GROUP MOBILITY AND LITHIC RESOURCE USE IN THE
ARCHAIC TO WOODLAND TRANSITION
AT THE MORROW SITE (1FR703)

by
LUKE THOMAS DONOHUE
JOHN H. BLITZ, COMMITTEE CHAIR
KEITH LITTLE
KATHRYN OTHS
MATTHEW WOLFGRAM

A THESIS

Submitted in partial fulfillment of the requirements
for the degree of Master of Arts
in the Department of Anthropology
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2015
ABSTRACT

The Archaic to Woodland transition in the North American Southeast (about 3000-2500 BCE) was a time of great social change for many ancient populations. Two of these included the Benton culture of the Archaic period and the Alexander culture of the Early Woodland period. The purpose of this thesis is to examine how changes through the Archaic to Woodland transition are represented in the lithic debitage of these two cultures. In order to accomplish this goal, several different types of comparative debitage analyses were performed on the Alexander and Benton cultural components at the Morrow site (1FR703), located in modern northwestern Alabama. It was posited that as cultures became more sedentary in the Woodland period, the types of debitage present at Morrow site would exhibit greater indicators for more sedentary practices over time. In addition, a secondary research goal was to examine and compare the preference for non-local blue-gray Fort Payne chert in flaked stone tool production within both components. Other researchers have noticed a preference for Fort Payne chert in the Benton culture; however, these previous studies have focused on diagnostic projectile points, not on the debitage.

The results of the study failed to support the original hypothesis concerning mobility. Instead, the measures explored through debitage analysis exhibited only very slight differences between the two occupations. It appears that both components used the Morrow site for similar activities which display no conclusive evidence on increasing sedentism from the Benton to Alexander cultures. In response to the secondary research goal, there was a slight trend towards increased use of blue-gray Fort Payne chert in the Benton occupation compared to the Alexander component, but not to the same extent seen in intersite comparisons of diagnostic Benton points.
This indicates that while the Benton culture may have used the Morrow site in very similar ways to the Alexander culture, they still had some preference for the Fort Payne stone material. Local materials were used for many activities, but not at the cost of completely ignoring the non-local Fort Payne chert.
ACKNOWLEDGEMENTS

As in any thesis serving as a culmination to one’s graduate schooling, the amount of recognition and gratitude I want to extend to those who helped me through its completion cannot possibly be covered here. First I would like to thank Dr. Blitz, my adviser, for all his help in guiding me through both class work and thesis research. I would also like to thank my committee: Dr. Little, Dr. Oths, and Dr. Wolfgram. Each of them provided insightful comments and critiques which benefited my thesis immensely and helped mold it into a stronger work. I would also like to thank the individuals at Tennessee Valley Archaeological Research who facilitated my work with the Morrow site collection. Specifically, acknowledgement is due to Kevin Cowart and Elin Crook for making the maps used throughout my thesis, Travis Rael for helping me access collections and provenience data, and Hunter Johnson, who was the Principal Investigator of the excavation and helped resolve questions that arose during my study. Several individuals from the University of Alabama and Tuscaloosa also assisted me in various ways through the research, data collection, writing, and editing process of my thesis, so I would like to thank Dr. Lisa LeCount, Dr. James Leeper, Jessica Kowalski, Jera Davis, Mitchell Childress, Kareen Hawsey, Erik Porth, Clay Nelson, and Sean Randall for their various contributions. This thesis was made stronger from all of your direct contributions to the betterment of my work.

In addition to the direct contributions of the above individuals, it would have been impossible to finish this project without the wonderful support system I had from my family up north. I would like to thank my Mom, Dad, and siblings: Patrick, Marielle, and Eliza, for all of their support from Pennsylvania and beyond. After family, I would not have kept my sanity throughout graduate school without timely and necessary distractions over the past two years.
from Brass Bralley, Angelica Callery, Camille Morgan, Emma Koenig, Achsah Dorsey, Ashley Stewart, Jessica Kowalski, Lynn Funkhouser, Erik Porth, Gracie Riehm, Nikki Henderson, Katie Lazzara, Chris Wilhelm and the rest of the Doctors and the Lawyers, and last and least, the University of Alabama Ultimate B team. For your amazing company and entertainment, thank you all.

My final acknowledgement goes to my fiancée Jess, without whom I would have never been pushed to come to graduate school in the first place, and who remains unwavering in her support from up in New Jersey while her future husband continues to count rocks in the middle of Alabama. She is undoubtedly my better half, as others have reminded me countless times before. Thank you so much for the countless Skype sessions, texts, and calls and for planning half a wedding while we both work to finish graduate school. She is my inspiration, as she does everything I do, while still maintain a 60 hour a week job. By her, the grace of God, all the fine people who I both mentioned above, and those I somehow forgot to thank, I was able to finish this thesis. I thank you all from the bottom of my heart.
CONTENTS

ABSTRACT ............................................................................................................................................. ii

ACKNOWLEDGEMENTS .......................................................................................................................... iv

LIST OF TABLES ......................................................................................................................................... vii

LIST OF FIGURES ...................................................................................................................................... viii

CHAPTER ONE: INTRODUCTION .............................................................................................................. 1

CHAPTER TWO: HUNTER-GATHERERS, INCREASED SEDENTISM, AND THE ARCHAIC TO WOODLAND TRANSITION ............................................................................................................................... 5

CHAPTER THREE: BENTON AND ALEXANDER ARCHAEOLOGICAL CULTURES OF THE TENNESSEE RIVER VALLEY AND BEYOND ........................................................................................................... 18

CHAPTER FOUR: THE SITE, THE MATERIALS, AND THE METHODS .......................................................... 31

CHAPTER FIVE: ANALYSIS AND RESULTS ............................................................................................... 45

CHAPTER SIX: DISCUSSION AND CONCLUSIONS .................................................................................. 64

REFERENCES ................................................................................................................................................. 71
LIST OF TABLES

Table 5.1 Excavation Unit 1 Depths and Cultural Components.................................................................49
Table 5.2 Excavation Unit 2 Depths and Cultural Components.................................................................49
Table 5.3: Size Grading Results..................................................................................................................50
Table 5.4: Weights in Grams and Percentage of Each Weight per Size Category Split by Cultural Component.................................................................................................................................52
Table 5.5: Counts for Each Degree of Decortication Category from the Individual Flake Analysis..................................................................................................................................................54
Table 5.6: Counts for Stone Material Types from the Individual Flake Analysis .......................................54
Table 5.7: Descriptive Statistics for Weight in Grams Split by Size Category ...........................................55
Table 5.8: Frequency of Flake Sizes in Each Cultural Component.............................................................58
Table 5.9: Cultural Component Compared to Degree of Decortication Cross tabulation .......................59
Table 5.10 Locality of Individual Flake Compared to Cultural Component Cross tabulation .........60
Table 5.11 Cross Tabulation Displaying Fort Payne and Non-Fort Payne Cherts Compared by Cultural Component........................................................................................................................................61
Table 5.12: Degree of Decortication for Fort Payne Chert Flakes Compared to Non Fort Payne Flakes ..................................................................................................................................................62
LIST OF FIGURES

Figure 3.1: Map of Morrow Site with Relevant Rivers. ................................................................. 19

Figure 4.2 Excavation Unit Site Map .......................................................................................... 36

Figure 5.1: Shovel Test Data Map. ............................................................................................... 46

Figure 5.2: Diagnostic Alexander Sherd....................................................................................... 47

Figure 5.3 Two Diagnostic Benton Projectile Points and a Ferruginous Sandstone Saw Implement. ......................................................................................................................... 47

Figure 5.4 Excavation Unit 1: North Profile...................................................................................... 49

Figure 5.5: Histogram of the Greater than One Inch Size Category Flake Weights with a Normal Distribution Curve ........................................................................................................... 56

Figure 5.6: Histogram of the Greater than One-Half Inch Size Category Flake Weights with a Normal Distribution Curve ........................................................................................................... 56

Figure 5.7: Histogram of the Greater than One-Quarter Inch Size Category Flake Weights with a Normal Distribution Curve ........................................................................................................ 57

Figure 5.8: Histogram of the Less than One-Quarter Inch Size Category Flake Weights with a Normal Distribution Curve ............................................................................................................ 57
CHAPTER ONE:
INTRODUCTION

Archaeologists and other researchers of the past have identified key processes where populations had to adapt to diverse but interrelated environmental and social stresses over the course of human history. One of the most noticeable transitions occurred in the North American Southeast around five thousand years ago. The Archaic to Woodland transition has been viewed by several archaeologists as a reaction of the populations across the Southeast to a series of climatic changes disrupting the region (Kidder 2006). The climatic and ensuing social changes culminated in the end of occupations at impressive Archaic sites, such as Poverty Point in Louisiana, and the slow increase in regionalism and sedentism across the Southeast into the Woodland Period. The different regions of the Southeast would react in different ways to these climatic changes, dependent on their own environments. Archaeologists have identified these reactions with varying degrees of success in the Southeast, depending on the region in question. Inhabitants of the Tennessee River Valley underwent some social change along with all the other regions, but as more information becomes available about this time period, better studies will reveal how and when specific changes occurred. This thesis examines the amount of change across the Archaic to Woodland transition through the frame of mobility at one specific site in Northwest Alabama, on the edge of the Tennessee River Valley drainage basin. Additionally, it provides elaboration on some of the practices specific to the cultures of the site.

The site in question, Morrow site (1FR703), contains the occupations from two different archaeological cultures from either side of the Archaic to Woodland Transition. The site is located near a source of Tuscaloosa gravel, a stone material type commonly used for flaked stone
tool production. The two occupations visible at Morrow site are the Benton and Alexander cultures. These two cultural components are stratigraphically separated by an alluvial fill at the site, preventing admixture. This makes the site ideal for comparing patterns of use, specifically dealing with the stone tool production process. These two cultures are distinguishable from each other by specific traits. The Benton culture is defined by its preference for Fort Payne chert and large diagnostic blades found far away from their stone material sources (Anderson and Sassaman 2012; Johnson and Brookes 1989; Meeks 1999). The Alexander culture is recognizable through its early use of ceramics and location temporally at the end of the Early Archaic period (Dye 1973; Dye and Galm 1986; Jenkins and Krause 1986; Meredith 2007). The stratigraphic separation in occupation between the two cultures at the Morrow site facilitates comparison without the confusion of mixed archaeological deposits. Also, the potential differences between the Alexander and Benton components at the Morrow site can be extrapolated more broadly to reveal valuable insight about differences in mobility practices for the Archaic and Woodland periods. The primary research goal for this thesis was to use lithic debitage analysis to determine whether the Alexander culture at Morrow site was more sedentary than the Benton culture. In order to examine this question I used both size grading and individual flake analyses. I hypothesized that the Woodland Alexander component at Morrow site would exhibit different characteristics through debitage analysis when compared to the Archaic Benton component. This hypothesis was based on the expectation that there was greater sedentism and regionalism during the Woodland period.

Chapter two of this thesis examines archaeological research on sedentism and how mobility can be displayed in the material record. It discusses the material procurement strategies of hunter-gatherer groups and the reasons such populations might increase in sedentism. The
chapter begins to discuss those trends in the framework of the Archaic to Woodland transition, describing how and why it may have occurred. It ends with a discussion of models for this transition and which one I am adapting for the duration of this thesis.

Chapter three examines more closely the region of study, focusing on northwest Alabama, the relevant river drainage basins, and other geophysical features in the area. It also introduces the Benton and Alexander archaeological cultures and their identifying features, and provides a survey of some of the most recent and salient archaeological research involving the two cultures. Here I also discuss the importance of Fort Payne chert to the Benton culture, a trend that has a very specific role in the conclusions of this thesis.

Chapter four details the methodologies I used in testing the research question. This chapter provides definitions and descriptions for the terms and concepts of lithics analysis and discusses some of the literature available on the subject. It introduces and describes the horizontal and vertical site distribution analyses I performed at Morrow site. The chapter then examines the primary types of analysis for the research question: size grading and individual flake debitage analyses. The chapter describes how I chose my sampling strategies and reiterates exactly what patterns I expected to uncover through my results. Finally, I introduce what types of statistical analysis I used in testing those results.

Chapter five displays all of the measurements and results for this thesis. The first section discusses the horizontal site analysis, making use of the original shovel test data. The second part describes the vertical site analysis- specifically how I determined which stratigraphic layers belonged to each cultural component. The third section describes what size grading measurements I took and how the results were used to evaluate the research hypothesis. The final section examines the different results of the individual flake analysis, how these correspond with
the size grading analysis, and how these results were used to evaluate the research hypothesis. It also reveals interesting patterns concerning stone material use when comparing the Alexander and Benton components at Morrow to the findings at others sites.

