same cultural complex or if there were several different cultural groups represented in this area (Bell 1984). During the very first conference of Caddo archaeology in 1946, Newkumet discussed some of his finds at these sites in the Wister valley and identifies them as "Fourche Maline focus" (Bell 1980; Krieger 1947). The original use of this "focus" was with regard to the relationship that Fourche Maline has to Caddo people. At this first conference, the attendees discussed the extent of the "Caddo area". The attendees each discussed components of the Oklahoma, Arkansas, Texas, Louisiana region that were thought to be associated with the Caddo people. Each "focus" was an area believed to be associated with the Caddo people, Fourche Maline was one of those foci (Krieger 1947). This was one of the first times Fourche Maline was presented as a potential cultural group. Bell and Baerreis (1951) also referred to this seemingly related group of sites as "Fourche Maline focus." Essentially, this idea described the material culture associated with this group. The specific characteristics of Fourche Maline outlined by Newkumet are the locational parameters of Fourche Maline, the pottery type, the burial types, and the other tools and materials mentioned earlier.

Bell and Baerreis (among others) believed that these sites were the likely remains of a local hunting-gathering group of "nomads" (Bell 1984:151) that instead of settling down as "sedentary horticulturalists" (Bell 1984:151) like the neighboring communities, continued living

as foragers and hunters. Later research about the "Fourche Maline focus" lead to delineating Fourche Maline mound sites into two different periods in which the sites were used (Bell 1984; Galm 1984; Schambach 2002). The earlier period was assigned the "Wister Phase" and the later period was the "Fourche Maline Phase." The major difference between the two phases that Bell described is the introduction of pottery into the Fourche Maline phase (Galm 1984).

These changes in terminology have contributed to the confusion about what "Fourche Maline" is and what it means (Galm 1984). Refining the terminology that is used to describe the group or groups of people that lived in the Wister valley and constructed these mounds is a necessary and crucial part of understanding Fourche Maline. One way that Galm (1984) attempted to rectify this dilemma was through radiocarbon dates on many of these associated sites. Galm (1984) concluded that while the Wister Phase has distinct associated dates that begin around 3500-3300 B.P. (Galm 1984), the Fourche Maline Phase does not have as distinct associated dates. The dates associated with the Fourche Maline Phase range from 2300 – 2200 B.P. to 1300 – 1200 B.P.

Galm (1984) stated that, while these periods are mostly determined from these dates and the artifact associations, there are some types of artifacts that are present throughout the Fourche Maline Phase and also in the Wister Phase; these are things like the contracting stem hafted bifaces and the chipped-stone hoes. Galm (1984) concludes that it is likely that many of the sites that are associated with Fourche Maline were occupied during both the Wister and Fourche Maline phases. Artifacts associated with these periods show few changes aside from slight stylized differences. The only major difference between these periods is the introduction of pottery. In addition to associated artifacts, other researchers question the time period that the Fourche Maline phase occurred. Orr (1952) believed that Fourche Maline was more toward the

Middle Woodland than what Bell concluded which was during the Late Archaic and Early Woodland.

Fourche Maline Chronology

Both Leith (2011) and Schambach (1982) worked to define the chronology of Fourche Maline occupation and conceptualize it to help settle these debates that were discussed above. In 1982, Schambach stated that Fourche Maline chronology was severely understudied because the was a lack of materials that have been excavated since the invention of radiocarbon dating. In order to better understand this chronology, Schambach (1982) separated Fourche Maline into three eras: early, middle, and late. Within those groups he developed seven periods and all of this data is associated with a time period. He determined that early Fourche Maline began around 2800 BP and it transitioned to middle Fourche Maline around 2100 BP; it transitioned to late Fourche Maline around 1500 BP and late Fourche Maline concluded around 1100 BP. This chronology was developed from ceramic assemblages from different sites in southwest Arkansas, with the Crenshaw Site (3MI6) being the main comparative.

Schambach (1982) also outlined temporally specific varieties of contracting stem hafted bifaces (Garys). He concluded that time could be observed by looking at the occurrence of these specific tools and corresponding them to the level in which they were recovered. Leith also conducted the same experiment with those tools and created a seriation to demonstrate that temporal trend. Leith also concluded that the Fourche Maline pottery could be temporal as well based on a similar seriation study. He determined that there were different stages of occupation that could be identified through the artifact analysis. As seen in Table 1.1, the earliest period of occupation identified in the Fourche Maline area is the Wister phase. Leith removes that

category from the Fourche Maline definition and identifies categories of occupation, much like Schambach (1982). Leith refines those groups even further. Leith also includes the Evans Phase with Fourche Maline; however, I do not include it as a Fourche Maline aspect for the purposes of this thesis as it is more thought to be post Fourche Maline (Regnier et al 2019). Nevertheless, I will still expand on both the Wister and Evans phase and the characteristics associated with those phase even though they are not directly Fourche Maline. It is also valuable to discuss them because it seems that many sites with Fourche Maline Period occupation have Wister and/or Evans phases of occupation. Leith divided Fourche Maline into four sub-categories and those categories were associated with a date and a time period (Table 2.1). These sub-periods were identified by Leith and are based off of the seriation that was described above. Leith took into account the chipped stone and pottery varieties to establish periods associated with the period of occupation of Fourche Maline sites.

Table 2.1: Fourche Maline sub-periods and associated time periods (adapted from Leith 2011)

Phase	Time Range
Evans	1050 – 900 BP
Akers	1400 – 1100 BP
Scott	2000 – 1400 BP
Williams	2300 – 2000 BP
Wister	3500 – 2300 BP

The Wister phase (3500 – 2300 BP) is generally associated with the Late Archaic. This is the pre-pottery era of this region. This phase is known for the abundance of contracting stem hafted bifaces (Gary) that occur during this occupation (Leith 2011; Galm 1984). The primary subsistence strategy for this phase is generally assumed to be hunting and gathering (Leith 2011).

The Williams Phase (2300 – 2000 BP) as described by Leith (2011) is associated with the introduction of pottery in this region. Ceramics of this phase are mostly thick, grog tempered, flat

bottomed pottery type usually identified as Williams Plain in this area. The contracting stem hafted biface is still present in these assemblages. This phase also includes chipped stone hoes which are generally assumed to be gardening tools (Leith 2011; Schambach 2002). Galm (1984) also notes the decrease in frequency of corner notched and expanding stemmed hafted bifaces.

The Scott Phase (2000 – 1400 BP) is also associated with the Williams Plain pottery type, however, it is also known for the introduction of the Williams Incised pottery type which is a decorated pottery type that is similar in manufacture to Williams Plain pottery. There is a continuation of the contracting stem hafted bifaces which appear to be thinner and more refined (Leith 2011). Fewer chipped stone hoes occurred during this phase, but some are still present.

The Akers phase (1400 – 1100 BP) corresponds with the introduction of bow-and-arrow technology, according to Galm (1984). The contracting stem hafted biface is still present in this phase. The Akers phase also includes both Williams Plain and Williams Incised pottery types; Leith also notes the introduction of the Williams Boneware pottery type. This pottery type is a decorated pottery that is tempered with grog and bone. There is a low number of chipped stone hoes present in this phase as well.

Finally, the Evans Phase (1100 – 900 BP) as described by Regnier et al. (2019) is identified by the pottery types such as Williams Plain, with the flat bottomed, flowerpot shape. This phase was thought to be part of the Fourche Maline period in the past, but it is now considered to be a phase with more Mississippian characteristics (Regnier et al. 2019). This phase also includes all of the previously described pottery types as well as the inclusion of the Woodward plain pottery type which is a shell-tempered pottery type.

Fourche Maline Theory

Most of the early researchers making interpretations about Fourche Maline sites had been using a culture historical approach (e.g. Bell 1953). They focused on creating a chronology of occupation in the region. While Leith did address the cultural chronology, he also used a different theoretical approach to justify his interpretations. The approach that Leith (2011) used is a human behavioral ecological approach. He argued that this body of theory has the potential to separate a mode of subsistence from social organization. According to Leith, it is also possible to discuss the emergence of agriculture by looking at the potential costly signaling of agricultural production with regards to prestige. Ultimately, Leith proposed that human behavioral ecology can help to explain the change in subsistence that is appearing at Fourche Maline sites.

There have been a few other theses and dissertations that address different theoretical approaches that have been applied to Fourche Maline research; however, most of these theoretical interpretations that have been applied to specific mortuary practices. This work does not explicitly address the burial and mortuary practices present at these Fourche Maline sites. This thesis focuses on the manipulation and overall construction of the landscape. Instead of using theoretical perspectives applied to mortuary practices or behavioral ecological perspectives, this thesis takes a landscape perspective. In order to conceptualize Fourche Maline within a landscape perspective, an overview of the concept of landscapes will be reviewed.

Landscapes are not only the physical, built environment, but the socially, culturally, and politically constructed one as well (Wright and Henry 2013). While different groups have different connections to the land that they live on, the places that people occupy are significant. This is due to the activities and social connections that take place on those landscapes. Those places continue to remain significant to the people that return to those landscapes. This means

that people are connected to that places that they live because of the people that occupied them before (Gamble 2017; Jordan 2011; Spivey et al 2015). Memories are created and formed on certain landscapes that construct meaning within the people and groups that live on, utilize and interact with certain landscapes (Gamble 2017). Landscape archaeology is concentrated on understanding the meaning that is associated with certain landscapes. Over time, meaning is re-inscribed into these landscapes; this meaning keeps people spiritually and physically tied to a certain place or places – whether that means long-term occupation of an area or frequently returning to those locations over time.

The concept of landscape archaeology can also be tied to a concept known as persistent place (Schlanger 1992). According to Gamble (2017), a persistent place is a location that groups of people live and interact with. These are places that people continue to return to for a very long period of time. There could be a lot of reasons that people are tied to these persistent places. People could be tied to the resources – whether they are abundant or important, or they could provide protection from other people or the environment. Another reason for persistent places is the likelihood that these locations are culturally significant (Gamble 2017). This significance creates a social memory on this landscape and, in turn, creates a place for people to live on and return to over time. People develop a connection to their landscape, and they continue to use and return to that landscape for a very long time.

The modification of landscapes creates a physical and visual reminder that people living on the landscape have connections to the people that built and manipulated the landscape (McNiven and Wright 2008). McNiven and Wright wrote: “mounded midden features were constant visual reminders [that] everyday social activities…had historical continuities with the everyday social lives of their ancestors” (2008:145). Landscape construction can proceed with

focused energy and effort; however, landscapes can also occur very slowing, as slight accumulations and modifications over time. McNiven (2012) refers to this idea as ritual middening. This is the idea that a group's everyday practices shape the values and traditions that continue on to the next generations. Areas previously believed to be refuse piles could actually by specifically constructed in a way that represents a continuation of culturally significant practices.

Landscape archaeology encompasses how people in the past have purposefully and not-so-purposefully shaped and modified the land they occupy and also the reasons for those modifications (Wright and Henry 2013). Landscape archaeology also incorporates these ideas around persistent place and ritualized middening (Gamble 2017; McNiven 2012; Schlanger 1982). These ideas and ideas similar to these will be utilized in this thesis as a way to understand more about the construction and social meaning of the Fourche Maline mound sites. Landscape archaeology will help to make sense of these mounds because these mounds have not only existed on the landscape for a long time, but it is likely that the area around the mounds are being repeatedly used for subsistence activities like hunting and horticulture but also culturally and socially significant activities like burying their dead.

This thesis mainly focuses on data that was collected on one mound site associated with Fourche Maline – 34LF33 (Troy Adams). This mound, like many of the other Fourche Maline mound sites, contained human burials, pottery sherds, lithic debitage and diagnostic tools, bone tools, and various other artifacts associated with Fourche Maline sites. As a way to better understand the people that manufactured these tools and the mounds they constructed, landscape archaeology provides methods for explaining and interpreting. This thesis proposes that, in order to understand what is happening with Fourche Maline mounds, one must look at the greater

physical and social landscapes. This thesis will use analyses from other sites, in comparison to 34LF33, in order to contribute to a better understanding of the people that lived in this area and constructed these mounds. Comparing these mound sites to each other allows for the opportunity to present commonalities between these sites, it also provides a way to expose the discrepancies that may persist between these sites. Visualizing the commonalities and discrepancies will paint a fuller picture of the various activities present at these sites.

In addition to providing a way to conceptualize multiple related sites. A landscape perspective allows for interpretations to be made about individual artifacts. This thesis examines individual artifacts and interprets how those artifacts were used within the landscape and how they manipulated the landscape. Artifacts analysis has the potential to show if any tools are present that could be used for plant cultivation, what kind of hunting practices people were using or how those foods were being prepared and/or stored and many other possibilities.

Concluding Remarks

This chapter discussed the history of the concept of Fourche Maline and the theory that has been used to explain it. It outlines some of the original ideas surrounding Fourche Maline during the initial excavations by the WPA. Early researchers into Fourche Maline recognized that there was a lot of similarities in site construction and material that they were finding along these creeks in eastern Oklahoma, but they were unsure if these sites were constructed and occupied by the same people or groups of people. There was some agreement between researchers that these sites were, in fact, representative of a larger cultural group but there still seems to be debates about certain aspects of this group.

Leith (2011) argued that these sites and artifacts represent a culture of transegalitarian complex hunter-gatherer-horticulturalists. Through different types of analyses on the material culture, he concluded that there was evidence that this group was somewhat socially stratified and there was evidence that there were prestige individuals within this group. He also concluded that this group of people were in the process of a transition into a more sedentary, horticultural subsistence.

This chapter also outlines the concept of landscape archaeology. This is the idea that people and groups interact with their environment in ways that, over time, lead to social connections to different landscapes. People interacting with their landscape starts a cycle of the development of social memory that essentially ties groups to certain places. Different events can trigger this attachment to certain landscape and the social memory formed keeps people returning to and living on certain landscapes.

This thesis employs landscape archaeology to better understand the congruencies that seem to be present at these previously identified at these mound sites. It allows for a way to explain what people were doing on the landscape and how they were interacting with it. Future chapters will incorporate the application of the landscape perspective with the discussions of the various forms of specimen analysis. This thesis will discuss more about what individual artifacts might indicate about how the landscape was used and manipulated. The next chapter will consist of an in-depth summary of the Fourche Maline mound site that was researched for this thesis with specific attention into the history of the excavation at 34LF33 and the work that was conducted by the WPA.

Chapter 3: The WPA, Fourche Maline Research, and Troy Adams (34LF33)

This chapter situates Fourche Maline sites within the history of excavations in the region. It begins with an overview of the physiography of the region. I then situate Fourche Maline sites within the history of the work conducted by the Works Progress Administration in eastern Oklahoma, and more specifically, the Wister valley, in the 1930s and 1940. Following the WPA was a series excavations and surveys by other archaeologists later on in the 20th century and in the 21th century. This chapter will then present a detailed description of the work conducted at 34LF33; the main site discussed throughout this thesis. I provide a history of the work done by the WPA at 34LF33 and the post-WPA work at this site.

Wister Valley Geography and Physiography

The Wister valley, and more broadly, Le Flore county are located in management region six in Oklahoma which has been determined by the office of the State Archaeologist and the State Historic Preservation Office (SHPO) (Brooks 1987). There is a total of six management regions that help divide Oklahoma into regions as a way to better handle the differing physiography and geographic areas in the state. Region six is comprised of seven counties in southeast Oklahoma. This region is bordered by the Arkansas river to the north and the red river to the south (Brooks 1987). This region is dominated by the Ouachita Mountains; to the north of the mountains is the Arkoma basin which includes the Arkansas River Valley and to the south of the Ouachita Mountains is the Gulf Coastal Plain and the Red River Valley (Brooks 1987).

Within the Ouachita Mountains, there is a variety of different types of rocks natural to the region including chert, sandstone, slate, and shale (Brooks 1987). The most dominate types of

faunal species in this region include white-tailed deer, different varieties of squirrel and other small animals like raccoon and wild turkey. Also, in this region there were larger animals like timber wolves and black bears (Brooks 1987). In Le Flore county, the most dominate type of forest is the Oak-Pine Forest and the second most dominate forest type is the Postoak-Blackjack Forest. The Poteau River is one of the major rivers flowing through Le Flore county and through the Wister Valley. The type of sites in this region range from Paleoindian all the way to post-European contact sites. The most dominate site type in Le Flore county are Late Archaic and Woodland-period sites (Brooks 1987). Some of the first archaeological work to be done in the southeastern portion of Oklahoma was conducted by crews of the WPA (Brooks 1987). These excavations will be discussed, in detail, in the following sections.

The Works Progress Administration

In the 1930s, the United States was experiencing some of the highest rates of unemployment. The federal government was forced to take action to help reduce unemployment and after congress approved the Emergency Relief Appropriation Act of 1935, an act allotting $4.88 billion ($91.1 billion in 2019 [U.S. Department of Labor 2020]) for jobs President Roosevelt was able to create the Works Progress Administration (WPA) in August of 1935 (Lyon 1996:63). The WPA mostly conducted infrastructure projects like the construction of roads, school, bridges but they also supported programs in the arts. They supported programs in art, writing, acting, music, and history (Lyons 1996:64).

Shortly after the WPA was enacted, the administrators worked on developing an archaeology program within it. Archaeology was a good outlet for the WPA because of the equipment was inexpensive and the labor did not need to be skilled (Lyon 1996:63). However,

the archaeology programs were also rather fragmented. They received assistance from both the National Parks Service and the Smithsonian Institute. There were a lot of issues with designations of authority and allocation of funds, and the necessary archaeological procedures and protocols that should be conducted. In 1939, there was a reorganization that reduced the number of archaeological projects. Subsequent work focused only on programs supported by institutions.

Oklahoma and the WPA

In light of all of these issues regarding management and in the WPA, around twenty Fourche Maline archaeological sites were excavated during WPA projects from 1939 to 1941 in Le Flore county, Oklahoma, in addition to many other excavations in other counties and areas. The Fourche Maline sites that were excavated by the WPA were located along the Poteau River and Fourche Maline Creek (Bell 1980). The majority of these excavations were led by Phil Newkumet, but several were excavated by Lynn Howard. These sites in particular were excavated by the WPA because this valley was set to be flooded as a result of the construction of the Wister Dam. The inundation of this lake was completed in 1949 (Galm 1984). In addition to these excavations, WPA supervisors and archaeologists were also responsible for producing reports of their work every quarter. The majority of the information that we have about these WPA excavations came from these reports. In most of the reports are descriptions of the sites they excavated, the condition of the area before they were excavated, and a general method for the way each of the sites were excavated. Many of these reports also contain artifact drawings, maps of the burials and features, and descriptions of those burials and features.

Post-WPA Archaeological Work

In 1942, the majority of these excavations were put on hold due to the United States being brought into World War II. Furthermore, all of the subsequent analysis that was being done on the artifacts found at these sites was also stopped. A few years later, in 1946, a reconnaissance survey of the Wister valley was conducted by Virginia Watson (Galm 1984). Over the next two years, Robert Bell concentrated on excavations at 34LF11 – The Scott site. Up until this point, no major works about the Wister valley had been formally published. Bell and Baerreis (1951) published the first synthesis of the archaeological work that took place in the region. This publication synthesized the aforementioned Fourche Maline focus developed by Newkumet. Over the next few decades, little was done regarding the physical archaeological sites but there were several reports regarding specific site analyses of the WPA material that were excavated (see Proctor 1957, Sharrock 1960, Guilinger 1970).

The next major development regarding Fourche Maline took place during the 1970s. Several government-funded surveys and subsequent excavations took place in the Wister Reservoir area. A proposal to permanently raise the Lake around six feet prompted the United States Army Corps of Engineers along with the Oklahoma Archaeological Survey to conduct test excavations and general excavation on a series of sites recommended by the 1975 survey of the area by Michael Mayo (Mayo 1975, Galm 1978a). The excavations took place in the fall of 1976 and the spring of 1977. During these excavations, thirteen sites and four localities within specific sites were excavated or tested. The purpose of the excavations was to provide insight into the chronology of the region; specifically, they wanted to better understand site occupation over time. This report also contains the analysis that was done on the artifacts that were collected

during these excavations (Galm 1978a). Galm did extensive excavations and analysis at 34LF5A (Curtis Lake site) which resulted in an additional research report (Galm 1978b).

After the 1970s, very little field work was conducted in the Wister valley. However, the next few decades focused on completing artifact analysis on the sites that were excavated by both the WPA and the more recent Galm excavations. One researcher (Irvine 1980) conducted a ceramic analysis on the artifacts from the Williams I site (34LF24). She focused on redefining the types of ceramics that were present at the site since no formal analysis had ever been conducted on these materials from this site. She also wanted to see if she could observe any changes in ceramics throughout the occupation of the site. She essentially concluded that it is possible the ceramic tradition that is found at Fourche Maline sites (Williams Plain) was contemporaneous with other plainware ceramics that occur other places at the same time. However, there was also evidence that supports the use of the pottery found in Fourche Maline contexts over a long period of time, even after other regions stopped using their local plainware (Irvine 1980).

One state over, in Arkansas, new research was also developing at this time. Frank Schambach was working on conceptualizing the Fourche Maline sites that had been found in Arkansas. These sites were very similar to ones found in Eastern Oklahoma. They contained the same types of archaeological materials including burials, points, ceramics, and various other artifacts. Schambach (1982) developed on the idea of the "Trans-Mississippian South." He argued that the cultural group or groups that are associated with Fourche Maline sites developed due to the unique setting of the environment. The region is not a part of the Woodland of the southeast or the Lower Mississippian Valley to the east. On the west are the plains (Schambach 1982). This region, he claimed, is subject to very temperamental climatic events which created a

challenging environment in which to live; therefore, leading to cultural adaptations to this specific environment (Schambach 1982).

Another contribution that Schambach made to Fourche Maline research was his involvement in the building of the chronology of these sites. He identified Fourche Maline components in northwest Louisiana, and also in east Texas (in addition to the sites in Arkansas). Raymond Wood (1981) was the first person to identify Fourche Maline materials at sites outside of Oklahoma but Schambach was one of the first people to identify the possible links between these types of sites that were found across all four of these states.

Recent Progress in Fourche Maline Research

By the late 1990s – early 2000s, Schambach had stripped Fourche Maline of its Late Archaic associations. Schambach proposed that the Wister phase that was developed by earlier researchers (Bell and Baerreis 1951, Bell 1953, Bell 1980, Galm 1984) be removed from Fourche Maline in Arkansas (Schambach 2002). However, based on the research done on Fourche Maline sites in Oklahoma, the Wister Phase (Archaic component of Fourche Maline) still holds a valuable place in Fourche Maline research. In addition to eliminating the Wister phase, Schambach does some more refining of Fourche Maline. He eliminated the Fourche Maline-Spiro connections that he once thought were present and later linked Fourche Maline to the Caddo people (Schambach 2002, Leith 2011).

Another, more recent investigation into Fourche Maline sites was the 2009 thesis by Rachel Fauchier, a 2006 thesis and a 2011 dissertation by Luther Leith, and the 2014 dissertation by Simone Rowe. These works by Fauchier (2009) and Rowe (2014) focused on the burials and the burial materials at a Fourche Maline site excavated by the WPA – 34LF32 (Akers). Fauchier

focused on the burial practices of the people associated with these Fourche Maline mounds. She also looked at a lot to the ceramics and other burial association from 34LF32 (Fauchier 2009). Rowe also conducted her dissertation research on materials from this site. Her dissertation focused on the analysis of the actual burial materials from 34LF32. Rowe examined the remains and found that there were high rates of skeletal trauma among these burials as well as a significant number of mass burials. She argued that the landscape in which these sites were located was a contested landscape, meaning that there were likely social and economic factors contributing to nutritional stress and competition for resources or conflict among each other or neighboring groups (Rowe 2014). Finally, Leith's (2011) research focused on "reconceptualizing" the assumptions regarding Fourche Maline. He conducted a series of different analyses (botanical and zoological analyses, seriation studies, and geophysical studies) and concluded that Fourche Maline represents a group of "transegalitarian complex hunter-gatherer-horticulturalists" (Leith 2011:1).

There is quite a bit of work that has been done at Fourche Maline-related sites over the last 80 years. My synthesis highlights an analysis of the materials that were excavated by the WPA in 1939 and 1940 as well as an interpretation of those materials based off of landscape construction and modification. Since a larger overview of the WPA activities has been covered, the next portion of the chapter will be a discussion of the site that is the subject of this thesis.

History of Work at 34LF33 – Troy Adams

The site that is the focus of this thesis is 34LF33 – Troy Adams. This site was one of the original sites excavated by the WPA in the summers of 1939 and 1940 (Figure 3.1). At the time of the excavations, the site was about one mile south of the Fourche Maline Creek (this part of

the creek is now Lake Wister) according to the WPA quarterly report (Clements 1940). 34LF33 is one of the dark-earth midden mounds that are believed to be associated with Fourche Maline sites. The materials associated with this site are various varieties of pottery, chipped stone, ground stone, boat stones, bone tools, and other tools and decorative items as well as several types of faunal remains.

Figure 3.1: Photo from Original WPA excavation in 1939 (Courtesy of Sam Noble Museum of Natural History (SNMNH), WPA files)

According to the WPA reports, the mound at 34LF33 was around 200 feet long (east to west) and 90 feet wide (north to south) (Newkumet 1940). During the 1939-1940 WPA excavations, the area that was excavated (according to a sketched map of the excavated units – Figure 3.2) was 175 ft. long and 75 ft. wide (Clements 1940). At this site, the WPA excavated

this mound in five ft. by five ft. squares units. These units were organized by a coordinate grid that was laid out prior to the excavations. Based on the quarterly reports published by the archaeologists and field directors, we do know a little about the process on the WPA excavations. The overall methodology that was used for the WPA projects in eastern Oklahoma was elaborated on by Regnier et al. 2019; however, in summation, the WPA crew conducted test pit excavations on large features, including mounds, then, established a grid system unrelated to the test pits. They excavated the mounds by the procedures outlines by the University of Chicago. They were excavated from the non-mounded area and moved toward the mound as they excavated (Regnier et al. 2019).

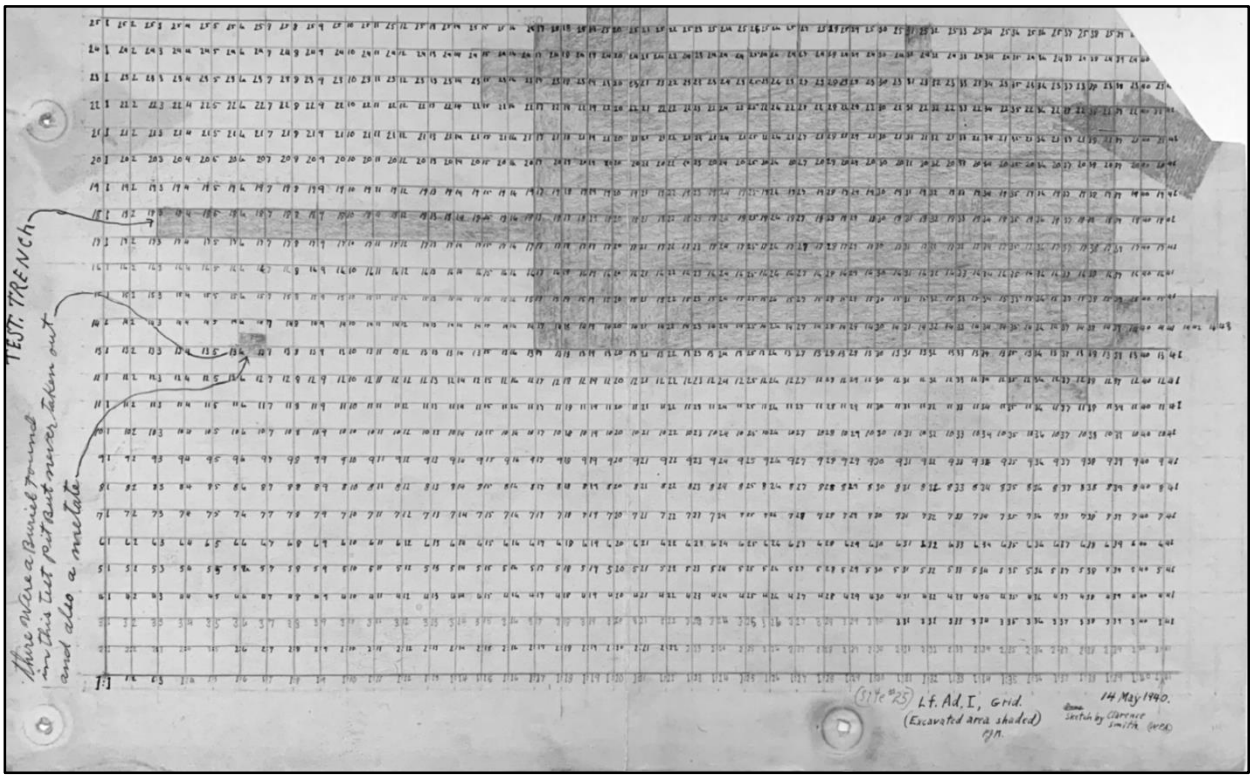

Figure 3.2: Sketch Map of excavated units at 34LF33 (Courtesy of SNMNH, WPA files)

We also know that it is likely the crews were digging in roughly six-inch intervals. These depths likely started at the surface of the mound. We know that when an object was found in

level one, that is the upper most level of the unit. Each level and unit had a different provenience so level can be identified based off of the specimen number assigned to the object. They also gave each 5x5 ft. unit a stake number (1:1, 1:2, etc.). Each artifact that was found was given a number based on the unit that they were found. Thus, objects currently housed at the SNMNH do have (for the most part) horizontal and vertical provenience. Almost all of the artifacts that were analyzed, along with the features and burials, can be matched to a semi-specific location on the ground (within five feet). The WPA did not use screens while excavating therefore we can conclude that they only collected material that they were able to identify visually. They did not systematically pick up debitage or other artifacts that were too small to notice with the naked eye or artifacts that might not have appeared to be artifacts like cores or fire cracked rock.

Apart from the actual dimensions of the excavated area WPA report of 34LF33 – Troy Adams – does not elaborate on the methodology used to excavate this specific site. Clement states, "The Troy Adams site was worked in the same manner as the J.W. Williams mound and as the Jimmy Sam mound. Since It has essentially the same characteristics, the burial and artifact types will be taken up without further discussion" (Clement 1940:42). There are still some questions regarding the specifics of the excavation methods. For example, in most cases we do not know how much of the mound was excavated, or what part of the mound was excavated. We do not know exact depths for every unit or how deep the mound deposits were or how tell the mounds were. Another issue that comes with WPA archaeology is that they employed mostly unskilled labor with very little supervision. There were very few archaeologists and most of them were spread between several WPA projects all happening at the same time (Galm 1978, Bell 1984).

In addition to the locational information, the WPA quarterly report from 34LF33 also contained detailed descriptions of the burials and some of the artifacts that were found. The report discussed where individual burials were located, how deep within the mound they were (although it does not indicate if the depth recorded is the top or the bottom of the deposit), the cardinal direction of the skull, the position of the remains (flexed, partially flexed, etc.) and the association (if any) found near the burial.

In total, there were 62 burials associated with this mound site. Of these 62 burials, there were nine burials that have more than one individual. Four burials had two individuals, four had three individuals and one burial had 11 individuals. The remaining 53 burials were single burials.

For this thesis I digitized the extant field maps to create a new master map of the site using the GIS software ArcMap (versions 10.6 and 10.7). During this process I created polygons to represent each excavation unit. I also generated polygons of ash features. Burial locations were converted to points and polygons. The points were placed at the center of a burial. The polygons encircled the extent of individual or group inhumations. These polygons do not necessarily correspond with burial pit margins (which were not recognized in the field). The map of the features and burials is presented in Figure 3.3.

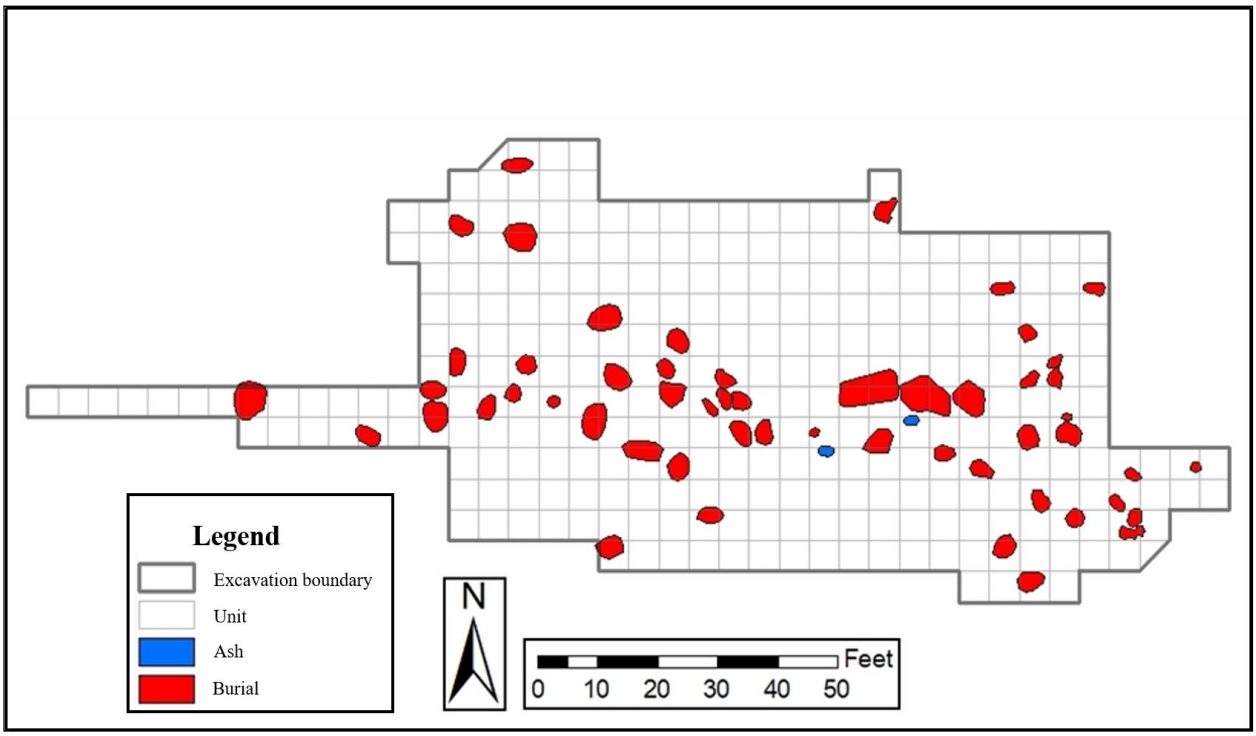

Figure 3.3: Digitized map of excavations at 34LF33, showing the excavation extent, ash features, and burial locations

In this digitized site map, burial features and ash features were plotted. In other versions of this map, thicknesses of the deposits are represented, the distributions of sherds cross the site and also the distribution of chipped stone tools across the site. The features were digitized from the original WPA site map and geo-referenced on the digital map to show the area of the deposits of the features.

