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ALTERNATE PATHWAYS TO RITUAL POWER: EVIDENCE FOR CENTRALIZED PRODUCTION AND LONG-DISTANCE EXCHANGE BETWEEN NORTHERN AND SOUTHERN CADDO COMMUNITIES

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ALTERNATE PATHWAYS TO RITUAL POWER: EVIDENCE FOR CENTRALIZED PRODUCTION AND LONG-DISTANCE EXCHANGE BETWEEN NORTHERN AND SOUTHERN CADDO COMMUNITIES

A DISSERTATION APPROVED FOR THE
DEPARTMENT OF ANTHROPOLOGY

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Dedication

I dedicate my dissertation to my loving grandfather, Calvin McInnish and wonderful twin sister, Kimberly Dawn Thackston. I miss and love you.

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Abstract

The Formative Caddo lived throughout the Arkansas Valley of eastern Oklahoma and the West Gulf Coastal Plain region of east Texas, northwest Louisiana, southwest Arkansas, and southeast Oklahoma between approximately A.D. 850 -1150. While these communities shared similar material traits, their ritual practices and traditions are rather distinct between the two areas. This dissertation uses a communities of practice approach for understanding the ritual dynamics and cultural variability of southern and northern Caddo people by conducting a detailed analysis of the different contexts in which groups produced, used, distributed, and deposited formative fine ware pottery.

Instrumental Neutron Activation Analysis is used to determine whether Formative Caddo finewares were made locally in the Arkansas River Basin or produced by their Gulf Coastal Plain neighbors to the south. The INAA results, in concert with a stylistic study indicating very few potters had the knowledge to produce them, show that Formative Caddo finewares were made in the southern Caddo region and exported north to Arkansas Valley mound centers where ritual elites used them for mortuary use. These findings suggest an extensive history of specialized ritual production and long-distance exchange between two diverse areas of the Caddo much earlier than expected.

CHAPTER 1: INTRODUCTION

The Caddo area encompasses the geographic and cultural landscape of east Texas, northwest Louisiana, southwest Arkansas, and eastern Oklahoma (Perttula 2012) (Figure 1.1). This dissertation focuses on the Formative Caddo Period (A.D. 850 – 1100) of eastern Oklahoma. This period was marked by dramatic material and ritual changes, culminating in the construction of aggregated villages and ceremonial centers within the Arkansas Valley (northern Caddo region) and the West Gulf Coastal plain region (southern Caddo area) (Figure 1.1). The Caddo are notable for the production and use of highly complex, ritually charged ceramic vessel forms and designs that were unlike anything archaeologists have seen in the American Southeast (Bell 1984: Girard et al. 2014). As this dissertation will show, the northern and southern Caddo areas developed localized practices and traditions (see Chapter 2) and maintained long-distance exchange relationships through the production and widespread distribution of these early fine wares.

In this study, I conduct a rigorous compositional and stylistic analysis to trace the rapid development and spread of this early fine ware assemblage across nine northern and southern Caddo ceremonial centers. My ultimate objective is to figure out whether Formative Caddo potters produced fine wares in the southern Caddo or northern Caddo areas and how this new ritual mode of production and distribution highlights cultural variation between the two areas. This study has the potential to provide clues about broad social processes during Caddo's emergence.

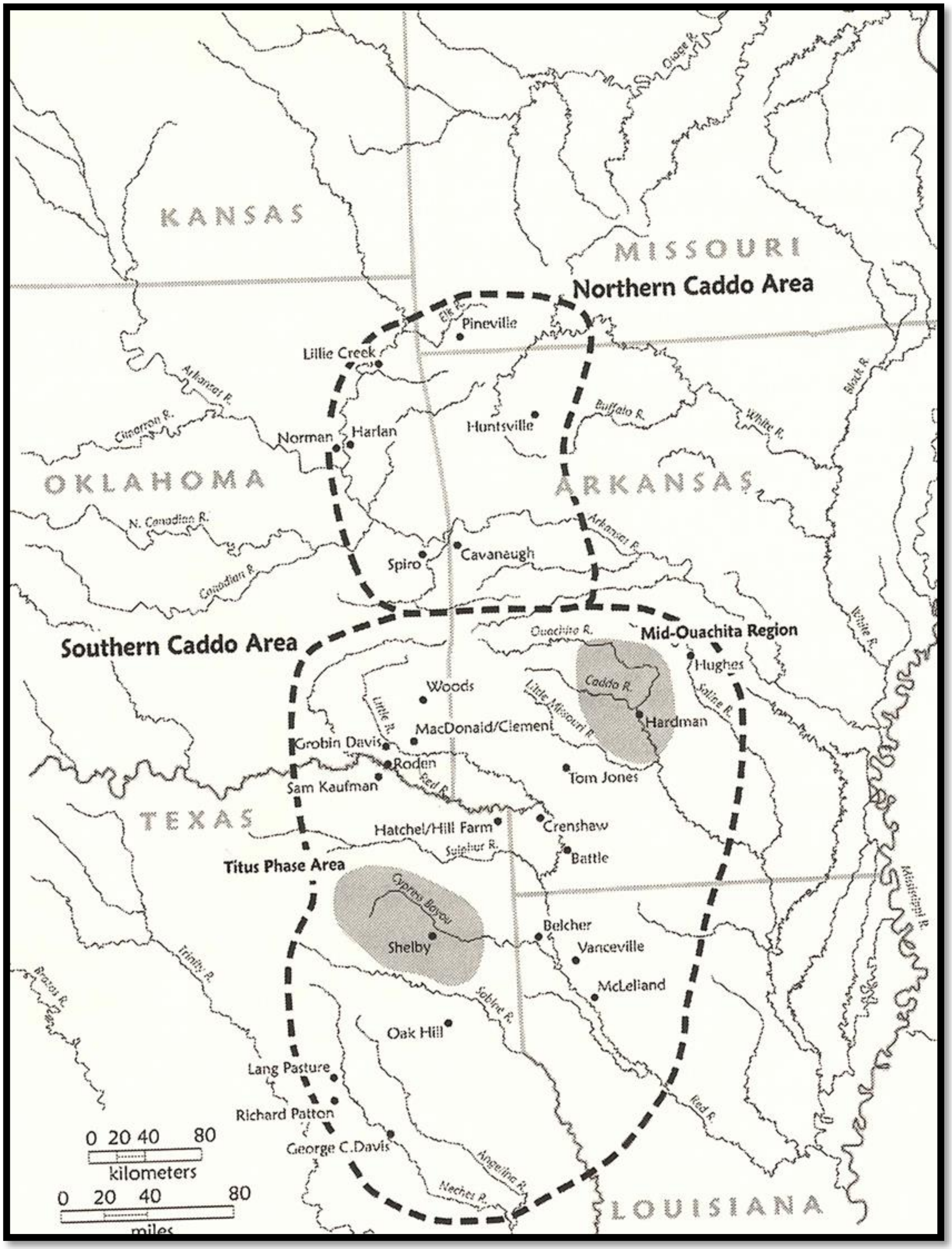


Figure 1.1. Location of the Northern and Southern Caddo areas (adapted from Perttula 2012: Figure 1-2).

While it has been shown Formative Caddo fine wares were locally produced in the Red River valley and surrounding Coastal Plain drainages (Girard et al. 2014:27-28), archaeologists have *assumed* Caddo people living in the Arkansas Valley and Ozark Plateau locally produced them (Bell 1984:236). However, there is reason to question this assumption, and this starts with the observation that fine wares are not recovered from the same contexts across both Caddo areas. Formative Caddo pottery is commonly found in both domestic and ritual contexts at Coastal Plain sites (Bell et al. 1969; Bohannon 1973; Burton 1970; Rohrbaugh 1972, 1973; Wyckoff 1965, 1967, 1968) but is restricted to ritual contexts at ceremonial centers on the Ozark Plateau (Bell 1972; Brown 1996; Schambach 1982, 1988, 1990, 1993). The ritual contexts in which Formative Caddo ceramics are recovered are also quite different. At Coastal Plain ceremonial centers, such as the George C. Davis site in Texas and the Crenshaw site in Arkansas, Formative Caddo ceramics have been deposited in off-mound, on-mound, and mortuary contexts. Yet, at ceremonial centers of the Ozark Plateau, such as the Spiro, Harlan, and Brackett sites in eastern Oklahoma, Formative Caddo ceramics have been deposited exclusively in mortuary contexts.

To examine the emergence and spread of these traditions, I have conducted a regional-scale study of the production and distribution of Formative Caddo pottery in the northern and southern Caddo areas. The first half of the analysis is the stylistic study of over 200 Formative Caddo fine ware vessels from nine ceremonial centers to determine the scale of design and technological variability across the larger Caddo area. The second half of the analysis uses Instrumental Neutron Activation Analysis (INAA) on the clay pastes of finely made grog-tempered engraved and incised bowls and bottles recovered from mortuary contexts at five ceremonial sites in the Arkansas Valley. To determine their sources, I compare the Arkansas Valley INAA results with previously generated elemental sourcing data from the Gulf Coastal Plain region (Perttula and Selden 2013). The studied sites include Spiro, Harlan, Norman, Reed, and Brackett in the Arkansas Valley and Crenshaw, Mounds Plantation, Boxed Springs, and George C. Davis in the Gulf Coastal Plain region (Figure 1.2).

A primary goal of this dissertation is to historicize and contextualize studies of Formative Caddo fine wares in a broader anthropological framework, and to highlight how studying these fine wares is relevant to research beyond the pre-Columbian Caddo area. The marked contrast between Formative Caddo pottery use and deposition between the northern and southern ceremonial centers provides insight into the development of Formative Caddo practices and traditions. Because northern Caddo communities used and deposited fine wares exclusively in mortuary contexts, while southern Caddo communities used them in a variety of social and ritual contexts, there may be fundamental differences that can be identified in the ritual programs of the northern and southern Caddo areas.

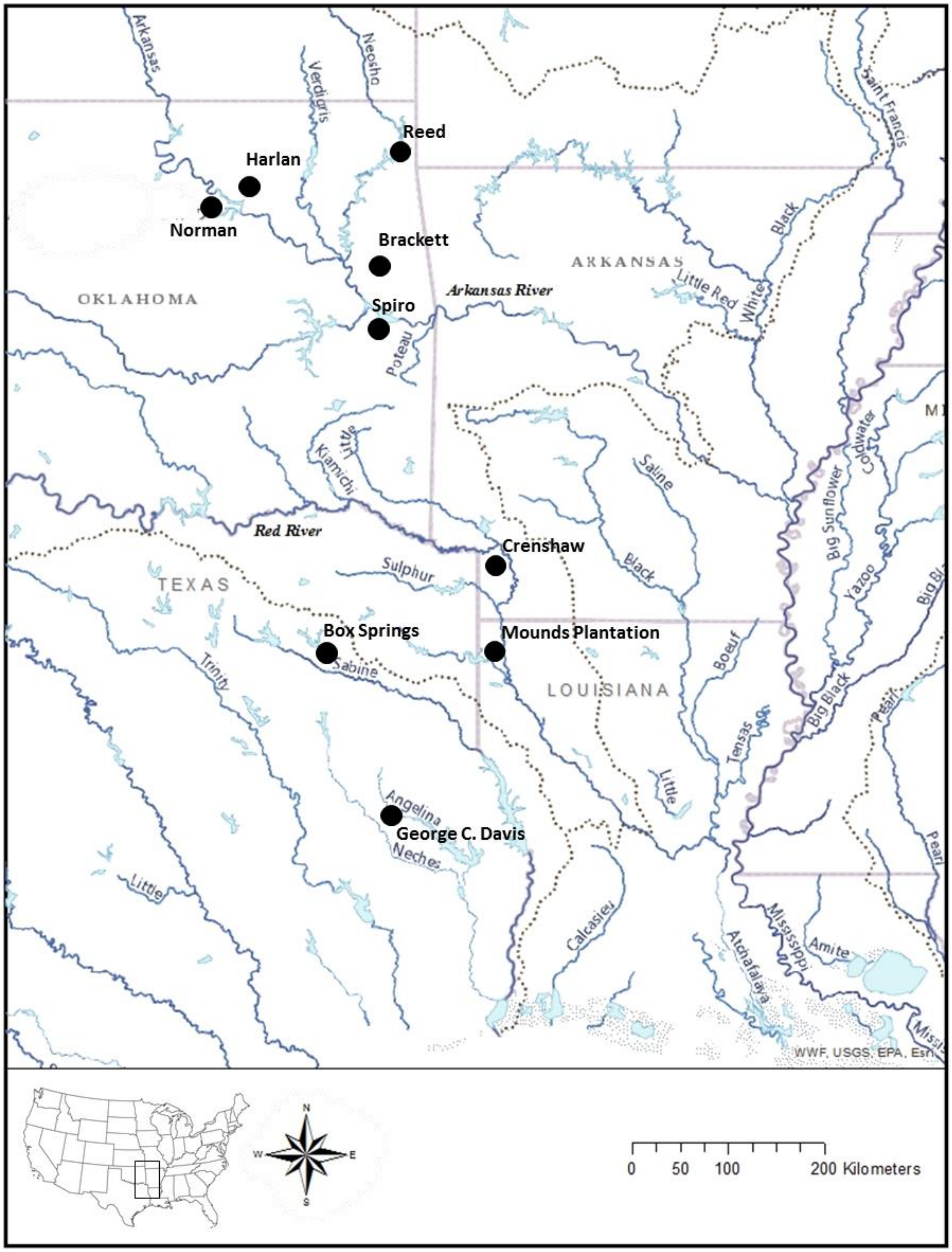


Figure 1.2. Caddo sites selected for research in the northern Caddo area of eastern Oklahoma with locations of other ceremonial centers in the southern Caddo area.

Research Questions

The primary research question that drives this research is where were Arkansas Valley fine wares were manufactured? The stylistic and compositional analyses have three possible outcomes: (1) all were made in the Arkansas Valley; (2) all were made somewhere in the southern Caddo area and exported north to Arkansas Valley ceremonial centers; or (3) some of the fine ware vessels were imported and some were made locally.

To investigate this question, I first examine INAA data generated by the Missouri University Research Reactor. If the fine ware vessels were imported, their chemical signatures will show that the Arkansas Valley fine wares have statistically significant geochemical similarities when compared to southern Caddo reference groups. If they are shown to be locally-made in the Arkansas Valley, then the signatures will show the fine wares have statistically significant geochemical similarities with the northern Caddo reference group. If some of these vessels were locally-made while others were imported, then the signatures will show that the fine wares overlap with both northern and southern Caddo geochemical reference groups.

I will also use a stylistic analysis to investigate the question of vessel origin. If these fine ware vessels were imported I would expect to see the same styles in both the northern and southern Caddo areas. If these were locally-made in the Arkansas Valley, I would expect to see a significant amount of stylistic variability and perhaps designs specific to Arkansas Valley communities. If the fine ware vessels were made in both Caddo regions, a significant amount of shared design elements would be expected, as well as designs distinct to both regions.

This dissertation will present strong evidence that fine wares used and deposited at Arkansas Valley sites were imported from somewhere in the southern Caddo area, where they had been made, most likely in Caddo communities along the Red River valley. Therefore, in Chapter 7, this dissertation will subsequently ask: (1) if fine wares were imported into the Arkansas Valley, why were they restricted to only mortuary contexts? (2) Can Arkansas Valley groups be considered to represent a separate community of practice? If so, (3) what in their histories before they emerged triggered the development of separate ritual structures among Caddo populations in both the northern and southern Caddo areas?

Addressing these questions will have major implications for how the integration of these communities and the origins and diversity of Caddo traditions and practices are viewed. It will enrich our understanding of social and ritual changes of pre-Columbian societies in the Southeast. It has the potential to show that emerging Caddo groups were engaged in the mass production, transportation, and exchange of socially-valued vessels hundreds of years earlier than currently thought. It means that the origins of early northern Caddo belief systems need to be seriously reevaluated as well as why their traditions and practices were so divergent from their southern Caddo neighbors.

Research Design

The introduction of Formative Caddo fine wares was accompanied by transformations of other material traits, suggesting that innovations in pottery production were an important part of a suite of behaviors associated with the Caddo emergence and the spread of new social and ritual systems during the tenth and eleventh centuries A.D. The research design presented here is thus modeled to understand the connections between fine ware production and distribution and broader regional processes that appear to be so important for the reorganization of the Caddo's ritual landscape.

Communities of Practice

In Chapter 4, I employ a "communities of practice" perspective (Lave and Wenger 1991; Pluckhahn et al. 2017; Stark 2006) to understand how separate Formative Caddo communities engaged in the production and long-distance exchange of their fine wares. This perspective offers a way to understand how dynamic communities become socially and ritually connected through a system of social networks constituted and maintained by the production and distribution of specific objects (Joyce 2012). Generally, a community of practice is defined as a group of experienced producers and apprentices who participate in the learned production of a shared material enterprise (Minar 2001a, 2001b; Van Keuran 2006). When a community of practice produces the same craft, it does not necessarily mean they share the same ethnic identity (Horton 2010). What these communities do share is a common set of manufacturing techniques and vessel decoration guided by observing, learning, and participating in a craft from skilled specialists (Stark 2006; Wendrich 2012). Transmitting the knowledge of technological and decorative style from one generation to the next not only links communities together through time and space (Dietler and Herbich 1998; Rice 1987; Sackett 1990), it is also an integral part "of being active participants in the process of social communities and constructing identities in relation to these communities" (Wenger 1998:4).

Stylistic Ceramic Analysis

A key focus of this study is conducting one of the most comprehensive analyses and assessments of stylistic and technological attributes of Formative Caddo fine wares in the Arkansas Valley and Gulf Coastal Plain region. To date, Caddo researchers have used "decorative style, particularly of ceramics … for defining cultural taxonomic units, recent archaeological studies use cultural traits such as domestic architecture, foodways, patterns of refuse disposal, and rock art from the perspective of technological style and practice theory to understand issues of social identity, social boundaries, multiethnic communities, and migration" (Girard et al. 2014:29-30). In Chapter 5, I use a hybrid approach that integrates Early's (2012) use of a design grammar analysis and Plog's (2008) hierarchical stylistic analysis to determine the level of continuity in vessel imagery and design choice used by potters in their production process.

While this stylistic approach is on the cutting edge of Caddo research (e.g., Dowd 2012; Early 2012), it alone cannot answer the posed research questions. For instance, if the stylistic analysis reveals a high level of design continuity between northern and southern Caddo area ceremonial sites, it may support a false sense of cultural homogeneity. Using design classifications as the primary analytical method has the potential of distorting notions of cultural variation, because archaeologists have the tendency to put equal "cultural weight" on the distribution and use of the same pottery types across an entire region. A multifaceted approach is thus necessary to answer the research questions with a higher degree of precision. A stylistic analysis as well as INAA will provide the means to evaluate not only the accuracy of the stylistic analysis but will also distinguish between local and non-local wares.

Ceramic Compositional Analysis

Using compositional analyses to understand the organization of the production, exchange, and distribution of pottery is an important method for archaeologists working in North America. Archaeologists use provenance studies to seek to document and identify variations in the compositions of clay pastes used to manufacture pottery. The results can be used to locate where ceramics were manufactured and subsequently distributed and deposited. The wealth of information on pre-Columbian Southeastern groups that has been obtained through INAA have led to the re-conceptualization of their diversity in social organization. Such studies ultimately expose issues of social complexity, social identity, social boundaries, multi-ethnicity, different communities of practice, migrations, and the ritual use and deposition of pottery (Sassaman and Rudolphi 2001; Steponaitis et al. 1996; Wallis 2007, 2011).

INAA uses neutrons to make each ceramic specimen radioactive. Following multiple irradiations, each sample emits gamma rays. Each gamma ray discharge is then counted to determine the presence or absence of major and minor elements. Each element has its own decaying scheme and allows researchers to detect chemical signatures of each sample (Glascock 2002). As Glascock and Neff (2003) stressed, INAA is an accurate and reliable way in which to identify the elemental abundance of clay pastes and to determine production locales of vessels from local to regional scales of analyses. Its relatively low cost and minor destruction to artifacts make INAA a common means of sourcing ceramics.

INAA has the potential to identify up to 35 elements. Once the abundance of each element is determined, a series of statistical multivariate techniques, such Principal

Components Analysis, Discriminant Analysis, and K-Means Cluster Analysis are used to identify compositional clusters (Baxter 1994; Davis 1986). These statistical methods reveal patterns in the archaeological data and identify the primary elements responsible for distinguishing variations and groupings in clay pastes. While INAA is straightforward when sourcing materials like obsidian (Ferguson 2012), it can be more of a challenge to determine distinct compositional groupings with clay sources. Clay sources are not only unique based on their composition geographically, but can also be transported and/or chemically altered based on post-depositional weathering histories (Glascock and Neff 2003). Potters also alter the chemical composition of raw clays by introducing tempering agents, such as grog and shell into their clay recipes. All these factors together can confound chemical characterization of ceramic pastes. Even with these issues, INAA has proven to be a productive method for investigating local and regional interactions based on ceramic analyses.

In Chapter 6, I use INAA to examine the production locales of formative Caddo fine wares recovered from five Arkansas Valley ceremonial sites. INAA will allow a better understanding of the production and long-distance exchange of the Caddo's earliest fine ware tradition. Central to this task is identifying archaeologically visible cultural processes that not only link distant Caddo communities together, but also how distant Caddo communities constructed and developed their own historical trajectories through the different ways in which they produced, exchanged, used, and deposited these fine wares.

Comparing the INAA results for fine wares in contemporaneous mound sites provides the means to assess whether northern and southern Caddo communities developed their own ritual system. If Arkansas Valley fine wares are imports from the southern Caddo area, then the compositional analyses will demonstrate it. If so, inferences can then be made regarding why these fine wares were exported to Arkansas Valley mound sites and why they were strictly used as mortuary vessels. These results would also then lead to hypotheses as to why southern Caddo communities participated in the production of the fine wares, not only for local use but as objects specifically made to be exported.

Organization of Chapters

Chapter 2 reviews the emerging Mississippian concepts and uses a historical approach to understand the cultural developments of the Caddo. Chapter 3 describes the archeological background of each site used this study. In Chapter 4, I describe the theoretical overview of the dissertation and examine how stylistic and INAA studies inform archaeologists about different communities of practice. This sets the stage for Chapters 5 and 6. In Chapter 5, I present the methods employed and results obtained of the regional stylistic analysis of formative Caddo fine wares, while Chapter 6 presents the methods and results of the INAA study of Arkansas Valley fine wares. Finally, Chapter 7 discusses the implications of stylistic and INAA results in addressing the nature of cultural variability between the northern and southern Caddo areas.

CHAPTER 2: CADDO EMERGENCE AND CULTURAL VARIABILITY

This dissertation examines Formative Caddo fine ware assemblages to understand cultural variability between the northern and southern Caddo areas. The northern Caddo area encompasses the Arkansas drainage/Ozark Plateau of eastern Oklahoma, and the southern Caddo area encompasses the West Gulf Coastal Plain region of east Texas, southwest Arkansas, and northwest Louisiana (see Figure 1.1). Around A.D. 850, Late Woodland groups who occupied this region experienced significant transformations in social organization, settlement patterns, and material culture due to social and environmental factors (Girard et al. 2014; Perttula 2017). By the 10th and early 11th centuries, groups in the southern Caddo area constructed ceremonial mound centers, such as Crenshaw in Arkansas, Mounds Plantation in Louisiana, and George C. Davis and Boxed Springs in Texas, while groups in the northern Caddo area constructed mound centers, such as Brackett, Norman, Harlan, Reed, and Spiro. Recent studies indicate ritual elites occupied these ceremonial centers (Kusnierz 2016; Regnier et al. 2017). These spaces served as stages for ritual activities, including processing the dead, world-renewal ceremonies, mortuary ceremonialism, and communal feasting (Girard et al. 2014; Kay and Sabo 2006; Rolingson 2012). Some of the most important objects used in these practices were a variety of engraved and incised wares, including Spiro Engraved, Holly Fine Engraved, Hickory Engraved, and Crockett Curvilinear Incised (see Figure 2.2).

The study of Formative Caddo communities from an archaeological perspective is challenging. It is an issue that will likely involve multiple researchers from different disciplines to obtain a concerted understanding of Caddo emergence and cultural variability (Perttula 2009). One issue with previous Formative Caddo studies is they are overwhelmingly atheoretical, ahistorical, and a macro-regional perspective that has never been synthesized. Another issue is the way scholars have applied the presence and distribution of Formative fine wares in their research. Because northern and southern Caddo groups had access to the same fine wares, archaeologists have likened them to a homogenous cultural landscape, irrespective to regional differences in depositional and social contexts. It is stressed that "custody and use of [Formative] fine wares were not restricted to community or religious leaders" (Girard et al. 2014:56). Until now, archaeologists used fine wares primarily as temporally diagnostic objects for descriptive-based studies (e.g., problem illustrated by Girard 2009). The use of fine wares as "same pots equal same cultural group" is problematic. This has masked notions of cultural variability between the northern and southern Caddo areas. My primary objective is to understand the production, widespread distribution, and varied depositional contexts of these fine wares through a comprehensive stylistic and compositional analysis. The results highlight centralized production and long-distance exchange between the northern and southern Caddo areas (see Chapters 5, 6, and 7).

In this chapter, I begin with a broad overview of emerging Mississippian theoretical concepts archaeologists used to understand the cultural developments of southeastern societies. It is apropos to examine different theoretical approaches because the use of theory in Formative Caddo research is either underutilized or outdated (Perttula 2009). At the end of this section, I use a ritual mode of production and distribution framework (e.g., Renfrew 2001; Spielmann 2002, 2008) and suggest early

Caddo ritual elites socially valued fine wares for their ritual meanings and used them to fulfill ritual obligations and create and sustain long-distance relationships.

The next section discusses how initial developments of Caddo culture was not significantly dependent or stimulated by the emergence of Mississippian-like traits in the Southeast (e.g., Regnier 2017). Rather than saying the Caddo developed from the western expansion of Mississippian traits, I offer a historicized view of Caddo emergence that begins with a deeper look into a diverse set of Late Woodland groups who resided within the northern and southern Caddo areas. A regional approach explaining that Late Woodland groups were the antecedents of the Caddo will construct a more localized narrative of emergence. Perttula (2009) and Girard (2009) offer some relevant and programmatic suggestions in considering Formative Caddo research. They argue to understand the social and ritual interplays of Formative Caddo groups, we need to first think macro-regionally, at multiple spatial and temporal scales. This study offers a perfect opportunity to understand the Formative Caddo on a macro-regional level. In this section, I argue Caddo traits emerged as a result of social and environmental factors in which facilitated the reorganization of Late Woodland groups into what we know archaeologically as Caddo.

After setting Caddo emergence within their localized history, the last section reviews the Formative Caddo and depositional contexts of formative fine wares. The discovery that northern and southern Caddo people used formative fine wares for significantly different practices and traditions fueled the need for a comprehensive stylistic and compositional study. The different contexts in which these vessels were deposited indicate the emergence of separate ritual horizons between the two Caddo areas, and the results discussed in Chapters 5 and 6 support this hypothesis. As will be discussed in Chapter 7, the production and widespread distribution of formative finewares was an integral part of community formation. The production and exchange of these pots offered a way in which for distant Caddo communities to sustain long-distance relationships, uphold ceremonial obligations, and allowed emerging ritual elites and craft specialists to maintain authority.

A Short History of Research on Mississippian Emergence

Archaeologists have researched the emergence and spread of Mississippian societies for over a century (Blitz 2010; Cobb 2003; Steponaitis 1986). Holmes (1903) first recognized the technological shift to the use of shell-tempered pottery within the Middle Mississippi valley and coined it as the Mississippian complex. Shell-tempered pottery thus became one of the first diagnostic Mississippian traits. Cultural historians later studied the spatial and temporal distribution of shell-tempered pottery and uncovered other traits particular to the development of Mississippian societies (Griffin 1943). These characteristics included the development of maize agriculture, small triangular projectile points, the emergence of platform mounds, highly visible markers of social inequality, and rectangular architecture (Anderson and Sassaman 2012:152; Deuel 1935). Excavations conducted by the Works Progress Administration (WPA) produced a substantial amount of data. The massive amount of data was employed to understand the emergence of Mississippian communities.

Culture historians rarely considered the emergence of Mississippian traits as a social process. More often than not, they assumed that Central Mississippi valley people were responsible for these new traits and objects, and the overwhelming Mississippian force spread through the Southeast and Midwest, assimilating and converting less complex and competitive groups (Caldwell 1958; Ford and Willey 1941; Krieger 1951). Culture historians thought the material culture of past peoples could only be useful for cataloging unilineal timelines based on shifts in material attributes, such as pottery types (Trigger 1989:148).

When archaeologists began investigating early Caddo ceremonial mound centers, they see them as the westernmost fringes of the Mississippian world (Regnier 2017). Undoubtedly, Caddo centers shared material traits and iconographic themes with the Mississippian world. Most, but not all, of the pre-Columbian Caddo built mounds special-purpose buildings, cultivated maize, utilized shell temper for pottery, and participated in the long-distance exchange of shell, copper, and stone objects (Girard et al. 2014). These shared material traits between the Caddo and sites in the Lower Mississippi Valley and American Bottom occupied by non-Caddo peoples have implied a homogenous Mississippian cultural fluorescence (Perttula 2014:5). Finer-grained observations of Formative Caddo archaeology indicate they did not adopt some Mississippian material traits, and the ones they did adopt emerged at different times, scales, and intensities relative to much of the Southeast (Regnier 2017). Communities of the Arkansas drainage and Gulf Coastal Plain region thus utilized their social and ritual landscapes, settlements, and ideologies in fundamentally different ways from the Mississippian World.

Most Caddo researchers have used a cultural historical approach to understand the distribution of Formative Caddo fine wares (Perttula 2009). The presence of fine wares is used primarily as a diagnostic timeline marker (Perttula 2017). As a result, researchers associate all Caddo communities who possessed Formative fine wares as the same cultural group with identical practices and traditions. Until now, not much as has been done to understand how diverse social groups within the Caddo world produced, used, and distributed the same pottery. Girard et al. (2014:53) contended the spread of early fine wares is emblematic of a homogenous group identity. This notion assumes communities in both the northern and southern Caddo areas produced them, making it hard to observe any social variability between the two areas. Because culture historical approaches tend to mask social variability, archaeologists from the early 1960s started to seriously criticize its utility in archaeological interpretations.

From the 1960s through the 1990s, a new wave of archaeologists became disillusioned with the culture historical approach. They maintained that through the rigorous use of the scientific method, material culture could be used to understand past ways of life (Blitz 2010). This new way of thinking opened up a variety of research topics. For instance, Renfrew (1987:6) stated that the "New Archaeology [shift] has learned to speak with greater authority and accuracy about the ecology of past societies, their technology, their economic bases and their social organization." Processual archaeologists developed ecological approaches to understand how past people adapted to different environmental conditions (Muller 1997; Smith 1978). Local environmental factors became the primary catalyst by which different groups adapted to floodplain environments and then social ranking emerged (Muller and Stephens 1991). Many processual archaeologists considered external factors, such as long-distance interactions and exchange of pottery as secondary casual factors to environmental forces. As a result, resource stress and competition over those resources was seen as the forerunner of Mississippian origins (Scarry 1990, 1993).

While Smith's (1990) edited volume *The Mississippian Emergence* used similar local eco-demographic approaches to understand the organization of past groups, it set the stage for other archaeologists to criticize its interpretive utility. King and Meyers (2002:115) contended that ecological approaches excluded Mississippian-like groups who lived in the backwaters of the Mississippian world. They argued that comparing contemporary groups who lived in diverse ecozones, such as floodplain, upland, and bluff environments, would produce a better understanding of emerging Mississippian social forms (King and Meyers 2002:113). Other studies showed that several emerging groups did not cultivate maize as their staple subsistence economy (Fritz and Kidder 1993; King 2002; Jefferies et al. 1996; Regnier 2017). The main criticism of the ecological approach from an archaeological perspective is how it downplayed the role of population movements, long-distance interactions, and exchange of socially valuable objects (Wilson and Sullivan 2017). Caddo archaeologists also used eco-demographic approaches to understand Caddo formation. Schambach (1998) argued the Caddo emerged specifically from a distinct ecological zone called the Trans-Mississippian South just west of the Lower Mississippi Valley.

From the 1980s through the 1990s, archaeologists working in eastern North America began to replace ecological perspectives with political-economic perspectives (Anderson 1994; Brown et al. 1990; Pauketat 1994; Welch 1991). Researchers focused on chiefly power and used neo-evolutionary approaches to develop emerging Mississippian models constructed from Service's (1971, 1975) chiefdom model of political development. In this view, emerging Mississippian leaders obtained political power and authority by controlling the production and distribution of food surplus. Chiefs also possessed exotic materials, such as copper and shell, which visually communicated their power and authority over people of lower social ranks. Thus, the chiefdom model mainly focused on elite versus non-elite dynamics.

A prestige goods economy model was primarily applied to understand the political and economic developments of emerging Mississippian groups (Anderson 1994; Friedman and Rowlands 1977; Steponaitis 1981; Welch 1991). Simply put, the prestige goods model posited that people who controlled the access and exchange of exotic objects obtained political power. This approach emphasizes social inequality in emerging hierarchies, such as investments in mound construction, mortuary ceremonialism, and large-scale production of fine ware pottery (Anderson 1994; Welch 1991). In trying to produce a concerted understanding of Caddo emergence, Girard (2009:57) argued that a prestige goods model would explain the emergence of large mound centers and political elites who appropriated fine wares (i.e., the ones used in this study) to gain political authority over others. Girard et al. (2014:54) viewed the sudden appearance of fine wares as accoutrements of wealth and power. Following Brown's (2012) research at Spiro, I do not think Formative Caddo fine wares were used primarily to support a political hierarchy, at least in regards to ones recovered at ceremonial centers.

By the Late 1990s, archaeologists began criticizing the prestige goods model (Wilson 2017). They argued exotic Southeast Ceremonial Complex (SECC) objects were valued not for their potential exchange value; rather, these objects were important because they contained religious meanings and were used in ritual practices (Renfrew 2001). Many of these objects, like the ones found in the Craig Mound at Spiro, may have contained such inalienable qualities. Political chiefs did not control their production but ritual elites did. Others have shown crafted objects, such as red flint clay figurines at Cahokia or stone pallets at Moundville, played an important role in ritual practices (Marcoux 2007; Pauketat 1992).

This top-down approach to understanding emerging social complexity only reinforced the continued application of the chiefdom model in the Southeast and Midwest, including the Caddo area. For decades, archaeologists considered the number of exotic goods from the Craig Mound at Spiro as evidence of a dominant prestige good economy, controlled by an authoritarian figure with strong political and economic ties to other Mississippian groups (Brown 1996; Rogers 1983; Wyckoff 1980). It has been implicitly assumed that Spiro was a center of a chiefdom based on these Mississippian-like attributes, but recent studies have challenged this assertion (see Brown 2012). Marcoux and Wilson (2010) explained some archaeologists have inaccurately used the chiefdom model in emerging groups in the absence of direct archaeological evidence. This fostered the belief contemporaneous groups emerged more culturally similar than was actually the case (Wilson et al. 2006). This is especially true regarding the emergence of the Caddo and Mississippian worlds (Brown 2012).

Sullivan (2001, 2006) has shown that the chiefdom model highlighted male leadership, while significantly downplaying roles women played in pre-Columbian societies. Wilson and Sullivan (2017:7) explained the chiefdom model "obscured the processes by which Woodland era leveling mechanisms and egalitarian social relations were circumvented to generate Mississippian political hierarchies." I argue the chiefdom and prestige goods models do not explain the cultural and historical mechanisms by which people constructed ceremonial centers, produced the first fine wares, and obtained and maintained authority within the Caddo area. Kusnierz's (2016:39) research at Brackett, a Formative Caddo ceremonial center in eastern Oklahoma, emphasized that alternative approaches "are a necessary inclusion to broaden discussions by considering community-centered motivations behind leadership strategies and positions of authority."

Formative Caddo practices and traditions did not develop overnight. It took planning, investment, and the consensus of the community for someone to have political and/or ritual authority over others. Ritual elites/specialists who lived at ceremonial centers likely possessed unique skills, talents, and esoteric knowledge. Social entanglements with multiple histories and relationships with diverse groups likely constrained and defined the degree to which they had ritual power and influence over others.

Ritual Mode of Production and Distribution

Caddo archaeologists have concluded there was not a significant degree of craft specialization during the Formative Caddo period (Girard et al. 2014). Traditionally the idea of specialization for ritual use and distribution was thought to only be present in more developed or ranked societies (Van Keuren et al. 1997). In fact, craft specialization in societies with an emerging organizational complexity have been primarily attributed to economic or political factors, such risk avoidance, population increase, or aspiring charismatic leaders (Bell 1984; Blitz 1991; Price and Brown 1985;

Wilson 1999). I assert the production and distribution of early Caddo fine wares should be viewed primarily as an attempt to construct and support a political hierarchy. An alternative to a prestige goods model is the *ritual mode of production* in small-scale societies (Spielmann 2002, 2008). This approach argues that intensified craft production and distribution in small-scale groups is a social response to an amplified demand by individuals and communal ceremonial obligations (Spielmann 2002:195). Intensified craft specialization in small scale groups is not so much about meeting the demands of subsistence, but is instead about meeting the demand for "socially valued goods" used for ritual purposes. Central to this premise is an emphasis on the community in which these socially valued goods were produced and then distributed "as they fulfill ritual obligations and create and sustain social relations" (Spielmann 2002:196-167).

When examining the origins and spread of pottery in native North America (Sassaman 2004:39), reasoned that the ritual demand for pottery for ceremonial and mortuary purposes led potters to produce many more vessels. Saunders and Wrenn (2014) studied the ritual modes of production and distribution of a Late Archaic fine ware called Orange pottery in northeast Florida. Their findings suggested this early pottery may have been produced by potters strictly for ritual use and distribution across different drainages. Moreover, Miller (2014) investigated the ritual economy of bladelet production from Hopewell earthworks. Miller's findings suggested only a few craft specialists may have been responsible for the moderate production and distribution of the stone blades.

Motivated by this research, I use multiple lines of evidence to investigate our current understandings of emerging societies in the Caddo world as a means to show that a mode of ritual production and distribution was an integral way in which Formative Caddo groups created ceremonial obligations and maintained long-distance relationships with one another. To understand distinct Formative Caddo communities of practice in time and space, one must first have a clear understanding of the social and ritual contexts of ceramic production and distribution (Fenn et al. 2006). At the moment, archaeologists have a clearer understanding of the organization of pottery production and distribution in the southern Caddo area (Perttula 2013a; Selden 2013; Selden et al. 2014), but still lack the ceramic data necessary to understand pottery production and distribution in the northern Caddo area.

Before more fine-grained scales of pottery production and distribution can be recognized in the Caddo area, such as household and community scales of production (e.g., Abbott 2009; Costin 1991; Rice 1987; Sinopoli 1991), it is necessary to untangle the roles of ritual production and distribution by considering the northern and southern cultural areas as a whole (Renfrew 2001). Southeastern archaeologists have not only shown the major implications of such a perspective by highlighting contextual differences in ceramic use and the ritual motivations for production and exchange in a region with small-scale societies (Pluckhahn 2007; Wallis 2014; Wilson 1999), but they have also shown the power of using INAA as a way in which to understand the organization of production and distribution that emphasized unique perspectives of social interaction and ritual practices (Lynott et al. 2000; Pevarnik 2007; Wallis et al. 2010). This dissertation seeks to understand Caddo ritual mode of Formative Caddo fine ware production through a detailed INAA and stylistic study that will distinguish which communities of potters produced them across this region. Whether northern and/or southern Caddo groups produced Formative fine wares, this study will be informative about the early development and maintenance of ritual practices and traditions in the Caddo area.

The next section historicizes the Caddo emergence. I argue placing the emergence of the Caddo within a localized history is the most effective way to highlight how emerging groups negotiated their social and ritual relationships in a time of heightened long-distance interactions, intensified ritual practices and traditions, the creation of new ceramic technologies, and community formation.

Historicizing the Formative Caddo Landscape

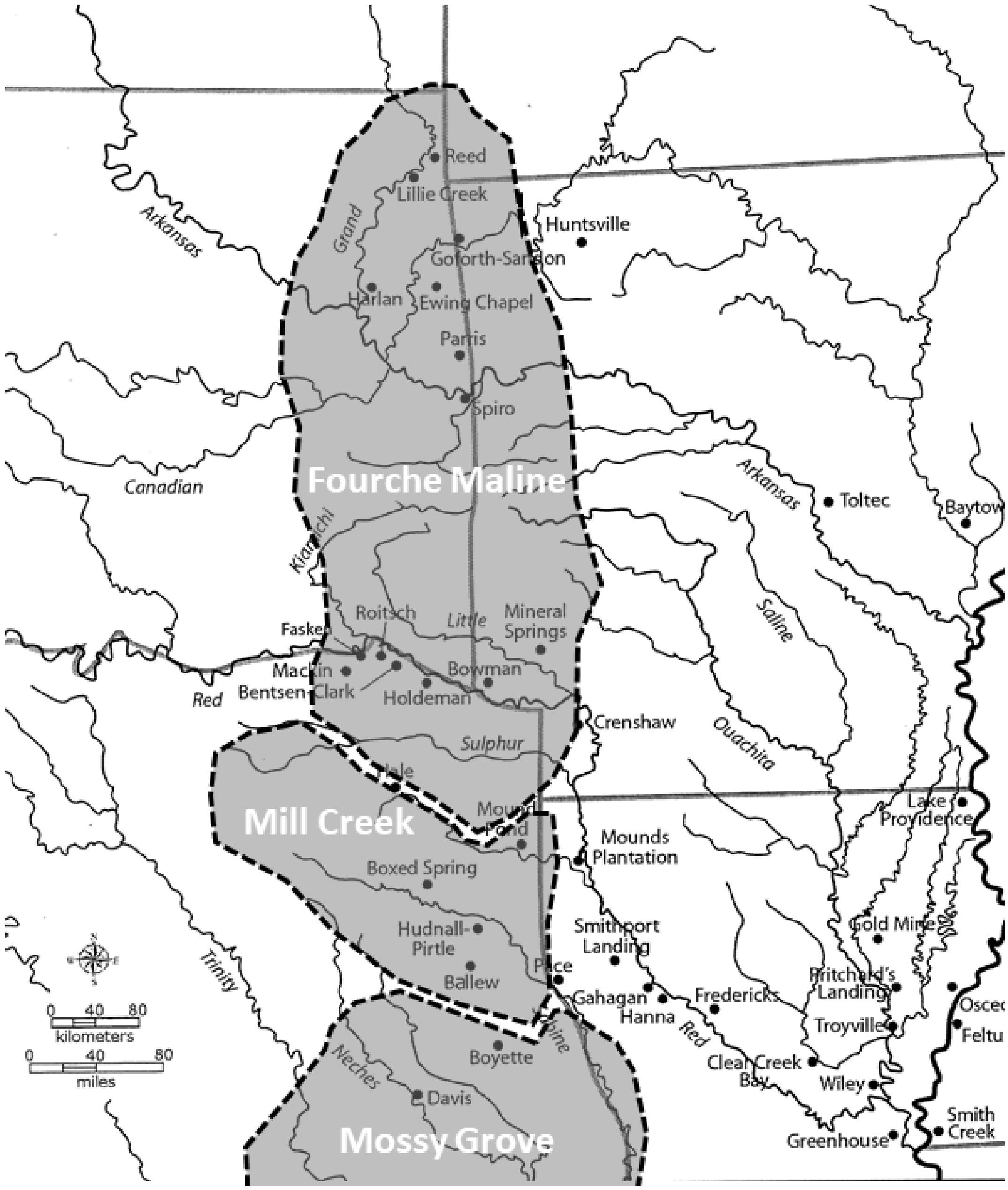
In this section, I synthesize a narrative of Caddo emergence that stresses the historical contingency of Formative Caddo fine ware production and distribution in multiple communities of practice. I use archaeological evidence to examine the Late Woodland to Formative Caddo transition and their interactions with other Southeast groups to emphasize the diversity of the Formative Caddo ritual landscape. The main purpose of this section is to show the Caddo emergence involved new practices, traditions, and cosmologies developed not only by one Late Woodland cultural base but through dynamic social entanglements among diverse groups of people.

Historicizing Caddo Emergence

By the early 2000s, archaeologists became dissatisfied with simplified models of Mississippian emergence. They started to consider novel approaches that highlighted how multiple histories and newly formed social interactions influenced the cultural developments of emerging groups (Cobb and Garrow 1996; Pauketat 2000). This completely transformed how intentionality was conceptualized, which scholars often accredited to emerging leaders to comprehend the origins of Mississippian groups. Rather than a top-down approach, archaeologists incorporated a middle-ranged approach (e.g., Feinman and Neitzel 1984) that emphasized the influence local communities and long-distance interactions had in the formation of Mississippian groups (Cobb and King 2005; Pauketat 2008, 2009; Wilson 2010). This study takes a similar historical approach to understand the cultural developments of communities that lived in the northern and southern Caddo areas.

For years, Caddo researchers argued that northern and southern Caddo communities developed from a single Woodland period group, the Fourche Maline culture, around A.D. 800-850 (Rose et al. 1998; Schambach 2002:91). For example, Schambach (2002:108) has maintained that “most archaeologists interested in Caddo culture understand that the Fourche Maline culture is ancestral to Caddo culture in northeastern Texas, southwestern Arkansas, northwestern Louisiana, and eastern Oklahoma.” The emergence of the Caddo was not a linear cultural development. Whatever the answers are to their emergence will no doubt be complex. This regional-scale study is an excellent starting point to understand the early history of the Caddo. To understand Caddo emergence and cultural variability between the northern and southern areas, there needs to be a deeper look into local Late Woodland period cultures. I propose that Formative Caddo populations arose out of these socially diverse Late Woodland groups who inhabited the Caddo region for some time and had fluid social and territorial boundaries (Figure 2.1).

Figure 2.1. Regional map showing the location of Formative Caddo sites and the



boundaries of Late Woodland period cultures (adapted from Girard et al. 2014: Figure 2.1 and Perttula 2017: Figure 21).

Woodland Period Ancestors of the Northern Caddo Region

Both Bell (1984) and Girard (2009) have argued that the origins of northern Caddo people, who built and inhabited Arkansas Valley ceremonial centers, lie with the northward spread of Fourche Maline groups. This idea is in opposition to Schambach's (1998:xiv) argument that "Arkansas Valley itself was never occupied by Fourche Maline peoples; rather, it harbored a population of 'emergent' Mississippians who were physically and culturally distinct from the Fourche Maline people in the Ouachita Mountains to the south of the Arkansas Valley." Schambach (1993, 2002) claimed that an early migrant Mississippian group, ancestral to the Tunica, were the inhabitants of the Spiro site. I must reject Schambach's notion. By the time Mississippian groups emerged in the Lower Mississippi Valley, inhabitants of the northern and southern Caddo areas had already adopted and developed a diverse set of localized ideologies, rituals, and material traits. This is not to say that interregional interactions did not shape the Caddo to some degree. Formative Caddo people tethered these newly formed practices and traditions to localized cultural developments, which occurred much earlier in their history than the western expansion of Mississippian-like traits. This view is echoed by a multitude of other archaeologists (e.g., Bell 1980, Brown 1984; Bruseth 1998; Galm 1978; 1984; Perttula 2012; Regnier 2017; Rogers 1991, Wyckoff 1982).

Fourche Maline Culture, A.D. 100-800. Fourche Maline communities marked the landscape with thick deposits of midden debris. Midden mounds are concentrated in the northern Ouachita Mountains of eastern Oklahoma along such streams as Fourche Maline Creek and the Poteau River. The Poteau River flows north into the Arkansas River 10 miles downstream from the Spiro site. Archaeologists once considered these mounded midden deposits as nothing more than trash heaps (Brown et al. 1978). However, Fourche Maline people typically buried their dead within them. Rowe (2014) argued these midden deposits should be characterized as burial mounds, not viewed as trash deposits. By the middle Fourche Maline period, the number of communal cremations included only certain individuals with indices of prestige. These "ranked" individuals were cremated in quart-sized pits with small caches of objects, such as copper beads and well-made Marksville Stamped jars and bowls. By the late Fourche Maline period (A.D. 600-800), burials commonly contained mortuary offerings, usually ceramic vessels placed around the head. As discussed by Schambach (1982), this mortuary practice was the harbinger of the Formative Caddo burial tradition where individual burials had abundant pottery vessels and other material types as funerary offerings.

The lower portions of midden burial mounds usually contained earlier Fourche Maline flexed burials and evidence of everyday activities, including hearths and habitation surfaces. The lower parts of the mounds also contained pre-pottery Fourche Maline tools, such as ground stone and Gary points. Faunal remains in these early deposits consisted mainly of deer, small game, and a variety wild plant foods. The Wann site (34LF27) is one of the only early Fourche Maline sites that pre-date A.D. 400 in the Arkansas Valley (Bell 1984). Comparison of the Wann site to later Fourche Maline settlement sites show very little change in material culture, with the exceptions of the increased use of plain grog-tempered pottery (Galm 1978).

The uppermost deposits of Fourche Maline burial mounds indicate that occupants began to make thick, grog-tempered pottery (Williams Plain), hunted with the bow and arrow, used double-bitted stone axes, and increased their use of grinding stones (Galm 1984). This change in material traits is evident at the Sam (34LF28), Mackey (34LF29), and Akers (34LF33) sites in the Poteau River basin (Bell 1984). By A.D. 700, Fourche Maline people produced decorated ceramic vessels with incised parallel and diagonal lines (Bell 1984). Their adoption of a burial mound tradition, grog-tempered pottery, the bow and arrow, and stone hoes indicate the emergence of trans-egalitarian horticulture societies (Leith 2011).

Woodland Period Ancestors in the Southern Caddo Area

The southern Caddo area stretches north to the Ouachita River and south to the Neches River in eastern Texas, also covering southwest Arkansas, southeastern Oklahoma, and northwestern Louisiana (see Figure 1.1). At least three different Woodland period cultures existed in the southern Caddo area, including the Fourche Maline, Mill Creek, and Mossy Grove cultures (Ellis 2013; Schambach 1998; Story 1990).

Fourche Maline Culture, A.D. 100-800. In the southern Caddo area, Fourche Maline people inhabited the Red and Sulphur River basins. Most Fourche Maline sites only contain pits and hearths, and only rarely are cemeteries and structural patterns present at these small village sites (Schambach 2002). Fourche Maline potters in the southern area also produced thick grog-tempered Williams Plain vessels, with fewer examples of decorated wares, such as Marksville and Coles Creek Incised (Perttula 2017). Bowls and jars were used for utilitarian and mortuary purposes.

The Crenshaw site (3MI6) along the Great Bend of the Red River in southwestern Arkansas is the most well-known Fourche Maline site in the southern

Caddo area. Late Fourche Maline people at Crenshaw built at least three mounds, used several cemeteries, and had a habitation area (see Chapter 3). Fourche Maline people used this site for habitation and mortuary ceremonialism for over 500 years (Samuelsen 2014; Schambach 1982, 2002). Plain grog-tempered ceramics dominate Crenshaw's ceramic assemblage. Crenshaw participants also used and deposited Lower Mississippi Valley style ceramics in burials, such as Coles Creek Incised and French Fork Incised. As Regnier (2017:190) pointed out, "while Coles Creek ceramics are found in varying frequencies at early Caddo sites, the relationship between Early Caddo developments and [Lower Mississippi Valley] LMV Coles Creek groups remain unclear."

Mill Creek Culture, A.D. 100-800. The Mill Creek culture is poorly understood. The most well-known Mill Creek site is the Herman Bellew site (41RK222) on Mill Creek, a tributary of the Sabine River (Rogers et al. 2001). This site lies not far south of the Mound Pond, Hudnall-Pirtle, and Boxed Springs mound sites in the Big Cypress and Sabine River basins (see Chapter 3 for more information on the Boxed Springs site). During several hearth and large storage pit features were excavated,Perttula (2017:46) noted the presence of these large storage pits could suggest extended stays by Mill Creek groups. The pits contained the charred remains of goosefoot seeds, hickory nuts, and walnuts, which indicated that the inhabitants depended mainly on uncultivated plant foods. Other well-known Mill Creek sites include Broadway (41SM273), Resch (41HS13), and Hawkwind (41HS915) (see Perttula 2017). Another attribute that makes the Mill Creek Culture distinct from their Fourche Maline neighbors is that they did not produce or use any thick Williams Plain ceramics. Instead, these communities produced a diverse ceramic assemblage with more decorated attributes, such as thinner grog-tempered plain vessels and designs with U-shaped line and circular punctations (Girard et al. 2014:34). Due to the lack of horticultural tools, such as ground stone and chipped stone hoes, there is no strong evidence that Mill Creek people engaged in horticulture practices (Ellis 2013). Perttula and Nelson (2004:156) argued that:

> Mill Creek groups were more residentially mobile than Fourche Maline groups in the Arkansas Valley, with small middens and settlements, none occupied for particularly long times. To date, no structures have been identified at any Mill Creek culture site, nor have any burials or burial mounds been found in the region. The occurrence of ceramics—albeit not necessarily in large quantities at any Mill Creek culture site—does point to the development of some occupational redundancy (i.e., tethering to certain locations and a repeated and consistent use of those locations) in site use in Woodland period times.

Mossy Grove Culture, A.D. 100-800. The Mossy Grove culture occupied "an area from the lower Brazos River to the Sabine River from west to east, and from the upper Neches/Angelina drainage and the vicinity of Logansport, Louisiana, on the Sabine River, south to the Gulf Coast" (Girard et al. 2014:34-35). Most of the inland groups in East Texas resided in the Neches and Angelina river basins, not far from the George C. Davis site (Story 1990). What distinguishes Mossy Grove groups from their northern Mill Creek and Fourche Maline neighbors is that potters used an un-tempered sandy clay paste to manufacture vessels. The principal type in this ceramic tradition is Goose Creek Plain. Mossy Grove potters also produced vessels with incised and punctated designs, known as Goose Creek Incised (Perttula 2017; Story 1990) as well as red-filmed vessels. Newell and Krieger (1949) recognized that the pre-Caddo inhabitants at George C. Davis produced and used the same sandy paste pottery at two early occupation areas at the site. Mossy Grove cultural components have been discovered at other sites later occupied by Caddo peoples, such as Deshazo (41NA27), Boyette (41NA285), and multiple sites at Lake Sam Rayburn on the Angelina River (Girard et al. 2014). These groups left behind fire-cracked rock concentrations and used ground stone tools. Perttula (2017) noted that Mossy Grove groups in East Texas did not stay long enough at habitation sites to leave traces of middens, which suggests a highly mobile lifestyle.

The Mossy Grove people that inhabited the Neches, Angelina, and Sabine River valleys constructed burial mounds over burial pits with cremated remains. Schambach (2002:111) also noted that "small additional deposits of prestige goods that had been laid on intermediate surfaces, probably along with fragmentary human remains, and covered with soil as the mounds were built." By A.D. 400-700 Mossy Grove inhabitants at sites, such as Coral Snake and Jonas Short started including prestige objects in burials, such as copper ornaments, quartz pendants, and well-made vessels (Corbin 1998).

Contested Late Woodland Landscape

There is bioarchaeological evidence to suggest that by the Late Woodland period, before Caddo emergence, groups who inhabited the Arkansas Valley region engaged in feuding. There is considerable evidence of violence-related trauma in Fourche Maline burial mounds at sites in the Wister Valley (Rowe 2014). For example, Rowe (2014:122) documented high levels of skeletal trauma and nutritional deficiency at the Akers site (34LF32). Other Fourche Maline period sites with increased rates of violence-related deaths included McCutchan-McLaughlin (34LT11) (Powell and Rogers 1980), Scott (34LF11) (Bell 1953), DeHart (34LF17) (Rowe 2014), Wann (34LF27) (McWilliams 1970), Sam (34LF28) (Rowe 2014), and Mackey (34LF29)

(Burns 1994). The high levels of skeletal stress Rowe and others discovered suggest the existence of a landscape progressively contested by different Late Woodland groups (Rowe 2014:121).

Late Fourche Maline groups also exhibit multiple signs of nutritional stress (Rowe 2014:149). Rowe maintained that Fourche Maline populations engaged in feuding due to population growth and competition over resources. Perttula (2017:42) noted that severe droughts plagued the Caddo region during the end of the Late Woodland period, around A.D. 850. Dye (2013:135) stated that social conflicts over resources due to severe environmental conditions tend to result in archaeologically visible social, material, and settlement transformations. In Chapter 7, I argue that these social conflicts among different groups during the Late Woodland period, in addition to resource and environmental stress, influenced the development of different Caddo communities of practice. The next section examines the Caddo emergence and discusses the cultural and material diversity between the northern and southern Caddo areas, especially regarding Formative Caddo fine ware contexts.

Formative Caddo Emergence and Cultural Variability

In the 10th and early 11th centuries, groups in the lower Ouachita and the Red River began to construct mound centers, such as at the Crenshaw and Mounds Plantation sites, while groups in the Arkansas Valley constructed mound centers such as Harlan and Spiro. Ceramic and mortuary evidence from these ceremonial centers indicate people used them for a variety of social and ritual activities, such as feasting, burying the dead, and perhaps as a way to maintain group solidarity and exchange ritual knowledge (Rolingson 1982, 2012). Ceramic studies and mortuary analyses remain the best ways to understand the ritual complexity of the Caddo (Girard et al. 2014).

During the Formative Caddo period, larger villages with more evidence of ritual activities begin to appear around the Caddo area. Many of the village sites are single-family dwellings or farmsteads as seen along the Red River and northwest Louisiana, such as the Mounds Plantation site (Girard 2009). Some communities arranged their households around a courtyard, as evidenced by the School Land I site in Oklahoma (Duffield 1969). Early inhabitants covered their cultural debris with earth caps or platforms; special structures were then built and continually burned and buried (Trubitt 2009). People started to build structures with extended entrance ways known as charnel houses in the northern Caddo area.

Development of Ceremonial Centers

By the end of the Late Woodland period, a new architectural pattern developed in the Caddo region. By A.D. 900, Formative Caddo people built ceremonial centers dominated by burial and rectangular platform mounds surrounding open plazas (Girard et al. 2014). The platform mounds often supported wattle and daub buildings but not always. Many are built over Late Woodland habitation areas, cemeteries, and special-purpose buildings, suggesting the importance of connecting to a localized past (Girard 2009; Perttula 2017). The exact nature of their emergence remains to be determined. The Toltec Mounds site of the Plum Bayou culture, in present-day central Arkansas, is one of the earliest ceremonial centers just east of the Caddo world. Toltec dates from about A.D 700 – 1050, which precedes the earliest Caddo centers by about 200 years (Rolingson 2012). Its inhabitants constructed 14 mounds surrounding two plazas.

Rolingson (2012) discovered the layout of the mounds was oriented to the moon's maximum south rise. Considering the early construction, layout, and relative proximity to the Caddo region, increased interaction with Toltec people might have influenced early Caddo mound construction. Formative Caddo people probably visited Toltec and brought back sophisticated knowledge of geometry and mensuration to construct mound centers (Regnier 2017; Regnier et al. 2017).

The construction of multi-mound centers marked a clear deviation from Late Woodland practices and traditions (Girard et al. 2014; Perttula 2017). The construction of platform and burial mounds during the Formative Caddo period may be seen as expressions of a new cosmological worldview. Ritual elites/specialists may have used these areas to consolidate ritual power (Perttula 2017). Ceremonial centers with multiple mounds were spaced out along the Arkansas, Ouachita, Red, Big Cypress, Sabine, and Neches river drainages, and they represent a highly integrated regional network of interaction and perhaps the centers of complex exchange networks of socially valued objects (see Thurmond 1990). Because of the considerable distances between the centers, Girard (2009:56) argued they were attempts of local social integration.

More recently, archaeologists have maintained the layouts of early mound centers among northern and southern Caddo areas look similar enough that they conformed to a broadly shared, relatively formal plan (Girard et al. 2014). These sites clearly served as the central places of ritual activities and communal gatherings (Girard 2009). Few people actually lived in the ceremonial centers—probably only religious leaders/specialists and their families (Kusnierz 2016). The majority of the early Caddo people lived in scattered outlying settlements and aggregated to these centers periodically for ceremonies and feasts (Rogers et al. 1989). Sites, such as Spiro, Harlan, and Brackett in Oklahoma, Crenshaw in Arkansas, George C. Davis in Texas, and Mounds Plantation in Louisiana had developed into multiple mound ceremonial sites by the 12th century (Perttula 2012).

Mortuary Patterns

Another important ritual tradition of the Formative Caddo is the practice of multiple burials. At southern Caddo ceremonial centers, shaft tombs, which were the mass burial of multiple individuals, were constructed by digging deep pits into previous mound levels (Regnier 2017). Many shaft tombs also had upright cedar poles that served as spatial markers and cosmological referents of the *axis mundi* (Brown 2012; Dowd 2012). The presence of Formative Caddo fine wares suggests that some of these tombs were constructed around A.D. 1000. Southern Caddo ceremonial centers, like Crenshaw and George C. Davis, had a burial tradition that included mass burials. For example, Crenshaw's Mound C contained two mass burials, one with 27 and the other with 43 individuals. Abundant grave goods, such as Formative Caddo fine wares, utility wares, pipes, beads, copper plates, hypertrophic Gahagan bifaces, and engraved shell items accompanied these burials (Bell 1984; Jackson et al. 2012).

Northern Caddo burials consisted of bundled individuals in which many were placed on litters as group burials (Brown 1996). Many of these individuals were interred in conjoined burial mounds. Conical burial mounds of which have multiple conjoined lobes are the most distinctive mortuary tradition of northern Caddo ceremonial centers. Conjoined burial mounds are documented at Spiro, Harlan, Reed, and Norman. The only ceremonial center used in this study that does not have a conjoined burial mound is Brackett. Although Howard (2001) speculated that a burial mound may have existed at Brackett but was destroyed by the landowners. Other archaeologists have supported this position (Brown 1984; Kuznierz 2016; Regnier et al. 2017). The similarity in burial mound construction indicates Arkansas drainage communities participated in a mortuary tradition that reflect shared symbolic and cosmological references (Hammerstedt and Savage 2013, 2014). Burial goods other than Formative fine wares include black stone beads, large bifaces, galena nodules, exotic bifaces, plain earspools, copper pins, and t-shaped pipes (Regnier et al. 2017).

Emergence of Fine Wares Revealing Cultural Variability

Formative Caddo potters produced a variety of ceramic fine wares, which include Holly Fine Engraved, Spiro Engraved, Hickory Engraved, and Crockett Curvilinear Incised types (Figure 2.2). The styles of these fine wares also marked a clear deviation from Late Woodland ceramic traditions, likely in response to a heightened expression of ritual activities in the Caddo area that involved their use, display, and symbolic meanings to specific cosmologies. Potters made these vessels with thin walls and polished surfaces with an array of incising, excising, engraving, and punctating. They came in a diverse set of forms, such as bowls, carinated bowls, bottles, seed jars, beakers, and compound vessels. They were also not large vessels used for storage or cooking but made to be portable serving vessels for travel and to be used in a variety of social and ceremonial activities (Girard et al. 2014).

Figure 2.2. Formative Caddo ceramic types selected for study: (a) Spiro Engraved vessel from the Spiro site, (b) Holly Fine Engraved from George C. Davis, (c), Hickory Engraved from Harlan, and (d) Crockett Curvilinear Incised from the Spiro Site.

The current hypothesis concerning the emergence of fine wares stresses that while there is some variation in ceramic decoration and vessel form (Perttula 2011), Caddo communities did not develop any noticeable degree of ceramic specialization until after ca. A.D. 1200 (Girard et al. 2014:54). Furthermore, archaeologists have argued that Formative Caddo ceramics are not emblematic of local group identity. Rather, their ownership and use are viewed as means by which people obtained status as well as a way in which to engage in broader social and religious contexts (Girard et al. 2014). I believe that a deeper look into how socially diverse Caddo communities produced, used, and deposited these fine wares in various social and ritual contexts may produce a better understanding of the development of large-scale fine ware production and distribution in small-scale societies.

Formative Caddo Pottery Contexts in the Southern Caddo Area

In the southern Caddo area, Formative Caddo people did not restrict the use of fine wares to ceremonial and ritual contexts. Instead, they used and deposited them at domestic villages, as well as in middens, sub-mound features, off-mound pit features, mound features, and a variety of mortuary contexts. In the southern Caddo area, it seems the use of these vessels was not socially restricted. For example, a number of domestic sites in Northeast Texas and Southeastern Oklahoma yielded Formative Caddo ceramics, a few examples worth mentioning here. Site 34MC762 is located on an alluvial terrace along the northern portion of Parker Creek in the Ouachita National Forest in McCurtain County, Oklahoma (Etchieson 2001). Seven 1 x 2 meter units exposed an intact midden deposit that contained a Crockett Curvilinear Incised sherd as well as other early Caddo ceramics (Etchieson 2001:14). The Boatstone site is a nonmounded Caddo site along Iron Bridge Creek and the Sabine River in Gregg County, Texas. Surface collections from the Boatstone site contained one example of a Holly Fine Engraved sherd (Perttula 2014a). Perttula (2014:3) posited that the Holly Fine Engraved sherd suggested a Caddo occupation dated ca. A.D. 850. The Horton site (41CP16) is on an upland slope by an old channel of the Big Cypress Creek in the East Texas Pineywoods. Surface collections and artifacts from private collections indicated the site had a Formative Caddo component. One fragment of a carinated bowl had engraved elements that resembled a Holly Fine Engraved motif (Perttula 2014b:28). 41LR351 is a Caddo village site along Pine Creek, a tributary of the Red River in Lamar County, Texas (Perttula 2013). Sherds from this site had Holly Fine Engraved and Sanders Engraved decorative elements, likely manufactured from ca. A.D. 850-1300. Most of the ceramics were deposited in the same contexts with burned house floors and with other structural materials just above the house floor (Perttula 2013b:9). Furthermore, the New Hope site (41FK107), just west of Big Cypress Creek in Franklin County, Texas, also had a Formative Caddo component with at least two Holly Fine Engraved examples (Perttula and Nelson 2012:59-60). Excavations at the Wolf site (41SM195) in Smith County, Texas, exposed an intact midden feature where examples of Holly Fine Engraved sherds were found (Walters 2003:12). Additionally, during a shovel test survey at the Polk Estate site in Camp County, Texas, Perttula and Nelson (2006:15) discovered a midden deposit that contained a Spiro Engraved body sherd, most likely the remnants of a beaker. Finally, at the Gray Pasture site along Clark Creek in Harrison County, Texas, archaeologists excavated sixteen units, and the ceramics recovered from these units were from a significant Formative Caddo component, with

Holly Fine Engraved, Hickory Engraved, Crockett Curvilinear Incised, and Pennington Punctated-Incised sherds. While these examples are not an exhaustive list of all Formative Caddo village sites, they showcase Caddo peoples using fine wares in a variety of domestic contexts.

Formative Caddo fine wares were also recovered from multiple ceremonial contexts at mound sites in the southern Caddo area. Individuals utilized them for more than mortuary purposes. For instance, the Boxed Spring site (41UR30), located in the Sabine River basin in Northeast Texas, consisted of at least four mounds, an off-mound cemetery, and several occupational areas. Most of the early fine wares were recovered from the mound and off-mound mortuary contexts. They included Hickory Engraved, Spiro Engraved, Holly Fine Engraved, Holly-Spiro Engraved, and Crockett Curvilinear Incised vessels (Perttula et al. 2000). More than one quarter of the decorated sherds recovered from an off-mound midden area were also early Caddo fine wares. These diverse contexts demonstrate Caddo peoples at the Boxed Springs site used these fine wares for a variety of social and ritual purposes (Girard et al. 2014:56).

The Hudnall-Pirtle site (41RK4) is on an alluvial terrace overlooking the Sabine River in Rusk County, Texas. This site is comprised of eight mounds surrounding a plaza with a significant village component to the southwest (Bruseth and Perttula 2006). During the 1989-1990 excavations, a variety of Formative Caddo fine wares were recovered, including Crocket Curvilinear Incised, Hickory Fine Engraved, Holly Fine Engraved, and Spiro Engraved vessel sherds. Most of the engraved wares were from the southwest village area (43 percent), while a very small percentage (< 2 percent) were recovered from Mounds A and F (Bruseth and Perttula 2006:93). Recent investigations at the Mounds Plantation site (16CD12), along an old channel of the Red River in Caddo Parish, Louisiana, encountered a sub-mound midden that yielded two Crockett Curvilinear sherds and a variety of Coles Creek Incised sherds (Girard 2012).

The George C. Davis site is a major early Caddo mound site along the Neches River in East Texas. Formative Caddo fine wares were deposited in a variety of contexts. The Caddo occupants deposited them in burials, especially Hickory Engraved bottles (Girard et al. 2014:56), and in several pit and midden deposits between and around Mounds A, B, and C (Creel 1979; Fields and Thurmond 1980). Ceramic types found in these pits included sherds from Hickory Engraved, Holly Engraved, and Crockett Curvilinear Incised vessels. Many of the pits contained charred faunal bone, charred nutshells, and burned sand suggesting inhabitants used them for cooking (Story 1981). The bulk of evidence from Red River sites demonstrates early Caddo peoples produced and used fine ware vessels as mortuary objects, but also used them as containers in a host of other domestic purposes.

Formative Caddo Pottery Contexts in the Northern Caddo Region

In contrast to the southern Caddo area, early fine wares in the northern Caddo region are exclusively recovered from mortuary contexts. The Harlan site (34CK6) is located in the Fort Gibson Reservoir along the Neosho River in northeastern Oklahoma. This site is comprised of five mounds, one of which is a conjoined conical mound, surrounding a plaza. Archaeological investigations into the mounds and off-mound areas uncovered copious amounts of ceramics. The Formative Caddo occupants restricted their disposal of fine wares to burial contexts. They used and deposited only plain grog-tempered ceramics in pits and structures (Bell 1972). Recent research has shown the Harlan occupants numerous charnel houses to conduct mortuary rituals, which was central to activity at the site (Kay and Sabo 2006).

The largest ritual center in the northern Caddo area is the Spiro site (Brown 1996). The site consists of 14 house and burial mounds. The site is divided across an upper and lower terrace. The upper terrace has main mound group surrounding a plaza, while the lower terrace includes a conjoined conical mound called the Craig Mound and two house mounds called the Ward mounds to the south. All Formative Caddo fine ware types from Spiro were recovered in Craig mound burials, which date to A.D. 1000-1450 (Brown 1996, 2012; Clements 1945; Orr 1946; Rogers 1991; Rogers et al. 1989; Rohrbaugh 2012; Rogers 1982; Rogers et al. 1980). Many of the Formative Caddo fine wares were in grave lots that postdate A.D. 1200, which suggests these ceramics were heirloom items deposited to mortuary contexts in the Craig Mound. Brown (2012) has researched the ritual placement of Craig Mound objects. His findings suggest that the variety of ways in which participants positioned sacred objects in time and space represented cosmological narratives. Early fine wares have not been recovered from other contexts at Spiro. Plain grog- and grog/shell-tempered ceramics dominate (at approximately 98 percent) the assemblages in the house mounds and habitation areas (Brown 1996:28-29).

The Brackett site (34CK43) is another early Caddo ceremonial center situated along the Baron Fork Creek, a tributary of the Illinois River, in Cherokee County, Oklahoma. This site has one mound, a cemetery, and a sizable village area with at least eight buildings (Howard 2001). Brown (1984) noted the cemetery area could have been a mound at one time, but because of agricultural activities, that is impossible to confirm.

Brackett has not been extensively excavated. According to ceramic provenience data, Formative Caddo fine wares have only been recovered from burial contexts, while utility wares dominantly in the residential area (Bareis 1955; Kusnierz 2016).

Finally, the Reed site (34DL4) has seen the least amount of archaeological attention when compared to other ritual centers but is important site for trying to understand the organization of Formative Caddo pottery production within and between the northern and southern Caddo areas. The site is along the Illinois River in Delaware County, Oklahoma, and includes a platform mound, burial mound, and habitation area. Purrington's (1971) research of the Reed site indicate that fine wares were also restricted to burial contexts, while only utility wares were found in the midden and habitation areas. Purrington (1971) acknowledged ceramic provenience information from the Reed site is severely lacking, so a complete ceramic reanalysis of the site would be necessary to determine the exact contexts of fine ware sherds (see Regnier et al. 2017).

This section has shown the northern and southern Caddo areas utilized Formative Caddo pottery for different social and ritual purposes. As Perttula (2013a:205) stated, it is likely groups in the southern Caddo area were producing fine wares at the "household or community level, and then distributed and used locally, with an unknown quantity of that pottery being made for trade or exchanged with neighbors, both near and far-flung." If the stylistic study and compositional analysis reveal southern Caddo potters produced the Formative Caddo fine wares found in the northern Caddo area, it would be evidence potters made them in part to be exported to distant ceremonial centers where ritual specialists used them for mortuary activities. It would also explain why Arkansas Basin individuals who had access to this pottery used and deposited them differently. Because ritual specialists who resided at northern Caddo ceremonial centers would have used the non-local vessels as mortuary offerings, it then suggests they imbued them with different meanings and connotations. These ritual elites may have controlled the access, circulation, and administered the ritual knowledge they possessed. Nevertheless, the INAA and stylistic analyses in this study have the potential to reconstruct how different Caddo communities with distinct ritual structures, modified, exchanged, and used their Formative Caddo fine wares for their traditions and practices.

Schambach (1997) suggested potters produced Caddo fine wares as objects to be exchanged with people who occupied northern Caddo ceremonial centers. I hypothesize that potting communities located somewhere in the southern Caddo area produced them, not only for a variety of local domestic and ritual purposes but as tools to develop a centralized system of mortuary gift exchange at ritually important ceremonial centers to the north. Ultimately, this implies that Formative Caddo ceramics in the Arkansas River drainage were vessels of non-local manufacture exchanged in an effort to maintain the newly formed ritual ideology of the region.