Chapter six summarizes my conclusions based primarily on the debitage analysis. I discuss why my research hypothesis was not supported and what this means to the modern understanding of the Benton and Alexander cultures’ place in the Archaic to Woodland transition. I discuss how my results may represent both greater similarity in mobility patterns between the two cultures and similar location use specific to Morrow site. I also discuss the relationship between the Benton occupants at Morrow site and Fort Payne chert and how my results both verify and contradict previous research on the subject. The chapter and thesis end with new directions for research at every level, including the Archaic to Woodland transition in the Southeast, the Benton and Alexander cultures, the relationship between Fort Payne and the Benton culture, and future analysis specific to Morrow site.
CHAPTER TWO:
HUNTER-GATHERERS, INCREASED SEDENTISM, AND THE ARCHAIC TO WOODLAND TRANSITION

In the history of archaeology, many researchers have studied hunter-gatherers through both the material record and ethnographic data. While many have noted that hunter-gatherers can demonstrate a wide range of cultural complexity, archaeologists often examine them as a foundation in the development of more hierarchical, complex societies (Kelly 2013; Price and Brown 1985). One vital piece in this development from the most basic hunter-gatherer groups into more complex communities is the increase of sedentism. Sedentism is intimately tied to subsistence practices and how populations are impacted by their surrounding environments. Researchers must untangle the relationship between environment and cultural practices in hunter-gatherers in order to determine how cultural complexity begins and increases. In this thesis, patterns of sedentism and by extension, cultural complexity, will be examined in the transition from the Archaic period to the Woodland period in the North American Southeast. In this chapter, I present a working definition for hunter-gatherers, how their mobility and subsistence practices fluctuate, and how these factors are related. Then, I discuss why sedentism increases amongst such groups and how that is tied into the larger themes of subsistence practices and cultural complexity. Finally, I consider the Archaic to Woodland transition in the Southeast, the current hypotheses about why that transition occurred, and what specifically it has to do with increasing sedentism in the region. Throughout this entire thesis, I examine the question of increasing sedentism in the Archaic to Woodland transition from a broadly processualist framework. This approach allows me to take into account the multitude of factors
that influence culture as a process and the combination of environmental and cultural pressures that elicit cultural changes.

**Hunter-Gatherers**

Hunter-gathering bands are ubiquitous throughout all of human history and persist to this day across the globe. Despite this apparent omnipresence, there are many definitions of hunter-gatherers, many of which are problematic. As Robert L. Kelly (2013:2) notes, if hunter-gatherers would be restricted to those populations that only obtain food directly from foraging techniques, all contemporary ‘hunter-gatherers’ would be exempt. Kelley’s reasoning for this conclusion is based on the fact that many modern hunter-gatherers can and often do trade with agriculturalists or participate in modern cash economies. This is probably a less accurate representation of hunter-gatherer groups in the past, as many of those ancient groups would have had some level of horticulture to supplement their foraging practices. Because of this limiting factor, Kelly (2013:2) defines “hunter-gatherers” (and foragers) simply as those groups that anthropologists have traditionally considered to fit in that category. T. Douglas Price and James A. Brown (1985:3), citing Lee and DeVore (1968), offer a similarly general definition. They state that hunter-gatherers live in small groups and move around frequently. I find both of these definitions to be too broad. Kelly seems too concerned with the minor interactions modern hunter-gatherers have with cash economies or other food producers. Price and Brown’s definition is better, but still too broad. Binford’s 2001 book contains a better definition. He defines all hunter-gatherer groups as populations that do not control food production through “strategic modifications” in their own environments (Binford 2001:116). In this thesis, based on Binford’s definition as opposed to Kelly or Price and Brown, I will treat hunter-gatherers as a term that refers specifically to groups that practice little to no food production.
Foragers and Collectors

As archaeologists and anthropologists have studied hunter-gatherers through the years, they have made many attempts to better categorize them. Mobility is invaluable in understanding these comparisons of different types of hunter-gatherers, as it is a primary qualifier in distinguishing them from most other populations. Lewis Binford’s forager and collector spectrum examined the mobility of such groups and provided some means of designation for the various kinds of hunter-gatherer populations over time (Binford 1980; cf. Kelly 2013). In creating his spectrum, Binford first studied modern hunter-gatherer groups, examining a number of populations around the world. He measured and compared factors such as how often annual hunter-gatherer groups moved, their size, the mean distance between their sites, and how far they may have traveled in a year (Binford 1980:5-7). He then considered how these patterns manifested in the archaeological record and attempted to designate different hunter-gatherer populations into a spectrum with the extremes of “forager” and “collector.” Where hunter-gatherer groups fell on this range depended on how they adapted to the various uncertainties dwelling in their chosen environment. Those uncertainties usually related to food and material availabilities. Binford performed ethnographic research on the gathering of materials in particular, which revealed that direct procurement, when groups go out specifically to obtain materials for tool production, appears to be very uncommon (1979:259). Instead, he found that most raw material collection occurred during foraging for food and that the placement of caches was fundamental in sustaining this approach. He termed this “embedded procurement” (Binford 1979:259-260). This was and is most relevant in the construction of stone tools, where hunter-gatherer groups would collect stone from all areas they were traveling through. Depending on their foraging habits, this practice would result in a variety of stone types from different
locations. Binford proposed that less mobile groups create all their stone materials from local materials, which would be identifiable in the material record. More mobile groups would be expected to have greater variety in their stone tool materials from more sources, while less mobile groups would have less variety of stone materials drawn from fewer sources. This connection between raw material variability and mobility is a major part of Binford’s models for foragers and collectors, based around the collection of food for hunter-gatherer groups. However, the differences in mobility for different hunter-gatherer groups appeared to have accounted for the collection of other raw materials as well, such as stone, in very specific ways during their subsistence based trips.

Hunter-gatherer populations labeled as foragers move consumers to food as they travel from source to source. These types of populations will set up temporary settlements in specific areas and then send out smaller groups to gather necessary resources, such as food or materials used in tool manufacture (Binford 1980:5-7). One way to visualize this is through the analogy of a daisy flower. The center serves as the “residential base” and the petals represent pathways to and from “locations” for gathering food and materials (Binford 1980:7-8). “Residential base” in this case means the primary but temporary living center for a forager hunter-gatherer group. “Location” is then defined as the places where foragers would collect the necessary materials and foods to bring back to the residential base (Binford 1980:9). Therefore forager’s settlement patterns map out and onto the region’s resource locations (Kelly 2013:78). For foragers, residential bases would leave the greater impact in the archaeological record although it would likely be minor compared to collector sites. Locations would translate into a smaller archaeological footprint in the material record, as forager sites would be generally smaller, low footprint sites across a region. Both types of places within the forager model would leave more
or less evidence in the material record depending on the amount of time spent at each site and how frequently hunter-gatherer groups may have frequented the same spots over time (Binford 1980:9). Residential base sites would be indicated by the evidence for domestic use, while locations would be indicated by evidence for different types of production. Additionally, location sites should occur by sources of raw materials important to hunter-gatherer populations.

The opposite of foragers on this hunter-gatherer spectrum are collectors. Collectors are based around more permanent sites, store food throughout the year, and do not travel as far or as frequently for resources. Instead, they use specialized task groups to gather food and materials and bring these back to the permanent site, in opposition to how foragers map onto regional resources through residential moves (Binford 1980:10). The addition of specialized task groups in collector communities compared to forager communities leads to the addition of three new places in Binford’s diagramming of hunter-gatherer models. He labeled these field camp, station, and cache. These are added to the already defined terms, residential base and location, from Binford’s previous model. The field camp is where specialized task groups would stay as others would travel to resource locations, away from the residential base (Binford 1980:10). Stations are positions where small parties can observe things like animal patterns, for the purpose of setting up ambushes or hunts. Finally, caches are places that the smaller task groups can hoard those resources in bulk to avoid taking large loads back to the residential base (Binford 1980:10-12). The enumeration of these extra places is most important to establishing the difference between foragers and collector movements. Since collectors have all of these extra spots, their central residential bases are generally more permanent than the corresponding location for foragers. More permanent bases meant that over time the site would accumulate larger amounts of artifacts and features. This provides greater archaeological visibility in the material record.
The outer areas (locations, field camps, stations, and caches) also have the potential for a greater presence in the material record, since they would likely be reused at a higher frequency by collectors as opposed to foragers (Binford 1980:10-12). Despite all this, not all foragers are more mobile than collectors. The important distinction is in how they are organized. Additionally, Binford is specific that these two categories are not meant to be viewed as oppositions, but rather as two extremes on a spectrum of mobility (Binford 1980:13; Kelly 2013:78-79). As he elaborated on what caused these differing types of mobility patterns, he wanted to keep in mind that hunter-gatherer groups could incorporate parts of both models.

The most important part of Binford’s spectrum for this thesis is how hunter-gatherer societies have variation in the utilization of their environments, which impacts how their sites appear in the material record. Additionally, the settlement patterns that these types of populations use are tied to what type of environment they live in and what types of food sources are available. Both Binford and Kelly noticed the important connection between the environment and hunter-gatherer subsistence practices. Hunter-gatherers who utilized forager methods tended to live in areas with wide spread food areas that varied at different times of year. When resources were equally distributed in an environment and mostly present year-round, collector patterns were more likely (Binford 1980:13-15; Kelly 2013:79). Only with a full understanding of why hunter-gatherer populations are mobile can we appreciate why they later abandoned these practices for increasing sedentism and how changes in their environment forced such a change.

**Sedentism**

Since mobility is a specific adaptation for hunter-gatherer populations and their environments, we must account for the factors behind increased sedentism. Just as the relationship between environment, food sources, and mobility is tied together for hunter-
gatherers, so is the relationship between sedentism and cultural complexity. Sedentism broadly means the lack of residential movement, mobility already being described as incredibly important to the hunter-gatherer lifestyle (Kelly 2013:78). As sedentism increases and formerly hunter-gatherer populations begin to settle down, archaeologists note a marked increase in population and cultural complexity, involving facets of society such as social hierarchies. This thesis must identify markers for increased sedentism, which can be tested in the archaeological record. Those markers can then be integrated into other models of increasing sedentism to better understand models of change for the Archaic to Woodland transition in the rest of the Southeast. By identifying the beginning of sedentism in this part of the North American Southeast, this thesis could aid understandings of when and how different hunter-gatherer populations eventually settled down and became sedentary.

Reasons for Increasing Sedentism

The basic understanding of archaeologists towards increasing sedentism is that it comes about as part of the more general trend towards cultural complexity in areas around the world. From a cultural evolution standpoint, hunter-gatherers eventually hit a point where different cultural adaptations, usually technology, allow them to provide enough food to support larger populations. As populations grew, some societies adopted practices such as agriculture to provide for larger communities, which required increases in cultural complexity to maintain food production. This led to surplus, which led to hierarchy and further cultural complexity (Price and Brown 1985:10-11). While this understanding of increasing complexity is well known, it comes with the disclaimer that not all hunter-gatherers inevitably increase in cultural complexity or population. Those that do not are clearly “advanced” enough to come up with concepts such as agriculture, as it is just not an inevitable conclusion of a human culture (Binford 2001; Cohen
While sedentism is viewed universally as a consequence of the specific increases of cultural complexity, it only arrives because of some specific variety of factors. Archaeologists are aware of a number of conditions and causes that help cultural complexity and sedentism develop. They must then reconcile those causes with indicators in the material record in order to identify increasing both sedentism and cultural complexity.

Certain conditions are necessary for increasing cultural complexity to occur, and ultimately result in sedentism. To start, hunter-gatherer groups themselves must show some signs of increasing complexity. These characteristics include the division of labor, differential material and food acquisition, and territoriality between different hunter-gatherer populations, amongst others. Other conditions present at the increase of cultural complexity and sedentism are limitations on movement, particular abundances of new food sources, and environmental changes (Arnold 1996; Cohen 1985; Price and Brown 1985:10-12). Since those factors are often present in many different societies, archaeologists have argued that one or several of these conditions are causes of cultural complexity, depending on the region of study. Based on a processualist standpoint as adopted in this thesis, culture and cultural complexity generally increase as part of general process. All these causes are viable reasons, depending on the hunter-gatherer group being studied at its point of increasing cultural complexity. One, some, or all of them may play a role in the development of an ancient people’s cultural complexity. In order to analyze why cultural complexity and mobility increased after the Archaic to Woodland transition, the scope needs to be narrowed to that specific region and the environment of the area when it occurred around 3000-2600 BCE.
The Archaic to Woodland Transition

The Archaic period in the North American Southeast saw the growth of cultural complexity and increased diversity across the area. Sites such as Poverty Point in Louisiana served as cultural centers for unknown numbers of peoples. As the period ended however, these centers became abandoned, and archaeologists have presented several theories as to why. The reasons behind the transition include horticulture, migrations, and climate change. The typical explanation for the termination of the Archaic period was that populations gradually transitioned into the Woodland period, adding new traits such as ceramics, burial mounds, and increasing regionalism, the last of those three represented by greater variety in the material culture (Anderson and Mainfort 2002; Anderson and Sassaman 2012; Sassaman 2006). The rise of ceramics is seen by some as part of changes in subsistence, particularly increases in horticulture. Proponents of this stance generally see this as the model for the lower Atlantic Coast (Kidder 2006:197-198). There is a problem with the claim that the appearance of ceramics in the Southeast is tied to increasing food production, since pottery predates food production in many other hunter-gatherer societies across the world (Rice 1987:7). Even in the Southeast, some societies were producing pottery before the start of the Woodland period (Sassaman 2003:398-399). Other indicators are needed for the rise of cultural complexity as ceramics alone are insufficient.

Archaeologists studying in west-central Illinois have focused on the immigration of other populations into the region (Emerson and McElrath 2001; Kidder 2006:198). These new groups had vastly different cultural organization than the ones they replaced, leading archaeologists to believe that incoming Woodland immigrants did not force out or absorb Archaic groups in that area, but rather entered the region after it was abandoned (Kidder 2006:198). Another regional
hypothesis for the Archaic to Woodland transition is focused around Poverty Point. Poverty Point is a large Late Archaic site in Louisiana, consisting of several massive earthworks, a raised plaza, and six concentric earthen ridges (Webb 1968:297; Ortman 2010: 657). In this model, the site became so large that the leadership of the time could no longer support the intense complexity and the site collapsed rapidly. Finally, several archaeologists have noted that the Midwest and Southeast experienced climate changes right around the time Late Archaic populations were in decline. They present a model where changes such as cooler summer temperatures and increased winter precipitation forced populations in the Southeast and Midwest to adapt to new environments, which led to a collapse of their former cultural complexity. New cultures would ultimately rise out of this change and form in the Woodland period (Anderson and Mainfort 2002; Brown 1985:211-213; Kidder 2006:198; Sassaman 2002). Most models of the transition are regional in scale, dealing with specific locations within the Southeast. However, there is a general, recent model that covers the entire area.

