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# A RE-CONCEPTUALIZATION OF THE FOURCHE MALINE CULTURE: THE WOODLAND PERIOD AS A TRANSITION IN EASTERN OKLAHOMA

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A RE-CONCEPTUALIZATION OF THE FOURCHE MALINE CULTURE: THE WOODLAND PERIOD AS A TRANSITION IN EASTERN OKLAHOMA

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF ANTHROPOLOGY

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## Dedication

This dissertation is dedicated to my grandfather Luther Leith who only received a fourth grade education. His support over my life taught me you can do anything if you set your mind to it. I further dedicate this dissertation to my mother (Phyllis) and father (Steve) for all their support they have provided me though out my life (Thanks Mom and Dad). Finally, I dedicate this dissertation to my my wife Liz, son Malcolm, and our soon-to-be son Liam. Family is what makes life great.

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Table of Contents

## List of Tables

## List of Illustrations

## Abstract

The question: “What is Fourche Maline?” has been long debated in Oklahoma. It is argued here that use of a transegalitarian framework is useful in addressing this question. It is proposed that Fourche Maline culture represents transegalitarian complex hunter-gatherer-horticulturalists on the prairie/woodland boarder of eastern Oklahoma. To address this hypothesis the social organization, subsistence, bioarchaeology, settlement patterns, and evidence for territoriality are examined. This research also revises the chronology for the Woodland Period in eastern Oklahoma, and brings Oklahoma terminology into line with the surrounding states. Based on laboratory analysis of existing W.P.A. (Works Progress Administration) collections, more recent collections, and fieldwork (including geophysical remote sensing) indicate that Fourche Maline people are transegalitarian hunter-gatherer-horticulturalists.

# Chapter 1: Introduction

What is Fourche Maline? This is a question that Oklahoma archaeologists have pondered for a long time. Schambach (2002) says the original conceptualization of Fourche Maline (in Oklahoma) was mainly an Archaic people with a Woodland Period veneer. The few available radiocarbon dates at the time supported the conclusion. In Oklahoma the tendency has been to view Fourche Maline as an Archaic/Woodland transitional culture (Bell and Baerreis 1951; Bell 1953; Galm 1981, 1984; Galm and Flynn 1978; Proctor 1957; Sharrock 1960). However, Orr (1952) considered Fourche Maline Focus to be mainly Early to Middle Woodland in age. Much of the past research has been focused on developing trait lists and determining where Fourche Maline fits in the regional chronology.

It is important to understand what Fourche Maline is because it is the formative culture for the later Caddoan peoples and is immediately prior to the spectacular Spiroan cultural manifestation in the Arkoma Basin. As the Spiroan people were practicing agriculture and developing a ranked society, a full understanding of this cultural florescence is impossible without understanding its roots in the Fourche Maline culture.

This dissertation addresses the question: What is the Fourche Maline culture in Oklahoma? Basically, who was living in eastern Oklahoma from around 3,500 to 1,500 years ago, and how were they making their living? I propose that Fourche Maline people were transegalitarian, complex hunter-gatherer-horticulturalists. Here I am using the term transegalitarian in the sense that Fourche Maline culture fits somewhere in the continuum between egalitarian bands, and ranked chiefdoms (Ames 2008; Clark and Blake 1994;

Hayden 2001; Sassaman 2004). Further, my use of the term complex refers to the number of parts in the society (Sassaman 2004). Following Clark and Blake (1994), a transegalitarian society should appear neither egalitarian or ranked. As stated in the title of this dissertation I identify the Woodland Period of eastern Oklahoma as a transitional time, where the complexity identified in the succeeding Mississippian Period develops.

The term transegalitarian provides a framework for researching the origin of complexity seen in the later Caddoan Period as it provides explanations of how and why inequality and complexity emerge. Also transegalitarian is a generalized term for societies between egalitarian and ranked levels of organization, but it avoids the pitfalls of earlier taxonomies as it allows independent variation in the traits that are tied to the origin of inequality. This framework provides an important first step in understanding the origins of Caddoan culture by analyzing the different traits that define Fourche Maline culture.

To address whether Fourche Maline people were transegalitarian, complex hunter-gatherer-horticulturalists, the social organization, subsistence, bioarchaeology, and settlement patterns are investigated. Information gleaned from this research also suggests the presence of two Fourche Maline groups inhabiting discrete non-overlapping territories. If Fourche Maline culture represents transegalitarian, complex hunter-gatherer-horticulturalists we would expect to see indicators of this in the archaeological record.

**Social Organization Expectations**

Transegalitarian refers to societies in the middle section of a complexity continuum between true egalitarian hunter-gatherers and ranked societies such as chiefdoms and states. To address the hypothesis that Fourche Maline people were transegalitarian I

examined the mortuary patterns, pottery technology and household structure in order to find evidence of the social organization of Fourche Maline and how these material remains relate to prestige based competition and possible wealth differences. Also, this research will explore the topic of complexity as seen in the use of midden mounds as repositories for the dead. I expect to identify evidence of both egalitarianism and indicators of emerging inequality.

**Subsistence Expectations**

Hayden (2001) suggested that the prestige competition present in transegalitarian societies is often based on the ability to produce a surplus of food which can then be used in competitive feasting or converted into prestige goods. This requires a subsistence base that is either in a resource rich environment with inexhaustible resources (such as salmon in the Northwest Coast), or it requires food production (Hayden 2001). Some transegalitarian societies produce a surplus, which potential aggrandizers can use as the basis of their competition. I will examine the evidence for surplus production by Fourche Maline people. I hypothesize that Fourche Maline represents the transition from hunting and gathering to horticulture. To test this hypothesis I have conducted an analysis of the material culture, faunal, and floral remains from several Fourche Maline sites. If Fourche Maline people were transitioning to horticulture I would expect to identify agricultural tools, plant remains that exhibit either domesticated attributes or appear to be in the process of domestication, and an intensification in the use of large game species.

**Bioarchaeology Expectations**

The bioarchaeological expectations are tied to the subsistence expectations and will further test the hypothesis that Fourche Maline people were transitioning to horticulture. The following skeletal traits have been identified as correlated to the adoption of an agricultural diet: increased rates of dental caries and abscesses, evidence of degenerative joint disease, and an overall reduction in health (Bridges 1989, 1992; Buikstra et al. 1986; Danforth 1999; Konisberg et al. 1989; Milner 1982; Tainter 1980; Tayles et al. 2000; Wood et al. 1992; but see Goodman 1993 for critique). If Fourche Maline are transegalitarian, hunter-gatherers who are transitioning to horticulture, there should be traces of this shift in subsistence present in the skeletal material. I would expect individuals from the earlier, hunter-gatherer populations to have low rates of dental pathologies, low rates of degenerative joint disease and low levels of infectious disease. Populations transitioning to horticulture should exhibit increases in the stated pathologies, with increased reliance on semi-domesticates and domesticates indicated by increasing levels of pathologies.

**Site Structure Settlement Patterns**

There has been a long held idea that Fourche Maline people were living on the midden mounds on a semi-sedentary (seasonal) basis. Increasing sedentism and populations have been identified as common traits for transegalitarian societies (Clark and Blake 1994; Hayden 2001). Clark and Blake (1994) and Hayden (2001) have divorced the origins of inequality from food production. They state that production of surplus through food production (or a resource rich environment) are a result of aggrandizers desire of

resources to use in competition. Increased intensification in subsistence practices usually leads to the development of surplus as well as increasing populations and sedentism (to provide a labor pool).

I propose that Fourche Maline people were experiencing population growth and were becoming increasingly sedentary. Further I propose two interrelated subsidiary hypotheses concerning Fourche Maline settlement patterns: 1) Fourche Maline people did not live on the midden mounds, and 2) Fourche Maline domestic activities and habitation were located in areas adjacent to the midden mounds. To test these hypotheses I conducted geophysical remote sensing at four Fourche Maline sites focusing on areas just off the midden mounds. My expectations are that anomalies representing domestic activities and habitation will be located off the midden mounds.

**Suggestions of Territoriality**

Research from my thesis (Leith 2006) and from recent investigations north of the Sans Bois Mountains (Leith 2009) have suggested lithic raw material preferences were tied to locally available stone north and south of the Sans Bois Mountains. This research led to the development of the hypothesis that there were two groups of Fourche Maline people inhabiting discrete non-overlapping territories in the Arkoma Basin with the Sans Bois Mountains acting as a buffer. To test this hypothesis I recorded information on lithic raw material preferences from several other sites while researching evidence for Fourche Maline as a transegalitarian society. To further address issues of territoriality I also analyzed the possible reasons for the mortuary program using the midden mounds. My expectations are that there are two groups of Fourche Maline people which can be

identified archaeologically based on a strong preference for either Ozark or Ouachita raw material and that these preferences indicate the presence of territoriality. Also, these territories are being conspicuously marked by the midden mounds using the ancestors interred in them to legitimize land claims.

Fourche Maline culture is not limited to Oklahoma and it is important to understand at the regional level. Chapter 2 reviews Oklahoma Fourche Maline within the context of the Caddoan heartland, i.e., the four corners area of Oklahoma, Arkansas, Texas and Louisiana. In order to query the archaeological record and to test the hypothesis a site sample is needed and the chronology needs to be refined. Chapter 3 introduces the sites analyzed in this research, Chapter 4 traces the history of the concept of Fourche Maline and revises the chronology. Chapters 5 through 8 test the hypothesis that Fourche Maline represents transegalitarian, complex hunter-gatherer-horticulturalists. Chapters 9 presents initial research into the development of Fourche Maline territoriality. Finally, Chapter 10 presents a new conceptualization of Fourche Maline and areas for future research.

## Chapter 2: Contextualizing Fourche Maline

Galm (1984) places the Wister and Fourche Maline Phases in his Arkansas Valley Formative Caddoan tradition. Willey and Phillips (1958) defined a Formative culture by the presence of agriculture or a subsistence economy of comparable effectiveness and well-established sedentary village life. They present traits such as pottery, weaving, stone carving and specialized ceremonial architecture as hallmarks of a Formative culture (Willey and Phillips 1958). Basically Formative culture involves a complex interplay of plant domestication, an increase in sociopolitical complexity, technological innovation, changing mobility strategies, changes in settlement patterns, and an increase in social interactions.

Smith (1992) pointed to four advances that allowed archaeologists to really begin to understand the changes in subsistence of Formative people. These are: 1) flotation methodology, which allowed archaeologists to recover the charred remains of small seeds that were the earliest domesticates, 2) Scanning Electron Microscopy (SEM), that allowed the recognition of minute morphological changes in plant remains associated with early domestication, 3) Accelerator Mass Spectrometry (AMS) dating, which allowed better/ more reliable dating using smaller samples, and 4) Stable Carbon Isotope studies of human bone, which yielded direct information on past diets (Smith 1992). Smith (1992) also pointed out a three part sequence for the shift to agriculture: 1) plant domestication (through tending of weedy camp followers), 2) development of food production economies (essentially the shift in dietary importance of cultigens) and 3) shift to mono

crop systems (basically full agriculture with only minor wild supplements). This transition in subsistence correlates to a change in world-view as well as a shift in land use strategies.

Cobb and Nassaney (2002) concluded that as people were domesticating plants there was a concomitant domestication of society. They based their argument for this changing world view on changes in mound construction and use. Increased social discipline can be seen in changing land use patterns as witnessed by the transformation of human attitude and perception of the natural and social world as they domesticated plants, and how those changes corresponded with increasing cultural and social domestication (Cobb and Nassaney 2002). They stated that hunter/gatherers view the land as an object, basically the land is a reservoir of resources to be exploited (Cobb and Nassaney 2002). Hunter/gatherers focus more on territories rather than tenure. In contrast, agricultural people view the land as an instrument. People could manipulate the land on a sustained basis in order to intensify food production (Cobb and Nassaney 2002). Agriculturalists had a notion of delayed return on investments, and they modified the land with the thought and intention of making the long-term yield more routine and predictable (Cobb and Nassaney 2002). With increased labor input in land modification there would be decreased mobility and territorial size due to the greater need to protect prime agricultural land. The increase in discipline, the domestication of society, as well as greater population led to higher degrees of sociopolitical complexity.

Intertwined and coinciding with the domestication of plants and increasing sociopolitical complexity were several material culture innovations. Pottery technology was developed. Pottery was integral to a shift in subsistence economies as pots could be

used for cooking and storing plant seeds. Development of agricultural tools was another important innovation as this allowed increased efficiency and intensification of garden tending, which could indirectly lead to initial domestication. Along with pottery, the presence of processing tools such as grinding stones provides indirect evidence for importance of cultigens. Increased hunting efficiency can be inferred form the adoption of bow and arrow technology. Bow and arrow technology uses smaller projectiles, allowing more efficient use of tool stone. The bow and arrow also allows a faster rate of fire, which could lead to increased hunting efficiency as it increases the likelihood of killing the target animal.

The adoption of pottery would tend to support a hypothesized decrease in residential mobility because the transport costs for moving pots (without breaking them) is very high. Binford (1980) defined residential mobility as the movement of the entire community to the location of the resource. This would tend to cause a decrease in overall mobility in favor of seasonal or longer sedentism. The bow and arrow technology would still allow for logistical mobility in hunting, and the increase in hunting efficiency would make up for the overall decrease in mobility. Logistical mobility is defined as having a central camp/community with work groups going on forays to obtain resources and return them to camp (Binford 1980). An increase in sedentism would cause a need for increased social interaction as people likely lost access to certain resources due to decreased mobility. This change in mobility pattern is directly related to Cobb and Nassaney's (2002) idea of changes in world-view. The decrease in residential mobility (increasing sedentism)

is tied to a shift from viewing the land as a container of resources to one of the land as a tool for growing resources.

Brown et al. (1990) pointed out that there is no such thing as an isolated self-sustaining community, and that all societies are intertwined within a wide economic sphere. Trade would have been a means of increasing social interaction, thus allowing access to certain resources. These authors do suggest that trade tends to be overlooked as most researchers have considered it unimportant or only give it cursory recognition (Brown et al. 1990). Trade can be linked back to increasing sociopolitical complexity as the authors argue that it is important in the growth of political centralization and the development of trade networks and resource distribution. Brown et al. (1990) identified three aspects that are key to research on trade: 1) the need to source the raw material of trade objects, 2) the need to identify the relative value of these objects, and 3) the need to distinguish between the context of manufacture, use, and consumption. They say that warfare, trade and marriage are important in understanding hostility, alliances etc., which are all part of the political economy (Brown et al. 1990).

Fourche Maline culture has several traits typical of such a cultural development. Fourche Maline people developed pottery technology (thick, grog tempered, flowerpot shaped vessels), shifted to bow and arrow technology, and added chipped-stone axe/hoes and groundstone celts to their material culture inventory. They also made gorgets as well as continued use of the bone and shell implements developed earlier during the Wister Phase (Galm 1984). A shared mortuary pattern is evidenced by flexed (with some extended) burials as well as a few possible cremations all with few to no grave goods

located in a midden mound (Galm 1984). There was an inferred shift to horticulture as seen in the adoption of pottery, the presence of grinding stones, and the use of agricultural axe/hoe implements (Galm 1984). Galm (1984:212) suggested Wister Phase people were trading and interacting with other groups identified by the presence of nonlocal raw materials, copper beads, and marine shell.

The relationship of Fourche Maline to the Gibson Aspect has been long discussed (see Davis 1961a, 1961b). During a discussion of cultural chronology between Robert Bell, Edward Jelks, Clarence Webb, Robert Fulton and Robert Stephenson at the Fourth Conference on Caddoan Archaeology, Bell, Jelks and Webb and Fulton identified "pre-Gibson" cultures in Oklahoma, Texas and Louisiana respectively. Stephenson suggested developing an aspect to cover the post-Archaic and pre-Gibson of this area (Davis 1961a).

Among of the first to identify an Early to Middle Woodland culture that can be assumed related to the Fourche Maline people are Fulton and Webb (1953). They discussed work conducted at the Bellevue Mound in Bossier Parish, Louisiana. Bellevue was a conical mound roughly 80 ft in diameter and over 10 ft tall (the mound was heavily disturbed, making estimates of the original dimensions impossible (Futon and Webb 1953). This mound was around 150 ft from a stream near the center of Bossier Parish, roughly two miles west of Bellevue and 20 miles northeast of Shreveport (Fulton and Webb 1953). Fulton and Webb excavated a trench through the mound to identify stratigraphy and cultural affiliation.

The mound capped three stratified midden deposits and three burials were identified (Fulton and Webb 1953). The burials were a mix of flexed burials and a

cremation with few to no grave goods. The material culture was predominately plainware pottery (thick, grog to grog/bone temper, flat bottomed bowls and cylindrical jars), contracting stem (*Gary*) points (Fulton and Webb 1953). Fulton and Webb (1953) concluded that the mound was an Early to Middle Woodland Period earthwork related to mortuary practice, and was constructed by a small group of people who they inferred were practicing some agriculture. The material culture and burial practices are very similar to Fourche Maline, and it is from mounds such as Bellevue that Webb and Fulton argued for a pre-Gibson culture in Louisiana (Davis 1961a)

The first to identify Fourche Maline Focus materials outside of Oklahoma was Raymond Wood in his report on the W.P.A. work at the Poole site (3Ga3) in Arkansas (Wood 1981). Research on Fourche Maline in Arkansas has continued and somewhat eclipsed the Oklahoma work (see Durham and Davis 1975; Hoffman 1977; Rolingson 1983; Schambach 1982, 1998, 2002; Wood 1963). Research on Texas Fourche Maline has been less productive. Early Texas researchers developed an East Texas and LaHarpe Aspect (Johnson 1962; Suhm et al. 1954). Fourche Maline Focus would fit in the Late LaHarpe/East Texas into Gibson Aspects. This is interesting as the Gibson Aspect was one of the Formative cultures Willey and Phillips (1958) identified in the North American Southeast.

Schambach (1998) developed the concept of the Trans-Mississippi South in which to study Formative developments. This biogeographic area covers parts of Missouri, Arkansas, Oklahoma, Texas and Louisiana (Figure 2.1). This area encompassed people who were oriented toward the Eastern Woodland cultural traditions (Schambach 1998).

Material remains from Formative cultures relating to Fourche Maline have been identified in Arkansas, Oklahoma, Texas and Louisiana. To better understand the development of Fourche Maline it is important to compare Oklahoma's Fourche Maline to the Formative cultures in the surrounding states. Table 2.1 presents the cultural chronology for Oklahoma and the surrounding states.

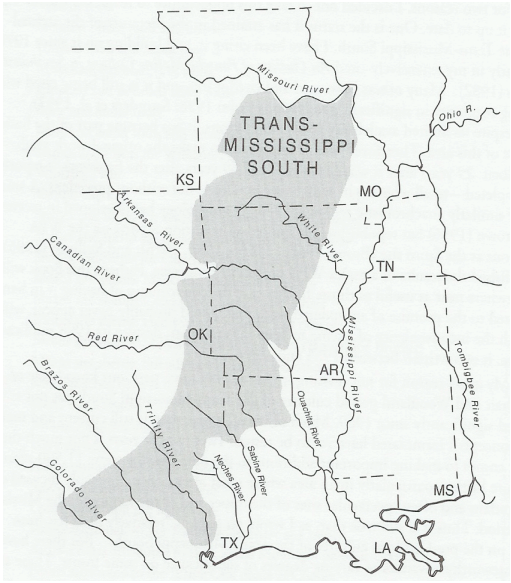


**Figure 2.1: Schambach's revised Trans-Mississippi South (Schambach 1998:xii).**

**Table 2.1: Cultural chronology of the Trans-Mississippi South.**

| | Oklahoma | Arkansas (Arkoma Basin) | Arkansas (Misissippi Alluvial Plain) | Texas (Gulf Coastal Plain) | |
|---|---|---|---|---|---|
| **Time Period** | **Phase** | **Period** | **Period** | **Period** | **Cultural Period** |
| A.D.1700 | Ft. Coffee (Caddoan) | Caddo | Mississippian | Caddoan | Mississippian |
| A.D.1600 | | | | | |
| A.D.1500 | | | | | |
| A.D.1400 | Spiro (Caddoan) | | | | |
| A.D.1300 | | | | | |
| A.D.1200 | Harlan (Caddoan) | | | | |
| A.D.1100 | | | | Formative Caddoan | |
| A.D.1000 | Evans | Caddo/Gober Complex | Coles Creek | | Woodland |
| A.D.900 | | | Plumb Bayou/Coles Creek | | |
| A.D.800 | Fourche Maline | Late Fourche Maline/Gober complex | | Late Fourche Maline | |
| A.D.700 | | | | | |
| A.D.600 | | | Plumb Bayou/Baytown | | |
| A.D.500 | | Middle Fourche Maline/Gober complex | | Middle Fourche Maline | |
| A.D.400 | | | | | |
| A.D.300 | | | Marksville | | |
| A.D.1 | | Middle Fourche Maline | | | |
| 100 B.C. | | | Tchefuncte | | |
| 300 B.C. | | Early Fourche Maline | | Early Fourche Maline | |
| B.C. 300+ | Wister | | | | Late Archaic |

Three Formative cultures in Arkansas appear strongly related to Oklahoma Fourche Maline. These are: the Gober complex, the Plumb Bayou culture, and the Arkansas Fourche Maline. The Gober complex was defined by Hoffman (1977). Sites of this cultural manifestation in western Arkansas are represented by sites in the bottomlands on natural levees. The Gober material culture is made up of many artifacts similar to Fourche Maline such as contracting stem points, and flat bottomed, grog tempered pottery, as well as the presence of a midden burial mound (Hoffman 1977). Hoffman (1977:39) stated that the Gober complex is directly and strongly related to Fourche Maline in Oklahoma. Recently Schambach (2002) argued that these people are not related to Fourche Maline and represent an Emergent Mississippian manifestation from which Spiro grows. He argued that the site layout/organization, the house patterns, the presence of *Stuben* points and the argillite spade/hoes indicate these people are not Fourche Maline material traits (Schambach 2002).

However, problems exist with Schambach's (2002) argument. First, the major drawback of past research, especially in Oklahoma, has been the sole focus on the midden mounds. We know little to nothing about Fourche Maline settlement patterns, or houses because of the lack of off-mound testing. Consequently, arguing that the settlement pattern and houses do not look like Fourche Maline is spurious. Second, the *Stuben* points conform favorably to the large corner-notched, expanding stem points of the Wister Phase. Schambach (2002) has gone to lengths to remove any Archaic component from his conceptualization of Fourche Maline in Arkansas, and this contrasts markedly with Oklahoma researchers who recognize the continuity between the Archaic, Wister Phase

and the subsequent Woodland, Fourche Maline Phase. Classifying the points as *Stuben* also has its problems as the distribution of this point type is Illinois, Missouri, and Iowa, and they are also comparable with re-sharpened *Marcos* or possibly *Ensor* points commonly associated with Wister assemblages in Oklahoma. Lastly, the argillite spades that are a hallmark of the Gober complex have been identified in at-least one Fourche Maline site in the Arkansas drainage (34Hs111) (Leith 2009). On this basis I would argue that the Gober complex, if not a manifestation of Fourche Maline in western Arkansas, is at least (as Hoffman 1977 stated) very closely related to the Fourche Maline culture.

Rolingson (1983, 1990, 1998a, 1998b, 2002) defined and has refined the concept of a Plumb Bayou culture of the Mississippi Alluvial Plain of east central Arkansas. Her concept of Plumb Bayou is a Woodland to Late Woodland culture (A.D. 600 to 1000), which fits well with the Oklahoma Late Fourche Maline to Evans Phase transition (Table 2.1). The Plumb Bayou people were the Formative group that built Toltec Mounds.

Toltec represents a early Mississippian manifestation of eastern Arkansas. Rolingson (1983) stated that there is continuity in ceramic industries (no forms drop out of use; they only change frequencies). The diagnostic pottery type of this culture is *Baytown Plain*, a thick, flat bottomed, grog to grog-grit tempered, flowerpot-shaped ware (Rolingson 1998a). She alluded to the fact that the only real difference between *Baytown* and *Williams Plain* is the presence of grit in some of the Arkansas vessel tempers (Rolingson 1998b).

The lack of published data on Fourche Maline sites in Oklahoma presents a problem, as I have personally seen *Williams Plain* vessels with grog-grit temper in

Oklahoma. Also of note, is the possibility of the grit being tied to clay sources rather than intentional additions. Either way, *Williams Plain* and *Baytown Plain* can and probably should be considered synonymous.

It is likely that Plumb Bayou people were one of the first groups in the region to be influenced by the Coles Creek societies in the Lower Mississippi Valley. Rolingson (1983, 1990, 1998a, 1998b, 2002) said there are strong ties between Plumb Bayou and Fourche Maline, and she and Belmont (1983) suggested that the cultural fluorescence seen at Toltec was basically Arkansas Fourche Maline people adopting and adapting Emergent Mississippian ideology, but doing it their own way.

Finally, Frank Schambach was instrumental in developing the concept of the Fourche Maline culture in southwest Arkansas. He defined a large biogeographical area, the Trans-Mississippi South, and stated that Fourche Maline represents a long-term adaptation in this area based on findings from two W.P.A. Fourche Maline sites for his dissertation (Schambach 1982). Schambach stated in his 1982 work that Fourche Maline culture was the foundation of the complex Mississippian cultures that were to follow (Toltec, Crenshaw, Spiro etc.). He pointed out, similar to Rolingson's findings, that the Fourche Maline people were influenced by (not replaced by) the Lower Mississippi Valley culture, and that they accepted and adopted the ideology in their own way (Schambach 1982).

During his work in the 1980s Schambach apparently recognized continuities between Fourche Maline and Spiroan cultures, but not the later Caddo. In 2002 Schambach published a new perspective on Fourche Maline. In this he totally cuts all the

"Archaic baggage" (his words) from the Fourche Maline culture, making it completely a Woodland Period manifestation. He conceptualized Fourche Maline in Arkansas to develop into the Caddoan culture (Schambach 2002). Schambach (2002) also removes the Gober complex and states that there are no Fourche Maline sites in the Arkansas River Valley. Where Schambach (2002) has cut ties between Fourche Maline and Spiro he now sees ties between Fourche Maline culture and Caddo peoples.

I have recently pointed out the problems I have with Schambach's argument for no Fourche Maline sites located in the Arkansas River Valley. I have reported that there are numerous sites conclusively attributable to Fourche Maline, including 16 along Sans Bois Creek, which drains into the Arkansas River (Leith 2009). I concur with Schambach that Fourche Maline represents the ancestors of the Caddo, but I see the ties going through Spiro (as did Orr 1946, 1952 and Bell 1984). Consequently, other Caddoan speaking ethnic groups are probably involved.

The evidence for Fourche Maline in Louisiana and Texas has had much less research completed and/or published. The earliest research on Fourche Maline looking sites in these areas was Moore's 1912 trip up the Red River for Louisiana, and Suhm et al.'s (1954) discussion of the Gibson and Fulton Aspects in Texas. Moore (2003) identified a few sites such as Gahagan that contained midden burials, which by description sound burials associated with Fourche Maline related sites. Apart from Moore's research and Fulton and Webb's (1953) report on the Bellevue mound, little work has been done/ published on Fourche Maline related cultures in Louisiana.

Suhm et al. (1954) performed the pioneering work on developing a cultural chronology for northeast Texas. They built their chronology using the McKern taxonomic system which has since been replaced by Willey and Phillips (1958) system. Suhm et al. (1954) presented trait lists for several cultural units they were fitting into a temporal framework for east Texas. Fourche Maline or related cultures would be in the pre-ceramic East Texas Aspect and/or into the ceramic using Gibson Aspect. With further refining of the cultural temporal framework Johnson (1962) defined the LaHarpe Aspect (a pre-ceramic period essentially Middle to Late Archaic) replacing the East Texas Aspect. Here Fourche Maline would be found in the late LaHarpe and early Gibson archaeological units. The artifact base for this transitional time period is contracting stem points and thick plainware pottery.

Perttula and Bruseth (1998) presented an updated review of Caddoan archaeology. Bruseth's (1998) northeast Texas cultural sequence goes from Fourche Maline to Formative Caddoan to Caddo. He stressed continuities between the three cultural units based on material culture and mortuary practices, and uses Schambach's (1982) Middle and Late Fourche Maline (B.C. 100 to A.D. 900) sequence.

In the Fourche Maline culture we see the first glimpses of what blossoms into the Caddoan Mississippian. The Fourche Maline people begin tending plants starting down the road to domestication. Fourche Maline also entails the development of semi- to fully sedentary villages. The people are practicing a variation of mound burial and are developing the technologies such as the bow and arrow, pottery and incipient horticulture, which are critical to the development of the Mississippian culture.

The Mississippian cultural emergence dates to roughly A.D. 800 to 1000, and the Mississippian Period continues until around A.D. 1400 (Morse and Morse 1990). Key features of the Mississippian culture are the building of mounds and the shift in subsistence to maize agriculture (Morse and Morse 1990). Mound building, the planned layout of the sites, as well as differential funerary rites potentially result from a high level of sociopolitical complexity. Anthropologists define this level of organization as chiefdoms (Service 1971).

Agriculture was the economic basis for of the Mississippian people. This economy was derived from several Woodland societies, which had varying histories of interaction with domestication. Gremillion (2002a) pointed out that the native people from the Midwest and Midsouth had a deep history of agriculture (throughout the Woodland Period) using North American domesticates before the introduction of maize, whereas the Deep South had only minor evidence of pre-maize agriculture. Perttula (2008) stated that starchy, oily seeds were a minor aspect of the Woodland people's diet in the Caddo area. Plant husbandry likely occurred as early as the Late Archaic, but archaeologically recovered examples of cultigens are rare for the Woodland Period (Perttula 2008). Perttula (2008) acknowledged that the lack of evidence of horticulture in the diet of Fourche Maline people could stem from a lack of research focused on the Fourche Maline culture in general and specifically a lack of adequate testing required to recover North American cultigens. Perttula (2008) and Gremillion (2002a) primarily use Ozark Bluff Dweller data (from Arkansas and Oklahoma respectively) for their Woodland Period evidence. The

Ozark Bluff Dwellers of northeastern Oklahoma and northwestern Arkansas show little similarity to the Fourche Maline culture of southeast Oklahoma.

The Fourche Maline people inhabit an ecotone that comprises the transition from the plains to the woodlands of North America. Many of the cultures Gremillion (2002a) identified as having gradual horticultural development are in similar ecotones. Perttula's (2008) discussion focuses on the Gulf Coastal Plain of Texas, an area that Gremillion (2002a) suggested had little evidence of agriculture before the introduction of maize. Pertulla (2008) pointed out that the Gulf Coastal Plain is an area that is subject to long and short-term climate fluctuations that increases the level of risk involved with adopting an agricultural lifestyle (Perttula 2008). The relatively late adoption of agriculture by the Caddo people (650 or less years ago) may be explained by the possibility of periodic droughts being a major disincentive to agriculture (Perttula 2008). People of the Fourche Maline culture inhabit the Southern Plains/Eastern Woodlands ecotone, an area where seasonal flooding is common (Schambach 1998). Floodplain soils are very conducive to agriculture; in fact three of the four native cultigens from North America can be considered floodplain weeds (Smith 1992). Evidence from this research could indicate that the Woodland/Plains ecotone was an important factor in the gradual development of agricultural societies.

The Mississippian cultural period was also noted for extensive exchange networks. This is witnessed by the ritual paraphernalia of the pan-regional mortuary and religious system that developed during Coles Creek and subsequent cultural phases (Bruseth 1998). Also, the presence of exotic materials occurring at many of the mound centers of the

Trans-Mississippi South such as Spiro, Toltec, Crenshaw and George C. Davis provide further evidence (Durham and Davis 1975, Newell and Kreiger 1949; Orr 1946, 1952; Rolingson 1990, Wood 1963).

This brings up the question: How does Fourche Maline relate to the emergence of Mississippian and especially the Caddoan cultures? To address this question I focus on the relationship of Fourche Maline to the Spiro, Toltec and Crenshaw sites. Spiro, Toltec and Crenshaw are mound groups that represent prehistoric ceremonial centers likely tied to the Mississippian chiefdoms of the southeastern United States. These sites and related cultures were contemporaneous with each other as well as the Emergent and full Mississippian Periods in the Central and Lower Mississippi Valley.

**Fourche Maline and Spiro**

Picarella (1999) argued that there is evidence of *in situ* development from Fourche Maline to Spiro in the Arkoma Basin. Further evidence is given by Bell (1984) who saw the Harlan Phase growing out of late Fourche Maline. The presence of possible Fourche Maline related middens at some of the Spiro Phase sites such as Harlan and Spiro could attest to the idea that the Fourche Maline people were the first inhabitants of these sites (Bell 1984; Orr 1946, 1952; Wyckoff 1980).

The Spiro site consists of 12 mounds divided into two clusters: a western mound group surrounding a plaza and an eastern group representing a major burial mound and two house platform mounds (Rogers 1989). The Spiro site represents one of the western-most extensions of the "Southern Cult" (Mississippian) influence (Orr 1946, 1952). Rogers (1989) saw Spiro as representing the development of ranked social organization.

Along with this comes the development of hierarchical settlement types (ceremonial centers-vs-hamlets and farmsteads), a dependence on maize, and expanding levels of interaction to the east. This is a trend we see in the emergence of Mississippian culture (Morse and Morse 1990).

The artifact evidence of ties between Fourche Maline people and Spiro people can be seen in the ceramic and lithic technologies. The common utilitarian plain-ware during the Evans, Harlan, and early Spiro Phases is *Spiro Plain*. This pottery type is thick, grog tempered, plain (with possible simple incised line decorations) vessels that resemble "flower pot" forms (Orr 1952). This vessel type conforms favorably to the description of the diagnostic Fourche Maline pottery type, *Williams Plain* (Bell 1953). Evans, Harlan, and Spiro Phases witness the development of numerous decorated varieties of pottery (Bell 1984; Orr 1946, 1952). These pottery types show influences from the Lower and Central Mississippi Valley "Southern Cult" to the east (Orr 1946). It should be noted that Orr (1946, 1952) argues that the "Southern Cult" influences, rather than replaces, the resident Fourche Maline people.

The lithic evidence, though not quite as diagnostic, manifests continuity. Sites relating to the Harlan and Spiro Phases have contracting stem bifaces (dart points/knives) as well as small corner-notched arrow points (of the *Scallorn* variety) (Bell 1984; Orr 1952). These are the same tool forms found at sites relating to late Fourche Maline occupations (Galm and Flynn 1978; Galm 1984). Spiro also has the chipped and ground stone axes and hoes (Orr 1952) similar to those found in the Fourche Maline assemblages.

**Fourche Maline and Toltec**

Schambach (1998) discussed the evolution of Fourche Maline in Arkansas. He divides Fourche Maline into three eras (early, middle, late), with seven numbered periods (Schambach 1982). Schambach (1982) contended that Late Fourche Maline people are mound builders. Rolingson (1998a, 1998b) asserted that Plumb Bayou culture develops out of the Middle to Late Fourche Maline in Arkansas and that this cultural group was responsible for the development and construction of the Toltec mounds. Toltec is the major ceremonial center for the Plumb Bayou culture. The site is located in the Arkansas River drainage at the east edge of the Arkoma Basin and Ouachita Mountains. It consists of 18 mounds with a lengthy embanked margin and covers 40 ha. (Rolingson 1990). The size and arrangement resembles those of Mississippian culture, however, the artifact assemblage is clearly not Mississippian (Rolingson 1990).

Clay/grog tempered plain wares dominate (90+%) the ceramic assemblage (Rolingson 1990). Much of this plain ware is the variety *Baytown Plain*. Rolingson (1998b) said the only difference between *Baytown Plain* and *Williams Plain* is the presence of grit in some of the *Williams Plain* temper. This would indicate an outgrowth from Fourche Maline. Hemmings and House (1985) argued that the diagnostic formative Mississippian ceramics found in the Plumb Bayou culture reflect Fourche Maline copying of Mississippian forms/designs with the typical Fourche Maline local paste/temper (grog and bone). The lithic assemblage is similar to what we see at Spiro, and it is noteworthy that the raw materials for Toltec tools come from the Arkansas River drainage and the Ouachita Mountains (Rolingson 1990).

**Fourche Maline and Crenshaw**

Crenshaw is another Caddoan mound center located in in the Red River valley of Miller County, Arkansas. Wood (1963) said that Crenshaw may represent the initial manifestation of the "Southern Cult" in the Caddoan area. The Crenshaw site is on the west bank of the Red River and consists of six mounds (Durham and Davis 1975). These mounds were first examined by C. B. Moore in the early 1900s (Moore 2003). The Coles Creek Phase at Crenshaw has similarities to Fourche Maline culture as seen in the presence of midden mounds that contain burials with few grave goods. Durham and Davis (1975) argued that the earliest occupation at Crenshaw was Fourche Maline. Later occupations saw steadily increasing Mississippian influence (more elaborate ceramics and more, larger mass-graves). Basically the Coles Creek Phase at Crenshaw represents a base of Fourche Maline people copying Mississippian culture in a Fourche Maline way (Durham and Davis 1975).

## Chapter 3: Site Summaries and Research Strategies

To address the hypothesis that Fourche Maline represents a transegalitarian, complex hunting-gathering-horticultural society, nine sites from eastern Oklahoma associated with the Fourche Maline culture were selected. All of the sites are in the Arkoma Basin, either in the Fourche Maline/Poteau or the Sans Bois drainages. Three of the sites are along Fourche Maline Creek, and one site overlooks the Poteau River in LeFlore and Latimer counties. The remaining sites are approximately 30 miles (48 km) north in the Sans Bois drainage of Haskell County (Figure 3.1). Between these two watersheds lay the Sans Bois Mountains.

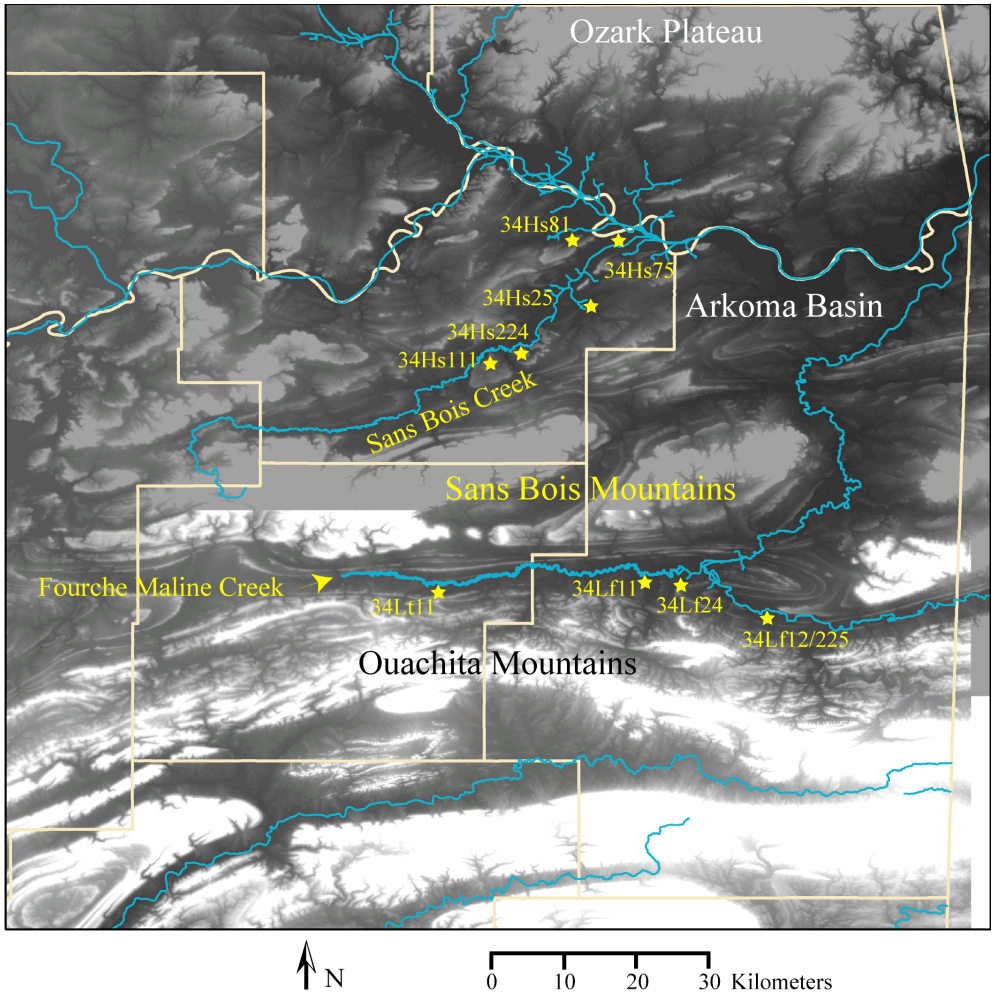


**Figure 3.1: Location of the sites researched.**

**Environmental Setting**

The sites from LeFlore and Latimer counties are adjacent to Fourche Maline Creek (from which the culture gets its name) or the Poteau River. Fourche Maline Creek flows east on the north side of the Choctaw Fault and is the southernmost drainage in the Arkoma Basin. The creek is a tributary of the Poteau River, which eventually drains into the Arkansas River near the town of Arkoma, Oklahoma.

The bedrock underlying Fourche Maline Creek is Atoka Formation. This formation is made up of shale and fine to coarse-sandstone (Marcher and Bergman 1983). Russell (1960) noted the Atoka Formation is made up of silty shales with silty sandstone beds with some clay ironstone concentrations. The soils in the drainage are Neff-Rexor silt loams resulting from the weathering of the silty shales and sandstone bedrock (Brinlee and Wilson 1981). These soils have a high potential for farming as well as woodlands, and are periodically flooded, thus replacing nutrients (Brinlee and Wilson 1981). This suggests areas containing these types of soil would have been highly sought after by people focusing on nut harvesting as well as transitioning to farming.

The sites in Haskell County are adjacent to either Little Sans Bois Creek, Sans Bois Creek, or one of its tributaries. These sites are in the Hill and Valley Belt of the Arkoma Basin (Curtis and Ham 1972) south of the Arkansas River and its fertile valley. Little Sans Bois Creek and Sans Bois Creek drain into the Arkansas River near the Robert S. Kerr Dam. The Sans Bois valley varies from several miles wide to around one mile wide. The Arkoma Basin lies between the Ozark Plateau to the north and the Ouachita Mountains to the south. It varies between around 15 to 30 miles wide (24 to 48 km.) and is

marked by numerous hills. Wyckoff (2010) notes that there is a thick chert mantle in the Ozark Plateau bedrock. Many of these cherts are knappable and are found in great quantities in the streams draining the Ozarks (Wyckoff 2010).

The bedrock in this area is the McAlester Formation, which is made up of shales and fine to coarse-grained sandstones, with some coal beds, some beds and lenses of limestone and some clay ironstone (Marcher 1969, Marcher and Bergman 1983; Oakes and Knechtel 1948). The bedrock in this area weathers to sand, silts and clays with the prevalence of shale, explaining the fairly high clay content of the soils in which the sites are found (Leith n.d.). Also present are thin beds of siderite that is exposed in river cuts. This material has been noted as the toolstone used to make axe/hoe tools common to Fourche Maline sites.

According the *Soil Survey of Haskell County, Oklahoma* (Brinlee 1975) the soil association in which the sites chosen from Haskell County are located is Rexor-Guyton. These loamy soils are deep, nearly level or gently sloping, and poorly drained (Brinlee 1975). The Rexor Series soils are formed under hardwood trees and are subject to flooding (Brinlee 1975:19). Near the streams these soils are further designated as channeled with areas mapped as Guyton comprising 13% of the acreage. The Guyton Series are also loamy soils covered by hardwoods (Brinlee 1975:9-10). The bottomland soils in most of the area (the Guyton silt loam and the Rexor silt loam) are conductive to farming (Brinlee 1975). However, flooding can be problematic, especially in the Rexor channeled soils (Brinlee 1975). Again, as in the Fourche Maline drainage, the bottomland areas would be sought after for the people using hickory nuts and transitioning to farming. As these

people occupied these zones they would have opened areas and disturbed the soil allowing weedy camp followers to flourish.

**Regional Resources**

Eastern Oklahoma represents a resource rich environment bounded by the prairie/ woodland (Cross Timbers) ecotone to the west and the rugged Ozark Plateau to the north and the Ouachita Mountains to the south. The Ozarks and Ouachitas are separated by the roughly 40 km wide Arkoma Basin which also has numerous rolling grassy uplands broken by rocky ridges. This area supports several ecological niches from wetlands located near the river bottoms to heavily forested uplands. This wide array of ecological niches supports a wide range of plant and animal life (Tables 3.1 and 3.2).

Galm (1981) presented a vegetation model based on historic reports from Thwaites (1905), Bruner (1931), Fitch (1900), Blair and Hubbell (1938), and Means (1969) as well as from faunal and floral assemblages from his archaeological study sites. He (Galm 1981) identified six biotic communities: oak barrens, oak-hickory forest, bottomland forest, alluvial prairie, scrub oak forest, and mixed pine-oak forest (Figure 3.2) (Galm 1981). These areas and the transitional (ecotone) areas provide habitats for diverse plant and animal communities (see Tables 3.1 and 3.2). Galm's generalized reconstruction can be applied to the Ouachita Mountains. Thwaites (1905:208) also states that Nuttall identified prairies/prairie coves north of what is Galm's study area and into the valley proper and Galm (1981:164) suggests the riparian bottomlands were likely dominated by hardwood forests.

**Table 3.1: Selection of potential plant resources from eastern Oklahoma (adapted from Galm 1981).**

| Scientific Name | Common Name | Edible part |
|---|---|---|
| *Acer* sp. | Maple | Sap |
| *Allium* sp. | Wild Onion | Bulb |
| *Allium canadense* | Wild Garlic | Bulb |
| *Amaranthus* sp. | Pigweed | Leaves, Seeds |
| *Amelanchier canadensis* | Service Berry | Fruit |
| *Asarum canadense* | Wild Ginger | Root Stock |
| *Asclepeias tuberosa* | Butterfly Weed | Shoots, Buds, Pods, Roots |
| *Asimina triloba* | Pawpaw | Fruit |
| *Astragalus* sp. | Ground Plum | Fruit |
| *Carpinus caroliniana* | American Hornbeam | Nut |
| *Carya* sp. | Hickory | Nut |
| *Ceanothus americanus* | New Jersey Tea | Leaves |
| *Celtis occidentalis* | Hackberry | Fruit |
| *Cercis canadensis* | Redbud | Flowers, Fruit |
| *Corylus americana* | Hazelnut | Nut |
| *Crateagus mollie* | Haw | Fruit |
| *Daucus pusillus* | Wild Carrot | Fruit |
| *Diospyrol virginiana* | Persimmon | Fruit |
| *Equisetun laevigatum* | Horsetail | Shoots, Bulb |
| *Fragaria* sp. | Strawberry | Fruit |
| *Gleditsia triancanthos* | Honey Locust | Pulp |
| *Gymnocladus dioica* | Kentucky Coffee Tree | Seed |
| *Helianthus* sp. | Sunflower | Seed |
| *Juglans nigra* | Black Walnut | Nut |
| *Lactuca* sp. | Wild Lettus | Leaves |
| *Morus rubra* | Red Mulberry | Fruit |
| *Nelumbo lutea* | American Lotus | Tuber, Seed, Stalk, Leaves |
| *Parthenocissus quinquefolia* | Virginia Creeper | Stalk |
| *Phytolacca americana* | Poke | Leaves |
| *Plantanus occidentalis* | Sycamore | Sap |
| *Prunus* sp. | Wild Plum | Fruit |
| *Pyrus icensis* | Wild Crab Apple | Fruit |
| *Quercus* sp. | Oak | Acorn |
| *Rhus* sp. | Fragrant Sumac | Fruit, Root |
| *Robina pseudo-acadia* | Black Locust | Seed |
| *Rubus* sp. | Blackberry/Dewberry | Fruit |
| *Rubus occidentalis* | Black Raspberry | Fruit |
| *Rudbeckia laciniata* | Green-headed Coneflower | Young Stems |
| *Rumex* sp. | Dock, Sheep Sorrel | Shoots, Leaves |
| *Saggittaria latifolia* | Broad Leafed Arrow Head | Tuber |
| *Sambucus canadensis* | Elderberry | Fruit |
| *Sassafras albidum* | Sassafras | Bark from root, Twig, Leave |
| *Smilax* sp. | Catbrier/Greenbrier | Rootstock, Young Shoots |
| *Taraxacum officinale* | Dandelion | Leaves |
| *Tilia americana* | Basswood | Flower, Fruit |
| *Typha latifolia* | Cat-tail | Root, Shoot, Pollen |
| *Vaccinium vacillans* | Blue Huckleberry | Fruit |
| *Viburnum prunifolium* | Black Haw | Fruit |
| *Vitis* sp. | Wildgrape | Fruit |

**Table 3.2: Selection of potential animal resources from eastern Oklahoma.**

| Class | Scientific Name | Common Name |
|---|---|---|
| Mammal | *Odocoileus virginianus* | White-tailed Deer |
| | *Castor canadensis* | Beaver |
| | *Sciurus* sp. | Squirrel |
| | *Lynx rufus* | Bobcat |
| | *Canis latrans* | Coyote |
| | *Procyon lotor* | Raccoon |
| | *Urocyon cinereoargenteus* | Grey Fox |
| | *Vulpes vulpes* | Red Fox |
| | *Mephitis mephitis* | Stripped Skunk |
| | *Mustela vison* | Mink |
| | *Sylvilagus floridanus* | Cottontail Rabbit |
| | *Sylvilagus aquaticus* | Marsh Rabbit |
| | *Marmota monax* | Woodchuck |
| | *Didelphis virginiana* | Opposum |
| Bird | *Meleagris gallopavo* | Wild Turkey |
| | *Anseriforms* | Duck/Geese |
| Reptiles | *Macrochelys temminckii* | Allogator Snapping Turtle |
| | *Chelydra serpentina* | Common Snapping Turtle |
| | *Pseudemys* sp. | Cooter/Slider |
| | *Terrapene carolina* | Eastern Box Turtle |
| | *Terrapene ornata* | Ornate/Western Box Turtle |
| | *Apalone* sp. | Softshell Turtle |
| Fish | *Carpoides* | Carpsucker |
| | *Pylodictus olivaris* | Flat-head Catfish |
| | *Ictaluridae* | Catfish |
| | *Lepisosteidae* | Gars |
| Mussels | *Amblema costata* | Three Ridge |
| | *Fusconaia flava* | Pig-Toe |
| | *Quadrula nodulata* | Two-horned Pocketbook |
| | *Quadrula pustulosa* | Warty-Back |
| | *Quadrula quadrula* | Maple-Leaf |
| | *Tritogonia verrucosa* | Buckhorn |
| | *Megalonaias gigantea* | Washboard Mussel |
| | *Eliptio dilatata* | Lady Finger |
| | *Pleurobema cordatum* | False Pig-Toe |
| | *Anodonta grandis* | Common Floater |
| | *Lasmigona complanata* | Pancake |
| | *Strophitus undulatus* | Squaw-Foot |
| | *Actinonaias carinata* | Mucket |
| | *Carunculina parva* | Snuff Box |
| | *Ellipsaria lineolata* | Dromedary Pearlymussel |
| | *Lampsilis anodontoides* | Yellow Sand Shell |
| | *Lampsilis ovata* | Sharp-ridged Pocketbook |
| | *Lampsilis radiata* | Eastern Lampmussel |
| | *Ligumia recta* | Black Sandshell |
| | *Ligumia subrostrata* | Western Pondmussel |
| | *Proptera purpurata* | Bleufer |
| | *Truncilla truncata* | Deer-Toe |
| | *Obliquaria reflexa* | Three-horned Warty-Back |

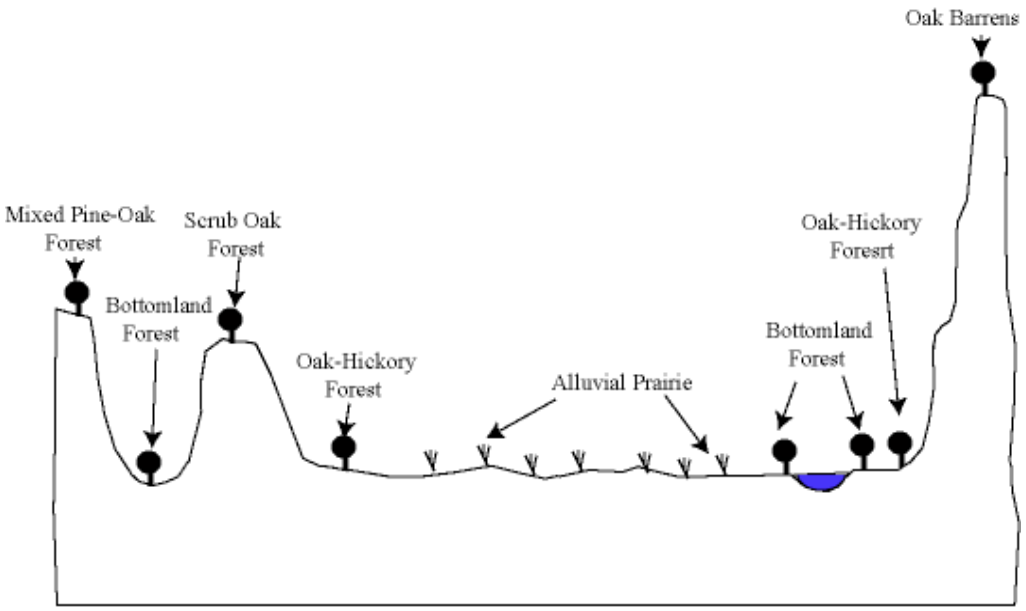


**Figure 3.2: Generalized valley cross section showing the biotic communities (adapted from Galm 1981).**

## Site Summaries

Most of the sites analyzed here have radiocarbon dates. Fundamentally the dates indicate contemporaneous occupations occurred in both the Sans Bois and the Fourche Maline drainages (Table 3.3). Many of the dates for sites in the Fourche Maline drainage were submitted by Jerry Galm during his time with Archaeological Research and Management Center at the University of Oklahoma. Galm performed much of the important work and published several reports covering many of Fourche Maline sites (Galm 1978a, 1978b, 1981, 1984; Galm and Flynn 1978). However, between the time of the Works Progress Administration (late 1930s and early 1940s) and the 1970s many of the sites had been heavily disturbed by looters. This likely explains some of the dates that seem out of sequence based on their depth.