I was also able to generate maps of the thickness of deposits using available data sheets (Figure 3.4). The thicknesses of the deposits were translated from the WPA data sheets that indicated the depth of the profiles that were excavated and the depth of the surface deposits. These depths were also digitized and georeferenced. Two measurements were recorded, "profile base" and "bottom of mixture" but elevation values were not recorded for every stake. Profile base likely is the term the WPA used to describe the maximum depth of the excavation in the unit. The bottom of mixture likely is the term they used to describe the basal depth of the dark

earth mound deposits. The measurements of the bottom of the mixture range from 24 to 44 inches thick (Table 3.1). Based on the information that is available, the deeper deposits seem to be associated with the northern and eastern portions of the mound. Both the "bottom of mixture" depths and the "profile base" depths seem to reflect this as well.

Table 3.1: Minimum and Maximum depths of profile base and bottom of the mixture

Measurement type	Minimum depth	Maximum depth
Profile base	20	47
Bottom of mixture	24	44

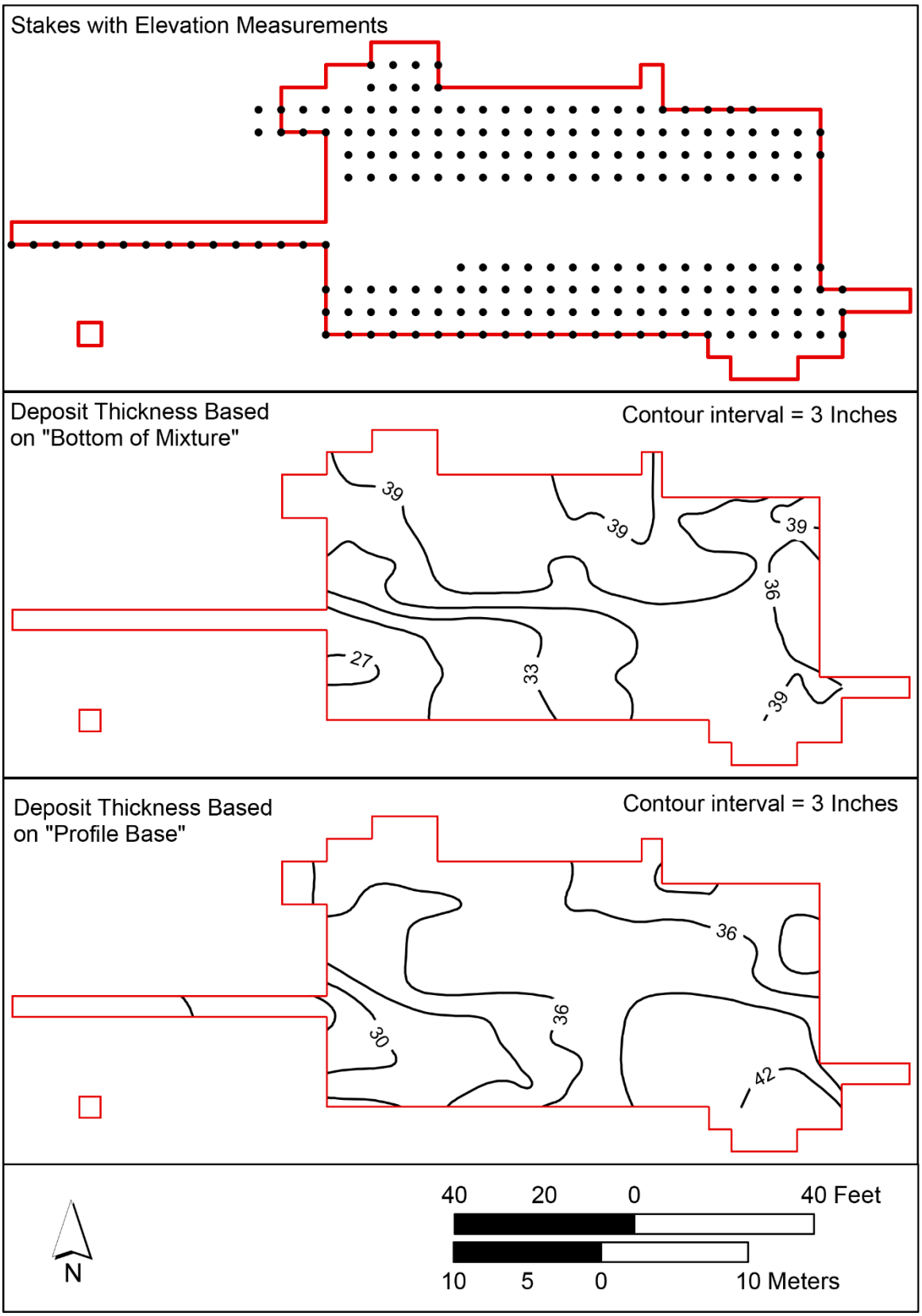

Figure 3.4: Maps of the thickness of the deposits at 34LF33

The majority of the major artifact types has provenience information available therefore each artifact was able to be placed in the respective unit from which it was excavated. A distribution of artifacts across the excavated area was plotted to gain a better understanding of where the artifacts are occurring across the landscape and to see if there is any patterning with how artifacts and features are distributed across the site.

Some issues that come along with these WPA collections is that amount of reconstruction that is necessary in order to determine basic information about this site. For example, nowhere in the original report did it indicate how tall the original mound was when they started excavations. Therefore, the depth data that has been recovered was challenging to interpret due to the fact that we don't know if the depth recording is from the top of the mound down or from the base of the mound. A lot of this research is built on some basic assumptions about how other sites were constructed while also using other site data to aid in the understanding of these sites. Another example regarding issues with site interpretation is the fact that since we know the WPA did not screen, we know that there are likely things that were missed. Because of this, it is difficult to know about the aspects of the site that were not collected or about the artifact that they missed of failed to collect during the original excavation.

One reason that we know there were numerous missed artifacts is because of the Galm excavations in the 1970s (Galm 1978). However, even more issues arose from the 1970s excavations as well. As mentioned before, Galm excavated several sites in the Wister valley in the 1970s. One of these sites was 34LF33. During these excavations they collected a lot of debitage, small ceramic material, bone fragments, and some decorative artifacts as well. This showed that there is a lot more that can be known about these Fourche Maline sites. These new materials have the potential to tell us a lot about lithic manufacturing and site organization.

However, the problem with the material found by Galm (1978) at this secondary excavation was that all of this excavated material appeared to have been derived from the WPA backfill, and thus was not a new, undisturbed portion of the mound. This means that this material is no longer in-situ. It cannot be examined for contextual data (outside of site-wide analysis). This made the 1970s excavations exponentially more difficult to interpret due to the lack of context and provenience information that would have come out of those excavations had the area been undisturbed.

The reason that they excavated in the wrong location during the Galm (1978) excavations was because this site was marked incorrectly on the map. The excavators in the 1970s thought they were digging a part of 34LF5A (Curtis Lake site), but they soon figured out that they were actually digging a part of 34LF33 (Troy Adams). Once this was discovered, they stopped work at 34LF33 and decided to come back to it once further analysis was done on the material they mistakenly excavated. Unfortunately, due to time, money or other possible constraints, no official analysis of the material from 34LF33 was ever completed on either the original WPA collections or the later materials collected in the 1970s.

The excavations at 34LF33, both the WPA and the Galm (1978), bring up some interesting and important observations that can and should be made about archaeological excavations of the past. The series of excavations at 34LF33 wound up being the perfect storm of challenges. The WPA excavations had a lack of methodological standards. The 1970s excavations had incorrect maps and non-contextual artifacts. In both excavations there are time and money constraints that limit people's capacities to complete projects to the best of their abilities, as well as a lack of analyzed materials. There is a lot that can be learned about what not to do at archaeological excavations – better methodology, better mapping techniques, but the fact

of the matter is that the construction of Wister Dam would have inundated and made inaccessible those sites in that area. The mounds would be inundated and inaccessible. While the WPA did have its problems, these sites can still be researched because of the work that they did. Furthermore, the excavations in the 1970s also had its problems but a lot can be learned from those excavations as well, for example, because of the 1970s excavations, we know that there was a lot that was missed by the WPA and the 1970s excavations can potentially help fill in the gaps.

Nevertheless, due to the issues surrounding the 1970s collections, those material were not analyzed for this thesis. The only materials analyzed for this thesis were the materials from the original WPA excavations. The WPA collections do have contextual data and provenience information. This work also focused on the non-burial related materials. No human remains or burial items were analyzed for this thesis. Future research should look into the collections from the excavations at 34LF33 in the late 70s. Looking at these collections could provide some valuable insights into what the WPA missed during their excavations in the 1940s. Future researchers should also look into the burials and burial associations found at this site.

Chapter Four: Fourche Maline Pottery Examination and Analysis

This chapter is a presentation of the analysis that was conducted on the ceramic artifacts that were excavated by the WPA at 34LF33 and the subsequent interpretations made thereafter. The pottery assemblage was analyzed in order to gain a better understanding of the uses of ceramics vessels and the types of activities that were taking place at this site, as well as, the greater landscape. The conclusions developed in this chapter came from a combination of ceramic analysis at 34LF33 and an examination of previous ceramic analyses from other Fourche Maline-related sites.

The interpretation of the ceramic artifacts associated with Fourche Maline will first begin with an outline of the ceramics found at various Fourche Maline mound sites in the region. Then this chapter provides a methodology for the analysis and then it will present the findings of the analysis of the ceramics at 34LF33. Finally, this chapter will compare the analysis of the ceramics found at 34LF33 and the ceramics found at other Fourche Maline sites to see how these sites compare, if the ceramics had similar attributes between the sites, and what the used of these ceramics might be. I conclude that the ceramics excavated by the WPA at 34LF33 are very similar to the types of ceramics being found at other sites. In my study I found that the majority of the sherds represent a thick, grog tempered, flat bottomed pottery. This is congruent with descriptions of the pottery at other sites. Finally, I conclude that these thick, grog temper, flat-bottomed pottery are likely being used for stone-boiling.

Fourche Maline Ceramic Typology

Bell (1984) and Galm (1984) have proposed the Fourche Maline tradition encompasses two different phases, as discussed before, the “Wister” phase and the “Fourche Maline” phase.

Bell (1984) and Galm (1984) argue that the difference between these two phases is the introduction of pottery into the later phase, the Fourche Maline phase. They also argue that this innovation happened around the transition between the late Archaic and the Early Woodland periods. The introduction of ceramics, in addition to several other types of artifacts, is what has led to asking more questions about subsistence practices in this region (Bell 1984, Schambach 1982). While the people and groups associated with Fourche Maline sites were thought to have subsisted on practices of hunting and gathering the introduction of pottery might be able to tell us more about the subsistence practices of these groups of people. Rice (2015) discusses that certain attributes can give evidence to how people were manufacturing certain pottery vessels and what they were using them for.

It is important to discuss how researchers in the past has discussed and conceptualized these ceramics in order to understand more about what these ceramics may have been used for and what they might be able to tell us about the people that used and created them. Several different ceramic types have been established as a way of organizing and understanding Fourche Maline ceramics. According to Leith (2011), most sites designated as Fourche Maline have at least one of five types of pottery. These types are Williams Plain, Le Flore Plain, Williams Boneware, Williams Incised and Woodward Plain (See Table 4.1).

Table 4.1: Description of pottery types associated with Fourche Maline (from Leith 2011)

Pottery type	Temper	Thickness	Surface Treatment	Forms
Williams Plain	Grog, sometimes mixed temper	5.9 – 17.8 mm mean 7.7 mm	Smoothing, wiping, burnishing	Simple bowl, globular bowl, cup, restricted jar, barrel shaped jar
Williams Boneware	Grog and bone	Same as Williams Plain	Same as Williams Plain	Same as Williams Plain
Williams Incised	Grog, sometimes mixed temper	Same as Williams Plain	Same as Williams Plain	Same as Williams Plain
Le Flore Plain	Grog and grit	4.2 – 9.8 mm mean 6.19 mm	Usually burnished	Simple bowl, globular bowl, carinated bowl, jars, narrow mouthed bottle, wide mouthed bottles
Woodward Plain	Shell	5 – 11.2 mm	Burnished	Simple

According to Leith (2011), Williams Plain is distinguished from the other types by the presence of only grog temper. Grog is a temper that is made up of other, smaller pieces of baked clay or pottery. Williams Plain also usually has either no surface treatment or, if it does, is roughly burnished and the pots are generally fairly thick. Williams Boneware is a pottery type that contains bone and grog temper. The surface is generally plain and is thick like Williams Plain. Williams Incised is similar in size, temper and thickness as Williams Plain except that Williams Incised is decorated in some capacity. Le Flore Plain is distinguished from Williams Plain by the inclusion of grit included in the temper and is more "well-made" than Williams Plain, according to Leith (2011). Finally, Woodward Plain has a smooth or burnished surface that is tempered with shell and generally it is slightly thinner than Williams Plain sherds. There are three key attributes that are important when it comes to analyzing the ceramics found at Fourche Maline sites: temper, surface treatment, and thickness.

Another type of pottery found at some Fourche Maline sites in Arkansas is known as Baytown Plain. This pottery type is extremely similar to Williams Plain; the only difference being the presence of grit temper in Baytown Plain. I would agree with Leith when is said that it is likely that Williams Plain pottery and Baytown Plain pottery are the same. That being said, Leith still indicated a discrepancy between Williams Plain and Le Flore Plain, the only difference being the presence of grit in the temper. In the analysis below, I categorize all sherds that are grog tempered and also sherds that I determined to be grog and grit temper as Williams Plain.

Analyzed Ceramic Assemblages at Fourche Maline sites

Much like 34LF33, many of the Fourche Maline sites that were excavated by the WPA had a lag in the analysis of the artifacts post excavation. At present, most of the sites have had analysis completed on some part of the assemblage but there are still a lot of sites that could use more research and analysis. Here, I will summarize the ceramic analyses that have been conducted on assemblages from Fourche Maline sites that were excavated by the WPA and later.

34LF11 (The Scott Site)

This site was first surveyed and then excavated by Robert Bell in 1947 and 1948, later surveyed by Mayo (1975) and then excavated again by Galm in 1977 (Galm 1978). During these excavations, Bell (1953) and Galm (1978) excavated several types of artifacts like ceramics, chipped stone tools, bone tools and other items, in addition to fifteen burials in 1953 by Bell, and nine burials by Galm in 1978. Pottery was also among the artifacts that were found at this site. Bell (1953) states that the pottery was fairly equally distributed throughout the excavation area.

Bell (1953) reported 319 pottery sherds. The majority of these sherds were "a thick granular clay tempered ware" (Bell 1953:328). The other type of pottery present at the site was a shell-tempered ware. Out of the 319 sherds, a total of 266 of them were the thick granular clay tempered ware. These wares also have incised lines on the rims (Bell 1953). Thirty-two sherds contain shell temper. These sherds were located in the top four levels (six inches per level) only, and few were decorated. Finally, there are 21 sherds that do not fit in with either category. Five of these sherds are bone tempered and one of them was sand tempered. The rest of the sherds either had an unidentifiable type of temper or had multiple tempers present.

Bell found that the lowest levels that were excavated at this site contained no sherds and the levels toward the middle contain no shell-tempered pottery sherds while the levels toward the top do contain the shell-tempered pottery. Bell (1953) suggests that this site contains a non-ceramic component as well as a ceramic component. Galm also found that during the excavations in the 1970s that that majority the if the ceramics were located at the upper levels (Galm 1978).

34LF24 (The Williams I Site)

This site was first excavated by Newkumet during the WPA excavations. Newkumet decided to excavate this site fully. Over the course of the excavations, they excavated 122 burials. They also collected 5,870 body sherds, 90 decorated sherds, fifteen perforated sherds, 210 rim sherds, 239 base sherds (45 basket-impressed). In 1980, Irvine published a thesis wherein she analyzed all of the ceramics from this site. There is a discrepancy in the total number of sherds found at this site as Irvine states there are only 5,085 sherds (Irvine 1980). Furthermore, she analyzed only 4,221 sherds because the excluded sherds lacked provenience

data. Her thesis focused on developing a typology for the ceramic types present at this site. Of the 4,221 sherds that she analyzed, 3,177 (75.27%) of them were designated as *Williams Plain.* Another 613 (14.52%) of these sherds were classified as Le Flore Plain. Seventy-two (1.71%) of the sherds were classified as shale-tempered plain, which is a shale-grit tempered ceramic with minimal surface treatment (Irvine 1980).

Irvine developed different categories mostly based off of temper and then surface treatment. It appears that there are a lot of combinations of different types of tempers and surface treatment that she recorded. For example, "grit-tempered incised," "grit, grog and bone decorated," and "grit and grog/brushed," and many others. This is the most detailed account of ceramics that is present among Fourche Maline research (at least in Oklahoma) so it is possible that other researchers did identify these different types of combinations of temper, but they were recorded by their most dominant temper.

Irvine concludes that out of the twelve levels excavated by the WPA, the upper six levels contains ceramics, with the seventh and eighth levels inconclusive. Ceramic use appears to be more dominant over time with that majority of the sherds in the first (19.3% of the sherds) and second (39.5% of the sherds) levels (Irvine 1980:51), which, according to most WPA reports, is around six inches per level.

Other Analyses

Aside from the minimal analysis done by the WPA, very few sites have had complete analysis done on their collections. Fauchier (2009) conducted an analysis on all of the burial associations from 34LF32, which included mostly complete or reconstructed vessels. None of the vessels at this site were grit or grog tempered. The vessels at this site were predominantly shell

tempered. Fauchier concludes that because of the lack of grog and grit tempered vessel, likely the site represents a later Fourche Maline occupation, which was confirmed through radiocarbon dates (Fauchier 2009).

In addition to lack of actual material analysis on ceramic material excavated at these Fourche Maline site, there is also a lack of interpretation associated with these analyses. Most argue that these vessels would have served a utilitarian function (Bell 1953, Irvine 1980, Leith 2011) but they lack data on what those actual functions were. Leith (2006) was really the first to claim that the thick, grog tempered, flat-bottomed pottery could have been used for stone boiling. Based on what is known about heat transfer, temper function and other morphological functions of pottery vessels it is likely that these vessels were not being placed directly on a heat source (Rice 2015). Leith, in his 2006 thesis uses a comparison from Sassaman (1995) to suggest that these vessels could have been used as a way to help facilitate the extraction of certain oils and fats from nuts and seeds. This will be expanded on below.

Ceramic Analysis of Artifacts from 34LF33

All of the ceramic artifacts (aside from the burial associations) that were collected by the WPA from site 34LF33 were analyzed for this study. The main goal of this analysis was to gain a better understanding of the types of ceramics present at this site and to see how these ceramics compare to the ceramics that have been found at other Fourche Maline sites. In order to do that, I will first discuss the distribution of ceramic artifacts at 34LF33, followed by the methodology used in analyzing the ceramics, then I will present my results.

The ceramic materials at this site were mapped form the WPA provenience information. With this information I was able to correspond most of the artifacts to a specific unit of

excavation. Each square in Figure 4.1 represents a five ft. by five ft. unit that was excavated. The densities of the sherds recovered in each unit is represented by a certain color. Based on Figure 4.1, it appears that the northern portion of the site has a higher density of positive unit than the southern portion of the site; additionally, the density of artifacts in those positive units is also higher in the northern portion of the site.

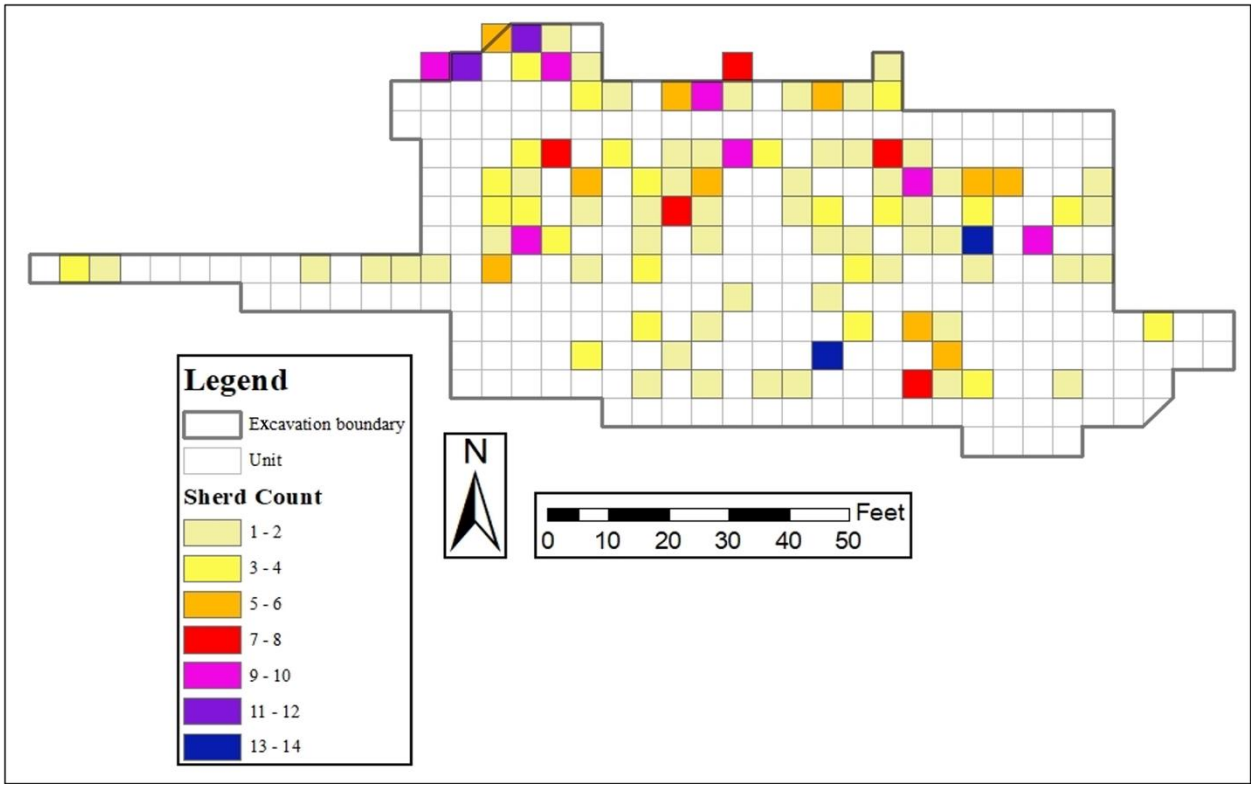

Figure 4.1: Map showing the distribution of sherd counts by excavation unit at 34LF33

Methodology

The collection that was analyzed for this thesis (34LF33 – Troy Adams) was picked for this research analysis due to the fact that it was one of the original Fourche Maline sites excavated by the WPA and the artifacts have never been formally analyzed. Furthermore, no analysis regarding this site been published aside from the initial WPA quarterly report in 1940 (Clements 1940).

The artifacts associated with this site are housed at the Sam Noble Museum of Natural History (SNMNH) in Norman, Oklahoma. The artifacts that were analyzed for this study include everything recovered during the WPA excavations except for the artifacts that were associated with burials. All of the burial associations were separated from the collection at the museum and were not analyzed. This analysis also does not include the artifacts that were excavated in the 1970s by Jerry Galm due to the reasons mentioned in the previous chapter.

Once the burial associations were removed from the collection, it was moved to the Oklahoma Archeological Survey where each artifact was individually analyzed. Each artifact in this collection has previously been assigned a provenience number that associates it with a specific excavation unit and level from the WPA excavation. In most cases, there were multiple artifacts excavated out of one unit; therefore, I also gave each artifact a specific specimen number in addition to the existing provenience number. The specimen number is a three-digit decimal number attached to the provenience number. For example, if the provenience number was 202, the artifacts found in that unit would be 202.001, 202.002 and so on. After all of the artifacts were assigned specimen numbers, they were individually analyzed.

The ceramic artifacts associated with Fourche Maline are generally identified as thick, grog-tempered, and flat-bottomed pottery. These characteristics seem to be the most identifiable and important for pottery analysis. Therefore, for every sherd, I recorded the type of temper present, the type of surface treatment on the sherd, and the maximum thickness of the sherd. This was done through visual inspection and a loupe (30x magnification). In addition to these characteristics, I also recorded the max length and width of the sherd, the height (if applicable) with digital calipers, and the weight (in grams).

The collection that was analyzed for this study consisted of base (Figure 4.2), rim (Figure 4.3) and body sherds (Figure 4.4) as well as decorated sherds. For each different type of sherd, I also recorded additional information. For base sherds, I also recorded base thickness, and if possible, base diameter. For rim sherds, I recorded rim thickness, orifice diameter, and, if applicable, neck to rim height. Finally, for the decorated sherds, I recorded the general decoration that was present on the sherd. I chose these attributes because, with Fourche Maline pottery, the most basic aspects of the pot (like temper type and general thickness) are what define the types in the area (Leith 2011; Schambach 1982).

Figure 4.2: Base sherds from 34LF33

Figure 4.3: Rim sherd from 34LF33

Figure 4.4: Plain rim sherds from 34LF33

Analysis

A total of 399 sherds (43.85%) out of 910 total artifacts were analyzed from this collection. The major types of temper present are grit, grit and shell, shell, grog, and what I have called "grog+" (Table 4.2) Due to the issues with the presence of grit in the temper as a possible natural inclusion, I used a category "grog+" to indicate any sherd that definitively contains grog

as a temper but also includes a small amount of grit. For the record, I consider grit to be a natural inclusion and not an intentional inclusion, however, for the purposes of this study, I have included grog+ as its own category for the sake of analysis and clarity. Furthermore, in some places grit is a definitive category due to the fact that it is not a natural inclusion in all clays.

Table 4.2: Sherd distribution per temper

Temper Distribution						
Temper	Count	Percentage	Average Thickness	Minimum Thickness	Maximum Thickness	Count of Decorated
Grit	13	3.26	8.05	4.6	15.8	9
Grit and Shell	3	0.75	7.47	6.3	84.0	0
Shell	12	3.01	7.42	4.8	10.1	1
Grog	254	63.66	11.79	6.1	31.9	3
Grog+	80	20.05	10.45	3.9	21.3	9
Unknown	37	9.27	8.06	4.4	14.1	0
Total	399	100.00	10.89	3.9	31.9	21

Grit Temper:

Of the 399 sherds present in this sample, only 13 (3.26%) of them are considered to be solely grit tempered. Based on previous statements this could also be identified as a category of "no temper" but for the sake of brevity and clarity they will be identified as grit temper. The average thickness of these sherds is 8.05 mm with the thinnest being 4.6 mm and the thickest being 15.8 mm. Twelve out of thirteen of these sherds have surface treatment on at least one side and four of them have burnishing on both the interior and exterior sides. Nine of these grit tempered sherds have some type of decoration on the exterior of the sherd. One of these decorated sherds has a red slip with engraved lines on the exterior. This is the only sherd in the collection that contains these features; it was excavated out of level one. A total of nine sherds

were excavated at the first level, two of them were located in a test pit (no level data), one was excavated at level two and one was excavated at level four.

Three of the thirteen sherds are rim sherds and the rest are body sherds. These three rims have possible diameters of 18 cm, 17cm, and 28cm (rim percentage not calculated). Sherd 637.001 is a carinated vessel with incised lines on the shoulder and upper portion of the vessel.

Grit and Shell Temper

Three sherds (.08%) of the 399 were considered to be categorized as grit and shell temper. The average thickness is 7.47 mm with the thinnest being 6.3 mm and the thickest being 8.4 mm. Two of the three sherds are burnished on the surface but none of the sherd are decorated. Two of the sherds were excavated out of level two and one came out of un unidentified test pit. All three of these sherds are body sherds.

Shell Temper

Twelve sherds (3.01%) of the 399 sherds for this collection have shell temper. The average thickness of these sherds is 7.42 mm with the thinnest being 4.8 mm and the thickest being 10.1 mm. Only three of the sherds are burnished on the exterior surface and only one is decorated. This sherd is decorated with fingernail punctations across the exterior surface. All of these sherds were excavated out of level one. Of these shell tempered sherds, only one is a possible rim sherd with a vessel diameter of 16cm (3.5% of vessel present).

Grog Temper

Of the 399 sherds, 254 (63.66%) are grog tempered sherds. The average thickness of these sherds is 11.79 mm with the thinnest being 6.1 mm and the thickest being 31.9 mm. 210 (82.68%) of the grog tempered sherds have some type of surface treatment on at least one surface. Only three of these sherds have any type of decoration which were all an incised line design. Two of the decorated sherds were excavated from level two and one of the was excavated from level one. In total, 21 sherds were excavated from a test pit, found in disturbed dirt or had an unknown provenience; 44 sherds were excavated at level two, ten sherds from level three, and five sherds from level four. The rest of the sherds (174) were excavated out of level one.

Three of these sherds were found to be rim sherds, one of them being also a decorated sherd. This decorated sherd has a likely rim diameter of about 18-20 cm. It is also burnished on the interior surface and the rim. The other two rim sherds are not decorated. One has a likely diameter of at least 22cm and the other has a likely diameter of 32-36 cm (See Figure 4.6). Additionally, 20 of the grog tempered sherds are base sherds. None of the base sherds are decorated.

Grog+ Temper

In total, 80 of the 399 sherds were placed in the category of grog+. On average, the sherds are 10.45 mm with the thinnest being 3.9 mm and the thickest being 21.3 mm. Another 59 (73.75%) of the sherds in the grog+ category had some type of surface treatment and nine of these 80 sherds had some type of decoration. Two of the decorated sherd were excavated out of level two and one of the decorate sherds was excavated out of level four. The rest of the decorated sherd were excavated out of level one. In total, six of the sherds were excavated out of

test pits, 21 sherds out of level two, four sherds out of level three, and three sherds out of level four. The rest of the sherds (46) were excavated out of level one.

A total of nine of the 80 sherds in this category are rim sherds. Two of these rims are decorated. Rim diameters seem to range from 10cm to 38cm. Furthermore, 14 of these grog+ sherds are also base sherds. None of these base sherds are decorated.

Unknown and Unidentified Tempers:

There were 37 (9.27%) sherds out of 399 sherds that had unknown or unidentifiable tempers. An unidentified temper includes temper-less clay, a sherd that has inclusions, but they were not distinct enough to identify, or an inclusion that appear to be unintentional. Of these sherds, the average thickness is 8.06 mm thick with the thinnest being 4.4 mm and the thickest being 18.9 mm thick. Of these, 27 of the sherds had some kind of surface treatment. None of these sherds were decorated. Four of these sherds were excavated out of a test pit, seven of the sherds from level two, one sherd from level three, and two sherds from level four. The rest of the sherds were excavated from level one. There are no rim sherds in this group and there are two base sherds in this group.

Base Sherds

In total, there are 36 base sherds in this collection. The average thickness of these bases is 17.03 mm with the thickest base being 31.90 mm and the thinnest base being 6.90 mm (Figure 4.5). Four of the bases had an unknown thickness. All of the basal sherds were grog or grog+ tempered aside from two sherds that had an unknown or unidentifiable temper. The majority of these sherd appear to be from vessels that resemble a ‘flowerpot’ shape, meaning that they are

flat on the bottom and the walls are straight and flare or extend out slightly. None of the bases in this collection are decorated or have any discernable surface treatment aside from slight burnishing. One basal sherd was recovered from level four and one sherd was recovered from level three; 21 sherds were recovered from level one, 11 sherds from level two and two sherds were recovered from unidentified test pits.

