The Analysis Of Contact-Era Settlements In Clay, Lowndes, And Oktibbeha Counties In Northeast Mississippi

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THE ANALYSIS OF CONTACT-ERA SETTLEMENTS IN CLAY, LOWNDES, AND OKTIBBEHA COUNTIES IN NORTHEAST MISSISSIPPI

A Thesis
Presented for the
Master of Arts
Degree
The University of Mississippi

Emily Clark

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ABSTRACT

The goal of this project is to compare the spatial distribution of sites across Clay, Lowndes, and Oktibbeha counties between the Mississippi and Early Historic periods using site files from the Mississippi Department of Archives and History. Using Geographic Information Systems (GIS), sites were mapped chronologically to examine change through time to investigate how people reacted to European contact and colonization. Site locations and clusters also were used to evaluate possible locations of the polities of Chicaza, Chakchiuma, and Alimamu discussed in the De Soto chronicles. Sites in Clay, Lowndes, and Oktibbeha counties were chosen due to the existence of the large cluster of sites around Starkville, and because these counties have been proposed as the locations of Chicaza, Chakchiuma, and Alimamu (Atkinson 1987a; Hudson 1993). The distribution of settlement clusters indicated possible locations for polities similar to those proposed by Atkinson (1987a:65). Based on the robust data, informed by work done by David Hally, three clusters and three potential polities have been located in northeast Mississippi. The most robust of these clusters is likely the location of the polity of Chicaza. This thesis serves as a means to direct future research in the area for both archaeological and ethnohistoric work.
DEDICATION

For Martha Jo Sturm, who taught me to be proud of my heritage, and that you can always work through difficulties with determination.
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I would like to express gratitude for my advisor, Dr. Tony Boudreaux. His guidance and expertise shaped this project. He also navigated every obstacle with me and discussed every question I had at length. His feedback, both on multiple drafts and in person, was invaluable. I also appreciate the cool hand of Dr. Maureen Meyers, who always had an answer, suggestion, or book at the ready. Dr. Robbie Ethridge also discussed the effects of European contact and fielded any questions I had about the De Soto entrada. Her critical reading of my thesis provided more expertise and suggestions to complete this thesis. All my committee members always provided me with focus while I worked on my research. Dr. Jay Johnson also provided invaluable skills and advice for this thesis. I also want to thank the University of Mississippi Department of Sociology and Anthropology. They provided funding and resources for my two years here.

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I could not have finished my research without the love and support of my family. I thank my parents, Gary and Kelsey Clark, for always encouraging me to work hard. Likewise, my siblings and grandparents continuously strengthened me, and I could not have done this without them. I want to also acknowledge Ryan and Roscoe, for understanding that I was busy and always being calming presences in times of stress.
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CHAPTER I
INTRODUCTION

For hundreds of years in the ancient Southeast, the main cultural sphere was the Mississippian world. While the rise and fall of the Mississippian world has been investigated and studied by archaeologists for over a century (Anderson and Sassaman 2012:153), the transition between pre-Columbian Mississippian chiefdoms and modern indigenous groups—the Choctaw, Chickasaw, Creek, etc.—is the focus of much work in the area, primarily through archaeological and ethnohistorical work focusing on the Contact period. From the time the Hernando De Soto entrada left northeast Mississippi in 1540 to the mid-seventeenth century, few European peoples entered the Southeast. During this time, much cultural reconstruction and renegotiation took place, as evidenced by the profound changes in the indigenous geopolitical landscape and transition from the Mississippian world to the coalescent societies of the eighteenth century (Ethridge 2009:36-42).

Consequences of the initial European-Indian interactions permeated native societies, affecting how they acted in nascent colonialism. This is especially evident in settlement data, and the distribution and density of settlements can demonstrate how people renegotiated their worldview following dramatic changes of both the social and physical landscape. Settlement analysis can help examine change and continuity from the Mississippi period into colonialism. In this thesis, I will use existing archaeological settlement data to determine how people
renegotiated their world following European Contact. Additionally, I will use these data to evaluate the possible location of three native polities—Chicaza, Chakchiuma, and Alimamu—mentioned in the De Soto chronicles.

European colonialism, in both the Southeast and worldwide, had profound consequences for native peoples. While the exact consequences and reactions to the colonial process is better understood elsewhere (Ethridge 2009), we currently do not know how native peoples of northeast Mississippi coped with contact. While ethnohistorical and some archaeological models exist discussing the significance of contact in northeast Mississippi (Ethridge 2010:74-75; Johnson 2000; Rafferty 1994; Rafferty 2008; Rafferty and Peacock 1996), it is necessary to examine archaeological settlements to see how people reacted to their changing worlds, to ground-truth current theories of how the ancestral Chickasaw reacted to the European presence and a dramatically changing world. To examine the reactions, we should also examine the possible existence of discernable polities in the archaeological record (Hally 1993; Livingood 2010, 2015), as well as how these polities changed in size, location, and dispersal due to geopolitical forces (Ethridge 2009:36-38; Worth 2002:50-53).

This study will contribute to our understanding of how the native peoples of northeast Mississippi reacted to European contact and colonialism. To accomplish a fuller understanding of how the people in this area responded to their changing world, it is necessary to combine the archaeological settlement data with information from the De Soto chronicles, as the study area includes the location where the De Soto entrada crossed the Tombigbee River into present-day Mississippi (Atkinson 1983a:65; Hudson 1997:261). Settlement analysis is conducted using site information from the state site files kept by the Mississippi Department of Archives and History.
(MDAH). Using the temporal information in the site files, site locations were mapped in a Geographic Information Systems (GIS) platform (ArcGIS) by temporal period to track how settlement patterns changed through time. Using density analysis on the site locations, clusters are visible on the series of maps presented. This visibly demonstrates how the density and distribution of sites changes spatially through time. The location of these sites also demonstrates how people renegotiated their social and political settings, including nucleating together for refuge or, alternately, large-scale abandonment (Worth 2002:50-53). Therefore, through the application of GIS to visualize the changing settlement patterns through time, we are able to abstract the fluctuating geopolitical climate in northeast Mississippi at the time of European contact.

In Chapter II, I include background necessary to understand and analyze settlement patterns in northeast Mississippi. This includes a brief history of archaeology in the region, as well as how the archaeology of northeast Mississippi fits into more general archaeology of the Mississippian world. I also discuss the consequences of contact, and how these consequences and the shatter zone concept can be examined through settlement patterns. In Chapter III, I outline and discuss the methods employed to use MDAH’s site data and analyze how settlement patterns change through time in northeast Mississippi. I outline how I mapped these data and used any quantitative methods to analyze their spatial distribution across the landscape and how this reflects a changing social landscape during the Contact period. I also discuss how I compare these data to evaluate possible locations for the ethnohistorical polities of the De Soto chronicles. Also, I outline potential issues in using site file information as a primary source of data. In Chapter IV, I present my results and discuss the general trends of the site clusters over time.
Additionally, I examine how these patterns reflect human attempts to control their world in the wake of the shatter zone, and if these clusters could potentially be the locations of Chicaza, Chakchiuma, and Alimamu. In Chapter V, I summarize the extent and findings of this study. I discuss that despite the drawbacks of the study, identifying settlement patterns are an essential step in understanding this crucial period in northeast Mississippi.
CHAPTER II
BACKGROUND AND LITERATURE REVIEW

Settlement analysis—or the study of the distribution of archaeological sites in a region—reveals much information about past and present arenas of living (Trigger 1967:149). It has been used in the archaeological record to demonstrate change and continuity in settlements through time. GIS theory of mapping archaeological sites and the combination of the shatter zone and agency create a study of settlement archaeology that considers environmental and social factors. Traditionally, settlement patterns were mapped, only considering patterns and how sites fit within cultural evolutionary processes (Trigger 1967:150); now the range of possibilities has widened to include social and political factors as well (Worth 2002). Theoretically, the location and size of archaeological sites on the landscape speaks to the geopolitical climate of the individual site, as well as the surrounding region. For instance, nucleated and palisaded towns suggest a period of conflict, whereas dispersed settlements generally suggest the opposite (Worth 2002:50-53). How these patterns change or persist through time also speaks to regional human interaction. Different settlement patterns suggest different political strategies, as well as reactions to outside conflict. Not only does conflict include warfare or raiding, but also disease episodes and distress from changing social landscapes, in this case, especially any following the De Soto expedition (Kelton 2009:312-314; Worth 2002:50). Therefore, settlement analysis can allow an archaeological study of inter- and intra-polity relations through time, and it can help examine change and continuity from the Mississippi period into colonialism.
In this chapter, I will provide the reader with a background understanding that demonstrates the basic concepts I used to conduct this study, both technically and theoretically. Important concepts and topics include the importance of the shatter zone, the use of settlement analysis to determine geopolitical interactions including the archaeological discovery of polities, the current state of archaeology in northeast Mississippi, Atkinson’s (1987a) model of polities in the region (Figure 2.1), and the use of GIS in this study. In this case, GIS is used to display and analyze the geopolitical processes in play from 1450-1650 C.E. Theoretically, mapping the location of these sites, the points and polygons, should result in an understanding of human interaction. These maps, when considered relative to concepts such as the shatter zone, will be able to demonstrate human reactions to contact in the study area.