Cultural Variation between the Northern and Southern Caddo Areas

Many archaeologists would agree the Caddo shared some cultural practices between the northern and southern areas, such as the construction of ceremonial centers (Perttula 2012). The widespread distribution of Formative Caddo fine wares has also been considered an important shared tradition that culturally linked the two areas together (Girard et al. 2014). Regnier (2017:190) stressed, however, that “the distinct differences between the two Caddo areas once again underscore the diversity of cultural practices across the Caddo area.” As this dissertation will show, there is an immense amount of contextual variability in pottery distribution, use, and deposition that has not yet been considered in any detail. We are just beginning to realize that significant variations existed, which will ultimately force archaeologists to consider the ritual complexity and diversity among separate Formative Caddo groups. In this section, I discuss some of the key archaeological debates surrounding Caddo cultural variability.

Cultural variability between the northern and southern Caddo areas has been a controversial and hotly debated topic in recent decades. Archaeologists have begun to question if the northern Caddo area can even be considered culturally Caddo (Schambach 1990). Girard et al. (2014) examined the controversy surrounding the distinction between the northern and southern Caddo areas and noted that the northern Caddo area has been the most problematic when compared to the southern Caddo area. This problem arose from the research done by several archaeologists that studied the material culture from these areas, which caused different ideas of Caddo’s culture history to emerge.

Orr (1952), Bell (1952), and Brown (1996) have asserted that the Arkansas Valley groups were Caddo and should be included within the broader Caddo world and did not see an issue including the Arkansas Valley groups into the larger Caddo realm; there is not enough evidence to do otherwise. Still, there has not been a consensus about Arkansas Valley groups and their membership as a Caddo population. This has fueled several debates. Schambach (1988, 1990, 1993) has shared his hypothesis regarding the formation of Arkansas Valley groups. He argued that the Arkansas Valley communities should not be treated as part of the Caddo's northern region. He proposed to rename the northern Caddo areas as the "Arkansas Valley Tradition," and places the origins of this group, not with local Fourche Maline ancestors, but with Lower Mississippi Valley groups, most likely Coles Creek people to the east (Schambach 1990). Schambach further asserted that Arkansas Valley people were the antecedents of the Tunica. Rogers (1991) and Brown (1991) agree that many differences existed between the south and the north areas, but they did not believe there was enough evidence to exclude the Arkansas River people from the rest of the larger Caddo population.

In Bell's (1972) publication on the Harlan site, he argued Formative Caddo communities in the northern and southern Caddo areas developed distinct cultural and material traits. Later, in a discussion of Spiro, Bell (1984) studied earlier Spiro I (dating from ca. A.D. 1000-1100) and II (dating from ca. 1100-1250) phase burials and contended that Arkansas Valley groups represented northern Caddo people. This he believed to be a time of the Arkansas Valley's peak cultural and ritual complexity. Trade and exchange of materials and knowledge came from all over the Southeast as well as in some instances from the Southwest (Brown 2012). The Arkansas Valley had sites ranging from large ceremonial centers to small habitation sites and farmsteads. Many cultural traits are associated with the Spiro culture, such as the use of litter burials, rectangular buildings, shell gorgets, engraved whelk shells, ceremonial structures, effigy pipes and figurines, wooden figurines, and copper plates. Iconographic studies have shown that motifs adorned on Formative Caddo fine wares were also duplicated on a number of large engraved lightning whelk shells (Phillips and Brown (1984). Contrary to Schambach (1990), Bell (1984:221) proposed that Arkansas Valley people should be called “Arkansas Valley Caddoans.” Even though Bell’s research highlighted many cultural and material differences between northern and southern Caddo groups, he still considered the Arkansas Valley the northern boundary of the Caddo.

Schambach (2000, 2003) argued against Rogers’ and Brown’s interpretation and continued to hold that the Arkansas Valley people should not be viewed as Caddo. Schambach’s (1998) notion that the Arkansas Valley tradition were ethnically and culturally similar to the Lower Mississippi Valley Tunica has been seen by others (e.g., Rogers 2009, Brown 2001) as an exceedingly simplistic explanation. From Schambach’s point of view, the Arkansas Valley people had a fixed social boundary that did not include the Caddo, as well as a narrowly straightforward history of migration and diffusion. The Spiro site has been the primary basis for Schambach’s claim that people living in the Arkansas Valley were not Caddo. Schambach (1990) viewed the Spiro ceremonial center as Mississippian. He believed that there were significant cultural and material differences between Spiro and the rest of the Caddo world. Schambach reasoned that the Arkansas Valley Caddo concept became popularized by the Caddo-made material recovered from Spiro. In his mind, the archaeology of the Arkansas Valley being considered Caddo has been entrenched in our archaeological interpretations since the WPA era excavations, and arguments that have tried to argue otherwise have been reaffirmed by Caddo archaeologists for far too long (Girard et al. 2014; Perttula 2012).

Schambach further divided the northern region into three sections: 1) an Ozark Highland that has a Mississippian tradition (which includes northeastern Oklahoma, northwest Arkansas, and southwest Missouri), 2) an Arkansas Valley Proper (which include eastern Oklahoma that harbored Lower Mississippi Valley peoples, like Plum Bayou and Spiroans), and 3) the Ouachita Mountain Region where the northernmost Caddo were living. Using this foundation, Schambach described a history of migration and displacement. During Spiro Ia and Ib (A.D. 1000-1100) of the Spiro occupation, Caddo people built the upper terrace portion of the site. He considered this part of the site to be Caddo, even though this part of Spiro is the most "Mississippian-like" in regards to the mound arrangements around a plaza. Schambach explained that a Lower Mississippi Valley group went across the Arkansas River and dispersed the Caddo groups who lived at Spiro. Once they were driven out, the Mississippian group set camp at the lower terrace of the Spiro site and built the Craig mound and resided in a village to the south. During the collapse of the Spiro site, around A.D. 1450, the Mississippian group decided to migrate back down the Arkansas River and eventually became the historic Tunica. One of his rationalizations on why a Mississippian group built the Craig Mound is revealing. He rationalized that most of the pottery found in Craig Mound was shell-tempered and from that, he asserted a Mississippian group had to be responsible for its construction. However, over 90 percent of the pottery in the Craig mound is grog-tempered (Brown 1996). Many of these pottery vessels were heirloom items, with some being hundreds of years old by the time people deposited them into the Great Mortuary, Hollow Chamber, and outlying burials in the Craig Mound (Brown 2012).

Rogers (1991) stated that Schambach's migration-displacement theory set Caddo archaeology back over 30 years. Rogers understood that many variations in practices and traditions existed, but agreed with Brown (1991) that these differences could indicate regional cultural variations across different Caddo communities. Rogers rejected Schambach's use of geographic determinism because he claimed that one region does equal one distinct ethnic group. Also, Rogers asserted that migration is not an appropriate method in which to frame the spread of Mississippian traits into the Caddo world. Rogers argued that the Arkansas Valley people likely developed from previous Fourche Maline groups.

Summary

Cultural variations existed between Caddo groups living in the northern and southern Caddo areas. A broad comparison of these two regions highlights a shared ritual horizon with other contemporary groups in the Southeast. I argue that diverse Late Woodland groups in a likely contested landscape influenced the development of distinct practices and traditions among northern and southern Caddo communities. At the moment, I agree with Rogers' and Brown's assumptions that we are currently not at a point to speculate with certainty that Arkansas Valley groups in eastern Oklahoma are ethnically different from southern Caddo groups.

I am also not comfortable with culturally designating northern Caddo people as "Mississippian" or the ancestors of the Tunica. Even with multiple lines of ceramic evidence, there is not enough such evidence to suggest Arkansas Valley ceremonial centers were constructed and occupied by non-Caddo people. As Chapter 4 makes clear, the use of a communities of practice perspective permits the discussion of Arkansas Valley communities without examining ethnicity, because a community in this sense is viewed as socially fluid (Horton 2010). What links communities together is the learned production and use of specific objects. Formative Caddo ceremonial centers may have been constructed and used by ethnically diverse communities, and one individual may have had multiple identities. At the moment, the cultural intricacies of the Formative Caddo are unable to be teased apart in the ways that Schambach and others hoped, especially with respect to the limited amount of material culture with which we have to work. Archaeologists have implied that the only way to definitively look at ethnicity in the Caddo area is to conduct DNA analyses (2017 personal communication with Susan Vehik and Timothy K. Perttula). Finally, these Arkansas Valley ceremonial sites like Spiro continue to be meaningful places to present-day Caddo and Wichita and other Affiliated tribes of Oklahoma.

This research has significance on a broader scale because centralized production and exchange of ritual vessels has become increasingly recognized in the archaeological record of North America. Wallis et al. (2010) determined Swift Creek groups in Alabama, Georgia, and northern Florida were engaged in the specialized production and exchange of their complicated stamped pottery. Through INAA, Wallis et al. (2010) determined that certain Swift Creek potting communities produced their pottery not only for local use but also to be exported to communities with mortuary mounds over 100 km away. In Arizona, Abbott (2009) emphasized only a few potting groups were responsible for more than six centuries of the extensive specialization and exchange of their pottery throughout the entire Hohokam area. Even in the Late Archaic period, after the regional adoption of pottery, the Mill Branch culture in Georgia produced soapstone vessels in large quantities to be exported for ceremonial use at the Poverty Point site in Louisiana (Sassaman 2001). Understanding which communities of practice produced and spurred the exchange of Formative Caddo pottery through time and space would have profound implications for Caddo research and any archaeological research that considers topics of ritual practices, long-distance interactions, and exchange relationships in regions with an emerging organizational complexity.

On a regional scale, this approach will emphasize a richly detailed and comprehensive model of Formative Caddo pottery production and distribution, with the potential to develop more models of robust ceramic production locales in time and space, as well as the degree to which Formative Caddo pottery was exchanged among northern and southern Caddo groups. It will showcase how early communities in this region emerged as a significant ceremonial and political landscape in eastern Oklahoma when compared to the greater Mississippian world. Lastly, if this study is propelled by a rigorous compositional analysis, it will identify the history of this distinct ritual ceramic package and may reveal a considerable degree of social variation between the northern and southern Caddo areas.

CHAPTER 3: ENVIRONMENTAL SETTINGS AND SITE BACKGROUNDS

For the central work of this study, I analyzed pottery from nine mound sites to examine whether Formative Caddo communities in the Arkansas Drainage in eastern Oklahoma engaged in the learned production and distribution of early engraved fine ware pottery. These sites are located in the Ozark Plateau (northern Caddo area) and West Gulf Coastal Plain regions (southern Caddo area) of eastern Oklahoma, southwest Arkansas, northwest Louisiana, and east Texas. Five Formative Caddo mound sites—Spiro, Harlan, Norman, Reed, and Brackett are located in the Arkansas River drainage while four sites—Crenshaw, George C. Davis, Boxed Springs, and Mounds Plantation—are located in the Red River valley and surrounding Coastal Plain drainages (Figure 3.1). The Ouachita Mountain region separates the northern and southern Caddo ceremonial centers.

The results of the INAA and stylistic study of pottery, shows that Spiro and the other ceremonial centers engaged in the mass production, transportation, and exchange of socially-valued vessels hundreds of years earlier than currently accepted. This means a serious reevaluation of the origins of early Caddo ceremonial centers should be done while also questioning why their traditions and practices were so divergent from other communities with mound centers throughout the Southeast.

Environmental Setting

As mentioned earlier, the study area consists of portions of the Ozark Plateau, Arkansas Basin, Ouachita Mountains, and the Gulf Coastal Plain regions (Figure 3.2). These dissected landscapes are environmentally diverse and are comprised of deeply entrenched river valleys, sloping uplands, lowlands, flat prairies, and complex formations of karst, chert, and dolomite outcrops (Albert and Wyckoff 1984). This intricate web of river basins and their associated tributaries formed a significantly stable environment that contained an assorted set of aquatic and terrestrial resources exploited by Formative Caddo communities (Bell 1984).

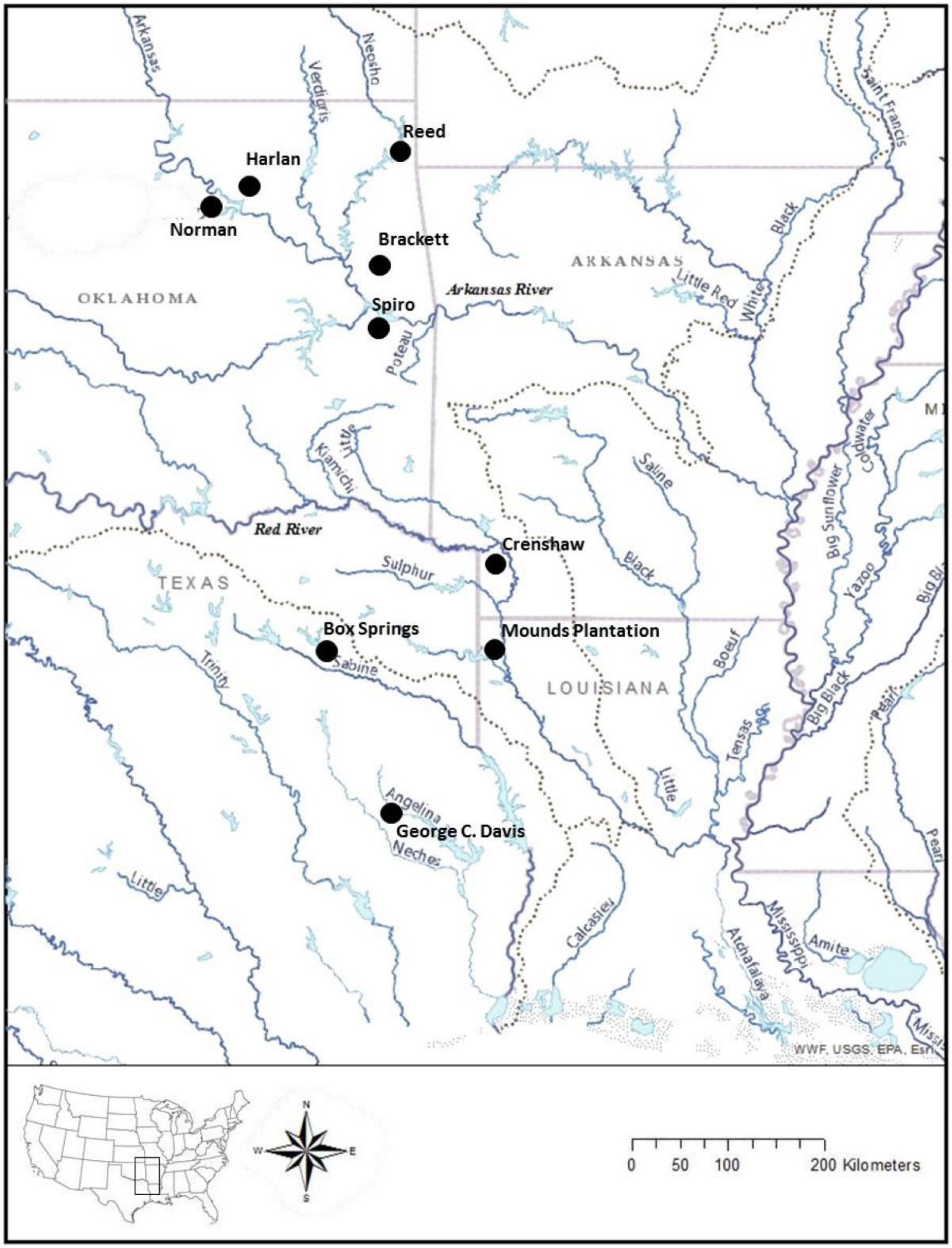


Figure 3.1. Location of sites in the study area.

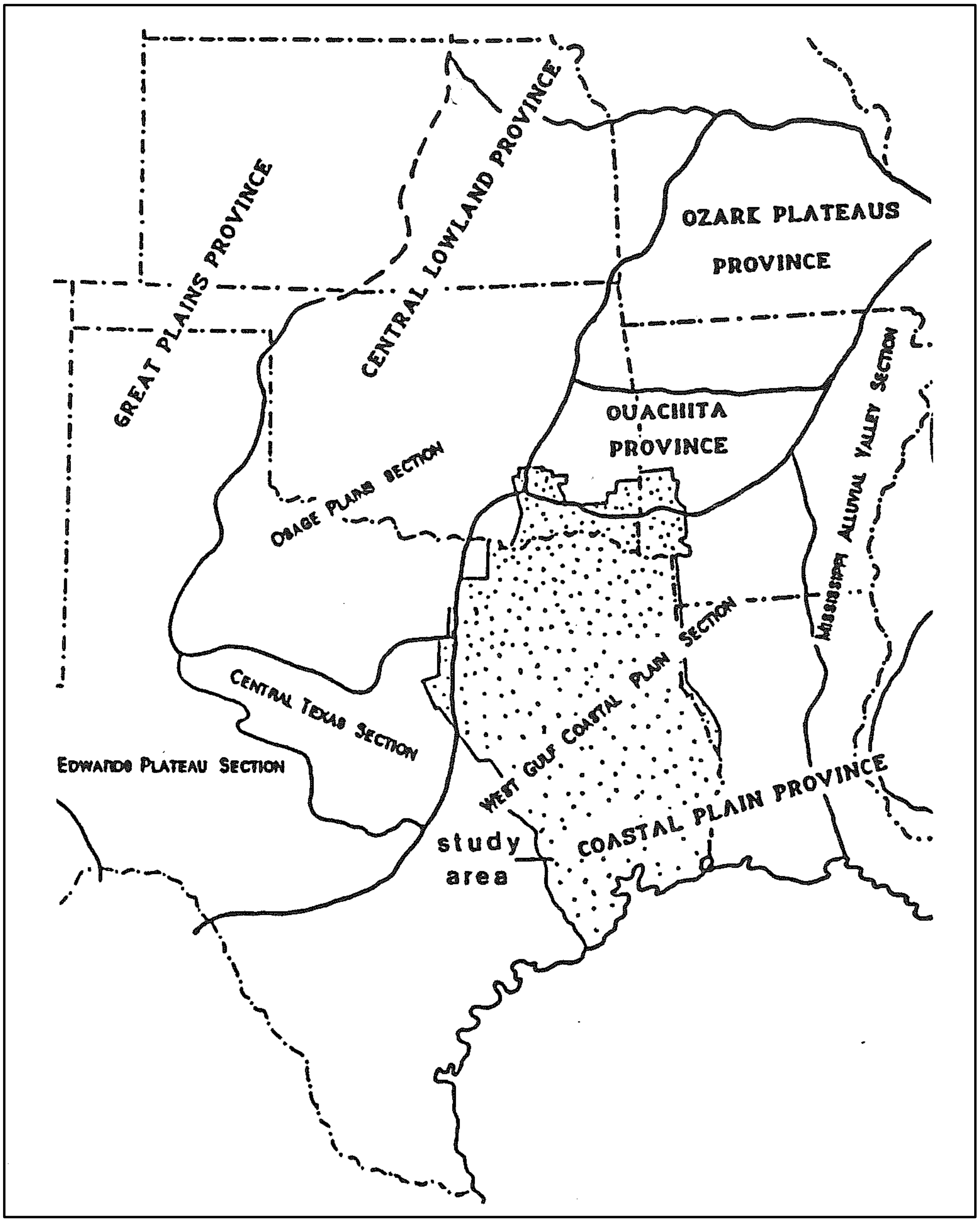


Figure 3.2. Physiographic provinces and sections (adapted from Story 1990:6 and Figure 4).

The Ozark Plateau

The boundaries of the Ozark Plateau begin in northeast Oklahoma and extend into Arkansas and Missouri and lie around 800 feet (245 m) above sea level. The natural streams and tributaries of this region flow southwest into the Arkansas and Illinois rivers. This area includes a dense oak-hickory and elm forest that sustains a multitude of native animals, such as deer, beaver, mink, fox, rabbits, skunk, pigeon, hawks, owls, sunfish, catfish, lizards, and snakes (Albert and Wyckoff 1984; Wallis 1959). The most significant drainage system in the Ozark Plateau region is the Arkansas Basin drainage system, which dominates the hydrology of the area (Horton 2010). The primary rivers and streams includes the Verdigris, Neosho, Poteau, and Arkansas rivers, drain much of the project area (Bell 1984).

The Ouachita Mountains

The Ouachita Mountains lie just south of the Ozark Plateau in southeastern Oklahoma and southwestern Arkansas "and form the westernmost exposed portion of a highly faulted and folded uplift extending eastward into Arkansas" (Albert and Wyckoff 1984:17). This area is comprised of Devonian novaculite, shale, sandstone, and limestone with the bedrock of this region primarily consisting of shale and sandstone (Sutherland and Manger 1979). The Ouachita Mountains rise from 1000 feet (300 m) around the valley floors to over 1400 feet (415 m) above sea level. The mountain region is located in the middle of two complex hydrological drainage systems. To the north, the Ouachitas drain into the Arkansas and Poteau rivers, while to the south, they drain into the Red River through the Kiamichi, Little Glover, and Mountain Fork rivers (Albert and Wyckoff 1984).

The primary soils of the Ouachitas are very thin layers called utisols, which are not appropriate for use in large-scale agriculture. The plants and animals in this region are distinctive from the Ozark Plateau: trees and include oak, pine, hickory, and blackjack forest. Plant species consist of witch-hazel, cucumber tree, and mulberry (Albert and Wyckoff 1984). Animals native to this area include deer, bears, cougars, wolves, foxes, opossums, mink, muskrats, quail, turkeys, herons, hawks, turtles, gar, catfish, and sunfish (Carter 1967).

The West Gulf Coastal Plain

The West Gulf Coastal Plain stretches from the southeastern border of Oklahoma eastward to the western portions of Bayou Bartholomew basin in Louisiana, and south to the coast of Texas. Overall, the Coastal Plain in the project area extends over 100 miles north-to-south and 160 miles from east-to-west and is comprised of belt-like strips. According to the Arkansas Geological Survey, elevations fluctuate across the region, from around 184 feet to 432 feet above sea level. The landscape has rolling hills with four major river systems, including the Red, Little Missouri, Ouachita, and Saline rivers in Arkansas, and the Sulphur, Sabine, Neches, and Angelina rivers in East Texas, with a complex system of tributaries.

The area is comprised of sedimentary rocks formed from sediment deposits on the edges of Cretaceous-era formations over 125 million years ago (Dowd 2012:50). The Coastal Plain region has a variety of rock and mineral resources such as chert, siltstone, igneous stones, and quartzite, much available in stream gravels (Banks 1990). Upland and valley alluvial soils are the primary soils formed on Quaternary alluvial deposits derived from the upland streams. The soils are classified as alfisols, ultisols, vertisols, and mollisols (Story 1990).

The modern climate characteristics of the Gulf Coastal Plain region is relatively humid, with annual temperatures range from 16.6 C to 21.1 C. The annual rainfall ranges from 81.3 cm to 142.2 cm. There is a variety of vegetation regions, including marsh, tall grass, oak-pine, oak-hickory, and oak zones. Within these six vegetation regions are a variety of terrestrial mammals similar to the Arkansas River valley (Story 1990).

Site Summaries

Between A.D. 800 and 1500, pre-Columbian groups across the southeastern United States attained unprecedented levels of interregional interaction, agriculture, long-distance trade, and ceremonialism (see Chapter 2). Various clues on how and why this cultural fluorescence emerged come from a number of domestic and mound sites, such as Cahokia along the bottomlands of the Mississippi River and Moundville along the Black Warrior River in west-central Alabama. This section discusses nine ceremonial mound centers in the northern and southern Caddo areas, and these sites were chosen because they have Formative Caddo fine wares in various social, ritual, and mortuary contexts.

For this dissertation, my primary focus has been researching Formative Caddo fine ware depositional contexts at the nine ceremonial mound centers. While Spiro has gained national attention because of the sheer quantity of materials from the Craig Mound, I hope that my discussion of other Caddo ceremonial centers will bring more attention to their archaeological significance in Southeast research like other scholars have done recently (e.g., Regnier et al. 2017).

Northern Caddo Mound Sites

Spiro Site (34LF40)

*The Site and Setting***.** Spiro was active as a major mound center for over five hundred years (ca. A.D. 900 to A.D. 1450). The Spiro site is strategically located east of an old channel of the Arkansas River and between the oak-hickory-pine forested Oauchitas to the south and the oak-hickory Ozark Plateau to the north in LeFlore County, Oklahoma (Brown 1996).

Brown (1996) primarily used Craig Mound gravelots to reconstruct Spiro's chronology (Table 3.1). The entire site encompassed approximately 80 acres and is divided by an upper and lower terrace (Brown 1996). Spiro has 11 earthen mounds on the upper terrace (Brown Mound, Copple Mound, Mounds A, B, and C, and six house mounds) and three earthen mounds on the lower terrace (Craig Mound and Ward Mounds 1 and 2) (Figure 3.3). The Brown and Copple mounds are the only platform mounds at Spiro (Rogers et al. 1989).

Table 3.1. Gravelot Periods and Cultural Phases (adapted from Brown 1996:161).

A.D.	Grave Periods	Cultural Phases	Cultural Changes
1650		Fort Coffee/ Neosho phases	Late Caddo Period. Retrenchment and termination of mound centers during the Late Fort Coffee phase. Complete transformation of social organization.
1600			
1500			
1400	Spiro IVC **Hollow Chamber** Spiro IV	Spiro	Middle Caddo Period. The Great Mortuary has been constructed and used for the most important mortuary rituals at Spiro. Hollow Chamber was constructed. Time of great social complexity.
1300	Spiro III	Norman	Intense connections with Cahokia and other major mound centers in the Southeast.
1200	Spiro III	Harlan	Formative Caddo period. Time of large-scale aggregations along major river drainages, construction of large ceremonial centers, and the production of Caddo's earliest fine ware pottery
1100	Spiro IB		
1000	Spiro IA	Evans	

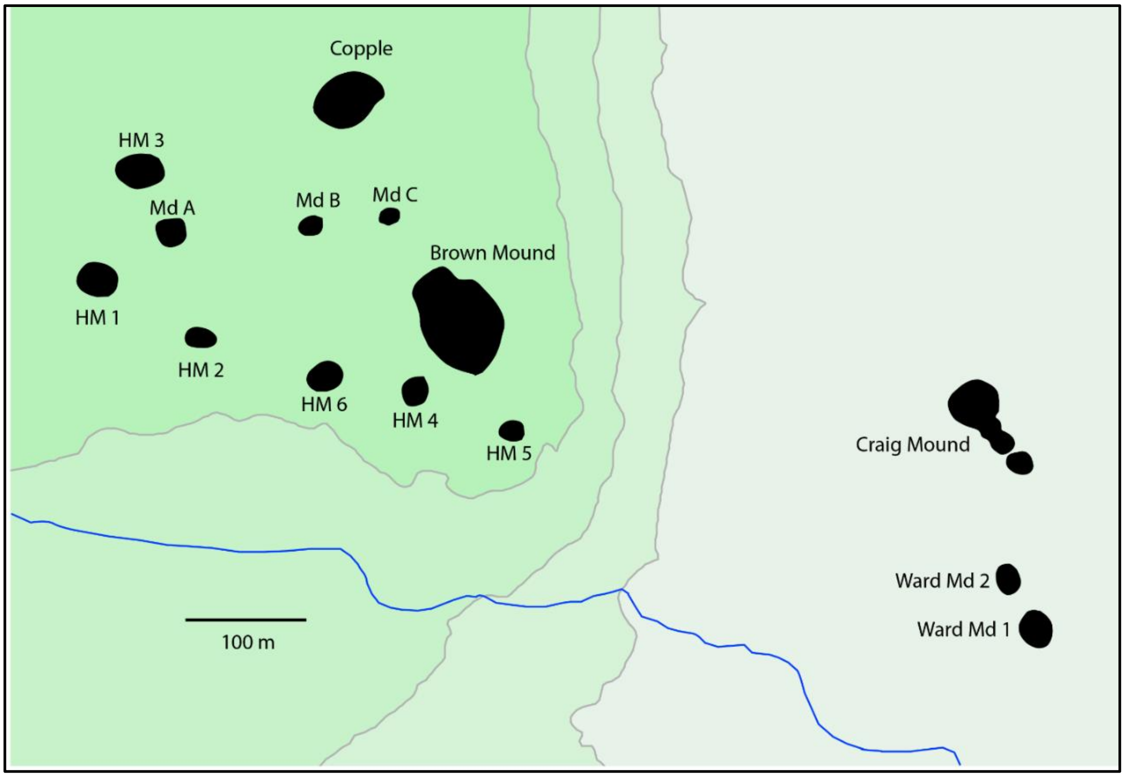


Figure 3.3. Map of the Spiro site illustrating mound arrangement (image produced by Patrick Livingood).

Spiro is one of the major Caddo mound centers in the Arkansas drainage stystem. This site is part of a much broader Caddo landscape that encompassed Eastern Oklahoma, Western Arkansas, Northeast Texas, and Northwest Louisiana. Ritual elites/specialists likely occupied Spiro, but by the end of the fourteenth century, Arkansas Valley groups primarily used it as a ceremonial center (Rogers et al. 1989).

Based on recovered artifacts, Spiro had major regional influences and maintained long-distance interactions through the exchange of important ritually-charged objects with complex iconographic elements, motifs, and themes, such as whelk shells, stone figurines, gorgets, and pottery (Rogers 2011). By the beginning of the fifteenth century, people no longer buried their dead at Spiro (Rohrbaugh 2012).

Instead, many individuals at this time were interred at numerous hamlets and villages within a five-mile radius of Spiro (Regnier et al. 2017).

History of Research. Spiro has received substantial but sporadic of archaeological attention since the late 1930s (e.g., Bell 1947; Brown 1996, 2012; Brown et al. 1990; Clements 1945; Hamilton 1952; Kozuch 2002; Lambert 2017; Orr 1946; Phillips and Brown 1978; Regnier et al. 2017; Rogers 1980, 1982; Rogers et al. 1989; Rohrbaugh 2012; Schambach 1993). Looters uncovered a human-made cavity in the largest cone of the Craig Mound and discovered troves of pre-Columbian artifacts. The looters took thousands of objects, which consisted of engraved gorgets, engraved shell cups, copper sheets, stone pipes, effigy figures, hypertrophic stone blades, pottery vessels, rattles, wooden masks and figurines, arrow point caches, shell beads, woven baskets and textiles (Figure 3.4). Looters sold these items to collectors and site visitors, which resulted in the loss of many of objects (Brown 1996). This discovery is what, ironically, helped to preserve the Spiro site for future archaeological research. The University of Oklahoma, University of Tulsa, and the Oklahoma Historical Society sponsored the largest excavation of Spiro during the ca. 1939-1942 Works Progress Administration period.

Figure 3.4. Examples of Spiro artifacts. Drawings illustrated by WPA artists and housed at the Sam Noble Museum of Natural History.

The number of materials uncovered in Craig Mound soon began to spark a variety of archaeological interpretations. For decades, the abundance of copper, shell, and iconographic themes were viewed as the remnants of a complex economic exchange system that was controlled by a powerful emerging chief (Rogers et al. 1989). As a result, Spiro was portrayed as another typical Mississippian chiefdom in which thousands of residents lived and forged important social and political ties to Cahokia, Moundville, and other chiefdom-level centers (Rogers 1983, 1996, 2006; Wyckoff 1980). As discussed in Chapter 2, however, there is evidence to suggest Spiro and contemporary Arkansas Valley centers were ceremonial centers at which ritual specialists lived.

The Craig Mound. My research at Spiro mainly focuses on the Craig Mound because all Formative fine wares were deposited there. At the end of Spiro's occupation in the mid-fifteenth century, the Craig Mound was comprised of four cones, the largest of which contained several litter burials known as the Great Mortuary (Figure 3.5). The WPA excavations of Craig Mound suggests three general phases of construction. Most of the features within Craig Mound were burials. Over 500 individuals were interred in 189 burials (Brown 1996). A wide variety of burial procedures are represented in this series, including the internment of single, partially articulated and extended individuals, groups of disarticulated individuals, litters of cedar logs piled high with skeletal parts, and a large crematory basin (Wyckoff 1968:4).

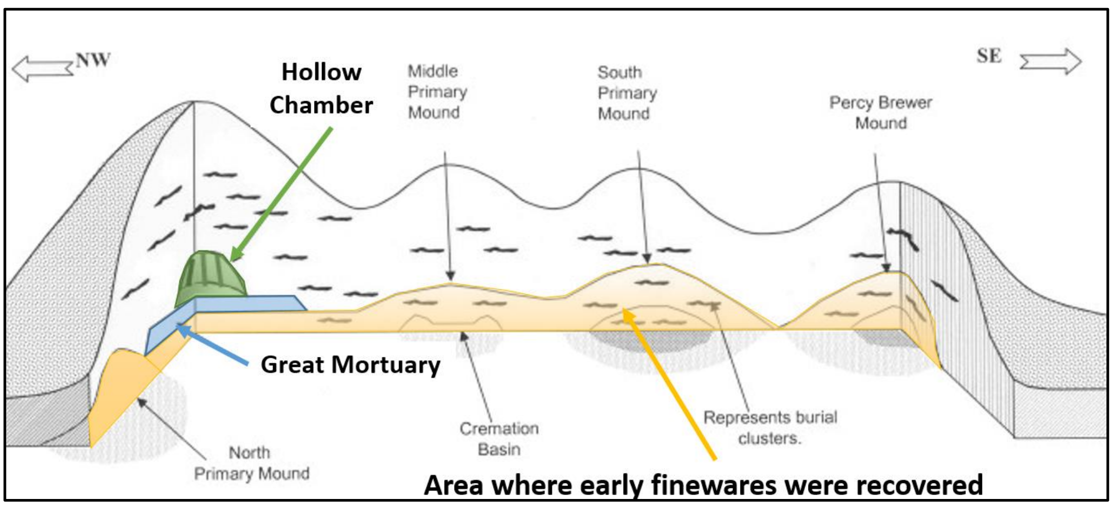


Figure 3.5. A diagrammatical view of the Craig Mound showing buried features, Hollow Chamber, Great Mortuary, and where Formative fine wares were deposited. (adapted from Merriam and Merriam 2004).

The distinct ways Craig Mound participants placed objects in the Great Mortuary, and the manner in which they layered the burials, reflect the cosmological and iconographic complexity of these ancient groups (Brown 1996, 2012). As James Brown (2012:136) stated, "the Great Mortuary and the totality of the main cone of the Craig Mound in this kind of scale becomes a ritual-architectural object of religious allurement." The Craig Mound was the "center of the universe" that brought together different, but socially linked, pre-Columbian Caddo groups and their sacred objects. Thus, the Great Mortuary was not about personhood, but about the importance of the community as the whole (Figure 3.6).

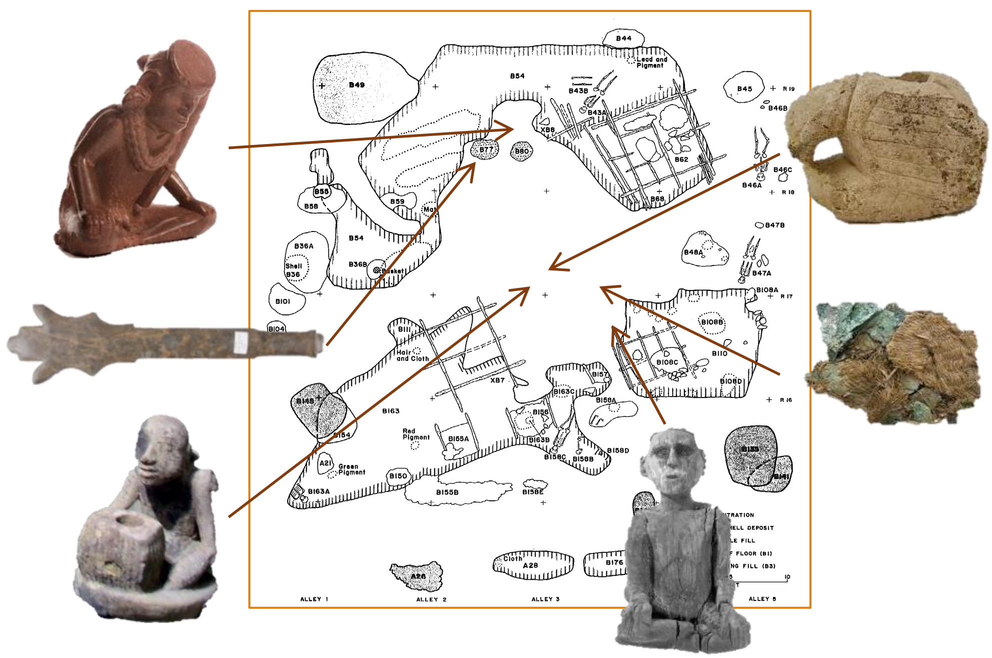


Figure 3.6. The Great Mortuary layout with a handful of major artifacts, as recreated by James A. Brown (2012).

The Hollow Chamber was constructed on top of the Great Mortuary around A.D. 1400. The Great Mortuary and the Hollow Chamber are now considered as two separate ritual events (Brown 2016). The Hollow Chamber, referred to as the "Spirit Lodge" in Brown (2016, 2017), is thought to have been constructed around A.D. 1400. According to Brown (2014), the Hollow Chamber is a symbolic embrace of a new cult. Before Craig Mound participants closed the Hollow Chamber, a single individual was placed within it with material offerings. Brown presumes this person is the driving force behind its construction. Brown (2017) also asserts that this individual was transformed into a supernatural being. Sabo (2014) has shown that engraved shell cups within the Hollow Chamber narrated this ritual transformation. The feature also contained intricate woven baskets, each with particular regalia and copper plates (Sabo 2014). The act of constructing the Craig Mound and the placement of powerful objects within it represented Craig Mound participants' "known universe in its geographical and cosmological dimensions" (Brown 2012:136-137). Now that we have a better grasp of the contextual significance of Craig Mound's unique features, such as the Great Mortuary and Hollow Chamber, we are in a better position to try to understand how Spiro and the mound centers in this study differ from other emerging Mississippian mound centers in the greater Southeast.

Formative Fine Ware Contexts. Centuries before the construction of the Hollow Chamber, Arkansas Valley inhabitants deposited Formative Caddo period (A.D. 850-1150) fine wares in the lowest construction stages of the Craig mound (Figure 3.7). They were used in some of the most important mortuary rituals (Bell 1984; Brown 1996).

For the stylistic study, I used 23 whole vessels from six burials, and for the compositional analysis, I selected 35 sherds from 23 burials (Table 3.2). Some burials contained several Formative fine ware vessels. For instance, Burial 189 had at least five vessels, Burial 62 had at least six vessels, and Burial 185 had at least four vessels. The number of vessels within each of these burials may indicate they were founding burials, during Craig Mound's earliest depositional history.

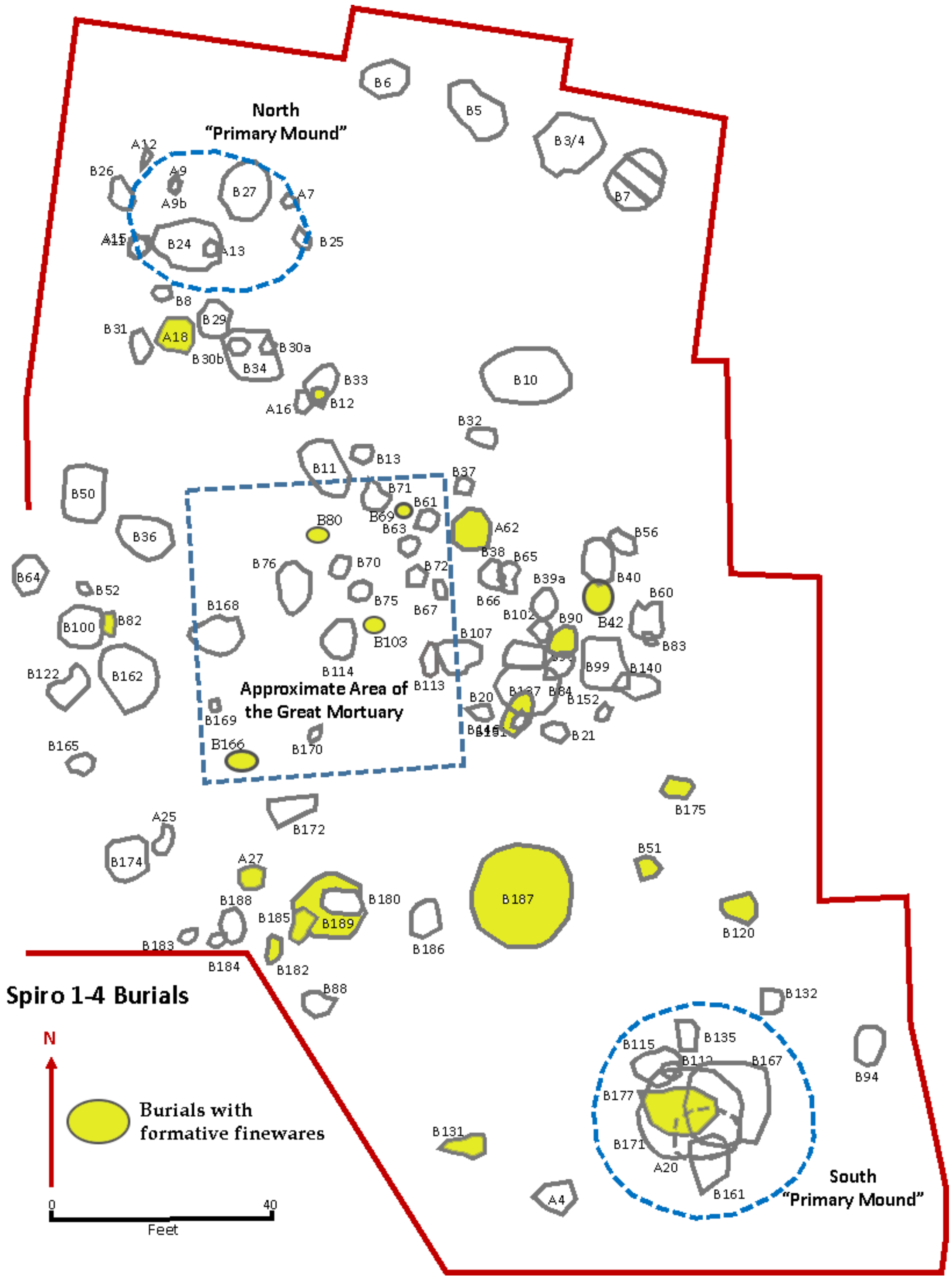


Figure 3.7. Plan view of Craig Mound burials showing the locations where Formative fine wares were deposited (adopted from Brown 1996).

Table 3.2. Formative Fine Wares used for Stylistic and Compositional Analysis at Spiro.

Whole Vessels Selected for Stylistic Study

Context	Crockett Curvilinear	Hickory Engraved	Spiro Engraved	Holly Fine Engraved	Total
B51		1	3		4
B62	1	1	1		3
B131	1				1
B189			4		4
B89			1		1
A25		1			1
Disturbed	6		3		9
Total	8	3	12		**23**

Sherds Selected for INAA

Context	Crockett Curvilinear	Hickory Engraved	Spiro Engraved	Holly Fine Engraved	Total
B90			1		1
B42			1		1
B51			2		2
B62		1	5		6
B175			1		1
B182			1		1
B189			5		5
B185			4		4
B120			1		1
B11			1		1
B103			1		1
B155	1				1
B166			1		1
B69			1		1
B27			1		1
B28	1				1
B177		1			1
A18	1				1
B80	1				1
B82				1	1
Unknown	1		1		2
Total	5	2	27	1	**35**

Brackett Site (34CK43)

The Site and Setting. The Brackett site is at the junction of Baron Fork Creek and the Illinois River in Cherokee County, Oklahoma. The site included at least one mound, village areas, and a cemetery (Figure 3.8). The site encompasses approximately 8.1 hectares, but habitation areas likely extend further out (Howard 2001). Preliminary surveys and excavations were conducted in July 1939 by the WPA.

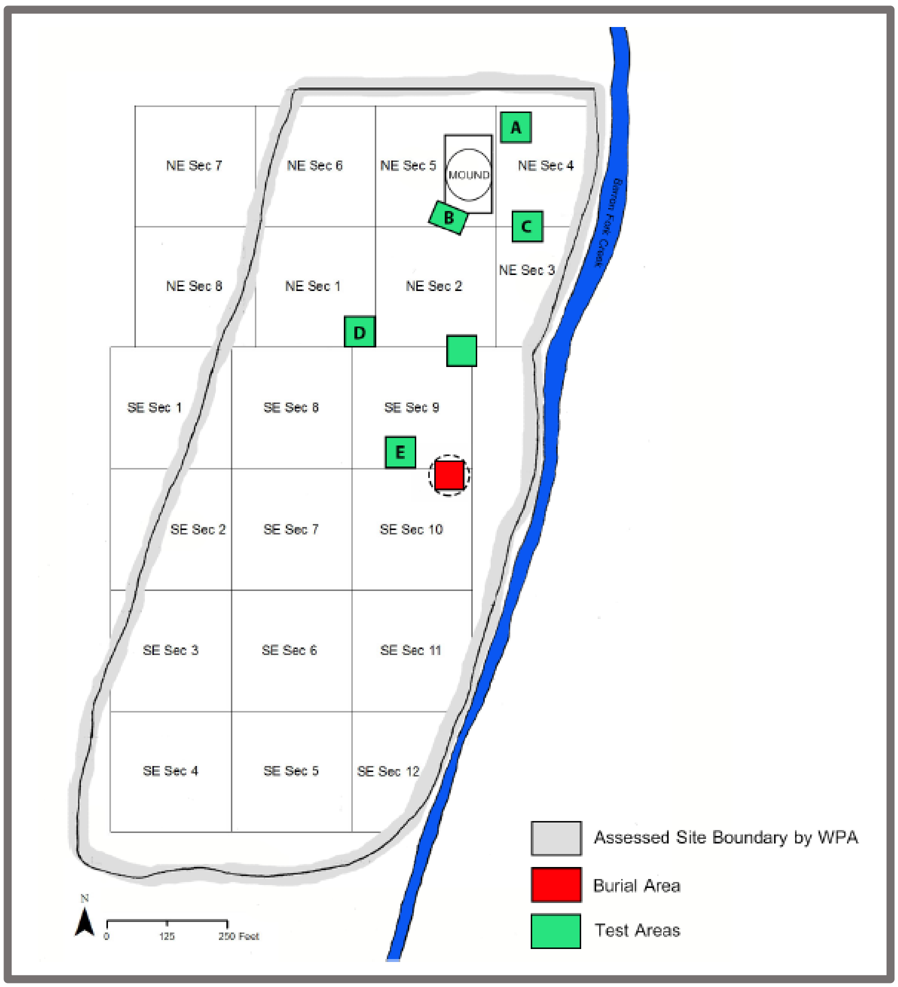


Figure 3.8. Brackett site map showing the mound, burial area, and WPA excavation areas (adapted from Kusnierz 2016).

History of Research. During the WPA-led excavations, archaeologists uncovered eight structures and the burial area. They also noted post holes in the mound but did not observe any strong structural patterns (Bareis 1955). The village area contained one rectangular structure with four center posts and a hearth and seven structures with extended entrance ways and four center posts (Howard 2001). Unlike Howard (2001:38), Kusnierz (2016) did not consider these structures to be part of a general village area. She argued these buildings functioned as the residences of ritual elites/specialists. This parallels well with the Kay and Sabo (2006) and Perttula (2009) study of special-purpose structures within the northern and southern Caddo areas.

Based on excavations that have taken place over the years, it is believed Brackett's residents built the mound in three to five construction stages. Archaeologists discovered two burials (Burial 16 and 17) in the lowest stratum of the mound (Kusnierz 2016:70). These burials did not contain any Formative fine wares.

Formative Fine Ware Contexts. The burial area is the only area in which Brackett inhabitants deposited Formative fine wares (Figure 3.9). The WPA burial forms show that archaeologists recovered several whole vessels from the burial area. Unfortunately, none were curated at the Sam Noble Oklahoma Museum of Natural History. Because I was not able to gain access to whole vessels from the burial area, I could not incorporate them into the stylistic analysis. However, a few fine ware sherds were curated at Sam Noble. I used 17 sherds from six burial contexts at Brackett in the INAA study. Only 12 sherds contained contextual information (Table 3.3). The other five sherds likely came from the same burial area as the provenienced fine wares.

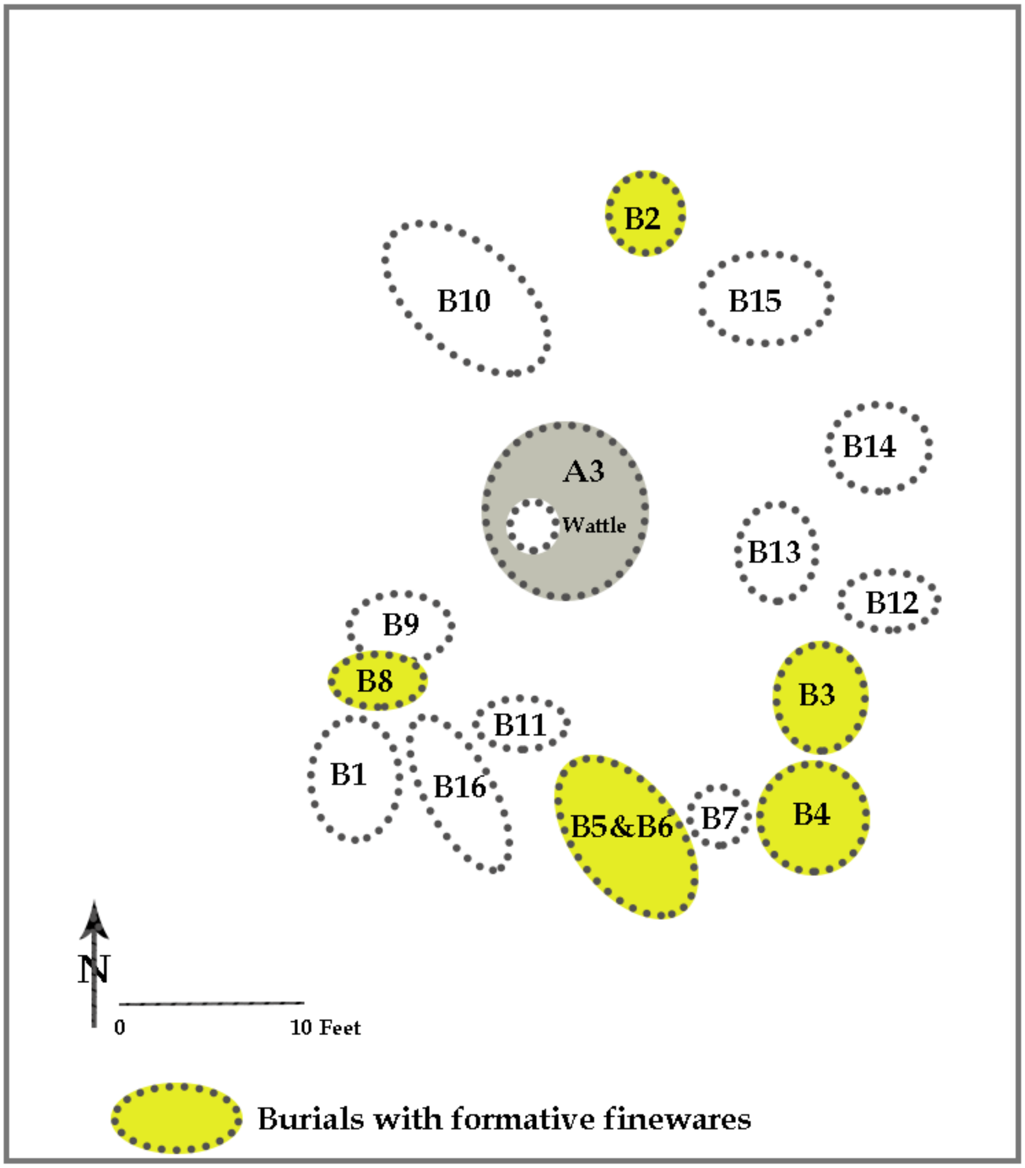


Figure 3.9. Burial area at Brackett showing locations of Formative fine wares (adapted from Bareis 1955).

Table 3.3. Sherds Selected for INAA at the Brackett site.

Sherds Selected for INAA					
Context	**Crockett Curvilinear**	**Hickory Engraved**	**Spiro Engraved**	**Holly Fine Engraved**	**Total**
B2	1		1		2
B3		1			1
B4		1	2		3
B5		1			1
B6		1			1
B8	4				4
Unknown	2	1	2		5
Total	7	5	5		**17**

Harlan Site (34CK6)

*The Site and Setting***.** The Harlan site, occupied from A.D. 1000-1200, is just west of Fourteen Mile Creek and northeast of the junction of the Grand and Arkansas rivers (Bell 1972). The site has five mounds (Units 1, 3, 4, 6, and 7) arranged around a plaza, and a village component that covers approximately 21 acres along a low bluff that overlooks Fourteen Mile Creek (Figure 3.10). Harlan has one large mound (Unit 7), three smaller mounds (Units 3, 4, and 6), and a three-lobed conjoined burial mound (Unit 1). During Bell's (1972) investigation into Harlan, each conjoined lobe of Unit 1 was given their own label (Lobes A, B, C).

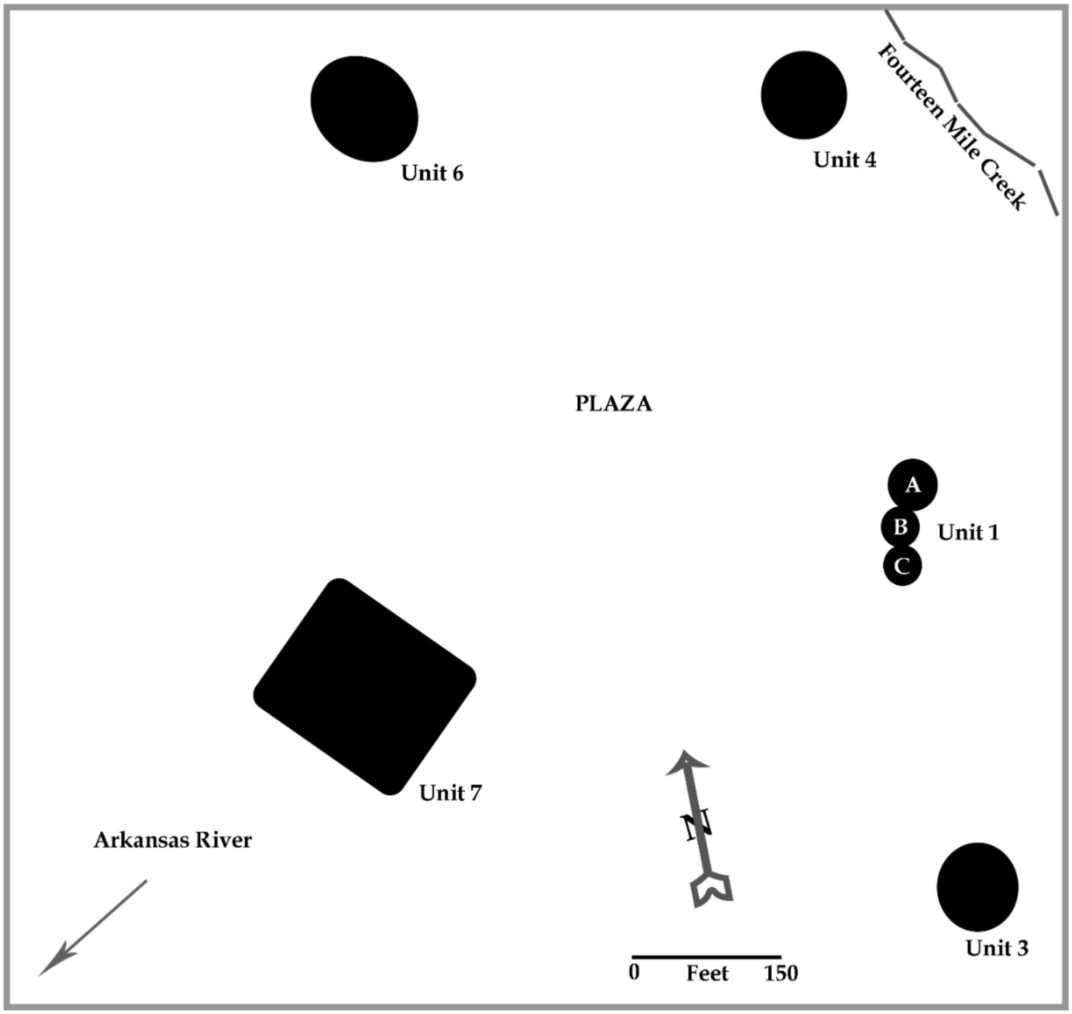


Figure 3.10. Harlan site map showing the location of mounds (adapted from Bell 1972:Figure 3). All fine wares used in this study came from Mound Unit 1A, 1B, and 1C.

History of Research. During the 1949 investigations, Units 1A, 1B, and 1C, Mound Unit 4, and Mound Unit 3 were excavated. Several structural patterns were also uncovered during unit testing just south of Mound Unit 7 and southeast of Mound Unit 4 (Bell 1949). During the 1950 and 1958 field seasons, Mound Unit 3 was completely excavated, additional structural patterns were uncovered in the northwest corner of Mound Unit 7, and all burials were removed from Mound Units 6 and 7 (Bell 1972).

Bell's analysis concluded that structural patterns at Harlan were part of a general village area. Recent research has shown that the spatial patterning and purposeful deconstruction of structures and mortuary patterns are archaeological indicators of ritual residences and special-purpose buildings used for ritual activities, in which ritual specialists communicated with supernatural beings and connected to a broad cosmology (Kay and Sabo 2006). While ritual specialists may have been the only permanent residents at Harlan, large-scale ritual events and material offerings used in ceremonies would have involved community participation.

Formative Fine Ware Contexts. All Formative fine wares at Harlan were recovered from the conjoined mound (Units 1A, 1B, and 1C). Bell recorded 123 burials in the conjoined mound. Mound Unit 1 was constructed in stages, and the super-positioning of burial clusters within each construction stage suggested multiple people were buried at the same time. Before people constructed the lobes of the conjoined mound, they placed three founding burials in shallow basins to mark each lobe. All lobes seemed to have been in use at the same time.

I used Formative fine wares from Mound Unit I in my stylistic and compositional analysis (Table 3.4). I utilized 15 vessels for the stylistic study, and 34 sherds were sampled for INAA. WPA lab assistants reconstructed most of the fine ware vessels from Harlan. In several instances, WPA workers were unable to refit all of the sherds from a vessel. I used these "leftovers" for the compositional analysis. For the stylistic study, I used whole and partial vessels.

Table 3.4. Formative Fine Wares used for Stylistic and Compositional Analysis at the Harlan.

Whole Vessels Selected for Stylistic Study

Context	Crockett Curvilinear	Hickory Engraved	Spiro Engraved	Holly Fine Engraved	Total
Mound Unit 1A	1		1		2
Mound Unit 1B	2	1	4	1	8
Mound Unit 1C	1	2	2		5
Total	4	3	6	1	**15**

Sherds Selected for INAA

Context	Crockett Curvilinear	Hickory Engraved	Spiro Engraved	Holly Fine Engraved	Total
Mound Unit 1A	1	1			2
Mound Unit 1B	8	1	3	1	13
Mound Unit 1C	4	5	10		19
Total	13	7	13	1	**34**

Reed Site (34DL4)

*The Site and Setting***.** The Reed site is a multi-component site at the confluence of the Elk and Grand rivers in Delaware County, Oklahoma. Inhabitants mainly occupied Reed during the Harlan and Norman phases, A.D. 1000-1300, but Plains Village groups later reoccupied a portion of the site during the Neosho phase (A.D. 1500-1650). While the precise extent of Reed is unclear, it encompassed at least 20 hectares (Regnier et al. 2017).

Reed has a platform mound, a conjoined mound with several burials, and a habitation area. Archaeologists further divided Reed into five zones: 34DL2, 34DL8, 34DL10, 34DL11, and 34DL14 (Figure 3.11). The zone on which I primary focus for this study is 34DL4, the conjoined burial mound (Figure 3.12). This feature contained all the Formative fine wares used for the stylistic and compositional analysis. Initial excavations of Reed during the fall and winter of 1922 focused primarily on the burial mound (Thoburn 1926, 1929, 1931).

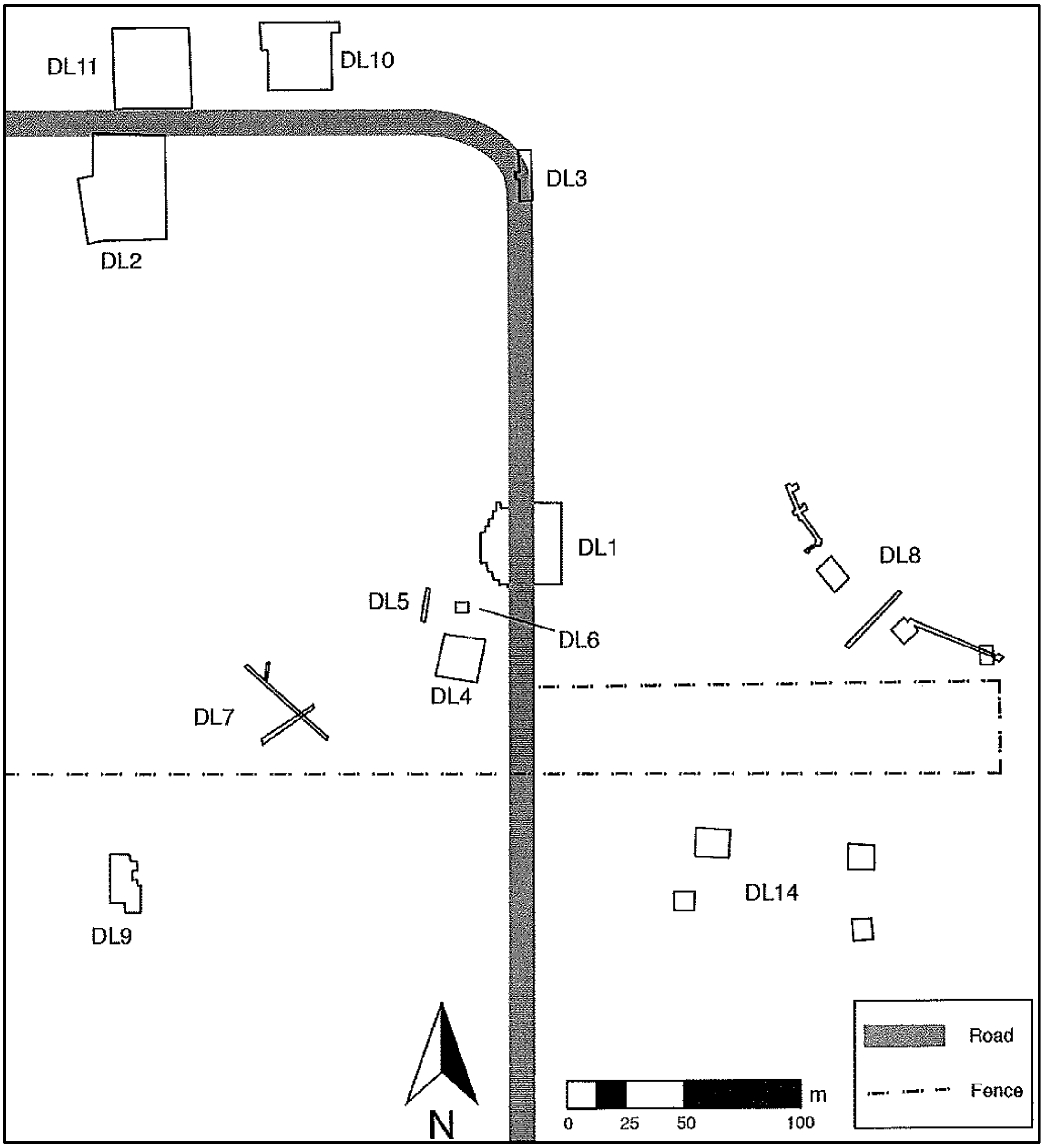


Figure 3.11. Reed site map showing the locations of WPA excavation zones (from Regnier et al. 2017:Figure 9.1).

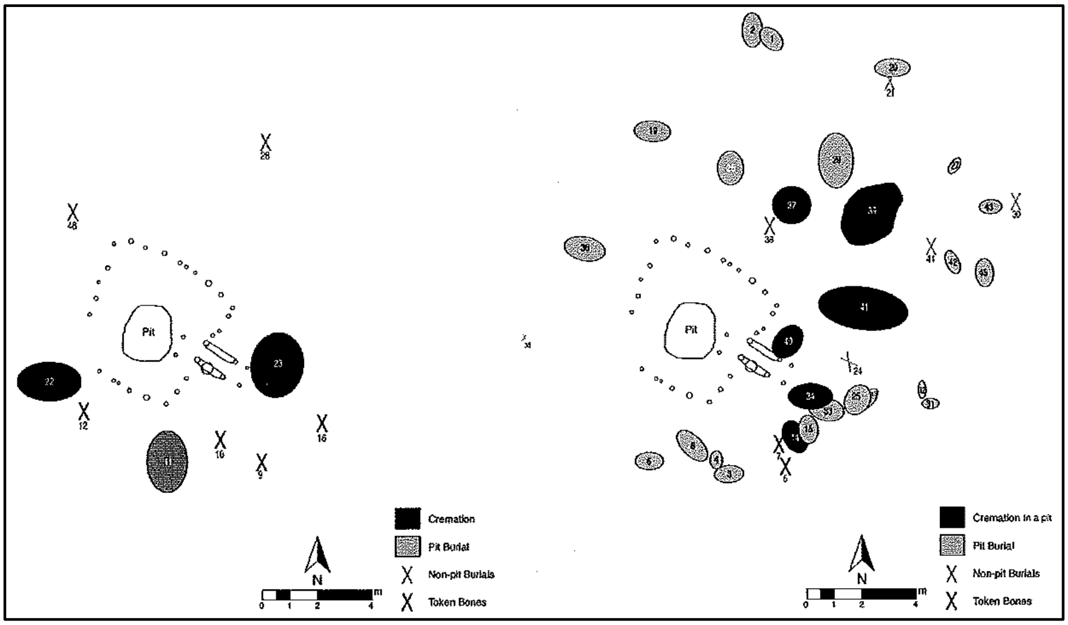


Figure 3.12. The conjoined burial mound at Reed (34DL4) showing two special-purpose buildings, cremations, and pit burials (from Regnier et al. 2017:Figure 9.10).

History of Research. WPA archaeologists revisited the site in 1937 when Joe Finkelstein briefly excavated the north side of the platform mound. David Baerreis took over excavations from 1937 through 1940 (Regnier et al. 2017:243-244). According to Regnier et al. (2017:244), WPA archaeology crews excavated several test pits and eventually excavated the remnants of the platform and conjoined mounds at Reed. They uncovered some cultural materials, structures, and burials. Most of the artifacts from Reed remain unanalyzed. In recent years, however, the analysis of different material types and color symbolism has been done to understand Reed's local, regional, and interregional significance (Hammerstedt and Savage 2012, 2014, 2016; Regnier et al. 2017; Younger-Mertz et al. 2015).

Formative Fine Ware Contexts. For this study, I will focus on the conjoined burial mound found in the 34DL4 area of Reed. The conjoined mound stood at least 3 meters tall and 15 meters in diameter (Thoburn 1931). During the Oklahoma Historical Society project, the upper 3 meters of mound fill was excavated, which included 25 burials. WPA crews came back to excavate the remaining basal levels of the mound (Regnier et al. 2017). The cluster of burials within the eastern lobe of the conjoined mound contained all the known Formative fine wares (Figure 3.12). The majority of recovered artifacts from Reed are currently housed at the Sam Noble Museum, though a number are unaccounted for. The fine wares used in this study were divided and distributed among the Sam Noble Museum, Woolaroc Museum, Gilcrease Museum, and the Oklahoma Historical Society. Overall, I used 18 whole vessels for the stylistic study and sampled four sherds for the compositional analysis (Table 3.5). Unfortunately, 78 percent of Reed's whole vessels did not have precise contextual information, but labels on each vessel specified they came from the conjoined burial mound from 34DL4.

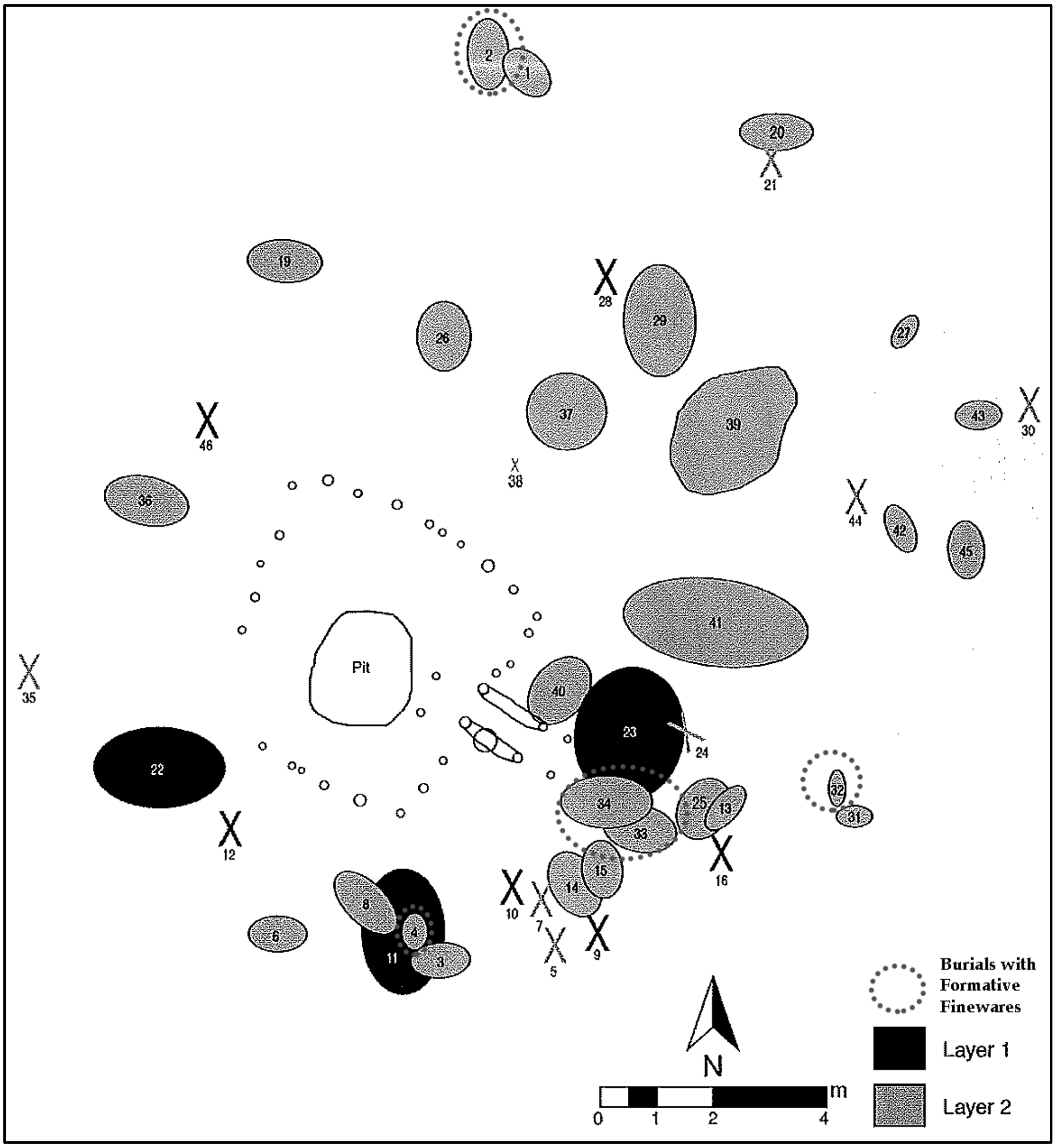


Figure 3.13. Eastern most lobe of Reed's conjoined burials showing the location of burials with Formative fine wares (adapted from Regnier et al. 2017:Figure 9.9).

Table 3.5. Formative Fine Wares used for Stylistic and Compositional Analysis at the Reed site.

Whole Vessels Selected for Stylistic Study

Context	Crockett Curvilinear	Hickory Engraved	Spiro Engraved	Holly Fine Engraved	Total
B34			1		1
B33	1		1		2
B32	1		1		2
Unknown		3	10		13
Total	2	3	13		**18**

Sherds Selected for INAA

Context	Crockett Curvilinear	Hickory Engraved	Spiro Engraved	Holly Fine Engraved	Total
B33		1			1
B2			2		2
B4			1		1
Total		1	3		**4**

Norman Site (34WG2)

*Site and Setting***.** The Norman site is a multi-mound ceremonial complex with a habitation area located along the west side of the Grand (Neosho) River in Wagoner County, Oklahoma. People occupied this site during the Harlan and Norman phases, A.D. 1000-1300. The site has several features: two bi-lobed mounds, one conical mound, a habitation area, and midden deposits. The two bi-lobed mounds consist of a conjoined platform and burial mounds (Regnier et al. 2017; Vogel et al. 2005). The habitation area was designated Unit IV and the midden area was designated Unit V (Figure 3.13).

