AMONG THE FIELDS: MISSISSIPPIAN SETTLEMENT PATTERNS IN THE BLACK WARRIOR VALLEY, ALABAMA

by

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A THESIS

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Abstract

This thesis offers a quantitative description of the settlement pattern of the Mississippi period Black Warrior Valley, west-central Alabama. Although believed to be an important part of the economy of the Moundville chiefdom, rural non-mound sites were rarely studied in the context of settlement patterns until the late 1970s. Based on archaeological survey and Alabama State Site File site data, five possible settlement pattern determinants are examined in this thesis. These include environmental determinants (proximity to a major waterway and geofluvial context) and social determinants (proximity to the paramount center, proximity to secondary centers, and proximity to other rural settlements).

Chapter 1: Introduction

The purpose of this thesis is to describe quantitatively aspects of the settlement pattern of the Moundville chiefdom, particularly with regard to non-mound Mississippi period archaeological sites in the Black Warrior Valley. The existence of these small sites has been recognized within the Mississippian world only since the late 1970s (Smith 1978b). Before that, it was believed that most Mississippian peoples living outside of mound centers inhabited nucleated villages. While this is true in some areas, it is not a universal trait of Mississippian cultures, nor is it even common. In this study, the distribution of non-mound sites in the Moundville chiefdom will be examined in terms of two general categories of settlement determinants: social and environmental. Social determinants to be considered include the proximity of such sites to the Moundville site, to outlying single-mound sites, and to other non-mound sites. Environmental determinants to be considered include the distance of such sites to major waterways and the Geofluvial Contexts in which they occur.

The data on which this thesis is based have been obtained through fieldwork undertaken by the Black Warrior Valley Survey, which was conducted by the University of Alabama's Department of Anthropology during the summers of 1999 through 2001, and through an examination of the Alabama State Site File. Such data are most valuable when studied in the context of settlement patterns (F. Plog 1974:71). In studying settlement patterns, a choice is made to seek general information from many sites, in

order to understand and interpret the distribution of a group of contemporary sites (F. Plog 1974:76), whereas other archaeological projects focus on providing a more detailed understanding of a small number of sites. The scale at which archaeological research is conducted (i.e., the region, the site, etc.) determines the context in which the results can be interpreted. The goal of this thesis, then, is to provide a better understanding of the way in which rural settlements were distributed throughout the Moundville chiefdom using survey data.

Cultural Context

The Mississippi Period

Mississippian culture emerged in parts of the Eastern United States beginning as early as A.D. 1000 and lasting until approximately A.D. 1600. A number of definitions of Mississippian culture have been proposed, with most of the variability in these definitions being in regard to the inclusion of cultures on the boundaries of the traditionally defined Mississippian universe. For example, according to Bense (1994:186), there are two categories of Mississippian subsistence patterns: (a) riverine or (b) coastal. The main difference between these patterns is the ratio of produced food to collected food in the diet. On the one hand, since coastal soils are generally poor agricultural soils, produced food made up a smaller portion of the diets of people living on the coast. On the other hand, many riverine soils are well-suited to agriculture and thus, in that environment, produced food made up a larger portion of the diet of people living along rivers. In contrast, Smith (1978a:480-481) sees the label Mississippian as being applicable only to those cultures that exhibited a specific adaptation to the meander-belt zones of the river valleys of the Eastern United States. This adaptation

focused on the exploitation of a number of naturally occurring faunal and floral species, as well as maize agriculture. According to Knight (1986:681), however, a definition of Mississippian should not be considered solely in terms of economic or political systems, as much as it should be considered as a common religious system. Thus, coastal societies whose religious/ritual systems were similar to those of the interior riverine societies can also be considered to have been Mississippian. Other definitions of Mississippian culture are trait lists of the general features found during the late prehistoric in the greater Southeastern United States. For example, Griffin (1990:7-9) describes Mississippian societies as those that possessed a major town, a number of subsidiary villages, and a large number of farmsteads. Also tending to characterize Mississippian societies were wattle and daub rectangular houses, platform mounds, plazas, a chief, maize agriculture, shell-tempered pottery, along with a number of other features.

Since there is no argument among prehistorians that the Moundville chiefdom was a Mississippian society, a working definition of "Mississippian" is not essential to this thesis. However, in the interest of clarity, any reference herein to Mississippian societies in general will denote, following Scarry:

> those people of the late prehistoric Southeast who practiced cleared-field agriculture with maize as the dominant crop, who had hierarchical political organizations with evidence of ascriptive status differentiation, and who shared a set of religious cult institutions and iconographic complexes (J. F. Scarry 1996:13).

The nature of sociopolitical organization in Mississippian societies is considered to be at the chiefdom level in the classic social evolutionary sequence of Service (1962) and Sahlins (1963) (Table 1). In chiefdom-level societies, the members of a polity are

<table>
<tr><th>Childe (1936)</th><th>Service (1962)
Johnson and Earle (1987)</th><th>Sahlins (1963)
Earle (1978)</th><th>Fried (1967)</th></tr>
<tr><td>Hunter-gatherers</td><td>Band
(family level)</td><td rowspan="2">Head man</td><td rowspan="2">Egalitarian Society</td></tr>
<tr><td rowspan="2">Farmers</td><td rowspan="2">Tribe
(local group)</td></tr>
<tr><td>Big Man</td><td rowspan="2">Ranked Society</td></tr>
<tr><td rowspan="3">Civilization</td><td rowspan="2">Chiefdom</td><td>Simple</td></tr>
<tr><td>Complex</td><td>Stratified Society</td></tr>
<tr><td>State</td><td>State</td><td>State</td></tr>
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Table 1. Some common anthropological typologies of social evolution (adapted from Earle 1994).

divided into two distinct groups based on ascribed status: elite and non-elite. The elites in Mississippian society were also ranked by genealogical distance from the chief as a way of organizing inheritance of elite statuses and titles (Knight 1990). The political power of the elite, and especially the chiefly elite, was reinforced via religious associations and through a monopoly on certain types of artifacts and iconography referred to as the warfare/cosmogony complex of sacra (Knight 1986), as well as through economic power and authority in warfare.

At least two forms of chiefdoms are theoretically recognized and are present in the Mississippian universe: simple and complex (Figure 1). There are two principal ideas on how to distinguish between these forms. The first is based on a control hierarchy, or the number of decision-making levels above the local community level (Anderson 1994). According to this model, simple chiefdoms would have one decision-making level above the local community, while complex chiefdoms would have at least two decision-making levels above the local community. The second model used to distinguish simple and complex chiefdoms is based on a hierarchy of political organization (Steponaitis 1978).

According to this model, simple chiefdoms have one level of chiefly political offices, while complex chiefdoms have an additional group of political offices subordinate to that of the chief. As Beck (1997) points out, however, both of these methods of chiefdom classification stress only one aspect of social complexity. This emphasis tends to mask variability, especially in the degree of complexity, among chiefdom-level societies.

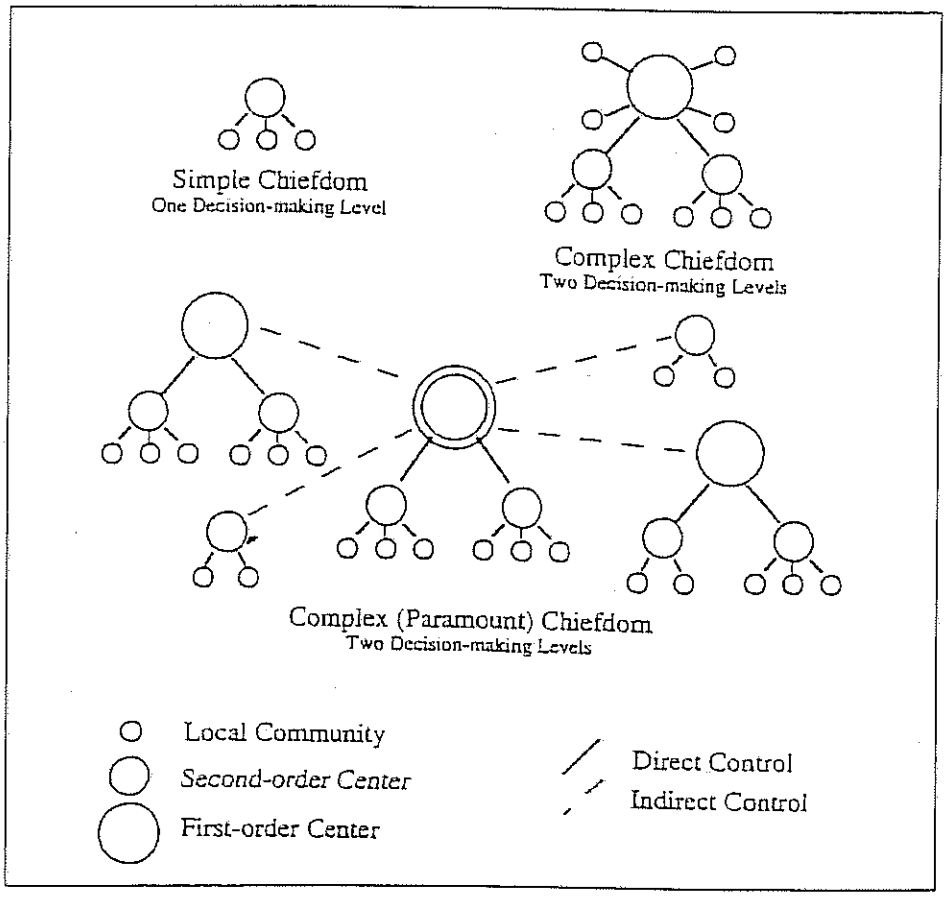

Figure 1. Simple and Complex Chiefdoms: Variability in Settlement and Control Hierarchies (Anderson 1994:9).

The Moundville Chiefdom

The Moundville chiefdom is located in the Black Warrior Valley, Alabama (Figure 2). The Moundville site is the ceremonial center of the chiefdom, consisting of

29 mounds, with many high-status burials and elaborate grave goods (Knight and Steponaitis 1998) (Figure 3). There are two general views of the origins of the Moundville culture. The first can be described as the intrusion model whereby Mississippian people entered the Black Warrior Valley, which was already inhabited by Late Woodland peoples (Seckinger and Jenkins 2000). The second can be described as the *in situ* evolution model whereby the culture of Late Woodland peoples living in the Black Warrior Valley gradually adopted Mississippian cultural traits without major population movement (Mistovich 1988).

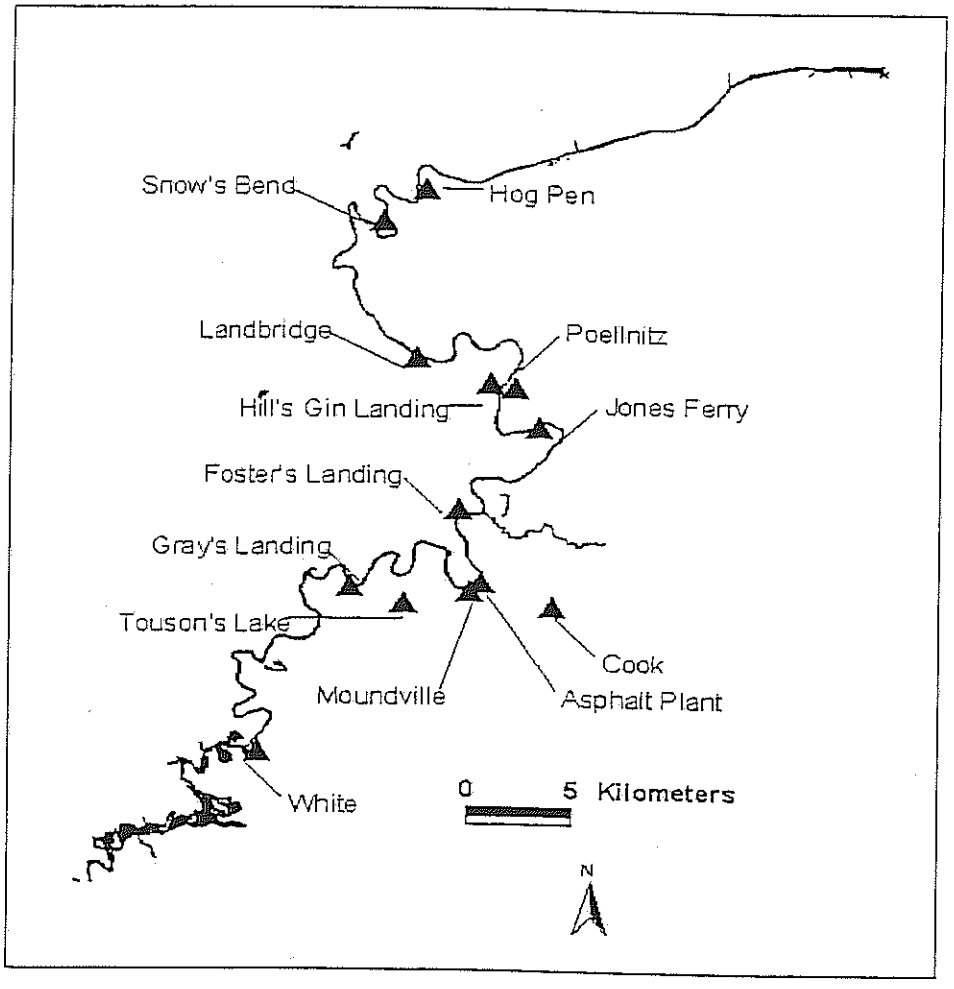

Figure 2. Mound sites of the Mississippi period Black Warrior Valley.

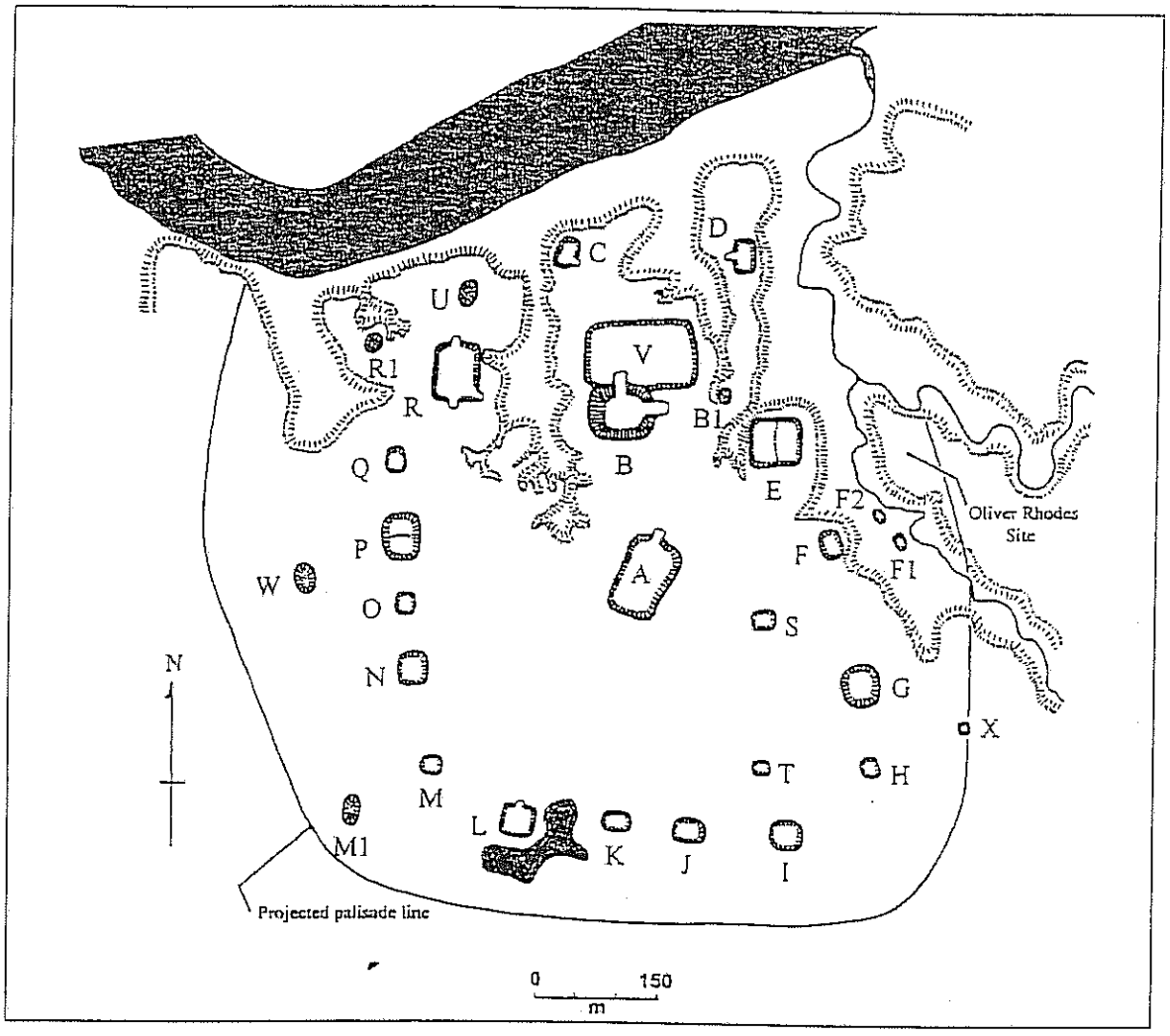

Figure 3. Schematic map of the Moundville site (Knight and Steponaitis 1998:3).