**Table 3.3: Radiocarbon Dates from Sites Analyzed.**

| Site | Unit | Depth (cm) | Depth (in) | Uncorrected Radiocarbon age | Laboratory # |
|---|---|---|---|---|---|
| 34Lf11 | N15-W1 | 10-15 | 4-6 | 1395+/-95 | WSU-2004 |
| | N15-W7 | 15-20 | 6-8 | 2005+/-125 | UGa-1966 |
| | N15-W1 | 25-30 | 10-12 | 1545+/-140 | Tx-2891 |
| | N15-W7 | 25-30 | 10-12 | 870+/-120 | WSU-2001 |
| | N15-W1 | 40-45 | 16-18 | 2225+/-70 | Tx-2892 |
| | N15W7 | 40-45 | 16-18 | 1940+/-90 | UGa-1965 |
| | N15-W1 | 50-55 | 20-22 | 2281+/-85 | UGa-1971 |
| | N15W7 (Burial) | 55-60 | 22-24 | 2150+/-115 | UGa-1967 |
| | N15W1 | 60-65 | 24-26 | 2544+/-75 | UGa-1972 |
| | N15W1 | 65-70 | 26-28 | 2148+/-100 | WSU-2002 |
| | N15W1 | 70-75 | 28-30 | 2580+/-180 | UGa-1973 |
| | N15W7 (Burial) | 80-90 | 32-36 | 2153+/-50 | Tx-2888 |
| | N15W1 | 85-90 | 34-35 | 2925+/-80 | WSU-2005 |
| | N15W7 | 90-95 | 35-37 | 2525+/-85 | UGa-1968 |
| | N15W1 | 100-105 | 39-41 | 2936+/-80 | UGa-1974 |
| | N15W6 | 110-120 | 43-47 | 2827+/-135 | UGa-1977 |
| | N15W1 | 115-120 | 45-47 | 4151+/-130 | WSU-2006 |
| | N15W7 | 120-125 | 47-49 | 4728+/-200 | Tx-2889 |
| | N15W1 | 130-135 | 51-53 | 3492+/-155 | UGa-1975 |
| | N15W7 | 135-140 | 53-55 | 3850+/-155 | UGa-1969 |
| | N15W1 | 145-150 | 57-59 | 3668+/-215 | UGa-1976 |
| | N15W1 | 150-155 | 59-61 | 4048+/-90 | Tx-2893 |
| | N15W7 | 150-155 | 59-61 | 3749+/-110 | Tx-2890 |
| | N15W7 | 165-170 | 65-67 | 4040+/-100 | WSU-2003 |
| | N15W7 | 170-175 | 67-69 | 4500+/-270 | UGa-1970 |
| | TU 36 Feture 1 | 20-30 | 8-12 | 243+/-15 | NZA 35994 |
| 34Lf12/225 | TU 5 F1 | 20-50 | 8-20 | 185+/-20 | NZA 35837 |
| 34Lf24 | 8:03 | 0-15 | 0-6 | 820+/-50 | Beta-250320 |
| | 12:16 | 15-30 | 6-12 | 590+/-30 | Beta-295987 |
| | 6:18 | 30 | 12 | 876+/-50 | UGa-1513 |
| | 10:17 | 30-46 | 12-18 | 1380+/-30 | Beta-295886 |
| | 6:09 | 43 | 17 | 742+/-60 | UGa-1514 |
| | 10:13 | 46-61 | 18-24 | 370+/-30 | Beta-295985 |
| | 14:23 | 71 | 28 | 2055+/-55 | UGa-1515 |
| | 8:19 | 76-91 | 30-36 | 1480+/-40 | Beta-250321 |
| | 2:10 | 78 | 31 | 1880+/-105 | UGa-1517 |
| | 5:11 | 96 | 38 | 1916+/-60 | UGa-1516 |
| | 9:06 | 152-168 | 60-66 | 2230+/-50 | Beta-250322 |
| 34Lt11 | 0-S8 | 10-15 | 4-6 | 1315+/-75 | UGa-2017 |
| | 0-S8 | 15-20 | 6-8 | 1185+/-75 | UGa2016 |
| | S6-W4 | 25-30 | 10-12 | 1515+/-165 | UGa-4042 |
| | S6-W4 | 35-40 | 14-16 | 2410+/-150 | UGa-4043 |
| | S20-E1 | 35-40 | 14-16 | 2250+/-75 | UGa-2015 |
| | N1-W1 | 48-53 | 19-21 | 1915+/-55 | UGa-1520 |
| | 0-W4 | 50-60 | 20-24 | 2610+/-145 | UGa-4044 |
| | N7-W1 | 73-78 | 29-21 | 2990+/-80 | Tx-3367 |
| | S6-W5 | 75-80 | 30-32 | 2480+/-80 | Tx-3365 |
| | S5-W4 | 80-85 | 32-34 | 2465+/-60 | UGa-3207 |
| | 0-W5 | 90-100 | 35-39 | 2900+/-90 | Tx-3514 |
| | 0-W5 | 90-100 | 35-39 | 2705+/-65 | UGa-2860 |
| | N1-W1 | 93-98 | 37-39 | 1945+/-55 | UGa-1521 |
| | N1-W1 | 93-98 | 37-39 | 2940+/-70 | Tx-3812 |
| | S6-W5 | 95-100 | 37-39 | 2820+/-70 | Tx-3366 |
| | N7-W1 | 98-103 | 39-41 | 2720+/-50 | Tx-3368 |
| | N15-W2 | 98-103 | 39-41 | 2200+/-55 | UGA-1522 |
| | 0-W1 | 100-110 | 39-43 | 2810+/-70 | TX-3369 |
| | 0-W1 | 110-120 | 43-51 | 2950+/-50 | Tx-3370 |
| 34Hs25 | S1-W1 | 23-31 | 9-12 | 1080+/-90 | UGa-1914 |
| | S1W8 | 23-31 | 9-12 | 950+/-75 | UGa-1950 |
| 34Hs111 | Strat Profile | 90 | 35 | 1530+/-40 | Beta-215949 |
| | Strat Profile | 137-147 | 54-58 | 1645+/-75 | UGa-1979 |
| | Strat Profile | 150 | 59 | 3060+/-50 | Beta-215950 |

*34Lf11: The Scott Site*

The Scott site (Figure 3.1) is on the floodplain along the east bank of a major bend of Fourche Maline Creek approximately one mile east of the confluence of Coal and Fourche Maline Creeks (Galm and Flynn 1978). The midden mound is approximately 53 m (174 ft) north-south and 36 m (118 ft) east-west and extends to a depth of 1.8 m (6 ft). The site has been eroded along its western margin, so the original east-west dimension cannot be determined. The site is covered in thick vegetation and trees that makes testing of the site unfeasible.

The site is very important as it was one of the type sites used by Bell and Galm in their conceptualizations of Fourche Maline. The site was excavated by Dr. Robert E. Bell in 1947 and 1948, tested in 1974 by Mayo (Mayo 1975), and further excavated by Galm in 1977 and 1978 (Galm and Flynn 1978). Dr. Bell's excavations were the basis of his and Baerreis' formal definition of the Fourche Maline Focus (Bell and Baerreis 1951; Bell 1953). In addition the site was one of the key sites in Galm's (1984) refinement of the old Fourche Maline Focus into the Wister and Fourche Maline Phases.

Dr. Bell excavated 21 1.5x1.5 m (5x5 ft) units in 15 cm (6 in) levels located on the highest point on the midden mound (Bell 1953). He uncovered 15 burials consisting of 18 individuals. Galm excavated 57 1x1 m units; three units were designated control units and were excavated in 5 cm levels; the rest were excavated in 10 cm levels (Galm and Flynn 1978) (Figure 3.3). Another 9 burials representing 10 individuals were identified. Dr. Bell identified 3 occupations (Archaic, Fourche Maline Focus and Fulton Aspect). Galm

identified 4 components (Middle Archaic, Wister Phase, Fourche Maline Phase, and Spiro Period).

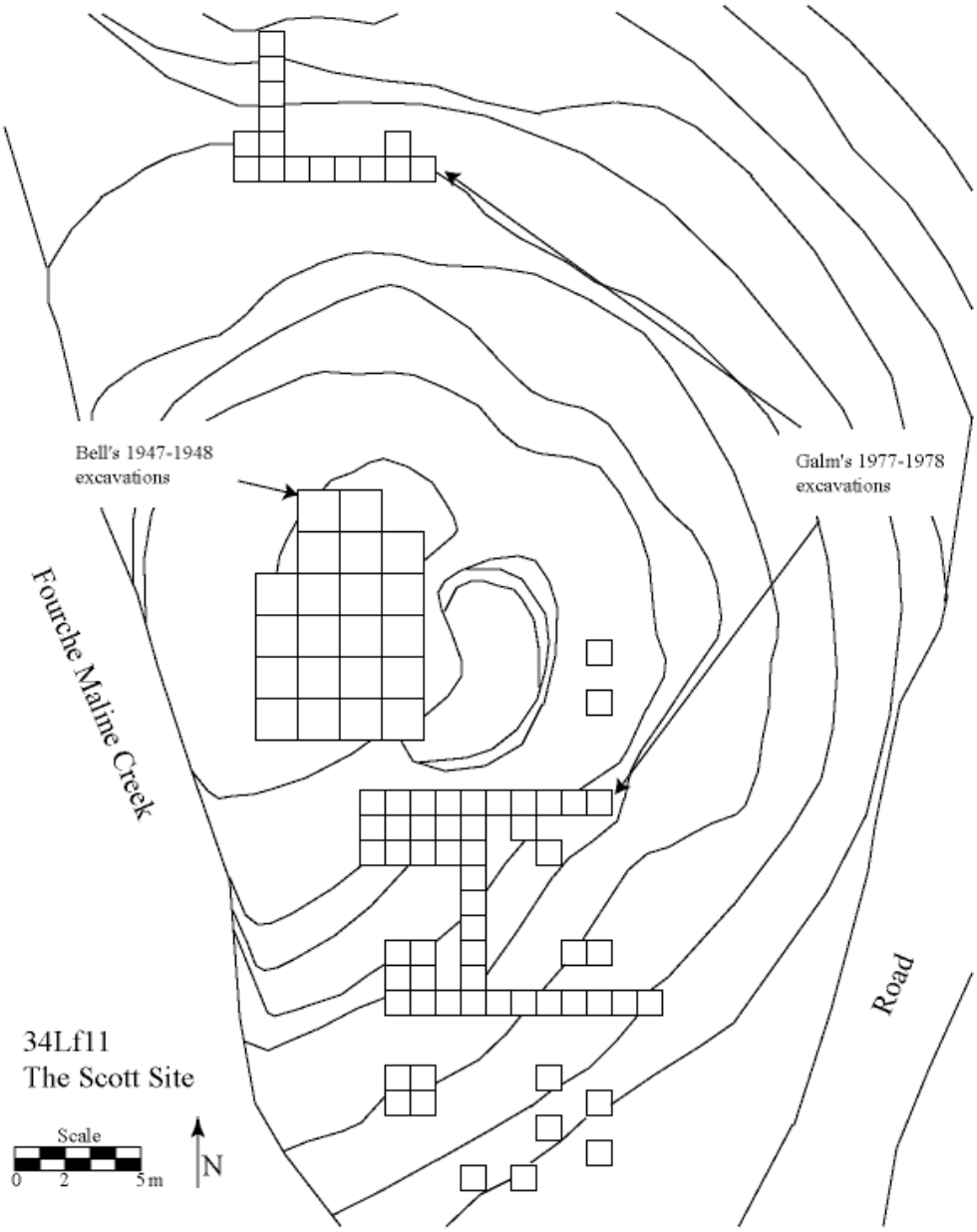


**Figure 3.3: Map of the Scott Site showing excavation units.**

Faunal materials recovered from Bell excavations were analyzed by Don Wyckoff (n.d.) and his results were used in the subsistence analysis conducted for this dissertation. The raw material preferences from Scott were used to test the hypothesis about the Fourche Maline territoriality.

*34Lf12/225: The Duncan's Mound Locality*

Duncan's Mound locality is on a low terrace along the Poteau River (Figure 3.1). This site consists of a small lithic scatter located near Duncan's Mound (34Lf225) and is considered part of the same site. 34Lf12 was identified and a small surface collection was made by Dr. Bell as part of a 1947 survey. It is surprising he did not identify the large midden mound located within yards from the site. Duncan's Mound (34Lf225) was identified by Michael Mayo as part of a resurvey of the effects of Lake Wister (Mayo 1975). He (Mayo 1975) notes that 34Lf12 is located very close to the midden and is likely an outlying occupation area.

This site was one of the four chosen to address the settlement patterns and subsistence of the Fourche Maline people. Most of the Fourche Maline sites located in the Fourche Maline drainage are heavily overgrown with thorny vegetation. Duncan's Mound locality is one of the least overgrown of these black-midden sites only allowing limited remote sensing to be conducted.

*34Lf24: The J.W. Williams I Site*

The J.W. Williams I site is often associated with seminal ideas about the Fourche Maline culture. It was from this site that Phil Newkumet first defined the Fourche Maline Focus, and it is the type site for the *Williams Plain* pottery (Bell 1980; Kreiger 1947). The Williams I mound was one of the larger Fourche Maline midden mounds at 150x130 ft (46x40 m) with a depth of 5 ft (1.5m) at the center (Newkumet 1940). The site is 2.5 miles (4 km) west of the confluence of Fourche Maline Creek and the Poteau River in LeFlore County (Newkumet 1940) (Figure 3.1).

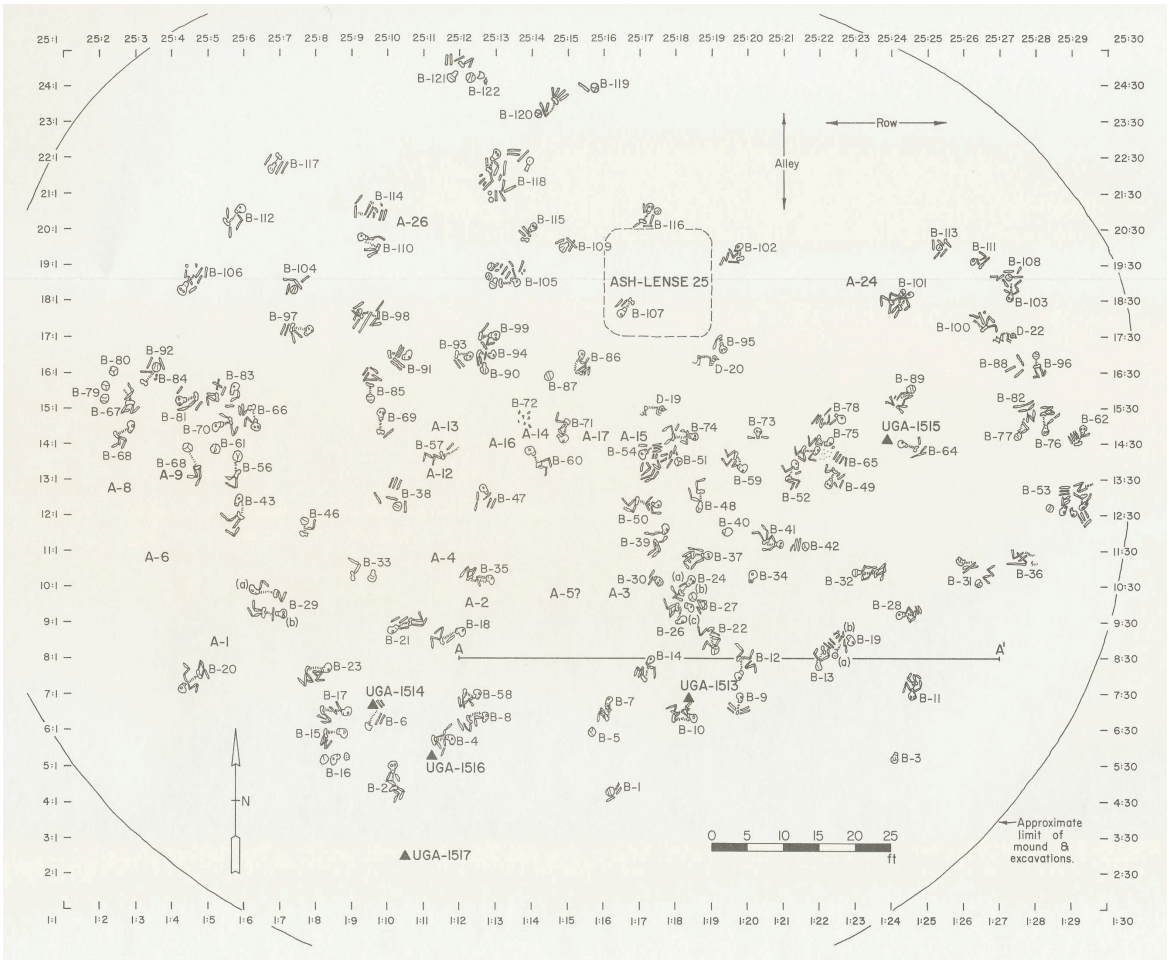


**Figure 3.4: Williams I midden mound plan view (Galm 1978a:234).**

The entire midden mound was excavated during the winter of 1939 to 1940 by the Works Progress Administration (W.P.A.) supported crews. The site was the best excavated of the W.P.A. black-midden sites along Fourche Maline Creek because they dug in 6 in (15 cm) levels and had many of the artifacts piece plotted. The site yielded 122 burials representing 166 individuals (Figure 3.4). Williams I is a multi-component site consisting of a Late Archaic (Wister Phase), Woodland Period (Fourche Maline and Evans Phases) and a thin Mississippian occupation (Harlan/Sprio Phase) at the top (Irvine 1980). The components are based on Irvine's (1980) detailed study of the pottery assemblage.

Testing of this site was not possible as it was inundated by Lake Wister. However, the site was chosen for research because it has a large artifact assemblage, good burial data, and fairly good contextual data (excellent for W.P.A. standards). The Williams I site also has a large faunal assemblage useful in assessing Fourche Maline subsistence strategies. Williams I was selected for refining the Fourche Maline chronology, addressing Fourche Maline subsistence (the faunal remains), and testing the hypothesized raw material based territories.

*34Lt11: The McCutchan-McLaughlin Site*

The McCutchan-McLaughlin site (34Lt11) is a black-midden mound on a large, open pasture along Fourche Maline Creek south of the Sans Bois Mountains in Latimer County. Site 34Lt11 is adjacent to the bank of Fourche Maline Creek near its confluence with Spring Creek (see Figure 3.1). The site was the location of the 1976 and 1977 University of Oklahoma field schools and Oklahoma Anthropological Society digs (Wyckoff 1976, Wyckoff and Woody 1977). A total of 110, 1x1 m units were excavated between the 1976 and 1977 excavations (Wyckoff 1976, Wyckoff and Woody 1977) (Figure 3.5). These excavations exposed 32 burials representing 48 individuals (Powell and Rogers 1980). Wyckoff (1976) identified three generalized zones: the uppermost was a pottery bearing zone with small arrow points, below this was a non-pottery zone with a preponderance of contracting stem (Gary) points, and the final lowest zone was identified by the presence of a variety of corner-notched dart points.

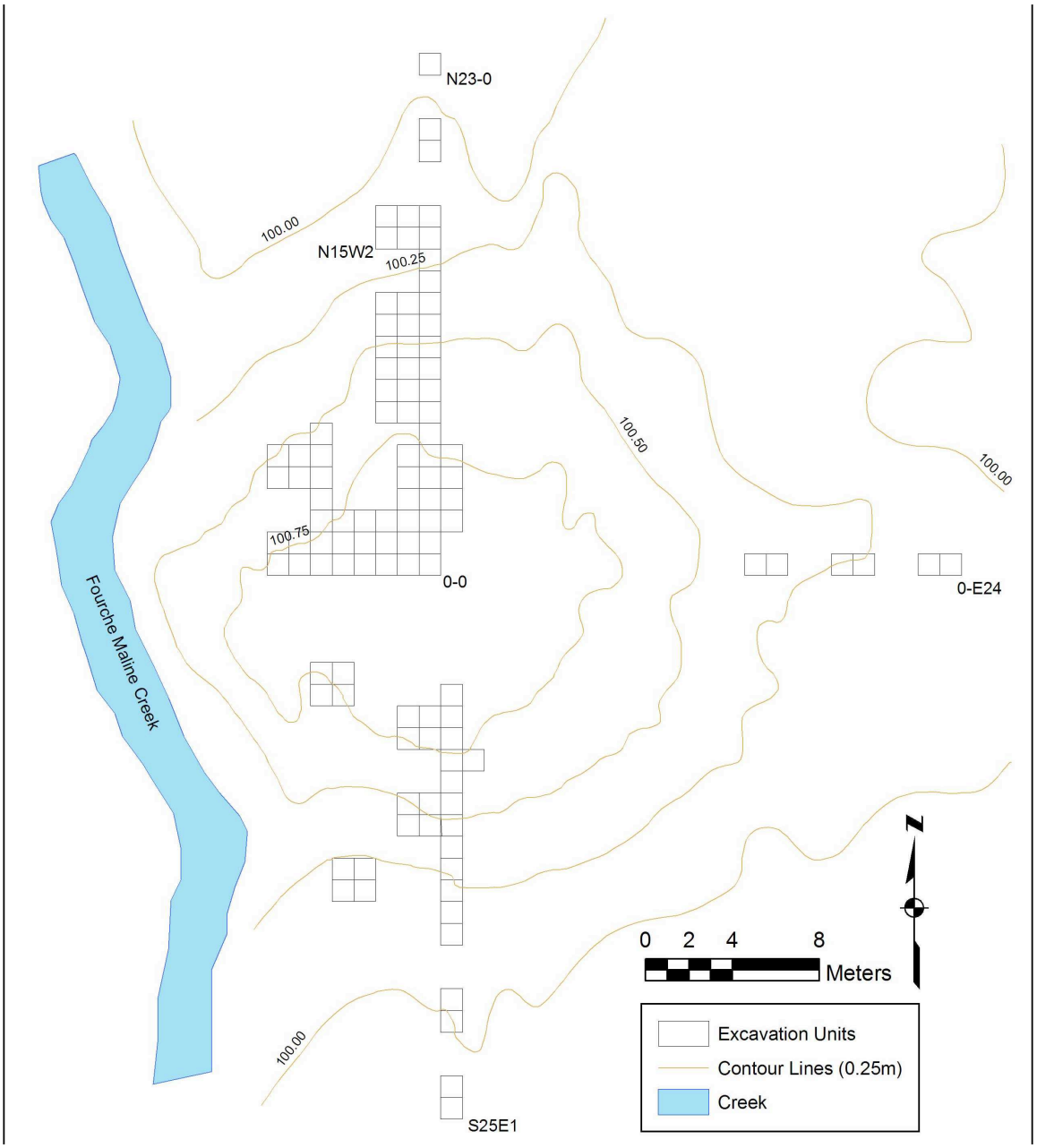


**Figure 3.5: Map of the 1976-1977 excavations at 34Lt11.**

Powell and Rogers (1980) published research on the bioarchaeology of the site. Baugh (1982) published all the radiocarbon dates from 34Lt11 and two master's theses also have been produced using materials from this site. Clarke (1987) analyzed the white-tailed deer (*Odocoileus virginianus*) from the Late Archaic (Wister Phase) component.

Leith (2006) looked at material culture change based on stratigraphy. The site was rip-wrapped and stabilized in December of 1979 and was purchased by the Archaeological Conservancy in December of 1990. Several geoarchaeological profiles were recorded along Fourche Maline Creek near 34Lt11 in the spring of 2010.

This site was chosen to address Fourche Maline bioarchaeology, subsistence (floral assemblage), settlement patterns and social organization. Bioarchaeology research was focused on the results of Powell and Rogers (1980). Subsistence analysis was conducted on soil samples from the 1976 and 77 excavations and recent field work from 2010. Settlement pattern and social organization issues were addressed with geophysical remote sensing. This site was chosen for remote sensing in the spring of 2009, due to it's location in a large open pasture. The past excavations were focused on the midden mound, with only minimal excavation testing near the edges of the midden, and thus they did not inhibit the remote sensing.

*34Hs25: The Otter Creek Site*

The Otter Creek site was recorded and excavated by Don Wyckoff in the spring of 1971. The site consists of a small 80x60 ft (24x18 m) midden mound standing 20 in (0.5 m) tall. The site is on a floodplain between two branches of Otter Creek (Figure 3.1) near the town of Keota in Haskell County (Miller 1977). Otter Creek is a tributary of Sans Bois Creek which itself joins the Arkansas River near the location of modern the Robert S. Kerr Dam.

Wyckoff excavated 20, 5x5 ft (1.5x1.5 m) units in the spring of 1971 (Miller 1977) (Figure 3.6). The excavations yielded 4 burials, a concentration of baked clay and 3 rock

concentrations (Miller 1977). The site was reassessed in 1976 as part of the McClellan-Kerr Arkansas River Navigation project (Miller 1977). Miller (1977) noted that the site was being eroded and recommended complete excavation. In an attempt to identify off mound habitation and activity areas, Dr. Frank Winchell cleared three trenches with a road patrol to a depth of 10 in (0.25 m) during the summer of 1998. Dr. Wyckoff and Billy Ross revisited the site in the late summer of 1998 and mapped and photographed the trenches (Picarella 1999).

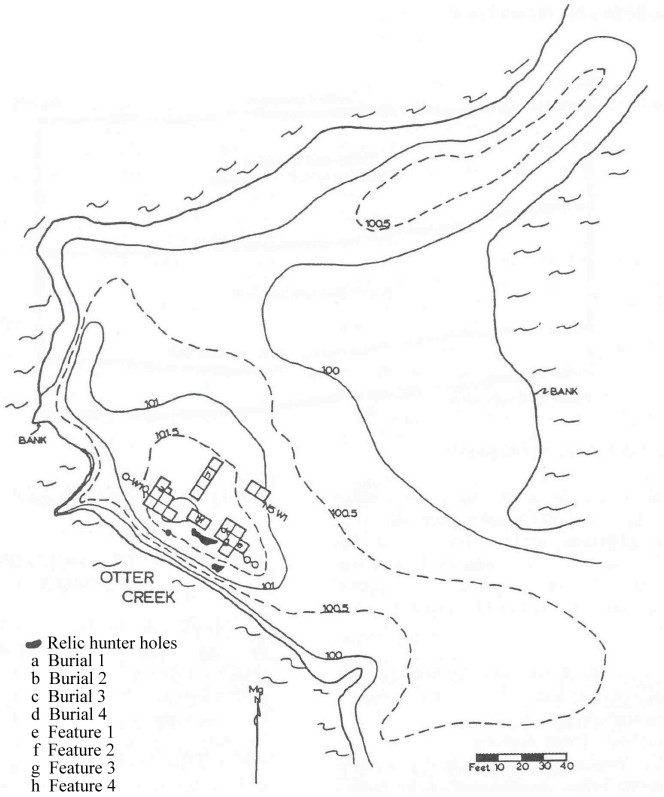


**Figure 3.6: Map of 34Hs25 showing location of 1971 units (adapted from Picarella 1999).**

Otter Creek faunal remains were analyzed by Wyckoff (n.d.) and were included in the revision of the Fourche Maline subsistence conducted in this research. The site was also chosen to address Fourche Maline settlement pattern and was subjected to geophysical remote sensing. The site is in an old pasture that is being overgrown with

briars. However, the site was the most open of the extant black-midden sites in the Sans Bois drainage.

*34Hs75: The Hickory Nut Ridge Site*

Hickory Nut Ridge was recorded in 1975 by Don Wyckoff. The site was on a northwest-southeast terrace south of Hickory Nut Ridge near the confluence of Sans Bois Creek and the Arkansas River in Haskell County (Miller 1977) (see Figure 3.1). Wyckoff estimated the site to be around 8 to 10 acres and noted the presence of dark lenses in the cutbank of Robert S. Kerr Lake on the site form. The site was determined to be eligible for nomination to the National Register of Historic Places (Miller 1977), though it never was nominated.

Miller (1977) reassessed the site in 1976 as part of the McClellan - Kerr Arkansas Navigation System survey. She made a surface collection from the beach and excavated 34 shovel tests. The site was attributed to the Late Prehistoric period (Miller 1977). The site had excellent research potential as a non-mound Late Prehistoric village site, but the terrace has since been eroded, and the site no longer exists. This site was chosen to address the territoriality hypothesis. The materials from this site were used to identify whether there were changes in raw material later in the cultural sequence associated with the possible territories identified for Fourche Maline times. A large surface collection from 34Hs75 is used in this research because it had lithic raw material previously recorded.

*34Hs81: The Red Hill Bridge Site*

Red Hill Bridge is along Little Sans Bois Creek about 4 miles (6 km) west of 34Hs75 and 7 miles (11 km) north of 34Hs25 (see Figure 3.1). The site lies on a high ridge

overlooking the Arkansas River bottomlands north of Red Hill and south of Little Sans Bois Creek. Robert S. Kerr Lake has inundated these bottomlands and the site presently is eroding into the lake. The site was reported by Mr. James Bruner in 1976 and recorded as part of the McClellan - Kerr Arkansas Navigation System survey (Miller 1977). The site is associated with the Fourche Maline culture in Haskell County.

Miller (1977) dug 17 shovel tests in her 1976 survey. She determined the site was eligible for the National Register, but it was never nominated. Recently a surface collection as well as a further 16 shovel tests and 5, 1x1 m test units were excavated (Leith 2010). Leith (2010) determined that only around 800 $m^2$ of the site is left. Local collectors noted that the lake has eroded between 100 and 200 ft (30 to 61 m) of the site between the 1976 and 2010 fieldwork (Leith 2010). The site is important as it is one of the only single component Woodland Period (Fourche Maline) sites in the Arkoma Basin. Raw material information from a large surface collection from the site is used in this research, and the 2010 research is used to address the territoriality hypothesis as these assemblages had the raw material recorded.

*34Hs111: The Thorny Channel Site*

The Thorny Channel site was presented as an example of the presence of black-midden (Fourche Maline) sites in the Arkansas River Valley (Leith 2009). The site was first identified and recorded by Chris Lintz as part of the Kerr-McGee Choctaw Coal Mine survey (Lintz 1978). The site is on a former Sans Bois Creek oxbow (Figure 3.1), cut off by channelization, near the confluence of Sans Bois Creek and Mule Creek in Haskell County (Leith 2009; Lintz 1978). Lintz (1978) undertook a surface collection and

recorded a soil profile. Leith (n.d.) reports on seven soil profiles recorded between 2004 and 2005 (Figure 3.7). The site is associated with the Late Archaic and Woodland Periods based on artifacts.

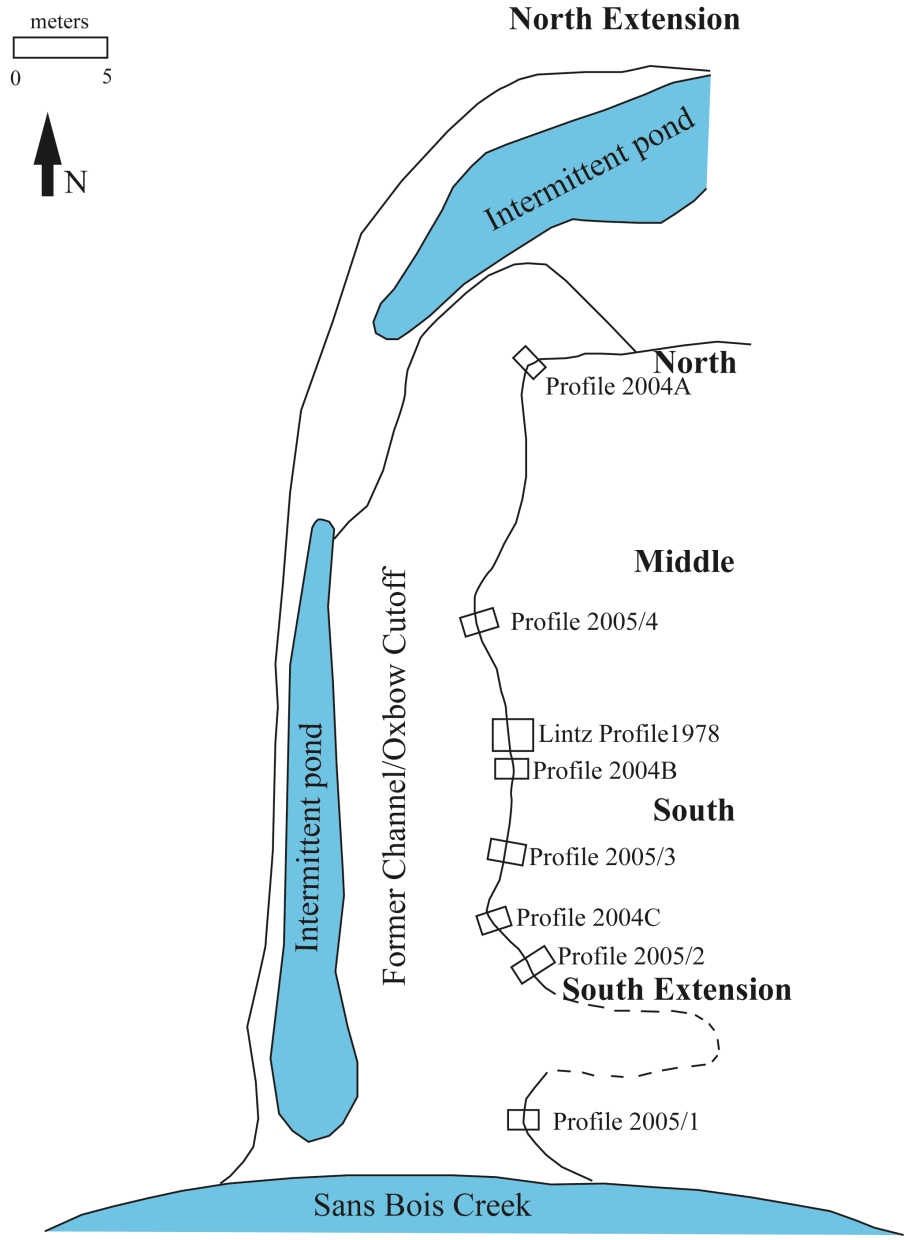


**Figure 3.7: Map of 34Hs111 showing location of surface collections and soil profiles (adapted from Lintz 1978).**

This site was included to test the territoriality hypothesis. Raw material preferences from a large surface collection has been gathered by Mr. Billy Ross a local Oklahoma Anthropological Society member from Keota, Oklahoma and the material collected by Lintz (1978) was used.

*34Hs224: The Sam Spears Site*

The Sam Spears site is a large site north of the Sans Bois Mountains, also in Haskell County. It was first recorded in the spring of 2008. It is on the east bank of Sans Bois Creek about two miles (3 km) upstream from 34Hs111. Site 34Hs224 is bounded by a former oxbow cutoff to the south, a forest to the north, Sans Bois creek to the west, and pasture to the east (see Figure 3.1). The site consists of a midden mound in an open pasture. Materials collected by the landowner Mr. Sam Spears indicate a Woodland Period occupation. The midden is being eroded into Sans Bois Creek with little more than 800 $m^2$ left. Also the midden has been heavily mined for garden soil.

This site was the final site chosen to address hypotheses associated with Fourche Maline settlement patterns and social organization. The fact that the site is in the pasture made it a prime candidate for remote sensing to search for associated habitation. Anomalies associated with habitation were identified but were not tested due to concerns about possible looting.

**Subsistence Methodology**

Faunal remains from the J.W. Williams I site, the Scott Site (34Lf11) and the Otter Creek site (34Hs25) were analyzed to identify the faunal preferences and diversity of animal use for Fourche Maline people. Specimens from the 34Lf24 assemblage were

identified using the mammal and bird synoptic collections housed at SNOMNH as well as the faunal comparative collection housed at the Oklahoma Archaeological Survey. The assemblages from the other sites were complied and described by Don Wyckoff in an unpublished manuscript. Relative percentages, meat weights, and ranks were calculated based on the chronology identified in the seriations. The results of the MNI counts were examined for changes in diversity between time periods. The MNI counts were rarefied to eliminate sample size biases. Rarefaction estimates the number of species that would be present in the assemblage based on the smallest (rarest) sample. Rarefaction eliminates the sample size bias common to diversity indexes such as Shannon's index.

To address the evidence of horticulture, samples were floated from the Duncan's Mound locality (34Lf12/225) and the McCutchan-McLaughlin site (34Lt11). The samples from these sites were collected using fine mesh sieves (USGS #45 for light fraction and #25 for heavy fraction). The residue from the light fraction was picked using a low power stereo-microscope. The heavy fraction was skimmed using the same microscope.

**Geophysical Methodology**

Four sites were selected to investigate evidence of off-mound habitation. These were 34Lf12/225, 34Lt11, 34Hs25, and the Sam Spears site (34Hs224). These sites were selected for testing because they were the least overgrown of the known black-midden sites in the two study localities. In the spring of 2009 a total of 32,500 $m^2$ were investigated using a Fluxgate® gradiometer at these four sites. The amount of remote sensing varied depending on the amount of vegetation cover or was limited to the maximum number of 20x20 m grids that could be covered in the time available. The

breakdown of the actual area covered was as follows: Duncan's Mound-700 $m^2$, McCutchan-McLaughlin-16,400 $m^2$, Otter Creek-1,200 $m^2$, and Sam Spears-14,200 $m^2$. The data recovered was processed using the Geoplot® software package.

Several anomalies were identified in the remote-sensing data that looked like possible off-mound habitation features. Two of the sites (34Lf12/225 and 34Lt11) were chosen to be tested to ground truth the anomalies. The other two sites were not tested because of time constraints. Duncan's Mound was tested in the spring of 2009. A total of nine 1x1 m units were excavated. These consisted of four 1x2 m excavations and a single 1x1 m expansion unit. The units were placed to examine several of the large dark anomalies (high positive) in the arc. Test Unit#1 and Test Unit#2 were positioned to test the large anomaly that initially looked like the location of either an extended entrance for a rectangular structure or a possible wall of a circular structure. Test Units#3 and #4 were positioned to further test the possible circular structure, and the last five units tested the large dipole near the northern part of the circular anomaly (Figure 3.8).

The McCutchan-McLaughlin site was tested during the summer of 2010. These excavations were conducted on private land adjacent the Archaeological Conservancy property and were permitted by Mr. Roy Alford the landowner. This was a 10 day excavation and with a crew of between 20 to 50 people. We were able to excavate a total of 20 1x1 m units, focusing on a large anomaly assumed to be a possible house pattern. Units were excavated in a north/south and east/west transect in an attempt to delineate the boundaries of the possible house. Once the boundaries were identified two 1x1 m units

were excavated to test the large (roughly 1 m diameter) strong positive anomaly that was considered a possible central hearth (Figure 3.9).

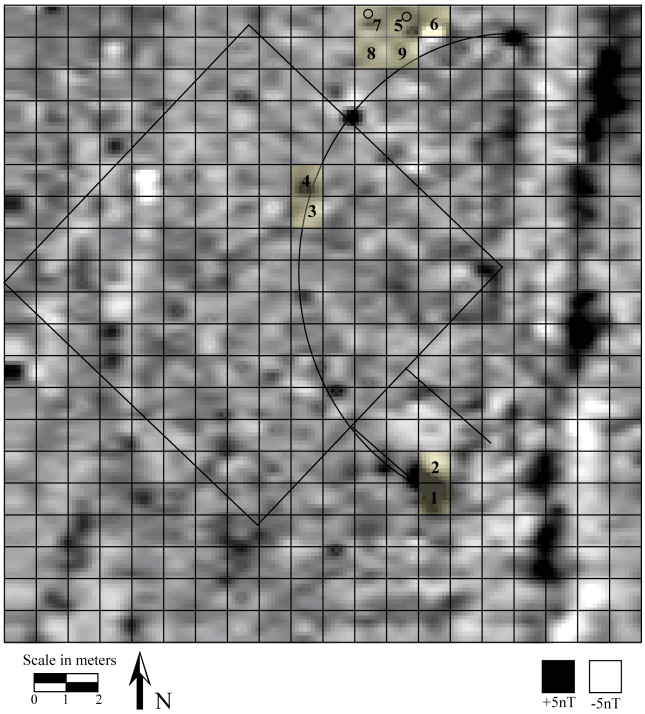


**Figure 3.8: Remote-sensing imagery of 34Lf12/225 showing the location of anomalies as well as Test Units and features identified.**

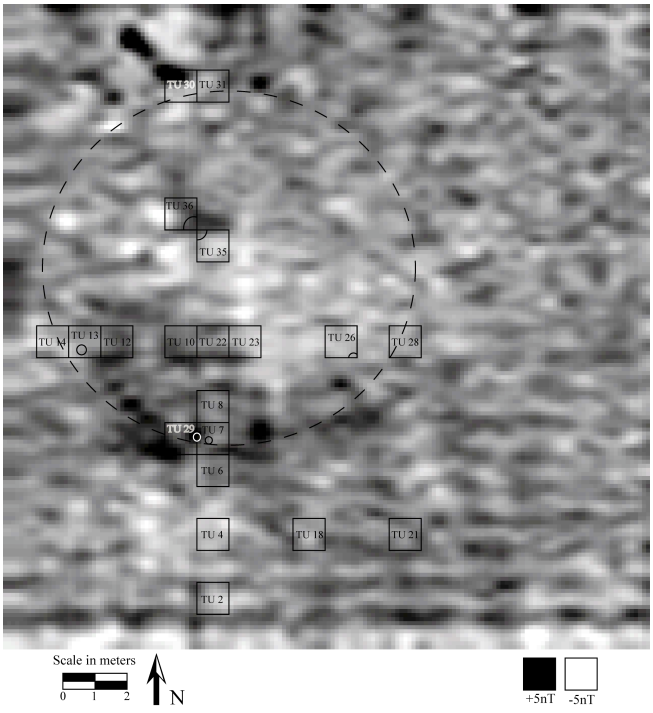


**Figure 3.9: Remote-sensing imagery showing the location of Test Units, house boundaries and possible hearth at 34Lt11.**

Materials recovered from the excavations were washed, catalogued and accessioned into the archaeological collections at the Sam Noble Oklahoma Museum of Natural History in Norman, Oklahoma. The data recovered provided evidence for off-mound habitation related to Fourche Maline settlement patterns.

Remote sensing at the Otter Creek site was limited to three 20x20 m grids. Grid three (the easternmost grid) has a great deal of noise, which could be associated with Winchell's 1998 graded trenches. Grid 1 contained a rectilinear pattern approximately 5x15 m as well as three large dark anomalies (Figure 3.10). A total of 35.5 grids were completed at the Sam Spears site. During the remote sensing, the landowner mentioned that there was a natural gas pad in the pasture. This explained the very large dipoles located in grids 3 through 6 and 10 through 12 (Figure 3.11). The site also has other disturbances, including a two-track road that was associated with the former gas pad. A total of four anomalies were identified in a grid-by-grid examination of the remote sensing imagery (Figure 20). Grid 13 has the best candidate for a house pattern seen in the large rectilinear pattern (roughly 10x10 m) (see Figure 3.11). Neither of these sites were tested due to time constraints and issues concerning potential looting.