GEOGRAPHIC INFORMATION SYSTEMS

In GIS, results come from the manipulation of spatial data. The points, lines, polygons, and images themselves have no meaning beyond the interpretation of them on the map. Choosing what cartographic data will be present shapes the abstraction of information (Bolstad 2016). For instance, the maps presented in this study combine modern drainages with the archaeological data to present a more holistic understanding of the population of the region. Additionally, GIS can help show the relations, processes, and patterns of settlement selection over time (Bolstad 2016). It can be used to spatially map the distribution of sites within certain geographical features, thereby creating a more detailed map for archaeological analysis.
Figure 2.1. Map of hypothesized locations of Chicaza, Chakchiuma, and Alimamu (from Atkinson 1987a:65).
ARCHAEOLOGY OF NORTHEAST MISSISSIPPI

A significant amount of archaeological research has taken place in northeast Mississippi. Mississippi archaeology fluoresced in this region during the 1970s and 1980s. The construction of the Tennessee-Tombigbee waterway by the Army Corps of Engineers from northeast Mississippi to the Gulf of Mexico created the need for archaeological survey during this time (Johnson 2002:189-190). The Corps of Engineers funded the surveys and many salvage excavations took place during this time (Johnson 2002:189; O’Hear et al 1981; Solis and Walling 1982). After this boom of archaeological research in northeast Mississippi ended, numerous smaller-scale projects have been conducted by the University of Mississippi, Mississippi State University, private cultural resource management firms, and agencies such as the Mississippi Department of Transportation and the Tennessee Valley Authority.

The Starkville Archaeological Complex is currently defined as a set of archaeological sites dating between the Late Prehistoric to Protohistoric period with shell-tempered pottery and settlements located on ridgetops in the Black Prairie physiographic region in and around Starkville (Atkinson 1979). The Black Prairie is a region in Mississippi bordering the Tombigbee Hills to the west (Dockery and Thompson 2016:23-24). It is named the Black Prairie because of its dark soils. Cretaceous chalk outcrops can be seen in erosional gullies. During the Mississippian and Contact periods (1000-1600 AD), it would have been open grassland with gentle elevations. Vegetation included milkweed, prairie clovers, stunted black jack oaks, and post oak.

While the debate over the legitimacy of the existence and timing of the Starkville Archaeological Complex continues (Johnson 2000; Rafferty and Peacock 1996), for this study, it
is acknowledged as valid. Still, the Starkville Complex is largely undefined. It also has been recognized as a possible ethnohistoric chiefdom. Atkinson (1987a:65) proposed that it is potentially the location of the polity of Chakchiuima, which is mentioned in the De Soto narratives. However, even though there is no archaeological evidence to associate the Starkville Complex with any of the ethnohistorical polities in the De Soto chronicles, there were chiefdoms located in the area (Johnson 2000:88).

While chiefdoms were economically self-sufficient (Ethridge 2010:17), they were not closed off completely from one another. Instead, they had social and political ties to other groups and places on the landscape (Johnson et al 1991; Regnier 2014). They were interconnected, through trade and political and social mechanisms. Chiefdoms in northeast Mississippi and northwest Alabama were likely linked (Hudson 1997; Peebles 1983). Sites on the Tombigbee River, such as Lubbub Creek in Alabama, likely were connected to the sites in this study area, as well as many farmsteads and hamlets in the vicinity (Peebles 1983). This is inferred from their proximity and shared artifact traditions found across the landscape (Solis and Walling 1982). However, many of these shared material traditions have not been synthesized fully, and a precise Mississippian through Protohistoric ceramic chronology for northeast Mississippi has yet to be established (Johnson et al 2008; Lieb 2004). Therefore, it is necessary to note that more can be learned from analyzing the region of northeast Mississippi to better understand the Mississippian world. Through a more thorough investigation and synthetic approach to the lives of people in the Late Prehistoric to the Early Contact period, we will better understand how people renegotiated their worldview in a dramatically changing landscape.
THE MISSISSIPPIAN WORLD

The Mississippi period (1000-1500 CE) was a time of political and social variability in the Southeast that directly preceded European contact (Cobb 2003). Some of its key attributes include intensive maize agriculture, centralized chiefdoms, settlement in floodplains, monumental architecture, and social stratification (Anderson and Sassaman 2012:159). Likely arising in the American Bottom near St. Louis, it spread throughout the Southeast between CE 1100 and 1450, with multiple different expressions of a general cultural pattern (Anderson 1999; Anderson and Sassaman 2012:163). While it is still unclear why the Mississippian cultural pattern spread throughout the Southeast, it is likely due to the role of politically organized chiefdoms within a world of increased population, intensive maize agriculture, peer-polity interactions, and increased warfare and hostility (Blitz 2010). Many different local manifestations of Mississippian culture existed, resulting in the existence of distinct cultural regions across the larger Southeast (Beck 2003; Blitz 1999, 2010; Livingood 2015:245; Regnier 2009:86). However, interactions among several of these polities indicate that these different cultural regions were interconnected, communicating with each other throughout the Mississippi period. Therefore, a larger discussion of the Mississippian Sphere, or the cultural pattern that varied and existed throughout the Southeast during the Mississippi and Early Contact periods, is necessary to establish a baseline to compare Mississippian life and the persistence or change of native lifeways in reaction to contact in northeast Mississippi.

While many different political structures were in place across the Mississippian world, the most common Mississippian sociopolitical structure is that of the politically centralized chiefdom (Anderson and Sassaman 2012:167; Cobb 2003; Ethridge 2010:16; Steponaitis 1978).
Different types of chiefdoms existed. Most archaeologists describe chiefdoms as simple, complex, or paramount (Blitz 2010; Ethridge 2010:16-17; Steponaitis 1978). The territory of complex chiefdoms generally was a half-day’s walk from their center, and this territory was surrounded by uninhabited “buffer zones” that separated different polities (Hally 1993; Livingood 2012, 2015). Complex chiefdoms ruled over a few villages all located in the same area. Paramount chiefdoms, with the largest political reach and most control, ruled over a larger region (Blitz 1999). These chiefs were potentially a “first among equals,” rather than a signal leader with extreme coercive powers (Ethridge 2010).

Politically, the Mississippian Sphere was characterized by a phenomenon termed “chiefly cycling.” This refers to the transition between simple, complex, and paramount chiefdoms (Anderson 1996; Beck 2003; Blitz 1999, 2010). This is usually inferred in the Mississippian region by equating the number of mounds at a center with its regional primacy (Blitz and Livingood 2004:295-299). Cycling was made up of transformations when the administrative section of a chiefdom fluctuated between “different levels above the local community” (Anderson 1996; Blitz 1999). Archaeologically, this is discerned in long-term sites that demonstrate relationships to each other in a region, often in terms of ceramic assemblages as a proxy for population (Blitz 1999). The presence of cycling episodes suggests chiefdoms experienced fluidity; there were no set dynasties, even though the title of chief was hereditary. This framework also maintains that chiefdoms can shrink in importance, fizzling out in the region (Blitz 1999).

Today, due to its flexibility, the fission-fusion process is one of the main theories for political organization of Mississippian chiefdoms (Blitz 1999). The fission-fusion model
suggests that the archaeological rise and fall of chiefdoms stems “from the aggregation or dispersal of cultural units” (Blitz 1999:557). The distribution and density of archaeological sites on a landscape, whether dispersed or clustered, could indicate fissioning—fractions that broke off from their natal settlement—or fusion—people of different natal groups settling an area together. Fission-fusion is more likely the case of transition of power among chiefdoms or dissolution in northeast Mississippi, based on the ethnohistorical evidence in the De Soto chronicles (Hudson 1997:262-269), as well as the presence of the Starkville Archaeological Complex (Atkinson 1979).

The physically constructed landscape of the Mississippi period varied as well. While earthen platform mounds are generally considered to be a hallmark of the Mississippi period, not all Mississippian polities had earthen mounds, especially towards the end of the period (Ethridge 2010). Also, the size and the number of mounds varied considerably, both spatially and temporally (Blitz and Livingood 2004:295-299). However, the types of mounds, pyramidal and conical, were standard throughout the Mississippi period (Anderson and Sassaman 2012:162). For example, the “Big Three” Mississippian sites—Etowah, Cahokia, and Moundville—were either abandoned or no longer the seat of power in their individual regions at contact (Cobb and King 2005; Pauketat 2007). While several polities visited by De Soto, contained mounds during the Late Mississippi period, some important polities during the Contact period lacked mounds as monumental constructions (Ethridge 2010). Mound building was abandoned in some areas of the Southeast during the Late Mississippi period, before contact (Ewen 1996), but it continued in some parts of the Southeast until the seventeenth and eighteenth centuries.
The diversity of the Mississippi period is evident archaeologically and ethnohistorically, as the De Soto entrada passed through the Southeast and recorded some information about their encounters with the Native peoples. It is likely that this diversity, as well as the results of the De Soto entrada, helped shape native interactions with Europeans throughout the contact and Colonial periods.

THE CONTACT PERIOD

The Contact period in northeast Mississippi (1500-1650) consisted of the first encounters between Native groups and Europeans. Some of the first Europeans present in the region were Spanish conquistadors who were searching for wealth and land in the Southeast (Hudson 1997:32-33). While the area was later colonized, with long-term and daily interactions between the two groups, the Contact period comprised short periods of interaction that had long-term repercussions. These repercussions took place during large periods of isolation from direct European communication. Therefore, archaeology, combined with historical analysis of the documents from the Spanish expeditions is used to understand the experiences and consequences of contact.