The prehistory of the Mississippi period in the Black Warrior Valley is often divided up in two ways. The first, more traditional way is based on Steponaitis's (1983) ceramic seriation of Moundville pottery. This method divides the late prehistoric within the Black Warrior Valley into four phases, or Moundville I, II, III, and IV. While this method works well when determining the relative age of an assemblage, it does not provide a cultural context. Knight and Steponaitis (1998) provide a complementary method for dividing up the Mississippi period in the Black Warrior Valley which focuses on the developmental trajectory of the Moundville chiefdom. The five developmental

stages of the chiefdom are: (a) intensification of local production, (b) initial centralization, (c) regional consolidation, (d) the paramountcy entrenched, and (e) collapse and reorganization. In discussing the late prehistory of the Black Warrior Valley, the developmental stages will be described, along with the corresponding ceramic phases.

Intensification of Local Production (West Jefferson Phase)

Although Late Woodland period settlement patterns are outside the scope of this thesis, a brief description of this phase will be provided as the West Jefferson phase, which is the terminal Late Woodland in the Black Warrior Valley, which lasted from AD 1020-1120, shows a good deal of continuity with the subsequent developmental stage. The level of political development evident during the West Jefferson phase can be characterized as a tribal organization perhaps involving a "Big Man" feature. It has been suggested that the intensification of local craft production, especially in the form of shell beads and other shell objects, was directed and utilized by local leaders in order to attract followers, thus gaining influence, though not power, in their communities (Knight and Steponaitis 1998:11).

The West Jefferson settlement pattern is clearly related to the seasonal availability of certain key foodstuffs. Based on survey data, terminal Late Woodland settlements are characterized by large nucleated villages within the floodplain (Bozeman 1982; Hammerstedt 2000; Hammerstedt and Myer 2001b). Welch (1981) has interpreted these large sites as being warm-season villages, proposing that small, upland extractive camps were inhabited during the cold season. In addition to these large village sites, smaller surface scatters containing West Jefferson phase artifacts have also been documented

within the Black Warrior Valley (Hammerstedt and Myer 2001b). These smaller West Jefferson sites may be an effect of a changing subsistence strategy, which gradually saw an increase in food production, especially maize, yet also a continued exploitation of wild foodstuffs, with a particular emphasis on nuts (C. M. Scarry 1993) (see below).

Initial Centralization (Early Moundville I)

The early Moundville I phase saw the emergence of a variety of typically Mississippian characteristics in the Black Warrior Valley. This stage, which lasted from AD 1120 to 1200, has been termed the "Initial Centralization" (Knight and Steponaitis 1998:12-13; Knight, et al. 1999). Although a complex chiefdom had not yet developed, mounds were already being erected in the vicinity of the Moundville site, presumably by local leaders of dispersed farming communities centered at Mound X at Moundville and at the Asphalt Plant mound (1Tu50), which is located approximately one kilometer to the northeast of Moundville (Steponaitis 1992; Knight and Steponaitis 1998:13) (Figure 4). The construction of these mounds may represent the beginnings of the political domination of Moundville-area leaders over others in the valley. Knight and Steponaitis (1998:13) suggest that the occupants of these mounds were the leaders of "small-scale ranked societ[ies]." These leaders, they believe, were involved in the trade of non-local raw materials.

Typical hallmarks of the Mississippi period, especially those related to architecture, ceramic technology, settlement patterns, and subsistence strategies are evident during this subphase, although some markers of the preceding West Jefferson phase are still present. Notable characteristics of the Mississippi period evident by the

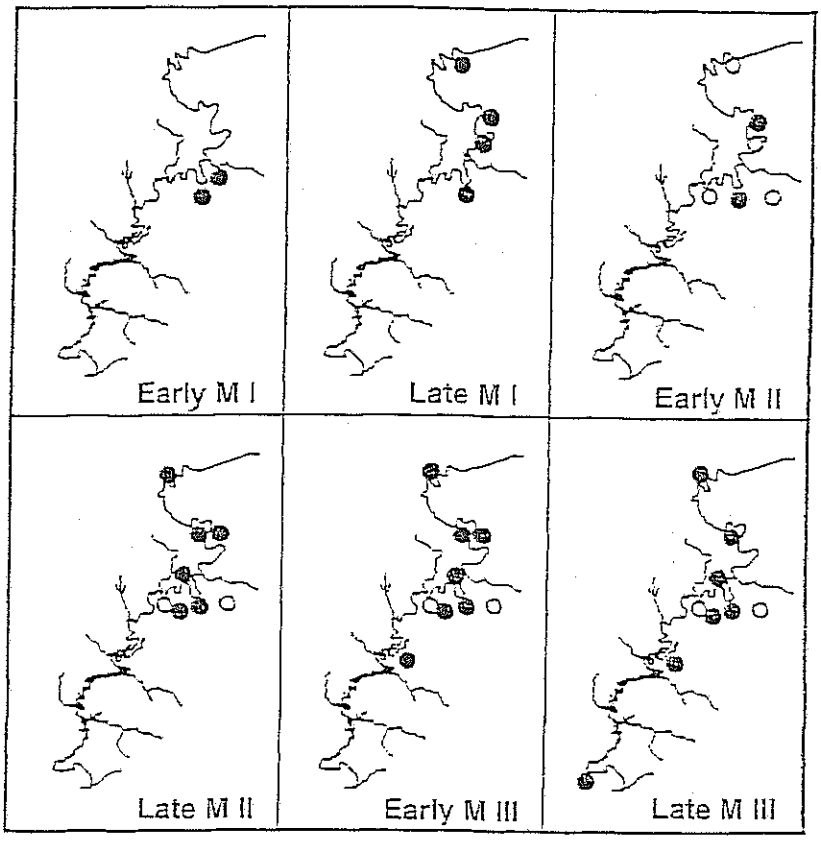

Figure 4. Settlement distribution of mound sites of the Moundville chiefdom. Solid circles indicate definite occupation, open circles indicate probably occupation. (Welch 1998:161).

early Moundville I phase include the intensification of agriculture, especially maize, the increasing popularity of shell tempered pottery, and shifts in the political, economic, and settlement systems. The intensification of maize production allowed for the emergence of a stable agricultural economy. As a result of the shift in subsistence economies to one focused on maize, most of the population of the valley appears to have been living in small outlying sites. These sites, traditionally referred to as farmsteads, formed the fundamental unit of the new agricultural economy (Knight and Steponaitis 1998:12; Knight and Solis 1983).

Regional Consolidation (Late Moundville I through Early Moundville II)

The development of a paramount chiefdom at Moundville occurred during the Late Moundville I phase. During this phase and the early Moundville II phase (AD 1200-1300), the plaza-periphery mounds were built at Moundville, as was the palisade (Figure 5). The amount of sheet midden dating to this time, an indicator of relative population size, suggests that the population at Moundville was quite large. The population in the rest of the valley flourished as well, as a series of single-mound centers were constructed,

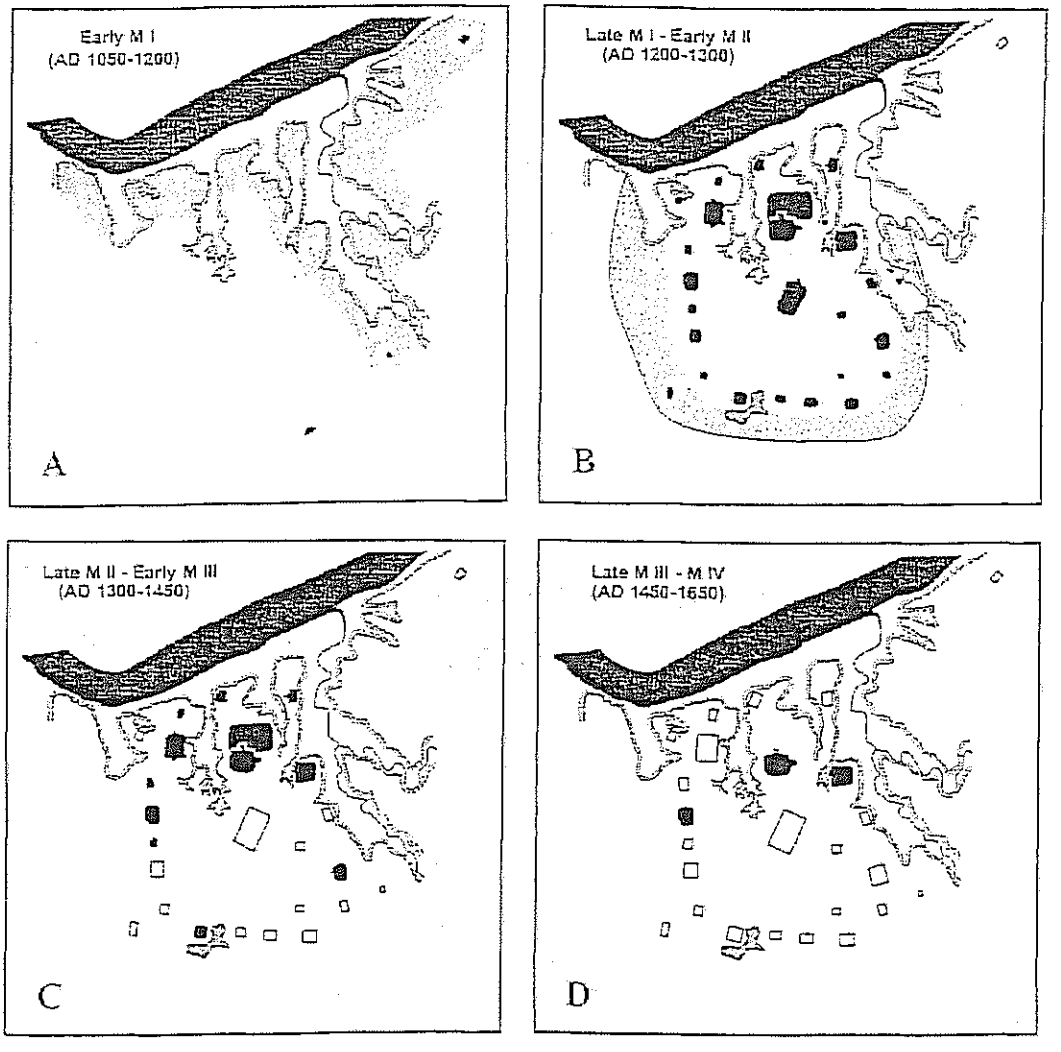

Figure 5. Occupation areas at the Moundville site (solid indicates occupied, open indicates unoccupied, stippled indicates domestic occupation area). (Knight and Steponaitis 1998:14).

presumably in order to exact some measure of control of and/or tribute from the farmstead inhabitants throughout the valley (Figure 4).

The subsistence strategy increasingly emphasized the importance of maize. It is generally believed that the non-elites living in farmsteads throughout the valley were provisioning the elite members of the society with shelled corn and prime cuts of venison (but see Maxham 2001; see also Knight 2001). Elites are presumed to have held control over the distribution of non-local goods and raw materials within the chiefdom (Welch 1991).

The Paramountcy Entrenched (Late Moundville II through Early Moundville III)

This stage in the development of the Moundville chiefdom lasted from AD 1300 through 1450. During the late Moundville II and early Moundville III phases, archaeological evidence indicates the distancing of elites from non-elites, especially through the types of grave goods found with some burials. Knight and Steponaitis (1998) suggest that the access to chiefly cult symbolism, such as that traditionally associated with the Southeastern Ceremonial Complex, indicates this separation of elite from non-elite. Also, a physical separation is indicated by the virtual evacuation of the Moundville site, except by the chief and other elites, as well as their retainers. The archaeological evidence used to suggest this is the drastic reduction in the formation of sheet midden compared to that of the previous stage. Many of the mounds built during the Regional Consolidation were no longer being utilized, with the exception of those on the northern perimeter of the site (Figure 5). The majority of the people of the Moundville chiefdom were presumably living in farmsteads, which were likely organized around the single-

mound administrative centers throughout the alluvial valley (Knight and Steponaitis 1998:18; Hammerstedt 2000; Hammerstedt and Myer 2001a).

It was during this stage that the Moundville site seemingly became a necropolis. This is suggested by the high frequency of burials dating to this time, coupled with the small amount of sheet midden. Knight and Steponaitis (1998:18-19) suggest three possible reasons for the virtual abandonment of the Moundville site by non-elites: (a) the desire by elites to increase the sanctity of the paramount center, (b) the exhaustion of natural resources around the site, and (c) the absence of a need for defensibility.

Collapse and Reorganization (Late Moundville III and Moundville IV)

The late Moundville III phase (AD 1450-1520) in the Black Warrior Valley saw dramatic shifts in the settlement pattern, as well as the inferred political structure of the chiefdom. The population at the Moundville site itself, already greatly diminished in the previous stage, further declined, although the dead from outside the site were still being interred there. The single-mound sites throughout the valley continued to be occupied and nucleated villages were present for the first time since the terminal Late Woodland period. Although Moundville can still be considered a mortuary center during the early portion of this stage, cemeteries were also present at the single-mound sites, as well as at some non-mound sites. Knight and Steponaitis (1998:21-22) interpret these trends as indicating an increased "self-sufficiency among the outlying communities."

The Moundville IV phase (AD 1520-1650) is thought to feature the complete abandonment of the Moundville site, as well as the single-mound sites within the valley. This phase can be characterized as a discontinuation of the Mississippian lifeway. The importance of maize in the diet of those living in the Black Warrior Valley declined in

favor of foodstuffs obtainable by hunting and gathering. The remaining population in the valley inhabited several non-mound nucleated villages. Additionally, the mortuary pattern shifted to one featuring urn burials. By the end of this phase, the entire valley had been abandoned and was considered to be a buffer zone between proto-Creeks and Choctaws.

Physical Context

The boundaries of the Moundville chiefdom are the Fall Line, near Tuscaloosa, Alabama to the north and the confluence of the Black Warrior River and the Tombigbee River at Demopolis, Alabama to the south (Figure 6). Like many Mississippi period chiefdoms, the Moundville chiefdom was located near a physiographic transition zone (Larson 1971) between the Cumberland Plateau and the Gulf Coastal Plain physiographic sections. The Fall Line, formerly a coastline, marks the boundary between the Gulf Coastal Plain and the Cumberland Plateau. The occupation areas of the chiefdom, though not necessarily the exploitation areas, are generally thought to be confined to the Black Warrior alluvial valley, which is between six and 15 kilometers wide. Above the Fall Line, the river is incised into and constrained by Pottsville sandstone bedrock, and the terrain is steep and rough. Below the Fall Line, however, the river meanders across a broad alluvial plain of both Pleistocene and Holocene origin. Terraces of Late Pliocene-Pleistocene (70,000-150,000 BP) and Late Pleistocene (30,000-15,000 BP) origins occur on the edge of the alluvial valley (Stephenson and Monroe 1940; Szabo 1972). The Moundville site itself is located on one such terrace, in an area where the river abuts it. Most of the alluvial plain, however, is the Holocene floodplain. The Holocene floodplain:

> has been formed by continuous meander migration and lateral erosion, and channel and overbank deposition. As a result of these erosional and depositional processes, a series of fluvial landforms have been formed. These landforms include natural levees, splays, abandoned channels or chutes, oxbows, meander scrolls, point bars, backswamps, and yazoo tributaries (Hooks 1986:40).

These features suggest lateral erosion as the dominant fluvial force in the Black Warrior Valley (Hooks 1986:40). Outside the valley walls are the rolling Fall Line Hills with winding ridge tops, steep slopes, and intermittent streams.