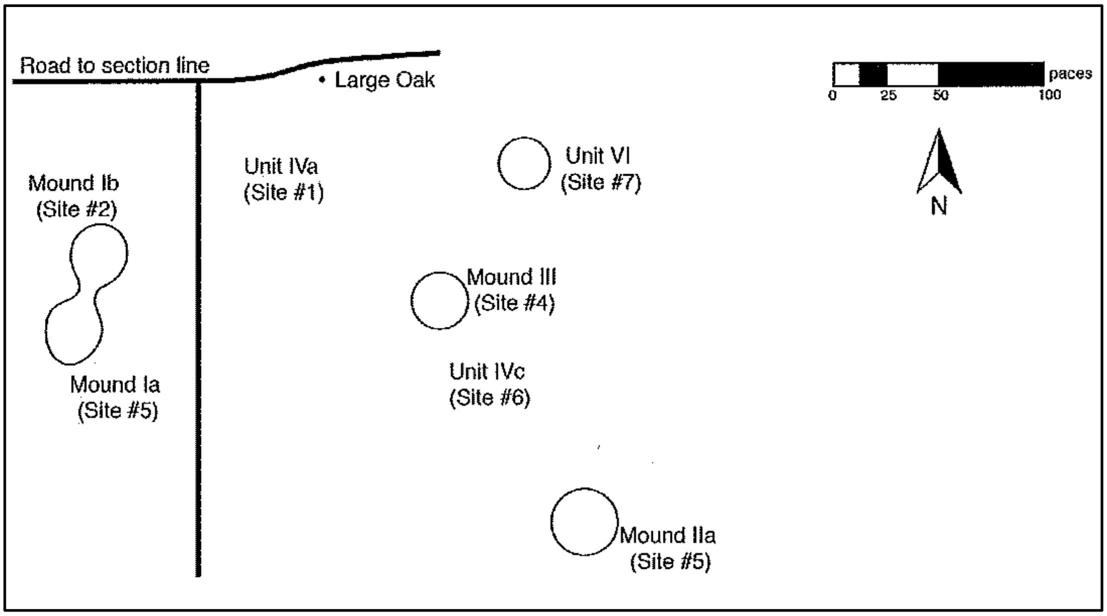


Figure 3.14. Norman site map showing the location of mounds (Regnier et al. 2017:Figure 4.2).

History of Research. In the past, investigations at the Norman site have inconsistently documented the locations and descriptions of the various site features, making archaeological interpretation challenging, if not impossible (Regnier et al. 2017:131). The locations of the mounds continually changed with each new site map. During the 1930s, archaeologists visited the site at different times and recorded the location of the conjoined burial mound in different areas. Recently, considerable work has been done to reconstruct a better map of the site and the excavations (Vogel et al. 2005; Regnier et al. 2017). Regnier et al. (2017) compared early site documents and have generated the most accurate site map to date of Norman.

With funds from the Civil Works Administration (CWA), Joe Finkelstein and a hired crew excavated the conjoined burial mound (Mound II-1 and II-2) in 1933 (Regnier et al. 2017). In 1942, the US Army Corps of Engineers purchased the Norman site. In 1948, Robert Bell and Joseph Caldwell, in collaboration with the University of

Oklahoma and the Smithsonian Institution River Basin Survey, conducted excavations from July to September 1948. Bell and Caldwell excavated Mound I and focused on an area south of Mound I (Bell 1948; Caldwell 1948). During the excavations of the conjoined burial mound, some exotic artifacts were recovered, such as t-shaped pipes, arrow points, copper hair pins, long-nose god masks, shell beads, effigy pipes, and engraved and incised pottery (Regnier et al. 2017).

*Formative Fine Ware Contexts***.** The fine wares used in this study come from Mound Unit II, the conjoined burial mound (Figure 3.14). Mound Unit II-1 was the larger lobe, approximately 3-4 meters high and 21 meters in diameter. Mound Unit II-2 was the smaller lobe, approximately 2 meters high and 30 meters in diameter (Vogel et al. 2005:28).

From the evidence at hand, it appears that at the Norman site fine ware pottery was deposited exclusively in Mound Unit II-1, the largest lobe of the conjoined mound. Burial 36 contained at least 12 Formative fine ware vessels; the number of fine ware vessels in Burial 36 may be indicative of a founding burial. Nine burials in the largest lobe of Mound Unit II contained Formative fine wares. For the stylistic study, I selected 13 vessels from six burials, and for the compositional analysis, I sampled 22 sherds from eight burials (Table 3.6).

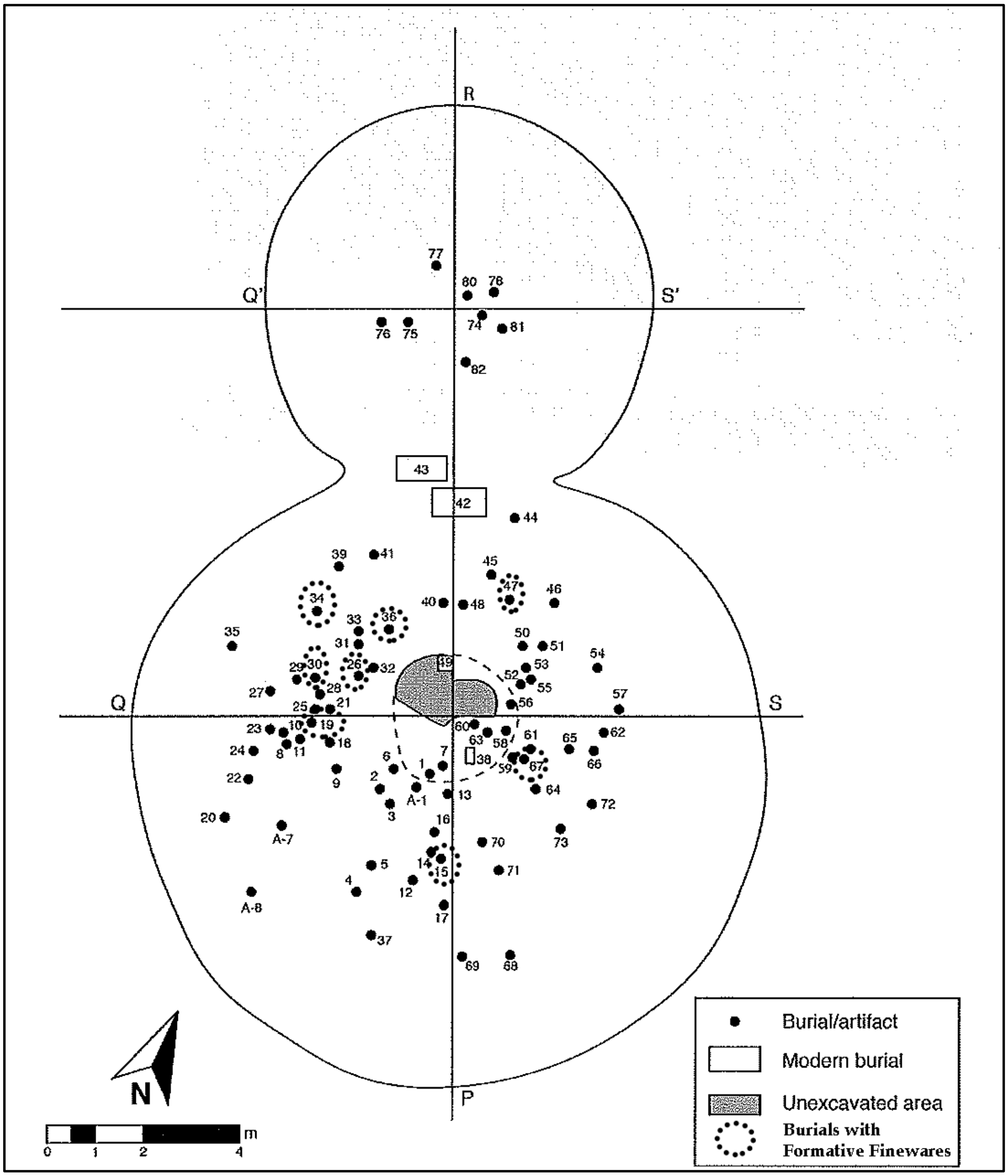


Figure 3.15. Norman Mound Units II-1 and II-2 map showing the location of burials and Formative fine wares (adapted from Regnier et al. 2017, Figure 4.5).

Table 3.6. Formative Fine Wares used for Stylistic and Compositional Analysis at Norman.

Whole Vessels Selected for Stylistic Study

Context	Crockett Curvilinear	Hickory Engraved	Spiro Engraved	Holly Fine Engraved	Total
B36		4	4		8
B26			1		8
B30			2		2
B34		1			1
B67			1		1
B15			1		1
Total		5	9		**14**

Sherds Selected for INAA

Context	Crockett Curvilinear	Hickory Engraved	Spiro Engraved	Holly Fine Engraved	Total
B26			2		2
B30			2		2
B36		5	7		12
B47			1		1
B67		1	1		2
B87			1		1
B15			1		1
B19			1		1
Total		6	16		**22**

Southern Caddo Mound Sites

George C. Davis Site (41CE19)

The Site and Setting. The George C. Davis site is a large multi-component mound site situated on a steep terrace overlooking Bowles Creek to the west and 1.3 km meters north of an old channel of the Neches River. The site is a large multiple mound center and associated settlement occupied primarily between ca. A.D. 800-1300. The site includes a large habitation to the north encompassing approximately 112 hectares, which makes George C. Davis the largest Formative Caddo ceremonial center in the northern and southern Caddo area (Fields and Thurmond 1980). There are three earthen mounds (Mounds A, B, and C) and one large borrow pit just west of Mound B (Figure 3.15).

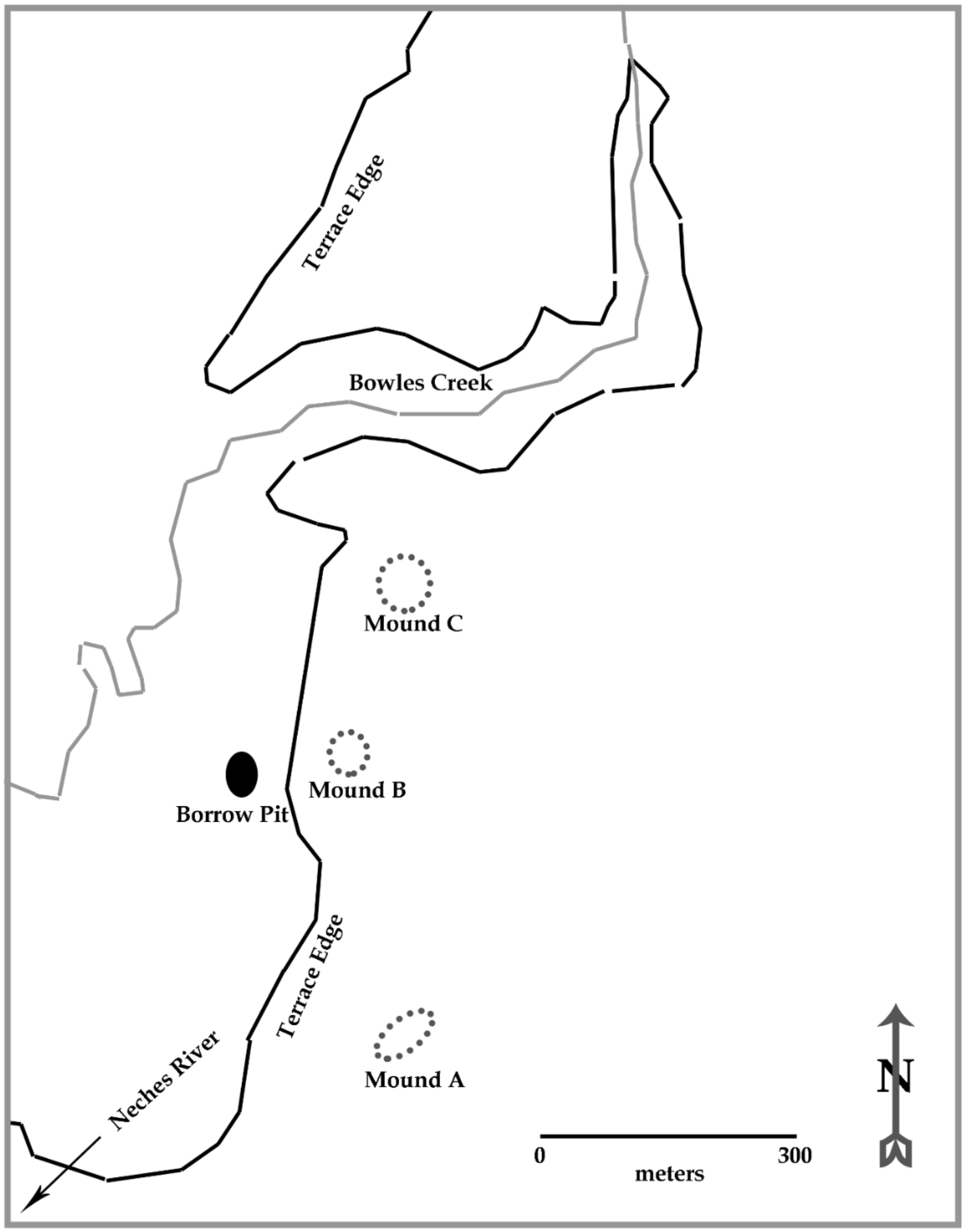


Figure 3.16. The George C. Davis site, showing the locations of mounds and borrow pit (adapted from Story 1981:Figure 1).

Mound A is an L-shaped platform mound and measures 100 meters in length and 60 meters in width. Mound A is the largest mound and contained several structures on the platform (Newell and Krieger 1949:Figure 4) and associated Formative Caddo ceramics. Mound B is a low-lying and rectangular-shaped mound with rounded corners, and was a platform for several structures. The dimensions of Mound B are 2 meters high, 50 meters long, and 35 meters wide. Mound C is a conical mound currently 5.5 meters in height and 42 meters wide (Story 1981). Newell and Krieger (1949) stated Mound C was most likely a platform mound during George C. Davis' occupation, but later work by Story (1997) determined that it was a special cemetery used by the elite.

History of Research. Since the 1940s, several archaeologists have visited, investigated, and documented the George C. Davis site (Creel and Baxter 1979; Newell and Krieger 1949; Perttula 2017; Ross and Thurmond 1980; Story 1972, 1981, 1997, 1998; Thurmond and Kleinschmidt 1979). More archaeological research has been carried out here than any other Formative Caddo ceremonial center in eastern Texas. For example, the first and largest investigation was during the WPA by Newell and Krieger (1949). Their excavations of Mound A and surrounding areas uncovered the remains of over 40 structures and 100,000 artifacts. Story (1972, 1981) conducted excavations on Mound C, Mound B, the borrow pit, and concentrated heavily on off-mound areas. During these excavations, Story uncovered the remains of several structures, middens, shaft tombs in Mound C, and pit features.

Formative Fine Ware Contexts. Story (1972) recovered Hickory Engraved, Holly Fine Engraved, and Crockett Curvilinear Incised vessels in several different contexts, such as middens, pits, hearths, inside structures, surface collections, in mound layers, and in mortuary contexts. The widespread distribution and variety of uses suggest Formative fine wares were used as serving wares in communal feasting and as mortuary offerings (Newell and Krieger 1949; Story 1981). The number of Formative fine wares recovered from George C. Davis is unprecedented compared to the number of Formative fine wares recovered at other ceremonial centers in the Caddo area (see Chapter 5). There are more Holly Fine Engraved and Crocket Curvilinear Incised vessels (and vessel sherds) than all the other ceremonial centers combined. So many Formative fine wares have been recovered from George C. Davis that Girard (2009) speculated the site could have been a major production and distribution area. Whole and partial vessels from George C. Davis are currently stored at the Texas Archeological Research Laboratory facility at the University of Texas at Austin. I was able to use only a small assemblage of whole and partial vessels (n=18) for the stylistic study (Table 3.7). The rest of the Formative fine wares from George C. Davis are sherds and too incomplete to be incorporated into the stylistic study.

Table 3.7. Selected Whole Vessels for Stylistic Analysis at George C. Davis.

Whole Vessels Selected for Stylistic Study					
Context	**Crockett Curvilinear**	**Hickory Engraved**	**Spiro Engraved**	**Holly Fine Engraved**	**Total**
Village Midden	3	2		3	8
Mound C	1			7	8
Mound A				2	2
Total	4	2		12	**18**

There is an extensive INAA database on the chemical composition of Caddo sherds from George C. Davis. This includes 80 sherds analyzed between 2003-2017 using INAA from WPA collections (Descantes 2003, 2005; Descantes et al. 2003;

Perttula 2017). Many of the sherds used for INAA were Crockett Curvilinear Incised (n=5), Holly Fine Engraved (n=10), and Pennington Punctated-Incised (n=5). Most of these fine wares and other Formative Caddo ceramics were sourced to the George C. Davis site, which provides clues about where potters produced Formative fine wares. I used these sherds to generate a southern Caddo baseline INAA group.

Crenshaw Site (3MI6)

*The Site and Setting***.** The Crenshaw site is a large civic ceremonial center in the Great Bend area of the Red River in southwest Arkansas. People inhabited and used this site from the Late Fourche Maline to Formative Caddo periods, A.D. 600-1000, as well as in post-Formative Caddo periods. Crenshaw covers an estimated eight hectares of land, and has two platform mounds (Mounds A and C), four conical-shaped mounds (Mounds B, D, E, and F), and a large cemetery (Figure 3.16). People primarily occupied Crenshaw during the Late Fourche Maline period. At this time, Fourche Maline people constructed Mounds C, D, and F. During the early 10th century, Formative Caddo communities constructed mounds on top and adjacent to previous Fourche Maline cemeteries and living areas abandoned for over a century (Jackson et al. 2012). The village and cemetery deposits, as well as funerary offerings included in burials under or in the various mounds, indicate Woodland Fourche Maline and Caddo peoples used the site for habitation and/or mortuary purposes for at least 550 years (Perttula et al. 2014:1).

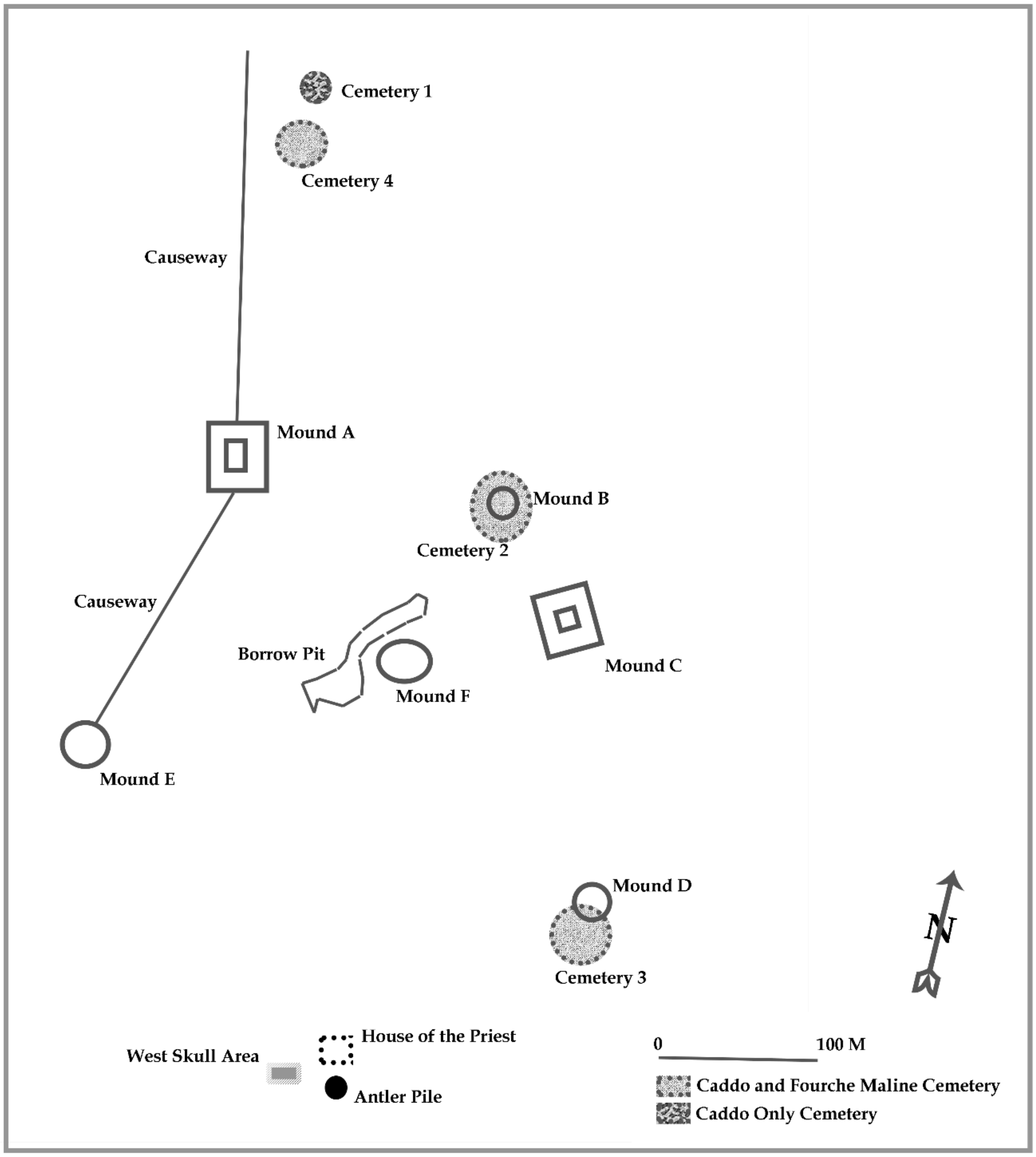


Figure 3.17. The Crenshaw Mound site, showing the locations of mounds, cemeteries, borrow pits, House of the Priest, antler pile, and skull area (adapted from Perttula et al. 2014:Figure 5 and Jackson et al. 2012:Figure 3-3).

History of Research. Crenshaw has had a long history of archaeological investigations and is unprecedented in size and complexity within the southern Caddo area (Davis 1962; Dickenson 1936; Durham and Davis 1975; Jackson et al. 2012;

Moore 1912; Powell 1977; Perttula et al. 2014; Samuelson 2009, 2010; Schambach 1982, 2002). Previous archaeological investigations at Crenshaw uncovered several uncommon ritual features that received substantial attention. These included a special purpose building, a large antler pile, and pits that contained either human mandibles or skulls. These features were discovered on the southern edge of the site. Caddo researchers have hypothesized the features were the residence and workplace of at least one ritual specialist (Jackson et al. 2012; see also Chapter 2).

Formative Fine Ware Contexts. The Crenshaw Site is one of the most important sites for understanding stylistic variation in fine wares between the northern and southern Caddo areas. In fact, approximately 50 percent (n=106) of the whole vessels used for the stylistic analysis came from Crenshaw. The number of Spiro Engraved vessels at Crenshaw is unrivaled when compared to the other Formative Caddo ceremonial centers in this study. Caddo vessels used in the stylistic study primarily came from Caddo burials in Mounds B (n=63) and C (n=36), and Mound D (n=7) (Table 3.8).

Table 3.8. Whole Vessels Selected for Stylistic Analysis at Crenshaw

Whole Vessels Selected for Stylistic Study					
Context	**Crockett Curvilinear**	**Hickory Engraved**	**Spiro Engraved**	**Holly Fine Engraved**	**Total**
Mound B	15	34	6	8	63
Mound C	6	9	17	4	36
Mound D	2	1	4		7
Total	23	44	27	12	**106**

Boxed Springs Mound Site (41UR30)

The Site and Setting. The Boxed Springs Mound is a Formative Caddo site (A.D. 900 – 1100) in the East Texas Pineywoods in the Sabine River drainage. The site covers approximately 48 acres on an upland ridge just north of an ancient Sabine River channel (Perttula 2010). Boxed Springs includes four earthen mounds (Mounds A-D), midden areas, occupational areas, and two borrow pits (Figure 3.17). The four mounds appear to surround an open plaza. According to Perttula (2010), several different fertile soils at and near the Boxed Springs Mound site would have been productive for Caddo horticulturalists.

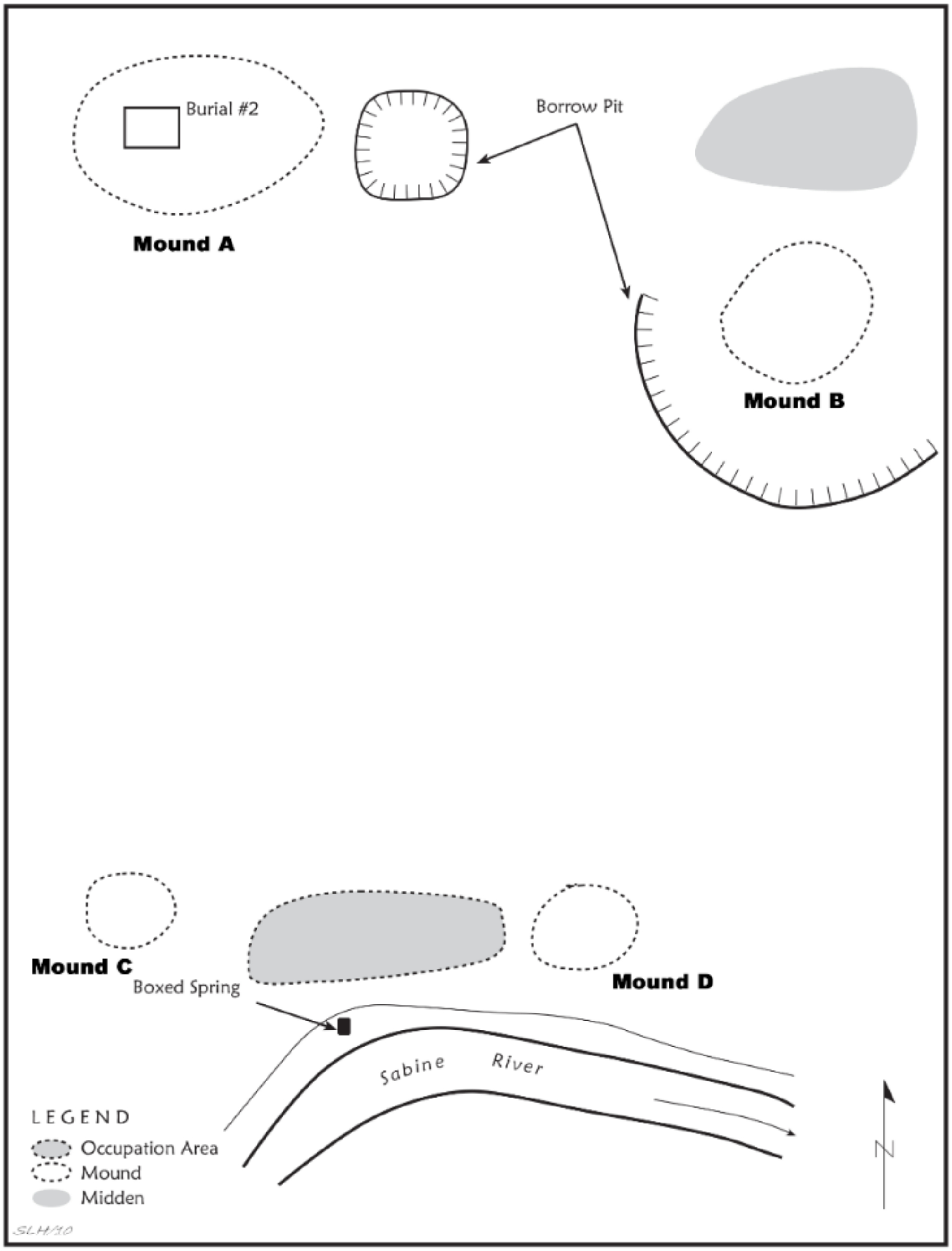


Figure 3.18. Layout of Boxed Springs Mound site (adapted from Perttula 2010:Figure 6). Formative fine wares recovered from Mound A and looted cemetery to the north.

History of Research. There have been a few archaeological investigations at the Boxed Springs Mound site since the 1960s (Perttula and Wilson 2000:35-70), the most recent of which included unit excavations and several shovel tests throughout the site (Figure 3.18) (Perttula 2011). People of Boxed Springs constructed Mounds C and D as low mounds over dismantled house structures. Both structures had prepared clay floors with very little cultural debris. Mound D was a burial mound with dimensions of 12 x 8 x 2 meters in length, width, and height. Mound B appears to have been a platform mound, but its primary function remains unknown (Perttula 2010).

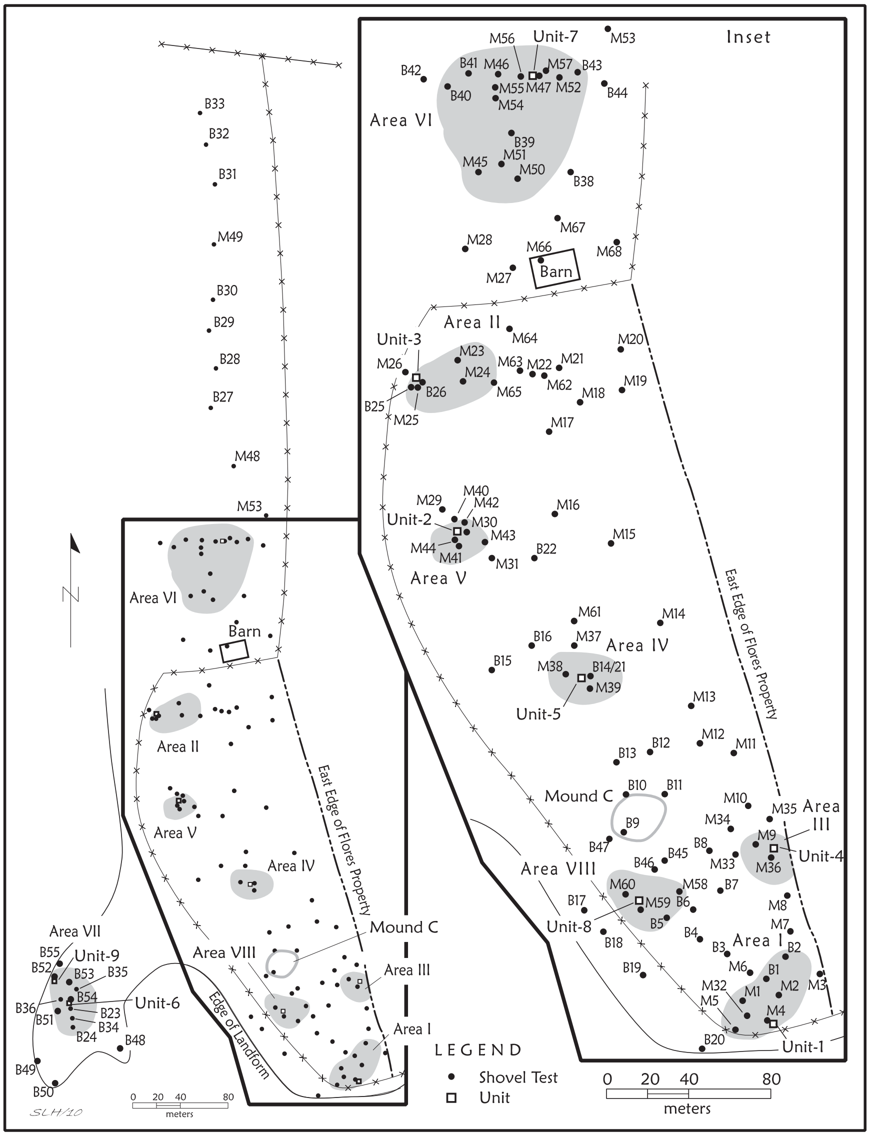


Figure 3.19. Distribution of units and shovel tests at the Boxed Springs site (adapted from Perttula 2011:Figure 18).

Sam Whiteside, an avocational archaeologist, investigated two burials in Mound A. Burial #1 contained the cremated remains of an individual, a large celt, and mano. Burial #2 contained at least three individuals placed in an east-west direction. Mortuary offerings included two stone bifaces, five stone celts, two burnishing stones, a sandstone saw, arrow points, and seven ceramic vessels (one Spiro Engraved beaker, one Pennington Punctated-Incised jar, one plain bottle, one plain carinated bowl, and two plain jars).

Boxed Springs inhabitants maintained a large cemetery with at least 150 individuals just north of Mounds A and B. Unfortunately, during the 1980s, looters destroyed a significant portion of the cemetery. The cemetery is undoubtedly associated with the Boxed Springs Mounds site. Formative Caddo engraved wares and other mortuary offerings came from the burials (Perttula and Wilson 2000). James E. Bruseth and Timothy K. Perttula documented many of the looted artifacts in 1990 (Perttula 2011:205-261). Formative fine wares (n=71) comprised 44 percent of the vessels. Unfortunately, only a small percentage of the Boxed Springs fine wares have been preserved for study.

Formative Fine Ware Contexts. I used 14 Formative fine ware vessels for the stylistic study in Chapter 5. These vessels came from Burial #2 (n= 1) in Mound A, and from the Red Mcfarland Collection (n=13), all of which are stored at TARL. I also used these fine wares in the Kernel Point Density analysis discussed in Chapter 6.

Mounds Plantation Site (16CD12)

The Site and Setting. Mounds Plantation is a multi-component site approximately 2.5 kilometers west of the present-day Red River channel in Northwestern Louisiana. Mounds Plantation has two platform mounds, seven conical mounds that surround a plaza, and three borrow pits (Figure 3.19). The area with mounds cover a ca. 1850 x 450 ft.

Mounds Plantation is in a wide valley containing an active river, old cut-off lakes, natural levees, backwater mudflats, and shallow lakes, and is flanked by forested terraces with a variety of natural floral and faunal recourses (Webb and McKinney 1975:41). Fertile soils encompass the site and this area of the Red River valley has a suitable climate for successful horticulture and agriculture (Webb 1959). Many other Formative Caddo communities strategically constructed mound sites on similar landscapes and environments.

Mounds Plantation is one of the most significant early Caddo mound sites along the Red River because of its occupation over the Coles Creek and Formative Caddo components. Mounds Plantation had one of the longest occupational histories in the southern Caddo region, and archaeologists have compared the site's social and material relationships to other contemporaneous southern Caddo mound sites, like Crenshaw and George C. Davis (Girard 2009; Webb and McKinney 1975).

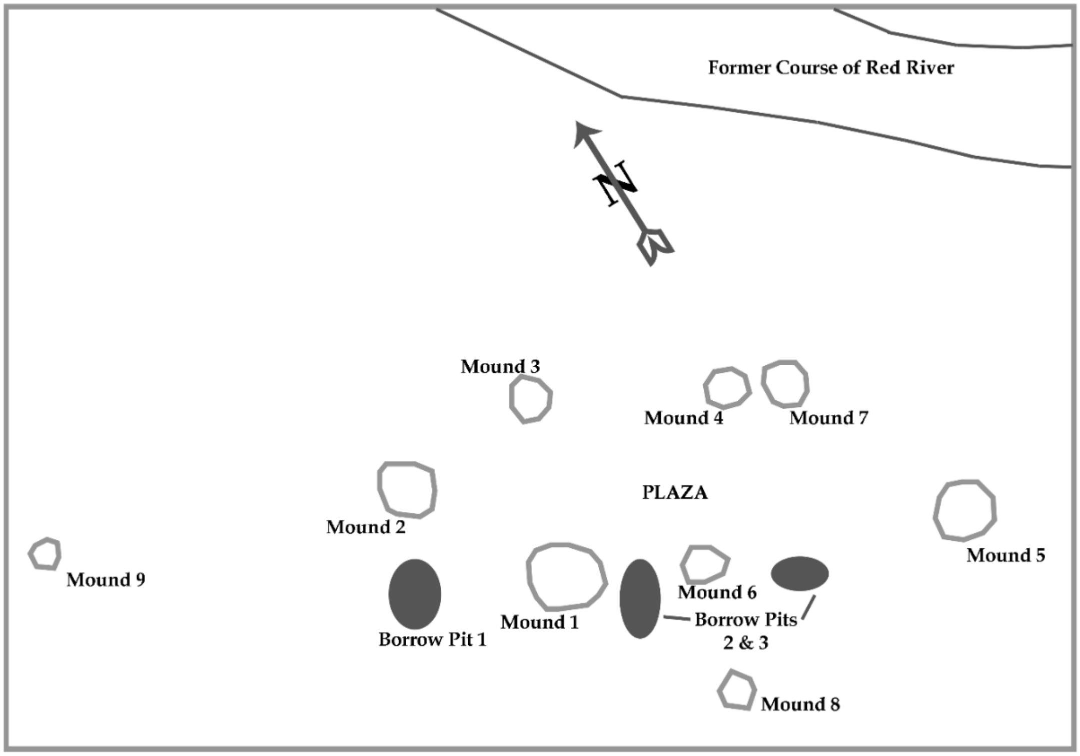


Figure 3.20. Mounds Plantations site, showing mounds, plaza, borrow pits, and old Red River channel (adapted from Webb and McKinney 1975:Figure 1).

History of Research. Clarence B. Moore (1912) was the first investigator at the site, and he referred to it as Pickett Landing. It was eventually renamed Mounds Plantation by Ford (1936) and Webb (1948, 1959, 1961). According to Moore's (1912) description, Mounds Plantation was subjected to considerable historical disturbances that he thought had destroyed much of the site, including modern agriculture and farm houses erected on four of the mounds; Moore only described six mounds at the site. When Webb and McKinney (1975) revisited the site, they identified at least nine mounds, two of which (Mounds 5 and 9) were peripheral to the primary mound cluster surrounding the plaza.

Webb and McKinney's (1975) investigations of the plaza, borrow pit, and Mounds 1, 3, and 5 produced several cultural features and deep burial pits or shaft tombs where people interred multiple individuals with a variety of mortuary offerings. One of the most ubiquitous types of grave goods was pottery. Many of the sherds and vessel fragments are Coles Creek Incised, French Fork Incised, Crockett Curvilinear Incised, Pennington Punctated-Incised, Hickory Fine Engraved, Holly Fine Engraved, and Weches Fingernail Impressed. Over ninety percent of the sherds from Coles Creek and Formative Caddo types were recovered from Mounds 3 and 5 (Table 3.9).

Table 3.9. Mounds Plantation Pottery Sherds and their Contexts.

Cultural Complex	Pottery Types	Surface	Barrow Pit Cache	Mound 5 Trench 3	Suface around Mound 3	Surface Clearing Mound 3	First Habitation Level Mound 3	Structure and and Fire Pit Mound 3	Second Habitation Level Mound 3	Total
Coles Creek Types	*Coles Creek Incised*	275	55	4	283	53	25	24	54	773
	French Fork Incised		2							2
Formative Caddo/Alto Focus Types	*Crockett Curvilinear*	1			2	2				5
	Pennington Punctate	5							3	8
	Weches Finernail Impressed					1				1
	Hickory Fine Engraved	26			26	2	4	2	14	74
	Holly Fine Engraved	7				1	1	1	7	17
Middle-to-Late Caddo/Belcher Types	*Belcher Engraved*	10								10
	Hodges Engraved	10								10
	Belcher Ridged	78			4				1	83
	Haley Engraved	2								2
	Heampstead Engraved	1								1
	Keno Trailed			1						1

Formative Fine Ware Contexts. I could not locate the whole vessels from Mounds Plantation to include them in the stylistic analysis. However, this site was an important addition to the Kernel Point Density analysis in Chapter 6 to compare the frequency distributions of Formative fine wares between ceremonial centers in the northern and southern Caddo areas.

Summary

The Arkansas drainage inhabitants lived in a rich environment within the Ozark Plateau, situated between the Ouachita Mountains to the south and the Central Lowlands to the northwest. High quality lithic, faunal, and flora resources were abundant and likely utilized. The complex web of major river drainages and tributaries provided inhabitants quick routes by which to move and interact with neighboring communities, like southern Caddo groups.

Substantial archaeological excavations have been undertaken at the five Arkansas drainage and four southern Caddo ceremonial centers. This chapter is not a comprehensive overview of these sites. I mainly focused on the variety of contexts in which inhabitants deposited Formative fine wares. Long-distances separate the northern and southern Caddo areas, but that did not deter the two communities from interacting, forming relationships, trading esoteric knowledge, and exchanging socially valuable objects, like Formative fine ware ceramic vessels. The chronological sequence of site occupation and the scale of social interactions between the two regions is not as well defined as it could be, but the production and spread of Formative fine wares suggest people occupied these ceremonial centers contemporaneously during some period of time, likely between ca. A.D. 900-1150.

The presence, burning, and reconstruction of extended entranceway structures at some of these sites suggest the residential places and ritual spaces of ritual elites/specialists. The contextual differences in fine ware use and deposition between northern and southern Caddo communities instilled the pottery with different meanings and connotations. Another important distinction between northern and southern Caddo traditions is the use of conjoined burial mounds. Conjoined burial mounds are found at Spiro, Harlan, Norman, and Reed. Inhabitants at these sites exclusively deposited Formative fine wares in features in the conjoined burial mounds, which is significantly different from the depositional contexts of fine wares at southern Caddo ceremonial centers. These social distinctions highlight the importance of the production of fine wares and how and why emerging groups distributed them throughout the Caddo areas.

CHAPTER 4: CERAMIC STYLE AND COMPOSITIONAL ANALYSIS AS A PROXY TO UNDERSTAND COMMUNITIES OF PRACTICE

In recent years, archaeologists have acknowledged that ceremonial mound centers did not develop solely from local populations. Rather, mound centers are developed "through the aggregation of people from diverse traditions" and practices (Pluckhahn et al. 2017:110). One of the best-documented examples is Spiro, formed partly from interactions with socially diverse communities from distant areas, such as Toltec in Arkansas, Red River, the American Bottom, and Lower Mississippi Valley (Bell 1984; Brown 1996, 2012; Girard et al. 2014). While the formation of the northern and southern Caddo regions is no doubt related through deep social ties (e.g., Girard et al. 2014:31-32), there are fundamental differences to the broader outlines by which these separate communities developed (see Chapter 2).

Exploring the "detailed historical and cultural contextual analyses that distinguish constellations of situationally significant materials and attributes" is key to understanding the social diversity in the formation of Arkansas Valley and Gulf Coastal Plain ceremonial centers (Emerson and Hargrave 2000:2). Unfortunately, such fine-grained analysis is often lacking for many southeastern ceremonial mound centers (Emerson and McElrath 2001:202). One longstanding issue – especially regarding Caddo research – is the heavy reliance on outdated ceramic typologies, which have a habit of masking cultural variation by demoting pottery to a restricted number of discrete types (Emerson 1999). Knowing that southern Caddo potters produced the fine wares and subsequently exported and used by Arkansas Valley people as burial offerings, in particular, could be explained by dynamic interactions among separate Caddo communities of practice.

For this study, I employ a community of practice perspective to understand the variation in formative fine ware style, production, distribution, use, and deposition at Arkansas Valley and Gulf Coastal Plain ceremonial centers. In this chapter, I define and discuss the utility of a communities of practice framework in the study of ceramics in archaeological contexts. Next, I review recent literature on how ceramic style has been used to understand community variation. Then, I discuss previous compositional studies on archaeological ceramics that have been particularly useful for understanding the dynamics of communities of practice. The final section of this chapter will explore how ceramic style and INAA can be used together as a proxy to understand community variation within the Caddo region.

Style as a Proxy to Understand Past Communities

Before I delve into defining community of practice theory and explaining its application in this study, it is important to discuss how the ideas of ceramic style have changed over the last few decades and to show how communities of practice evolved from these perspectives. Archaeologists have long been intrigued with how ceramic style can be used to untangle complex social questions, whether style is conceptualized as a secondary non-functional by-product, as a way to generate broad typologies, as a means to emphasize a distinct finite group in time and space, or used to express individual and communal identities (Alt 2001; Binford 1962; Plog 1980, 2008, Weissner 1983; Wobst 1977). Because ceramics are usually the most ubiquitous material recovered from the late precontact archaeological record of the southeast and they reflect deeply rooted social identities that can potentially expose different scales of social organization through time and space, a high value has been placed on the study of pottery. Although most southeastern archaeologists would agree that studies on ceramic style are an important avenue to emphasize social processes and production, stylistic studies concerning Caddo ceramics have lagged behind in favor of more technological, material, and compositional research (Perttula et al. 2005; Perttula and Ferguson 2010). Schambach (1981) and Early (1998) have been the premier archaeologists who have developed new classificatory systems for the Caddo region, but their utility is limited and restricted to particular areas of interest. Early (2012) has recently argued for a multifaceted approach that bridges style with compositional and technological studies, because multiple lines of evidence reveal more nuanced ideas of ceramic production and exchange.

We are only beginning to understand the complexity and diversity of the Formative Caddo, especially regarding cultural variation between the northern and southern Caddo regions before and after their emergence. A community of practice framework will allow me to explain the widespread distribution and contextual differences in ceramic use and distribution. In order to determine whether there is variation in the production, distribution, and use a stylistic and compositional analysis in addition to a strong theoretical framework is necessary. This approach will highlight diverse communities who used and distributed formative fine wares for significantly different ritual and social purposes while still staying within the bounds of a broadly shared cultural tradition. At the moment, we are unable to observe how Formative

Caddo communities interacted within another. Did the emergence of ritually-charged ceramics become the catalyst by which Caddo communities maintained distant social ties and did the differences in the production, distribution, and use stimulate cultural variation among the Arkansas Valley and Gulf Coastal Plain groups?

Theoretical Evolution of Stylistic Variation Studies

Stylistic variation analyses have been an integral part of archaeological inquiry for around 100 years. Early studies conducted by Kidder (1931) and Ford (1935) developed some of the first ceramic typologies through the study of their decorative and technological differences. For Binford (1962), the use of style was not a necessary part of archaeological analyses. Instead, the function of style provided only “a symbolically diverse yet pervasive artefactual environment promoting group solidarity and serving as a basis for group awareness and identity” (Binford 1962:220). Binford (1963) also conceptualized the notion that style is based on the amount variability or range in someone’s stylistic norms between the mother, daughter, and parent communities who learn from one another, which were essentially acculturated. External factors, such as differences in resource procurement and migration, could be factors of stylistic variability. By 1965, Binford stressed that stylistic continuity originated from the linear transmission of ideas from generation-to-generation. Stylistic variation can only develop when separate cultural units interact through marriage or exchange. Overall, Binford had a very static view of how groups interact.

Deetz (1965) and Longacre’s (1970) notion of style, which was very similar to Binford’s view of stylistic variation, emphasized that style could be used to understand how individuals interacted and learned from one another. At this point, style expanded beyond something learned from past generations, but through past peoples' day-to-day experiences. Archaeologists no longer used stylistic studies as a primary means to construct cultural chronologies. Deetz and Longacre still viewed style as a one-to-one correspondence between the object and the social group. Group membership was determined by the presence of diagnostic objects and exotic objects were the main determiners of interaction with other communities. In many ways, this notion of style is currently how Caddo archaeologists view the distribution of Formative Caddo fine wares (see Girard et al. 2014:54-57). The spread of formatives fine wares between the northern and southern Caddo areas is viewed as emblematic of a regionally shared expression of group identity. Even Formative Caddo Late Woodland ancestors appear to have much more social diversity than the Formative Caddo (Perttula 2017). I maintain that this is a serious issue primarily based on the distribution of Formative Caddo fine wares.

Another contribution to stylistic research is the motor habits theory (Hill 1977). Variations in style are attributed to various learned motor habits, which can include learning how potters executed design pathways. Differences in the angle or height of a design may suggest a potter's unique design signature. While the overall design will look similar, variations may exist on a micro stylistic level. Hill argued this type of learned behavior is most likely a subconscious form of design expression.

One of the significant contributions to the understanding of stylistic variation is Wobst's (1977) information exchange theory. For Wobst, stylistic variations between different groups are intentional. Thus, group membership leads to shared styles. This type of information exchange can reduce stress and sustain human survival. Wobst's underlying theory is that style is emblematic. Groups use style to signal group membership. Style does not just appear because you happen to interact with people a lot; rather, it is a system of communicating information. The variation a group had on a regional level is attributed to distance. If a social group interacted less frequently, social links would begin to break down, and as a result, variations in style would develop. Wobst continued to use an evolutionary perspective on style. He also discussed the importance of artifact visibility. The more visible the style is the more information is exchanged by different cultural groups. By the late 1970s, stylistic studies had become so generalized that Wobst (1977:317) argued that “stylistic analysis has become a boring routine which rests on shaky foundations.”

The late 1970s through the 1990s saw significant theoretical changes and heated debates regarding the role and utility of style in archaeological studies (Binford 1986; Sackett 1985, 1986; Wiesner 1983, 1985, 1990; Wobst 1977). It was during this period, called the New Archaeology, that archaeologists thought about the different ways in which material culture varied within and between groups, what those differences conveyed about group interaction and identity, and how style influenced cultural preservation. Ceramic style was viewed at this time as a salient form of information exchange within and between pre-Columbian communities (Wobst 1977:329). What became highly debated among researchers was the degree to which objects conveyed the exchange of information and its intentionality.

The primary focus of these debates stemmed from differing views on the degree to which potters had agency and whether variation in ceramic style resulted from conscious behaviors or an unconscious, passive “ways of doings” (Hegmon 1998). For instance, Sackett (1986) developed isochrestic and iconological understandings of style. Isochrestic variations in style were the unconscious choices made by potters. They are learned and are historically contingent on the potter and their communal identity. Sackett viewed Isochrestic choices of artisans as instances of passive variations in style because they are primarily dictated by a broadly shared technological and stylistic tradition of a community (Sackett 1990:33). Sackett used stylistic similarities within and between groups to highlight ethnic relatedness. Iconological variations in style were more symbolic or abstract expressions. Iconological styles result from active and conscious design choices to communicate messages regarding identity and group membership. Specific design elements may be broadly accepted throughout an entire region, but their meanings and usage may vary from community to community. The meanings of these designs may also be more restricted to specific people within different communities. This view of style has become a very important addition to understanding material variation. Before we can understand variations in style, there first needs to be a better appreciation of who produced, distributed, and used specific objects in a variety of practices and traditions.

However, not all archaeologists viewed style in this way. Hegmon argued that "style is not just a passive by-product of cultural norms or mental templates. Style does something." (Hegmon 1998:265). Hegmon also stressed there may never be a consensus on the definition of style. She explained that earlier theories viewed style as a product of material culture and that variation was determined through technological constraints. For too long, style has been regarded as a passive phenomenon. Hegmon wrote a definitive review of the practice of style in archaeological studies (Hegmon 1992).

Here, she incorporated individual and communal agency to understand stylistic variation within and between groups. Style, for Hegmon, was seen as an individual social and communal process that aided in community formation. In this view, style becomes much more complex and fluid. Now, the study of ceramic vessels can not only be used to understand the communal expressions of group membership but also to understand unique design pathways specific to the potter.

Hegmon and Kulow (2005) took this view of style a bit further and added structure with agency to understand the production process and distribution of vessel forms and designs. Vessel form was theorized as an expression of communal structure. Vessel forms are unique to the identity of a group and potters needed to know what type of vessel form to build first before they embellished it. So, there are much more structural constraints on how to build a vessel. On the other hand, design was theorized to be an expression of agency. Style can vary from the human experience and variations are more socially fluid. Potters may have more individual freedom to alter a traditional design.

Weissner (1983) modified Wobst's (1977) view of style to include the explicit purpose of group membership and identity. Weissner (1990) viewed stylistic behavior as a nonverbal communicative device that relates mostly to identity formation and community continuity. In other words, style can be individually unique, but can also express membership in a community. Weissner developed the notions of emblematic and assertive style. Emblematic style refers to a kind of style that speak to the whole community, while assertive style refers to a more subjective way of creating a design, which is most likely referents to the maker of a vessel rather than his/her community.

Hodder (1991) saw style as a cognitive process and as a way of doing and being in the world. Hodder claimed a person's thoughts and feelings significantly influenced material culture. Hodder studied the meanings of Catabash pottery and developed interesting contrasts between milk and blood, which were markers for women and young men. Thus pottery became a way in which women and young men to showcase their prestige in the community and maintain group solidarity.

Style expresses much more than decorative attributes. Style is deeply engrained within a group's social process and operational sequence of technological style. Longacre (1991) has shown that ethnic differences could be inferred from stylistic variations in Kalinga pottery. Variations showed distinct social and geographical boundaries. Early (2012) has extensively studied the designs on Caddo pottery. She developed the concept that ceramic designs are made up of specific design pathways that are structured by "design grammar." By studying the variability in ceramic design pathways, one can reveal cultural signaling of separate communities of practice. This idea of style is analogous to Joyce's (2008:26) analysis of pottery as "historicized chains of practice through which humans and non-humans are connected over time in materially substantial ways." In this way, variation in the production, distribution, and use play a fundamental role in historical change within and between a cultural region.

Dietler and Herbich (1998) abandoned the use of typologies and evolutionary explanations in understanding stylistic variation and promoted more of an agency-based approach to understanding regional diversity. They incorporated Bourdieu's theory of practice to understand the social formation of groups and developed different methodological categories to understand the variations that they were seeing. Things were materials that took up material space; techniques were expressions of individual and communal actions. The way in which they understood stylistic variation was through a chaîne opératoire approach. This historical framework provided the link between structure and agency, stylistic variability, and social boundaries through time and space.

Spielmann (2006) did a very interesting stylistic study of the Salina Province. She researched aspects of public versus hidden forms of style, which Spielmann saw as a cultural response to Spanish invasions during the seventeenth century. Spielman investigated two pottery communities of practice and discovered during Spanish interactions, pottery designs became much more abstract and hidden, most likely as a way to mask and preserve traditional esoteric knowledge. The use of agency allowed Spielmann to observe how individual potters chose particular design elements to distinguish themselves from others.

In this section, I have shown that style has been subjected to a staggering amount of theoretical scrutiny. The theory of communities of practice was born from combining ideas "of habitus and technological and decorative style to study stability in particular motor skills and identify bounded social units" (Stark 2006:25). The following sections concentrate on describing communities of practice theory to understand the Formative Caddo fine ware decorative and technological tradition. The salience of theoretically framing this study with communities of practice lies in challenging current assumptions of localization of production and the widespread distribution of formative fine wares between separate Caddo groups.

Defining Stylistic Variation for Use in this Study

Plog (2008) explained that the more groups interact, the more homogenous ceramic designs become. Groups with noticeably different design structures could be considered separate communities of practice. But design similarities across an entire region may not indicate a single community of practice. It is first important to determine if one single community of practice engaged in the large-scale production and distribution of the same pottery types. For a regional perspective, ceramic style may look similar, but if we do not know where pottery was being produced and distributed, it could give a false sense of cultural homogeneity. Still, Plog's (2008) stylistic variation analysis will help archaeologists understand if potters belonged to a single or separate communities of practice, and even identify individual potters. As Plog (2008) pointed out, there is not a lot of consensus on the methods of stylistic variation and design classification. This all depends on what the archaeologists determine to be the most important attributes. Attributes are the conscious or subconscious decisions made by each potter during the production process. These attributes together are the amalgam of alternative choices that build off one another in a hierarchical fashion (Dowd 2012; Early 2012; Plog 2008). So choosing culturally sensitive ceramic attributes are very important part of this study's methodology. For instance, it is essential to list all design elements in your design analysis and then determine which elements are culturally distinguishable attributes (Figure 4.1).

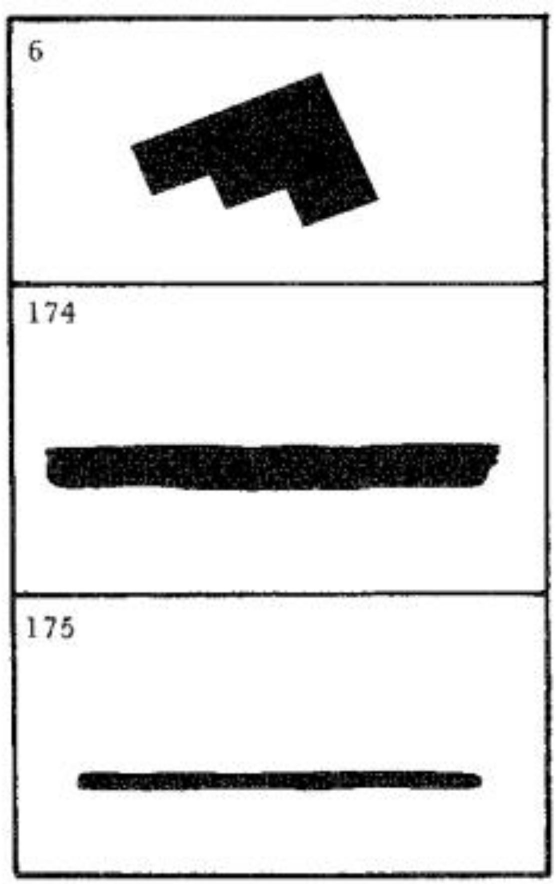


Figure 4.1. Three design elements of Plog's Classification System. Design attributes 6 and 174 would be considered two separate design choices. Design attributes 174 and 175 would not be considered separate design choices (Plog 2008: Figure 4.1).

All three of these elements are incised just under the rim. To the naked eye, they look like three different design attributes. However, as Plog (2008) pointed out, the last two design attributes are more or less identical except for line thickness. So, when choosing attributes (i.e., basic units of design classification) to show stylistic variation, each one has to be alternate design forms. Once chosen, we can begin to look for variations across time and space by recording their frequency distributions.

Dowd (2012) and Plog (2008) used a hierarchical stylistic variation analysis to determine each level of decision-making from the overall primary form. A primary design form is a set of design pathways that produce the most commonly shared motif. These common motifs may be found throughout a cultural region. However, when potters add secondary and tertiary design elements, it may express specific group memberships. Dowd and Plog break down their hierarchical classification system into primary, secondary, and tertiary motifs (Figure 4.2). A Primary motif is the combination of elements that constitute the most basic geometrical design on a vessel, such as a single or double spiral motif. Secondary design motifs are additional design elements that artisans add onto the primary motifs, such as punctations in the center of the single or double spiral. Locating the presence or absence of these secondary motifs is very important for deducing any stylistic variation. Tertiary motifs would be if the potter decided to add a feathering element around the spirals (Plog 2008:48). Thus, the classification system that Plog and Dowd used has the potential to reveal alternative choices made by potters among different communities. However, Dowd (2012) also incorporated vessel form, which is an important structural element in observing stylistic variation. The same style may be executed on totally different vessel forms or executed on the same vessel type with different formal attributes or modes, such as a simple bowl versus a carinated bowl. The same design elements adorned on different vessel forms may be spatially and temporally significant and can indicate different communities of practice.

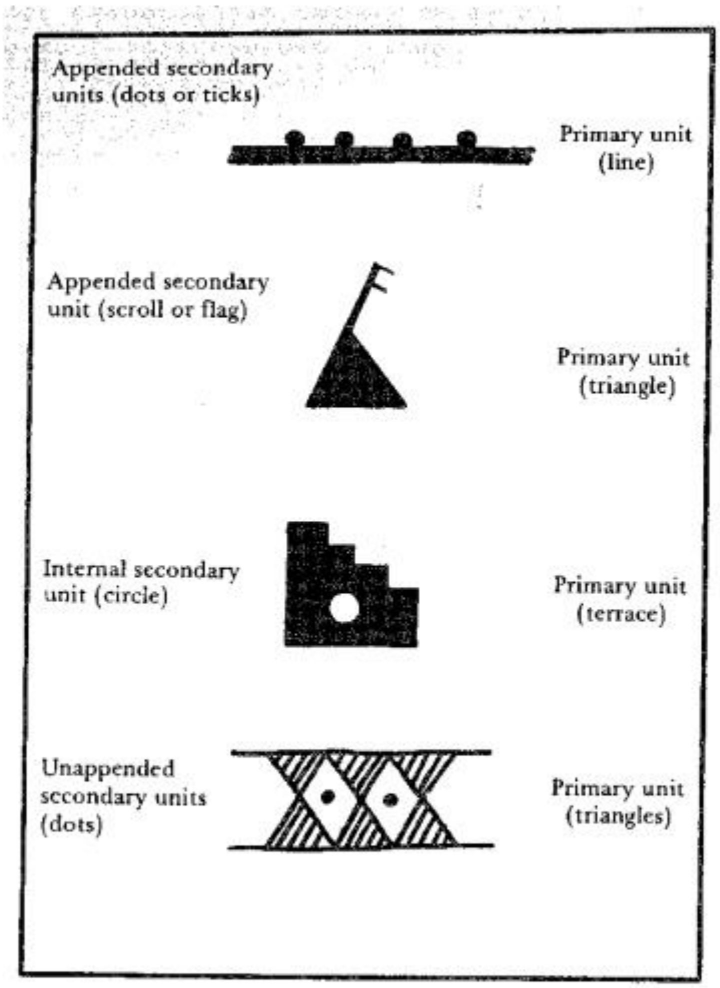


Figure 4.2. Examples of primary and secondary forms. Secondary forms are design choices that are utilized to understand variation within and between communities of practice (Plog 2008, Figure 4.2).

Many archaeologists have used this method of stylistic variation to detect similar or different communities of practice in time and space (Phillips 2012; Stark 2006). Eckert (2006) revealed Pecos and Rio Grande Glaze Ware stylistic variation by combining design layout, elements, and motifs to understand the social boundaries of different southwestern communities of practice. She was able to observe how different communities of practice interacted by investigating the different ways in which Pueblo people used and deposited the same pottery. Much like how I view the Formative

Caddo fine ware traditions, Phillip (2012) realized that the common view of Rio Grande Glaze ware traditions was too simple because it blurred notions of social diversity between different communities of practice. Phillip defined a series of different polychrome painting rules and discovered that changes in Rio Grande ceramic designs were caused by interactions with the Mimbres culture and Mesoamerica who appear to have shared their design traditions (Phillips 2012:34). Versions of this ceramic tradition suggested different communities of practice producing their own painting rules while still staying within the broader interaction sphere.

Combining a hierarchical stylistic analysis and design grammar has the potential to emphasize more dynamic narratives of pre-Columbian communities. But in order to identify different communities of practice in time and place, we must also consider the possibility that potters chose specific vessel forms on which to adorn particular design motifs. The process of vessel construction thus becomes just as important as the imagery when trying to observe stylistic variation. The fabrication process may include how the vessel was built (coiling and/or slabbing), the shape of the vessel, wall and rim thickness, rim profile, and lip shape. Based on Early's (2012) work on design grammar, vessel shape is in integral part of the narratives about vessels and should be considered in the overall design classification. Fields and Gadus (2012) and Gadus (2013) explored the structural similarities in Late Caddo Ripley Engraved motifs on bottles. To make sense of the abstract motifs on the bottles, they compared them with more representational imagery found on shell gorgets and shell cups from mound sites in Texas and Oklahoma. Their findings indicated that ceramic motifs and vessel forms expressed Lower and Upper World imagery. For instance, abstract Lower World imagery, such as snakes and other water dwelling creatures were consistently found on these Caddo bottles. Bottles themselves are containers that hold watery substances, which is another important element of the Lower World. In the view, bottle forms are understood as an extension of imagery, not separate from it. Their work highlighted the importance on how vessel forms play an important role when considering the overall iconographic significance. It appears with Gosselain's (1998, 2000) work that the fashioning process is the most resistance to change. If there are discernable differences in vessel shape, it may suggest either functional differences in use or may emphasize different communities of practice. It can be difficult to infer different communities of practice from ceramic attributes alone (Cordell and Habicht-Mauche 2012). However, comparing the results of the ceramic analysis with the results of the compositional analysis of clay paste, I should be able to identify with a high degree of certainty communities practice within the Caddo region.

Communities of Practice

The regional production and distribution of pottery not only involves exchange but also emphasizes how people and the community in which they live develop social networks (Stark 2006). The theory of communities of practice offers a way in which to understand past communities who were socially and ritually connected through a system of social networks constituted and maintained by the production and distribution of specific objects (Joyce 2012). A community of practice is defined as a group of experienced producers and apprentices who participate in the learned production of a shared material enterprise (Minar 2001a, 2001b; Van Keuran 2006). When a community of practice produces the same craft, it does not necessarily mean they share the same ethnic identity (Horton 2010). What these communities share is a common set of manufacturing techniques guided by observing, learning, and participating in a craft from skilled specialists (Stark 2006; Wendrich 2012). Transmitting the knowledge of technological and decorative style from one generation to the next not only links communities together through time and space (Dietler and Herbich 1998; Rice 1987; Sackett 1990), but is also an integral part "of being active participants in the process of social communities and constructing identities in relation to these communities" (Wenger 1998:4). Because objects and people are socially entangled with one another (e.g., Hodder 2012), objects have the potential to illuminate information about groups of people who produced, used, and distributed them (Birch 2013). Thus, a sustained practice over a period of time develops into a shared tradition, which leaves patterned material traces observable in the archaeological record (Stark 2006). Because ceramics are constructed from social, technological, and stylistic processes that are more resistant to change (Dyer 2012), they have become useful tools because their production, distribution, and use involved the participation of social networks at different scales of intensity (Cordell and Habicht-Mauche 2012; Duwe and Neff 2007; Eckert 2008; Huntley et al. 2012; Lave and Wenger 1991).

To examine how the intensity of formative fine ware production and distribution met the demands for long-distance exchange and mortuary use at ceremonial centers in the northern Caddo area, I employ a regional-scale INAA study to get at the issue of whether or not southern Caddo communities of potters were responsible for their production and export. A regional-scale INAA investigation may not detect more nuanced social processes between Arkansas Valley ceremonial sites. However, it seems logical that if one of the primary goals of one or more community of potters was to produce formative fine wares for export to northern Caddo groups, then an INAA study could determine the organization of pottery production and perhaps distinguish between separate communities of practice. This project will have major implications for how we understand emerging Caddo ritual practices, traditions, and potentially point to a much larger regional exchange between separate groups of the Caddo much earlier than is currently accepted (e.g., Bell 1984; Girard et al. 2014). Support for this position can be found in the different ways in which northern and southern Caddo groups chose to use formative fine wares. The restrictive nature in which northern Caddo people chose to use their formative fine wares is in strong contrast to the various domestic and ritual contexts in which they were used and distributed by southern Caddo people.

This project is built on similar logic involving archaeologists who used compositional analyses while theoretically framing their studies with communities of practice to understand the roles of production and distribution of pottery in small-scale societies (Eckert 2008; Fenn et al. 2006; Herhahn 2006; Horton 2010; Huntley 2006; LeBlanc and Henderson 2009; Nelson and Habicht-Mauche 2006; Wendrich 2012). Sassaman and Rudolphi (2001) examined Stallings pottery, an early pottery type, along the Savannah River drainage. They discovered the distribution of Stallings pottery resulted in "entirely new expressions of decoration, technology, and function" (Sassaman and Rudolphi 2001:422). The differences in manufacturing and use were attributed to the presence of at least three different communities of practice. Eckert (2012) used INAA to examine the interior polychrome recipes of Zuni Glaze Wares in

New Mexico. Eckert revealed that two different glaze paint compositions were being used to depict very similar iconography. She reasoned this reflected two different communities of practice who knowingly used the same designs to make the vessels indistinguishable at a distance. Duwe and Neff (2007) used laser ablation to understand how pigment and slip recipes could be used to discern different communities of practice at the Bailey Ruin Site in east-central Arizona. They showed different recipes corresponded to various communities of practice at the household level of production. These recipes, therefore, most likely were passed down to each new generation in the form of teacher-student apprentice relationships (Duwe and Neff 2007:412). Thus, the theory of communities of practice can be applied to various scales of social organization, from household to regional scales of pottery production and distribution. From a Formative Caddo perspective, we need to begin our efforts on a regional scale of analysis to understand from where this pottery is being made and which communities of practice distributed them before we can analyze more localized levels of production and distribution.

Formative Caddo pottery is compositionally and technologically complex. The operational sequence of Formative Caddo production had to be the products of skilled artisans, most likely women (e.g., Swanton 1942), who directly communicated manufacturing knowledge to others. This pottery was more than just finished pots that moved through networks of exchange; vessels were desired not just for their craftsmanship (Girard et al. 2014). Rather, their production and distribution must have also been emblematic of the social networks of interaction they created and maintained among northern and southern Caddo groups. By employing INAA with a community of practice approach, I will be able to show how the same pottery mattered differently among northern and southern Caddo groups, especially when contextual distinctions in production, distribution, and use are considered. This study is anthropologically compelling because it begins to unravel the complicated networks of interaction and social identities within which formative fine wares were circulated during an emerging organizational complexity.

Formative Caddo Communities of Practice Defined

If southern Caddo potters were the primary producers of formative fine wares, northern and southern Caddo groups can be theorized as separate communities of practice. I view the dissimilar ways in which formative fine wares were produced, used, distributed, and deposited as the cultural performances of distinct Formative Caddo communities of practice. A community of practice framework will show how northern and southern groups utilized these fine wares to develop and maintain social and ritual relationships with one another. For instance, if the INAA reveals that southern Caddo groups exclusively produced formative fine wares, it would emphasize that northern Caddo groups did not participate in the learning process of early fine ware production. My stylistic analysis indicates a single community of practice made all the fine wares and the INAA indicates they were located in the southern Caddo area. It would emphasize that the northern Caddo communities of potters were not involved in the manufacturing practices necessary to demonstrate a more homogenous community of practice. If the INAA results show that both Caddo regions produced their own formative fine wares for local use and exchanged them with one another, it would emphasize that both regions shared similar manufacturing techniques. This outcome would prove the northern and southern Caddo areas engaged in a more socially bounded community of practice. This would also highlight that emerging Caddo groups in the northern and southern regions had similar methods of learning and producing this craft, which would contribute to broader theoretical discussions about how communities of practice transmitted production knowledge on a regional-scale (Dyer 2012).

Combining Stylistic and INAA Results as Proxy to Understand Communities of Practice

If the results of the stylistic analysis reveal no significant variation between northern and southern Caddo sites, it suggests only a limited number of potters had the knowledge and skill to produce them. Because of the distance between the two Caddo areas, I would anticipate substantial stylistic variation to exist if both regions learned how to make the same pottery. Combining these results with the INAA, which may show that formative fine wares were produced in the southern Caddo region, would support the presence of separate Caddo communities of practices – southern Caddo communities who produced and transported the fine wares and northern Caddo communities who received the imported vessels and subsequently used them strictly for mortuary purposes.

However, if the results of the stylistic analysis reveal significant variation between northern and southern Caddo groups, it suggests that the knowledge to produce the fine wares were somehow shared throughout the region. The stylistic variation may be the result of localized versions of the same formative Caddo designs. Combining these results with the INAA, which may show that formative fine wares were locally produced in the Arkansas Valley, would support the presence of a more culturally cohesive community of practice. Because Arkansas Valley people were using them strictly for mortuary activities, as opposed to their southern neighbors, one could argue distinctions in use and deposition of Formative fine wares could indicate they were not associated with the southern Caddo community of practice.

Summary

Archaeological studies have found multiple lines of evidence helpful for identifying social processes related to single or separate communities of practice. I collected ceramic attributes and compositional data from Arkansas Valley ceremonial sites and compared those results with pottery from southern Caddo ceremonial sites to search for differences in the production, distribution, use, and deposition of fine wares. My findings suggest formative Caddo communities developed two distinct ritual structures (see Chapter 7). The next two chapters discuss the methods and results of my stylistic and compositional analyses.

CHAPTER 5: A COMPREHENSIVE ANALYSIS OF FORMATIVE FINE WARES: VESSEL FORM, CONSTRUCTION, AND DESIGN VARIABILITY

During the Formative Caddo period, Caddo potters began to create complex decorative patterns and vessel shapes (Girard et al. 2014). Beginning in the late ninth century A.D. the Caddo adopted new ideas of ceramic construction, decorative patterns, design symmetry, and design structure, which potters depicted on an array of bowls, bottles, and jars. The result was the distribution and use of several fine ware styles across various domestic, ritual, and mortuary contexts at domestic villages and ceremonial mound centers in both the northern and southern Caddo areas. Despite the sudden appearance of this engraved ware tradition, Formative Caddo pottery has received far less research than pottery associated with later Caddo occupational periods (Dowd 2012; Early 2012). The Formative Caddo decorative tradition is information-rich and should be utilized to gain insights into more aspects of their culture and develop a more temporally and spatially holistic understanding of ceramic design continuity and change.

In this chapter, I analyze vessels categorized as four Formative Caddo fine ware types, Hickory Engraved, Spiro Engraved, Holly Fine Engraved, and Crockett Curvilinear Incised, recovered from seven ceremonial centers in the northern and southern Caddo areas (Figure 5.1). To do so, I employ Plog's (1980) *hierarchical stylistic analysis* and Early's (2012) notion of *design grammar* to understand technological and design attributes and choice, organization, construction, and Formative fine ware variability between northern and southern Caddo ceremonial centers. On a more regional scale, I will test Girard's (2009:57-58) premise that

Formative fine ware ceramic forms and designs exhibited such minute variation that only a few potters had the knowledge and skill to fabricate them and examine and Early’s (2012) hypothesis that Caddo potters followed a very limited set of design choices and techniques on specific vessel forms. An integral part of this study is determining if traditions of design choice and techniques arose during the Formative Caddo period. If they did, it will highlight a longer-held Caddo tradition of ceramic production than has been previously been acknowledged.

Figure 5.1. Formative Caddo ceramic types selected for study: (a) Spiro Engraved, (b) Holly Fine Engraved, (c), Hickory Engraved, and (d) Crockett Curvilinear Incised.

General Observations on Formative Caddo Fine wares

The widespread distribution of fine wares during the Formative Caddo period is likely the result of regional interaction between separate groups of the Caddo over almost three centuries (Perttula 2009). The question of who produced and distributed fine wares has not been answered (Girard 2009). Fine ware ceramics can be placed into two basic design categories: (1) evenly-spaced horizontal lines finely executed just under the rims of bowls and jars or just under the base of the neck on bottles (Hickory Engraved) and (2) a more highly embellished mixture of curvilinear and rectilinear motifs, many of which have excised, feathered, punctated, and cross-hatched elements, as well as red pigment rubbed into engraved or incised lines and zones (Holly Fine Engraved, Spiro Engraved, and Crockett Curvilinear Incised). The skillfully-made vessel forms primarily contain a fine grog tempered paste, thin walls, and highly burnished exteriors.