De Soto Expedition

Following the failed expeditions to La Florida lead by Lucas Vazquez de Ayllon in 1526 and Panfilo de Narvaez in 1528, the first entrance into the Mississippian Southeast began in 1539 when Spanish conquistador and governor of Cuba, Hernando De Soto, and 600 of his men began
their *entrada* into *La Florida* (Ethridge 2010:25-26 Hudson 1997:47). The first expedition to explore a great deal of the interior of the Southeast, they began their exploration of *La Florida* to find alleged gold and take it to New Spain. This expedition failed after four years of survey and conflict. De Soto’s route was long and turbulent. Instead of relying on diplomacy, he used force and violence as his primary means of gaining goods and information from indigenous peoples (DePratter 1994; Hudson 1997). However, the indigenous groups actively used and resisted De Soto and his men for their own purposes. For example, the chief of Chicaza convinced the Spanish to punish a rebellious subservient chief (Ethridge 2010:39; Hudson 1997:266). Due to the history, geography, and existing cultural mechanisms in place during the Mississippi period in the Southeast, De Soto’s expedition was not easy. Not only did he encounter hostile groups of people, but he also had to traverse vast expanses of empty space, gaining very little material wealth and relying on the Native peoples for food before his eventual death in 1542 (Ethridge 2010; Hudson 1997; Knight 2009).

Different native polities employed methods of ridding themselves of the Spanish. While the Apalachee of North Florida terrorized the Spanish, the people of Coosa and Cofitachequi merely pushed De Soto and his men along on their journey. Many groups even advised him on which polities to stop at next to move him out of their territory. Many chiefs were even expecting to meet with him (Hudson 1997:229). However, the entrada was not always met peacefully. Tascalusa, the chief of Atahachi and surrounding areas, and his men attacked De Soto and his men at the town of Mabila, where the Spanish were almost extinguished and thousands of indigenous warriors died (Hudson 1997:236-245).
Next, De Soto and his men traveled west, eventually arriving at the polity of Chicaza, where they would spend the winter of 1540-1541. Initially, the Spanish were met with a show of power and violence, and warriors killed the Indian serving as the (forced) Spanish ambassador (Ethridge 2010; Hudson 1997). However, unlike many of the other groups, the chief, also known as Chicaza, directly took advantage of the Spanish presence. He asked De Soto and the Spanish to support him against a rebellious, subordinate chief. This potentially cemented his power and possibly realigned the existing power structure in northeast Mississippi (Ethridge 2010:39). Eventually, however, the inhabitants of Chicaza attacked the disrespectful Spanish, setting their camp on fire, killing most of their pigs, some scores of horses, and 12 Spaniards (Ethridge 2010:43-44, 55; Hudson 1997:269). Following the failures at both Mabila and Chicaza, the Spanish expedition was demoralized.

Shortly thereafter, De Soto and his men gave their wounds time to heal, only to continue west (Ethridge 2010:58; Hudson 1997:269). Subsequently, they crossed the Mississippi River (Ethridge 2010:59; Hudson 1997:271). Finally, after reaching the territory of Quigualtum on the Mississippi River, De Soto was desperate, ill, and possibly insane. De Soto died shortly thereafter, and his men buried him in the Mississippi River (Hudson 1997:314). His men eventually reached New Spain, and the expedition was yet another failure for Spain.

Juan Pardo

Following the De Soto expedition, the Spanish crown commanded other Spanish explorers to establish permanent colonies in the Southeast (Beck et al. 2016). Juan Pardo, another Spanish captain, arrived in Santa Elena in 1566. He, like De Soto, traveled into the
Mississippian interior and attempted to establish another permanent colony (Beck et al. 2016). Pardo and his men attempted to reconstruct De Soto’s route, and followed it to Joara, Cofitachequi, and Coosa in present-day North Carolina and Tennessee (Beck et al. 2016; Ethridge 2010:75-80). In fact, at Joara, Pardo established Fort San Juan (Beck et al. 2016). Pardo’s men actually provided further glimpses into the aftermath of the De Soto expedition, such as the social reorganization of the Carolina piedmont (Davis 2002) and the destabilization of Coosa (Ethridge 2010:64). Even though the Pardo expedition never went into northeast Mississippi, it is possible that their trade goods did, through indigenous trade routes. However, misjudgments ultimately lead to the failure of the fort, as well as lasting tensions between the Spanish and indigenous peoples of the region.

*Effects of Contact*

The interactions between the Native population and the De Soto *entrada* lead to profound changes in the indigenous population and experience. These changes make up the shatter zone—the profound changes in native lifeways that ended the Mississippi period. While generally used to refer to the effects of long-term colonialism such as the Atlantic slave trade, slave raiding, and altered trade networks, in this case, I use the shatter zone to denote the profound effects of contact on indigenous communities (Ethridge 2009:12-16). These transformations are culturally mediated, meaning they were experienced and demonstrated differently across the Southeast. These different reactions to contact can be seen archaeologically, particularly through the way people settled across the landscape.
The shatter zone is the concept that the Mississippi period ended not due to prime movers such as disease, but because of complex relationships among many factors. These factors include the inherent instability of polities of the Mississippian world, and the inability of these chiefdoms to withstand the full force of colonialism (Ethridge 2010; Ethridge and Shuck-Hall 2009). This, combined with disease, the introduction of capitalism, and the intensification of the slave trade and violence, caused the transition of Mississippian societies into the more modern iterations of indigenous nations of North America. This is known as the “shattering” of the Mississippian world (Ethridge 2009:4, 2010:12-16). Even the communities that did not interact directly with De Soto’s men experienced the indirect effects of contact, as they rippled through existing native social networks. Through a ripple effect, the connected Mississippian and non-Mississippian spheres experienced changes. The shatter zone is an important theoretical tool to explain the complex reasons for wide-spread change across the Southeast. It provides enough flexibility within the theoretical framework to continuously be applied to unique situations.

Traditionally, Mississippian chiefdoms were not all-encompassing or all-powerful with a clear line of succession, such as Western European monarchies of the same time. On the contrary, these chiefdoms were often messy, due to the complicated rules of succession. Rather than a primogenitor approach, multiple related people within the same kin network had equal access to the office of mico, or chief (Ethridge 2010:11; Hudson 1997). This inherently created more political instability within individual chiefdoms. Without a clear line of succession, the race for the next leader may have been more desperate in times of conflict or distress. Furthermore, military losses, natural disasters, disease, or other unfortunate events that affected the chiefdom could possibly lead to a regime change (Ethridge 2009:34, Hudson 1997:267).
This, combined with concepts of fission-fusion and chiefly cycling, helps to explain the tumultuous geopolitical turnover, the rise and fall of chiefdoms and polities, during the Mississippi period (Blitz 1999; Ethridge 2009:4, 2010:12). Therefore, the inherent structural instability of chiefdoms during the Mississippi period created a possibility for amplifying the devastating effects of European contact and colonialism in the Southeast.

However, not every aspect of contact was necessarily direct in the European-Native interactions, such as military losses from the De Soto expedition. For instance, the slave trade was introduced as part of the colonial capitalist system, yet the victims and slavers were more often indigenous peoples themselves who went further into the interior to raid towns for new slaving victims (Meyers 2009:97). Furthermore, the introduction of the capitalist system includes down-the-line trade of European goods, and with it, often some smaller form of disease (Kelton 2009:315). While archaeologists and historians agree that Spanish expeditions led to the beginning of demographic decimation in the Southeast, the precise timing and severity of epidemic episodes are still debated (Blitz 2010; DePratter 1994; Kelton 2009:315-217). However, demographic collapse occurred, and it affected the social strategies used by different groups throughout the Southeast. It created larger buffer zones and vacant areas; it also disrupted and ended several trade networks that had been in place. Ceramic styles both experienced change and continuity within the larger Southeast. More groups moved around the landscape to reconsolidate and recover from these issues (Beck and Hudson 2013; Kelton 2009:318-322)

These factors, combined with each other and the structural instability of Mississippian chiefdoms and succession, helped facilitate the change of the polity of Chicaza to become the
more politically decentralized Chickasaws, while simultaneously producing extremely hierarchical groups like the Natchez (Ethridge 2010:46). Much like a chemical equation, the unique circumstances yielded diverse results across the Southeast. However, there are consequences that only come from specific options limited by the Mississippian world.

Archaeological Theory

Like most modern archaeological discussions, this study is shaped by theoretical perspectives of agency. In this case, I question to what extent people agentively acted within this period of great transition from the Mississippian chiefdoms to coalescence and confederations. However, just because humans are mentally or physically able to act in a certain way does not mean that they are culturally able. Rather, humans often act within their own social worldview (Panich 2013; Worth 2002:50-53, 2009). Whether this means that commoners do not challenge their chief, or other actors within the same matriline challenge a chief’s authority when instability occurs, actors can only use their agency in ways that fit within their worldview.

It is important to note, when discussing archaeological theory, that these were people capable of thinking within their worldview and whose actions had consequences. These were not automatons who blindly and completely followed a singular cultural tradition. This is not to say that these people possessed unlimited agency. People could act within their accepted societal worldview and produce culture through daily practices (Pauketat and Alt 2005). Therefore, they were limited in their actions by cultural rules, while simultaneously choosing to reproduce or change their own culture. In the tumultuous period discussed here, contact and the resulting “shattering” of the Mississippian world, people produced the material culture, as well as the
cultural elements not present in the archaeological record, through certain practices. Thus, while transitioning out of the Mississippi period, people used their own practices to produce the indigenous cultures of the Early Historic period.