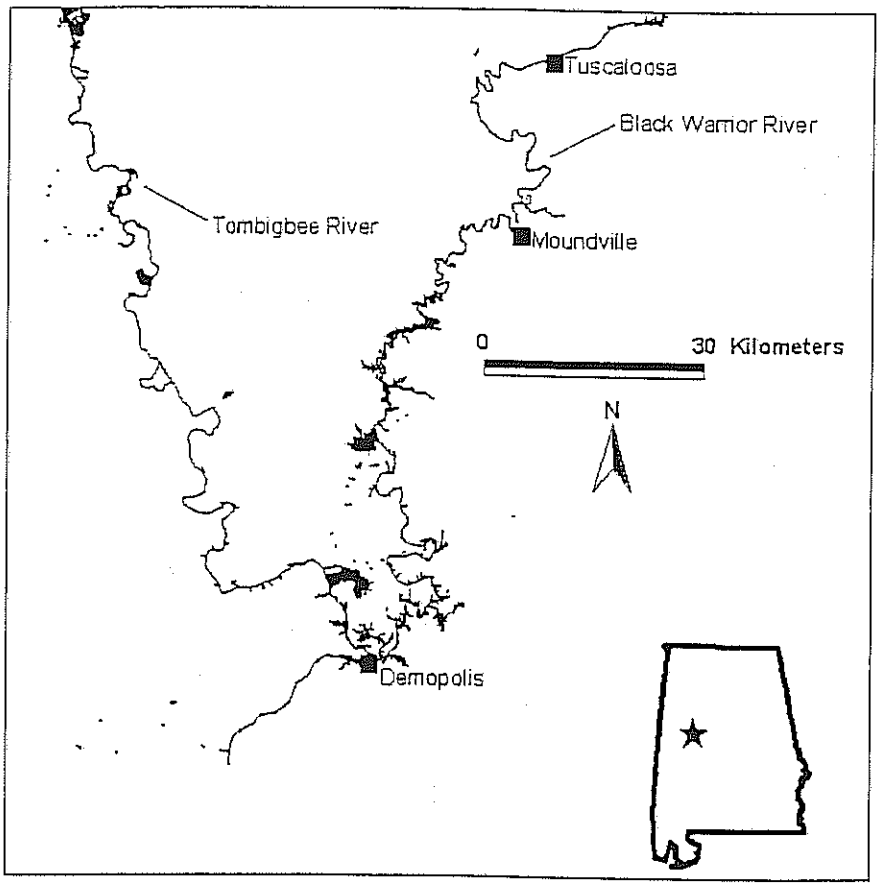

Figure 6. Probable extent of the Moundville chiefdom.

The climate in the study area is moderate, with an average yearly temperature of 63.4 degrees (Fahrenheit) and an average amount of yearly precipitation of 49.26 inches,

with an agricultural growing season which lasts from April until November. The Black Warrior Valley is composed of two distinct floral zones: (a) the oak-hickory Eastern Deciduous Forest, associated with the Appalachian Highlands, occurring above the Fall Line and (b) the swamp forest complex, associated with the Coastal Plain Mixed Forest, occurring below the Fall Line (Clark 1971:113). The Moundville chiefdom is located below the Fall Line and is thus situated in the swamp forest complex. Within this complex, at least three distinct environments, each dominated by certain tree species, can be found in the Lower Black Warrior Valley (L.S. Alexander 1982:14). In the poorly drained, low-lying areas of the floodplain, water tolerant tree species are dominant. Trees found in these areas primarily include sweetgum, holly, black tupelo, maple, oak, and beech (C. M. Scarry 1986:100). The more well-drained portions of the floodplain support an assortment of evergreen and deciduous hardwoods, including holly, oak, pine, hickory, beech, maple, and sweetgum (C. M. Scarry 1986:98). The higher, well-drained terrace areas are dominated by oak, pine, and hickory (C. M. Scarry 1986:96). Beyond the alluvial valley margins, in the Fall Line Hills, mixed hardwoods and pine predominate (C. M. Scarry 1986:92). Many of the trees found in the Lower Black Warrior Valley produce edible nuts or fruit, providing a supplemental subsistence source to agricultural products. Additionally, other foods including grains, oil seeds, greens, fleshy fruits, and roots and tubers could be obtained from a variety of other plants in the valley (C. M. Scarry 1986). Faunal populations within the Black Warrior Valley are similar to those found throughout the Southeastern United States. Those of importance to the Mississippi period subsistence system included white-tailed deer, turkey, smaller mammals such as squirrel and rabbit, and a variety of aquatic species.

In summary, the sites included in this thesis are situated within the preceding cultural and physical contexts: the Mississippi period in the Lower Black Warrior Valley. The settlement pattern determinants considered in this thesis, both social and environmental, fit into the above-described cultural and physical contexts, respectively, as well. The next chapter will provide a background to settlement patterns in archaeology in general, as well as in the Mississippi period Southeastern United States and, more specifically, in the Black Warrior Valley, West-Central Alabama.

Chapter 2: Settlement Patterns

> *"In settlement, man inscribes upon the landscape certain modes of his existence. These settlement arrangements relate to the adjustments of man and culture to environment and to the organization of society in the broadest sense."*
>
> G. R. Willey (1956:1)

> *"Of all those aspects of man's prehistory which are available to the archaeologist, perhaps the most profitable for such an understanding are settlement patterns."*
>
> G. R. Willey (1953:1)

Settlement Patterns in Archaeology

Archaeologists have long recognized the importance of the settlement patterns of prehistoric peoples. For example, some form of site plans and survey maps have been drawn, when appropriate, for most of the history of American archaeology. Traditionally, settlement patterns were determined based solely on the spatial relationships between contemporaneous sites. The settlement pattern, especially the number of different site types, of a culture area was used to determine the level of social development of a group of people (Service 1962). According to this system, societies could be labeled as bands, tribes, chiefdoms, or states, based, in large part, on their settlement pattern type. Although this approach works well as a general indicator of social complexity cross-culturally, it fails to consider the importance of environmental factors and variation is often ignored. The interpretation, and not just description, of

settlement patterns as an important aspect of the understanding of a culture area is a more recent phenomenon (Willey 1993:445-446).

Settlement studies in the New World have tended to focus on a wide range of variables. This approach allows for the study of the relationships of prehistoric peoples to their physical environments, as well as sociopolitical relationships between settlements (Vogt 1956:173). According to Vogt (1993:14-20) there are five basic explanatory models of settlement patterns: locational, ecological, elites as "fungal versus functional" in relation to non-elites, symbolic-structural/ideological, and disequilibrium of power and wealth of competing groups. In determining the explanatory model that best fits a settlement pattern, the spatial relationship of sites to one another and to the environment must be considered (Winters 1969).

The first use of settlement patterns as the primary method of studying a culture area was Gordon Willey's (1953) *Prehistoric Settlement Patterns in the Virú Valley, Peru*. This publication provided a basis for most subsequent settlement pattern studies. Willey (1953:1) defines a settlement pattern as "the way in which man disposed himself over the landscape on which he lived." The determining factors of the settlement pattern, according to Willey (1953:1), are the physical environment, the sociocultural environment, and the level of technology of the culture. As were most archaeologists of the time, Willey (1953) was mainly concerned with the ability of settlement patterns, once described in terms of geography and chronology, to provide information on the culture history of an area.

With the rise of the New Archaeology in the 1960s, the concept of settlement patterns in archaeology was revamped to fit into this more scientific, systemic approach

to archaeological research. Although the definition of settlement patterns remained generally unaltered, the perception of their determinants was modified to fit into a processual framework. An example of this shift can be seen in another landmark publication, "The Determinants of Settlement Patterns" (Trigger 1968). According to Trigger (1968:53), the determinants of settlement patterns are "those classes of factors that interact with each other to produce the spatial configuration of a social group." Some of these determinants will tend to reinforce one another, while others conflict with one another. The settlement pattern, then, is a negotiation among conflicting determinants (Trigger 1968:53). By studying these determinants and their interaction, it is possible to understand their relative importance. Trigger (1968:72) calls this concept the hierarchical resolution of conflicting tendencies. Another important concept introduced by Trigger (1968:71) is the principle of functional limitation, which states that, while a variety of settlement solutions may be ecologically possible in a given environment, their manifestation is limited by the perceived social functions of the settlement.

The study of settlement patterns does not only refer to the distribution and location of sites within a region. Settlement patterns can be studied at a number of different scales (Crumley and Marquardt 1990:73). The most widely accepted notion of appropriate scales in settlement pattern studies involves three levels: (a) the individual building or structure, (b) the community layout, and (c) the zonal pattern, or the distribution of communities over the landscape (Trigger 1968:54-55). The latter, also referred to as inter-site settlement patterns, is most compatible with site survey data, and is thus the focus of this thesis.

There is one final aspect of settlement patterns which should be discussed: the concept of the landscape. Landscape, according to Crumley and Marquardt (1990:73), is the "spatial manifestation of the relations between humans and their environment." This definition can be generally equated with Winters's (1969:110) description of settlement patterns as the physical, both geographic and physiographic, relationships among contemporaneous groups of sites. Landscapes are both determined and defined by sociohistorical and physical structures (Crumley and Marquardt 1990:74). Sociohistorical structures refer to a culture's political, legal, and economic systems, while physical structures refer to environmental characteristics beyond human control. The sociohistorical structures, then, are generally equivalent to Winters's (1969:111) *settlement system*, or the functional relationships among contemporaneous settlements of a given culture. The examination of physical structures is essential in studying the cognized environment of prehistoric peoples, which is the basis of any settlement pattern. While the influence of different structures on settlement may conform to Trigger's (1968) concept of a hierarchical resolution of conflicting tendencies, Crumley and Marquardt (1990:74) suggest that these structures may be better described as heterarchical. These elements, then, could be unranked, relative to one another, or ranked in various ways, as a result of systemic requirements (Crumley 1979).

Mississippian Settlement Patterns

The study of settlement patterns of the Mississippi period in the Southeastern United States was, for the most part, focused on multi-mound paramount centers and their related single-mound sites until the 1970s (Smith 1978a:479). With the excavation and publication of the Gypsy Joint site, a Powers phase site in Missouri, the importance

of small, non-mound Mississippian sites began to be recognized (Smith 1978b). It was, and still is, generally accepted that the sites associated with each Mississippian chiefdom were hierarchically organized (J. F. Scarry 1999:70; Smith 1978a; see also Milner and Schroeder 1999). While the settlement patterns of the Mississippi period Southeast are variable, the general model consists of a two- or three-tier settlement hierarchy.

The types of sites that make up these settlement hierarchies vary throughout the Southeast. Typical site types include multi-mound centers, single-mound centers, nucleated villages, and farmsteads. Any given chiefdom may consist of all of these site types or some combination thereof. When first recognized, small, dispersed non-mound sites were generally referred to as farmsteads, or small, agriculturally oriented, single-family sites (Knight and Solis 1983). While the term "farmstead" is still the standard label for such sites, the term may be misleading. As more of these sites are excavated, it is being recognized that the primary function assigned to these sites through the use of the term "farmstead" may be incorrect in some cases. Also, it has been found through subsurface testing that at least some amount of skilled crafting of special goods may have been occurring at some of these sites (Prentice 1985; H. B. Johnson 2001). Additionally, it has recently been suggested that some "farmsteads" functioned as community gathering places (Maxham 2000; Redwine 2002). Thus, sites that appear similar in surface survey often show more functional variability than expected when excavated. For the time being, it seems more appropriate to reserve the term "farmstead" for small sites for which it can be demonstrated through excavation that their function was primarily domestic and agricultural in nature, and to refer to outlying non-mound sites more generally as *rural settlements*. In areas where more excavation data are available for non-mound sites,

multiple site types have been identified (Milner 1984:185-187; Mehrer 1995:112). This may become possible in the Black Warrior Valley as more rural settlements are excavated.

There are three general classes of settlement patterns found throughout the Mississippian world. Since one of the defining characteristics of Mississippian chiefdom-level society is the presence of sites containing one or more platform mounds, these types of sites form an element of each class. Also, some areas are thought to have had additional site types, other than the traditional farmstead. One category of settlement pattern has nucleated centers, or villages which may contain one or more mounds, with very few or no outlying farmsteads. An example of this settlement pattern can be seen in the Dallas phase of the Tennessee Valley (Polhemus 1987). This settlement pattern is believed to be a result of the need for defensible settlements with relatively large populations (Bense 1994:248-251). A second settlement pattern class consists of single-mound centers with farmsteads clustered around them. Cultures conforming to this settlement pattern would be traditionally referred to as simple chiefdoms, since there is only one decision-making level above the local community (Anderson 1994; but see Beck 1997) or one level of chiefly political offices (Steponaitis 1978). This type of pattern can be seen in the Tombigbee Valley (Blitz 1993). The benefit of this type of settlement pattern is that local resources can be efficiently utilized while the settlement cluster is still somewhat defensible (Blitz 1993:22-23). The third settlement pattern class consists of a paramount, multi-mound center surrounded in some fashion by both secondary mound centers and farmsteads. Cultures exhibiting this class of settlement pattern have traditionally been referred to as complex chiefdoms, since there is,

presumably more than one decision-making level above the local community (Anderson 1994; but see Beck 1997) or more than one level of chiefly political offices (Steponaitis 1978). An example of this model can be seen in the American Bottom region, where the Cahokia site is the major ceremonial, or paramount center (Mehrer 1995; Emerson 1997). This type of settlement pattern is ideal for utilization of local resources, but can only be beneficial if there is little or no need for defense.

This thesis is concerned with the latter settlement pattern class, where a multi-mound paramount center, as well as secondary centers and rural settlements are present. It is important to remember that within each of the general classes just outlined, there may be considerable variation, especially in regard to site types. One can theoretically outline at least five possible settlement pattern types within the settlement pattern class of interest in this thesis, based solely on social determinants. Environmental factors would also play a role, however, in determining the location of all sites in these models. The differences in each potential type are based on the manner in which rural settlements are distributed (Table 2).

(1) A first type would have rural settlements clustering tending to only around the paramount center.

(2) In the second type, rural settlements would tend to cluster around the paramount center, as well as around secondary centers.

(3) In the third type, rural settlements would tend to cluster only around secondary centers.

(4) The fourth type would exhibit no apparent spatial relationship between rural settlements and mound sites, with rural settlements

tending to cluster together throughout the valley.

(5) In the fifth type, rural settlements would not be clustered at all, but evenly dispersed, with no apparent spatial relationship to any other site.

In the first three potential types, clustering for social reasons would seem to outweigh any clustering for environmental reasons, while in the latter two, environmental determinants would probably play a bigger role in site location. The fourth type would yield to some social considerations, whereas the last would probably be based entirely on environmental determinants.

Possible Settlement Pattern Type	Proximity to Paramount Center	Proximity to Secondary Center	Proximity to Other Rural Settlements
1	+	-	+
2	+	+	+
3	-	+	+
4	-	-	+
5	-	-	-

Table 2. Possible settlement pattern configurations. Pluses indicate greater importance and minuses indicate lesser importance.

In order to examine the advantages and disadvantages of these potential settlement pattern types, two major assumptions must be made. The first assumption is that, in a chiefdom-level society, some relations must be maintained between elites and non-elites, whether viewed as allegiance or control. These relations can take several forms, especially economic, political, military, and religious. The most efficient way in which to cement a relationship between elites and non-elites is through the possibility of routine interaction between these two groups. Thus, it would be beneficial for both elites

and non-elites to live in close proximity to one another. It should be emphasized that the issue is the *possibility* of direct interaction, not the actuality of such interaction. A second assumption is that both elites and non-elites seek to maximize access to natural resources. These resources include building materials, subsistence items, agriculturally profitable land, as well as raw materials necessary for craft production. Since most of these materials were consumed by all members of the chiefdom, it would be beneficial to both elites and elites to maximize the exploitation of natural resources.

These settlement pattern types form a sort of continuum based on the direct relationship between rural settlements and the paramount center and the ability of the chiefdom as a whole to maximize exploitation of natural resources (Figure 7). With each successive type, the direct relationship between the paramount center and rural settlements decreases. That is, in the first type, with rural settlements tending to cluster around the paramount center, a great deal of direct contact is possible. In the last type, with relatively even dispersal of rural settlements throughout the area, a minimum amount of possible direct interaction is assumed. On the other hand, with each successive settlement pattern type, the potential to maximize the exploitation of natural resources increases. That is, in the first type, since all rural settlements would tend to be clustered around the paramount center, exploitation of natural resources would be limited, with a large population in a relatively small area. In the last type, however, a relatively even dispersal of rural settlements across the valley would allow for the maximum efficient exploitation of natural resources within the area by minimizing transportation costs. The settlement pattern of a culture area, then, would be, at the most basic level, a negotiation between these two goals (Trigger 1968).