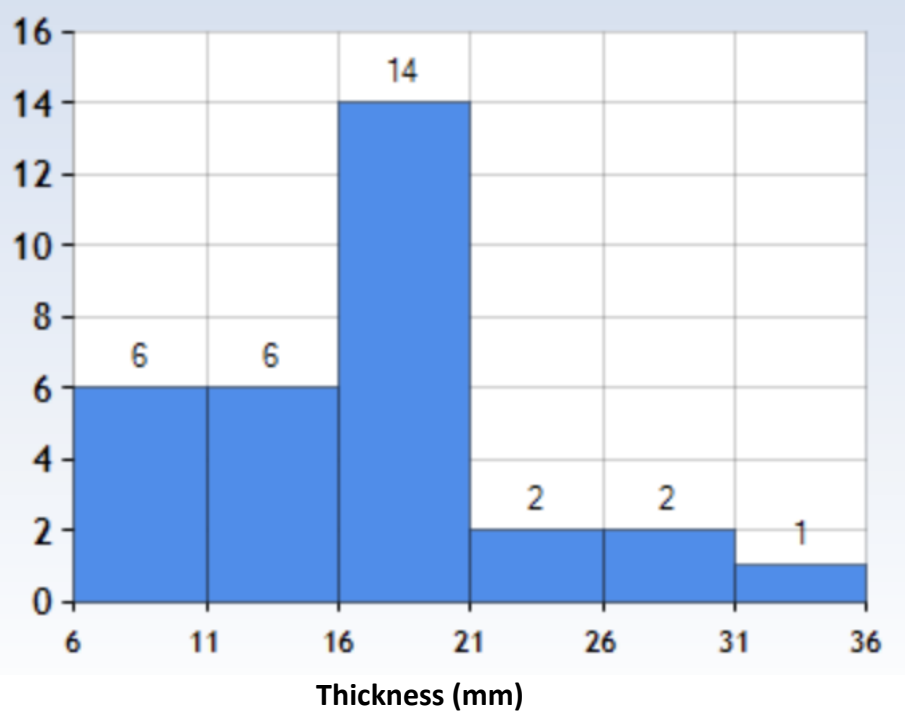

Figure 4.5: Histogram of basal sherd thickness (mm)

Rim Sherds

There are 16 rim sherds in the collection. The average thickness of the rim sherds is 6.47 mm with the thickest being 10.2 and the thinnest being 3.3 mm. only one sherd had an unknown thickness. In total, there are 16 rim sherds from 34LF33 and 15 of rim sherds had a measurable orifice diameter. The rim sherds have various orifice diameters that range from 10

cm to 38 cm. There are five vessels with orifice diameters that fall between 15 and 20 cm, three fall between 20 and 25 cm, three fall between 25 and 30 cm. only one vessel falls between 10 and 15 cm, one falls between 30 and 35 cm and two fall between 35 and 40 cm. One sherd was shell tempered, and the rest of the sherds were either grog or grog+ temper. The majority of the shape of the rim sherds were straight or direct and one sherd was carinated. Out of 16 rim sherds, six of them had some kind of decoration, mostly incised lines. Only one sherd was recovered from level three, seven sherds were recovered from level one, six sherds from level two, and two were recovered from unidentified test pits.

Decorated Sherds

There is a total of 22 decorated sherds in this collection (see Figure 4.6). Fifteen of these sherds are tempered with grog or grog+ temper; six of the sherds are a girt-like temper, and one of the sherds is shell tempered. The shell tempered sherd is a body sherd that is decorated with rows of fingernail punctations. This was recovered from the first level and has a thickness of 8.4 mm.

The grit tempered sherds have several different types of decorations. The dominant decoration type is a series of parallel incised line that form triangles or ovals. One grit tempered vessel is engraved with a red film; the engravings are parallel lines that are slightly curved. The average thickness of the grit tempered sherds is 6.65 mm with the thinnest being 4.6 mm and the thickest being 9.6 mm. All of the grit tempered sherds are body sherds. One decorated, grit tempered sherd was recovered from level four and the rest of the grit tempered sherds were recovered from level one.

For the grog and grog+ sherds, there decorations are also parallel, incised lines and lines that make shapes such as triangles, spirals and ovals. Of the 15 grog tempered sherds, 5 of them are rim sherds and the rest are body sherds. The average thickness of the grog tempered sherds is 8.02 mm with the thinnest being 6.1 mm and the thickest being 10.7 mm. One sherd was recovered from level 4; nine sherds were recovered from level one and five sherds were recovered from level two.

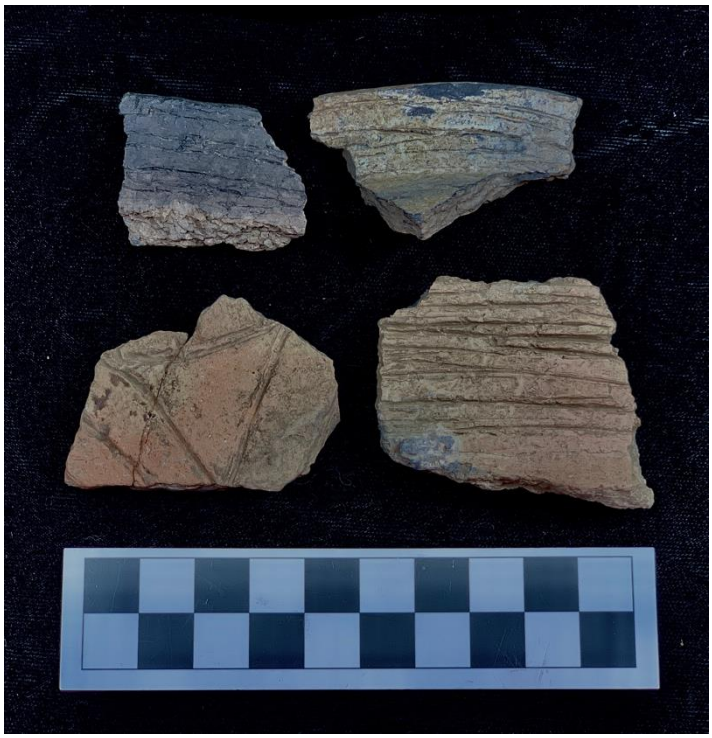

Figure 4.6: Decorated Sherds from 34LF33

Sherd distribution throughout each excavated level

The sherds in this assemblage were recovered from four levels, the disturbed dirt, and an unidentified test pit. There were 11 sherds recovered from level four. Out of these 11 sherds, only one of them was identified as grit tempered, two were unidentified tempers, and the remaining sherds were grog tempered. There were two decorated sherds in level four. Only one

base sherd was recovered from this level and the remaining sherds were identified as body sherds.

There were 15 sherds recovered from level three. All but one of these sherds were grog tempered; the remaining sherd had an unidentified temper. There were no decorated sherds associated with this level. There is one base sherd in this level and one rim sherd. The remaining sherds were body sherds.

In level two, there is a total of 73 sherds. There were seven sherds with an unidentified temper and the remaining 66 sherds were identified as grog temper. Five sherds in this level are decorated and all of them depict an incised line design. There are 10 base sherds in this level and six rim sherds. The rest of the sherd were all body sherds.

There are 34 sherds that were not associated with a level or location, this means these sherds were associated with either the disturbed dirt of the site or were recovered from an unidentified test pit. There are two grit tempered sherds associated with this category, one grit and shell tempered sherd and four sherd with an unknown temper. The remaining 27 sherds are grog tempered. There are no decorated sherds associated within this category. Also, in this category are two base sherds and two rim sherds and 30 body sherds.

Finally, 266 sherds were recovered from level one of the excavated area. This level contained over 65% of the total sherds in this assemblage. Associated with this level are seven grit tempered sherds of these grit tempered sherds, five of them are decorated. There are two grit and shell tempered sherds from this level, neither of which are decorated. All 12 of the shell tempered sherds are associated with this level and only one of them is decorated with fingernail punctations. One shell tempered sherd is a rim sherd. There are 23 sherds from this level that have no identifiable temper, all of them are undecorated and there are two base sherds. The

remaining 222 sherds associated with this level are grog tempered sherds. Nine of these grog tempered sherds are decorated. There are six rim sherds with one of these rim sherds being the carinated rim. There are 19 base sherds associated with this level. The rest of the 197 grog tempered sherds are body sherds.

Results

Out of 399 sherds, there are 13 grit temper, 3 grit and shell temper, 12 shell temper, 254 grog temper, 80 grog+ temper, and 37 sherds of unknown or unidentified tempers. The overall average of the thickness of the sherds is 10.89 mm with the thinnest sherd being 3.9 mm and the thickest being 31.9 mm. In total, 312 (78.20%) of the sherds had some kind of surface treatment whether that is interior or exterior. Twenty-two sherds had some kind of decoration, typically incised lines near the rim of the vessel. One of the decorated sherds is shell tempered, nine of the decorated sherds are grit tempered, three are grog tempered and nine sherds are grog+. There is a total of 36 base sherds, and 16 rim sherds with the rest of the sherds being body sherds.

Furthermore, 266 or 66.67% of the sherds were excavated out of level one (Table 4.3). This is followed by 73 (18.30%) of the sherds from level two, 15 (3.76%) from level three, 11 (2.76%) from level four and 34 (8.52%) from the disturbed dirt or test pit.

Table 4.3: Sherd distribution per level

Level Distribution		
Level	Count	Percentage
1	266	66.67
2	73	18.30
3	15	3.76
4	11	2.76
unknown	34	8.52
Total	399	100.00

Vessel Use and Form

Out of 36 total bases, all of the bases are consistent with a flat-bottomed pot shape with walls that are straight or flair out. Furthermore, the 13 rim sherds out of 16 (81.25%), seem to suggest that these vessels have rims that are either straight or slightly excurvate. This data seems to indicate that these vessels are mostly flowerpot shaped. Furthermore, there are examples of vessels from this region that appear to be a similar style of manufacture and similar temper types and rim and base shape. These vessels from other sites can be used as a comparative measure to get an idea of the likely size and shape of the vessels from 34LF33.

There are several examples of Williams Plain vessels that can be compared to the vessels form 34LF33. For example, based off of descriptions provided by Leith (2011), Figure 4.7 shows adequate representations of whole vessel types that would likely resemble those from 34LF33. The vessels in Figure 4.7 are examples of possible vessel forms vessel from Akers, which is a Fourche Maline site. These vessels are from mortuary contexts at 34LF32 (Akers) (Figure 4.7). Based off of the analysis presented in this chapter, these vessel forms are similar to the vessels from 34LF33. Furthermore, we also know that the majority of the vessels with known orifice diameters from 34LF33 have a rim diameter between 15 and 30 cm with none being smaller than ten centimeters and only three being more than 30 cm (see Figure 4.8).

Figure 4.7: Mortuary vessels from 34LF32 (Akers)

In addition to the vessels from 34LF33 and the vessels from 34LF32 (Akers), the Crenshaw site (3MI6) in Arkansas contains a number of whole Williams Plain vessels from a late Fourche Maline occupation (Perttula 2013). A comparison of orifice diameter in Williams Plain vessels from 3MI6 (Figure 4.8) and vessels from 34LF33 (Figure 4.8) revealed that the majority of vessels from 3MI6 had a smaller orifice diameter than those from 34LF33 (Figure 4.10). The box plot shows that there is a wide range of differences between the orifice diameter of the vessels form each site. The median is also different. This suggests that there may be a difference in the assemblages, and perhaps functions of the vessels, over time. It is possible that these vessels change in size as time goes on and as activities change.

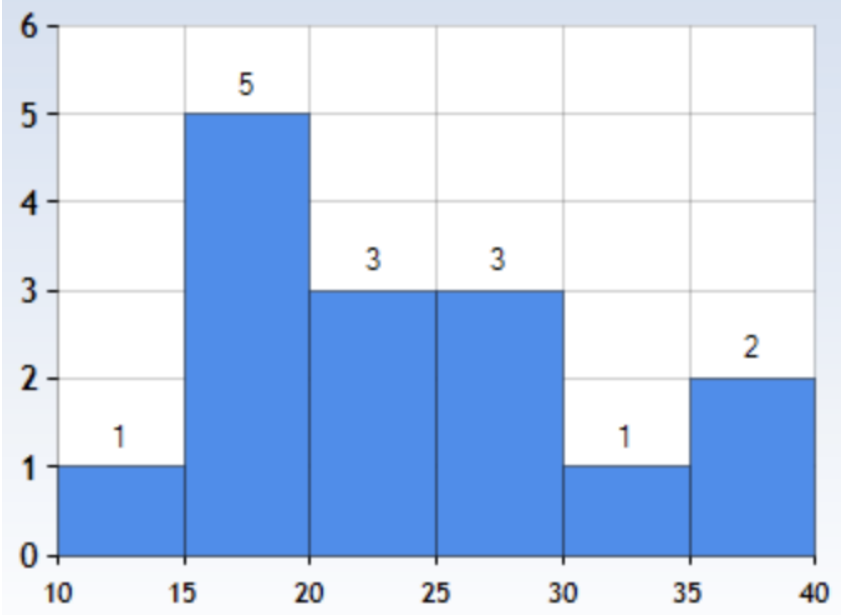

Figure 4.8: Histogram of the orifice diameters of grog-tempered rim sherds from 34LF33

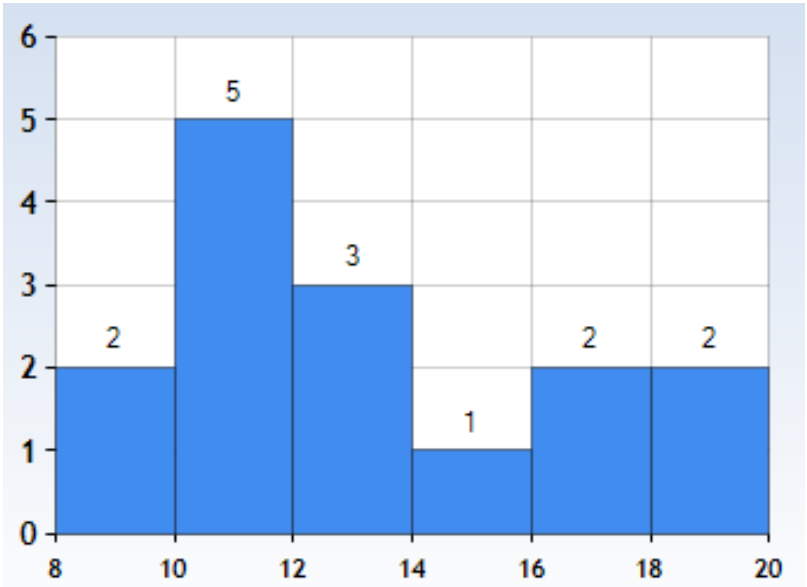

Figure 4.9: Histogram of the orifice diameters or rim sherds from 3MI6 (data from Perttula 2013)

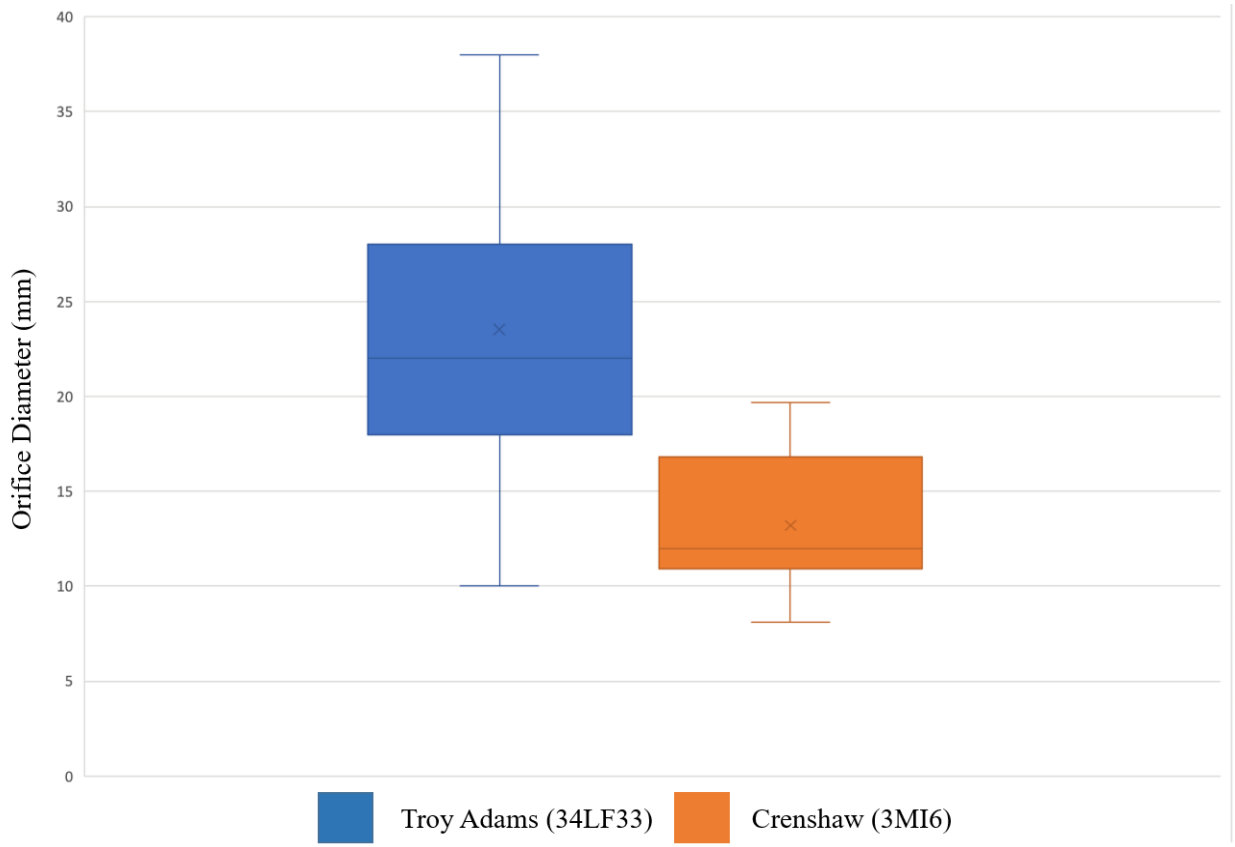

Figure 4.10: Comparison of orifice diameter from 34LF33 and 3MI6

Another issue that is present when discussing pottery types associated with Fourche Maline is that actual pottery types that are claimed to exist are not exclusive enough to be able to identify definitive differences between the types. One example is the existence of Le Flore Plain and whether or not it is actually a definitive type. It appears that the only difference between Le Flore Plain and Williams Plain is the addition of grit in the temper and the Le Flore Plain is more "well-made" than Williams Plain. Depending on the soils, the clay, and where it can from, it is likely that the presence of grit in the temper is likely to be natural. I question whether the presence of grit in the clay is intentional or if it is a mere result of the clay source. Furthermore, the description of Le Flore Plain as more "well-made" than Williams Plain is not a quantifiable category. It will likely change based on who is doing the analysis and their own definition of

well made, especially if the make of the pottery is dependent on its use. While some people still use Le Flore Plain as a typology, there are so many additions to the definition of this pottery type that it is not a helpful or useful type anymore.

Discussion and Conclusion

One issue that comes to the fore with types of typological characterizations that are mentioned earlier in this chapter is the lack of specification within the types. For example, one of the characteristics used in analysis is the differences in thickness. The issue is that while thickness does help identify Fourche Maline pottery types, it appears that it is relatively difficult to tell the difference between type based on thickness. Furthermore, I also found that presence of burnishing did not appear to help differentiate between types due to the fact that the majority of the sherds that I examined had some evidence of burnishing.

One of the questions that I had going into the analysis of the ceramics from this site is how the 34LF33 ceramic assemblage compares to those from other sites. My analysis suggests that the results are comparable to those from the excavations at 34LF11 by Bell (1953). He found that around 83% of the ceramics excavated were plain grog tempered ware, these are what I would call grog tempered. In my study, I found that about 64% of the sherds were grog tempered and if I add the grog+ to that percentage it goes up to about 84% of the assemblage. Furthermore, Irvine (1980) considered about 75% of the ceramics she analyzed to be grog tempered wares. Bell also found that around 10% of his sample was shell tempered. When I combined the two shell tempered categories, I found that about 4% of the sherds were shell tempered. Irvine also considered about 4% of the 34LF24 collection to be shell tempered.

Based on these criteria alone it seems that there is a trend across at least a few sites with regard to the types of ceramics people were producing and utilizing. Overall, the grog tempered wares seem to be the most common throughout these few sites. Followed by shell temper (with a wide margin). Bell (1953) states that the majority of the ceramics tend to be at the upper levels of the deposits, which lead him to the idea that the transition between pre-pottery and pottery is visible and can be calculated. With regards to 34LF33, it is clear that the upper levels of the site contain far more ceramics than the bottom levels. In order to address the question of if there is a pre-ceramic component at this site, we must examine the stone tool component of this site (see Chapter 5). This will provide a better idea of occupation at the site. If there were a lot more artifacts at the lower levels, then one might be able to postulate that there could be an occupation at the site that was preceramic. If all of the artifact tended to be closer to the upper levels, then it might not be possible to make those conclusions about the types of occupation at the site. The presence of different tempers might suggest different periods of occupation. The presence of shell tempered pottery and the grit tempered pottery might indicate a later occupation.

Another aspect of the ceramic material that I wish to address is the possible use of these ceramic materials. As mentioned before, one possible explanation for the use of these ceramics, in addition to storage, is for stone boiling. Stone boiling is the act of heating up stone in a fire pit and then moving the hot stones into a pot of water, this process heats up the water so that different oils and fats can be extracted from certain grains and foods (Sassaman 1995). The reason that Leith (2011) thought that stone boiling in a likely explanation for the use of these vessel is due to the shape and size of the vessel. Most of these pots are very thick, both on the walls of the pot and the base of the pot. Thick walls tended to be more susceptible to thermal stress particularly when placed directly on a heat source. It has been shown that vessels with

rounded edges instead of sharp, and thinner walls instead of thick, and curved bases instead of flat had better chances of surviving thermal treatment (Rice 2015:330). The thickness of the pot would make it hard for the fire to heat up what was on the inside of the pot. However, due to the presence of temper, it is likely that these people were using these pots for cooking of some kind. The presence of temper has the ability make the vessel less likely to crack or shatter when heated but tempers are also used all over the world in both cooking and non-cooking vessels but it is generally thought that the presence of temper is beneficial for cooking vessels (Rice 2015:332). Also, from the examination of these sherds form 34LF33, there is very little oxidation from being placed over a fire. It is possible that the cleaning done by the WPA contributed to the lack of residues, but it is also possible that there were no residues on the sherds to begin with. This would be an argument to support that idea that people were not placing these pots on a direct heat source.

Therefore, if these pots could not be placed directly on a fire but they were likely used for cooking in some ways, stone boiling seems to make the most sense when it comes to the use of these vessels. This idea also corresponds with the idea that the people living at or near these sites were likely manipulating their environment for food production among other reason. Pottery production is a process that heavily involves the environment – from collection of raw materials to the processing of food and then finally their deposition into the ground after they are no longer being used. Based on the consistency of temper usage and vessel form throughout these Fourche Maline sites, I argue that the built environment played a large role in the production, use and distribution of these vessels. People are either moving across this landscape manufacturing these same vessels for generations and depositing them at these important locations (like mound sites)

after feasting events or other community gatherings or they are living at these sites for long periods of time and manufacturing the same types of ceramics as their neighbors.

Chapter Five: Fourche Maline Chipped Stone Examination and Analysis

This chapter discusses the analysis that was conducted on the shipped stone materials from 34LF33. Much like the previous chapter, the goal of this chapter is threefold: (1) document the range of stone tool types recovered from the mound, (2) determine the function of these tools; and (3) identify how the tools articulate in the landscape. In order to interpret the data collected for this analysis, a combination of information from previously analyzed lithic materials from Fourche Maline-related sites and the data collected from 34LF33 is considered.

The interpretation of the chipped stone artifacts that are associated with Fourche Maline begins with an outline of the types of lithic materials that have been found at other Fourche Maline sites. Knowledge of the distribution of raw materials can be used to infer landscape use. Then this chapter provides a methodology of the analysis that was conducted on the artifacts from 34LF33 as well as a description of the chipped stone material on the site map that was digitized for this thesis. Finally, the chapter compares the analysis of the chipped stone from 34LF33 to some of the other chipped stone materials from various Fourche Maline-related sites. This will allow for better, more informed interpretations to be made about the chipped stone that are found at Fourche Maline sites.

A Background of Fourche Maline Chipped-stone Technology

As a way to gain a better understanding of Fourche Maline, Leith (2011) compiled a list of artifacts that have previously been associated with Fourche Maline-related sites during the different phases of the Fourche Maline period. Among these artifacts are the stone tools that have been found at various Fourche Maline site. Leith (2011) argued that the Wister Phase contains tools like *Gary* hafted bifaces (contracting stem hafted bifaces), various other hafted and formal

bifaces, and different types of pecking stone artifacts such as hammerstones and grinding stones. Within the Fourche Maline period, along with the introduction of pottery, Gary bifaces were still produced, but assemblages also contain smaller dart and arrow points as well as a number of chipped stone hoes (often referred to as double bitted axes).

In other words, based on the description provided by Leith, the Wister Phase assemblages contain Gary bifaces and other larger hafted bifaces and formal bifaces. The introduction of pottery was associated with a change in chipped stone tool production. Gary's continued to be produced, but other hafted bifaces like the expanding stems and various notched tools were eventually phased out. Instead, people were producing smaller tools for darts and arrows and also large hoe-like tools. Leith (2011) suggests that this transition could be associated with a change in subsistence. Especially due to the presence of the hoe-like tools that could have been used for cultivation, but more on those later.

One of the main goals of Leith's (2011) dissertation was to develop a chronology of Fourche Maline. He wanted to find a way to align the Fourche Maline sites that were found in Oklahoma with the Fourche Maline sites that were found in Arkansas. In order to do this, Leith conducted a seriation on an assemblage from the Williams I site (34LF24). This seriation tested the occurrence of certain types of artifacts at certain depths in the mound. Leith was able to create the seriation because 34LF24 (Williams I) was a comparably deeply stratified site, with 12 levels being excavated by the WPA. Leith used the seriation he developed as a model for Fourche Maline site occupation. However, other sites excavated by the WPA were not as deep and therefore a seriation would not be as effective for the development of a chronology at other sites.

Instead of developing another chronology based on seriations at another site, this thesis describes the types of chipped stone tools present at these sites and provides explanation for how these artifacts were used by the people to operate on and manipulate the surrounding landscape. Understanding the types of chipped stone that have been found at these types of sites is the first step in gaining a better understanding of what they were being used for and what that might tell us about how people are interacting with the landscape. The next section will break down each class of artifact and how they are related to Fourche Maline sites.

Fourche Maline Chipped Stone Tools

This section will focus up the types of chipped stone tools that are associated with Fourche Maline. These tools include both contracting stem and non-contracting stem hafted bifaces, chipped stone hoes, and miscellaneous chipped stone. Before I discuss the chipped stone categories, I will discuss the raw material sources associated with these chipped stone tools.

Chipped Stone Raw Material Sources

Before I discuss each artifact class, it is important to first provide some background information on the types of raw materials that these tools were made out of and the possible locations these materials are derived from. The Wister valley is located in eastern Oklahoma. It is between both the Arkoma River Basin and the Ouachita Mountains. The Wister valley is home to Lake Wister, which was constructed in the 1940s by the WPA. Before the lake was there, this valley contained the convergence of the Poteau River and Fourche Maline Creek. The presence of the rivers in the Wister valley also made this area a frequent flood plain (Galm 1978). The Wister valley sits right in between two different sedimentary formations. According to Johnson

(2008), both of these formations were formed during the Pennsylvanian age. The geologic deposits are mostly sandstone, coal, limestone, and marine shale (Johnson 2008:6), but are dominated by sandstones. The Wister valley also sits at the confluence of the Hogback Frontal Belt and the McAlester Marginal Hills Belt (Johnson 2008:8). These are specific geomorphic provinces in Oklahoma. These provinces would have undergone different formations processes that result in a different physiography. These formation processes can produce different types of geological formations. The sedimentary layers mentioned above are both sandstone formed during the Pennsylvanian age (see Figure 5.1).

As far as raw material for stone tool production goes, there is an abundance of raw materials that were locally available within the watershed of this region. Banks (1990) discusses the diversity among the chert types in the Ozark region of northeastern Oklahoma. In the Ouachita Mountains, both in Oklahoma and Arkansas are a number of different outcrops of rock formations like novaculite, quartzitic sandstone, and various chert types. Some of the major rock types in this region are Johns Valley chert, Chickachoc chert, Johns Valley shale, Battiest chert, and Woodford chert.

The major types of raw materials present in the archaeological sample from the Wister valley are different varieties of quarzitic rock and sandstone, various types of chert, including Chickachoc Chert, and Reeds Spring Chert, followed by novaculite. Wyckoff (2010) discusses the use of Reeds Spring chert throughout the Ozarks in Oklahoma. He synthesizes the use of this chert type during the Archaic period in eastern Oklahoma. According to Banks (1990) and Wyckoff (2010), Reeds Spring chert can be found in the Ozarks region of northeastern Oklahoma. While the novaculite is hard to directly source to a specific place. It is very likely that

the Ouachita Mountains is the general region that most of this raw material is coming from. The Chickachoc chert can also be found in outcrops located in the Ouachita Mountains.

Raw material sources that are located in the Ouachita Mountains are what I would consider to be “local” raw material resources. The Ozarks would also be semi-local for the materials coming out of that region. These materials would also likely be found in the rivers and streams that run through these mountains so people could have also accessed these resources by finding them in the rivers.

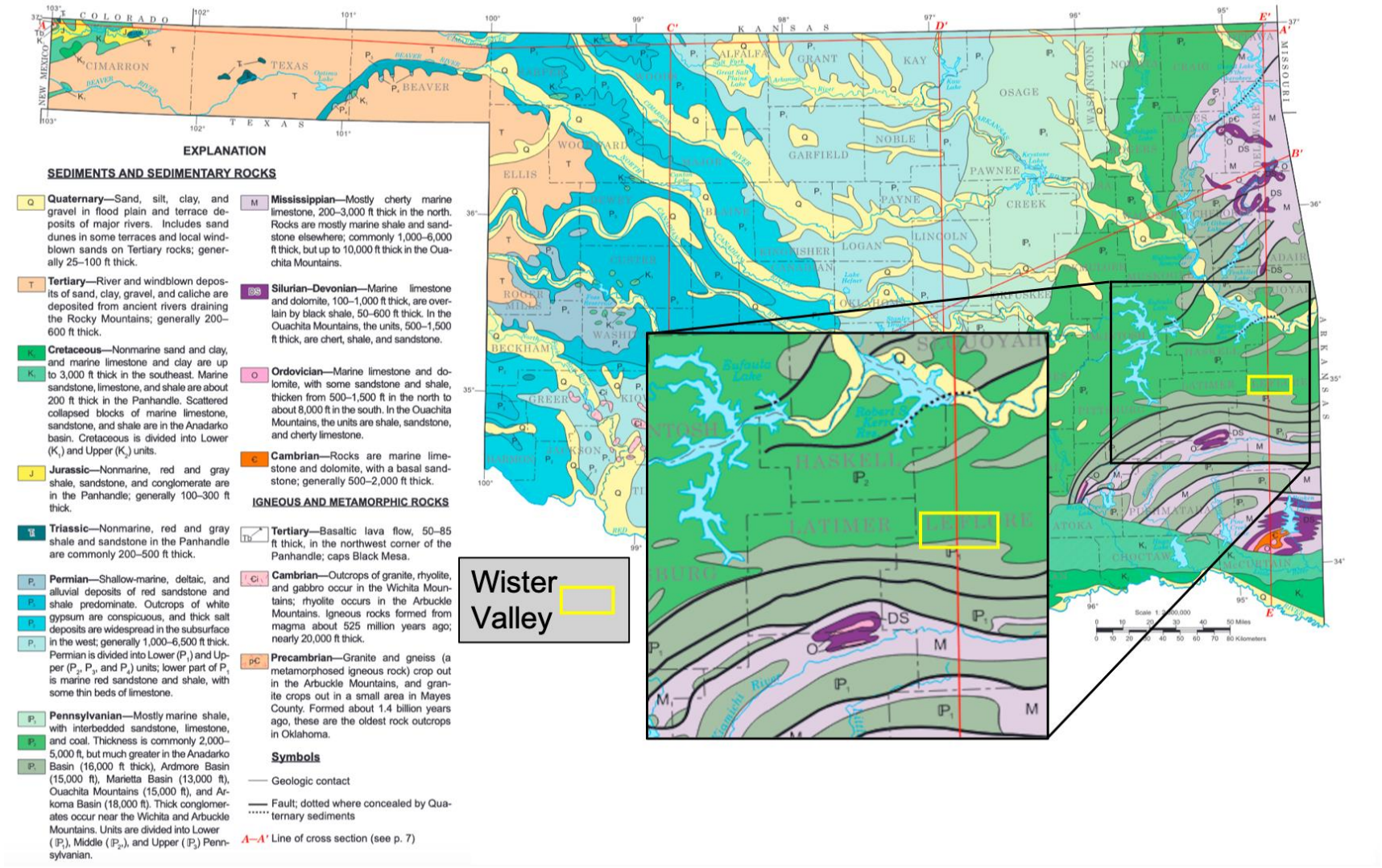

Figure 5.1: Geologic Map of Oklahoma (adapted from Johnson 2008)

Contracting Stem Hafted Bifaces

While the Wister Phase and the Fourche Maline phase of the Fourche Maline period contain distinct chipped stone technologies there is some crossover between the two phases. One type of tool that has been associated with both phases is the *Gary* biface. A Gary biface is a hafted biface that has a contracting stem. There are many varieties of these types of tools but one thing they all have in common is the stem form (Figure 5.2). Schambach (1982) states that there are three main varieties of the Gary that are significant to Fourche Maline: *gary, leflore,* and *camden*. These varieties are defined by three different features: base shape, width, and thickness (See Table 5.1). Schambach believed that the different varieties of Gary points could lead to identifying a chronology of tool production.

Figure 5.2: Contracting stem hafted bifaces from 34LF33

Based on seriation conducted, Leith (2011) concluded that the Gary *gary* variety of Gary's were found in the lower levels, followed by Gary *leflore* and the Gary *camden* at the top. Leith suggested that there was a clear change in the manufacture of Gary's over time at 34LF11. There are several issues that I have identified with this type of analysis. The first issue that I

found is that Schambach does not provide a reasoning for why he picked the three varieties of Gary's that he did. There are a large number of varieties of these contracting stem hafted bifaces, so it is hard to say why these varieties were the ones that he felt were the most important to Fourche Maline sites.