T.R. Kidder’s model for the Archaic to Woodland transition borrows in part from several of the models listed above. It also serves a direct contrast to the idea of a general progression towards increased cultural complexity that began in the Woodland period. Kidder starts with the cultural centers common in the Lower Mississippi Valley in the Middle to Late Archaic period. He notes that there is very little evidence of populations leaving the area when they collapsed. New sites representing population movement do not appear locally in the immediate aftermath of the collapse of Poverty Point and the site was not reconstituted elsewhere (Anderson and Sassaman 2012:107-109; Kidder 2006). This leads him to three possible conclusions: Poverty Point was not as populated as previously thought; the post settlements sites were so widely dispersed so quickly, they left no visible impact in the material record; or the evidence is
somehow hidden by natural and cultural factors (Anderson and Sassaman 2012:109; Kidder 2006). Similar abandonments occur at both large and small sites on river banks across the Southeast around the collapse of Poverty Point. This led to Kidder’s examination of the climate around 3150 to 2700 BCE, based on his carbon dating the end of Archaic sites and the start of sites labeled as Early Woodland period around the Lower Mississippi River Valley. He found, through a rigorous examination of different kinds of measures for climate change, that these dates roughly corresponded with the start of a period of increased precipitation, ranging from 3000-2600 BCE (Kidder 2006). His model is based on these increases in precipitation in the Lower Mississippi River Valley, and he postulates that they led to increased flooding. Rises in flooding disrupted the complex societies in the area and forced them into cultural upheaval, leading populations to abandon the area. These populations then spread throughout the Southeast, further disrupting the interactions of hunter-gatherer groups outside the Lower Mississippi Valley. These other hunter-gatherer groups were dealing with climate changes of various levels in their own areas and could no longer depend on the interaction spheres they had developed to deal with environment shifts (Anderson and Sassaman 2012; Kidder 2006). Subsistence already practices strained by shifting climates were now doubly pushed by the influx of new populations from the outside (Brown 1985:214-215; Kidder 2006). This caused the end of the Archaic period. As populations adapted over time to their new environments and neighbors, they became the foundation of the Early Woodland period. This is Kidder’s model, and is the understanding this thesis uses as the explanation for the Archaic to Woodland transition for the entire Southeast.
The Rise of Sedentism in the Woodland Period

As the Early Woodland period begins around 1000 BCE, archaeologists generally see less cultural complexity than at the height of the Archaic period, although this differs slightly throughout the Southeast. They see a definite increase in sedentism following this collapse as the Woodland period continues. While hunter-gatherer groups exhibited great cultural complexity in the Archaic period, building massive earthworks in several regions, they did not settle down and establish differential material records (or regionalism) to the same extent as in the Woodland period. Once sedentism begins to increase in the Woodland period, as populations start recovering from the climate changes, cultural complexity also grows again (Brown 1985:223-224). When looking at the process of Archaic period societies and their responses to the climate change that brought about the Woodland period, populations had to create new ways of dealing with their environments. It appears that increasing sedentism was one of the ways different populations ultimately reacted to the changes of the Archaic to Woodland transition. This took time, but all models of the transition acknowledge that sedentism increases as the Woodland period continued; although it is not well defined at what rate this occurs in different regions. In order to verify Kidder’s model of the Archaic to Woodland transition, the model needs to be tested on regions outside his focus in the Lower Mississippi Valley. One way of doing so would be to test the rates of sedentism in different areas, which is not well defined by the current research. The focus of this research is to take the current, generalized understanding of cultural change occurring during the Archaic to Woodland transition in the North American Southeast and apply it to one of the smaller regions. Specifically, it examines one site, the Morrow site (1FR703) located in northwestern Alabama, which contains deposits left by the Benton and Alexander archaeological cultures. These two cultures date to the Archaic period and Woodland
period respectively. Studying these two different cultures, on either side of the Archaic to Woodland transition, allows for the testing of sedentism patterns over time and can help us draw larger conclusions on how mobility practices in both periods may have worked, relative to each other. These two archaeological cultures, the areas within the North American Southeast in which they inhabit, and their relationship at Morrow site will be discussed in the next chapter.
A large part of Kidder’s model is based on the patterns of occupation in large sites of the Lower Mississippi River Valley. However, he extrapolates that the populations from those large sites spread all over the region, into areas already inhabited by other hunter-gatherer groups outside of the Poverty Point culture (Kidder 2006). Climate change had impacted the rest of the Southeast, as other sites show evidence of populations abandoning river environments for higher ground (Beasley 2009; Sassaman 2006; cf. Anderson and Sassaman 2012:109). These regions would have been further impacted by the populations moving away from the large sites of the Lower Mississippi River Valley. These climatic and social factors would force hunter-gatherer groups to forge new alliances in uncertain environments (Anderson and Sassaman 2012:107). Two of the regions outside the Lower Mississippi Valley are the Gulf Coastal Plain and the Tennessee River Valley. Morrow site, the object of study for this thesis, is situated at the interface of these two regions (see Figure 3.1). Specifically, it is located by the Tombigbee drainage basin of the Gulf Coastal Plain and within the Bear Creek drainage basin, an extension of the Tennessee River drainage basin. I will address those two smaller areas in this chapter with special attention paid to the types of lithics they contain.
Figure 3.1: Map of Morrow Site with Relevant Rivers.
Physiography of North Alabama

Bear Creek Drainage Basin

The Tennessee River Valley starts in Kentucky and takes up much of northern Alabama and central Tennessee, also extending into parts of Mississippi, Georgia, Virginia, and North Carolina. Archaeology in this region is therefore varied due to the differing environments and cultures. A number of tributaries split off from the Tennessee River, including Bear Creek. Cedar Creek is a tributary of Bear Creek, and is included in the area known as the Bear Creek Reservoir. The Bear Creek reservoir was examined by Eugene Futato of the Office of Archaeological Research, University of Alabama, for the Tennessee Valley Authority in the 1970s (Futato 1983a). This watershed begins on the Tennessee River in northwestern Alabama, cutting into the sandstone of the Cumberland Plateau. It is surrounded by hundreds of formerly inhabited rock shelters, making it an ideal focus for archaeological study (Futato 1983a:3). As Bear Creek extends to the south of the Tennessee River, it splits into Lower Bear Creek and Cedar Creek around the border of northeastern Mississippi and northwestern Alabama. The mouth of Cedar Creek resides within the western part of the Moulton Valley, where the river has cut into the primarily Bangor limestone, with some outcroppings of Hartselle Sandstone (Futato 1983a:3). These rock outcroppings provided the lithic material types that the inhabitants of this drainage basin used for thousands of years. While Bangor chert and ferruginous sandstone were often a part of ancient Native American toolkits, the most commonly used stone materials were from the Tuscaloosa gravel group. This group is widespread throughout the drainage basin, usually as the cap of ridges in the Bear Creek watershed, and consisted of two types: a yellow chert often called yellow jasper and Camden chert, which ranges from yellow or white to faintly pink. It is distinguishable from its small veins and inclusions of grey opaline material (Futato
The prevalence of Tuscaloosa gravel in the drainage basin made it a very common material for stone tools across all of northern Alabama. The prevalence and location of these local stone types can aid immensely in identifying patterns in mobility, as they exhibit exactly how far away a population can access raw materials.

Both Bear Creek and Cedar Creek flow westward into the area known as Fall Line Hills, within the eastern Gulf Coastal Plain. In fact, the whole Bear Creek drainage basin is considered by some researchers to be a part of the Gulf Coastal Plain of the Southeast, despite the fact that both Cedar and Bear Creek are tributaries of the Tennessee River (Futato 1983a:3-4). Morrow site is also located near to the Tombigbee River drainage base. Therefore, a short introduction into the Gulf Coastal Plain area is necessary in introducing cultures of this region during the Archaic to Woodland transition.

Tombigbee Watershed and the Tombigbee Hills

To the east and south of the Bear Creek drainage basin is the Tombigbee Hills region of the Gulf Coastal Plain. Judith Bense led several investigations into this area in the first half of the 1980s with the University of West Florida’s Office of Cultural and Archaeological Research (Bense 1987). The Tombigbee River runs from its foothills in northeastern Mississippi until it merges with the Mobile River which drains into the Gulf of Mexico. The Tombigbee Hills are a series of different marine sediments left behind from the Upper Cretaceous age located along the Northern stretch of the river. The Eutaw and Tuscaloosa formations, which consist of different types of bedded sands, clays, and gravels, are the primary formations outcropping in this area, providing the materials for the alluvial deposits along the river (Bense 1987:5). The ancient Native Americans that operated throughout this region had access to many of the similar stone materials as those in the Bear Creek drainage basin, in some cases drawing from the same
sources. The most frequently used material for flaked stone tools come from the Late Cretaceous Tuscaloosa formation, found north and east of the Upper Tombigbee Valley. These cherts consist of round cobbles, used in about 75 percent of all stone tools found in the area (Bense 1983:1). Populations dwelling in the Tombigbee Hills would have brought in both Fort Payne chert and Bangor chert from locations in northern Alabama, central Tennessee, northeastern Mississippi, and northern Georgia, just as those in the Bear Creek drainage basin. Additionally, ancient residents of the Upper Tombigbee Valley drew from the Tallahatta formation, which had outcroppings across south-central Alabama, and into central and northern Mississippi (Bense 1983). Those four formations (Tuscaloosa, Fort Payne, Bangor, and Tallahatta) make up about 95 percent of the lithic materials found in the Upper Tombigbee Valley (Bense 1983:2). The remaining five percent came from locations all over the Southeast and beyond, usually appearing as exotic tools or very small finishing flakes. Understanding where these populations got their stone tool materials is important, as what formations they manufactured their stone tools from would have changed if their mobility and trade relationships changed within northern Alabama. Events such as the Archaic to Woodland transition should be identifiable based on the lithic remains in the material record. In order to adequately compare either side of this transition better, however, analysis will have to focus on the specific archaeological cultures.

**Archaeological Cultures**

In order to focus the broader themes of this research on the shifting mobility of groups in the North American Southeast around the Late Archaic to Early Woodland transition, I will examine two specific archaeological cultures. Benton and Alexander signify two cultures found in the Tombigbee and Tennessee River drainage basins. Benton is variously referred to as a cultural complex or interaction sphere in the Late Archaic period, recognized by a diagnostic
projectile point of the same name (McNutt 2008; Meredith 2007). Alexander is usually defined as an archaeological culture marked by diagnostic pottery of the Alexander type and dates to the Early Woodland period. Some researchers, however, have referred to the Alexander as part of the Gulf Formational period (Jenkins and Krause 1986; Meredith 2007). Both the Benton and Alexander culture are well established in that part of the Southeast, with numerous sites identified to each culture. The rest of this chapter will better define these cultures and their accompanying sites.

**Benton**

Researchers have determined the extent of the Benton culture to fall in the Middle to Late Archaic, with dates usually ranging from about 4800 BCE to 4000 BCE (Anderson and Sassaman 2012; McNutt 2008; Meeks 1999). McNutt (2008:56) has set one of the most recent ranges for radiocarbon dates of the Benton culture. He believes that the culture rose out of the fluctuating temperatures of the dry Hypsithermal interval, which peaked around 5050-4450 BCE, long before the climate changes Kidder discusses in his model for the Archaic to Woodland transition. By McNutt’s radiocarbon dates, the peak of the Benton culture lasted from 4500 BCE to 4000 BCE, where it begins to disappear in the material record as the Southeast transitions into the Late Archaic (McNutt 2008:55-57). McNutt draws his radiocarbon data from a multitude of sites, but works extensively with the Eva site in Middle Tennessee, excavated by Thomas Lewis and Madeline Kneberg Lewis in the 1940s (Lewis and Lewis 1961). Eva contained well stratified Middle Archaic components which helped identify the different diagnostic flaked stone tools of the Middle Archaic upon its excavation, including Kirk Serrated, Eva, and, of particular relevance here, Benton (Lewis and Lewis 1961, McNutt 2008:45-47). While he discusses this one site in particular, the validity of McNutt’s radiocarbon dating is tested through the cross
comparison of many Benton sites. Through this comparison, he is able to establish a primary range of 4500 to 4000 BCE, based on samples from 25 of the 31 sites (81 percent) that have radiocarbon dates which intersect 4452 BCE (McNutt 2008:56). This establishes the Benton archaeological culture at the height of the Archaic period, making it an ideal initial parameter in comparing either side of the Archaic to Woodland transition.

The Benton culture is also widely identified by the Benton interaction sphere, best explained as a series of far-ranging caches of long bifaces and a preference for the use of blue-gray Fort Payne chert (Meeks 1999). Benton culture is identifiable at most sites in this area through its diagnostic broad-based points, which range from standard length points to large “Turkey Tails” and other such bifaces. The larger bifaces, up to 26 cm in length, are believed to mark a trading network alliance between groups across the Tombigbee and Tennessee watersheds (Anderson and Sassaman 2012; Johnson and Brookes 1989; Meeks 1999). Normal Benton points are often made from more local materials, usually blue-gray Fort Payne chert. Although regular points, typically associated with day-to-day use, often decrease in size the farther away from the Fort Payne source they are found (Johnson and Brookes 1989:143), the largest points are often associated with mortuary deposits and other types of ceremonial sites. These points are found far beyond the typical range of blue-gray Fort Payne flaked stone tools and do not decrease in length as distance from their lithic sources increases (Anderson and Sassaman 2012: 89-90; Johnson and Brookes 1989:143-144). This patterning has led archaeologists to propose that these longer Benton points represent non-utilitarian forms intended for social bonding and creating trading networks (Johnson and Brookes 1989:143-144). The extent of the Benton caches shows the range of the culture’s influence throughout the
Tennessee and Tombigbee river valleys, and perhaps indicates membership in the Benton exchange system (Meeks 1999:42).