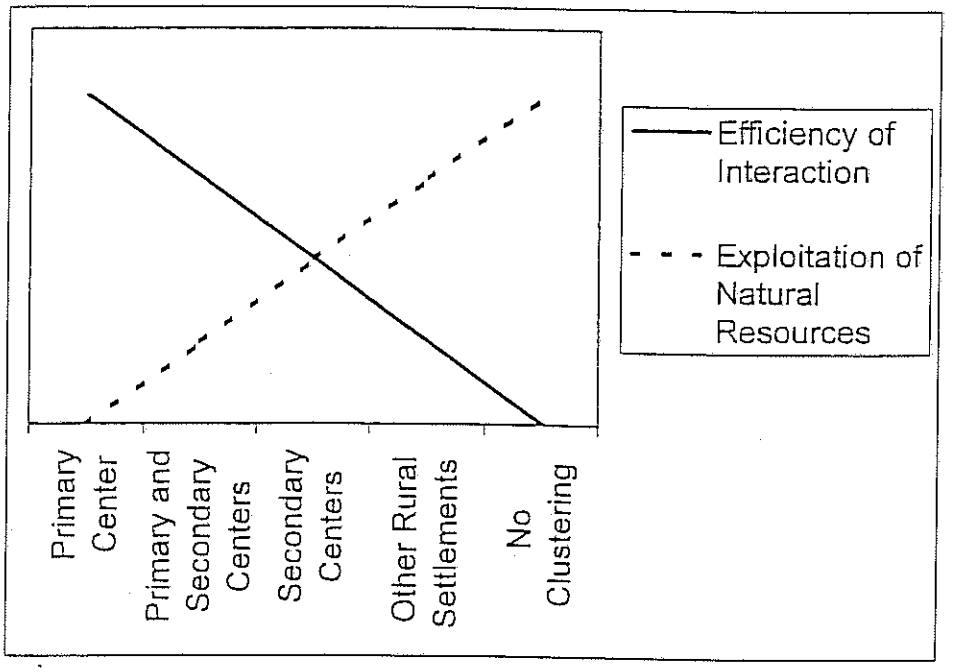

Figure 7. Balancing social interaction and exploitation of natural resources.

These hypothetical models suggest the importance of the location and characteristics of rural settlements in determining the settlement pattern of chiefdoms (Cordell and Milner 1999:110). It has also been suggested that one of the defining characteristics of a "Mississippian population" be based, in part, on certain aspects of the settlement pattern in a given area (Smith 1978a). These aspects, according to Smith, would be the number of different categories of sites in terms of size (rank-size hierarchy), the number of different sites per category (rank-size ratio) and the spatial distribution of settlements within the culture area.

According to the models described above, settlement patterns are based on the relative importance of social relations versus the relative importance of environmentally favorable conditions. Smith (1978a) states that the availability of agriculturally high-quality soils and access to high-protein resources, in addition to close proximity to local

centers were key determinants of the location and distribution of Mississippian rural settlements. Additionally, although not examined in this thesis, the locations of single-mound sites, or local administrative centers, are probably also related to environmental variables, and may actually be partially determined by proximity to large pre-existing groups of rural non-mound settlements. Much more research regarding the distribution of rural settlements, in relation to each other, as well as to other types of sites throughout the Mississippian world is necessary before conclusions can be made about Mississippian settlement patterns in general. This study will add to the growing understanding of settlement patterns of the Mississippi period by providing evidence regarding the importance of environmental and social factors in the location of rural settlements in the Mississippi period Black Warrior Valley.

Moundville Settlement Pattern

With the recognition of the farmstead as the primary economic unit of many Southeastern chiefdom-level societies in the late 1970s, this type of site was added to the picture of the Moundville settlement system (Blitz 1993:99; Smith 1978a:489; Muller 1993:137; Knight and Solis 1983). The first settlement pattern analyses of the Mississippi period Black Warrior Valley were published in the late 1970s (Peebles 1978; Steponaitis 1978). While Steponaitis's (1978) contribution focused on the relationship between outlying single-mound centers and the Moundville site, Peebles's (1978) included non-mound sites. Peebles's (1978: 410-412; see also Peebles 1987) preliminary characterization of the Moundville settlement pattern indicated three categories of site types within the valley: (a) the paramount center (the Moundville site), (b) single-mound centers (n=8), and (c) village/hamlets (n=10). The locations of these sites, he argued,

were based on a combination of environmental and social factors. The environmental factors included proximity and access to arable land and water, raw materials, and fuel and building materials (Peebles 1978:411). The main social factor noted by Peebles (1978:411) was minimal transportation costs between Moundville, the single-mound centers, and villages (see also Steponaitis 1978). Peebles's analysis is flawed, however, since only 10 non-mound Mississippian sites were available for analysis at that time. Such a small sample was misleading, and increased the possibility that the results of the analysis were incorrect. Later, Bozeman (1982) showed that "village" sites were in fact large Late Woodland sites with one or more discrete Mississippian occupations overlying them. Therefore, the rural Mississippian sites were much smaller than originally believed. The village category was thus eliminated, except for those adjacent to mound centers (Bozeman 1982).

The earliest survey work in the Black Warrior Valley was undertaken by C. B. Moore in the early twentieth century. Moore (1905) published his findings, including a map of the sites, mostly mounds, that he encountered in the valley. Although he missed several of the currently known single-mound sites, his observations provided excellent information, especially since some of the mounds he recorded have since been completely destroyed by lateral erosion of the Black Warrior River (see below). The next major work in the river valley, as well as at Moundville proper, was undertaken by the Alabama Museum of Natural History, under the direction of W. B. Jones and D. L. DeJarnette in the 1930s and 1940s. Many non-mound Mississippian sites in the valley, especially those located adjacent to the Black Warrior River, were recorded during this time. It was not until the 1970s, however, that the importance of these sites in

understanding the Mississippi period in the Black Warrior Valley was fully recognized. With this recognition, a series of site surveys, including cultural resource management surveys, have been undertaken in the area. These included the recording of a relatively large number of small Mississippian surface scatters of artifacts (Bozeman 1982; L. S. Alexander 1982; Walthall and Coblentz 1977; see also Hammerstedt 2000). However, most of these projects resulted in a basic descriptive analysis of a relatively small number of sites, accompanied on occasion by conjectures on the settlement pattern of the prehistoric Black Warrior Valley (Welch 1998:138). This type of preliminary characterization was necessary, but is of limited usefulness in determining the complex settlement pattern in question, and in applying the results to our understanding of the Moundville chiefdom.

Black Warrior Valley Survey Project

The University of Alabama Department of Anthropology's Black Warrior Valley Survey was begun in 1999 in order to produce survey data which, when combined with that of previously recorded sites, could be used to more thoroughly describe and analyze the Moundville settlement pattern. Survey areas were chosen with the goal of providing more representative coverage of the different environmental types within the valley walls. This included surveying the more marginal areas within the Black Warrior Valley where few Mississippian sites had previously been recorded. The reason for this was that prior surveys, with the exception of those conducted as cultural resource management projects, were generally opportunistic, focusing in most cases on easily surveyed agricultural fields, which are located for the most part on well-drained soils. This practice resulted in conclusions that rural settlements tended to be located in this specific type of

environment, even though more marginal areas had yet to be investigated (Welch 1998; Hammerstedt and Myer 2001b).

The first season of the Black Warrior Valley Survey, which took place in the summer of 1999, focused on surface collection of plowed fields and resulted in a preliminary analysis of the environmental characteristics of non-mound Mississippian sites in the Black Warrior Valley (Hammerstedt 2000). This season was an unfunded pilot project designed to determine the feasibility of this type of survey and to gain familiarity with the area, as well as its landowners. The second and third seasons of the project were funded by the Alabama Historical Commission. During the second season, the surface collection of plowed fields continued, while shovel testing of marginal environments was begun in order to increase the representativeness of survey coverage (Hammerstedt and Myer 2001b). The third season of the survey focused mainly on shovel testing areas whose coverage was thus far poorly represented. The goal was to increase the survey coverage within each Geofluvial Context (see below) within the survey area to at least 10 percent. The third season also involved a limited amount of surface collection in plowed fields.

The project was designed so as to provide a surveyed sample of a variety of environmental and social conditions. The survey area consists of two three-mile wide transects (Figure 8). Both of these transects consist of the entire alluvial valley to the west of the Black Warrior River and the alluvial valley extending to Highway 69 for the southern transect and to the Great Southern Railroad for the northern transect to the east of the river, beyond which modern disturbance becomes problematic. The placement of the transects over such large areas of the floodplain allowed areas from a variety of

environmental conditions to be tested, including those of varying proximity to the river and those of differing Geofluvial Contexts (see below). Additionally, it was important to test areas in a variety of social conditions. The northern transect contains at least two single-mound Moundville-related sites (but see below): the Poellnitz mound (1Tu278) and the Hill's Gin Landing mound (1Tu46). The southern transect contains the Moundville site and three Moundville-related single-mound sites: the Fosters Landing or Wiggins mound (1Tu42), the Asphalt Plant mound (1Tu50), and the Gray's Landing mound (1Tu41). This allowed for areas of varying proximities to single-mound sites, as well as to the Moundville site to be tested.

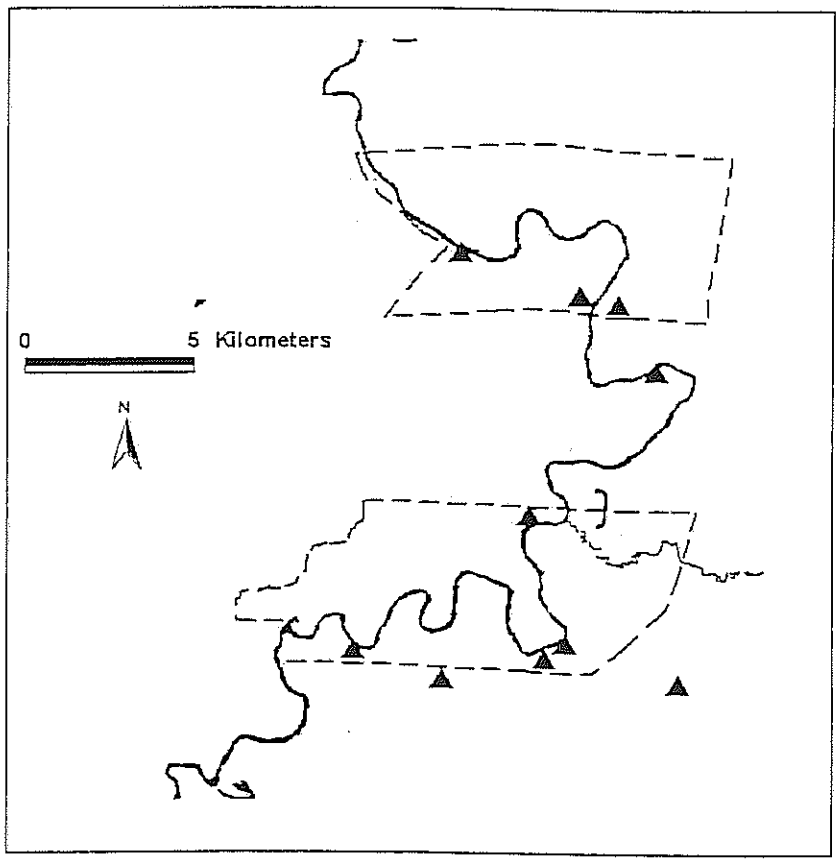

Figure 8. Black Warrior Valley Survey Transects.

The survey methods utilized during the three seasons of the project included surface collection and shovel testing. Of the 24 weeks of the project over three seasons, approximately two-thirds of the time was spent surface collecting while the remaining one-third was spent shovel testing. Plowed fields were surveyed by spacing crew members approximately 5 meters apart. Any artifacts encountered were temporarily marked using pin flags. The distribution of the pin flags was then used to delineate site boundaries. When an archaeological site was encountered, it was recorded on temporary site forms. Site size, universal transverse mercator (UTM) coordinates, and general characteristics were noted and the site's location plotted on 7.5' USGS topographic maps (Coker, Tuscaloosa, Fosters, and Englewood quadrangles). All artifacts from each site were collected and placed in bags labeled with appropriate site information. Alabama State Site File forms were completed and submitted to the site file for each newly recorded site, and updated forms were submitted for previously recorded sites that were revisited during the project.

Areas where surface collection was not possible included pastureland and wooded areas where ground cover prevented artifacts from being seen or where alluvial deposits could possibly overlay archaeological sites. In these environments, shovel tests were placed 25 meters apart, and were at least 40 cm in diameter and up to one meter in depth. All soil excavated from each shovel test was screened using ¼-inch mesh screen. If artifacts were recovered in a shovel test, additional shovel tests were excavated at 5 meter intervals north, south, east, and west from each positive shovel test until a negative test was encountered. Using this method, sites were recorded in the same way as sites discovered by surface collection.

It has been recognized within the past 30 years that traditional, opportunistic survey methods generally do not allow for accurate and reliable analysis beyond basic descriptions (Drennan 1996:80-82). Probabilistic survey, on the other hand, is much more conducive to such analyses (S. Plog 1976; D. A. Alexander 1983). The survey methods utilized in this project do not yield a conventional random sample. The reason for this is that within the survey area, the manner by which land is divided up among landowners does not allow for random sampling. Instead of being divided into land tracts of similar size, land parcels are of widely varying sizes and shapes. Additionally, landowners can generally be classified as vacant, with tenant farmers, and hunting clubs made up of large numbers of members holding land rights. Furthermore, the costs in terms of time and labor of surveying swampy and thickly forested land with no ground surface visibility are dramatically higher than surveying cleared fields or even pastureland. This would also have limited our abilities to incorporate random sampling into the project. The way in which land is divided, the way it is owned, and the differential costs of surveying different types of land make traditional random sampling nearly impossible in the Black Warrior Valley.

During the first two seasons of the project, surface collection was the primary survey method used. Thus, the areas surveyed were limited to those currently in cultivation. An additional limiting factor, as well as a fortuitous one, was our ability to gain permission from landowners and tenant farmers to work on their land. During the third season of the project, we intentionally chose to work in areas that are not generally used for cultivation. Rather, the areas surveyed as part of that season's fieldwork were selected based on environmental characteristics that were underrepresented in the survey

data thus far. This was done by locating areas within the survey transects on which no archaeological survey had taken place and that have environmental characteristics on which few or no rural settlements had been previously recorded.

There are three main Geofluvial Contexts within the project area. The first, which will be labeled Geofluvial Context 1, is located on natural active and relict levees, point bars and low terrace remnants. This type correlates with well-drained, loose sandy loam soils (Table 3). The second setting, Geofluvial Context 2, is found at higher elevations on Pliocene and Pleistocene terrace remnants, which are characterized by dissected, gently rolling topography. This type correlates with moderately well-drained to well-drained sandy loam soils (Table 3). Geofluvial Context 3 includes abandoned channel features, meander scrolls, oxbow margins, backswamps, and first terraces of streams. This type correlates with poorly drained silty soil (Table 3). Since the correlation between geophysical type and soil type is strong, each of the soil types within the survey

Geofluvial Context	Associated Soils Types
1	Cahaba Choccolocco Dundee Ellisville
2	Bama Falkner Iuka-Mantachie Shatta Smithdale Boswell Ruston
3	Adaton

Table 3. Soil types used as proxies for Geofluvial Context.

area was used as a proxy to assign the land within the survey area to one of these three Geofluvial Contexts. These three types served as the sampling strata during the 2001 BWV survey. Because the majority of previous surveys have targeted Geofluvial Context 1, we chose to focus on the Contexts 2 and 3. The goal was to increase the survey coverage in these two settings to approximately 10 percent, as the coverage of Context 1 was approximately 15 percent. Although we were able to increase the coverage of Context 2 to 15.6 percent, Context 3 was only brought to 5.5 percent. The limited amount of surface collection undertaken during the third season of the project brought the surveyed area of Context 1 to 18.3 percent. Three main reasons that the percent of surveyed area in Geofluvial Context 3 remains well below that of Contexts 1 and 2 are that: (a) there is a relatively large amount of land included in this type in the valley, (b) little previous survey has taken place within this Geofluvial Context, and (c) since the soil is so poorly drained, much of this area remains underwater. Because landowner permission was not always granted, it dictated the areas that were surveyed, and thus introduced a fortuitous factor which aided in increasing the representativeness of the sample.