As discussed in Chapter 2, Formative fine wares appear in many domestic and ritual contexts, but in the Arkansas Valley are only deposited in mortuary contexts at ceremonial sites. Thus, understanding the amount of design variation across a variety of social, ritual, and mortuary contexts is key to insights into the shared religion and ritual traditions of the pre-Columbian Caddo peoples living in the Arkansas Valley and surrounding Coastal Plain stream basins. Girard (2009:57) has researched Formative fine wares in northwest Louisiana and suggested that these vessels were important display items and “were limited to specific groups within communities…probably involving feasts or ritual consumption of food.” Perttula and Ferguson (2010) have shown that early fine wares were also important trade items among distant Caddo communities and other groups in the eastern Woodlands and Plains. Girard et al. (2014:54-55) studied early fine wares in the southern Caddo area and hypothesized that these vessels served as accoutrements of wealth, power, and status and became important exchange items among emerging elites who not only resided within the Caddo area, but also at Cahokia in the American Bottom during the eleventh and twelfth centuries. Regardless of where they were manufactured, it is important to first understand how Formative fine wares were constructed, how designs were executed, and the variation within designs on fine wares across the northern and southern Caddo areas. My approach to the study of fine ware vessels will allow the introduction of nuanced explanations regarding the intensity of social interaction, exchange, and the causes of variability or stability in design choice.

Methods of Stylistic and Technological Analysis

Before the ceramic stylistic analysis is discussed, I first review the methods used to analyze Formative Caddo fine wares. I briefly discuss site selections and explain important ceramic attributes utilized in this study. This chapter seeks to conduct the first comprehensive analysis of Formative Caddo fine wares and places primary emphasis on stylistic and technological attributes of whole vessel assemblages.

Criteria of Sites

My primary objective is to be inclusive as possible when choosing archaeological sites and ceramic assemblages for the stylistic and technological analysis. Including ceramics from multiple sites ensures a robust comparative sample. All sites chosen for this study have yielded whole vessels associated with the Formative

Caddo period of the Arkansas Valley in eastern Oklahoma and the Gulf Coastal Plain region of eastern Texas, southwest Arkansas, and northwest Louisiana. The presence of Hickory Engraved, Spiro Engraved, Holly Fine Engraved, and Crockett Curvilinear Incised vessels and sherds verify the presence of a Formative Caddo component. All ceramic materials included in this analysis date from ca. A.D. 850-1150.

After identifying a number of mound sites in the study area, I categorize them into northern and southern Caddo areas to look for any stylistic and technological variation between the two regions. The northern Caddo group includes five ceremonial sites: Spiro, Brackett, Harlan, Reed, and Norman. The southern Caddo group includes four ceremonial sites: Mounds Plantation, Boxed Springs, Crenshaw, and George C. Davis.

For all these sites, the amount and quality of fieldwork differs significantly. In several cases, sites were largely excavated during the Works Progress Administration (WPA) period, as mound excavations were the primary focus of that work. In other cases, extensive excavations took place in on and off-mound contexts to uncover village areas and other domestic and ritual features. The ways in which previous archaeologists handled, reconstructed, and bagged many of the ceramics also affects the study. The Arkansas Basin ceremonial sites are in various curation states. A few of the specimens used for stylistic and technological analyses and INAA, are in the same paper bags used in the WPA fieldwork. Several whole vessels are so heavily reconstructed from only a few sherds that designs cannot be confidently authenticated. Some designs on whole vessels seem to have been added post-excavation, perhaps to make them more of a museum quality specimen. Still, most of the collections have been curated in bags, sorted based on material type, and many of the fine wares were sorted based on their decorative type.

The majority of the collections used in my analysis are stored at research facilities, such as the Texas Archeological Research Laboratory (TARL) and the Sam Noble Museum of Natural History (SNMNH). When samples were chosen to be used for this study, they were catalogued and sorted for specific analytical uses. Some of the whole vessels from Spiro chosen for analysis have only Craig Mound provenience information. These were still used due to a low number of Formative fine wares at Arkansas Basin ceremonial centers as compared to southern Caddo sites. Most vessels do have the necessary provenience information to locate precisely where they were deposited on an archaeological site.

Methodology for the Detailed Ceramic Stylistic and Technological Analysis

The methods chosen are specifically designed to feature stylistic and technological attributes. The results and interpretations in this chapter are based on understanding similarities and differences in vessel form and their overall design grammatical structure. As previously mentioned, the methods I employ are an amalgamation of a hierarchical stylistic analysis (Plog 2008) and a reconstruction of the super-positioning of each vessel's design pathways referred to as design grammar, referring to as design grammar (Early 2012).

Vessel Form Classification, Distribution, and Construction

For this study, I have assembled a sample of 199 whole vessels from seven ceremonial centers in the northern and southern Caddo areas —Harlan, Norman, Reed, Spiro, Crenshaw, Boxed Springs, and George C. Davis —to understand the variation in Formative Caddo vessel forms. I observed vessels from sites in the Arkansas Valley firsthand, whereas whole vessels from the southern Caddo area were studied through photographs. From this assemblage, I have defined five primary vessel form groups (bottles, bowls, jars, beakers, and effigy vessels), and further divided the primary groups into 16 subcategories of vessel forms to showcase the variation within each primary group (Figure 5.2).

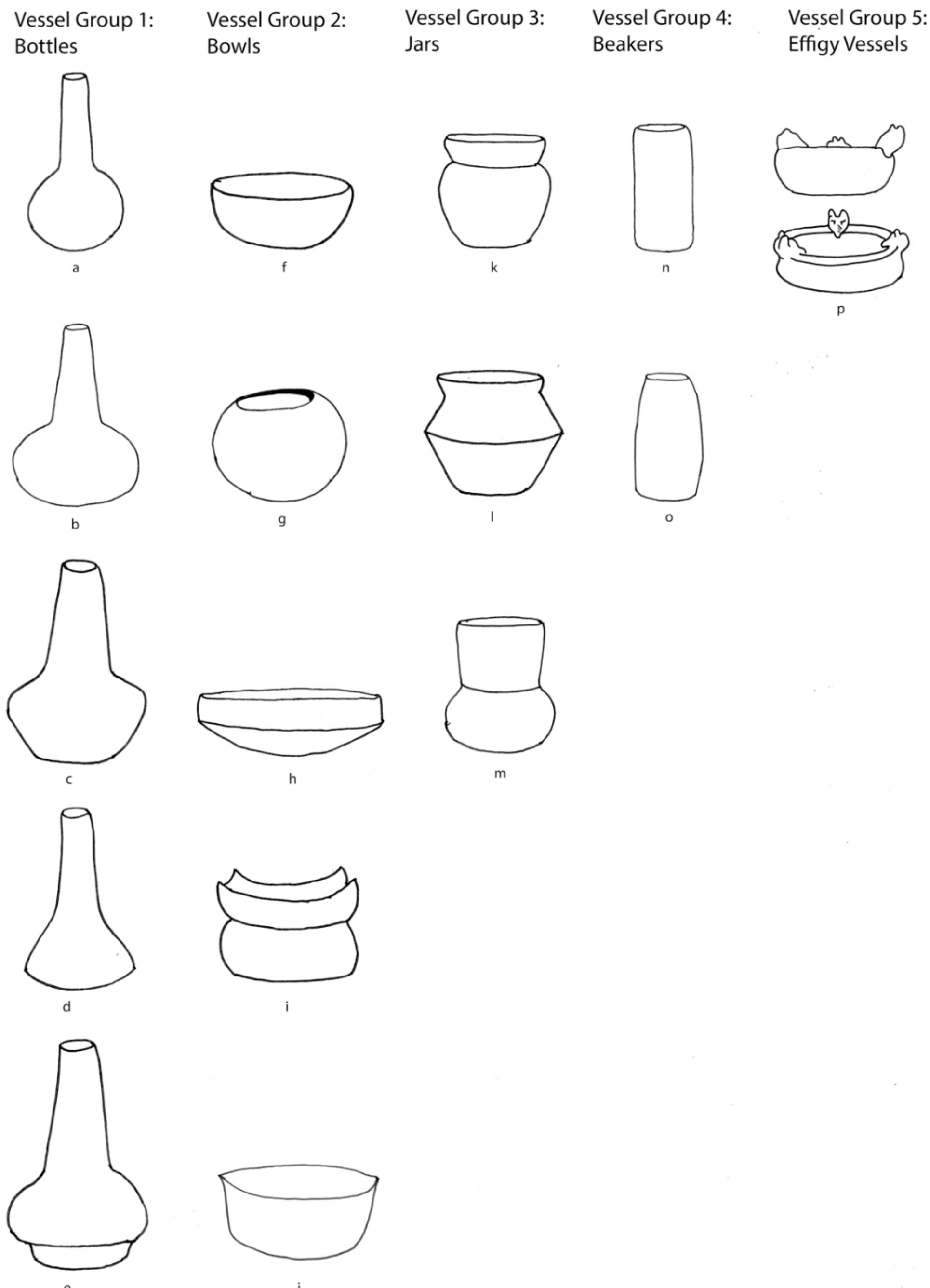


Figure 5.2. Formative Caddo vessel forms: (a) simple bottle, (b) bottle with globular body, (c) bottle with four shoulder peaks, (d) squatted bottle, (e) bottle with pedestal base, (f) simple excurvate bowl, (g) restricted bowl, (h) carinated bowl, (i) scalloped rim bowl, (j) "gravy boat" bowl, (k) simple jar, (l) carinated jar, (m) tall neck jar, (n) straight beaker, (o) excurvate beaker, and (p) effigy vessel.

Simple Bowls

Simple bowls are the least complex vessel form in the Formative Caddo vessel assemblage. Bowls have only one distinct section on the body with no other angular inflection points (Dowd 2008:66; Rice 1987:218). Simple bowls in the sample are most commonly slightly excurvate to more spherically excurvate (n=20). Two vessels are spherical with highly restricted orifices (Figures 5.3 and 5.4). Within the total assemblage, approximately 11 percent (n=22) of the vessels are classified as simple bowls. Designs depicted on simple bowls are primarily Crockett Curvilinear Incised design types but this will be discussed in more detail later.

Figure 5.3. Simple bowl form.

Figure 5.4. Simple bowl form with restricted orifice.

Vessel height for simple bowls ranges from 2.7 to 18.7 cm and orifice diameter ranges from 4.8 to 32.3 cm with a mean diameter of 14.3 cm and a mean height of 3.6 cm (Figure 5.5). The Figure 5.5 scatterplot shows a bivariate plot of height in cm versus diameter in cm of simple bowls. The red point values are bowls from southern Caddo mortuary contexts and the blue point values are bowls from northern Caddo mortuary contexts. Over 70 percent of the bowls from the northern Caddo area have smaller diameters and heights compared to bowls from the southern Caddo area. Generally, potters who made bowls for northern Caddo ceremonial centers made them smaller than potters who made bowls in the southern Caddo area. The orifice diameter of bowls from the southern Caddo area are also much wider than northern Caddo bowls. This may indicate they were built for different uses than bowls from southern Caddo ceremonial centers.

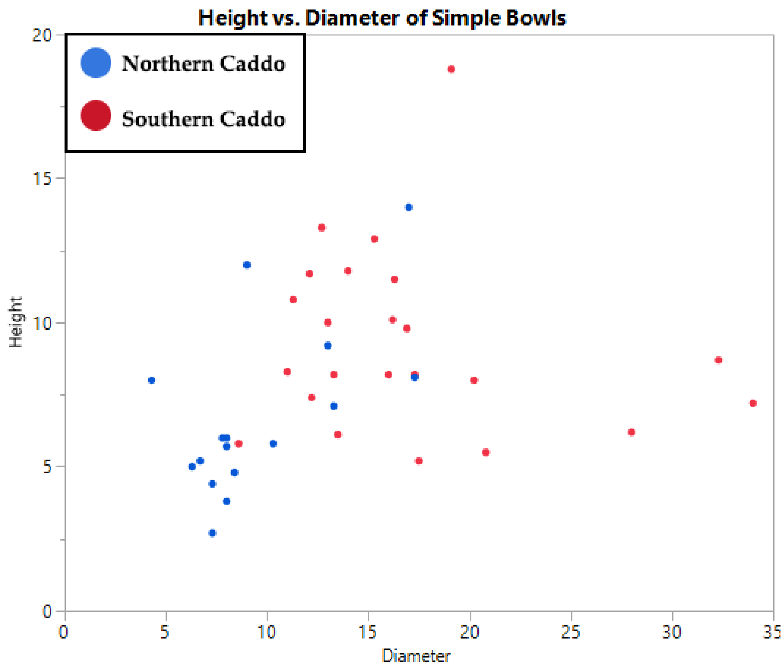


Figure 5.5. Simple bowl scatterplot of height versus diameter. Blue dots represent bowls from northern Caddo ceremonial contexts and red dots represent bowls from southern Caddo ceremonial contexts. Units of measurement are centimeters.

Carinated Bowls

Formative Caddo carinated bowls are technologically dissimilar from the simple bowl. These bowls have two distinct areas: (1) a body that is usually not hand-coiled, but instead made from a pottery mold and (2) the rim section that is hand-coiled and separated by a 60 to 95-degree corner point where it meets the molded base of the vessel (Rice 1987:201). The different degree corner points of a carinated bowl may have straight, excurvate, or incurvate rim sections like simple bowls. Carinated bowls make up only 7.5 percent (n=15) of the total vessel assemblage (Figure 5.6). Most of the carinated bowls have Holly Fine Engraved motifs, to be discussed below.

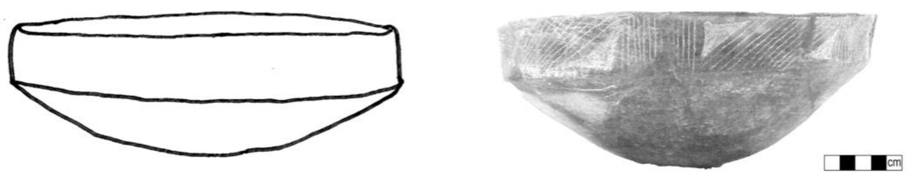


Figure 5.6. Carinated bowl form.

Vessel height ranges from 5.5 to 9.7 cm and vessel orifice diameter ranges from 14.6 to 32.3 cm, with a mean dimeter of 21.4 cm and a mean height of 7.2 cm (Figure 5.7). The height to diameter ratio reveals that Formative Caddo carinated bowls are significantly shallower than simple bowls. This attribute of carinated bowls must have a direct correlation to the intended use of the vessels (Rice 1987). Hally (1986:288-289) pointed out that large carinated bowls are suitable for use in serving large groups of people at one time, while small carinated bowls would have been best suited to serve small liquid type foodstuffs. The red point values on Figure 5.7 are carinated bowls from the southern Caddo ceremonial centers and the blue point value is from one northern Caddo ceremonial center, the Spiro site. Similar to simple bowls, carinated bowls in the southern Caddo area are larger than the one carinated bowl recovered from the Craig Mound at Spiro. This may have to do with the fact that the carinated bowl from Spiro has a Crockett Curvilinear Incised design, generally a very uncommon design for carinated bowls during the Formative Caddo period.

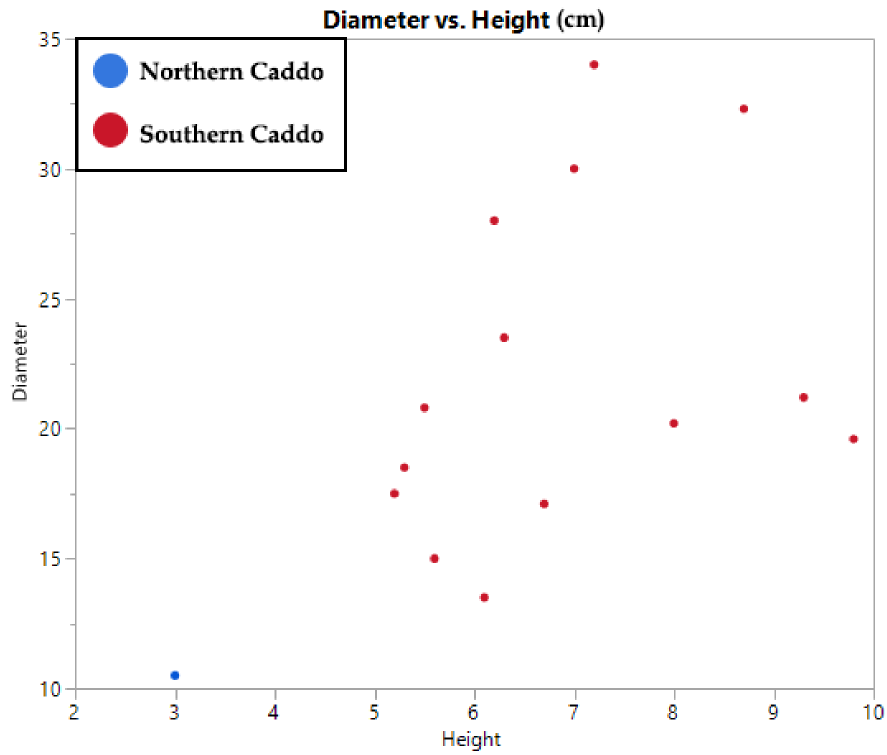


Figure 5.7. Diameter versus Height scatterplot of carinated bowls.

Boat-Shaped Vessel Forms

Gravy boat vessels have oblong orifice diameters, an overall oval body shape, and usually have two rim peaks or rim points at each end (Figure 5.8). Rice (1987:219) classified this vessel as a cone or frustum shape. Usually, the diameter measured from each rim peak will be wider than the height of the vessel. Gravy boat vessels are one of the most uncommon vessel types made during the Formative Caddo period and seem to be restricted to mortuary contexts in both northern and southern Caddo areas. Hally (1986:290) speculated from ethnohistorical sources that gravy boats were highly ritualistic and not suitable for cooking or serving. They may have carried sacred fires from one area to another due to the fact that they have soot deposits observed on their interior surfaces, suggesting there is evidence boat-shaped bowls from Formative Caddo contexts had a similar function. Figure 5.9 illustrates a small gravy boat from the Craig Mound with a Spiro Engraved motif. The interior has large areas of soot deposits, which may indicate this vessel was in part used to hold or transport a heating source.

Figure 5.8. Gravy boat or boat-shaped vessel form.

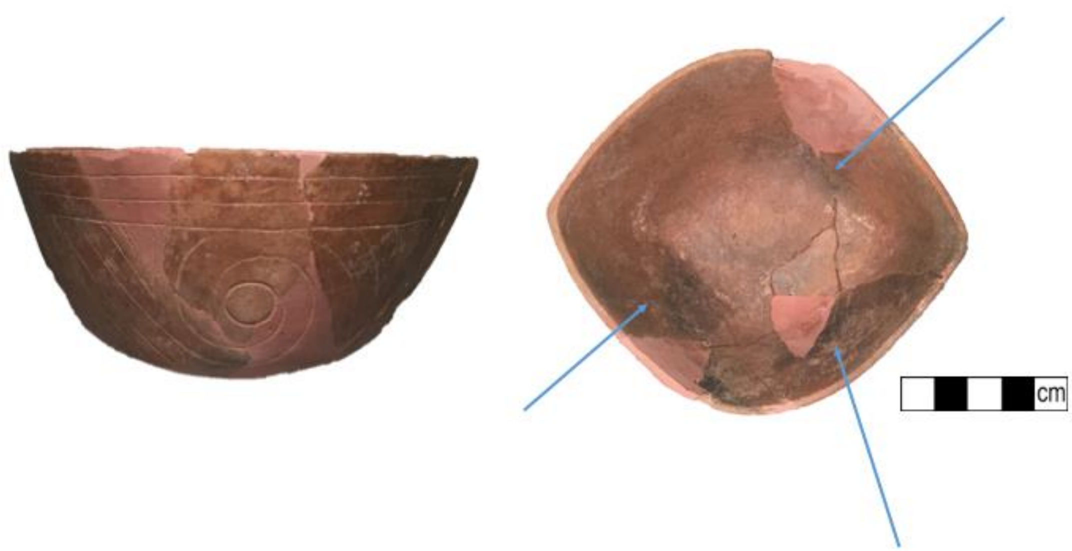


Figure 5.9. Spiro Engraved gravy boat bowl from Spiro's Craig Mound with evidence of soot deposits.

As shown in Figure 5.10, there are no differences in the size of gravy boats (n=7) among northern and southern Caddo ceremonial centers. All gravy boats came from mortuary contexts and perhaps were used for similar ritual practices. Gravy boats range from 6.3 to 23.3 cm in diameter and 5 to 13 cm in height with a mean diameter of 15.8 cm and a mean height of 8.7 cm. Therefore, the diameters of Formative Caddo gravy boats are consistently twice as wide as their height. This seems to be a very common way to construct gravy boat vessels in other parts of the Southeast (Hally 1986:290).

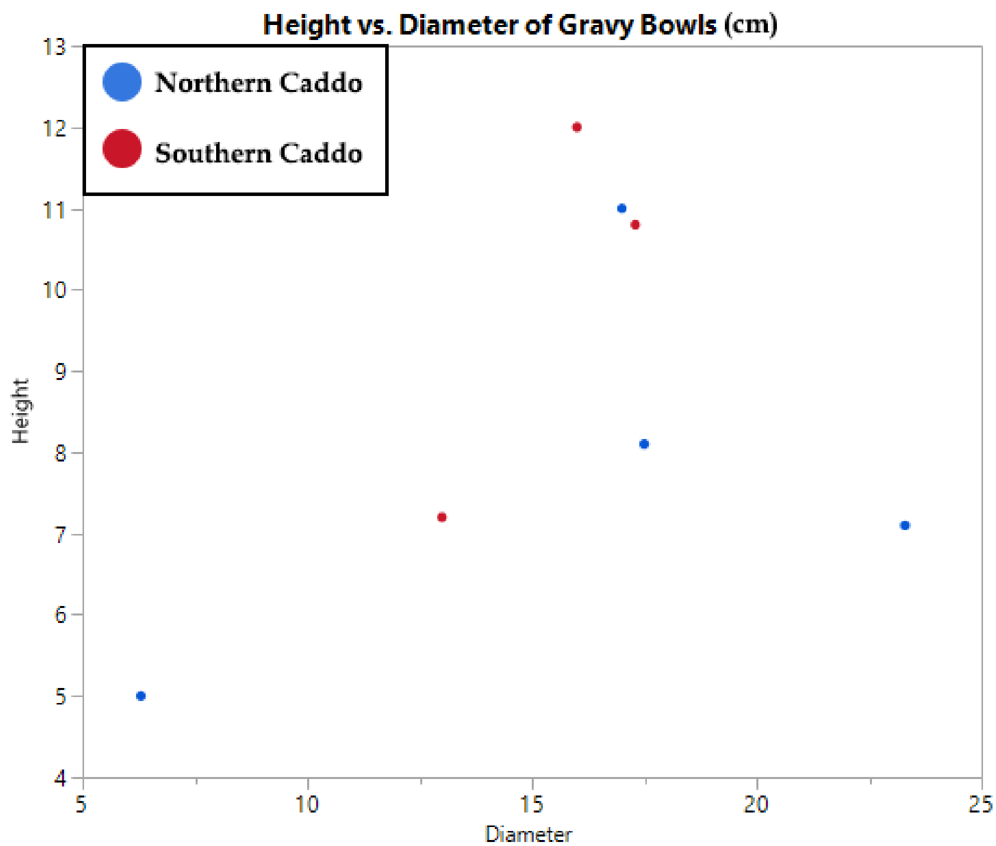


Figure 5.10. Diameter versus Height scatterplot of gravy boats.

Scalloped Rimmed Bowls

Scalloped rimmed bowls (Figure 5.11) are usually simple bowls with four or more rim peaks or rim points (Rice 1987). These bowl types can range from very small to large in size, and were most likely to have been used to cook and serve food for a variety of consumption activities (Hally 1984:56). Scalloped rimmed vessels are also very uncommon (n=4) in mortuary contexts at ceremonial centers during the Formative Caddo period. In this assemblage, scalloped vessels range from 7.8 to 30.3 cm in diameter and 6 to 18.7 cm in height with a mean diameter of 23.34 cm and mean height of 11.9 cm. As shown in Figure 5.12, the red point values are scalloped rimmed vessels from the southern Caddo area and the blue point value is from the northern Caddo area. The one scalloped rimmed vessel from the northern Caddo area is significantly smaller than the three scalloped rimmed vessels from the southern Caddo area. This might be a sampling error or perhaps northern Caddo communities are using scalloped rimmed vessels for different purposes than their southern Caddo neighbors.

Figure 5.11. Scalloped rimmed vessel from the Harlan Site.

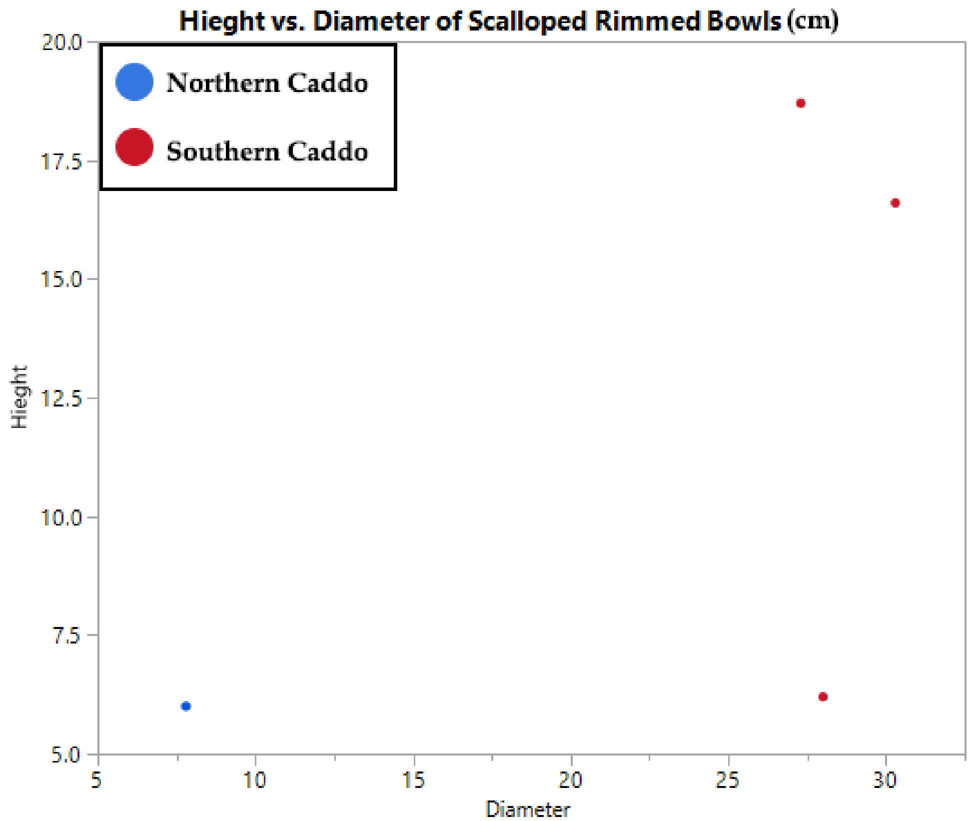


Figure 5.12. Diameter versus Height scatterplot of scalloped rimmed bowls.

Jars

Formative Caddo jars (n=21) have been subdivided into three different jar forms – simple jar, carinated jar, and tall neck jar. The simple jar is characterized by a globular body, rounded base, constricted neck, and vertical or excurvate rim. The carinated jar is characterized by a barrel shaped body, flat base, and sides that expand outwards. The bowl should have a distinct break in the profile of the vessel (Hally1986:277). Finally, the tall neck jar has a globular body, and a tall neck that can be either excurvate or straight (Hally 1984). In formative Caddo tall neck jars, the neck height is taller than its body height.

Figure 5.13. Simple jar form with Crockett Curvilinear Incised design.

Figure 5.14. Carinated jar form.

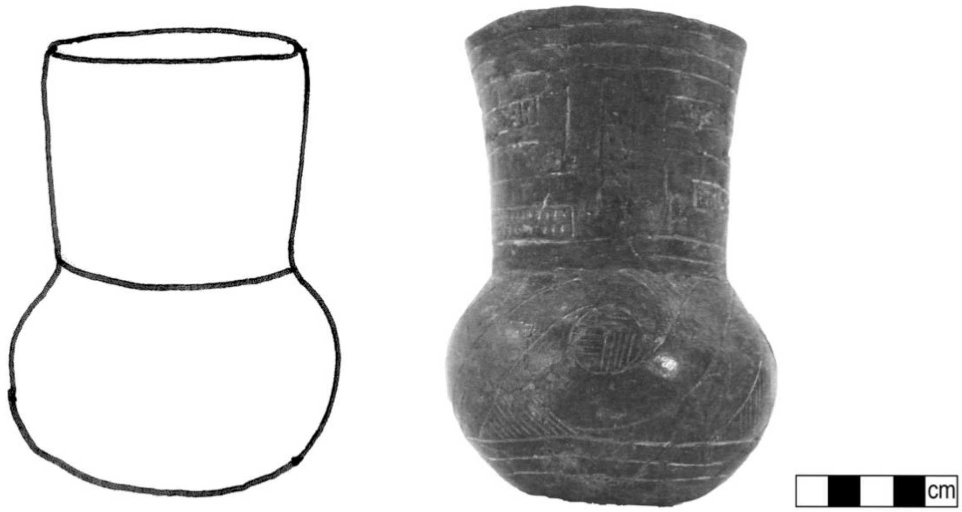


Figure 5.15. Tall neck jar form.

Jars with Formative Caddo fine ware designs seemed to be more prominent in southern Caddo ceremonial centers (n=19) than northern Caddo ceremonial centers (n=2). Jars range from 8 to 25.9 cm in diameter and 9.2 to 27.8 cm in height with a mean diameter of 13.4 cm and mean height of 15.5 cm. As shown in Figure 5.16, the red point values are jars from southern Caddo ceremonial centers, while blue point values are jars from northern Caddo ceremonial centers. Like most of the other vessel forms, jars deposited in northern Caddo ceremonial centers are smaller than the jars deposited in southern Caddo ceremonial centers. According to Hally (1986:286), larger jars are suitable as a general-purpose cooking and less well suited to hold liquids. The two northern Caddo jars are so small that they seem to be nonfunctional for general use.

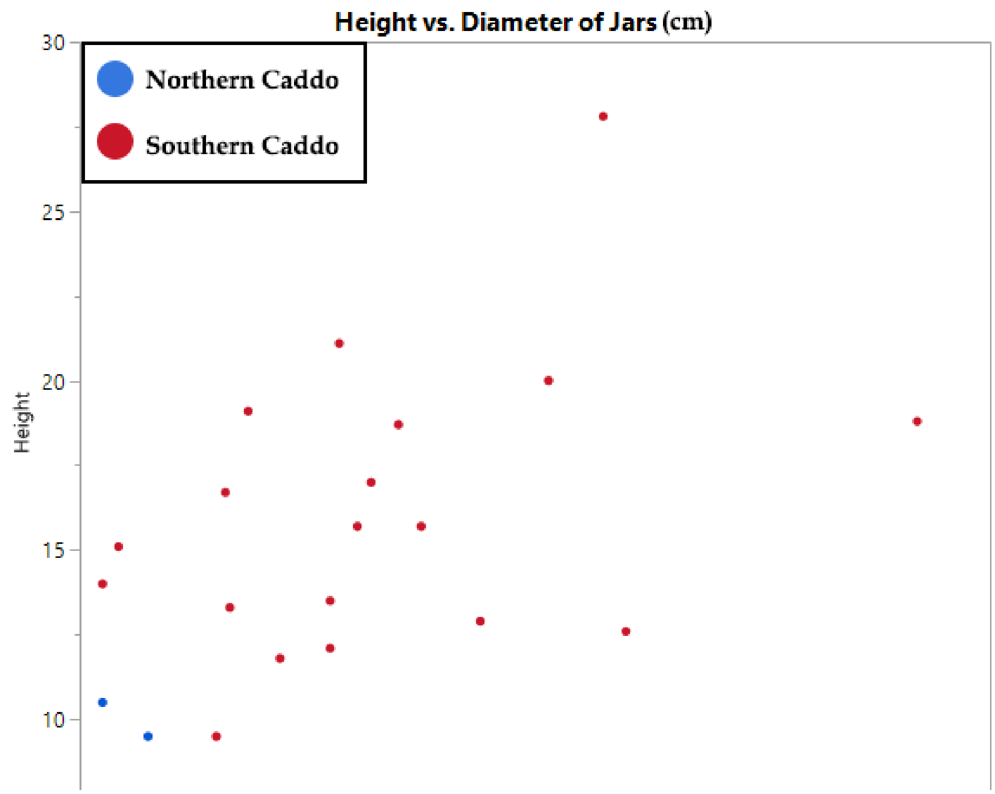


Figure 5.16. Diameter versus Height scatterplot of Jars.

Beakers

Beakers from Formative Caddo contexts (n=7) are the second rarest vessel form in the assemblage. These vessels are defined as barrel shaped vessels with either straight or excurvate sides. The rim of the vessels can be either straight or restricted (Figures 5.17 and 5.18). They are usually highly decorated with primarily Holly Fine Engraved motifs, but there are two examples of beakers with Spiro Engraved motifs. According to Hally (1986), their function most likely was to hold and serve liquids. They are not suitable for cooking or serving food.

Figure 5.17. Straight-sided beaker with a Holly Fine Engraved motif.

Figure 5.18. Excurvate-sided beaker with a Holly Fine Engraved motif.

As shown in Figure 5.19, there is no significant difference in beaker size between northern and southern Caddo ceremonial centers. They range from very small to medium in size. Most beakers are found in only mortuary contexts, so their function may have been very similar. The red point values are beakers from southern Caddo ceremonial centers and the blue point values are from northern Caddo ceremonial centers. Formative Caddo beakers have a range diameter of 3.6 to 9.4 cm and range height of 5.2 to 16 cm with a mean diameter of 6.2 cm and mean height of 11.9.

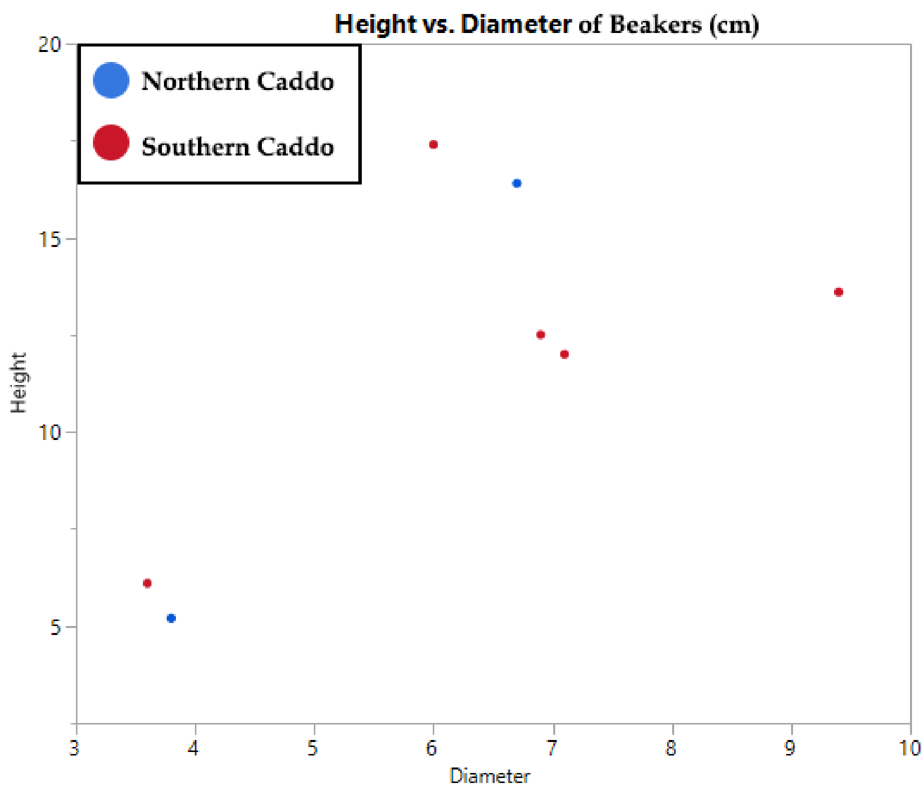


Figure 5.19. Diameter versus Height scatterplot of beakers.

Effigy Vessels

Effigy vessels are the rarest vessel form in the Caddo world from the Formative Caddo to Late Caddo periods, except perhaps during the Frankston phase in the upper Neches River basin, where effigy bowls are common (Perttula 2017). Early (2012:28) stated "Caddo potters rarely modeled effigy profiles, although they did put anthropomorphic or zoomorphic rim tabs on some bowls." In this study, there is one effigy vessel with three zoomorphic rim tabs on a Holly Fine Engraved bowl (Figure 5.20). This vessel's height is 6.4 cm and diameter is 13.5 cm. The effigy bowl was recovered from Mound B at the Crenshaw site.

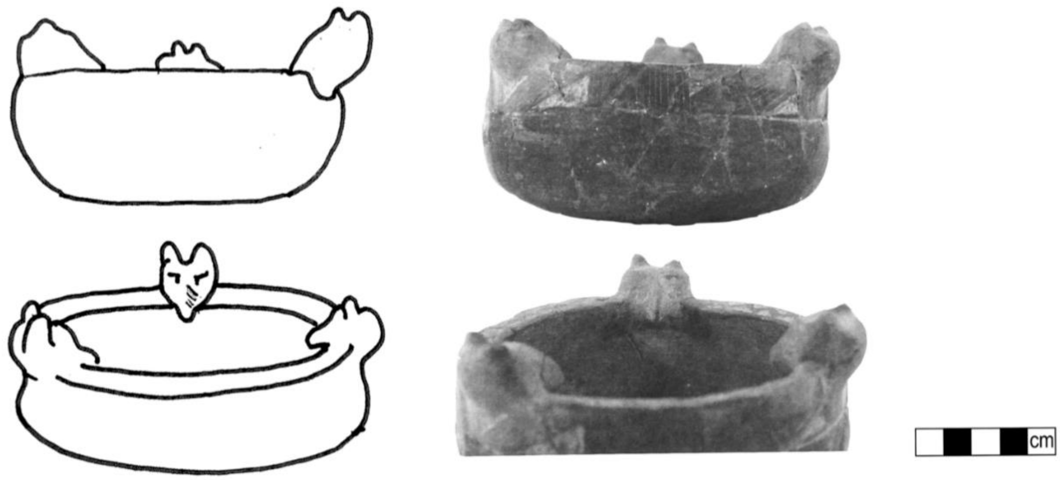


Figure 5.20. Zoomorphic effigy vessel from the Crenshaw site.

Bottles

Bottles are the most frequent vessel form in the Formative Caddo vessel assemblage (n=98). I subdivided bottles into five subcategories: plain bottle, bottle with globular body, bottle with four shoulder peaks, bottle with pedestal base, and bottle with squatted body (Figures 5.21-5.25). As shown in Figure 5.26, the red point values are bottles from the southern Caddo ceremonial centers and the blue point values are bottles form northern Caddo ceremonial centers. The range of neck heights is 6.1 to 16.2 cm, lower neck diameters range from 4.1 to 11.0 cm, orifice diameters from 2.5 to 5.5 cm, the range of body diameters is 8 to 21.1 cm, and vessel heights range from 15.8 to 43 cm. The mean neck height is 11.4 cm, mean lower neck diameter is 5.9 cm, mean orifice diameter is 3.8 cm, mean body diameter is 14.1 cm, and mean vessel height it 24.7 cm. When viewing a scatterplot comparing neck height and vessel height, bottles from northern Caddo ceremonial centers are smaller than bottles from southern Caddo ceremonial centers (Figure 5.27). Furthermore, when comparing vessel height, there is a clear difference between bottles from Spiro, Harlan, and Reed compared to bottles from Crenshaw and George C. Davis.

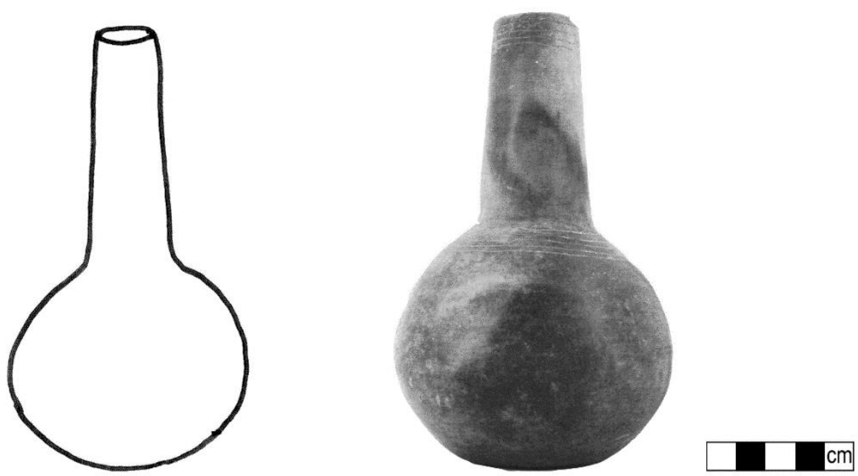


Figure 5.21. Simple bottle form with Hickory Engraved motif.

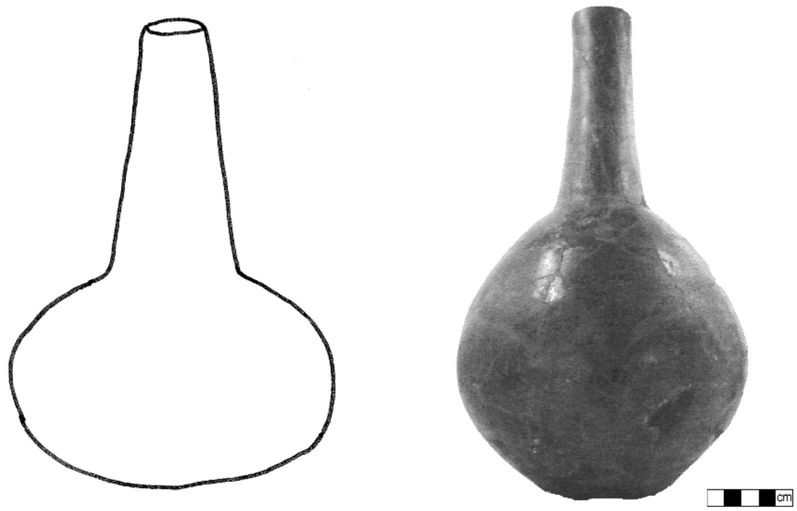


Figure 5.22. Globular bottle form with a Hickory Engraved motif.

Figure 5.23. Bottle with four body peaks, and with a Spiro Engraved motif.

Figure 5.24. Bottle with pedestal base and with a Hickory Engraved motif.

Figure 5.25. Squatted bottle with a Spiro Engraved motif.

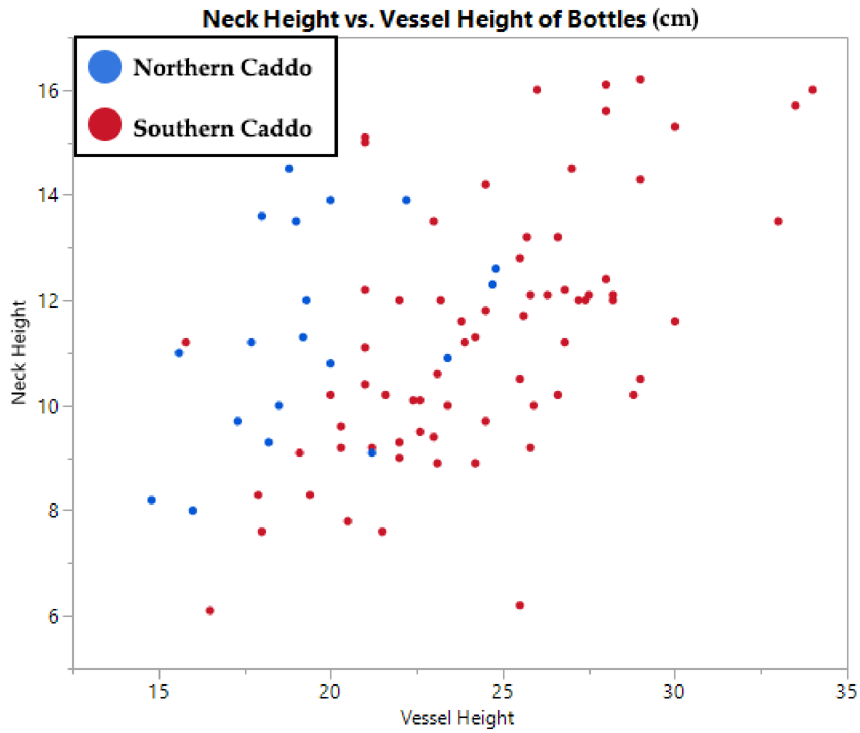


Figure 5.26. Neck Height versus Vessel Height scatterplot of bottles.

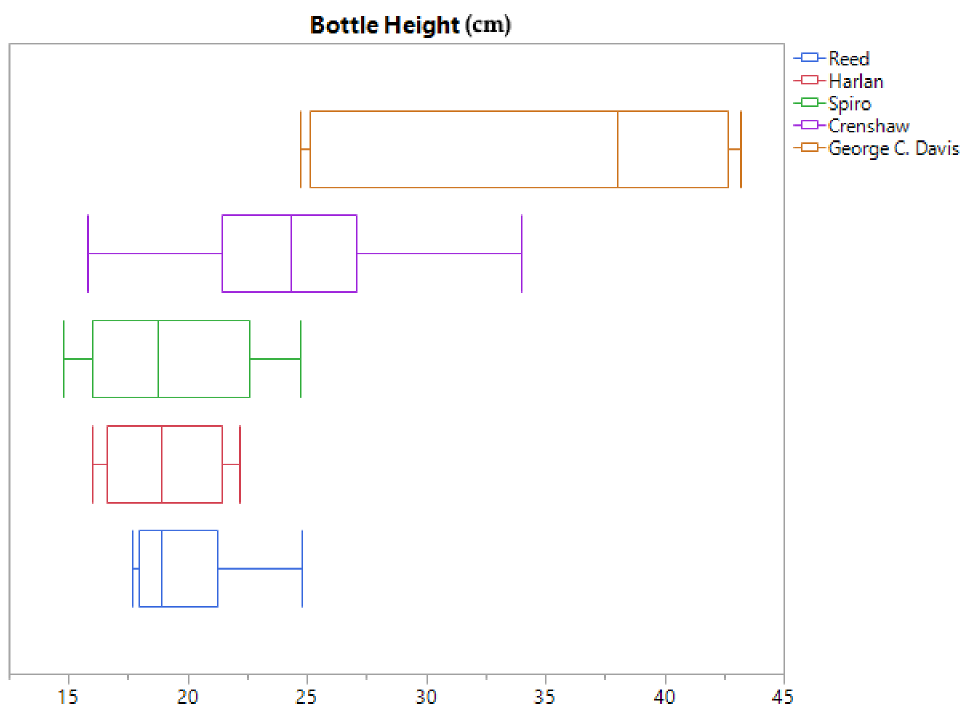


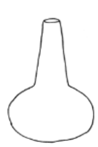
Figure 5.27. Box and whisker plots of vessel height in bottles.

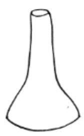
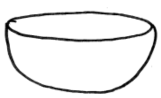
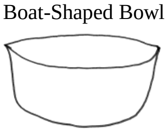
Vessel Form Distribution by Site

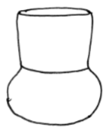
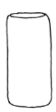
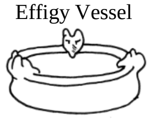
There are some notable differences in vessel form types recovered at each site (Table 5.1). At Spiro, 50 percent of the vessel forms are bottles (simple and globular), 46 percent are bowls (simple, carinated, and gravy boat), and there is one beaker. There are no Formative Caddo fine ware jars, scalloped bowls, or effigy vessels. Like Spiro, 50 percent of the vessel forms at the Harlan site are bottles (simple, globular, and pedestal), 33 percent are bowls (simple, restricted, gravy boat, and scalloped), and there is one simple jar and one excurvate beaker. At Harlan, there are no peaked or squatted bottles, carinated bowls, tall necked jars, carinated jars, or effigy vessels. At the Reed site, 85 percent of the fine ware assemblage are bottles (simple, globular, peaked, pedestal, and squat), 10 percent of the vessels are bowls (restricted gravy boat), and there is one tall necked jar. There are no simple, carinated, or scalloped bowls. There are also no simple jars, carinated jars, beakers, or effigy vessels. Interestingly, at the Norman site, 100 percent of the fine ware vessels are simple bottle forms. There are no other types of bottle form or any other vessel form type in this assemblage. Over 75 percent of the fine ware assemblage in the northern Caddo area are bottles, 24 percent of the assemblage are bowls, and less than 1 percent are jars and beakers. Hence, in the northern Caddo area, there was a preference of having bottles more so than any other vessel type.

At the Crenshaw site, 65 percent of the vessel form assemblage are bottles (simple, globular, peaked, pedestal, and squat), 17 percent of the assemblage are bowls (simple, carinated, gravy boat, and scalloped), 15 percent are jars (simple, carinated, and tall necked), 2 percent are beakers, and there is one effigy vessel. Crenshaw has the entire spectrum of vessel forms except for restricted bowls. In contrast to the vessel assemblage from the Crenshaw site, 14 percent of the vessel forms at George C. Davis are bottles (only simple forms) and 57 percent are bowls (simple, carinated, gravy boat, and scalloped). Only 2 percent of the vessels are simple jars and there is one beaker. Like George C. Davis, the Boxed Springs site vessel assemblage has approximately 30 percent bottles (only simple bottle forms), 50 percent are bowls (simple and carinated), and 20 percent are beakers (excurvate and straight). In the southern Caddo area, there seems to be a mixture of vessel form preferences, which may have much to do with the kinds of activities that occurred at each ceremonial center. Overall, southern Caddo ceremonial centers had access to or preferred more fine ware vessel form types than their northern Caddo ceremonial neighbors (Table 5.1).

Table 5.1. Vessel form distribution by site. Percentages in cells are row percentages.

Vessel Form Subgroups and Site Location								
Vessel Form	**Spiro**	**Harlan**	**Reed**	**Norman**	**Crenshaw**	**George C. Davis**	**Boxed Springs**	**Total**
Simple Bottle 	10 (11%)	4 (4%)	10 (11%)	13 (15%)	47 (54%)	2 (2%)	3 (3%)	**89**
Globular Bottle 	2 (22%)	1 (9%)	1 (9%)	0	5 (60%)	0	0	**9**

Bottle with Peaks 	0	0	3 (35%)	0	6 (65%)	0	0	**9**
Pedestal Bottle 	0	3 (35%)	2 (20%)	0	4 (45%)	0	0	**9**
Squat Bottle 	0	0	1 (20%)	0	4 (80%)	0	0	**5**
Simple Bowl 	6 (27%)	2 (10%)	0	0	8 (35%)	3 (14%)	3 (14%)	**22**
Carinated Bowl 	2 (14%)	0	0	0	6 (44%)	4 (28%)	2 (14%)	**14**
Restricted Bowl 	0	1 (50%)	1 (50%)	0	0	0	0	**2**
Boat-Shaped Bowl 	3 (44%)	2 (30%)	1 (13%)	0	1 (13%)	0	0	**7**
Scalloped Bowl 	0	1 (25%)	0	0	2 (50%)	1 (25%)	0	**4**
Simple Jar 	0	1 (9%)	0	0	8 (66%)	3 (25%)	0	**12**

Tall Neck Jar 	0	0	1 (14%)	0	6 (86%)	0	0	**7**
Carinated Jar 	0	0	0	0	2 (100%)	0	0	**2**
Excurvate Beaker 	1 (25%)	0	0	0	2 (50%)	0	1 (25%)	**4**
Straight Beaker 	0	1 (33%)	0	0	0	1 (33%)	1 (33%)	**3**
Effigy Vessel 	0	0	0	0	1 (100%)	0	0	**1**
Total	**24 (12%)**	**16 (8%)**	**20 (10%)**	**13 (7%)**	**102 (51%)**	**14 (7%)**	**10 (5%)**	**199**

Formative Caddo Vessel Construction

To reconstruct Formative Caddo ceramic production technologies in the northern and southern Caddo areas and to specify the stability of this technology, partial and whole vessels from eight ceremonial centers have been investigated. This section aims to understand the life cycle of Formative fine ware production, from choice of raw materials through production stages of different vessel forms. The section provides a summary and critical assessment of each major developmental stage of pottery production, which will make a valuable contribution to Caddo research. First, I discuss what types of raw materials may have been used and how they were prepared. This is followed by a discussion and illustration of how Formative fine wares were fashioned. Finally, I examine surface treatments and firing.

Raw Materials. When Formative Caddo potters selected clays for pottery production, a necessary requirement was to "ensure that the clay is sufficiently plastic for forming but that its drying shrinkage is not so great to result in cracking" (Tite 1999:184). Otherwise, constructing fine wares would be an almost impossible task. When Caddo potters found a clay source suitable enough to build thin, complex vessel forms, they may have been highly valued and continued to be utilized with each new generation of potters (Perttula 2001). Archaeologists rely on ethnoarchaeological studies that indicate potters mostly used clays within 1 km of where they lived, and in many places all of the clays in that radius will have similar signatures.

Most raw clays cannot be used right after procurement. Instead, clays must go through a refining process to remove undesirable non-plastic inclusions. In my experience making clay vessels and teaching others how to make pottery, large inclusions, such as quartz or sandstone increase the difficulty of building a pot and do not permit the manufacture of thin-walled vessels with polished surfaces. Formative Caddo potters most likely encountered similar issues and used their own refining techniques. Once a clay has been refined, other non-plastic materials or tempering agents can be added to the clays to influence the strength of the clay and/or increase thermal-shock resistance. In other words, tempering allows potters to build different vessel forms thinner and reduce the risk of cracking and breakage. Formative Caddo potters are notable for using grog (i.e., crushed sherds) in their fine ware ceramics (Girard et al. 2014). Out of the 199 whole vessels studied and 112 fine ware sherdlet samples sent for INAA, 98 percent (n=304) contained a very fine-grained grog temper, while the other 2 percent (n=7) also contained a fine-grained grog temper with the addition of bone. Using fine-grained grog tempers must have been a crucial manufacturing technique for creating Formative Caddo fine wares. Bronitsky and Hamer (1986:97) conducted experiments on the effects of various tempering materials and discovered “a general principle in ceramics that specimen strength increases with decreasing grain size of grog” and reduced the amount of cracking and spalling. They also found that the more fine-grained a temper is, the more a potter can efficiently fashion vessels with thin walls and burnished surfaces. In my experience with hand-coiling dozens of Formative fine ware vessel replicas, I found this to be especially true. By using a fine grog temper, I could hand-coil a beaker that is 22 cm tall, 2.7 mm thick, and use a polishing stone to highly burnish its surface (Figure 5.28).

Figure 5.28. Replica of a Formative Caddo fine ware beaker with a Holly Fine Engraved motif and with a fine grog temper.

Vessel Forming. There are various ways to form a vessel; potters sometimes incorporate multiple techniques on one or more parts of the vessel to create one finished piece (Rice 1987). The primary ways to take a lump of clay and mold it into a desired shape include pinching, using a clay mold, hand-coiling, clay slabbing, or wheel throwing. It can be difficult to distinguish which methods were used by ancient potters, but with training and practice, “it is often possible to infer the method used from visual examination of surface marking, cracks and joins, pore and temper distribution and orientation, and variations in wall thickness” (Tite 1999:186). In the Formative Caddo assemblage, broken vessels were examined to determine manufacturing techniques, Formative Caddo potters fabricated their pots in three primary ways: (1) hand-coiling the entire vessel, (2) using a combination of a base mold and hand-coiling, and (3) using a combination of a base mold, hand-coiling, and slabbing.

The least common way to build a Formative fine ware vessel was solely using the hand-coiling technique. The only vessels that potters built without a base mold were beakers. Formative Caddo beakers have very flat bases and very straight or slightly excurvate sides, which makes them easier to fabricate without using a base mold. To make a beaker, potters cut out a flat piece of clay with a desired diameter and thickness and lay and join each coil. Other tools such as anvils and/or paddles may have been used to help keep the shape and curvature of the vessel.

The most common way to build a Formative Caddo fine ware vessel is via a combination of a base mold and hand-coiling (Figure 5.29). In the fine ware vessel assemblage, Formative Caddo potters used this method on all the bowls and jars. The best way to illustrate this method is exemplified by a typical carinated bowl. A carinated bowl has two main parts: the lower portion of the body and the sharp break in the profile of the vessel that makes up the rim or upper portion of the vessel (Figure 5.30). First, a potter would place a section of clay in the base mold. Then, from the top of the base mold, the potter would begin to hand-coil, joining the lower portion of the vessel with the upper portion. Observing the breakage of carinated bowls. Most carinated bowls break at this junction and throughout the rim section. This suggests the bottom portion of a carinated bowl was made by using a mold. There is far less breakage in this area, while the coiled upper portion is where most of the breakage occurs. Coiling is a great way to build a vessel, but breaks and cracks usually occur at the joining ends of two coils because there is less structural integrity between each coil (Tite 1999).

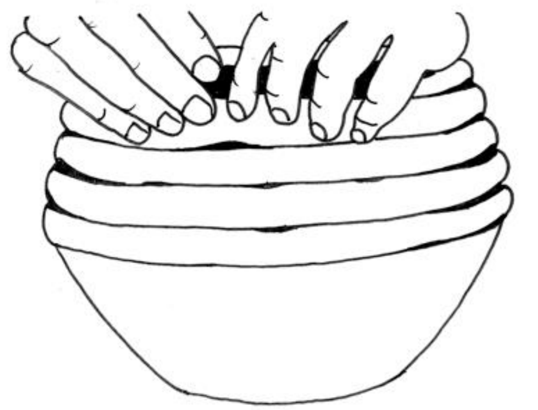


Figure 5.29. Illustration of making a vessel using a combination of a base mold and hand-coiling.

Figure 5.30. Holly Fine Engraved carinated bowl from the George C. Davis site.

Formative Caddo potters also built fine ware vessels by combining three different production techniques to form one piece: base molds, hand-coiling, and slabbing. In the Formative Caddo fine ware assemblage, this method was only executed on bottles (Figure 5.31). This combination of techniques was likely a very significant Formative Caddo Period innovation, because bottles are not recovered in the Woodland period archaeological record before this time. This same technique of making bottles continued throughout the Late Caddo period in many areas across the Caddo area (Dowd 2008).

As shown in Figure 5.31, a potter would first take a base mold (a), and place a clay section in the mold to create the bottom portion of the bottle. Next, the potter would use the hand-coiling method (b) to build the remaining part of the bottle's body. Then, the coils are smoothed and the body formed to the desired shape (c) with a small restricted orifice remaining for the bottle neck. Afterwards, the potter would cut out a thin slab of clay, roll it, and connect the two end of the slab (d). This step may have involved molding the slab around another broken bottle neck or around a specially made bottle neck mold to produce a standardized tapered neck form (Figure 5.32). Finally, the slabbed neck is attached to the body of the bottle (e), which is where Formative Caddo bottles break (Figure 5.33).

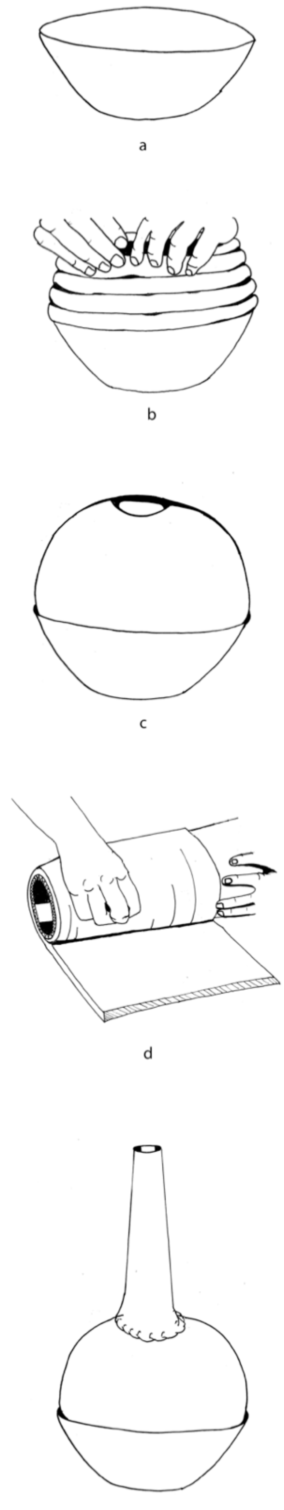


Figure 5.31. Illustrated steps in making a Formative Caddo bottle.

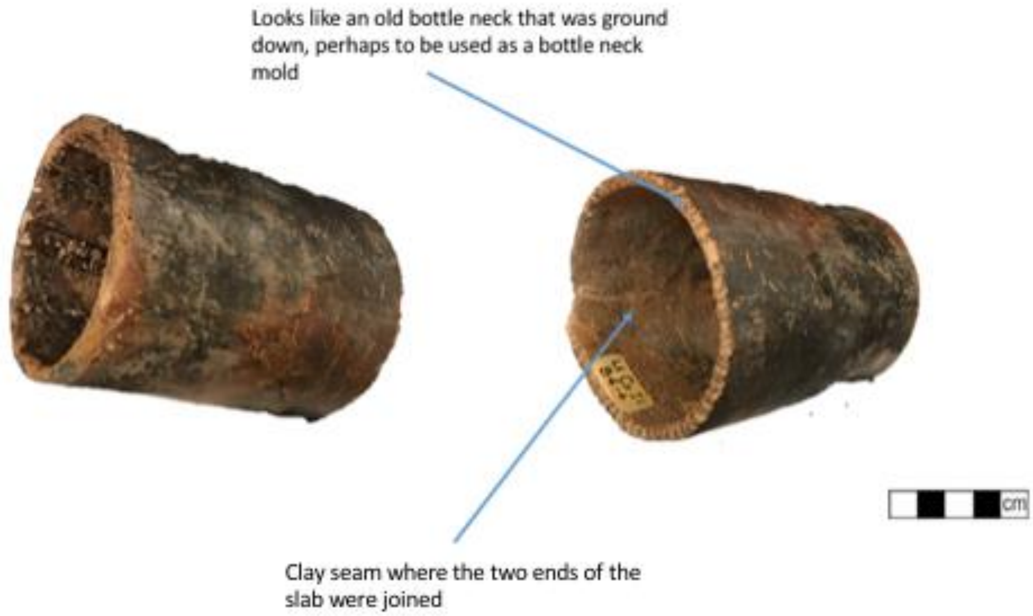


Figure 5.32. Possible bottle neck mold used with the clay slabbing technique.

Figure 5.33. Broken bottle necks showing typical breaks at the seam where the bottle neck was attached to the body.

Surface Treatments. Formative Caddo fine ware vessels were subjected to a variety of surface treatments. Some of these methods such as smoothing, burnishing, and adding a clay slip may not only have been for decorative purposes, but also “to reduce the permeability of the vessel to liquids” (Tite 1999:187). Formative Caddo surface treatments include: smoothing, burnishing, application of a red slip, application of pigments, and reduction of the vessel in a low oxygen firing atmosphere to produce a blackened surface (Figure 5.34). Eighty-seven percent of formative Caddo fine ware vessels are burnished and blackened, 10 percent are smoothed, and around 3 percent show signs of red pigment rubbed into the engraved lines.

Figure 5.34. Examples of Formative Caddo vessel surface treatments.

Design Structure and Stylistic Variation between Northern and Southern Caddo Areas

As described earlier in this chapter, the overall technological tradition defines the total range of vessel form variation for fine wares in the northern and southern Caddo pottery assemblage in this study. This description is the first step towards a comprehensive vessel analysis, because understanding the ceramic production cycles of Formative fine wares provides a base line for comparing other Formative fine wares from sites outside the study area. It is also a complicated task to describe meaning in design attributes and choice without first having a grasp on the different ways in which Formative Caddo fine wares are fabricated.

Now that an understanding of how formative fine wares vessels were formed has been established, the analysis of inter-assemblage design variation can begin. First, I employ a method I call *design stratigraphy* to understand the design structure or the steps involved to complete a Formative Caddo fine ware motif. This method indicates that there are only a very limited set of beginning-to-finishing options that producee significantly similar design pathways no matter the design type or vessel form used. This design analysis then uses both the hierarchical classificatory system (Plog 1980) and design grammar (Early 2012) to define the overall organizational principles that guided design manufacturing reveals the most important independent design attributes and primary design motifs to compare against one another. Finally, the results are brought together in this chapter to describe the design similarities and differences between the northern and southern Caddo assemblages.

A few caveats need to be addressed before presenting the design analysis. The sample size is highly variable between each southern Caddo ceremonial center (see Table 5.1). While Crenshaw has a sizeable 102 vessels, the George C. Davis assemblage of fine ware consists of only 15 whole or partial vessels. But whole vessels are not necessarily a good representation of the entire Formative fine ware assemblage. For example, Newell and Krieger (1949) performed a minimum number of vessel analysis on sherds at George C. Davis. Their results suggested that there were over 1000 Formative fine wares used for different social and ritual contexts in their site sample (Table 5.2). Boxed Springs has 169 known whole vessels, of which approximately 10 percent (n=17) are Formative fine wares (Perttula et al. 2011). Therefore, restricting the analysis to whole vessels necessarily reduces the sample size from what was produced and used at these ceremonial sites. I did observe many of the designs from whole vessels on sherds from the George C. Davis and noted those designs were within the range of variation present in the whole vessel collection. Thus, I feel confident that an analysis of designs on whole vessels is well-suited to represent the range of design variation of Formative Caddo fine ware ceramics.

Table 5.2. Minimum Number of Vessel (MNV) Analysis on fine ware sherds at the George C. Davis site (MNV analysis by Newell and Krieger 1949)

	Holly Fine Engraved	Hickory Engraved	Crockett Curvilinear Incised	Spiro Engraved
Field	1,280	158	832	
Feature 9 (midden)	300	18	120	2
Phase 3 Secondary Mound	674	162	335	
Phase 2 Temple Mound	347	91	158	
Phase 1 Pre Temple Mound	219	39	26	
Total sherds	2,820	468	1471	2
Minimum Number of Vessels	1,101	227	818	1

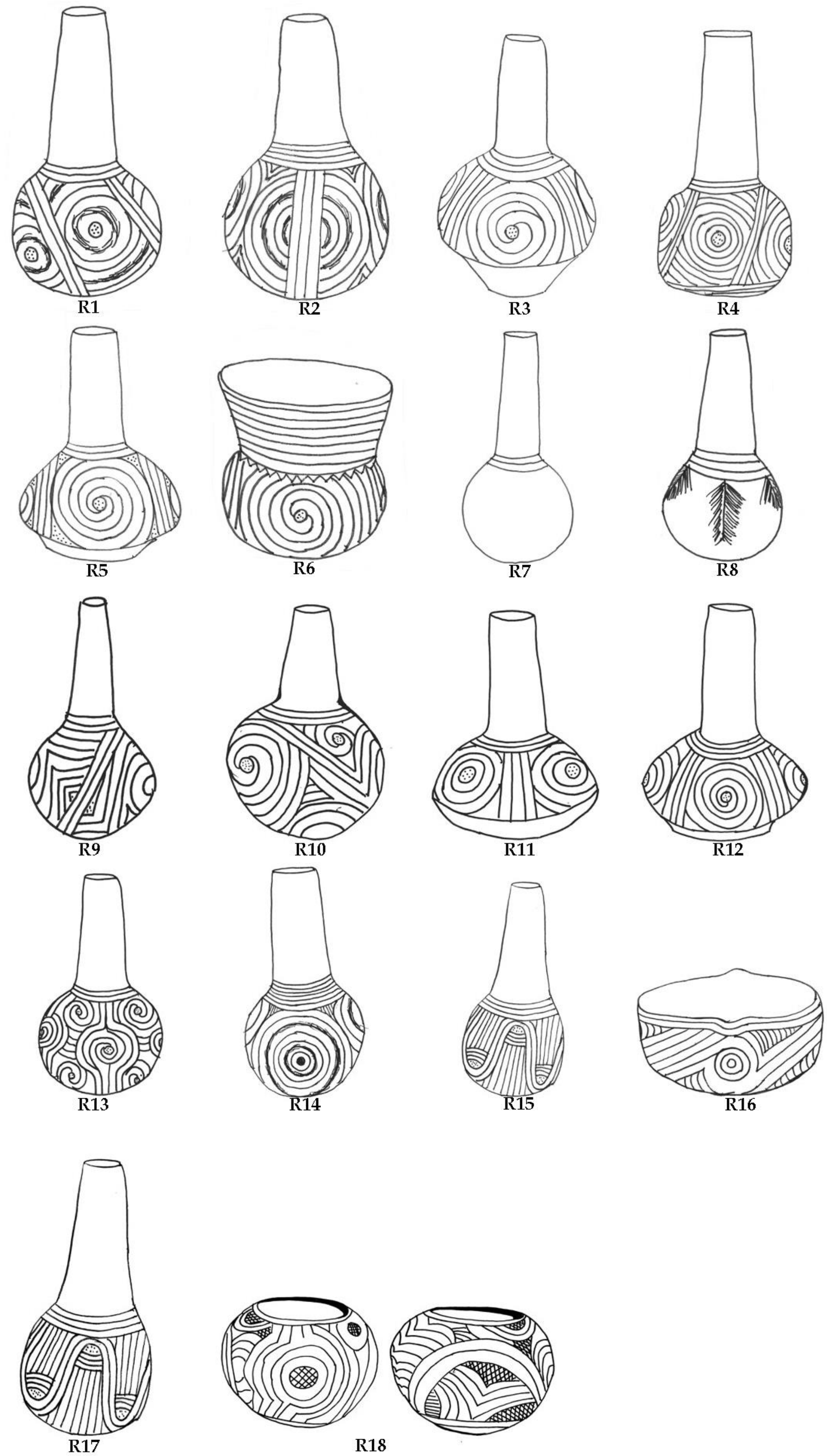
The Spiro site has 24 whole vessels, the Harlan assemblage consists of 16 vessels, Reed has 20 vessels, and the Norman site has 13 vessels. Several of these ceremonial centers had fine ware sherds. While they were utilized for INAA, their designs and vessel forms could not be determined. For the same reason, the Brackett site is not included in this design analysis. There are no whole vessels in the Brackett collection, only sherds used for INAA. I believe the low sample size of whole vessels in the northern Caddo area is more intriguing than the result of sampling error and the results of the INAA will determine its significance (see Chapter 6).

Illustrating the Corpus of Formative Caddo Designs

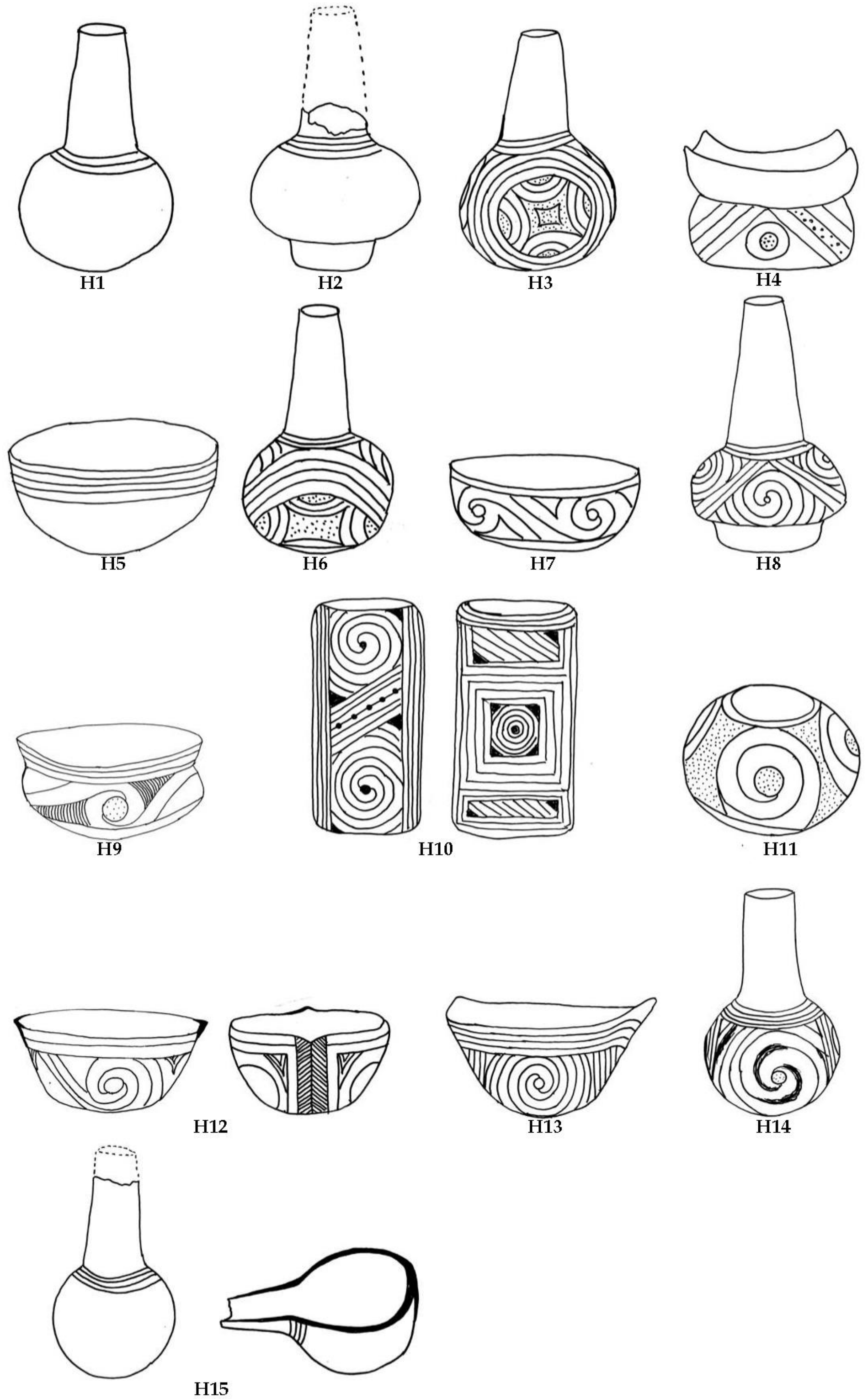
Many Formative Caddo fine wares are lightly engraved, which means photographs often do not capture the detail required for the design analysis (Figure 5.35). Because of this, I drew all 199 vessel forms and their designs compare designs and present them to others. Those illustrations (Figure 5.36) make up the rest of this section.