Another issue is that when Leith conducted this analysis, he used morphological characteristics defined by Schambach for sites in Arkansas of the three varieties significant to Schambach. The issue with this is that Leith does not consider the possibility that the points at these Fourche Maline sites in Oklahoma might be different than the Fourche Maline sites in Arkansas; despite the close proximity, there is the possibility that there is different resource availability or a different temporal association with those varieties in the area that Schambach was working compared to the area that Leith was working.

Table 5.1: Gary variety attributes (from Leith 2011)

"Gary" Types	Morphology	Thickness	Mean Thickness
Gary *gary*	Lobate Stem, convex edges rounded base	7 – 13 mm	10 – 11 mm
Gary *Leflore*	Stem narrower in proportion to blade, V shaped pointed base	4 – 14 mm	7 – 8 mm
Gary *camden*	Narrow point, weakly shouldered to no shoulder, blade only slightly wider than *leflore* stems	4 – 14 mm	7 mm

Non-contracting stem points

Another tool that has been found moderately distributed throughout most samples are the non-contracting stem projectile points. These hafted bifaces have expanding stems, basal stems, or straight stems (Figure 5.3). Most of the early literature surrounding Fourche Maline research does not go into detail about the different frequencies of these tools and what the presence of them may mean. Bell (1953) does state that some of the straight stemmed bifaces tend to stay in the lower levels of the Scott site but other types of straight stemmed tools as well as expanding

stem bifaces appear throughout the distribution. One trend that Bell (1953) identified is that the tools tend to go from larger to smaller in overall size over time. He also points out that there are both "crudely" made tool as well as tools with "good quality workmanship" (Bell 1953:322). He states that the crudeness of the tools might be indicative of the material type they were working with. Bell (1953) does not include the ratio of crudely made points to quality made points nor does he include the raw material types of the crudely made points versus the quality points. It would be interesting to see if there was a correlation between raw material type and the type of the tool however that information is not provided by Bell (1953).

Figure 5.3: Basal notched, expanding and straight stemmed bifaces (not to scale)

Chipped-stone hoes

Aside from hafted bifaces, Fourche Maline sites are also known to contain chipped-stone hoes. These tools have also been referred to as double-bitted axes due to the fact that they look like that are axes that have two blades (Figure 5.4). Bell (1953) mentions that there are only one or two tools that resemble the chipped stone hoes in Figure 5.4 that were found at the Scott site. Bell states that he designated them as a digging tool (Bell 1953:324). However, Schambach (1982) states that the specimens that have been found at Fourche Maline sites in southwest Arkansas were not very polished nor do they show much evidence of use wear. Schambach was

unsure of their use but hypothesized that they were rough woodworking tool rather than gardening hoes. He claims that, in Arkansas, they were found in the earlier deposits and if they were using them for gardening tools then they should increase in use over time rather than fall out of use.

Schambach (2002) later recants his suggestion that these tools were used as woodworking tools and agrees that it is more likely that they were using these tools for gardening and digging. His reasoning for changing his mind was that he made that assumption before we knew about certain types of food production including starches and seeds in this region (Schambach 2002:105). He claims that if they were using these tools to cultivate these types of food products and then they switched to a different type of crop, like corn, which does not require the same type of equipment to cultivate; therefore, they no longer had a use for the chipped-stone hoes.

Figure 5.4: Chipped stone hoes (not to scale)

Most recently in the debate regarding the use of these chipped-stone hoes was a thesis from 2014. Campbell (2014) conducted a microscopic use-wear analysis on a collection of these hoes from a site in southwest Arkansas in order to see if she could definitively answer the questions surrounding these tools. In addition to the analysis of the collection of tools, she also

conducted use wear analysis on an experimental collection that was modelled after the real collection. She conducted different experiments on these replicas to test the different types of uses for these tools and see which activities might show the most similar micro-use-wear as the archaeological collection. Campbell essentially concluded the use-wear on the archaeological collection most resembled the experimental tools that were utilized as an agricultural hoe (Campbell 2014:119). It is now generally accepted that these tools were mostly utilized for some type of cultivation or gardening as a hoe to help dig into the dirt more easily.

Miscellaneous Chipped Stone

The final category of chipped stone that have been associated with Fourche Maline sites is a smattering of various bifaces, scrapers, preforms, drills, and cores (Figure 5.5). Bell found there to be quite a few small, flake scrapers in the lower levels of the mound at the Scott sites as well as various hafted scrapers. A couple of drills were located towards the middle of the midden and various types of knives were also found fairly evenly distributed throughout the mound. These groups of artifacts seem to be the least talked about tools. It seems very little interpretation has been made regarding these tools aside from general number and type counts. This is likely due to the fact that very few of these tools look similar enough to each other to make any kind of conclusion about specific cultural or group processes. Furthermore, a lot of these artifacts are typical of archaeological assemblages and therefore are assumed to have similar associated uses.

Figure 5.5: Examples of miscellaneous chipped stone (not to scale)
From left to right – biface, likely drill or perforator, biface, preform

Lithic Analysis at 34LF33

This section of the chapter will address the analysis that was done on the chipped stone assemblage from 34LF33 for this thesis. Therefore, the research goals associated with this analysis are focused on understanding the landscape usage of the area surrounding 34LF33 based on the chipped stone assemblage. Another goal of this analysis is to see how the chipped stone assemblage from 34LF33 compares to the types of materials that have been found at other Fourche Maline-related sites. In order to accomplish these goals, I will first discuss the methodology used for analyzing the chipped stone in this assemblage. Next, I will discuss the distribution of chipped stone artifacts at 34LF33, then I will discuss the analysis of each artifact type and finally, I will discuss my overall results and interpretations form this analysis.

Figure 5.6 shows the distribution of chipped stone artifacts at 34LF33. This map does not include the artifacts associated with burials. The colors represent the density of artifacts within each unit. Based on the data displayed in the map, it appears that there is a higher density of artifacts along the northern portion of the site, just like the ceramic distribution. The southern

portion of the site still contains a number of chipped stone tools, but the positive units are more scattered and less dense. Another observation that can be made is that the areas with burials tend to have fewer chipped stone artifacts. This is likely due to the fact that none of the artifacts associated with burials were included in this analysis.

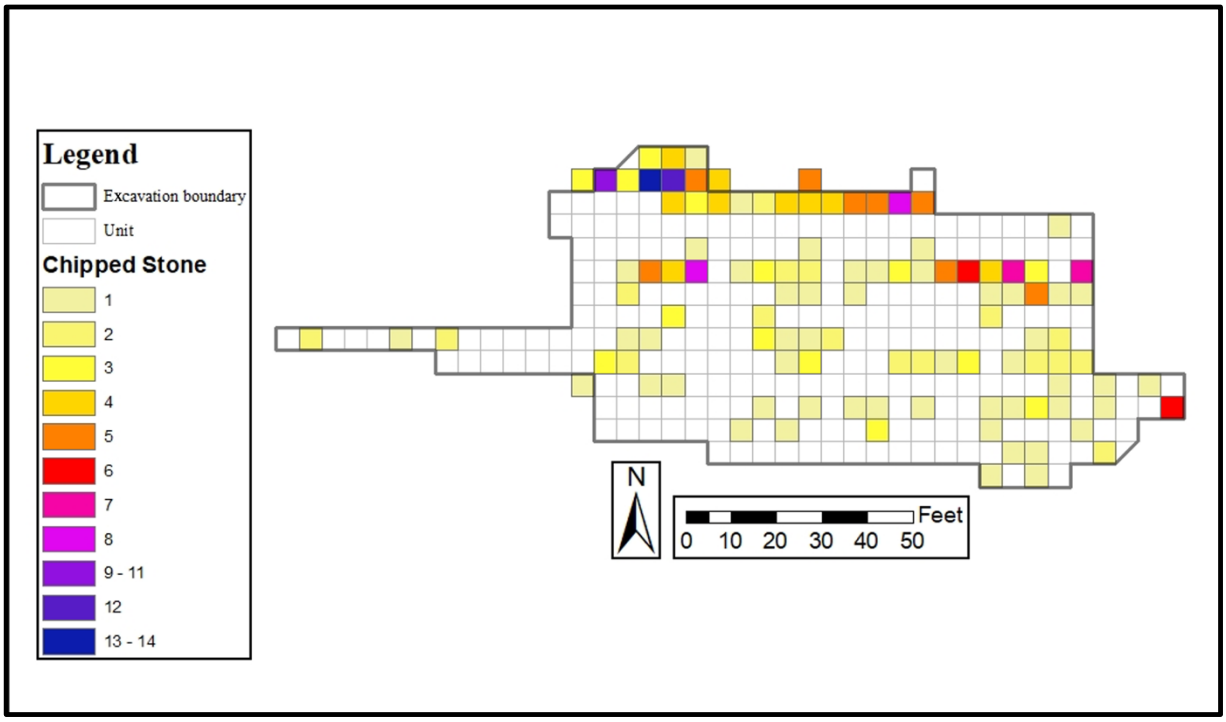

Figure 5.6: Chipped stone distribution across 34LF33

Methodology

As mentioned before, the material from this site have never been analyzed prior to this analysis aside from the initial WPA analysis (Clements 1940). Much like the ceramic analysis, all of the artifacts associated with burials were removed from the collection as they were not analyzed for this thesis. Once the collection was cleared, each individual artifact was assigned a three-digit number that was attached to the provenience number as a way to help identify where in the mound that artifact was excavated. Each artifact was individually analyzed after they were assigned a number.

Hafted Bifaces

For each of the hafted bifaces, several different types of measurements were recorded: maximum length, maximum width (or shoulder width), maximum base width, length of the stem, and maximum thickness. I measured maximum length as the longest distance from the tip of the biface to the base of the biface. I measured the maximum width as the longest distance between the shoulders or perpendicular to the maximum length measurement. The maximum base width is the widest portion of the base. The stem length was the length from the start of the stem (usually at or below the shoulder) to the edge of the base. The maximum thickness was the thickest measurement registered on the biface. For each biface, even broken ones, every category or measurement was recorded to the best of my abilities. All measurements were taken with metric calipers and recorded in millimeters.

In addition to measurements, other types characteristics were also recorded. I also recorded base shape, stem type, raw material type, whether or not it was thermally altered, whether or it was broken and how, and if it was retouched. Each biface also has individual notes taken about each artifact. For the “base shape” category, the points included in the analysis were either categorized as "V" shaped, "U" shaped, "U/V" shaped, "square," “concave”, “convex,” or “unknown” with regards to the shape of the base. A “V” shape is a stem that appears to come to a point at the base and has relatively straight edges. A “U” shape is a stem that comes to a softer, subtler point at the base and has convex edges or edges that curve outward. A “U/V” shape is one that is intermediate between the “U” shape and the “V’ shape. Finally, a “square” shape is a stem that is mostly flat on the base regardless of the shape of the stem. “Concave” is when the base curves up into the point and “convex” is when the base curves down or away from the point.

Figure 5.7: Stem types – Contracting, expanding, lanceolate, and straight (not to scale)

"Stem type" refers to the most basic type of stem present on that artifact. The tools were categorized as "contracting," "expanding," "lanceolate," "straight," or "unknown" (see Figure 5.7). A contracting stem is when the stem starts wide (at the shoulders) and then as it gets closer to the base, the stem narrows. An expanding stem is when the stem is narrower closer to the shoulder of the tool and gets wider as it gets closer to the base. "Lanceolate" is when there is no true stem on the piece, but the tool forms a more triangular shape overall. A "straight" stem is when the stem appears to maintain the same dimensions from the top of the stem to the base.

The raw materials of the tools that were analyzed for this thesis were recorded as the basic material type (i.e. quartzite, chert) and then if I could be more specific regarding specific types of chert, than I was. Most of the raw material descriptions were also recorded with their color. I also recorded if they were broken and how they were broken as well as any other interesting features for example, if the blade was offset or if the shoulder was barbed.

Chipped-Stone Hoes

This recording of the chipped-stone hoes was similar to the hafted points with only a few differences. I recorded the maximum length, maximum width, minimum width, thickness, weight (in grams), number of blades, whether or not it was broken and how, raw material type, evidence of use-wear, and other, more specific notes.

Miscellaneous

Due to the fact that the miscellaneous artifacts tend to be highly variable each artifact was sorted by class or artifact type, and individually analyzed. The artifact classes are drills, bifaces and scrapers, preforms, and cores and flakes. The artifacts were measured for maximum length and width and then described with more specific notes.

Results

The chipped-stone assemblage at 34LF33 recovered during the WPA excavations includes two categories of tools: hafted bifaces and miscellaneous chipped stone. Within each category are several additional categories. The hafted bifaces include both contracting and non-contracting stem bifaces, as well as the chipped-stone hoes. The miscellaneous tools include bifaces, scrapers, cores, flakes, and other miscellaneous tools. This analysis will describe each of the tool categories mentioned above and the data that was collected from the analysis. I will discuss each of the artifact types independently and then at the end I will interpret the assemblage as a whole.

Contracting Stem Hafted Bifaces

The contracting-stem hafted bifaces were the most abundant out of all of the hafted bifaces. Exactly 188 out of 388 or 48.45% of the hafted bifaces were considered to be contracting stem bifaces. Out of 188 contracting stem bifaces, 103, or 54.79% of them were made from a quartzite-like raw material. The rest of the bifaces (45.21%) were identified at some variety of chert. Sixteen (8.51%) of the tools were identified as Reed Spring chert, 10 (5.32%) of the tools were identified as Chickachoc Chert; Only one biface was not able to be matched to a raw material type. The rest of the 58 bifaces (30.85%) were recorded as a general "chert" category (Table 5.2).

Table 5.2: Percentage of raw material type for contracting stem hafted bifaces

Raw Material Type for Contracting Stem	Count	Percentage
Quartzite	103	54.79
Reeds Spring Chert	16	8.52
Chickachoc Chert	10	5.32
Unknown Chert	58	30.85
Unknown Raw Material	1	0.53
Total	188	100.00

On average, the majority of these tools were excavated from level one (43.09%). The second level held 33.51% of the contracting stem bifaces; about 7.98% of the tools were found in level three and levels four, five and six each had one contracting stem biface located which accounts for 0.53% each of the contracting stem bifaces. The rest of the contracting stem tools (12.77%) were either found in the disturbed dirt, in a test pit (location unknown), or do not have a provenience number. The average maximum length of these tools is 50.07 mm with the longest being 107.8 mm and the shortest being 23.8 mm (Table 5.3). The most common "base shape presented in this group is the "U-shape" base with 66 tools (35.11%) followed closely by the "U/V-shape" with 54 tools (28.72%) (Table 5.4).

Table 5.3: Tool measurement averages by base shape in mm (contracting stem hafted bifaces)

Base shape	Maximum length	Maximum width	Maximum base width	Stem length	Maximum thickness
Unknown (n=18)	44.89	27.97	17.49	9.00	8.09
U-shape (n=66)	49.72	28.79	18.65	15.96	8.60
V-shape (n=28)	53.72	29.94	19.03	15.53	9.39
U/V shape (n=54)	51.14	28.61	18.01	16.20	8.31
Square (n=22)	48.12	29.22	17.71	13.35	9.08

Table 5.4: Percentage of base shape within each raw material type (contracting stem hafted bifaces)

Raw Material	Unknown stem %	U-shape %	V-shape %	U/V-shape %	Square %
Quartzite (n=103)	8.73	33.01	22.33	23.30	12.62
Reed Spring Chert (n=16)	0.00	43.75	12.5	37.50	6.25
Chickachoc Chert (n=10)	0.00	50.00	0.00	20.00	30.00
Unknown Chert (n=58)	15.52	32.76	5.17	37.93	3.45
Unknown Raw Material (n=1)	0.00	100.00	0.00	0.00	0.00

Some other common features that I have noted is that a lot of the tools have blades that are offset, or one side of the blade is longer than the other. Furthermore, a few of the tools also had offset stems. This means that the stem was not quite centered on the point. It also appeared that around half of the points that were broken (about 45%) in some way had evidence of impact fractures (about 22%) (Table 5.5). An impact fracture is identified as a break in the tool that appears to be a ripple or step fracture from the impact of an object on the tool.

Table 5.5: Percentage of broken tools within each raw material type (contracting stem hafted bifaces)

Raw Material Type	Percent of Broken Tools
Quartzite	43.69
Reed Spring Chert	25.00
Chickachoc Chert	40.00
Unknown Chert	50.00
Unknown Raw Material	100.00

Based on all of this information, I conclude that among contracting stem hafted bifaces quartzite-like raw material were used most frequently. This material could have been the most preferred material, or it could have been the most readily available material. Another conclusion that I made is that over 95% of the contracting stem bifaces were excavated from the two upper most levels. This could mean that there are very few deeper deposits at this mound in general or it could mean that these contracting stem bifaces were utilized later in time. In order to be sure, it is necessary to incorporate all of the chipped stone tools into this analysis.

Typological Experiment of Contracting Stem Hafted Bifaces

Based on the descriptions provided by Leith (and Schambach) of these varieties of Gary points, I conducted an experiment on the assemblage of contracting stem points from 34LF33 in order to see if I could replicate the results from Leith's dissertation (2011). I wanted to test if I could also identify these varieties in the sample I was using and confirm Leith's (2011) conclusions. The main question that I wish to answer is whether or not multiple varieties within the Gary typology can be identified. If I could identify these varieties, then I should also be able to place these points in time, according to Leith's chronology.

In my attempt at categorization, I recorded different features about each point and I was able to identify multiple categorical differences between these contracting stem points; however, I also noted that it was difficult to match these differences to the differences outlined by Schambach (1982) and Leith (2011). It appeared that there was a lot of variety between these points which made it hard to classify each point in a certain group (see Figure 5.8). The fact that I could not recreate these categories in the sample that I was working with does not mean these categories do not exist or that change in lithic production over time cannot be identified; it does mean that if varieties cannot be clearly or distinctly described, one must question why the variety even exists. We must ask ourselves why these distinctions are being made and if they mean anything or if they can tell us something meaningful about the culture or group of people that used or manufactured them.

Gary points are likely the most controversial of the Fourche Maline projectile points due to the fact that they are very common, they occur at almost all of the Fourche Maline-related sites as well as other sites around Oklahoma, and they are highly variable with regards to shape and form, raw material, and quality of manufacture. While It is well known that these points are present at these sites in high numbers, more questions about why these types were found in such abundance at these Fourche Maline-related sites as well as other sites in Oklahoma. One could argue that they were easy to manufacture or a relatively sturdy tool, or they could have had a greater significance to the people using and manufacturing them. Researchers like Schambach (1982) and Leith (2011) do a great job at describing how these Gary points are different from each other and how they might have changed over time, but what they fail to discuss, which might be even more significant, is that these types of points were consistently used for a very

long period of time and that they can be found in abundance at Fourche Maline-related sites. This observation in itself might be indicative of a greater importance regionally and culturally.

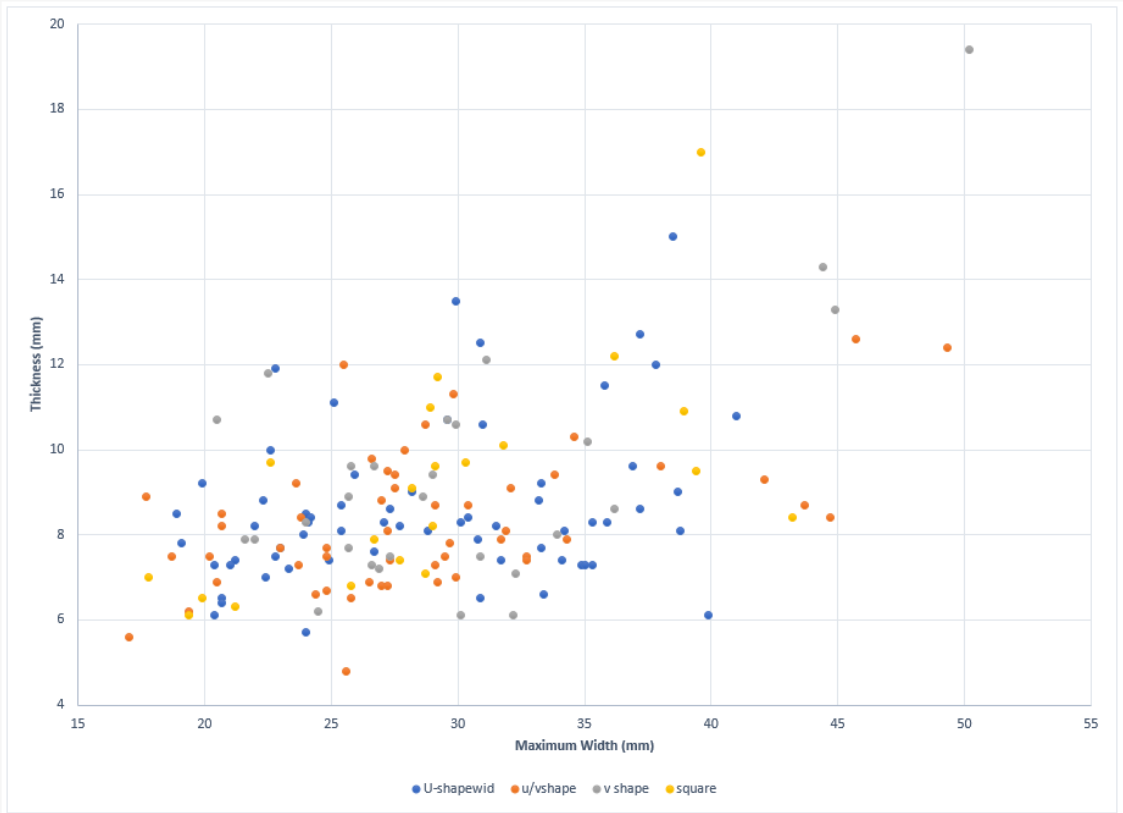

Figure 5.8: Scatter Plot of the maximum width versus thickness for the non-contracting hafted bifaces

Non-Contracting Stem Bifaces

There are 140 non-contracting or unknown stem bifaces out of 388 total hafted bifaces in this assemblage. This is approximately 36.08% of the hafted bifaces in this assemblage. Of these 140 points, 66 of the points, or 47.14%, were made from quartzite-like material. Alternatively, 73 points, or 52.14%, were manufactured from chert-like materials. Six (4.29%) were identified as Chickachoc chert, six (4.29%) were identified as novaculite, and six (4.29%) were identified as Reed Spring chert. Only one point (.71%) was identified as argillite-like material (Table 5.6).

With regards to where in the mound these points have been found, 56 points (40.58%) are found to be associated with level one, 42 points (30.43%) are associated with level two, 20 points (14.49%) are associated with level three, one point (.72%) was from level four and one point (.72%) was from level six. The remaining points were found in either the disturbed dirt or in a test pit.

Table 5.6: Percentage of raw material type for non-contracting stem hafted bifaces

Raw Material Type for Contracting Stem	Count	Percentage
Quartzite	66	47.14
Reed Spring Chert	6	4.29
Chickachoc Chert	6	4.29
Novaculite	6	4.29
Unknown Chert	55	39.27
Argillite	1	0.71

As far as stem type goes, the majority of the points (n=58) in this group have expanding stem types (42.03%), 27 points (19.57%) have straight stems, nine points (6.52%) have a lanceolate stem, and 46 (33.33%) have an unknown stem type (Table 5.7). The average maximum length of these points is 46.85 mm with the longest being 77.9 mm and the shortest being 27.4 mm (Table 5.8).

Table 5.7: Percentage of stem shape within each raw material type (non-contracting stem hafted bifaces)

Raw Material	Unknown stem %	Expanding stem %	Straight stem %	Lanceolate stem %
Quartzite (n=66)	25.76	51.51	21.21	1.52
Reed Spring Chert (n=6)	16.67	50.00	33.33	0.00
Chickachoc Chert (n=6)	33.33	50.00	16.67	0.00
Novaculite (n=6)	33.33	33.33	16.67	16.67
Unknown Chert (n=55)	43.64	27.27	16.36	12.73
Argillite (n=1)	0.00	100.00	0.00	0.00

Table 5.8: Tool measurement averages in mm (non-contracting stem bifaces)

Stem type	Maximum length	Maximum width	Maximum base width	Stem length	Maximum thickness
Unknown (n=46)	43.95	27.59	N/A	N/A	7.86
Expanding (n=58)	48.93	30.39	20.18	13.56	9.00
Straight (n=27)	50.34	32.62	18.11	15.13	8.87
Lanceolate (n=9)	37.86	20.06	16.30	N/A	7.88

Additional notable features from this assemblage include a variety of shoulder and notch types including barbed and straight shoulders as well as corner, side and basal notched points. Out of the 140 points in this category, 102 of them (72.86%) had at least one broken feature on the tool (Table 5.9). A broken feature could include an impact fracture, a missing feature, or a chipped point or tip.

Table 5.9: Percentage of broken tools within each raw material type (non-contracting stem hafted bifaces)

Raw Material	Percent of Broken Tools
Quartzite (n=66)	80.30
Reed Spring Chert (n=6)	83.33
Chickachoc Chert (n=6)	83.33
Novaculite (n=6)	33.33
Unknown Chert (n=55)	67.27
Argillite (n=1)	0.00

Some interpretations can be made regarding the lithic in this assemblage. First of all, there appears to be a higher percentage of chert-like tools in this assemblage compared to quartzite-like tool; this slightly contrasts the contracting stem assemblage where the quartzite is the dominate raw material. In this assemblage, only 70% of the points are associated with the two upper most levels. Based on the stratification of points at this site, it is possible that there is an association with kinds of points that are present in this mound and the period of occupation;

however, the deposits at this site are not deep enough to definitively say whether or not temporal change can be identified.

Chipped-stone Hoes

In the lithic assemblage from 34LF33 there are a total of 21 shipped-stone hoes. Within this category, there are 16 tools (76.19%) made out of quartzite-like material. There are two tools (9.52%) made from hematite-like material, two (9.52%) of argillite-like material and one (4.76%) of chert-like material (Table 5.10). Out of the 21 chipped-stone hoes, 11 of the them (52.38%) where excavated from the first level. Four of them (19.05%) were excavated from the second level and four of them (19.05%) from the third level. The remaining two tools were found in the disturbed dirt at the site.

Table 5.10 Percentage of raw material type within chipped stone hoes

Raw Material	Percentage
Quartzite	76.19
Hematite	9.52
Argillite	9.52
Chert	4.76

About half of the tools (47.62%) from this assemblage only have one blade; of those 10 tools several of them are broken at the mid-section but it cannot be confirmed if there should be a secondary blade. The other 11 tools (52.38%) are hoes with two blades. Overall, these tools have similar features but there are some very small and thin tools and also some large and thick tools. The average length of these chipped-stone hoes is 102.2 mm long with the longest being 243.5 mm and the shortest being 57.5 mm. These measurements include both whole and broken tools.

A histogram (Figure 5.9) was created to show the variety of the lengths of the chipped stone hoes that are present in this assemblage. A few example of the varieties of sizes and shapes of these tools can be seen in Figures 5.10 – 5.12.

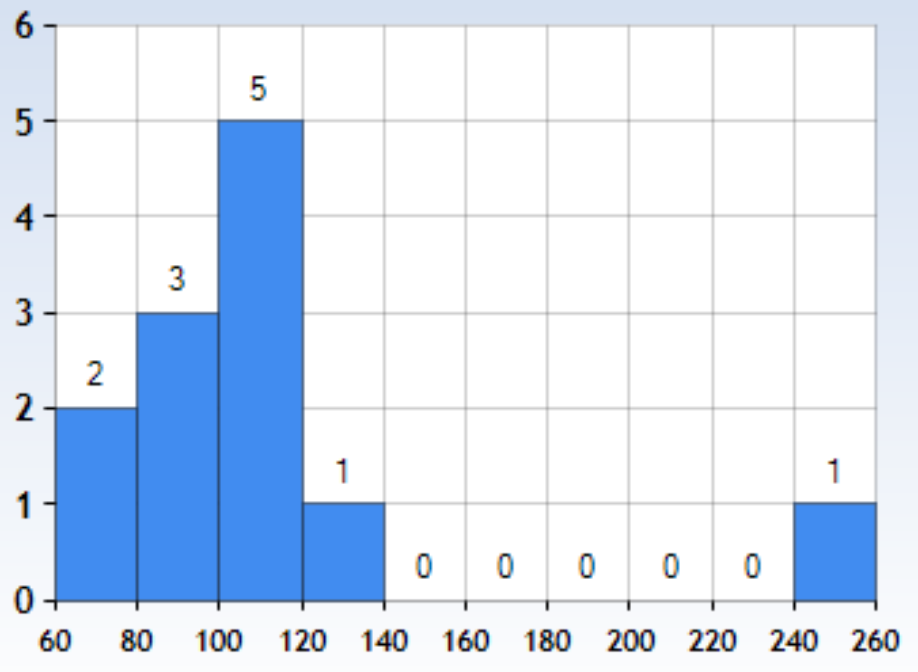

Figure 5.9: Histogram of maximum lengths of whole double bitted chipped stone hoes

Figure 5.10: Chipped stone hoe from 34LF33

Figure 5.11: Chipped stone hoes from 34LF33

Figure 5.12 Chipped stone hoe from 34LF33

The majority of these tools showed some kind of polishing on at least one surface or a blade. Since no microscopic analysis was done on these tools, use wear was not able to be identified but based on the research on these tools that was discussed earlier, it is likely that these tools can be associated with some type of horticulture or gardening practices (Leith 2011, Schambach 2002).

Miscellaneous Chipped Stone

The miscellaneous tools in this lithic assemblage include, scrapers, bifaces, preforms, cores and flakes. In total, there are 39 tools in this category. There are four cores, two angular flakes, and 33 bifaces, scrapers, and preforms. The majority of these tools (30 or 76.92%) are made from a quartzite-like material with a few (nine or 23.08%) being chert-like material. Three of the tools are from disturbed dirt, 16 of them are from level one, 17 of them are from level two, four of them are from level three and one of them is from level four.

The majority of these tools being quartzite could tell us that most of the manufacturing done at this site was on quartzite-like materials and that non-quarzitic materials are traded, brought in, or manufactured off-site.

Chipped stone distribution throughout each excavated level

There are six levels of chipped stone materials recovered from this site. In level six there were a total of two tools recovered. One of the tools, which was made from quartzite, had a slight impact fracture to the tip of the tool and is a contracting stem hafted biface. The other tool, which was made from a light grey chert, was broken at the base. Due to the break it is unknown whether it is stemmed or notched.

There was one tool associated with level five. It was a contracting stem hafted biface made from quartzite. At level four, there was two associated hafted biface and miscellaneous chipped stone tool. One of the hafted bifaces was a contracting stem hafted biface made from quartzite and the other is a side- notched tool made from a black chert. This tool also had a slightly concave base.

Level three contained 35 hafted bifaces, four chipped stone hoes, and four preforms/bifaces. Two of the chipped stone hoes were made with quartzite, one with argillite, and one with hematite. Of the hafted bifaces, 15 of them were contracting stem hafted bifaces; 10 of them were made with quartzite, and five of them with chert. There were 20 remaining tools and of these there were five with an unknown base and stem types; two made of quartzite, three made of chert. Finally, the remaining 15 tools were non-contracting hafted biface. There were nine tools that were corner notched, one that had a basal notch, one that was side notched, and one that could be either side or corner notched.

Recovered from level two there were a total of 105 hafted bifaces, four chipped stone hoes, and 16 miscellaneous chipped stone. All four of the chipped stone hoes were made of quartzite. Of the hafted bifaces, there were 63 contracting stem hafted bifaces; 30 of them made of quartzite, 32 made of chert, and one was an unknown chert type. There were five lanceolate tools associated with level two four of them were made of chert and one made of novaculite. There were 13 tools had an unknown base or stem type, 16 were corner notched, four of them were side notched and four of them were basal notched.

In level one, there was a total of 163 tools. There were 137 hafted bifaces, 11 chipped stone hoes and 15 miscellaneous chipped stone tools. Eight of the chipped stone hoes were made of quartzite, one of hematite, one of argillite, and one of chert. There were 81 contracting stem

hafted bifaces associated with this level. There were four lanceolate tools, 25 with an unknown base or stem, 23 that were corner notched and four that were side notched. All of these side notch points are greater than 25 mm in length.

Finally, there are a number of chipped stone tools that were recovered from the disturbed dirt as well as an unidentified test pit. There were 46 hafted bifaces, two chipped stone hoes, and three miscellaneous chipped stone tools associated with this category. Both of the chipped stone hoes were made of quartzite. There are 26 contracting stem hafted bifaces in this category, two tools with unknown stem and base types, three basal notched tools, 12 corner notched tools, one side notched tool, and two tools that could be side or corner notched

Conclusions

The main goals regarding this analysis was to gain a better understanding of the types of chipped stone present at this site and hypothesize how these chipped stones may have been used at this site and on the landscape. Based on the data that was collected, the artifacts at 34LF33 appear to be typical of other Fourche Maline-related sites. Out of 388 tools, 188 of them, or 48.45%, were contracting stem points consistent with the Gary type. Approximately 140 or 36.08% of them were non-contracting stem points or indeterminate. Only 21 tools, or 5.41%, were identified as chipped-stone hoes. Finally, 39 tools, or 10.05%, were considered to be "miscellaneous," meaning that they were either bifaces, scrapers, preforms, cores or flakes (Table 5.11).