Agency is necessarily questioned in this study because it is the actions of people that lead to the episodes of coalescence. This includes the transition from the more hierarchical chiefdoms of Chicaza, Coosa, and Tascalusa into the more egalitarian, decentralized authority of the societies during the later seventeenth century (Ethridge 2009:63). Therefore, the worldview and the extent of agency in different societies is considered in this study. People were likely acting within their own culturally accepted worldviews. Different adaptations in different polities and circumstances lead to unique results in practice. Adaptations include large-scale changes from a hierarchical to decentralized authority, such as the Chickasaw, to persistence of chiefly power and prestige, such as the Apalachee (Ethridge 2009:9; Scarry 2001; Worth 2002:50-53). Therefore, taking agency of these actors and their daily practices during this time period into account for this study is necessary to fully understand the indigenous reactions to contact and eventual colonialism. This is further enumerated in settlement analysis. Through tracking the daily practices and communities during the Contact period, it becomes more possible to delineate specific chiefdoms and polities, thereby connecting the ethnohistoric and archaeological records.

Settlement Strategies Following Contact

Settlement analyses communicate indigenous strategies of change and continuity, particularly as it speaks to group agency. While some groups remained in their general territory,
many moved to different locations. Some of these new towns and polities were located in previously unoccupied or buffer areas. This has long been used as evidence of a means of coping with the effects of contact using cultural mechanisms in place, including site cycling. Site cycling, often a product of chiefly cycling, indicates the power over nearby territory as the seat of power. This includes abandonment, reorganization, and relocation of people across the landscape. It can include slow abandonment of once-large polities. This is evident in the ethnohistorical records of Coosa; it changed from the great polity De Soto visited to a much smaller polity during the Pardo expedition (Ethridge 2009:12-13, 2010:64). Occurring throughout the Mississippi period, site cycling is another form of settlement strategy reflecting the geopolitical climate in the archaeological record (Anderson and Sassaman 2012:164; Cobb 2003; Ethridge 2010:130). It speaks to political organization, as well as the social climate throughout the Southeast, and how political and social forces changed through time. As these settlements were made up of individual actors, settlement population variation also speaks to the agency and strategies of different groups to cope with these changes, which had several possible consequences. Many different reactions to the Contact period are evident in settlement patterns. This includes contraction or nucleation, relocation and abandonment, aggregation, confederation or coalescence, or assimilation (Worth 2002:50-53)

Strategies such as contraction and nucleation are seen in the archaeological record in times of stress (Worth 2002:50-53). Contraction and nucleation could result from environmental or geopolitical stressors. Contraction is when dispersed settlements become more tightly settled, abandoning satellite communities within a local or regional domain (Worth 2002:50). Contraction, or nucleation, usually involved the same group of people in one area. Groups who
advocated this particular response to the consequences of Native-European interaction suffered later during the Colonial period when shatter zone intricacies led to slave raiding and the Yamasee War (Ethridge 2009:15). Similarly, aggregation is the movement of smaller communities into a preexisting chiefdom (Worth 2002:51). Like nucleation, aggregation is the arrival of several peoples in a smaller region. Both nucleation and aggregation have been used in Southeastern archaeology to indicate periods of sociopolitical stress in a landscape (Davis 2002; Worth 2002:50-53). These strategies often suggest that many different groups in an area came together for protection, and suggests another possible response to contact. For example, in the Carolina Piedmont, many groups nucleated in a region and coalesced (Davis 2002). This also indicates population decline and emigration occurred elsewhere. During the sixteenth and seventeenth centuries, aggregation and nucleation also generally co-appeared with social assimilation and coalescence.

Abandonment and relocation also occurred throughout the Southeast. Site abandonment had been used for millennia in the Southeast (Anderson and Sassaman 2012). Furthermore, whole regions were abandoned throughout the Late Mississippian and Contact periods (Cobb and Butler 2002). This strategy was often used in times of distress or the introduction of factors from the shatter zone (Ethridge 2010; Worth 2002). These groups did not just disappear. Entire populations may coalesce with other groups, or they may just relocate spatially as continuous or new iterations of themselves. For example, the Westos were likely Erie Indians who were originally from the Northeast and displaced. They eventually relocated as the Richahecrians in Virginia and again as the Westos when they settled the Savannah River Valley in 1680 (Meyers 2009:82-83). In northeast Mississippi, people likely emigrated from the still unlocated polity of
Chicaza and reappeared in Tupelo as the Chickasaws by 1650 (Cegelski 2010; Ethridge 2010:167; Johnson et al. 2008).

Coalescence, the cultural merging of two or more different groups to create a new polity, is a strategy seen throughout the Southeast. Coalescence is a mechanism that advocates a strength-in-numbers approach, but several groups must come together and create new cultural rules. This was one of the preferred responses to contact in the Southeast, suggesting that it was related to previous cultural mechanisms dealing with new groups of people coming together (Davis 2002). Some of the many coalescent societies that appeared after contact included the Chickasaw, Catawba, Creek, Cherokee, and others (Davis 2002; Ethridge 2010:165-167).

Dispersion is another settlement strategy seen occasionally in the archaeological record, yet it has not always been discussed. Dispersion is evident in the Black Prairie during the Contact period, suggesting a different reaction to the changing geopolitical landscape within northeast Mississippi (Johnson et al 1994; Peacock and Rafferty 1996). The geographical location of settlements can also demonstrate distress. Periods where settlements are in more defensible locations, such as on ridgetops and away from floodplains, also suggest conflict. This is a pattern already noted in northeast Mississippi (Johnson et al 1994; Johnson et al 2004; Peacock and Rafferty 1996).

Settlement analysis includes a consideration of agency as people choose where to go or how to organize themselves by essentially “voting with their feet.” Some groups chose to support a more decentralized power, such as the major confederacies of the Historic period, or a more Mississippian hierarchy, such as the famous Natchez case study (see Galloway 2009, Milne 2009). Theoretically, mapping the changes over time in the Black Prairie will result in the
ability to understand the changing geopolitical climate before and after contact, and, therefore, allow a glimpse into the way people decided how and where to live during this transition.

Polities are identified in settlement analysis not only from location on the landscape, but also through the production and use of material goods. Therefore, diagnostic ceramic types are crucial for understanding not only the possible identity of the occupants of these sites, but also the chronological distribution of sites on the landscape. It consistently has been demonstrated that ceramic types vary across space and time (Cordell 2002; Lieb 2004; Steponaitis 1983). Stylistic analysis can be used to analyze identity across time and space. The use of both settlement and ceramic data is necessary to more fully comprehend the geopolitical landscape before and after contact (Regnier 2014). Through the examination of settlement analysis, archaeologists can better access the changing social composition of native groups across northeast Mississippi.

**CONCLUSIONS**

Together, the shatter zone, settlement analysis, and agency work to shape both the questions and interpretations of this study. For instance, the instability of Mississippian chiefdoms, particularly in terms of succession, most likely led to changes immediately following the presence of the De Soto expedition. Also, the presence of down-the-line trade probably led to smaller disease episodes due to trading and the beginning of slave raids.

While it is evident in other settlement studies, particularly those focused on the fallout of Coosa following contact, that succession changes took place as the seat of the polity changed (Ethridge 2009:12-13), we are lacking this information in northeast Mississippi. It is unlikely
that the polity of Chicaza experienced the same tumultuous changes as that of Coosa because the people of Chicaza had their own unique experience due to different kinds of exposure to instability and trade goods (Ethridge 2010). While there is no set formula for the reaction to European contact and colonialism, general trends can be seen, such as the spread of disease and violence, and the subsequent population decline over 200 years (Ethridge 2010:62; Kelton 2009:312-313; Meyers 2009:84). This study examines how people renegotiated their world physically and politically during the Contact period. Settlement data are essential to answer questions about how people experienced the world in this dramatic time of change. Settlement analysis can examine how people who successfully manipulated the Spanish and then forced them out of their homeland, transformed during a time of no direct European contact. In addition to examining how settlement patterns changed through time as a result of first contact, I examine the exact timing of the settlement of the Black Prairie, an issue of some debate (Johnson et al 1994; Peacock and Rafferty 1996). Furthermore, I will examine the possible location of Chicaza and the other polities of northeast Mississippi discussed in the De Soto accounts, and how people reacted to the shattering of the Mississippian world.
CHAPTER III

METHODS

The goal of this project is to compare the spatial distribution of sites across Clay, Lowndes, and Oktibbeha counties between the Mississippi and Early Historic periods. Mapping these differences and using quantitative measures to assess the degree of clustering across the landscape is used to investigate how people reacted to European contact and colonization. Site locations and clusters also are used to evaluate possible locations of the polities of Chicaza, Chakchiuma, and Alimamu discussed in the De Soto chronicles. Sites in Clay, Lowndes, and Oktibbeha counties were chosen due to the existence of the large cluster of sites around Starkville, and because these counties have been proposed as the locations of Chicaza, Chakchiuma, and Alimamu (Atkinson 1987a; Hudson 1993). Theoretically, the distribution of settlement clusters will indicate possible locations for polities as proposed by Atkinson (1987a: 65). It is important to note that this is a preliminary test—a means to direct future archaeological research that will assess the validity of these results. By no means am I arguing for the precise location of any ethnohistorical polity.