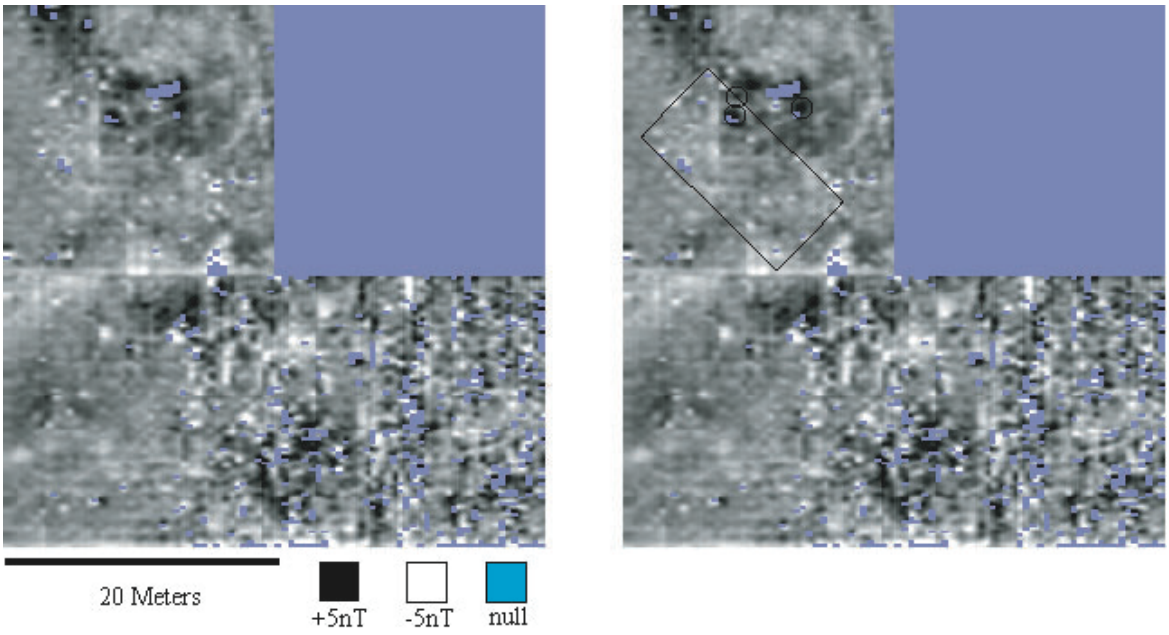


**Figure 3.10: Remote sensing imagery form 34Hs25, the left image is the raw data, the right has potential habitation anomalies marked.**

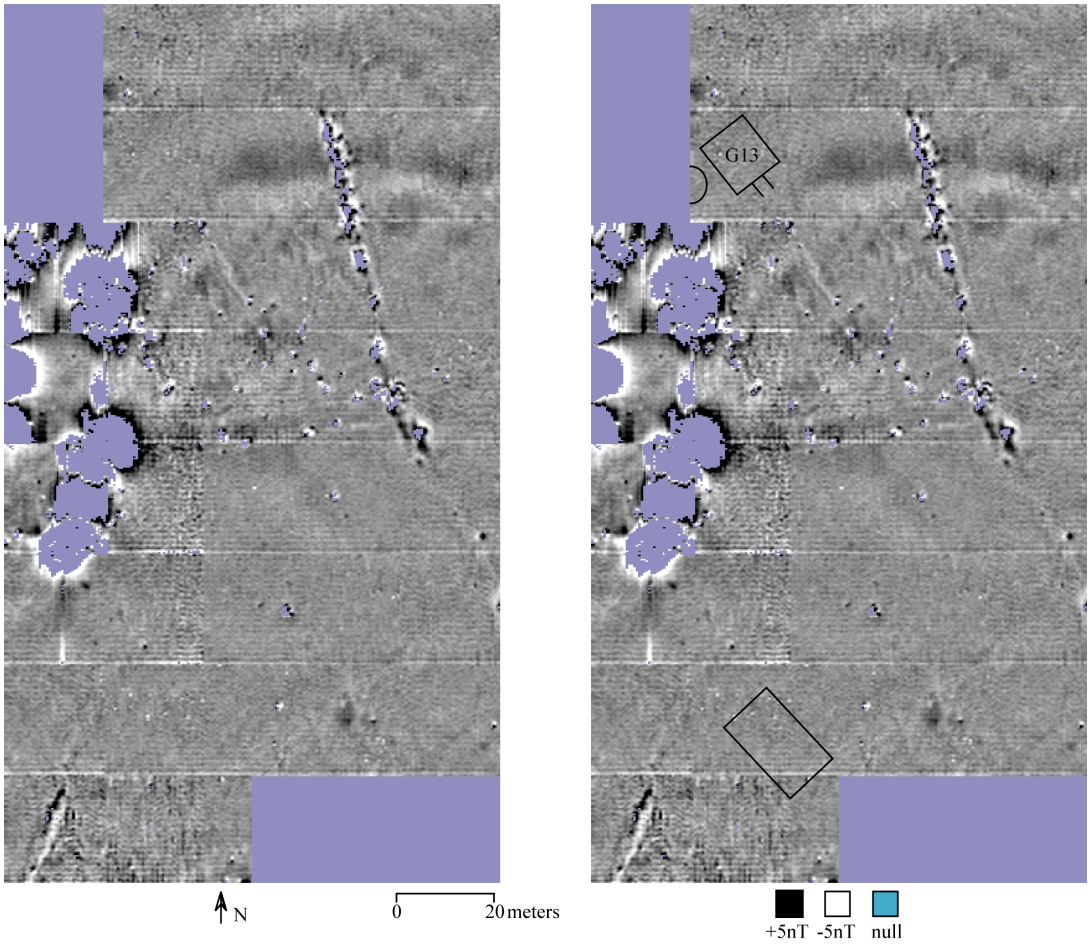


**Figure 3.11: Remote sensing imagery form 34Hs224, The left image is the raw data, the right has the potential habitation anomalies marked.**

# Chapter 4: Evolution of the Fourche Maline Concept and Building a Chronology

The history of the concept of Fourche Maline begins with Moore's 1912 and Harrington's 1917 expeditions up the Red River in Arkansas (Harrington 1920; Moore 2003). These early archaeologists were looking for beautiful, finely decorated, pottery and other material-culture. However, Moore and Harrington did excavate sites that fit Bell and Baerreis' (1951) definition of Fourche Maline traits (black-middens located near streams). Little attention was paid to this cultural manifestation during Moore and Harrington's earlier excavations, because these black-midden mounds had very few beautiful pots and other distinctive artifacts.

Major research in Oklahoma did not begin until the late 1930s and early 1940s as part of the Works Progress Administration (W.P.A.) excavations (Kreiger 1947; Newkumet 1940; Orr 1946). At this time, archaeologists were attempting to develop a cultural chronology for southeastern Oklahoma. Research continued off and on in Oklahoma up through the end of the 20th century (Bell 1953; Bell and Baerreis 1951; Davis 1961a, 1961b; Galm 1981, 1984; Galm and Flynn 1978; Guilinger 1971; Orr 1952; Picarella 1999; Proctor 1957; Sharrock 1960; Vehik 1982a, 1982b). Most of the excavations conducted at Fourche Maline sites have focused on the midden mound with very little off-mound investigation. Research primarily continued to develop chronology, cultural-trait lists, and some early regional syntheses (e.g., Galm 1984; Orr 1952; Wyckoff 1980).

The major problem with 20th century research in Oklahoma, Arkansas, Texas, and Louisiana was the lack of a coherent concept of what Fourche Maline is. Throughout this

period, the term Fourche Maline has referred to: a creek, a cultural group, a cultural area, a focus, and a phase. Many of the early trait lists, though very comprehensive, mask the variability of these sites. For example, Bell and Baerreis (1951:19) define Fourche Maline sites as "accumulations of village debris or midden deposits situated on the bank of a river or stream." The McCutchan-McLaughlin site (34Lt11) is considered an example of a typical Fourche Maline site (Figure 4.1). The creek is just west of the mound (the tree line in the photo).

**Figure 4.1: View of the McCutchan-McLaughlin site (34Lt11).**

This definition provided by Bell and Baerreis (1951) disguises the fact that some of the sites considered Fourche Maline and excavated by the W.P.A. were not near a stream or river. One such example is the Dan Akers site, 34Lf32 (Figure 4.2). In addition, some sites did not have a midden mound, such as Red Hill Bridge (34Hs81). Though the material culture of sites identified as Fourche Maline is very similar, each site is unique and the differences may be as important as the similarities.

**Figure 4.2: Picture of the 1941 W.P.A. excavations of the Dan Akers Site (34Lf32), the creek is located in the far tree line (Photo courtesy of the Sam Noble Oklahoma Museum of Natural History).**

A second major problem is one of chronology. The black-midden sites used to define the Fourche Maline Focus are frequently multi-component, and it is possible that a Woodland occupation is not present at some of these sites. Based on Irvine's (1980) ceramic analysis of J.W. Williams I (34Lf24) the type site for the Fourche Maline Focus, the site has three major components (Late Archaic, Woodland, and Mississippian). A quick perusal of the site catalogue database at Sam Noble Oklahoma Museum of Natural History indicates that every one of the black-midden sites have multiple components, and at some of these sites the non-Fourche Maline components are larger or more intense than the Fourche Maline occupation.

Galm (1984) following Bell's (1980) call for re-conceptualizing Fourche Maline attempted to clarify the terminology and bring the concept of Fourche Maline up to date. He redefined the Fourche Maline Focus as two phases: the Late Archaic (Wister Phase) and the Woodland Period (Fourche Maline Phase) (Galm 1984). Schambach (2002) argues that Galm inappropriately named the Fourche Maline Phase as he had defined Fourche Maline as a cultural unit (basically a tradition following Willey and Phillips 1958) two years earlier (Schambach 1982). The problem here is one of competing grey literature as Galm and Flynn (1978) had already published definitions of the Wister and Fourche Maline Phases, which would be five years before Schambach's 1982 definition.

However, Schambach's conceptualization of Fourche Maline as a cultural tradition has gained acceptance and is currently used in Arkansas and Texas (Schambach 1982, 1998, 2002; Bruseth 1998). A second problem with Galm's (1984) definition of the Fourche Maline Phase is its length. Galm has Fourche Maline spanning the period 300 B.C. to A.D. 800, which is over 1000 years. Willey and Phillips (1958) define a phase as an archaeological unit that is distinct from units similarly conceived and spanning a relatively brief period of time. Galm's phase fits better as a sub-period in its duration and needs to be refined into units that are more in line with Willey and Phillip's definition. Along with the need to refine the Fourche Maline Phase in Oklahoma, we need to bring the Oklahoma concept of Fourche Maline into line with the Schambach's (2002) Fourche Maline culture. Researchers in Arkansas, Texas, and Louisiana have defined Fourche Maline as a Woodland Period society who are the ancestors of the modern Caddo people.

Much of the research up to present has focused primarily on building cultural chronology and refining trait lists. The trait lists are a decent beginning for defining Fourche Maline but they are incomplete. They are lacking data on settlement patterning, social organization, and a refined subsistence strategy, as well as some insight into what all the traits and behaviors mean.

Fourche Maline material culture can provide evidence of territoriality and possibly identify different communities within the culture. Many sources present information on the material culture of the Fourche Maline people (Bell 1953; Bell and Baerreis 1951; Davis 1961a, 1961b; Galm 1981, 1984; Galm and Flynn 1978; Guilinger 1971; Orr 1952; Picarella 1999; Proctor 1957; Sharrock 1960; Vehik 1982a, 1982b). Presently Galm (1984) tends to be considered the standard definition of Fourche Maline in Oklahoma. As mentioned earlier, Galm replaced the old Fourche Maline Focus with the Arkansas Valley Caddoan Formative, which is made up of Archaic (Wister Phase) and Woodland (Fourche Maline Phase) occupations (Galm 1984). This chapter begins with a brief summary of his definitions:

**The Wister Phase**

Galm (1984: 210-213) defines the Wister Phase as Late Archaic occupations in the Fourche Maline valley dating from roughly 300 B.C. to around A.D. 300. This phase is recognized by pre-pottery assemblages. Among the artifacts are contracting stem (*Gary*) projectile point/knives with some corner-notched, expanding stem points. This phase also contains ground stone objects (handstones, boat stones, pendants), bone tools (awls, pins, atlatl hooks, fish hooks) and shell beads, discs, and pendants (Galm 1984: 210-213). This

assemblage conveys clues that the subsistence strategy was hunting, gathering and fishing. Long distance trade is witnessed by occasional exotic raw materials such as copper and marine shell (Galm 1984:210-213).

**The Fourche Maline Phase**

Galm (1984:213-216) defines the Fourche Maline Phase as Woodland Period occupations generally dating to around A.D. 300 to 800. The important marker of this phase is a thick grog tempered and mixed grog temper pottery of the *Williams Plain* and *LeFlore Plain* types. The artifact assemblage also contains contracting stem (*Gary*) points, fewer corner notched dart points, and initial use of small corner-notched (*Scallorn*) arrow points, indicating a shift in hunting technology (Galm 1984:213-216). Also a variety of chipped stone implements, such as hoes and double bit axes, as well as continued use of ground stone and bone implements are common during the Wister Phase (Galm 1984:213-216).

It is time to revise Galm's (1984) concept of Fourche Maline by refining the chronology. He alludes to material culture hallmarks that can and should be used to break what are essentially sub-periods into more manageable phases. An example is the adoption of the bow and arrow which can and should represent a temporally diagnostic change in material culture. The refinement of the Fourche Maline chronology is a necessary first step in identifying what Fourche Maline is as it will avoid confusing temporal differences with spatial or social differences.

Several assumed temporally sensitive artifact types were chosen to refine the chronology. These were varieties of large contracting stem (*Gary*) points, arrow points,

chipped stone axe/hoes, and pottery (*Williams Plain, Williams Boneware,* and *LeFlore Plain*). Once the chronology is refined then the issue of defining territories and or identifying groups based on material culture can be addressed.

**Methodology**

In order to refine the Fourche Maline chronology I seriated select artifact classes from the J.W. Williams I site (34Lf24). This site's entire midden mound was excavated by the W.P.A. I recognize biases occur when using W.P.A. excavated sites because the methodology used was not as rigorous as modern field methods. But the Williams I site was the best excavated W.P.A. black-midden site in Oklahoma. It was excavated in arbitrary six inch levels, and many of the artifacts have piece-plot references.

A total of three blocks of contiguous units were selected for the seriation. The primary seriation was conducted on a block of 13 contiguous 5x5 ft (1.5x1.5 m) units located near the center of the midden (Figure 4.3). These units were chosen to avoid burials because these intrusive features were hard to identify in the dark soil and cannot be controlled for using arbitrarily excavated levels. This sample also allows greater artifact counts and a greater diversity of artifact types which strengthen the seriation. The choice of contiguous units near the center of the midden mound was an attempt to alleviate problems associated with the contour of the mound. The units chosen should be comparable as they are near the apex of the mound and the difference in elevation is only around 0.07 in (0.2 cm) per horizontal foot (30.5 cm) between samples units.

Two other blocks of units; one near the eastern margin and one near the western margin, were selected to test the results of the initial seriation. Again, these were selected

to avoid units containing burials. The eastern sample consisted of 17 5x5 ft (1.5x1.5 m) units, and the western sample consisted of 19 5x5 ft (1.5x1.5 m) units. It should be noted that there is close to one foot (30.5 cm) of elevation change between some of the units in these groups which could affect the depths/levels from which artifacts are coming (Figure 4.3). Percentages were calculated on each of the artifact types by level. This was important in the seriation of the  pottery as it addresses issues of minimum number of vessels by giving single sherds more weight. However, the use of percentages does mask some of the differences because each category is dependent on the others. This can lead to over-inflating some of the categories due to low counts. In order to address this issue a separate seriation was done on the raw counts.

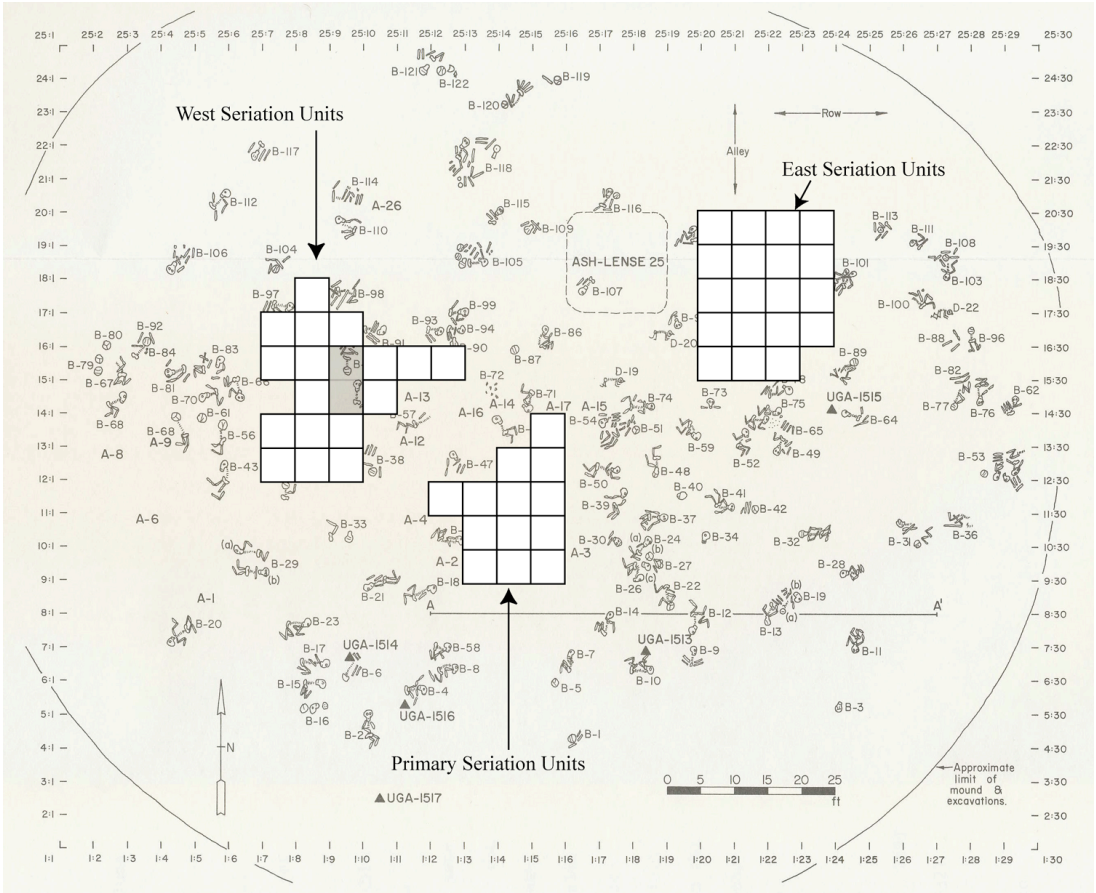


**Figure 4.3: J.W. Williams I map showing the location of units used in the seriation (grey units omitted).**

Correspondence analysis using the JMP™ statistics program. Correspondence analysis is an exploratory data-analytic technique that is commonly used for seriation in archaeology (Baxter 2003:137). Basically correspondence analysis is a Principle Component Analysis for tables of counts that produces a graphical view of the structure of a table (basically a representation of the realtionship between rows and columns allowing identification of the association between between them) (Baxter 2003). The aim of a correspondence analysis is to hopefuly suggest an ordering for the assemblage that has chronological interpretations (Baxter 2003:137-138).

*Point Seriation*

Schambach (1982) identified three varieties of *Gary* points that he considered temporally sensitive (Table 4.1). These are varients *gary, leflore,* and *camden* (Figures 4.4). The defining features of these variants are the shape of the base, thickness and width.

**Table 4.1: Attributes and variables of Schambach's (1982) *Gary* point varieties.**

| 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 | 7mm |

To test Schambach's model, base shape (U or V shaped), thickness, and variety designations were recorded for the 213 contracting stem points from the 34Lf24 sample units. In addition to testing Schambach's *Gary* variants temporal sensitivity, counts of Archaic dart points and arrow points (with thickness for the arrow points) were also recorded. A seriation using correspondence analysis was performed on the three varieties of *Gary*, generalized Archaic bifaces (including notched and straight stem forms) and arrow points.


**Figure 4.4: *Gary* varieties from J.W. Williams I (top *gary*, middle *leflore*, bottom *camden*).**

*Axe/Hoe Seriation*

Chipped-stone axe/hoes are common to the Wister and Fourche Maline Phases. There were only 135 chipped stone axe/hoes from the entire 34Lf24 midden. All the axe/ hoes from the site were considered as the overall count was low. These tools were identified as stemmed, double-bitted, or indeterminate. The indeterminate, surface finds, and burial units were omitted. Counts were recorded by level for both the stemmed and double bit varieties, and a seriation was then performed.

*Pottery Seriation*

Galm (1984) states the diagnostic pottery wares associated with Fourche Maline people are *Williams Plain*, and *LeFlore Plain*. He also notes that the addition of bone to the temper of *Williams Plain* looks to be a later trait (Galm 1984). Again the Williams site was chosen for seriation as the pottery assemblage has had research conducted on it (Irvine 1980), which helped with initial identification of pottery types. The same units chosen for the point seriation were used for the pottery seriation. The attributes and variables recorded were temper, thickness, presence/absence of burnishing. These were used to identify four specific wares or types and one general pottery category. These were: *Williams Plain, Williams Boneware, LeFlore Plain, Woodward Plain,* and Indeterminate Decorated (see Table 4.2 and Figures 4.5 to 4.7). These types were then seriated using correspondence analysis.

**Table 4.2: Fourche Maline pottery types.**

| Pottery Type | Temper | Thickness | Surface Treatment | Forms |
|---|---|---|---|---|
| *Williams Plain* (Brown 1971) | predominately grog, with some mixed temper | 5.9 - 17.8 mm mean 7.7 mm generally >1cm | smoothing, wiping, some burnishing | simple bowl, globular bowl, cup, restricted jar, barrel shaped jar, with some miniature versions |
| *Williams Boneware* (Proctor 1957) | grog-bone | likely same as *Williams Plain* | smoothing, wiping, some burnishing | likely same as *Williams Plain* |
| *Williams Incised* (Proctor 1957, Brown 1971) | predominately grog, with some mixed temper | likely same as *Williams Plain* | smoothing, wiping, some burnishing | likely same as *Williams Plain* |
| *LeFlore Plain* (Brown 1971) | grog-grit | 4.2 - 9.8 mm mean 6.19 mm generally <1mm | usually burnished | simple bowl, globular bowl, restricted orifice globular bowl, carinated bowl, gourd-section bowl, jars, narrow-mouthed bottle, wide mouthed bottles |
| *Woodward Plain* (Brown 1971) | shell | 5 - 11.2 mm mean 7.48 mm | burnished | simple bowls, independent restricted jars, wide-mouthed bottle, seed jar |

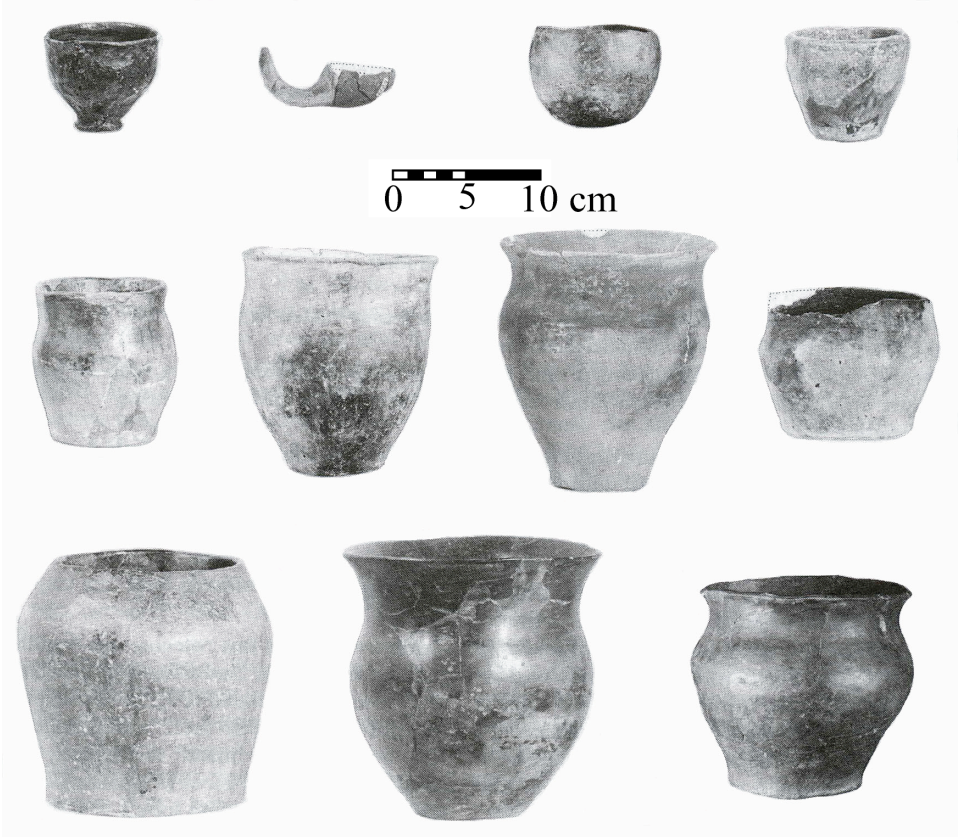


**Figure 4.5: *Williams Plain* vessel forms from Spiro (adapted from Brown 1971).**


**Figure 4.6: *LeFlore Plain* vessel forms from Spiro (adapted from Brown 1971).**


**Figure 4.7: *Woodward Plain* vessel forms from Spiro (adapted from Brown 1971).**

**Building a Fourche Maline Chronology**

As discussed earlier before issues of territoriality can be discussed we need to refine the Fourche Maline chronology. To initiate this I began by testing Schambach's (1982) temporally sensitive varieties of *Gary* points. Figure 4.8 shows the results of the correspondence analysis based on percentage by level. Baxter (2003) stated that 'horseshoe'-shapped plots in which the ordering can be read around the horseshoe are oftern considered a good seriation. The direction in which the plot is interpreted must come form outside information, in this case we know which way to read the findings because we know the order of the levels excavated.

The findings do indicate that Schambach's *Gary* varieties are temporally sensitive. The strong horsehshoe shape, following Baxter (2003), indicated a good sertiation. Reading the horseshoe from bottom right (oldest) to top right (youngest) support Schabmach's temporal hypothesis (Figure 4.9). I have also presented Fordian battleship graphs to help with the interpretation of the corresponcence analysis.

The *Gary gary* variety appears to be an early variety which peters out around Level 6 (Figures 4.10). The *leflore* variety appears long lived showing up at around Level 8 and continuing throughout the rest of the levels. The *camden* variety is the smallest (and thinnest) variety and appears late in the sequence (around Levels 2 and 3). *Gary camden* may be a transitional dart/arrow point type as Schambach (1998:128) has suggested. The raw counts for the points shows essentially the same results, but the Archaic dart points are not as over-inflated in relation to the other points due to the use of percentages.

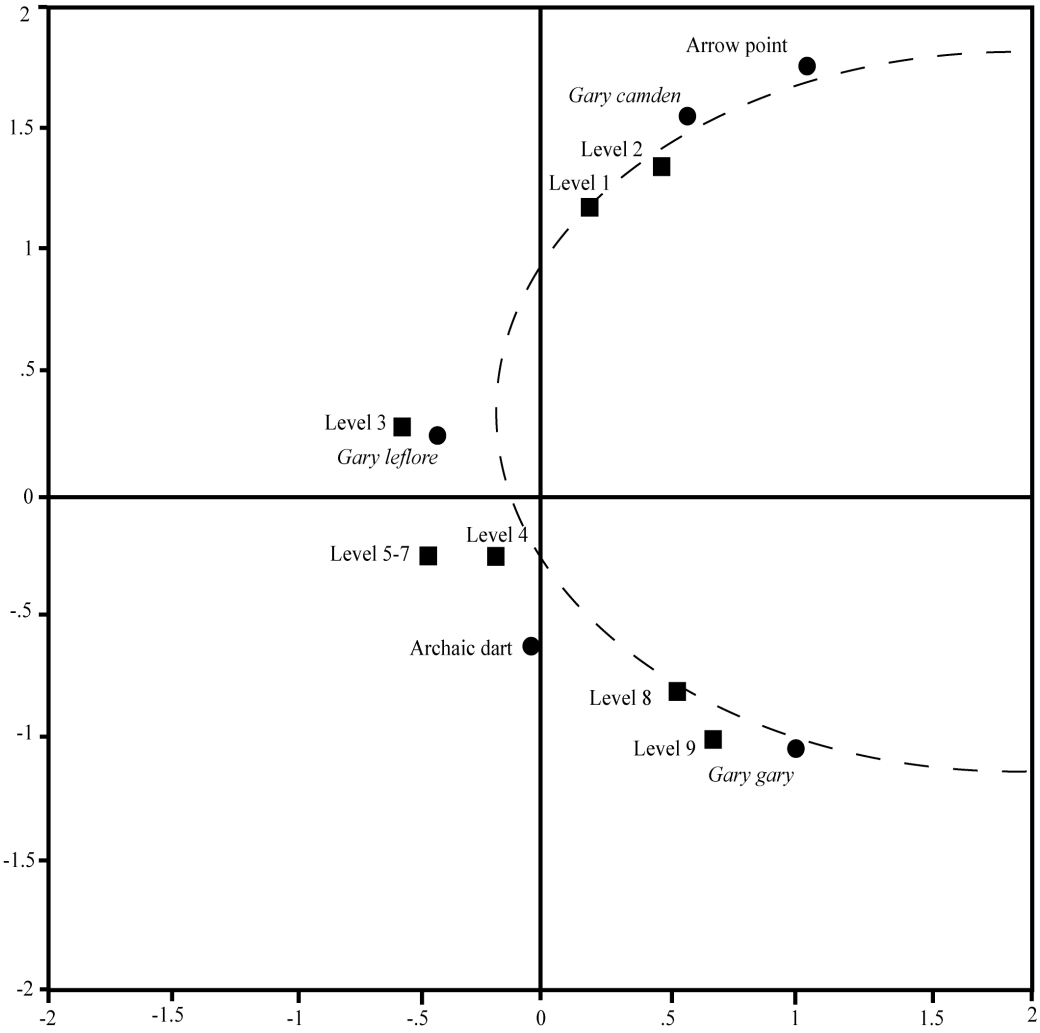


**Figure 4.8: Results of the Williams I point type correspondence analysis (note the strong horseshoe-shaped curve).**

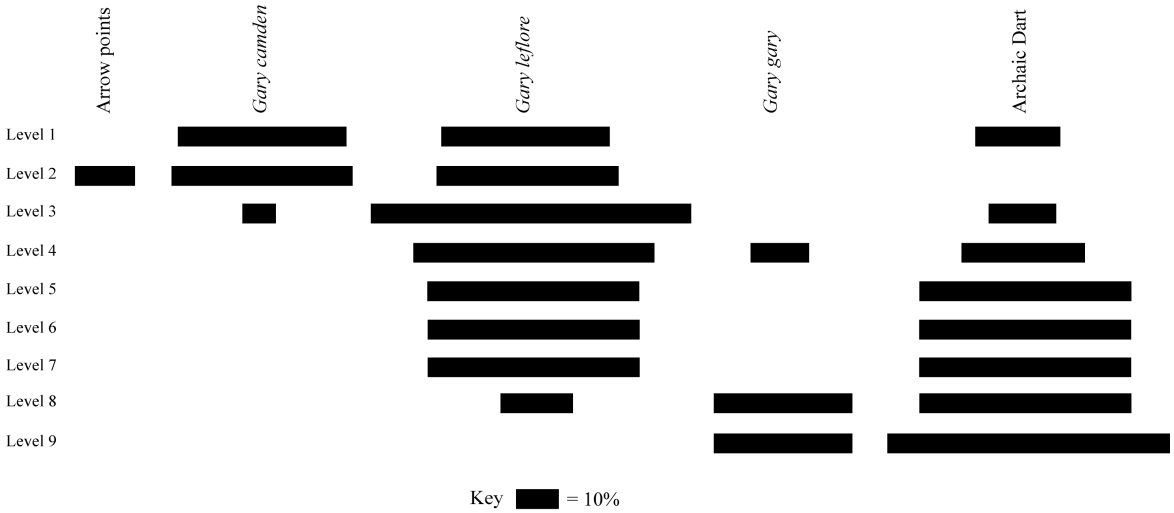


**Figure 4.9: Battleship graph of the Williams I seriation of points percentages by class.**

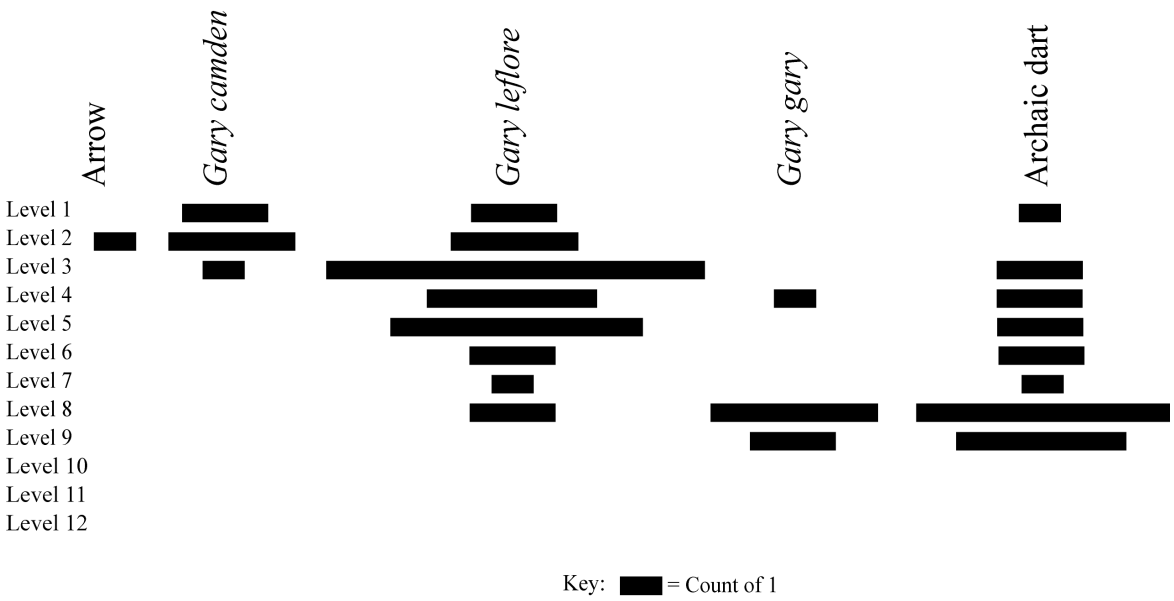


**Figure 4.10: Battleship graph of the Williams I seriation of point frequency by class.**

The pottery types also proved to be temporally sensitive. In this research I separated the grog-bone temper sherds as a new type *Williams Boneware*, because Galm (1984) and others have suggested that the addition of bone to the temper of *Williams Plain* may have a temporal significance. Figure 4.11 presents the results of the correspondence analysis for the pottery types. The assemblage is dominated by *Williams Plain* in both percentage and frequency (Figures 4.12 to 4.13), but the frequency data removes the inflation seen in the initial adoption of pottery technology (the presence of only *Williams Plain* pottery). This can be seen especially well in levels 4 though 6 where *Williams Plain* represents 100% of the assemblage but is only represented by one, eight and one sherd respectively. It is interesting to note that *LeFlore Plain* appears to be earlier that *Williams Boneware*. The Indeterminate Decorated could represent the initial influence of Coles Creek (a hallmark of the Late Woodland cultural period, Evans Phase as per Brown 1971)

but the sherds were too small to definitively identify. The single sherd located in level five likely represents a disturbed context.

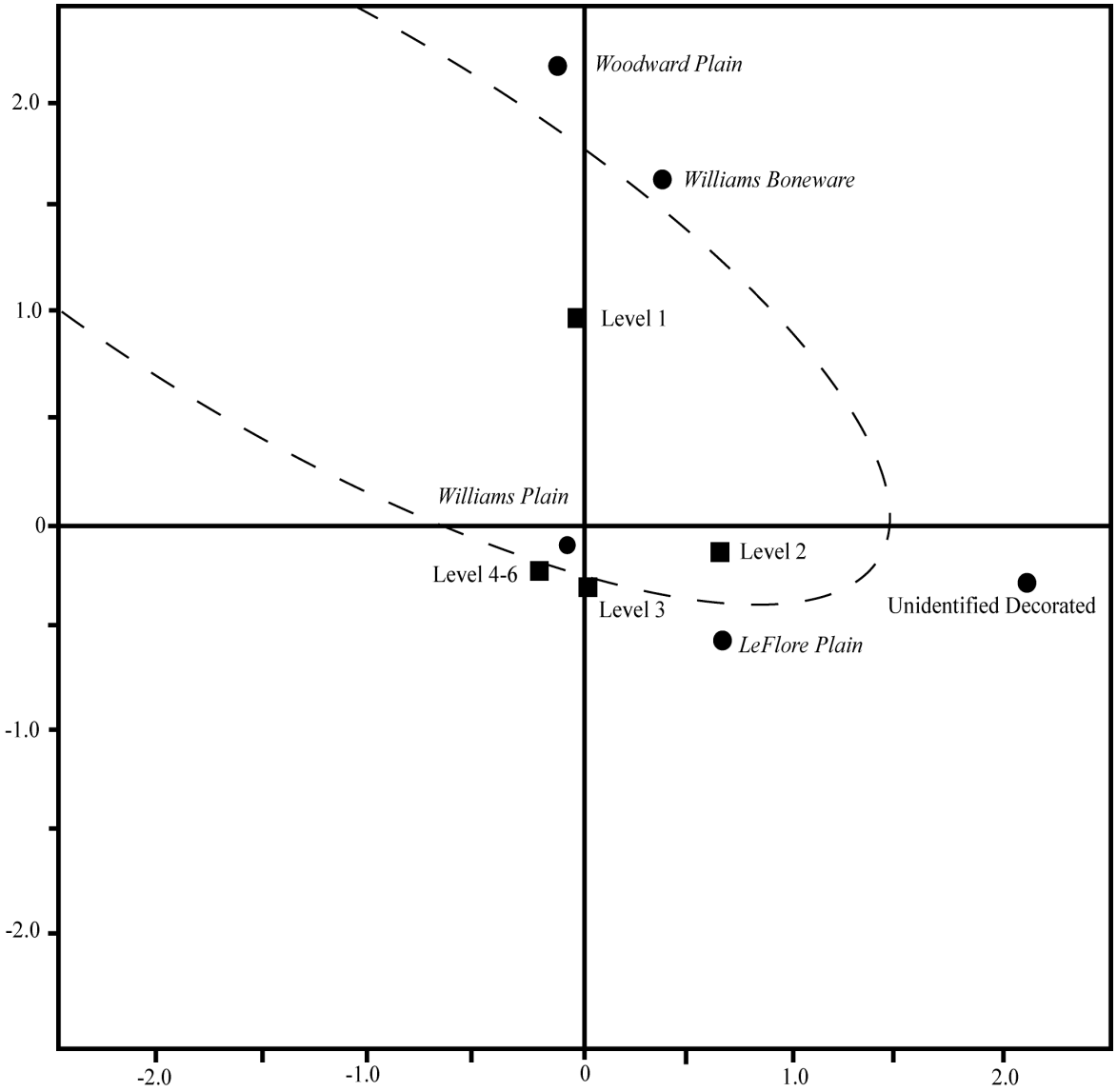


**Figure 4.11: Results of the Williams I pottery type correspondence analysis (the horseshoe is read from bottom left, oldest, to top right, youngest).**

The pottery distributions suggest five temporal breaks. First, Level 6 represents the initial appearance of pottery technology, thus identifying an Early Woodland Period. Second, *LeFlore Plain* pottery represents an addition of a new pottery technology at Level 3. *Williams Boneware* represents a second Middle Woodland division at level 2, and

finally the addition of *Woodward Plain* in level 1 identifies a technological change associated with the Late Woodland cultural period.

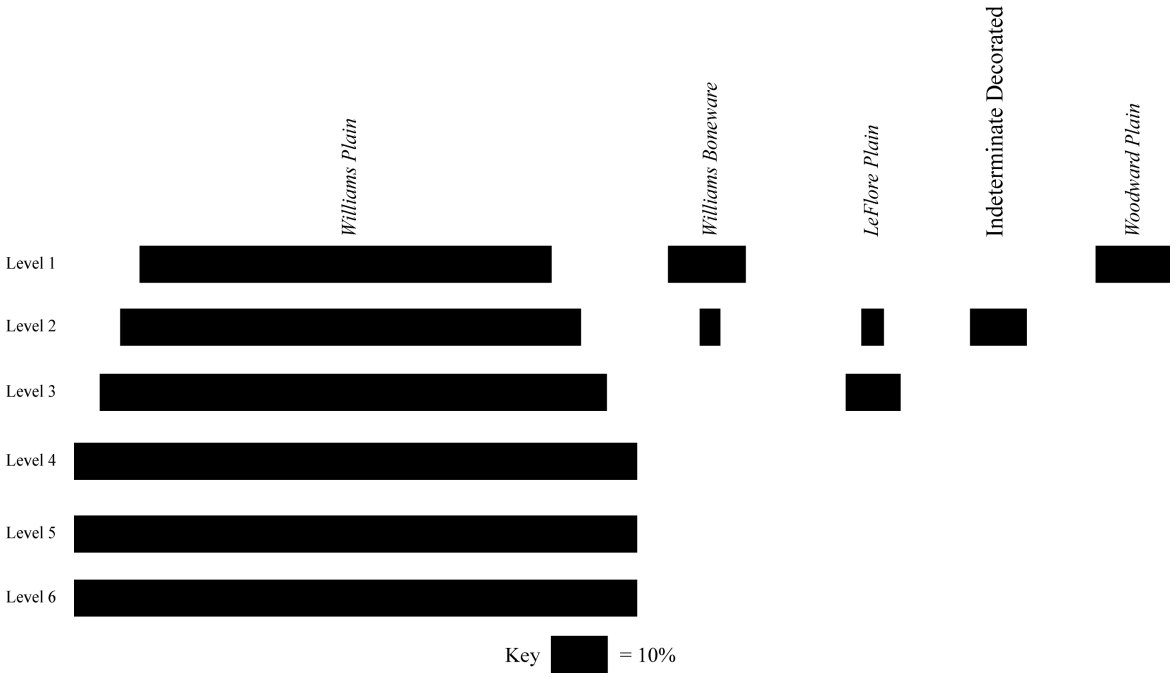


**Figure 4.12: Battelship graph of Williams I pottery percentages by type.**

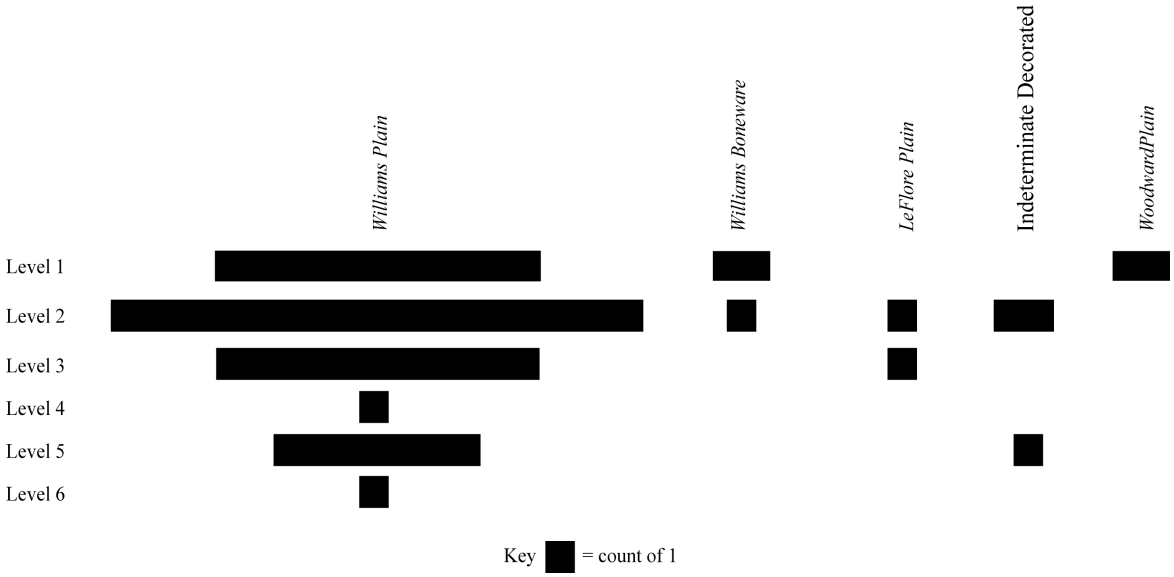


**Figure 4.13: Battleship graph of the Williams I pottery frequency by type.**

The chipped-stone axe/hoe category was also seriated but the results did not indicate a strong seriation. However, plotting of a Fordian battleship graph for the chipped-stone axe/hoes suggests some temporal significance. The potential problems with the seriation is likely tied to the fact that there are only two types, but the correspondence analysis does indicate two culsters with the stemmed hoes clustering with the deeper (older) levels and the double-bitted axe/hoes clustering with the upper (younger) levels (Figure 4.14).

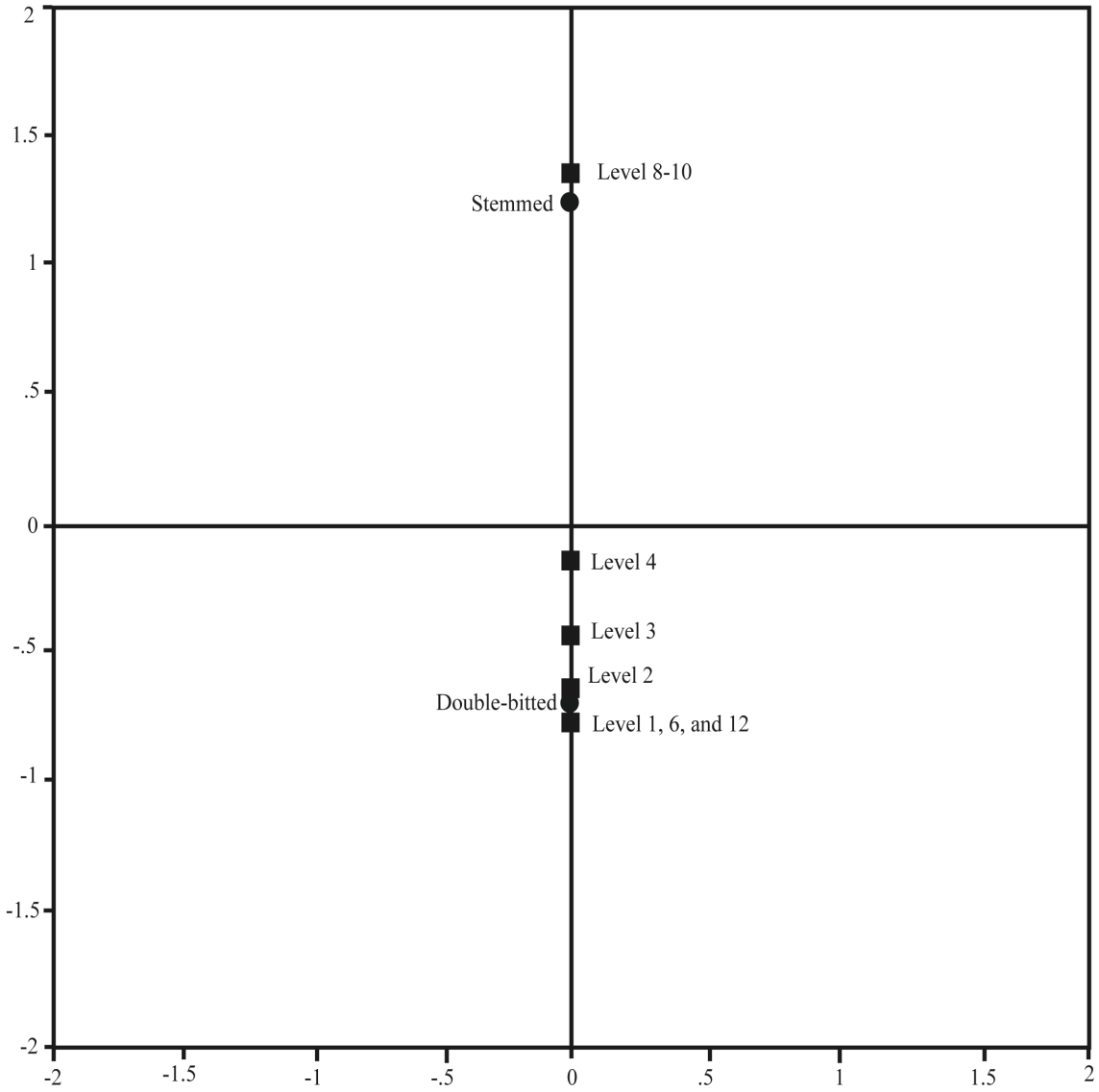


**Figure 4.14: Williams I axe/hoe correspondence analysis results indicating clustering.**

The entire chipped stone axe/hoe assemblage from the Williams I site (minus the surface and burial units) was analyzed. There appears to be a cultural preference for stemmed hoes during the Late Archaic cultural period. The appearance of double bit axe/ hoes corresponds to the Woodland Period (beginning at Level 6) (Figure 4.15). The double-bitted axe/hoe in level 12 is likely due to mixing from intrusive burials.

Stemmed hoes are also present along side the double bit variety into the Late Woodland Period. These findings are interesting when compared to Galm's (1984) definition of the Wister and Fourche Maline Phases. He does not describe the Wister Phase people as using hoes and limits the double bit variety to the Fourche Maline Phase. The association of stemmed hoes with the Wister Phase may indicate some degree of garden tending during the Late Archaic cultural period.

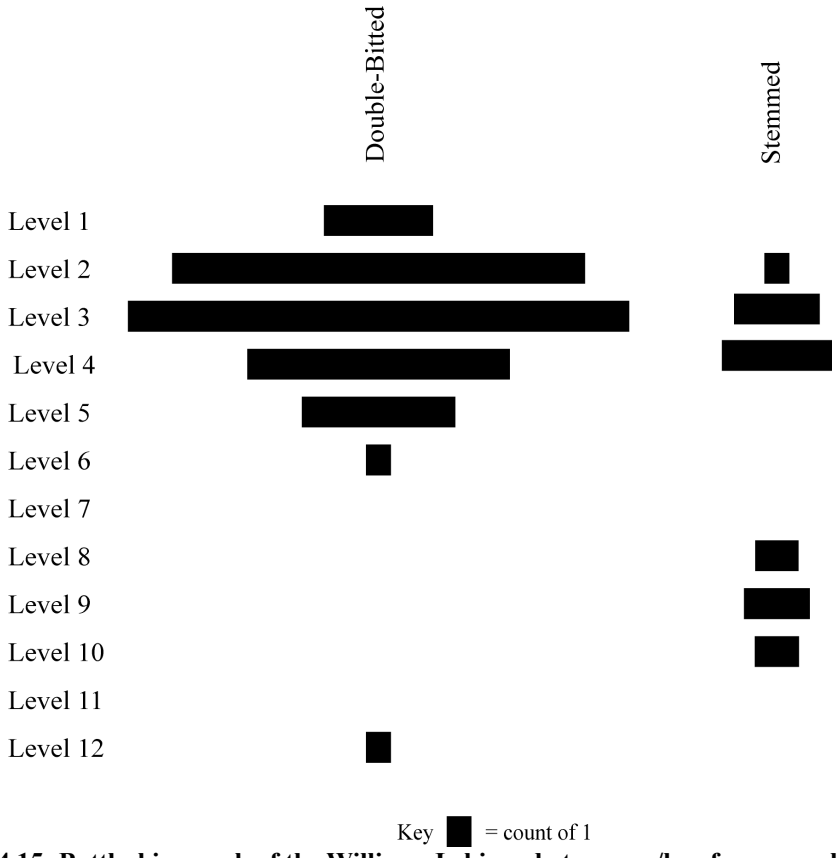


**Figure 4.15: Battleship graph of the Williams I chipped-stone axe/hoe frequency by class.**

When all of the artifact types are viewed together several technological switches or changes are noted that may be good clues for dividing the traditional Fourche Maline Phase (Figure 4.16). The results indicate five intervals of occupation at the site, four of these appear to be associated with the Woodland Period, and one with the Late Archaic. The uppermost level (Level 1) appears to be associated with a Late Woodland (Evans Phase) occupation as indicated by the presence of shell tempered (*Woodward Plain*) vessels.