Figure 5.35. Example of a high-resolution photo in which the design is still very difficult to study.

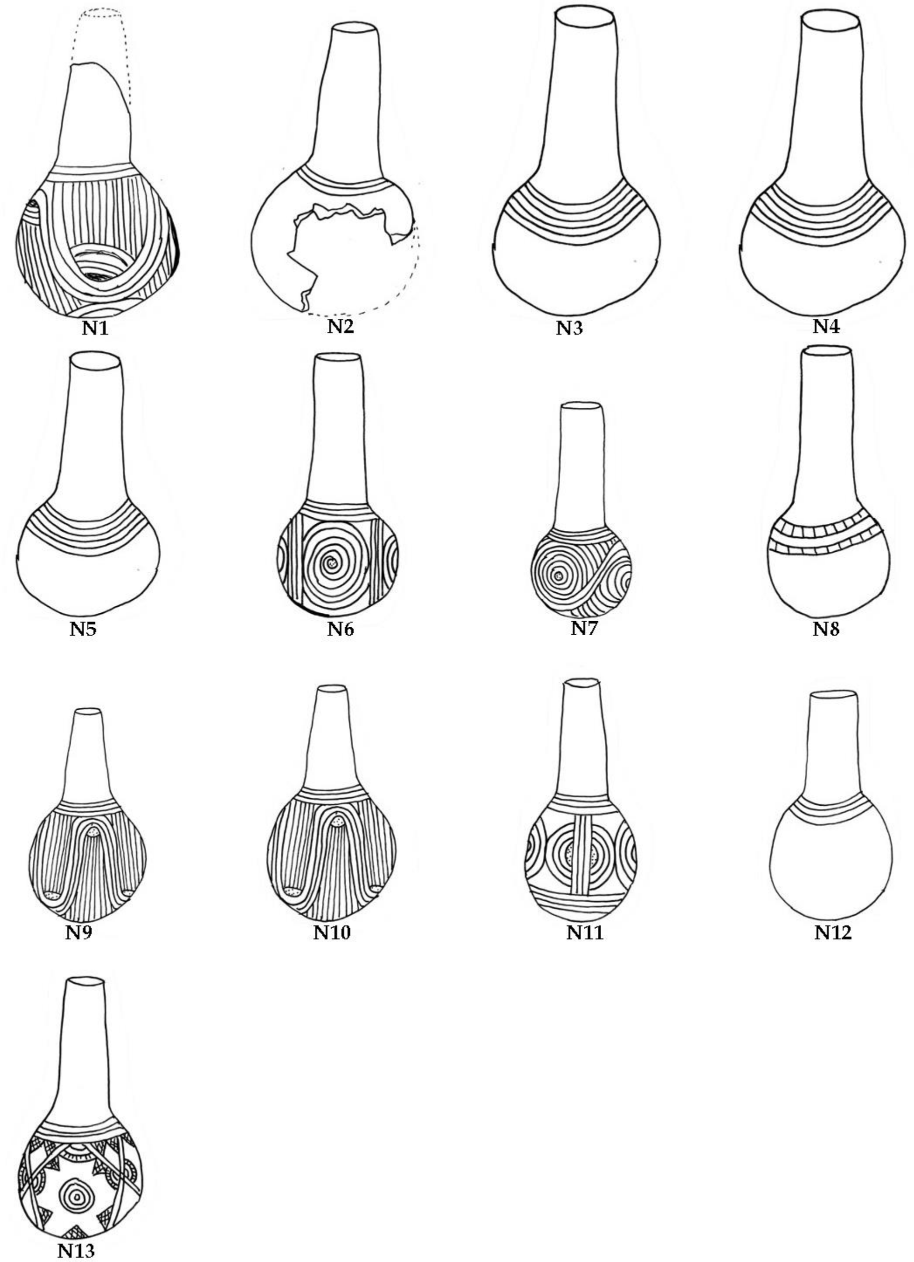
Formative Caddo Fine Wares from the Reed Site (34DL4)



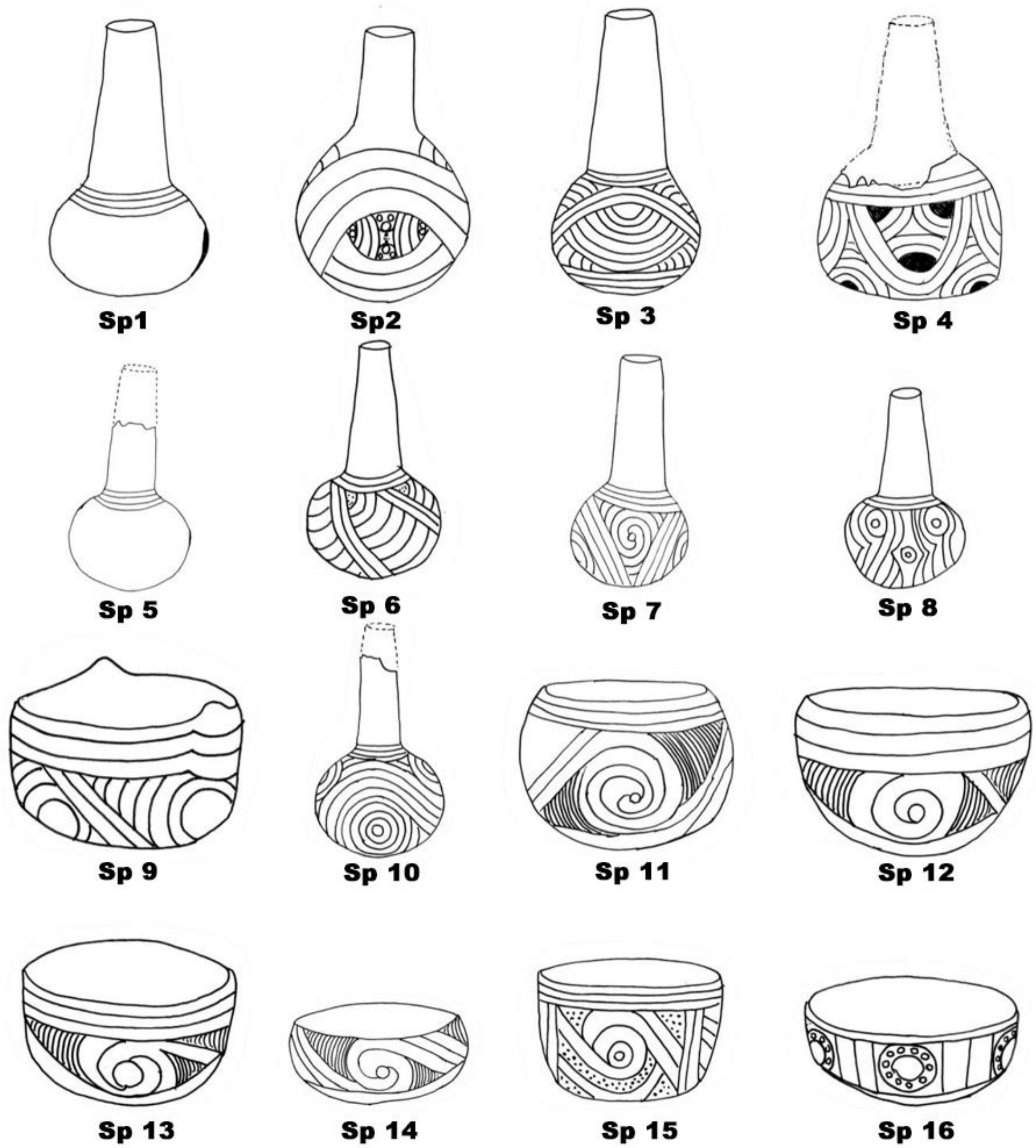
Formative Caddo Fine Wares from the Harlan Site (34CK6)



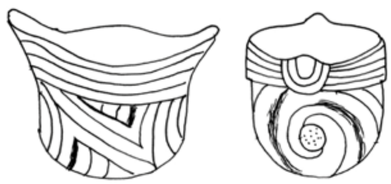
Formative Caddo Fine Wares from the Norman Site (34WG2)



Formative Caddo Fine Wares from the Spiro Site (34LF40)



Spiro (cont)



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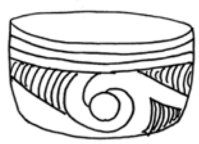

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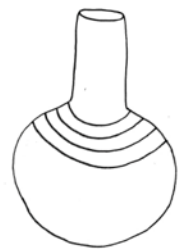

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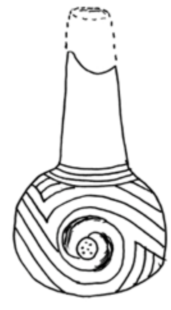

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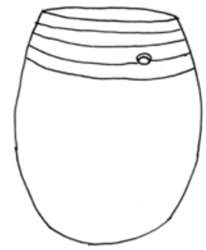

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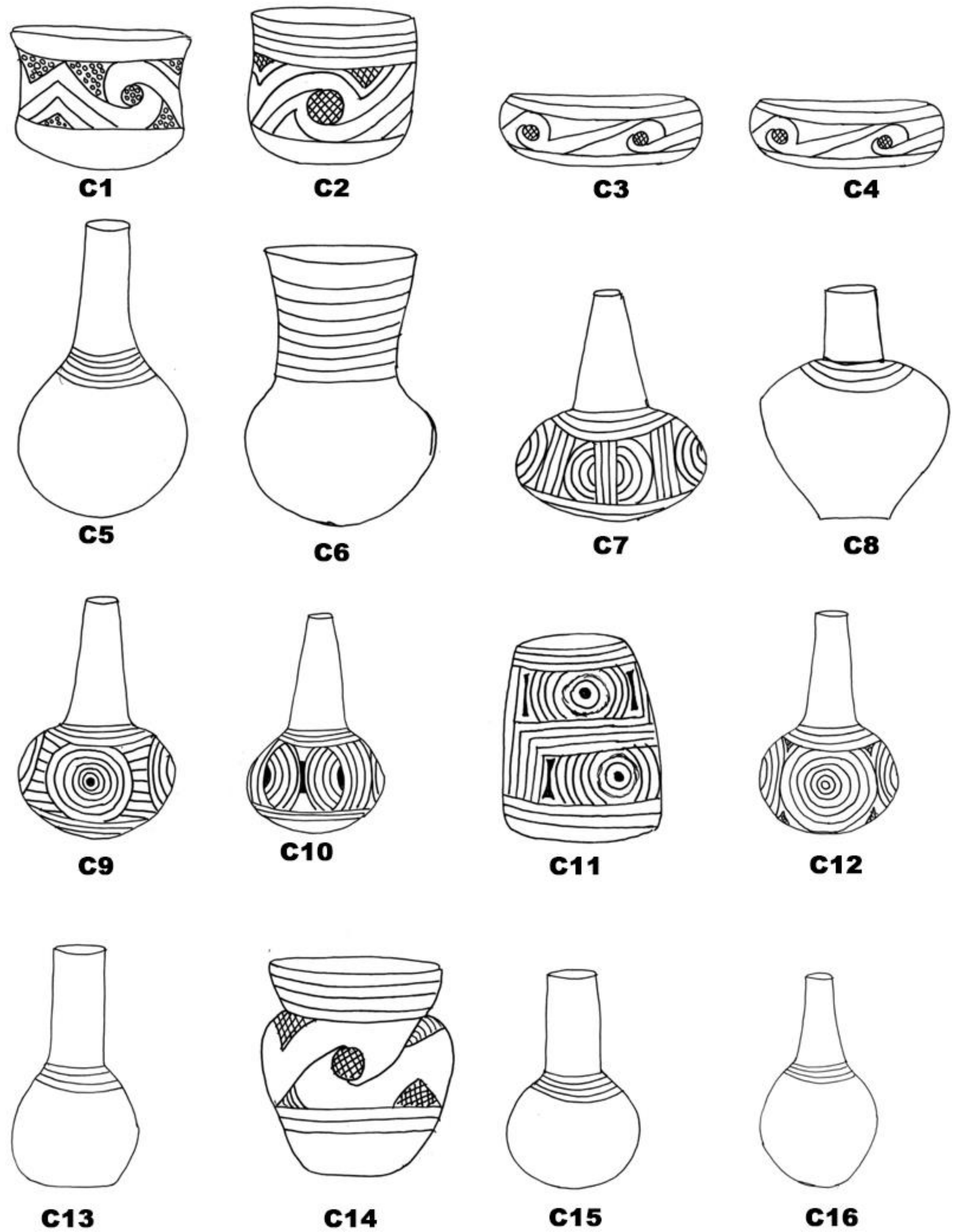
Formative Caddo Fine Wares from the Crenshaw Site (3MI6)



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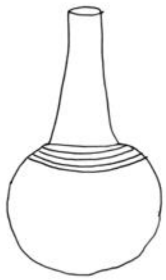
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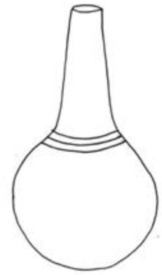
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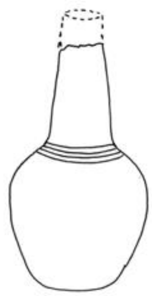
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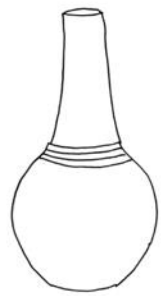
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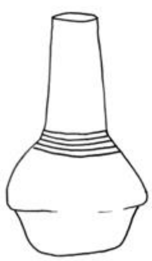
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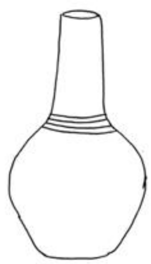
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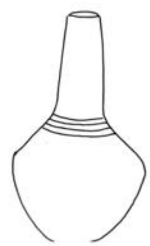
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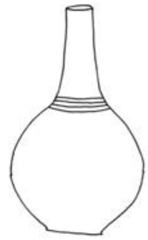
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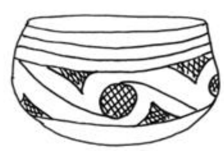
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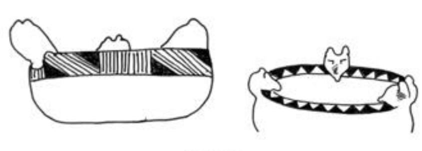
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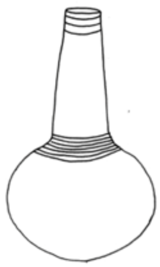
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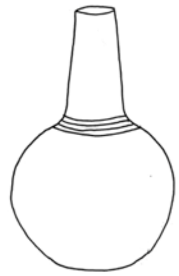
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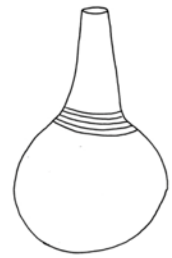
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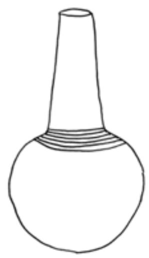
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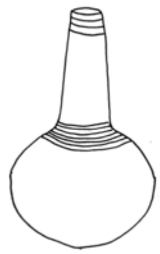
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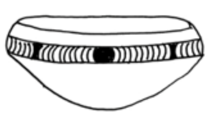
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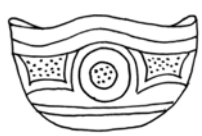
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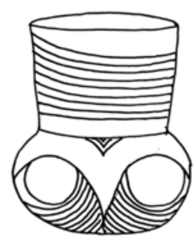
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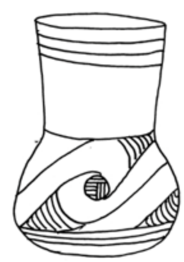
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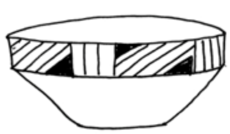
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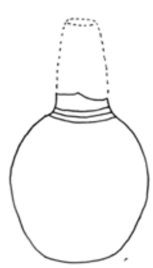
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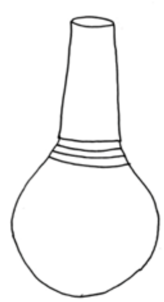
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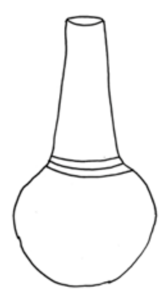
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Crenshaw (cont)

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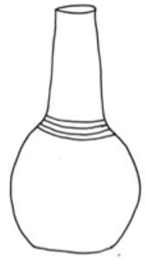

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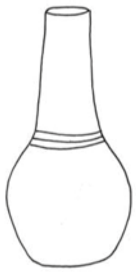

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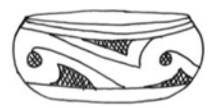

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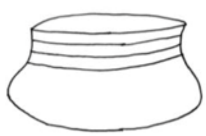

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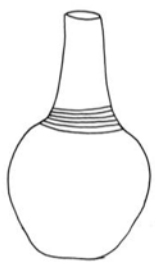

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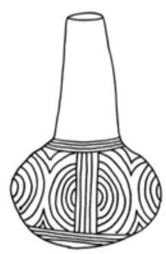

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C63

Crenshaw (cont)

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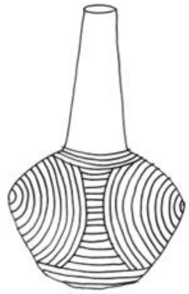

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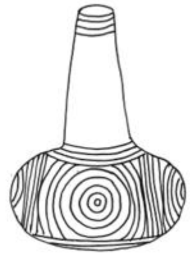

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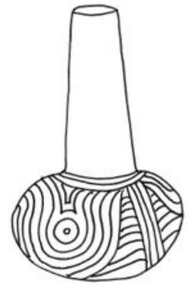

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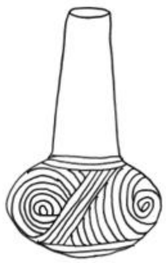

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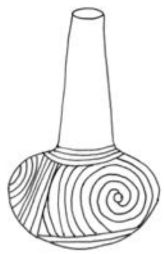

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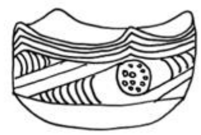

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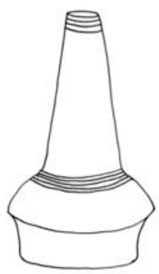

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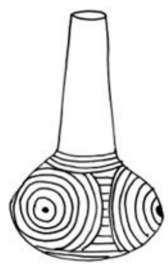

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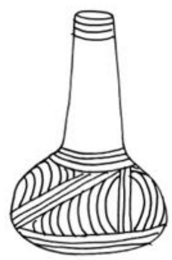

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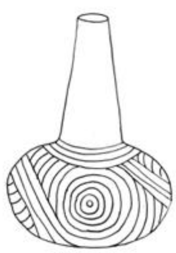

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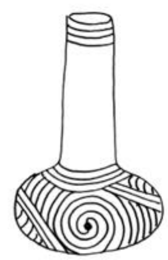

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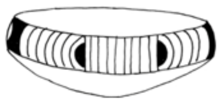
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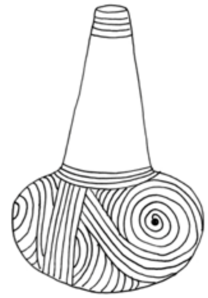
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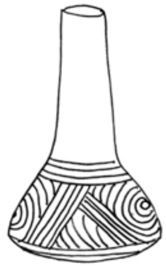
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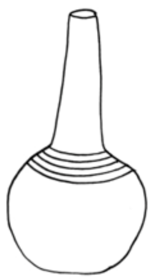
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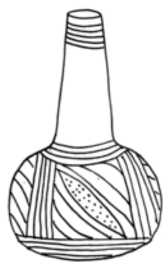
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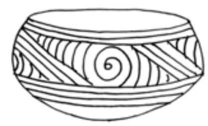
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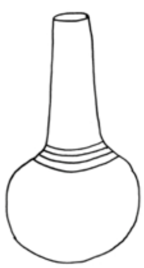
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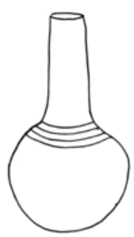
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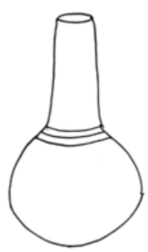
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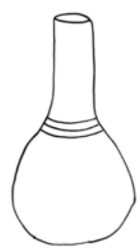
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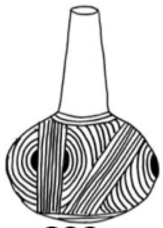
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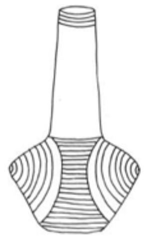
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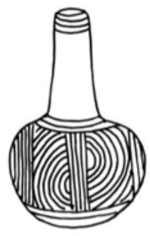
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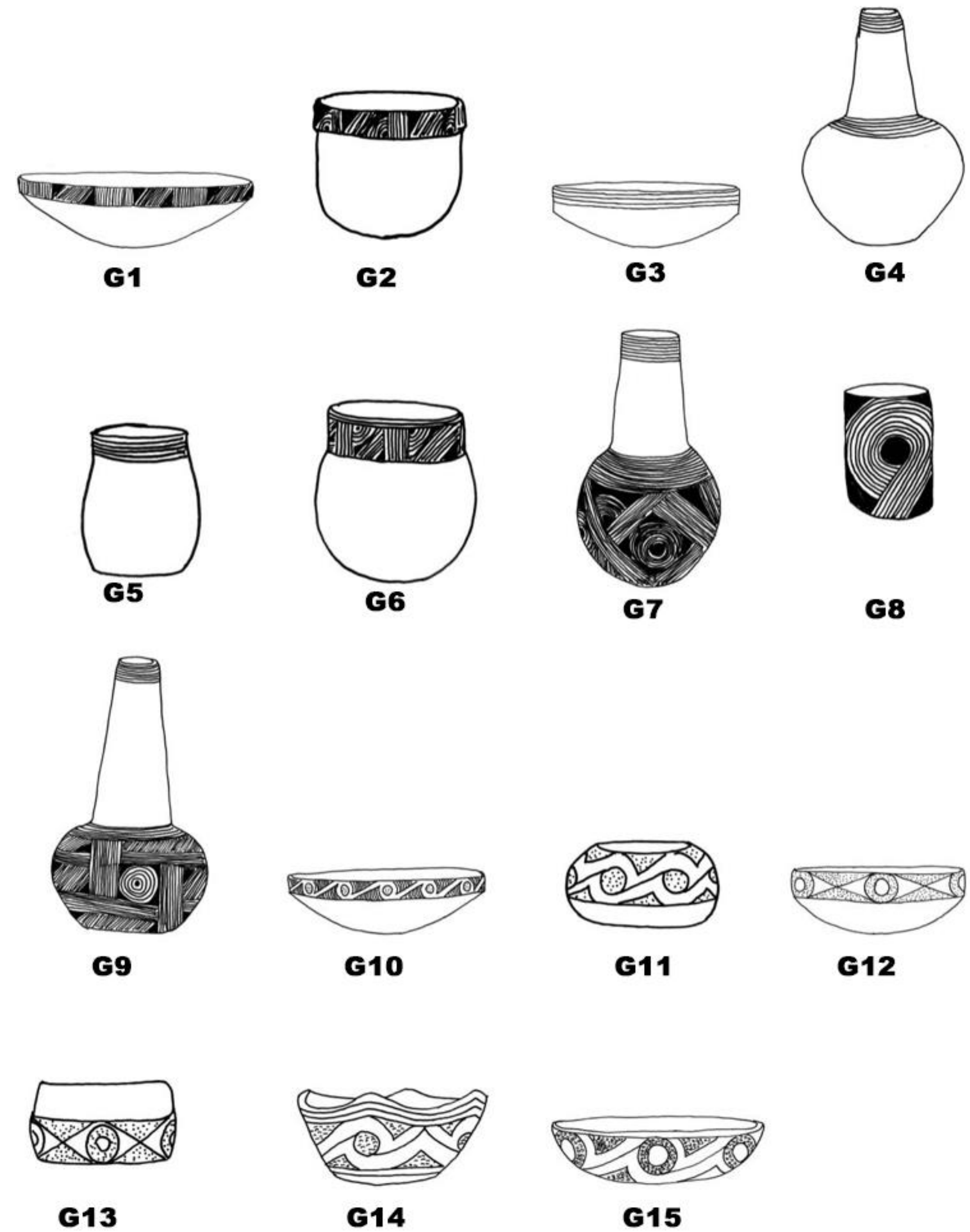
Formative Caddo Fine Wares from the George C. Davis Site (41CE19)



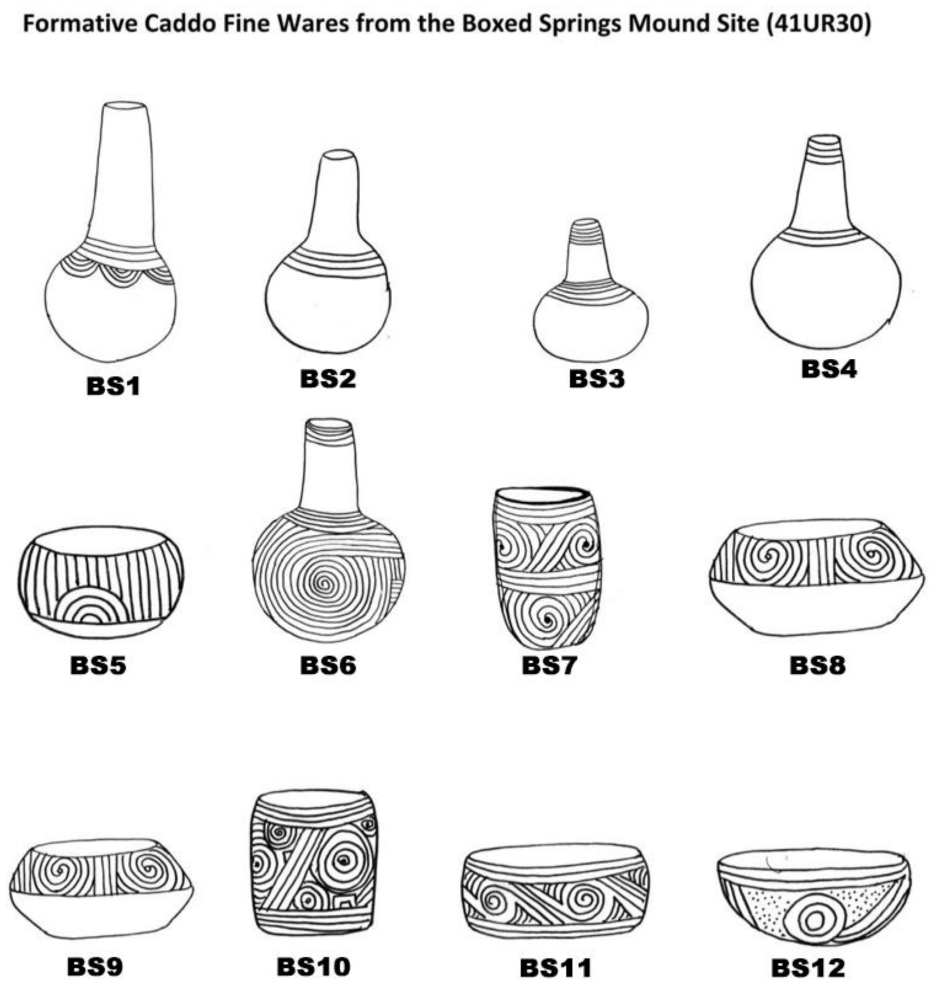


Figure 5.36. Whole vessels used in the stylistic study from Harlan, Brackett, Spiro, Norman, Reed, Crenshaw, Boxed Springs, and George C. Davis.

Design Stratigraphy as a Proxy to Understand Overall Design Structure

In all Formative Caddo fine wares, potters engraved or incised the lines with a skillful steady hand usually using equally spaced lines to produce repeating symmetrical design motifs. Apart from Crockett Curvilinear incised designs, Spiro, Hickory, and Holly Fine engraved types were not executed until after the vessel was formed and fired. This became evident when the engraved lines of a motif exposed the underlying natural color of the clay. This most likely was a purposeful and meaningful technique since the differently colored engraved lines create a vivid contrast and texture to many of the blackened pots.

To understand the configuration of Formative Caddo designs, I use a combination of method described by Early (2012:34) and what I refer to as design stratigraphy. When potters use tools to engrave or incise a Formative Caddo fine ware, several of the lines overlap with one another. This is not so much a design flaw as a necessary byproduct of the production process to complete a design on a vessel. The process of design stratigraphy or design grammar is largely identifyies that Caddo potters started by creating fields in which they rendered designs from a very narrow set of choices (Early 2012; Elsbeth 2012). Therefore, design stratigraphy is the study of the super-positioning of lines that create a motif. The earliest lines fashioned will have the most overlap, while the latest lines will have little to no overlap (Figure 5.37). This method is not much different from when an archaeological site has two or more overlapping structures and one tries to determine which structure was built first and which one was built last. By studying these areas of the design on Formative Caddo fine ware vessels, I have determined the sequence of design construction (Figures 5.38, 5.39, and 5.40). This method is integral to reconstructing the sequence of steps through which fine wares were decorated. I uncovered that no matter which design type or vessel form the potters chose, the same pathways were used to complete the designs.

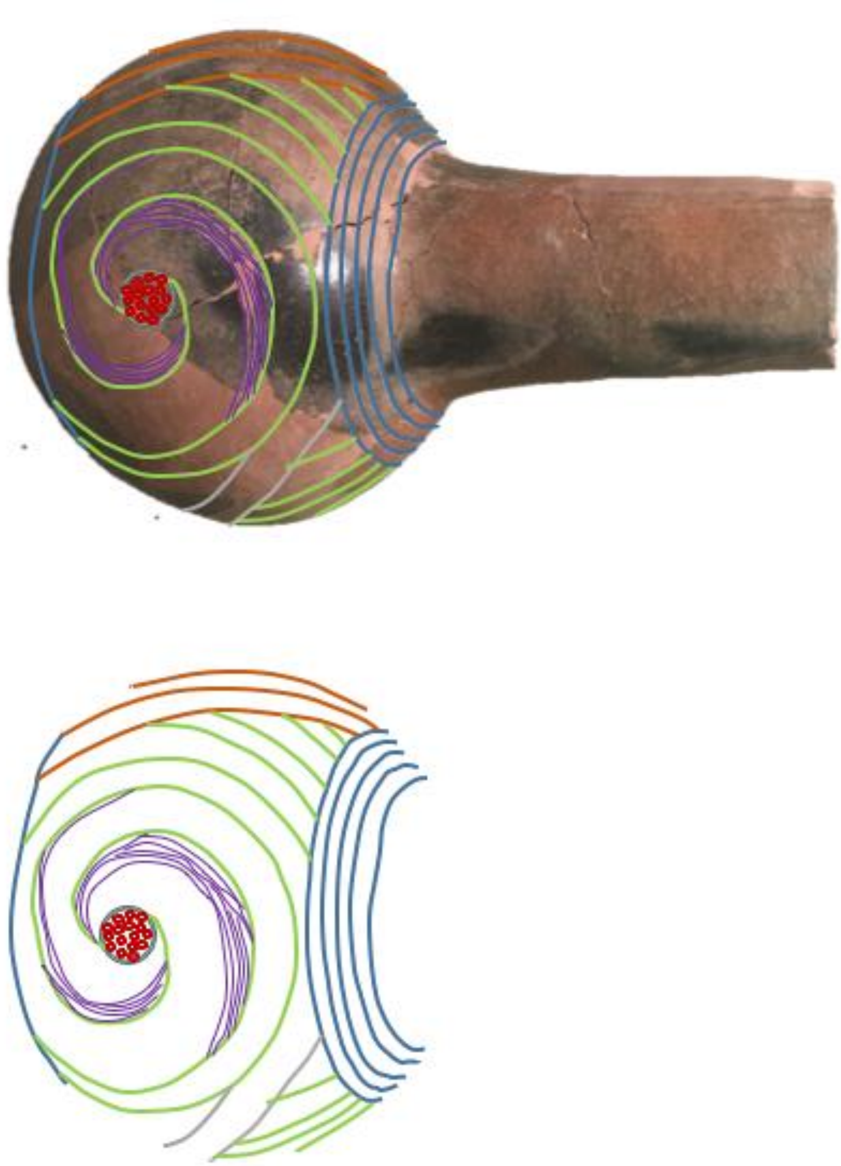


Figure 5.37. Example of the Design Stratigraphy process showing how Formative Caddo fine ware lines overlap in the motif. Step 1 (blue lines), Step 2 (green lines), Step 3 (purple lines), and Step 4 (red circle punctate).

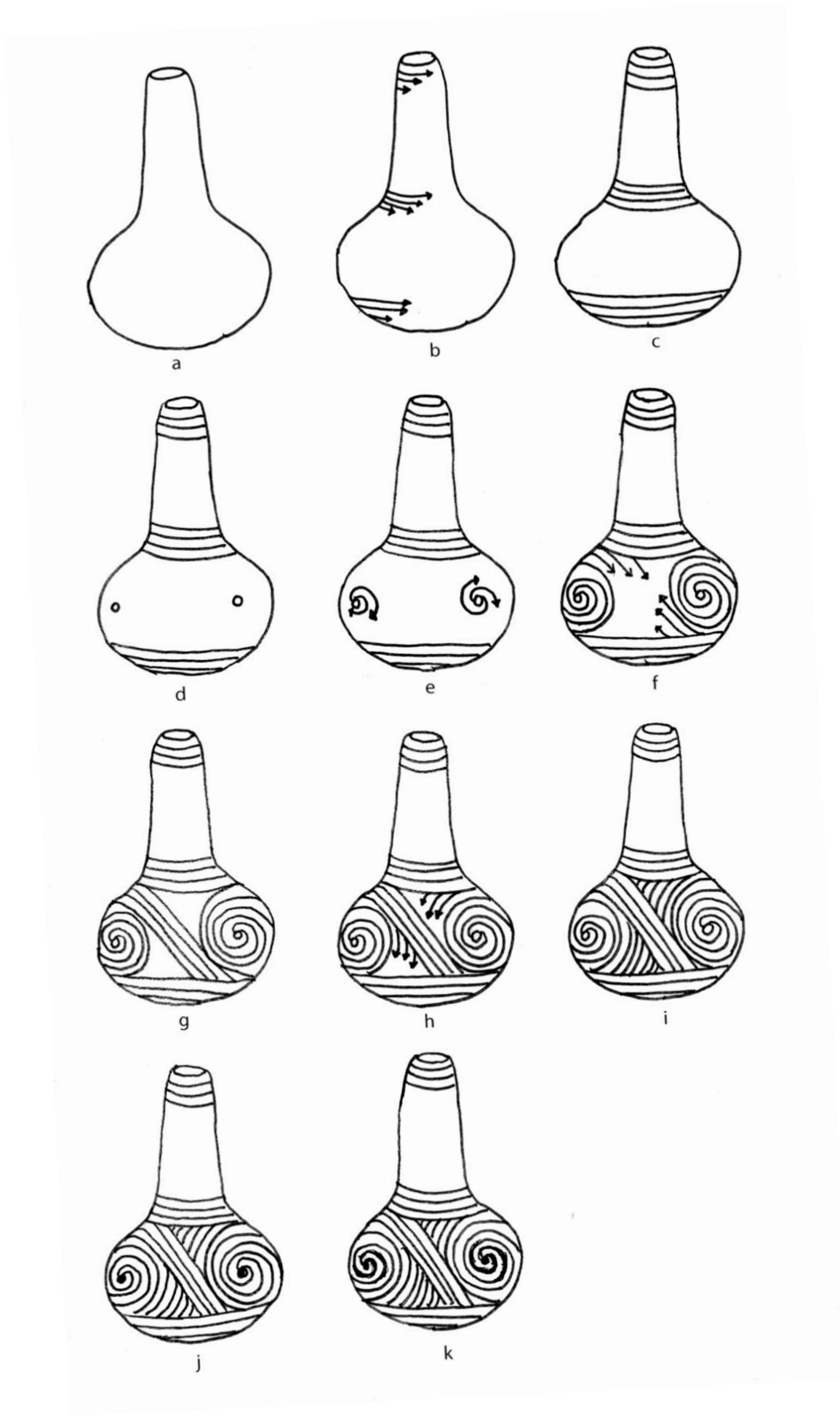


Figure 5.38. Overall design pathways to create a Spiro Engraved motif.

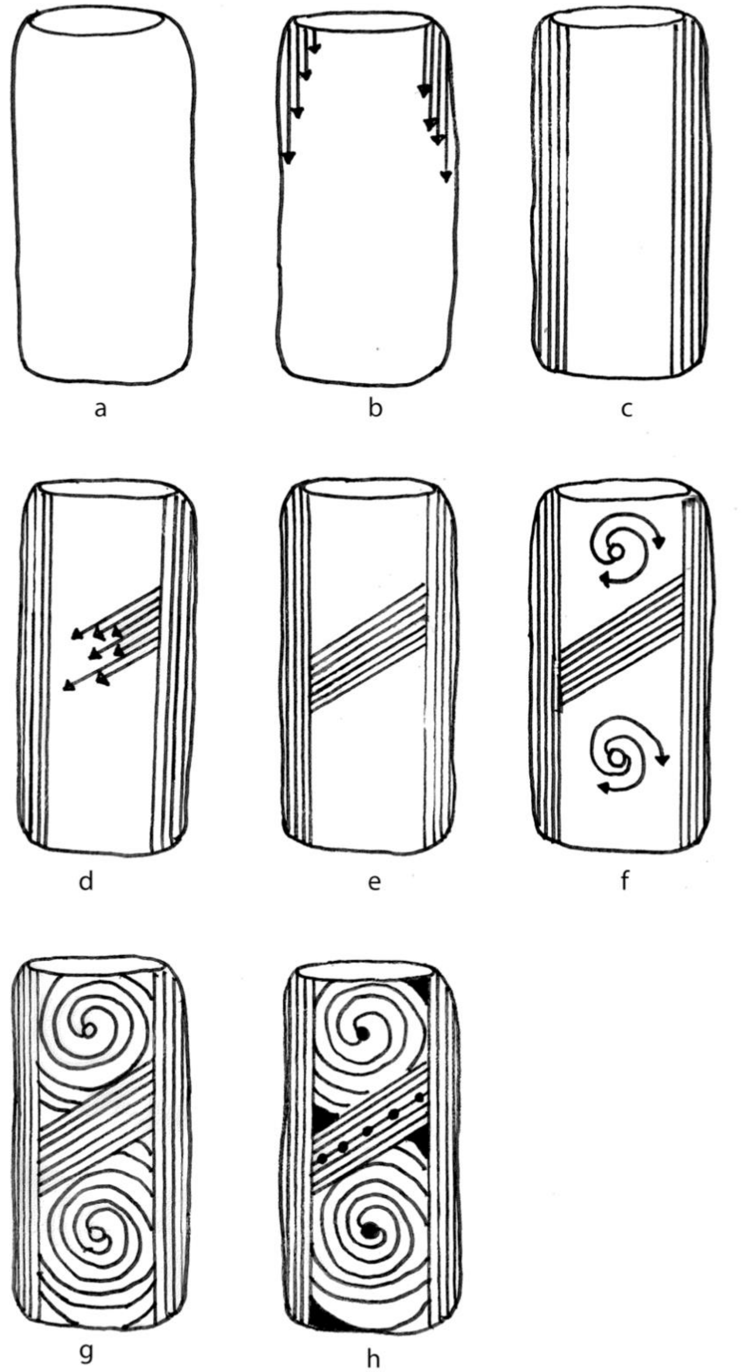


Figure 5.39. Overall design pathways to create a Holly Fine Engraved motif.

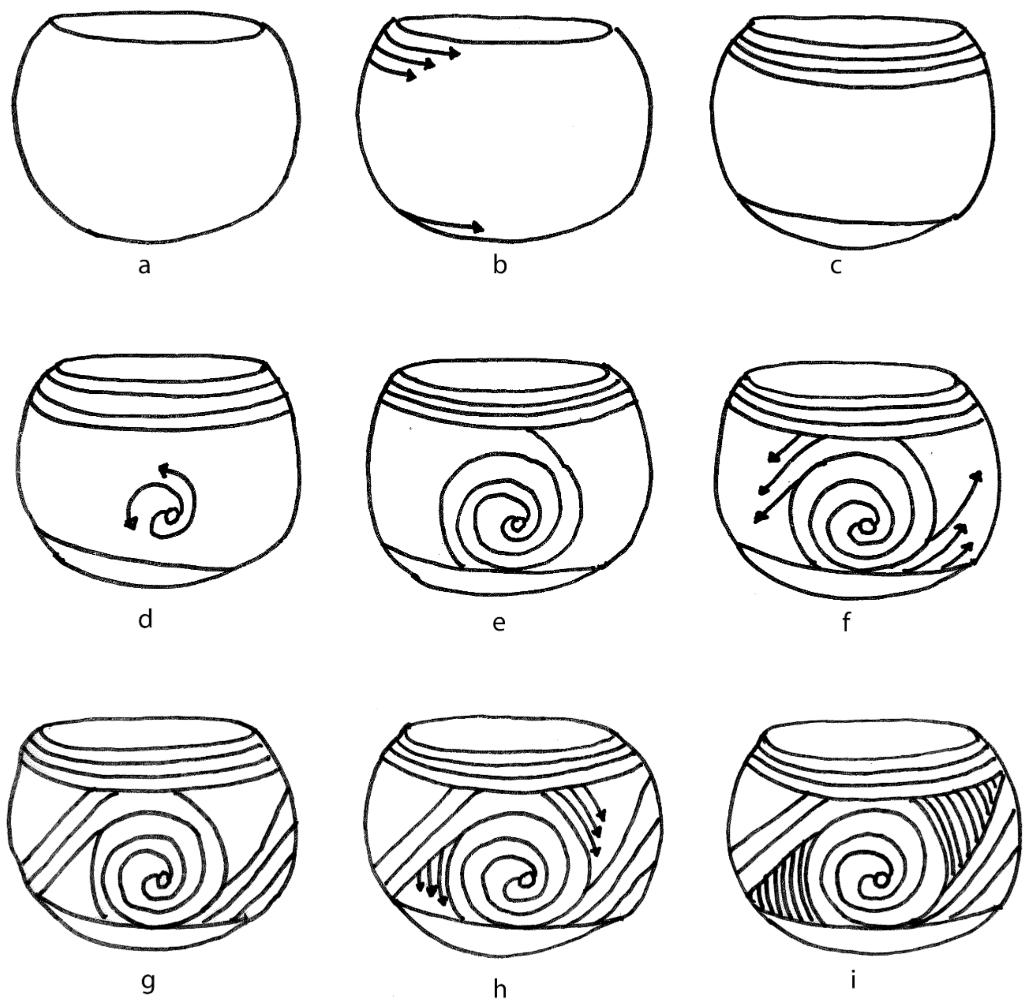


Figure 5.40. Overall design pathways to create a Crockett Curvilinear Incised motif.

Defining Primary Design Form and Secondary and Tertiary Design Attributes

Before I investigate the design construction of the fine wares, it is important to define primary design motifs, secondary attributes, and tertiary attributes. As shown in Figure 5.41, a primary design motif is the basic set of elements that produce a finished image. This usually involves single and double spiral, concentric circles, or a mixture of concentric circles and rectilinear elements (primarily on Holly Fine Engraved vessels). In most cases, the primary design motif is bounded by border panels that help to break up repeating designs around a vessel. Any other design attributes potters added to the primary design motif, I consider secondary and tertiary attributes or finishing options. Some potters choose to add one secondary element, such as punctations (middle illustration in Figure 5.41). Others may choose to add a third design attribute, such as an engraved feathered element (far right illustrations in Figure 5.41).

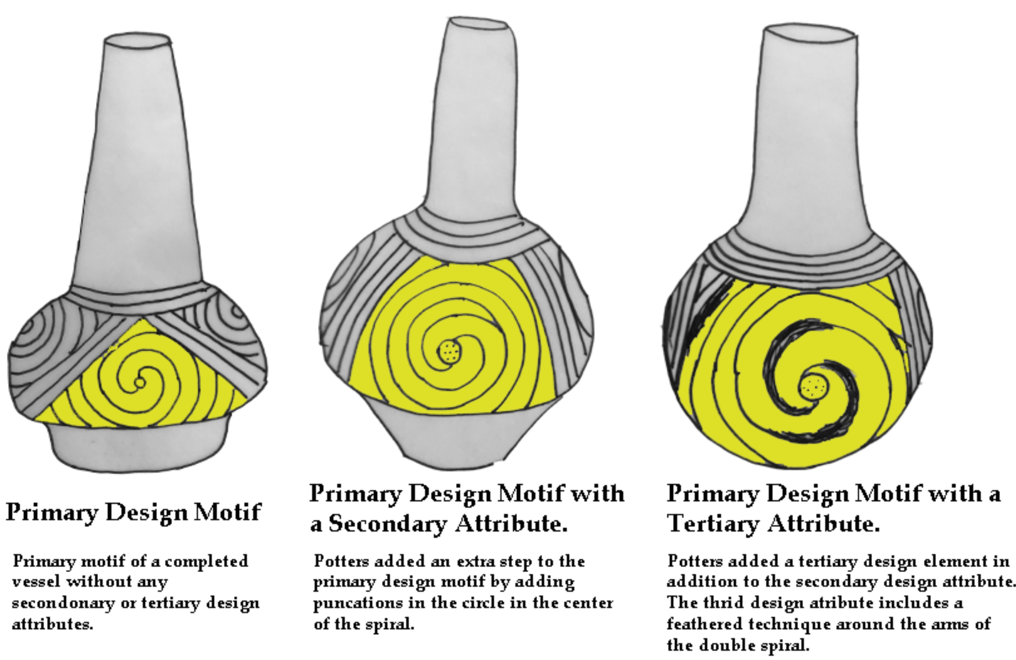


Figure 5.41. Primary design motif and secondary and tertiary design attributes.

Step One: Creating the Border Panels

The first step in decorating Formative fine wares is to divide the body of the vessel by engraving or incising horizontal, vertical, and/or diagonal border panels that frame the design area (see Figures 5.38a-c, 5.39a-e, and 5.40a-c). This step is repeated two or more times around the vessel to make the desired number of central motifs inside the border panels. Most Formative Caddo fine ware designs, such as Spiro Engraved and Crockett Curvilinear Incised, have one repeating panel, each panel mirroring the central motif next to it (Figure 5.36: R3, R11, R16, SP11). However, only Holly Fine engraved designs (except for one Spiro Engraved beaker from Boxed Springs) have two stacked division panels (Figure 5.36: C64, C84, C87, G9). This is because potters specifically chose to execute engraved designs on Holly Fine Engraved beakers, bottles that have a beaker-shaped body, or bottles with very large globular bodies. The vertically elongated body of these vessel types make it a perfect medium to have two division panels stacked on top of one another. Determining this clearly indicates Formative Caddo potters knew what designs to execute before the vessel was formed.

Out of the entire Formative fine ware assemblage, 96 percent of the vessels (n=191) have one border panel and 4 percent of the vessels (n=9) have stacked border panels (5.36: R13, H10, C11, C64, C84, C87, G7, G9, B57). Of the eight vessels with stacked border panels, 88 percent (n=7) of the vessels have Holly Fine Engraved designs. Designs of this nature are at the Harlan (n=1), Crenshaw (n=5), George C. Davis (n=1), and Boxed Springs (n=1) sites. This stacked design attribute may have a temporal or spatial significance. All were recovered from mortuary contexts, so AMS dating and INAA is needed to answer this question. The only difference in terms of sequence of steps between single and stacked border panels is that potters repeated the sequence of steps twice on vessels with stacked designs.

Step Two: Placing Central Element

This decorative step takes place in the very center of each framed panel (see Figure 5.38d, Figure 5.39f, and Figure 5.40d). This step is commonly applied to Formative Caddo fine ware, with the exception of Hickory Engraved vessels because the design is simply equally spaced engraved horizontal lines.

The central element usually involves an engraved or incised circle. However, 5 percent of the Holly Fine Engraved vessels (n=8) have repeating or reflected excised triangles in the corners of the framed border (5.36: G6, G7, G1, G2). This triangle element is most abundant at the George C. Davis site (Newell and Krieger 1949). This step is fundamental to the symmetry of the repeating motifs around the vessel. Potters paid extra attention in aligning each element directly in the center of each framed panel. The desired number of repeating motifs significantly influenced their placement. On four-peaked bottles, the central element would be placed at the tip of each of the four peaks, again showing the potters knew what design to put on the vessel before forming it (5.36: C97, C86, C65, C18). There are three four-peaked bottles from the Reed site and six four-peaked bottles from the Crenshaw site. This bottle form is a bit unusual in comparison to the other bottle forms and much more difficult to make, so I would speculate very few potters made them.

Step Three: Creating the Primary Design Motif

This step involved using the central elements from Step 2 as a guide to expanding from the center to fill in the rest of the framed panel (see Figure 5.38e-i, Figure 5.39f-g, and Figure 5.40d-g). Even though most Formative Caddo fine wares followed this pathway, there are a few ways in which potters chose to do so (Figure 5.41). One way to expand outward from the central element is to use concentric circles (Figure 5.42a). In three Formative Caddo design types, 26 percent of the vessels (n=52) have concentric circles or a variation of concentric circles to fill in the framed panel (5.36: N11, SP8, SP10, SP18, C7, C60, C63). Northern and southern Caddo ceremonial centers have this attribute in their fine ware assemblages. Another way to expand outward from the central element is to use one engraved or incised line to spiral around the central element (Figure 5.42b). In three Formative Caddo design types, 11 percent of the vessels (n=22) has a single lined spiral. This design attribute is also found in vessels from both northern and southern Caddo areas. The most popular way to expand outward from a central element is with a double spiral (Figure 5.42c). In three Formative Caddo design types, 34 percent of the vessels (n=67) used the double spiral design (5.36: R6, R10, R5, H7, H14, C36, C64). This attribute is also found in all the assemblages in this study. Only a few options potters could choose to fill in the design panel were available.

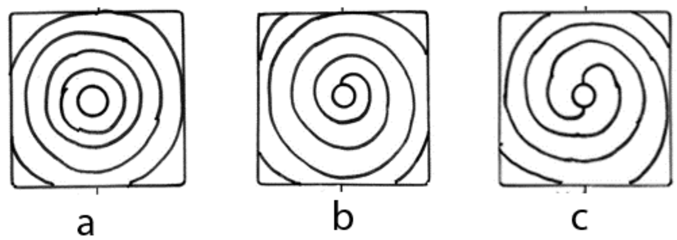


Figure 5.42. Attributes expanding out from central element: (a) concentric circles, (b) single spiral, and (c) double spiral. These represent three Primary Design Motifs.

After potters completed the Primary Design Motifs, they only had a few secondary and tertiary finishing options from which to choose. It is important to note here some variation to the concentric circle Primary Design Motifs (Figure 5.43). Three percent of the vessels from the assemblage (n=6) have a division panel that bifurcates the concentric circles (Figure 5.43a) (Figure 5.36: R2, R9, C7, C10, C80, C87, C96) and 1 percent of the vessels (n=2) have glide-reflected concentric circles also bifurcated by a division panel (Figure 5.43b) (Figure 5.36: C101). I separated these two design attributes from the plain concentric circle form and labeled as their own Primary Design Motifs. These designs are both found at Harlan, Reed, and Crenshaw. Each example of these two designs are so similar in design execution, one potter most likely was responsible for their manufacture. On 27 percent of the vessels (n=54), these five Primary Design Motifs represent completed designs with no additional embellishments. Vessel with only the Primary Design Motifs represent the majority of completed vessels, approximately 75% of the assemblage used this study.

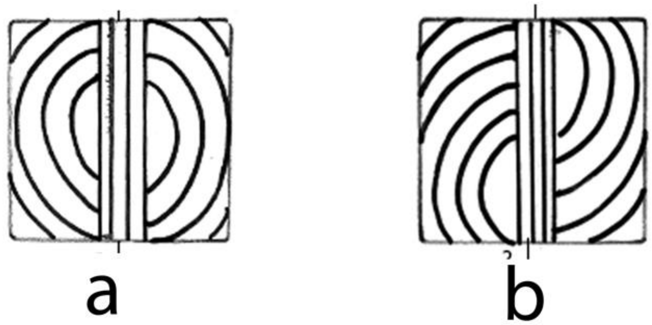


Figure 5.43. Other Primary Design Motifs of the concentric circle attribute: (a) concentric circles bifurcated by division panel and (b) glide-reflected concentric circles bifurcated by division panel.

Step Four: Primary Design Motif with an Additional Design Attribute Added

After the Primary Design Motifs were complete, potters had a limited set of secondary design choices. Secondary design attributes are additional elements potters placed on the Primary Design Motif (see Figure 5.41, middle illustrations). One option available at this point was filling in the central circle with tooled punctations (Figure 5.44). This additional element to the Primary Design Motifs are found in 11 percent of the vessels (n=21). Only Spiro Engraved and Crocket Curvilinear Incised designs have this finishing option (Figure 5.36: R3, R4, R5, R6, R11, R12, C41, C82).

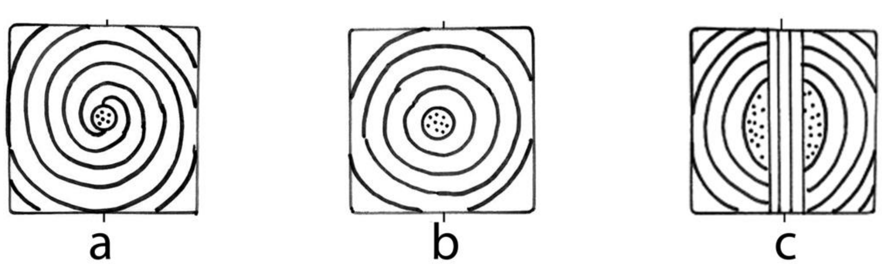


Figure 5.44. Examples of Primary Design Motifs with a central punctated element.

Another finishing technique potters used was to either excise the central element, excise triangle elements in the corners of the framed panels, or a combination of both (Figure 5.45). This secondary design choice to the Primary Design Motifs represents 18 percent of the vessels (n=36) in this assemblage. Excising only occurs in Spiro Engraved and Holly Fine Engraved motifs and is found on vessels in both northern and southern Caddo ceremonial centers (Figure 5.36: H10, N1, SP4, C9, C11, C31, C36, C78). Most Caddo researchers lump together any design with excising as Holly Fine Engraved (e.g., Bohannon 1973; Durham and Davis 1975; Girard et al. 2014; Suhm and Jelks 1962). However, I highly disagree with this division. This discovery became apparent in the hierarchical stylistic analysis of Spiro Engraved vessels.

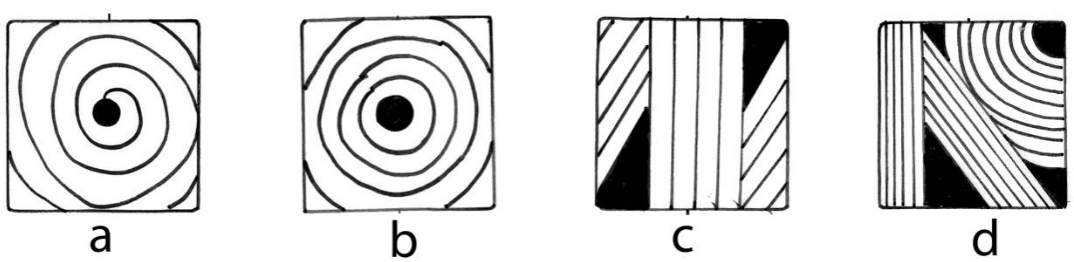


Figure 5.45. Excising finishing options: (a-b) excising central element on Spiro Engraved motifs, (c) excising triangle in corners of framed panel on a Holly Fine Engraved motif, and (d) combination of excising central element and triangles on a Holly Fine Engraved motif.

The last secondary finishing option available to Formative Caddo potters was filling in the central element and/or filling in triangles in the corners of border panels with cross-hatching (Figure 5.46). This finishing option is by far the most uncommon and is spatially restricted (Figure 5.36: R18, N13, C2, C14, C30, C55). Only 4 percent of the vessels (n=9) have cross-hatching elements; 89 percent of vessels (n=8) with cross-hatching come from Crenshaw and the other vessel is from Reed. Six of these vessels represent completed design, while the other two vessels have tertiary attribute and three-tiered finishing options. Crockett Curvilinear Incised is the most popular design type to have cross-hatching (n=6), but there are Spiro Engraved examples (n=2) with cross-hatching. This finishing option may be temporally sensitive and restricted to the latter part of the Formative Caddo period or even a variant of Formative fine wares that post-date the period, because cross-hatching is a more popular design element on fine ware vessels in Middle-to-Late Caddo contexts (Dowd 2012; Early 2012).

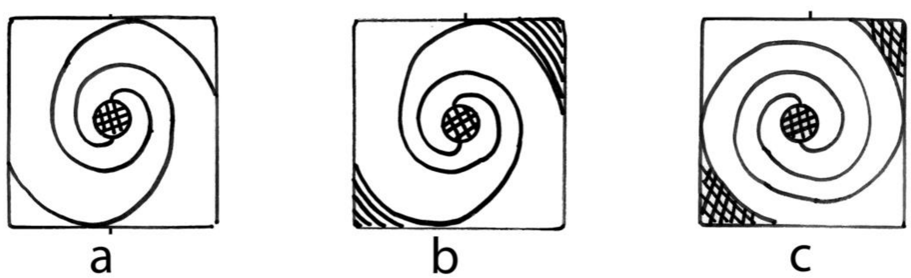


Figure 5.46. Examples of the cross-hatching finishing option: (a-b) cross hatched central elements on Crockett Curvilinear Incised design types and (c) central element as well as two opposing triangles are cross-hatched on a Crockett Curvilinear Incised design type.

Step Five: Primary Design Motifs with Two Design Attributes Added

This step involved potters placing two elements on the Primary Design Motif to complete the overall structure of the design (Figure 5.47). This decorative step took place primarily on Spiro Engraved design types (n=5). There are also one example from Holly Fine Engraved design types (n=1) and one example from a Crockett Curvilinear Incised pot (n=1) (Figure 5.36: R1, R14, H14, SP21, C11). Using two or more finishing options and Primary Design Motif is uncommon in Formative fine ware assemblages, which may suggest that only few potters had the knowledge to employ these finishing options on vessels. They are found at both northern and southern Caddo ceremonial centers: Reed has two vessels, Harlan has one vessel, Spiro has two, and Crenshaw has two vessels with tertiary attribute elements added to the primary form. The most common way potters joined two elements together was punctating the central circles of the spiral designs and then feathering the spiral arms (Figure 5.46b-d). This design combination produces a vessel with a multi-toned texture and draws the viewer towards the center of the motif.

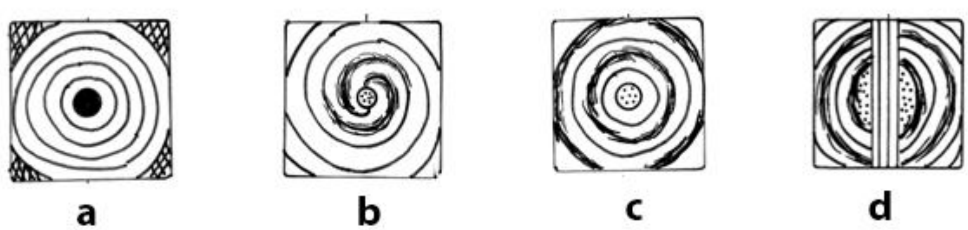


Figure 5.47. Examples of tertiary attribute finishing options: (a) excised central element with cross-hatched triangles, (b) punctated central element with feathered spiral arms, (c-d) punctated central element with opposing concentric circles and feathered circles.

Step Six: Adding Three Elements to Primary Design Motif

The most unique combination of design elements occurred when potters placed three different design elements on a primary form to complete the overall structure of the design (Figure 5.48). This finishing option is the rarest way in which Formative Caddo potters finished the design on a vessel. Only one Spiro Engraved vessel in this assemblage from the Reed site has three different design elements in addition to the primary form (5.36: R14). The central element is an excised circle. From that central element, two sets of opposing circles and feathered circles fill the design panel. To complete the vessel, the potter chose to cross-hatch the cornered triangles.

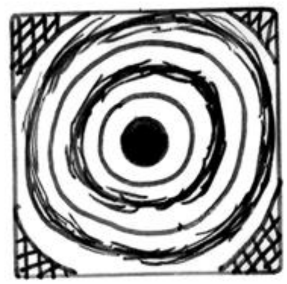


Figure 5.48. Example of a three-tiered finishing option. This is the only such example in the entire assemblage.

Hierarchy of Design Choice

To illustrate the limited number of design choices Formative Caddo potters had I developed four hierarchical tree diagrams for each design type: Spiro Engraved, Crockett Curvilinear Incised, Hickory Engraved, and Holly Fine Engraved (Figures 5.50-53). Each diagram displays the different primary design motifs or the primary elements that constitute the most basic structure of the design (Plog 1980:48). Each element added to the Primary Design Motifs is considered a secondary element or a finishing option (Figure 5.49). When Formative Caddo potters added secondary elements, their placement in the overall design configuration is heavily dependent upon which primary form was used. Many of the Primary Design Motifs illustrated were the final completed design for a variety of vessels. However, when secondary elements were applied to other vessels, they went through only one to three design steps before their designs were completed.

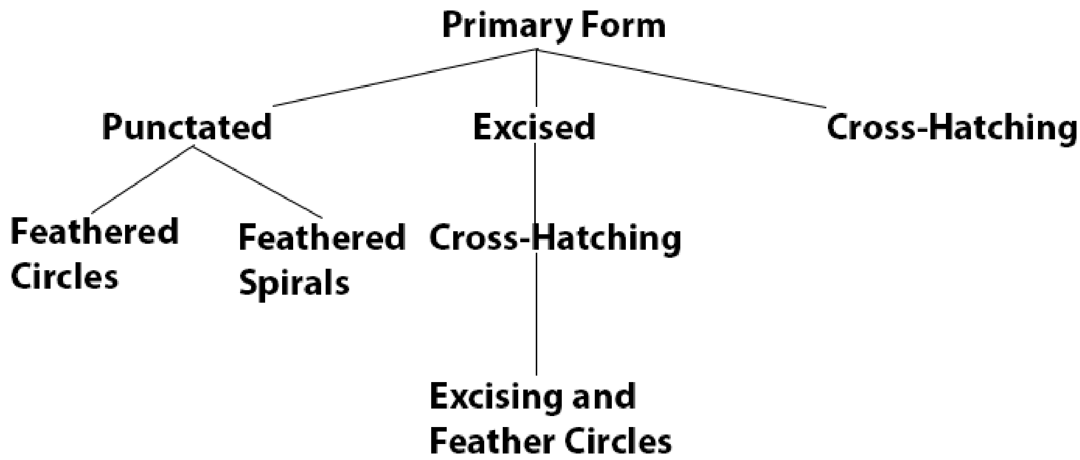


Figure 5.49. Primary Design Motif and simplified range of secondary elements of Formative Caddo fine wares.

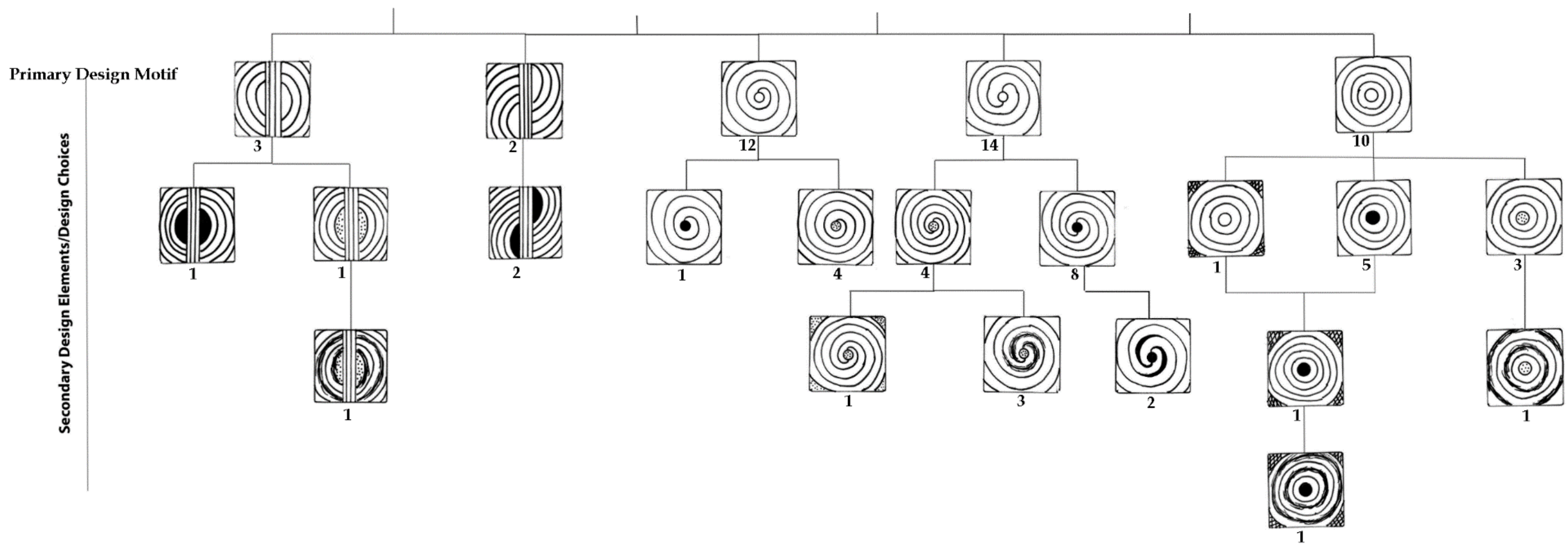


Figure 5.50. Spiro Engraved Hierarchical Tree Diagram showing the limited number of design choices. Numbers underneath each design box are the number of vessels with the design in the assemblage.

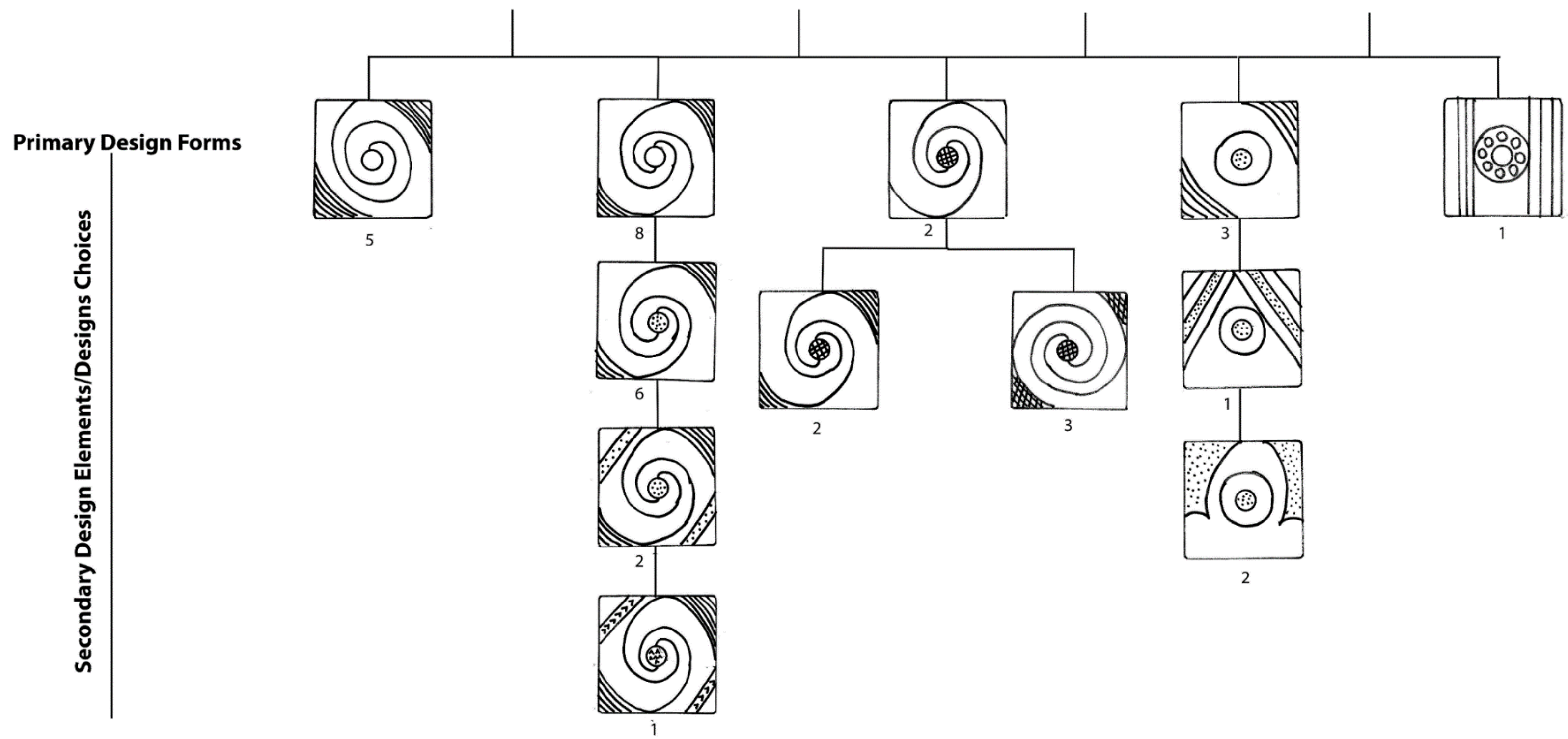


Figure 5.51. Crockett Curvilinear Incised Hierarchical Tree Diagram showing the limited number of design choices. Numbers underneath each design box are the number of vessels with the design in the assemblage.

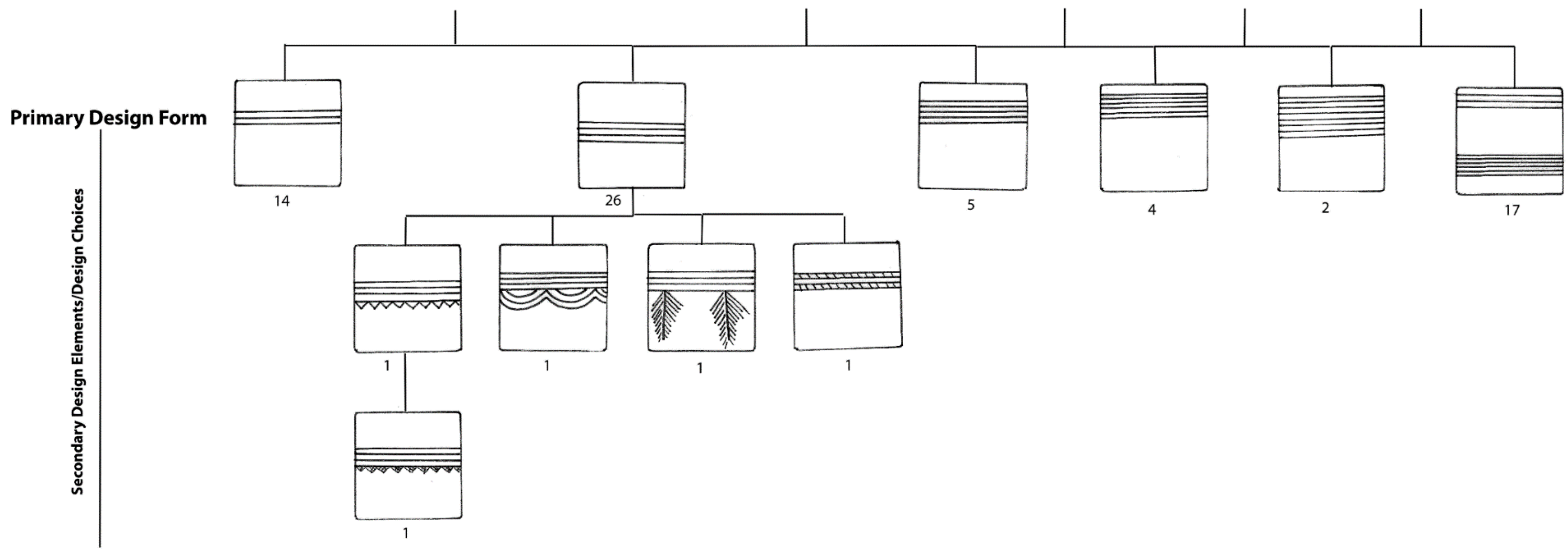


Figure 5.52. Hickory Engraved Hierarchical Tree Diagram showing the limited number of design choices. Numbers underneath each design box are the number of vessels with the design in the assemblage.