PROJECT GOALS

The main objective of this thesis is to spatially map the locations of sites that were occupied during the Mississippian and Contact periods. Sites were mapped in ArcGIS and
divided out chronologically to examine how native peoples reacted to the effects of contact. These settlement patterns indicate native means to renegotiate their geopolitical landscape during this transition. The transformation and subsequent reconciliation is known as the shatter zone (Ethridge 2010:12-16). Analysis of this transformation includes analyzing the spatial location and size of clusters of sites over time. To explore how people reacted to contact, spatial and temporal information for sites in the three counties is necessary. I used site locations in MDAH’s GIS database, which represents sites as points and polygons. To assign sites to time periods, from the Paleoindian period to Historic Sites post-dating the Civil War, I used MDAH site file information that was available online.

It should be noted that there are many issues associated with using site files as a main source of data. In a number of cases, the online information was insufficient. For example, 293 sites were labeled as “Mississippian.” They were not demarcated as “Early,” “Middle,” or “Late Mississippian.” Likewise, another 199 were labeled as “Historic Indian,” and it was unclear if they referenced sixteenth through seventeenth-century ancestral Chickasaw occupations or nineteenth-century Choctaw sites associated with later missions that were established in the area. Therefore, I examined many of the physical site cards at MDAH to try to resolve those issues. Few site cards contained more information. Most of the sites labeled “Mississippian” or “Historic Indian” that could not be further delineated are still included in this study.

I imported base maps of drainages for the three counties from the Mississippi Automated Resource Information System (MARIS) into ArcGIS. These reflect modern usage, however, and should not be interpreted to perfectly represent the physical landscape during the Mississippi or Contact periods. The shapefile containing site coordinates was joined with the spreadsheet to
create a series of four maps: all sites, Early and Middle Mississippian, Late Mississippian and Contact, and Historic Indian.

Mounds may have been present on the landscape during the Protohistoric period as mounds were still in use in polities along the Tombigbee River during the Late Mississippi period (Blitz 1993:52-68; Livingood 2011:139). The creation and abandonment or persistence of mound sites over time will better indicate the location of polities (Ethridge 2010: 48, 80). All sites that were noted to contain mounds, such as Lyon’s Bluff, have been marked with a triangular symbol on the maps. During the Mississippi period, platform mounds are accepted as indicative of seats of power within chiefdoms (Anderson and Sassaman 2012:166-167; Blitz and Livingood 2004:295-299; Hally 1993:157-160; 1996:112, 124; 2006; Livingood 2012, 2015). The number and size of mounds at individual sites also are seen as indicative of the power of the chief over contemporaneous sites (Hally 1993). Contemporaneous centers with multiple mounds likely hold power over nearby towns, even if a single mound is present at smaller centers. The size, duration, and goods present at these mound centers often indicate whether these centers are paramount, complex, or simple chiefdoms (Ethridge 2010:17; Hally 1993:159; Steponaitis 1978).

Early and Middle Mississippian (1000-1450 CE) sites were used to create a baseline—a point of comparison for the later distribution of sites across the study area. These two periods were combined because they were often listed as multiple components of sites in MDAH’s database, because there were not enough Middle Mississippian sites to analyze alone, and because while a general ceramic chronology in northeast Mississippi exists, it lacks phases. Late Mississippian and Contact period sites were also combined into one map, spanning from 1450-
1600 CE. This is due to the lack of a precise ceramic chronology during these time periods, as many diagnostics for Late Mississippian and Protohistoric sites are the same (Lieb 2004). Until a more precise ceramic chronology is established, it is not always possible to differentiate between Late Mississippian and Protohistoric sites. Historic Indian sites are sites between contact and the Choctaw missions in northeast Mississippi.

IDENTIFYING SITE CLUSTERS

Many different quantitative tests were employed to spatially define clusters of sites. These include tests built into ArcGIS, such as kernel density, hot-spot analysis, and cluster and outlier analysis. Kernel density uses a cluster analysis to demonstrate naturally occurring spatial clustering across the landscape. The results look akin to heat vision, with larger concentrations, or “hotspots” becoming more vibrant in color. Hotspot analysis calculates a Getis-Ord-Gi* statistic, using p-values and z-scores to find features with high or low clusters spatially. Cluster and outlier analysis identifies high or low value spatial clusters (ArcGIS Pro 2017). K-means cluster analysis was used in an attempt to spatially cluster sites using UTM data. K-means cluster analysis has successfully been used to analyze spatial patterns previously (see Kintigh 1990; Kintigh and Ammerman 1982). Unfortunately, k-means cluster analysis was not helpful in identifying clusters of sites in the settlement data I used. One reason might be due to the unwieldy nature of the UTM coordinates which consist of a six digit easting coordinate and a seven digit northing coordinate. Another factor might have been the large, dense cluster of sites in the vicinity of Starkville. With 45 percent of the sites concentrated around Starkville (n=301), cluster analysis created two clusters—those around Starkville, and those outside of Starkville—with two outliers.
Even after the Starkville sites were removed from the data set, a k-means cluster analysis of the remaining sites (n=363) did not identify any site clusters.

Although quantitative methods did not provide useful insights regarding the locations of site clusters, I visually identified several clusters of sites that may represent polities based on gaps between sites that may represent buffer zones between polities. Multiple sites within an area surrounded by potential buffer zones indicates potential archaeological polities, as outlined by Hally (1993; Livingood 2012, 2015). Then, I examined how these clusters changed and persisted through time. I particularly compared the size and densities of settlements within individual clusters, and how this compared to the settlement strategies outlined in the previous chapter. I compared these clusters for evidence of nucleation, coalescence, abandonment, and geographic location (Johnson 2000:89; Worth 2002:50-53). Geographic location includes site selection near water or the potential defensibility or vulnerability of settlement locations. This was completed by examining the distribution of elevation of sites in individual clusters (Johnson 2000:89). Next, I compared Atkinsons’s (1983a) proposed locations of Chicaza, Chakchiuma, and Alimamu to the site clusters I identified. I then determined if these clusters indeed match the predicted locations. The comparisons indicate that certain clusters occur near Atkinson’s original prediction, particularly around Starkville and in Clay county. These comparisons are discussed in the next chapter.

**ISSUES WITH SITE FILE DATA**

There are many issues associated with using primarily site file data. Clusters I identified need to be examined further to discern whether they are real or the results of these potential
problems. Potential problems include factors that could bias recorded site locations, determining when sites were occupied, and errors in the site files.

Factors that could bias recorded site locations include where surveys were conducted and ground cover that affects visibility. Surveys are conducted based on modern land ownership, which does not reflect indigenous polity boundaries. Many surveys are completed because of construction or land alterations, such as the archaeological work of the Tennessee-Tombigbee Waterway (Johnson 2002:190). The construction of this waterway resulted in multiple surveys and excavations (Johnson 2002:189-190). The location of the anthropology program at Mississippi State University also predisposes Starkville for more archaeological work. The presence of several archaeologists in one town who work in northeast Mississippi could lead to an increase of archaeological work in the area. Additionally, ground cover and visibility largely affects the ability of archaeologists to conduct complete surveys (Sheldon 2009:111). Many site cards reported a pedestrian or surface survey, particularly with low ground visibility, which limits the analysis needed to create an in-depth understanding of a site.

Another potential problem with using site file data is determining when sites were occupied. While northeast Mississippi has a general ceramic chronology, relative dating cannot be used reliably at sites for the Mississippi, Contact, and Early Historic Indian periods until a more detailed artifact chronology is established (Johnson 2000:88). Also, some surveyors and recorders did not record information about diagnostics, artifact counts, or reasons for assigning sites to specific time periods. For instance, several site cards only recorded general information about artifact classes, such as “sherds” or “flakes.” Historic Indian sites have no specific criteria that are universally accepted. Without more information, it is impossible to know what
classifies as “historic” for individual recorders (Williams 1994:38). Additionally, due to the nature of survey and excavation work, many sites have been only partially investigated (Sheldon 2009:108-109). This means that archaeological information cannot be recorded in the site files until sites have more extensive archaeological work completed.

Finally, the last potential issue with relying primarily on site file data is human error (Williams 1994:38). There were errors recorded in the site files, such as a site incorrectly listed with an elevation of approximately 2,000 feet in Clay county, where there are no mountains. Also, some sites were designated as “Mississippian” in MDAH’s database, but the physical site card listed “Protohistoric” and “Historic Indian.” Human error is also difficult to control for. There also were inconsistencies in how sites were recorded in MDAH’s database. In the Georgia Site Files, error rates for UTM coordinates exist at 1 to 2 percent (Williams 1994:38). Consequently, it is reasonable to assume that misspellings, mistyped UTM coordinates, and other errors are likely to occur as well in the Mississippi database.

While using the MDAH site files as a main source of data is somewhat problematic, its benefits for this analysis far outweigh the issues with the site files. The sheer amount of information recorded for sites—UTM coordinates, component information, and some lists of diagnostics—allows for a regional analysis. Furthermore, reliance on site files for primary data allows me to use sites that may have been destroyed due to construction or farming. Due to the site UTM coordinates available, I can map the spatial distribution of sites can which inform us about how people reacted to European contact and colonization. I am mitigating these biases to create the most useful data possible. This thesis presents a clearer picture of northeast Mississippi during and after contact, as well as outlines future work that needs to be completed.
Especially because of the De Soto entrada in the area, it is necessary to further research northeast Mississippi to understand how people reacted to the shatter zone.