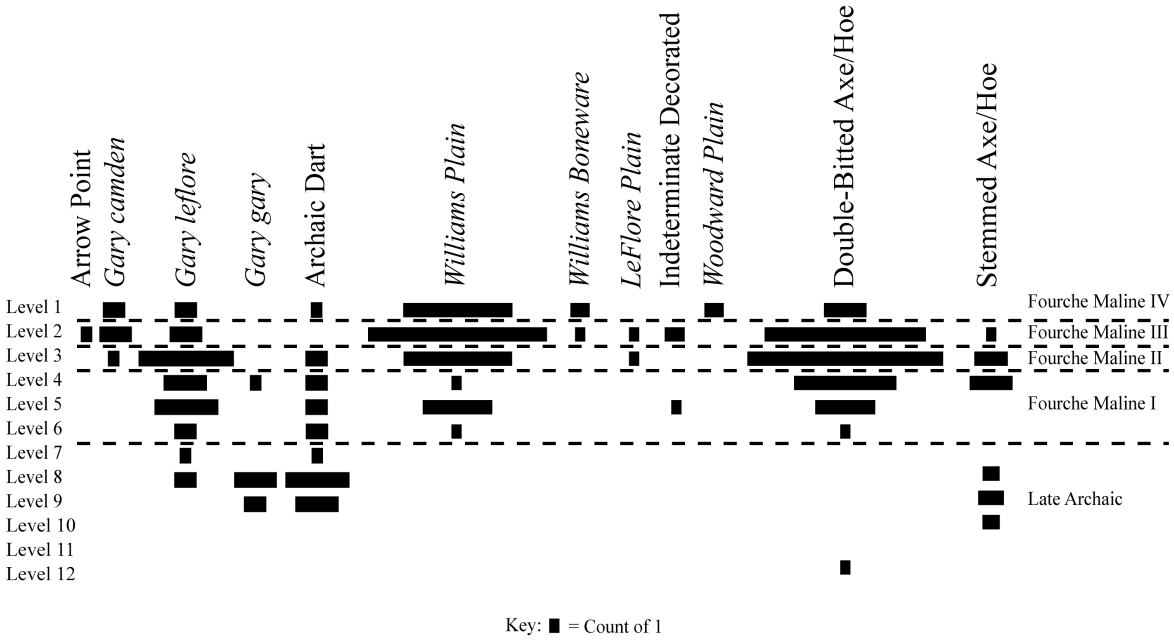


**Figure 4.16: Battleship graph of the entire Williams I seriation assemblege frequency by class.**

The presence of arrow points, the initial appearance of *Williams Boneware*, and the Indeterminate Decorated pottery identifies a second Woodland occupation (Level 2) associated with the later part of Galm's (1984) Fourche Maline Phase. Basically there is a shift in hunting technology associated with the bow and arrow, and apparent influences from the Lower Mississippi Valley (Coles Creek) culture as witnessed by the decorated sherds.

A third Woodland occupation is identified at Level 3, where *Gary camden* points and the initial use of *LeFlore Plain* pottery appear. A fairly long Early Woodland occupation (Levels 4 through 6) is identified based on the adoption of *Williams Plain* pottery, an increase in the use of *Gary leflore* points, and the initial use of double bitted axe/hoes. Finally, the earliest occupation at the Williams I site is non-ceramic Late Archaic (Wister Phase). The artifacts associated with this occupation are *Gary gary* points, several varieties of notched and stemmed dart points, the use of stemmed hoes, and the lack of pottery.

In order to test the findings from the initial seriation, two other groups of units were selected one from the east central portion of the Williams I midden mound and one from the western portion of the mound for supplemental seriations (see Figure 4.3). Again units without burials were selected to avoid possible mixing of artifacts. The findings from these units closly mirror the initial seriation (Figure 4.16). The differnce in the thicknesses of the occpation levels in the second seriation is likely tied to the contour of the midden mound as units near the center are close to one foot higher in elevation than units located closer to the edge of the mound. However, this being said the artifact distributions looked similar. The Late Woodland occupation was limited to the upper six inches. Below this was a second Woodland occupation was identified by the presence of arrow points, *Williams Boneware*, and the Indeterminate Decorated wares. This occupation appears to be six inches thicker than the initial seriation from the center of the midden mound, but again this is likely due to the contour of the mound.

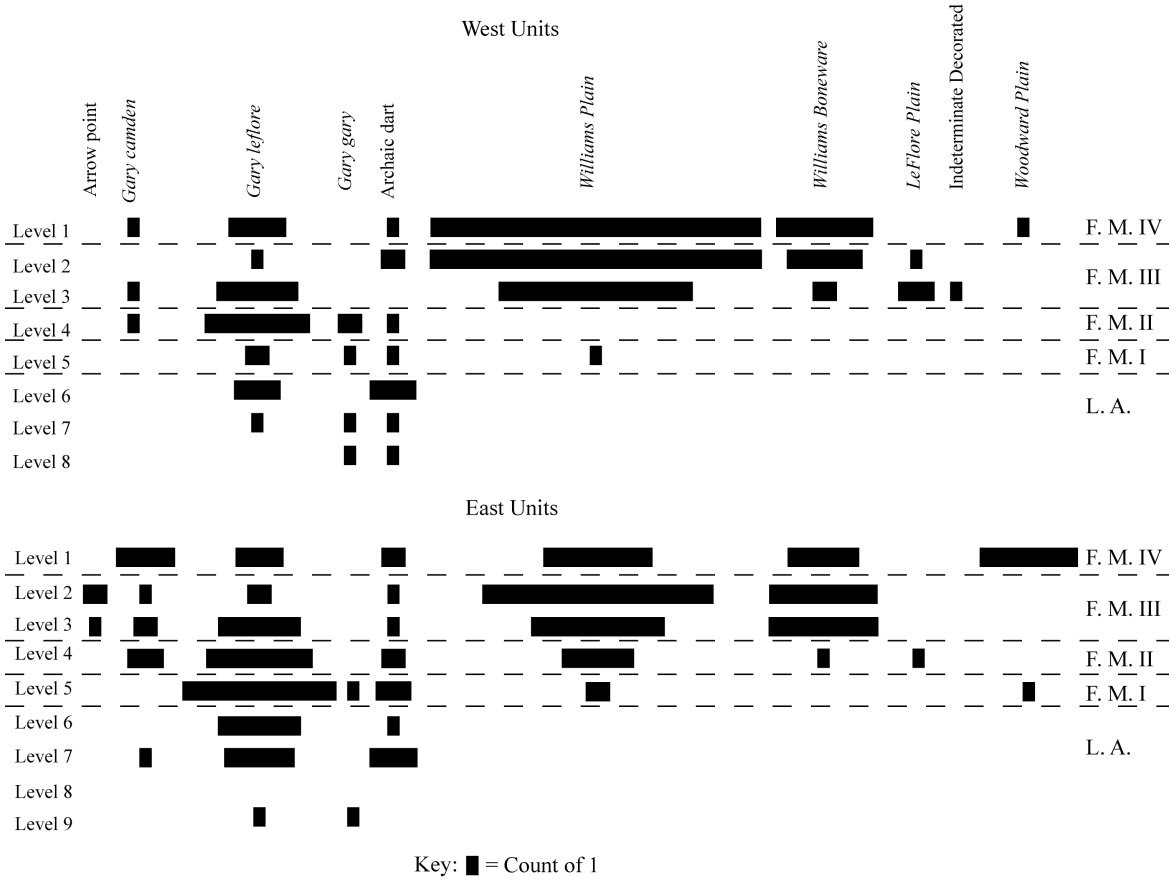


**Figure 4.16: Battleship graphs of the alternate seriations from the Williams I site**

Below this is a third thin Woodland occupation identified by the presence of *Gary camden* and *LeFlore Plain*. The Early Woodland/Late Archaic boundary identified with the initial use of pottery is between Levels 5 and 6, indicating that the Early Woodland occupation debris was concentrated more toward the center of the mound where it is close to 18 in (46 cm) thick. Finally the levels below this are Late Archaic (Wister Phase).

A strong correlation appears between the seriations with the occupations thicknesses varying slightly as one progresses from the center of the midden out to the edges. These findings are slightly at odds with Irvine's (1980) occupation horizons from the Williams I site. Based on her pottery analysis Levels 1 through 3 were Mississippian, Level 4 was Late Woodland (Evans Phase), Levels 5 and 6 were Fourche Maline Phase

and below Level 6 the cultural horizon was associated with the Wister Phase. The problem with Irvine's (1980) chronology is that the decorated sherds from Williams I represents only 3% of the entire pottery assemblage at the site, and 79% of these decorated sherds are likely affiliated with Woodland cultural period variety (*Willaims Incised*). This indicates that Irvine's (1980) idenitification of a Mississippain occupation is not well supported and strengthens the argument for identifying the upper 18 in (46 cm) as Woodland rather than a Mississippian component. Redifining Irvine's (1980) Mississippian as Woodland corresponds well with the seriation conducted here.

**Discussion**

The seriation results indicate that changes in material culture can be used as temporal markers to divide the roughly 2,400 year Arkansas Valley Formative Caddoan into more manageable and reasonable phases than Galm's (1984) two phase (Wister and Fourche Maline) scheme. Galm (1984:215) noted that his phases were long lasting (~1,200 years each) and in the future could and should be refined into smaller units. I am interested in the dynamics of the Woodland Period and will not focus on the Wister Phase other than to say there are continuities between the Late Archaic and Woodland people and that stemmed hoes need to be added to the material culture list and that *Gary gary* points are solely Late Archaic.

Following Galm (1984:215), the seriations indicate that there are adequate changes in material culture to break the Woodland Period into four sub-periods (Fourche Maline I through IV). The material culture identifying the Early Woodland (Fourche Maline I) is the adoption of pottery technology (mostly *Williams Plain,* with some *Williams Incised*),

the presence of only *Gary leflore* for the large contracting stem biface type, and the shift to double-bitted axe/hoes. Fourche Maline II incorporates a development of a dart/arrow transitional point type (*Gary camden*), the continued use of *Gary leflore* (likely as knives and dart points), continued use of double-bitted axe/hoes, and the addition of the grog/grit tempered (*LeFlore Plain*) to the pottery assemblage. Fourche Maline III is associated with the adoption of bow and arrow technology (as seen in the presence of small corner-notched arrow points), the continued presence of *Williams Plain* and *LeFlore Plain* with the addition of *Williams Boneware* pottery, and again, the use of double-bitted axe/hoes. Finally, the Late Woodland (Fourche Maline IV) is identified by an increase in decorated pottery, the appearance of shell tempered (*Woodward Plain*) as well as an increase in various arrow point forms. It should also be noted that there are stemmed hoes present in some of the Woodland cultural horizons but at a much lower frequency than the double-bitted axe/hoes. Archaic (stemmed and notched) dart points are also present through all the Woodland occupations in very low frequencies (1 to 2). These may represent either some degree of mixing in the units examined, heirloom/interesting finds, or both.

**Summary**

This chapter addressed the origin and problems with the traditional concept of Fourche Maline and whether there are changes in material culture that could allow us to refine the chronology. The answer to this question is yes. The identification of temporally sensitive material culture types allow a refinement of the chronology for the Fourche Maline drainage and will help in refining the chronology in other drainages. Also an understanding of the material culture changes over time will help to identify occupations

from the many Archaic, Woodland, and Mississippian surface collections in Oklahoma. The refinement of the chronology is crucial to testing the hypothesis that Fourche Maline represents transegalitarian, complex hunter-gatherer-horticulturalists, because it prevents mistaking temporal changes as cultural changes. This will allow better finer-grained resolution of cultural changes, such as subsistence, over time.

# Chapter 5: Fourche Maline Social Organization

This chapter addresses the hypothesis that Fourche Maline people represent transegalitarian complex hunter-gatherer-horticulturalists. To test this hypothesis the social organization of the Fourche Maline people is examined by analysis of the mortuary practices, pottery changes and household patterns. Little research has focused on the question of Fourche Maline social organization because the burial practices yield few grave goods, the pottery is considered homogeneous, and because we know very little about Fourche Maline habitations due to the lack of off-mound excavations.

First, a review of the typological models used to identify different levels of social organization. Then, following Binford's (1965) calls for multivariate analysis of the archaeological record, I will discuss the methods archaeologists use to infer social organization from the archaeological record. Finally, I will apply the methods to the Fourche Maline culture to identify the social organization most likely to have been practices by Fourche Maline people.

**Review of the Typological Models for Social Organization**

One of the earliest and most influential models is that of Service (1971). He developed a unilinear evolutionary typology of Bands, Tribes, Chiefdoms, and States. At each evolutionary "level" Service (1971) described the social organization most likely associated with that degree of complexity. This framework has been criticized over the years because of its unilineal pattern and because the hallmarks of each level vary independently. For example, the presence of agriculture does not necessarily indicate sedentism, or political complexity.

In an attempt to refine Service's framework, Johnson and Earle (1987) discussed social organization through levels of socioeconomic integration. They proposed a three level classification: 1) the Family Group, 2) the Local Group, and 3) the Regional Polity (Johnson and Earle 1987).

In the Family Group, Johnson and Earle (1987) included the egalitarian family/ camp and family/hamlet. The family/camp societies are low-density foragers, using a sexual division of labor with leadership rarely outside the family (Johnson and Earle 1987). Warfare is rare, ceremonialism is ad-hoc, and territorial ownership does not exist. The family/hamlet societies have a larger population density. They subsist mainly on wild resources although initial horticulture and/or herding can supplement the diet (Johnson and Earle 1987). Ceremonialism at this level is more developed; evidence exists for territorial ranges (though they are undefended), and little evidence is manifest for structured warfare (Johnson and Earle 1987).

The Local Group consists of groups of families that form for common interests such as defense (Johnson and Earle 1987). These societies are still fairly egalitarian, although some level of achieved status exists (such as the Big Man level of complexity) (Johnson and Earle 1987). Villages become common at this level with population densities of more than one person per square mile (2.6/$km^2$) (Johnson and Earle 1987). With the population compaction comes an increase in warfare (Johnson and Earle 1987). Ceremonialism is used as a means of group identity and solidarity, and resources are owned by kin groups who defend territories (Johnson and Earle 1987).

Lastly Johnson and Earle's (1987) Regional Polity level consists of Service's (1971) Chiefdom and State levels of sociopolitical complexity. This level is identified by organized warfare between polities, ascribed/hereditary leadership, agriculture and trade (Johnson and Earle 1987). The origin of state and empire levels within the Regional Polity category is seen as expansions of political domination, vast populations (possibly multi-ethnic), and the rise of institutions such as a standing army, a bureaucracy, codified laws and law enforcement etc. (Johnson and Earle 1987).

Johnson and Earle's classification system has the same problems as did Service's, i.e., the assumed covariance of the traits used to identify each level of socioeconomic integration. More recent models developed from and refining Clark and Blake's (1994) concept of transegalitarian alleviate this problem. These models allow for independent variation in many of the traits used in earlier models (for example, social inequality, food production, sedentism all vary independently).

**Fourche Maline as a Transegalitarian Culture**

Models of social organization act as heuristic devices for identifying and comparing the relative complexity of a society. Clark and Blake (1994) coined the term transegalitarian to refer to societies which are neither egalitarian nor inegalitarian (ranked). Clark and Blake were interested in the development of chiefdoms and originally transegalitarian was synonymous with emergent chiefdom. In Clark and Blake's (1994) original conception the emergence of inequality identified in transegalitarian societies is an unintended consequence of prestige competition among aggrandizing males. Aggrandizers are typically identified as ambitious males competing for prestige within a

regional setting (Clark and Blake 1994). More recently, the term transegalitarian has became more generalized as encompassing all societies between the mobile, truly egalitarian hunter-gatherers on one end of the continuum and the ranked chiefdom/state level societies on the other end of the continuum (Ames 2008:490).

Hayden (2001) presented a economic model for the emergence of inequality seen in transegalitarian societies. Here he argued that aggrandizers are competing with the express intention of gaining power and social dominance (Hayden 2001). Hayden (2001) divorced the origin of inequality from food production (agriculture). He does suggest that the subsistence economy generally is able to produce surpluses that can be used in prestige competition or transformed into prestige goods. His model is very materialistic and at this time would be very difficult to operationalize with the information available for the Fourche Maline culture.

Sassaman (2004) approached the origin of inequality from a slightly different perspective. He focused on the concept of complexity and how it relates to the development of ranked societies (Sassaman 2004). First, as with sociopolitical classifications, he stated that our current knowledge indicated that the term hunter-gatherer means nothing more that a subsistence form focused on wild resources (Sassaman 2004). Many of the past typological systems have generally equated hunter-gatherers with egalitarian, band-levels of social organization. Today we know that inequality can exist in hunter-gatherer societies, for example the cultures of the Northwest Coast of North America were hunter-gatherers who were organized as ranked chiefdoms (Sassaman 2004). Sassaman also discussed the concept of complexity. He stated that complexity is

defined as the relative number of parts in a system and the number of interrelationships among the parts (Sassaman 2004).

Sassaman (2004) reviewed the concept of vertical (hierarchies) and horizontal (heterogeneity) components as they relate to complexity. Horizontal intensification is the elaboration of society by adding parts (technologies, storage etc.). Vertical intensification developed to integrate the increasing number of parts and differentiate among them to reduce scalar stress (Sassaman 2004). Contrary to Hayden (2001), Sassaman (2004) noted that complexity is not tied to the ability to produce a surplus. However, the ability to produce a surplus, when present, is usually tied to increasing complexity. Finally Sassaman (2004) addressed the use of monumentality of complex hunter-gatherers, something that has not really been explored by earlier research. Sassaman (2004) examined the building and use of monumental earthworks by complex hunter-gatherers in eastern North America (such as Watson Brake and Poverty Point).

How do archaeologists get from the material record to levels of complexity such as egalitarian, transegalitarian, or inegalitarian? Archaeologists use several frameworks to infer social organization of prehistoric societies. Archaeologists focus on patterning in the material record using information from the mortuary patterns, pottery styles and designs, and domestic activities related to house size and activity areas. Any method used alone can give only a tentative glimpse of the social organization of prehistoric societies. Using Binford's (1965) call for multivariate analysis, a combination of these methods can lend strength, or illuminate weaknesses in hypotheses about social organization.

Three general aspects of past behaviors provide information on the social organization of prehistoric societies; mortuary patterns, material culture (usually ceramic studies), and household patterning. Each holds promise for enlightening issues tied to social organization, but details related to these are not always available. I will discuss each of these and address their applicability to the Fourche Maline material record.

**Mortuary Studies and Social Organization**

The single most important line of evidence in studying social organization is mortuary information. Saxe (1970) has been very influential in identifying past social organization as he present several hypotheses regarding this issue. Many researchers such as Tainter (1978) and Goldstein (1981) have drawn from insights presented by Saxe. Saxe continues to be influential as seen in Mantha's (2009) use of Saxe's Hypothesis 8 in her research on the establishment of territoriality in Peru. For a good review of the use of mortuary studies to address social organization see Parker-Pearson (1999:72:94)

**Ceramics and Social Organization**

Many archaeologists (Deetz 1965; Graves 1991; Longacre 1970; Sinopoli 1991; Stark et al. 2000; Whallon 1968; Wright 1991) have used ceramic findings to infer social organization of prehistoric societies. These archaeologists use style and symbolism in ceramic decoration, which build on Deetz's (1965) framework. Some of the more recent research has focused on the importance of feasting in the emergence of social inequality and how this relates to ceramic technology (Blitz 1993; Spielmann 2002).

## Household Archaeology and Social Organization

Study of household archaeology can yield information related to the social organization of prehistoric peoples. Household archaeology, as used here, means the study of community-level activity areas and the analysis of household organization as seen in house size and interior activity areas. This level of analysis avoids the problems of circular reasoning that may be present in regional and/or worldwide analysis. Researchers are able to ask more precise questions. Deetz (1968) and Hill (1968) research household patterns/ activity areas, and Ember (1973), Hoffman (1999), and Peregrine (2001) discuss house size.

## Mortuary Findings

Rogers (Powell and Rogers 1980) attempted a mortuary analysis focusing on the social organization of the Fourche Maline people. Following Saxe (1970) and Binford (1971) Rogers investigated the amount of energy expended in deposition of the deceased (Powell and Rogers 1980). The McCutchan-McLaughlin site burial population consists of 32 burials representing 42 individuals. Six of the burials (19%) have more than one individual; this represents 45% of the individuals present in the burial population (Powell and Rogers 1980). It should be noted that Burial 6 is skewing this figure as it is a mass burial of nine people. Rogers interpreted most of the other multiple interments as burials of mothers and children (Powell and Rogers 1980:52).

Rogers noted that 40% of the burials at 34Lt11 have grave goods. This fits well with Galm's (1978a:240) figure of 39% of individuals having grave goods (Powell and Rogers 1980:80). Table 5.1 presents the burials containing grave goods and the type of

grave good. Rogers pointed out an important fact concerning points associated with the burials. He stated that one needs to identify the points that are likely grave goods from the points that are likely those that killed the individual (Powell and Rogers 1980).

**Table 5.1: Burials and Grave Associations from 34Lt11**

| | Utilitarian | | | | | | | | | | | Non-Utilitarian | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stone | | | | | | Bone | | | | Shell | Stone | | | Beads | | | | |
| Burial # | Points | Biface | Uniface | Groundstone | Unmod stone | | Awl | Fish hook | Antler | Deer tibia | Mussel valves | Boatstone | Hematite | Fossil | Bone beads | Seed beads | Snail beads | Freshwater pearl | Canine tooth pendant |
| 2 | 6 | 1 | 1 | | | | | | | | | | | | | | | | |
| 3 | 1 | | | 1 | | | | | | | | | | | | | | 1 | |
| 6 | 28* | | 1 | | | | | | | | | | | | | | | | |
| 8 | | 2 | | 1 | | | | | 1 | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | 1 |
| 12 | | | | | | | | | | | | 1 | | | | 220 | ~55 | | |
| 13 | 1 | | | 1 | | | | 1 | | | | | | | | | | | |
| 14 | 1 | | | | | | | | | | | | 1 | | | | | | |
| 19 | 3* | | | | | | | | | | | | | | | | | | |
| 20 | 2* | | | | 1 | | 5 | | | | 12 | | | | | | | | |
| 21 | 2 | | | | | | | 1 | | 3 | | | | | | | | | |
| 22 | 2* | | | | | | | | | | | | 1 | | | | | | |
| 25 | | | | | 1 | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | 1 | 2 | | | | |

* = Associated with death of individual not grave good

The 34Lt11 grave goods have interesting implications for addressing Fourche Maline social organization. Rogers (Powell and Rogers 1980) concluded that the Fourche Maline mortuary program indicated an egalitarian level of organization with some evidence of social inequality. His conclusions are problematic as he is using a model developed by Fried (1960) and modified by Buikstra (1976) which has little flexibility between egalitarian and ranked societies. I agree with Rogers that the mortuary program does not indicate ranked social organization, but this is where the development of the transegalitarian framework really identifies its advantages.

Rogers suggested the possibility of some degree of ascribed status as evidenced by two infant burials and one adolescent with grave goods (B21, B29, and B12A) (Powell and Rogers 1980:80). Further, he identified one burial (two individuals, B12A and B12B) that has material culture associated with high energy investment, namely 220 seed beads, and 55 snail shell beds (Powell and Rogers 1980:80). Also, there are hints of a possible sexual division of labor seen in the presence of a possible female tool kit (a sandstone slab, five bone awls, and 12 mussel valves) associated with an adult female (B20). All of this evidence is interpreted to show some degree of social inequality was present in Fourche Maline society further supporting the idea that Fourche Maline people represent a transegalitarian organization.

**Fourche Maline Pottery**

The pottery associated with the Fourche Maline assemblages commonly lack intricate decorations, making the sherds very homogeneous (Bell 1953; Bell and Baerries 1951; Galm 1984; Galm and Flynn 1978; Wood 1981). The hallmark ceramic type used to identify Fourche Maline culture is *Williams Plain* (Bell 1953; Bell and Baerries 1951; Galm 1984; Galm and Flynn 1978). However, research for this dissertation has indicated that the Fourche Maline people were making and using *Williams Boneware*, *LeFlore Plain* and *Woodward Plain*. Variations in temper and thickness help separate these pottery types (Table 4.2).

All of these pottery types are plainwares with little to no decorations. Proctor (1957) identified a variety of thick grog tempered decorated sherds that he named *Williams Plain Decorated*; later Brown (1971) renamed this type *Williams Incised*. The

decoration consists of incised lines organized into simple parallel lines and chevrons (Proctor 1957) (Figure 5.1).

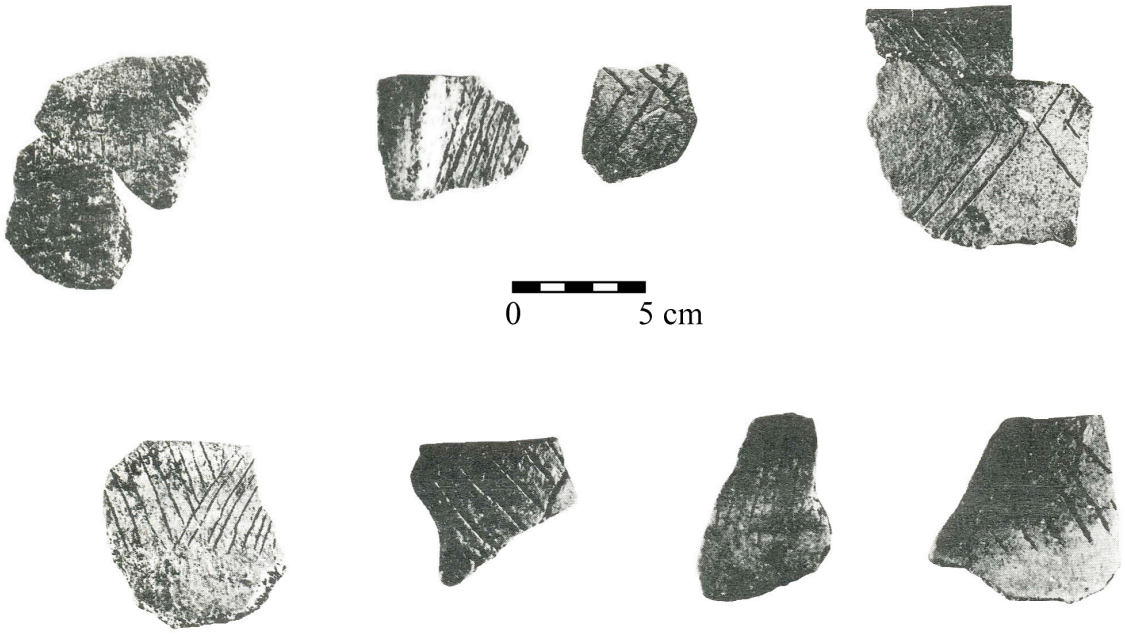


**Figure 5.1: Examples of *Williams Incised* sherds (adapted from Proctor 1957)**

Fourche Maline pottery is predominately plainware but variations exist in vessel form. Bell (1953) identified the pottery as being "flower pot" shaped with straight rims, but he notes that there are some flared rims. Brown (1971) pointed out that several vessel forms are associated with Fourche Maline (Figures 4.5 to 4.7). Variation in vessel form and decoration could yield clues to how Fourche Maline people were organized. Following Blitz (1993) one could investigate the possibility of feasting, common to transegalitarian people, at Fourche Maline sites as an avenue toward understanding how aggrandizers are manipulating the system. At this time this type of research has not been conducted but it would make an excellent area of future research.

**Fourche Maline Household Study**

Household archaeological models are great middle range theories, but some of them require good contextual data as well as fairly strict field methodology. To be able to analyze activity areas the houses need to be uncovered and recorded in such a way that artifact distributions and patterning can be determined. This kind of information is not always available, especially with the methodology used by the W.P.A. crews digging Fourche Maline sites. Other issues hindering full household analysis is the Caddo and Wichita practice of cleaning out houses after their use as seen at other Caddoan sites such as the Clement site (34Mc8) (Hammerstedt et al. 2010:288). Recent fieldwork appears to push this practice back to the Woodland Period in eastern Oklahoma.

The first evidence of possible Fourche Maline domestic structures comes from findings at the Poole Site (3Ga3). Most of the excavations at Fourche Maline related sites, especially in Oklahoma, consisted of excavations of the midden mounds with little uncovering of areas off the mounds (Bell 1953; Bell and Baerries 1951; Galm 1984; Galm and Flynn 1978). The Poole Site was an exception. The W.P.A. crews excavated three "Plots" at the Poole Site, none of which were on mounds (Wood 1981). These excavations exposed a large house pattern (Wood 1981). This house pattern and associated features, along with some information gained from other black-midden sites, are a great data set with which to test Fourche Maline social organization. The site, as with most other black-midden sites, yielded a homogeneous Fourche Maline ceramic assemblage which has little to no stylistic variation suggesting matrilocal residence patterns (Deetz 1965; Graves 1991; Whallon 1968).

The Poole site is in Garland County, Arkansas, on a terrace of the Ouachita River (Wood 1981). It encompasses a large village and cemetery (750x200 m) with both Fourche Maline and later Caddoan occupations (Wood 1981). The W.P.A. excavated the site in 1939 and 1940 (Wood 1981). It consists of two mounds. Mound 1 is circular, about one meter tall with a diameter of 30 m (Wood 1981). Mound 2 is also circular, is one meter tall, and has a diameter of 10 to 12 m (Wood 1981). Three "Plot" locations were chosen for excavation in areas that had not been disturbed by commercial diggers, none of which involved mound excavation (Wood 1981).

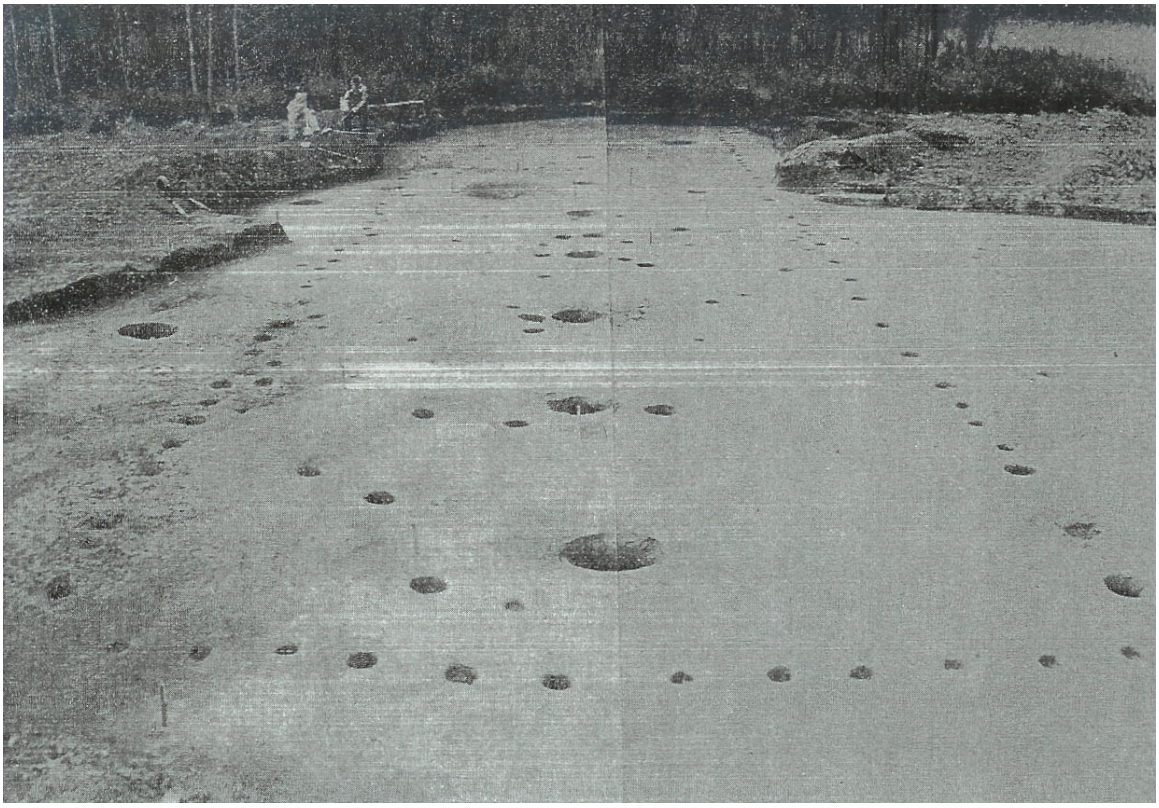

**Figure 5.2: Photo of the Poole site house (adapted from Wood 1981:17).**

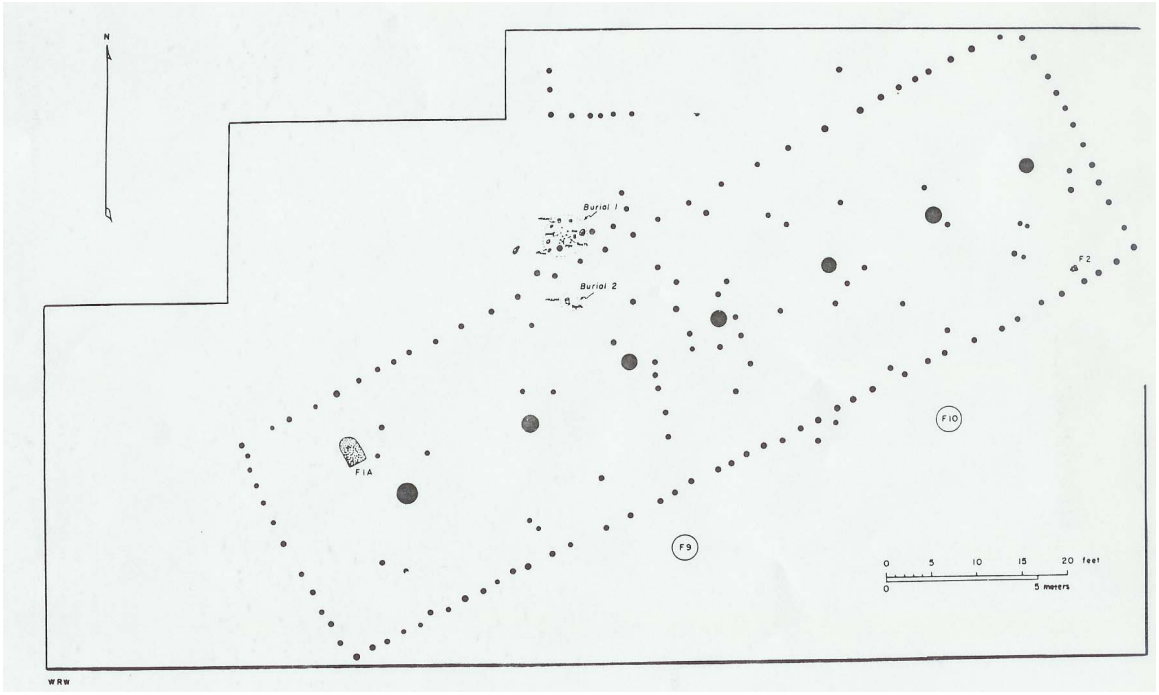


**Figure 5.3: Map of the Poole site house showing the location of features (adapted from Wood 1981:16).**

Plot 2 of the excavations exposed a large long rectangular structure (Wood 1981) (Figures 5.2 and 5.3). This structure was orientated east-northeast by west-southwest and was interpreted to be a house (Wood 1981). It was 30 m long and 8.5 m wide with a possible entrance on southwest end (Wood 1981). Another possible rectangular structure may exist to the north of the house (Wood 1981).

Inside the Poole house were four features (F1, F2, F9, and F10) as well as two burials (Wood 1981) (see Figure 5.3). Feature 1 was a small rectangular fireplace in the northwest corner of the structure (Wood 1981). Feature 2 was a cache of 19 large novaculite flakes, buried 40 cm below the ground surface (Wood 1981). Features 9 and 10 were refuse-filled pits (likely abandoned storage pits) (Wood 1981). One of the burials was just outside the northwest wall and the other burial was inside the house; both burials were Fourche Maline affiliated based on material associations (Wood 1981). An

unrecorded number of *Williams Plain* and *Williams Incised* sherds were found on the house floor (Wood 1981).

Issues can be raised about the Poole structure. First, the W.P.A. excavation methods were commonplace at the time, but have long since been outdated. For example, none of the matrix was screened; few faunal and floral remains were retained; and there was little record of artifact distributions. Second, this excavation consists of a single house, a large one at that. This leads to two important questions: 1) Is this house representative of all Fourche Maline houses? 2) Was it a multifamily domicile or a large communal/ceremonial structure? I would argue that the house is a domestic residence due to the features present and the lack of any "ritual or ceremonial" goods recovered in the excavation. Schambach (1982) argues that the large house at the Poole site is related to the later Caddo occupation of the site. He does note that it is atypical for a Caddo structure. The presence of a burial beneath the house floor that has Fourche Maline materials associated with it as well as the recovery of Fourche Maline materials from the area in and around the house (Wood 1981) would argue it is associated with the Fourche Maline occupation. The representativeness of the house must be answered with future research. Two large structures associated with Fourche Maline, possibly similar to the Poole site house, were recently uncovered in northeast Texas (Skinner 2007).

In the spring of 2009 total of 32,500 $m^2$ of geophysical remote sensing was conducted at four sites to address off-mound Fourche Maline culture habitation. The McCutchan-McLaughlin site yielded six anomalies that were considered to be associated

with habitation (Figure 5.4) and thus was the best candidate for questions of social organization.

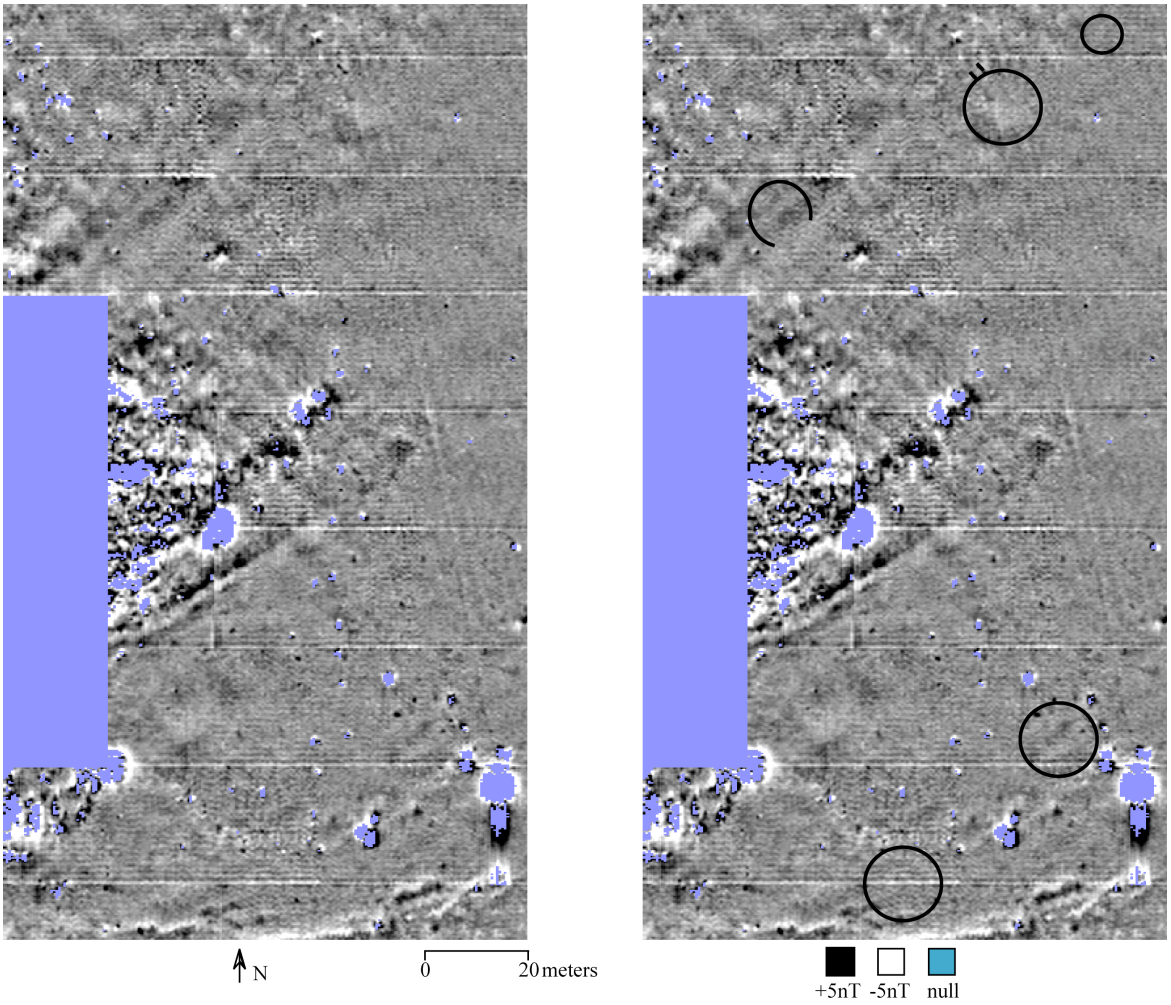


**Figure 5.4: Remote-sensing imagery of 34Lt11**
**raw image on right, image with anomalies marked on right.**

Oklahoma Anthropological Society volunteers excavated a total of 20 1x1 m test units focusing on the anomaly located in Grid 31 (Figure 5.5). A yellowish brown (10YR5/4) compacted horizon was noted at a depth of 30 to 40 cm below the surface (Figures 5.6 to 5.8). This horizon may be a former house floor based on its compacted nature, the presence of postmolds in Test Units 7, 13, 26, and 29, as well as the presence of a hearth in Test Units 35 and 36. However, a very low artifact frequency was noted. A total

of 25 artifacts were recovered of which 23 were flakes, 1 was a biface fragment, and 1 was a broken corner-notched dart point. The ephemeral nature of the features present leads me to believe that the house was dismantled and cleaned out at the end of its occupation.

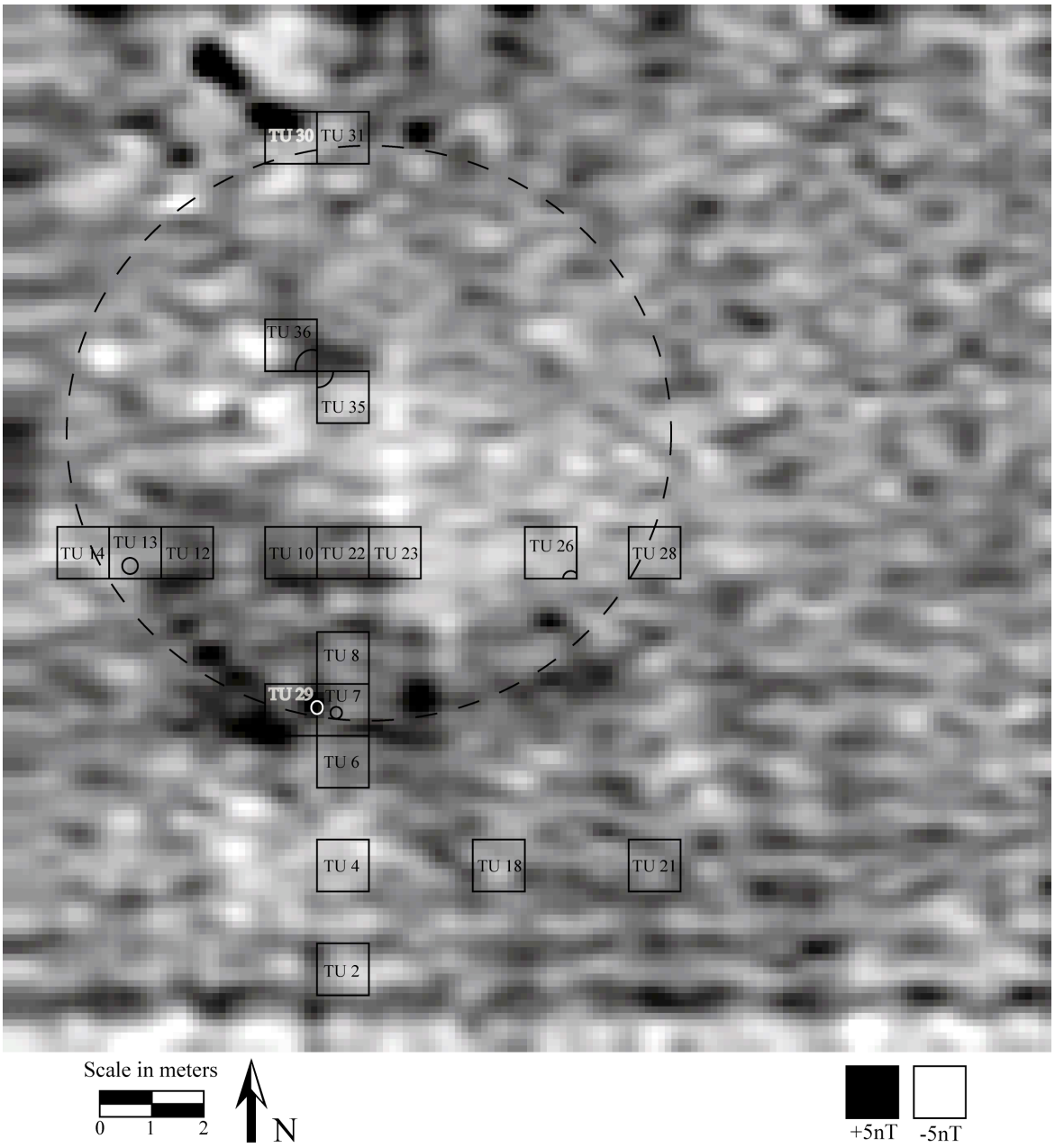


**Figure 5.5: Image of Grid 31, 34Lt11, with excavated units, projected house boundaries, and identified features.**


**Figure 5.6: Photo of the north wall of TU 10, 22, 23 from 34Lt11 identifying the house floor.**

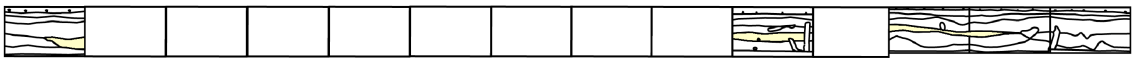

**Figure 5.7: North-South profile map for Grid 31 (34Lt11) with house floor identified (units are 1 m wide).**

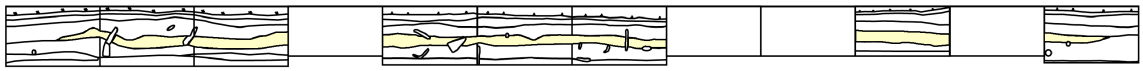

**Figure 5.8: East-West profile map for Grid 31 (34Lt11) with house floor identified (units are 1 m wide).**

The house pattern at 34Lt11 is roughly 12 m in diameter with a possible extended entrance to the southeast. This yields a floor-plan of 113 $m^2$. Four other large circular anomalies were identified. They are around 12 m in diameter and likely represent other houses. Two other circular anomalies are smaller, roughly 6 to 10 $m^2$, and it is unknown what they represent. The large (2160 $ft^2$, 658 $m^2$) house at the Poole site and the possible houses at 34Lt11 (~113 $m^2$) are well within the large house size proposed by Ember (1973) for matrilocal residence patterns. The Poole site house is actually within 102 $ft^2$ (31 $m^2$) of Ember's historic (A.D.1750) Iroquois house (2258 $ft^2$, 688 $m^2$).

The remote sensing results at the two sites in Haskell County identified large anomalies that might be house patterns. If the anomalies were houses they would also

suggest matrilocality as they are 75 $m^2$ (34Hs25) and up to 240 $m^2$ (34Hs224). Testing is needed to ground truth these anomalies but it is intriguing that they are also in the size range of houses already identified as matrilocal.

If we are to believe that the Fourche Maline people were matrilocal we need more evidence. Leith (2006) and this research presents information suggesting the initial adoption of horticulture by Fourche Maline people. Powell and Rogers (1980) also give evidence of increased importance of carbohydrates in the diet seen in the increased dental wear and caries in the Fourche Maline population at the McCutchan-McLaughlin site. Peregrine (2001) argues that as societies are shifting to agriculture female work parties become established, and he relates these to the adoption of matrilocality and larger houses.

Peregrine (2001) also notes increasing warfare and/or long-distance trade as a reason for forming matrilocal societies. His argument is that matrilocal societies allow males to be absent for long periods of time (conducting warfare or long-distance trade) without disturbing the core community. Powell and Rogers (1980) give the most common cause of death for the McCutchan-McLaughlin people as traumatic injury. Burial 6 at the McCutchan-McLaughlin site is a mass grave of 11 individuals with points imbedded in bones (Powell and Rogers 1980). Galm (1984) also states that Fourche Maline people were conducting long-distance trade as evidenced by artifacts of Gulf Coast marine shell and copper from northern Michigan. This is not to say that Fourche Maline people were traveling these great distances but were likely traveling some distance and receiving goods from down the line exchange. Thus, if Fourche Maline society was matrilocal as it appears from house sizes, the social core would not have been disturbed by the absence of men.

Naroll (1962:588) developed a model for determining the rough population for an archaeological settlement. He suggested the population is equal to "one tenth the floor area in square meters," defining floor area as the total area under the roof of a dwelling. Following Naroll's (1962) model for determining the rough estimate of population, the McCutchan-McLaughlin site would have approximately 11 people/house (113 $m^2$). The remote-sensing results identified a total of three anomalies that are might houses based on the 2010 testing; this would yield a population of 33 individuals from the site. If my proposition that the houses are arranged in an arc approximately 60 m from the midden is correct there could be at least three other houses outside the area that was examined. This would increase the population estimate to around 50 to 70 individuals.