Table 5.11: Total percentage of chipped stone tool types

Chipped stone type	Total	Percentage
Contracting Stem hafted bifaces	188	48.45
Non-Contracting Stem hafted bifaces	140	36.08
Chipped-Stone Hoes	21	5.41
Miscellaneous bifaces	39	10.05
Total:	388	100.00

As far as raw material goes, the majority of the tools were made from quartzite-like materials, followed by chert-like materials. Only a very small number of artifacts were found to be either made from argillite-like materials, hematite or novaculite. The margin between quartzite and chert seems to be rather small but one must also take into account the type of tool that is being made out of that material. It seems that in this case, more contracting stem tools are being made out of quartzite and more non-contracting stem tools are being made out of chert-like materials (Table 5.12). It would be interesting to see if there was a relationship between the types of tools manufactured at this site and the types of materials that were being used for those tools. One way to gain a better understanding of the types of tool production that is happening at this site would be to look at the lithic debitage. Unfortunately, the WPA did not screen during the excavations and they did not collect smaller artifacts like lithic debitage. Alternatively, when Galm was doing excavations at this site in the 1970s, a large amount of debitage was collected. However due to the issues associated with that excavation that were mentioned in chapter three, those artifacts were not analyzed for this thesis.

Table 5.12: Total raw material type percentages

Raw Material	Total	Percentage
Quartzite	215	55.41
Chert	161	41.49
Argillite	3	0.77
Novaculite	6	1.55
Hematite	2	0.52
Unknown	1	0.26

As stated before, one of the main goals of this analysis was to gain a better understanding of the activities taking place at this site and what the artifacts can tell us about these activities. In that past, researchers like Bell (1953), Schambach (1982), and Leith (2011) have focused on developing a history of occupation through chronological analysis. They looked at the stratigraphy of these sites as a way to get a better understanding how what was happening at these sites over a long period of time. Generally, that is an effective strategy for looking at change in sites over time. However, not all of these sites are as deeply stratified as other sites. Due to the fact that 34LF33 is not a deeply stratified as other Fourche Maline sites (see Table 5.13) a strict chronology cannot be achieved like it has been as other sites. However, if one takes into account the fact that most of these deposits at this site are above the burial deposits, this could mean that the burial mound was intact before the other deposits were placed onto the mound. If that is the case, it could be suggested that these "dark-earth midden mounds" are not middens at all; that they were burial areas first and then utilized later for other purposes or they were burial areas that were topped with the remains of a feasting or other community event. Nevertheless, there is the caveat that since this analysis did not include any of the burial associations that there might be a bias in the level data.

Table 5.13: Total distribution of chipped stone tools in excavated levels

Excavation level	Total	Percentage
1	163	41.91
2	125	32.13
3	43	11.05
4	3	0.77
5	1	0.26
6	2	0.51
Unknown	51	13.37
Total:	388	100.00

Furthermore, Bell (1953), Schambach (1982, 2002), and Leith (2011) tended to focus only on the contracting stem hafted bifaces (the Gary's). These tools have been of major importance to Fourche Maline research because they have been found all of these sites and also all over the eastern portion of Oklahoma. The focus on these tools has neglected the research that has been done on the non-contracting stem hafted bifaces however these tools also appear at other Fourche Maline sites in the region. At 34LF33, they make up a large percentage of the chipped stone tools that are associated with this site. Quartzite is the dominate raw material between each of these categories therefore it is possible that one factor that could explain the difference in type is time. However, the majority of both the contracting and the non-contracting hafted bifaces are from the first and second levels. It is hard to get at time when there appears to be no discrepancy between the context in the ground in which they were found.

It can be confirmed that, based on the artifacts that were analyzed for this thesis, these artifacts are representative of a group that subsists on hunting and likely, based on the chipped-stone hoes and the pottery, small-scale horticulture or food production at some scale. As mentioned before, the fact that these contracting and non-contracting stem hafted bifaces as well

as the chipped stone hoes is important for understanding the landscape associated with the groups of people that lived in this area. Much like with the pottery, the fact that these types of artifacts occur at these Fourche Maline sites indicates that there is something connecting these locations. The consistency of the artifacts across these sites could mean that people are passing knowledge of their skill between groups or moving around and continuing these same practices over time and across the landscape.

Chapter Six: Miscellaneous Artifacts

This chapter will present an analysis of the miscellaneous artifacts that are associated with the WPA excavations at 34LF33. These artifacts include various polished stones, pecking stones, paint stones or hematite, bone tools, pendants, gorgets, and other artifacts that are not pottery or chipped stone materials. Much like the previous chapters of analysis, this chapter will begin with a description of the non-ceramic, non-chipped stone artifacts that have been associated with Fourche Maline sites. Then, this chapter will discuss the methodology that was used to analyze the artifacts from 34LF33 and the main goals guiding this research. Finally, this chapter will present the analysis of the material that was excavated at 34LF33 as well as a comparison of these materials to other Fourche Maline sites. Comparing these materials will provide a better idea of what items are commonly occurring at these sites and if there are any outliers or artifacts that's are only found at this site.

Fourche Maline Artifacts

Pecking stones

The first classes of artifacts that will be discussed are pecking stones, which encompasses grinding stones and other types of ground stone artifacts. Pecking stones are artifacts that are used to shape lithic materials into different types of tools. Grinding stones are usually used to grind up different seeds, grains or other materials. These are commonly found at archaeological sites, especially ones that have some type of production component. According to Schambach (1982), tools for grinding and food preparation are found in abundance at Fourche Maline sites in Arkansas. These materials, he confirms, are characteristic of these sites in this region due to the fact that earlier sites in this region during the Archaic did not have these types of materials and

also other sites that were occupied at the same time but a different place in Arkansas also did not have these materials (Schambach 1982). The occurrence of these materials likely means that food processing is taking place at these Fourche Maline sites across the region were these tools are present.

Bone and Antler Tools

There are several types of bone and antler tools that have been found at Fourche Maline-related sites. The majority of these tools are bone awls or pins. The bone that these materials are made of is usually some type of animal, but species is usually not identified. However, it is likely that they are made mostly from deer bone (Fauchier 2009) and some from bird bone (Bell 1953). Commonly, bone tools were used as hair pins, in leather working, in sewing, and possibly in pressure flaking (Fauchier 2009). Depending on the context at which they are found can provide a better guess as to what the tools are being used for. Fauchier (2009) writes that in burial contexts, they have been found near the back of the skull which might indicate they were used to pin back hair.

Antler tools comprised another category that is found at Fourche Maline sites is antler tools. It is likely that some of the antlers were also used as handles for tools, but they could have also been used as billets for flint knapping. Little is discussed about these bone tools outside of burial contexts however they do appear to occur frequently in both burial and non-burial contexts. Other unidentified worked bone materials have been found at various Fourche Maline-related sites but use or function typically goes unidentified (Bell 1953).

Gorgets, Pendants, and Boat Stones

Other commonly identified Fourche Maline artifacts are gorgets, pendants, and boat stones. These have also been found in both burial and non-burial contexts (Schambach 1982). Gorgets and pendants are typically described as decorative materials made from polished stone and slate that are made from non-local materials (Schambach 1982). Interpretations regarding gorgets and pendants tend to be consistent with the idea that they are decorative items or a part of elaborate costumes (Fauchier 2009).

Boat stones are typically thought to be used as weights or balances for atlatls or throwing sticks. They are usually curved on the edges and flat or hollowed out at the base. Sometimes the edges are beveled and/or notched so they can be easily fastened to the atlatl. They attach the stone to the handle portion of the atlatl. Theoretically, it serves as an additional mechanism that helps balance the atlatl (Fauchier 2009). However, some believe that the weight does not serve a purpose and is merely decorative (Beatty 1967). Atlatls are typically thought to have come before the bow and arrow in most cases. Atlatls are generally thought to be more effective than a regular spear because the handle acts as an extended arm which gives the spear and shaft more leverage and allows it to travel farther and at a higher velocity (Pettigrew et al 2015). Furthermore, if there is a weight attached to the throwing stick, that could act as a counterbalance that would offset the weight of the spear (Kinsella 2013).

Quartz, Fired Clay, and Paint Stones

The final categories of artifacts have also been found at Fourche Maline sites are quartz fragments, fired clay, and paint stones, also known as hematite. Both the fired clay and paint stones are likely to be from local sources; however, the quartz is a material that has been found

in both burial and non-burial contexts. The exact location that this quartz is coming from is unknown but there are mines of different types of crystals that naturally occur in the Ouachita Mountains (U.S. Forest Service 2020). It is possible that the quartz is coming from somewhere in this area. Other sites in the U.S. southeast have trace the quartz found in those contexts to the Ouachita Mountains (Rolingson and Mainfort 2002). As far as use/function goes, Fauchier (2009) states that it is likely these crystals held meaning in some way. She states that in burial contexts, these quartz crystals have been found inside turtle shells, or carried together in a bag, or as charms on tools like atlatls (Fauchier 2009:94). She goes on to state that quartz crystals have also been found later in time at other mound sites outside of Fourche Maline sites, like Spiro, in this same region. Rolingson (2002) states that in the Plum Bayou area of Arkansas, these quartz crystals were used as perforators or cutting tools in addition to some arrow points and other bifacially worked tools. There are many instances of quartz crystals being found in archaeological contexts all across the U.S. southeast (Anderson and Mainfort 2002).

A material that is likely made from local materials is fired or baked clay. Baked clay is a hardened chunk of clay that was purposefully or accidentally baked in a fire or some sort. Bell (1953) stated that during the excavations on 34LF11 they would occasionally find a baked or burned piece of clay. However, they usually were nowhere near other materials that would be associated with a hearth. Unfortunately, the best description that we have for this artifact is "baked clay balls," (Bell 1953); no photos or measurements were taken. It is possible that these clay balls were used as stone the "stone" for "stone-boiling." Some baked clay balls are found in abundance as Poverty Point (Huxtable et al 1972) and are thought to be used for the same purpose at that site. There is a possibility that these artifacts traveled from Poverty Point to the Wister Valley or that there was trade or movement between people in these locations; it is also

possible that this technique could have been independently invented at both locations. Alternatively, there is the most likely possibility that these amorphous balls of clay are not actually balls of clay and could be a type of daub fragment used in wattle and daub housing construction. However, nothing is known about Fourche Maline houses due to the fact that none of them have ever been found. Schambach (2002) does not think that wattle and daub is a technique that was used by people occupying Fourche Maline sites. Nevertheless, both of these options are a reasonable and possible use for this artifact.

The final artifact that will be discussed in this section is paint stones or hematite. While some of the artifacts were actually made from hematite, these stones are also angular or globular shaped artifacts that are also found at Fourche Maline sites. The general consensus with these artifacts is that they were crushed or ground down to be used as a base for red paint (Fauchier 2009, Schambach 1982). This is a likely possibility although no red painted objects have been directly identified in these sites. Another possibility is that they are essentially hematite debitage that was removed from the other hematite objects during their construction.

Miscellaneous Artifact Analysis at 34LF33

This section of the chapter will discuss the analysis that was done on the assemblage of miscellaneous artifacts from this collection. The research goals associated with this analysis are focused on gaining a better understanding of what these wide varieties of artifacts might mean for the development of the landscape and how people are using it and potentially moving across it to acquire new resources. I will also compare this assemblage to what is present at other Fourche Maline sites. I will start this by outlining the methodology that I used for this analysis

and then I will discuss the results of the analysis and finally, I will discuss the overall interpretations that I made from assemblage analysis.

Methodology

Much like the other material types, no burial associations were analyzed for this research. I assigned all of the artifacts a three-digit specimen number that attached to the provenience number of the artifact. Each artifact was identified for tool type, material type and then a description was made about each of the artifacts. The main goals of this research are to see what other kinds of materials are occurring at this site and try to ascertain how these tools were being used and if the presence of absence of any materials could contribute to idea surrounding land use and landscape modification.

Results

Pecking Stones

Both large and small pecking stones, grinding stones, and other types of ground stone were identified in the assemblage. Most of the larger pecking stones were made out of a sandstone-like material. One pecking stone was identified as hematite-like. Several other, smaller artifacts were also believed to be pecking stones as they had striations on the lateral margins. The smaller artifacts were mostly polished cortex and showed evidence of modification. In total, 15 artifacts were identified as pecking or grinding stones and an additional four are considered to be likely pecking stones. This means that 19 out of 909 total artifacts (or 2.09%) in this collection are likely to be some type of pecking or grinding stone. All of the grinding stones and pecking stones were found among the first and second levels of the excavation. The reason that pecking

stones and grinding stones are grouped together is due to the fact that the majority of these stones show evidence of modifications that are on both the lateral margins and also the top and bottom surfaces of the tool. Nine of the tools show evidence of a depression or wear in the center surface of the tool (see Figure 6.1) and three show evidence of modification toward the lateral edge of the tool (see Figure 6.2). Some of the tools show wear on both the edge and in the center of the tool like it was being used for both grinding and pecking.

The average length of these pecking stones is 109.83 mm with the longest being 151.1 mm and the shortest being 76.1 mm. The average width of these tools is 79.11 mm with the widest being 101.1 mm and the narrowest being 57.0 mm. The average thickness of these tools is 40.45 mm with the thickest being 51.4 mm and the thinnest being 21.8 mm.

As stated before, I am hypothesizing that these tools were being used in food preparation to some extent. Wear from these likely activities is very evident on the surface of these materials, on most of the stones there are depressions one or both sides of the tool. It is unknown exactly what types of materials that they might be grinding due to the fact that no floral remains were identified with this collection. However, Leith (2011) conducted analyses of some of the floral remains from 34LT11, another Fourche Maline site in eastern Oklahoma. He determined that goosefoot was among the most common seeds that was collected from the samples. Leith stated that the variety of goosefoot that were present at that site might indicate that they were being actively tended (Leith 2011:118). Fritz (1989) states that the people associated with these Fourche Maline sites were likely horticulturalists based on the presence of these materials.

Figure 6.1: Modifications on top surface and lateral margins

Figure 6.2: Modifications on lateral margins

Bone and Antler Tools

Bone and antler tools of all sizes were found at 34LFf33; they were all identified as some type of animal bone but only a few specimens allowed the categorization to be more specific. A total of 56 (6.15%) of 909 total artifacts were modified bone artifacts and of the 56, three (5.35%) modified antler tools were identified. Of these bone tools, 27 (48.21%) of the 56 were identified as some type of awl-like tool or perforator. These tools are typically made from the long bones of small animals and deer. Usually they are polished on the sharpened end due to use. Out of the 27 awls/perforators, four of them were found in the first level, eight of them were found in the second level, 11 of them were found in the third level, one of them was found in the fourth level and three of them were found among the disturbed dirt.

Figure 6.3: Bone Awls and Perforators from 34LF33

The rest of the bone artifacts (29 total; 51.79%) were identified as generic bone tools. These are bone tools that are worked in some way (i.e., polished, sharpened or broken), but the exact original function could not be identified. Four of the generic bone tools were noted as burnt

in some ways. All four of these tools were found among the first and second levels and in a test pit. In total, 13 of these tools were found among the first level, nine of them were found at the second level, four of them were found at level three, and three of them were found in a test pit or in the disturbed dirt.

There is one intact antler handle in this assemblage that is in remarkable condition (Figure 6.4). This handle has a carved hole in the handle for the placement of the tool. Leith (2011) discusses an antler that was recovered from 34LF35 (Williams II). He states that some of the contracting stem hafted bifaces fit well in the hole from the handle 34LF25. I did not test to see if any tools fit into the hole of the handle recovered from 34LF33, but the width of the hole is 12.4 mm in diameter and there are plenty of contracting stem hafted biface that would fall into the range of fitting into that hole.

Figure 6.4: Antler Handle

Bone tools likely had a wide variety of uses and could have been used in different ways and manufactured for different purposes. Due to the presence of awl-like tools, one could make

the argument that they were being used for the manufacture of leather goods or decorations. It is also likely that they were decorative adornments, pressure flakers, and other tools.

Gorgets, pendants, and Boat Stones

The types of gorgets and pendants present in this assemblage seem to be fairly variable. In total there are five gorgets/pendants and two boat stones. One of the gorgets was a long thin oval with two holes near either end that are bore all the way through form both side and on hole in the center bore partway through on one side (Figure 6.7). This gorget is made of a dark hematite and was found in the third level. Two of the gorgets are flat and mostly rectangular in shape. One is slightly larger and thicker and made of hematite with a bore hole towards one end of the piece. It is possibly broken because it appears there is a bore hole that is broken that would be above the other hole. This piece was found in level one. The other gorget is thinner and smaller and manufactured from a grey shale-like material (Figure 6.8). The gorget is also broken in half at the bore hole. The edges of the piece are rounded and notched. This piece was found in level three. The other two gorgets are fragments and it is hard to tell the exact shape of the pieces. Both of them were found in the disturbed dirt of the site.

The two boat stones in this assemblage were similar in size and shape. Both them appear to be made of a hematite-like material. They are both flat at the base and curved around the edges. The edges are also beveled parallel to the edge of the tool. One of the boat stones was found at level two and the other one was found at level three.

Figure 6.5: Top and middle: Boatstone; Bottom: Pendant/Gorget

Figure 6.6: Shale Gorget

Quartz, Baked Clay and Paint Stones

At 34LF33, several fragments of quartz crystal were found at this site. A total of eight fragments of quartz crystal were found. Most of the fragment were very small but one of them

was a fairly decent sized clast (Figure 6.7). Only one piece of quartz was found in the first level, one piece was found in the second level, four pieces were found in level three, and two pieces were found at level four. There was one piece of fired clay associated with this assemblage as well (Figure 6.8 and 6.9). This piece was found at level two. It appears to also have impressions of something that it was pressed up against. It is likely a piece of daub that was from wattle and daub housing construction as suggested earlier or it could be from the lining a woven basket or the like. Finally, 23 pieces of hematite paint stones were noted in this collection (Figure 6.10). These pieces were found in various locations in the first and second levels and the disturbed sediment at the site.

Figure 6.7: Quartz crystal fragment

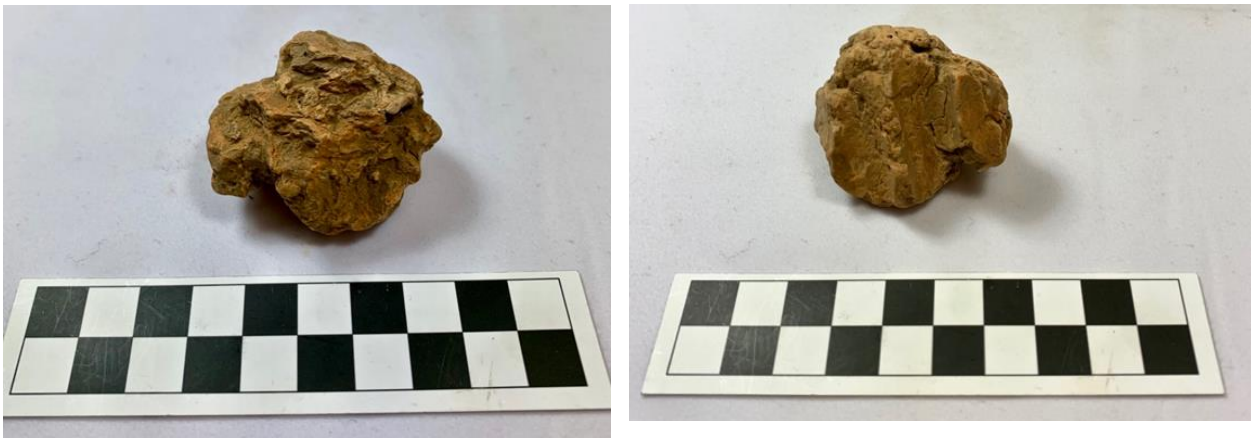

Figure 6.8 and Figure 6.9: Fired Clay Fragment

Figure 6.10: Hematite paint stone fragment

Conclusion

The main goals for the analysis of the miscellaneous artifacts from 34LF33 was to identify non-chipped stone tools are present at this site and to see if the presence of these artifacts might contribute in some way to the perception of how these sites were likely used and modified. The artifacts the were found at 34LF33 appear to be fairly consistent with materials from other analyzed Fourche Maline sites in the region.

Based on the information compiled from typical Fourche Maline sites as well as from the data that was collected from 34LF33, several interpretations can be made about 34LF33 and likely the greater Fourche Maline area. First of all, it is highly likely that the pecking stones were used for processing food as well as tool manufacture; some were used for both activities and some were only used for one or the other. The people living and working at this site were likely processing grains, seeds and starches that they likely cultivated themselves. They were also manufacturing their own tools and modifying them as they see fit.

Another interpretation that can be made is regarding the presence of boat stones. It is possible that these stones were being used as atlatl weights based on shape, appearance and general understanding of what these artifacts are usually associated with (Fauchier 2009; Pettigrew et al 2015). However, it is also possible that these artifacts are not weights and are actually decorative items.

A final interpretation that I would like to make is regarding the presence of the fired clay. While this collection only possessed one of these artifacts, it is possible that more artifacts like this were present at the site. This is due to the fact that it is well known the WPA did not collect everything, especially if it did not look like an artifact. We also know that Bell (1953) found what he called baked clay balls throughout 34LF11; however, we do not know if they look similar to this one in Figures 6.8 and 6.9. It does appear that this particular piece of baked clay is dab from a wattle and daub like substance due to the impressions on one side of the ball. This could be an interesting clue into the housing style that these people were using. If these remains are being placed in the mound after its use, then it could also be indicative of a more temporary living situation rather than a long-term living situation.

The following chapter will discuss some of the interpretations that have been stated throughout this thesis, it will discuss some of the overarching themes and goals of this research and finally, it will provide some concluding thoughts about this site and this research area as well as provide some future directions for possible research.

Chapter Seven: Final Conclusions and Future Directions

In this final chapter, I will be summarizing the previous chapters and the interpretations that were made in each of those chapters, then I will combine those interpretations as a way to make some broader conclusions about 34LF33 and other Fourche Maline sites. Finally, I will offer some concluding thoughts about Fourche Maline and provide some future directions for researchers.

Synthesis

Most of the early work in this region took a cultural historical approach in that there is a description of the site or the materials or attempting to develop a chronology for the region or site, but beyond that, people hesitated to make conclusions about these site and what might be happening at them. Merely understanding and establishing what the term "Fourche Maline" actually means took a very long time and still today there are things that need to be further clarified.

The way that I chose to interpret the site discussed in this thesis was through the lens of landscape archaeology, which was discussed in the second chapter. This is generally the idea that there is meaning attached to the places and spaces that people occupy and by looking at how landscapes have been modified and manipulated by the people that lived on and used them we can make interpretations about certain groups of people. There are things that tie people together and it is possible that we can see those ties if you look beyond the site and look at the greater landscape. One way to get a better understanding of what kinds of activities were taking place at a site is to look at the artifacts associated with those sites. With landscape archaeology, these

activities and repeated use over time can create a social memory that can be tied to places on the landscape.

In the third chapter, I provided a summary of all of the work that had been done at this site by the WPA and later. There are a lot of things that could have been done differently when this site and other sites like it were excavated by the WPA but despite their time and money constraints, a lot of really interesting and really important information regarding these sites and the people that occupied them was not lost to the construction of the lake, and thanks to the WPA and the people doing this fieldwork, there is a lot more that can be learned about these sites because we still have materials to study. The third chapter also provided a reconstruction of the mound. I displayed the thickness of the mound deposits and also the burial pit margins and ash features. I also discussed how much of the material associated with the mound is concentrated more towards the upper levels of the profiles.

Chapters four, five and six consisted of an analysis of all of the non-burial materials that were excavated at this site by the WPA in 1939 and 1940. Chapter four discussed the ceramic assemblage at 34LF33. The dominant type of ceramic recovered was grog temper. While difficult to address, most vessels appear to be bowls ranging from 10 – 38 cm in diameter. This range is greater than the vessels from later Fourche Maline contexts from elsewhere.

Chapter five discussed the chipped stone assemblage at 34LF33. The most dominate type of chipped stone is the contracting stem hafted biface followed by the non-contracting stem hafted biface. These two tool types make up over 80% of the chipped stone assemblage. Another tool in this assemblage is the chipped stone hoes. These tools range in sizes from 57.5 mm to 243.5 mm. As far as the miscellaneous chipped stone tools, there is a number of bifaces and preforms.

Chapter six discussed the miscellaneous materials from 34LF33. This includes the bone tools, pecking stones, hematite paint stones, quartz crystals, boatstones, gorgets/pendants and fired clay.

In total, 909 artifacts were analyzed for this thesis. There were 399 pottery sherds, 388 chipped stone tools, and 122 miscellaneous artifacts (Table 7.1). There are a few major trends with this dataset, first, the dominate temper type among the pottery is grog temper or grog+. The dominate raw material for the chipped stone tools is quartzite followed by various types of chert. The dominate tool type is hafted bifaces by a wide margin.

Table 7.1: Percentage of Artifact totals

Artifact type	Count	Percentage
Pottery	399	43.89
Grog tempered sherds	254	63.66
Grit tempered sherds	13	3.26
Shell tempered sherds	12	3.01
Grit and shell tempered sherds	3	0.75
Grog+ tempered sherd	80	20.05
Unknown temper	37	9.27
Chipped Stone	388	42.68
Contracting Stem hafted biface	188	48.45
Non-contracting stem hafted biface	140	36.08
Chipped stone hoe	21	5.41
Miscellaneous chipped stone	39	10.05
Miscellaneous tools and artifacts	122	13.42
Bone tools	56	45.90
Antler tools	3	2.46
Boat stones	2	1.64
Gorgets/pendants	4	3.28
Quartz crystals	8	6.56
Fired clay	1	0.82
Pecking stones	19	15.27
Hematite paint stones/stones	29	23.77
Total	909	100.00

Interpretations

The WPA and previous Archaeological work

The WPA methods used to excavate Fourche Maline sites adds additional complications to making interpretations. The WPA excavations at 34LF33 took place over two summers in 1939 and 1940. The workers were generally focused on completing the excavations due to budgetary constraints, time constraints, and an excess of projects. There were also few archaeologists stretched between many projects. All of these factors contributed to various issues with the materials from 34LF33 and the interpretations thereafter. Additional excavations in the 1970s also contributed to the complications at 34LF33. There was incorrect site information along with excavations that were never analyzed or interpreted; a seemingly common occurrence for these Fourche Maline sites.

However, despite these complications there is still a lot that can be learned from this collection. We can do a fair amount of site reconstruction because of the site maps that were made and the details of the artifact locations as well as the burial and ash locations. Because of these reconstructions, we can learn a lot about how the WPA conducted their excavations. We can also learn about how this mound was situated at some levels. We know there seems to be deeper deposits and more artifacts concentrated in the northern portion of the excavated area.

Mound Composition

Based off of the materials present at this mound site and the previous understandings of what those artifacts could mean or represent, the people occupying the area were small-scale horticulturalists who lived near this mound. It is likely that the deposits excavated from this mound are the remains of a large feasting event or community gathering. The artifact deposits

seem to appear as if they are topping off the burial mound. This is based off the observation that objects are most abundant in the upper two levels of the mound.

The artifacts that were found in this mound suggests that they were manipulating their landscape not only by constructing this mounded area but also by preparing the land for cultivation at some scale. There are various observations that can be made about what activities are being represented by the objects present at the site. For example, I do not think the cultivation of the land was at a very large scale but based on the presence of the chipped-stone hoes, it is likely that some area near the mound was being prepared. The grinding stones and pecking stones would indicate that once either the cultivated plants or the wild, collected plants were grown that they were being processed in some way. The ceramic pots, as I have discussed before, were likely being used for stone or pot boiling. It is possible that once those starchy grains were harvested and processed, they were placed in boiling water to help better extract the nutrients form the food.

Chronology

There are several attributes that can help narrow down approximate dates that 34LF33 was occupied. The first indicator is the presence and absence of certain artifacts at this site. The next indicator is where in each excavated level these tools have been recovered. These indicators can be compared to other Fourche Maline sites in the area. Leith (2011) was able to identify certain artifact types as Fourche Maline and then he was also able to seriate these types to get a better idea of where artifacts were occurring throughout the mounds. Leith stated that the majority of the mound sites associated with Fourche Maline site in the Wister valley are multi-component sites (2011:52). This means that it is likely that these sites were occupied for long

periods of time or several sequences of shorter occupations. Either way, it is likely that 34LF33 also exhibited traits of a multi-component site.

In chapter two, I outlined the different phases of the Fourche Maline period and what those phases entail. Based off of those identified attributes, some conclusions can be made regarding the chronology of 34LF33. It is apparent in Table 7.2 that the majority of almost all artifact types were recovered from level one. The next most abundant level is level two which is followed by level three. Levels five and six contain no pottery of any kind but these levels do contain a small number of chipped stone. It is possible that these levels are part of the "pre-pottery" phase known as the Wister Phase. Another observation from Table 7.2 is that 100% of the shell and shell and grit tempered sherds are associated with level one and the disturbed dirt. Chapter two discusses the shell tempered pottery to be associated with the Evans Phase, which is a post-Fourche Maline occupation. Leith also noted a very low number of shell-tempered sherds associated with the Williams I site; those shell tempered sherds were also in the first level. He notes that the occurrence of shell-tempered pottery indicates a "technological change associated with the Late Woodland cultural period" (Leith 2011:67). This supports that likelihood that there was a transition of occupation between the Fourche Maline Period and the Evans Phase.

Table 7.2: Percentage of artifact types within each excavated level

	1	2	3	4	5	6	unknown
% of grog tempered sherds	65.88	19.58	4.15	2.37	0.00	0.00	8.01
% of shell tempered sherds	100.00	0.00	0.00	0.00	0.00	0.00	0.00
% of grit tempered sherds	70.00	0.00	0.00	10.00	0.00	0.00	20.00
% of grit and shell tempered sherds	66.67	0.00	0.00	0.00	0.00	0.00	33.33
% of unidentified temper sherds	62.16	18.92	2.70	5.41	0.00	0.00	10.81
% of decorated sherds	68.18	22.73	0.00	9.09	0.00	0.00	0.00
% of contracting stem hafted bifaces	43.09	33.51	7.98	0.53	0.53	0.53	13.83
% of notched or lanceolate bifaces	32.98	30.85	15.96	1.06	0.00	0.00	19.15
% of unknown stem or base bifaces	54.35	28.26	10.87	0.00	0.00	2.17	4.35
% of chipped stone hoes	52.38	19.05	19.05	0.00	0.00	0.00	9.52
% of miscellaneous chipped stone	38.46	41.03	10.26	2.56	0.00	0.00	7.69

The data seem to support there being an occupation within the Williams Phase (2300 – 1700 BP) and likely Scott Phases (1700 – 1400 BP). This is because Leith indicated that these phases had the largest number of contracting stem hafted bifaces (Gary's), non-contracting stem hafted bifaces, chipped stone hoes as well as an abundance of both the plain and the incised thick, grog tempered, flat bottomed pottery. Furthermore, the uppermost level of 34LF33 reflected the high percentages of these artifacts.

The Akers phase of the Fourche Maline Period occurs just prior to the transition out of the Late Woodland. Leith (2011) stated that bow and arrow technology was introduced during this phase. This means a site with an Akers phase occupation should contain small arrow points

in addition to the contracting stem hafted bifaces, and the grog tempered pottery type. The analysis of chipped stone from 34LF33 showed that there are six possible and one very likely candidate for the typical Late Woodland arrow point described by Leith (2011). In his analysis, Leith argues that the presence of the arrow point is indicative of an additional occupation. However, out of the six possible arrow points, one of them was associated with level three, three of them with level two, one of them with level one, and one of them with an unidentified test pit, with the most likely one being form level one. Based on the evidence that supports there being a Scott Phase or William phase occurring in the top two levels, it is possible that there is an Akers component at 34LF33 based off of the single, likely arrow point associated with this site. The possible arrow points associated with the third level perhaps reflect an Akers Phase, but would be stratigraphically out of place.

In conclusion, 34LF33 had components that were likely associated with all phase of the Fourche Maline Period as well as the earlier Wister Phase and the later Evan Phase. The 12 shell tempered pottery sherds were associated with the Evan Phase. The possible arrow point was likely associated with the Akers Phase; the contracting stem hafted bifaces, grog tempered pottery (both plain and decorated) and chipped stone hoes can be associated with the Scott and Williams Phases; and finally, the presence of contracting stem hafted bifaces prior to the occurrence of pottery indicated the possibility of a Wister Phase occupation. Furthermore, I suggest that the main period of occupation was in the Williams and Scott Phases (2300 – 1400 BP).

The Greater Landscape

Because the WPA did not excavate any of the areas that were adjacent to the mound, we have a very low understanding of were the people were living, what they were living in, or where these landscape modification practices may be happening off-mound. However, looking at these mounds can give us a glimpse into the lives to the people that were living here and using this land. We can use these materials that were found in these mound contexts to make assumptions about the activities that were happening off mound.

While 34LF33 is just one site in this region, there is the possibility that, based on the materials found at this site, that other, similar activities can be found to be happening at these other sites in the area. Fauchier (2009) claims that it is likely that when people were buried at these places, that their families remembered their ancestors and remembered where they were buried later on in time and that's why people are continuously occupying this region. It is possible they are moving around the landscape, stopping for periods of time to cultivate the land, utilize the neighboring water sources, hunt the woods and the pastures and also bury their dead. Returning to these areas would be an important part of their social identity. It is likely that if people were occupying these areas across several generations that, while they would know their ancestors were buried in these places, they might not know exactly where they were buried. This could explain why there are midden deposits on top of burial deposits, but very little artifacts intermixed throughout the entirety of the deposits.

Ultimately, the main questions surrounding the research that was conducted for this thesis wanted to address what is happening on this landscape and what an examination of the landscape could tell us about the people that were living on it. The landscape perspective was used because it allowed me to make observations about the artifacts that I analyzed and connect them to how

people were using the landscape. It is clear people are engaging with their landscape. They are modifying and utilizing the landscape for multiple reasons. People were cultivating the landscape for food production, but they were also traveling or trading to acquire things like quartz crystals and certain lithic materials like argillite and novaculite. Furthermore, they were burying their dead in mounds and then continuously returning to them over time. It is clear that people were connected to their landscape at multiple levels.