**CONCLUSION**

I have spatially mapped the locations of sites that were occupied during the Mississippi and Contact periods. While many quantitative methods did not provide useful insights, I have visually assessed the spatial distribution of clusters, using site density and the absence of sites to identify potential habitation areas and buffer zones in the region. I have examined how the size, density, and shape of these clusters change through time. I have also assessed the location of the sites in relation to physiographic regions, rivers, and elevation. I have compared the locations of these clusters and how they change through time with settlement strategies outlined in the previous chapter. These strategies are used to infer agency and people’s reactions to the shatter zone in northeast Mississippi. I examined whether these clusters validate Atkinson’s prediction (1983a) for ethnohistorical polities. The results of all these methods are presented in the next chapter.
CHAPTER IV

RESULTS

In this chapter, I use archaeological site location data and ethnohistorical research to address the two main foci of my research. First, this project understands the effects of European contact and colonialism to have been dramatically destabilizing, rendered as the shatter zone concept. Second, I am examining the possible locations of the chiefdoms listed in the De Soto chronicles—Chicaza, Chakchiuma, and Alimamu—that were most likely in present-day northeast Mississippi (Atkinson 1987a; Clayton et al 1993:297; Hudson 1993:250-267). This is an attempt to reconstruct what the chiefdoms in northeast Mississippi were like at contact, which is necessary as a baseline for assessing how people reacted to contact. We know that the De Soto entrada passed through northeast Mississippi, and because of these records, we have some ethnohistorical records about the inhabitants of the region (see Figure 2.1). I am looking to locate possible polity locations, not the specific locations of the central towns of Chicaza, Chakchiuma, and Alimamu. The presence of the De Soto entra pada and the incursion of later Europeans destabilized much of the Southeast, including depletion of food stores, possible disease, and future aspirations for trade (Ethridge 2010:61-62). However, little is known about how people in northeast Mississippi specifically reacted to these stresses, except to say that the Chickasaw appear in Tupelo around 1650 (Johnson et al 2008:1).
ARCHAEOLOGICAL BASELINE IN ESTABLISHING POLITIES

Archaeologically, Mississippian polities have been identified using a model developed by David Hally (1993) for Southern Appalachia. Using 43 mound sites in north Georgia, Hally used habitation and mound construction information to date these sites (1993:148). This was accomplished using existing ceramic chronologies and radiocarbon dates (Hally 1993:148-149). It is also important to note that many of these archaeological sites and polities were not contemporaneous—they may have overlapped or not been in use during the entire time periods, and there are undoubtedly more sites to be uncovered (Hally 1993:149). Hally’s work in north Georgia gives an example of what Mississippian polities might look like archaeologically in northeast Mississippi.

The South Appalachian Mississippian settlement data from Hally (1993) and Livingood (2012, 2015) show that secondary mound centers were always located less than 18 km away from the primary center. Using distance-cost analysis, Livingood (2012:183-184, 2015:246) found that these secondary centers were approximately a half-day’s walk from the primary center. The primary centers from differing polities were never closer than 33 km (Hally 1993; Livingood 2015:245). These separate polities were surrounded by buffer zones—empty spaces that archaeologically signify territory between polities (Hally 1993; Livingood 2015:252-253). This implies that archaeologically, multiple sites must be in close proximity with one another and be surrounded by a buffer zone to constitute a polity. Although Hally depends on mound sites to inform his study, I do not solely focus on mounds because few mounds are present in the study. Additionally, these 18-km designations are straight line radii (Hally 1993), but they could easily be affected by natural impediments, such as rivers, plateaus, forests, and so on (Livingood 2012:174-175). Such impediments are present in northeast Mississippi: the
Tombigbee River and associated bluffs, upland ridges in the Black Prairie, and Tibbee-Line Creek are a few of the natural impediments in the region. Archaeologists have documented a center-farmstead settlement pattern in northeast Mississippi that reflects abundant wild game, such as white-tailed deer, along with smaller farmsteads on high ridges near smaller streams (Blitz 1993:32-33, 98-125; Johnson et al 1994:175). To make use of Hally’s Southern Appalachian model, it is necessary to make note of the terrain difference in northeast Mississippi. Therefore, while the Southern Appalachian model is useful for analysis, its spatial parameter of 18 km and reliance on mound sites does not fit with the Mississippian world of northeast Mississippi. Other aspects, such as the presence of buffer zones and clusters of sites, however, are likely to be apparent in the region.

SITE CLUSTERS AND CHANGE THROUGH TIME

I visually identified site clusters that may represent Mississippian polities based on several criteria. One was the presence of buffer zones around clusters, or empty spaces that separated different polities in the Mississippian world (Hally 1993). Another criterion is close proximity to other sites within in an area. For instance, three sites in a large area (18 km), would not constitute a cluster in this study. However, if 15 or more sites are located within an 18-km radius and have an empty space around them, they were considered to be a cluster.

The location of sites, both in terms of physiographic regions and geographical markers such as water sources, also were used to assess clusters. Here, elevation is used as a proxy for proximity to major water sources. This has been demonstrated to be a defensive strategy—higher elevations were more easily defended. This is seen historically by the Chickasaw in Tupelo (Johnson 2000). Additionally, the size and density of clusters over time is also
examined. Finally, the number of clusters over time is examined. The last two criteria could represent a changing geopolitical landscape and evidence for settlement strategies outlined in Chapter II. Together, these criteria will be used to determine cluster existence and membership, and how it changes over time as native peoples dealt with the effects of contact.

**All Sites**

All the sites used in the study are first mapped together (Figure 4.1). This presents an opportunity to see how the sites designated only as “Mississippian” are situated spatially among all the other sites. Also, most sites in Lowndes county are simply demarcated as “Mississippian,” with no other temporal description. Due to the combination of sites from all time periods, many clusters of sites appear, including around Lyon’s Bluff (22Ok520) and Butler Mound (22Lo500). More sites also occur in Lowndes county when all sites, are shown regardless of time period (n=126). However, Lowndes county only contains 19 percent of all sites. This includes many of the sites near the Butler Mound, where 23 sites are located in a 5-km radius (Figure 4.1). Certain physiographic regions were preferred overwhelmingly in all time periods; the Black Prairie, followed by the Tombigbee Bluffs (see Table 1). In fact, 84 percent of sites from all periods were located in the Black Prairie. However, as 271 sites are delineated as simply “Mississippian,” further research at still viable sites and collections are necessary to glean more information, particularly in Lowndes County (Table 1). The overwhelming majority of sites in the Black Prairie has been documented before, due to the presence of wild game (Boudreaux et al 2017; Johnson and Sparks 1986).
Figure 4.1. Map showing the location of all sites (1000-1650 CE).
Early and Middle Mississippi period (1000-1450 CE)

The Early and Middle Mississippi periods provide a baseline for comparisons with later time periods, demonstrating the Mississippian patterns that preceded the De Soto entrada. This does not mean that these site clusters are direct ancestors of the polities discussed in the chronicles, but rather provides a way to understand how those polities may have formed into what they did.

The Early and Middle Mississippian sites represent the smallest set of sites for this analysis (n=115, Figure 4.2). I identified three clusters of sites (Figure 4.3). However, all three clusters appear to be more oval in shape, rather than circular as described by Hally (1993). The largest cluster, with 57 percent of the sites, is the northernmost one, located primarily in Clay county (Figure 4.2). For simplicity’s sake, this will be the Northern Cluster. The next largest cluster is in Oktibbeha county, south of Starkville (Figures 4.2-4.3). This will be referred to as the Western Cluster. Just 30 percent of the sites labeled Early or Middle Mississippian in the site files are in this cluster. All remaining sites (n=15) are members of the third cluster in Lowndes

<table>
<thead>
<tr>
<th>Physiographic Region</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Prairie</td>
<td>562</td>
<td>84.6</td>
</tr>
<tr>
<td>Flatwoods</td>
<td>10</td>
<td>1.5</td>
</tr>
<tr>
<td>Pontotoc Ridge</td>
<td>3</td>
<td>0.5</td>
</tr>
<tr>
<td>Tombigbee Hills</td>
<td>52</td>
<td>7.8</td>
</tr>
<tr>
<td>Unassigned</td>
<td>37</td>
<td>5.6</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>664</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 4.1. All Sites by physiographic region.
Figure 4.2. Map showing the location of sites during the Early and Middle Mississippian Periods (1000-1450 CE).
Figure 4.3. Map showing the location of sites with cluster membership during the Early and Middle Mississippian Periods (1000-1450 CE).
county, the Eastern Cluster (see Figures 4.2-4.3). Butler Mound is also located in the Eastern Cluster. All three clusters are bounded by buffer zones. Furthermore, the Northern cluster is mostly bounded on its southern edge by Tibbee-Line Creek. The Eastern Cluster is bounded by the Tombigbee River. These buffer zones indicate that these are likely separate polities in northeastern Mississippi. Furthermore, the fact that the Northern and Eastern clusters are near water also indicate that some of the sites are near the floodplains, a Mississippian settlement hallmark (Anderson and Sassaman 2012:159).