Guilinger (1971) reports that a Fourche Maline site occurs every ¼ to ½ mile along Fourche Maline Creek. If we use the sites Galm (1984) identifies as having an Evans and/ or Fourche Maline (Woodland) component and assume they are all occupied at the same time and there are 60 people per site, we arrive at a population of 1,440 people. It is not likely that all of these sites were occupied at the same time. However, the thick middens (up to 2 m) and the frequency of the such sites along Fourche Maline Creek implicate a relatively high population.

To derive a approximate population for the Fourche Maline drainage I assumed one site per half-mile; this yields a total of ~23 sites (45 mile drainage divided by two). If we assume only half were occupied at any given time we would have a total of 12 occupied sites. These 12 sites would yield a population of ~720 people for the entire drainage with a density of 2.6 people per $km^2$.

**Summary**

The population density, the identification of possible large houses, and the suggestion of emergent status differentiation among Fourche Maline people fit well with Clark and Blake's (1994), Hayden's (2001) and Sassaman (2004) models of transegalitarian complex hunter-gatherer-horticuturalists. The presence of grave goods (though in small amounts) in approximately one-third of the burials suggests the emergence of some low level social inequalities. Rogers pointed out that one burial (B12) has grave goods (shell beads) that required a high level of energy involvement (Powell and Rogers 1980:80). This burial consists of an adult and juvenile male, and may represent one of the aggrandizing individuals and his son. Further evidence for aggrandizing behavior as far back as the Late Archaic is suggested by Galm's (1984:212) notation that rolled-copper beads, and marine-shell pendants and beads (usually in burial contexts) indicate trade and interaction. The acquisition of these exotic goods would increase the prestige of the individual who could obtain them.

The presence of grave goods with the infant burials may imply that status is beginning to be ascribed (Powell and Rogers 1980:80). Also, as stated above the presence of an assumed female tool kit with Burial 20 (an adult female) may indicate the possibility of a sexual division of labor. The adoption of pottery (a new technology) and an expansion of pottery types and vessel forms can be tied to transegalitarian societies because these types of innovations would be useful in aggrandizing prestige competitions (Clark and Blake 1994). These technological changes have been identified in Chapter 4 and were used to refine the Fourche Maline chronology.

Finally, matrolocality can also be associated with transegalitarian people. Peregrine (2001) pointed out that females tend to form the agricultural labor force and matrilineal groups were likely the foundation of corporate political strategies. Hoffman (1999) suggested that there is a shift from single families to corporate groups in response to increased warfare, and these corporate groups allow for larger labor forces (more surplus goods). Again, following Ember (1973) this shift usually represents the establishment of matrilocality. There is evidence of violence (raiding etc.) during Fourche Maline times, Powell and Rogers (1980) noted that most common cause of death was violent trauma.

Hayden (2001:259-260) stated that aggrandizers use surplus to acquire desirable wives, because aggrandizers with more daughters can gain more wealth (through bride price for example) and can expand alliances. Also aggrandizers with sons can acquire a great deal of control over their son's labor. As states above Burial 12 may represent one of the aggrandizers and his son. The presence of grave goods with Burial 12A may indicate the individual had undergone some specialized training, because aggrandizers invest in their children to increase their worth for marriage purposes (Hayden 2001:259). All of these traits would fit well in a matrilocal organized lineage system.

# Chapter 6: Fourche Maline Subsistence

A review and refinement of subsistence change over time is warranted based on the revised chronology presented in Chapter 4. This chapter addresses two related hypotheses: 1) Fourche Maline culture represents the transition from hunting and gathering to incipient horticulture, and 2) that if Fourche Maline groups are transegalitarian then the subsistence evidence should indicate their ability to produce a surplus, which potential aggrandizers can use as the basis of their competition.

To test the hypothesis that the transition from hunting and gathering to horticulture occurred during the Woodland Period (Fourche Maline times), both indirect and direct evidence for horticulture should be identified. There should be evidence of horticultural tools, direct evidence of domesticated or semi-domesticated resources, and, as Speth and Scott (1989) suggest, there should be a shift to intensive exploitation of large game coinciding with the shift in subsistence. The hypothesis that Fourche Maline are transegalitarian complex hunter-gatherer-horticulturalists relying on surplus is addressed based on evidence for resources that have the potential to produce surpluses as well as evidence for storage.

**Review of Fourche Maline Subsistence**

Past research on Fourche Maline subsistence has been insufficient to address whether the transition from hunting and gathering to horticulture happened during the Woodland Period (2,300 and 1,200 years ago). Bell (1953) suggests that grinding stones from black-midden sites are similar to the grinding equipment of known agricultural sites. Galm summarized findings on Fourche Maline subsistence in several publications (Galm

1981, 1984; Galm and Flynn 1978). Generally he concluded that the Late Archaic (Wister Phase) people practiced a hunting-gathering-fishing economy relying mostly on hickory nuts and deer with small mammals, turtles, fish and mussels as supplements (Galm 1984). He stated that the Woodland Period (Fourche Maline) people continued the same subsistence practices.

Fritz (1989) argued that the Fourche Maline people in the Arkansas River valley were practicing seed-crop horticulture/agriculture focusing on the Eastern Cultivated Starchy Seed complex (goosefoot, marshelder, sunflower and squash). By the late 1990s Schambach (2002) suggested that the presence of grinding implements and chipped-stone axe/hoes provided circumstantial evidence of horticulture during the Woodland Period. He stated that Fritz's study was problematic, as he believed no Fourche Maline people were in the Arkansas River valley. However, he again stated that elsewhere Fourche Maline people were likely practicing horticulture although there is no direct evidence for this (Schambach 2002).

Recently I have pointed out that black-midden sites are present in the Arkoma Basin north of the Sans Bois Mountains, including 16 sites typed as Fourche Maline located in the Sans Bois drainage (Leith 2009). I have also identified potential cultigens from flotation samples as part of my thesis work (Leith 2006). One of the major drawbacks of much of the past research is the lack of flotation, or more accurately the lack of adequate flotation methodology to recover the small seeds associated with the Eastern Cultivated Seed Complex. Galm undertook both water screening as well as flotation but his smallest screen size was ~1 $mm^2$ which is inadequate to capture seeds such as

goosefoot (*Chenopodium/Amaranthus* sp.). The methodology I followed used a 355µm (No. 45 USGS Standard Sieve) for the light fraction and a 710µm (No. 25 USGS Standard Sieve) for the heavy fraction. The light fraction sieve was less than half Galm's 1 $mm^2$ screen size and recovered seeds as small as carpetweed (*Mullugo verticillata*).

Two other major problems with the past subsistence investigations were that the commonly used, long duration cultural phases mask possible changes. Galm's definition of the Wister and Fourche Maline Phases span approximately 2,000 years. Such a span makes studying diachronic change nearly impossible. Also, the sites Galm investigated, though excavated with modern methods, were highly disturbed by pot-hunters which caused mixing of components.

To better understand both plant and animal foodstuffs used by the Fourche Maline people I conducted a detailed analysis of materials from five sites with Fourche Maline components that could be divided into shorter, more reasonable occupation phases. I acknowledge that biases are present in these assemblages: two were excavated using W.P.A. methods, and flotation samples were available for only two (with most of these being small less that one liter).

The other problems in working with the W.P.A. excavated sites are that the midden matrix of the site was not screened and only bones large enough to catch an excavator's eye were recovered. This said, the sites chosen for analysis had substantial faunal assemblages (the J.W. Williams I site had 7,666 bones and bone fragments) and surprisingly some represent small mammal and fish remains. Acknowledging the bias in

working with the W.P.A. recovered materials, the sites held great potential to identify changes that can be tested with better excavated sites in the future.

Floral remains were analyzed from two recently excavated sites as well as from samples recovered during the 1976 and 1977 excavations at 34Lt11. The recent excavations took samples over two liters, which should be of adequate size to recover plant remains from soils generally considered not conducive to preserving plant remains. Dr. Richard Drass (personal communication 2006) stated that flotation samples for sites in eastern Oklahoma should be at least two liters due to the acidic nature of the soils which inhibit preservation. The flotation samples collected in the 2009 and 2010 field work ranged from approximately two to ten liters.

**Theoretical Approach**

Ecological approaches to the archaeological record have a fairly long record of use in the processual paradigm, especially with issues concerning subsistence. Beginning in the 1970's, evolutionary ecology began to be used to interpret archaeological remains (Winterhalder 1981). This theoretical approach draws from Darwinian evolution and microeconomics and addresses questions such as resource procurement, life history and mating, predator avoidance, as well as diet breadth, mobility issues, group size, and settlement pattern (Gremillion 2002b, Winterhalder 1981). The theory has a strong focus on fitness and entails several models that relate to fitness such as risk management, site catchment, diet breadth and optimal foraging (Gremillion 2002b; Smith and Winterhalder 1992; Winterhalder and Smith 1992).

Evolutionary ecology and it's subsidiary models are based on several assumptions. First is the assumption that natural selection has a major role in the evolution of humans, both biologically and culturally. Second, evolutionary ecology assumes that humans act rationally. Third, humans are assumed to strive to optimize their behavior, and last, there is a strong focus on reproductive fitness (Gremillion 2002b; Smith and Winterhalder 1992; Winterhalder and Smith 1992).

These assumptions can lead to the following problems for the theory: 1) Does natural selection act at the individual, group, or kin group level? 2) Are humans really rational? 3) Do humans ever really optimize their behavior? 4) What level does fitness work on: individual or group? Along with these problems come the claim of environmental determinism, the critique that the theory is synchronic, and the question of intentionality. These problems have major consequences for archaeology, because archaeologists can rarely identify the individual based on material remains.

One method to get around the problems of individual-vs-group is to use methodological individualism. Smith and Winterhalder (1992:39) define methodological individualism as "properties of groups [that] are made up of the actions of its individual members." Basically, methodological individualism is collective individualism, meaning most "individuals" will come to the same conclusion which will be expressed archaeologically. Using methodological individualism, natural selection and fitness acting at the individual level can be expressed at the group level.

The problems of rationality and optimization can be addressed if one views the results of the model building not as the actual behavior expressed or as the behaviors to be

sought in the archaeological record. Instead, one uses the results as a model of what the behaviors should be in the perfect scenario. From this model the researcher could compare the information collected from the archaeological assemblage and then discuss why the people being studied did not act rationally or achieve optimization.

The critique of evolutionary ecology being environmental deterministic can be a problem. The environment does not determine behavior, but it can limit the number of possible behaviors. Gremillion (2002b) suggests using linear programing to remedy the problem of synchronic-vs-diachronic change. I argue that it is important to understand the behaviors we are dealing with first and then agree that intentionality is involved with the choices stemming from the weighting of the costs and benefits. Evolutionary ecology provides numerous models that can be used to address questions of subsistence strategies such as diet breadth modeling.

Traditionally the use of evolutionary ecology has been limited to research hunter-gatherers. Recently human behavioral ecology (a branch of evolutionary ecology) has begun to be used to address questions related to the transition to horticulture (food production) (Winterhalder and Kennett 2006). Briefly the behavioral ecologist define horticulture as: the small-scale planting of domesticated species in garden plots, or swidden plots, with hunting and gathering of wild resources making up the majority of the diet (Winterhalder and Kennett 2006:4).

The behavioral ecologists argue that three advantages exist in their models: 1) The models engage selectionalist explanations that are more powerful than the traditional functionalist models. 2) Human behavioral ecology has tools for non-normative analysis

of unpredictable variation in environmental features and risk minimizing adaptive tactics they elicit. 3) Human behavioral ecology focuses on localized and immediate resource decisions and their consequences for the people. Basically human behavioral ecology engages the behaviors that are likely to cause evolutionary change (Winterhalder and Kennett 2006:8).

The behavioral ecologists further argue that agriculture (food production) is the precursor to the development of social stratification (Winterhalder and Kennett 2006). Further, behavioral ecologists point out two problems with socioeconomic models (such as Hayden 2001): 1) Socioeconomic models lack a unifying explanation for why agriculture developed in several different places at approximately the same time, and 2) Although there is evidence that agriculture developed in resource rich environments, initial domestication of most plants and animals occur well before conditions promoting socioeconomic competition (Winterhalder and Kennett 2006:7).

This would appear to be at odds with the transegalitarian framework; as stated earlier the researchers following this framework have gone to lengths to divide the social inequality from subsistence (Clark and Blake 1994; Hayden 2001). However, Bettinger (2006) argues that perhaps agriculture is not as much about producing food as it is about costly signaling of aggrandizers trying to gain prestige. Thus, human behavioral ecology can address how and when the shift to horticulture (incipient agriculture) and the socioeconomic framework can address possible reasons for this shift in subsistence.

**Methods: Faunal Analysis**

Elements from faunal assemblages were identified to the species level where possible using the mammal and bird synoptic collections housed in the Department of Mammology and the Department of Ornithology at the SNOMNH, as well as the faunal comparative collection housed at the Oklahoma Archeological Survey. Minimum number of individuals (MNI) was calculated based on the element that had the highest count (by side) for the mammals and birds. The identified reptiles consisted entirely of turtles. MNI was calculated for these based on plastron characteristics (proximal/distal hinge for box turtles and right/left proximal/distal for the other turtles). Fish MNIs were calculated on the most frequent element (and side where applicable). Lastly the fresh water mussels were identified by White (1977). He does not identify MNI nor is his information divided by level or unit making diachronic analysis of the freshwater mussels impossible at this time.

Percentages were calculated based on the components recognized at the sites using the MNI tabulations. These percentages were then used to rank the animals based on their importance (i.e percent of the bone assemblage). Live weight was recorded for each of the species identified. The live weight used here is an average of adult male and females. Oklahoma figures were used where they differed from the general North American weights.

Meat weights were recorded using White's (1953) method for the mammals and birds. White has been criticized for the units he uses to calculate meat weight because what modern Euroamericans consider edible and inedible cannot be assumed to be the

same in past cultures (see Lyman 1979). Acknowledging this possible bias I have chosen to use White's calculations because I'm interested in general changes in subsistence over time and not focusing on the actual kilocalories contributed by each animal to Fourche Maline people's diets. Meat weight determined for the reptiles and fish were based on percent usable based on discussions with zoologists from SNOMNH. I identified the percent each species contributed to the diet based on meat weight to compare to the MNI percentages.

Changes in faunal diet breadth have been attributed to the adoption of horticulture (Speth and Scott 1989). To identify possible changes in diet breadth I undertook an analysis of the diversity of the faunal assemblage. Diversity is made up of two related concepts richness and evenness. Richness is the number of classes present in a sample, thus the more classes present the more diverse the assemblage is. Evenness is the idea that when all classes are represented evenly the assemblage is more diverse that situations where one class dominates the assemblage (Jones and Leonard 1989:2)

Two diversity indices are commonly used, the Shannon index and the Simpson index (Orton 2000). The problem with diversity (generally) and these two indices (specifically) are that they are highly influenced by sample size (Grayson 1984; Orton 2000). The process of rarefaction was a method developed to help address the problems inherent in archaeological assemblages. Rarefaction estimates the number of classes an assemblage would have at smaller sample sizes. Basically the question is how many classes would a given sample have were that sample smaller (rarer) in sample size (Grayson 1984:151). Grayson (1984:152) notes that even using rarefaction sample size

could be a problem. To test changes in diversity over time I calculated the Shannon and Simpson index based on MNI then rarefied the assemblage using the R™ statistics package.

I omitted several taxa that were most likely not food resources (Table 6.1). Species such as the mountain lion, eagle and hawk were likely ritual. The canines were omitted due to the difficulty of identifying some as wild or domesticated. No evidence exists for Fourche Maline people eating domesticated dog. Instead they were often buried in the midden mounds (probably as grave offerings) and the remains have no indication of butchering. The other small mammals were probably harvested for their fur, or represent non-cultural ecofacts rather than food sources.

**Table 6.1: Taxa omitted from the diet breadth modeling.**

| Species | Common Name |
|---|---|
| *Puma concolor* | Mountain Lion |
| *Canis latrans/ lupus familiaris* | Coyote / Dog |
| *Canis lupus/ lupus familiaris* | Wolf / Dog |
| *Canis* sp. | Canine |
| *Canis lupus* | Grey Wolf |
| *Canis lupus familiaris* | Domestic Dog |
| *Canis latrans* | Coyote |
| *Lynx rufus* | Bobcat |
| *Mustela vison* | Mink |
| *Mephitis mephitis* | Striped Skunk |
| *Geomys bursarius* | Plains Pocket Gopher |
| *Cratogeomys castanops* | Yellow-faced Pocket Gopher |
| Ciconiformes | long-legged wading birds |
| Anseriformes | Duck / Goose / Swan |
| Falconiforme, Accipitridae c.f. *Aquilla* sp. | Eagle |
| Falconiforme, Family Accipitridae | Hawk |

I then re-tabulated the MNI and meat weight percentages and performed a rarefaction using R™ statistics package on the MNI to avoid sample size biases . Lastly, I compared the rarefied richness (count of species) and the relative importance of large mammals in the assemblage.

**Methods: Floral Remains**

The goal for the floral analysis was to determine if direct evidence of exists for horticulture and when this practice developed. Samples were processed to recover possible cultigens as well as their submission for AMS dating. Recent flotation samples from two sites (34Lf12/225 and 34Lt11) as well as several samples from the 1976/1977 midden excavations were used for the floral analysis. All the recent samples analyzed were greater than 2 liters while the 1970s samples ranged from 0.1 to 0.9 liters. The methods for the flotation process were as follows: Sample size in liters was recorded. They were then floated using a No. 45 mesh USGS standard sieve to capture the light fraction; the matrix was water-screened through a No. 25 USGS standard sieve. These samples were dried and then the light and heavy fractions were processed using a low power binocular stereo-microscope. Charred seeds and vegetal material as well as larger pieces of charcoal were picked out of the fractions. Minnis (1981) noted that charred seed identified in archaeological assemblages can be considered cultural rather than modern disturbances especially in deeper samples.

As this research was focused on cultigens, only charred seeds were picked out of the nutshell-rich midden samples. Because numerous flotation samples processed in the past yielded large amounts of charred nutshell, and because I was interested in cultigens associated with horticulture, I focused on these remains rather than the nutshell. Preliminary identifications were determined using Martin and Barkley (1961). Final determination was made with the help of Dr. Paul Minnis and Dr. Richard Drass using their floral comparative collections. Two samples of charcoal were then submitted to

Rafter Radiocarbon Laboratory (New Zealand) for AMS dating. The amount of possible cultigens recovered was not of sufficient size to suggest their relative importance in the diet and were thus omitted from the diet breadth modeling.

**Subsistence Findings: Faunal Remains**

A total of 17,044 bone, shell and fragments from three sites (34Hs25, 34Lf11, 34Lf24) were analyzed. This assemblage consisted of directly examining the 7,666 specimens of bone from the Williams I site, with the remaining 9,378 individuals deriving from an unpublished analysis of 34Hs25 and 34Lf11 by Don Wyckoff (Wyckoff n.d.). The assemblage yielded 66 taxa of which 25 were mammal, 12 were bird, 10 were reptile, 3 were fish and 16 were fresh water mussels. Only the Scott site (34Lf11) has information on freshwater mussels. White (1977) identified the species present, but only provided NISP (number of individual specimens present) and he did not retain provenience data (Table 6.2). Due to lack of provenience data for the fresh water mussels only the presence of these resources will be acknowledged as a subsistence resource. The assemblage analyzed here consisted of 25 mammal taxa representing 22 species. The 12 bird taxa yielded 7 species; the 10 reptiles yielded 7 species, and the fish 2 species. Minimum number of individuals (MNI) was calculated according to occupation at the three sites (Table 6.3).

Table 6.4 presents the results of the vertebrate MNI calculations and their corresponding rank in the diet. White-tailed deer (*Odocoileus virginianus*) appears to be the most important resource from the Late Archaic through the Mississippian cultural periods, representing 23 to 46% of the assemblage. Differences occur in the rank of non-

deer resources by period and these are likely tied to opportunistic harvesting. It is interesting that the animals larger than deer such, as elk (*Cervus elaphus*) and black bear (*Ursus americanus*), are present but are ranked low based on MNI. The lack of diversity and rank of fish could be tied to sampling error (again a result of W.P.A. excavation methods).

The live weights and calculated meat weights for the taxa identified in this research, less the fresh water mussels are presented in Table 6.5. Table 6.6 presents the dietary ranks based on the calculated meat weights. Again, deer dominate the assemblage representing between 58 to 84% of the meat harvested. Where elk are present they increase in importance to second, and black bear ranks second or third when present. Several other medium bodied mammals and wild turkey are in the upper ranked resources.

The richness based on the raw MNI tabulations indicated that there was an increase in diversity during the Late Archaic to Woodland cultural transition. This was followed by a general decrease in diversity through the Mississippian occupations (Figure 6.1). This sequence could be problematic due to sample size (Table 6.7). The larger the sample size the more likely one will identify more species. Rarefaction provides a method to avoid sample size biases because it uses probability to determine the number of species that would be present if the samples were the same size as the smallest sample (Grayson 1984).

**Table 6.2: Fresh water mussel counts from the Scott Site (34Lf11) (adapted from White 1977).**

| Species | Raw Count |
|---|---|
| *Amblema costata* | 182 |
| *Fusconaia flava* | 77 |
| *Quadrula nodulata* | 2 |
| *Quadrula pustulosa* | 279 |
| *Quadrula quadrula* | 1 |
| *Tritogonia verrucosa* | 139 |
| *Megalonaias giganteus* | 1 |
| *Elpitio dilatata* | 88 |
| *Plurobema cordatum* | 44 |
| *Lampsilis anodontoides* | 27 |
| *Lampsilis ovata* | 29 |
| *Lampsilis radiata* | 13 |
| *Ligumia recta* | 6 |
| *Proptera purpurata* | 3 |
| *Truncilla truncata* | 27 |
| *Obliquaria reflexa* | 9 |
| Total | 927 |

**Table 6.3: Minimum number of individuals by occupation and site.**

| | | | Otter Creek Site (34Hs25) | Scott Site (34Lf11) | | | | | | J.W. Williams I Site (34Lf24) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Fourche Maline IV** | **Mississippian** | **Fourche Maline IV** | **Fourche Maline III** | **Fourche Maline II** | **Fourche Maline I** | **Wister Phase** | **Fourche Maline IV** | **Fourche Maline III** | **Fourche Maline II** | **Fourche Maline I** | **Wister Phase** | **No Layer** |
| | | | **21"** | **6"** | **12"** | **6"** | **6"** | **6"** | **36"** | **6"** | **6"** | **6"** | **18"** | **36"** | |
| **Class** | **Species** | **Common Name** | MNI | MNI | MNI | MNI | MNI | MNI | MNI | MNI | MNI | MNI | MNI | MNI | MNI |
| **Mammal** | *Cervus elephas* | Elk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 1 |
| | *Ursus americanus* | Black Bear | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 |
| | *Odocoileus virginianus* | White-tailed Deer | 21 | 2 | 8 | 3 | 3 | 3 | 15 | 2 | 16 | 26 | 118 | 15 | 19 |
| | *Puma concolor* | Mountain Lion | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| | *Castor canadensis* | Beaver | 4 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 2 | 4 | 11 | 2 | 1 |
| | *Canis latrans/ lupus familiaris* | Coyote / Dog | 1 | 1 | 2 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| | *Canis lupus/ lupus familiaris* | Wolf / Dog | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |
| | *Canis* sp. | Canine | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | *Canis lupus* | Grey Wolf | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| | *Canis lupus familiaris* | Domestic Dog | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 10 | 2 | 5 |
| | *Canis latrans* | Coyote | 0 | 0 | 0 | 0 | 1 | 0 | 2 | | | | | | |
| | *Lynx rufus* | Bobcat | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 1 | 0 |
| | *Procyon lotor* | Raccoon | 2 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 4 | 22 | 2 | 2 |
| | *Didelphis virginiana* | Opposum | 3 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 6 | 2 | 1 |
| | *Urocyon cinereoargenteus* | Grey Fox | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 |
| | *Vulpes vulpes* | Red Fox | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | *Mustela vison* | Mink | 1 | 0 | 0 | 0 | 0 | 0 | 1 | | | | | | |
| | *Lontra canadensis* | River Otter | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | *Mephitis mephitis* | Striped Skunk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 |
| | *Sylvilagus* c.f. *floridanus* | Eastern Cottontail | 4 | 1 | 0 | 0 | 1 | 1 | 7 | 0 | 0 | 1 | 3 | 0 | 0 |
| | *Sylvliagus aquaticus* | Swamp Rabbit | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Lepus californicus* | Black-tailed Jack Rabbit | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Sciurus niger* | Fox Squirrel | 2 | 0 | 3 | 0 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Geomys bursarius* | Plains Pocket Gopher | 2 | 0 | 2 | 1 | 2 | 2 | 4 | 0 | 0 | 1 | 0 | 0 | 0 |
| | *Cratogeomys castanops* | Yellow-faced Pocket Gopher | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| **Bird** | *Anas platyrhynchos* | Mallard Duck | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | *Gavis immer* | Great Northern Loon | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Casmerodius albus* | Great Egret | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Ardea herodias* | Great Blue Heron | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Ciconiformes | long-legged wading birds | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Branta canadensis* | Canadian Goose | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 3 | 1 | 0 |
| | Anseriformes | Duck / Goose / Swan | 0 | 0 | 0 | **1** | 0 | 0 | **3** | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Cygnus* c.f. *columbianus* | Tundra Swan | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | Falconiforme, Accipitridae c.f. *Aquilla* sp. | Eagle | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | Falconiforme, Family Accipitridae | Hawk | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | *Meleagris gallopavo* | Wild Turkey | 0 | 0 | 2 | 1 | 1 | 1 | 7 | 1 | 1 | 4 | 17 | 3 | 0 |
| | *Tympanuchus cupido* | Greater Prairie-Chicken | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 0 |
| | Indeterminate bird | | 0 | 0 | 1 | **1** | 0 | **1** | **3** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Reptile** | Chelydridae c.f. *Macroclemys temminckii* | Alligator Snapping Turtle | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | *Chelydra serpentina* | Common Snapping Turtle | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Graptemys* sp. | Map Turtle | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Pseudemys scripta* | Big Bend Slider | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Pseudemys floridana* | Peninsula Cooter | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Pseudemys* sp. | Cooter / Slider | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 1 | 1 |
| | *Terrepene carolina* | Eastern Box Turtle | 4 | 1 | 2 | 1 | 1 | 1 | 0 | 2 | 4 | 4 | 22 | 2 | 1 |
| | *Terrepene ornata* | Western (Ornate) Box Turtle | 7 | 1 | 4 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Terrepene* sp. | Box Turtle | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Indeterminate snake* | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | *Trionyx muticus* | Smooth Softshell Turtle | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| **Fish** | *Carpoides* sp. | Carpsucker | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| | *Lepisosteus platostomus* | Shortnose Gar | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | *Pylodictus olivaris* | Flathead Catfish | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| | | Total | 56 | 9 | 32 | 16 | 19 | 22 | 57 | 6 | 31 | 64 | 242 | 38 | 34 |

## Table 6.4: Animal dietary ranks based on MNI.

| Kingdom | | Species | Common Name | % Wister Phase | Rank | FM I % | Rank | FM II % | Rank | FM III % | Rank | FM IV % | Rank | Mississippian % | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mammal** | **1** | *Cervus elephas* | Elk | **1** | **6** | 2 | 7 | 3 | 5 | 2 | 5 | 0 | | 0 | |
| | 2 | *Ursus americanus* | Black Bear | 0 | | <1 | 9 | 1 | 6 | 2 | 5 | 0 | | 0 | |
| | | *Odocoileus virginianus* | White-tailed Deer | **35** | 1 | 46 | 1 | 34 | 1 | 40 | 1 | 34 | 1 | **23** | 1 |
| | | *Puma concolor* | Mountain Lion | 1 | 6 | <1 | 9 | 1 | 6 | 0 | | 0 | | 0 | |
| | | *Castor canadensis* | Beaver | 5 | 3 | 5 | 4 | 5 | 3 | 4 | 3 | 5 | 4 | **11** | 2 |
| | | *Canis latrans/ lupus familiaris* | Coyote / Dog | 0 | | 1 | 8 | 0 | | 3 | 4 | 3 | 6 | **11** | 2 |
| | | *Canis lupus/ lupus familiaris* | Wolf / Dog | 0 | | <1 | 9 | 1 | 6 | 3 | 4 | 0 | | 0 | |
| | | *Canis* sp. | Canine | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | *Canis lupus* | Grey Wolf | 1 | 6 | <1 | 9 | 1 | 6 | 2 | 5 | 0 | | 0 | |
| | | *Canis lupus familiaris* | Domestic Dog | 2 | 5 | 4 | 5 | 5 | 3 | 2 | 5 | 0 | | 0 | |
| | | *Canis latrans* | Coyote | 2 | 5 | 0 | | 1 | 6 | 0 | | 0 | | 0 | |
| | | *Lynx rufus* | Bobcat | 1 | 6 | 2 | 7 | 1 | 6 | 0 | | 0 | | 0 | |
| | | *Procyon lotor* | Raccoon | 5 | 3 | 9 | 2 | 5 | 3 | 2 | 5 | 3 | 6 | 0 | |
| | | *Didelphis virginiana* | Opposum | 3 | 4 | 3 | 6 | 3 | 5 | 0 | | 4 | 5 | **11** | 2 |
| | | *Urocyon cinereoargenteus* | Grey Fox | 1 | 6 | <1 | 9 | 1 | 6 | 2 | 5 | 0 | | 0 | |
| | | *Vulpes vulpes* | Red Fox | 0 | | <1 | 9 | 1 | 6 | 0 | | 0 | | 0 | |
| | | *Mustela vison* | Mink | 1 | 6 | 0 | | 0 | | 0 | | 1 | 8 | 0 | |
| | | *Lontra canadensis* | River Otter | 0 | | <1 | 9 | 0 | | 0 | | 1 | 8 | 0 | |
| | | *Mephitis mephitis* | Striped Skunk | 1 | 6 | 1 | 8 | 0 | | 0 | | 0 | | 0 | |
| | | *Sylvilagus* c.f. *floridanus* | Eastern Cottontail | 8 | 2 | 3 | 6 | 3 | 5 | 0 | | 4 | 5 | **11** | 2 |
| | | *Sylvliagus aquaticus* | Swamp Rabbit | 0 | | 0 | | 1 | 6 | 0 | | 2 | 7 | 0 | |
| | | *Lepus californicus* | Black-tailed Jack Rabbit | 1 | 6 | <1 | 9 | 1 | 6 | 0 | | 0 | | 0 | |
| | | *Sciurus niger* | Fox Squirrel | 3 | 4 | <1 | 9 | 1 | 6 | 0 | | 5 | 4 | 0 | |
| | | *Geomys bursarius* | Plains Pocket Gopher | 5 | 3 | 1 | 8 | 4 | 4 | 2 | 5 | 4 | 5 | 0 | |
| | | *Cratogeomys castanops* | Yellow-faced Pocket Gopher | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| **Bird** | | *Anas platyrhynchos* | Mallard Duck | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | *Gavis immer* | Great Northern Loon | 1 | 6 | 0 | | 0 | | 0 | | 0 | | 0 | |
| | | *Casmerodius albus* | Great Egret | 0 | | 0 | | 0 | | 0 | | 1 | 8 | 0 | |
| | | *Ardea herodias* | Great Blue Heron | 1 | 6 | 0 | | 0 | | 0 | | 0 | | 0 | |
| | | Ciconiformes | long-legged wading birds | 0 | | 0 | | 0 | | 2 | 5 | 0 | | 0 | |
| | | *Branta canadensis* | Canadian Goose | 2 | 5 | 3 | 6 | 1 | 6 | 0 | | 1 | 8 | 0 | |
| | | Anseriformes | Duck / Goose / Swan | 0 | | 0 | | 0 | | 2 | 5 | 0 | | 0 | |
| | | *Cygnus* c.f. *columbianus* | Tundra Swan | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | Falconiforme, Accipitridae c.f. *Aquill* | Eagle | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | Falconiforme, Family Accipitridae | Hawk | 3 | 4 | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | *Meleagris gallopavo* | Wild Turkey | 8 | 2 | 7 | 3 | 6 | 2 | 4 | 3 | 3 | 6 | 0 | |
| | | *Tympanuchus cupido* | Greater Prairie-Chicken | 2 | 5 | <1 | 9 | 1 | 6 | 0 | | 0 | | 0 | |
| | | Indeterminate bird | | 3 | 4 | 0 | | 0 | | 2 | 5 | 1 | 8 | 0 | |
| **Reptile** | | Chelydridae c.f. *Macroclemys temmin* | Alligator Snapping Turtle | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | *Chelydra serpentina* | Common Snapping Turtle | 0 | | 0 | | 0 | | 2 | 5 | 1 | 8 | 0 | |
| | | *Graptemys* sp. | Map Turtle | 0 | | <1 | 9 | 1 | 6 | 2 | 5 | 2 | 7 | 0 | |
| | | *Pseudemys scripta* | Big Bend Slider | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | *Pseudemys floridana* | Peninsula Cooter | 0 | | 0 | | 0 | | 2 | 5 | 0 | | 0 | |
| | | *Pseudemys* sp. | Cooter / Slider | 1 | 6 | 3 | 6 | 4 | 4 | 4 | 3 | 2 | 7 | **11** | 2 |
| | | *Terrepene carolina* | Eastern Box Turtle | 2 | 5 | 9 | 2 | 6 | 2 | 11 | 2 | 9 | 3 | **11** | 2 |
| | | *Terrepene ornata* | Western (Ornate) Box Turtle | 0 | | 1 | 8 | 3 | 5 | 2 | 5 | 13 | 2 | **11** | 2 |
| | | *Terrepene* sp. | Box Turtle | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | *Indeterminate snake* | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| | | *Trionyx muticus* | Smooth Softshell Turtle | 1 | 6 | <1 | 9 | 3 | 5 | 2 | 5 | 0 | | 0 | |
| **Fish** | | *Carpoides* sp. | Carpsucker | 0 | | 0 | | 1 | 6 | 0 | | 0 | | 0 | |
| | | *Lepisosteus platostomus* | Shortnose Gar | 0 | | <1 | 9 | 0 | | 0 | | 0 | | 0 | |
| | | *Pylodictus olivaris* | Flathead Catfish | 0 | | <1 | 9 | 1 | 6 | 0 | | 0 | | 0 | |
| | | *Ictalurus* sp. | Catfish | 0 | | 0 | | 0 | | 0 | | 1 | 8 | 0 | |

**Table 6.5: Live weights and calculated meat weights.**

| | Average Live Weight in kg. | Calculated Meat Weight in kg. | % useable as per White 1953 |
|---|---|---|---|
| Mammals | | | |
| *Cervus elaphus* | 226 | **113** | 50% |
| *Ursus americanus* | 148 | **74** | 50% |
| *Odocoileus virvinianus* | 60 | **30** | 50% |
| *Puma concolor* | 54 | **27** | 50% |
| *Castor canadensis* | 24 | **16.8** | 70% |
| *Canis lupus* | 36 | **18** | 50% |
| *Canis lupus familiaris* | 18 | **9** | 50% |
| *Canis lupus/lupus familiaris* | **34** | **17** | 50% |
| *Canis latrans/lupus familiaris* | 16 | **8** | 50% |
| *Lynx rufus* | 10 | **5** | 50% |
| *Procyon lotor* | 9 | **6.3** | 70% |
| *Didelphis virginiana* | 2.7 | **1.89** | 70% |
| *Urocyon cinereoargenteus* | 5 | **2.5** | 50% |
| *Vulpes vulpes* | 4 | **2** | 50% |
| *Lontra canadensis* | 8 | **5.6** | 70% |
| *Mustela vison* | 0.8 | **0.56** | 70% |
| *Mephitis mephitis* | 4 | **2.8** | 70% |
| *Sylvilagus sp. c.f. floridanus* | 2 | **1.4** | 70% |
| *Sylvilagus sp. c.f. aquaticus* | 2 | **1.4** | 70% |
| *Lepus californicus* | 2 | **1.4** | 70% |
| *Sciurus niger* | 0.8 | **0.56** | 70% |
| *Cratogeomys castanops* | 0.3 | **0.21** | 70% |
| *Geomys bursarius* | 0.1 | **0.07** | 70% |
| Birds | | | |
| *Anas platyrhynchos* (Mallard) | 1.1 | **0.77** | 70% |
| *Gavis immer* | 4.1 | **2.87** | 70% |
| *Ardea alba* | 0.95 | **0.665** | 70% |
| *Ardea herodias* | 2.8 | **1.96** | 70% |
| *Branta canadensis* (Canadian Goose) | 4.4 | **3.08** | 70% |
| *Cygnus* c.f. *columbianus* (Tundra Swan) | 6.9 | **4.83** | 70% |
| Accipitridae c.f. *Haliaeetus* sp. (Eagle) | 5 | **3.5** | 70% |
| Accipitridae c.f. *Buteo* sp. (Hawk) | 1.1 | **0.77** | 70% |
| *Meleagris gallopavo* (Turkey) | 6.1 | **4.27** | 70% |
| *Tympanuchus cupido* (Prairie chicken) | 0.9 | **0.63** | 70% |
| Reptiles* | | | |
| Chelydridae c.f. *Macroclemys tomminckii* | 21 | **8.4** | 40% |
| *Chelydra serpentina* | 7.58 | **3.032** | 40% |
| *Graptemys* sp. | 0.5 | **0.15** | 30% |
| *Pseudemys scripta* | 0.6 | **0.18** | 30% |
| *Pseudemys floridana* | 1.4 | **0.42** | 30% |
| *Pseudemys* sp. | 0.8 | **0.24** | 30% |
| *Terrepene carolina* | 0.3 | **0.09** | 30% |
| *Terrepene ornata* | 0.3 | **0.09** | 30% |
| *Trionyx muticus* | 0.4 | **0.16** | 40% |
| Fish* | | | |
| *Carpoides* sp. | 4.6 | **3.22** | 70% |
| *Lepisosteus platostomus* | 2.6 | **1.82** | 70% |
| *Pylodictus olivarius* | 56 | **39.2** | 70% |
| *Ictalurus* sp. | 4.5 | **3.15** | 70% |

* Calculations Not Associated with White 1953

## Table 6.6: Animal dietary ranks based on meat weight.

| Kingdom | Species | Common Name | Wister Rounded % | Rank | FM I Rounded % | Rank | FM II Rouded % | Rank | FM III Rounded % | Rank | FM IV Rounded % | Rank | Mississippian % | Rank |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Mammal** | *Cervus elephas* | Elk | 9 | 2 | 7 | 2 | 18 | 2 | 13 | 2 | 0 | | 0 | |
| | *Ursus americanus* | Black Bear | 0 | | 2 | 5 | 5 | 3 | 9 | 3 | 0 | | 0 | |
| | *Odocoileus virginianus* | White-tailed Deer | 71 | 1 | 76 | 1 | 58 | 1 | 66 | 1 | 84 | 1 | 68 | 1 |
| | *Puma concolor* | Mountain Lion | 2 | 4 | 1 | 6 | 2 | 5 | 0 | | 0 | | 0 | |
| | *Castor canadensis* | Beaver | 6 | 3 | 4 | 3 | 5 | 3 | 4 | 4 | 8 | 2 | 19 | 2 |
| | *Canis latrans/ lupus familiaris* | Coyote / Dog | 0 | | <1 | 7 | 0 | | 1 | 6 | 2 | 3 | 9 | 3 |
| | *Canis lupus/ lupus familiaris* | Wolf / Dog | 0 | | <1 | 7 | 1 | 6 | 2 | 5 | 0 | | 0 | |
| | *Canis* sp. | Canine | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| | *Canis lupus* | Grey Wolf | 1 | 5 | <1 | 7 | 1 | 6 | 2 | 5 | 0 | | 0 | |
| | *Canis lupus familiaris* | Domestic Dog | 1 | 5 | 2 | 5 | 1 | 6 | 1 | 6 | 0 | | 0 | |
| | *Canis latrans* | Coyote | 1 | 5 | 0 | | 1 | 6 | 0 | | 0 | | 0 | |
| | *Lynx rufus* | Bobcat | 1 | 5 | <1 | 7 | <1 | 7 | 0 | | 0 | | 0 | |
| | *Procyon lotor* | Raccoon | 2 | 4 | 3 | 4 | 2 | 5 | 1 | 6 | 2 | 3 | 0 | |
| | *Didelphis virginiana* | Opposum | 1 | 5 | <1 | 7 | <1 | 7 | 0 | | 1 | 4 | 2 | 4 |
| | *Urocyon cinereoargenteus* | Grey Fox | <1 | 6 | <1 | 7 | <1 | 7 | <1 | 7 | 0 | | 0 | |
| | *Vulpes vulpes* | Red Fox | 0 | | 0 | | <1 | 7 | 0 | | 0 | | 0 | |
| | *Mustela vison* | Mink | 0 | | 0 | | 0 | | 0 | | <1 | 5 | 0 | |
| | *Lontra canadensis* | River Otter | 0 | | <1 | 7 | 0 | | 0 | | 1 | 4 | 0 | |
| | *Mephitis mephitis* | Striped Skunk | <1 | 6 | <1 | 7 | 0 | | 0 | | 0 | | 0 | |
| | *Sylvilagus* c.f. *floridanus* | Eastern Cottontail | 1 | 5 | <1 | 7 | <1 | 7 | 0 | | 1 | 4 | 2 | 4 |
| | *Sylvliagus aquaticus* | Swamp Rabbit | 0 | | 0 | | <1 | 7 | 0 | | <1 | 5 | 0 | |
| | *Lepus californicus* | Black-tailed Jack Rabbit | <1 | 6 | <1 | 7 | <1 | 7 | 0 | | 0 | | 0 | |
| | *Sciurus niger* | Fox Squirrel | <1 | 6 | <1 | 7 | <1 | 7 | 0 | | <1 | 5 | 0 | |
| | *Geomys bursarius* | Plains Pocket Gopher | 0 | | <1 | 7 | <1 | 7 | <1 | 7 | <1 | 5 | 0 | |
| | *Cratogeomys castanops* | Yellow-faced Pocket Gopher | 0 | | <1 | 7 | 0 | | 0 | | 0 | | 0 | |
| **Bird** | *Anas platyrhynchos* | Mallard Duck | 0 | | 1 | 6 | 0 | | 0 | | 0 | | 0 | |
| | *Gavis immer* | Great Northern Loon | <1 | 6 | 0 | | 0 | | 0 | | 0 | | 0 | |
| | *Casmerodius albus* | Great Egret | 0 | | 0 | | 0 | | 0 | | <1 | 5 | 0 | |
| | *Ardea herodias* | Great Blue Heron | <1 | 6 | 0 | | 0 | | 0 | | 0 | | 0 | |
| | Ciconiformes | long-legged wading birds | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| | *Branta canadensis* | Canadian Goose | 1 | 5 | <1 | 7 | <1 | 7 | 0 | | <1 | 5 | 0 | |
| | Anseriformes | Duck / Goose / Swan | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| | *Cygnus* c.f. *columbianus* | Tundra Swan | 0 | | <1 | 7 | 0 | | 0 | | 0 | | 0 | |
| | Falconiforme, Accipitridae c.f. *Aquilla* sp. | Eagle | 0 | | <1 | 7 | 0 | | 0 | | 0 | | 0 | |
| | Falconiforme, Family Accipitridae | Hawk | 1 | 5 | 1 | 6 | 0 | | 0 | | 0 | | 0 | |
| | *Meleagris gallopavo* | Wild Turkey | 2 | 4 | 2 | 5 | 1 | 6 | 1 | 6 | 1 | 4 | 0 | |
| | *Tympanuchus cupido* | Greater Prairie-Chicken | <1 | 6 | <1 | 7 | <1 | 7 | 0 | | 0 | | 0 | |
| | Indeterminate bird | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| **Reptile** | Chelydridae c.f. *Macroclemys temminckii* | Alligator Snapping Turtle | 0 | | <1 | 7 | 0 | | 0 | | 0 | | 0 | |
| | *Chelydra serpentina* | Common Snapping Turtle | 0 | | 0 | | 0 | | <1 | 7 | <1 | 5 | 0 | |
| | *Graptemys* sp. | Map Turtle | 0 | | <1 | 7 | <1 | 7 | 0 | | <1 | 5 | 0 | |
| | *Pseudemys scripta* | Big Bend Slider | 0 | | <1 | 7 | 0 | | 0 | | 0 | | 0 | |
| | *Pseudemys floridana* | Peninsula Cooter | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| | *Pseudemys* sp. | Cooter / Slider | <1 | 6 | <1 | 7 | 1 | 6 | 0 | | <1 | 5 | <1 | 5 |
| | *Terrepene carolina* | Eastern Box Turtle | <1 | 6 | <1 | 7 | 1 | 6 | <1 | 7 | <1 | 5 | <1 | 5 |
| | *Terrepene ornata* | Western (Ornate) Box Turtle | 0 | | <1 | 7 | <1 | 7 | 0 | | <1 | 5 | <1 | 5 |
| | *Terrepene* sp. | Box Turtle | 0 | | <1 | 7 | 0 | | 0 | | 0 | | 0 | |
| | *Indeterminate snake* | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| | *Trionyx muticus* | Smooth Softshell Turtle | <1 | 6 | <1 | 7 | <1 | 7 | <1 | 7 | 0 | | 0 | |
| **Fish** | *Carpoides* sp. | Carpsucker | 0 | | 0 | | <1 | 7 | 0 | | 0 | | 0 | |
| | *Lepisosteus platostomus* | Shortnose Gar | 0 | | <1 | 7 | 0 | | 0 | | 0 | | 0 | |
| | *Pylodictus olivaris* | Flathead Catfish | 0 | | 1 | 6 | 3 | 4 | 0 | | 0 | | 0 | |
| | *Ictalurus* sp. | Catfish | 0 | | 0 | | 0 | | 0 | | <1 | 5 | 0 | |

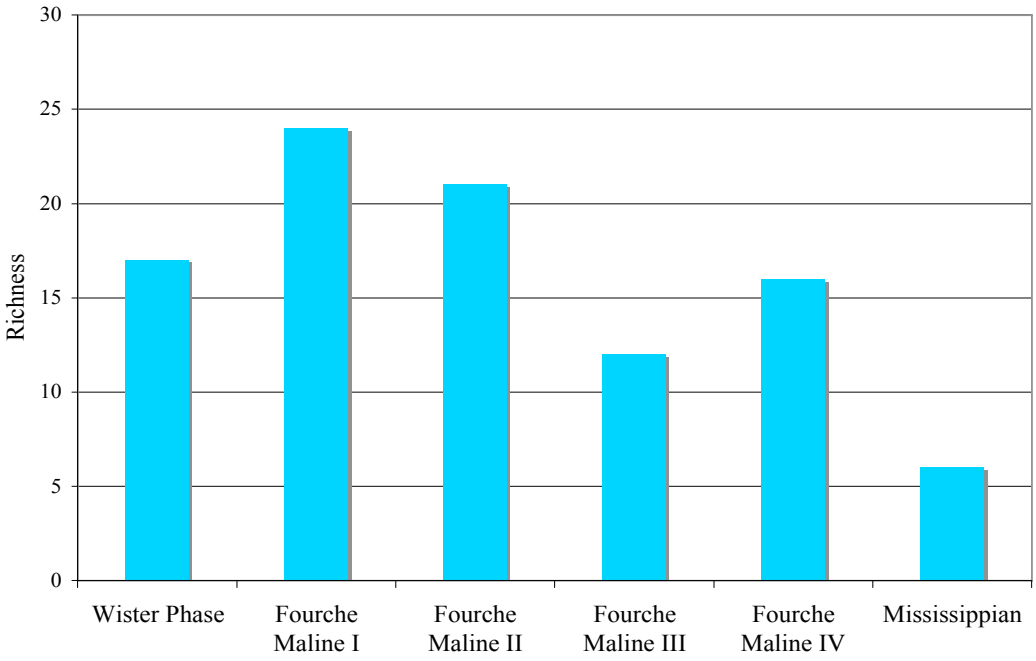


**Figure 6.1: Plot of the richness in animal species over time using raw MNI.**

**Table 6.7: Sample sizes by period.**

| Period | Occupation thickness in inches |
|---|---|
| Mississippian | 6 |
| Fourche Maline IV | 37 |
| Fourche Maline III | 15 |
| Fourche Maline II | 14 |
| Fourche Maline I | 25 |
| Wister phase | 72 |

The rarefied results produced a different trend indicating that sampling bias was likely present in the raw MNI counts. This sequence indicates a decrease occurs in diversity at the end of the Late Archaic. There was a slight increase in diversity during Fourche Maline II, and a decrease between Fourche Maline II and III. This was then followed by increasing diversity through the Mississippian occupations (Figure 6.2). However, to test whether the small number of species identified for the Mississippian

Period (6 species) was masking possible trends, I performed a rarefaction omitting this period (Figure 6.3).