Mississippian sites included in the sample were identified based on the presence of shell-tempered potsherds, considered to be diagnostic of Mississippian ceramic technology. The presence of several decorated Mississippian potsherds allowed a few sites to be dated more specifically within the Moundville ceramic chronology, although this was rare. It should be noted that shell-tempered pottery is common throughout the Mississippi period in the Black Warrior Valley prior to the rise of the Moundville chiefdom, through its height, and past its decline. Also, during the early Mississippi

period, grog-tempered pottery was still being used in addition to shell-tempered pottery (Steponaitis 1983; C. M. Scarry 1995; Knight and Steponaitis 1998). In some cases, the tempers occur together in the same vessels (Steponaitis 1983). Although grog-tempered and mixed shell- and grog-tempered pottery are extremely prevalent at the sites included in this sample, sites with both probably do not all date to the early Moundville I subphase. It is more likely that the frequency of grog-tempered pottery at sites also yielding shell-tempered pottery is the result of a continuity of land usage spanning from the Late Woodland period West Jefferson phase through the Mississippi period Moundville phases. This will be discussed further in Chapter 4.

The site data from the three seasons of the Black Warrior Valley Survey were combined with previously recorded sites. While the Alabama State Site File was useful in determining which sites were within the survey area, many of the site forms on file do not contain detailed information, such as cultural affiliation. For such sites, it was necessary to analyze the collections located at the University of Alabama Office of Archaeological Research's Erskine Ramsey artifact storage facility. While many of the collections from the sites located within the survey area had been previously analyzed by Hammerstedt (2000), he found that collections from 34 sites previously recorded within the survey transects were missing. It was necessary for me to examine unlabeled boxes of artifacts from various surveys in order to locate these missing collections. The total number of sites for which no cultural affiliation is known is now reduced to 19. If collections were found from a previously recorded site, the artifacts were analyzed. Those sites whose collections contained Mississippian artifacts were added to the sample being used for this thesis.

In summary, the study of settlement patterns in archaeology is a useful framework in which to analyze survey data. The determinants of a particular settlement pattern can be generally characterized as being negotiations between multiple conflicting tendencies. This thesis seeks to describe the Mississippi period settlement pattern in the Black Warrior Valley in terms of both social and environmental determinants. The settlement pattern of chiefdom level society should seek to maximize the potential for social interaction between elites and non-elites as well as the potential exploitation of natural resources. Since these are conflicting tendencies, neither can be maximized. They are instead balanced, with the result being the distribution of non-mound rural settlements. In the next chapter, trends in Mississippi period settlement in the Black Warrior Valley will be analyzed in terms of social and environmental determinants.

Chapter 3: Methods and Results

As with any study of intersite settlement patterns, the fundamental unit of analysis in this thesis is the settlement. A settlement is best defined by Sears (1956:45) as "a unit of space which was characterized during some culturally definable period of time by the presence of one or more dwellings or other structures." As discussed above, the settlements of interest in this thesis have traditionally been referred to as farmsteads but are referred to as *rural settlements* for the purposes of this thesis.

The possible locational and distributional determinants of this type of site can be divided into two categories: environmental and social. Environmental determinants that were examined in this thesis include proximity to a major waterway and the Geofluvial Context in which these sites occur. The social determinants examined in this thesis include proximity to the paramount center, proximity to secondary mound centers, and proximity to other rural settlements. The analysis of the importance of these characteristics includes all Mississippian sites recorded within the Black Warrior Valley Survey project area (n=100).

Environmental determinants

Proximity to a Major Waterway

Within the Black Warrior Valley, there are two waterways that were presumably important transportation routes (e.g., are navigable by canoe): the Black Warrior River and Big Sandy Creek (Figure 9). The Black Warrior River meanders within the floodplain of the Black Warrior Valley. Big Sandy Creek empties into the Black Warrior

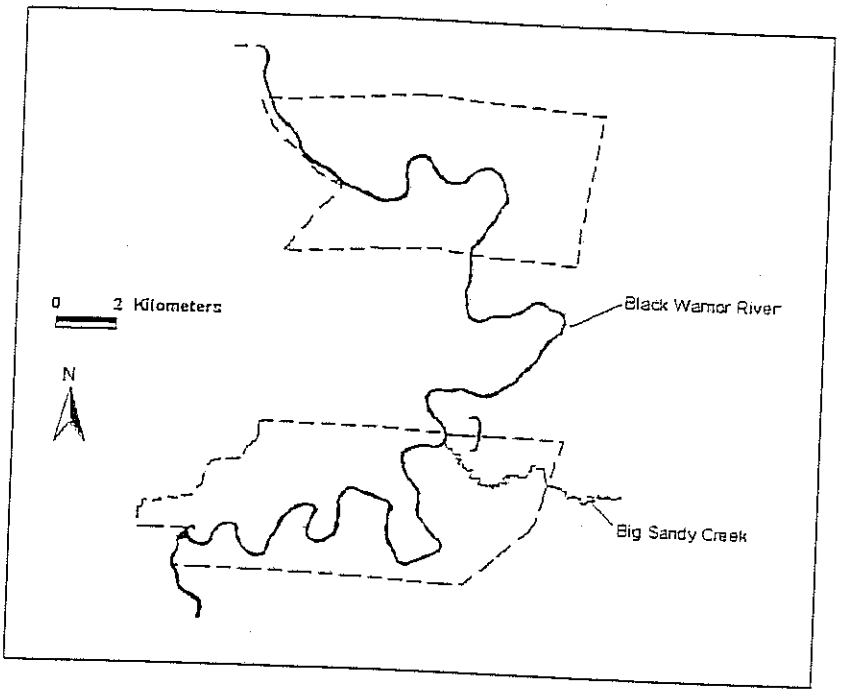

Figure 9. Locations of Black Warrior River and Big Sandy Creek.

River approximately four kilometers north of Moundville. Since these waterways would most likely have been important transportation routes, as well as sources of subsistence goods, water, and raw material to Mississippian people living in the Black Warrior Valley, an analysis of the proximity of rural settlements to them was undertaken.

In determining the importance of proximity to a major waterway in rural settlement location, the amount of archaeologically surveyed area was determined per 500 meter interval from the Black Warrior River and Big Sandy Creek (Figure 10). Hull Lake, a recent oxbow, was included in this analysis since it was part of the main channel of the Black Warrior River during the Mississippi period (Hammerstedt 2000:58; Joo 1990). The number of sites within each 500 meter interval was then ascertained using GIS software and a site density index was computed by dividing the number of sites by the amount of surveyed area for each interval (Table 4). The result was then multiplied

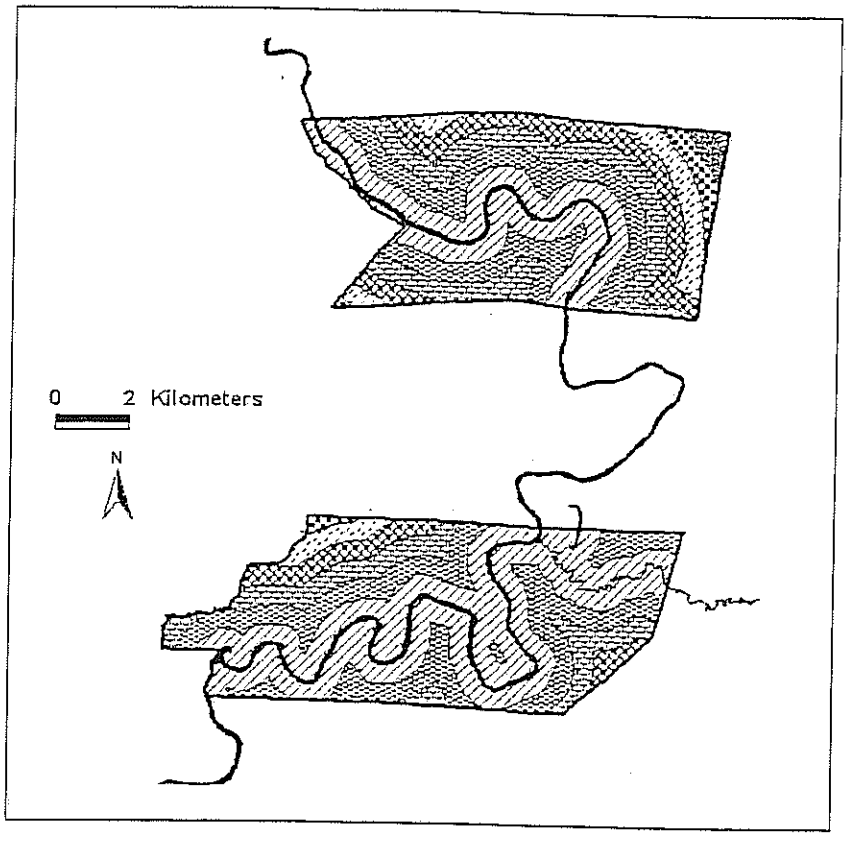

Figure 10. 500 meter intervals from the Black Warrior River and Big Sandy Creek.

by 100 in order to obtain an integer. For example, for the first interval (0 to 500 meters), the number of sites (n=84) was divided by the amount of surveyed area (671.16 hectares) and then multiplied by 100. The site density index, then, for this interval is 12.5. This means that there are .125 sites per surveyed hectare within 500 meters of a major waterway.

This analysis indicates rather dramatically that all Mississippian sites within the survey transects are located within 1,500 meters of either the Black Warrior River or Big Sandy Creek, while no sites are located between 1,500 and 4,000 meters from one of these waterways. Further, the majority of these sites (84 percent) are located within 500

meters of these waterways (Figure 11). Based on these results, a more fine-grained analysis was done using a smaller interval (400 meters) (Table 5; Figure 12). This analysis indicated that sites are located exclusively within 1,200 meters and mostly

Distance to Major Waterway (meters)	Total Area Within Transects (hectares)	Surveyed Area Within Transects (hectares)	Number of Sites Within Transects (n=100)	Site Density (number of sites/surveyed area x100)
0-500	3872.22	671.16	84	12.5
500-1000	2429.29	441.60	13	2.9
1000-1500	1581.53	134.90	3	2.2
1500-2000	1036.86	39.40	0	0
2000-2500	501.14	14.27	0	0
2500-3000	182.24	6.38	0	0
3000-3500	63.43	.1308	0	0
3500-4000	14.25	0	0	0

Table 4. Proximity to a major waterway site density per 500 meter interval.

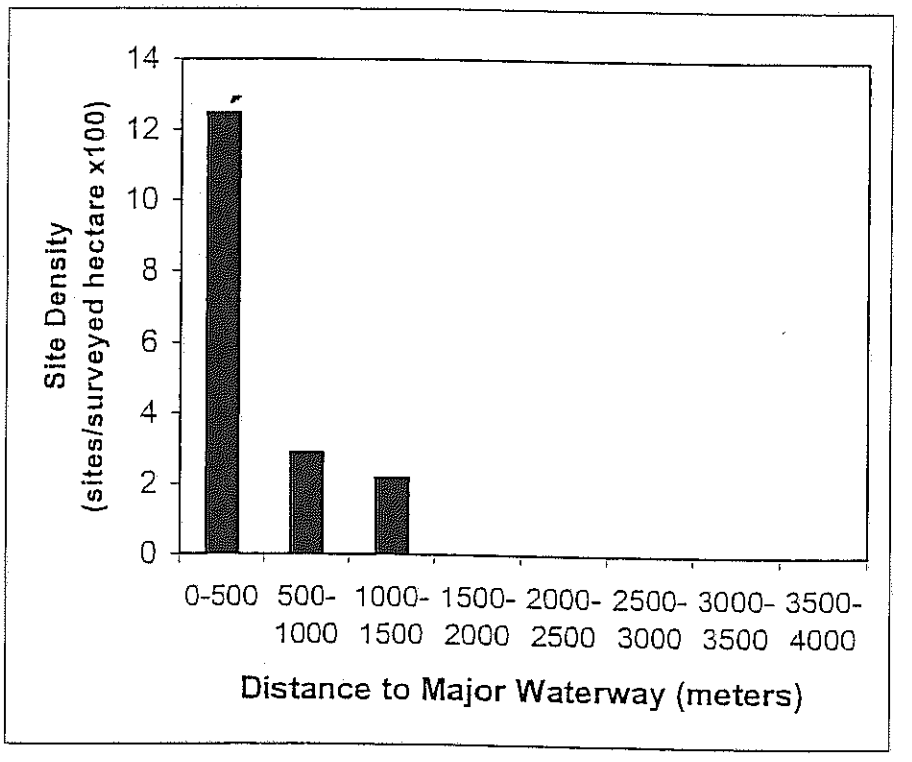

Figure 11. Site density per 500 meter interval from a major waterway.

within 400 meters of these major waterways (Figure 13). This suggests that being within close proximity to either the Black Warrior River or Big Sandy Creek was extremely important in the location of rural settlements.

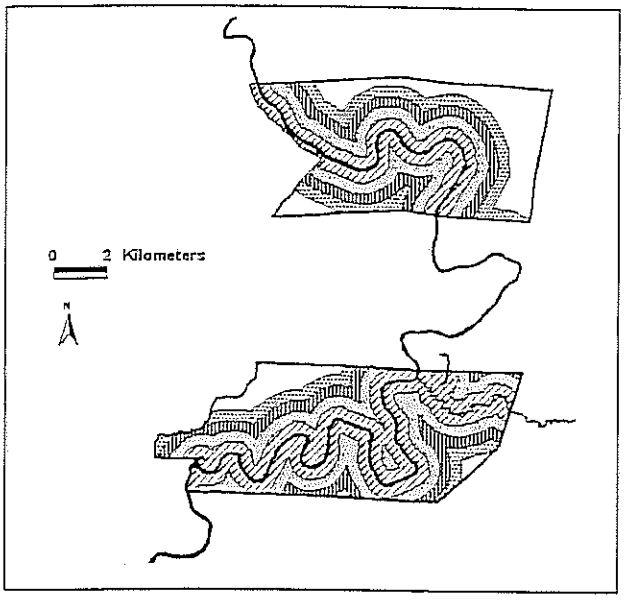

Figure 12. 400 meter intervals from the Black Warrior River and Big Sandy Creek.

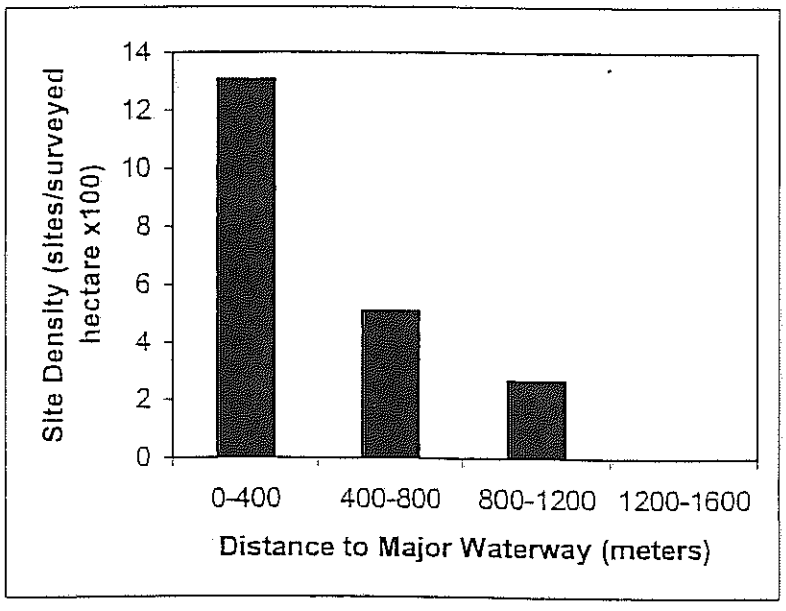

Figure 13. Site density per 400 meter interval from a major waterway.

Distance to Major Waterway (meters)	Total Area Within Transects (hectares)	Surveyed Area Within Transects (hectares)	Number of Sites Within Transects (n=100)	Site Density (number of sites/surveyed area x100)
0-400	3340.86	550.43	72	13.1
400-800	2164.59	450.93	23	5.1
800-1200	1501.78	183.98	5	2.7
1200-1600	1120.87	70.68	0	0

Table 5. Proximity to major waterway site density per 400 meter interval.