Throughout the Early and Middle Mississippian periods, the people of northeast Mississippi focused on the Black Prairie. Out of the 115 sites, 89 percent are in the Black Prairie (Table 4.2). However, this could be higher, as a few sites (n=10) are unassigned to any physiographic region. Remaining physiographic regions for site location vary by cluster membership. The Northern Cluster has a single site on the Pontotoc Ridge, the Western cluster has one site located in the Flatwoods, and the Eastern Cluster has a single site located on the Tombigbee Bluffs (Table 4.2).

**Late Mississippian to Contact Era (1450-1600 CE)**

I argue that three site clusters were present during the Late Mississippian and Contact period. Again, unlike Hally’s Circles (Livingood 2012), these clusters appear to be largely oval. At least two of the clusters are clearly distinguishable, while a third is probable (Figures 4.4-4.5). The most notable change from the Early to Middle Mississippian sites is in the Western Cluster. Having grown in size, this cluster is now, by far, the largest of the three, with 80 percent of the sites located here (n=254), an increase of 625.7 percent. Measuring 25.6 km north-south and 14 km east-west, with a 12.8 km radius, the Western Cluster is also the largest cluster in terms of
Table 4.2. Settlement Selection in Physiographic Region by Cluster Membership in the Early and Middle Mississippi periods.

<table>
<thead>
<tr>
<th>Physiographic Region</th>
<th>Western Cluster</th>
<th></th>
<th></th>
<th></th>
<th>Northern Cluster</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>Eastern Cluster</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
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<tr>
<td></td>
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<td>Percent</td>
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<td>Count</td>
<td>Percent</td>
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<tr>
<td>Black Prairie</td>
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<td>29.6</td>
<td>57</td>
<td>49.6</td>
<td>11</td>
<td>9.5</td>
<td>102</td>
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<tr>
<td>Flatwoods</td>
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<td>0.9</td>
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<td>--</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>0.9</td>
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<td></td>
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<tr>
<td>Pontotoc Ridge</td>
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<td>--</td>
<td>1</td>
<td>0.9</td>
<td>--</td>
<td>--</td>
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<td>0.9</td>
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<td></td>
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<tr>
<td>Tombigbee Hills</td>
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<td>--</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>0.9</td>
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<td>--</td>
<td>7</td>
<td>6.0</td>
<td>3</td>
<td>2.6</td>
<td>10</td>
<td>8.6</td>
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<tr>
<td>Grand Total</td>
<td>35</td>
<td>30.5</td>
<td>65</td>
<td>57.5</td>
<td>15</td>
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<td></td>
</tr>
</tbody>
</table>


Figure 4.4. Map showing the location of sites during the Late Mississippian and Protohistoric Periods (1450-1600 CE).
Figure 4.5. Map showing the location of sites with cluster membership during the Late Mississippian and Protohistoric Periods (1450-1600 CE).
perimeter, but not area (Table 4.3). Using the radii from each cluster (r=12.8 km), it is roughly 164 km$^2$ (Hally 1993; Livingood 2015: 245). It is the densest of the clusters, although this could be partially due to the presence of Mississippi State University in Starkville. With archaeologists in the vicinity, it makes sense that the obvious cluster around Starkville is partially due to the location of the university. However, the sheer number of sites here makes it unlikely that the existence of the Western cluster is only due to the vagaries of sampling.

<table>
<thead>
<tr>
<th>Table 4.3. Area (km$^2$) of clusters, by period.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>Early and Middle Mississippi period</td>
</tr>
<tr>
<td>Late Mississippian and Protohistoric Period</td>
</tr>
<tr>
<td>Historic Indian Period</td>
</tr>
</tbody>
</table>

*Historic Indian (1600-1650 CE)*

Only one cluster really appears during the Early Historic period. Again, these are only Historic Native American sites that were not labeled as Choctaw, as those missions post-date this study. In the Historic period (Figure 4.6-4.7), 92 percent of sites are located around Starkville (n=174). Again, the Black Prairie is the main physiographic region, with all but five sites
Figure 4.6. Map showing the location of sites during the Historic Indian Period (1600-1650 CE).
Figure 4.7. Map showing the location of sites with cluster membership during the Historic Indian Period (1600-1660 CE).
located in the region. The Historic period Western cluster is also the densest of all clusters (see Figures 4.3, 4.5, 4.7). With an area of 154 km, the density is more than one site/km². With a radius of 7 km, this is also the smallest cluster (see Table 4.3).

CHANGE AND PERSISTENCE THROUGH TIME

The “shattering” of the Mississippian world can only be understood when a baseline is established of what the Mississippian world was prior to contact. From there, particular strategies employed in settlement patterns can be used to reconstruct human interaction (Worth 2002). This section characterizes how different settlement strategies demonstrate native actions to control their social world following European contact and colonization.

When the site locations from all time periods are combined on one map (see Figure 4.1), it is evident that many places were suitable for settlement. As previously stated, the Black Prairie had plentiful game, particularly white-tailed deer for hunting (Johnson et al 1994). The entire study area was clearly settled from before the Mississippi period until Indian Removal. However, the Western Cluster persisted for the entirety of the study period, first expanding from the Middle Mississippi period to the Contact period (see Figures 4.2-4.5). Other sites of persistence include Lyon’s Bluff and settlements in the Northern Cluster, and Butler Mound in Lowndes county (see Figures 4.1-4.5). This trend of physiographic persistence is visible across all three clusters (Table 4.4). This continuity in physiographic zone is important. It demonstrates a continuation of foodways and native lifestyle, even during episodes of European contact.

Elevation changes are also apparent. The elevation of sites for the Western Cluster is consistent through time, up through the Historic period (Figures 4.8-4.11). Settlement selection
Table 4.4. Settlement Selection in Physiographic Region by Cluster Membership in the Late Mississippian and Contact periods.

<table>
<thead>
<tr>
<th>Physiographic Region</th>
<th>Western Cluster</th>
<th>Northern Cluster</th>
<th>Eastern Cluster</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Black Prairie</td>
<td>252</td>
<td>80</td>
<td>23</td>
<td>7.3</td>
</tr>
<tr>
<td>Flatwoods</td>
<td>1</td>
<td>0.3</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Tombigbee Hills</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>(blank)</td>
<td>1</td>
<td>0.3</td>
<td>18</td>
<td>5.8</td>
</tr>
<tr>
<td>Grand Total</td>
<td>254</td>
<td>80.6</td>
<td>41</td>
<td>13.1</td>
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</tbody>
</table>

Figure 4.8. Boxplot of elevation (in feet) for all sites by time period.

50
Figure 4.9. Boxplot of elevation (in feet) for sites during the Early to Middle Mississippian Periods (1000-1450 CE) by cluster membership.
Figure 4.10. Boxplot of elevation (in feet) for sites during the Late Mississippian to Contact Periods (1450-1600 CE) by cluster membership.
Figure 4.11. Boxplot of elevation (in feet) for sites during the Historic Period (1600-1650 CE) by cluster membership.
shifts between clusters and over time. In the Early and Middle Mississippi period, different site clusters were located in different parts of the Black Prairie. Eastern Cluster sites are lower than 300 feet, demonstrating that they were closer to the floodplains of the Tombigbee (see Figure 4.1, Figure 4.8). Sites in both the Northern and Eastern Clusters were located on higher ground during the Early and Middle Mississippi periods (see Figures 4.8 and 4.9), away from the bottomland streams. However, the Northern Cluster still includes sites in the floodplain, indicating that not all people living in the Northern Cluster had transitioned to farming in the uplands yet. While people were already shifting from the floodplains to more secure upland settlements before contact, it is possible that the shatter zone accelerated this defensive strategy. This trend continues in the Late Mississippian and Protohistoric period (see Figure 4.10), as well as the Historic period (see Figure 4.11). Movement of settlements from floodplains to uplands demonstrates that people were concerned with defensibility and safety, even before contact (Anderson and Sassaman 2012:164; Regnier 2014; Worth 2002:50-53) This demonstrates that site selection away from larger streams, in more defensible locations, was already in practice before contact (Johnson and Sparks 1987:67, 70).

The shape of the clusters suggests possible options, when compared to Hally Circles. As these shapes are largely oval instead of circular, it could be a local adaptation of a larger Mississippian pattern. This could be due to the location of watersheds or how people populated the prairie. Less likely, it is a possible response to European contact. I believe that while that contributed to other social changes and did impact the shape of the clusters, it is not the only reason these clusters appear to be oval. Oval-shaped clusters were present in the Early and Middle Mississippi periods, as well (see Figure 4.3). Therefore, it is likely that this is a local adaptation of Hally Circles, and this was still in use following European contact.
The Western Cluster expansion does demonstrate that there is some political change. The sudden increase in site density indicates coalescence (Worth 2002:50-53). Furthermore, it may indicate a power struggle, as noted in the ethnohistorical record (Ethridge 2010). One chief could be gaining more power or prestige, while others fall. The increase of sites and assumed influx of people in the Western Cluster signals a change in the seat of power in northeast Mississippi. Of all the clusters I identified in the Late Mississippian and Contact periods, 254 sites (80 percent) are located in the Western Cluster, up from 35 sites (30.5 percent) in the Early and Middle Mississippi periods. While in the Early and Middle Mississippi periods the Northern Cluster was the largest cluster with 65 sites (57.5 percent), by the Late Mississippian and Contact periods, the Northern Cluster has decreased to 41 sites, a decrease of 36.9 percent. Just 13.1 percent of the total number of sites in the Late Mississippian and Contact periods are associated with the Northern Cluster. This sharp decline in sites suggests that people moved out of the Norther Cluster. It is impossible to tell with the current data if they were pulled to the larger Western Cluster or if the former inhabitants of the Northern Cluster left the area altogether. The remaining 6.3 percent of sites (n=20) are in Lowndes county. The smallest cluster, which is the Eastern Cluster, in terms of individual sites and area (130 km²), needs the most future work.