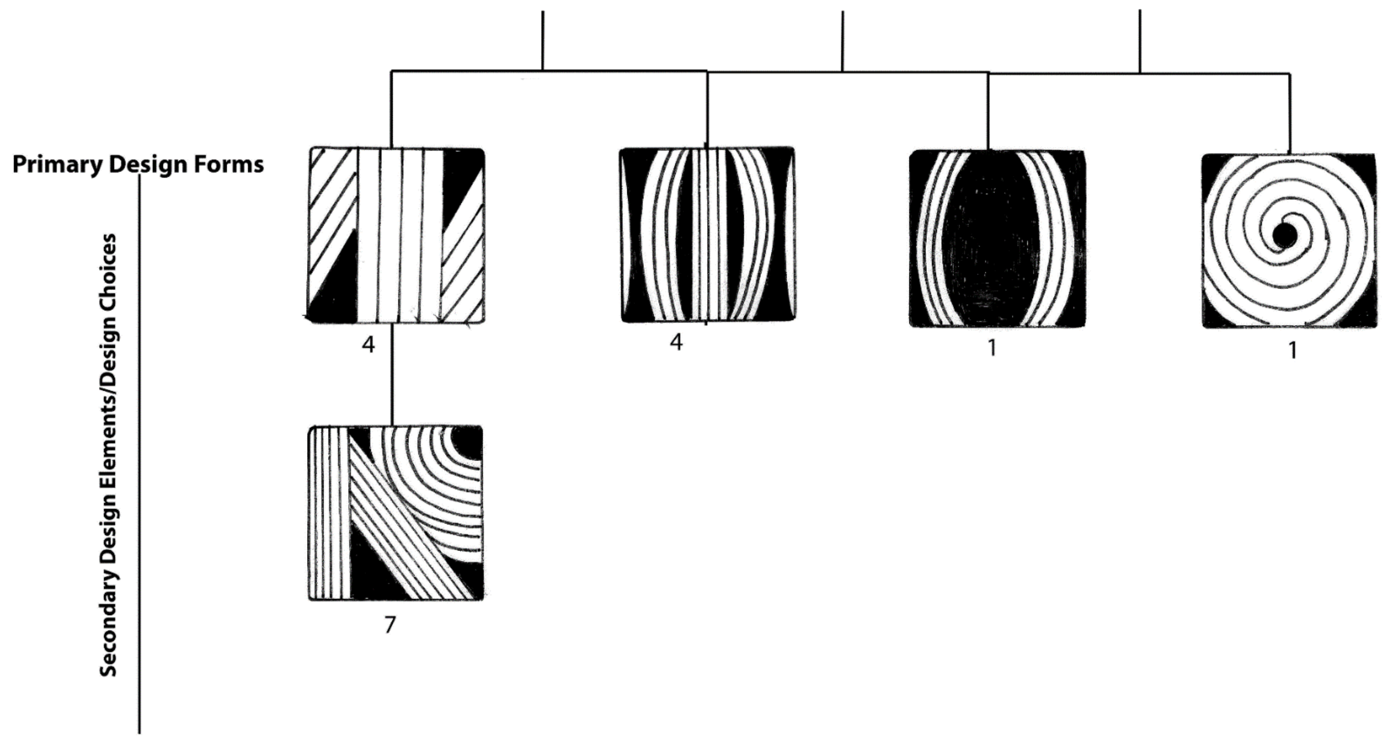


Figure 5.53. Holly Fine Engraved Hierarchical Tree Diagram showing the limited number of design choices. Numbers underneath each design box are the number of vessels with the design in the assemblage

Spiro Engraved Hierarchical Analysis. As shown in Figure 5.50, there are five Spiro Engraved Primary Design Motifs to which very few secondary design elements were added. The Primary Design Motifs consist of two styles of spirals and three types of concentric circle motifs. The double spiral and simple concentric circle motifs have the most variation in design choice. Yet even within this variation, there are only three different levels of secondary elements chosen to embellish the primary form: punctation, excising, feathering, and cross-hatching. The primary form with concentric circles bifurcated by a division panel has the next most variation, with punctations, excising, and feathering. The single spiral primary form only has one level of secondary elements, which consist of a central excised and punctated element. The least amount of variation is the glide-reflected concentric circles bifurcated by a division panel. The only embellishment on its primary form is an excised central circular element.

The numbers underneath each box represent the number of vessels with a given motif. The Primary Design Motifs have the greatest number of vessels (n=41) and with each subsequent secondary element chosen the number of vessels decrease significantly. This may suggest that only a few potters had the ability to embellish primary design motifs with secondary elements or perhaps they were fashioned for specific ritual activities. All the Spiro Engraved vessels came from mortuary contexts, so it is possible the more uncommon designs with secondary elements may represent something unique about the person with whom they were interred. What can be said about the design variation in Spiro Engraved is that the design grammar is limited to a few design elements of expression and when secondary elements are added to the Primary Design Motifs they are placed on similar areas.

Crockett Curvilinear Incised Hierarchical Analysis. As shown in Figure 5.51, there are five Crockett Curvilinear Incised Primary Design Motifs on which very few secondary design elements were added. The Primary Design Motifs consist of single and double spirals and concentric circle motifs. Like Spiro Engraved motifs, double spirals and concentric circles have the most design variation or secondary elements incised onto the Primary Design Motifs. Yet even within this variation, there are only two-to-three levels of secondary elements chosen to be used to embellish the Primary Design Motifs: punctations and cross-hatching. Punctated areas are a defining element of Crockett Curvilinear Incised designs (Suhm and Jelks 1962:31), so it is not unexpected to observe some variation in the types of tools being used to produce them. The primary types of punctations used to decorate Crockett vessels are (1) tiny punctated areas made with a very thin object with a rounded or semi-triangular distal end, (2) larger triangular punctations perhaps made with the vertebrae of a fish, and (3) punctations made with a reed cane and/or incised circles that appear like cane punctations. These styles of punctations are not restricted to one ceremonial site, but are present on vessels in both northern and southern Caddo areas. Another secondary step in producing Crockett Curvilinear motifs is that some vessels (n=4) have punctated zoned bars on either side of the central motif (see Figure 5.50). These are present at Harlan (n=1), Spiro (n=1), and at Crenshaw (n=2). The most uncommon and site-specific secondary design element on Crockett Curvilinear Incised vessels is cross-hatching. There are seven examples of this element; all on vessels at the Crenshaw site. The results of hierarchical analysis of Crockett vessels indicates design grammar was limited to a specific set of finishing design choices to complete the overall design structure. The whole vessels in this study are from mortuary contexts, so it would be advantageous in future analyses to determine whether Crockett vessels recovered from domestic or off-mound contexts have the same or different ranges of variation.

Hickory Fine Engraved Hierarchical Analysis. Hickory Engraved motifs have the simplest design structure in the Formative Caddo fine ware assemblage. As shown in Figure 5.52, most of the vessels (n=68) have only equally spaced horizontal lines just under the bottle neck and/or just under the rims of bottles and bowls. I was initially apprehensive about hierarchically dividing Hickory Engraved based on the number of horizontal lines, because as Plog (1980:42) stated, the “problem with some previous classifications and analyses is that many of the studies have dealt with variation in the frequencies of design elements that do not have the property of substitutability.” Do three horizontal lines differ from four horizontal lines? Can those differences be qualified? In continuing with the hierarchical analysis, I divided each Hickory Engraved vessel with a certain number of engraved lines as its own primary form. As show in the tree diagram, there are no secondary elements with five of the six Primary Design Motifs. However, there is notable variation in design choice when Hickory Engraved vessels had four engraved lines. The range of secondary design choices on the primary form with four engraved lines included triangles, cross-hatched triangles, rayed circles, feather-like elements, and diagonal lines connected to the horizontal lines (n=5). The Hickory Engraved motif with the feather-like element is located at the Reed site, the Hickory Engraved motif with the two-barred element is located at the Norman site, the Hickory Engraved motif with the concentric rayed elements is located at the Boxed Springs site, and the two Hickory Engraved vessels with the triangle elements are at the

Crenshaw site. These could be locally-made variants of the Hickory Engraved motif or perhaps they are temporally sensitive versions of the motif. Overall, the hierarchical analysis of Hickory Engraved motifs did not find significant design variation between sites or between vessels from the northern and southern ceremonial centers. Few potters added secondary elements to Hickory Engraved designs, which suggests that there were strict design grammar rules in place for the structure of this motif.

Holly Fine Engraved Hierarchical Analysis. There is very little design choice for Holly Fine Engraved vessels (n=17) (see Figure 5.53). There are only four Primary Design Motifs in the entire Holly Fine Engraved assemblage. The only secondary choice comes from the primary form with two opposed excised triangles. Potters added full or semi-concentric circle elements to the excised triangle primary form and the central concentric circle is always excised. This limited design grammar may indicate the production of Holly Fine Engraved was more centralized than other fine wares, and very few potters produced them. The George C. Davis site may very well be the epicenter of Holly Fine Engraved production (Girard 2009). Holly Fine Engraved was the most numerous decorated type (n=1101 estimated vessels) among the minimum number of vessel analysis from the Mound A excavations alone (see Table 5.2, see also Newell and Krieger 1949). No collections from anywhere else in the Caddo world even come close to the quantities represented at Davis (Girard 2009). Only one Holly Fine Engraved has been recovered in northern Caddo ceremonial centers; that vessel comes from Harlan. In the southern Caddo area, there are three vessels from the Boxed Springs site and 11 vessels from the Crenshaw site. The Holly Fine Engraved sherds from Davis are from a non-mortuary "inner precinct" area (Story 1997), possibly an elite ritual/habitation area, while the whole vessels in this study come from mortuary contexts.

Relationships between Decorative Motif and Vessel Form

The vessel assemblage in this study is dominated by three vessel forms: bottles, bowls, and jars. Variations exists within each of these primary vessel forms (see Figure 5.2). Because the hierarchical analyses revealed little variation in design choice between decorative types, it was essential to see if vessel forms co-vary with design types. The limited design grammar in Formative Caddo decorative types suggests potters had rules in place for certain designs being adorned on specific primary vessel forms. To determine if there is a covariation between vessel form and design choice, I link primary form designs to the vessel forms on which they were adorned in Figures 5.54-5.57).

Spiro Engraved and Vessel Form Relationships. There is covariation between Spiro Engraved motifs and the vessel forms potters chose to execute them on (see Figure 5.54). Out of the 50 motifs represented in this figure, 76 percent of the motifs (n=38) are depicted on bottles. Clearly bottles were the primary preference for Spiro Engraved motifs. Another 16 percent of the motifs (n=8) are represented on bowls, but 63 percent of bowls with Spiro Engraved motifs are on the boat-shaped vessel form, preferring to adorn a more uncommon bowl form with Spiro Engraved motifs. The most uncommon vessel forms to be adorned with Spiro Engraved motifs were jars and beakers. Just 4 percent of the motifs were represented on jars (n=2), and 4 percent of the motifs were represented on beakers (n=2).

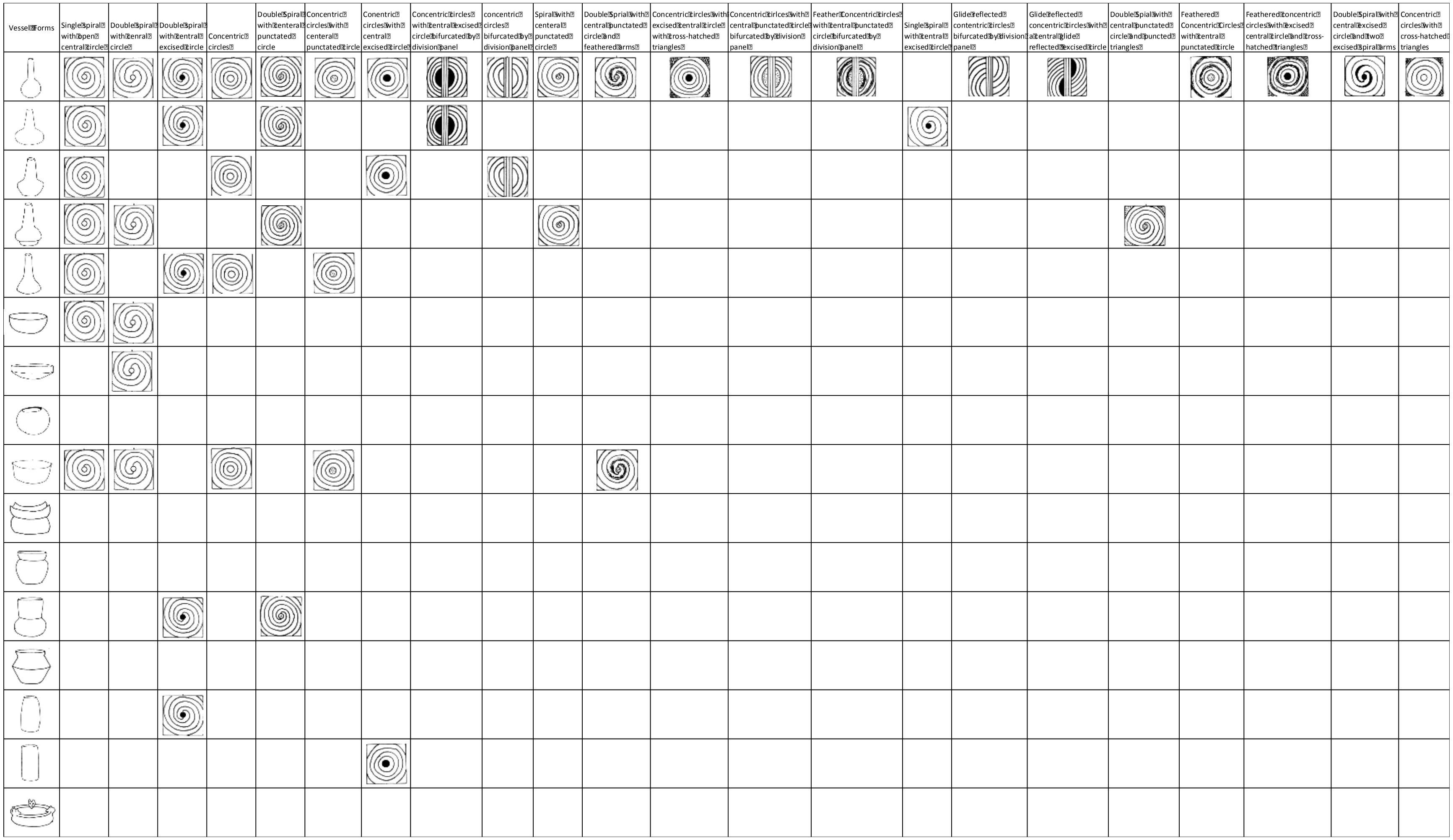
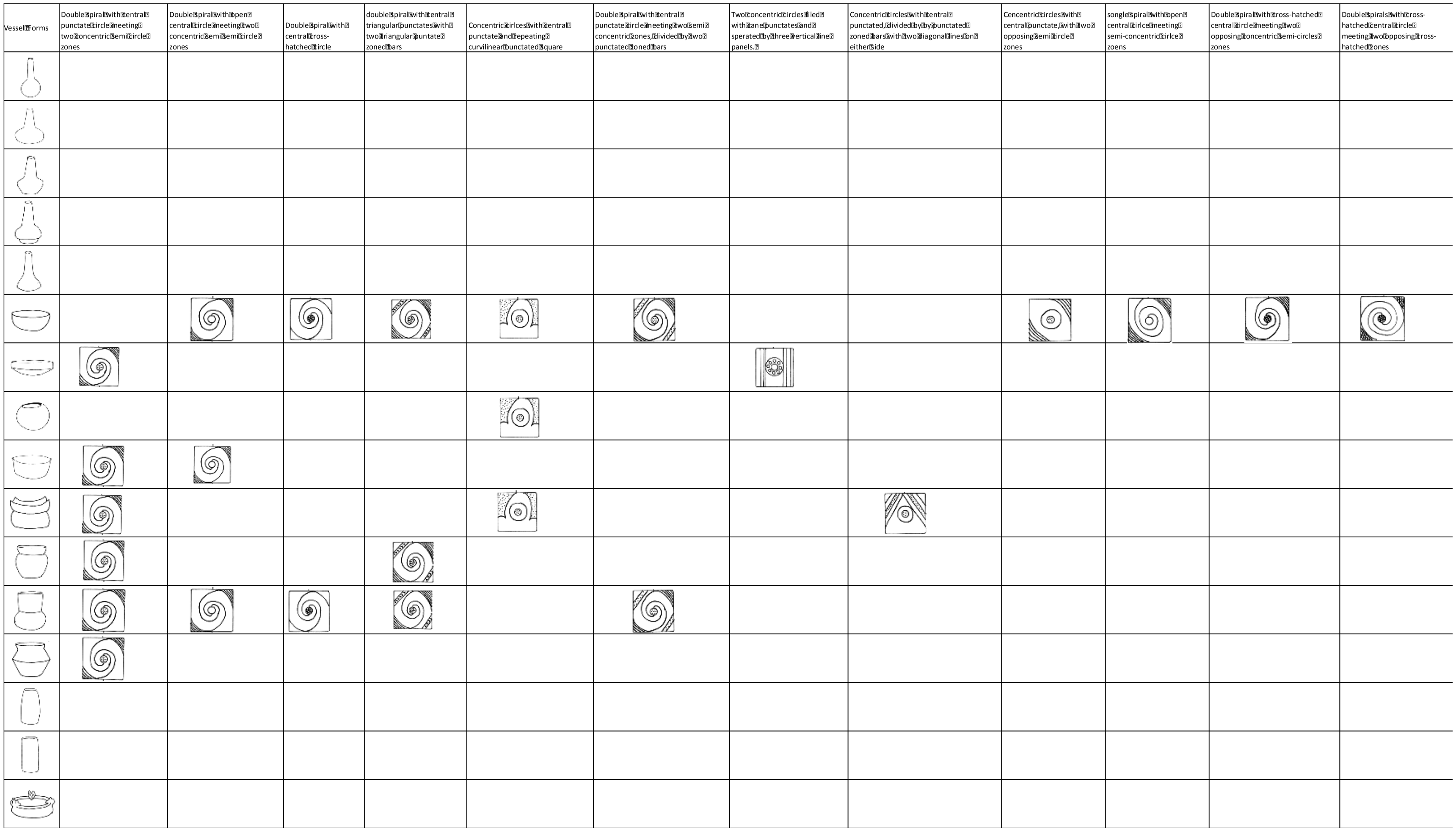


Figure 5.54. Spiro Engraved and vessel form correlation.



5.55. Crockett Curvilinear Incised and vessel form correlations.

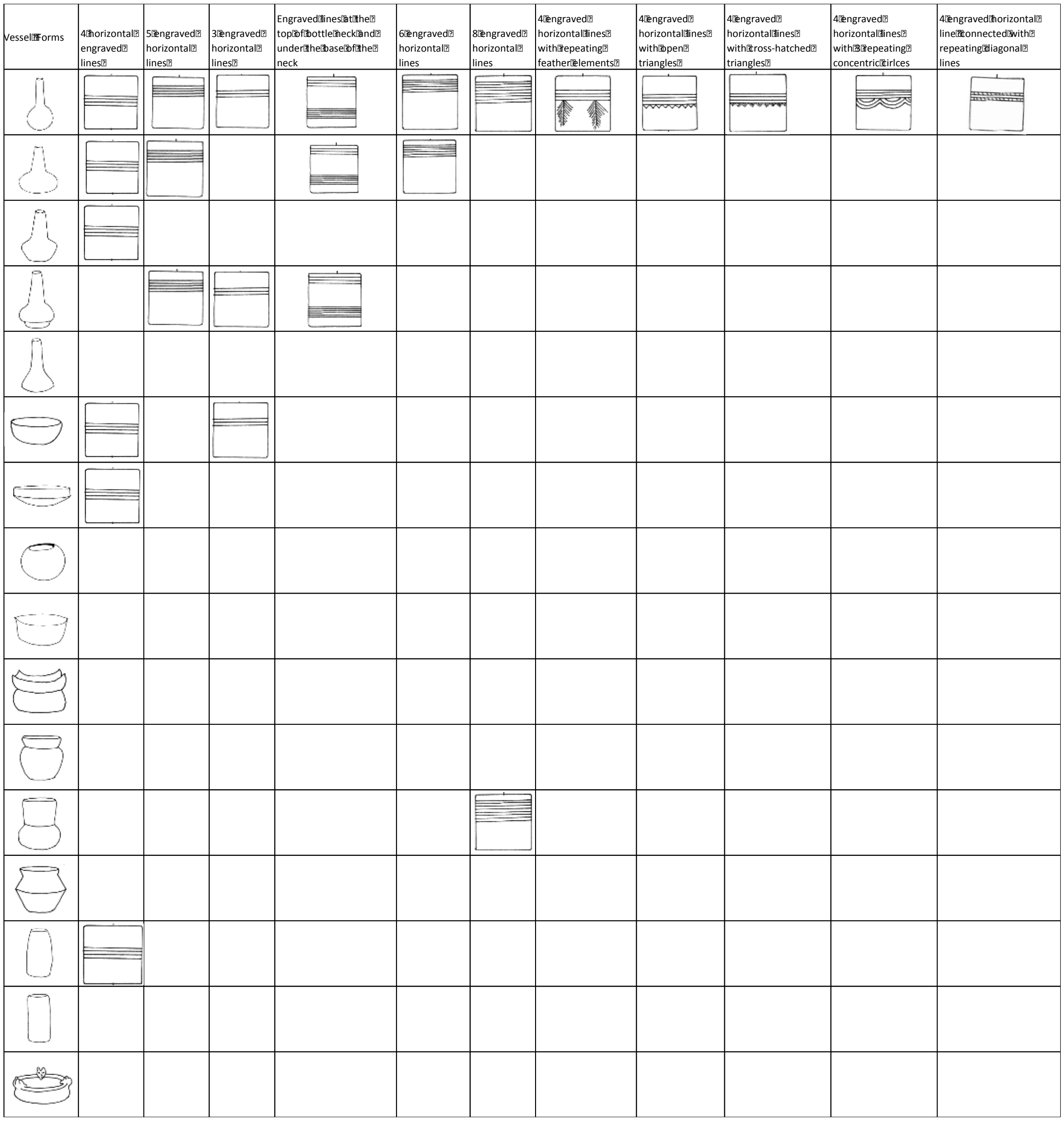


Figure 5.56. Hickory Engraved and vessel form correlations.

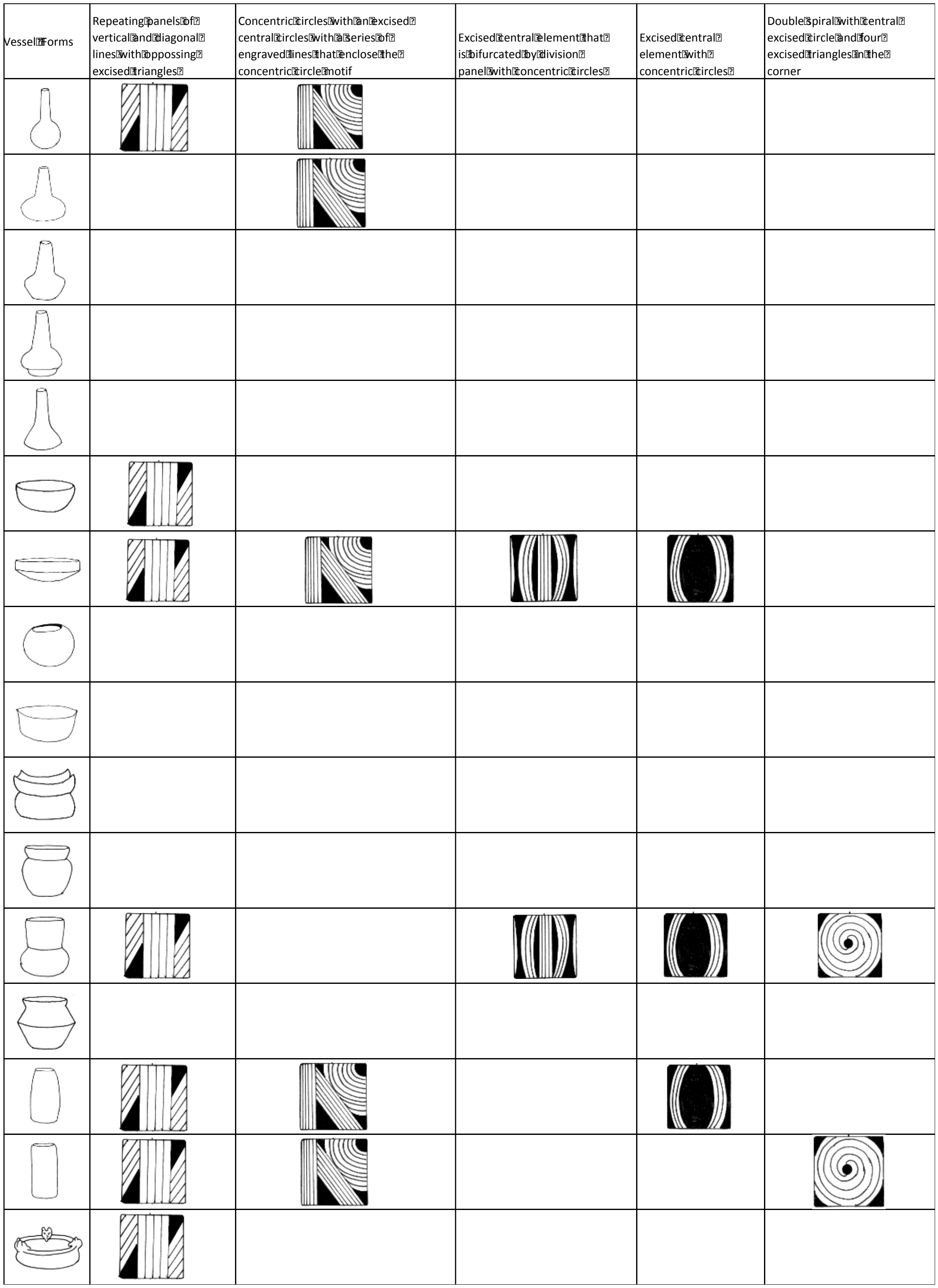


Figure 5.57. Holly Fine Engraved and vessel form correlations.

Crockett Curvilinear Incised and Vessel Form Relationship. There is also significant covariation between Crockett Curvilinear Incised and the vessel forms on which potters chose to execute them (see Figure 5.55). Out of the 24 motifs represented in this figure, 67 percent of the motifs (n=16) are executed on bowls and 33 percent of the motifs (n=8) are executed on jars. Crockett Curvilinear Incised designs are not present on any other vessel form types, indicating that these designs were only meant to be placed on specific vessels, perhaps for specific purposes. The most popular bowl form with a Crockett Curvilinear Incised design is the simple bow and the most preferred jar type was the tall necked jar. Perhaps there is a relationship between the design and vessel form is associated with the type of contents participants put in the vessels when used. Crockett Curvilinear designs were also executed on uncommon bowl types, such as scalloped rimmed (n=2) and gravy boat bowls (n=2), suggesting the design may have been used on vessels to serve a range of purposes.

Hickory Engraved and Vessel Form Relationships. As shown in Figure 5.56, there is also significant covariation between Hickory Engraved designs and the vessel form upon which potters chose to depict them. Of the 24 motifs represented in the figure, 80 percent (n=19) are represented on bottles. Like Spiro Engraved motifs, potters favored bottles to portray Hickory Engraved motifs. However, potters seemed to have chosen the simple bottle form for Hickory Engraved over other bottle form classes. Hickory Engraved motifs do occur on other vessel forms. Twelve percent of the motifs (n=3) are represented on bowls, 4 percent are represented on tall necked jars (n=1), and 4 percent are represented on beakers (n=1). All in all, Hickory Engraved and Spiro Engraved have a preference for embellishment on bottles, which strongly suggest a relationship between design, vessel form, and the contents that were poured into these bottles.

Holly Fine Engraved and Vessel Form Relationships. Holly Fine Engraved designs are portrayed on the complete range of primary vessel types (Figure 5.57). This is in strong contrast to Spiro Engraved, Crockett Curvilinear Incised, and Hickory Engraved motifs. There are no differences between vessel forms and motifs, as 16 percent of the motifs (n=3) are represented on bottles, 26 percent of the motifs (n=5) are represented on bowls, 21 percent of the motifs (n=4) are represented on jars, 31 percent of the motifs (n=6) are represented on beakers, and 5 percent of the motifs (n=1) are represented by a single effigy vessel.

One notable aspect of Holly Fine Engraved motifs are the most common designs found on beakers. Holly Fine designs are notable for stacked design panels. Beakers have a vertically elongated form, which make them well-suited for a stacked design. Another relationship between Holly Fine Engraved and beaker forms could be the nature of the contents that were put inside beakers when they were used. All things considered, Holly Fine Engraved motifs are depicted on multiple vessel forms but have the least amount of stylistic variation. This suggests Holly Fine Engraved motifs were put on vessels used for different social and ritual purposes. They were important mortuary items in the northern Caddo area, but at George C. Davis they were also important for cooking, serving, and holding liquids.

Variation between Design Type and Northern and Southern Caddo Areas

Northern and southern Caddo ceremonial sites include the same design types (Table 5.3). The frequency distributions of the design types are of interest here.

Southern Caddo ceremonial centers have two to three times as many vessels of each design type than do northern Caddo ceremonial centers. The most notable illustration of this is Holly Fine Engraved. Only one Holly Fine Engraved vessel was recovered from the northern Caddo area, while all others were recovered from each southern Caddo ceremonial center. No Spiro Engraved whole vessels came from the George C. Davis site, while Crenshaw has almost as many as all the other sites combined. This is similar to the distribution of Hickory Engraved vessels, as Crenshaw has 39 whole vessels, while all the other sites combined only have 25 whole vessels. These differential frequencies may indicate places where vessels are being produced and subsequently distributed from.

Table 5.3. Number of Whole Vessels Divided by Design Type and Site Location.

Northern Caddo Area	**Spiro Engraved**	**Hickory Engraved**	**Crockett Curvilinear Incised**	**Holly Fine Engraved**	**Total**
Reed	15	4	1	0	**20**
Spiro	12	4	7	0	**23**
Harlan	7	4	3	1	**15**
Norman	7	6	0	0	**13**
Total	**41**	**18**	**11**	**1**	**71**
Southern Caddo Area					
Crenshaw	29	39	22	11	**101**
George C. Davis	0	3	6	6	**15**
Boxed Springs	3	4	1	5	**13**
Total	**32**	**46**	**29**	**22**	**129**

Summary

The minimal number of design choices and overall stylistic variability in Formative Caddo fine wares revealed by this study may indicate only a few potters had the knowledge and skill to produce them. This also may suggest centralized areas of production. One principle discovered in this analysis is the orderly and hierarchical nature of design pathway sequences of Formative fine wares. It appears it was not just important for potters to reproduce the overall design, but essential that potters and novices learning the craft know the precise placement, or step-by-step decision-making process, for each engraved line. This suggests personal tutelage in learning the craft and may indicate that skilled artisans and their pupils were closely related.

Additional principles evident in this analysis were the limited set of secondary design choices and minimal stylistic variation between each decorative class that potters had at their disposal. When potters produced Spiro Engraved, Holly Fine Engraved, and Crockett Curvilinear Incised vessels, they had three primary design choices: excising, punctating, and feathering. Even within the basic Primary Design Motifs of each decorative type, design elements are significantly related, including spirals, concentric circles, and parallel lines. These design elements are commonly arranged symmetricity within design fields. Thus, design symmetry is one of the most fundamental principles of Formative Caddo fine ware production.

Potters also chose particular vessel forms on which to execute their designs. Spiro Engraved motifs are almost exclusively used on bottles, with a few exceptions. The vessel form itself should also be considered a type of motif since these forms were such a vital part of the design itinerary for the objects’ completion. This analysis shows that potters adhered to a fixed set of structural principles that continued to be an important aspect of Caddo pottery production hundreds of years after the emergence earliest Caddo fine wares.

CHAPTER 6: COMPOSITIONAL AND POINT DENSITY ANALYSIS OF FINE WARES

As discussed in Chapter 1, INAA has been used extensively in provenance studies of Southern Caddo ceramic assemblages (Perttula 2010). Applications of INAA in the Northern Caddo area are relatively recent. Wiewel's (2014) provenance study of Late Caddo communities in central Arkansas is the only other extensive INAA analysis from the Arkansas Valley. This study represents the first INAA study for the region and late pre-Columbian period. In this chapter, I discuss previous INAA research in the surrounding Caddo region, methods, and results of the compositional analysis. I then end the chapter with a kernel point density analyses to propose possible production locales of Formative Caddo fine wares.

Background on INAA Research in the Surrounding Caddo Region

Using compositional analyses to understand the organization of the production, exchange, and distribution of pre-Columbian pottery is an important method for archaeologists working in North America. Such studies ultimately expose issues of social complexity, social identity, social boundaries, multiethnic groups, different communities of practice, migrations, and the life histories of people and objects (e.g., Sassaman and Rudolphi 2001; Steponaitis et al. 1996; Wallis 2007, 2011). Archaeologists working in the Caddo area have examined production and exchange in regard to clay sourcing to determine the regional distribution of pottery (Perttula 2002; Perttula et al. 2003; Perttula and Ferguson 2010). Although archaeologists have examined ceramic production through INAA in the southern Caddo area, they have not focused on understanding the role of ceramic production and exchange in the emergence of a new religious worldview.

Archaeologists recognize that after A.D. 900, people produced and distributed several diagnostic ceramic styles throughout the Caddo area (Perino 1995). These vessels seem to have been traded to other cultural areas, such as groups in the American Bottom (O'Brien 1972), Lower Mississippi Valley (Lafferty 1994; Kidder 1998; Schambach 1999, 1997, 2000, 2001), and groups in the Southern Plains (Baugh 1998; Perttula 2001; Vehik and Baugh 1994). Two decades ago, "much of the ceramic evidence for prehistoric Caddoan exchange … has not been systematically compiled or studied" (Perttula et al. 1996:51). Since then, several INAA studies that have put archaeologists in a better position to confidently investigate the scope, timing, and direction of exchange between different communities of potters in the southern Caddo area. Archaeologists have accumulated a sizeable INAA dataset of Caddo sherds (n = 1308) from over 200 archaeological sites across the Gulf Coastal Plain region (Selden 2013; Selden et al. 2014). Samples have been taken from sites in Louisiana, southwest Arkansas, northeast Texas, and southeast Oklahoma. Overall, 11 chemical groups have been identified in the southern Caddo region (Figure 6.1).

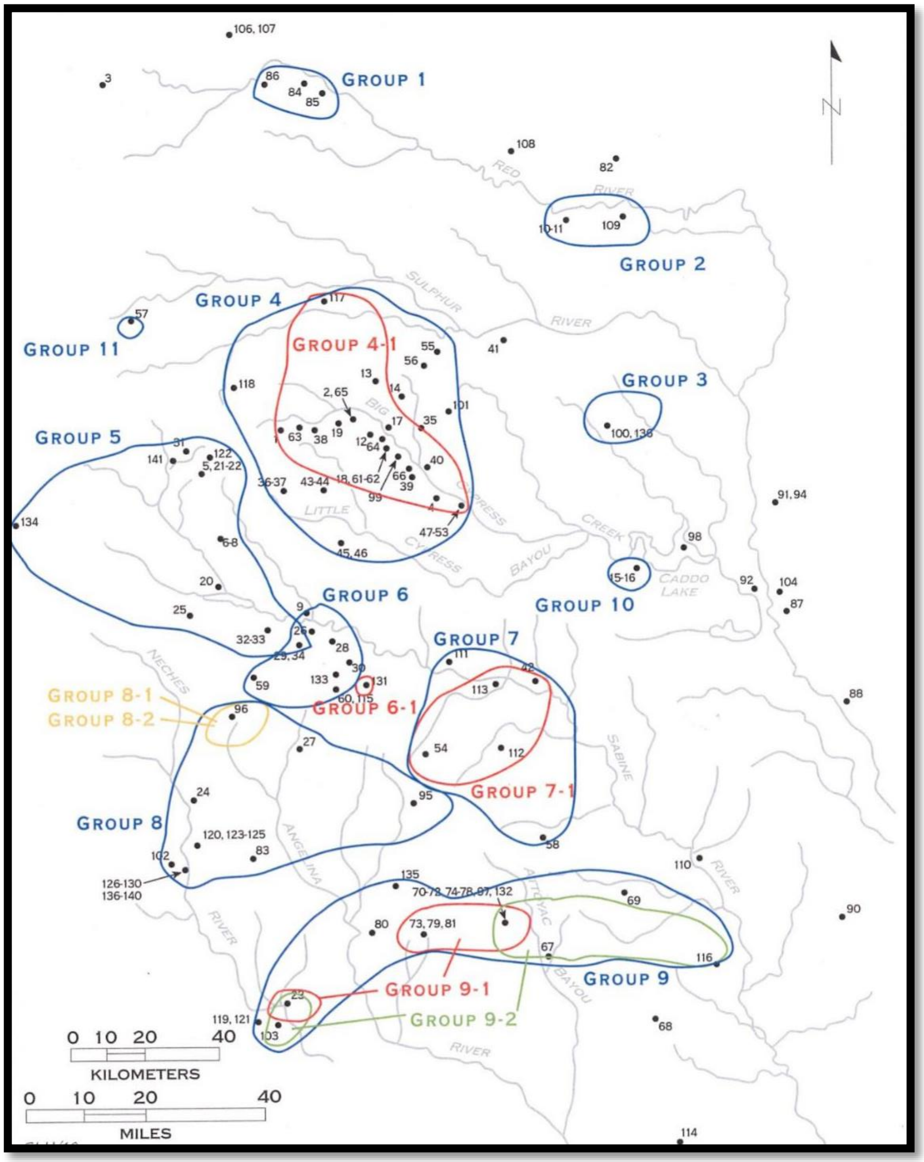


Figure 6.1 INNA compositional groups in the southern Caddo area (adapted from Perttula and Selden 2013, Figure 1).

INAA Analysis of the Southern Caddo Area

One of the first INAA analyses of the Caddo area began with 22 sherds processed by the National Institute of Standards and Technology (NIST). This analysis was one of the first regional-scale INAA studies in the southeast (Steponaitis et al. 1996). During the late 1990s, the University of Missouri's Research Reactor Center (MURR) began to conduct INAA research on Caddo pottery. Once enough samples were analyzed to gain a better understanding of manufacturing loci, archaeologists began to answer questions concerning trade and exchange of Caddo ceramics on a regional and interregional scale. Evidence for production locales and non-local ceramics came from 66 Woodland and Caddo sherds from the Hurricane Hill site (41HP106), Mockingbird site (41TT550), and the Oak Hill Village site (41RK214) (Neff et al. 1996, 1998). Perttula (2000a) analyzed one Holly Fine Engraved sherd recovered from the Audrey site, an early Mississippian site (A.D. 1050) on the Illinois River in the state of Illinois. He revealed that that the sherd was produced in northeast Texas, supporting the notion of exchange between Formative Caddo communities and Lower Illinois Mississippian groups. Evidence from other INAA studies shows the Caddo exchanged fine wares with groups from central Kansas (Perttula 2000b, 2002), and within the Caddo area among groups in northeast Texas, southwest Arkansas, and southeast Oklahoma (Selden 2013). An INAA analysis of fine wares from the Hatchel site (41BW3) indicated every sample was locally manufactured (Speakman and Perttula 2003). Descantes et al. (2004) conducted an INAA investigation of pottery from the George C. Davis site in east Texas along the Neches River. INAA was performed on 50 Formative Caddo sherds from five utility and fine ware ceramic types. All of the

George C. Davis sherds had the same geochemical signatures of clays from the Neches River Basin. The reasonable conclusion was that most, if not all, of the Davis ceramics were locally made and not imported (Descantes 2004:134-135). The INAA studies presented here showcase considerable work in the southern Caddo area over the last 15 years. The results of these investigations have shown that clay paste sourcing, while difficult, has had some success in the southern Caddo area, "with some evidence for the exchange of vessels from one group to another in different basins" (Perttula 2013a:205).

INAA Analysis in the Northern Caddo Area and its Implications

As Perttula and Selden (2013:95) emphasized, the majority of sherds subjected to INAA have been from Caddo sites in east Texas and southeastern Oklahoma. Applications of INAA north of the Ouachita Mountains are comparatively few and relatively recent. Wiewel's (2014) INAA research of Late Caddo communities in the Central Arkansas Valley showed associated ceramics were locally-made, not imports from the Southern Caddo area. It is important to begin our efforts to understand the compositional makeup of Formative Caddo ceramic assemblages in neighboring river basins. If early fine ware ceramics were produced in the northern Caddo region, they will be chemically distinguishable from ceramics produced in the southern Caddo region. This is because formative sites in the northern Caddo area are in different physiographic zones, including the Ozark Plateau and Arkansas Basin, while formative sites in the southern Caddo area are located in the Gulf Coastal Plain and Ouachita Mountain regions (Figure 6.2). For over 20 years, Tim Perttula and Robert Selden have implored others to consider conducting INAA research in other parts of the Caddo area (Perttula 2001; Perttula and Selden 2013). Such research in the Arkansas Basin would

(1) clarify how ceramics moved across the Caddo landscape in time and space, (2) would help to locate other production areas and produce more refined compositional groups, (3) aid in understanding the nature of Caddo exchange and interaction, (4) illuminate developments and changes in local and long-distance social networks of exchange, and (5) provide archaeologists working in other regions more data to utilize for their own research. All in all, the information that can be collected from the proposed INAA investigation has the potential to address these questions and research issues.

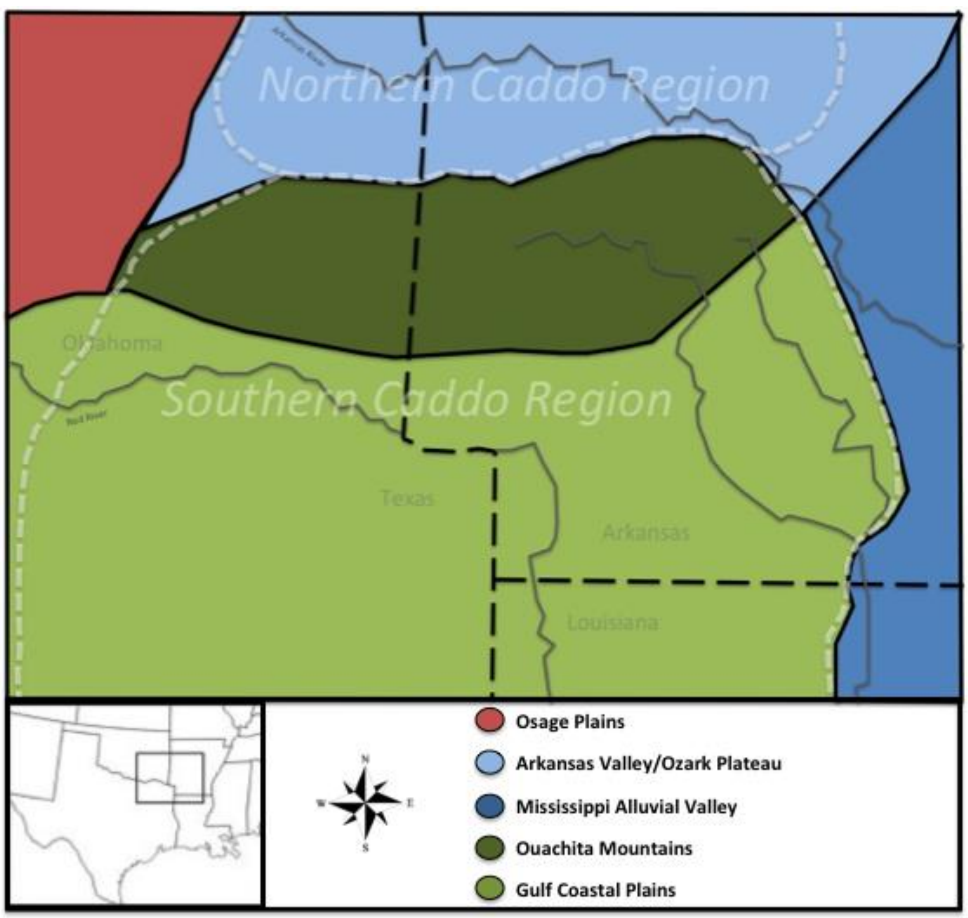


Figure 6.2. Physiographic regions of the northern and southern Caddo area.

Methods

To determine whether Formative Caddo fine wares were locally-made at ceremonial sites in the Arkansas Valley, existing ceramic assemblages from 5 Arkansas Basin mound sites were sampled for INAA and compared with southern Caddo INAA data from southeastern Oklahoma, east Texas, and northwest Louisiana. These samples were sent to University of Missouri Research Reactor (MURR) for INAA. Only specimens from sherds were used for this study. All designs on each sherd remained fully intact after samples were taken. No whole vessels (approximately 65% of the Arkansas Valley formative fine ware assemblage) were used for INAA. Future samples used for INAA may result in different compositional and statistical outcomes. This research however utilized every possible formative fine ware sherd at each ceremonial center. Destructive analyses on whole vessels will probably never be conducted because of their cultural and research significance. This study may constitute the one and only compositional study of formative fine wares, at least until a method is invented to get high-resolution compositional data from whole vessels via a non-destructive method. I am confident trends captured in this study are statistically significant. The analysis highlights more nuanced patterns of Formative Caddo ceramic production and evidence for long-distance exchange between two separate Caddo communities of practice. These results can be used in numerous future studies to help further our understandings of emerging Caddo ritual complexity.

Sample Selection

A total of 90 INAA fine ware specimens came from five Arkansas Valley ceremonial sites: Spiro (n = 27), Harlan (n = 28), Norman (n = 17), Brackett (n = 14), and Reed (n = 4) (Table 6.1). Formative Caddo fine ware sherds were recovered from mortuary contexts at each site during previous excavations and utilized in this study with the permission of the Caddo and Wichita and Affiliated Tribes of Oklahoma (see Appendix A). To produce the Arkansas Valley baseline group, an additional 116 utility ware specimens were selected for INAA (Table 6.2). The utility wares were chosen following the "criterion of abundance" strategy (e.g., Bishop et al. 1982) in which production locations are assumed based on their ubiquity at each site. The relative abundance of utility wares, like Williams Plain and Leflore Plain, their thickness, and vessel size most likely reflect locally-made wares. This method has been the standard and most effective way to generate a robust reference group (Triadan 1997; Zedeňo 1994). Each utility ware sherd was chosen from different archaeological contexts to ensure they did not belong to the same vessel.

Additionally, I draw on the INAA results of 212 samples from 21 southern Caddo sites analyzed from previous projects to generate a southern Caddo baseline group (Perttula and Ferguson 2010; Perttula et al. 2017) (Table 6.3). The southern Caddo ceramic samples were chosen because they are (1) grog-tempered, (2) temporally concurrent with the Arkansas Valley sites, and (3) chemically verified as locally-made wares. Table 6.3 provides a summary of the Northern and Southern Caddo samples analyzed for this study.

Table 6.1. Formative Fine Ware Sherds Selected for INAA.

Site Name	Vessel Type	No. of sherds for INAA
Spiro	Spiro Engraved	19
	Holly Fine Engraved	1
	Hickory Engraved	3
	Crockett Curvilinear	4
Harlan	Spiro Engraved	13
	Holly Fine Engraved	1
	Hickory Engraved	3
	Crockett Curvilinear	11
Norman	Spiro Engraved	12
	Holly Fine Engraved	0
	Hickory Engraved	5
	Crockett Curvilinear	0
Brackett	Spiro Engraved	10
	Holly Fine Engraved	0
	Hickory Engraved	1
	Crockett Curvilinear	3
Reed	Spiro Engraved	3
	Holly Fine Engraved	0
	Hickory Engraved	1
	Crockett Curvilinear	0
Total INAA Samples		**90**

Table 6.2. Utility sherds selected for INAA.

Site Name	Vessel Type	No. of sherds for INAA
Spiro	Williams Plain	32
Harlan	Williams Plain	20
Brackett	Williams Plain	26
Norman	Williams Plain LeFlore Plain	11 10
Reed	Williams Plain	17
Total INAA Samples		**116**

Table 6.3. Sherd samples selected for INAA (Southern Caddo INAA data produced by Perttula 2010).

Context	Site No.	Sample Description
Eastern Oklahoma Northern Caddo Area	Spiro (34LF40)	27 fine wares 32 utility wares for Arkansas Valley reference group
	Harlan (34CK6)	28 fine wares 20 utility wares for Arkansas Valley reference group
	Brackett (34CK43)	14 fine wares 26 utility wares for Arkansas Valley reference group
	Norman (34WG2)	17 fine wares 21 utility wares for Arkansas Valley reference group
	Reed (34DL1)	4 fine wares 17 utility wares for Arkansas Valley reference group
East Texas Southern Caddo Area	41FK107	5 sherds for Southern Caddo reference group
	41LR2	7 sherds for Southern Caddo reference group
	41WD51	7 sherds for Southern Caddo reference group
	41WD575	3 sherds for Southern Caddo reference group
	41WD573	2 sherds for Southern Caddo reference group
	41WD577	10 sherds for Southern Caddo reference group
	41UR30	3 sherds for Southern Caddo reference group
	41BW171	6 sherds for Southern Caddo reference group
	41TT650	5 sherds for Southern Caddo reference group
	41HS407	4 sherds for Southern Caddo reference group
	41HS240	4 sherds for Southern Caddo reference group
	41CP25	5 sherds for Southern Caddo reference group
	41CP525	10 sherds for Southern Caddo reference group

	41WD46	8 sherds for Southern Caddo reference group
	41CE19	80 sherds for Southern Caddo reference group
	41SM273	21 sherds for Southern Caddo reference group
NW Louisiana Southern Caddo Area	16CD12	6 sherds for Southern Caddo reference group
	16NA587	5 sherds for Southern Caddo reference group
	16BO327	5 sherds for Southern Caddo reference group
	16CD218	5 sherds for Southern Caddo reference group
	16DS268	11 sherds for Southern Caddo reference group
Total INAA Sample	**418**	

It was important to choose sherds from southern Caddo contexts contemporaneous to the Arkansas Basin ceremonial sites. Previous INAA studies of southern Caddo ceramics suggest that as time passes and people move across the landscape for resettlement, potters changed their clay sources. (Creel et al. 2012; Selden 2013). As discussed earlier, detecting variation between clay sources in the Southern Caddo area has been difficult and sometimes impossible due to the homogeneity of Coastal Plain alluvial clays. I omitted Poteau Plain sherds that were selected for INAA in the statistical analysis because that is not my time period of interest. Poteau Plain is a shell tempered ware that arrived in the Arkansas Valley post A.D. 1200 (Bell 1984; Brown 1996). Overall, I concentrated on southern Caddo ceramic assemblages that are contemporaneous with the Arkansas Valley sites because it may capture Formative Caddo potters who used the same clay sources that produced the fine wares.

Other limitations affected the number of pottery samples submitted for INAA. In order to obtain permission from the Caddo Nation, Wichita and Affiliated Tribes, and the Sam Noble Museum of Natural History, there were certain restrictions in place. Due to their rarity and context in the Arkansas Valley, no whole vessels were selected for INAA. In addition, when sherds were chosen for INAA, decorative embellishments had to be completely preserved. Sherds were not chosen for INAA if the sampling damaged any designs. The destruction of highly decorated sherds would also adversely affect future stylistic studies. In other cases, eligible sherds selected for INAA were dexterously broken off with pliers. After each sample was taken, the pliers were cleaned to decrease the chances of cross-contamination. MURR also has techniques in place that further decrease the chances for potential contamination.

Arkansas Valley Sherd Data

Because INAA is a destructive method, each sherd was meticulously documented prior to undergoing the analysis. Selected sherds were photographed and descriptions recorded, which included weight, thickness, temper, paste characteristic (i.e., temper size, Munsell color, and hardness), vessel form when applicable, and design type. (see Appendices A). Contextual information was also recorded, which included provenience, collector, excavator, and curation facility.

INAA Sample Preparation

Sherd samples were prepared for INAA using standard procedures at MURR. 1 cm^2 pottery fragments are removed and abraded by using a silicon carbide burr which removes added pigments, slips, and/or glazes. Deionized water is then used to remove any adhering soils reducing the chances of post-depositional contamination. After each specimen is dried, they are ground into a fine powder in an agate mortar. Leftover specimens are archived for future research.

MURR utilizes two different irradiation methods for each specimen. The first involves a short irradiation, whereby 150 mg of powder is placed into high-density polyethylene vials. The second method is a long irradiation, whereby 200 mg of each sample is placed into high-purity quartz vials. Each sample is then weighed to the nearest 0.01 mg using an analytical balance. The samples undergo a series of standards created by the National Institute of Standards and Technology (NIST) certified standard reference materials of SRM-1633b (coal fly ash) and SRm-688 (basalt rock) were similarly prepared, SRM-278 (obsidian rock) and Ohio Red Clay. These standards allow MURR's instruments to detect any inaccuracies and ensure standardization across all samples.

Collecting Chemical Data with INAA

In order for MURR and other INAA laboratories to detect a large spectrum of elements with differing decay schemes, samples are subjected to two irradiations and three gamma counts on high purity germanium detectors (Glascock 2002; Neff 1992, 2000). The samples in this study were subjected to a short irradiation through a pneumatic tube irradiation system. A neutron flux of 8×10^{13} n $cm^{2}s^{1}$ irradiated each sample in polyethylene vials and were subjected to 720-second count that yielded nine elements. For seven days, the samples were allowed to decay before being counted for 1,800 seconds. This technique yielded another seven medium half-life elements. The samples were allowed an additional three-week decay and a final 8,500 second count was conducted for each sample. This final technique allowed MURR to detect 17 long half-life elements. INAA tabulates each of these elemental concentrations in parts per million. Overall, 33 elements were detected for this study.

None of the sherds included in this analysis contained any shell, since sherds with shell temper can pose many analytical problems that need to be resolved before data interpretations can begin. Shell is comprised primarily of calcium, thereby increasing the amount of the element during INAA. Most researchers use Cogswell et al. (1998) mathematical correction that compensates the effects of shell in clay pastes. The primary temper in 98% of this assemblage was grog. The other 2% contained a mixture of grog and bone or grog and grit. Still, calcium was not considered during statistical analysis. Raw chemical data for the elements were transformed to base-10 logarithms by MURR before statistical analysis began.

Interpreting Chemical Data

The primary goal of INAA is to identify discrete homogenous groups or clusters through the use of multivariate analyses (for more information see Baxter and Buck 2000; Bieber et al. 1976; Glascock 2002; Neff 2000). Clay sources are so ubiquitous it would be impossible to determine all sources (Steponaitis et al. 1996). Variations can be observed by comparing two or more known reference groups (i.e., known locally-made pottery or raw clay sources) with specimens of unknown provenience (i.e., Formative Caddo fine wares in this study). As Glascock (1992:16) stated:

> Compositional groups can be viewed as ‘centers of mass’ in the compositional hyperspace described by the measured elemental data. An individual group is characterized by the location of its centroid and the unique correlations of the element concentration with one another. Assignment of a specimen to a group is then determined by the overall probability that its measured concentrations of elements could have come from that group.

Multivariate statistics, such as principal components analysis (PCA), discriminant analysis, and/or cluster analysis, are the preferred techniques used for recognizing patterns in the chemical data. One of these techniques may be preferred over another. For the goals of this research, PCA, discriminant analysis, and cluster analysis are employed.

It is always a challenge to make sense of large archaeological and geological chemical datasets, especially if there are a large number of variables. PCA reduces many variables down fewer so data can be visualized to highlight variation and show patterns in the archaeological data. It is a technique used to partition a dataset or observe groupings in data (Glascock 1992).

A discriminate analysis compares unknown data points (i.e., formative fine wares) to known reference groups (i.e., Arkansas Valley utility wares and locally-made Southern Caddo ceramic data) to determine statistical proximity. In this study a Mahalanobis distance was used to figure group membership and discriminates between two or more groups[1]. The result is the discriminant analysis takes the new set of data and classifies each specimen into one or both of the known reference groups.

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[1] The Mahalanobis distance of a specimen from a group centroid (Bieber et al. 1976, Bishop and Neff 1989) is defined by:

$$D^2 = [\, y - X \,]^t I \,[\, y - X \,]$$

where *y* is the 1 x m array of logged elemental concentrations for the specimen of interest; *X* is the n x m data matrix of logged concentrations for the group to which the point is being compared with *X* being its 1 x m centroid, and I_x is the inverse of the m x m variance-covariance matrix of group *X* (from Wiewel 2014:75).

Results

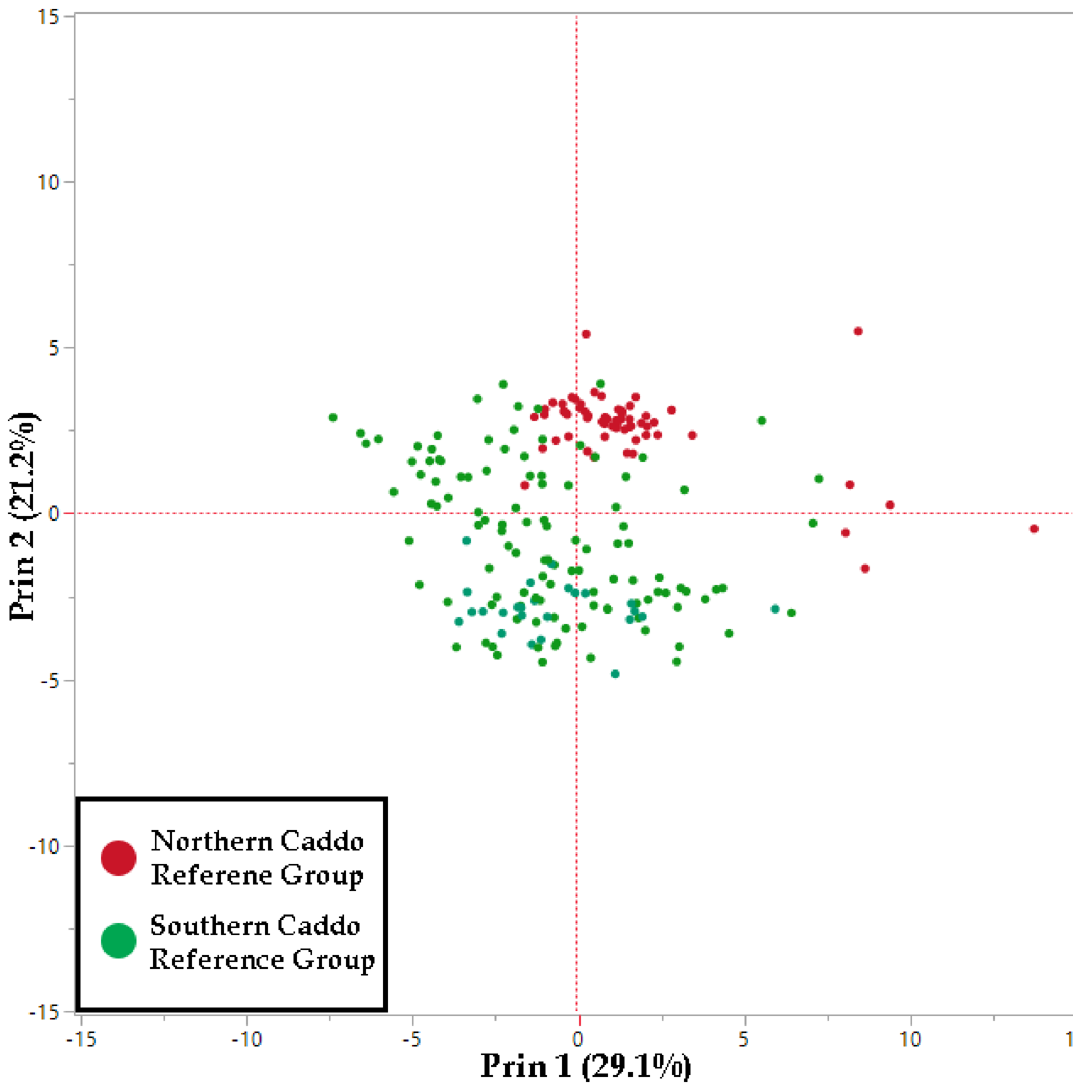
A first step in this statistical study is to use principal component analysis (PCA) to explain compositional variations between locally-made utility ware sherds from northern and southern Caddo sites. Then I determine which elements account for the variation between the two geographic reference groups. Next, I compare the unknown Arkansas Valley fine ware group with the two known reference groups to see whether fine wares have geochemical relationships with the northern or southern Caddo areas. Then, a discriminant analysis (DA) is used as an analytical tool to support the findings of the PCA to understand the group membership of the Arkansas Valley fine ware group. Finally, I discuss and examine the implications of high rates of sodium in the southern Caddo reference group and Arkansas Valley fine ware group.

Arkansas Valley and Gulf Coastal Plain Region Comparison

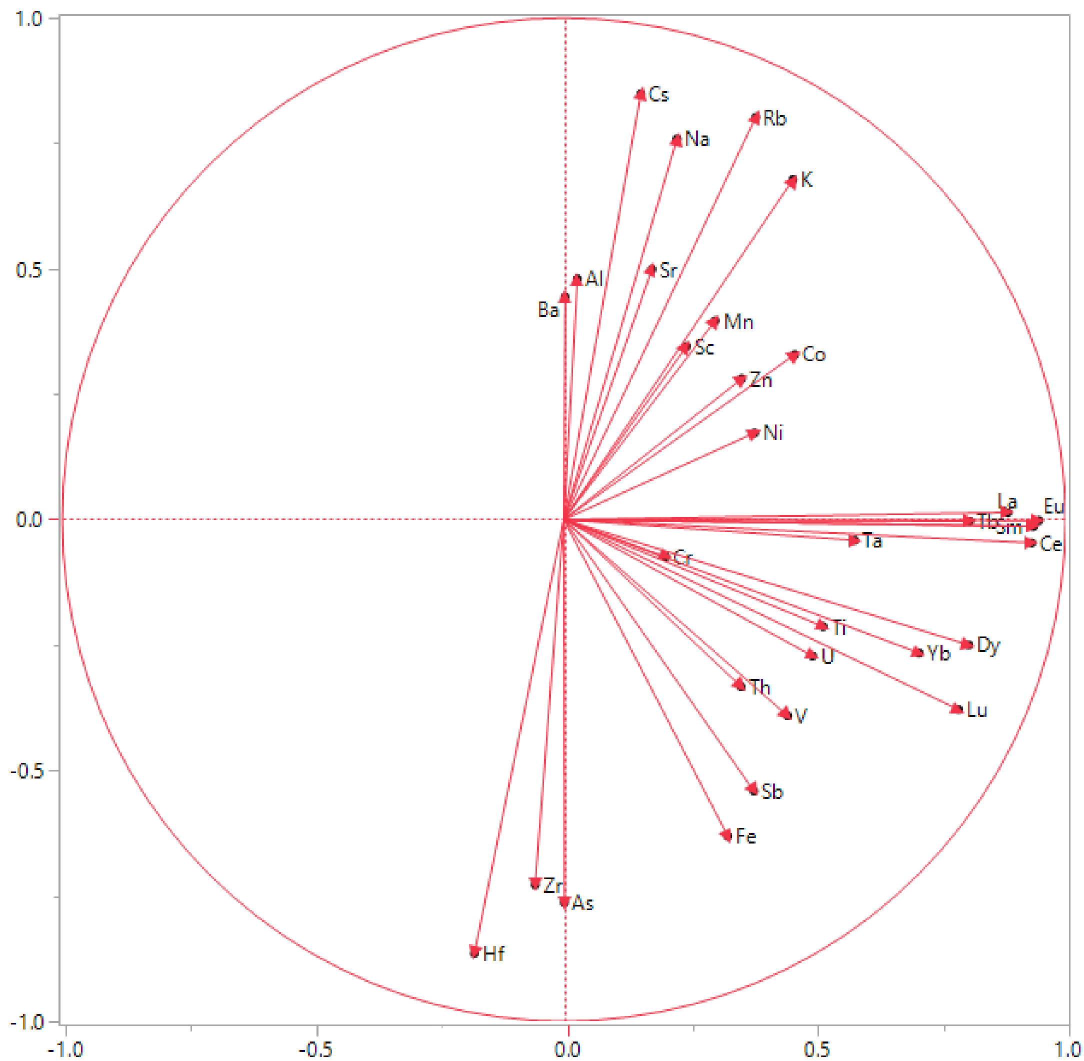
Overall, 33 major and minor elements were captured by INAA.[2] I first generated a multivariate scatterplot matrix of 32 of the 33 elements, excluding calcium, to observe which elements explained the most variation between Gulf Coastal Plain and Arkansas Valley locally-made sherds (Figures 6.3-6.4). Although none of the specimens used for INAA had shell temper, there is still a possibility the pulverized vessels potters used for their temper contained shell. As shown in Figure 6.3, there is not a significant amount

[2] Elements captured in INNA: As (arsenic), La (lanthanum), Lu (lutetium), Nd (neodymium), Sm (samarium), U (Uranium), Yb (ytterbium), Ce (cerium), Co (cobalt), Cr (chromium), Cs (cesium), Eu (europium), Fe (iron), Hf (hafnium), Ni (niobium), Rb (rubidium), Sb (antimony), Sc (scandium), Sr (strontium), Ta (tantalum), Tb (terbium), Th (thorium), Zn (zinc), Zr (zirconium), Al (aluminum), Ba (barium), Ca (calcium), Dy (dysprosium), K (potassium), Mn (magnesium), Na (sodium), Ti (titanium), V (vanadium)

of overlap between the northern and southern Caddo reference groups, even with the input of 32 elements. This means it is likely two or more elements can be used to geochemically distinguish the two regions.



Figures 6.3. PCA bivariate plot of the first two principal components of 32 elements showing regional variation among Arkansas Basin and Gulf Coastal Plain locally-made specimens.



Figures 6.4. First two principal components of 32 elements showing elemental variation among Arkansas Basin and Gulf Coastal Plain locally-made specimens.

I produced another PCA scatterplot to illustrate the primary elements that account for the variation between the northern and southern reference groups (Figure 6.5). As shown in Figure 6.5, Sodium (Na), Potassium (K), Zirconium (Zr), Hafnium (Hf), Arsenic (As), Rubidium (Rb), and Cesium(Cs) are the primary elements that vary between the two regions. The first two principal components explain 72% of the variance for each sample.

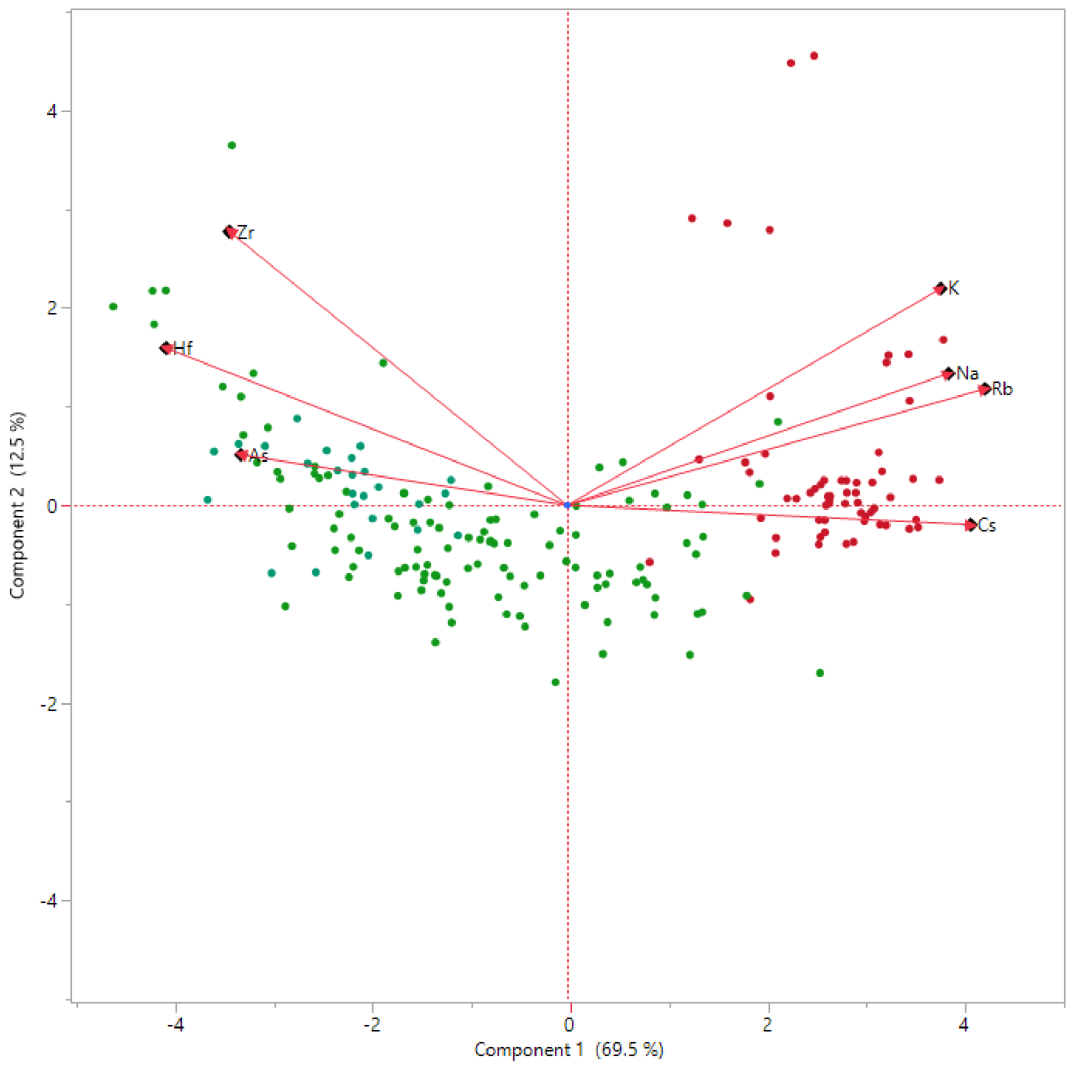


Figure 6.5, PCA showing the elements responsible for distinguishing between the northern and southern Caddo reference groups.

I then used these seven elements to examine the variation between the two reference groups. I produced a scatterplot with 90% confidence ellipses to visually represent the group membership between the southern and northern Caddo reference groups (Figure 6.6). The PCA produced very strong results. As shown in Figure 6.6, the seven elements produced two discrete compositional clusters showing the chemical variability between northern and southern Caddo ceramics. These findings showcase there are meaningful geochemical differences between locally-made sherds in the Arkansas Basin and locally-made sherds in the Gulf Coastal Plain region.

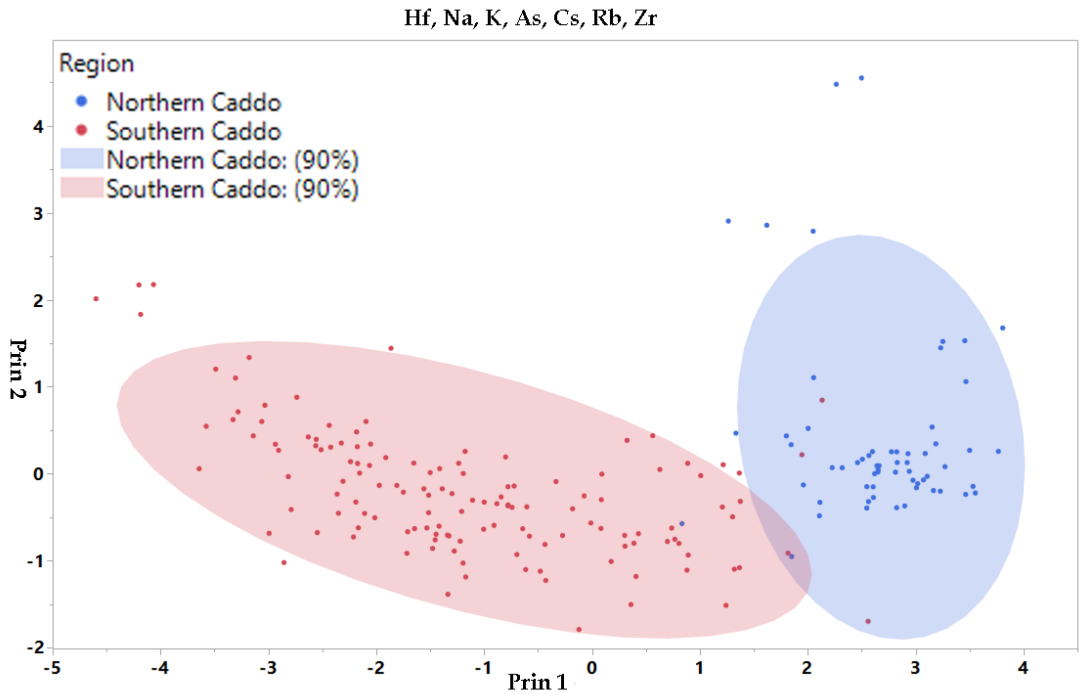


Figure 6.6. Biplot of the first two principal components of Hafnium (Hf), Zirconium (Zr), Rubidium (Rb), Arsenic (As), Cesium (Cs), Sodium (Na) and Potassium (K). Ellipses represent 90% confidence level for group membership.

A PCA plot of sodium (Na) and Potassium (K) reveals even stronger discrete clusters of northern and southern Caddo specimens, with the southern Caddo reference group having higher levels of sodium (Na) and potassium (K) (Figure 6.7). Overall, two distinct composition groups are recognized within the chemical data from the southern and northern Caddo reference groups.

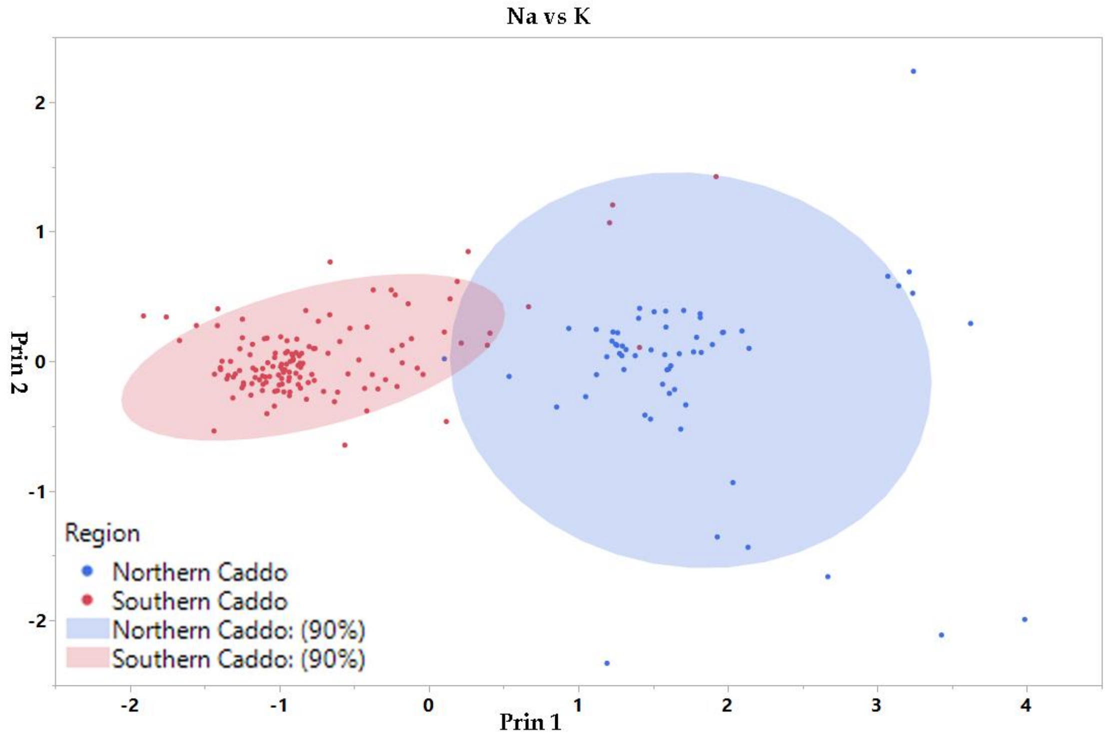


Figure 6.7. Biplot of the first two principal components of Sodium (Na) and Potassium (K). Ellipses represent 90% confidence level for group membership.