Geofluvial Context

In Mississippi period settlement pattern studies, soil type is often thought to be an important determinant of site location since Mississippian subsistence systems relied heavily on produced foods such as maize (Ward 1965; Cottier 1975; Hammerstedt 2000). While certain characteristics of soils were no doubt important to Mississippian farmers, other related environmental characteristics should also be included. Soil types are the result of geomorphological processes, and thus should be understood within their broader Geofluvial Contexts. For example, well-drained sandy loam soils such as those found in Geofluvial Context 1 are best for maize agriculture (Ward 1965; Welch 1998; K. W. Johnson 1981) (Table 3; Figure 14). In the Black Warrior Valley, these types of soils are found on active and relict levees, point bars, and low terrace remnants. Thus, these soils are only located at certain elevations (greater than 115 feet above mean sea level) and are generally in close proximity, if not adjacent to the current channel of the Black Warrior River.

In this analysis, soil type was used as a proxy for general Geofluvial Contexts based on their depositional histories and the suite of characteristics making up these general classes. Within the project area, a total of 20 different soil types as defined by

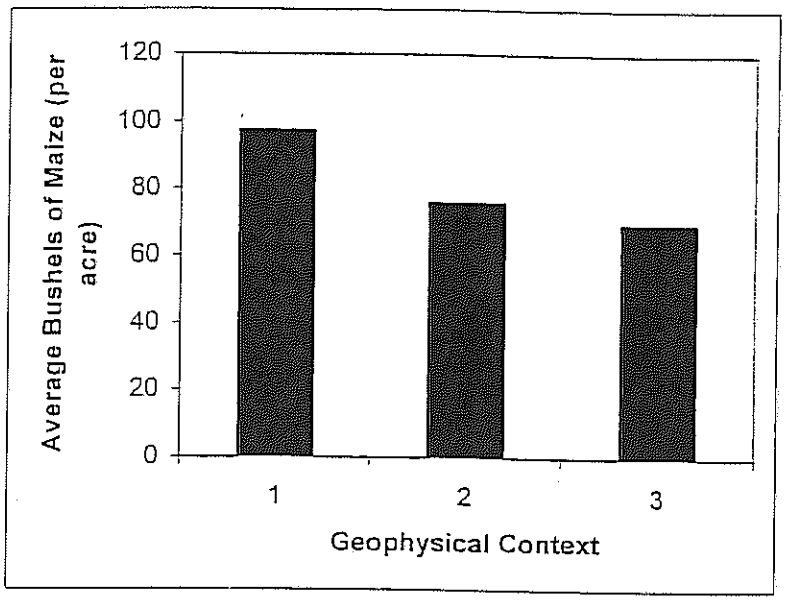

Figure 14. Average maize productivity per Geofluvial Context. Note that productivity is based on modern crop yields (K. W. Johnson 1981).

the Soil Conservation Service (K. W. Johnson 1981) are present. These can be assigned to three Geofluvial Contexts based on their geomorphological characteristics (Table 3; Figure 15). Although these three classes were described in the previous chapter, they will be summarized here. Geofluvial Context 1 is located on Holocene levees, point bars, and low terraces and correlates with well-drained, loose sandy loam soils. Geofluvial Context 2 is located on Pliocene and Pleistocene terrace remnants and correlates with moderately well-drained to well-drained sandy loam soils. Geofluvial Context 3 is filled-in channel features, first terraces of streams, and other swampy areas and correlates with poorly drained silty soils.

In order to assess the importance of Geofluvial Context in Mississippian site location, site density indexes were determined for each context (Figure 16). This was done by determining the total surveyed area in addition to the number of sites within each

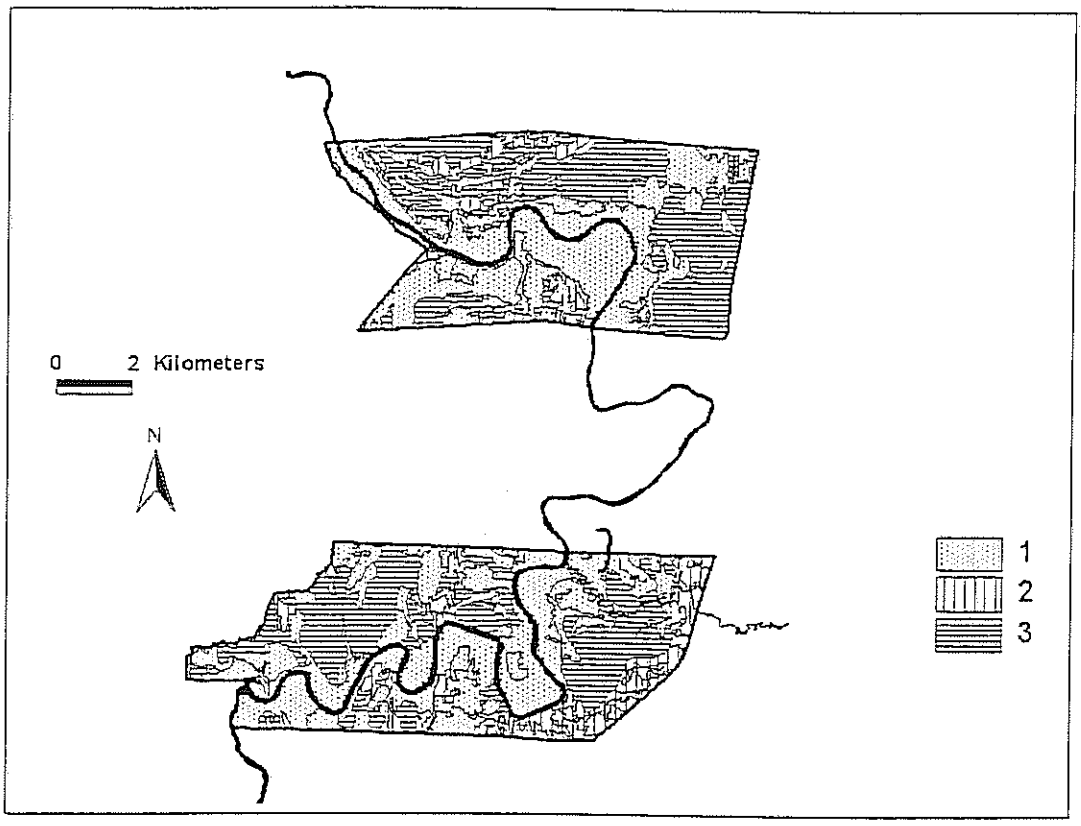

Figure 15. Geofluvial Contexts within the survey transects.

context using GIS software (Table 6). The number of sites was then divided by the number of surveyed hectares. The result was multiplied by 100 to produce an integer.

The results of this analysis indicate a preference for Geofluvial Context 1. This is not surprising since this is the most common Geofluvial Context throughout the valley that is made up of agriculturally profitable soils and is not extremely flood-prone. Geofluvial context 2 also has a relatively high site density, despite the fact that it is not as agriculturally profitable as Context 1. This context rarely, if ever, floods, however, it is generally not located in close proximity to a major waterway. Sites that do occur in this context are generally located in the few areas where a major waterway is within close

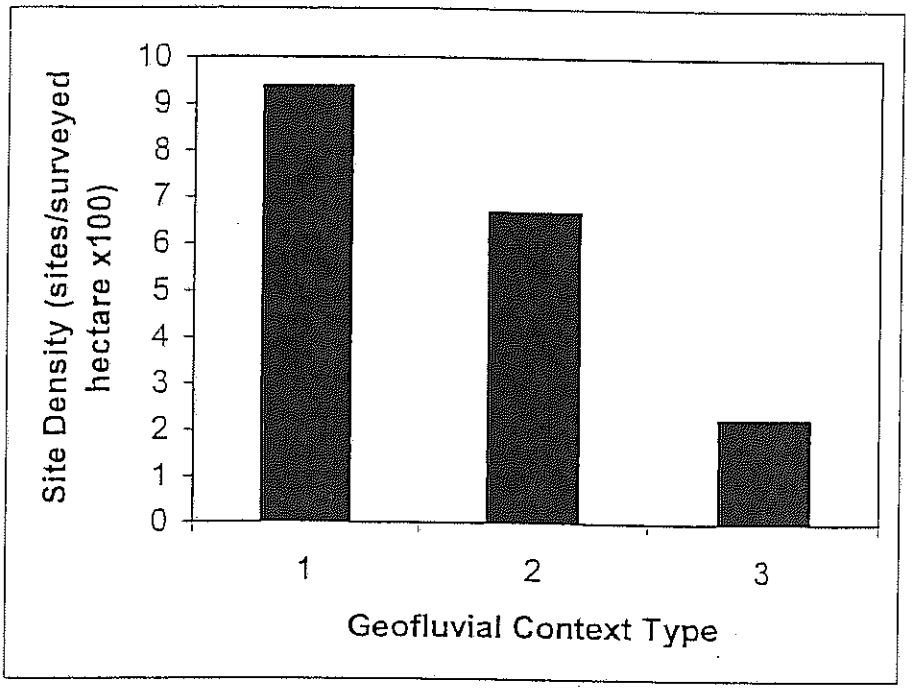

Figure 16. Site density per Geofluvial Context.

Geofluvial Context	Total Area Within Transects (hectares)	Surveyed Area Within Transects (hectares)	Number of Sites Within Transects (n=100)	Site Density Index (number of sites/surveyed area *100)
1	5018.53	918.88	86	9.4
2	964.97	150.28	10	6.7
3	3173.77	175.82	4	2.3

Table 6. Site density per Geofluvial Context.

proximity, such as at the location of the Moundville site itself. Given the relatively small amount of this area available within the valley coupled with the high site density, it is likely that this Geofluvial Context was preferable in some cases to the other, more flood-prone contexts in the valley, so long as a major waterway was immediately accessible. There is, however, a larger site density than would be expected for low-lying, poorly drained areas of Geofluvial Context 3. It should be noted in the interpretation of this

analysis that all four of the sites located within this context are on the boundary with another context. Three possibilities may help to explain this. The first is that some Mississippian people were in fact choosing these flood-prone areas for their settlement locations. Another possibility is that the site locations were transferred incorrectly in the Alabama State Site File. Even being off by a few millimeters on a topographic map can easily put these sites within a different Geofluvial Context. A final possibility is that the soil type boundaries are mapped imprecisely in the Tuscaloosa County Soil Survey (K. W. Johnson 1981). The latter possibility is a very real one since many of the soil type boundaries were determined from aerial photographs based on vegetation and were not ground truthed (Hooks 2001, personal communication). The latter explanation is the most likely one, and could very easily account for all of the sites mapped as being in Geofluvial Context 3.

Social determinants

Proximity to the Paramount Center

The Moundville site is the primary or paramount center of the Moundville chiefdom. Since the paramount chief, and presumably most of the chiefly elite resided at Moundville, it is considered to be the center of the political, economic, and religious systems of the Moundville chiefdom. It seems reasonable to suppose that rural settlements would tend to be located in close proximity to Moundville for a variety of social reasons.

In order to determine the influence of proximity to Moundville on outlying non-mound site location, the surveyed area within four kilometer intervals, as well as the number of sites per interval was determined using GIS software (Figure 17; Table 7).

Site density indexes were calculated by dividing the number of sites by the amount of surveyed area for each interval and then multiplied by 100 in order to produce an integer. These results are unimodal, suggesting that rural sites tended to be located between four and 12 kilometers from Moundville. This, however, may be due to the interval size chosen in this analysis (Figure 18). When the interval is decreased to two kilometers, the result is bimodal (Table 8; Figure 19). The bimodal distribution is probably because the northern and southern survey transects are separated by almost five kilometers and, thus, a large gap exists in surveyed area between six and 10 kilometers of Moundville (Figure

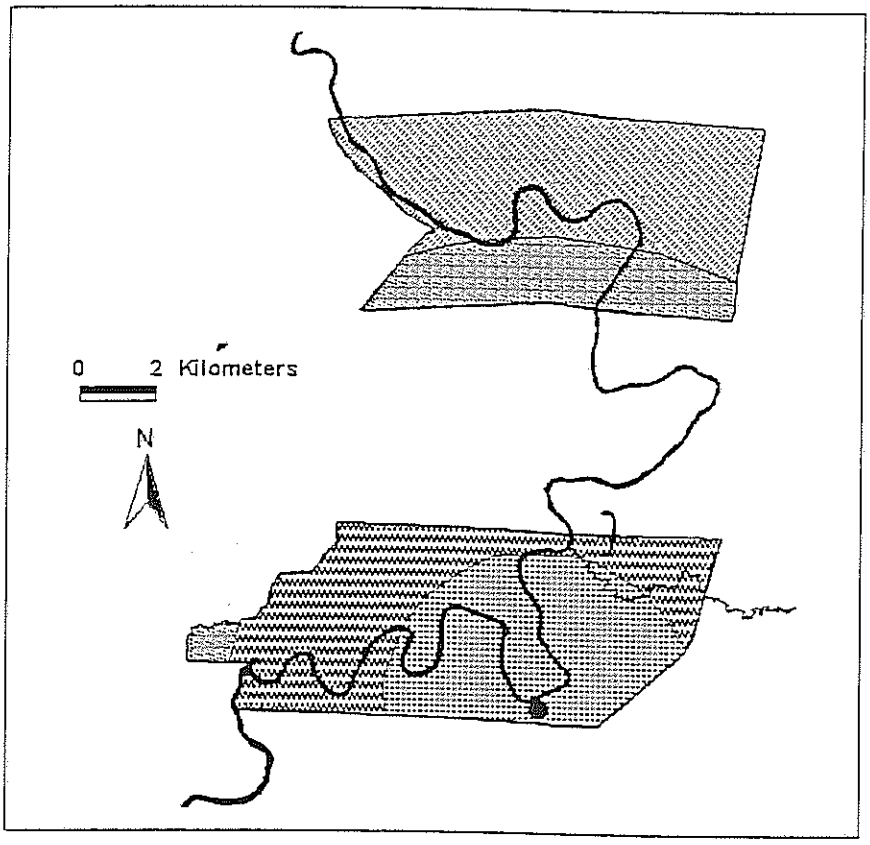

Figure 17. Four kilometer intervals from the Moundville site.

Distance to Moundville (kilometers)	Total Area Within Transects (hectares)	Surveyed Area Within Transects (hectares)	Number of Sites Within Transects (n=100)	Site Density Index (number of sites/surveyed area *100)
0-4	2509.21	517.55	28	5.4
4-8	2514.06	218.62	29	13.3
8-12	1447.38	248.49	26	10.5
12-16	3209.72	320.27	17	5.3

Table 7. Site density per 4 kilometer interval away from Moundville.

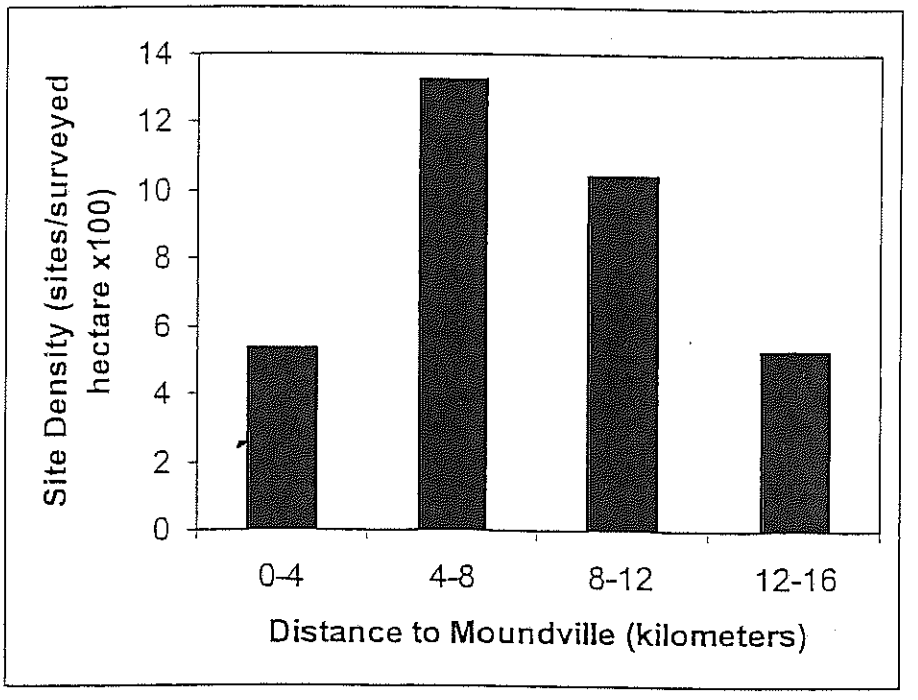

Figure 18. Site density per 4 kilometer interval from the Moundville site.