The demographic change among clusters between the Early to Middle Mississippi periods and the Late Mississippian to Contact periods suggests a power shift between the Northern and Western Clusters. The degree of abandonment of settlements of the Northern Cluster compared to the settlement and assumed population boom in the Western Cluster suggests that people were realigning themselves with a more powerful polity or chief in the region. When examined with the preference for more defensible upland sites, this settlement and population explosion of the Western Cluster and concomitant partial abandonment of the
Northern Cluster indicates several factors. First, these are likely locations of indigenous polities in the region. Second, the Northern Polity was most likely still the most powerful polity in northeast Mississippi in the Early and Middle Mississippi period. Third, a power shift occurred by the Late Mississippian and Contact periods, and the Western Cluster became the most prominent polity. This also has been discussed ethnographically. Chicaza, the *mico*, or chief, of Chicaza, used the De Soto entrada to punish a subordinate rival chief (Ethridge 2010; Hudson 1993). It is possible that Chicaza had recently risen to power and used De Soto to solidify position (Ethridge 2010; Hudson 1993).

The expansion of the Western Cluster with the dense concentration of sites around Starkville during the Late Mississippian and Contact periods is possibly the beginning of the Starkville Archaeological Complex (SAC), a cluster of Contact period sites first discussed by Atkinson (1979). The Northern, Eastern, and Western Clusters during the Late Mississippian and Contact periods closely align with the locations of the De Soto-era polities proposed by Atkinson (1983a: see Figure 2.1). My Eastern Cluster aligns with his proposed location of Chicaza, my Western Cluster with his location for Chakchiuma, and my Northern with his locations for Alimamu. However, my data do not quite match Atkinson’s prediction. For example, the sheer volume of sites around Starkville indicate that it was the location of Chicaza (Ethridge 2010). Archaeological signatures of the polity of Chicaza include a large number of sites in northeast Mississippi, on ridgetops, near the Tombigbee River (Ethridge 2010). The Western Cluster has the largest density of sites in northeast Mississippi (see Table 4.3), is near the Tombigbee River (see Figure 4.5), and it is located in areas of higher elevation than the other two clusters (see Figure 4.10). Therefore, much of the data from MDAH suggests that the Western Cluster may be the location of Chicaza.
By the Historic period, the Northern and Eastern Clusters appear to have been abandoned, while the Western Cluster still contained a large number of settlements nucleated around Starkville (see Figures 4.6-7, Table 4.5). This abandonment is seen ethnohistorically, as well; the Alimamu relocate to present-day Alabama, while the Chakchiuma moved to the Yazoo Basin and later joined the Chickasaw (Ethridge 2010). The introduction of capitalism, in the form of intensive trade of slaves and animal hides, introduced the final section of the shatter zone in the seventeenth century (Ethridge 2010:89). Due to indigenous interaction networks, shock waves traveled from the Atlantic coast and English colonies to northeast Mississippi (Ethridge 2010:116-117). These shock waves include increased violence. The nucleation of sites around Starkville could be an indication of the prevalence of violence, possibly the beginnings of slaving, or even some effects of disease (Anderson and Sassaman 2012:164-165). As communities were devastated by violence or disease, they may have come together around Starkville for safety; furthermore, native peoples could have adopted captives to replace lost kin (Ethridge 2010:240; Kelton 2009:323). Either strategy bolsters the population and provides protection from nearby enemies intent on warfare or even slave raids from other groups (Ethridge 2010:241). The De Soto entrada, and any effects from the attack at Chicaza, could have continued to destabilize the area, therefore creating the nucleation and exodus (Ethridge 2010:26).

Also, it is further evidence of likely coalescence around Starkville. It is already documented archaeologically that the Chickasaw moved north to established settlements in Tupelo, north of Clay County, by 1650 (Cegelski and Lieb 2011; Johnson et al 2008). This
could have been an attempt to gain power by controlling part of the trade routes through northeast Mississippi, a factor that made leaving Clay, Oktibbeha, and Lowndes counties more attractive than staying in the region (Ethridge 2010:85-88). By no means were all the sites used in this study assumed to be contemporaneous. They represent different settlements over time that have not been further delineated temporally; more precise dating may not even come with further investigations. The settlement strategies used in response to contact are evidence of indigenous reactions in the shatter zone—people acted in culturally appropriate ways in response to the destabilization of the polities in northeast Mississippi.

**CONCLUSION**

European contact affected native peoples across the Southeast, including the abandonment of settlements and polities. People were living in a changing world. They regrouped themselves, socially and physically, and continued to live in the new world of native peoples and European contact and colonization. This change did not take place overnight; rather
it happened in the century without direct Native-European interaction following the De Soto entrada’s exit out of northeast Mississippi.

Throughout this, I have identified several patterns. There is a decrease in the number of sites from the Late Mississippian and Contact periods to the Historic period. There are three possible clusters that could represent Mississippian polities during the Early to Middle Mississippian and Late Mississippian to Contact periods. These clusters do not remain static. Both the Northern and Eastern Clusters were abandoned by the Historic period, while the people of the Western Cluster nucleated around Starkville over time. Despite all these changes, settlements in northeast Mississippi were still located in the Black Prairie over time, indicating a continuation of native life and foodways. In the next chapter, I will discuss these trends in terms of the shatter zone.
CHAPTER V
CONCLUSION

This thesis has two main objectives. The first is to examine how people dealt with the effects of European contact in northeast Mississippi. The shattering of the Mississippian world presented an opportunity to renegotiate their lives in a changing geopolitical landscape. I have attempted to use ArcGIS to analyze settlement patterns and indicate how people navigated through a changing social landscape. The importance of these interactions must not be overlooked. European contact and colonialism fundamentally altered how native peoples interacted within the new geopolitical landscape. I have attempted to demonstrate that even in times of stress, the native peoples of northeast Mississippi agentively navigated their social setting to persist in their lifeways. The second objective is to assess the possible location of the ethnohistorical polities enumerated in the De Soto chronicles—Chicaza, Chakchiuma, and Alimamu—in 1540-1541.

Settlement patterns in northeast Mississippi demonstrate stress, violence, fear, and changing power structures during the Contact period. Movement away from the floodplains of the Tombigbee River and the Tibbee-Line Creek watershed into the uplands may reveal a strategy to deal with a changing world by moving to more defensible positions. While this trend began during the Mississippi period, it appears to have accelerated by contact. Nucleation was used as a means to cope with uncertainty throughout the Southeast. The eventual nucleation around Starkville in the Western Cluster indicates stress during the Early Historic period (1600-
Continued nucleation around the area in a more defensible location suggests a strength-in-numbers approach. The large-scale abandonment of the rest of the study area also demonstrates changing power during this time. Abandonment of the Northern and Eastern Clusters indicates that there are reasons for the inhabitants to either move to the more densely populated Western Cluster or out of the region entirely. The growth of the Western Cluster is likely an instance of coalescence, one way native peoples answered the shattering of the Mississippian world. However, even after contact, people still maintained parts of their lives. Remaining in the Black Prairie indicates a continuation of lifestyle and foodways. Therefore, although drastic settlement changes occurred during this time, native people did not simply abandon their lives from before contact.

This study has identified several patterns in the existing archaeological record, and they have been interpreted through the laws of the shatter zone concept. This study is based on existing site file data, which allowed me to examine larger regional patterns over time (Figure 5.1). The robust number of sites around Starkville is unlikely due to the biases previously presented, and likely represents a real habitation cluster in the west. Likewise, the Northern Cluster had a large number of sites around the Lyon’s Bluff Mound site, and also represents a real area of habitation in the Mississippi period. Furthermore, the Black Prairie is fairly open and not densely inhabited or developed. This contributes to the likelihood that these habitation zones are probable locations of these ethnohistoric polities. While the polities themselves are not in the same precise locations as Atkinson’s (1987a) prediction, three polities are still present in the area. I propose the Chicaza polity was located around Starkville, due to the sheer density of sites in this area. Therefore, this study has succeeded in many senses as a preliminary test.

However, these findings only call for more work to be done. A detailed ceramic
Figure 5.1. Series of maps demonstrating settlement change through time, 1000-1650 AD.
chronology needs to be established for this region. Furthermore, the proposed locations for these polities, including polity boundaries and density of sites within the polities, need to be further examined. While the location of the principal towns for each polity would be the smoking gun, it would be difficult to find archaeologically. More work can be done at each cluster in each time period to assess the validity of this visual analysis. It is important to note that even though the Mississippi period ended, the people of the Mississippian world were not removed from the region. Their descendants, the Chickasaw and the Choctaw, remained in the area until Indian Removal in the nineteenth century (Johnson 2000).

The existence of these site clusters suggests different archaeological polities in northeast Mississippi. The change in size and density of these clusters also indicates a shifting political landscape in the region. Additionally, the movement away from watersheds and floodplains to the uplands implies a need for more defensible settlements. These patterns are likely indigenous responses to their changing world. Contact and colonialism had definitive consequences in the entire Southeast. Identifying these patterns, as examples of how people responded to the shatter zone, is an important step in understanding a crucial period in this important area.
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