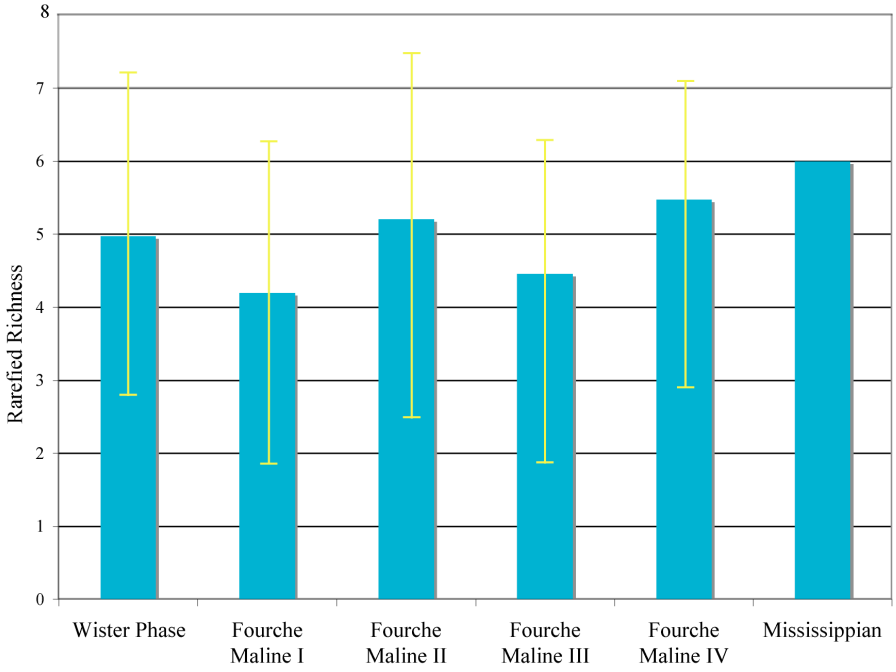


**Figure 6.2: Plot of the rarefied species richness and 95% confidence interval over time based on MNI.**

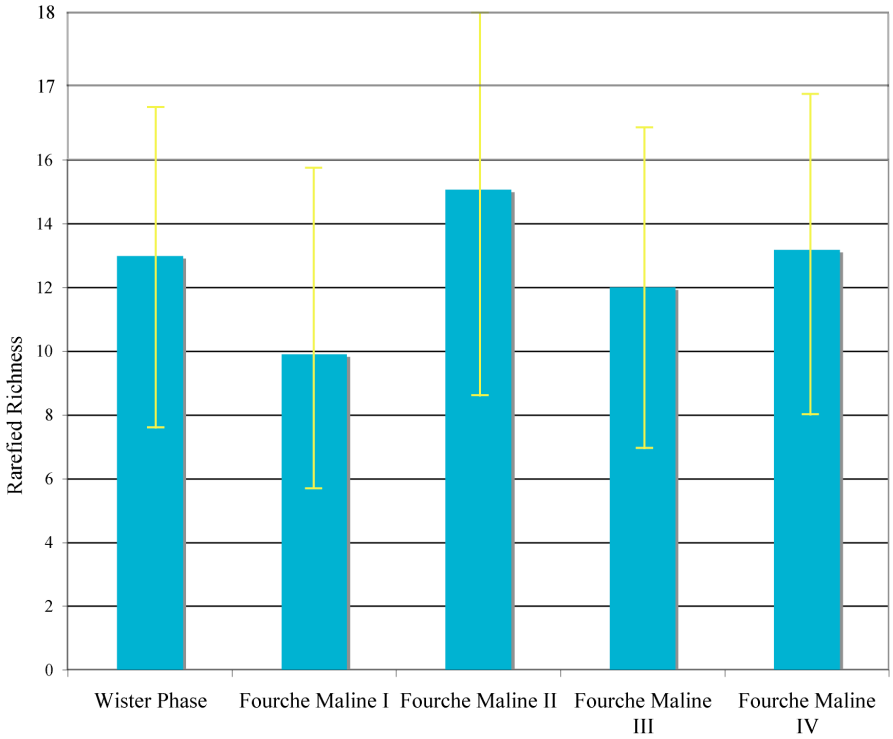


**Figure 6.3: Plot of the rarefied species richness and 95% confidence interval based on MNI less the Mississippian Period.**

This rarefaction closely followed the previous results, indicating that the Mississippian sample size was not biasing the outcome. These results indicated that there was a decrease in diversity during Fourche Maline I, an increase in diversity during Fourche Maline II, a second decrease during Fourche Maline III, finally there was an increasing trend in diversity. The fact that the confidence interval bars overlap indicates the trend is not very pronounced.

**Subsistence Findings: Floral Remains**

This research combined with findings from my thesis (Leith 2006) yielded a total of 56 charred seeds and 169 charred fungus body fragments associated with the Woodland Period occupations (Table: 6.8). These seeds represent 9 taxa of which 6 are edible. Of the 56 identified seeds, 34 were charred *Chenopodium/Amaranthus* sp. (Figure:6.5).

**Table 6.8: Seeds recovered from flotation samples.**

| | Site | 34Lt11 (Leith 2006 Pottery Component) | | | | | | 34Lt11 1976-1977 | | | | | | | 34Lt11 2009-2010 | | | 34Lf12/225 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unit | N15-W1 | | N16-W1 | | N16-W2 | | 0-0 | | | N1-W2 | | | 0-W4 | TU36/F1 | | TU7&29 PM1 | TU5 Stain | TU5, F1 S1/2 | TU5, F1 N1/2 |
| | Level | 2 | 3 | 1 | 3 | 1 | 3 | 1 | 2 | 3 | 2 | 3 | 4 | 1 | 1 | 2 | 4 | 2 | 3 | 3 |
| | Sample size in ml | 250 | 450 | 150 | 550 | 250 | 350 | 225 | 100 | 100 | 300 | 900 | 800 | 200 | 19400 | 8000 | 7500 | 1000 | 5800 | 7500 |
| Taxa | Common Name (e) = edible (c) = cultigen | | | | | | | | | | | | | | | | | | | |
| *Chenopodium/Amaranthus* | Goosefoot/Lambsquarters/Pigweed (e) (c) | 0 | 0 | 0 | **2** | **2** | 0 | **8** | **8** | **1** | **4** | **9** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Portulaca oleracea* | Purslane (e) | 0 | 0 | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | **1** | **1** | 0 | 0 | 0 | 0 | 0 |
| *Phytolacca americana* | Pokeweed (e) | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 |
| *Rubus* sp. | Blackberry/Raspberry (e) | 0 | 0 | **1** | 0 | **4** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 |
| *Euphorbia* sp. | Spurge | **5** | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Passiflora incarnata* | Passionflower | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Vitis* sp | Grape (e) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** |
| *Polygonum* sp. | Smart/Knotweed (e) | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | 0 | 0 | 0 |
| fungus | Unidentified fungus bodies | **1** | 0 | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **2** | 0 | **1** | 0 | **19** | **6** | **69** | **3** | **17** | **50** |

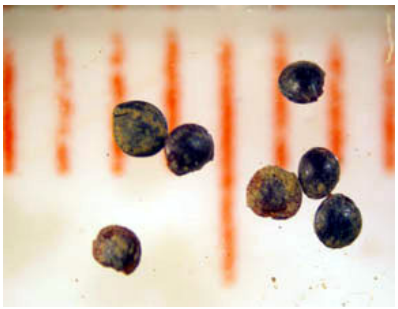

**Figure 6.5: Photo of goosefoot seeds recovered from 34Lt11 flotation samples (hash marks are mm).**

One other taxa represented by 2 individuals are also possible edible starchy seeds (*Polygonum* sp.). Two of the taxa (*Rubus* sp., and *Vitis* sp.) are fruit seeds from black/ raspberry and wild grape respectively. The final two species identified as edible are purslane (*Portulaca oleracea*) and pokeweed (*Phytolacca americana*). Scarry (2003:73) says that the greens (leaves) of these plants were the portion consumed. The final two taxa (spurge and passionflower) are weeds that happened to have become charred.

While undertaking this research I determined that the material identified as charred squash rind in my 2006 research was actually a charred fungus body fragment (Figure 6.6). The presence of these fungus bodies has been recognized at many sites and is thought to be tied to organic rich soils associated with human occupation (Constance Arzigian personal communication 2011). The identification of this plant remain as fungus removes squash/gourd as a possible cultigen used by Fourche Maline people, but the presence of the fungus body is associated with human occupation.

**Figure 6.6: Charred fungus bodies recovered from 34Lf12/225 float samples (hash marks are mm).**

The identification of goosefoot (*Chenopodium/Amaranthus* sp.) was fortunate because the research was searching for evidence of possible cultivation. Goosefoot was one of those making up the Cultivated Starchy Seed Complex of eastern North America (Asch and Asch 1982, 1983). Smith (1992) discusses the domestication of goosefoot. He states that the major morphological criteria for identifying domesticated goosefoot are the presence of a truncated margin and a thin seed coat (outer epiderm) thickness. Based on his research domesticated *Chenopodium* has a seed coat thickness of 7 to 21 microns (μm) and wild varieties exhibit a thickness of 40 to 57 μm (Smith 1992:123). Smith also notes that there are specimens from Ash Cave that have intermediate seed coat thicknesses (28.3 μm) and oval cross sections that he suggests are intermediate weed companions to the domesticated species (Smith 1992:155). Also of note are the "red morph" wild varieties that exhibit truncated margins and thin seed coats, thus making identification of domestication based on seed coat and margin morphology problematic (Smith 1992:148).

The goosefoot seeds identified here were examined using a low power stereo-microscope to ascertain the cross section of the seeds by focusing on the margin morphology. These seeds exhibit a rounded margin, which made the determination of domestication somewhat unlikely. To check the seed coat thickness one of the fragmentary seeds was inspected using the Scanning Electron Microscope housed at SNOMNH. The results indicated the seed coat was within the thickness range for domesticated *Chenopodium* (20 μm) (Figure: 6.7). The thin seed coat and the rounded margin lead me to propose that these seeds represent an early intermediate variety of goosefoot that represents the initial tending associated with incipient horticulture. The seeds do not

exhibit the truncated margin seen in the "red morph" variety, and the seed coat is thinner than the intermediate weed variety identified from Ash Cave (Smith 1992:154-155).

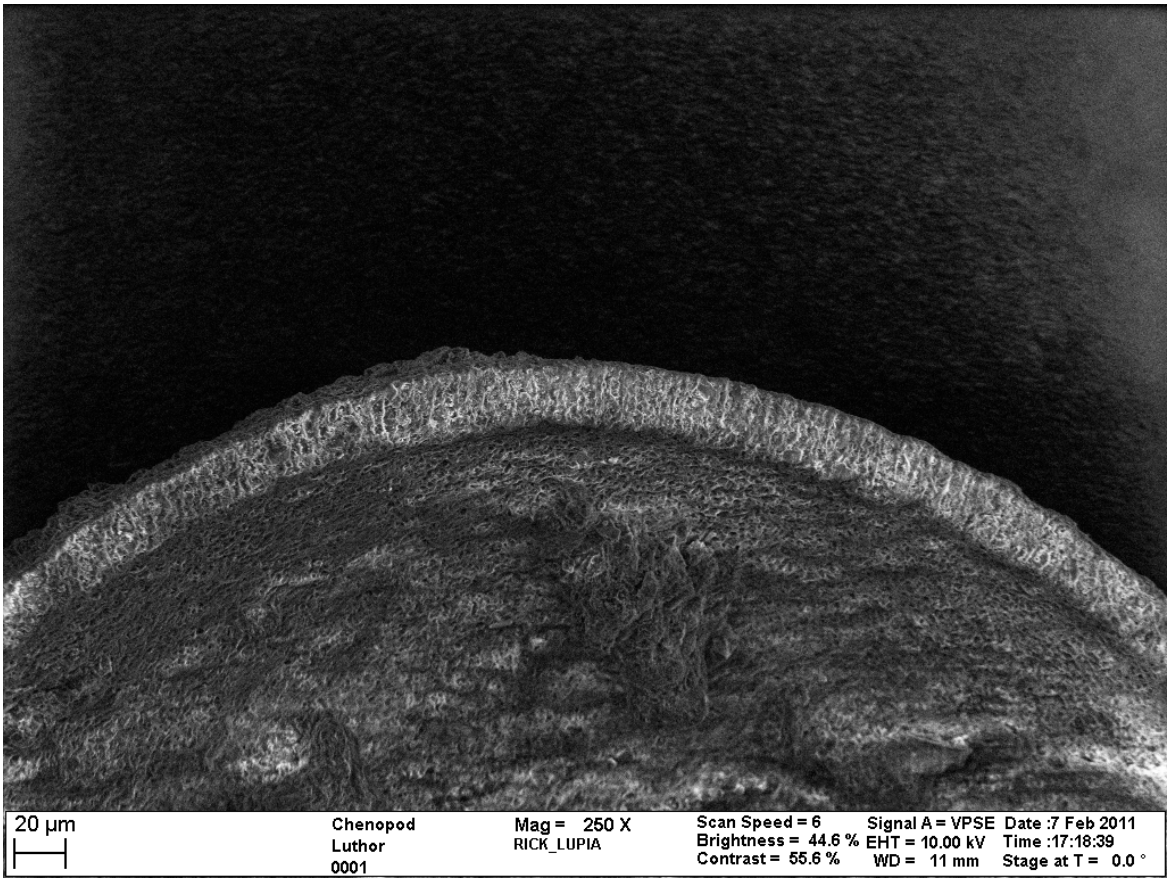


**Figure 6.7: SEM image of *Chenopodium*/*Amaranthus* sp. indicating a seed coat thickness of ~20 µm.**

These findings support Fritz's (1989:85) suggestion that Fourche Maline people were likely using maygrass, little barley, chenopod and knotweed at some level. She says Fourche Maline people probably had a horticultural system based on the four members of the Eastern Cultivated Starchy Seed Complex possibly with squash/gourd. Maize comes in during the Mississippian Period or around the 1,000 A.D. (Fritz 1989). Her findings from the Harlan Phase Copple Mound at Spiro fits the starchy seed to maize transition. At the time she based this suggestion on the analogies between Spiro and Mississippian sites in Illinois. In Illinois evidence exists for Woodland cultures practicing horticulture, which

transitioned to maize agriculture (Fritz 1989:86). Thus, the Woodland Period, Fourche Maline people, must have been practicing horticulture which was the basis for the Spiroan agriculture.

Schambach (1998:xv, 2002) has long championed the idea that Fourche Maline people were practicing horticulture. This has been based on circumstantial evidence such as the presence of agricultural implements such as the stemmed and double-bit hoes as well as grinding implements. Both he and Fritz have long said that the reason for the lack of direct evidence of horticulture is due to research designs that have not focused on recovering these types of remains (Fritz 1989; Schambach 1998, 2002). As witnessed here, the use of flotation methods designed to capture small pre-maize cultigens, even in old collections, can yield the results Schambach and Fritz have long suspected.

**Summary**

Two general models were proposed for the changes in animal use associated with the development of horticultural life-ways. These are: the "garden hunting hypothesis" and classic diet breadth modeling (Speth and Scott 1989). The garden hunting hypothesis states that gardens open up the land, thus, creating an edge environment niche that supports a diversity of small game which become the focus of the farmer's hunting (Speth and Scott 1989). Classic diet breadth modeling argues that as people become more sedentary they deplete their local environment causing them to widen their diet breadth to include smaller lower ranked resources (Speth and Scott 1989). Both of these models suggest that diet breadth widens and small game becomes the dominate prey for the hunters. Speth and Scott (1989) contended that it is more complicated than this and

actually proposed that the diet breadth narrows with few to a single large species becoming the focus of the hunt. Basically the difference between Speth and Scott's model and the other two is whether people are generalized or specialized foragers. In essence, do they diversify or intensify their efforts?

The diversity of animal game harvested by horticulturists has also been tied to changes in social organization and settlement patterns. Jackson and Scott (2002) identify several changes associated with the development of dependence on domesticated resources. These are: increased sedentism, changes in seasonal patterns of labor demands, land clearing, spring planting, summer/fall harvesting, and diminished locally available game over time leading to longer distance hunting forays. With increasing population a concomitant reduction occurs in territories due to compaction. Jackson and Scott (2002) echo Speth and Scott (1989) stating that there are two general strategies to deal with these changes: diversification and/or intensification. Diversification would be identified by increasing diversity in the archaeological assemblage. Intensification is recognized archaeologically by a decrease in diversity, evidence of complete processing of large prey, and a shift in the age curve (the use of younger individuals) (Jackson and Scott 2002).

The findings of my subsistence study indicate that there is strong evidence of the shift from hunting and gathering to horticulture during the Late Archaic/Woodland transition. The region inhabited by the Fourche Maline people was a resource-rich environment. The Wister Phase people were generalized foragers. They were making strong use of hickory nuts and other plant resources such as fruit, hunting deer and small game, seeking diverse aquatic resources (fish, turtles and mussels).

I propose that during the end of the Wister Phase the inhabitants of eastern Oklahoma began tending and using starchy/oily seed plant such as goosefoot. This is suggested archaeologically by from the development of pottery, the presence of grinding implements and the presence of horticultural tools. Further evidence is provided in Clarke's (1987) thesis. Clarke (1987) analyzed white-tailed deer (*Odocoileus virginianus*) from the Wister Phase occupations at the McCutchan-McLaughlin site (34Lt11). She identified a shift in selection to younger individuals late in the Wister Phase (Clarke 1987:56). She indicated that this would lower habitat stress, increase nutrition and reproductive rates for the deer, making them a more dependable resource (Clarke 1987:56). This intensification may suggest that the Wister Phase people were beginning the process of cultivating plants. Further circumstantial evidence for this is the presence of stemmed hoes during the Wister Phase as well as the fragmentary nature of the deer bones indicating intense harvesting and possible marrow extraction (Vehik 1977).

This initial adoption of horticulture also saw a decrease in the variety of animals harvested with deer dominating the meat used during Fourche Maline I times. There was an increase in the diversity of animals procured during Fourche Maline II times. This may be associated with the development of garden plots that created the edge zones discussed by Speth and Scott (1989). It is very likely that people transitioning to horticulture would exploit the resources provided by this niche environment. However, these resources would likely be exhausted fairly quickly. This is likely tied to a second decrease in diversity identified during Fourche Maline III. This period has the strongest evidence for horticulture as seen in the presence of possibly cultivated goosefoot seeds at 34Lt11.

These seeds have rounded margins and a seed coat thickness of 20 μm that implicate they may represent at least semi-domesticated cultigens. The decrease in the diet breadth corresponds to intensification on large mammals specifically deer.

Large mammals (here defined as mammals with a live weight over 60 kg.) make up between 19 and 55% of the assemblage based on MNI. However, when the meat weight is factored in the large mammals dominate the assemblage (72 to 94%) (Figures 6.7 and 6.8). Of the total percentage of large mammals, deer compose the majority of the meat weight (between 63% and 80%). The two other species present in the large mammal category are black bear (*Ursus americanus*) and elk (*Cervus elaphus*). Both of these species are present from the hunting and gathering Wister Phase through the early horticultural Fourche Maline III.

The lack of elk after this time period could be tied to a minor shift in climate as the prairie chicken drops off during Fourche Maline II possibly tied to a decrease in prairie environment. Albert (1981:99) reported that forests began closing around 1,700 years ago with increasing moisture, and a closed forest environment was present by ~500 years ago. Claire et al. (1989:354) stated that elk prefer intermediate forests with grasslands (65.6%) and only spend 25.3% of their time in closed forests. Black bears were likely not affected by the climate shift, but they are identified in low numbers (no more than one in Fourche Maline I to III) and likely represent fortuitous or ritual harvests. This leaves deer as the most sought after large mammal and as Clarke (1987) pointed out the Wister Phase ancestors of the Fourche Maline people had began to intensify their procurement of this resource during the later centuries B.C.

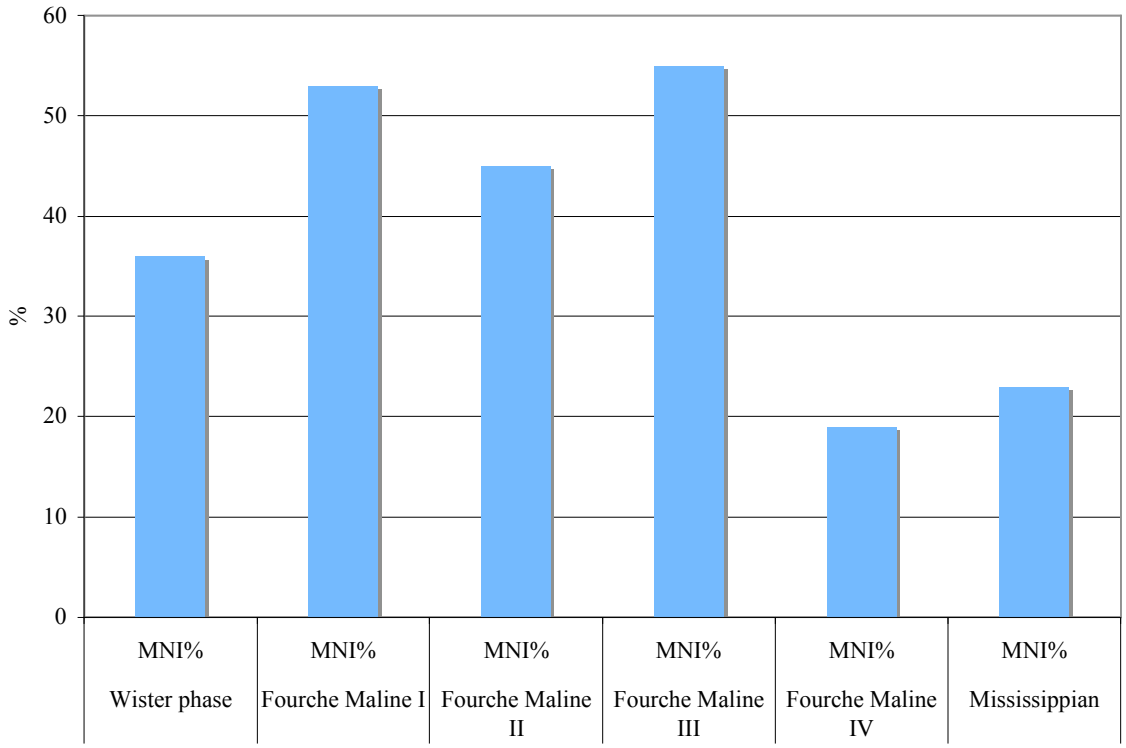


**Figure 6.7: Graph of the relative importance of large mammals by MNI.**

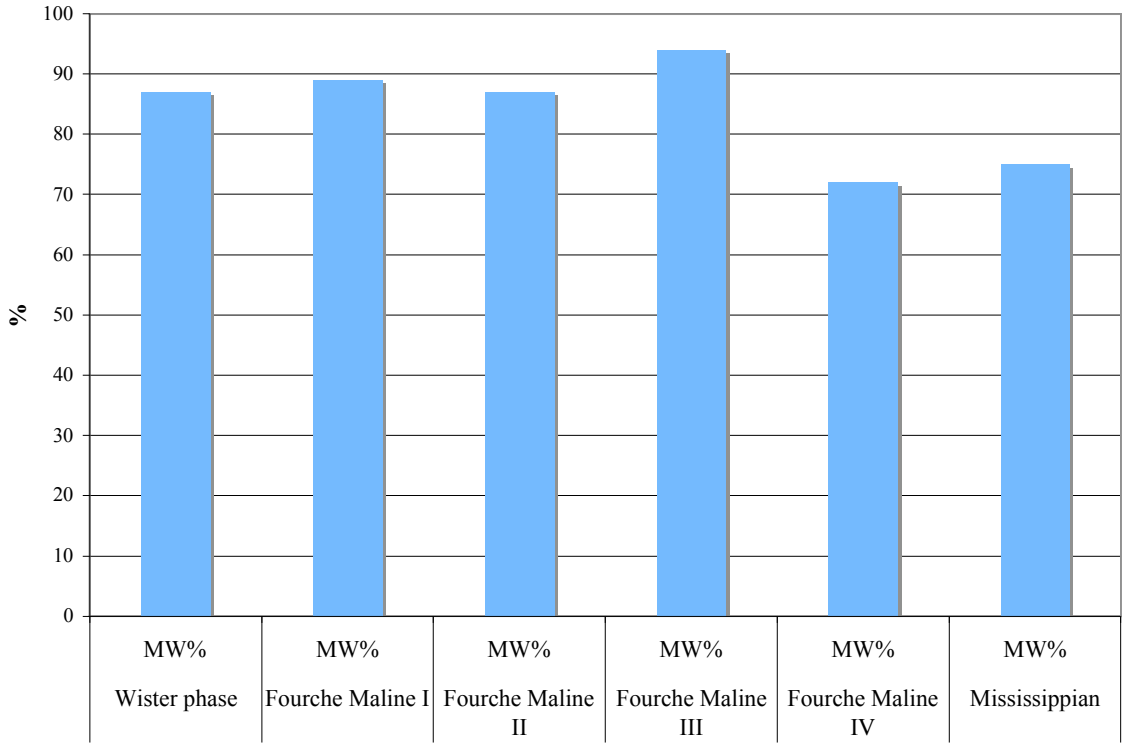


**Figure 6.8: Graph of the relative importance of large mammals by meat weigh.**

## Conclusions

This chapter involved testing the hypotheses that Fourche Maline people transitioned from a hunting and gathering to a horticultural subsistence practice, and the corollary that Fourche Maline represents transegalitarian complex hunter-gatherer-horticulturalists. Based on Hayden's (2001) and Sassaman's (2004) models transegalitarian cultures often rely on surplus food for aggrandizing competetions. Though not directly addressed here the Late Archaic (Wister) and Woodland (Fourche Maline) people were making use of hickory nuts, which can provide surpluses. The transition to horticulture may have to do with costly signaling by aggrandizers (a method of prestige building) as it had to do with subsistence needs. As with the initial use of maize in many areas of North America the initial use of goosefoot and other cultigens may have been tied to ritual or status realted practices tied to aggrandizing behavior.

# Chapter 7: Fourche Maline Bioarchaeology

Information from the previous chapter suggests that Fourche Maline people were beginning the transition from a hunting and gathering economy to incipient agriculture. Evidence exists for the use of possibly cultivated goosefoot (*Chenopodium/Amaranthus*). The intensity of use, or rather the importance of food production, should be recognizable in the skeletal assemblage.

This chapter further tests the hypothesis that Fourche Maline people are transitioning from hunting and gathering to horticulture. As stated in Chapter 1, I propose that if Fourche Maline people do represent transegalitarian people transitioning to a horticultural economy there should be traces of this shift present in their skeletal remains. For example the earlier population should appear healthier (less infectious disease), have less evidence of pathologies associated with repetitive motion (arthritis etc.), and have fewer dental pathologies. Populations transitioning to horticulture should exhibit increases in these types of pathologies.

## Skeletal Correlates of the Adoption of Agriculture

The skeletal correlates of the transition from hunting and gathering to agriculture have long been a focus of anthropologists. Early on it was assumed that the shift to a more settled lifestyle and the adoption of a framing economy generally increased health and nutrition as well as decreased the workload for prehistoric people (Larsen 1995). However, more recent studies have presented an alternative view, that with the adoption of agriculture health and nutrition actually decreased (Larsen 1995).

It should be noted that Wood et al. (1992) questioned the applicability of bioarchaeological data to the topic of agricultural origins. They point out three flaws in bioarchaeological research; demographic nonstationarity, selective mortality and hidden heterogeneity. Demographic nonstationarity basically means that small changes in fertility have great effect on mean age-at-death, whereas large modifications to mortality have virtually none (Wood el at. 1992). Thus calculated life expectancy and age-at death measure fertility not mortality. Selective mortality concerns the issue that the burial population is not representative (i.e. it is not all the people at risk, only those who died). Hidden heterogeneity means individuals have varying risks of disease and death. Wood et al. (1992) state that the bioarchaeological data can equally support either the point that health declined or increased with the adoption of agriculture.

Goodman (1993) responds to this pessimistic view. He says that the use of multiple indicators, models contextualizing the indicators of stress, and the use of multiple lines of evidence to clarify contexts of lesions and their biological cause will remedy the problems that trouble Wood et al. (1992). Milner (1982) echoes a similar call for an interdisciplinary approach providing multiple lines of evidence to support/supplement the bioarchaeological data almost a decade earlier.

Buikstra et al. (1986) argue that fertility is also affected by changes in diet. They point that fertility increases with agriculture, but this may have as much to do with the ability to process and make a weaning gruel as it had to do with increased nutrition for the mothers (Buikstra el at 1986). Mean age-at-death is a good indicator of fertility in past populations (Buikstra et al. 1986; Konisberg et al. 1989; Wood et al. 1992). Agriculture

requires planting and tending of the crops which decreases the relative mobility of the farmers. Increased fertility and the availability of a weaning gruel generally cause an increase in population.

Decreased mobility, increasing population and settled life-ways eventually tend to develop social stratification (Kidder and Fritz 1993). Danforth (1999) discusses issues of status and its effect on nutrition. She looks at indicators such as iron deficiency anemia (porotic hyperosteosis) and several dental pathologies that are associated with a narrower diet breadth focusing on maize agriculture (Danforth 1999). Her review covers the range of societies from egalitarian (where status is tied to age and sex) to state level societies (where social ranking is at its highest). She concludes that as social and political complexity increases, the gap in nutrition widens between the commoners and elites.

Milner (1982, 1984) points out that increased populations and densities, especially at civic centers typical of chiefdom and state levels of complexity, increases the likelihood of contracting infectious disease due to contamination of the immediate environment. This is directly associated with the shift in land use to less mobility. The longer the duration of occupation the more trash accumulates. This leads to a less healthy environment if the trash is not dealt with, as the people can no longer just move away. This could have important ramifications for lower ranked individuals as they are typically the ones who show the most nutritional deterioration with increased complexity (Milner 1982). This malnutrition weakens the immune system, which facilitates catching other diseases (Danforth 1999), thus nutrition and disease are closely tied together.

A shift from harvesting the natural resources of the land to working the land to increase food production would increase the amount of physical labor, much of which was repetitive. Indicators of this increased stress are thickening of cortical bone (Bridges 1989; Larsen 1995), long bone dimensions/symmetry (Bridges 1989), and arthritis and degenerative joint disease (Bridges 1992; Tainter 1980). Bridges (1989) and Larsen (1995) argue that the increase in bone thickness/robusticity is tied to an increased physically demanding life-way (such as planting, harvesting caring loads etc.) Different activities are associated with symmetry and long bone dimensions. Bridges (1992) argues that use of a atlatl would cause bilateral asymmetry in the arm bones as the one arm was used more (had more stress). She contrasts this to the use of the bow and arrow that caused more equalized stress on both arms resulting in more symmetry. An increased workload would also contribute to the most common pathology recognized, osteoarthritis.

**Fourche Maline Bioarchaeological Studies**

Little bioarchaeological research has been conducted on Fourche Maline burials in Oklahoma. It was not until the middle of the twentieth century that sites with these kind of burials were excavated in Oklahoma. Most of this work was conducted by the W.P.A. crews who excavated numerous Fourche Maline sites. Very few reports on these excavations exist, and the burials themselves were curated and put into storage with little more than a cursory inventory. The next series of excavations were conducted by the University of Oklahoma, and most had to do with sites affected by proposed lake impoundments. Dr. Bell excavated and reported on the Scott site (34Lf11) He was the first to give burial descriptions (basically depth, body position, facing and grave good

description if present) (Bell 1953). Proctor (1957) and Sharrock (1960) analyzed and reported on two of the W.P.A. excavated black-midden sites. Again they present general burial descriptions, but at least identify burials as adult, child etc.

McWilliams analyzed the burials from the James B. Sam (34Lf28) and the Omer Wann (34Lf27) sites as his master's degree research (McWilliams 1970). McWilliam's work was fairly comprehensive. These burials consisted of both single and multiple interments, representing a population of 32 individuals from the Wann site and 73 individuals from Sam. He determined age, sex and stature were possible, identified several pathologies, determined life expectancy and performed basic genetic analysis based on skeletal traits (McWilliams 1970).

McWilliams (1970) made the following conclusions: the individuals living at Sam and Wann were tall and gracile, and there is little evidence of hard physical labor as seen in the low rates of arthritis and other degenerative diseases. He notes evidence of dietary deficiency in part of the population (McWilliams 1970). McWilliams (1970) also states that based on his epigenetic and osteometric analysis the people from Sam and Wann were members of the same population. It should be noted that McWillaims considered the Fourche Maline Focus to represent Archaic hunter/gatherers with some later Gibson Aspect (Woodland) influence. He compared the individuals with pottery to the earlier Archaic population and based on his epigenetic analysis found no morphological difference (McWilliams 1970).

Powell and Rogers (1980) performed the first bioarchaeological analysis of burials from the Fourche Maline culture. They point out that the McCutchan-McLaughlin site had

two occupations with close to 600 years separating them (Powell and Rogers 1980). Powell and Rogers record age, sex stature, as well as pathologies present on the burials.

Their analysis suggests that the population was healthy indicating the diet was adequate. Powell and Rogers (1980) point out the population had a fairly strong resistance to infectious disease. The skeletons were fairly gracile indicating a generally low workload record. They conclude that the most frequent cause of death was violent trauma (Powell and Rogers 1980). They do point out that the population is skewed towards adults and sub-adults, and they suggest this is due to preservation issues and/or misidentification of infants and small children in the field or lab.

Burns (1994) conducted bioarchaeological research on a population from the W.P.A. excavated Raymond Mackey site (34Lf29). Her focus was on the paleodemography of the population. She determined the male to female ratio to be 1:1 (however, her range was from twice as many females on the one extreme to twice as many males on the other). Again she points out (as Powell and Rogers did for 34Lt11) that the population was biased toward adults. Her sub-adult to adult ratio was 28.8% . This is likely more extreme than at 34Lt11 based on the differences in methodology between the W.P.A. and the archaeological field methods used in the 1970s. She determined the mean age-at-death to be around 28 to 36 years old.

Rowe (2009) and Fauchier (2009) reported on the W.P.A. excavated Dan Akers site (34Lf32). Rowe (2009) focused on the bioarchaeology and Fauchier (2009) analyzed the grave goods present at the site. Rowe's work included ageing, sexing, and stature determination as well as population demography (Rowe 2009). She argued that the

population is not representative and is biased toward the adult individuals as well as having a 2:1 ratio of females to males. Fauchier (2009) determined that all the burials with grave goods from Akers were from a later Caddoan (Mississippian) occupation. Rowe acknowledges that there may be a mixed context and compared the individuals with burial goods (the later component) with the individuals with no grave goods (earlier component). Rowe found that there were no stature differences between the males, and only a small difference in stature for females. This was a positive first step, but differences in health and pathologies would be more enlightening as to the question of the transition to horticulture.

The major problem with past research (in Oklahoma at least) is the idea that each of these sites represents a single population. This problem stems from the lack of archaeological research on the black-midden sites conducted to identify temporally sensitive artifact types. This has left the bioanthropologists only the relative depth of the burials for determining early-vs-late. This being said, the black-midden sites are multi-component, meaning the burials at these sites represent several different populations and need to be analyzed as such. Viewing the burials as a single population masks variability that may be associated with subsistence change relating to changes in land use. This makes diachronic comparisons very difficult. Along with the problem of diachronic study is the problem of developing a demographic model that contains more than one population and then applying it at a regional scale.

Powell and Rogers (1980) attempted to identify early and late burials at 34Lt11 but the lack of chronologically sensitive artifacts inhibited the determinations. Burns (1994)

and Rowe (2009) conducted preliminary research focused on population demography and as indicated above Rowe (2009) compared the burials with grave goods to those without and only identified slight changes in the stature of the females. She is presently researching the pathologies at the Akers site and this research may have more promising results.

Another problem with Akers is whether the population is Woodland or Mississippian. Fauchier (2009) notes that the burials with grave goods are from a later Mississippian occupation. She obtained dates of around 1290 to 1300 A.D. from shell temper samples (Fauchier 2009). A quick perusal of the site database indicates a great deal of shell tempered pottery including sherds in L3 (24 to 36 inches below the surface) which is the bottommost occupation level. Shell tempered pottery is generally associated with occupations late or post-dating Fourche Maline. Finding this type of pottery in the deepest level at the site, as well as the Mississippian sherds analyzed by Fauchier, suggests that the major use of the site may have been later than Fourche Maline. There are some notched and expanding stem points that may indicate a modest Wister/Early Fourche Maline habitation, but overall the site looks to be mostly late (Evans/Harlan/Spiro). To understand the shift to agriculture the research has to identify early from late burials and any variability in health, demography, pathologies etc. By pooling the data this variability is masked with the averages.

**Discussion**

Many of the early researchers such as Bell (1953) and Galm (1984) suggested that the Fourche Maline people were living on the mounds. These mounds are assumed to

be highly organic midden deposits (based on the presence of animal and human remains). Basically, the black-midden mounds would likely be an unhealthy place to live due to proximity of refuse. If Fourche Maline people were living on the mounds then their health status should be roughly equivalent to that of the lower ranked individuals Milner (1982, 1984) identified. These lower ranked individuals lived in areas where they were in close proximity to refuse causing a higher incidence of infectious disease (Milner 1982, 1984). The bioarchaeological data published by Powell and Rogers (1980) indicate the Fourche Maline people were generally healthy, implying they were most likely living off the mounds. The archaeological unit wall profiles also revealed few signs of prepared floors in the midden mound (Wyckoff 1976, Wyckoff and Woody 1977). Post molds have been identified in some of the midden mounds, however they do not appear to indicate a house pattern.

A major indicator of emergent horticulture/agriculture is the increase in dental pathologies associated with the use of crops. Danforth (1999) and others argue that an increase in dental pathologies (wear and caries etc) correlates highly with the shift to a farming diet. Tayles et al. (2000) point out that the increase in dental pathologies has much to do with the processing technique associated with food crops. Generally, food crops have a high carbohydrate load that when processed becomes sticky (Tayles et al. 2000). The use of grinding stones to process food enters grit into the food and is a major cause of dental wear, which makes teeth more susceptible to caries as the dentin and pulp of the tooth essentially gets closer to the surface (Tayles et al. 2000).

Fourche Maline people generally are argued to have had a low rate of caries, which would indicate low importance of carbohydrate rich agricultural foods (Powell and Rogers 1980). There are two problems with this argument. The first problem has to do with the repeated grouping of the burials from the Fourche Maline sites into single populations. This grouping would mask the variability in caries rates if both the Archaic hunter/ gatherers and the Woodland gardener/farmers are not distinguished and separated. The second problem has to do with the amount of dental wear of the Fourche Maline people. Fourche Maline people generally have a great deal of dental wear, even to the degree that Powell and Rogers (1980) added a ninth stage of dental wear to Murphy's (1959) dental attrition scoring system (Burnett 1990). If the wear were this great (complete exposure of the dentin) then any evidence of caries on the occlusal surface would be erased, though there should still be evidence near the root or between teeth.

The shift in world-view from land as a resource to a tool for production (Cobb and Nassaney 2002) correlates to increased stress on the body. Bridges (1992) notes that the shift to agriculture added activities that are stressful to the joints. An example is grinding corn that stresses the shoulders and elbows (Bridges 1992). Wister Phase and Fourche Maline people were known to have made use of locally available hickory (*Carya* sp.) nuts. The presence of nuttingstones as well as grinding implements suggest a similar processing manner to corn. Leith's (2006) analysis of *Williams Plain* pottery attributes suggested they were used for stone boiling. Stone boiling for nut oil extraction likely did not require the amount of processing needed to prepare corn flour, and the small seed processing suggested by the presence of goosefoot probably represent a minor part of the diet. The

type of motion is not necessarily as important as the repetition and duration of the activity. An agricultural focused life-way requires massive bulk processing with correlating long duration and repetitive motion. Constant repetitive and long duration activities contribute to degenerative joint disease (Tainter 1980). Tainter (1980) points out that with increasing sociopolitical complexity and ranking, differences in activities levels become evident, as seen in different levels of degenerative joint disease.

Understanding variation in degenerative joint diseases and repetitive use injuries is inhibited by the same problems as variation in dental caries rates; that problem is the lumping of burials from multiple components into a single population. According to current published information the Fourche Maline people have gracile skeletons indicating a low degree of hard labor (Powell and Rogers 1980). Along with the gracile skeletons Powell and Rogers (1980) point out that there is a low occurrence of degenerative joint disease and arthritis before late maturity. These findings could be tied to the fact that the major occupation at 34Lt11 is Late Archaic people who were using nuts but were not farmers. McWilliams (1970) noted higher rates of degenerative joint disease and arthritis in the females from the population and attributes this to habitual load caring or the use of mano and metate for food grinding. Again, these burials result from several occupations which likely mask variability. This makes diachronic comparisons of the prevalence of these types of disease impossible.

**Proposed Bioarchaeological Research Design**

In an attempt to remedy the problems of multiple occupations I propose the following joint archaeological and bioanthropological research design. First,

archaeologists need examine the grave goods focusing on the time period with which they are associated. Generally, Fourche Maline burials have few to no grave goods. If grave goods are present they should represent the material culture of the Fourche Maline people (i.e., thick grog, mixed grog, and grit temper pottery, contracting stem points, corner-notched arrow points, double-bitted axe/hoes etc.). For example, the grave goods should not include decorated grit or shell temper pottery, engraved conch shell or other material culture associated with the Mississippian Period.

Second, review the burial depths. Shallow burials are not likely to be from the earliest occupation. However, deep burials cannot be assumed to be early! There is some evidence of later burials intruding into earlier (deeper burials) such as burial 6 at 34Lt11. Sometimes the burial pit outline can be discerned but more often this is not the case because of the dark homogeneous color of the middens. Third, determine the distribution of arrow points and pottery. This will help in determining if deep burials originated in later component.

Fourth, the bioanthropologist should develop a list of traits and attributes to be recorded that pertain to the transition from hunting and gathering to agriculture and record this information for each individual as an individual. Use these results to determine if there are clusters based on expected traits and pathologies for hunter/gatherers-vs-agriculturalists. Determine how these clusters correlate to the presence and types of grave goods, the burial distributions, the artifact distributions. Finally, the researchers can then compare the burial findings to those of known agriculturalists and/or hunter-gatherers.

If Fourche Maline people did shift from hunting and gathering to agriculture the early population should have the following traits: low rates of dental caries and abscesses, low rates of degenerative joint disease associated with repetitive use, and a low level of infectious disease. The later population should exhibit pathologies somewhere between the hunter-gatherer and agricultural populations. For example, the horticulturalists should have greater rates of caries, more evidence of degenerative joint disease and appear generally less healthy than the earlier non-agriculturalist population. (Bridges 1989, 1992; Buikstra et al. 1986; Danforth 1999; Konisberg et al. 1989; Milner 1982; Tainter 1980; Tayles et al. 2000; Wood et al. 1992; but see Goodman 1993 for critique)

**Conclusions**

In summary the human skeletal information currently available indicate agriculture had little to no importance for the Fourche Maline people. I have pointed out and acknowledged the problems inherent in this data set as it stands today, and I have proposed a possible joint archaeological and bioanthropological research design that may remedy these deficiencies. Without attempts to study bioarchaeological changes over time we will never be able to identify the important shift from hunting and gathering to horticulture which was the base on which the Spiro and modern Caddoan peoples developed.

There are potential clues that the grouping of the burials from Fourche Maline sites may be masking the actual variability can be seen in the higher incidence of repetitive use injury in females identified by McWillaims (1970). Also as stated above, The high degree of dental wear noted by Powell and Rogers (1980) may be erasing the much of the evidence of caries in Fourche Maline populations. The current bioarchaeological

information, however, does suggest that farming was only contributing a minor part of the diet. The expectations drawn from the proposed transegalitarian complex hunter-gatherer-horticulturalist hypothesis are not well supported with the current bioarchaeological information. Perhaps future research focused on identifying early from late burials will clarify the questions of when the transition to to food production occurred in eastern Oklahoma.

## Chapter 8: Fourche Maline Settlement Patterns

Settlement patterning can be viewed at two different scales or resolutions: 1) the regional level, and 2) the site level. There is a great deal of information available for Foruche Maline settlement pattens at the regional scale. Galm (1978a, 1981, 1984) and Wyckoff (1980) have indepth discussions on the distribution of the Woodland Period, Fourche Maline sites in Oklahoma, and Schambach (1982) presents a great summary of the distribution of Fourche Maline (black-midden) sites in Arkansas. Close to 100 sites have been identified as Fourche Maline Phase in eastern Oklahoma. The black-midden (Fourche Maline Phase) sites in Oklahoma are found as far north as Cherokee County, as far south as McCurtain County, and as far west as central Pittsburg County (Figure 8.1).

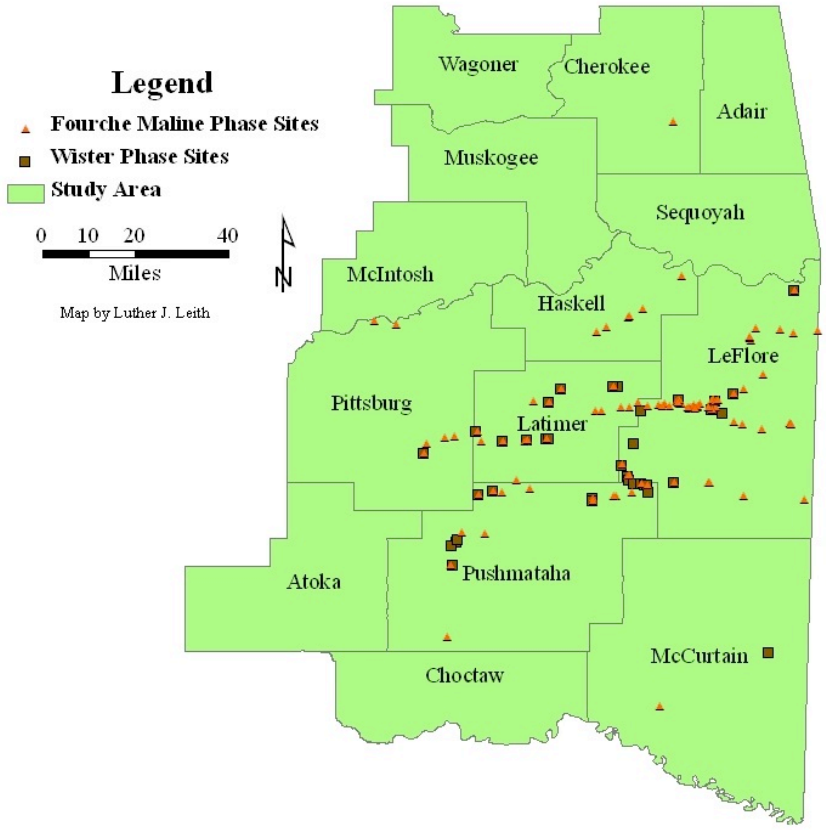


**Figure 8.1: Distribution of Fourche Maline and Wister Phase sites in eastern Oklahoma.**

The area of settlement patterning where little research has been conducted is at the site level of resolution. This mainly stems from the idea that the black-middens represent the habitation area for Fourche Maline people. This has caused much of the archaeological work conducted at these sites to be focused on the mound with little off mound testing. Some pioneering work such as Vehik's (1982a) off-mound trenching at Bug Hill (34Pu116) was conducted but found no evidence of habitation. I propose that the off-mound testing that has occured provided too limited a view of possible habitation related activities because trencing and shovel testing can miss structures or other features.

In Chapter 1 I proposed two related subsidiary hypotheses associated with the hypothesis that Fourche Maline people are transegalitarian complex hunter-gatherer-horticulturalists. These hypotheses are: 1) that Fourche Maline people were not living on the midden mounds, and 2) that domestic activities and habitation were conducted off the midden mounds. In order to test these hypotheses geophysical remote sensing was conducted at four black-midden sites (see Chapter 3 for the methods followed). The remote sensing allowed much greater coverage of areas around the middens thus avoiding the limited window trenching and shovel testing provide. My expectations are that Fourche Maline people are becoming increasingly sedentary, Fourche Maline people population was expanding and that Fourche Maline settlements were located in areas adjacent to the midden mounds.

Many researchers considered the Fourche Maline culture to comprise the transition from residentially mobile hunter-gatherers, to seasonal and finally fully sedentary horticulturists (Bell and Baerreis 1951; Galm 1984; Galm and Flynn 1978; Leith 2006;

Schambach 2002; Vehik 1982a). This process was gradual, taking place between 300 B.C. to A.D. 800 and is recognized by a shift in technology from atlatl to bow and arrow, the development of pottery, and by the transition to a horticultural economy.

Balck-midden sites are identified by the presence of large midden-mounds, generally about 60 m in length, between 25 and 50 m in width (around 2100 $m^2$), and up to two meters deep (Galm and Flynn 1978; Vehik 1982a). Bell and Baerreis (1951) originally described these sites as "accumulations of village debris, or midden deposits." Other researchers such as Vehik (1982a) have described the sites as base-camp deposits, still implying a degree of sedentism. The thickness of the midden-mound deposits would indicate either numerous seasonal re-occupations or possibly a year-round occupation (Galm 1984).

Until recently very little research had been undertaken off the mounds because the mounds had been considered to be areas of habitation. Vehik (1982a) has identified several "occupation surfaces" based on unaligned post molds and ash concentrations. However, as these mounds have been interpreted as midden deposits, ash concentrations could be related to dumping episodes, and the post molds are not generally associated with any house pattern, floor, or compacted living surface. In order to examine black-midden site structure it was necessary to perform research off the midden mounds to find evidence of Fourche Maline habitation.

During the spring and summer of 2009 I conducted geophysical remote sensing using a gradiometer at four black-midden sites (34Lf12/225, 34Lt11, 34Hs25, and 34Hs224) searching for evidence of off-mound habitation. The remote sensing yielded

numerous anomalies at each site. The patterning suggested the presence of structures as well as possible domestic features such as hearths and storage pits. Several anomalies were tested at two of the sites (34Lf12/225 and 34Lt11) in 2009 and 2010.

**Results of the Remote Sensing at Duncan's Mound**

The remote sensing indicated several off-mound anomalies that possibly relate to habitation features. Two possible structure patterns were identified in Grid 2. These anomalies looked like a possible house patterns (Figure 8.2). In addition to the possible house patterns several strong positive (black) and negative (white) anomalies were present. These anomalies were interpreted as possible hearths or storage pits. Test Units 3 through 6 were excavated to test this interpretation. The testing indicated that the circular anomaly was not a house, but the large (approximately one m diameter) strong positive (dark) anomalies appeared to be associated with hearth/burned-rock features (likely open air fire pits).