Beyond the large Benton and “Turkey Tail” points, the specific usage of blue-gray Fort Payne chert helps archaeologists further understand the expanse of the Benton culture. Several researchers have noticed that, while the length of non-ritualized blue-gray Fort Payne chert stone tools decreases over distance, the frequency of Fort Payne chert flaked stone tools present at Benton sites does not change (Meeks 1999:33). This preferential use of Fort Payne in the Benton culture is uncommon, as populations do not typically carry lithic stone types outside the range of the stone material’s source. For example, flaked stone tools made from Tuscaloosa gravels do not show the same type of persistence in the material record at Benton sites not located by such sources in the Cedar Creek area (Meeks 1999:36).

When examining why the Benton culture used one material so broadly, studies have acknowledged that Fort Payne chert is an objectively good material for flaked stone tool production (Meeks 1999:42). However, such reports emphasize that the value of Fort Payne in flintknapping is not the only reason the Benton culture spread the material so widely. Instead, Meeks and others have emphasized the use of Fort Payne chert within the culture as representative of the social connections around the Tennessee and Tombigbee River valleys (Johnson and Brookes 1989; Meeks 1999). In broader research on the curation of artifacts by hunter-gatherer groups, the usual pattern is for these types of populations to utilize the best stone materials they have available. In studies not focusing on the Benton culture, when hunter-gatherers find a favorable raw stone material type they either carry different cores of the best stone material with them or cache preformed blades or points of the artifact around the region (Binford 1979). However, caching found in the Benton period, as mentioned earlier, seems to
only relate to ritual deposits. In a similar pattern, Meeks reports seeing only minimal refining done to Benton points when moved throughout the region (Johnson and Brookes 1989; Meeks 1999:40-42). Therefore, members of the Benton interaction sphere likely recognized the value of Fort Payne chert and carried points made of the material for long distances, but the material had value as a social signifier as well. As sedentism increased and social relationships deteriorated in the Archaic to Woodland transition, access to blue-gray Fort Payne chert was limited or lost, and groups emphasized more local materials in the Woodland period.

In addition to patterns of lithic material use, some archaeologists have established models for subsistence practices around the Archaic to Woodland transition. These models provide a broader understanding of cultural practices in archaeological cultures such as the Benton and the Alexander. Jenkins (1974) has proposed a model for the Late Archaic subsistence-settlement system in the Tennessee River Valley, in which Benton and Late Archaic populations were seasonally ranging groups with central summer camps marked by shell midden sites on the Tennessee River. Groups would then split up for the fall and winter months and survive more on nuts and hunting before meeting up again in late spring-early summer (Jenkins 1974:190-191). As proposed, Jenkins’ model provides an example of how to incorporate elements of both sides in Binford’s forager and collector model. Groups within Jenkins’ model spend time residing in central residential bases in the summer and send out groups to bring in food, which would appear to be part of Binford’s collector model. In the winter, however, Jenkins’ settlement pattern displays a forager model where formerly collector populations break into smaller groups and travel to food locations. While the Benton archaeological culture predates Jenkins’ model, it does provide some testable ideas on how populations acted during the transitional stage around the end of the Benton culture and into the beginning of the Woodland. This sets the stage for the
subsistence practices of the cultures preceding the Alexander. Beyond this transition, a few archaeologists have discussed themes that continued from the Benton culture into the later Alexander culture, during the Early to Middle Woodland period.

**Alexander**

The Alexander archaeological culture is represented by a specific ceramic variant and ranges from about 800-200 BCE (Jenkins and Krause 1986; Beasley 2009). This time span is sometimes referred to as the Late Gulf Formational period in this region, which coincides with the broader Early Woodland period. This time period is easily distinguished from the Late Archaic period in the Tombigbee drainage basin by the presence of ceramics (Jenkins and Krause 1986; Meredith 2007). Alexander pottery is identifiable by sand-tempered clay and decorative treatments such as incision, tool punctuating, pinching, and fingernail decoration, these methods always being applied to a smooth surface (Meredith 2007). The ceramic tradition within Alexander culture is generally viewed as rising out of the Gulf Tradition beginning in 800 BCE (Bullen 1970; 1974). However, recent excavation in this region has pushed the culture’s inception to 500 BCE (Beasley 2009:41). Different researchers have identified several phases within Alexander ceramics over the years. The most notable include the Hardin phase in the middle Tennessee River drainage basin (split into Hardin I, II, and III amongst the Pickwick), the Wilson-Wheeler basin, and the Guntersville basins (Dye 1973; cf. Beasley 2009:44). Another is the Henson Spring phase in the Tombigbee River drainage, along with the Dry Branch phase found around the Coosa River, and the much scarcer Ivy Knoll phase, found at a few sites in Alabama River drainage in central Alabama (Jenkins and Krause 1986; Meredith 2007:9-17). Here, phase follows the Wiley and Phillips definition, meaning an archaeological unit limited to one specific spatial region, in this case different river drainages, occurring only for a brief
amount of time (Wiley and Phillips 1958; cf. Meredith 2007:8). For phases occurring within the Alexander, the assumption is that they lasted for the duration of the archaeological culture in each region and that all the phases (Hardin, Henson Spring, Dry Branch, and Ivy Knoll) occurred contemporaneous to each other. For the purpose of this research, most of the Alexander ceramics would be expected to be either Hardin or Henson Spring phase. Hopefully this brief introduction of Alexander ceramic classification provides a beneficial understanding to the diagnostic ceramics in this particular culture and area, although this thesis does not deal extensively with pottery. Since ceramics were not present in the Benton culture, more comparable material remains are needed.

Archaeologists have identified several diagnostic flaked stone tools for the Alexander culture. The Flint Bear Creek and Little Bear Creek projectile point types have been identified in Alexander sites and can be considered relatively diagnostic for the culture (Dye and Galm 1986:29-32; Cambron and Hulse 1975). However archaeologists typically use Alexander ceramics for that purpose (Dye and Galm 1986:30-32). Therefore, most archaeological research on the Alexander culture focuses on the typology and use of ceramics (Dye 1973; Meredith 2007). A brief analysis of the lithic remains from the Aralia site (22IT563), tested in 1979 by the University of Alabama and excavated from 1980 to 1981 by the University of West Florida, revealed a similar model of hafted biface construction (Dye and Galm 1986). Dye and Galm determined through analysis of flaked stone tool manufacture at sites in the Upper Tombigbee Valley that both the Alexander and Benton cultures produced their diagnostic flakes in a similar way (1986:32-34). They based their conclusions on a step by step analysis of Benton and Alexander preforms and lithic by-products (Dye and Galm 1986:34). What they found was the types of preforms and lithic debitage at production sites for both Benton and Alexander stone
tools was incredibly similar (Dye and Galm 1986). This similarity in production would indicate persistence of technological themes, and perhaps populations in the Tombigbee Valley through the Archaic to Woodland transition and into the Middle Woodland. The populations of the Alexander appear to have been at least partially related to the Benton. Although the style of their flaked stone tools changed, the methods of manufacturing them were based on the same techniques.

More research, specifically on the lithics of an Alexander site, was done on the Old Eighty site (1SH493) in Shelby County, Alabama. Located in central Alabama in the Cahaba drainage, which flows into the Alabama River, the site contains a significant Alexander component (Beasley 2009). As part of the lithic analysis of the site, prepared by MRS Consulting LLC, researchers noticed a few trends in comparing the Alexander and other Early Woodland/Gulf Formational components to the Late Woodland components at Old Eighty. First, they addressed questions about mobility over the course of the Woodland, stating that they would expect the Late Woodland to be much more sedentary than the Early Woodland. They also expected the lithic analysis to be the most productive method for examining that point (Beasley 2009:285). Other patterns observed at the site included higher counts of ground stone in Alexander contexts and a higher frequency of biface artifacts and flake tools in Late Woodland contexts (Beasley 2009:320). Since the report for Old Eighty is a broad overview of the site’s excavation, they were not able to address larger themes and draw further conclusions. Therefore the authors did not include either an analysis of Archaic to Woodland components or more detailed conclusions on mobility practices of Alexander populations.

Alexander subsistence practices are less defined then those of Benton. However, the introduction of pottery has often been associated with a greater reliance on seeds or acorns,
despite some researchers suggesting the practice postdates the first use of pottery (Anderson and Sassaman 2012). Broadly, the Early Woodland period is known for an increase in horticulture as part of growing sedentism, and the Alexander culture is not viewed as a discrepancy to this trend. Hickory nuts, opossum, snake, bird, some other mammals, fish, and shellfish have been recovered in Henson Springs phase components in the Tombigbee area (Jenkins and Krause 1986:46). Since the Early Woodland in this area is primarily defined as slowly increasing in practices of sedentism, the best assumption for subsistence practices during this time is they would skew towards types of food easily gathered in collector mobility patterns (as defined by Binford 1980). This pattern would entail bringing in resources to more central base camps. As subsistence practices are only partially defined, the work in this thesis should aid in understanding the extent of sedentism in the Alexander archaeological culture, and at least provide a stronger baseline concerning its relationship with the Benton archaeological culture.

The Benton and Alexander cultures stand out as two distinctly different, although related, groups on either side of the Archaic to Woodland transition around the Tombigbee and Tennessee drainage basins. They are related not only spatially but also through methods of lithic production visible in the archaeological record. These similarities in material record and regional occupation indicate that there was some overlap in populations between the two cultures, even after disruptions occurring around the end of the Archaic period. As sedentism increased in the onset of the Woodland period, subsistence practices changed for the local populations. Investigations into a site containing Benton and Alexander components should allow for interesting analysis of those subsistence practices, based around the idea of increasing sedentism from the Benton to the Alexander culture as a byproduct of the Archaic to Woodland transition.
CHAPTER FOUR:
THE SITE, THE MATERIALS AND THE METHODS

The purpose of this chapter is to present the materials and methods used in the study. The analysis and results of these methods are presented in Chapter Five.

Morrow Site (1FR703)

Morrow Site, or 1FR703, is located on Bear Creek in Franklin County, Alabama, near the modern Alabama and Mississippi border (see Figure 3.1). It is a part of the Bear Creek drainage basin and, more broadly, the Tennessee River Valley, but its proximity to the Tombigbee River and the broader Gulf Coastal Plain allows it to serve as a transitional site between the Tennessee River Valley and Gulf Coastal Plain regions. It was excavated in 2006 and 2007 by Southeastern Anthropological Institute (now Tennessee Valley Archaeological Research) through a joint program with a nearby high school. Professional archaeologists supervised local high school students in the excavation as part of a public education and research project. Excavations consisted of 34 shovel tests to determine the horizontal and vertical extent of the site deposits, four two meter by two meter excavation units, and a one meter by two meter excavation unit. These investigations revealed stratigraphically distinct Benton and Alexander components at the site. During the excavations, all dirt was dry screened at one-quarter of an inch. Upon excavation, site investigators noticed the Benton and Alexander components were clearly separated by a culturally sterile stratum, which is an optimal context for evaluating changes in sedentism between those two cultures. Further helping this purpose is the fact that the site is located immediately next to a source of Tuscaloosa gravel and was a likely location for gathering lithic materials used for creating flaked stone tools. The Fort Payne chert often favored by
Benton groups, as discussed in the previous chapter, is absent from this area. The local presence of the Tuscaloosa Gravel source and the fact that Fort Payne chert is non-local to the site helps to determine if flaked stone tools (primarily hafted bifaces or projectile points) in the Benton and Alexander components are made of local or non-local stone. If one component has significantly higher frequencies of non-local lithic material and less diversity in the patterns of flaked stone tool production, that component would be thought of as more mobile. As already discussed, Benton would be expected to be the more mobile population, which should be reflected in the material record.

In order to analyze the cultural materials from Morrow site, I performed several different analyses on different kinds of cultural material from the site. After Southeastern Anthropological Institute excavated the site, they were unable to devote significant time on lab analysis of the collection due to a variety of factors. This meant that once the collection was brought to the University of Alabama’s archaeology lab in Tuscaloosa, the artifacts were mostly unwashed and unsorted with few exceptions. Additionally, since the site had been excavated with the help of high school students, the Southeastern Anthropological Institute retained all screened materials, in order to avoid dumping out any cultural materials. This had the unfortunate, but necessary, side effect of leaving most of the lithics and many of the ceramic sherds mixed in with large amounts of non-cultural material. A few of the shovel tests and some of the most easily identifiable projectile points and ceramic sherds from the test units had been separated out and catalogued, but the majority of the lithic debitage and ceramics were unwashed, still in bags amongst the non-cultural material. The first step in analysis was to determine the site parameters, then separate the cultural materials from the non-cultural, and then separate the cultural materials by type (lithic debitage, ceramic, projectile point). Once this was done, I could begin recording
the data. This involved four specific types of analysis, the first being a horizontal site analysis involving the shovel test cultural materials. Then, I examined the diagnostic artifacts from Excavation Units 1 and 2 by stratigraphic level to determine the vertical distribution of the site. After that, I performed a size grading debitage analysis based on all the debitage removed in Excavation Units 1 and 2. Finally, I examined a smaller sample of 4439 flakes, drawn from just two stratigraphic levels of Excavation Unit 1 for an individual flake analysis.