Future Directions

There is a lot of work that still needs to be done with these sites in order to make more secure conclusions about what is happening on this landscape. More research should be done on the pottery to see if there are any residues left behind that might confirm or deny the proposed uses of those objects, this could be done at 34LF33 and other sites as well. Future researchers should look into the burial items to see if they can be dated to the same time period as the artifact deposits on top of them. Off-mound studies that are not underwater should be done near these sites as well. Geophysical surveys could be conducted on these areas. This could give us great insights into where all of the activities were taking place on the landscape. More site reconstruction used mapping software to get a better understanding of the distribution of the artifacts across the mound. Lastly, more full-site artifact analysis should be done on other Fourche Maline sites in this area. Some of these sites have been sitting in boxes since they were excavated, waiting for someone to analyze them. We owe it to previous researchers to finish their work and we also owe it to the descendants of these communities of people that were removed from the ground to try and understand how people were living in the past.

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Appendix

Appendix A: Pottery Analysis Data Table

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
202.001	test pit				32	11.6	11.1	base	grog +	burnished 1,2	UNDECORATED	ceramic sherd, base (2.5% of diameter - possibly 32cm, thickness ~11.6mm), grog/grit temper, burnished (int & ext)
202.002	test pit				10-14	13.1	13.1	base	grog +	na	UNDECORATED	ceramic sherd, base (at least 10cm (maybe 14cm), 13.1mm thick), grog and grit temper, unknown surface treatment, basket impressed
202.003	test pit		22	9.4			9.4	rim	grog	burnished 1?,2,3	UNDECORATED	ceramic sherd, rim (straight, at least 22cm diameter (3%), 9.4mm thick), grog temper, burnished (ext, rim and possibly int)
202.004	test pit		28	10.2			13.2	rim	grog +	burnished 1,2,3	UNDECORATED	ceramic sherd, rim (straight, 28-30cm diameter (~5%), 10.2mm thick), grog and grit temper, burnished (ext, int & rim)
202.005	test pit						18.7	body	grog	na	UNDECORATED	ceramic sherd, body (18.7mm thick), grog temper
202.006	test pit						13.2	body	uk	burnished 2	UNDECORATED	possible grog temper but looks like all inclusions are likely natural; maybe base sherd?
202.007	test pit						11.5	body	grog	burnished 2	UNDECORATED	grog temper, larger chuncks, some grit - maybe natural
202.008	test pit						12.4	body	grog	burnished 2	UNDECORATED	grog temper, larger chuncks, some grit - maybe natural
202.009	test pit						12.4	body	grog	burnished 1,2	UNDECORATED	grog temper, large sherd, possible reductive atmosphere post fire? (think black layers on interior, both sides burnished)
202.010	test pit						13.6	body	grog	burnished 2	UNDECORATED	grog temper, portion of neck present (52.4 mm), ext burnished
202.011	test pit						11.1	body	grog +	burnished 1,2	UNDECORATED	many small grit inclusions fairly evenly distributed, burnished int and ext
202.012	test pit						12.7	body	grog	burnished 2	UNDECORATED	grog temper, larger chuncks, some grit - maybe natural, burnished int
202.013	test pit						15.8	body	grit	burnished 2	UNDECORATED	many small grit inclusions fairly evenly distributed, burnished ext
202.014	Test pit						8.6	body	uk	burnished 2	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, burnish ext, reductive atmosphere?

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
202.015	test pit						8.9	body	uk	na	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, reductive atmosphere?
202.016	test pit						14.1	body	uk	burnished 2	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, no carbon core - same color throughout
202.017	test pit						8.4	body	grit and shell	burnished 2	UNDECORATED	shell and possible grit temper, burnished ext
202.018	test pit						9.7	body	grit	burnished 2?	UNDECORATED	grit temper - evenly distributed, possible burnish on ext
203.001	test pit						11.3	body	grog	burnished 2	UNDECORATED	grog temper with some grit inclusions, burnished ext
203.002	test pit						10.4	body	grog	burnished 2	UNDECORATED	grog temper, evenly distributed, burnished ext
203.003	test pit						12.5	body	grog	burnished 2	UNDECORATED	grog temper, fairly evenly distributed, burnished ext
203.004	test pit						12.7	body	grog	burnished 2	UNDECORATED	grog temper, some grit inclusions, burnished ext
203.005	test pit						12.3	body	grog	burnished 2	UNDECORATED	grog temper, some large chunks, fairly evently distributed, burnished ext
203.006	test pit						12.1	body	grog	burnished 2	UNDECORATED	grog temper, some large chunks, fairly evently distributed, burnished ext
203.007	test pit						8.7	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
203.008	test pit						9.9	body	grog +	burnished 2	UNDECORATED	grog temper and grit inclusions, not very evenly distributed, burnished ext
203.009	test pit						9.5	body	grog	burnished 2	UNDECORATED	grog temper and grit inclusions, not very evenly distributed, burnished ext
203.010	test pit						10.3	body	grog	burnished 2	UNDECORATED	grog temper, portion of neck present (not enough to measure), burnished ext
203.011	test pit						8.5	body	grog	burnished 2	UNDECORATED	grog temper, grit inclusions, densely distributed, burnished ext
203.012	test pit						12	body	grog +	burnished 2	UNDECORATED	grog temper, grit inclusions other inclusions?? Burnished ext

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
203.013	test pit						12.5	body	grog	burnished 1,2	UNDECORATED	grog temper, some grit inclusions, burnished int and ext
204.001	dst drt						12.8	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
204.002	dst drt						7.5	body	grog	na	UNDECORATED	grog temper, no surface treatment
242.001	13:23	1					15.8	body	grog	na	UNDECORATED	grog temper with some grit inclusions, no noticable surface treatment
246.001	13:25	2					13	body	grog	burnished 2	UNDECORATED	grog temper, some large chunks, fairly evently distributed, burnished ext
246.002	13:25	2					16	body	grog +	burnished 2	UNDECORATED	grog and grit temper, girt inclusions might be natural, somewhat evenly distributed, burnished ext
251.001	13:27	2					10.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
253.001	13:28	2			16	21.3	21.3	base	grog +	burnished 2	UNDECORATED	ceramic sherd, base (16cm diameter (28%), 21.3mm thick), grog and grit temper, burnish (ext), basket impressed
259.001	13:32	1					10.5	body	grog	burnished 2?	UNDECORATED	grog temper and grit inclusions, some large chunks, somewhat evenly distributed, possible burnished ext
259.002	13:32	1					13	body	grog	burnished 2	UNDECORATED	possible grog temper, burnished ext. maybe int too? Not enough surface to tell
259.003	13:32	1					13.2	body	grog	burnished 1?,2	UNDECORATED	grog temper, some grit inclusions, burnished ext, possible burnished int
259.004	13:32	1					17.9	body	grog	burnished 2	UNDECORATED	grog temper, evenly distributed temper, burnished ext
259.005	13:32	1					10.7	body	grog	na	UNDECORATED	grog temper, no surface treatment/hard to tell due to lack of surface
259.006	13:32	1					16.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
259.007	13:32	1					9.8	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
259.008	13:32	1					12.1	body	grog +	burnished 1,2	UNDECORATED	grog temper, possibly other inclusions??, burnished int, ext
262.001	13:33	1			uk	31.9	31.9	base	grog	burnished uk	UNDECORATED	ceramic sherd, base (unknown diameter, 31.9mm thick), grog temper, burnished (unknown surface)
262.002	13:33	1			uk	uk	20.5	base?	grog	burnished 2	UNDECORATED	ceramic sherd, base (base portion broken off but can tell it is a base due to the curvature of the interior portion of the sherd), grog temper, burnished (ext)

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
264.001	13:34	1					7	body	uk	burnished 1?,2?	UNDECORATED	grog temper? Sherd has a very platey structure but see no evidence of shell, possible no long present? Different texture of clay on parts of ext surface
264.002	13:34	1					10.3	body	grog	burnished? And possible scraping 2	UNDECORATED	grog temper, maybe int burnish, ext burnish and possible scraping
264.003	13:34	1					12.2	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
264.004	13:34	1					13.9	body	grog	burnished 1?,2	UNDECORATED	grog temper, coarse paste, even distribution, burnished ext, possible burnished int
272.001	13:37	1			25	19.2	19.2	base	grog +	burnished 2	UNDECORATED	ceramic sherd, base (25cm diameter (16%), 19.2mm thick), grog/grit temper, burnished (ext)
272.002	13:37	1			16	17	18.9	base	uk	burnished 2	UNDECORATED	ceramic sherd, base (16cm diameter (18%), ~17mm thick), possibly grog temper, burnished (ext)
285.001	14:21	1					12.3	body	uk	na	UNDECORATED	likely grog temper, possibly burnished ext surface, hard to be sure
285.002	14:21	1					14.2	body	grog +	burnished 1,2	UNDECORATED	grog temper, possible other inclusions, burnished ext and int
285.003	14:21	1					7.8	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
295.001	14:24	1					10.9	body	grog	burnished 2	UNDECORATED	grog temper, girt inclusions, burnished ext
295.002	14:24	1					10.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
310.001	14:29	2			16+	18.4	18.4	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (at least 16cm diameter (possibly more) (6%), 18.4mm thick), grog temper, burnished (ext)
310.002	14:29	2			16-18	12.2	15.5	base	grog +	burnished 2	UNDECORATED	ceramic sherd, base (16-18cm diameter (12%), 12.2mm thick), grog and grit temper, possible burnish (ext)
310.003	14:29	2			12-14	19.2	19.2	base	grog +	burnished 2	UNDECORATED	ceramic sherd, base (12-14cm diameter (8%), 19.2mm thick), grog and grit temper, burnished (ext)

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
310.004	14:29	2			uk	uk	13.8	base	grog	na	UNDECORATED	ceramic sherd, body/base (base portion broken off but can tell it is part of a base due to the curvature of the interior portion of the sherd), grog and grit temper, no surface treatmeat
310.005	14:29	2					13	body	grog	burnished 1?,2	UNDECORATED	grog temper, larger chuncks, some grit - maybe natural, burnished int? and ext
310.006	14:29	2					11.9	body	grog +	burnished 1,2	UNDECORATED	grog temper with grit inclusions, evenly distributed, burnished int, ext
310.007	14:29	2					13.2	body	uk	burnished 1,2	UNDECORATED	likely grog temper, burnished ext and int
310.008	14:29	2					8.1	body	grog	burnished 2?	UNDECORATED	grog temper, hard to tell if surface is burnished do to the glue that was used to glue the pieces together
311.001	14:29	3					13.2	body	grog	burnished 2?	UNDECORATED	grog temper, likely burnished on ext surface
311.002	14:29	3					11.8	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
311.003	14:29	3					14	body	grog +	burnished 2	UNDECORATED	grog temper, girt inclusions, burnished ext
311.004	14:29	3					13.5	body	grog +	burnished 2	UNDECORATED	grog and grit temper, girt inclusions might be natural, somewhat evenly distributed, burnished ext
311.005	14:29	3					7.6	body	grog	na	UNDECORATED	likely grog temper, possibly burnished ext surface, hard to be sure
321.001	14:33	2					12.6	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
321.002	14:33	2					12.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
321.003	14:33	2					12.1	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
321.004	14:33	2					10.5	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
321.005	14:33	2					10.4	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
321.006	14:33	2					7.1	body	uk	na	UNDECORATED	likely grog temper but other inclusions likely too, no noticable surface treatment
355.001	15:23	2			16	28.5	28.5	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (16cm diameter (12%), 28.5mm thick), grog temper, burnished (ext)

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
355.002	15:23	2			20+	9.7	9.7	base	grog +	burnished? 2	UNDECORATED	ceramic sherd, base (at least 20cm in diameter (possibly more), (4%), 9.7mm thick), grog and grit temper, possible burnish (ext)
355.003	15:23	2					9.6	body	grog +	burnished 1,2	UNDECORATED	likely grog temper with girt inclusions, sherd is also likely portion of a carinated vessel,
355.004	15:23	2					7.9	body	uk	burnished 1,2	UNDECORATED	likely grog temper, burnished ext and int
360.001	15:25	2					14	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
369.001	15:30	1					8.4	body	shell	burnished 2	DECORATED	ceramic sherd, body, grit and possible shell temper, decorated, punctations (rows of fingernail punctations), burnished (ext)
369.002	15:30	1					14.8	body	grog +	burnished 2	UNDECORATED	grog temper with some grit inclusions, burnished ext
369.003	15:30	1					9.9	body	grog	burnished 1,2 And possible scraping 1	UNDECORATED	grog temper, burnished int and ext, possible scraping int
373.001	15:32	2					12.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
373.002	15:32	2					11.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
373.003	15:32	2					9.4	body	grog +	burnished 2	UNDECORATED	grog temper, possible grit inclusions, no noticable surface treatments
373.004	15:32	2					7.1	body	grog +	na	UNDECORATED	grog temper, likely grit inclusions, burnished ext
374.001	15:32	3					13.5	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
376.001	15:33	1					13.3	body	uk	burnished 2	UNDECORATED	grog temper, burnished ext
377.001	15:33	2					9.5	body	grog	na	UNDECORATED	grog temper, possible grit inclusions, no noticable surface treatments
395.001	15:40	1					16.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext, also hold in ext - maybe from inclusion coming out or some kind of damage
395.002	15:40	1					13.5	body	grog +	burnished 1?,2	UNDECORATED	grog temper with some grit inclusions, burnished ext

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
395.003	15:40	1					15	body	grog +	na	UNDECORATED	grog and grit temper, girt inclusions might be natural, somewhat evenly distributed, no noticable surface treatment; clay color is very red
409.001	16:26	1			uk	16	16	base	grog +	burnished uk 1?	UNDECORATED	ceramic sherd, base (unknown diameter (at least 13cm), 16.0mm thick), grog/grit temper, possibly burnished (unknown surface, maybe int?)
413.001	16:29	1					13.4	body	grog +	burnished 1?,2?	UNDECORATED	grog temper with other white inclusions, ext and int surface likely burnished - hard to tell
413.002	16:29	1					14.2	body	grog +	burnished 1?,2?	UNDECORATED	grog temper with possible grit inclusions, large inclusions, burnished both surfaces?
441.001	17:4	1					6.2	body	grit	filmed??	UNDECORATED	no temper or grit depending on if grit is natural?, no surface treatment; ext surface might be flimed but likely no
441.002	17:4	1					8.5	body	grog	burnished 2?	UNDECORATED	grog temper, likely burnished on ext surface
441.003	17:4	1					10.5	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
441.004	17:4	1					10.2	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
444.001	17:5	1			8	6.9	6.9	base	grog +	burnished? And possible scraping 2	UNDECORATED	ceramic sherd, base (8cm diameter (23%), 6.9mm thick), possible grog and grit temper, maybe burnish and possible scraping (ext)
444.002	17:5	1					9.8	body	shell	na	UNDECORATED	shell temper, many holes where shell inclusions used to be, texture of rotted wood? No noticable surface treatment. Perhaps this is the tempers WP?
458.001	17:12	1					11.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
460.001	17:14	1					7.4	body	grog +	na	UNDECORATED	grog temper and some grit inclusions, no noticable surface treatment
463.001	17:15	2					15.3	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext, possible scraping int
465.001	17:16	1	18	6.8			9.9	rim	grog +	burnished 2,3	DECORATED	ceramic sherd, rim (straight/excurvate, 18cm diameter), grit and grog temper, decorated, insiced lines (parallel with rim), burnished (ext)

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
469.001	17:18	1					12.5	body	grog +	burnished 1?,2?	UNDECORATED	grog temper, some grit inclusions, possible burnished int and ext
469.002	17:18	1					13.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
469.003	17:18	1					13.7	body	grog +	na	UNDECORATED	grog temper with some grit inclusions, no noticable surface treatment
469.004	17:18	1					11.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
469.005	17:18	1					7.9	body	uk	burnished 1?,2	UNDECORATED	likely grog temper but other inclusions likely too, burnished ext
474.001	17:21	1					15.7	body	grog +	burnished 2	UNDECORATED	grog temper, possible other inclusions, burnished ext
479.001	17:23	2					8.9	body	grog +	na	UNDECORATED	grog temper, possible other inclusions, very smooth ext surface but no noticable burnish of other suface treatments
479.002	17:23	2					13.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
479.003	17:23	2					6.9	body	uk	burnished 2	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, burnish ext
479.004	17:23	2					14.7	body	grog	burnished 2?	UNDECORATED	grog temper, hard to tell if surface is burnished do to the glue that was used to glue the pieces together
499.001	17:30	2					5.4	body	uk	burnished 1?,2	UNDECORATED	no noticable temper, very thin sherds, burnished ext, possible burnished int
499.002	17:30	2					14.1	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
499.003	17:30	2					9.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
502.001	17:31	3					12.5	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
508.001	17:34	3				uk	13.3	base?	grog	na		grog temper, hard to tell if surface is burnished do to the glue that was used to glue the pieces together
508.002	17:34	3					12.7	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
516.001	17:37	4					8.5	body	grog +	na	DECORATED	ceramic sherd, body, grit/sand temper, decorated, incised lines (diagonal parallel lines intersecting to make triangles),
516.002	17:37	4					5.1	body	grit	burnished 1	DECORATED	ceramic sherd, body, sand/grit temper, decorated, incised lines (mostly parallel), burnished (int)

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
519.001	17:38	1					9.7	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
522.001	18:18	1					11.8	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
522.002	18:18	1	na	na			6.1	rim?	shell	na	UNDECORATED	shell temper, many holes where shell inclusions used to be, texture of rotted wood? No noticable surface treatment. rim sherd (16cm? 3.5%)
525.001	18:19	1			16-18	16.7	16.7	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (16-18cm diameter (9%), 16.7mm thick), grog temper, burnished (ext)
525.002	18:19	1					14.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
525.003	18:19	1					14.8	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
525.004	18:19	1					14.1	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
525.005	18:19	1					13.1	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
525.006	18:19	1					14.7	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
525.007	18:19	1					10.5	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
525.008	18:19	1					11	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
525.009	18:19	1					7.3	body	grog	burnished 2?	UNDECORATED	grog temper, possible ext burnished - hard to tell
527.001	18:20	1					6.7	body	uk	burnished 1?,2	UNDECORATED	no noticable temper, very thin sherds, burnished ext, possible burnished int
527.002	18:20	1					9.9	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
527.003	18:20	1					12.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
527.004	18:20	1					6.4	body	uk	na	UNDECORATED	no temper or grit depending on if grit is natural?, no surface treatment
533.001	18:23	1					10.2	body	grog	na	UNDECORATED	grog temper, very smooth ext surface but no noticable burnish or other suface treatments
540.001	18:25	1					11.5	body	grog +	burnished 2	UNDECORATED	grog temper, some grit inclusions, burnished ext

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
540.002	18:25	1					8.1	body	grog +	na	UNDECORATED	grog temper with some grit inclusions, no noticable surface treatment
552.001	18:29	1			18-20	20.7	20.7	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (18-20cm diameter (11%), 20.7mm thick), grog temper, burnished (ext)
552.002	18:29	1					11.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
555.001	18:30	2	18	4.7			6.8	rim	grog +	burnished? 2	DECORATED	ceramic sherd, rim (straight, around 18cm diameter), grog and grit temper, decorated, incised lines (parallel to rim, one perpendicular at the bottom), possible burnish (ext)
560.001	18:32	1					13.3	body	grog	burnished 2?	UNDECORATED	grog temper, no surface treatment/hard to tell due to lack of surface
560.002	18:32	1					5.4	body	uk	burnished 1,2	UNDECORATED	likely grog temper, burnished ext and int
562.001	18:33	1					13.2	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
564.001	18:34	1					12.6	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext, appears to have int scraping in addition to burnish from use?
564.002	18:34	1					14.5	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext, appears to have part of the neck/collar intact
564.003	18:34	1					13.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.004	18:34	1					12.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.005	18:34	1					11.5	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.006	18:34	1					11.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.007	18:34	1					11.9	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.008	18:34	1					11.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.009	18:34	1					12.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.010	18:34	1					11.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.011	18:34	1					12.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.012	18:34	1					13.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
564.013	18:34	1					9.4	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
564.014	18:34	1	36	8.4			17.1	rim	grog +	burnished 1,2,3	UNDECORATED	ceramic sherd, rim (straight, 36cm diameter (6%), neck to rim - 60.5mm, 8.4mm thick), grog temper, burnished (int, ext, and rim)

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
567.001	18:36	4			18-20	9.8	9.8	base	grog +	burnished 2	UNDECORATED	ceramic sherd, base (18-20cm diameter (9%), 9.8mm thick), grit/grog temper, burnished (ext), weird fiber-like things on the int of vessel (diagenetic process post burial?)
567.002	18:36	4					14.5	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
567.003	18:36	4					10.4	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
567.004	18:36	4					15.9	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
567.005	18:36	4					8.2	body	grog +	na	UNDECORATED	grog temper, possible int scrapes from use?
567.006	18:36	4					9.5	body	uk	burnished 2	UNDECORATED	likely grog temper but possibly other inclusions likely too, burnished ext
567.007	18:36	4					6.3	body	uk	burnished 2	UNDECORATED	no noticable temper, very thin sherds, burnished ext
567.008	18:36	4					7.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
567.009	18:36	4					10.7	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
571.001	19:18	1			16+	9.7	9.7	base	grog +	na	UNDECORATED	ceramic sherd, base (at least 16cm diameter (possibly more) (8%), 9.7mm thick), grit/grog temper, probably no surface treatment
571.002	19:18	1					10.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
571.003	19:18	1					6.3	body	uk	burnished 1?	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, maybe burnish int
574.001	19:19	2					14.1	body	grog	burnished 2?	UNDECORATED	grog temper, possible ext burnished - hard to tell
574.002	19:19	2					8.5	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
574.003	19:19	2					8.7	body	uk	burnished 2	UNDECORATED	grog temper, maybe also shell temper, burnished ext
580.001	19:21	3					7.7	body	grog +	na	UNDECORATED	grog temper with other white inclusions, no noticable surface treatment
582.001	19:23	1					7	body	grog	na	UNDECORATED	grog temper, some residue or something on int surface

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
582.002	19:23	1					8.7	body	shell	na	UNDECORATED	shell temper, no noticable surface treatment
584.001	NA	NA					11.4	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
585.001	19:24	1			14	14.9	14.9	base	grog +	burnished 2	UNDECORATED	ceramic sherd, base (14cm diameter (33%), 14.9mm thick), grog/grit temper, burnished (ext)
585.002	19:24	1					7.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
585.003	19:24	1					11.1	body	grog	burnished 2	UNDECORATED	grog temper with some grit inclusions, burnished ext
585.004	19:24	1					5.8	body	grit	burnished 1,2	UNDECORATED	grit temper, (or no temper) burnished int and ext
585.005	19:24	1					15.3	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
585.006	19:24	1					14.5	body	grog	na	UNDECORATED	grog temper, no surface treatment/hard to tell due to lack of surface
585.007	19:24	1					5.1	body	shell	na	UNDECORATED	shell temper, no noticable surface treatment
585.008	19:24	1					15.2	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
589.001	19:25	3					11.1	body	grog	burnished 1,2	UNDECORATED	grog temper with other white inclusions, ext and int burnished
598.001	19:29	1					10.8	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
598.002	19:29	1					14.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
598.003	19:29	1					10.8	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
598.004	19:29	1					4.8	body	shell	na	UNDECORATED	shell temper, no noticable surface treatment
604.001	19:31	2			uk	19.5	19.5	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (unknown diameter, 19.5mm thick), grog temper, possible burnished (ext)
604.002	19:31	2					14	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
604.003	19:31	2					13.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
604.004	19:31	2					9.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
606.001	19:32	1					13.9	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
612.001	19:34	1					10.8	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
612.002	19:34	1					14.9	body	grog	burnished 1?,2	UNDECORATED	grog temper with other white inclusions, ext and int surface likely burnished - hard to tell
612.003	19:34	1					13.8	body	grog +	burnished 2	UNDECORATED	grog temper, burnished ext
612.004	19:34	1					8.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
622.001	19:37	1					11.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
622.002	19:37	1					8.4	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
622.003	19:37	1					8.4	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible int burnished - hard to tell
625.001	19:38	1			12-14	13.8	13.8	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (12-14cm diameter (28%), 13.8mm thick), grog/grit temper, burnished (ext)
625.002	19:28	1					11.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
628.001	20:18	1					7	body	grit	slipped and burnished 2	DECORATED	ceramic sherd, body, grit temper, decorated, engraved lines (parallel and curved with some prependicular), red-filmed and burnished? (ext)
628.002	20:18	1			18	17.4	17.4	base	grog +	burnished? 2	UNDECORATED	ceramic sherd, base (18cm diameter (7%), 17.4mm thick), grog and grit temper, possibly burnished (ext), possible score lines where base meets wall
628.003	20:18	1					14.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
630.001	20:19	1					5.6	body	uk	na	UNDECORATED	no noticable temper, very thin sherd, no noticable surface treatment
630.002	20:19	1					13.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
637.001	20:21	1	28	4.2			10.7	rim	grog +	burnished 1,2	DECORATED	ceramic sherd, rim (inverted; 28cm diameter), grit and possible sand temper, decorated, incised lines (on top portion of exterior; diagonal parallel), burnished (int & ext), carinated vessel
638.001	20:21	2	24	4.4			4.9	rim	grog +	burnished 3	UNDECORATED	ceramic sherd, rim (straight, ~24cm diameter (3%), 4.4mm thick), grit temper, burnished rim

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
638.002	20:21	2					6.9	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
638.003	20:21	2					15.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
638.004	20:21	2					9.5	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
641.001	20:23	1					6.7	body	grit	scraped 1	DECORATED	ceramic sherd, body, grit temper (possible), decorated, incised (deep, spiral or circles), possible scraped (int)
641.002	20:23	1					6.7	body	grog +	burnished? 2	DECORATED	ceramic sherd, body, grog or grit temper, decorated, incised lines (diagonal also possibly in the shape of a diamond), possible burnish (ext)
642.001	20:23	2					12.9	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
642.002	20:23	2					10.3	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
644.001	20:24	1					8.4	body	grog +	burnished 1,2	DECORATED	ceramic sherd, body, grog temper, decorated, engraved line (1), burnished (int & ext)
644.002	20:24	1	38	6.4			9.4	rim	grog +	burnished 1	DECORATED	ceramic sherd, rim (straight; 38cm diameter; burnished), grit and grog temper, decorated, incised lines (sets of parallel lines intersecting with other lines), burnished (int)
647.001	20:25	1					6.8	body	grog +	na	UNDECORATED	grog temper with other white inclusions, no noticable surface treatment
647.002	20:25	1					11	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
647.003	20:25	1					15.3	body	grog	burnished 2?	UNDECORATED	grog temper, possible ext burnished - hard to tell
647.004	20:25	1					10.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
647.005	20:25	1					7.1	body	shell	na	UNDECORATED	shell temper, no noticable surface treatment
655.001	20:28	2					10.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
655.002	20:28	2					11.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
662.001	20:31	1	18	6			6.1	rim	grog	burnished 1,3?	DECORATED	ceramic sherd, rim (straight), grog temper, decorated, incised lines (diagonal parallel lines intersecting to make triangles)

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
662.002	20:31	1					9.6	body	grit	burnished 1,2	DECORATED	ceramic sherd, body, grit temper, decorated, incised lines (on top portion of ext.), burnished (int. & ext), possible carinated vessel
665.001	20:32	1					6.9	body	uk	na	UNDECORATED	no noticable temper, very thin sherd, no noticable surface treatment
665.002	20:32	1					6.8	body	uk	na	UNDECORATED	no noticable temper, very thin sherd, no noticable surface treatment
665.003	20:32	1					4.4	body	uk	na	UNDECORATED	no noticable temper, very thin sherd, no noticable surface treatment
665.004	20:32	1					6.9	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
665.005	20:32	1					7	body	uk	burnished 2	UNDECORATED	grog temper, burnished ext
665.006	20:32	1					8.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
665.007	20:32	1					7.3	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
665.008	20:32	1					6.4	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
666.001	20:32	2					7.9	body	grog	na	DECORATED	ceramic sherd, body, grit temper, decorated, incised lines (diagonal parallel lines intersecting to make triangles)
666.002	20:32	2					8	body	grog	na	DECORATED	ceramic sherd, body, grit and grog temper, decorated, incised (lines and oval or curve)
668.001	20:33	1					5.5	body	uk	burnished 1,2	UNDECORATED	no noticable temper, very thin sherd, burnished int and ext
668.002	20:33	1					8.8	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
671.001	20:34	1					9.5	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
671.002	20:34	1					9.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
671.003	20:34	1					6.6	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
671.004	20:34	1					8.7	body	grog	red film 2?	UNDECORATED	grog temper, possible red film on ext surface?
671.005	20:34	1					9.5	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
672.001	20:34	2	17	4.1			6.6	rim	grog +	burnished 1,2	DECORATED	ceramic sherd, rim (straight (height - 18.5mm) possible storage vessel, around 17cm diamater), grit temper, decorated, incised lines (parallel to rim, only on collar), possible slip, burnished (int & ext)

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
675.001	20:35	1					8.7	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
675.002	20:35	1					8.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
676.001	20:35	2	20	5			7.6	rim	grog +	burnished 2	UNDECORATED	ceramic sherd, rim (straight, ~20cm diameter (4%), 5.0mm thick), grog temper, burnished (ext)
676.002	20:35	2	10	3.3			6.3	rim	grog +	burnished 1,2,3	UNDECORATED	ceramic sherd, rim (incurved (likely jar shaped), 10cm diameter (6%), 3.3mm thick), grog and grit temper, burnished (int, ext & rim)
676.003	20:35	2	16	5			5.1	rim	grog +	na	UNDECORATED	ceramic sherd, rim (straight, 14-20cm diameter (<5%), 5.0mm thick), grit and possible grog temper, no surface treatment
686.001	20:38	2					5.6	body	grog +	burnished 1,2	UNDECORATED	grog temper with some grit inclusions, burnished ext and int
686.002	20:38	2					5.9	body	grog +	burnished 1,2	UNDECORATED	grog temper with some grit inclusions, burnished ext and int, likely part of same vessel as 686.001
692.001	21:19	1					3.9	body	grog +	burnished 1?,2?	UNDECORATED	grog temper with other inclusions, ext and int surface likely burnished - hard to tell
692.002	21:19	1					11.7	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
692.003	21:19	1					9.8	body	grog	na	UNDECORATED	grog temper, no surface treatment/hard to tell due to lack of surface
696.001	21:20	1			9-11	9	9	base	uk	burnished? and scraped? 1,2	UNDECORATED	ceramic sherd, base (9-11cm diameter (10%), 9mm thick), possible grog temper, possible burnish and scraped (ext & int)
696.002	21:20	1					11.2	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
696.003	21:20	1					14.5	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
696.004	21:20	1					12	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext, possible int burnished - hard to tell
696.005	21:20	1					12.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext, appears to have int scraping in addition to burnish from use?
697.001	21:20	2					9.2	body	grog +	na	UNDECORATED	grog temper with other white inclusions, no noticable surface treatment

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
697.002	21:20	2					14.9	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
703.001	21:22	1					6.9	body	grog +	burnished 2	DECORATED	ceramic sherd, body, grit/sand temper, decorated, incised line (1), burnished (ext)
703.002	21:22	1					6.2	body	grog +	na	UNDECORATED	grog temper, possible grit inclusions, no noticable surface treatments
703.003	21:22	1					14.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
703.004	21:22	1					9.8	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
710.001	21:24	1					12.2	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
710.002	21:24	1					9.9	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
713.001	21:25	1					10.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
717.001	21:26	1			uk	24.3	24.3	base	grog	na	UNDECORATED	ceramic sherd, base (unknown diameter (at least 7cm), 24.3mm thick), grog temper, no surface treatment
717.002	21:26	1					5	body	uk	na	UNDECORATED	no noticable temper, very thin sherd, no noticable surface treatment
717.003	21:26	1					9.5	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
717.004	21:26	1					8.6	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
717.005	21:26	1					7.4	body	grog	na	UNDECORATED	grog temper, no surface treatment/hard to tell due to lack of surface
717.006	21:26	1					8.3	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext, appears to have int scraping in addition to burnish
718.001	21:26	2					7.1	body	uk	burnished 1?,2	UNDECORATED	no noticable temper, very thin sherd, burnished ext and pobbile int
718.002	21:26	2					14.6	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
718.003	21:26	2					11.6	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
720.001	21:27	1					6	body	grog +	na	UNDECORATED	grog temper, possible other inclusions, no noticable surface treatment
720.002	21:27	1					10.1	body	shell	burnished 2?	UNDECORATED	shell temper, no noticable surface treatment or ext burnish