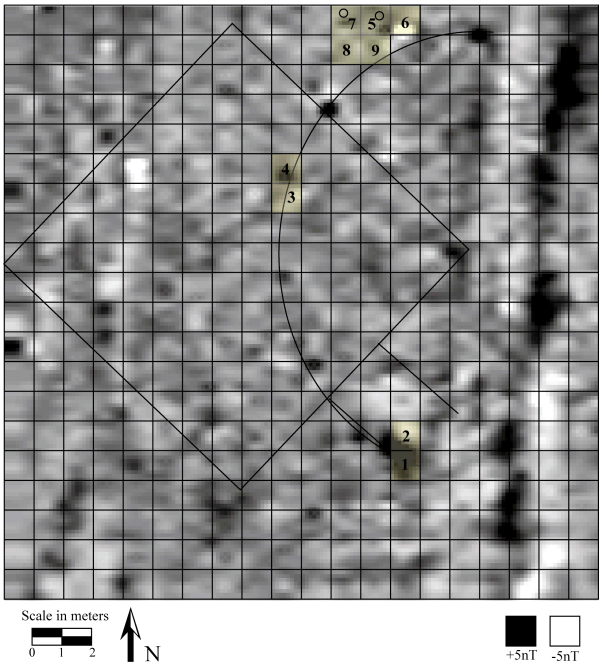


**Figure 8.2: Remote-sensing imagery of Grid 2 from 34Lf12/225 identifying anomaly patterning and the location of test units.**

The excavation indicated that the occupation was in the upper 20 cm with a gleyed soil underneath. The gleyed soil had large amounts of iron oxide, which may have been causing some interference with the gradiometer. Excavations yielded numerous flakes and fire-cracked rock. Level 2 (10 to 20 cm below ground surface) had the highest density of fire-cracked rock, ranging from around eight to 40 grams/liter. Two possible small post molds were identified in Test Units #3 and #4 (Figure 8.3)

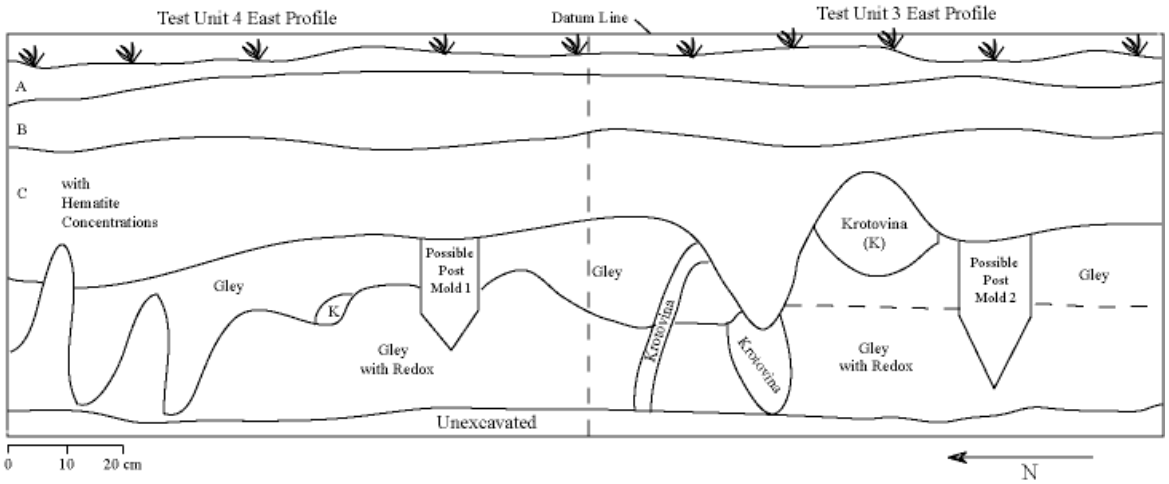


**Figure 8.3: Profile map of Test Unit 3&4 from 34Lf12/225 identifying possible post molds.**

Two confirmed post molds were exposed in an excavation block in the northern part of the grid (Test Units 5 through 9) (Figure 8.4). The large, strong-positive, anomalies were identified as open-air hearth/fire pits. The post molds in the northern excavation block suggest an off-mound habitation feature possibly a structure but their location near the northern edge of the geophysically tested area and time constraints hindered further identification of the pattern.

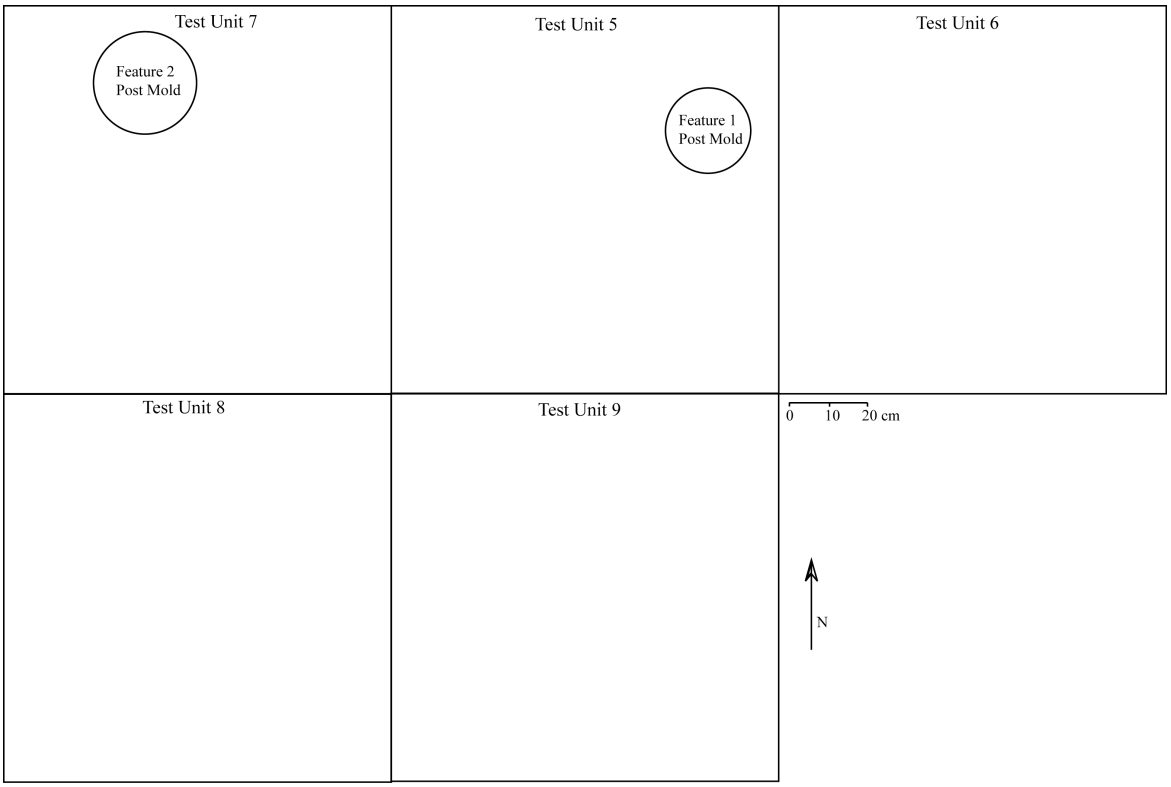


**Figure 8.4: Plan-view of Test Units 5-9 from 34Lf12/225 indicating the location of the identified post molds.**

## Results of the Remote Sensing at the McCutchan-McLaughlin site

The McCutchan-McLaughlin site is located in an open pasture and represented one of the best chances of finding houses among the sites I geophysically surveyed. The results of the McCutchan-McLaughlin remote sensing indicated the presence of five anomaly patterns that are possibly house patterns (Figures 8.5 though 8.9). The excavations focused on the single large anomaly pattern in Grid 31, which had the most promise of being a house pattern (Figure 8.9). The twenty 1x1 m test units were able to define the north, south, east and west boundaries of the house pattern as well as four possible post molds. The soils at the site had many iron-oxide nodules and extended to a depth of about 50 cm with the subsoil consisting of gleyed silty clay.

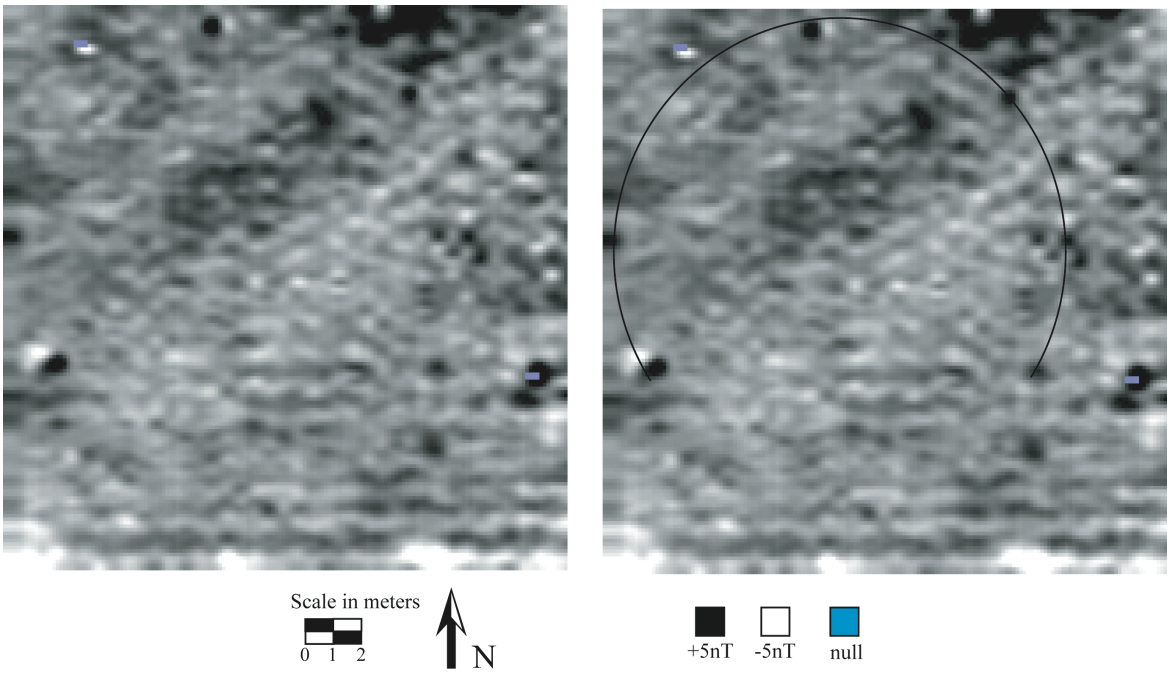


**Figure 8.5: Possible house pattern in Grid 7, 34Lt11, right is the raw image, left has the possible structure identified.**

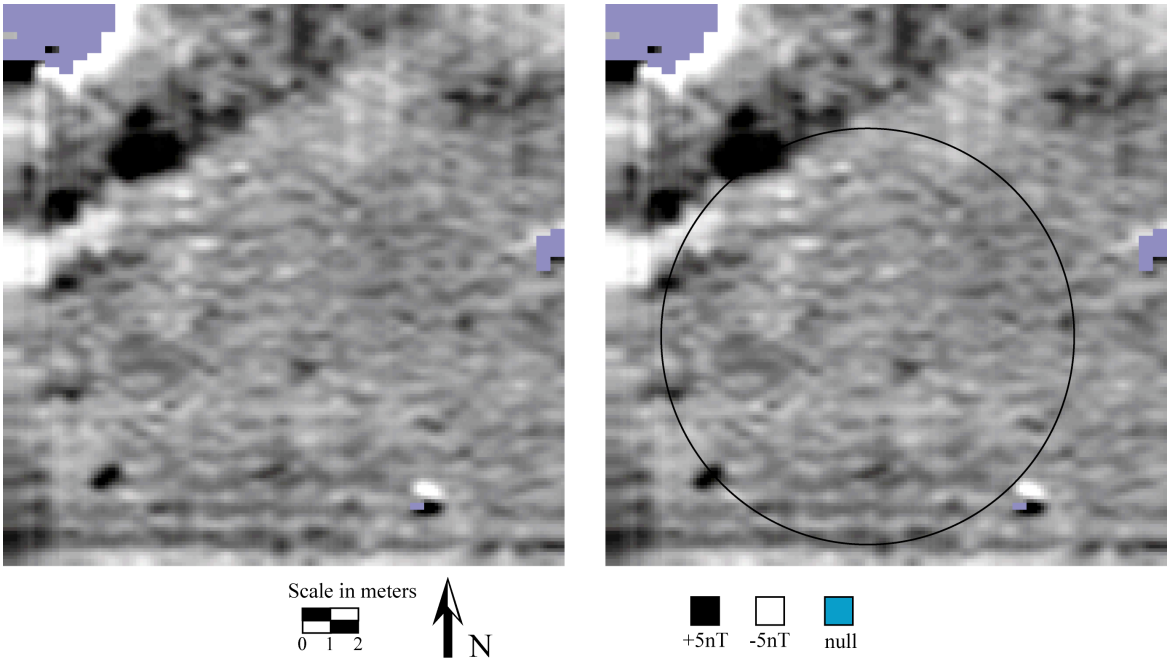


**Figure 8.6: Possible house pattern in Grid 15, 34Lt11, right is the raw image, left has the possible structure identified.**

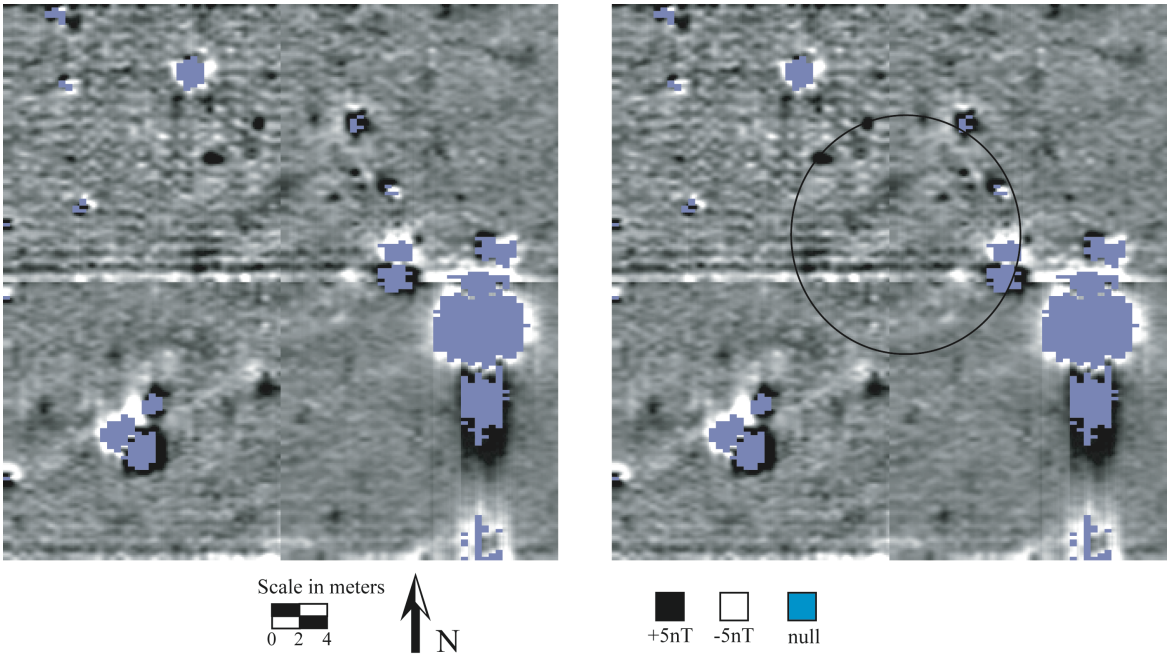


**Figure 8.7: Possible house pattern in Grids 25, 26, 34, and 35, 34Lt11, right is the raw image, left has the possible structure identified.**

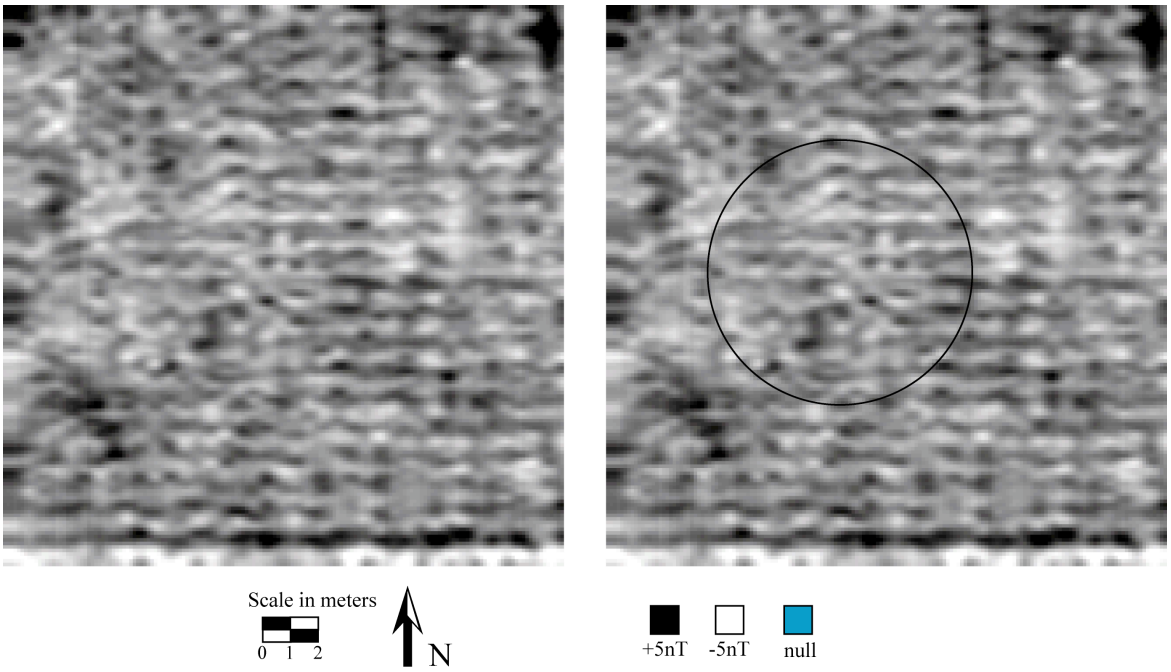


**Figure 8.8: Possible house pattern in Grid 41, 34Lt11, right is the raw image, left has the possible structure identified.**

The identified house pattern in Grid 31 was round, estimated 12 m in diameter, and has a possible extended entrance to the southeast. Three other anomalies that were

approximately the same size as the Grid 31 possible house pattern were identified at 34Lt11 (Figure 5.4). These anomalies may represent houses and appear to be approximately 60 m from the edge of the midden mound. I suggest the possibility of at least two other houses further to the east (just outside the limits of the remote sensing) based on the location of these other anomalies. Consequently, I estimate the total number of houses at the site to be between four and six. These structures appear to be arranged in a semicircle about 60 m from the mound.

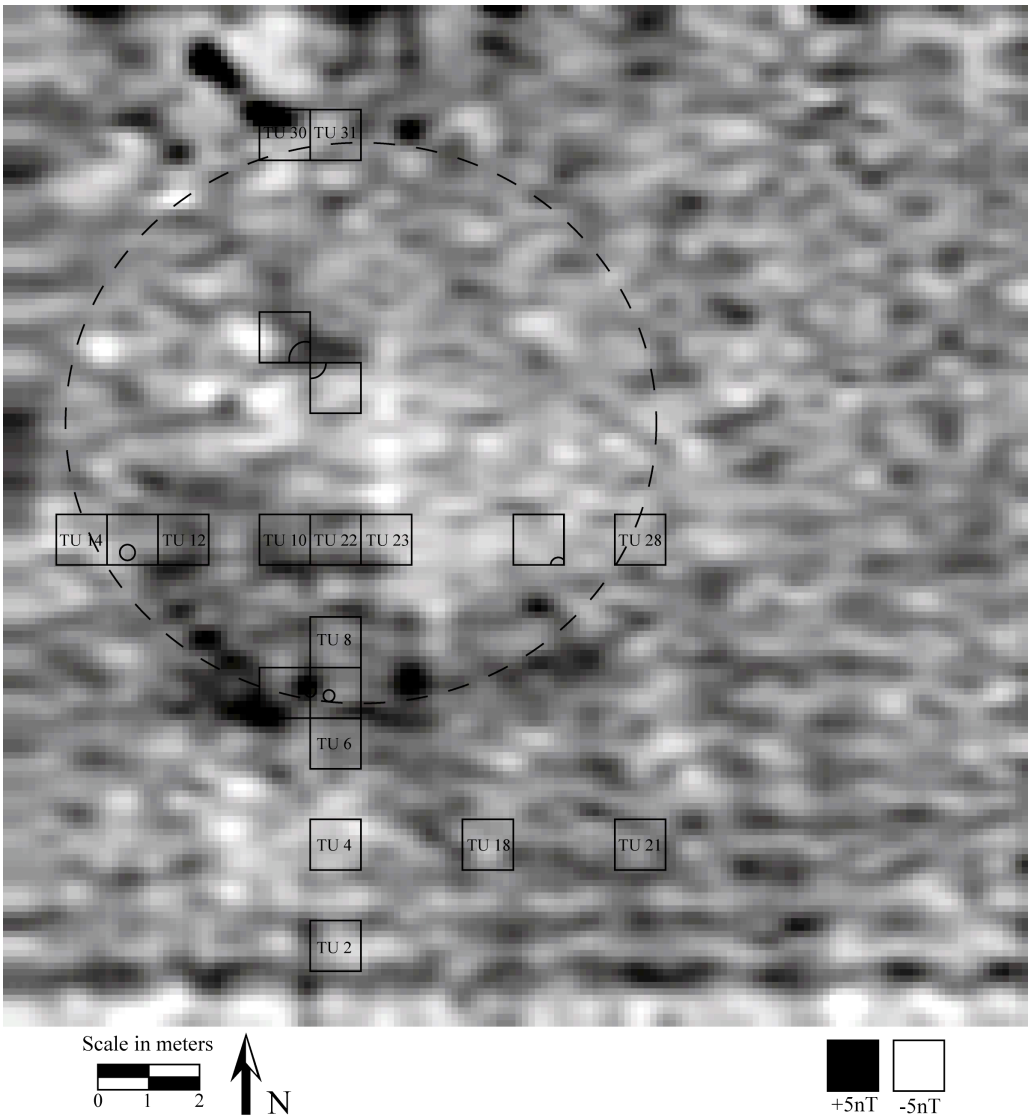


**Figure 8.9: Remote-sensing imagery of Grid 31 from 34Lt11 indicating the location of the test units, the proposed house boundaries, post molds and possible hearth**

**Results of the Remote Sensing at the Otter Creek Site**

Remote sensing at the Otter Creek site was limited to three 20x20 m grids. Grid three (the easternmost grid) has a great deal of noise that could be associated with Winchell's 1998 graded trenches. Grid 1 contained a rectilinear pattern (identified by light negative anomalies) approximately 5x15 m as well as three large dark anomalies (Figure 8.10). Testing needs to be undertaken to test these anomalies.

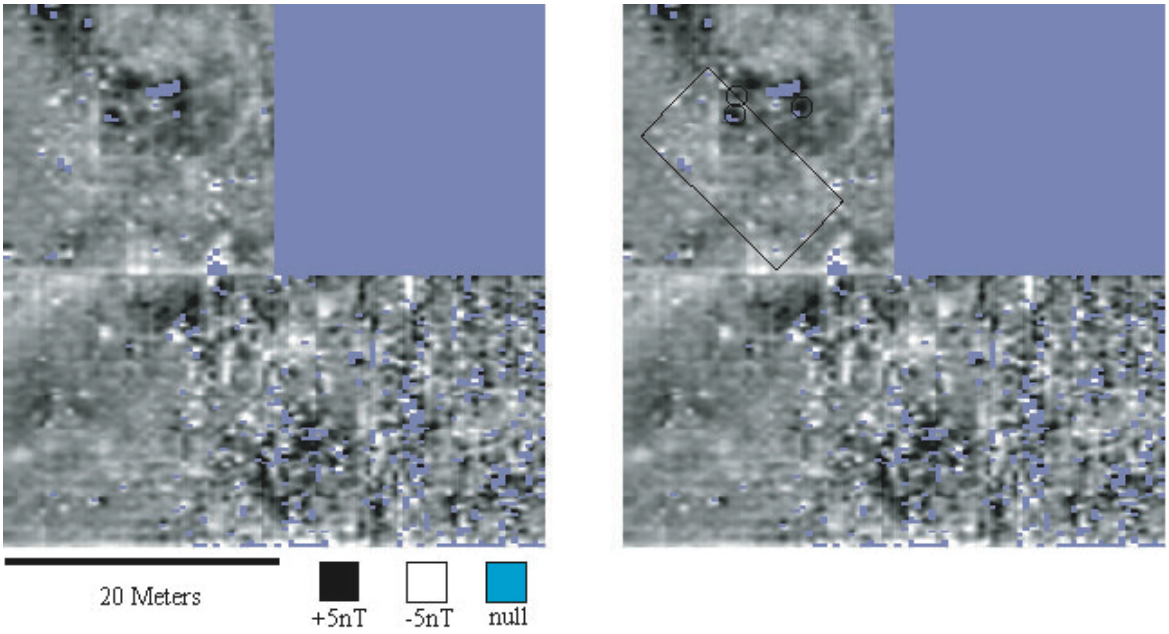


**Figure 8.10: Remote-sensing imagery from 34Hs25**
**(right image has the possible house and other anomalies marked)**

**Results of the Remote Sensing at the Sam Spears Site**

A total of 35.5 20x20 m grids were completed at the Sam Spears site. During the remote sensing, the landowner mentioned that there was a natural gas pad in the pasture. This explained the very large dipoles located in grids 3 to 6 and 10 to 12 (the large blue null anomalies in Figure 3.11). The site also has other disturbances, including a two-track road that was associated with the former gas pad. A total of three possible house pattern anomalies were identified in a grid-by-grid examination of the remote-sensing imagery

(Figures 8.11 and 8.12). Two anomalies are rectilinear; one measures approximately 12x12 m, and the other measures about 12x20 m. Along with the two rectilinear anomalies one circular anomaly roughly 10 m in diameter was identified in Grid 13 (Figure 8.11). Again, testing is required to determine if the anomalies do indeed represent structures, but their presence is interesting.

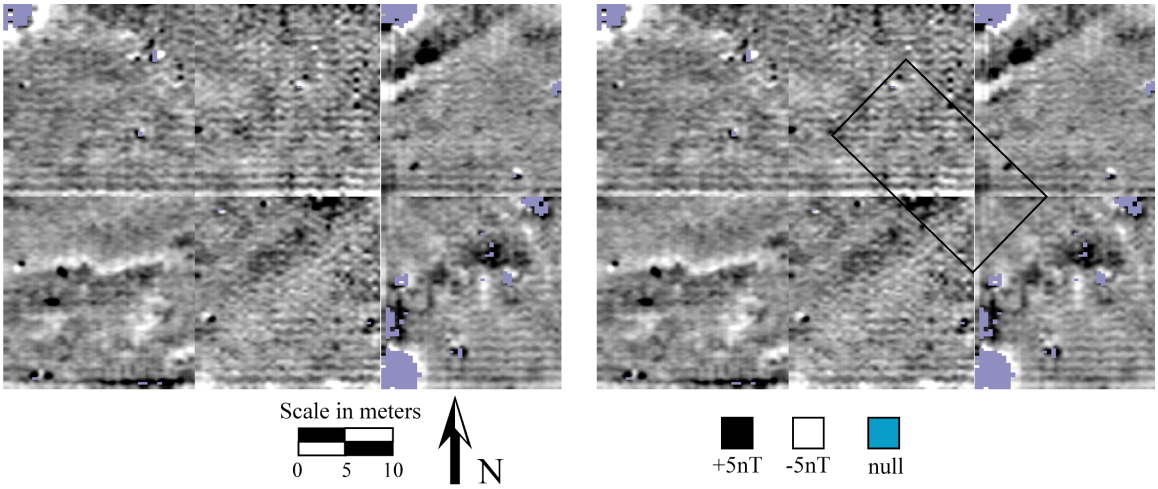


**Figure 8.11: Remote-sensing imagery from Grids 1, 2, 7, 8, 14, and 15, 34Hs224 indicating possible habitation anomalies, right is raw image left has possible structure indicated.**

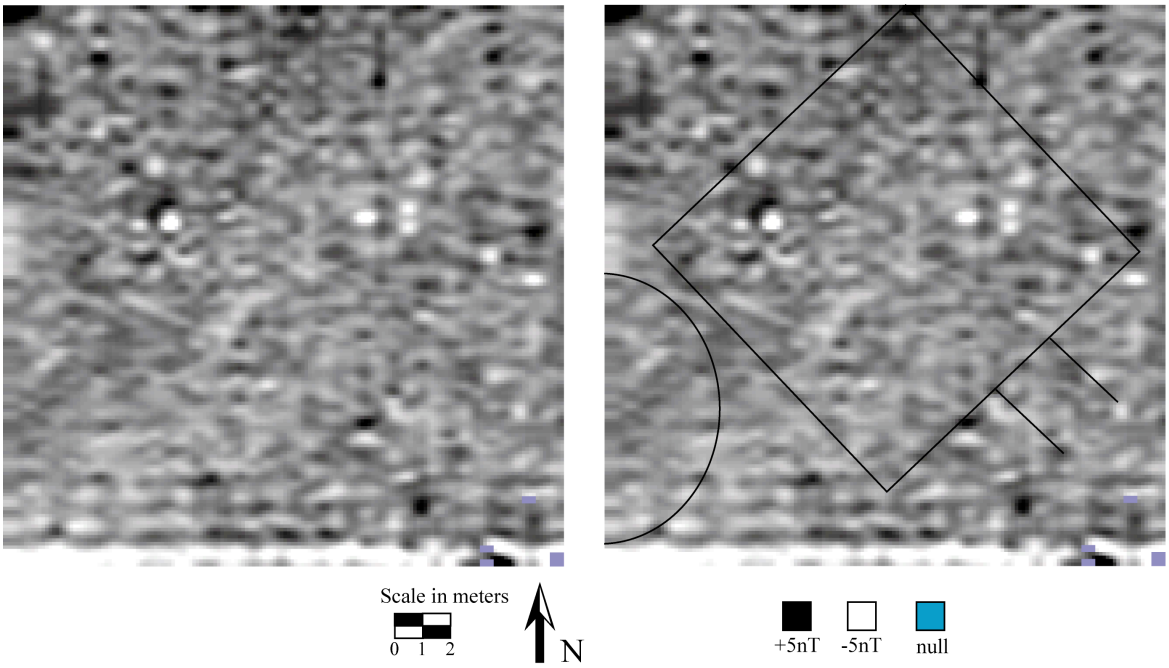


**Figure 8.12: Remote sensing imagery form Grid 13, 34Hs224, right is the raw image, left has anomalies indicated.**

**Fourche Maline Settlement Patterns**

Schambach (2002) describes Fourche Maline site-level settlement patterns as small villages .8 to 2 hectares with the associated deep midden mound, but again, it is unclear how he came up with these figures as no definitive Fourche Maline house or village had been identified at the sites he studied. Another problem is many researchers use the term village to mean different things. Chang (1972) defines village as a semi-permanent sedentary settlement pattern. Johnson and Earle (1987) describe villages as a semi to fully sedentary group of people with a population between 100 and 200 people (300 to 500 in more complex "Big Man" villages).

At the present time information on the Fourche Maline settlement structure is just beginning to be identified. More research and testing is needed to determine what pattern these settlements represent (base camps, hamlets, villages etc.). The research conducted here indicates the presence for off-mound habitation for the Foruche Maline people, and it provides information for addressing the degree of sedentism present during the Woodland Period.

**Evidence of Sedentism During Fourche Maline Times**

Sedentism, here defined as year round occupation of a site by at least part of the population, can be addressed using information on the site structure. Site structure is the size of the site, and the arrangement of activity areas and features (Kent 1991). Two lines of evidence are examined for the level of sedentism practiced by Fourche Maline people. These are the substantialness of the structures and the evidence for storage, both of which are related to the anticipated occupation duration (Kent 1991; Smith 2003; Soffer 1989).

The potential house at 34Lt11 is large (able to house a family group about 11 people). The presence of a compacted living floor and postmolds combined with the abseence of daub suggest the houses may have been similar to the grass houses used by the Caddo people at contact. The Caddoan-speaking people on the Southern Plains/Eastern Woodlands were using large substantial houses when encountered by Europeans, some even having a second-story loft. Joutel (1968:108) describes the *Cenis* (Hasinai) houses as: "round at the top, after the manner of a bee-hive, or a reek of hay. Some of them are sixty feet diameter." These substantial structures suggest that the anticipated occupation duration was long, or the people were intending to reuse the site in the near future (Kent 1991, Smith 2003). Kent (1991) stated that substantial house construction indicates longer term anticipated occupation. Smith (2003) reiterated this argument stating that energy expendature on construction is associated with anticiapted duration or expectations of repeted use.

The presence of  possible rectilinear houses identified at the sites north of the Sans Bois Mountains is interesting. These houses bracket the 113 $m^2$ house at 34Lt11 (between 75 and 240 $m^2$). There is also a possible 10 m circular structure identified at Sam Spears. These are very close to the size range for the houses at 34Lt11. It is not clear how many possible houses are at these sites and if these anomalies are truly houses as they have not been even partially exposed. Agian, these possible structures suggest a high rate of energy expendature indicating a long term anticipated occupation.

Two additional lines of evidence for increased sedentism associated with the houses are the evidence for cleaning and trash removal and the density and diversity of artifacts (Smith 2003). The fact that the potential house patten identified at 34Lt11 has a low dentsity of artifacts (25 flakes and one point) suggest the house was cleaned out after use. The cleaned out house and the presence of the midden mound, with a dense and diverse artifact assemblage, support the proposal that Fourche Maline people were practicing a sedentary lifestyle.

One of the key factors in identifying and substantiating sedentism is the presence of storage (Kent 1991; Smith 2003; Soffer 1989). Soffer (1989) noted there is a diachotomy between storage and sedentism. She said some cultures have storage technology and are sedentary (Natufians and Jamon), while others are seasonally mobile (East Russia). The nature of the food available for storage limits its use as a stored product (basically what is its the shelf life?) (Smith 2003; Soffer 1989). Smith (2003) identified several facilities used for storage: pits, cribs, graineries, rooms and bins.

The 2009-2010 field work did not find evidence for storage pits, however, Fourche Maline material culture included large potts, and indirect evidence for basketry both of which would work as storage facilities. *Williams Plain* pots can reach close to 13,000 cc (13 L) and would make good storage containers. Leith (2006) stated that *Williams Plain* pots would have been used for stone boiling and there is charred residue on pottery sherds from several black-midden sites. The fact that some of the pots were used for cooking does not mean they cold not have been used for storage. The presence of *Willaims Plain* sherds with parch holes (holes drilled into the vessel to allow cordage to stabilize cracks)

supports the argument for storage. Cracked vessels with holes in them would not function well as cooking vessels but would function as storage vessels. The pottery from the Fourche Maline culture also provides indirect evidence for basketry which could also have been used for storage.

Storage is predicated on the presence of a storable resource and sedentism is tied to the shelf life of the stored product (Smith 2003; Soffer 1989). Fourche Maline people are making intensive use of hickory nuts (*Carya* sp.). Soffer (1989:728) stated that nuts and accorns have a longer shelf life than dried meat. The high density of hickory nut shell in the black-middens (Galm 1978a, Galm and Flynn 1978) suggests the bulk processing of nuts which would require storage of the surplus. Smith (2003) stated that above ground storage, such as the pots suggested here, are associated with longer term occupations.

The possible house patterns, the presence of large middens with dense and diverse artifact assemblages, the exploitation of hickory nuts, and the presence of possible storage facilities (pots and baskets) all suggest that Fourche Maline people were living relative sedentary lives. Galm (1984) argued that Foruche Maline people were at least semi-sedentary (fall-winter occuaptions). I agree with Galm and propose that the Wister and Fourche Maline people were intermittently living at these sites seasonally to year round and were reusing the sites numerous times from 3,500 to 1,500 years ago. This begs the question: Why did these people settle down?

**Why Settle Down?**

Researchers such as Kuijt (2000) focus on population pressure as a major factor in reducing residential mobility. Kuijt (2000) focuses on how the increasing population of the

Near East Pre-Pottery Neolithic led to territorial circumscription, which reduced the frequency of residential moves. This circumscription could lead to scalar stress as recognized by Johnson (1981), which would need to be mitigated with integrative facilities. This was necessary because as the environment became more "packed" with people, they were less able to use fissioning as a conflict-resolution tactic because there was no place to go (Johnson 1981).

I propose that increasing sedentism identified during eastern Oklahoma's Woodland Period is tied to the transition from the hunting and gathering life-ways of the Late Archaic to the agricultural economy of the Mississippian Period. Fourche Maline culture falls between these two different life-ways and thus represents the transitional period. This change is also likely tied to increasing population, compaction and scalar stress (Johnson 1981, Kuijt 2000). Powell and Rogers (1980) find that the Fourche Maline people were healthy overall with the most common cause of death being violent trauma. This increase in violence is associated with the Woodland Period because the mass grave at 34Lt11 extends from the uppermost, Woodland deposits. The estimate of the population for the drainage as seen in Chapter 5 yields a population density of 2.6 people per $km^2$. This density of people is the threshold at which Johnson and Earle (1987) identify increasing warfare and population compaction.

**Summary**

The remote sensing results suggest that the Fourche Maline people were living in small settlements located near the midden mounds. Further, it suggests that the habitation and domestic activity areas were located in areas adjacent to the midden mounds. The

evidence for sedentism further support the hypothesis that Fourche Maline people were transegalitarian complex hunter-gatherer-horticulturalists. With the understanding that the traits commonly associated with the emergence of inequality and complexity vary independently, Clark and Blake (1994) suggest that the process associated with the emergence of ranked societies (in Mexico) are: 1) a shift from residentially mobile to sedentary habitation, 2) an increased emphasis on food production, 3) the development or adoption of pottery technology, 4) rapid population growth, and 5) the beginning of craft specialization. Clark and Blake point out that these changes are ties to prestige competition.

Hayden (2001) also stated that complex hunter-gatherers (the first transegalitarian societies) are identified by increased population, sedentism, creation of prestige items, socioeconomic hierarchies, ownership and intensification of resources, and more intensive warfare and competitive feasting. As stated earlier these traits vary independently, but it is interesting to note that Fourche Maline society shares many of these traits identified in transegalitarian complex hunter-gatherers (and horticulturalists). I maintain that the settlement pattern identified with the remote sensing further supports the hypothesis that Fourche Maline people were transegalitarian complex hunter-gatherer-horticulturalists. I contend that the origin of settled life in Fourche Maine society is likely tied to increasing population, and scalar stress as a result of increasing sedentism and the shift to horticulture. As stated before the shift in subsistence and increasing sedentism may be tied to competition between aggrandizers. The high rate of traumatic death may indicate

territorial circumscription and population pressure as proposed by Kuijt (2000), as well as Johnson's (1981) scalar stress, further influencing the decision to settle down.

# Chapter 9: Fourche Maline Territoriality

Clark and Blake (1994) and Hayden (2001) suggest that transegalitarian societies are often associated with increasing populations and sedentism. Increasing populations and sedentism tend to lead to the development of territories. I have recently suggested that two groups of Fourche Maline people can be identified archaeologically based on lithic raw-material preferences (Leith 2009). This is not to say these groups were identifying themselves by the lithic raw material, but that archaeologists can identify the groups by their lithic raw material preference.

The raw material preferences suggest the presence of two non-overlapping territories with the Sans Bois Mountains acting as a buffer. One group is north of the Sans Bois Mountains. These people primarily procured cherts and siltstones from the Ozark Plateau. The other group used diverse chert and quartzite raw materials obtained from the Ouachita Mountains. The relationship between these groups appears not to have been positive, as there is evidence of raiding between these groups. Information supporting this argument is the fact that the points imbedded in the individuals from the mass grave at 34Lt11 are all made from Ozark materials (Powell and Rogers 1980).

I propose that there are two groups of Fourche Maline people occupying two non-overlapping territories, which can be identified archaeologically by lithic raw material preferences. Further, I propose the midden mounds of the Fourche Maline culture represent conspicuous territorial markers using the ancestors to legitimize land claims. To test the first hypothesis raw material preferences for the chipped-stone assemblage from six sites were identified using the lithic comparative collection housed at the SNOMNH.

Three of the chosen sites (34Hs75, 34Hs81, 34Hs111) were north of the Sans Bois Mountains and the remainder (34Lf11, 34Lf24, 34Lt11) are from south of the mountains (Figure 9.1). To address the proposition that the midden mounds were used as territorial markers I reviewed that size and location of the midden mounds as well as the reasons for constructing the mounds.

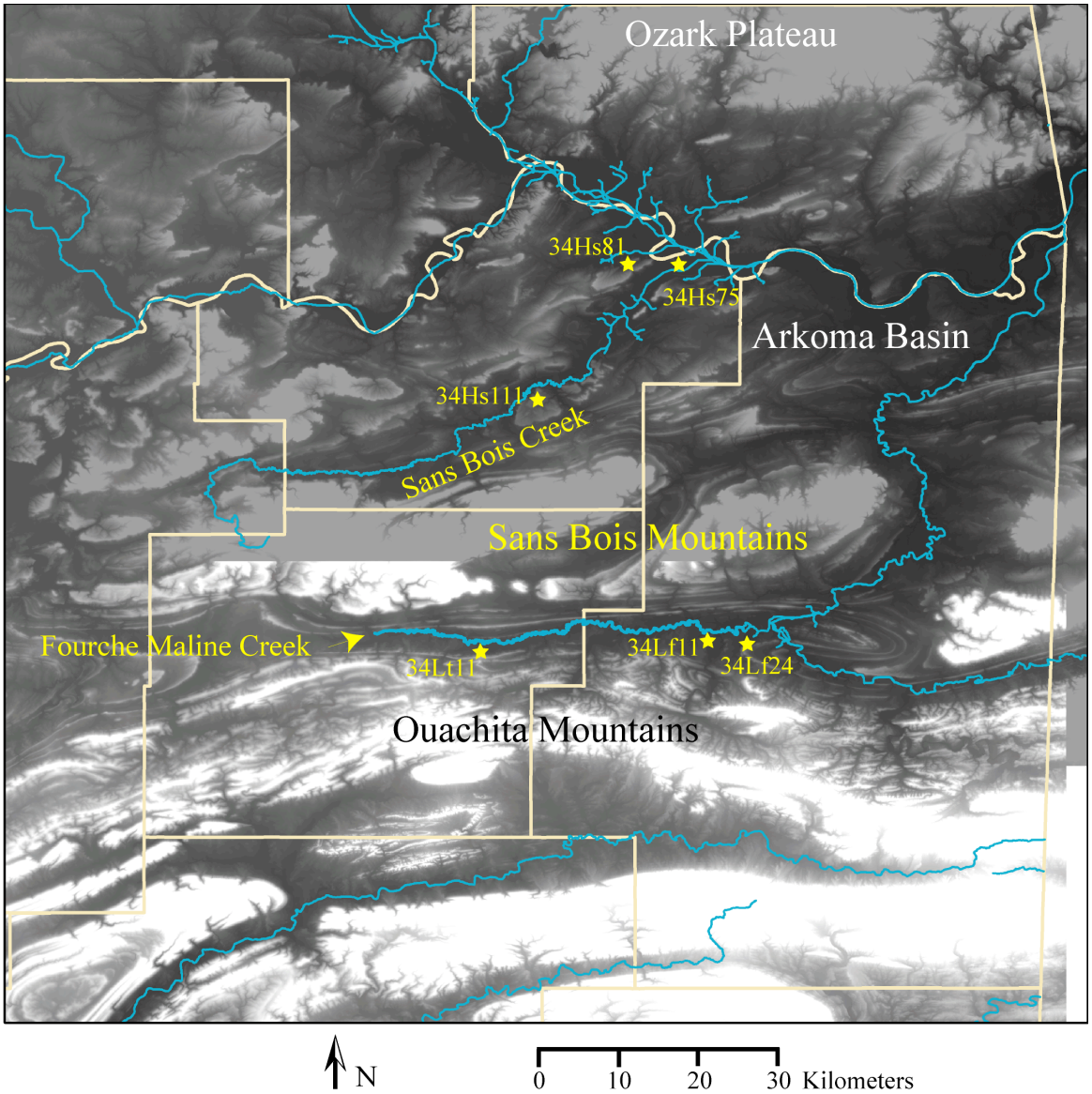


**Figure 9.1: Map showing the location of the sites analyzed in the lithic raw material study.**

**Evidence of Fourche Maline Territoriality**

Lithic raw material preferences from six sites were examined for evidence of territoriality. Initial research (Leith 2006, 2009) suggested the possibility of identifying two Fourche Maline groups based on raw material preferences. There are two major raw material sources in eastern Oklahoma, the Ozark Plateau and the Ouachita Mountains (Figure 9.2). These two source regions provide distinct cherts, as well as silicified siltstones and sandstones.

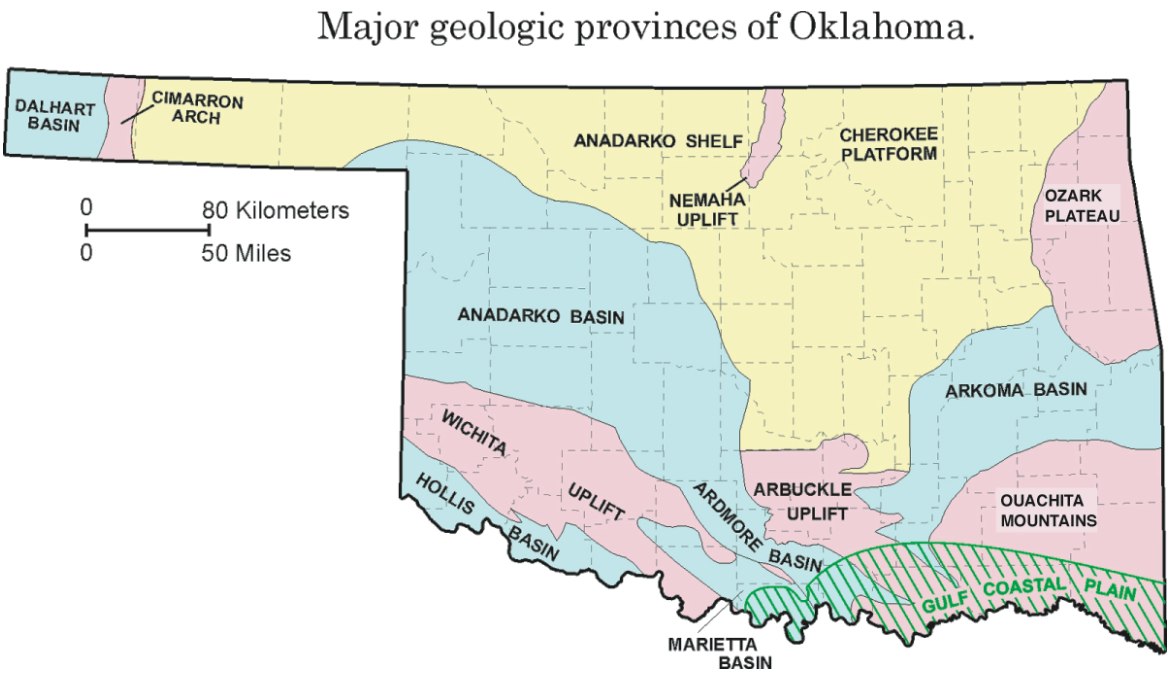


**Figure 9.2: Geologic map of Oklahoma identifying the Ozark and Ouachita source areas (modified from Northcutt and Campbell 1995).**

The lithic raw materials from the Ozark Plateau and Ouachita Mountains were primarily identified based on color and texture using the lithic type collection housed at SNOMNH. Ozark chert materials range from nearly pure white (Gley 1 1/N) to a mottled white and grey, light greenish grey (Gley 1 7/10Y) to a blue-grey (Gley 2 5/5B). The Ouachita chert materials are generally darker though the Novaculite ranges from white (Gley 1 8/N) to a mottled greenish grey (Gley 1 5/5GY). Other Ouachita material range

from pale green (Gley 1 8/5G) to dark grey (10YR 4/1), with some nearing black (10YR 2/1). The colors correspond to Munsell® soil color charts designations.

In addition to the cherts, several other kinds of knappable stone occur in each of these regions (Table 9.1). It should be noted that siderite, argillite and sandstone are available in both regions and when present in an assemblage from north or south of the Sans Bois Mountains they were considered locally available (i.e. from the local source region). Also, the presence of the Flint Hills and Southern High Plains materials are likely available as gravel clasts in the Arkansas River Valley and can be considered local raw material for the sites north of the Sans Bois Mountains.

**Table 9.1: Lithic raw material and corresponding source regions**

| Raw Material | Source Region |
|---|---|
| Boone Chert | Ozark Plateau |
| Keokuk Chert | Ozark Plateau |
| Reeds Spring Chert | Ozark Plateau |
| Cotter Dolomite | Ozark Plateau |
| Siderite | Ozark Plateau |
| Argillite | Ozark Plateau |
| Sandstone | Ozark Plateau |
| Johns Valley Chert | Ouachita Mountains |
| Johns Valley Silicified Sandstone | Ouachita Mountains |
| Woodford Chert | Ouachita Mountains |
| Novaculite (Arkansas and Potato Hills) | Ouachita Mountains |
| Siderite | Ouachita Mountains |
| Argillite | Ouachita Mountains |
| Sandstone | Ouachita Mountains |
| Red River Jasper | Ouachita Mountains |
| Florence Chert | Flint Hills |
| Alibates Dolomite | Southern High Plains |
| Ogallala Quartzite | Southern High Plains |

## Results

The chipped stone tools and debris examined here indicate a strong preference for local raw materials. At all the sites except one (34Hs75) the local preference is close to 90% (Table 9.2). Site 34Hs75 still manifests very strong preference for local materials

with 75% of the assemblage from the Ozark Plateau. There is evidence of excursions and interaction between the two groups as seen in the presence (at relatively low frequency) of toolstone from the other regions.