20). This analysis reinforces the previous one, suggesting that the preferable distance from Moundville is between four and 12 kilometers. Thus, close proximity to Moundville does not appear to be a determinant in rural settlement location, although certain farther distances from the site may be preferred over others. In order to further

demonstrate this tendency, survey data from the area between the Black Warrior Valley Survey transects are needed.

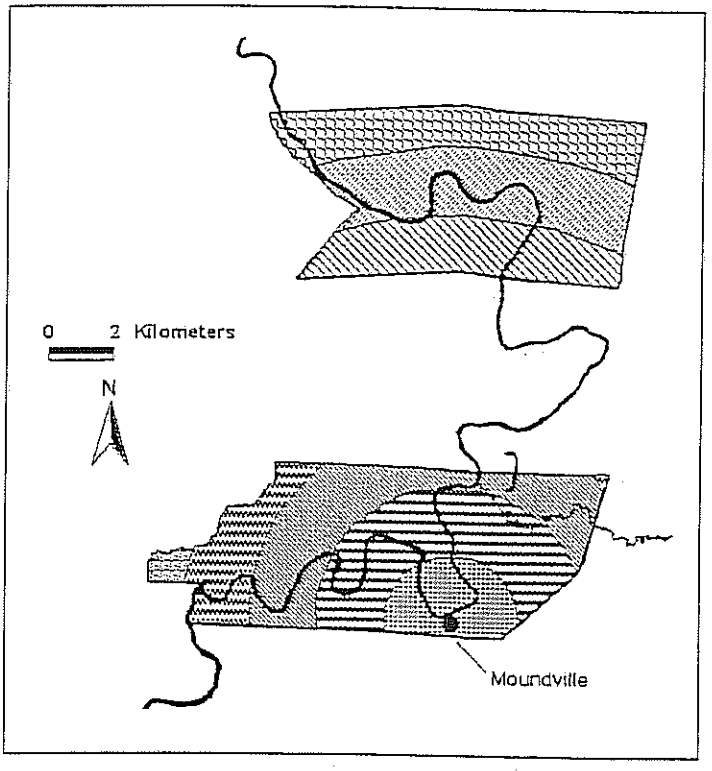

Figure 19. Two kilometer intervals from the Moundville site.

Distance to Moundville (kilometers)	Total Area Within Transects (hectares)	Surveyed Area Within Transects (hectares)	Number of Sites Within Transects (n=100)	Site Density Index (number of sites/surveyed area *100)
0-2	737.04	171.36	6	3.5
2-4	1772.17	346.19	22	6.4
4-6	1762.29	192.52	29	15.1
6-8	751.77	26.10	0	0
8-10	101.76	0	0	0
10-12	1345.62	248.49	26	10.5
12-14	1778.35	178.97	15	8.4
14-16	1431.37	141.30	2	1.4

Table 8. Two kilometer interval distance from Moundville.

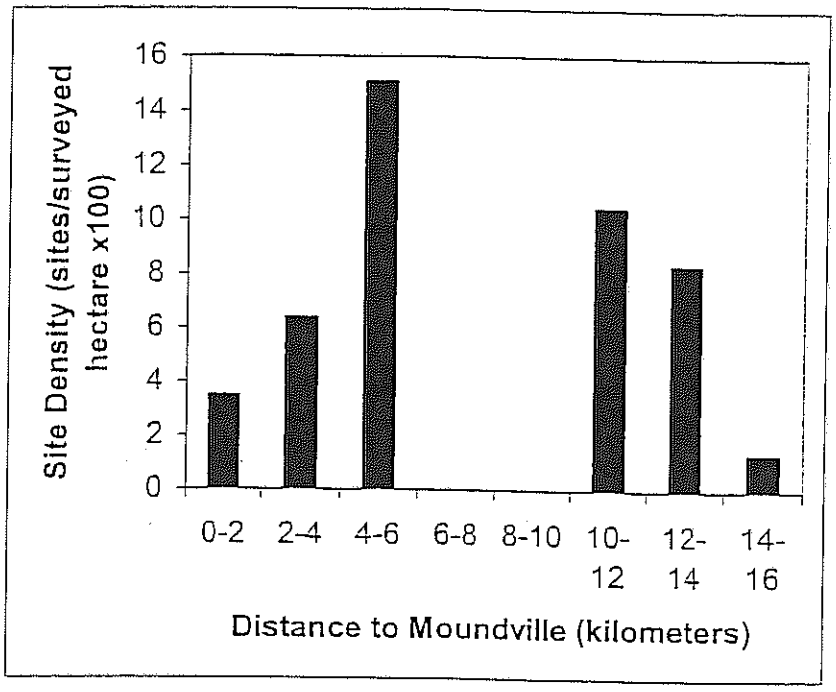

Figure 20. Site density per 2 kilometer interval from the Moundville site.

Proximity to Secondary Centers

In the settlement hierarchy of the Moundville chiefdom, single-mound sites, believed to be outlying administrative centers, occupy the second tier. The exact number of such sites is currently unknown due to factors such as lateral erosion of the Black Warrior River, problems with relocating mound sites recorded early in the twentieth century, and the lack of chronologically diagnostic artifacts from some sites (Welch 1998:148-161). As discussed above, the northern survey transect contains two documented Mississippi period single-mound sites (Hill's Gin Landing mound and Poellnitz mound), while the southern transect contains three such sites (Foster's Landing or Wiggins mound, Asphalt Plant mound, and Gray's Landing mound). The Moundville

site is also included in this analysis since it was a single-mound site during the early Moundville I subphase.

Based on C. B. Moore's (1905) map of the archaeological sites he encountered in the Black Warrior Valley, as well as his descriptions of each site, an additional mound site of unknown age was located within the northern transect. This mound, located below the Foster's Ferry landbridge, is described as being a remnant mound on the riverbank (Figure 21; Moore 1905:22). Although the period and phase designations of this mound are unknown, a good possibility exists that it was part of the Moundville chiefdom since all other mound sites within this part of the Black Warrior Valley date to the Mississippi period. Since the Foster's Ferry landbridge no longer exists, and since the remnant mound has been completely eroded away by the Black Warrior River, Moore's (1905) map, including the remnant mound location, was digitized using other sites of known location as control points. This allowed for the approximate relocation of the mound and its inclusion in this analysis. It will be referred to as the Landbridge mound in the analysis of the influence of proximity to single-mound sites on rural settlement location.

It has just been demonstrated that close proximity to Moundville was of no importance to rural settlement location. However, as discussed in Chapter 2, routine direct interaction between elites and non-elites is a necessity in maintaining a chiefdom-level society. Thus, the influence of proximity to single-mound sites was examined by determining the number of sites, as well as the amount of surveyed area, within one kilometer intervals from single-mound sites using GIS software (Table 9; Figure 22). The number of sites per interval was divided by the amount of surveyed hectares and then

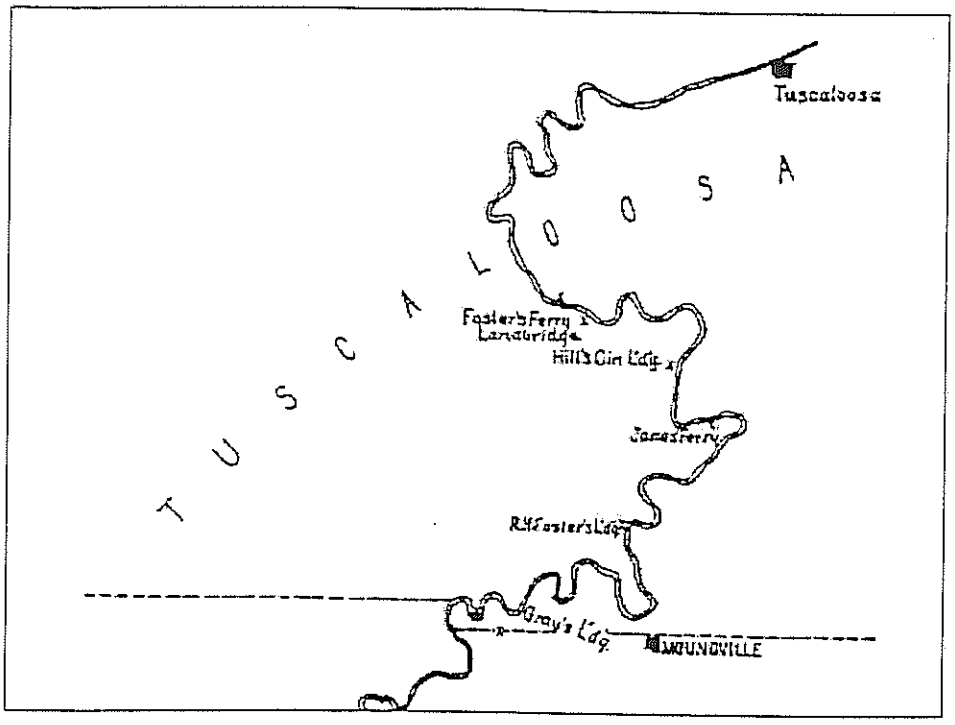

Figure 21. Portion of C. B. Moore's map of sites in the Black Warrior Valley (C. B. Moore 1905: 22).

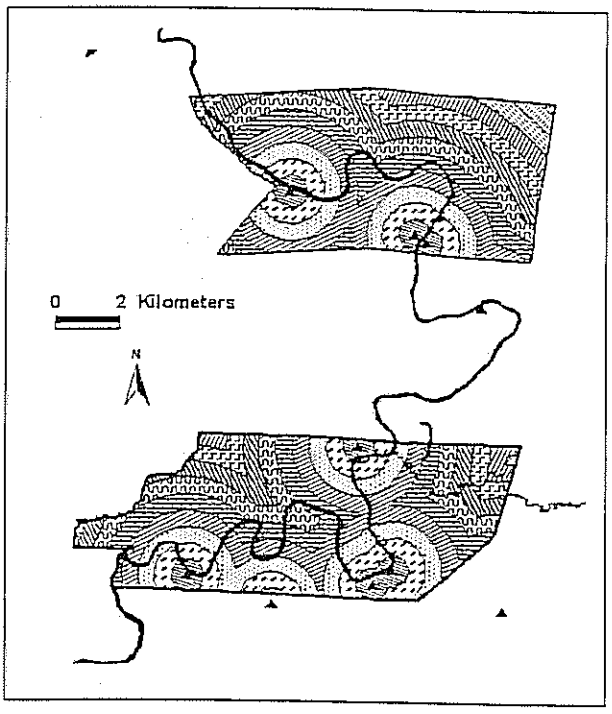

Figure 22. One kilometer intervals from single-mound sites.

multiplied by 100. This produced a site density index for each one kilometer interval away from a single-mound site (Figure 23). Within the survey transects, the furthest distance from a known single-mound site is six kilometers. Thus, there are six intervals to be considered.

Distance to Nearest Single-Mound Site (kilometers)	Total Area Within Transects (hectares)	Surveyed Area Within Transects (hectares)	Number of Sites Within Transects (n=100)	Site Density Index (number of sites/surveyed area *100)
0-1	1503.19	359.82	49	13.62
1-2	3298.62	579.24	28	4.83
2-3	2795.18	257.72	16	6.21
3-4	1536.41	86.79	2	2.30
4-5	497.91	24.74	5	20.21
5-6	62.65	.71	0	0

Table 9. Site density per 1 kilometer interval from nearest single mound site.

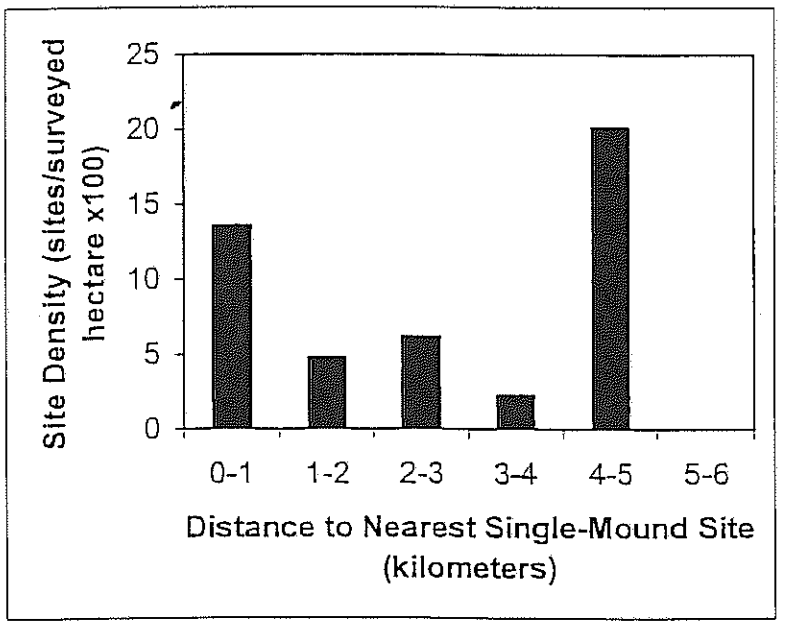

Figure 23. Site density per 1 kilometer interval from the nearest single mound site.

The results of this analysis suggest that, while there is a strong tendency for sites to be located within one kilometer of a single-mound site, there is also a tendency for sites to be located between four and five kilometers of a single-mound site. A possible reason for the high site density within the fifth interval is because only 24.74 hectares (as compared to 359.82 hectares for interval one) have been surveyed in that interval, and thus there may be a sampling bias in effect. It is also notable, however, that all five of the sites in the fifth interval occur within close proximity to each other on terrace lands near Big Sandy Creek (Figure 24). Therefore, this is a small cluster of anomalous sites that are not located within the alluvial floodplain of the Black Warrior River. If the influence of proximity to single-mound sites is determined only for those rural settlements located within the floodplain, a clear unimodal falloff results (Table 10; Figure 25). Overall, it becomes clear that there is a joint effect influencing site location. Within the floodplain, all non-mound sites are located within four kilometers of a single-mound site, with the

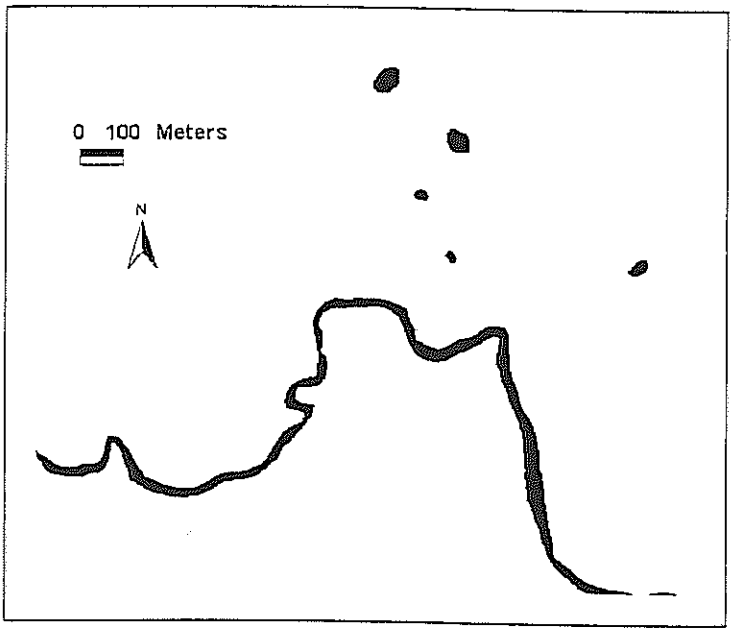

Figure 24. Five sites located further than 4 kilometers from the nearest single-mound site.

majority being within two kilometers (73 percent). However, for sites located on terraces east of the floodplain within Geofluvial Context 2, proximity to single-mound sites apparently was not a locational determinant. There may be additional small clusters of

Distance to Nearest Single-Mound Site (kilometers)	Total Area Within Floodplain in Transects (hectares)	Surveyed Area Within Floodplain in Transects (hectares)	Number of Sites Within Transects (n=100)	Site Density Index (number of sites/surveyed area *100)
0-1	976.98	254.99	45	17.7
1-2	2033.02	445.4	28	6.3
2-3	1281.92	180.91	16	8.8
3-4	487.0	44.19	2	4.5
4-5	203.75	0	0	0
5-6	35.86	0	0	0

Table 10. Site density per 1 kilometer interval from nearest mound site within the floodplain.