Materials and Methods for Horizontal Site Analysis

The purpose of the horizontal site analysis methods was to get a firm idea of the extent of the site and its two cultural occupations. While excavating, and within the limited amount of lab analysis by the Southeastern Anthropological Institute, excavators had already determined that there were distinct Benton and Alexander components at the site. By examining the shovel test data, I could get a general idea of how far each component extended across Morrow site. The analysis was to simply examine the cultural material from each shovel test. The shovel tests at Morrow site were excavated in 30 centimeter diameter cylindrical holes, 10 meters apart. If artifacts were recovered, the shovel test was marked as positive. If no artifacts were recovered, the shovel test was marked as negative (see Figure 4.1). In some of the transect locations, they were unable to excavate a shovel test due to standing water, resulting in the no dig point entries. This positive/negative distinction would give a good idea how far the site extends, and is a standard part of analysis for any set of shovel tests. Next, I needed to identify the spatial extent of the Alexander and Benton component extents. Any shovel test that included diagnostic early Woodland period projectile points or any ceramics was designated as Alexander. Shovel tests with any ceramics could be confidently identified to the later components since the Benton culture in this region has no evidence of pottery use. Identifying shovel tests as definitively part
Figure 4.1: Map of Shovel Tests Designated as Positive or Negative. Also, take note of the Tuscaloosa Gravel Outcrops, labeled as Chert Outcrops on the Map.
of the Benton component was more difficult. In this case, I had to depend on diagnostic Middle Archaic projectile points occurring in the shovel tests. Standard References were used to identify projectile point types (Cambron and Hulse 1975; Futato 1983a; Justice 1987). These are admittedly imperfect measures for the expanse of the two components, but they are the only pieces of the material record that can be confidently dated to either culture. Once I had recorded the results of each shovel test, I could cross-reference my findings with a map of the shovel tests to get an idea of the horizontal layout of the site.

*Materials and Methods for Vertical Site Analysis*

The vertical site analysis methods required an examination of the site stratification. In this case, instead of analyzing shovel tests, I examined the cultural material from Excavation Units 1 and 2 (See Figure 4.2). These units were excavated in ten centimeter arbitrary levels. Once the artifacts from each level had been washed and separated from the large quantities of non-cultural material, I went through each level again checking for both ceramics and diagnostic projectile points, using the same resources as before (Cambron and Hulse 1975; Futato 1983a; Justice 1987). Since the excavation units were much larger than shovel tests, they were much more likely to contain diagnostic points in each level. Once I recorded each level as positive or negative for Benton or Alexander diagnostic artifacts, I cross referenced the results against the profile drawings and photographs taken during excavation. This allowed for a very good idea of how the components were vertically deposited. While the excavators already had a very good idea of how the Benton and Alexander components at Morrow site were separated, this allowed me to separate out exactly which arbitrary excavation levels belonged to each and to see where the alluvial fill had disturbed each component. Finally, concretely defining each component was
Figure 4.2 Excavation Unit Site Map.
vital in order to move on to the lithic debitage analysis, since it depended on determining exactly which archaeological culture produced which debitage.

Methods for Lithic Debitage Analysis

While the previous methods revealed much about the horizontal and vertical distributions of Morrow site, the original research section for this thesis required analysis of the lithic debitage. Several key terms need to be defined. Lithics references any cultural material made of stone, whether it be stone tools or the pieces of rock removed in the making of those tools. Flaked stone tools are made in a subtractive process where large flakes removed from a core of a specific material, such as Fort Payne chert or Tuscaloosa chert cobbles. Over time the outer core (cortex) is stripped away by striking it with various hammerstones and refining tools through the processes known as flintknapping, which results in the projectile points and knives found in the material record (Yohe 2009:47). My analysis focused specifically on those pieces of rock removed during flintknapping, referred to as flakes or debitage. These terms are mostly interchangeable: debitage always refers to all the detached pieces of stone removed in tool creation, while flake can be used to focus on one specific piece of debitage (Andrefsky 1998; Yohe 2009). Flakes can be differentiated based on the amount of cortex present on their outer edge, defined as an individual flake’s degree of decortication. The various degrees of decortication will be further delineated below. The creation of flaked stone tools has been a focus for many insightful studies by archaeologists, as their ubiquity and permanence in the material record allows for extensive usage in cross regional and temporal studies. Differences in flaked stone tools are the most common baseline in designating material cultures, as their presence extends beyond the introduction of ceramics. This was useful in establishing the presence and extent of the Benton and Alexander components at the site. For the purpose of this project, I
examined differences in the debitage between the two components. Measurements such as the specific stone types present as debitage, the size of the debitage, and the degree of decortication illuminated new aspects about differences in stone tool production and mobility between the Benton and Alexander cultures present at this site.

As discussed in chapter three, the stone types selected in the construction of flaked stone tools were not always based on what was readily available. Blue-gray Fort Payne chert in particular had special meaning in the Benton culture (Anderson and Sassaman 2012: 89-90; Johnson and Brookes 1989:143-144; Meeks 1999). However, it would be expected at a site such as Morrow that inhabitants would have made extensive use of the local Tuscaloosa gravel varieties, which was ubiquitous in the region and had an outcrop on top of the hill overlooking the site (see Figure 4.1 above). Chapter two of this thesis introduced the idea that the mobility of hunter-gatherer groups such as those that made up much of the Benton and Alexander cultures would be tied to their specific placement along the forager to collector spectrum. I also discussed how the procurement of lithic materials would have been tied to practices of obtaining food (Binford 1979:259-260). So I expected both Fort Payne and Tuscaloosa lithics to be present at Morrow, with Benton components showing higher frequencies of Fort Payne chert and other non-local stone material types than Alexander components due to mobility patterns and the ritual significance of Fort Payne to the Benton culture. Beyond examining types of lithic material, there are several other attributes of debitage that can help indicate mobility levels of the two cultures. Debitage size exhibits how much more mobility either the Benton or Alexander culture may have had when used as a comparative measure for size grading analysis, while degree of decortication does the same for individual flake analysis.
Methods of Size Grading Analysis

Size grading analysis was developed in order to provide a more efficient form of analysis for large counts of flakes. As ancient peoples removeddebitage from stones in order to make flaked stone tools, the flakes decrease in size, with the largest removed in the initial tool creation process, and the smallest removed during reworking or sharpening of already fully formed lithic implements (Ahler 1989: 89-90). Size grading analysis builds on this understanding of flintknapping as a subtractive technology and grades all flakes by the smallest width for each flake. In this analysis all flakes from a given site are passed through graduated screens, which sort them into different size gradients. The flakes can then be counted or weighed by size class in order to determine what type of stone tool technologies were being used at a particular site. Higher frequencies of large flakes indicate a site or sample where individuals were producing flaked stone tools early in the production process. Large frequencies of smaller or late-stage flakes indicate individuals refining stone tools later in the production process (Ahler 1989).

Work by Ahler in his 1989 article established that this methodology of debitage analysis managed to compare favorably to the results from individually examining each flake for tool production indicators (Ahler 1989:101-113). In order to examine the large quantities of flakes found at Morrow site for this thesis, I performed size grading analysis on Excavation Units 1 and 2.

For this procedure, I put all the lithic material through a set of three graduated screens, separating them out into four size categories: greater than one inch, greater than one-half inch, greater than one-quarter inch, and less than one-quarter inch. This was done while cleaning and categorizing all cultural and non cultural materials and became the most time consuming part of the analysis. Eventually, the lithics from both Excavation Units 1 and 2 were separated from all
other cultural and non-cultural material, and sorted by size into the four size groups. Then they were weighed instead of individually counted, to avoid spending copious amounts of time on the thousands of flakes from those two units. For the purpose of this thesis, the weight in grams of each size category should prove illuminating enough. From this, I examined changes in frequencies of weight in grams across the two occupations. Levels that had higher weight frequencies in the larger size categories identified components where more initial flintknapping occurred. In contrast, higher concentrations of weights in the smaller categories in an excavation unit level (greater and less than one-quarter inch) indicated more refining and sharpening of stone tools. Differences in these the composition of size categories would indicate varying lithic production techniques in the Benton and Alexander occupations. In order to test differences in stone tool production, I then formulated a chi-square test on size category compared across cultural component based on the flake weights. I would expect that more variability in the size categories would indicate a more sedentary, complex site, as they would be creating a more specialized lithic toolkit. In order to prevent over-reliance on one analysis type, I also performed individual flake analysis on a smaller stratified sample from the site. This second type of analysis allowed me to examine stone material types for individual flakes, something I was unable to do with the size grading analysis.

*Methods of Individual Flake Analysis*

Individual flake analysis, or IFA (Ahler 1989), involves examining each flake and recording several of its specific characteristics. As opposed to size grading analysis, IFA can be used to specifically link flake function to different categories. Individual flake analysis for flaked stone tool production is done through determination of the degree of decortication, understood as how much cortex is found on each flake. Cortex is the outer chemical and physical weathering
on a piece of chert before it is modified in any way for stone tool production. It has a visibly
duller, unrefined finish compared to the other surfaces on a flake that would be much smoother,
based on its removal through the flintknapping process. Flintknappers remove either most or the
entire cortex in the creation of any flaked stone tool. Flakes removed at the beginning of the
flintknapping process end up with cortex covering all of one side. Those flakes are called
primary decortication flakes, and the side covered in cortex is known as the “dorsal” side of the
flake (Yohe 2009:63-65). Flakes removed later in the tool making series will have only partial
decortication. If they have some cortex on their dorsal side, they are referred to as secondary
decortication flakes (Yohe 2009:63). Flakes with no cortex on the dorsal side at all and are
therefore removed latest in the flintknapping process are called tertiary decortication flakes.
Finally, not all debitage is necessarily a flake. Shatter is the term for waste removed in
flintknapping that does not have a real flake shape (Yohe 2009:64). In my individual flake
analysis, I attributed each flake to one of these four categories (primary, secondary, and tertiary
decortication, and shatter). Due to the types of stone materials available to the residents of
Morrow site, examination of the degree of decortication could be very beneficial to this thesis, as
most of the materials in the area are covered by an easily identifiable outer cortex.

Flakes were selected for individual flake analysis based on the vertical site analysis. From
that earlier analysis, I had identified which levels of Excavation Unit 1 were Benton or
Alexander (or disturbed fill). From there, I was able to identify Level 3 of the excavation unit as
definitely Alexander, and Level 7 as part Benton. Since the flakes were already divided by size
grade, I recorded flake characteristics for all of the flakes from the greater than one inch, one-
half inch, and less than one-quarter inch categories. In both Levels 3 and 7, the greater than one-
quarter inch size category had too many flakes to complete data collection for every flake. So I
took a random sample of 1000 flakes from that size category for each cultural component. Once my sampling was finished, I could continue my individual flake analysis.

It has been noted already that other archaeologists performing individual flake analysis on decortication have compared it favorably to size grading analysis. They found that overall, individual flake analysis based on decortication and size grading analysis identified the sites as containing similar types of lithic production (Ahler 1989). Therefore, the true advantage to the individual flake analysis within this research was the examination of material types. In chapter three, I outlined most of the stone types common to the Tombigbee River drainage basin that were used in tool construction. In my procedure, I used these descriptions and type collections available at the University of Alabama to identify the stone materials. Through my analysis, I identified Tuscaloosa gravels and Fort Payne chert, as well as Ferruginous Sandstone, Conglomerate, and Fossiliferous Bangor at Morrow site. There were a few flakes I was unable to identify, so I labeled them as “unidentified” before recording all other possible characteristics within my individual flake analysis. For each flake I recorded their excavation unit and level. I also recorded the flake’s material type, whether or not it was heat treated, its degree of decortication (primary, secondary, tertiary, or shatter), and its weight in grams. Cores for tool-making are often heat treated to help the flintknapping process as it improves the stone’s flake-making characteristics (Yohe 2009:47). While I was not examining heat treating for this thesis, it could prove useful in future research involving Morrow site.

The most relevant characteristics measured in the individual flake analysis for this thesis were material type and degree of decortication. For material type, I compared the two levels through local and non-local chert. I counted Tuscaloosa gravel as local, and Fort Payne and Fossiliferous Bangor as non-local for the purpose of this analysis. I then ran chi-squares on the
frequencies of local and non-local materials across the Benton and Alexander components. Next, I examined the frequencies of all four size decortication categories, including shatter, and ran chi-squares across the Benton and Alexander components in order to see if the relationship was statistically significant. Finally, I compared the results from my analysis on degree of decortication to my results from the size grading analysis on flake weights. I expected that flakes from the Benton occupation would have higher frequencies of non-local stone flakes with less decortication at a statistically significant value (p<.05), compared to the flakes from the Alexander component, which was expected to have higher frequencies of local stone flakes with more cortex.

*Chi-Squares*

I must provide a note here on the utility of chi-squares in archaeological tests. Several researchers have delved into the validity of chi-square comparisons and the types of sample sizes used in archaeology. Drennan (2010:190) comments that just because large samples are more likely to produce statistically significant results in chi-squares, those results may not actually be valid as they magnify differences that are actually too small to be valuable. Cowgill (1977:367) had similar concerns, discussing the issues with certain statistical testing, assumptions behind null hypothesis procedures, and the importance of examining the frequencies and percents as well as whether the values come out as statistically significant on a certain test. Moving into my analysis and results, remember that despite the statistical significance of a given result, examination of the actual percentages is necessary in understanding the test’s validity.