**Table 9.2: Raw material preferences by region (n= count)**

| Site | Ouachita | Ozark | Other | Unid | n= |
|---|---|---|---|---|---|
| 34Lf11 | 88% | 12% | 0 | 0 | 43 |
| 34Lf24 | 91% | 9% | 0 | <1% | 749 |
| 34Lt11 | 99% | 1% | <1% | <1% | 36004 |
| 34Hs75 | 11% | 74% | 2% | 13% | 510 |
| 34Hs81 | 6% | 94% | <1% | 0 | 284 |
| 34Hs111 | 7% | 90% | 1% | 2% | 1039 |

**Discussion**

The raw material preferences seen in my research echo Ballenger's (2001) findings for the Late Paleoindian Dalton culture of eastern Oklahoma. Ballenger (2001) argued that there are two Dalton macrobands in eastern Oklahoma, one inhabiting the Ozark Plateau and one inhabiting the Ouachita Mountains with both macrobands using the Arkoma Basin as a buffer zone. Ballenger's data set was 324 points from three different surface collections. The sites associated with the collections are in the Arkoma Basin (buffer zone) where he suggested they were fall aggregations renewing social ties (Ballenger 2001). The raw material percentages for three surface collections were: 70:30, 65:34, and 88:12 (Ozark-Ouachita). He argued that these sites were locations of aggregations between Ozark and Ouachita groups with the percentages representing the rough size (or occupation duration) for each group.

The fact that the Fourche Maline sites north of the Sans Bois Mountains have such high percentages of Ozark materials and the sites south of the Sans Bois Mountain have such high percentages of Ouachita materials, as well as the presence of habitation sites in

these areas indicate they the were not areas of aggregation but rather occupations by separate groups of Fourche Maline people. I contend that there are two groups of Fourche Maline people divided by the Sans Bois Mountains as a rough social boundary. This does not prohibit the possibility of several bands inhabiting these two regions, only that based on raw material preference two general groups can be identified. Residents of the sites north of the Sans Bois are frequenting both the former Dalton Arkoma Basin buffer zone north of the Sans Bois Mountains and the Ozark Plateau. The occurrence of small percentages of Ozark and Ouachita raw materials outside their respective groups may indicate there was some non violent interaction between them. However, recently boulders of Ozark material have been found in the Ouachita Mountains suggesting that the small percentage of Ozark material south of the Sans Bois Mountains could have been locally derived.

As noted earlier there is evidence that the interactions were not always a positive experience. Besides the raw material preferences, evidence of conflict exists between the two groups. Several mass graves are known from the W.P.A. excavated black-midden sites as well as the large mass grave at 34Lt11 (Powell and Rogers 1980). The mass grave at 34Lt11 has points imbedded in bones of several individuals as well as points that would have been in the abdominal area (Figures 9.3 and 9.4). All of these projectiles have been examined and identified as Ozark Plateau material (Boone Chert) (Powell and Rogers 1980). Many of the other mass graves have points associated with them (including some imbedded in the bone) (see Figure 9.4). Recent work has not affirmed these points as Ozark Plateau materials but descriptions of the points suggest an Ozark affiliation. The

lack of raw material identification is tied to the lack of research on these sites. However, research is currently underway that will answer these questions.

The subsistence data suggests that the Fourche Maline people were transitioning from a hunting and gathering to a farming life-way. The subsistence data as well as the evidence for conflict suggest that Fourche Maline people were also developing territories. The raw material preferences identified here provide a glimpse into the development of Woodland Period territories. These raw material preferences, when viewed together with the subsistence, bioarchaeology, social organization and settlement patterns indicate the importance of defined territories for transegalitarian complex hunter-gatherer-horticulturalists. This brings up the question: If there are established territories are they marked and if so how? I propose the Fourche Maline people are using the midden mounds as territorial markers and that their ancestors are legitimizing land claims.


**Figure 9.3: Photo of mass grave (Burial 6) from 34Lt11 (Photo courtesy of Sam Noble Oklahoma Museum of Natural History).**

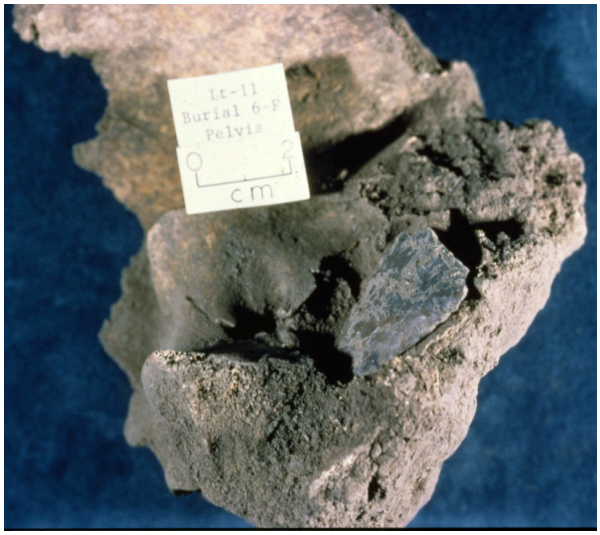


**Figure 9.4: Photo of pelvis with an imbedded projectile from Burial 6, 34Lt11 (Photo courtesy of Sam Noble Oklahoma Museum of Natural History).**

## Mortuary studies

Very little research has been directed towards the question of why Fourche Maline people were burying their ancestors in the manner that they did. As mentioned in Chapter 5, Rogers (Powell and Rogers 1980) analyzed the mortuary program at 34Lt11 in an attempt to address questions of social organization. This is one of the only times research has been conducted on Fourche Maline mortuary patterns. Rogers made a promising first effort, but still did not address why the dead were placed in the mounds (Powell and Rogers 1980). I present four related propositions to explain the mortuary practices of the Fourche Maline people.

1) Archaeologists view the Fourche Maline midden mounds as trash accumulations, but the Fourche Maline people's view of refuse was not the same as our modern western ideas on refuse.

2) The Fourche Maline midden-mounds were "houses of the dead."

3) Fourche Maline mortuary practices were a means of ancestor veneration.

4) Fourche Maline people were using their ancestors and the midden mounds as a means of legitimizing and marking territories.

**Fourche Maline View of the Midden Mound**

The first proposition is not easily addressed, as it is impossible to ask a Fourche Maline person what their view of the midden mound was. As archaeologists we identify middens as trash deposits. The presence of human burials in these mounds indicate this was not likely how the Fourche Maline people considered the mounds. The middens are places where burial of the deceased is relatively easy due to soft soil (Powell and Rogers 1980:56). The continued reuse of these locations ties that spot to the ancestors which provides legitimization of ownership rights (see Saxe 1970:119).

Burnett (1990) argued that the Wister Phase burials (at Bug Hill, 34Pu116 at least) were unproductive members of society. She noted that a majority of the burials are children and the adults present are handicapped by disease (Burnett 1990). She goes on to argue that these burials are "only a part of an elaborate mortuary program that distinguishes by status" (Burnett 1990:198).

There are several problems with her argument. First, Bug Hill was not completely excavated and the site's demography could easily be attributed to sampling bias. Second, if Bug Hill was the only Fourche Maline site identified the argument would be supported, but there are close to 100 recorded Fourche Maline Phase (black-midden) sites (with several in the Kiamichi drainage). A total of five of the black-midden sites have had some level of bioarchaeology performed on them. The bioarchaeological data indicate that individuals of all ages and sexes were buried in the middens (acknowledging that these populations may not be representative). Third, there has been off-mound exploration

including 16,400 $m^2$ of geophysical remote sensing at the McCutchan-McLaughlin site of which there were no indications of off-mound cemetery deposits.

The only off-mound burials that are considered Fourche Maline are the two burials associated with the large house identified at the Poole site (3Ga3) in Arkansas (Wood 1981). These two individuals have grave goods consistent with Fourche Maline material culture (Williams Plain pottery, double bit axe/hoe, contracting stem points, etc.) (Wood 1981). This house was a large (8.5x30 m) rectilinear structure and until the present study was the only Fourche Maline building identified. It is unclear whether this house and burial pattern is typical or an anomaly.

The evidence for a different concept of the midden mounds by the Fourche Maline people is more substantial. First, humans are buried in every one of the black-midden mounds. These burials include young and old, male and female individuals. Along with the human burials there are grave offerings (albeit rare), which include material remains such as points, pottery, beads/pendants etc. as well as occasional dog (*Canis lupus familiaris*) burials. There is no evidence of butchering marks on the dogs and the complete nature of several of these burials indicates they were placed there with care. If Fourche Maline people identified the mounds as midden deposits (trash) they would likely not have interred their ancestors in these mounds. Rather, the relative ease of burying individuals in the midden mounds due to the softer soil would lead to these locations being important places for the Fourche Maline people. I contend that the presence of burials generally flexed, with some occasional grave goods (including dog burials) indicate that the Fourche

Maline viewed these deposits as something other than trash. This raises the question: What was the Fourche Maline people's concept of the midden mounds?

**Midden Mounds as Houses of the Dead**

I propose that the black-midden mounds were houses of the dead. Early researchers believed the Fourche Maline people were living on the mounds (see Bell 1953; Bell and Baerreis 1951; Galm 1984). Excavations in these middens identified some random post molds, layers defined as living surfaces, and ash deposits. As mentioned in the bioarchaeology chapter, living in close proximity to areas of refuse disposal such as middens usually leads to increases in infectious disease (Milner 1982), and the health status of the Fourche Maline people indicate off-mound habitation. Also, the remote sensing and testing at 34Lt11 identified a likely domestic structure located approximately 60 m from the midden mound.

The identification of post molds and compacted "floors" may correlate to a possible charnel facility of some kind. The ash deposits identified in these mounds may even be related to cremations. Many of the W.P.A. excavations were conducted by individuals with little to no background in archaeology, and it would be very easy to misidentify cremations (especially ones with few remaining bones) as simple ash deposits. Cremations are not unheard of; Vehik (1982a) identified a cremation at Bug Hill. Proctor (1957) also notes three cremations at the Sam site as well as post-mold patterns identified as two houses. The houses identified at the Sam site may represent the houses of important members of the society (possibly heads of certain kin groups or lineages) that were subsequently buried and that location became the charnel facility.

**Evidence of Ancestor Veneration in the Fourche Maline Culture**

Schambach, a key researcher of the Fourche Maline people in Arkansas, argues for a concept of honored dead in the Fourche Maline culture (Schambach 1982). He states that early on the Fourche Maline people used a mortuary custom in which all members of society rated a cremation (Schambach 1982). He further notes that later the cremation program was commandeered by an emerging elite, with the remainder of the society buried in the midden mounds (Schambach 1982). Ancestor veneration is recognized in the small mounds capping former charnel facilities, which Schambach (1982) equates to Adena-Hopewell.

These small mounds appear to be an Arkansas manifestation of the Fourche Maline culture. They likely represent a different group of the ancestral Caddoan people that became the one of the ethnographic Caddoan societies. In Oklahoma's Arkoma Basin the only analogue resembling these small mounds is Unit 3 at the Harlan site (34Ck6). Bell (1972) notes the materials associated with this mound are *Williams Plain* pottery, *Gary* and *Scallorn* points. These artifacts as well as the radiocarbon dates of A.D. 670 to 700 support this mound's temporal alignment with the Fourche Maline people.

I argue that the midden burials represent ancestral veneration that is linked to the emergence of territorialism. As discussed in Chapter 5 approximately one third of the Fourche Maline burials in the Wister Valley have grave goods. These grave goods do not indicate large differences in status or wealth, but the placement of grave goods with the ancestors does indicate some respect for and I suggest veneration of the deceased.

The burial of the dead in midden mounds is a cultural pattern seen at all Oklahoma black-midden sites. These midden-mounds are large, many close to 150 ft (46 m) in diameter and can be over 2 m deep in the center, and they contain numerous burials (Bell 1953; Bell and Baerreis 1951; Bruseth 1998; Galm 1978a, 1978b, 1984; Galm and Flynn 1978; Wyckoff 1976; Wyckoff and Woody 1977). The presence of grave goods in some, but not all graves is consistent with transegalitarian burial practices, indicating the possibility of emerging social inequality.

The midden-mound burial practice may have been a way to keep the ancestors close to the living. Evidence from recent remote sensing (Figure 9.5) suggest that the mound is the center of the community with houses in an arc around the midden mound. The houses are located some 60 m from the midden mound with what appears to be an open between them and the midden. The location of the midden mound and associated ancestors in the center of the community indicates their importance.

Though there is no evidence of non-mound burials associated with Oklahoma Fourche Maline, in Arkansas there is further evidence exists of ancestor veneration. This can be seen in the two Fourche Maline burials associated with the "long house" at the Poole site (Wood 1981). One of these burials is just outside the house, and the other was buried under the house floor (Wood 1981). These burials could represent founding ancestors for a village/household/lineage or possibly sacrifices associated with building the structure. Because little excavation off the mounds, it is difficult to say whether these burials are an anomaly or the norm.

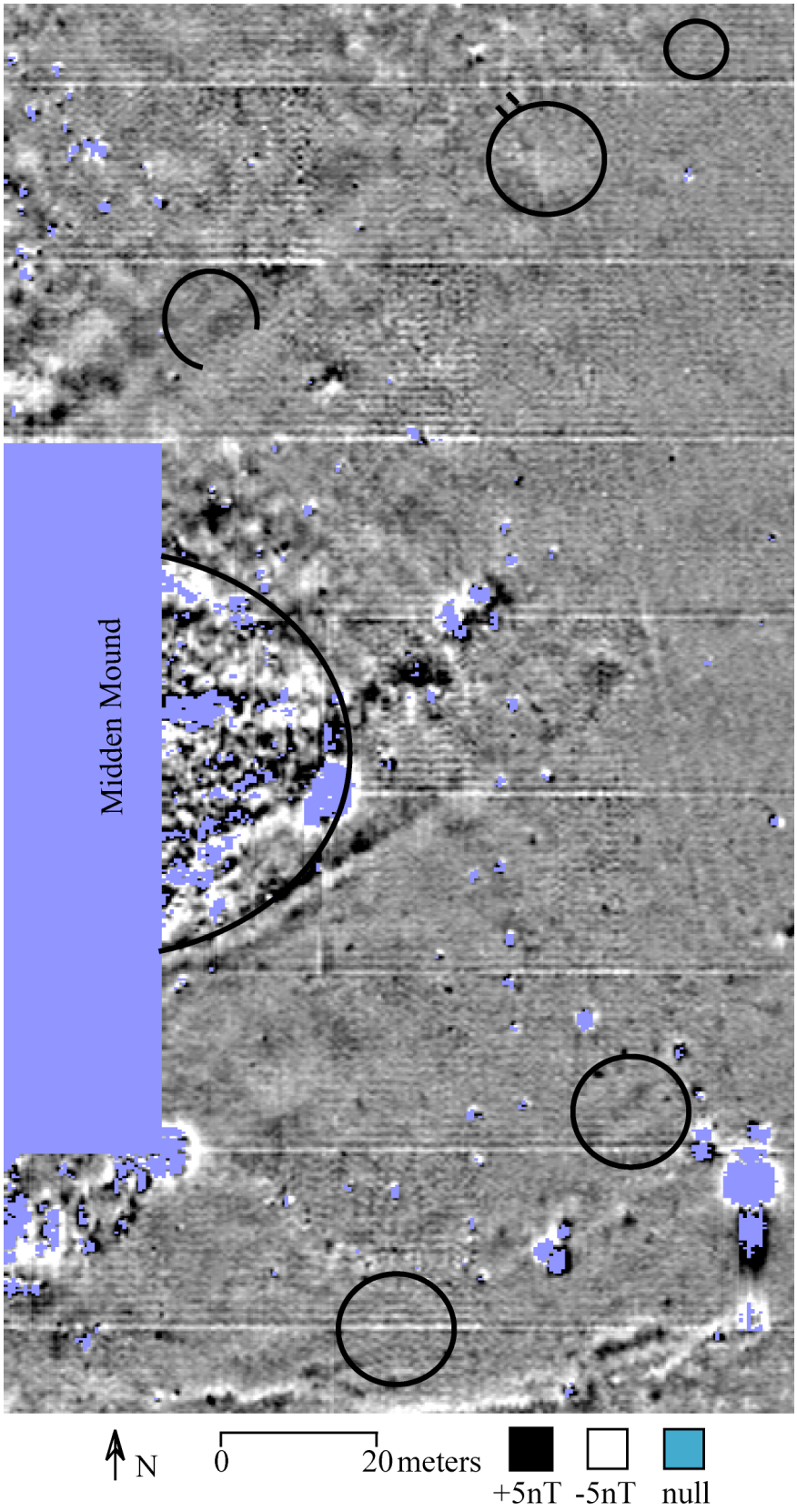


**Figure 9.5: Remote-sensing imagery of 34Lt11 showing the location of the midden mound and probable structures.**

The presence of possible secondary burials (bundles) and cremations (Schambach 1982) may represent a situation similar to the Merina where groups return to their home territory to bury their dead (Bloch 1968). Bloch's study examines the importance of tombs. These tombs were the traditional cornerstone of Merina kinship and territorial groupings (Bloch 1968). With expansion in the late pre-contact and into the post-contact/ colonial times the Merina experienced population and territorial expansion. However, the ties to the ancestral village remained strong (Bloch 1968).

Where the ancestor lived was more important than where the Merina "colonist" lived. This was due to the politics of the past in which certain ancestral villages were politically stronger, thus determining the rank of the person in modern times (Bloch 1968). One way this was maintained was by the construction and maintenance of large tombs. Each Merina would choose either the tomb of their mother, father or sometimes his/her spouse (Bloch 1968). This choice is governed by economic and political factors, and led to a form of ancestor veneration where the ancestors were tied to the traditional territory and were a means of legitimatizing the political relations of the living (Bloch 1968). If there is a concept of honored dead as suggested in this research as well as by Schambach (1982) for the Fourche Maline people, why were these people practicing this type of burial rite? The ancestors probably legitimatized control over territories.

**Evidence of Territoriality**

Mantha (2009) researches the development of ancestor veneration among the Late Intermediate Period people of the Rapayán Valley in the Central Andes of Peru. She follows Hyslop (1977) in arguing that burial architecture was used by family units as land

markers to access territorial possession (Mantha 2009). Mantha (2009) argues there is a link between mortuary architecture, ancestor worship and territoriality. The use of ancestors as a mechanism for marking and claiming territory fits well with Saxe's (1970) Hypothesis 8. Saxe's Hypothesis 8 stated "To the degree that corporate group rights to use and/or control crucial but restricted resources are attained and/or legitimized by means of lineal decent from the dead (i.e. lineal ties to ancestors), such groups will maintain formal disposal areas for the exclusive disposal of their dead, and conversely" (Saxe 1970:119).

Mantha (2009) states that mortuary architecture housed collections of venerated ancestors. These monuments were mechanisms of social control through space and served as the basis of territorial rights (Mantha 2009). Mantha (2009) argues that the mortuary architecture allowed household members/kin groups to draw social boundaries between insiders and outsiders, which strengthened identity and solidarity.

Glazier's (1984) study of the mortuary rituals of the Mbeere yields insightful information on the development of ancestor veneration. The Mbeere were traditionally a mobile hunting and gathering people. Before the establishment of a French colonial government the Mbeere disposed of corpses in the bush with little ceremony (Glazier 1984). They traditionally considered the spirits of the deceased as malevolent toward the living and as such were best appeased and avoided (Glazier 1984). With colonization an important shift occurred in the disposal of the dead as well as the use of the ancestors. Land became restricted with the coming of the French colonial government. The people were organized into defined territories for which ownership was justified by claims of ancestry in that area (Glazier 1984). The need to legitimize claims to ancestral land lead to

a view of ancestors having some positive benefit for the living people and veneration of the ancestors (Glazier 1984).

The long period that the Fourche Maline culture encompasses provides evidence for both change and continuity. This period, especially the later intervals, was likely a turbulent time. Earlier I estimated the population density for the Fourche Maline drainage to be 2.6 people/km$^2$, which is at the threshold for increasing conflict due to scalar stress. This conflict is supported by the mass burials at many of the Fourche Maine sites.

There are Fourche Maline people living north of the Sans Bois Mountains. Picarella (1999) argued that the black-midden sites along drainages in the Arkoma Basin north of the Sans Bois Mountains were a late Fourche Maline migration north. Recent dating suggests that Wister Phase people were there as early as the Late Archaic. Picarella (1999) proposed that it was the Fourche Maline people north of the Sans Bois Mountains who were to become the Spiroan peoples. Evidence for the Fourche Maline-Spiro connection is evidenced by material culture ties. Also there was a black-midden north of Craig Mound and a Fourche Maline burial including a Poole pipe (a pipe associated with Fourche Maline people in the Red River drainage) under Craig Mound at the Spiro site (Don Wyckoff personal communication 2010).

An increasing population and a corresponding decrease in land is a major cause of scalar stress as discussed by Johnson (1981). This rise in scalar stress generally reaches a critical point where interpersonal conflict is inevitable (Johnson 1981). Evidence of scalar stress in the Fourche Maline culture is presented in Powell and Rogers (1980) bioarchaeological analysis of the McCutchan-McLaughlin site (34Lt11). At the

McCutchan-McLaughlin site a mass grave was uncovered. This burial consists of nine individuals with spear points imbedded in the remains (many in the abdominal/pelvic region). Powell and Rogers (1980) conclude that the most common cause of death was violence at McCutchan-McLaughlin. This mass grave is not an anomaly associated with only 34Lt11. Many of the black-midden sites contain mass graves with points that appear to be tied to violence (Rowe personal communication 2011).

It is noteworthy that the points imbedded in the bone are "text book" Fourche Maline biface styles made of Ozark Plateau material (Powell and Rogers 1980). In my analysis of the McCutchan-McLaughlin site (Leith 2006), I determined that the McCutchan-McLaughlin people were using 90+% local Ouachita Mountains material (Leith 2006). Recent investigations at the Thorny Channel site (34Hs111) in the Sans Bois drainage indicate that these people from were using 90+% local Ozark material (Leith 2009). One might infer from these results that the individuals responsible for the killings at McCutchan-McLaughlin were likely Fourche Maline residents from the Arkoma Basin.

Theler and Boszhardt (2000) present a similar prehistoric example, which closely mirrors Saxe's Hypothesis 8. They examine the of the end of Effigy Mound culture in the upper Midwest. These researchers argue that increasing population density lead to increasing sedentism as the landscape became filled with people (Theler and Boszhardt 2000). This increased sedentism, as well as the adoption of the bow and arrow, led to competition for resources and increased territoriality marked by effigy mounds. These effigy mounds generally have one to four burials located in them with few or unimpressive grave goods (Theler and Boszhardt 2000). Theler and Boszhardt (2000:292) state that

these mounds are “cemeteries that hold the remains of the dead, designated ritual space, and… served to mark social and economic territories.”

In sum we can conceptualize that Fourche Maline people were using the midden-mound burials as territorial markers and that they were using their ancestors as a means of legitimizing this claim. These earthen markers were large, thus able to accommodate numerous generations of ancestors. The midden mounds would have been highly visible as most were over 30 m in diameter with a hight in the center that sometimes exceeded two meters. The mounds were located near creeks/rivers, which were important transportation corridors for prehistoric peoples. Chapter 8 suggests that Fourche Maline people are becoming increasingly sedentary and have a possible population density of 2.6 people/km$^2$. The mass burials at 34Lt11, 34Lf32, and 34Lf33 suggest that there is increasing conflict during the Woodland Period. I have proposed in earlier chapters that this conflict is due to scalar stress.

**Summary**

The evidence presented here suggests that there were at least two non-overlapping territories occupied by Fourche Maline people. Evidence of these territories are the overwhelming preference for local lithic raw material. Following Mantha (2009) I contend that the midden mounds were the Fourche Maline burial architecture that the Fourche Maline people were marking their territories with the midden mounds, and were using their ancestors to legitimize land claims and to strengthen group identity and solidarity. Following Glazier (1984) I propose that the use of ancestors to legitimize land claims increased their value to the living population further expanding the concept of honored

dead and ancestor veneration. The need to mark territories has been tied to increasing population, increasing sedentism, and circumscription. Transegalitarian societies are generally associated with increasing population and sedentism,because it allow for larger work parties to produce more surplus thus, allowing increased prestige competition.

# Chapter 10: New Conceptualization of Fourche Maline Culture

In order to address the question: What is Fourche Maline? I proposed the hypothesis that Fourche Maline people were transegalitarian complex hunter-gatherer-horticulturalists. In addition I proposed three subsidiary hypotheses: 1) Fourche Maline culture encompassed the transition from hunting and gathering to horticulture, 2) Fourche Maline people were not living on the midden mounds, and 3) Fourche Maline habitation and domestic activity areas were located adjacent to the midden mounds. To test these hypotheses I examined the social organization, subsistence, bioarchaeology, settlement patterns, and presented the evidence for the development or territoriality among the Fourche Maline people. I further proposed the following expectations:

1) Social Organization: I expected to identify the presence of both egalitarian and the emergence of social inequality.
2) Subsistence: My expectations were to identify both circumstantial and direct evidence of the transition to horticulture.
3) Bioarchaeology: The expectations were that individuals from focused on hunting and gathering to exhibit low rates of dental pathologies, low rates of degenerative joint disease, and infectious disease. And as a corollary individuals transitioning to horticulture should exhibit marked rise in these pathologies.
4) Settlement Patterns: I expected to find evidence of domestic and habitation located off the mounds suggesting a sedentary lifeway.
5) Territoriality: The territoriality expectations were that there were two non-overlapping territories that could be identified based on lithic raw material preferences, and that these territories were conspicuously marked with mounds housing venerated ancestors.

In order to test my hypotheses a much needed revision of the chronology was performed. As indicated in the previous chapters the growing information on what constitutes Fourche Maline indicated the need for a re-conceptualization of this important

culture. I agree with Schambach (2002) that the term Fourche Maline should be limited to the Woodland Period in eastern Oklahoma.

Seriations performed in this research indicate that there are temporally sensitive technological changes that encourage dividing Galm's (1984) Fourche Maline Phase. These units would correspond to what Willey and Phillips (1958) define as archaeological phases. The use of Fourche Maline as a phase designator should be terminated and new phase names with less baggage should be developed. I also propose the renewed use of the term "black middens" for the midden sites presently identified as Fourche Maline because these sites are multi-component and the term black midden has no temporal baggage which masks the other components present.

This chapter synthesizes the data from the previous chapters in order to perform the needed re-conceptualization. The systematics for developing these archaeological units is presented. These units are then used as the basis for discussing the subsistence, mortuary and settlement patterns, and the social organization of the Woodland Period people of eastern Oklahoma. This information is important in developing a holistic understanding of what constitutes Fourche Maline culture.

While I am removing the Wister Phase (Late Archaic) from the definition of Fourche Maline, it is important to understand this unit because strong continuities exist between the Late Archaic, Woodland, and Mississippian Periods in eastern Oklahoma. The Wister Phase represents the earliest Caddoan origins that can currently be traced in Oklahoma. The Wister Phase people also represent the earliest occupations at many of the black-midden sites.

The material culture for the Wister Phase remains close to what Galm identified in his Wister Valley work (Galm 1978a, 1978b, 1981, 1984; Galm and Flynn 1978). To review, Galm (1984) states that Wister Phase traits are as follows: contracting-stem dart points (*Gary*), various corner-notched expanding-stem dart points, groundstone (handstones, boatstones, and pendants), bone (awls, pins, atlatl hooks), and shell (beads, discs, and pendants). The changes identified in this research include a refining of the contracting-stem points, identifying *Gary gary* as representing the Late Archaic form of contracting-stem point. The appearance and use of *Gary leflore* represents a transitional Archaic/Woodland/Mississippian type. *Gary leflore* bifaces likely represent hafted knives/ projectiles. The seriation data also indicated that the stemmed hoes developed during the Late Archaic and continued to be used during the Woodland Period, although they are overshadowed by the double-bitted hoes in the later period.

**Woodland Period Systematics**

The development of a Fourche Maline chronology is based on seriation studies undertaken above, as well as separations Galm (1984) suggested, such as the presence of bone in *Williams Plain* temper, the suggestion that *LeFlore Plain* was later than *Williams Plain*, and late (~A.D. 600) adoption of the bow and arrow. As mentioned earlier I have moved the term Fourche Maline from a phase designation to a cultural designation, what Willey and Phillips (1958) identify as a tradition. This brings the Oklahoma terminology in line with the surrounding states. This also makes Fourche Maline a regional cultural-horizon similar to the succeeding Caddoan culture.

Following Schambach (1982, 1998, 2002), I have then separated Oklahoma's Fourche Maline tradition into four sub-periods (Fourche Maline I through IV). These sub-periods can then be further divided into drainage-specific phases. I have named phases that correlate to the sub-periods for the Fourche Maline drainage (Table 10.1).

**Table 10.1: Revised cultural chronology for Eastern Oklahoma**

| Time Period | Phase | Period | Culture |
|---|---|---|---|
| A.D.1700 | Ft. Coffee phase | Mississippian | Caddoan Culture |
| A.D.1600 | | | |
| A.D.1500 | | | |
| A.D.1400 | Spiro phase | | |
| A.D.1300 | | | |
| A.D.1200 | Harlan phase | | |
| A.D.1100 | | | |
| A.D.1000 | Evans phase | Woodland | Fourche Maline IV |
| A.D.900 | | | |
| A.D.800 | Akers phase | | Fourche Maline III |
| A.D.700 | | | |
| A.D.600 | | | |
| A.D.500 | Scott phase | | Fourche Maline II |
| A.D.400 | | | |
| A.D.300 | | | |
| A.D.1 | Williams phase | | Fourche Maline I |
| 300 B.C. | | | |
| 300 - 1,500 B.C. | Wister Phase | Late Archaic | |

As Fourche Maline is now a regional unit, drainage-specific phase designations can be developed for other culturally related archaeological assemblages. More absolute dating is needed to refine the date ranges for the phases.

*Fourche Maline I - Williams Phase*

Fourche Maline I is identified by the adoption of pottery technology in eastern Oklahoma and dates roughly 300 B.C. to the first century A.D. The pottery is thick, coarse, grog-temper plainware of the *Williams Plain* type. During this phase the use of the *Gary gary* variety of contracting stem point appears to be in decline, and if present, they are at very low frequencies. The projectile assemblage is dominated by the *Gary leflore*

variety of contracting stem form. This likely corresponds to the use of a form that works well as a hafted knife as well as a projectile point. In fact we have slotted antler handles in which *Gary leflore* bifaces fit well (Figures 10.1 and 10.2) (see Newberry et al. 1986 for discussion of similar handles).


**Figure 10.1: Slotted antler handle from the Williams II site (34Lf25).**


**Figure 10.2: Antler handle with *Gary leflore* biface fitted into the slot.**

Double-bitted chipped-stone axe/hoes appear during this phase. Many past researchers have identified these implements as axes (Bell 1953; Bell and Baerreis 1951; Galm 1978a, 1978b, 1981, 1984; Galm and Flynn 1978; Guilinger 1971; Orr 1952; Proctor 1957; Sharrock 1960). However, I agree with Schambach's (1998, 2002) suggestion that these are likely agricultural implements (hoes). The two bits could be associated with increased efficiency as once one of the bits becomes too dull to use the implement can be flipped over and the other bit can be used. This would reduce the frequency of sharpening events.

As Galm (1984) notes corner-notched, expanding-stem dart points are present, at a lower frequency, during the Woodland Period. These dart forms were identified throughout the Woodland sequence and even into the early Mississippian. Bell's (1984:233) definition of the Mississippian, Harlan Phase includes *Ellis* and *Edgewood* points (in low numbers). These are corner-notched dart points typically associated with the Late Archaic. It is not clear if these represent heirlooms, prehistoric collecting of interesting points, or whether they continued to be used as projectile points.

*Fourche Maline II - Scott Phase*

Fourche Maline II dates to around A.D. 1 to ~A.D. 600. This phase is identified by the continued use of *Williams Plain* and the initial decoration of pottery as seen in the development of *Williams Incised* (a decorated variety of *Williams Plain*). Along with *Williams Plain* and *Williams Incised,* the Fourche Maline people of this interval began making a thinner, more refined plainware identified as *LeFlore Plain*. This type is described by Brown (1971), but essentially it is a grog-grit tempered, burnished plainware.

The chipped-stone technology is dominated by multipurpose *Gary leflore* points/ knives, with low frequencies of corner-notched, expanding-stem points along with occasional *Gary gary* points being identified. The important technological development is the refinement of *Gary leflore* points into the small *Gary camden* variety. Several of these bifaces are thin (approximately 6.3 mm), which is close to the thickness of the larger corner-notched arrow points (about 5.7 mm). Schambach (1998:128) suggests this variety is a short step away from arrow points. I agree with Schambach that some of the smaller *Gary camden* points could have functioned as arrow points. Also double-bitted and some pear-shaped stemmed hoes continued to be used in this cultural phase.

*Fourche Maline III - Akers Phase*

An approximate range for this phase is A.D. 600 to 800. The timing is based on Galm's (1984) suggestion that bow-and-arrow technology appears around A.D. 600. It also correlates with Galm's (1984) terminus for the Fourche Maline Phase (~A.D. 800). The pottery assemblage for Fourche Maline III attests to continued use of *Williams Plain*, *Williams Incised*, and *LeFlore Plain*. Also present is a new variety of *Williams Plain* represented by inclusion of crushed calcined bone temper in the paste. This variety has long been recognized (Bell 1953; Brown 1971; Galm 1984; Irvine 1980; Proctor 1957; Sharrock 1960). Because this variety appears to be chronologically sensitive, I have applied the name *Williams Boneware* to this pottery type. Small amounts of decorated grit and grit-grog temper pottery occur during this interval and suggests ties to Coles Creek societies further east.

A major technological innovation for this phase is the development of the bow and arrow identified by the presence of small corner-notched (*Scallorn*) arrow points. But Fourche Maline people continue to use *Gary leflore* and *Gary camden* points. The *Gary camden*, as stated earlier, are likely serving as arrow points and the *lefore* points as hafted knives. The evidence for this is the presence of slotted-antler handles occasionally found at the black-midden sites (Newberry et al. 1986) (see Figures 10.1 and 10.2). Double-bitted hoes are still present but appear to be declining in importance. Stemmed hoes are occasionally recovered but the frequency is very low, and their presence in this time period may be due to mixing from burial units.

*Fourche Maline IV - Evans Phase*

The Evans Phase originally was identified as a transitional phase between the Fourche Maline and Harlan Phases dating from A.D. 800 to 1000. Evans Phase was derived from Orr's (1952) research at Spiro (34Lf37,40,46,51, and 58) and is basically a Coles Creek-influenced Fourche Maline tradition (Orr 1952:254). The recognition of Evans Phase never really gained acceptance in Oklahoma (Brown 1971) although Schambach (1982) supports its use. Bell (1984) absorbed what can be considered the Evans Phase into his Harlan Phase.

I believe there are technological indicators that suggest Evans Phase has archaeological applicability. Evans Phase represents the Late Woodland/Caddoan Mississippian transition. The continuities with earlier Fourche Maline components are the use of *Williams Plain*, *Williams Incised*, *Williams Boneware*, and *LeFlore Plain* pottery and the continued use of *Gary leflore* and *camden* points. A florescence of arrow-point

styles occur during the Evans Phase as well as the adoption of shell-tempered (*Woodward Plain*) pottery. The Phase was identified as having a strong Coles Creek influence as seen in the presence of decorated wares (*Coles Creek Incised* and *French Fork Incised*) (Brown 1971).

With these materially based, revised systematics for Fourche Maline it is now appropriate to review the possible corresponding changes in the life-way of these people. Examining changes in subsistence, mortuary patterns, settlement patterns and social organization will provide a more holistic picture of what Fourche Maline really was.

**Fourche Maline as Transegalitarian Complex Hunter-Gatherer-Horticulturalists**

In the social organization chapter I identified a relatively high population density, the presence of structures off the mound (possible large houses) and the suggestion of emerging social inequality. These traits all mesh well with the concept of transegalitarian societies. The burial information even implicates the presence of a possible aggrandizer. The information on the pottery technology of the Fourche Maline people suggest this technological innovation (as well as changes in this technology over time) are useful in aggrandizing prestige competitions. Additional in-depth research is needed to provide more than the tentative ties as identified in Chapter 5. The anomalies identified as large houses indicate the possibility of a matrilocal residence pattern. Following Peregrine (2001) the adoption of matrilocality and larger houses often correlates with the establishment of female work parties. This pattern would be of benefit to aggrandizers as they would be able to mobilize a larger labor force, and produce offspring that can further increase the labor pool as well as form important alliances.

**Fourche Maline Subsistence**

There are changes in subsistence that likely attest to the development of a horticultural economy which also correlate to material culture changes identified in the seriations. As discussed earlier, Clarke (1987) identified an increase in intensification of deer resources in late Wister Phase times. I believe that this intensification was tied to the beginnings of a horticultural life style. Speth and Scott (1989) point out that emergent horticulturists tend to intensify their harvests of large game. Also of note is Leith's (2006) identification of a drop in the nutshell density between the pre-pottery and pottery components at 34Lt11.

The rarefaction analysis performed in this research indicated that there was a drop in diversity of animals harvested during early Fourche Maline times. The reduction in diversity also suggests an intensification of deer resources as the deer represent 76% of the assemblage based on meat weight. Other indications of intensive use of deer is evidenced by the presence of bone representing every element from antler to tail, with many of the long bones broken to remove the marrow.

The material culture correlates for this shift in subsistence are the development of *Gary leflore* bifaces. These points with their narrow "V"-shaped bases could easily toggle into a dart back-shaft, eliminating the need for a fore-shaft while increasing efficiency (Boszhardt 2002). Leith (2006) noted that the physical properties of *Williams Plain* pottery are very conducive to stone boiling which would have increased efficiency in bone grease extraction. Also, as noted above, the double-bitted hoes represent an increase in efficiency

over the pear-shaped stemmed variety. Overall this indicates an interest in intensification and efficiency on the part of the Fourche Maline people.

The Fourche Maline II rarefaction data indicates an increase in diversity in the animals exploited. I propose that this correlates to what Speth and Scott (1989) identify as garden hunting. Exploitation of the niche environment created by planting gardens could easily be conducted by the individuals tending the plants. However, as Speth and Scott (1989) point out, these resources are finite and would most likely have been quickly exhausted.

Materially, the changes during this period are a refinement of the pottery technology identified by thinner vessels as well as the initial use of decoration. The thinner pottery (*LeFlore Plain*) may indicate a difference in food preparation strategies that are associated with horticulture. Further increases in hunting efficiency are identified by the development of *Gary camden* points. Many of these points could represent refinement of the dart technology or possibly the initial emergence of bow-and-arrow technology.

During Fourche Maline III a second decrease occurs in diversity of the animals exploited. Again, deer are the most important resource, representing 66% of the meat obtained by the Fourche Maline people. This period corresponds with the levels containing the goosefoot seeds at 34Lt11. The seeds likely represent an intermediate stage between wild and domesticated goosefoot and is the strongest direct evidence of horticulture.

Fourche Maline III also includes the definite development of bow-and-arrow technology as seen in the presence of *Scallorn* arrow points. The pottery assemblage expands to include *Williams Boneware* and there are also suggestions of influences of Coles Creek culture during this time as indicated by the presence of some thin grit-temper decorated sherds. Overall, the changes during this period can be viewed as increasing hunting efficiency and intensity of deer use coinciding with the early stages of domestication.

Finally, Fourche Maline IV is associated with an increase in lower-ranked resources into the diet as identified in the increase in diversity in the rarefied richness results. This increase in diversity is not at the expense of deer use but may represent local gathering. Deer have increased to 84% of the meat consumed based on meat weight, further indicating intensified use. During Fourche Maline IV times the influence of the Lower Mississippi Valley societies are identified based on the presence of *Coles Creek Incised* and *French Fork Incised*. *Woodward Plain* represents the evolution of a cooking ware as its thin walls would conduct heat well.

The Woodland Period Fourche Maline people were making choices and adaptations that increased efficiency related to emerging horticulture. The findings of the subsistence chapter support the proposal that Fourche Maline people were complex hunter-gatherer-horticulturalists. These included intensifying their use of white-tailed deer by managing the herd. They were taking more, younger individuals, bringing them back to the village and getting as many calories out of the remains as possible. They were still collecting hickory nuts but the intensity of this use appears to be lessening through the

Woodland Period. Major technological innovations helped with the increased efficiency as seen in bow-and-arrow technology and creating a vessel that could be used near or directly over the fire by around A.D. 800. The adoption of a horticultural economy lead to increased population, intensification and the development of marked territories as seen in the mortuary program of the Fourche Maline people.

**Fourche Maline Bioarchaeology**

The Fourche Maline bioarchaeology did not conform to my expectations. However, as I pointed out in the bioarchaeology chapter, the lack evidence for horticulture in the diet of the Fourche Maline people may be tied to either problems associated with viewing the Fourche Maline burials at each site as a single population or to the fact that horticulture was not playing a large role in the diet of the Fourche Maline people. This problem stems from the lack of good archaeological chronological indicators with which to identify early-vs-late burials. Hopefully the revised chronology proposed here as well as the temporally sensitive artifact types identified will provide more than just burial depth to help differentiate early-vs-late. As the archaeology is refined at each of the black-midden sites so will the biological anthropology.

The research design I proposed is a cooperative endeavor for both archaeologists who will revise the chronology, and bioanthropologists who will identify possible pathologies in the burial populations. The research design should address the possible temporal problems with identifying the population as a single group. If future research identify the traits common to emergent horticulturalists (i.e. an increase in disease and pathologies) then the hypothesized shift to horticulture will gain more support.

It should be noted that either conclusion can support the hypothesis that Fourche Maline people are transegalitarian complex hunter-gatherer-horticulturalists. The subsistence chapter provided evidence for the shift to horticulture, but at this stage its relative importance in the diet is not known. If future research indicates it is playing an increasing important role in the diet then the argument for producing surplus that and be used in prestige competitions can be evaluated. If the evidence indicates these seeds played only a minor role in the diet this may suggest that the crops were initially tied to ritual use (Rolingson 1998a), possibly by aggrandizers as a prestige feasting food.

**Fourche Maline Settlement Patterns**

Fourche Maline site-level settlement patterns are only now being identified. Hopefully, the old idea of the people living on the mounds will soon be put to rest. Considering evidence from the McCutchan-McLaughlin site the Fourche Maline people are living in small settlements of approximately 60 individuals. These settlements consist of five to six houses approximately 60 m from the midden mound. The houses are organized around an open area with the midden mound as the central focus suggesting the importance of the ancestors in this society.

The possible houses identified south of the Sans Bois Mountains, in the Fourche Maline drainage, maybe fairly substantial. They appear to be round, about 12 m in diameter, with a central hearth and a possible extended entrance oriented to the southeast. It is unclear whether these houses had wattle and daub walls or resembled the traditional Caddo “bee hive” thatch houses identified by Joutel (1968). The fact that no wattle and daub were found during the 2010 excavations at 34Lt11 would suggest that the houses

were of the bee hive form. However, wattle and daub have been identified at some black-midden sites (such as the James M. Sam site, 34Lf28), suggesting some of the structures had that type of construction.

The anomalies associated with possible houses north of the Sans Bois Mountains are generally rectilinear and range from 72 to 240 $m^2$. The Sam Spears site also has two 10 m diameter circular anomalies that may represent a house similar to the possible structure identified at 34Lt11. Testing is needed to confirm these results, but it is interesting that the possible houses north of the Sans Bois appear different, supporting the argument for two groups of Fourche Maline people.

The site structure and evidence for storage suggest that Fourche Maline people were sedentary (at least seasonally) and were likely reusing the sites. The high density of nutshell in the middens supports the idea that Fourche Maline people were bulk processing hickory nuts. I have proposed that the pottery and possible baskets used by the Fourche Maline people could have been storage facilities. The actual duration of the occupations has not been determined and future research looking for stratified house pattern for example, will shed light on the occupation durations.

**Fourche Maline Territoriality**

Increasing populations from the Late Archaic through the Woodland Period tied to increased sedentism, which also increased circumscription. This circumscription can be identified in changes in the subsistence economy, namely, the intensification of hunting white-tailed deer and the development of horticulture. Both of these economic strategies are related to the need to define territories. The research conducted here has identified two

non-overlapping territories in eastern Oklahoma with the Sans Bois Mountains acting as a cultural buffer based on lithic raw material preferences. The people north of the Sans Bois Mountains have an overwhelming preference for local Ozark Plateau material, those south of these mountains have an overwhelming preference for Ouachita Mountains raw materials. As mentioned several times in this dissertation evidence exists for raiding and violent conflict between these two groups. Clark and Blake (1994:264) point out that raiding plays an important role in the emergence of inequality, as it one of the ways an emerging leader can gain a reputation and undercut the prestige of his rivals

I contend that the way in which Fourche Maline people designated territories was with mortuary practices that entailed ancestor veneration. Strong continuities appear in the mortuary practices from the preceding Late Archaic (Wister Phase) peoples. The midden-burial program was one that marked the foundations of territories, which is likely tied to increasing population pressure, which Clark and Blake (1994) identify as a precondition or threshold phenomenon.

As mentioned above all of these sites probably were not occupied at the same time, but were presumably occupied intermittently based on resource availability. Once these territories were established they were maintained over time with new burials added with each new occupation. These locations became important places on the landscape and appear to have strong cultural meaning as they were used from the Archaic through the Mississippian Periods (Fauchier 2009). Some of these sites became the location of Mississippian mound centers (Spiro and Harlan both have preceding Fourche Maline occupations) (Bell 1984; Orr 1952).

I have argued earlier that these midden mounds represent formal repositories of the dead and are tied to the development of ancestor veneration likely during the Wister Phase. The mortuary program indicates strong cultural continuity, as it appears to change little over approximately 2,000 years. This program stresses kinship affiliations and group solidarity. The natural question is why did this long-running mortuary program develop?

As discussed earlier, if we assume only half of the sites along Fourche Maline Creek were occupied at a given time the population for this drainage would be 720 people, which equates to 2.6 persons per $km^2$. This number is a threshold identified by Johnson and Earle (1987) for increased warfare due to population compaction. Such population compaction would lead to competition for resources and with the development of horticulture on the best farming land. Evidence for increased warfare is identified by the mass graves at many of the black-midden sites (Powell and Rogers 1980; Rowe, personal communication 2011). I have suggested that these mass burials represent strife between the people living north and south of the Sans Bois Mountains. The idea that these people were using lithic raw material as cultural markers derives from the overwhelming preference for the different raw materials by groups living north and south of the Sans Bois as well as the fact that all the points associated with the killings represented by burial 6 at 34Lt11 were made of Ozark cherts.

Conspicuously marking territories with midden mounds near streams, especially with ancestors buried in them, would identify strong, clear claims to territories. As Glazier (1984) points out the use of ancestors is one of the strongest ways to mark territories. The location of the midden mounds near the streams would easily signal to people traveling

along the streams that they were entering another's territory. These midden mounds would have stood out from the landscape and may have been marked further with pendants or flags as Theler and Boszhardt (2000) suggest for the effigy mounds of the upper Midwest. Therefore the midden mounds mark a land-use pattern of structured territories.

**Conclusions and Areas for Future Research**

This research represents much needed rethinking about the Fourche Maline culture. The results of this study bring Oklahoma's view of Fourche Maline into line with the surrounding states. This is important, because it will facilitate transfer of information and ideas as it clarifies or removes problematic terminology and jargon. Fourche Maline is now identified as a wholly Woodland Period culture. It elevates the term Fourche Maline in Oklahoma from a phase designator to a cultural or tradition level as it is used in neighboring states. The removal of Fourche Maline as a phase name allows future development of drainage specific designators as Willey and Phillips (1958) originally intended. The former Fourche Maline phase that was more a sub-period has been divided into three phases lasting more reasonable amounts of time. These divisions were based on chronologically sensitive material culture changes. Along with splitting Fourche Maline phase I have proposed the revival of the Evans Phase as Late Woodland Period occupations. I believe that the Evans Phase has applicability and allows for a more smooth transition between the Fourche Maline and Caddoan traditions.

This information suggests that Fourche Maline people were not living on the midden mounds. I have proposed above that the post molds and compacted surfaces identified in some of the black-midden mounds are most likely associated with mortuary

structures. My field work indicated that Fourche Maline habitation is located near the midden mound. The work at 34Lt11 indicates a settlement of between four and six houses were located in an arc roughly 60 m from the mound. Further evidence for off-mound habitation activities are provided in the work at Duncan's Mound. Here, hearth/fire pits were identified off the midden with a structure located in the northern portion of Grid 2.

Flotation methodology focused on recovery of small seeds associated with the Eastern Starchy Seed Complex yielded some direct evidence of horticultural practices utilized by Fourche Maline people. The recovery of goosefoot with a thin seed coat is interpreted to indicate that the Fourche Maline people were in the process of domesticating this plant. Analysis of the faunal remains further supports the transition to horticulture. This is identified by the intensification of large mammal resources corresponding to changes in material culture as well as the identification of the goosefoot.

Finally, the identification of a house at 34Lt11, combined with the mortuary patterns, and pottery information, has provided insight into the social organization of the Fourche Maline people. The size of the house corresponds with Ember's (1973) ethnographic matrilocal groups. The identification of other anomalies which are possibly houses based on the testing at 34Lt11 suggest settlements of between 50 and 70 people. The estimated population density, identification of early villages, and the lack of indicators of different status indicate that Fourche Maline people were transegalitarian complex hunter/gatherer/horticulturists.

This research represents an important step in understanding Fourche Maline, but, there are areas that require more study. First, we need identification and analysis of the

freshwater mussels as well as analysis of faunal collections that do not have the inherent biases that W.P.A. collections have. This information could then be added into the diet-breadth modeling. Also, more flotation needs to be conducted and any recovered plant remains identified. Hopefully, this will result in information robust enough to also be incorporated into the diet-breadth modeling. This would allow greater understanding of the relative importance of different foodstuffs in the diet.

This study also made an important first step in identifying Fourche Maline habitation. More field work is required to test other anomalies assumed to be house patterns. Along with this field work more survey needs to be conducted along the drainages of eastern Oklahoma to determine if the population estimates for the Fourche Maline drainage are representative. I have argued that there appears to be two macro bands or groups divided by the Sans Bois Mountains. More work is required to identify other material culture associated with this division.

Lastly, as I have noted, the elevation of Fourche Maline to a tradition/culture allows for development of drainage specific chronologies. The needed survey work identified above as well as analysis of individual sites would go a long way in addressing this needed area of study.

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