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
720.003	21:27	1					11.9	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
723.001	21:29	1					15.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
723.002	21:29	1					7.6	body	uk	burnished 2	UNDECORATED	no noticable temper, very thin sherds, burnished ext
729.001	21:30	1					6.6	body	grog +	burnished and scraped 2; scraped 1	DECORATED	ceramic sherd, body, grit and grog temper, decorated, incised (two incised lines along one edge), burnished and scraped (ext), scraped (int)
732.001	21:31	1			20-22	14.6	16.1	base	grog	na	UNDECORATED	ceramic sherd, base (20-22cm diameter (4%), 14.6mm thick), grog temper, no surface treatment
732.002	21:31	1					10.4	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
732.003	21:31	1					12	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
732.004	21:31	1					13.3	body	grog	burnished 2?	UNDECORATED	grog temper, possible ext burnished - hard to tell
733.001	21:31	3	34	9			13.9	rim	grog	burnished 2,3	UNDECORATED	ceramic sherd, rim (slightly everted, 32-36cm diameter (3%), neck to rim - 30.9mm, 9mm thick), grog temper, burnished (ext & rim)
733.002	21:31	3					5.7	body	grog +	burnished 1,2	UNDECORATED	grog temper with some grit inclusions, burnished ext and int
733.003	21:31	3					9.9	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
735.001	21:32	1					5.3	body	grog +	na	UNDECORATED	grog temper, possible other inclusions, no noticable surface treatment
735.002	21:32	1					6	body	grog +	na	UNDECORATED	grog temper, possible other inclusions, no noticable surface treatment, some scraping on int surface
870.001	23:21	1					10.8	body	grog	na	UNDECORATED	grog temper, very smooth ext surface but no noticable burnish or other suface treatments
870.002	23:21	1					7.7	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
870.003	23:21	1					9.3	body	grog	scraping 2	UNDECORATED	grog temper, scraping on ext
873.001	23:22	1			18-20	20.2	20.2	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (18-20cm diameter (4%), 20.2mm thick), grog temper, possibly burnished (ext)
879.001	23:24	1			uk	9.6	9.6	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (unknown diameter (at least 6cm), 9.6mm thick), grog temper (one weird inclusion, maybe limestone), burnished (ext)
879.002	23:24	1					14.1	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished int, possible burnished ext
879.003	23:24	1					9.7	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
879.004	23:24	1					7.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished int and ext, appears to have ext scraping in addition to burnish
879.005	23:24	1					7.5	body	shell	na	UNDECORATED	shell temper, no noticable surface treatment, possible residue on int surface
879.006	23:24	1					6.9	body	grog	burnished 2	UNDECORATED	grog temper with some grit inclusions, burnished ext
881.001	23:25	1					6.9	body	grit	na	DECORATED	ceramic sherd, body, grit temper, decorated, incised lines (large triangle, other lines parallel to triangle)
881.002	23:25	1					9.3	body	grog +	burnished 2	DECORATED	ceramic sherd, body, grit and possibly grog temper, decorated, incised lines (many parallel lines on the collar (possible)) burnished (ext)
881.003	23:25	1					14.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext, slight curvature on one end of int side indiacting it could be a part of a base
881.004	23:25	1					12.5	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
881.005	23:25	1					6.8	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
881.006	23:25	1					7.5	body	grog	burnished 2?	UNDECORATED	grog temper, possible ext burnish, possible residue on int
881.007	23:25	1					9.5	body	grog +	burnished 1,2	UNDECORATED	grog temper with other white inclusions, ext and int burnished
881.008	23:25	1					7.7	body	shell	na	UNDECORATED	shell temper, no noticable surface treatment, possible residue on int surface

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
881.009	23:25	1					8.3	body	grog +	burnished 1?,2	UNDECORATED	grog temper, some other inclusions, burnished ext
882.001	23:25	3					5	body	uk	scraping 2	UNDECORATED	no noticable temper, very thin sherd, no noticable surface treatment, ext scraping
884.001	23:26	1					9.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
890.001	23:28	1					12.6	body	grog +	burnished 1,2	UNDECORATED	grog temper with other inclusions, ext and int surface burnished
894.001	23:29	1					10.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
894.002	23:29	1					13.7	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
894.003	23:29	1					13.9	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
894.004	23:29	1					12.6	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
894.005	23:29	1					6.4	body	grog +	burnished 2	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, burnished ext
898.001	23:30	1					9.3	body	grog	burnished 2	UNDECORATED	grog temper, possible ext burnished - hard to tell
898.002	23:30	1					8.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext, appears to have ext scraping in addition to burnish
901.001	23:31	1					13.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
901.002	23:31	1					8.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
901.003	23:31	1					9.9	body	grog +	na	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, very smooth ext surface
901.004	23:31	1					5.8	body	uk	burnished 2?	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, very smooth ext surface
904.001	24:16	1					4.6	body	grit	burnished? 2	DECORATED	ceramic sherd, body, grit/sand temper, decorated, incised lines (diagonal to one line intersecting), possible burnished (ext)
904.002	24:16	1					7.7	body	grit and shell	na	UNDECORATED	non-grog temper sherd, appears to be grit with possibly shell temper also.
904.003	24:16	1					12.7	body	grog +	burnished 2	UNDECORATED	grog temper, possible grit inclusions, burnished ext
904.004	24:16	1					9.7	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
904.005	24:16	1					8.7	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext, slight curvature on one end of int side indiacting it could be a part of a base

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
904.006	24:16	1					6.7	body	grog	burnished 2	UNDECORATED	grog temper, some other inclusions, burnished ext
904.007	24:16	1					7	body	uk	burnished 2	UNDECORATED	possible grog temper but looks like all inclusions are likely natural, burnished ext
904.008	24:16	1					8.9	body	uk	burnished 1? Scraping 2	UNDECORATED	likely grog temper but possibly other inclusions likely too, possible burnished ext, appears to be scraping on ext
904.009	24:16	1					6.3	body	grit and shell	burnished 2	UNDECORATED	appears to be grit and shell temper - no shell left, only voids where shell once was? Burnished ext
907.001	24:17	1			22-24	uk	11.8	base	grog	na	UNDECORATED	ceramic sherd, base (22-24cm diameter (4%), unknown thickness), grog temper, no surface treatment, possible basket impressed
907.002	24:17	1					6.3	body	uk	na	UNDECORATED	no noticable temper, very thin sherd, no noticable surface treatment
907.003	24:17	1					9.2	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext - sherd in three pieces
907.004	24:17	1					8	body	grog	na	UNDECORATED	grog temper, no noticable surface treatment
907.005	24:17	1					10.2	body	grog	burnished 1,2	UNDECORATED	grog temper, burnished int and ext
907.006	24:17	1					11.5	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
907.007	24:17	1					8.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext, slight curvature on one end of ext side indiacting it could be a part of a base
907.008	24:17	1					7.3	body	grog +	na	UNDECORATED	grog temper, possible other inclusions, no noticable surface treatment, part of ext surface has the appearance of deterioration?
908.001	24:17	2					8.5	body	grog +	na	DECORATED	ceramic sherd, body, grit temper, decorated, incised lines (diagonal parallel lines intersecting to make triangles), possibly part of the same type as 516.001
908.002	24:17	2					11.1	body	grog	burnished 2?	UNDECORATED	grog temper, possible ext burnished - hard to tell
908.003	24:17	2					14	body	grog	na	UNDECORATED	grog temper, no surface treatment/hard to tell due to lack of surface

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
913.001	24:19	1					6.4	body	uk	burnished 2	UNDECORATED	no noticable temper, very thin sherds, burnished ext
913.002	24:19	1					9.9	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
913.003	24:19	1					8.1	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
913.004	24:19	1					5.7	body	grog +	burnished 2	UNDECORATED	grog temper, possible grit inclusions, burnished ext
916.001	24:20	1			28	18.2	18.2	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (~28cm diameter (~6%), 18.2mm thick), grog temper, burnished (ext)
916.002	24:20	1					6.3	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
916.003	24:20	1					10.5	body	grog	burnished 1?,2	UNDECORATED	grog temper, burnished ext, possible burnished int
916.004	24:20	1					11.7	body	grog +	burnished 2	UNDECORATED	grog temper with other inclusions - large chunks, enevly distributed, coarse paste, ext burnished
916.005	24:20	1					8.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext
916.006	24:20	1					6.6	body	grog +	burnished 2	UNDECORATED	grog temper, possible other inclusions, possible ext burnish, scraping on ext
916.007	24:20	1					10.4	body	grog	burnished 2	UNDECORATED	grog temper, burnished ext, smooth paste
916.008	24:20	1					7.2	body	shell	na	UNDECORATED	shell temper, many holes where some shell inclusions used to be, texture of rotted wood? No noticable surface treatment. Perhaps this is the tempers WP? Woodward plain?
917.001	24:20	2					12.6	body	grog	burnished 2	UNDECORATED	grog temper - large chunks, relatively evenly distributed, coarse paste, ext burnished
919.001	24:21	1					10.8	body	grog	burnished 1?,2	UNDECORATED	grog temper - large chunks, relatively evenly distributed, smoother paste, ext burnished, possible int burnish
919.002	24:21	1					7.8	body	grog	burnished 2	UNDECORATED	grog temper, smooth paste, thick and distinct carbon core (contract color with color of paste), burnished ext
925.001	24:26	1					15.6	body	grog	burnished 2?	UNDECORATED	grog temper, coarse paste, even distribution, possible burnished ext

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
925.002	24:26	1					13.6	body	grog	burnished 2	UNDECORATED	grog temper, smooth paste, likely burnish ext
925.003	24:26	1					16.5	body	grog	burnished 1?,2	UNDECORATED	grog temper, smooth paste, likely burnish ext and int
925.004	24:26	1					8.8	body	grog +	burnished 1?,2	UNDECORATED	grog temper, possible other inclusions, smooth paste, possible burnished ext and int
926.001	24:26	2			12+	19.8	19.8	base	grog +	burnished 2	UNDECORATED	ceramic sherd, base (at least 12cm (probably more), (<1%), 19.8mm thick), grog and grit temper, burnished (ext)
926.002	24:26	2			16	uk	14.6	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (maybe 16cm diameter (~3%), unknown thickness), grog temper, possible burnish (ext)
926.003	24:26	2			16-20	18.9	18.9	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (16-20cm diameter (4%), 18.9mm thick), grog temper, burnished (ext)
926.004	24:26	2					9.5	body	grog +	burnished 1,2	UNDECORATED	grog temper, possible other inclusions, smooth paste, thick and distinct carbon core (contract color with color of paste), burnished ext and int
929.001	24:31	1			14	26.4	26.4	base	grog	burnished 2	UNDECORATED	ceramic sherd, base (14cm diameter (20%), 26.4mm thick), grog temper, burnished (ext)
933.001	25:18	1	26	10.1			10.1	rim	grog +	burnished? 3	UNDECORATED	ceramic sherd, rim (Straight, 26cm diameter (3%), 10.1mm thick), grog and grit temper, possible burnished (rim), weird line just below int. rim (maybe incision, probably part of paste inclusion)
933.002	25:18	1					11.7	body	grog	burnished 1,2	UNDECORATED	grog temper, evenly distributed, smooth paste, burnish ext and int
933.003	25:18	1					14	body	grog	burnished 2	UNDECORATED	grog temper, coarse paste, even distribution, burnished ext
933.004	25:18	1					9.5	body	grog	na	UNDECORATED	grog temper, smooth? paste, no noticable surface treatment
933.005	25:18	1					6.5	body	shell	burnished 2	UNDECORATED	shell temper, smooth paste, many holes where some shell inclusions used to be, texture of rotted wood?burnished ext, Woodward plain?

Provenience Number	Stake	Level	rim diameter (CM)	rim thickness (mm)	base diameter (CM)	base thickness (mm)	Thickness MM	Sherd Type	temper	surface treatment int - 1; ext - 2; rim - 3	Secondary Material Type	Description General to specific - Ex: Projectile Point, Gary, broken base
935.001	25:19	1			uk	19.3	19.3	base	grog	na	UNDECORATED	ceramic sherd, base (thickness - 19.3), possible grog temper
935.002	25:19	1					10.1	body	grog	burnished 2	UNDECORATED	grog temper, smooth paste, burnish ext
935.003	25:19	1					8.7	body	grog	burnished 1?,2	UNDECORATED	grog temper, smooth paste, burnish ext and possible int
935.004	25:19	1					9.5	body	grog	burnished 2	UNDECORATED	grog temper, smooth paste, burnish ext
935.005	25:19	1					8.3	body	grog +	burnished 1?,2?	UNDECORATED	grog temper, possible other inclusions, coarse paste, possible burnished ext and int
935.006	25:19	1					12.4	body	grog	burnished 2	UNDECORATED	grog temper - large chunks, relatively evenly distributed, coarse paste, ext burnished
935.007	25:19	1					14.6	body	grog	na	UNDECORATED	grog temper - large chunks, relatively evenly distributed, coarse paste, no noticable surfact treatment
935.008	25:19	1					11.5	body	grog	burnished 2	UNDECORATED	grog temper, coarse paste, even distribution, burnished ext
935.009	25:19	1					11.1	body	grog	burnished 2	UNDECORATED	grog temper, coarse paste, even distribution, burnished ext
935.010	25:19	1					8	body	grog	burnished 2	UNDECORATED	grog temper, coarse paste, even distribution, possible burnished ext
935.011	25:19	1					8.6	body	grog	burnished 1?,2	UNDECORATED	grog temper, smooth paste, burnish ext, possible int
935.012	25:19	1					8.1	body	grog	burnished 1,2	UNDECORATED	grog temper, smooth? paste, burnished int and ext
939.001	25:20	1					8.1	body	grog	burnished 2	UNDECORATED	grog temper, coarse paste, even distribution, burnished ext
939.002	25:20	1					7.9	body	grog	burnished 1,2	UNDECORATED	grog temper, smooth paste, burnish ext and int

Appendix B: Chipped Stone Data Tables

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
204.009	dst drt		59	25.1	18.2	19.2	11.1	U-shape	contracting stem	quartzite	no		no	
204.010	dst drt		47.3	25.7	19.6	15.5	8.9	v-shape	contracting stem	quartzite	no		no	
204.011	dst drt		43.5	29.5	14.5	na	7	na	contracting stem	quartzite	yes	tip - impact fracture; possible broken stem	no	offset blade
204.012	dst drt		51.6	30.4	16.5	15.3	8.7	u/v-shape	contracting stem	Reeds Spring	yes	shoulder	yes?	possible attempt at shoulder retouch on non-broken shoulder
204.013	dst drt		42.2	20.2	11.7	12.8	7.5	u/v-shape	contracting stem	Reeds Spring	no		no	
204.014	dst drt		32.9	17	13.5	13.8	5.6	u/v-shape	contracting stem	chert (black)	no		no	
204.015	dst drt		40.2	30.8	15	10.2	6.6	na	na	chert (black)	yes	stem - step fracture	no	unable to tell stem shape bc it looks broken
204.016	dst drt		48.4	26.8	18.1	19.5	8	square	straight	chert (black)	no		no	Dallas type?
204.017	dst drt		47.4	27	17.7	14.3	6.8	u/v-shape	contracting stem	chert (grey)	no		no	
204.018	dst drt		54.9	31.9	19.6	15	8.1	u/v-shape	contracting stem	chert (tan/beige)	no		no	
204.019	dst drt		45.4	32.7	14.7	14.3	7.4	u/v-shape	contracting stem	chert (tan/white)	no		no	
204.020	dst drt		45.8	29.7	17.7	13.1	7.8	u/v-shape	contracting stem	chert (grey/brown)	no		no	
204.021	dst drt		52.5	29.9	11.3	7.8	7	u/v-shape	contracting stem	chert (brownish red)	yes?	shoulder	no	unifacially worked flake shaped into point; minimal
204.022	dst drt		40	23.6	19	19.1	9.2	u/v-shape	contracting stem	chert (pink/peach)	no		yes?	possibly retouched due to length of blade compared to length of base
204.023	dst drt		40.6	27.7	18.3	15.2	8.2	U-shape	contracting stem	chert (pink/peach)	yes	lateral break (impact)	no	possible heat fracture lines
204.024	dst drt		44.5	41.8	20.5	13.8	6.4	square	straight	quartzite (black)	yes	diagonal - lateral, one notch broken	no	barbed shoulder, basal notched (Like Wade type),
204.025	dst drt		48.3	34.3	22.6	20.4	9.1	square	straight	quartzite (dark grey)	yes	shoulder; distal portion	yes	barbed shoulder, corner notched, (Like Bulverde); attempted retouch of the tip
204.026	dst drt		59	51.7	23.9	18.5	11.8	square	expanding	quartzite (black)	yes	lateral snap - distal; portion of barb	no	barbed shoulder, basal notched (Like Castroville)
204.027	dst drt		45.9	30	uk	uk	7	uk	uk	chert (grey)	yes	impact fractures at base and tip	no	unable to tell stem shape bc it is broken
204.028	dst drt		47.6	24	21.2	14.4	8.5	concave/bifurcated	expanding	chert (tan/beige)	yes	part of stem/base	no	tapered shoulders; side notched, slightly bifurcated

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
204.029	dst drt		43.2	24.5	18.5	21.4	6.8	square	straight	chert (grey/tan)	no		yes?	possibly retouched due to length of blade compared to length of base; straight
204.030	dst drt		58.7	38.1	20.5	22.3	8.9	square	straight	quartzite (dark grey)	yes	lateral snap - distal	no	straight shoulders, corner notched
204.031	dst drt		42.6	26.9	19.9	13	9.3	convex	expanding	quartzite (medium grey)	yes	tip - impact fracture; shoulder	no	straight shoulders, corner notched
204.032	dst drt		48.7	30.8	19.3	13.3	7.8	convex	expanding	quartzite (dark grey)	yes	tip and stem	no	straight shoulders, slightly barded; corner or side notched
204.033	dst drt		49.5	26.5	13.9	11.1	10.4	convex	straight	quartzite (light grey)	no		no	straight shoulders, slightly barbed; corner or side notched
204.034	dst drt		49.9	32.7	21.7	13.9	9.5	square	straight	quartzite (dark grey)	yes	shoulder	no	straight shoulders, corner notched
204.035	dst drt		48.7	30.9	17.8	10.8	9.2	convex	straight	quartzite (light grey)	yes	stem	no	slightly barbed shoulder, corner notched
204.036	dst drt		43.7	25	16.8	12.5	6.8	convex	expanding	quartzite (medium grey)	yes	tip - impact fracture	no	straight shoulders, corner notched
204.037	dst drt		46.9	25.1	17.6	11.3	8	square	expanding	quartzite (medium grey)	yes	tip - impact fracture; shoulder	no	straight shoulders, corner notched
204.038	dst drt		42.8	23.6	17.2	9.7	6.4	square	expanding	chickachoc - AT	yes	both shoulders	no	unknown shoulder; corner notched
206.001	11:34	2	46.1	20.8	20.8		6	square	lanceolate	chert (grey/tan)	no		no	
212.001	11:36	1	34	20.7	13	12.7	6.5	u-shape	contracting stem	Chickachoc - AT	no		No	
221.001	12:35	1	69	50.2	42.8	17.3	19.4	v-shape	contracting stem	quartzite	no		no	
223.001	12:36	2	53.6	24	21.8	17.8	5.7	U-shape	contracting stem	Chickachoc - AT	no		no	
231.001	12:39	2	52.6	25.8	21.4	19.1	9.6	v-shape	contracting stem	quartzite	yes	shoulder	no	
231.002	12:39	2	33.5	21.2	na	na	7	na	contracting stem	chert (grey)/banded	yes	tip - impact fracture; broken stem	no	unable to tell which end was distal to the shape of biface and both ends are broken;
243.001	13:23	3	51.7	33.6	18.5	13.9	7.8	square	straight	chert (beige/brown)	yes	part of shoulder	no	barbed shoulder, corner notched, (Like Bulverde); possible evidence of heat treatment

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
246.003	13:25	2	71.7	43.2	23.1	23.1	8.4	square	contracting stem	quartzite	yes	tip - impact fracture	no	
256.001	13:29	2	55.1	29.9	24.4	17	10.6	v-shape	contracting stem	quartzite	yes	tip - lateral - possible impact fracture	no	
256.002	13:29	2	66.8	27.5	13.7	12.7	10.6	convex	expanding	quartzite (dark grey)	yes	both shoulders	yes	retouch on stem?;likely barbed shoulder; corner notched
257.001	13:29	3	56.3	29.6	23.7	13.5	13.1	square	expanding	chert (pink/red)	no		no	Tapered shoulders; side or corner notched
265.001	13:34	2	48.1	32.2	uk	uk	8.1	uk	uk	chickachoc - AT	yes	broken at base and tip	no	straight shoulders, unknown stem type
274.001	13:38	3	72.3	44.4	24.8	19.8	14.3	v-shape	contracting stem	quartzite	no		no	
297.004	14:24	3	65.9	27.9	na	na	10	u/v-shape	contracting stem	quartzite	no		no	unable to tell which end was distal to the shape of biface
303.001	14:26	1	86.1	33.3	22.8	24.7	9.2	U-shape	contracting stem	quartzite	no		no	
307.001	14:28	2	54.3	33.5	uk	uk	8.3	uk	uk	chert (grey/tan)	yes	broken at base and tip	no	straight shoulders, unknown stem type
311.006	14:29	3	49.6	32.9	16.8	9.3	7.7	square	straight	quartzite (light grey)	no		no	slightly barbed shoulder, corner notched
316.001	14:31	1	52.7	37.8	25.4	13.3	12	U-shape	contracting stem	quartzite	no		no	
323.001	14:34	1	56.9	26.6	17.3	21.8	8	square	straight	quartzite (red/brown)	yes	shoulder	no	straight shoulders, corner notched
325.001	14:35	3	52.4	38	18.4	17.1	9.6	u/v-shape	contracting stem	Chickachoc - AT	no		no	shoulder points angled slightly down (barbed)
326.001	14:36	2	73.2	37.2	21.4	9.4	12.7	U-shape	contracting stem	quartzite	yes	shoulder	yes?	possible attempt at shoulder retouch
326.002	14:36	2	59.8	27	21.7	16.8	8.8	u/v-shape	contracting stem	chert	no		no	
327.001	14:36	3	52.1	28.2	16.6	17.6	9.1	square	contracting stem	quartzite	no		no	one side of shoulder higher than other
330.001	14:37	1	44.2	37	20.7	17	9	square	straight	novaculite (white/tan)	no		no	barbed shoulder, corner notched

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
335.001	14:39	3	62.8	22.6	14.8	8.8	10	U-shape	contracting stem	Reeds Spring	no		no	
337.001	14:42	1	40.7	19.9	15.5	11	9.2	U-shape	contracting stem	quartzite	no		no	
337.002	14:42	1	55.6	29.1	20.4	15.7	9.6	square	contracting stem	quartzite	no		no	
337.003	14:42	1	46.2	28.9	20.9	13	11	square	contracting stem	quartzite	yes	shoulder	no	
337.004	14:42	1	45.7	28.8	uk	uk	6.6	uk	uk	chert (black)	yes	broken at base and tip	no	straight shoulders, unknown stem type
337.005	14:42	1	45.7	32.6	18.9	22	9.1	square	straight	quartzite (dark grey)	yes	lateral snap - distal	no	straight shoulders, corner notched
339.001	14:42	3	50.8	34.6	uk	uk	10.4	uk	uk	reeds spring?	yes	base	no	slightly barbed shoulder, unknown stem type
343.001	15:16	2	49.2	22.8	na	na	7.5	U-shape	contracting stem	chert (black)	no		no	weak shoulder
348.001	15:19	2	72.3	32.9	14.9	7	13.2	square	straight	quartzite (black)	no		no	barbed shoulder, basal notched (like Eva)
351.001	15:20	3	57.3	36.6	uk	uk	9.3	uk	uk	chert (light grey)	yes	base	no	straight shoulders, unknown stem type; curved blade
387.001	15:37	2	58.1	30.8	22.9	12.5	7.9	U-shape	contracting stem	chert (black/tan)/ banded	no		no	haft is not very distinct; curved blade on one side
389.001			53.3	22.8	19.1	16.5	11.9	U-shape	contracting stem	quartzite	no		no	
392.001	15:39	2	39.1	25.3	uk	uk	6.2	uk	uk	chert (brownish	yes	broken at base and tip	no	one shoulder slightly barbed; unknown stem type
398.001	15:41	1	40.6	25.8	uk	uk	7.5	uk	uk	chert (black)	yes	base	no	possible tapered shoulders, unknown stem type
403.001	16:17	2	47.9	23	uk	uk	6.4	uk	uk	quartzite (black)	yes	base	no	possible tapered shoulders, unknown stem type
403.002	16:17	2	67	27.8	18.9	15.2	10.2	square	expanding	quartzite (medium grey)	yes	small portion of base	no	straight shoulders, corner notched
403.003	16:17	2	39	19.3	18.5	12.2	7.6	square	expanding	quartzite (light grey) banded	no		no	Tapered shoulders; side notched
405.001	16:18	2	47.8	28.9	18.8	11.6	6.8	square	expanding	quartzite (dark brown)	yes	part of stem/base	no	straight shoulders, side notched
405.002	16:18	2	50.3	11.4			5.8	uk	uk	chert (tan/white)	yes	lateral break	no	drill

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
407.001	16:25	2	65	34.1	18.4	17.5	7.4	U-shape	contracting stem	chert (grey/tan) black spots	yes	portion of blade has large chip	no	offset blade
409.002	16:26	1	56.2	26.6	15.2	15.1	7.3	v-shape	contracting stem	quartzite	no		yes?	retouched shoulder?
409.003	16:26	1	43.6	20.4	15.4	10.1	6.1	U-shape	contracting stem	Reeds Spring	no		no	
409.004	16:26	1	46.5	26.5	19.1	14.6	6.9	u/v-shape	contracting stem	chert (grey)	yes	tip - impact fracture; broken stem	no	
413.003	16:29	1	67.9	31.1	19.9	11.6	12.1	v-shape	contracting stem	quartzite	yes	tip - impact fracture	no	
415.001	16:30	1	40	27.6	uk	10.7	5.9	concave	expanding	reeds Spring	yes	part of stem/base	no	straight shoulders, side notched
416.001	16:30	2	50.1	33.9	21.1	16.7	8	v-shape	contracting stem	chert (grey/tan)	no		no	
419.001	16:31	1	65.1	31.3	23.3	17.1	13.9	square	expanding	quartzite (medium grey)	yes	shoulder	no	straight shoulders, likely side notched
419.002	16:31	1	63.5	37	19	15	14.3	square	expanding	quartzite (dark brown)	yes	stem	no	barbed shoulder, corner notched
421.001	16:32	1	51.1	30.3	18.1	13.8	9.7	square	contracting stem	quartzite	yes	lateral break (impact?)	no	shoulder points angled slightly down and hooked
424.001	16:33	2	50.6	29.6	18.1	19.2	10.7	U-shape	contracting stem	quartzite	no			
424.002	16:33	2	44.2	30.7	17.5	10.7	7	convex	expanding	quartzite (black)	no		no	straight shoulders, corner notched
425.001	16:33	4	49.9	24	21.1	12.3	10.8	concave	expanding	chert (black)	no		no	straight shoulders, side notched
429.001	16:35	1	42.3	20.7	12	17.3	8.2	u/v-shape	contracting stem	chert (tan/beige)	no		no	
431.001	16:36	2	44.6	28.5	16.7	8.7	8.2	convex	expanding	chert (grey/tan)	no		no	barbed shoulder, corner notched
431.002	16:36	2	41	29	13.5	12.4	6.5	square	straight	chickachoc - AT	no	lateral break - distal (impact?)	no	straight shoulders, corner notched
433.001	16:37	1	38.4	39.9	19.1	16.4	6.1	U-shape	contracting stem	Reeds Spring	yes	lateral break (impact?) slightly curved	no	shoulder points angled slightly down (barbed)
433.002	16:37	1	42.4	28.8	uk	uk	10.8	uk	uk	chert (dark grey)	yes	base and part of blade	yes?	one shoulder slightly straight; unknown stem type; possible retouch on tip

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
436.001	16:38	1	53.6	34.6	22.3	22.7	10.3	u/v-shape	contracting stem	quartzite	no		no	
436.002	16:38	1	54.8	27.6	20.3	12.2	7.7	convex	expanding	Argillite (black)	no		no	barbed shoulder, corner notched
441.005	17:4	1	51	36.2	23.5	11.3	12.2	square	contracting stem	quartzite	yes	tip - impact fracture	no	
441.006	17:4	1	39.1	16.5	10.2	7.4	7.2	na	contracting stem	chert (grey/tan)	yes?	stem (impact?)	no	possibly thermally altered? Tip has a pinkish color
452.001	17:8	1	33.6	17.8	12.2	11.3	7	square	contracting stem	chert (grey)	no		no	possible heat fracture lines
455.001	17:10	1	55.9	21.2	16.7	13.3	6.3	square	contracting stem	chert (grey/tan)	no		no	
456.001	17:10	2	28.5	18.5	18.5		5.3	convex	lanceolate	chert (grey)	no		no	
470.001	17:18	2	39.8	23.3	23.3	na	5.6	slightly convex	lanceolate	chert (tan/white)	no		no	slightly side notched
472.001	17:19	1	39	36.2			8.8	uk	uk	quartzite (dark grey)	yes	lateral break	no	pointed, bifacially worked tool
482.001	17:24	1	56.4	27.7	na	na	7.4	na	na	quartzite	yes	fracture in stem - possible lateral break	no	
483.001	17:24	2	38.8	17.7	12.2	13.7	8.9	u/v-shape	contracting stem	quartzite	no		no	
483.002	17:24	2	56.8	23.7	uk	uk	6.2	uk	uk	chert (grey/tan)/ banded	yes	base	no	straight shoulders, unknown stem type
487.001	17:25	2	62.1	46.6	26.5	7.7	9.6	square	straight	chert (pink/purple)	yes	diagonal/lateral - distal	no	barbed shoulder, basal notched
490.001	17:26	3	36.9	23	9.1	11	7.7	U-shape	contracting stem	quartzite (black)	no		yes	point retouched into drill
492.001	17:27	2	61.1	29.2	21.2	18.6	6.9	u/v-shape	contracting stem	chert (grey)	no		no	blade slightly offset
492.002	17:27	2	38.6	21.2	17.7		7.3	square	lanceolate	novaculite (white)	no		no	curves in blade
512.001	17:36	5	39.1	20.5	15.7	18	6.9	u/v-shape	contracting stem	quartzite	no		yes?	blade retouch?
517.001	17:37	6	38.7	22	18.1	16.1	8.2	U-shape	contracting stem	quartzite	no	tip - impact fracture?	no	tip possibly retouched
517.002	17:37	6	59.3	33.1	uk	uk	7.3	uk	uk	chert (light grey)	yes	broken at base and impact fracture at tip	no	slightly barbed shoulder, unknown stem type
527.005	18:20	1	59.1	30.9	15.6	16	12.5	U-shape	contracting stem	quartzite	no			

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
527.006	18:20	1	55.6	23.8	19	13.4	8.4	u/v-shape	contracting stem	Reeds Spring	no		no	
527.007	18:20	1	48.8	29.1	uk	uk	7.8	uk	uk	quartzite (light grey)	yes	base and one shoulder	no	possible tapered shoulders, unknown stem type
538.001	18:24	2	55.6	33.5	19.8	na	9	na	contracting stem	quartzite	yes	tip - lateral - possible impact fracture; base - lateral	no	
538.002	18:24	2	32.2	32.9	uk	uk	7.4	uk	uk	chert (pink/red)	yes	proximal, shoulder	no	possible heat fracture lines, basal notched, broken at stem
564.015	18:34	1	66	33.6	24.2	na	13.4	na	contracting stem	quartzite	yes	chipped on blade and possibly broken at base	no	
564.016	18:34	1	27.7	32.5	16.9	na	5.6	na	contracting stem	chert	yes	lateral break (impact)	no	
571.004	19:18	1	52.6	31.8	uk	uk	6.4	uk	uk	quartzite (light grey)	yes	base and one shoulder	no	slightly barbed shoulder, possible basal stem type
571.005	19:18	1	53.7	28.2			6.9	uk	uk	quartzite (light grey)	yes	lateral break	no	blade of knife or pointed bifacially worked tool
588.001	19:25	1	50.8	25.9	18.3	10.8	9.4	U-shape	contracting stem	Reeds Spring	no		no	weak shoulder
592.001	19:26	3	52.7	33.6			11.7	uk	uk	quartzite (black)	yes	lateral break	no	blade of knife or pointed bifacially worked tool
596.001	19:28	2	53.8	45.7	33.4	20.2	12.6	u/v-shape	contracting stem	quartzite	yes	lateral snap - distal	no	
612.005	19:34	1	66.7	31.7	18	15.5	7.4	U-shape	contracting stem	chert (beige/brown)	no		yes	tip possibly retouched, one shoulder higher than other;
616.001	19:35	2	55.9	39.6	19.7	9.5	17	square	contracting stem	quartzite (dark grey)	no		no	straight shoulders
618.001	19:36	1	35.6	24.8	15.3	15.6	6.7	u/v-shape	contracting stem	chert (black)	no		yes?	possibly retouched due to length of blade compared to length of base
618.002	19:36	1	36.8	18.2			9.1	uk	uk	quartzite (black)	yes	lateral break	no	blade of knife or pointed bifacially worked tool
618.003	19:36	1	28.9	14			7.5	uk	uk	chert (grey)	yes	diagonal/lateral break	no	blade portion of a small point
618.004	19:36	1	31.3	20.2			6.7	square	lanceolate	chert (grey/tan)	no		no	
620.001	19:36	4	54.4	20.7	16.1	19.3	8.5	u/v-shape	contracting stem	quartzite	yes	tip - lateral (post depo?)	no	