To summarize, in this chapter I introduced Morrow site as the object of study. I also listed and discussed the different methodologies I used in examining the site. I discussed my methods of vertical and horizontal site analysis, which would provide better understanding of the
site distribution. I also examined methodologies for size grading and individual flake analysis in order to determine how they differed and what each one could tell me about Morrow site. Finally I discussed what kinds of comparisons I made in order to test the research hypothesis. The hypothesis being that through different types of lithic debitage analysis the Benton component would indicate higher levels of mobility than the Alexander component at Morrow site. The analysis and results of the data gathered by the methods discussed here are presented in the following chapter.
CHAPTER FIVE:
ANALYSIS AND RESULTS

The purpose of this chapter is to present the analysis and results uncovered through the methodologies discussed in the last chapter. The discussions and conclusions based on these analyses and results are exhibited in Chapter Six.

Site Composition

The first step of my methods involved the horizontal distribution of Morrow site. TVAR was able to compile a map based on my findings on diagnostic artifacts found in the shovel tests (see Figure 5.1). From Figure 5.1, the first noticeable pattern is the clustering of almost all the positive shovel tests around the datum in the central and eastern part of the site. Looking ahead to Figure 5.2, the five excavation units were investigated in this area, grouped in the northeastern section of the site. In examining the differences between Benton and Alexander positive shovel tests, several patterns emerge. First, more of the tests are positive for diagnostic Alexander artifacts compared to diagnostic Benton artifacts. Second, the Benton positive tests are all located in the eastern half of the site, while the Alexander diagnostic artifacts are more widely distributed. Finally, the places with overlap are close to where the excavation units were investigated (cross reference with Figure 4.2 from the previous chapter).
Figure 5.1: Shovel Test Data Map.
Figure 5.2: Diagnostic Alexander Sherd, the Alexander Pinched sherd on the left is representative of the Alexander Culture. The Mulbary Creek Plain Sherd on the right is not, due to its persistence in the next cultural period.

Figure 5.3: Two Diagnostic Benton Projectile Points and a Ferruginous Sandstone Saw Implement. The saw is not a diagnostic artifact, but does provide an example of how the stone material might be used.
Horizontal Site Analysis and Results

Examining the diagnostics from each stratigraphic level and then cross-referencing them with the profile drawings and photographs from excavation gave me a clear picture of how each one aligned with either the Benton or Alexander component. Visible in Figure 5.4, Table 5.1, and Table 5.2, both excavation units began with about 20-30 cm of plow zone. Plow zone is a disturbed area of topsoil found covering sites in areas where deposits have often built up over time. Below that is the Alexander component, extending to a depth of 30-40 cm and identified by a substantial amount of pottery sherds. This stratum included several sherds categorized as O’Neal plain and Alexander Pinched. In between the Benton and Alexander components is a visible alluvial deposit (see Figure 5.4). While the alluvial fill itself is sterile soil, due to how the excavation units were uncovered in arbitrary levels, parts of the Benton and Alexander components were excavated with alluvial fill. This led some levels to contain both diagnostic Alexander and Benton artifacts. Therefore, in order to avoid admixture in my vertical analysis, I designated Level 5 of Excavation Unit 1 and Level 4 of Excavation Unit 2 as part of that alluvial deposit and kept them out of the size grading analysis. Beneath the sterile stratum, there is a significant Benton component that extends until sterile soil. As it was investigated first, Excavation Unit 1 was excavated to 120 cm below surface, its depth extending well below the termination of the Benton deposit. This allowed the excavators to examine the full profile of the unit and identify the termination depths of the Benton occupation. Excavation Unit 2 was then terminated at 83 cm, where the investigators determined the Benton occupation had ended based on changes in soil composition visible in excavation and on the profile wall of Excavation Unit 1 (see Figure 5.4 below).
Figure 5.4 Excavation Unit 1: North Profile.

<table>
<thead>
<tr>
<th>Level</th>
<th>Depths</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0-20 cm</td>
<td>Plow Zone</td>
</tr>
<tr>
<td>2</td>
<td>20-30 cm</td>
<td>Plow Zone</td>
</tr>
<tr>
<td>3</td>
<td>30-40 cm</td>
<td>Alexander</td>
</tr>
<tr>
<td>4</td>
<td>40-50 cm</td>
<td>Alexander</td>
</tr>
<tr>
<td>5</td>
<td>50-60 cm</td>
<td>Sterile Alluvium</td>
</tr>
<tr>
<td>6</td>
<td>60-70 cm</td>
<td>Benton</td>
</tr>
<tr>
<td>7</td>
<td>70-80 cm</td>
<td>Benton</td>
</tr>
<tr>
<td>8</td>
<td>80-90 cm</td>
<td>Benton</td>
</tr>
<tr>
<td>9</td>
<td>90-100 cm</td>
<td>Benton</td>
</tr>
<tr>
<td>10</td>
<td>100-110 cm</td>
<td>Benton</td>
</tr>
<tr>
<td>11</td>
<td>110-120 cm</td>
<td>Benton</td>
</tr>
<tr>
<td>12</td>
<td>120-130 cm</td>
<td>Benton</td>
</tr>
</tbody>
</table>

Table 5.1 Excavation Unit 1 Depths and Cultural Components.

Table 5.2 Excavation Unit 2 Depths and Cultural Components.
Figure 5.4, Table 5.1, and Table 5.2 help detail the vertical extent of Morrow site. It is clear that the Benton and Alexander components were distinct from each other with a sterile alluvial deposit acting as a buffer in between the two. Establishing this separation was vital for the remaining analysis of this thesis. It allowed for the bulk of the analysis done on this site to assume that the two layers represented two different site occupations and enabled comparisons with cross-cultural implications. Additionally, since the Benton component appeared to be much larger in terms of sheer volume than the Alexander component, the pure counts were inadequate measures for this analysis. Instead, analysis focused on comparing frequencies per component.

**Size Grading Analysis and Results**

The size grading analysis allowed for the processing and understanding of these frequencies. In the table below are the weights in grams and percentages of each size category of every level in both excavation units. Frequencies in this case were calculated as each respective size category’s weight in grams divided by the total weight of all debitage for that level.

<table>
<thead>
<tr>
<th>Excavation Level</th>
<th>&gt;1&quot;</th>
<th>Percent</th>
<th>&lt;1&quot; to &gt;.5&quot;</th>
<th>Percent</th>
<th>&lt;.5&quot; to &gt;.25&quot;</th>
<th>Percent</th>
<th>&lt;.25&quot;</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>2565.7 g</td>
<td>40.5</td>
<td>2477.0 g</td>
<td>39.5</td>
<td>1207.0 g</td>
<td>19.3</td>
<td>18.4 g</td>
<td>0.003</td>
</tr>
<tr>
<td>1.2</td>
<td>2893.3 g</td>
<td>45.0</td>
<td>2152.6 g</td>
<td>33.4</td>
<td>1380.9 g</td>
<td>21.4</td>
<td>12.3 g</td>
<td>0.003</td>
</tr>
<tr>
<td>1.3</td>
<td>3224.5 g</td>
<td>46.6</td>
<td>2475.8 g</td>
<td>35.8</td>
<td>1209.6 g</td>
<td>17.5</td>
<td>15.8 g</td>
<td>0.003</td>
</tr>
<tr>
<td>1.4</td>
<td>1810.4 g</td>
<td>46.0</td>
<td>1583.0 g</td>
<td>40.2</td>
<td>596.8 g</td>
<td>13.6</td>
<td>6.9 g</td>
<td>0.003</td>
</tr>
<tr>
<td>1.5</td>
<td>1533.2 g</td>
<td>50.0</td>
<td>3822.8 g</td>
<td>32.0</td>
<td>631.4 g</td>
<td>10.9</td>
<td>3.7 g</td>
<td>0.002</td>
</tr>
<tr>
<td>1.6</td>
<td>3455.0 g</td>
<td>41.3</td>
<td>3474.2 g</td>
<td>41.5</td>
<td>1430.8 g</td>
<td>17.1</td>
<td>5.4 g</td>
<td>0.002</td>
</tr>
<tr>
<td>1.7</td>
<td>2054.6 g</td>
<td>41.6</td>
<td>2204.8 g</td>
<td>44.7</td>
<td>671.1 g</td>
<td>13.6</td>
<td>7.9 g</td>
<td>0.003</td>
</tr>
<tr>
<td>1.8</td>
<td>3254.1 g</td>
<td>52.0</td>
<td>2177.7 g</td>
<td>34.8</td>
<td>814.4 g</td>
<td>13.0</td>
<td>7.3 g</td>
<td>0.002</td>
</tr>
<tr>
<td>1.9</td>
<td>2036.5 g</td>
<td>53.6</td>
<td>1330.3 g</td>
<td>35.0</td>
<td>429.7 g</td>
<td>11.3</td>
<td>2.8 g</td>
<td>0.004</td>
</tr>
<tr>
<td>1.10</td>
<td>1451.0 g</td>
<td>36.9</td>
<td>1359.2 g</td>
<td>43.9</td>
<td>589.8 g</td>
<td>19.1</td>
<td>4.0 g</td>
<td>0.006</td>
</tr>
<tr>
<td>1.11</td>
<td>2800.1 g</td>
<td>59.8</td>
<td>1422.8 g</td>
<td>29.7</td>
<td>497.7 g</td>
<td>10.4</td>
<td>5.2 g</td>
<td>0.002</td>
</tr>
<tr>
<td>1.12</td>
<td>9035.6 g</td>
<td>75.2</td>
<td>2381.9 g</td>
<td>19.8</td>
<td>597.6 g</td>
<td>5.0</td>
<td>5.1 g</td>
<td>0.004</td>
</tr>
<tr>
<td>2.1</td>
<td>3575.9 g</td>
<td>34.2</td>
<td>4582.7 g</td>
<td>43.8</td>
<td>2289.6 g</td>
<td>21.9</td>
<td>10.3 g</td>
<td>0.002</td>
</tr>
<tr>
<td>2.2</td>
<td>1701.4 g</td>
<td>38.5</td>
<td>1958.3 g</td>
<td>44.3</td>
<td>752.8 g</td>
<td>17.0</td>
<td>7.6 g</td>
<td>0.004</td>
</tr>
<tr>
<td>2.3</td>
<td>2460.4 g</td>
<td>42.9</td>
<td>2330.8 g</td>
<td>40.7</td>
<td>934.6 g</td>
<td>16.3</td>
<td>5.5 g</td>
<td>0.003</td>
</tr>
<tr>
<td>2.4</td>
<td>1533.2 g</td>
<td>39.6</td>
<td>1726.0 g</td>
<td>44.6</td>
<td>608.0 g</td>
<td>15.7</td>
<td>4.1 g</td>
<td>0.004</td>
</tr>
<tr>
<td>2.5</td>
<td>3107.2 g</td>
<td>46.8</td>
<td>2646.7 g</td>
<td>39.9</td>
<td>862.5 g</td>
<td>13.0</td>
<td>17.5 g</td>
<td>0.002</td>
</tr>
<tr>
<td>2.6</td>
<td>10410.9 g</td>
<td>39.7</td>
<td>10727.7 g</td>
<td>40.9</td>
<td>5003.3 g</td>
<td>19.1</td>
<td>113.8 g</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 5.3: Size Grading Results. Under level, different entries are marked with the excavation unit first. For example, Excavation Unit 1, Level 5 is written as 1.5.
This table illustrates one of the problems with the differing sizes of the levels for each excavation unit. For example, Excavation Unit 2, Level 6 contains very high total weights compared to the other levels. Remember from Table 5.2 that this level was the very last one in Excavation Unit 2 and was therefore excavated down to the end of the Benton component. This likely contributed to its much higher weight in every size category. The frequency values for each weight, however, were much more in line with the rest of the two excavation units. In fact, with a few exceptions, such as Excavation Unit 1, Level 12, most of the levels had similar frequencies for each size category. Excavation Unit 1, Level 12 had an unusually high weight frequency in the greater than one inch category, which likely stemmed from just a few particularly large, heavy fragments. Just a few larger flakes skewed the results, exhibiting the problem with using weight in grams as the basis for size grading lithic analysis. Further sampling would help to mitigate such issues, as would having the time to count every single flake for the size grading analysis.

In order to better visualize the difference between the Alexander and Benton components in comparison to each other, I grouped all weights from either component together, visible in Table 5.4. I also distinguished each weight value by size category, and included the percentages for the respective size categories within each component.
Table 5.4: Weights in Grams and Percentage of Each Weight per Size Category Split by Cultural Component.

<table>
<thead>
<tr>
<th>Size Category</th>
<th>Alexander</th>
<th>Benton</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;1 Inch</td>
<td>9196.7</td>
<td>37354.2</td>
<td>46550.9</td>
</tr>
<tr>
<td>Percent</td>
<td>43.5</td>
<td>49.7</td>
<td>47.8</td>
</tr>
<tr>
<td>&gt;1/2 Inch</td>
<td>8347.9</td>
<td>27725.3</td>
<td>36073.2</td>
</tr>
<tr>
<td>Percent</td>
<td>40.2</td>
<td>36.7</td>
<td>37.8</td>
</tr>
<tr>
<td>&gt;1/4 Inch</td>
<td>3433.8</td>
<td>10897</td>
<td>14330.8</td>
</tr>
<tr>
<td>Percent</td>
<td>16.1</td>
<td>13.5</td>
<td>14.3</td>
</tr>
<tr>
<td>&lt;1/4 Inch</td>
<td>35.8</td>
<td>169</td>
<td>204.8</td>
</tr>
<tr>
<td>Percent</td>
<td>0.003</td>
<td>0.002</td>
<td>0.003</td>
</tr>
<tr>
<td>Total</td>
<td>21015.2</td>
<td>76146.5</td>
<td>97161.7</td>
</tr>
</tbody>
</table>

In this table is the total weight in grams and percent for each size category. The Benton component had a slightly higher weight devoted to the largest size category, while the Alexander component had greater weight frequencies for the three smaller categories. However, the differences in percentage are very slight. To test how statistically significant the differences are, I ran a chi-square test on the differing frequencies per size category, split by component. For the purpose of this test, I assumed a significance value of less than .05 as the alpha level. In this case, the null hypothesis was that the size category weights exhibited no change between cultural components, while the alternative hypothesis was that they do indicate change between the occupations.