Internal Data Patterns in the Arkansas Valley Reference Group

While all the sherds assigned to the Arkansas Valley reference are statistically separated from the Gulf Coastal Plain reference group, it is worthwhile to examine the variation in the distribution of sites within the Northern Caddo Area. As I have mentioned above, Gulf Coastal Plain specimens were obtained from the George C. Davis site along the Neches River and other early Caddo sites in northeast Texas, northwest Louisiana, and southeast Oklahoma. The tight clustering of the Gulf Coastal Plain specimens reaffirms the challenges archaeologists face trying to observe variation in the southern Caddo area (Selden et al. 2014). However, there seems to be much more internal variability among Arkansas Valley specimens and appear to be site specific (Figures 6.8-6.10).

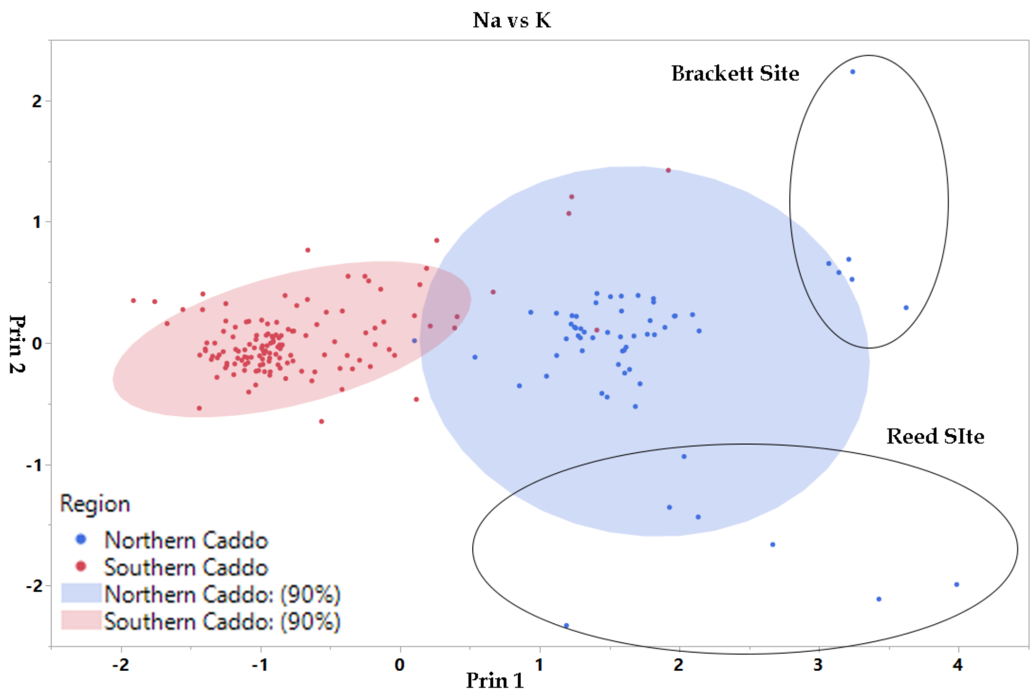


Figure 6.8. Biplot of the first two principal components of Sodium (Na) and Potassium (K) showing outliers as being site specific. Ellipses represent 90% confidence level for group membership.

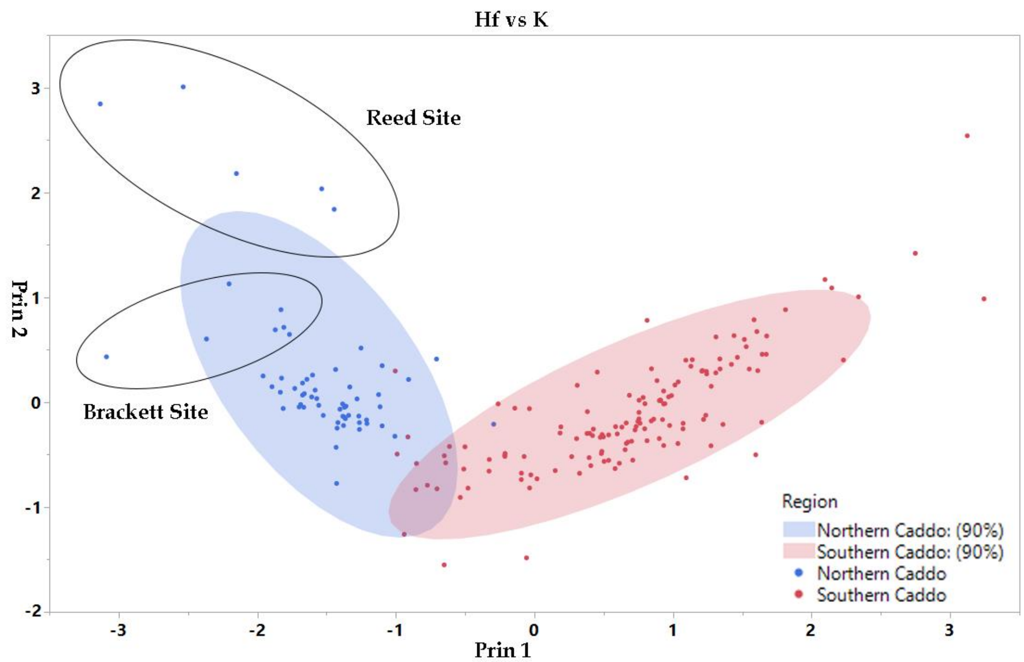


Figure 6.9. Biplot of the first two principal components of Hafnium (Hf) and Potassium (K) showing outliers as being site specific. Ellipses represent 90% confidence level for group membership.

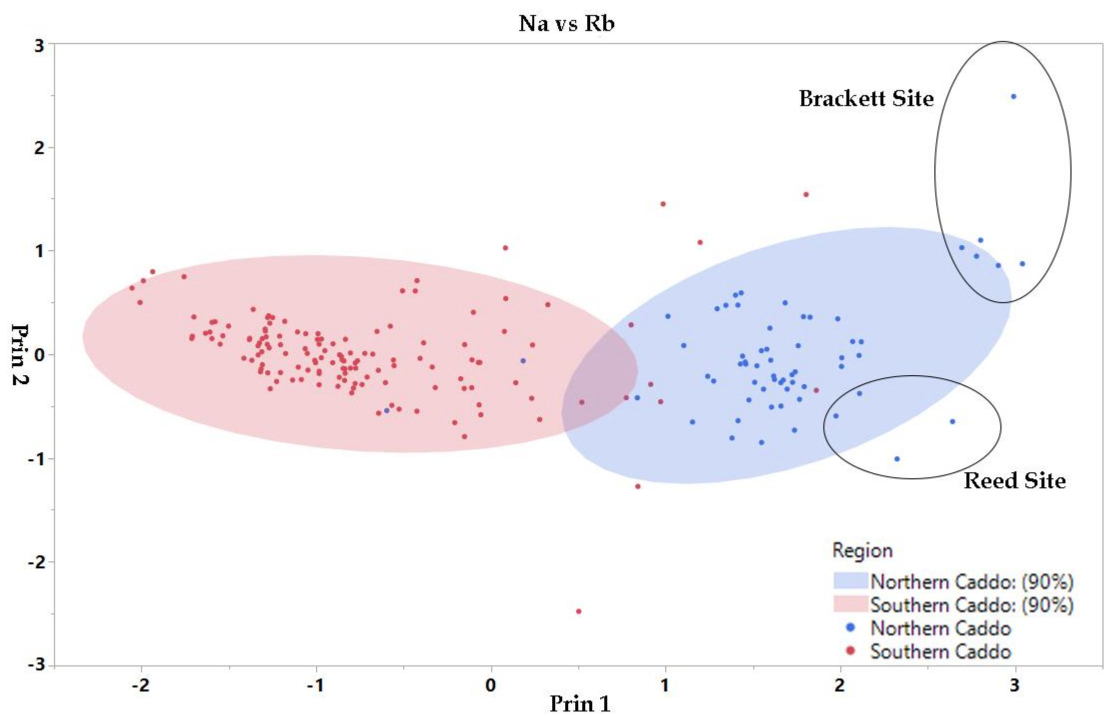


Figure 6.10. Biplot of the first two principal components of Rubidium(Rb) and Sodium (Na) showing outliers as being site specific. Ellipses represent 90% confidence level for group membership.

As shown in Figures 6.8-6.10, there are two outlying clusters outside the greater Arkansas Valley reference group. The sites that represent these two clusters are the Brackett site (34CK43) and the Reed site (34DL4). This is most likely the result of variation in clay sources within the Arkansas Valley. Reed and Brackett are on the edge of the Arkansas Valley along the Neosho/Grand River drainage, while the other northern Caddo sites, Spiro, Norman, and Harlan are along the Arkansas River (Figure 6.11). Thus it appears that Reed and Bracket have different Rb, Na, K, and Hf levels than locally-made ceramics at Spiro, Harlan, and Norman. This may indicate future compositional analyses could be conducted to detect variability in the clay pastes of pottery within and between Arkansas Valley sites.

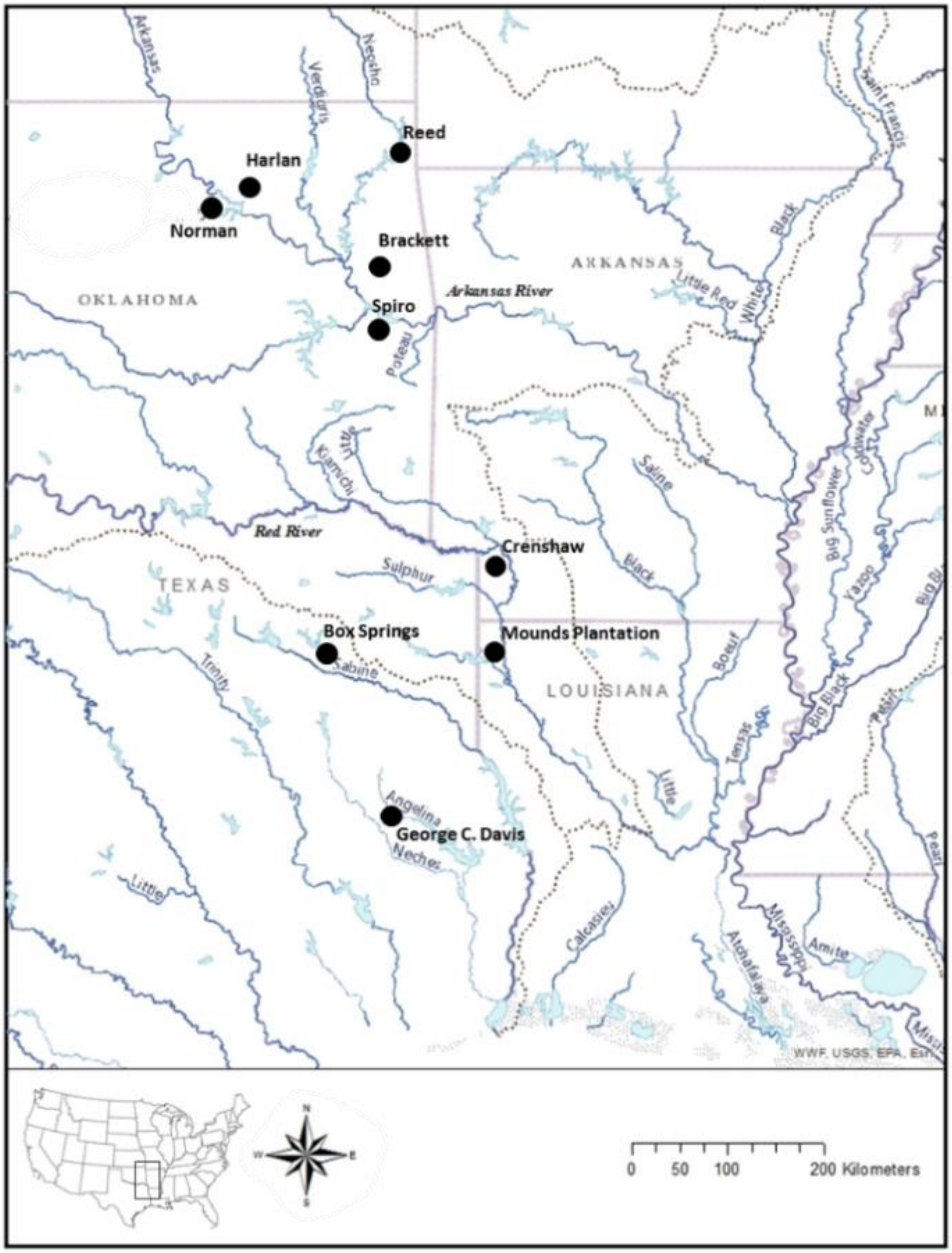


Figure 6.11. Location of Formative Caddo ceremonial centers.

Locating Production Locales of Formative Fine Wares

I have shown there are multiple elemental groups that can partition the geochemical data between the northern and southern groups, which are demonstrably chemically distinct. Now I attempt to assign the Formative Caddo fine wares (unknown samples) with the two known reference groups to identify their particular production locales. I produced several biplots using different elemental groups to determine whether Arkansas Valley fine wares are more geochemically similar to the northern Caddo or the southern Caddo groups. The resulting compositional variability showed promising results.

I first generated a multivariate scatterplot matrix of 32 of the 33 elements, excluding calcium, to observe which element(s) sourced the Arkansas Valley fine ware group (Figure 6.12). As shown in Figure 6.12, there is not a significant amount of overlap between the Arkansas Valley fine wares and the northern Caddo reference group, even with the input of 32 elements. This shows the likelihood that two or more elements can be used to geochemically distinguish the two regions and source Arkansas Valley fine wares.

The results of the PCA show two ways to source Arkansas Valley fine wares. One principle component plot shows that Barium (Ba), Zirconium (Zr), Potassium (K), Rubidium (Rb), Arsenic (As), Hafnium (Hf), Cesium (Cs) and Sodium (Na) are the key elements in sourcing the origins of the Arkansas Valley fine wares (Figures 6.13-6.14). Another biplot of the first two principal components of sodium (Na) and Potassium (K), reveals a significant geochemical relationship between Arkansas Valley fine wares and the southern Caddo reference group (Figure 6.15).

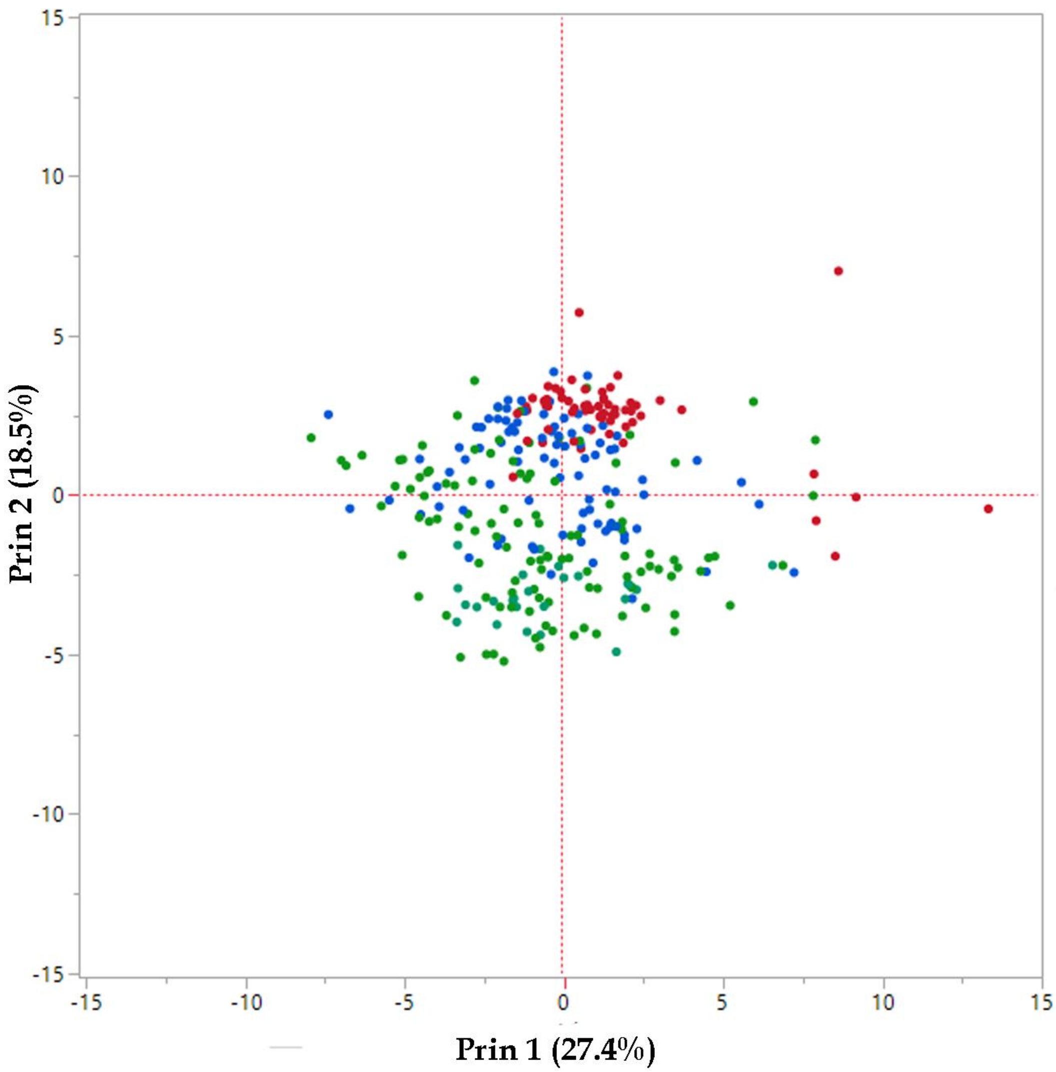


Figure 6.12. Biplot of the first two principal components along with the relative influence of each of the 32 elemental variables.

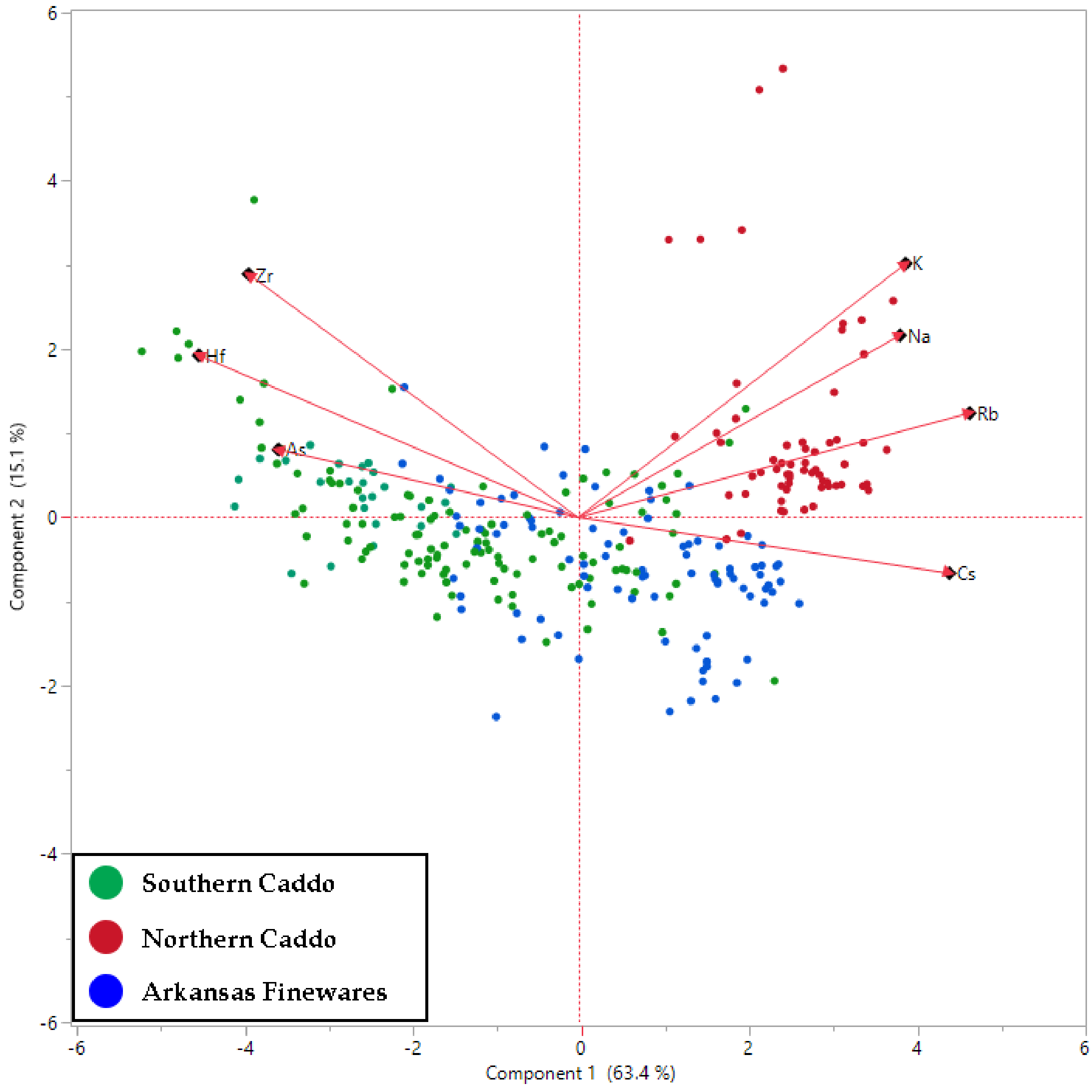


Figure 6.13. PCA showing the seven elements responsible for distinguishing between the northern and southern Caddo reference groups.

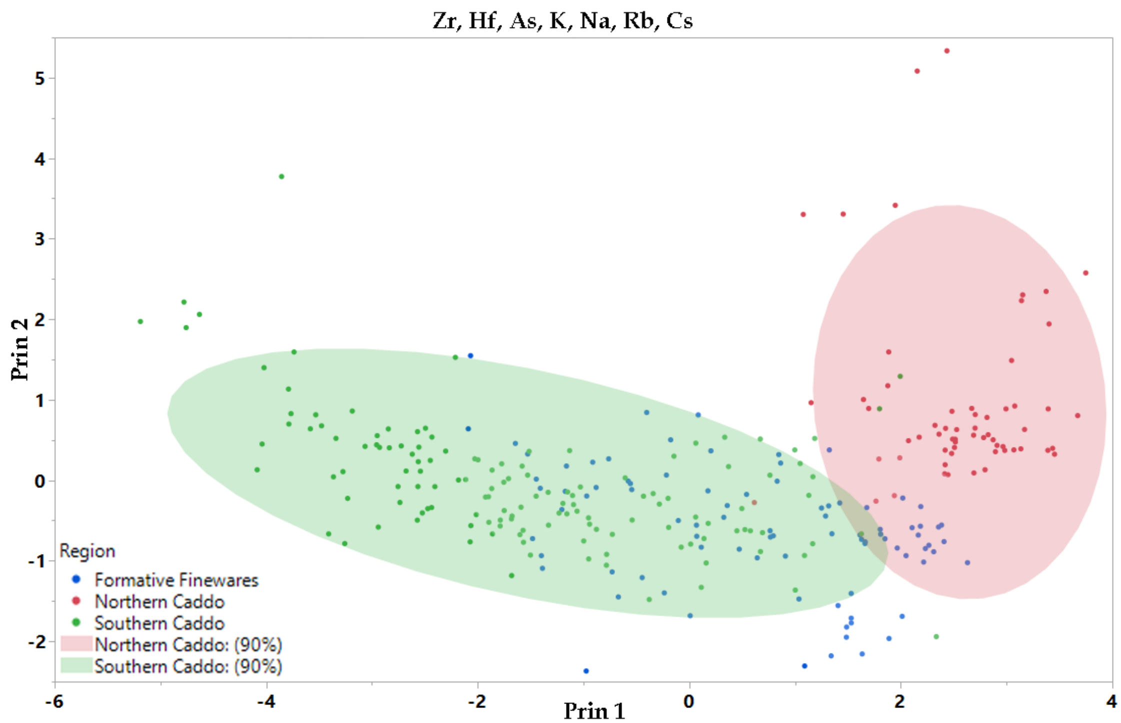


Figure 6.14. Biplot of the first two principal components to show Arkansas Valley fine wares relationship with the southern Caddo reference group. Ellipses represent 90% confidence level for group membership.

It is important to mention here that several Arkansas Basin fine ware sherds (n=19) initially used for INAA were omitted from the statistical analyses. During the sampling phase of the study, they were too small to be definitively typed to a specific formative Caddo fine ware style. They were initially documented as possible early fine ware types (see Appendix A) and used for INAA to meet the proposed sample size. Upon further inspection of these sherds, it is more likely they are post A.D. 1200 fine ware types. Overall, the strong spatial patterning makes it likely that potters from southern Caddo communities produced Arkansas Valley formative fine wares.

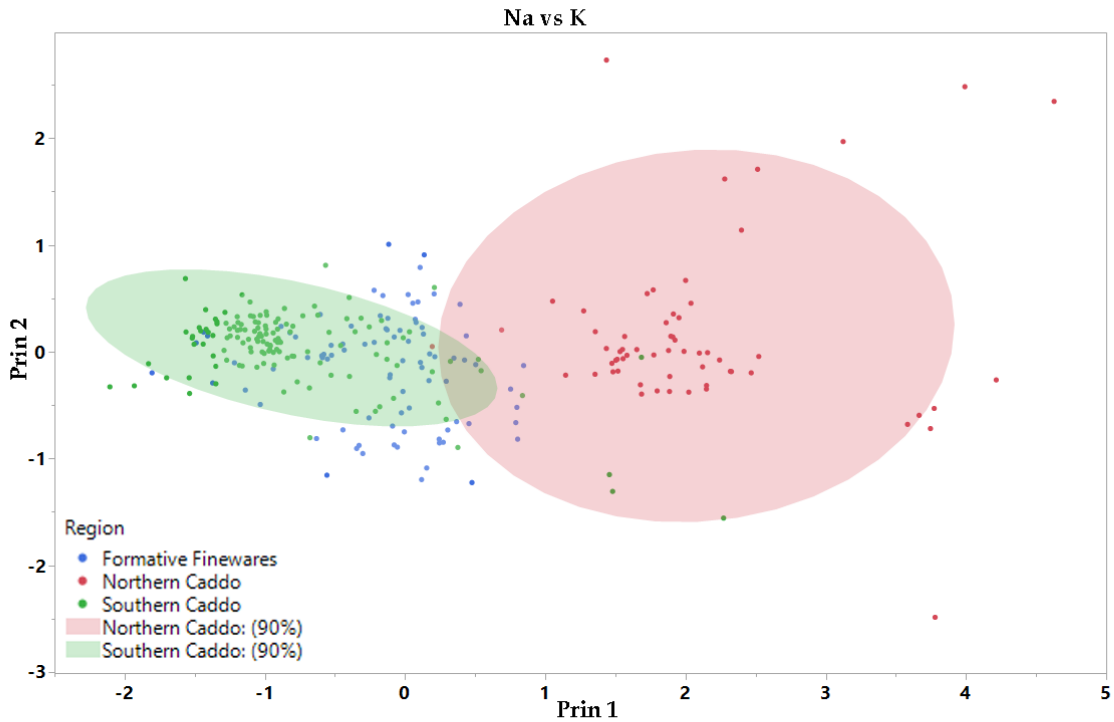


Figure 6.15. Biplot of the first two principal components of Sodium (Na) and Potassium (K) to show Arkansas Valley fine wares relationship with the southern Caddo reference group. Ellipses represent 90% confidence level for group membership.

Now that compositional patterns in the dataset have been established, I want to know the probabilities of group membership between Arkansas Valley fine wares and the two known reference groups. “Discriminant analysis (DA) for classification purposes and related techniques is based on the standardized-squared distant or Mahalanobis distance, which is defined as the square Euclidean distance between a group centroid and an individual specimen divided by the group standard deviation in that direction” (Glascock 1998:30). The use of discriminant analysis relies on Mahalonobis distance to mathematically detect difference in two or more unknown groups to determine group membership of an unknown group. The software I used to generate the discriminant analysis is JMP. I produced one discriminate biplot using Zr, Hf, As, K, Na, Rb, and Cs. To produce the second DA biplot using Na and K. The results of the two discriminant functions show that all Arkansas Valley fine wares have group membership with the southern Caddo reference group and none with the Arkansas Valley reference group (Figure 6.16-6.17). The DA scatterplot of sodium (Na) and potassium (K) reveals an even stronger relationship between formative fine wares and the southern Caddo reference groups (Figure 6.17). These findings in addition to the PCA, supports the hypothesis that southern Caddo communities manufactured formative fine wares and exported them north to Arkansas Valley ceremonial centers.

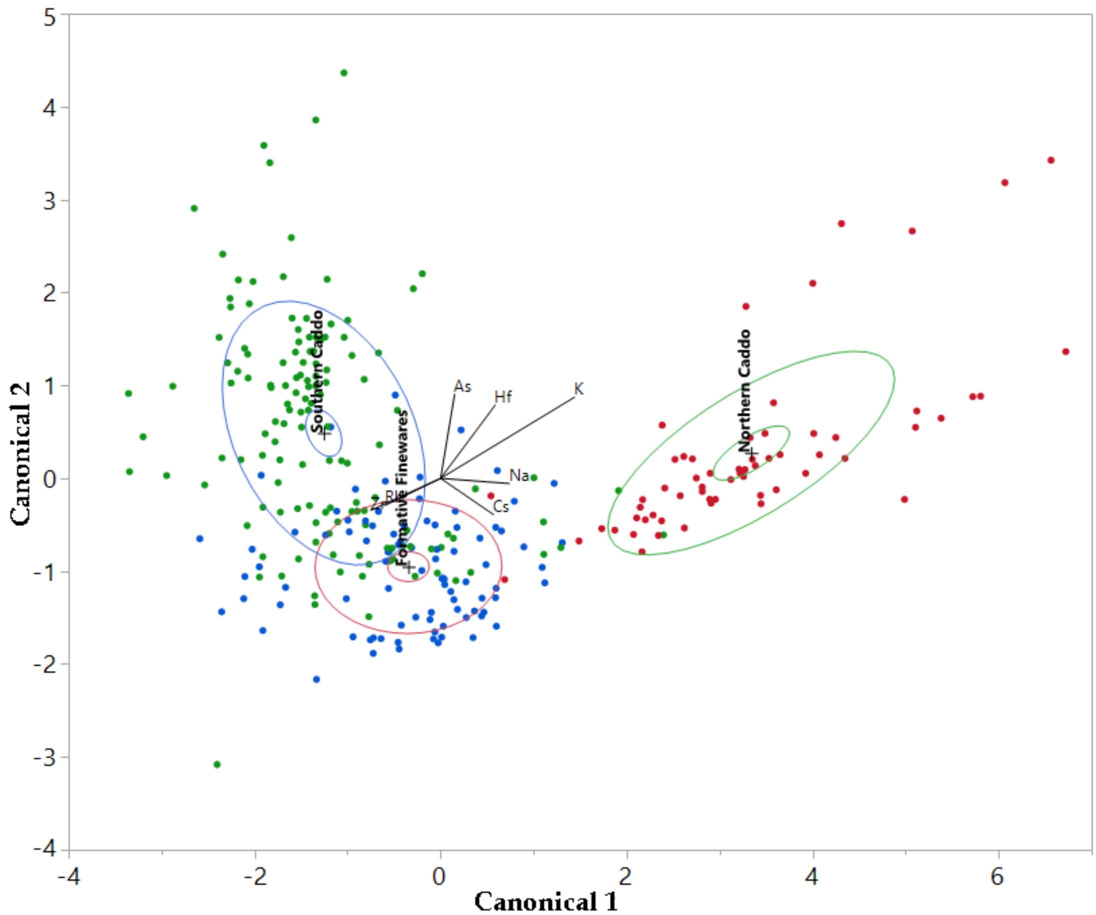


Figure 6.16. Discriminant bivariate plot showing formative fine ware group membership with the southern Caddo reference group using Zr, Hf, As, Na, Rb, and Cs.

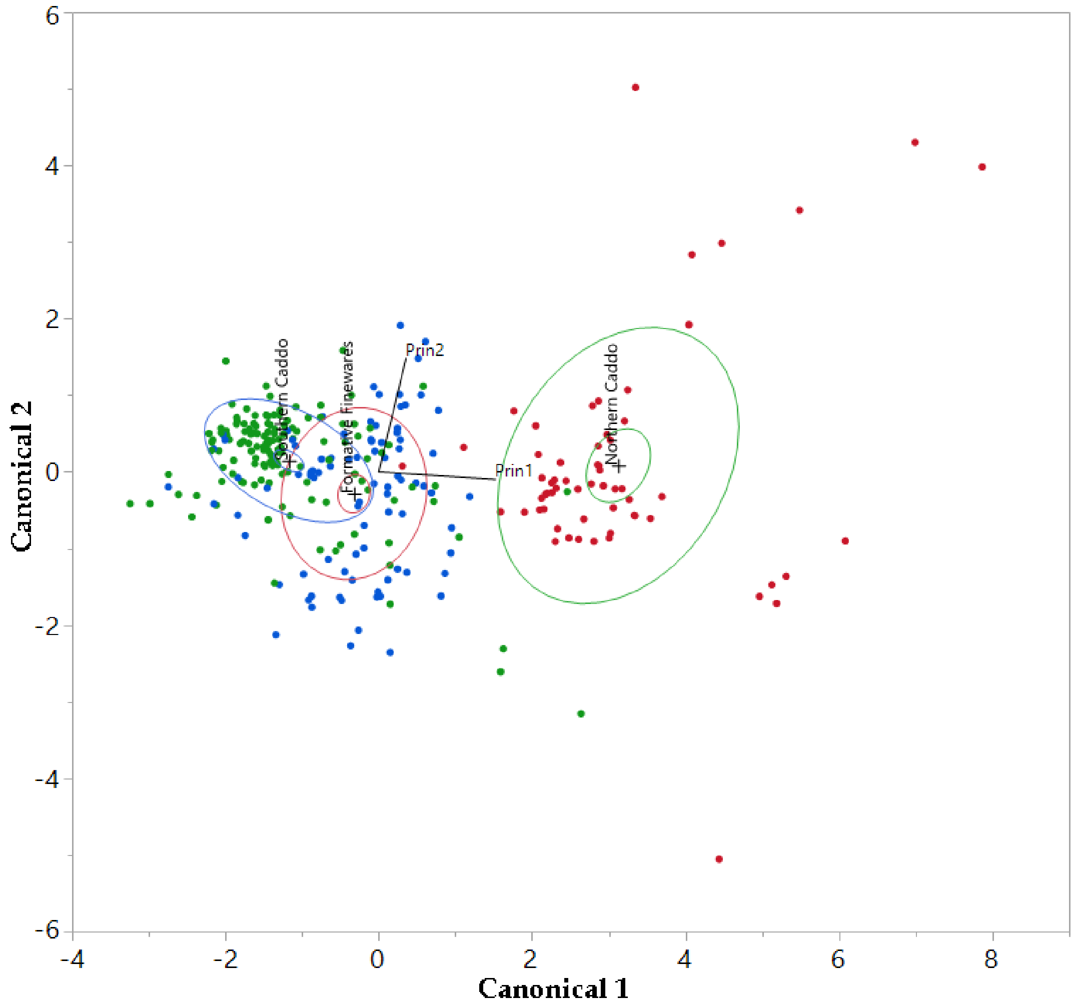


Figure 6.17. Discriminant bivariate plot showing formative fine ware group membership with the southern Caddo reference group using the first two principles components of Na and K.

Implications of High Levels of Sodium

Since there is a high probability Arkansas Basin fine wares were imported, it is necessary to try determine their production locales within the southern Caddo area. Attempts to identify clear patterns of group separation within the Gulf Coastal Plain region have been challenging (Ferguson et al. 2008). Although 11 core groups have been identified by Perttula and others (Selden et al. 2014), it remains nearly impossible to assign unknown samples to a specific area with absolute confidence since each core group overlaps with others (Wiewel 2014:84). According to recent communication with MURR researchers, the best hope to chemically distinguish between Caddo ceramics produced in the Neches and Red River Valleys. Observing the high rates of sodium and potassium within the southern Caddo region may emphasize more centralized production areas of the fine wares.

There are multiple ways people could have introduced salt into Formative Caddo clays causing higher sodium concentrations in the southern Caddo area. For example, potters may have intentionally added salt to clay pastes to strengthen their vessels or added salt into clay slips to make vessel walls more impermeable (Rye and Evans 1976). However, Stoner et al. (2014) argued that intentional inclusions of salt in clays by prehistoric societies are rare. They conducted INAA and other archaeological experiments to understand if elevated rates of sodium and potassium in ceramics recovered from Xaltocan, Mexico resulted from cultural behavior, naturally occurring salty clays, or a saline post-depositional environment. Their findings suggest high rates of sodium in Xaltocan ceramics were present before the firing process. It appears that once pottery is low fired it locks in the sodium, preventing the element from getting leached out from post-depositional processes. This also makes sodium harder to permeate into clay walls after the firing process is complete. However, the temperature at which ceramics are fired will affect the rate of post-depositional absorption of salt (Stoner et al. 2014). Stoltman and Mainfort (2002) performed a petrographic and INAA study of ceramics from the Pinson Mound in Tennessee. They found high rates of sodium and potassium in the ceramic's chemical makeup. They concluded the salts may have entered into the ceramics either through natural processes, such as natural salty clays or that potters intentionally added sodium-rich water to the clay mixture (Stoltman and Mainfort 2002:27). Lopez-Arce et al. (2013) did an elemental study on the intensity of soluble salt absorption between low and high fired amphora ceramic vases recovered from sea contexts. Their findings suggest the degree to which salt gets absorbed into ceramics in post-depositional contexts is related to the firing temperature. High fired ceramics were shown to have almost no salt absorption, while low fired specimens contained higher rates of sodium. This is because high fired ceramics have lower surface areas and less connected porosity (Lopez-Arce et al. 2013:2031). Lopez-Arce et al. also used chemicals trying to leach out sodium from the clay paste. The results showed (similar to Stoner et al.'s findings) it is very difficult to leach out sodium to any significant degree.

The higher rates of sodium in southern Caddo ceramics is possible a result of saline water saturation of clays from the ocean that once covered the entire Gulf Coastal Plain region tens of millions of years ago (e.g., Story 1990). This also indicates the slightly lower rate of sodium in the fine wares is less likely from post-depositional leaching but more likely represents particular production locales where clays contained less sodium. In the next half of this section, I look for compositional variation of sodium and potassium within the southern Caddo area, specifically between the Red River and Neches River Valley sites. This analysis may help me to understand whether Arkansas Valley fine ware were produced in the Red River Valley or throughout the southern Caddo region.

As shown in Figure 6.16, ceramics from the southern Caddo reference group have chemical compositions higher in sodium relative to the northern Caddo reference group. The Arkansas Valley reference group also has higher rates of sodium than the northern Caddo reference group. While the fine ware group is more geochemically similar to the southern Caddo reference group, they do not completely overlap with one another. There could be two reasons why this is happening: (1) the elemental patterning is caused by increased salts in the clays in the southern Caddo area that are leached out during deposition in the northern Caddo area or (2) the lower rates of sodium in the Arkansas Valley fine ware group may be due to potters producing them along the Red River Valley, which is on the northern edge of the West Gulf Coastal Plain region. According to Selden's (2013) INAA study of southern Caddo pottery, the Red River Valley has significantly lower levels of sodium relative to the sodium levels of the Neches River drainage (Figure 6.18).

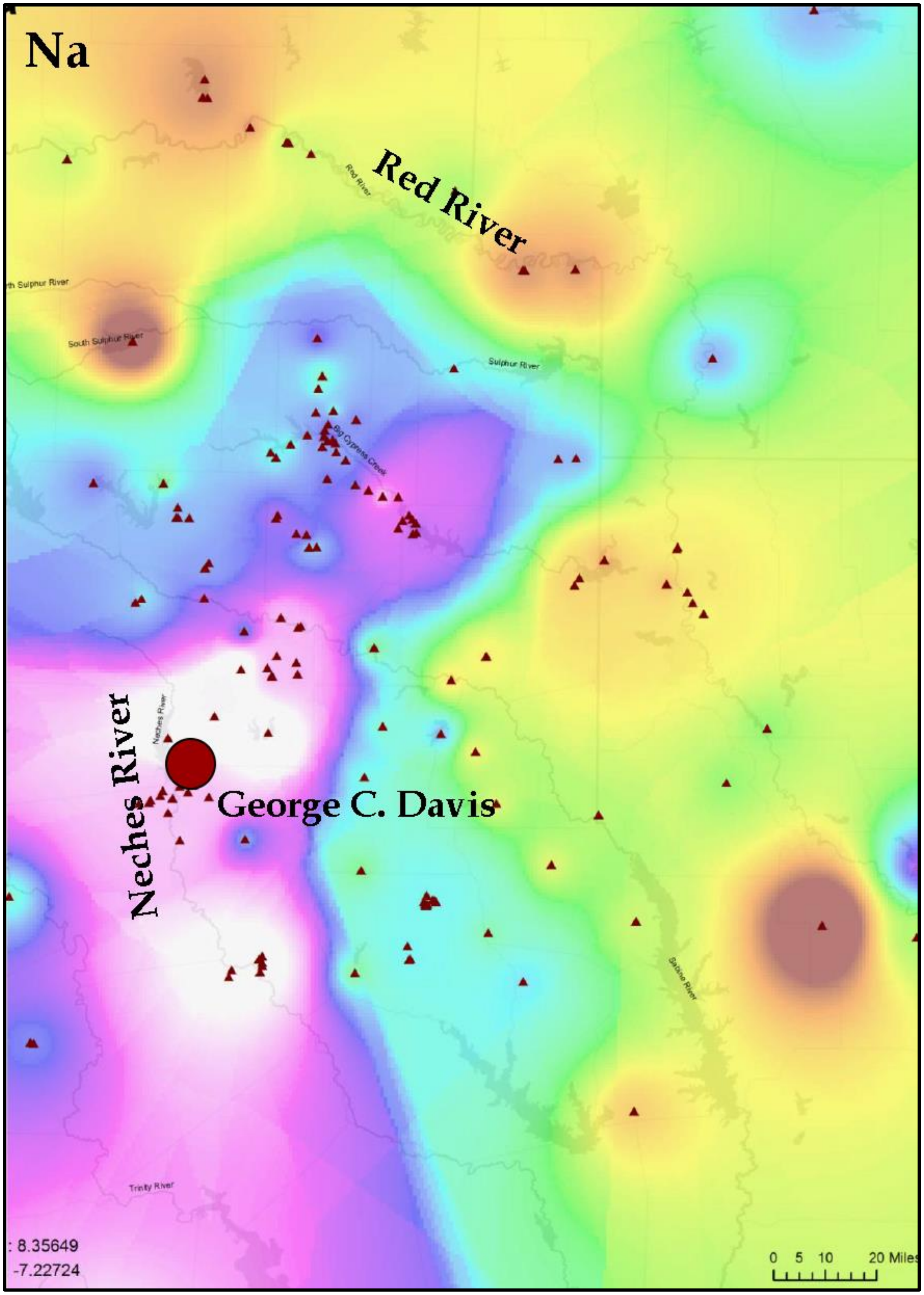


Figure 6.18. Variation in sodium (Na) concentrations for INAA of Southern Caddo ceramics (from Selden 2013, Figure A. 18).

Figure 6.19 is a biplot of the first two principal components of sodium and potassium showing the variability between the Arkansas, Red, and Neches River Valleys. Most of the ceramic specimens that make up the Neches River group came from the George C. Davis site. The ceramic specimens that make up the Red River Valley group came from 20 sites in northeast Texas and northwest Louisiana. While the Neches and Red River Valley groups overlap, the Neches group is tightly clustered relative to the wider distribution of the Red Valley specimens. Most of the Red River Valley specimens contain less sodium than the Neches River group. These findings correspond with the variation in sodium concentrations in the southern Caddo region shown in Figure 6.18.

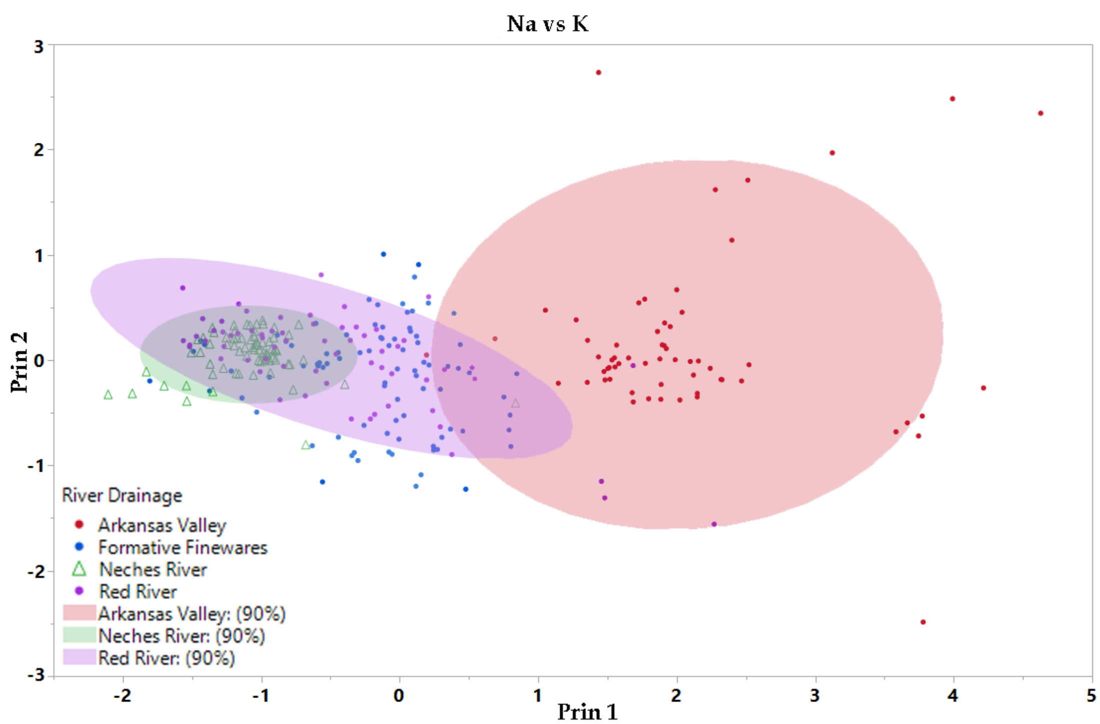


Figure 6.19. Biplot of the first two principal components of Sodium (Na) and Potassium (K) to show variation between the Arkansas, Red, and Neches River Valleys. Ellipses represent 90% confidence level for group membership.

Figure 6.20 is a biplot of the first two principal components of sodium and potassium showing the compositional relationship between the Arkansas Valley fine ware group and the two southern Caddo reference groups. This biplot shows that most of the Arkansas Valley fine wares are more geochemically similar to the Red River Valley group. Only 16 fine ware specimens overlap with the Neches River group. I believe this analysis has identified probable patterns of fine ware production within the Red River Valley. While I cannot completely rule out the possibility that potters also produced fine wares along the Neches River, I do think these results are in favor of Red River Valley production areas. This corresponds with the stylistic results in which showed that Spiro Engraved vessels were most likely produced in the Red River Valley.

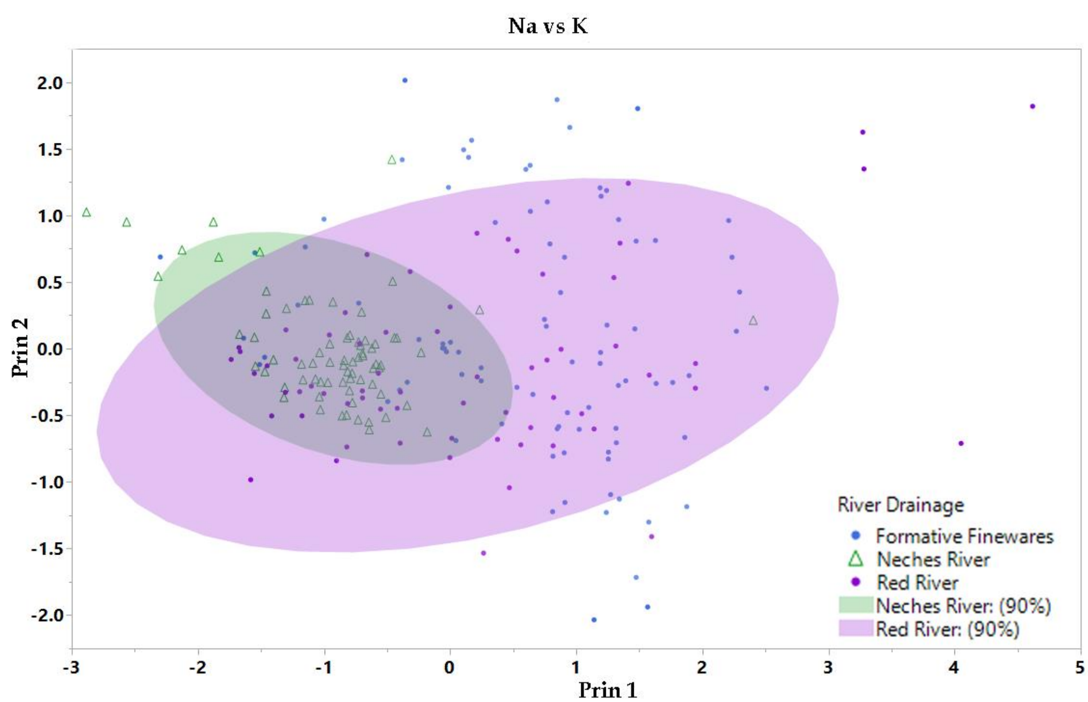


Figure 6.20. Biplot of the first two principal components of Sodium (Na) and Potassium (K) showing the relationship between the Arkansas Valley fine wares and the two southern Caddo reference groups. Ellipses represent 90% confidence level for group membership.

Kernel Point Density Analysis

By calculating formative fine ware densities at domestic and ceremonial sites may shed light on possible production areas in the southern Caddo area. Kernel Point Density maps were calculated for each Formative Caddo fine ware type to observe where the highest densities were used and deposited (Figures 6.21-6.25). This analysis includes 185 mound and domestic sites in Oklahoma, Arkansas, Texas, and Louisiana (see Appendix B). Unlabeled points on the maps reflect domestic sites in which fine wares were recovered. Including a large spectrum of site types visually displays the unrestricted use and access of formative fine wares within the southern Caddo area in opposition to their restricted contexts in the northern Caddo area. Observing highly concentrated densities or "hot spots" may suggest possible manufacturing areas. Site densities may reflect biased sampling. Over several decades, Caddo researchers have focused more of their efforts on mound sites and less on outlying domestic village areas. Many of the domestic sites were simply surface collections. Yet, the probability of sampling bias is true with most regional site maps showing frequency distributions, but their use is still warranted for archaeological interpretations.

Figure 6.21 is a point density map displaying the distribution of Crockett Curvilinear Incised vessels. The map clearly shows several density clusters throughout the southern Caddo region, the largest of which is at George C. Davis with an estimated 800 vessels. Several other sites, such as Boxed Springs, Sam Kaufman, and Crenshaw, also have high densities of Crockett Curvilinear Incised. Crockett seems to be found throughout the entire southern Caddo area, where it is primarily used at mound centers, but also at many domestic sites. As you go north from George C. Davis, the number of

Crockett vessels begin to decrease significantly. At northern Caddo ceremonial centers the number of Crockett vessels are significantly less than any other major southern Caddo mound site.

Since there is evidence northern Caddo region were getting their fine wares from the southern Caddo region, it is possible other southern Caddo groups may have also been getting their fine wares from centralized production centers. The knowledge to make these fine wares may have been widespread in the southern Caddo area, as demonstrated by the wide range of contexts in which they were deposited. I argue the former is more likely, as evidenced by the minimal amount of stylistic variation in Chapter 5. This may suggest George C. Davis or perhaps elsewhere in the Neches River drainage was the manufacturing epicenter of Crockett Curvilinear Incised vessels. Arkansas Valley ceremonial sites are over 400 km north of George C. Davis, and the distance could be one of the reasons why very few Crockett vessels are being recovered. There could also be social factors at play. George C. Davis and surrounding communities may not have been in continuous communication with Arkansas Valley groups. Just as likely, Crockett could be coming to Arkansas Valley sites through down-the-line exchange with other southern Caddo groups. Overall, the sheer number of Crockett vessels being made and used in the southern Caddo area, in addition to the compositional results, imply that southern Caddo potters fabricated and imported them to northern Caddo mound sites.

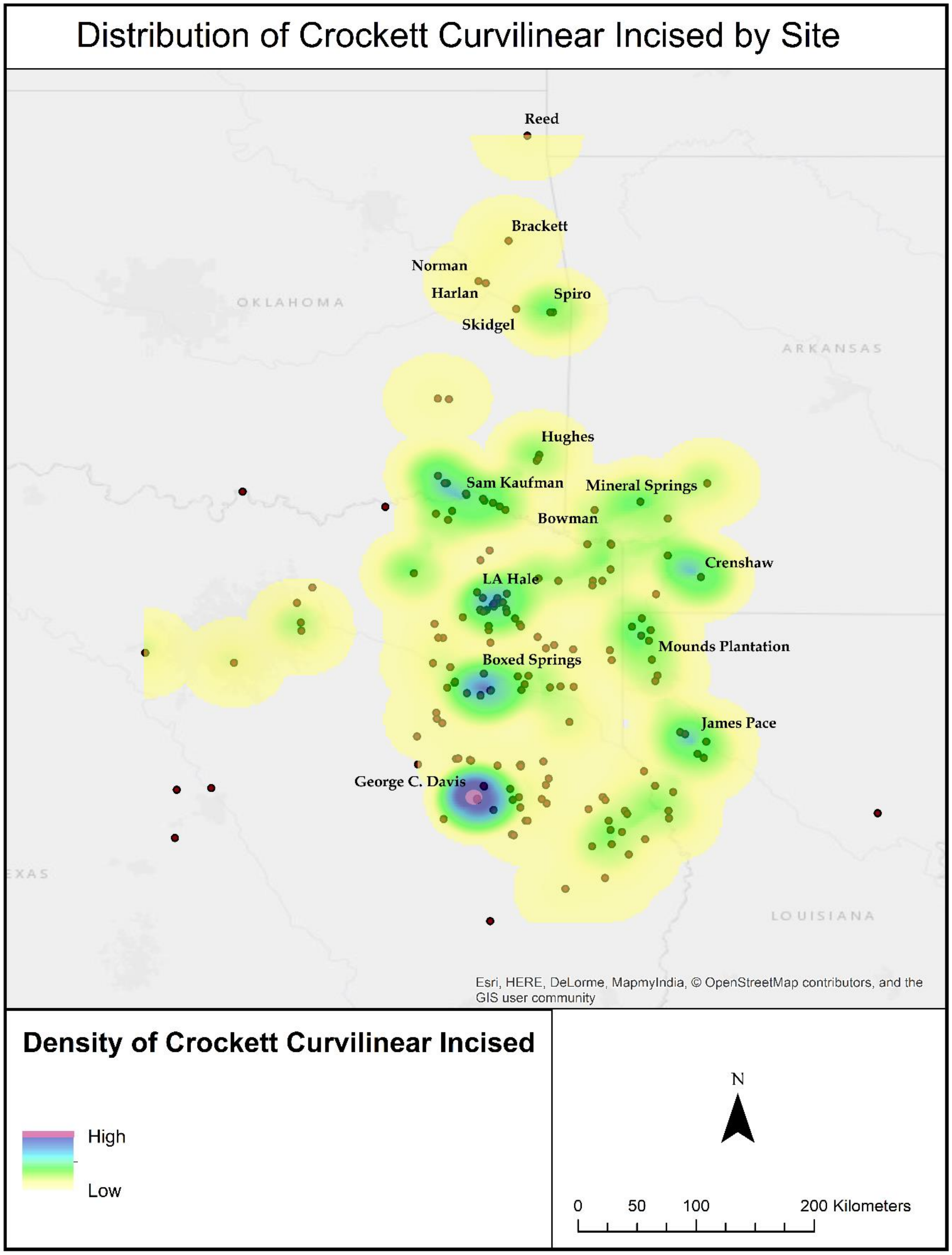


Figure 6.21. Point density map showing the widespread distribution of Crockett Curvilinear vessels.

Figure 6.22 is a point density map of the distribution of Holly Fine Engraved vessels. The density clusters are similar to Crockett Curvilinear clusters, with a few noticeable differences. The map clearly shows density clusters throughout the Neches, Sabine, and Sulfer River drainages. Like Crockett, the most prominent density cluster is over George C. Davis, with an estimated 1000 Holly Fine Engraved vessels. The Boxed Springs mound site also has a high density of Holly Fine Engraved vessels but in much less quantities than George C. Davis. Holly Fine vessels are also found in other mound and domestic contexts, but in much lower numbers than Crockett. While Holly Fine is recovered from domestic contexts, its access seems to be more restricted than Crockett Curvilinear. There is less use of these fine wares across other southern Caddo mound centers too, such as Crenshaw, Mounds Plantation, Mineral Springs, Hughes, and Bowman. Moving north from George C. Davis and Boxed Springs, Holly Fine Engraved vessels decrease dramatically, dropping off around the Red River Valley. In the northern Caddo area, there are only two examples of Holly Fine vessels, from the Spiro and Harlan sites. George C. Davis and Boxed Springs have the majority of Holly Fine vessels. Perttula and Ferguson (2010) sent a few Holly Fine Engraved sherds for INAA, all were found to be locally-made at or close by George C. Davis. This may indicate Holly Fine production locales are somewhere in the Neches and/or Sabine River drainages as Girard (2009) hypothesized. If they were being produced around George C. Davis, it could explain why there are so few along the Red River drainage and in the northern Caddo area. Again, the distance between George C. Davis and other Formative Caddo mound sites may be the reason these vessels are not distributed in higher frequencies.

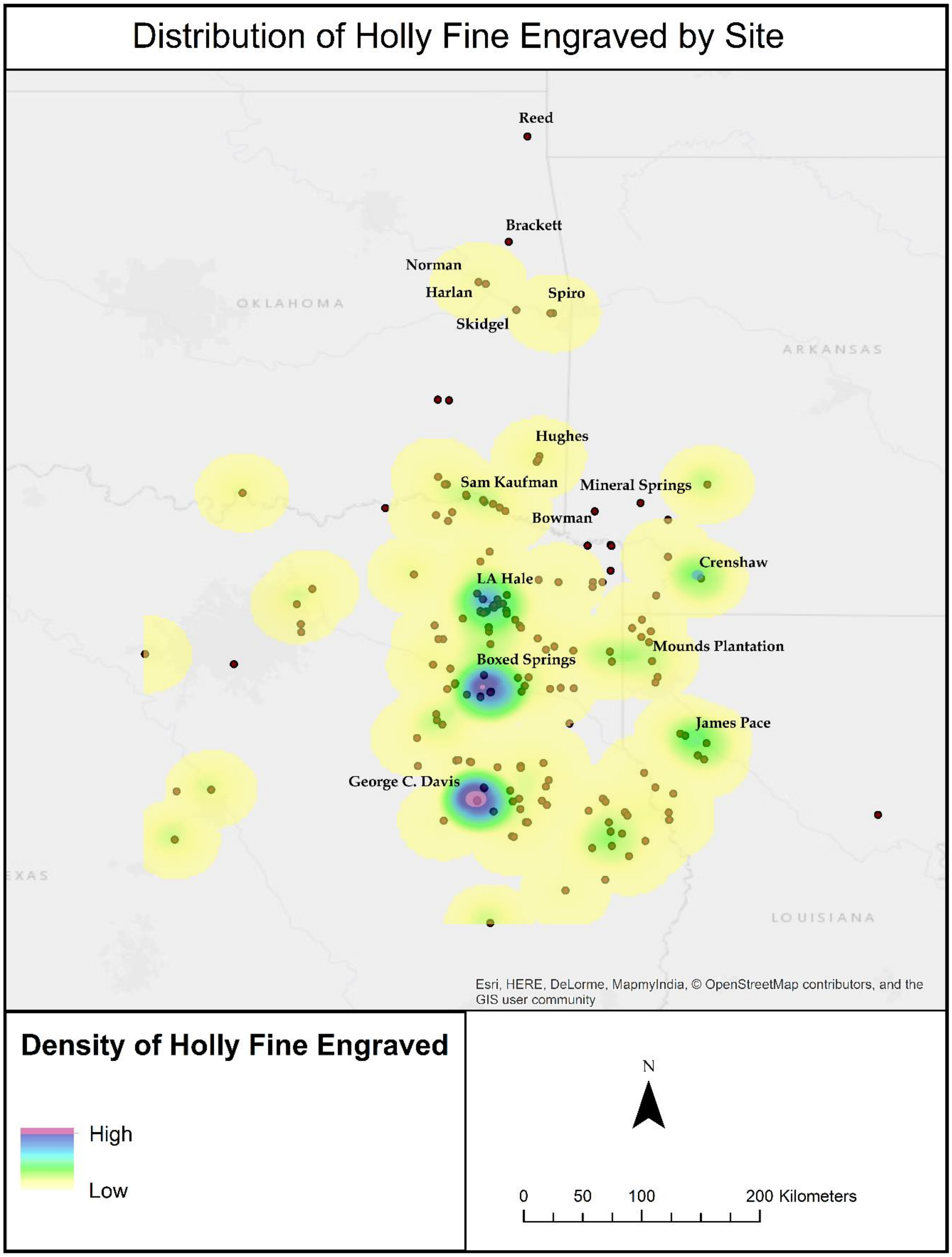


Figure 6.22. Point density map showing the widespread distribution of Holly Fine Engraved vessels.

Figure 6.23 is a point density map displaying the distribution of Hickory Engraved vessels. There are some noticeable differences in the densities and distribution of this fine ware   type compared to Crockett Curvilinear and Hickory Engraved vessels. The largest density clusters are distributed over several drainages, such as the Red, Neches, and Sabine Rivers. The majority of Hickory Engraved vessels are being used were deposited in the southern Caddo region along the Red River at Crenshaw (n = 40), Bowman (n = 8), Hughes (n = 6), Mineral Springs (n = 13), Sam Kaufman (n = 13), and Mounds Plantation (n=20). Further south along the Sabine and Neches River drainages, Hickory Engraved vessels are primarily recovered at Boxed Springs (n = 26), and George C. Davis (n = 227). Hickory vessels are also being used and deposited in multiple domestic and mortuary contexts, but primarily concentrated at mound centers. In the northern Caddo area, they are mainly recovered from Spiro (n=11), Norman (n = 6), and Harlan (n = 4). Due to the complex clusters and widespread distribution of Hickory Engraved vessels, it is likely several potters produced them at or around mound centers, like Crenshaw, George C. Davis, and Boxed Springs. As discussed in Chapter 3, Hickory Engraved is the simplest formative fine ware type, but has the greatest stylistic variation. The variation could directly reflect a higher number of potters scattered across several Formative Caddo sites in the southern Caddo area.

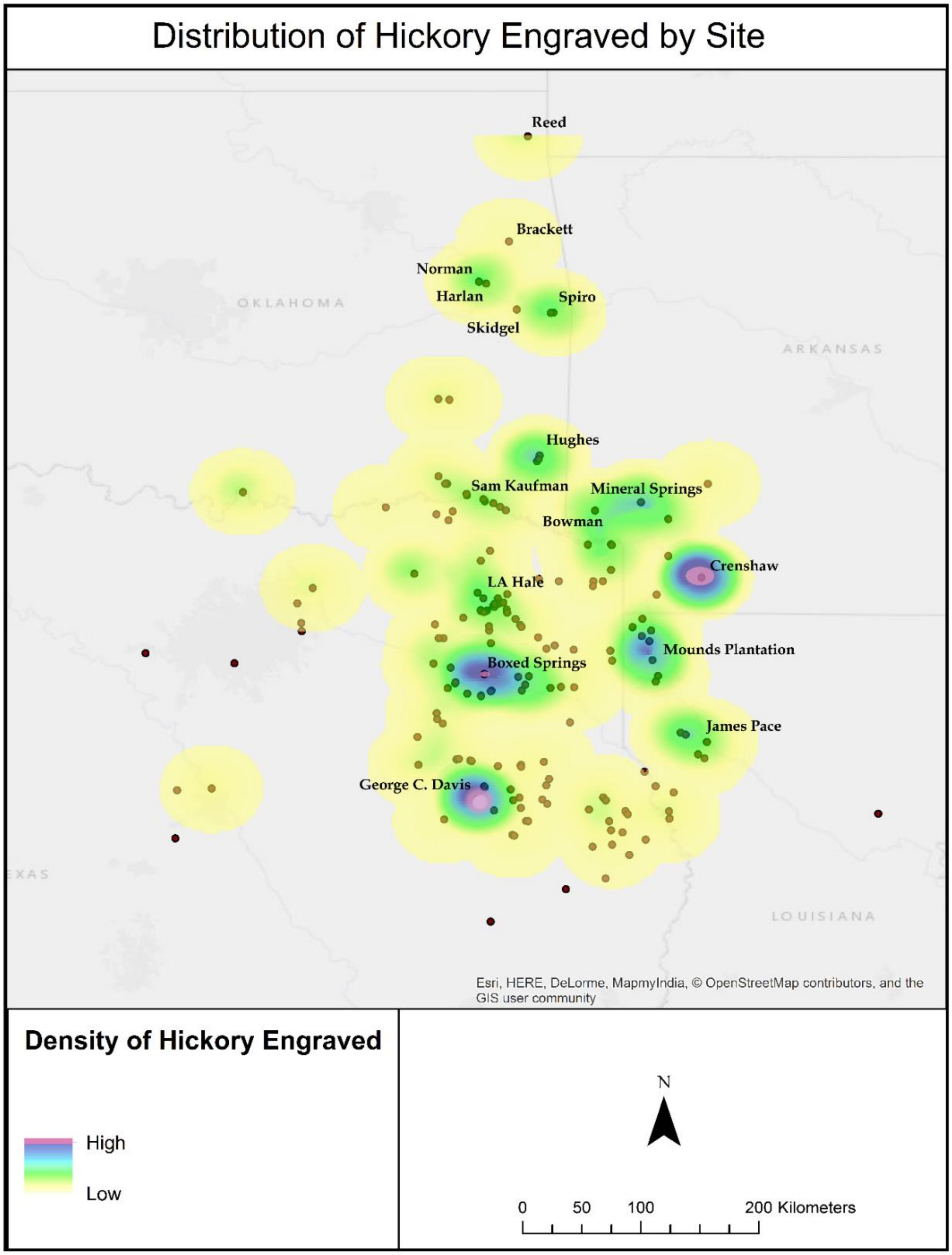


Figure 6.23. Point density map showing the widespread distribution of Hickory Engraved vessels.

Figure 6.24 is a point density map displaying the distribution of Spiro Engraved vessels. The location and distribution of Spiro Engraved density clusters are significantly different than any other Formative Caddo fine ware type. Spiro Engraved vessels seem to be much more restricted to Red River Valley sites, such as Dan Holdeman (n = 20), Bentsen-Clark (n = 24), Mineral Springs (n = 13), Gahagan (n = 6), and Crenshaw (n = 30). In contrast with other formative fine wares, the number of Spiro Engraved vessels start to decrease to the south at sites along the Neches and Sabine River drainages. For instance, Boxed Springs has approximately 15 Spiro Engraved vessels and George C. Davis has only two Spiro Engraved examples. Spiro Engraved sherds at several domestic sites have been found, but in much lower quantities than other formative fine wares in the southern Caddo area. In the northern Caddo area, there are more Spiro Engraved vessels than any other formative fine ware type: Spiro (n = 25), Norman (n = 13), Harlan (n = 7), Reed (n = 15), and Brackett (n = 12). It seems clear that most Spiro Engraved vessels were specifically produced to be used at ceremonial centers in the Northern and Southern Caddo areas. Over 70% of Spiro Engraved vessels are recovered along the Middle and Great Bend of the Red River, which may suggest these are the areas in which they were being produced. It would explain the lower densities of vessels in the Sabine and Neches River drainages and higher densities of vessels at Arkansas Valley sites. Finally, when a point density map is generated of all formative fine ware types, the picture becomes clear mound centers in the Red, Sabine, and Neches Rivers played a vital role in their use, distribution, and possible production (Figure 6.25).

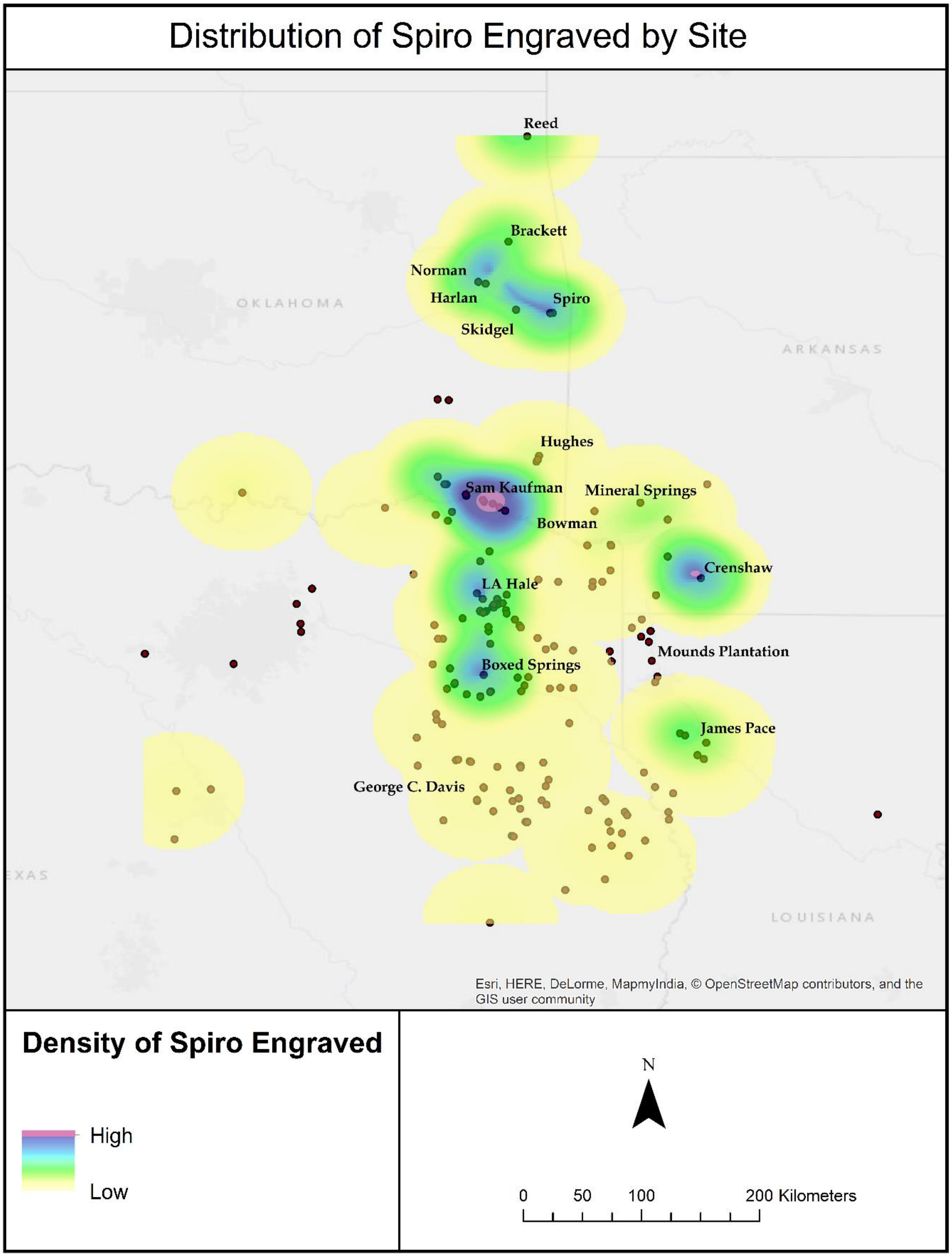


Figure 6.24. Point density map showing the widespread distribution of Spiro Engraved vessels

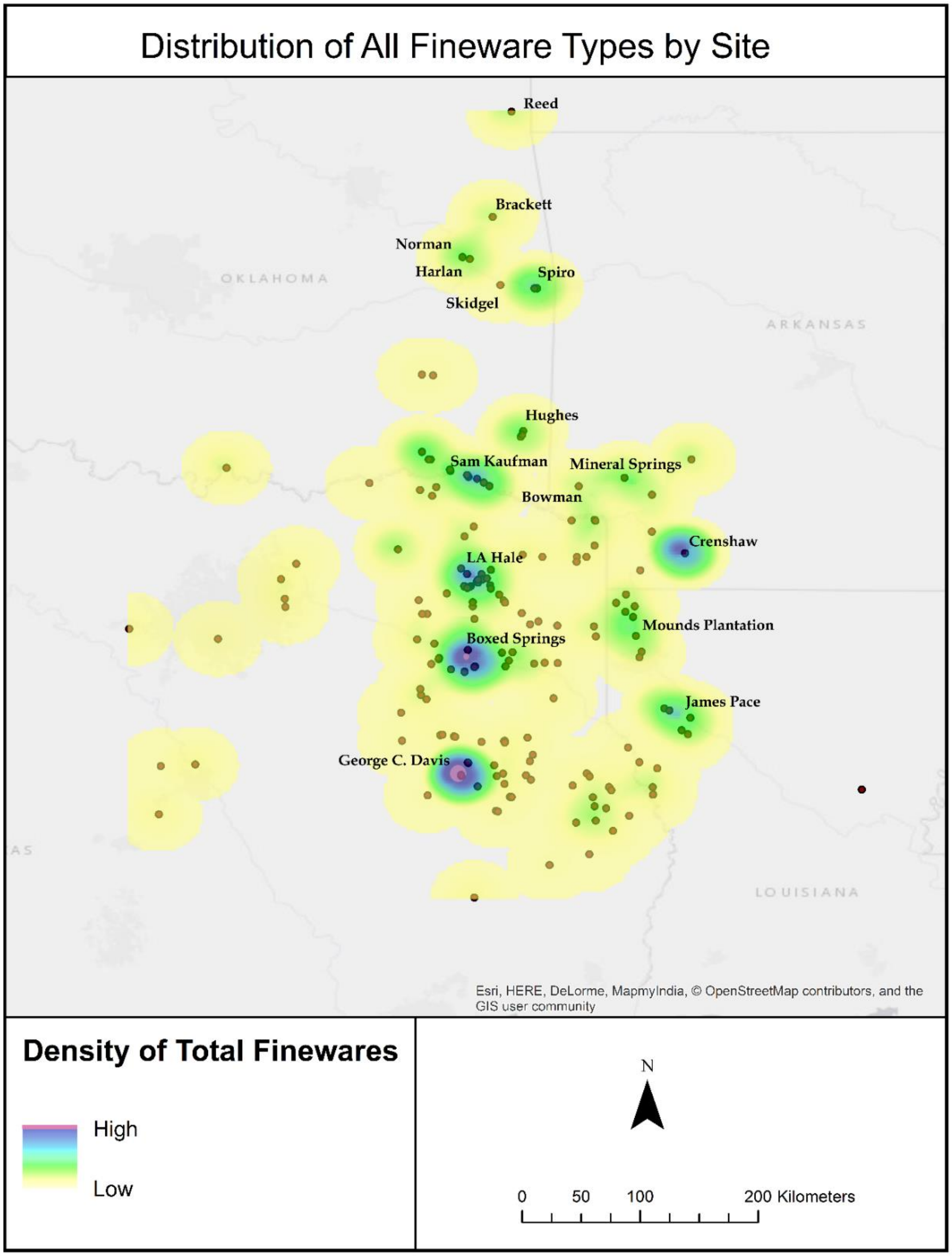


Figure 6.25. Point density map showing the widespread distribution of all Formative Fine ware vessels.