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
622.004	19:37	1	35.2	25.8			9.8	uk	uk	quartzite (dark grey)	yes	lateral break	no	likely small contracting stem point
626.001	19:38	2	39.6	33.2			9.7	uk	uk	quartzite (light grey)	yes	lateral break	no	blade of knife or pointed bifacially worked tool
628.004	20:18	1	58.7	34.1	23.5	12	8.9	square	expanding	quartzite (dark brown)	yes	shoulder	no	barbed shoulder, corner notched
630.003	20:19	1	42.3	22.5	uk	uk	8	uk	uk	chert (black)	yes?	tip and base	no	possible tapered shoulders, unknown stem type
630.004	20:19	1	30.4	22.6	16.7	7	5.3	square	expanding	chert (black)	yes	both shoulders	yes	one shoulder looks retouched; unknown shoulder type; likely corner notched
631.001	20:19	2	78	35.8	19.1	12.5	11.5	U-shape	contracting stem	quartzite	yes	chip at tip and one shoulder	no	
631.002	20:19	2	54.6	32.7	15.1	15.5	7.5	u/v-shape	contracting stem	chert	no		yes?	offset blade
631.003	20:19	2	42.6	24.8	12.3	8.4	7.7	u/v-shape	contracting stem	chert (grey)	no		no	offset stem
634.001	20:20	1	49.1	22.5	15.8	12.4	11.8	v-shape	contracting stem	quartzite	no		no	
634.002	20:20	1	50.8	35.3	15.8	17.5	8.3	U-shape	contracting stem	quartzite	no		no	
635.001	20:20	2	35.1	20.4	14.2	15.5	7.3	U-shape	contracting stem	Chickachoc - AT	no		yes?	stem retouched?
635.002	20:20	2	45.8	29.6	na	na	6.4	na	contracting stem	quartzite	yes	stem and one shoulder	no	
637.002	20:21	1	32.2	27.7	13.2	9	7.4	square	contracting stem	Chickachoc - AT	yes	tip - impact fracture	yes?	unable to tell if actually retouched
637.003	20:21	1	55.9	23.9	16.4	18.2	8	U-shape	contracting stem	quartzite	no		no	
637.004	20:21	1	55.1	38.7	22.7	19	9	U-shape	contracting stem	quartzite	yes	lateral snap - distal	no	
637.005	20:21	1	37.2	21	12.1	13.5	7.3	U-shape	contracting stem	Reeds Spring	no		yes?	different retouch flaking on stem
638.005	20:21	2	65.2	34.9	18.1	21.2	7.3	U-shape	contracting stem	quartzite	no		no	
638.006	20:21	2	65.2	na	19	16	8.1	u/v-shape	contracting stem	quartzite	yes	tip - lateral - possible impact fracture; part of shoulder	no	
638.007	20:21	2	49.1	31.5	19.6	14.3	8.2	U-shape	contracting stem	Reeds Spring	no		yes?	possible attempt at shoulder retouch
638.008	20:21	2	29.8	31.6	19.5	7.1	5.9	concave	expanding	chert (black)	yes	lateral break - distal (impact?); shoulders	no	likely barbed shoulders; likely corner notched
642.003	20:23	2	44	26.1	18.5	10.6	8.1	convex	expanding	chickachoc - AT	yes	shoulder	yes	retouch on broken shoulder; barbed shoulder; corner notched
644.003	20:24	1	61.6	29.8	16.5	14.5	11.3	u/v-shape	contracting stem	quartzite	yes	one side of base to shoulder	no	

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
644.004	20:24	1	58.5	22.3	16.9	14.9	8.8	U-shape	contracting stem	chert	yes	tip - impact fracture	no	
645.001	20:24	2	43.9	34.2	10.7	8.1	10.5	square	straight	quartzite (black)	yes	portion of shoulder	yes	attempted at retouch of shoulder; barbed shoulder,
648.001	20:25	2	49.1	30.4	22.3	18.9	8.4	U-shape	contracting stem	quartzite	no		no	
648.002	20:25	2	77.9	38.5	21.6	13.2	7.5	convex	expanding	quartzite (medium grey)	yes	both shoulders	no	slightly barbed shoulder, corner notched
650.001	20:26	1	49.5	23.2	18..1	13.9	8.4	square	expanding	quartzite (med grey) banded	no		no	Tapered shoulders; side or corner notched
650.002	20:26	1	56.3	40.6	20.9	17.9	12	uk	expanding	reeds Spring	yes	lateral break - distal, shoulders and stem	no	unknown shoulder; likely corner notched
655.003	20:28	2	55.6	31	24.5	20.8	10.6	U-shape	contracting stem	Chickachoc - AT	no		no	
657.001	20:29	1	54.1	28.8	22.1	20.1	8.1	U-shape	contracting stem	chert (grey/tan)	no		no	one side of shoulder higher than other
660.001	20:30	2	24.6	30.3	20.5	na	7.9	na	contracting stem	chert	yes	lateral break (impact?); possible broken base?	no	
660.002	20:30	2	59.1	24.5	13.6	16.8	6.2	v-shape	contracting stem	Reeds Spring	no		no	
660.003	20:30	2	44.3	39.4	20	10.1	9.5	square	Contracting stem	Reeds Spring	no		yes?	curved; possible blade retouch due to lack of
663.001	20:31	2	45.7	27.1	21.5	20.4	8.3	U-shape	contracting stem	quartzite	no		yes?	possibly retouched due to length of blade compared to length of base
665.009	20:32	1	40	23.7	11.2	12.8	7.3	u/v-shape	contracting stem	quartzite	yes	lateral snap - distal	no	
665.010	20:32	1	35.1	24.6	19.5	12.9	7.4	square	expanding	reeds Spring	yes	lateral break - distal (impact?)	no	straight shoulders, corner notched
666.003	20:32	2	39.1	31	23.6	14.6	8.7	square	expanding	quartzite (dark brown)	yes	shoulder	no	likely straight shoulders, likely corner notched
666.004	20:32	2	37.6	23.5	22.8	12.9	7.7	square	expanding	quartzite (dark grey)	yes	tip - impact fracture?	no	Tapered shoulders; side notched
666.005	20:32	2	67.3	36.7	22.4	19.8	8.5	square	expanding	quartzite (medium grey)	no		no	straight shoulders, slightly barbed; corner notched

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
668.003	20:33	1	45.6	24.8	13.2	13.5	7.5	u/v-shape	contracting stem	quartzite	yes	tip - impact fracture	no	
668.004	20:33	1	65.2	35.3	19.1	18	7.3	U-shape	contracting stem	quartzite	no		no	
668.005	20:33	1	58	27.2	18.8	13.5	9.5	u/v-shape	contracting stem	chert (red)	no		no	
668.006	20:33	1	45.4	29.2	19.8	16.7	9.1	convex	expanding	quartzite (dark grey)	yes	tip	no	possible tapered shoulders, or corner notched
669.001	20:33	2	48.6	34.3	23.7	15.6	7.9	u/v-shape	contracting stem	chert (grey)	yes	lateral break - distal (impact?)	no	
669.002	20:33	2	38.3	29.5	18.5	14.2	7.5	u/v-shape	contracting stem	chert (grey)	yes	lateral break - distal (impact?); one shoulder	no	shoulder points angled slightly down (barbed)
671.006	20:34	1	39.8	29	22.4	18.4	9.4	v-shape	contracting stem	quartzite	yes	lateral snap - distal	no	
672.002	20:34	2	65	31.7	19.6	19.2	7.9	u/v-shape	contracting stem	Reeds Spring	no		no	
672.003	20:34	2	41.7	33.3	16.3	11.9	7.7	U-shape	Contracting stem	chert	yes	tip - lateral - possible impact fracture; part of shoulder; stem	no	
673.001	20:34	3	46.4	25.4	18	15.6	8.7	U-shape	contracting stem	quartzite	no		no	
675.003	20:35	1	54.2	36.9	26.3	21.1	9.6	U-shape	contracting stem	quartzite	yes	lateral snap - distal	yes?	possible attempt at tip retouch
675.004	20:35	1	48.5	24.5	na	na	8.6	na	contracting stem	chert (black)	yes	pot lid on one side, missing side of blade; part of shoulder	no	
676.004	20:35	2	65.7	37.2	19.5	10.8	8.6	U-shape	Contracting stem	chert	yes	blade	yes	possible blade and tip retouch
676.005	20:35	2	39.4	23.9	11.3	7.9	5.9	uk	uk	chert (black)	yes	stem and one shoulder	no	offset stem; potlids on one side on distal end, step fracture near tip
677.001	20:35	3	107.8	49.3	29.4	25	12.4	u/v-shape	contracting stem	quartzite	no		no	
677.002	20:35	3	51.8	30.7	uk	uk	9.2	uk	uk	chert (black)	yes	base - impact?	no	possible pot lidding on surface; straight shoulder, corner notched
677.003	20:35	3	43.7	35	30.2	18.3	11	square	expanding	quartzite (black)	no		yes?	possibly retouched due to length of blade compared to length of base; straight shoulder, side notched

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
680.001	20:36	2	35.9	18.9	12.5	15.5	8.5	U-shape	contracting stem	chert (black)	no		no	
680.002	20:36	2	39.4	22.3			10.7	square	lanceolate	chert (black)	no		no	
681.001	20:36	3	75.7	32.2	24.2	18.2	12.5	uk	expanding	quartzite (light grey)	no		no	Tapered shoulders; corner notched; offset stem, looks like the stem tangs are also notched
685.001	20:38	1	58.7	24	12.8	16.6	8.3	v-shape	contracting stem	quartzite	yes	tip - lateral (post depo?)	no	
685.002	20:38	1	43.6	35	21	21	7.3	U-shape	contracting stem	chert (grey)	yes	lateral break - distal (impact?)	no	
685.003	20:38	1	51.5	28.9	13	8.4	6.6	square	straight	chert (black)	no		no	straight shoulders, corner notched
685.004	20:38	1	30.3	25.5	17.6	16.8	8.8	square	straight	reeds Spring	yes	lateral snap - distal and part of stem	no	straight shoulders, corner notched
685.005	20:38	1	43.1	22.6			6.7	uk	uk	chert (black/grey)	yes	portion of shoulder and stem/base	no	likely lanceolate point; curved blades
688.001	20:38	3	36.2	23.6	17	11.9	7.4	convex	expanding	novaculite (white/red)	no		no	straight shoulders, corner notched
688.002	20:38	1	32.2	17.3			7.7	square	lanceolate	chert (black/grey)	no		no	
700.001	21:21	2	53.2	29.2	17.3	5.5	11.7	square	contracting stem	quartzite	no		no	maybe not Gary? Corner notched?
717.007	21:26	1	27.9	19.4	13.3	9.3	6.1	square	contracting stem	Chickachoc - AT	yes	tip - impact fracture	yes	impact fracture appears to be retouched to a kind of point
732.005	21:31	1	54.7	29.6	18.5	14.1	10.7	v-shape	contracting stem	quartzite (medium grey)	yes	blade, shoulder	no	
844.001	22:37	2	49.3	24.2	16.8	16.9	8.4	U-shape	contracting stem	chert (grey)	yes	tip - impact fracture	no	offset stem
867.001	23:20	2	43.5	23.3	13.3	15	7.2	U-shape	contracting stem	quartzite	no		no	
867.002	23:20	2	47.5	24.3	na	na	9.5	uk	contracting stem	quartzite	yes	stem and one shoulder	no	
867.003	23:20	2	62.5	28.3	20.5	19.2	10.3	square	straight	chert (grey/tan)	yes	shoulder	no	distinct barb on shoulder, corner notched
867.004	23:20	2	50.7	27.7	27.7	16.9	8.7	square	expanding	novaculite (white)	no		no	blade is slightly off-set and curved; weakly tapered shoulders side of corner notched

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
870.004	23:21	1	63.2	23.3	18.6	10.4	5.7	uk	contracting stem	chert (black)	yes?	broken stem?	yes?	blade possibly modified into drill?
870.005	23:21	1	38.1	30.7	21.1	9.9	7	square	expanding	chert (grey/tan)	no		no	barbed shoulder, corner notched
871.001	23:21	2	53.5	29.9	18.4	13.8	13.5	U-shape	contracting stem	quartzite	yes	tip - impact fracture?	no	
873.002	23:22	1	46.8	27.2	19.2	11.2	8.1	u/v-shape	contracting stem	quartzite	no		yes?	missing shoulder on one side - likely retouched
873.003	23:22	1	49.9	30.1	15.3	10.9	8.3	U-shape	contracting stem	chert (grey/tan)	no		yes?	one side on shoulder sticks out - either retouched or offset blade
873.004	23:22	1	59	25.4	uk	uk	9.9	uk	uk	quartzite (light grey) banded	yes	tip and base	no	possible straight shoulder; unknown stem
874.001	23:22	2	46.1	30.1	14.7	14	6.1	v-shape	contracting stem	quartzite	no		yes?	part of blade retouched? Shoulders have different lengths
877.001	23:23	3	58.3	42.5	24.2	16.4	9.8	square	expanding	quartzite (black)	yes	shoulder	no	barbed shoulder, corner notched; potion of shoulder broken
878.001			51.5	27.3	18.9	22.1	7.5	v-shape	contracting stem	quartzite	no		no	
879.007	23:24	1	64.7	27.2	16.2	17.1	6.8	u/v-shape	contracting stem	chert (brownish red)	no		no	
879.008	23:24	1	56.9	26.7	13.7	9.8	9.6	v-shape	contracting stem	chert (grey/tan)	no		no	offset blade
881.010	23:25	1	39.2	22	14	14.9	7.9	V-shape	contracting stem	quartzite	no		yes?	
881.011	23:25	1	29.6	40.8	15.9	11.5	7.4	square	straight	quartzite (dark grey)	yes	lateral snap - distal and shoulder	no	distinct barb on shoulder, corner notched
881.012	23:25	1	31.7	23	17.7	12.6	7.1	square	expanding	quartzite (light grey)	yes	lateral break - distal; one shoulder	no	Tapered shoulders; side or corner notched
881.013	23:25	1	41.2	22.5			4.8	uk	uk	chert (pink/peach)	yes	lateral break	no	blade of knife or pointed bifacially worked tool
885.001	23:26	2	42.4	24.1	18.5	16	8.3	U-shape	contracting stem	quartzite	no		yes?	retouch above the shoulder?
885.002	23:26	2	43.5	44.7	18.4	18.7	8.4	u/v-shape	contracting stem	quartzite	yes	lateral snap - distal	no	shoulder points angled slightly down (barbed)
885.003	23:26	2	32.4	34.6	20.1	10.6	8.8	square	expanding	quartzite (dark grey)	yes	lateral snap - distal	no	barbed shoulder, basal notched
885.004	23:26	2	40.4	29.2	20.4	11.8	6.8	convex	expanding	quartzite (black and grey)	yes	tip - impact fracture; shoulder	no	barbed shoulder, corner notched

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
887.001	23:27	1	37.4	18.7	11.6	11	7.5	u/v-shape	contracting stem	quartzite	yes	tip - impact fracture?	no	
887.002	23:27	1	60.2	na	20	22.6	9.5	U-shape	contracting stem	quartzite	yes	lateral snap (impact?) - distal and	no	
887.003	23:27	1	49.9	27.3	15.9	18.2	8.6	U-shape	contracting stem	chert (brownish red)	yes?	tip - impact fracture?	yes?	tip is rounded - possibly from type of impact' possible attempt at retouch?
888.001	23:27	3	46.8	43.7	25.8	22.9	8.7	u/v-shape	contracting stem	quartzite	yes	lateral snap - distal	no	shoulder points straight out farther than blade
890.002	23:28	1	50.1	21.2	13.7	15.8	7.4	U-shape	contracting stem	quartzite	no		no	
890.003	23:28	1	32.2	19.9	11.9	9	6.5	square	contracting stem	quartzite	no		no	
890.004	23:28	1	38	37.2	17.2	uk	10.3	uk	uk	chert (tan/beige)/ banded	yes	tip and stem	no	barbed shoulder, corner notched; broken stem
891.001	23:28	2	44.7	25.6	18.5	16	4.8	u/v-shape	contracting stem	chert (black)	yes	entire side blown out - pot lids?	no	
892.001	23:28	3	75.2	57.6	28.4	14.4	15.7	square	expanding	quartzite (black)	yes	portion of stem and tip	no	barbed shoulder, basal notched
894.006	23:29	1	62.4	29.5	na	na	8.1	na	contracting stem	quartzite	yes	stem and one shoulder	no	one shoulder broken; base broken - lateral
894.007	23:29	1	43.1	24.9	20.9	13.5	7.4	U-shape	contracting stem	chert (black)	no		no	
894.008	23:29	1	47.5	35.8	21.4	13.7	10	square	expanding	quartzite (light grey)	yes	tip - lateral - possible impact fracture; shoulder; stem	no	straight shoulders, slightly barbed; corner notched
895.001	23:29	2	64.7	31.8	19.1	14.5	10.1	square	contracting stem	chert (grey/tan)/	no		no	
896.001	23:29	3	49.4	27.9	18.4	13.7	8.5	convex	expanding	chert (pink/peach)	no		yes?	retouched shoulder?; Straight shoulder, corner notched
898.003	23:30	1	31.2	36.4	20.2	8.6	9	na	contracting stem	quartzite	yes	lateral break (impact?); possible	no	
898.004	23:30	1	52.2	32.2	22.1	15.9	9.7	convex	straight	reeds Spring	no		yes?	retouch on tip? Curved blade; straight shoulder, corner notched
898.005	23:30	1	45	19.1	9.1		11	convex	lanceolate	chert (grey/black)/ banded	no		no	curved blade
898.006	23:30	1	39.8	17.8	8.4		10.6	square	lanceolate	quartzite (medium grey)	no		no	curved blade

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
899.001	23:30	2	43.8	20.7	14.9	16.3	6.4	U-shape	contracting stem	Chickachoc - AT	no	chip at tip		
899.002	23:30	2	54.3	41	33	20.8	10.8	U-shape	contracting stem	quartzite	no		no	
899.003	23:30	2	53	19.4	15.2	10.3	6.2	u/v-shape	contracting stem	Reeds Spring	no		yes?	one side of blade more curved, likely retouched
899.004	23:30	2	36.8	26.6	uk	uk	8.4	uk	uk	quartzite (dark grey)	yes	tip - lateral - possible impact fracture; shoulder; stem	no	unknown shoulder; unknown stem type
901.005	23:31	1	45	24	17.3	14.5	8.5	U-shape	contracting stem	quartzite	no		yes?	
901.006	23:31	1	48.6	42.1	27.7	19.6	9.3	u/v-shape	contracting stem	quartzite	yes	lateral snap - distal	no	
901.007	23:31	1	28.7	na	19	13.4	6	U-shape	contracting stem	quartzite	yes	angled break above shoulder and part of shoulder	no	
901.008	23:31	1	40.4	38.8	19.8	17.6	8.1	U-shape	contracting stem	chert	yes	lateral snap - distal	no	
902.001	23:31	2	68.4	44.9	26.2	19.6	13.3	v-shape	contracting stem	quartzite	no		no	
904.010	24:16	1	53.6	22.5	13.6	na	9.8	na	contracting stem	quartzite	yes?	step fractures in stem - possible lateral break		
905.001	24:16	2	41.6	29.1	12	13.4	7.3	u/v-shape	contracting stem	quartzite	no		no	
905.002	24:16	2	46.3	24.4	15.9	11.7	6.6	u/v-shape	contracting stem	quartzite	no		no	offset stem
907.009	24:17	1	39	32.3	10.5	6.1	7.1	v-shape	contracting stem	quartzite	no		yes	stem likely retouched, blade offset
907.010	24:17	1	46.4	32.2	11.9	9	6.1	v-shape	contracting stem	Reeds Spring	yes	shoulder	no	really small stem
907.011	24:17	1	63.2	39.4	19.4	15.8	10.7	convex	expanding	quartzite (dark grey)	no		yes	straight shoulders, slightly barbed; corner notched;
908.004	24:17	2	40.5	26.7	19.2	17.5	7.9	square	contracting stem	Chickachoc - AT	yes	tip - impact fracture	no	
908.005	24:17	2	42.6	25.4	19.3	17.9	8.1	U-shape	contracting stem	quartzite	no		no	
908.006	24:17	2	39.2	25.8	11.8	9.2	6.8	square	contracting stem	quartzite	yes	tip - impact fracture; possible broken stem	no	
908.007	24:17	2	50.4	29.4	uk	uk	7	uk	uk	chert (grey/tan)	yes	broken at base and tip	no	straight shoulders, unknown stem type
908.008	24:17	2	44.2	29.5			9.5	uk	uk	chert (red)	yes	lateral break	no	blade of knife or pointed bifacially worked tool

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
909.001	24:17	3	62.8	36.2	17.7	15.5	13	square	expanding	chert (grey/tan)	yes	tip - impact fracture; shoulder	no	straight shoulders; corner notched; curved blade
909.002	24:17	3	50.7	33.6	17.6	14.4	8.7	square	expanding	chert (grey/tan)	yes	tip - impact fracture	no	straight shoulders; corner notched; curved blade
909.003	24:17	3	45.8	26.5			8.6	uk	uk	quartzite (medium grey)	yes	lateral break (impact)	no	blade of knife or pointed bifacially worked tool
911.001	24:18	3	45.8	28.7	20.9	18.2	7.1	square	Contracting stem	chert	yes	shoulder (impact?)	no	missing one shoulder
911.002	24:18	3	48.9	36.2	21.1	17.7	8.6	v-shape	contracting stem	chert (tan/beige)/ banded	yes	lateral snap - distal	no	
911.003	24:18	3	51.2	47.7	22.1	16.4	10.6	convex	expanding	quartzite (dark grey)	yes	diagonal/lateral, distal; shoulder	no	barbed shoulder, corner notched; curved blade
913.005	24:19	1	39.8	26.9	14.8	9.1	7.2	v-shape	contracting stem	quartzite	no		no	
913.006	24:19	1	39.1	26.7	18.8	16.1	7.6	U-shape	contracting stem	quartzite	yes	lateral snap - distal and shoulder	no	
913.007	24:19	1	35.8	29.3	na	na	6.6	na	na	quartzite	yes	lateral snap - below shoulder	no	
913.008	24:19	1	50.9	na	15.4	12.9	7.6	square	contracting stem	chert	yes	shoulder	no	
913.009	24:19	1	41.9	19.1	12.2	13.6	7.8	U-shape	contracting stem	Reeds Spring	no		no	
913.010	24:19	1	48.9	25.8	14.1	15.5	6.5	u/v-shape	contracting stem	Reeds Spring	yes	tip - impact fracture	no	
913.011	24:19	1	27.6	23.4	uk	uk	6.6	uk	uk	chickachoc - AT	yes	lateral snap - distal and stem	no	possible tapered shoulders, unknown stem type
913.012	24:19	1	41.8	13.2			8.6	uk	uk	quartzite (black)	yes	lateral break	no	drill
914.001	24:19	2	41.1	29.1	23.2	22.8	8.7	u/v-shape	contracting stem	Chickachoc - AT	yes	lateral snap - distal	no	
914.002	24:19	2	29.6	35.9	22.9	18.1	8.3	U-shape	Contracting stem	na	yes	lateral snap - distal	no	
914.003	24:19	2	47.6	28.2	20.2	15.8	9	U-shape	contracting stem	chert (white)	no		no	blade is slightly off-set
914.004	24:19	2	60.9	24	17	13.6	11.3	convex	expanding	quartzite (medium grey)	no		no	Tapered shoulders; side notched

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
914.005	24:19	2	56.9	31.2	23.9	23.1	10.2	square	straight	chert (tan/white)	no		no	straight shoulders, slightly barbed; corner notched
914.006	24:19	2	48.4	28.7			9.6	uk	uk	novaculite (white)	yes	tip, shoulder/blade, stem	no	possible contracting stem point but unable to tell
916.009	24:20	1	50.3	31	14.3	na	8.2	na	contracting stem	quartzite	yes	tip - impact fracture; broken stem	no	
916.010	24:20	1	23.8	34.2	24.6	17.9	8.1	U-shape	contracting stem	chert (tan/white)	yes	lateral break - just above shoulder	no	
916.011	24:20	1	63.8	23	16.1	17.3	7.7	u/v-shape	contracting stem	chert (pink/peach)	yes	tip - impact fracture	no	blade is slightly off-set
916.012	24:20	1	43.5	34	15.8	15.9	6.8	square	straight	quartzite (medium grey)	yes	lateral break (impact?) slightly curved break	yes?	possible attempt at shoulder retouch; barbed shoulder, corner notched
916.013	24:20	1	36.4	28.5	uk	uk	8.6	uk	uk	chert (light grey)	yes	lateral snap - distal and stem	yes?	possible retouch on blade due to position of stem; unknown shoulder and stem type
916.014	24:20	1	36	28.7	uk	uk	6	uk	uk	chert (pink/red)	yes	parts of blade and stem	no	straight shoulders, unknown stem type
916.015	24:20	1	39	23.3	uk	uk	6.1	uk	uk	quartzite (medium grey)	yes	stem	no	unknown shoulder; unknown stem type
916.016	24:20	1	36.4	24.1	21.5	14.9	9.1	square	expanding	quartzite (medium grey)	yes	lateral break - distal (impact?)	no	Tapered shoulders; side notched
916.017	24:20	1	28.2	23.9	22.2	15.7	7.5	convex	expanding	chert (pink/red)	yes	diagonal/lateral, distal	no	straight shoulders, side notched
916.018	24:20	1	51.7	33.5	22	21.7	9	square	expanding	quartzite (grey/brown)	yes	both shoulders	no	slightly barbed shoulder, corner notched
917.002	24:20	2	27.4	25.3	13.6	8.1	5.6	convex	expanding	chert (brownish	yes	lateral snap - distal and part of stem	no	barbed shoulder, corner notched
917.003	24:20	2	38.8	34	22.8	17.7	9.5	square	expanding	chert (grey/tan)	yes	lateral break - distal (impact); one shoulder	yes	retouch on shoulder; slightly barbed; corner notched
919.003	24:21	1	41.1	24.7	uk	uk	9.8	uk	uk	novaculite (white)	yes	stem	no	possible tapered shoulders, unknown stem type
919.004	24:21	1	47.2	26.2	14.4	9.6	8.4	convex	expanding	chickachoc - AT	yes	blade, shoulder	yes	blade offset due to blade retouch; likely straight shoulders; corner notched
919.005	24:21	1	36.2	34.4			5.4	uk	uk	quartzite (medium grey)	yes	lateral break	no	blade of knife or pointed bifacially worked tool
920.001	24:21	2	53.2	30.9	22.2	19.9	7.5	v-shape	contracting stem	quartzite	no		no	

Prov number	Stake	Level	max length	max width	max base width	stem length	thickness	base shape	stem type	raw material type	broken?	type of break	retouched?	notes
920.002	24:21	2	35.1	21.2	11.6	5.3	7.3	na	contracting stem	chert (black)	yes?		yes?	stem very small - maybe broken and then retouched?
922.001	24:22	1	54.3	20.5	12.5	14.6	10.7	v-shape	contracting stem	quartzite	no			
922.002	24:22	1	58.1	22.6	17.1	14.5	9.7	square	contracting stem	quartzite	no		no	
922.003	24:22	1	52.7	28.7	17.7	18.8	10.6	u/v-shape	contracting stem	chert (tan/brown)	yes	tip and portion on blade	yes?	possible retouch on tip due to it curving and not coming to a point
923.001	24:22	2	45.3	27.2	19.4	na	7.7	na	contracting stem	chert (beige/brown)	yes	stem (impact?)	no	offset blade
925.005	24:26	1	78.1	35.1	27	22.4	10.2	V-shape	contracting stem	quartzite	yes	tip - lateral (post depo?)	no	some cortex on exterior
925.006	24:26	1	48.4	26.6	na	na	9.8	u/v-shape	contracting stem	chert (black)	no		no	weak shoulder; unifacially worked with pressure flaking on both sides
927.001	24:26	3	41.1	22.4	11.1	13.9	7	u-shape	contracting stem	quartzite	no		no	
927.002	24:26	3	44.5	30.9	17.8	8.5	6.5	U-shape	contracting stem	chert (grey/tan)	no		no	
927.003	24:26	3	67.6	32.8	13.4	13.2	9.2	square	straight	quartzite (light grey)	yes	shoulder	yes	possible attempt at shoulder retouch; barbed shoulder, [illegible]
937.001	25:19	3	44.9	33.4	20.3	18.2	6.6	U-shape	contracting stem	quartzite	yes	lateral snap - distal	no	two lateral breaks, base and part of midsection glued back together
937.002	25:19	3	52.1	25.5	16.7	18.5	12	u/v-shape	contracting stem	quartzite	yes	tip - impact fracture?	no	
937.003	25:19	3	38.7	26.2	18.3	11.6	8.3	convex	expanding	quartzite (light grey)	yes	shoulder	no	slightly barbed shoulder, corner notched
939.003	25:20	1	35.1	36.8	23.6	13.3	8.3	na	contracting stem	chert (white/pink) banded	yes	lateral snap - distal and stem	no	shoulder (one) points angled slightly down (barbed)
939.004	25:20	1	32.9	30	uk	uk	7.1	uk	uk	chert (pink/red)	yes	lateral snap - distal and stem and part of	no	possible barbed shoulder; likely corner notched
939.005	25:20	1	42.1	24.7	18.4	15.5	8.8	square	straight	chert (black)	no		yes?	retouch on tip; straight shoulder, corner notched
940.001	25:20	2	49.3	25.7	17.7	17.2	7.7	v-shape	contracting stem	quartzite	no		no	
944.001	25:21	3	66	33.2	19.6	15.2	8.1	square	expanding	chert (tan/beige)	no		yes?	barbed shoulder, corner notched, curved blade, tip reshaped into drill?

Appendix C: Chipped Stone Hoes Data Table

Prov Number	Stake	Level	max length	max width	min width	thickness	weight (g)	# of blades	broken?	type of break	raw material	use wear	notes
245.001	13:25	1	75.6	77.6	51.7	24.7	174.7	1	no		hematite	polishing on blade	outer layer of hematite breaking off; polishing on portion that would be hafted (both sides)
598.005	19:29	1	106.8	78.6	52.8	17.8	160.9	1	yes	split down the midsection	quartzite (reddish brown)		section between blades appears to be longer and straighter than others; possibly no secondary blade?
622.005	19:37	1	57.5	48.9	33.9	11.8	42.1	1	yes	split down the midsection	quartzite (black)	polishing on blade	tool is much more angular and straight compared to other pieces. Shape more similar to a modern axe blade
876.001	23:23	1	102.3	82	68.4	16.6	206.4	1	yes	split down the midsection as it begans to expand towards other blade	Argilite (black)	polish on both surfaces and blade	polish and heavy chipping on blade indicates a lot of use
574.004	19:19	2	76.2	63.2	47.7	17.4	90.8	1	yes	split down the midsection	quartzite (dark grey)	chipping on blade	tool is much more angular and straight compared to other pieces. Shape more similar to a modern axe blade
686.003	20:38	2	101.7	42.6	18.3	12.5	44.7	1	no		quartzite (light grey)		narrow, angular blade
293.001	14:23	3	84.7	101.1	59.1	26.6	232	1	yes	likely broken in the midsection between blades	quartzite (light grey)	possible polish on blade	only one blade, looks like it should be double; unable to see polishes due to caked on dirt
434.001	16:37	3	100.5	80.4	40.4	22.2	203.1	1	no		hematite	polish on both surfaces and blade	likely large impact fracture on the blade that cracked the hematite
484.001	17:24	3	109.4	76.1	22.8	16.8	180.2	1	no		argilite (black)	polish on both surfaces and blade	all portions have polishing and there are several small and large impact fractures on blade
276.001	13:39	1	93.9	72.6	52.5	31.9	235.7	2	no		quartzite (reddish brown)	polish on both surfaces	one blade bigger than the other; polish on both surface from use or haft
306.001	14:28	1	243.5	117.5	91	32.3	1105.8	2	no		quartzite (light grey/beige)	polishing on blade	very large blade with minimal evidence of polishing on either surface but a little on the larger blade; oxidation of both surfaces
320.001	14:33	1	90.1	64.1	41	23.2	158.3	2	no		quartzite (reddish brown)	polishing and chipping on blade	smaller blade side is dulled with a lot of caked on dirt, larger blade side is thicker and sharper; polishing on both surfaces

Prov Number	Stake	Level	max length	max width	min width	thickness	weight (g)	# of blades	broken?	type of break	raw material	use wear	notes
427.001	16:34	1	127.2	60.9	54.3	21.4	247.2	2	no		quartzite (dark grey)		one blade is thinner and sharper than the other, both blades are about the same size; no polishing on surface or blades but quartzite grain is fairly rough
444.003	17:5	1	67	56.8	30.5	24.2	79.1	2	yes	part of the end of the smaller blade	quartzite (black and red)	polish on both surfaces and blade	larger blade has an impact fracture and smaller blade has the broken portion
603.001	19:31	1	106.4	71.4	53.9	22.8	189.6	2	no		Chert (black)	polish on both surfaces	both blade appear to have small chips and polish; both blades appear to be the same size and shape
622.004	19:37	1	103.2	72	46.1	20.6	134.9	2	no		quartzite (med grey)		one blade is wider and less curved than other - which is more curved and thinner
349.001	15:20	2	109.6	79	49.3	26.5	240.1	2	no		quartzite (med grey and red)	polish on both surfaces and blade	larger blade is thinner with more polish than smaller blade
407.002	16:25	2	69.3	54.7	29.4	11.3	42.8	2	no		quartzite (med grey)	polishing on blades	both blade appear to have small chips and polish despite one blade being larger than the the other
541.001	18:25	3	111.5	65.9	40.4	35.1	202.9	2	yes	half of one of the blades - diagonal break	quartzite (reddish brown)	polish on one surface	one surface is heavily covered in caked dirt; other surface shows evidence of polish; blades appear to have many small chips indicative of use
204.039	dst drt		97.1	66.6	57	34.1	254.5	2	no		quartzite (dark grey)	polish on one surface	one blade more curved and thinner than the other; likely polish from hafting or use
204.040	dst drt		113.2	80	52.5	31.8	258.1	2	no		quartzite (med grey)	na	one blade bigger than the other; smaller blade slightly thinner; unable to see polishes due to caked dirt on surface