When calculated as a chi-square for statistical significance, the resulting p-value was significant at less than a .001 level. This result rejected the null hypothesis, suggesting that there was a substantial difference between flake weight sizes across Alexander and Benton components. Looking at the percents, the Benton cultural component had a higher frequency of greater than one inch flakes compared to the Alexander occupation. Typically this type of result indicates the Benton component was involved in more early stage lithic removal than the Alexander component. Notably, the Alexander component does have slightly more variability in
its size categories, which would support the primary hypothesis of this thesis. The primary hypothesis as it relates to the size grading analysis was that the Alexander culture at the site would contain debitage indicative of greater variety in flaked stone tool production compared to the Benton component. However, I believe most of the chi-square test exhibiting a strong statistical significance is due to the influence of the giant sample size. Therefore, the use of weights in grams as a count, as opposed to the actual counts of flakes, made slight changes in differences statistically significant more so than actual differences in frequency. Although, even if I was able to use flake counts, the sample sizes would likely still be too large to accurately get a reading on a significance test. Instead, the importance in this size grading result is that the frequencies of flake size categories are so similar, which still rejects the research hypothesis, despite the high chi-square significance level.

**Individual Flake Analysis and Results**

*Basic Data Results*

The individual flake analysis ultimately consisted of 4439 flakes: 181 greater than one inch, 1958 between one and one-half inch, 2001 in between one-half and one-quarter inch, and 299 less than one-quarter inch. These samples were drawn from Levels 3 and 7 from Excavation Unit 1. The flakes comprised all of the greater than one inch, greater than one-half inch, and less than one-quarter inch size categories from both levels, with a sample of around 1000 flakes from each levels’ greater than one-quarter inch size category. When split by degree of decortication, there were 165 primary flakes, 1090 secondary flakes, 2951 tertiary flakes, and 233 designated as shatter (see Table 5.5). It was not surprising to see such a concentration in the secondary and tertiary degrees of decortication, as much more flakes were drawn from the smaller size
categories, which were more likely to contain higher amounts of refining flakes (more secondary and tertiary flakes).

Examining Table 5.6, the material types were overwhelmingly Tuscaloosa gravels, with 3750 of the flakes coming from this local material. The material type with the next highest count was Ferruginous sandstone, with a count of 425 total flakes, followed by Fort Payne chert at 141 flakes, Conglomerate flakes at 95, and Fossiliferous Bangor at 11. Also, I was unable to identify stone type for 17 total flakes, mostly due to their small size. The fact that the most common material type was Tuscaloosa gravel was not necessarily surprising, due to the proximity of a source of it overlooking the site. However, the degree to which it overshadowed the rest of the material types was surprising, especially for the Benton cultural component.

In addition to material types, degree of decortication, and size category, I also collected information on whether or not flakes were heat treated. I identified 2267 flakes as having some
evidence of heat treating, while 2172 showed no evidence for heat treating. After running several preliminary tests on heat-treated flakes, I determined there was little they told me that related to this thesis. More research could be done on this category, specifically on the relationship of heat treating and Tuscaloosa Gravels, but it did not indicate anything about mobility patterns or other changes around the Archaic to Woodland transition.

IFA Mass Results and Analysis

The last category I measured in the individual flake analysis was weight in grams. The initial results were skewed towards smaller values, because of the much higher sampling of smaller-sized flakes. For the entire individual flake sample, the dataset displays clear skewness to the right, a mean of 2.27 and a standard deviation of 9.52. For further analysis of flake weights, I split them by size category. This resulted in the following table, Table 5.7, of basic descriptive stats for each size category and Figures 5.5, 5.6, 5.7, and 5.8 displaying the distribution of flake weights in grams, split by size category. The general skewness of flake weights is displayed in each histogram in the below figures, although to a lesser extent.

<table>
<thead>
<tr>
<th>Weight in grams</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Total Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;1 inch</td>
<td>181</td>
<td>2.4</td>
<td>375.2</td>
<td>26.84</td>
<td>39.09</td>
<td>4859.4</td>
</tr>
<tr>
<td>&gt;1/2 inch</td>
<td>1958</td>
<td>0.2</td>
<td>16.0</td>
<td>2.24</td>
<td>2.20</td>
<td>4380.4</td>
</tr>
<tr>
<td>&gt;1/4 inch</td>
<td>2001</td>
<td>0.1</td>
<td>2.2</td>
<td>0.40</td>
<td>0.31</td>
<td>793.4</td>
</tr>
<tr>
<td>&lt;1/4 inch</td>
<td>299</td>
<td>0.1</td>
<td>0.5</td>
<td>0.11</td>
<td>0.04</td>
<td>33.1</td>
</tr>
</tbody>
</table>

Table 5.7: Descriptive Statistics for Weight in Grams Split by Size Category.
Figure 5.5: Histogram of the Greater than One Inch Size Category Flake Weights with a Normal Distribution Curve.

Figure 5.6: Histogram of the Greater than One-Half Inch Size Category Flake Weights with a Normal Distribution Curve.
Figure 5.7: Histogram of the Greater than One-Quarter Inch Size Category Flake Weights with a Normal Distribution Curve.

Figure 5.8: Histogram of the Less than One-Quarter Inch Size Category Flake Weights with a Normal Distribution Curve.
The above histograms display the extreme skewness and variability in the flake weights for the smaller sample. This variability exhibits how problematic size grading is as a singular method of examining lithic analysis. In the case of the greater than one inch size category, the range of flakes from 2.4 grams to 375.2 grams provides a good example as to how flakes of that size could cause extreme differences across occupations.

*Degree of Decortication Analysis and Results*

The size grading data, displayed in Tables 5.3 and 5.4, indicated minor differences between the Alexander and Benton culture components in lithic debitage patterns. Degree of decortication, however, is another way to examine site use, using results from the individual flake analysis. Previous comparisons of individual flake analysis to size grading flake analysis exhibit that the two different analyses indicate the same methods of stone tool production in the material record when performed on the same collections (Ahler 1989). As the types of stone material types present at Morrow site lent themselves to certain individual flake typologies, I decided to measure a specific set of attributes for this next part of my analysis. First, however, sampling for the analysis was drawn from the size categories, so it was important to understand exactly where the lithics were coming from. If one excavation unit level contained more of one size category than the other, it would skew the data.

<table>
<thead>
<tr>
<th></th>
<th>&gt;1 Inch</th>
<th>Percent</th>
<th>&gt;1/2 Inch</th>
<th>Percent</th>
<th>&gt;1/4 Inch</th>
<th>Percent</th>
<th>&lt;1/4 Inch</th>
<th>Percent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexander</td>
<td>94</td>
<td>4.1</td>
<td>986</td>
<td>43.1</td>
<td>1000</td>
<td>43.7</td>
<td>207</td>
<td>9.1</td>
<td>2287</td>
</tr>
<tr>
<td>Benton</td>
<td>87</td>
<td>4.0</td>
<td>972</td>
<td>45.1</td>
<td>1001</td>
<td>46.5</td>
<td>92</td>
<td>4.3</td>
<td>2152</td>
</tr>
</tbody>
</table>

Table 5.8: Frequency of Flake Sizes in Each Cultural Component.

As visible in table 5.8, the Benton half of the sample contains one more flake in the greater than one-quarter inch category. The flakes from the Alexander component contained higher concentrations in the greater than one inch and greater than one-half inch categories, and
in the less than one-quarter inch category. None of these differences are very substantial, as seen in the percentages per each component, except for perhaps the slight increase in the Alexander greater than one inch size category. The similarities in the types of flakes present in both components goes against the research hypothesis predicting more variability in the Alexander over the Benton occupation, but more sampling and analysis beyond the scope of this thesis would be necessary to see if this was truly a verifiable difference. Next, I tested the degree of decortication across cultural components. I used Pearson’s chi-square to do this, testing the four size decortication categories discussed in chapter four against the Benton and Alexander cultures from the individual flake analysis. This test determined if the difference between frequencies of degree of decortication across the Benton and Alexander components used in the individual flake analysis are statistically significant. I used an alpha level of .05 to test this significance.

<table>
<thead>
<tr>
<th></th>
<th>Alexander</th>
<th>Benton</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>88</td>
<td>3.8</td>
<td>165</td>
</tr>
<tr>
<td>Secondary</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>526</td>
<td>23.0</td>
<td>1090</td>
</tr>
<tr>
<td>Tertiary</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>1565</td>
<td>68.4</td>
<td>2951</td>
</tr>
<tr>
<td>Shatter</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>108</td>
<td>4.7</td>
<td>2287</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
</tr>
<tr>
<td></td>
<td>2287</td>
<td>4.7</td>
<td>4439</td>
</tr>
</tbody>
</table>

Table 5.9: Cultural Component Compared to Degree of Decortication Cross tabulation.

This table displays the cross tabulation for each individual flake’s cultural component compared to its degree of decortication. Looking at the trends from the percents and counts, however, it is clear that the relationship between cultural component and degree of decortication is complicated. The Benton cultural component had only slight increases in the secondary decortication and shatter, while the Alexander component had similarly minor differences in
primary and tertiary decortication. None of the differences in percents for the degree of
decortication across cultural component was greater than 4, making the significance again more a
result of the large sample size than true difference in flake decortication. It does at least display a
trend towards differential tool production

*Material Type and Cultural Component*

Another way of testing mobility across the Benton and Alexander components is through
material type. For this comparison I used another chi-square test. When categorizing local stone
types I used Tuscaloosa gravels, and for non-local stone types I used Fossiliferous Bangor and
Fort Payne chert. All other stone material types were removed from this comparison, as
conglomerate and ferruginous sandstone are harder to source and the unidentified flakes could
not be properly classified as either local or non-local since their material type was unknown. For
the chi-square test, I used an alpha level of .05. In this test the hypothesis was that the Benton
component’s use of non-local stone materials would be greater than that of Alexander’s.

<table>
<thead>
<tr>
<th></th>
<th>Alexander</th>
<th>Benton</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Count</td>
<td>1844</td>
<td>1906</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>96.4</td>
<td>95.8</td>
</tr>
<tr>
<td>Non Local</td>
<td>Count</td>
<td>68</td>
<td>84</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>3.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>1912</td>
<td>1990</td>
</tr>
</tbody>
</table>

Table 5.10 Locality of Individual Flake Compared to Cultural Component Cross tabulation.

Table 5.10 shows that a higher percentage of the non-local flakes are in the sample drawn
from the Benton component, but not by much. The Fisher’s exact chi-square gave a value of
.321, much greater than the alpha level of .05, which therefore failed to reject the null hypothesis
that there was not statistically significant difference between the Benton and Alexander
components for use of local and non-local chert. Because the Fisher’s exact chi-square is based
on maximum likelihood rather than parametric statistics, it is insensitive to the marginal skew.
However, it is still sensitive to the large sample sizes, making it more notable that the results were not statistically significant, indicating similarity in stone material use for the two occupations.

In chapter three, I discussed the importance of Fort Payne chert to the Benton culture. I wanted to test if that importance still showed up at a site so close to a lower quality material. Since the Benton culture showed a preference for Fort Payne chert at other sites, I wanted to see if there were significantly different frequencies of that chert between the two components at Morrow site. So, I ran another chi-square, this time with Fort Payne chert compared to the combined counts of all other stone materials present at Morrow site, including unidentified materials. I assumed for this test that the unidentified flakes were not Fort Payne flakes, which I would have been able to identify. I again assumed an alpha level of .05, and used a null hypothesis where the change between Benton to Alexander culture would exhibit no differences in the presence of Fort Payne chert. Then I ran a new chi-square test for this comparison.

<table>
<thead>
<tr>
<th></th>
<th>Alexander</th>
<th>Benton</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non Fort Payne</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>2226</td>
<td>2072</td>
<td>4298</td>
</tr>
<tr>
<td>Percent</td>
<td>97.3</td>
<td>96.3</td>
<td>96.8</td>
</tr>
<tr>
<td><strong>Fort Payne</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>61</td>
<td>80</td>
<td>141</td>
</tr>
<tr>
<td>Percent</td>
<td>2.7</td>
<td>3.7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2287</td>
<td>2152</td>
<td>4439</td>
</tr>
</tbody>
</table>

Table 5.11 Cross Tabulation Displaying Fort Payne and Non-Fort Payne Cherts Compared by Cultural Component.

The cross tabulation for this chi-square exhibits how the Benton component does have a slightly higher number of Fort Payne flakes than the Alexander component. This results in a Fisher’s Exact Test result of .049, which is just barely statistically significant. Despite the scant difference between the amount of Fort Payne chert for either component, the large overall sample size once again makes even subtle differences significant. So even though most of the
other tests for mobility within this thesis have come back negative, there is a positive trend for the use of Fort Payne chert in the Benton component. However, even here, it is a very slight difference, and could still be attributed to sample size.

Blue-Gray Fort Payne Chert and Degree of Decortication

After I saw the Benton culture’s higher quantity of blue-gray Fort Payne chert, I went back to examine one specific trend. I wanted to investigate what the degrees of decortication were for each Fort Payne stone material flake.