Summary

Overall, two compositional groups were identified during this analysis. Northern and southern Caddo utility ware specimens are compositionally different, resulting in two chemically-diverse groups. Sodium, Zirconium, Hafnium, Arsenic, Rubidium, Cesium, and Potassium were the primary elements that distinguished Gulf Coastal Plain and Arkansas Valley utility wares. All Arkansas Valley fine ware specimens have a strong statistical relationship to the geochemical signatures of the southern Caddo reference group. Formative fine ware specimens did not significantly overlap with the northern Caddo reference group. Performing the Discriminant Analyses was important to understand formative fine ware group membership. The results revealed that fine wares had group membership with the southern Caddo baseline group. This outcome is not surprising given the findings from my stylistic analysis in Chapter 5. The whole vessel analysis revealed very little stylistic variation across the four formative fine ware types, which suggests that very few potters, now most likely from the southern Caddo area, had the knowledge to produce them. Using sodium and potassium to further divide the southern Caddo area into Neches and Red River Valleys reference groups showed some promising results. Most fine wares had a significant geochemical relationship with the Red River Valley reference group that may imply Red River Valley potters produced them.

The high rates of salt in the southern Caddo reference group is probably from an ancient ocean that covered the Gulf Coastal Plain millions of years ago. The salts may have permeated into the raw clay sources of which southern Caddo potters took advantage. Although, Arkansas Valley fine wares appear to contain slightly lower rates of sodium relative to the southern Caddo reference group. This is presumably the reason the two compositional groups did not fully overlap with one another. I believe there is evidence to suggest that most of the Arkansas Valley fine wares in this study were produced along the Red River. The Red River valley borders the northern edge of the West Gulf Coastal Plain region and has been shown to have lower concentrations of sodium than Caddo sites along the Neches River.

The Kernel Point Density maps also revealed some important information regarding possible production locales. The large number of Crockett Curvilinear and Holly Fine Engraved vessels recovered along the Neches and Sabine Rivers suggest that production locales could have been somewhere close to George C. Davis or Boxed Springs Mound site. The distribution and clustering of Hickory Engraved vessels were more punctuated throughout the southern Caddo landscape, which may suggest multiple potters were producing them. The restrictive distribution and tight clustering of Spiro Engraved vessels was most intriguing and in strong contrast to the other fine ware types. Spiro Engraved vessels are principally clustered along the Middle and the Great Bend of the Red River at several mound sites. Few vessels have been recovered in the Neches and Sabine River drainages, which strongly suggests Spiro Engraved vessels were produced somewhere along the Red River (perhaps Crenshaw?). I assert Red River communities produced Spiro Engraved vessels, not only for their own domestic and ritual use, but also to be exported to Arkansas Valley ceremonial sites. For a future research idea, it might be interesting to see a kernel density map that also takes context into account.

Based on previous stylistic studies of formative fine wares, Northern and Southern Caddo communities have been stirred into one large cultural melting pot (Girard et al. 2014). Ideas of early Caddo production, distribution and long-distance exchange have been impossible to conceptualize because we have relied too heavily on the presence of diagnostic pottery types as the primary determiners of an already too broad community membership. Based on the stylistic and compositional assessments alone, I have shown that Caddo communities were much more dynamic and complex than is currently acknowledged. This study suggests that separate Caddo groups produced, used, and exchanged fine wares to obtain and maintain group identity and ritual power. It is also likely that long-distance exchange of formative fine wares created and maintained long-distant relationships with distant Caddo groups. I consider the implications of these results in more detail in Chapter 7 and synthesize these outcomes with other lines of archaeological and theoretical evidence discussed in Chapters 2 and 4.

CHAPTER 7: DISCUSSION AND CONCLUSIONS

The stylistic and compositional data discussed in Chapters 5 and 6 allow for the consideration of ceramic production, long-distance exchange, and their use in different ritual and domestic contexts between separate Caddo communities of practice. By integrating multiple lines of ceramic evidence in Chapters 5 and 6, I consider how emerging Caddo groups participated in the large-scale production and exchange. This study has major archaeological implications because it explores how communities' technological innovations, such as the fine wares, not only caused emergent properties in the construction of pre-Columbian communities, but it also showed how the same pottery used in different social and ritual contexts mattered differently among northern and southern Caddo groups. In this chapter, I examine the implications of the stylistic and compositional results. The theoretical framework described in Chapter 3 provides a way to ground the interpretations, allowing for the investigation into the ritual mode of production and exchange among different Caddo communities of practices. Finally, I discuss how the results of this study emphasize alternative pathways to ritual power between the northern and southern Caddo areas.

Social Contexts of Arkansas Valley Formative Fine wares

The most fundamental question which led me to conduct a stylistic and compositional analysis was: what were the contexts in which Arkansas Valley fine wares were deposited? To observe the social contexts of formative fine wares in the Arkansas Valley, I focused on fine ware deposition and the relationship of those contextual differences to patterns of domestic and ceremonial features. Initially, I focused on the five Arkansas Valley ceremonial sites in this study and contemporary outlying domestic sites in search for fine ware deposition. I discovered that formative fine wares did not get deposited in any domestic/village contexts. Instead, Arkansas Valley groups deposited formative fine wares exclusively in mortuary contexts at the five Arkansas Valley ceremonial centers.

Based on this discovery, I compared the distributional contexts of Arkansas Valley fine wares with the distributional contexts of southern Caddo fine wares, which revealed some striking variability. Southern Caddo communities distributed these fine wares throughout the southern Caddo area, in both domestic and ceremonial contexts. At southern Caddo centers, such as Crenshaw, Boxed Springs, and George C. Davis, fine wares are deposited in middens, hearths, pits, on-mound, and off-mound contexts. At southern Caddo domestic sites, people deposited them in village cemeteries, middens, and residential contexts. The unrestricted distribution at southern Caddo ceremonial and domestic sites show the inhabitants utilized formative fine wares for a variety of social activities, while the controlled distribution at northern Caddo ceremonial centers show more limited context of use in mortuary practices. This preliminary stage of my dissertation research illustrates how important it was to look at differential deposition in their social contexts. The diversity of deposition and use during the Formative Caddo period suggested that the earliest fine wares had marked regional and local social connotations.

Implications of Technological and Stylistic Results

In Chapter 6, I assessed stylistic and technological variation in ceramic forms and designs by evaluating several attributes of 200 whole fine ware vessels. Style is defined as the "experience and custom combine to establish a body of information and practice governing the manufacture of pottery vessels … resulting in a characteristic final product with a unique range of properties" (Rice 187:201). This stylistic study was fundamental to explain the similarities and variabilities between the attributes of artifacts. The variability in style and technological attributes of Caddo pottery likely resulted from the mechanics of the Formative Caddo production process. The amount of overall variability between the two Caddo areas should relate to the scale and intensity of fine ware production and distribution. The results of the stylistic and technological analysis of 200 whole fine ware vessels from both northern and southern Caddo ceremonial centers indicated few potters andcentralized areas of production. For the study, I used a hierarchical stylistic analysis (Plog 2008) and a design grammar analysis (Early 2012) to understand technological and design attributes, the degree of design choice, organization, construction, and overall regional variability between northern and southern Caddo ceremonial centers.

The examination of the step-by-step process by which Formative Caddo potters manufactured fine wares showed almost no significant variation between the vessels found in the southern and northern regions. Potters hand-coiled bowls and jars from a pottery base mold. The bottles, however, had their own unique construction process. First, potters hand-coiled each vessel from a base mold. In order to produce the bottle necks, potters used a clay slabbing technique. Slabbing may explain why there is so much standardization in the tapering of the bottlenecks. However, when I examined vessel construction between southern Caddo and northern Caddo sites, the only noticeable difference was vessel size. It appears potters intentionally produced formative fine wares approximately 25% smaller for export at northern Caddo ceremonial sites than vessels they produced for use in southern Caddo contexts. The smaller sizes could have a couple of implications. First, the potters could have intentionally made them smaller for easier transportation. Another explanation could be that potters made them smaller because they knew northern Caddo communities used them for mortuary purposes. Miniaturized vessels are commonly recovered in mortuary contexts, and shown to have ritual significance (Spielmann 2002).

The stylistic results showed potters had a very limited set of design combinations, which indicates very few had the knowledge and skill to produce these four fine ware types. I developed a method called design stratigraphy to analyze the depth and overlap of lines to reveal the sequence of design construction. From there, I was able to reconstruct the sequence of steps of each fine ware type to understand design pathway variability. The results proved all potters placed each engraved and incised lines in the same order. Formative Caddo potters did not just try and imitate an overall design. It seems they placed more emphasis on learning the exact order of where each line should go, implying personal tutelage in designing the pots.

The hierarchical stylistic analysis showed all fine ware vessels had a very limited set of design choices in which potters used to complete a vessel. I produced hierarchical tree diagrams for Spiro Engraved, Holly Fine Engraved, Hickory Engraved, and Crockett Curvilinear vessels displaying the range of stylistic variability. Each element added to the primary forms is considered secondary element or finishing option. For example, Spiro Engraved vessels only contained five primary design forms, all of which are stylistically related to one another. Formative Caddo potters restricted themselves to only three secondary design choices, which included excising, feathering, and punctating. This is true for both northern and southern Caddo ceremonial centers. In fact, identical Spiro Engraved motifs and vessel forms have been found in both Caddo regions; most are located at southern Caddo ceremonial centers. If many different potters manufactured these vessels throughout the entire Caddo region, I would expect much more stylistic variation than is shown here. These findings are in concert with the INAA results and suggest the emergence of ceramic specialization from only a few craft specialists.

Additionally, the analysis showed that the design motif was primarily conditioned by the vessel form potters chose to use. Potters mainly chose bottles for Spiro and Hickory Engraved imagery. For Crockett Curvilinear motifs, potters chose bowls and jars. Interestingly, potters used the entire spectrum of vessel forms for Holly Fine Engraved motifs. The relationships between design and vessel form suggest potters communicated specific meanings and used for a particular purpose. This may also imply that specific contents (e.g., foodstuff and liquids) placed into each vessel form were just as important as vessel forms and imagery.

Implications of Compositional and Kernel Point Density Results

The results of the INAA study performed on ceramic pastes in Chapter 6 demonstrate that northern Caddo ceremonial communities participated in long-distance exchange networks with communities in the southern Caddo region. First, it is clear that ceramic sourcing works to differentiate between clays of the Arkansas Valley and Gulf Coastal Plain, and this insight can be used in future studies. This result will likely advance our current understandings of early Caddo pottery production. On a regional scale, knowing the provenance of formative fine wares will allow future research to more precisely model the movement of people and ceramics across the Caddo landscape and observe meaningful interactions and social variability between the northern and southern regions.

Second, the clays that Arkansas Valley potters used to manufactured Williams and Le Flore Plain utility wares, which were used to create a northern Caddo reference group for the elemental analysis, have more compositional variability relative to the southern Caddo reference group This indicates we may be able to chemically distinguish pottery produced in different areas of the Arkansas Valley. Overall, Arkansas Valley sourcing demonstrates that the use of INAA to compare intra-and inter-site compositional variability may prove to be a valuable method in future research.

The southern Caddo compositional groups, which included 21 sites in eastern Texas and northwest Louisiana, produced one compositional cluster. Understanding the precise production locales of formative fine wares within the southern Caddo area was not necessary for this regional study. It was most important to show that Arkansas

Valley people did not produce formative fine wares. Perttula and Selden (2013) have made progress in trying to distinguish southern Caddo clays. In Chapter 6, I tried to chemically distinguish between pottery from the Neches River Valley sites and pottery from the Red River Valley to understand why the fine wares had slightly lower levels of sodium than the southern Caddo reference group. While the two River Valley reference groups still heavily overlapped, most of the fine wares clustered with the Red River Valley compositional group using discriminant analysis. This is not definitive evidence that fine wares were produced along the Red River Valley. Much more INAA data is needed to determine this (Perttula 2010).

An examination of the distribution of formative fine wares within the entire Caddo region brings to light possible production locales. The series of kernel point density maps examined in Chapter 6 shows formative fine wares were not evenly distributed across the Caddo region. There are significant frequency clusters at southern Caddo sites, including Crenshaw, George C. Davis, and Boxed Springs that may reflect the places in which potters produced them. For example, at George C. Davis more Holly Fine Engraved and Crockett Curvilinear Incised vessels are recovered than all Caddo ceremonial centers combined. Even though the compositional analysis did not show exact production locales, it is likely potters manufactured these two pottery types somewhere along the Neches River drainage. This premise is consistent with Girard's (2009) argument that potters made Crockett Curvilinear Incised and Holly Fine Engraved vessels at George C. Davis. In Chapter 5, I explained stylistically how Hickory Engraved had the simplest design pathways, which may represent why there are clusters throughout the southern Caddo region. More southern Caddo potters may have replicated Hickory Engraved vessels in more locales because learning the design elements did not involve as much knowledge and skill.

As discussed in Chapter 2, Caddo researchers have assumed potters produced Spiro Engraved vessels at or in the vicinity of the Spiro site. This is because archaeologists first discovered Spiro Engraved vessels in Craig Mound burials during the WPA era excavations. As a result, archaeologists dubbed this engraved ware type Spiro Engraved, which has seriously influenced our ideas about its area of origin. In fact, Spiro has much lower frequencies of Spiro Engraved vessels compared to southern Caddo sites. The highest frequencies of Spiro Engraved vessels are found along the Red River, primarily at the Crenshaw site and other mound sites along the Middle Red River. I propose the Red River may be the locus of production for Spiro Engraved, rather than Spiro. This hypothesis will hopefully challenge us to reevaluate other Caddo pottery types and the meanings of their production and distribution.

Implications of Formative Caddo Craft Production

As I have discussed in Chapters 2 and 4, archaeologists have not acknowledged that the Caddo developed centralized areas of craft production until post A.D. 1200 (Girard et al. 2014). The evidence presented in this study suggests that Formative Caddo participated in the ritual production and exchange of their fine wares. Specialization has been defined as the “production for use by others” (Costin 2007:50). The emergence of craft production in small-scale societies is often analogous to changes in settlement patterns, social structures, and the emergence of ritual complexity (Appadurai 1986; Hodder 1982; Weiner 1994). People then transform objects into social facts (Wright 1996) that are then continually experienced by others who produced and used them (Earle 1997). Crafted objects acquire multiple layers of value, power, and meaning through their production process, the social structure and agency of the artisans, and by diverse groups who use them for discrete practices and traditions (Costin 1998; Spielmann 1998). Therefore, when communities use crafted objects for different domestic and ritual activities, they are in effect materializing their local ideology (Costin 2001). On a regional-scale, production by one community of practice and varied use by others construct social relationships, communicate ritual status and power, and mark social and ritual variability between those groups (Eckert 2008). As Costin (2001:275) emphasized in her work of emerging craft production systems, "the function and meaning of objects cannot be understood fully without understanding who made them." We now know who produced formative fine wares and potters produced them partly to be exported as mortuary offerings hundreds of kilometers to the north. I argue at least some southern Caddo potters can be considered part-time specialists "in the sense of highly skilled production and not simply a task to be taken up periodically by anyone when mortuary obligations demanded" (Wallis et al. 2017:140).

Degree of Specialization

While I maintain Formative Caddo potters were part-time craft specialists, understanding the precise form of specialization, which in this study involves distinguishing between household and communal forms of production, is much more challenging. Because INAA could not distinguish precise production locales within the southern Caddo area, references to either one these levels of specialization would be speculative. As mentioned in Chapter 2, Caddo researchers have argued cases for both household and communal scales of production (Girard 2009; Perttula 2009). Stark's (1992, 1994) ethnoarchaeological research into the organization of Kalinga pottery production and distribution has shown when potters produce complex pottery types in centralized locations with little stylistic variation, it may indicate a communal-level specialization (also see Rice 1987:189). Van Keuren et al. (1997) has argued that communal-level specialization and long-distance exchange can emerge in small-scale societies when pottery production and use exceeds local consumption needs. Such contextual boundaries are characteristic of a ritual economy among different communities of practice (Huntley et al. 2012), in which "ritual and belief define the rules, practices, and consumption" (Spielmann 2002:203).

The combined evidence of the stylistic and INAA results and their implications still point towards a communal level or house hold level of organization. Potters living in close proximity to each other could be producing fine wares at the household level or they may be aggregating to or living at the ceremonial centers to transmit knowledge, learn, and produce the craft. In order to distinguish the degree of the organization of pottery production, we examine: (1) stylistic variability, (2) amount of time and labor put into the craft, and (3) skill and knowledge that show specialized ability. As shown in Chapter 5, there is significant duplication of the same stylistic choices, which result in far less duplication than one might expect given the flexibility present in the design grammar. If potters made fine ware vessels at the household level of production throughout the entire southern Caddo area, I argue there would be more stylistic variability within the 200 vessels in this study. Another possibility that would reject the communal-level organization of production hypothesis could be that just a few households in centralized locations produced the fine wares. The kernel point density maps show large clusters at just a few ceremonial centers for all four fine ware types. This may indicate that potters either lived at or aggregated to these ceremonial centers, like Crenshaw, George C. Davis, and Boxed Springs to teach, learn, and produce the craft. This also makes sense theoretically. Coming together to teach, learn, and produce a craft helps to develop a resilient, socially unified community of practice (Wendrich 2012).

The intensity of craft production or low versus high-intensity production measures the amount of time specialists spent manufacturing and distributing an object (Costin 2001). One way to measure the intensity is to study their deposition to infer the range of activities for which people used them. (Hegmon et al. 1995). Low-investment production is when the object of study is only found within household/domestic contexts, while more intensive production is inferred from their frequent deposition in ceremonial/ritual contexts throughout a region (Costin 2001). However, I do not agree with Costin's argument here. I instead argue an emerging society can have low-level production (specialized or unspecialized) for objects of ritual use. Mills and Crown (1995) suggested the more artisans produce a craft for extra-household consumption and use, it emphasizes a much higher intensity of production. From these points of view, the intensity of formative fine ware production is relatively high because the highest volume and densities are recovered from ceremonial/mortuary contexts in both southern and northern Caddo contexts. Southern Caddo ceramic specialists and perhaps other ritual elites invested significant time and labor in the production and perhaps the transportation of hundreds of whole vessels from their source of production.

The emergence of the earliest Caddo fine ware tradition had to be the result of skilled artisans. I consider the production process and complex design motifs as characteristic of highly skilled specialists. Caddo potters not only produced an entirely new set of design motifs, but they also produced a brand-new vessel form, the tapered-neck bottle. These innovations indicate Formative Caddo specialists developed a form of considerable technologically sophistication, occurring during a period of emerging organizational complexity.

Implications of Multiple Communities of Practice

During the late 9th and early 10th centuries a variety of cultural and material transformations developed into what we know archaeologically as the Formative Caddo landscape. As discussed in Chapter 2, groups began to mark the Formative Caddo landscape with multiple ceremonial centers to produce new ceramic traditions. The emergence of fine wares and their widespread distribution shows people developed a new habitus of ceramic production during the Formative Caddo period, which consisted of the use grog temper, introduction of the bottle, reduced firing atmosphere, highly burnished surfaces, rubbed red and white pigments, and complex motifs. Until now, the spread of these fine wares has been proposed as the emergence of a culturally homogenous ritual landscape (Girard et al. 2014), which suggests a similar habitus throughout the northern and southern regions. Contrary to this view, this research has shown that socially dynamic communities became unified through the centralized production and distribution of fine wares, which may represent the development of separate ritual structures.

As examined in Chapter 4, the learned production and distribution of pottery central is fundamental in understanding single or separate communities of practice (Cordell and Habicht-Mauche 2012). The results of the stylistic and compositional analyses indicate only a limited number of southern Caddo potters produced formative fine wares. With the evidence at hand, it does not appear that northern Caddo communities participated in the learned process of formative fine ware production. This suggests that potters transferred their knowledge and skills of fine ware production to apprentices who shared a close habitus with their teachers and likely shared group membership within a broader southern Caddo social structure.

My argument for two communities of practice in the Caddo region is strengthened by knowing that southern Caddo people produced the fine wares and used them in a variety of domestic contexts. Both regions used the fine wares but northern Caddo inhabitants did not partake in the learned production process and used them only for mortuary purposes. The stylistic study specifies potters had strict rules in place for vessel and design construction. Without the INAA results, the stylistic study alone may have implied a more homogenous community of practice. The combined evidence supports a premise showing a diverse social landscape that completely transforms our current understandings of how Formative Caddo communities interacted and developed. Now that formative groups are considered separate communities of practice, it problematizes and challenges current ideas of Caddo pottery production. The limited number of potters and their controlled use of technological and stylistic attributes suggest southern Caddo practices and traditions are more socially divergent from northern Caddo practices and traditions. It means that the habitus of southern Caddo producers and consumers may have been significantly different than the habitus of northern Caddo communities. Because the two regions produced, distributed, and used them for different reasons, it may indicate they developed alternate pathways to ritual power. In the next section, I explore evidence concerning the possible origins of alternative ritual structures between northern and southern Caddo communities.

Alternate Pathways to Ritual Power

The development of the earliest Caddo fine ware traditions indicates the creation of a new habitus of pottery production. This research has shown it is even more multifaceted than simply a unilineal social transformation. The emergence of potters who produced and exchanged fine wares may emphasize a social response to a demand by ritual elites/specialists as a way to maintain their own ritual power and communal ceremonial obligations (Spielmann 2002:195). The key artifacts used in the most important mortuary ceremonies at Spiro and other Arkansas Valley ceremonial centers for three centuries are now understood as imports. This means that because northern Caddo people imported them from great distances, they would have imbued them with different meanings and connotations than that of the southern Caddo potters. It also indicates that southern Caddo ceramic specialists and perhaps other ritual elites invested significant time and labor in the production of hundreds of whole vessels from their source of production. Because southern Caddo potters produced them, I suspect northern Caddo people traveled (perhaps to the Red River mound sites) to acquire them. The multiple lines of evidence presented here indicate that the northern and southern Caddo people developed their ritual traditions in different ways. What in their history before their emergence could help us to understand the nuances of the diversity of social life? Can these social divergences be studied to understand how ritual objects were used to develop and maintain separate ritual structures?

As discussed in Chapter 2, Spielmann (2002, 2008) has been at the forefront of research aimed at expanding archaeological approaches to the development and organization of small-scale societies. In particular, she has challenged archaeologists' views of ritual complexity and the scale of production and distribution for communal ritual beyond traditional concepts of emerging groups. Spielmann has sought to problematize the concept of ritual mode of production and large-scale distribution in small-scale groups by examining how the organization of production of ritual objects and ceremonial places influence community construction (Spielmann 2008:42). She does not only look at these communities during the occupational period in which they existed but also examines their ancestral past to obtain a historicized view of how early societies crafted and formalized their sacred spaces and objects. I believe this is a good way to begin to understand how two Caddo communities of practice developed separate traditions that branched off into two ways of doing and being in the world. To do this, I examined the Late Woodland social landscape (A.D. 500 – 850) of the northern and southern Caddo areas, as groups who occupied this period are viewed as the direct ancestors of the Caddo (Regnier 2017).

I argue that the emergence and spread of formative fine wares are directly related to the diversity of Late Woodland groups and their historical processes and events. These correspondingly shaped the diversity of the Caddo during the founding of ceremonial centers and ritual complexity. "Understanding how changes in material culture are linked to social transformations has long been one of the primary goals of archaeological research" (Schachner 2008:125). Some archaeological markers researchers study to understand processes leading to cultural change and variability are shifts in ceramic technology, styles, and choices (Stark 1998, 1999; Stark and Longacre 1993). Of particular interest to this study is the social landscape of the Fourche Maline Period and how its collapse led to dramatic shifts in ceramic technology and new ritual systems during the Formative Caddo period.

As defined by Galm (1978, 1984), Fourche Maline potters made primarily flowerpot-shaped vessels. These vessels are typically thick and made with grog temper. Traditionally, archaeologists viewed Fourche Maline communities as semi-sedentary hunter-gatherers (Galm 1984). Recent studies into the complexity of Fourche Maline communities suggested their organization reflected transegalitarian complex hunter-gatherer-horticulturalists (Leith 2011). The most well-known archaeological marker of Fourche Maline groups is black midden mounds made up of flexed burials and traces of habitation surfaces. These mounds dotted the landscape along such streams as Fourche Maline Creek and the Poteau River. Rowe (2014) examined interred individuals from these black midden mounds and discovered high frequencies of skeletal trauma. As much as 25% of the individuals interred in these mounds died from violence-related trauma. She argued that high rates of skeletal trauma reflected an increase in feuding. Rowe's results indicated that by the end of the Fourche Maline period, began contesting their social landscape. Rowe surmised that population growth and competition over resources might have led to conflict between different communities. The competition over resources may have been the catalyst by which late Fourche Maline groups reorganized their settlements, constructed ceremonial centers, and transformed their material culture during the Formative Caddo period (Rowe 2014:153-154). Whether these influences resulted completely from warfare and violence remains to be determined. It is possible the mass amount of violence Rowe documented during a period right before formative Caddo people emerged influenced this social transformation to some degree.

There may be a direct relationship with the number of Late Woodland groups who lived within the Caddo area and the emergence of different Caddo communities of practice. Fourche Maline groups may have reorganized themselves in the Arkansas Valley, while Mossy Oak and Mills Creek groups reorganized themselves in the southern Caddo area. These groups had different histories and established their own social processes which led to significant changes in their practices, traditions, and ritual structures by the Formative Caddo period. This dramatic shift in settlement location may have influenced transformations in material culture, including the production and distribution of formative fine wares. Southern Caddo potters (ritual elites who resided at ceremonial centers may have had some control over their distribution) produced formative fine wares in part to expand their social ties with northern Caddo ritual elites at Arkansas Valley ceremonial centers as a way in which to maintain ceremonial obligations. As Schachner (2008:139) pointed out, “processes of resettlement and new exchange relationships between separate communities of practice would have been a prime opportunity for initiations of key changes in ritual structures.” Formative fine ware production and distribution may have created new opportunities for distant communities to develop new social and ritual ties. The different ways in which these two communities of practice used these fine wares may indicate the emergence of alternate ritual structures.

The shift away from thickly-made vessels to highly complex engraved wares represented a dramatic break with Fourche Maline technological styles. The continued use of grog temper for formative fine wares, at a time when most other emerging Mississippian groups began to use shell temper for their pottery, highlights the importance of sustaining social ties to a localized past. The variability of social practices and the deposition of fine wares in mortuary contexts among ritual elites at northern Caddo ceremonial centers also indicate the maintenance of a distinctive ritual structure. The preservation of the two new ritual horizons appears to have been an important way for different Caddo communities of practice to distinguish themselves and for ritual craft specialists and elites to maintain their power.

All in all, from A.D. 850 – 1100, with the shift to fine ware production and large-scale exchange, residents of the northern and southern Caddo areas formed separate communities of practice, incorporating these objects for their own local practices and traditions. As a result, northern and southern communities were both reconstructed and created anew. These social distinctions likely encouraged and solidified the formation of separate ritual structures and maintained long-distance exchange relationships. The resulting shift to fine ware production in the southern Caddo region and the marked differences in use and deposition (and other practices and traditions) in the northern Caddo region is perhaps the process of community building and identity formation. The intricacies of the Formative Caddo ritual landscape would have been largely inexplicable without placing it in historical contexts and connecting the same pots to the diversity of social life, practices, and traditions.

Conclusions

The relationships between the production and distribution of formative fine wares and the creation of two distinct ritual horizons are multilayered. The results from multiple lines of evidence have shown that communities of the Formative Caddo ritual landscape developed a rich, complexly patterned fine ware exchange system between two separate communities of practice. The transport of fine wares from the south to the north likely means these regions had different meanings and traditions associated with these vessels. The evaluation of technological style and compositional data indicates that only a few ceramic specialists at more centralized locations were responsible for the mass production and long-distance export of fine wares.

In the southern Caddo area, people used fine ware pottery in ceremonial and domestic contexts, part of a newly adopted ritual system focused on widespread social integration. In the northern Caddo area, ritual elites used fine ware pottery for mortuary use at Spiro and other Arkansas Valley ceremonial centers. Because fine wares were produced hundreds of kilometers to the south, Arkansas Valley ritual elites may have ascribed them with different meanings and connotations. The production of this early fine ware industry, was influential in the development of these two new ritual systems, but it also provided mechanisms of partnership that allowed different Caddo communities of practice could interact with one another.

This study demonstrates we should not only reevaluate northern Caddo belief systems, but also reconsider the ritual complexity of other small-scale societies in the pre-Columbian southeast as many archaeologists have begun to do (Pluckhahn 2017; Wallis et al. 2017). The ritual venues ritual elites and craft specialists ascribed and maintained their power should be considered important contexts of study in groups with an emerging organizational complexity. By researching and acknowledging the ritual complexity of societies of all different scales, we begin to broaden our knowledge of the diverse social interplay that shaped their social, ritual, and economic dynamics.

Future Work

I see this study as an initial step into understanding the diverse patterning of early Caddo production and exchange. I believe the implications of the study further broaden our understandings of Caddo's fascinating history of identity, ceramic specialization, large-scale production and distribution. I hope this research motivates other researchers to review current assumptions of small-scale societies. There is great room to improve our current understandings of how Caddo people interacted with one another. The compositional variability that I identified in the Arkansas Valley reference group shows that future compositional studies could be used to determine the movement of ceramics within and between northern Caddo sites. The whole vessels used in this study is by no means comprehensive. I implore other researchers to compare my stylistic results with other whole vessels and sherd assemblages to observe whether or not the hypotheses proposed here need further refinement. Finally, future researchers may want to take into account other material objects that are associated with formative fine wares in this study, because they only show a small window into the emergence of the Caddo ritual landscape.

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Appendix A. Arkansas Valley Ceramic Samples used for INAA

Site Name	Site Number	ANID	Alternate ID	Museum	Local Subregion	Northing	Easting	Ceramic Type	Vessel Form	Exterior Decoration	Context	Provenience	Period	Date Range
Spiro	34LF40	SPL001	LF001	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 90-2	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL002	LF002	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 42-01	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL003	LF003	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 51-09	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL004	LF004	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 51-09	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL005	LF005	Sam Noble Museum	Arkansas River Valley	3908840	357140	Hickory Engraved	bottle	engraved	subsurface	Craig Mound/Burial 62-04	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL006	LF006	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 175-01	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL007	LF007	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 182-01c	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL008	LF008	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 187	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL009	LF009	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 189-11	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL010	LF010	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 185-11	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL011	LF011	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 185-02	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL012	LF012	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 189-11	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL013	LF013	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 185-02	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL014	LF014	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 185-02	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL015	LF015	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 189-13	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL016	LF016	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 189-10	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL017	LF017	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 189-01	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL018	LF018	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 189-10	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL019	LF019	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 62?	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL020	LF020	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 62?	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL021	LF021	Sam Noble Museum	Arkansas River Valley	3908840	357140	Crockett Curvilinear	bowl	incised	subsurface	Craig Mound/Unknown Burial	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL022	LF022	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Unknown Burial	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL023	LF023	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 120-06	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL024	LF024	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Criag Mound/Burial 11-05	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL025	LF025	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 103-01	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL026	LF026	Sam Noble Museum	Arkansas River Valley	3908840	357140	Crockett Curvilinear	bowl	incised	subsurface	Criag Mound/Burial 155-08	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL027	LF027	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Criag Mound/Burial 166-05	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL028	LF028	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 69-04a	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL029	LF029	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle	engraved	subsurface	Craig Mound/Burial 62	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL030	LF030	Sam Noble Museum	Arkansas River Valley	3908840	357140	Spiro Engraved	bottle?	engraved	subsurface	Craig Mound/Burial 62	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL031	LF031	Sam Noble Museum	Arkansas River Valley	3908840	357140	HIckory Engraved	bottle	engraved	subsurface	Craig Mound/Burial 62	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL032	LF032	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Spiro Engraved	bottle?	engraved	subsurface	Criag Mound/Burial 27	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL033	LF033	Sam Noble Museum	Arkansas River Valley	3908840	357140	Crockett Curvilinear	bowl	incised	subsurface	Craig Mound/Burial 28-01	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL034	LF034	Sam Noble Museum	Arkansas River Valley	3908840	357140	Hickory Engraved	bowl	engraved	subsurface	Craig Mound/Burial 177-08	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL035	LF035	Sam Noble Museum	Arkansas River Valley	3908840	357140	Pennington Punctate	bowl	incised/punctate	subsurface	Craig Mound/Burial 281 A#18	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL036	LF036	Sam Noble Museum	Arkansas River Valley	3908840	357140	Possible Crockett Curvilinear	bowl	incised	subsurface	Craig Mound/Burial 80-03a	early Mississippian	A.D. 850 - 1150
Spiro	34LF40	SPL037	LF037	Sam Noble Museum	Arkansas River Valley	3908840	357140	Holly Fine Engraved	ravy boat bow	engraved	subsurface	Craig Mound/Burial 82-02	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL038	LF038	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit A 12"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL039	LF039	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit A 12"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL040	LF040	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit A 12"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL041	LF041	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit A 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL042	LF042	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit A 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL043	LF043	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit A 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL044	LF044	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit A 13"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL045	LF045	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit A 18"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL046	LF046	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit C 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL047	LF047	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit C 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL048	LF048	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit C 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL049	LF049	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit C 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL050	LF050	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit C 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL051	LF051	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit C 24"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL052	LF052	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit D 11"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL053	LF053	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit D 16"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL054	LF054	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit D 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL055	LF055	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit D 11"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL056	LF056	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit D 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL057	LF057	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit D 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL058	LF058	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit D 14"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL059	LF059	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit F 19"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL060	LF060	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit F 19"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL061	LF061	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit F 19"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL062	LF062	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit G 10"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL063	LF063	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit G 10"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL064	LF064	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit B 10"	early Mississippian	A.D. 850 - 1150

Site Name	Site Number	ANID	Alternate ID	Museum	Local Subregion	Northing	Easting	Ceramic Type	Vessel Form	Exterior Decoration	Context	Provenience	Period	Date Range
Spiro	34LF48	SPL065	LF065	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit B 10"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL066	LF066	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit E 24"	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL067	LF067	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit T	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL068	LF068	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit T	early Mississippian	A.D. 850 - 1150
Spiro	34LF48	SPL069	LF069	Sam Noble Museum	Arkansas River Valley	3908840	357140	Williams Plain	Jar	plain	subsurface	Lower Terrace/Test Pit T	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL070	CK070	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bowl	incised	subsurface	Unit 1B/Burial 114	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL071	CK071	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bowl	incised	subsurface	it 1B/Burial 114a/Sqaure S13-	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL072	CK072	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bowl	incised	subsurface	it 1B/Burial 114a/Square S13-	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL073	CK073	Sam Noble Museum	Arkansas River Valley	3977237	298670	Hickory Engraved	bottle	engraved	subsurface	nit 1B/Burial 41/Square S13-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL074	CK074	Sam Noble Museum	Arkansas River Valley	3977237	298670	Pennington Punctate	bowl	incised/punctate	subsurface	nit 1A/Burial 38/Square S4-R2	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL075	CK075	Sam Noble Museum	Arkansas River Valley	3977237	298670	Pennington Punctate	bowl	incised/punctate	subsurface	nit 1B/Burial 73/Square S13-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL076	CK076	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bowl	incised	subsurface	nit 1B/Burial 73/Square S13-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL077	CK077	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bowl	incised	subsurface	nit 1B/Burial 73/Square S13-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL078	CK078	Sam Noble Museum	Arkansas River Valley	3977237	298670	Pennington Punctate	bowl	incised	subsurface	C/Burial 74/Square 20 S21-R8 L	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL079	CK079	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	nit 1B/ Burial 75/Square S14-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL080	CK080	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bowl	incised	subsurface	it 1C/Burial 100/Square S20-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL081	CK081	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	it 1C/Burial 94b/Square S19-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL082	CK082	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	it 1C/Burial 94b/Square S19-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL083	CK083	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bowl	incised	subsurface	C/Burial 100/Square S20-R7 L	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL084	CK084	Sam Noble Museum	Arkansas River Valley	3977237	298670	Pennington Punctate	bowl	incised/punctate	subsurface	Unit 1B/Burial 114	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL085	CK085	Sam Noble Museum	Arkansas River Valley	3977237	298670	Holly Fine Engraved	beaker	engraved	subsurface	it 1B/Burial 114b/Square S12-	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL086	CK086	Sam Noble Museum	Arkansas River Valley	3977237	298670	Pennington Punctate	bowl	incised/punctate	subsurface	t 1B/Burial 114a/Sqauare S13-	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL087	CK087	Sam Noble Museum	Arkansas River Valley	3977237	298670	Pennington Punctate	bowl	incised/punctate	subsurface	nit 1B/Burial 116/Square S8-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL088	CK088	Sam Noble Museum	Arkansas River Valley	3977237	298670	Hickory Engraved	bowl	engraved	subsurface	nit 1B/Burial 35/Square S13-R	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL089	CK089	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bowl	incised	subsurface	Unit 1C/Burial 100?	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL090	CK090	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S21-R5 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL091	CK091	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S22-R5 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL092	CK092	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S20-R7 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL093	CK093	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bowl	engraved	subsurface	1C/Burial?/Square S20-R6 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL094	CK094	Sam Noble Museum	Arkansas River Valley	3977237	298670	Possible Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S20-R5 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL095	CK095	Sam Noble Museum	Arkansas River Valley	3977237	298670	Possible Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S22-R5 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL096	CK096	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S21-R5 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL097	CK097	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S22-R5 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL098	CK098	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S19-R6 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL099	CK099	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	bottle	engraved	subsurface	1C/Burial?/Square S19-R6 Lev	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL100	CK100	Sam Noble Museum	Arkansas River Valley	3977237	298670	Hickory Engraved	turned into a	engraved	subsurface	it 1C/Burial?/Square S21-R6 1	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL101	CK101	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	ravy boat bow	engraved	subsurface	it 1B/Burial?/Square S13-R5 3	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL102	CK102	Sam Noble Museum	Arkansas River Valley	3977237	298670	Spiro Engraved	ravy boat bow	engraved	subsurface	it 1B/Burial?/Square S13-R7 3	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL103	CK103	Sam Noble Museum	Arkansas River Valley	3977237	298670	Crockett Curvilinear	bottle	incised	subsurface	nit1B/Burial?/Square S13-R6 4	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL104	CK104	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 2/Square N3-0 Level 3	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL105	CK105	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N4-L7 Layer B	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL106	CK106	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N4-L2 Layer A	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL107	CK107	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N3-L2 Layer B	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL108	CK108	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4 Square N1-L9 Layer B	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL109	CK109	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4 Square N4-L7 Layer B	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL110	CK110	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4 Square N3-L6 Layer B	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL111	CK111	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 2/Square N1-R1 Level 2	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL112	CK112	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 2	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL113	CK113	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 2/Square N3-R1	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL114	CK114	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 2/Square N3-R1 Level 3	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL115	CK115	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 2/Square 0-N1 Level 4	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL116	CK116	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 2/Square N4-R3 Level 2	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL117	CK117	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 2/Square N4-R4 Level 3	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL118	CK118	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N3-L8 Layer B	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL119	CK119	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N3-L9 Level 5	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL120	CK120	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N3-L9 Level 3	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL121	CK121	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N6-L3	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL122	CK122	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N6-L2	early Mississippian	A.D. 850 - 1150
Harlan	34CK6	SPL123	CK123	Sam Noble Museum	Arkansas River Valley	3977237	298670	Williams Plain	Jar	Plain	subsurface	Unit 4/Square N6-L8	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL124	CK124	Sam Noble Museum	Arkansas River Valley	3969780	327560	Pennington Punctate	bowl	incised/punctate	subsurface	Test Pit 2/Burial?	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL125	CK125	Sam Noble Museum	Arkansas River Valley	3969780	327560	Crockett Curvilinear	bowl	engraved	subsurface	Test Pit 2/Burial?	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL126	CK126	Sam Noble Museum	Arkansas River Valley	3969780	327560	Possible Spiro Engraved	bottle	engraved	subsurface	Test Pit? SE Sec 9	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL127	CK127	Sam Noble Museum	Arkansas River Valley	3969780	327560	Crockett Curvilinear	bowl	incised	subsurface	NE Sec 4 SW 19:8	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL128	CK128	Sam Noble Museum	Arkansas River Valley	3969780	327560	Possible Spiro Engraved	bottle	engraved	subsurface	Test Pit 2/SE Sec 9	early Mississippian	A.D. 850 - 1150

Site Name	Site Number	ANID	Alternate ID	Museum	Local Subregion	Northing	Easting	Ceramic Type	Vessel Form	Exterior Decoration	Context	Provenience	Period	Date Range
Brackett	34CK43	SPL129	CK129	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Burial ?	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL130	CK130	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Burial ?	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL131	CK131	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Test Pit 2/Burial?/4:8 SE Sec 9	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL132	CK132	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Stake 11:4/Burial ?	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL133	CK133	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Stake 11:4/Burial ?	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL134	CK134	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Test Pit 2/Burial?/Stake 4:6	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL135	CK135	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Test Pit 2/Burial?/Stake 10:8	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL136	CK136	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Test Pit 2/Burial?/SE Sec 9	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL137	CK137	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Test Pit 2/Buria?/Stake 2:6	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL138	CK138	Sam Noble Museum	Arkansas River Valley	3969780	327560	Spiro Engraved	bottle	engraved	subsurface	Test Pit 2/Burial?	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL139	CK139	Sam Noble Museum	Arkansas River Valley	3969780	327560	Crockett Curvilinear	bowl	incised	subsurface	Stake 11:7/Burial?	early Mississippian	A.D. 850 - 1150
Brackett	34CK43	SPL140	CK140	Sam Noble Museum	Arkansas River Valley	3969780	327560	Hickory Engraved	bottle	engraved	subsurface	Burial ?	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL141	CK141	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 3	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL142	CK142	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 3	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL143	CK143	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 1	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL144	CK144	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 3	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL145	CK145	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 1	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL146	CK146	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL147	CK147	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 3	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL148	CK148	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 3	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL149	CK149	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 1	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL150	CK150	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2/Stake 4:5	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL151	CK151	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 1/Stake SW 2:2	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL152	CK152	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	House I Test Area	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL153	CK153	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	NE SEC 4 SW/Stake 18:18	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL154	CK154	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 3/Stake 5:11	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL155	CK155	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	surface	surface collection	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL156	CK156	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	surface	surface collection	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL157	CK157	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	surface	surface collection	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL158	CK158	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2/Stake 4:8	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL159	CK159	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2/Stake 11:2	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL160	CK160	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2/Stake 1:1	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL161	CK161	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2/Stake 10:8	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL162	CK162	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2/Stake 10:8	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL163	CK163	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2/Stake 10:8	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL164	CK164	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Test Pit 2/SE Sec 9	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL165	CK165	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Stake 8:1	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL166	CK166	Sam Noble Museum	Arkansas River Valley	3969780	327560	Williams Plain	jar	plain	subsurface	Stake 2:1	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL167	CK167	Sam Noble Museum	Arkansas River Valley	3969780	327560	daub	daub	plain	subsurface	Stake 11:10	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL168	CK168	Sam Noble Museum	Arkansas River Valley	3969780	327560	daub	daub	plain	subsurface	Stake 8:15/N3 9" E 4.10	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL169	CK169	Sam Noble Museum	Arkansas River Valley	3969780	327560	daub	daub	plain	subsurface	Stake SW 20:12/NE Sec 4 4"	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL170	CK170	Sam Noble Museum	Arkansas River Valley	3969780	327560	daub	daub	plain	subsurface	Stake SW 20:12/NE Sec 9	early Mississippian	A.D. 850 - 1150
Brackett	34Ck43	SPL171	CK171	Sam Noble Museum	Arkansas River Valley	3969780	327560	daub	daub	plain	subsurface	Stake 11:10	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL172	WG172	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 26	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL173	WG173	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 26	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL174	WG174	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 30	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL175	WG175	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 30-04	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL176	WG176	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 36-08	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL177	WG177	Sam Noble Museum	Arkansas River Valley	3979107	294854	Hickory Engraved	bottle	engraved	subsurface	Burial 36-09	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL178	WG178	Sam Noble Museum	Arkansas River Valley	3979107	294854	Hickory Engraved	bottle	engraved	subsurface	Burial 36-10	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL179	WG179	Sam Noble Museum	Arkansas River Valley	3979107	294854	Hickory Engraved	bottle	engraved	subsurface	Burial 36	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL180	WG180	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 36-11	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL181	WG181	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 36	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL182	WG182	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 36-17	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL183	WG183	Sam Noble Museum	Arkansas River Valley	3979107	294854	Possible Hickory Engraved	bottle	engraved	subsurface	Burial 36-14	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL184	WG184	Sam Noble Museum	Arkansas River Valley	3979107	294854	Hickory Engraved	bottle	engraved	subsurface	Burial 36-13	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL185	WG185	Sam Noble Museum	Arkansas River Valley	3979107	294854	Possible Spiro Engraved	bottle	engraved	subsurface	Burial 47	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL186	WG186	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 67	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL187	WG187	Sam Noble Museum	Arkansas River Valley	3979107	294854	Hickory Engraved	bottle	engraved	subsurface	Burial 87	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL188	WG188	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 36-6	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL189	WG189	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved	bottle	engraved	subsurface	Burial 36-5	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL190	WG190	Sam Noble Museum	Arkansas River Valley	3979107	294854	Spiro Engraved (possibly fake?)	bottle	engraved	subsurface	Burial 15-01	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL191	WG191	Sam Noble Museum	Arkansas River Valley	3979107	294854	Possible Spiro Engraved	bottle	engraved	subsurface	Burial 19	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL192	WG192	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	II A-83	early Mississippian	A.D. 850 - 1150

Site Name	Site Number	ANID	Alternate ID	Museum	Local Subregion	Northing	Easting	Ceramic Type	Vessel Form	Exterior Decoration	Context	Provenience	Period	Date Range
Norman	34WG2	SPL193	WG193	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-88	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL194	WG194	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	II A-114	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL195	WG195	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-118	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL196	WG196	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-918	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL197	WG197	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-918	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL198	WG198	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-118	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL199	WG199	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-118	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL200	WG200	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-118	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL201	WG201	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	II A-118	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL202	WG202	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	A-121	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL203	WG203	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	A-121	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL204	WG204	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	A-121	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL205	WG205	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	A-121	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL206	WG206	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	A-121	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL207	WG207	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	II A-115	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL208	WG208	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	A-120	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL209	WG209	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	II A-117	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL210	WG210	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	II A-117	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL211	WG211	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-117	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL212	WG212	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	II A-117	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL213	WG213	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	II A-72	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL214	WG214	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	II A-72	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL215	WG215	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	II A-40	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL216	WG216	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	II A-39	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL217	WG217	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	II A-74	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL218	WG218	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	A-75	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL219	WG219	Sam Noble Museum	Arkansas River Valley	3979107	294854	Poteau Plain	jar	plain	subsurface	A-34	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL220	WG220	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	II A-139	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL221	WG221	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	A-122	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL222	WG222	Sam Noble Museum	Arkansas River Valley	3979107	294854	Sanders Plain	jar	plain	subsurface	A-124	early Mississippian	A.D. 850 - 1150
Norman	34WG2	SPL223	WG223	Sam Noble Museum	Arkansas River Valley	3979107	294854	Williams Plain	jar	plain	subsurface	A-124	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL224	DL224	Sam Noble Museum	Arkansas River Valley	4058200	342080	Possible Hickory Engraved	bottle	engraved	subsurface	Burial 33-02	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL225	DL225	Sam Noble Museum	Arkansas River Valley	4058200	342080	Spiro Engraved	bottle	engraved	subsurface	Burial 2-01	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL226	DL226	Sam Noble Museum	Arkansas River Valley	4058200	342080	Spiro Engraved	bottle	engraved	subsurface	Burial 2-01	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL227	DL227	Sam Noble Museum	Arkansas River Valley	4058200	342080	Spiro Engraved	bottle	engraved	subsurface	Burial 4-01	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL228	DL228	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL229	DL229	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL230	DL230	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL231	DL231	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL232	DL232	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL233	DL233	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL234	DL234	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL235	DL235	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL236	DL236	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL237	DL237	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL238	DL238	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL239	DL239	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Habitation Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL240	DL240	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Stake 6:7 Strat 4	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL241	DL241	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Stake 6:7 Strat 5	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL242	DL242	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 6:7 Strat 5	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL243	DL243	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Stake 6:7 Strat 5	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL244	DL244	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 2:8 Strat 5	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL245	DL245	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 6:7 Strat 7	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL246	DL246	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 2:8 Strat 8	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL247	DL247	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 6:7 Strat 2	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL248	DL248	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Stake 6:7 Strat 2	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL249	DL249	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 7:7 Strat 8	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL250	DL250	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 7:7 Strat 2	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL251	DL251	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 1:7 Strat 3	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL252	DL252	Sam Noble Museum	Arkansas River Valley	4058200	342080	Williams Plain	jar	plain	subsurface	Stake 6:7 Strat 2	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL253	DL253	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL254	DL254	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 7:7 Strat 5	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL255	DL255	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Stake 7:7 Strat 4	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL256	DL256	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150

Site Name	Site Number	ANID	Alternate ID	Museum	Local Subregion	Northing	Easting	Ceramic Type	Vessel Form	Exterior Decoration	Context	Provenience	Period	Date Range
Reed	34DL1,4	SPL257	DL257	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL258	DL258	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL259	DL259	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL260	DL260	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL261	DL261	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL262	DL262	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL263	DL263	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150
Reed	34DL1,4	SPL264	DL264	Sam Noble Museum	Arkansas River Valley	4058200	342080	Poteau Plain	jar	plain	subsurface	Disturbed Area	early Mississippian	A.D. 850 - 1150

Appendix B. Ceramics used for Kernel Point Density Analysis.

Site #	Site Name	UTM			Latitute	Longitutude	Crockett Curvilinear	Holly Fine Engraved	Hickory Engraved	Spiro Engraved	Total Finewares	Mound Site	Domestic Site
41NA223	N/A	15	N3497500	E342850	31.601888	-94.656526	0	1	0	0	1		X
41SM195A	Browning SIte	15	N3585973	E300194	32.3946	-95.1242	0	0	1	0	1		X
41CE309	Mud Creek Site	15	N3526133	E311264	31.857	-94.9948	1	0	0	0	1		X
41RK191	N/A	15	N3526367	E327558	31.8617	-94.8227	0	1	0	0	1		X
41RK197	Heaton #2 Sites	15	N3526826	E327981	31.8659	-94.8183	0	1	0	0	1		X
41RK200	N/A	15	N3525291	E328011	31.8521	-94.8178	0	0	1	0	1		X
41CP230	Cherokee Point Site	15	N3657829	E305989	33.0434	-95.0776	0	1	1	0	2		X
41WD52	M.W. Burks Site	15	N3634985	E274464	32.8315	-95.4094	1	0	1	0	2		X cemetery
41SM195	Wolf Site	15	N3585973	E300194	32.3946	-95.1242	2	5	0	0	7		X
41TT650	Crabb Site	15	N3667819	E313853	33.1349	-94.9955	3	11	0	2	16		X
41UR279	South Lilly Site	15	N3640975	E307160	32.889983	-95.061579	0	0	1	1	2		X
41CP245	Polk Estates Site	15	N3658303	E319941	33.0501	-94.9284	2	0	1	3	6		X cemetery
41HS574	Coleman Farm Site	15	N3591913	E367059	32.4582	-94.4144	0	0	2	0	2		X
41BW171	Cranfill Site	15	N3712211	E378445	33.5444	-94.3092	1	0	2	0	3		X cemetery
41WD46	Carlisle Site	15	N3609967	E279068	32.6069	-95.3543	1	0	0	0	1		X
41LR351	N/A	15	N3740077	E271897	33.7762722	-95.463306	0	2	0	0	2		X
41SM442	Alligator Pond Site	15	N3596883	E281882	32.4878199	-95.321323	1	1	1	0	3		X
41CE339	Buckner Dam Site	15	N3532396	E281562	31.90815	-95.309976	0	0	2	0	2		X
41CE445	Piney Point Site	15	N3532970	E283225	31.911955	-95.292539	0	0	1	0	1		X
41SM440	Sarah's Deer Stand Site	15	N3597762	E282201	32.495805	-95.318133	0	0	1	0	1		X
41CP239	Tom Hanks SIte	15	N3655585	E320255	33.0257	-94.9245	0	1	0	0	1	X2	
41MR6	Younger Site	15	N3624774	E347747	32.752	-94.6252	1	0	0	0	1		X cemetery
41CP288	Dead Oak or Trailer House Cove Site	15	N3657175	E305102	33.03738	-95.08699	5	0	0	0	5		X
41TT758	TXU Park and Boat Ramp Site	15	N3661890	E310660	33.0791375	-95.02846	0	3	1	0	4		X
41CP8	Sam Roberts Site	15	N3645307	E329239	32.9344	-94.8264	0	0	1	0	1	X?	
41CP496	Sam D. Carpenter Garden Plot Site	15	N3650550	E326129	32.979486	-94.860693	0	0	1	0	1		X
41WD208	Goldsmith SIte	15	N3635125	E271023	32.832	-95.4462	0	1	1	0	2		X
41SM193	Redwine Site	15	N3585544	E300177	32.390746	-95.124335	11	0	0	0	11	X1	
41SM55	Bryan Hardy Site	15	N3587810	E290508	32.409396	-95.227558	0	0	2	0	2	X1	
41HS524	Gray's Pasture Site	15	N3591578	E350118	32.453	-94.5946	5	1	1	2	9		X
41PN149	Tom Moore SIte	15	N3562210	E363709	32.1899	-94.4458	6	0	0	0	6	X1	
41SM56	Henry Chapman SIte	15	N3590039	E307805	32.4326	-95.0442	18	36	0	2	56		X
41SA135	N/A	15	N3488379	E376468	31.5254	-94.3011	0	1	1	0	2		X
41CP71	Greasy Creek Site	15	N3643554	E330304	32.9188	-94.8147	1	0	1	1	3		X
41TT891	Cedar Island Site	15	N3657700	E301570	33.039746	-95.124912	1	1	2	0	4		X
41TT892	Monticello TXU Park Site	15	N3661720	E310400	33.077559	-95.0312403	0	0	1	0	1		X
41UR10	Harroun Site	15	N3634421	E341948	32.8382	-94.6887	0	0	1	0	1	X3	
41CE19	George C. Davis Site	15	N3497576	E296136	31.5969	-95.1487	818	1101	227	1	2147	X3	
41HP78	Lawson Site	15	N3690096	E255049	33.3239	-95.6314	12	4	7	0	23		X
41SM89	N/A	15	N3566619	E268477	32.214	-95.4565	1	1	1	0	3		X
41SM90	Neches #3 Site	15	N3571740	E268132	32.2601	-95.4614	0	0	1	0	1		X
41CV21	Grimes Houy Burned Rock Midden Site	15	N3464338	E647262	31.3058	-97.4526	0	6	0	0	6		X
41CS2	Hawkins Bluff Site	15	N3681654	E357396	33.2662	-94.5311	2	1	0	0	3		X
41CS44	N/A	15	N3681277	E388641	33.2665	-94.1956	2	0	0	1	3		X
41TL7	N/A	15	N3421297	E358894	30.9183	-94.4767	1	1	0	0	2		X
41HE8	M.S. Roberts Site	15	N3552200	E252850	32.451	-95.377	1	0	0	0	1	X1	
41SA48	N/A	15	N3488836	E400699	31.351862	-94.045974	1	1	0	0	2		X
41SA50	N/A	15	N3485700	E403479	31.503802	-94.016389	1	0	0	0	1		X
41SA52	N/A	15	N3486751	E402789	31.513225	-94.023756	2	0	0	0	2		X
41WD109	Spoonbill Site	15	N3646876	E268715	32.9374	-95.4737	1	0	0	0	1		X cemetery
41AG9	N/A	15	N3479360	E330898	31.4383	-94.7793	1	1	0	0	2		X cemetery
41AG10	N/A	15	N3479235	E332297	31.4374	-94.7646	0	1	1	0	2		X cemetery
41CE42	Will Odham Site	15	N3531252	E291477	31.8997	-95.2049	1	1	0	1	3		X cemetery
41GG3	N/A	15	N3589680	E329561	32.4329	-94.8128	0	0	1	0	1		X cemetery
41JP3	N/A	15	N3430116	E387888	31.001	-94.1743	1	0	0	0	1		X
41SB35	N/A	15	N3462483	E417261	31.295413	-93.869345	0	1	0	0	1		X cemetery

Site #	Site Name	UTM			Latitute	Longitude	Crockett Curvilinear	Holly Fine Engraved	Hickory Engraved	Spiro Engraved	Total Finewares	Mound Site	Domestic Site
41SB36	N/A	15	N3449761	E405311	31.1797	-93.9937	2	2	0	1	5		X cemetery
41AG3	N/A	15	N3467777	E320702	31.3323	-94.8845	0	0	1	0	1		X
41AG5	N/A	15	N3467189	E322004	31.3272	-94.8707	0	1	0	0	1		X
41CE43	J.B. Maxwell Site	15	N3530788	E292336	31.8957	-95.1958	0	1	0	0	1		X
41LR2	Sanders Site	15	N3746720	E236269	33.8296	-95.8496	0	0	1	1	2	X2	
41CE289	N/A (just north of George C. Davis)	15	N3498582	E296047	31.606	-95.1498	3	14	0	0	17	X?	
41CE477	Peach Orchard Site	15	N3508805	E301381	31.6974026	-95.095716	0	1	0	0	1		X
41HE338	N/A	15	N3552060	E253834	32.0797	-95.608	0	1	0	0	1		X
41CE476	Cornfield Site	15	N3509316	E301066	31.7019552	-95.0991425	0	0	1	0	1		X
41NA5	N/A	15	N3509190	E345856	31.7094	-94.6267	0	1	0	0	1		X
41NA6	N/A	15	N3506333	E320064	31.679884	-94.898222	0	1	0	0	1		X
41NA65	N/A	15	N3490455	E327181	31.5378	-94.8204	0	1	0	0	1		X
41WD632	N/A	15	N3613721	E266815	32.638227	-95.48572	2	3	4	0	9		X
41SA15	N/A	15	N3498234	E387173	31.615389	-94.189495	0	0	1	0	1		X
41SA80	N/A	15	N3470624	E392157	31.3668	-94.1339	0	2	1	0	3		X
41SA77	N/A	15	N3478385	E390998	31.4367	-94.147	1	0	1	0	2		X
41SA108	N/A	15	N3484020	E404443	31.4887	-94.0061	1	2	0	0	3		X
41SA9	N/A	15	N3498430	E386760	31.6171	-94.1939	0	0	1	0	1		X
41SA11	N/A	15	N3495892	E388785	31.594426	-94.172243	0	1	0	0	1		X
41SA85	J. McGilberry Site	15	N3456974	E378678	31.2423	-94.274	3	3	0	1	7		X
41SA96	41-42D6-2 Site	15	N3458539	E39290	31.2578	-94.1246	5	5	1	0	11		X
41TT321	Roger D. Simmos Site	15	N3394980	E303600	30.6714129	-95.0500677	0	6	0	1	7		X cemetery
41RR2	Frank Norris Farm Site	15	N3755369	E293759	33.920327	-95.230959	0	2	2	3	7	X3	
41UR30	Boxed Springs Mound Site	15	N3604018	E302943	32.5578	-95.0988	1	6	26	20	53	X4	
41SM73	Joe Meyer Estate Site	15	N3562938	E272350	32.1817	-95.4145	0	6	1	1	8		X
41RR3	T.N. Coles Site	15	N3700040	E302446	33.4233	-95.1247	0	3	4	4	11	X1	
41RR11	Dan Holdeman SIte	15	N3748341	E312314	33.8605	-95.0289	11	1	1	19	32	X1	
41TT36	Tigert #1 Site	15	N3671367	E320635	33.168	-94.9235	0	1	0	0	1		X
41RR214	Ernst Roitsch Site	15	N3750176	E306229	33.875892	-95.095004	1	4	0	0	5		X
41NA285	Boyette Site	15	N3514678	E348032	31.759189	-94.604583		1	0	0	1		X
41RR41	Bentsen-Clark Site	15	N3742145	E320902	33.8061	-94.9348	4	2	3	24	33		X cemetery
41FK2	N/A	15	N3652062	E288878	32.9883	-95.2594	0	1	0	1	2		X
41BW3	Hatchel SIte	15	N3712478	E394753	33.5485	-94.1337	3	0	1	0	4	X2	
41HS74	N/A	15	N3592340	E357698	32.4609	-94.5141	1	0	1	0	2		X cemetery
41CP25	Peach Orchard Overlook Site	15	N3660720	E311271	33.0704	-95.0217	1	0	0	0	1		X
41BW8	Stover Lake	15	N3690766	E394525	33.3527	-94.1336	4	0	3	0	7		X cemetery
41FK3	N/A	15	N3672904	E299566	33.1782	-95.1497	0	0	2	4	6		X
41SM56	Chapman Site	15	N3590039	E307805	32.4326	-95.0442	0	1	1	0	2		X
41GG5	N/A	15	N3601615	E334817	32.5413	-94.759	0	0	1	0	1		X
41GG50	Teneryville #1 Site	15	N3601275	E327238	32.5371	-94.8397	0	0	2	0	2		X cemetery
41BW4	Paul Mitchell SIte	15	N3711732	E395369	33.5418	-94.1269	3	0	7	3	13		X cemetery
41LR39	Little Pine Mound Site	15	N3742045	E283398	33.7982	-95.3397	0	0	1	1	2	X1	
41RK2	Torn Shumate Farm Site	15	N3529159	E344466	31.889313	-94.644534	1	1	1	1	4		X
41BW33	Old Berry Place Site	15	N3681352	E381872	33.2665	-94.2683	2	0	1	0	3		X
41RR77	Rowland Clark Site	15	N3745204	E316972	33.833	-94.9779	0	0	1	1	2		X cemetery
41HS12	Mound Pond Site	15	N3622520	E393326	32.7371	-94.1385	3	3	2	0	8	X1	
41CP497	Dave Spencer Site	15	N3644560	E307195	32.922306	-95.0619544	0	1	0	0	1		X
41CP16	Horton Site	15	N3657140	E304674	33.037	-95.0916	0	2	0	0	2		X
41FK107	New Hope Site	15	N3658320	E301480	33.0453189	-95.1260098	1	3	0	0	4		X
41TT12	L.A. Hale Mound Site	15	N3668117	E303567	33.1357	-95.1058	1	5	1	4	11	X6	
41MR2	Whelen Estate	15	N3627274	E353641	32.7754	-94.5627	0	2	0	0	2	X4	
41UR4/99	Davis-McPeek Mound Site	15	N3630158	E308161	32.7944	-95.0486	1	8	0	2	11	X1	
41CP3	George W. Rumsey Farm Site	15	N3646566	E330071	32.9189	-94.8172	1	3	0	0	4		X cemetery
41CP14	R.A. Watts Site	15	N3656462	E303646	33.0307	-95.1024	0	0	0	2	2		X
41FK3	R.L. Jaggers Farm Site	15	N3672904	E299566	33.1782	-95.1497	0	3	2	7	12		X cemetery
41HS240	Harrison Bayou Site	15	N3614055	E394556	32.6608	-94.1244	0	5	0	0	5		X

Site #	Site Name	UTM			Latitute	Longitutude	Crockett Curvilinear	Holly Fine Engraved	Hickory Engraved	Spiro Engraved	Total Finewares	Mound Site	Domestic Site
41TT108	Tankersley Creek Site	15	N3663415	E314471	33.0953	-94.988	14	1	0	0	15		X
41TT47	Poole Site	15	N3664241	E317652	33.1033	-94.9541	0	1	0	0	1		X
41TT209	East Island Site	15	N3663205	E311385	33.0929	-95.021	0	1	0	0	1		X
41TT804	Titus Island Site	15	N3663116	E311304	33.092028	-95.021839	0	2	1	0	3		X
41AN51	Pace McDonald Site	15	N3528433	E253958	31.8666	-95.6006	0	0	3	0	3	X2	
41MX79	N/A	15	N3683736	E343385	33.2831	-94.6818	8	0	0	0	8		X
41NA143	Panola Pipeline Site	15	N3493596	E346347	31.5688	-94.6191	1	0	0	0	1		X
41NA33	N/A	15	N3497052	E321795	31.5965	-94.8783	2	0	0	0	2		X
41CS36	N/A	15	N3677296	E381592	33.2299	-94.2708	1	0	0	0	1		X
41MR273	Whelan 1 Site	15	N3623743	E367207	32.7435232	-94.417378	0	1	0	0	1		X
41BQ269	N/A	15	N3505121	E648018	31.6735	-97.4386	0	0	0	1	1		X
41RR170	N/A	15	N3708142	E309119	33.4975	-95.0547	0	0	0	4	4		X
41SM53	Whiteside #1 Site	15	N3589738	E307704	32.4299	-95.0452	0	3	0	3	6		X
41SM156	Whiteside #2 Site	15	N3589487	E307266	32.4275	-95.0498	0	2	0	0	2		X
41ML44	Chupik Site	15	N3506865	E672961	31.6858	-97.1752	0	5	2	0	7		X
41SY100	Toleda Bend Site	15	N3520000	E416840	31.814284	-93.878616	2	1	0	0	3		X
41HO70	N/A	15	N3481781	E271455	31.4499	-95.405	0	1	1	0	2		X
41RW2	Upper Rockwall Site	14	N3648054	E734341	32.9474	-96.4933	3	0	0	0	3		X
41RW4	Glen Hill Site	14	N3641169	E734891	32.8852	-96.4892	5	0	0	0	5		X
41COL9	Branch Site	14	N3664604	E731202	33.0972	-96.5227	0	4	0	0	4		X
41COL34	Upper Farmersville Site	14	N3677848	E741808	33.2143	-96.4056	0	2	3	0	5		X
41DL148	Cobb-Pool Site	14	N3613101	E687423	32.6414	-97.0019	4	0	0	0	4		X
41PR107	Bell Camp SIte	14	N3620780	E623810	32.717849	-97.6788739	5	1	0	0	6		X
41NA20	Riser Site	15	N3499168	E326383	31.6162	-94.8303	2	1	1	0	4		X
41CE290	Forest Mound Site	15	N3488674	E307771	31.5187	-95.0244	0	5	0	0	5	X1	
41GG69	Hardan A Site	15	N3594548	E332109	32.477201	-94.786618	5	6	12	0	23		X cemetery
41RR14	Fasken Mound Site	15	N3756576	E293448	33.9312	-95.2346	2	0	0	0	2	X3	
41RR16	Sam Kaufman (Roitsch) Site	15	N3751841	E305346	33.890731	-95.104919	3	0	2	0	5	X2	
41LR135	Ray Site	15	N3734648	E280321	33.7309	-95.371	12	0	0	0	12		X
34LF40	Spiro Site	15	N3908840	E357140	35.312575	-94.571494	14	1	11	25	51	X12	
34DL4	Reed Site	15	N4058400	E342080	36.658105	-94.766898	1	0	4	15	20		
34CK43	Brackett Site	15	N3969780	E327560	35.857075	-94.909734	3	0	1	12	16		
34CK6	Harlan Site	15	N3936145	E306022	35.55	-95.14	3	1	4	7	15	X7	
34WG2	Norman Site	15	N3936553	E301654	35.535255	-95.084091	0	0	6	13	19		
34LF70	Skidgel Site	15	N3908820	E355300	35.31213	-94.591724	0	0	0	0	0	X1	
34MA15	Haley's Point Site	14	N3759652	E692834	33.944914	-96.936841	0	4	5	3	12		X
34HS9	Robinson-Solesbee Site	15	N3912080	E331740	35.337821	-94.851446	0	0	0	2	2		X
34MC1	Beaver Site	15	N3783520	E343680	34.1809512	-94.696243	2	0	5	2	9		X cemetery
34CH112	Hugo Dam Site	15	N3765760	E280080	34.0094409	-95.3814358	8	2	0	2	12		X cemetery
34MC21	Hughes Site	15	N3788420	E345540	34.2254008	-94.6769431	6	3	0	0	9		X
34CH53	Payne Site	15	N3772200	E274100	34.0661988	-95.4478073	10	1	3	12	26		X cemetery
34MC54	Johnson Site	15	N3785340	E344780	34.1975224	-94.6846384	3	1	10	2	16		X
34CH113	Pat Boyd Place Site	15	N3765850	E278650	34.0099512	-95.3969317	1	0	0	1	2		X
34PU73	Vanerwagen Site	15	N3836700	E283300	34.6493365	-95.3644685	0	0	2	0	2		X
34PU116	Bug Hill Site	15	N3837540	E275540	34.6552338	-95.4492953	1	0	1	0	2		X
16SA22		15			31.655769	-93.656323	1	0	0	0	1		X
16SA100		15			31.455713	-93.689129	0	1	0	0	1		X
16DS10	James Pace Site	15			32.112558	-93.602653	8	3	5	7	23		X cemetery
16SA30		15			31.702824	-93.793421	1	1	0	0	2		X
16DS9		15			31.946601	-93.470309	7	2	1	0	10	X4	
16SA101		15			31.456688	-93.687285	3	0	1	0	4		X
16RR1	Gahagan	15			32.040243	-93.40377	6	12	6	6	30	X3	
16CD12	Mounds Plantation	15			32.664814	-93.818332	5	8	19	0	32	X9	
16CD11		15	N3600900	E427250	32.544585	-93.775671	2	0	1	0	3		X
16CD25		15	N3649250	E416350	32.980086	-93.894395	3	2	1	0	6		X cemetery
16CD30	JA Margetich Site	15	N3642300	E409450	32.916102	-93.969148	4	0	0	0	4		X

Site #	Site Name	UTM			Latitute	Longitutude	Crockett Curvilinear	Holly Fine Engraved	Hickory Engraved	Spiro Engraved	Total Finewares	Mound Site	Domestic Site
16CD32	Thompson Mound Site	15	N3639250	E422650	32.89022	-93.827629	3	0	4	0	7	X3	
16CD37	Bush Site	15	N3630150	E421250	32.808526	-93.840772	4	0	2	0	6	X1	
16CD42	Pine Island Site	15	N3634550	E415850	32.84799	-93.899119	1	0	2	0	3		X
16CD44	Bauman Hill Site	15	N3696200	E425600	32.501627	-93.79271	4	0	0	0	4		X
16LA1	Battle Mound Site	15	N3484500	E572260	31.494063	-92.097765	0	0	0	0	0	X3	
16DS4	Hadden Bend Site	15			32.096714	-93.564765	3	3	4	0	10		X cemetery
16SA27	Horatio Kunaz Site	15			31.512549	-93.691471	6	2	2	0	10		X
16NA64	Kevin Roy Site	15			31.916022	-93.422069	3	1	0	1	5		X
3LR6	Bowman Mound Site	15	N3741237	E383894	33.8049522	-94.25437	5	0	8	1	14	X1?	
3MI6	Creshaw Site	15	N3706610	E430642	33.294836	-93.444799	22	14	39	29	104	X6	
3MI1	Haley Place Site	15	N3669746	E426705	33.164024	-93.786057	1	0	1	0	2	X6?	
3LA27	Foster Place Site	15	N3702341	E435205	33.458549	-93.697241	8	1	0	0	9	X3	
3CL21	East Place Site	15	N3763195	E463436	34.008733	-93.395977	8	7	2	0	17	X5	
3HO1	Mineral Springs Site	15	N3747987	E416205	33.8688797	-93.9059805	12	0	13	2	27	X11	
3HE35	Washington Mound Site	15	N3733566	E435475	33.7401788	-93.696596	5	0	7	6	18	X?	