<table>
<thead>
<tr>
<th></th>
<th>Fort Payne</th>
<th>Not Fort Payne</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Count</td>
<td>2</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>1.4</td>
<td>3.8</td>
</tr>
<tr>
<td>Secondary</td>
<td>Count</td>
<td>30</td>
<td>1060</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>21.3</td>
<td>24.7</td>
</tr>
<tr>
<td>Tertiary</td>
<td>Count</td>
<td>109</td>
<td>2842</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>77.3</td>
<td>66.1</td>
</tr>
<tr>
<td>Shatter</td>
<td>Count</td>
<td>0</td>
<td>233</td>
</tr>
<tr>
<td></td>
<td>Percent</td>
<td>0.0</td>
<td>5.4</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>141</td>
<td>4298</td>
</tr>
</tbody>
</table>

Table 5.12: Degree of Decortication for Fort Payne Chert Flakes Compared to Non Fort Payne Flakes.

This table shows that of the 141 total Fort Payne chert flakes, 139 of them were secondary or tertiary flakes, with 109 of them labeled as tertiary. It seemed that the Fort Payne chert flakes at the Morrow site are overwhelmingly higher degree of decortication flakes. Compared to the non Fort Payne flakes, there is a definitive increase in the tertiary flakes which comes primarily at the expense of the primary and shatter percents.

To summarize, the horizontal analysis on the shovel test data revealed that both the Benton and Alexander components did not necessarily occupy the same space over the entire site. However, they did both use the area uncovered in the excavation units. In the vertical analysis, drawn from the excavation units, I was able to identify exactly which excavation levels
belonged to each cultural component. The size grading analysis indicated similar percents in terms of debitage size for both components with a trend towards more variability in stone tool production in the Alexander component. Individual flake analysis based on degrees of decortication compared to cultural component revealed that the Alexander component had higher counts of primary and tertiary flakes, while the Benton had higher counts of secondary flakes and shatter. Individual flake analysis failed to indicate a statistically significant relationship between flake stone material types based on locality and cultural component, with the exception of when comparing Fort Payne flakes to all other stone materials. Then it indicated a positive trend between the Benton cultural component and the Fort Payne chert. Finally, when examining the degree of decortication for the Fort Payne flakes, I found that most of the flakes had either a secondary or tertiary degree of decortication. The implications of the lithic data analysis and results from Morrow site for the research problem are discussed in the final chapter.
CHAPTER SIX:
DISCUSSION AND CONCLUSIONS

Coming into this thesis, the primary difference between Alexander and Benton archaeological cultures appeared to be their chronological position on either side of the Archaic to Woodland transition in the Tennessee River Valley. Populations across the Southeast exhibited patterns of increasing consolidation and regionalization (represented by material culture diversity) at the start of the Woodland period. The Alexander culture occurs at the very beginning of this period, referred to in this region as the Gulf Coast Formational (Jenkins and Krause 1986). Based on various models of the Archaic to Woodland transition, sites that contain Alexander cultural components should exhibit signs of more material cultural diversity and more sedentary practices when compared to Archaic period cultures, such as Benton. This was the logic behind the primary research hypothesis of this thesis, expecting these differences in mobility to appear as differences in debitage patterns at Morrow site. I expected that the excavation levels associated with the Alexander culture would exhibit more local stone types and more variety in sizes and degrees of decortication when compared to those levels from the Benton culture. The variety in flake size and degree of decortication in the Alexander component would have identified more variability in flaked stone tool production. None of my analysis conclusively supported this hypothesis.

When comparing the two components at Morrow site with the methods of size grading debitage analysis, I did find a statistically significant difference between the Alexander and Benton components. Looking at the frequencies, there are some trends that indicate greater variety in Alexander stone tool production, but I am uncertain as to how much difference exists
between the two occupations. Based on the problems with using flake weight as a comparative measure and in using chi-squares on such a large sample size (Cowgill 1977; Drennan 2010), I would argue the similarities in the size category percents indicate similar site use. In addition to the size grading analysis, decortication comparisons from the individual flake analysis across the two components shows only some variability, at differences of up to 5 percent (see Table 5.9). I believe this indicates that the types of stone tool-making activities that occurred in both phases at Morrow site were very similar in both cultures. Additionally, comparisons of local and non-local stone material types split by the two components showed no significant increase in local stone types in the Alexander culture. This indicates that both cultural occupations at the site drew from the same types of lithic sources and does not signify definitive changes in mobility. Therefore, I argue that the tool production and mobility practices of the Benton and Alexander occupations at Morrow site were very similar and do not exhibit increasing sedentism around the Archaic to Woodland transition.

There are several potential causes for the lack of conclusive indicators for increasing sedentism from the Benton to the Alexander culture at Morrow site. First, this may be a result of the Alexander culture’s presence within the early Woodland period, when it was still too early to exemplify the patterns of regionalism and sedentism that are commonly associated with the period overall. Or it may be that the Morrow site represents a “location” in Binford’s collector and forager models (Binford 1980), where both cultures came to gather and work materials before moving back to their “residential bases.” The Benton and Alexander occupations at Morrow site had similarities in both the size grading and level of decortication splits. While the results were statistically significant, I believe that is mostly a result of the large sample sizes as opposed to actual differences in the frequencies (Cowgill 1977; Drennan 2010).
Taking into account the horizontal site distribution, there is a third potential reason for the lack of variation in the excavation units. It appears that based on the horizontal distribution of diagnostic artifacts, the Benton component at Morrow site is much more restricted than the Alexander component. That may represent the two cultures using the sites in different ways. But since both the excavation units I examined came from the area where the Benton and Alexander components overlapped, I was unable to observe differences in site distribution for the two occupations. Despite the lack of Benton points in the horizontal distribution, finding any diagnostic point in a shovel test is difficult, while the Alexander component is identifiable by the presence of any ceramics. In order to identify different site usage between the Alexander and Benton occupations, another test unit would have to be excavated at the site, further west than the previous five. This would help determine if the horizontal extent of the Alexander occupation was actually larger than in the Benton occupation. In any case, I find this third working hypothesis the least likely explanation for the similarities in between the Alexander and Benton components at Morrow site. When considering the above reasons for the lack of indicators of increasing sedentism, I suggest a working hypothesis that displays both a decreased importance on the differences in mobility between Alexander and Benton cultures, as well as an understanding of where Morrow site fits in the flaked stone tool production process for both occupations.

Although very slight, the Benton component did exhibit a slight trend of increased Fort Payne chert flakes over the Alexander component in the sample. This was expected based on the previously documented tendency of the Benton culture to use Fort Payne chert over all other types, albeit the difference between the two occupations was smaller than anticipated. Examining the broader preference for Fort Payne chert, did the Benton culture prefer to use the blue-grey
material because of its proximity, or did the culture consider this stone type necessary for flaked stone tool production? Meeks (1999) examined raw material frequencies of diagnostic Benton points at a variety of sites around the Benton interaction sphere. While he found a slight decrease in the use of Fort Payne chert for Benton points in the upper Bear Creek and Cedar Creek drainage basin (Meeks 1999:34-35), it was not nearly to the extent exhibited at Morrow site. Compared to Morrow site debitage, Meeks (1999:35) found that the frequency of Benton points made from Fort Payne chert in his sample of sites was roughly uniform despite increasing distances from the Fort Payne source. In other words, there was no fall off in frequency of Fort Payne chert material with distance from source.

Meeks’ work was based on projectile points, however, not debitage. Benton projectile points, as opposed to stone flakes, are diagnostic and allow for better cross-site comparison. Looking at the lithic debitage at Morrow site, the frequencies are nothing like what Meeks observed in the diagnostic Benton points. Inhabitants of Morrow site used almost no Fort Payne chert in stone tool production, in either the Benton or Alexander culture components. In part, this is due to the site’s proximity to a Tuscaloosa gravel source, but it does not explain the extent to which the Benton culture ignored working with Fort Payne chert. There is a slight trend of 19 flakes, showing a preference for Fort Payne flakes in the Benton component, that may have originated with the preference for the material in that culture. But this does not explain why it was such a small percentage of the actual debitage. It appears that when Benton populations were very distant from their sources for Fort Payne chert, they took advantage of local stone materials for standard tool use. It appears that during the Benton occupation of Morrow site, individuals preferred to work with Tuscaloosa gravel. All flaked stone tool production dealing with Fort Payne chert in either occupation at the site was focused on refining, as exemplified in the high
counts of Fort Payne tertiary flakes. This supports some of Meeks’ findings, which noted that very few of the Benton diagnostic points from around the Tennessee and Tombigbee River drainage basins seemed to be reworked (Meeks 1999:40-42). While Benton points made of Fort Payne chert were valuable enough for the culture to take the points around the Tennessee River drainage basin, they took advantage of the local materials when they were too far away from Fort Payne sources to gather the material for regular use. Future work on this site examining questions of mobility should focus on the projectile points in the interest of comparing the Benton culture at Morrow site to other sites in both the Little Bear Creek and Cedar Creek drainage basins and the rest of the Benton interaction sphere. At one point I intended to include a comparison between Morrow site and other nearby sites’ projectile points within this thesis. Difficulties with accessing all of the diagnostic points and time constraints prevented me from completing that part of my methods.

There are a number of other directions for future research that would expand on the findings of this thesis. Future work on the Archaic to Woodland transition should continue to examine changes in mobility in this region over time. Work specific to Morrow site should focus on understanding how the site functioned in the Benton and Alexander settlement systems. Based on Binford’s description of hunter-gatherer models, it appears that Morrow site is a “location” or a temporary extraction site for both the Benton and Alexander cultures. This would explain why the two occupations at the site exhibited no statistically significant differences in lithic analysis designed to examine differences in lithic production strategies. In order to test this understanding, future investigations would have to identify residential bases for both the Alexander and Benton culture and compare those two. Residential base sites would better lend
themselves to cross-component studies in order to better differentiate the Archaic to Woodland transition.

In order to better understand the types of hunter-gatherer behavior of both the Benton and Alexander culture, future investigations could examine the diversity and variability present at Morrow site. These investigations could then compare to nearby sites with similar components, but varying uses of Morrow site are only one piece of a larger behavioral model for the hunter-gatherer groups of the Archaic and Woodland periods. Therefore, more data is needed to understand both Morrow’s place in Binford’s models and what types of artifact assemblages represent other parts of the collector and forager models for both the Benton and Alexander cultures. This could be done by comparing the shovel test and excavation unit data from Morrow site to other sites and examining for patterns of tool use that could represent specific site functions. Additionally, more excavation units in areas other than the northeastern section of Morrow site (see Figures 3.1 and 5.2 in previous chapters) could reveal whether both occupations have the same horizontal distribution. In solely examining Morrow site’s Benton component, it would be helpful to see how the raw material types of diagnostic Benton points compare to Meeks’ frequencies. More broadly, information on the importance and utilization of blue-gray Fort Payne chert in the Benton culture would help understandings of how materials come to hold ritualistic meaning to specific cultures.

In conclusion, the original research hypothesis that Morrow site would exhibit differences in the material record which reflected increasing sedentism from the Alexander to Benton component was not supported by either the size grading or individual flake analysis. I have put forth several explanations as to why this may be the case, but I believe the reason for lack of changes in mobility at Morrow site is some combination of the following two working
hypotheses: first, that the difference in mobility between the Alexander and Benton cultures has been overstated in the archaeological literature and that both populations had similar levels of mobility; second, that the ways both cultures would have used a site so close to a local stone material source are very similar in the model of a location within Binford’s forager and collector spectrum (Binford 1980). Finally, despite a very slight trend in the frequency of Fort Payne chert flakes compared to non-Fort Payne chert flakes for the Benton component at Morrow site, it appears that production of Benton diagnostic points occurred primarily around the Fort Payne source with only minor refining occurring at more distant sites around local material sources.
REFERENCES

Ahler, Stanley A.

Andrefsky, William J.

Anderson, David G. and Robert C. Mainfort

Anderson, David G. and Kenneth E. Sassaman

Arnold, Jeanne E.

Beasley, Virgil R.
2009 The Old Eighty Site (1SH493): Phase II and Phase III Archaeological Investigations in Shelby County, Alabama. MRS Consultants LLC. Submitted to Shelby County Engineer’s Office.

Bense, Judith A.


Binford, Lewis R.


Brown, James A.

Bullen, Ripley P.


Cambron, James W. and David C. Hulse

Cohen, Mark Nathan

Cowgill, George L.

Drennan, Robert D.

Dye, David H.

Dye, David H. and Jerry R. Galm.
Emerson, Thomas E., and Dale L. McElrath  

Futato, Eugene M.  


Jenkins, Ned J.  
1974 Subsistence and Settlement Patterns in the Western Middle Tennessee Valley During the Transitional Archaic-Woodland Period. In Journal of Alabama Archaeology 20(2):183-193


Johnson, Jay K. and Samuel O. Brookes  

Justice, Noel A.  

Kelly, Robert L.  

Kidder, Tristram R.  

Lewis, T. M. N, and Madeline Kneberg Lewis  

McNutt, Charles H.  
2008 The Benton Phenomenon and Middle Archaic Chronology in Adjacent Portions of Tennessee, Mississippi, and Alabama. In Southeastern Archaeology 27(1):45-60.
Meeks, Scott C.  

Meredith, Steven M.  

Ortmann, Anthony L.  

Price, T. Douglas and James A. Brown  

Rice, Prudence M.  

Sassaman, Kenneth E.  


Webb, Clarence H.  

Willey, Gordon R. and Phillip Phillips  

Yohe, Robert M.  