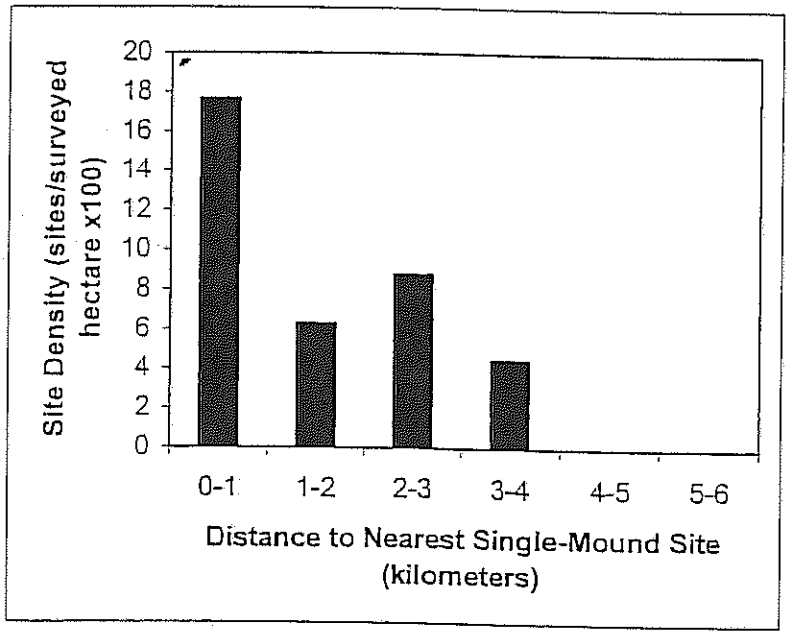

Figure 25. Site density per 1 kilometer interval from nearest single-mound site for sites within the floodplain.

sites on these terraces whose choice of location was governed by other considerations as well.

Proximity to Other Rural Settlements

Because of a lack of broad scale, intensive systematic survey coverage of large tracts in the Black Warrior Valley, this analysis will focus on the largest contiguously-surveyed area within the survey transects. This area is located approximately 26 river kilometers north of Moundville. In this area, a total of 2.5 square kilometers was surveyed during the 2000 and 2001 field seasons of the Black Warrior Valley survey. A total of 28 Mississippian sites were recorded within this area.

Inspection of the area intuitively indicates that there is at least one real cluster of sites, named the Braughton Field cluster, located in the western portion of the surveyed area (Hammerstedt and Myer 2001a and b) (Figure 26). In order to determine statistically if there is a significant difference in the frequency of sites occurring in different portions of the surveyed area, a chi square test was implemented by dividing the tract into four sections of equal area (Pinder, et al. 1979:44) (Figure 27). The resulting sections contained 17, 3, 4, and 5 sites each. The expected number of sites per section was seven. The results of the chi-square test (Chi-Square=19.143, df=3, $p<.005$) indicate that there is indeed a statistically significant difference at the .05 level in the distribution of sites across the area, as predicted.

While the results of the chi-square test show a significant difference in the number of sites per arbitrary section, they do not strictly speaking indicate clustering of sites. In order to do so, k-means, or pure locational clustering analysis was used (Myer 2001). This type of k-means spatial analysis, developed by Kintigh and Ammerman

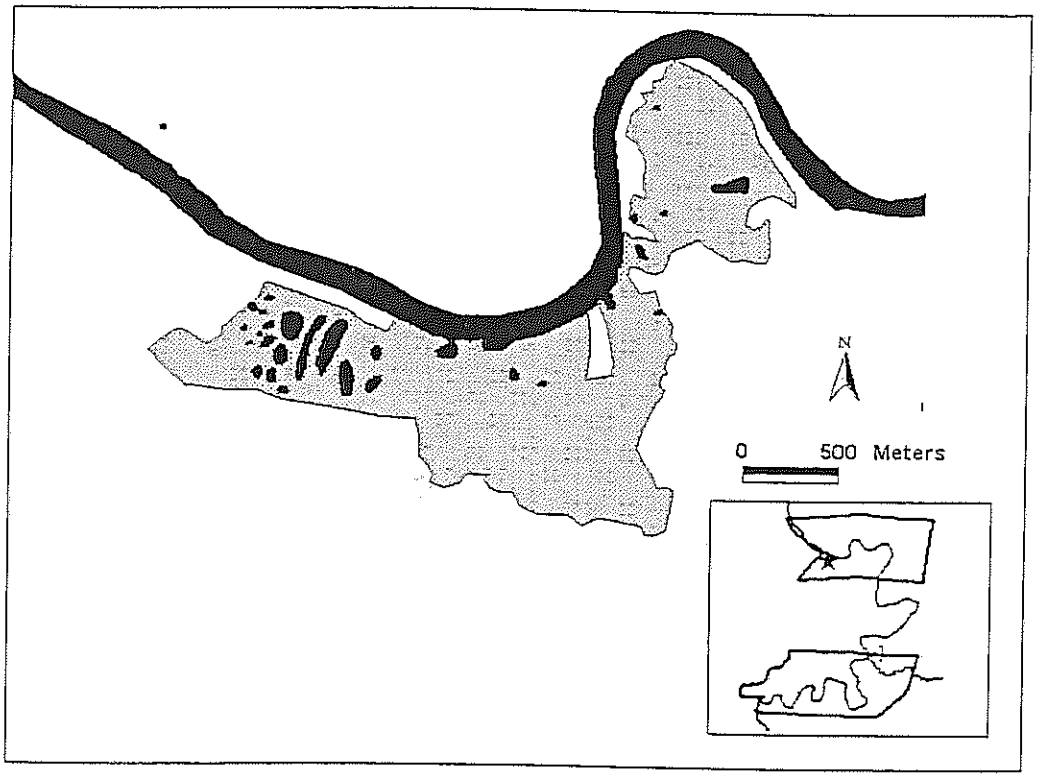

Figure 26. Largest contiguously-surveyed area in survey transects.

(1982), performs non-hierarchical divisive cluster analysis of point distributions. K-means analysis determines the best configuration of the clustering of points by identifying spatial clusters as well as their component parts. Based on a comparison of artificial, randomly generated and observed data, the technique indicates the presence or absence of clustering (Kintigh 1990:184-185). The benefit of using this type of analysis is that it is intended to be heuristic so that the goal of the method is to provide objectively derived configurations of point distributions (Kintigh and Ammerman 1982:34-37). Configurations produced as output from the computer-aided analysis are examined by the analyst to determine which, if any, are intuitively plausible.

The technique places each point, in this case site location, into one of a specified number of clusters in a manner that seeks to minimize a global goodness-of-fit measure.

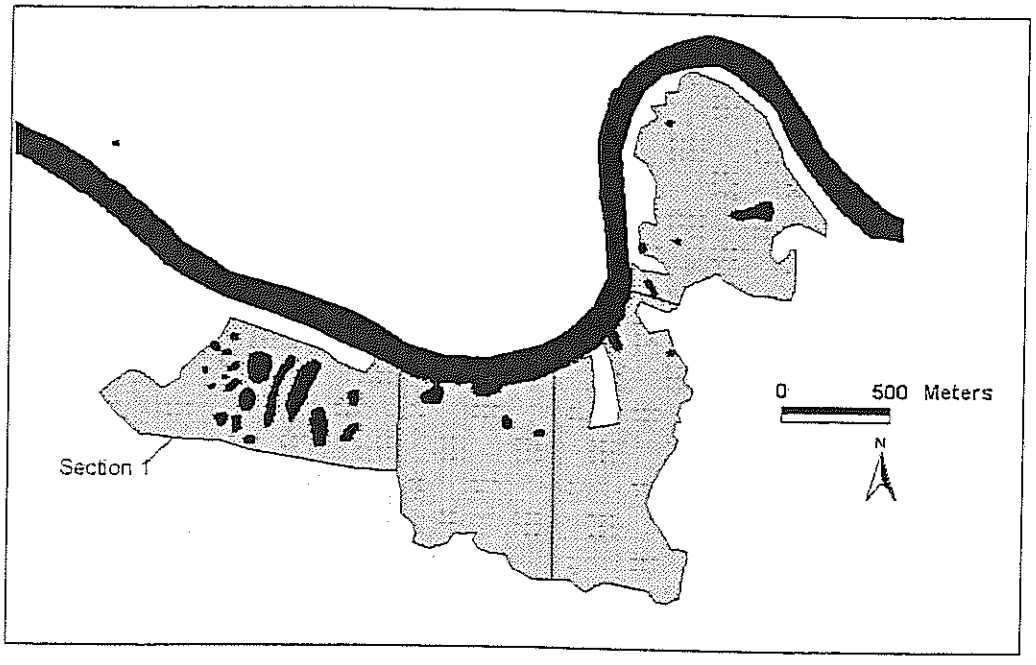

Figure 27. Division of area into four areas of equal size for Chi-Square test.

The measure used is the sum squared error, or SSE, which is the sum of the squared distances from each point to the centroid of its assigned cluster. The centroid is derived by taking the mean of the X coordinates and the mean of the Y coordinates of the points assigned to that cluster. In order to determine if the points are clustered, the plotted percent SSE values of each clustering level for the real data can be compared to those of an equal number of random points. If the percent SSE values of the observed data are smaller than those of the random data, this is a good indication of clustering (Kintigh and Ammerman 1982:45-46). Points of inflection in the plot of the SSE for each number of clusters are used as indicators of the best cluster configurations (Kintigh and Ammerman 1982:44-45).

In this analysis, twelve clusters were requested so as to maximize the number of cluster configurations output by the program. Three groups of random points were

analyzed along with the actual data. Random points were obtained using a random number generator such that all random points fell within the boundaries of the surveyed area. The percent SSE plots of the site data compared to those of the random data indicate that the sites are in fact clustered since the values of the former are less than those of the latter (Figure 28).

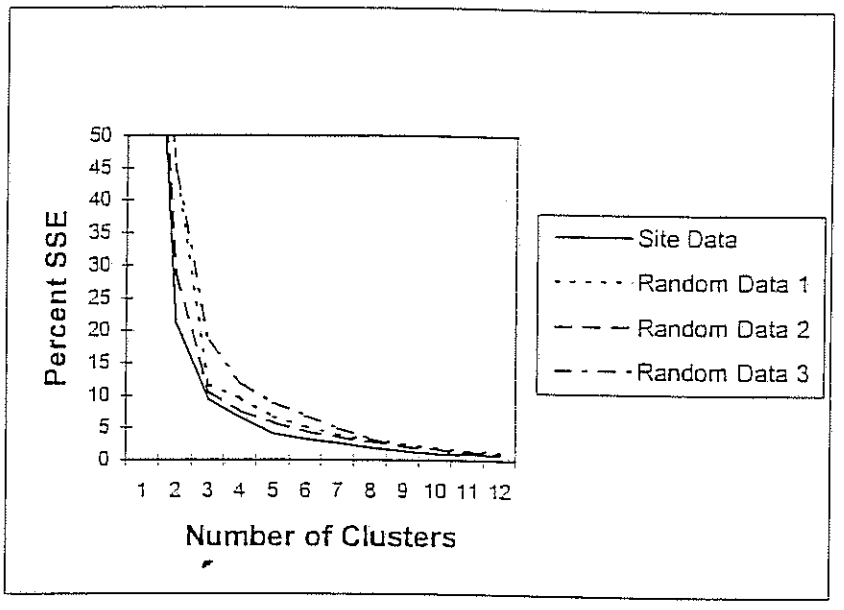

Figure 28. Percent SSE for three sets of random data and site data.

In plotting the percent SSE for each number of clusters, inflection points are most notable at the two and three cluster configurations (Figure 28). These are considered the best cluster configurations to examine for their plausibility. The two-cluster solution (Figure 29) grouped the 18 western-most sites into one cluster and the 10 remaining sites into a second cluster, while the three-cluster solution (Figure 30) grouped the 17 western-most sites into a cluster, the seven eastern-most sites into a cluster, and the remaining four sites, located between the first two, into a residual cluster. Mathematically, the two-

cluster solution is a better one since the difference between its SSE and those of the random data is greater than for the three-cluster solution. However, the three-cluster solution is a more intuitive one (Figures 29 and 30).

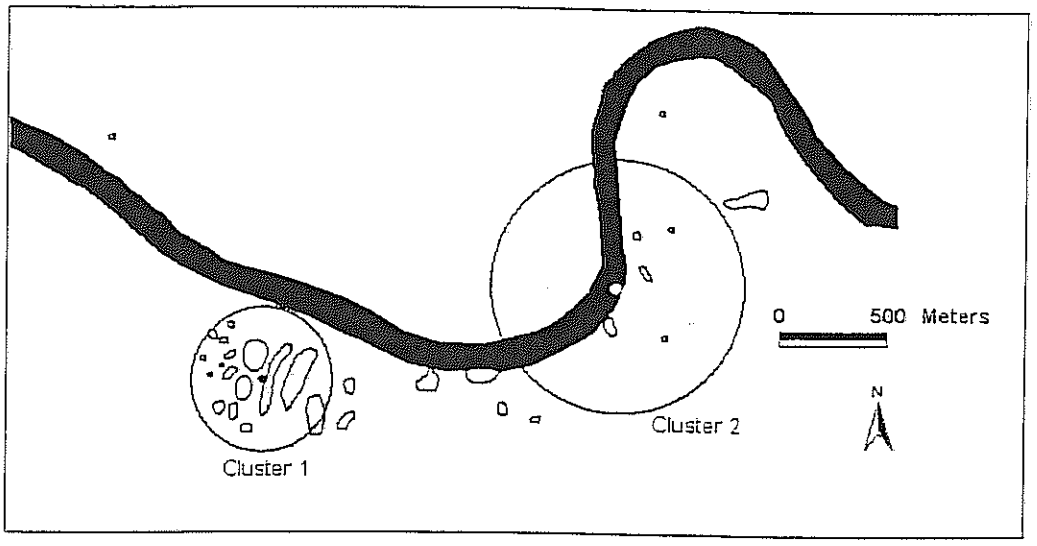

Figure 29. K-means analysis two cluster solution.

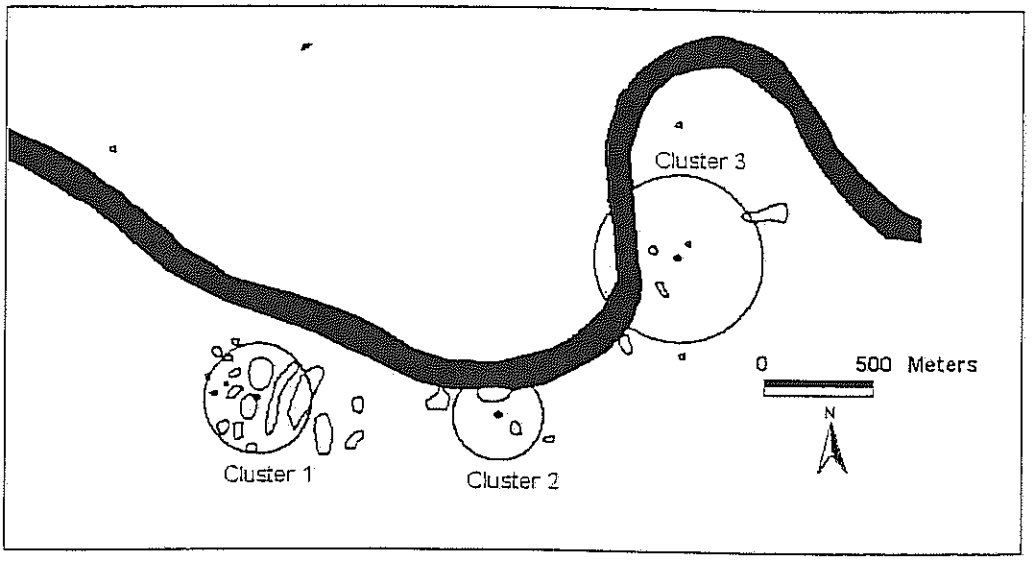

Figure 30. K-means analysis three cluster solution.

In the two-cluster configuration, for example, site 1Tu96 is considered to be a component of Cluster 1, whereas it is actually closer to site 1Tu97, a component of Cluster 2, than any of the sites in Cluster 1 (Figure 31). Additionally, the mean radius of the clusters in the two-cluster configuration is 441 meters from the centroid. In the three-cluster scenario, the mean cluster radius is only 277 meters. This indicates more compact, and by extension, more intuitive clustering.

Remembering that the technique is intended to be heuristic, the plausibility of any clusters produced also needs to be evaluated. First, k-means is incapable of producing a one-cluster solution that does not contain the entire population of sites, yet that is precisely what seems intuitive from inspection of the distribution. Second, since k-means analysis assigns every site to a cluster, no outliers occur. Thus, in a three-cluster solution, clearly there is a difference in the degree of clustering in Cluster 1 relative to the other

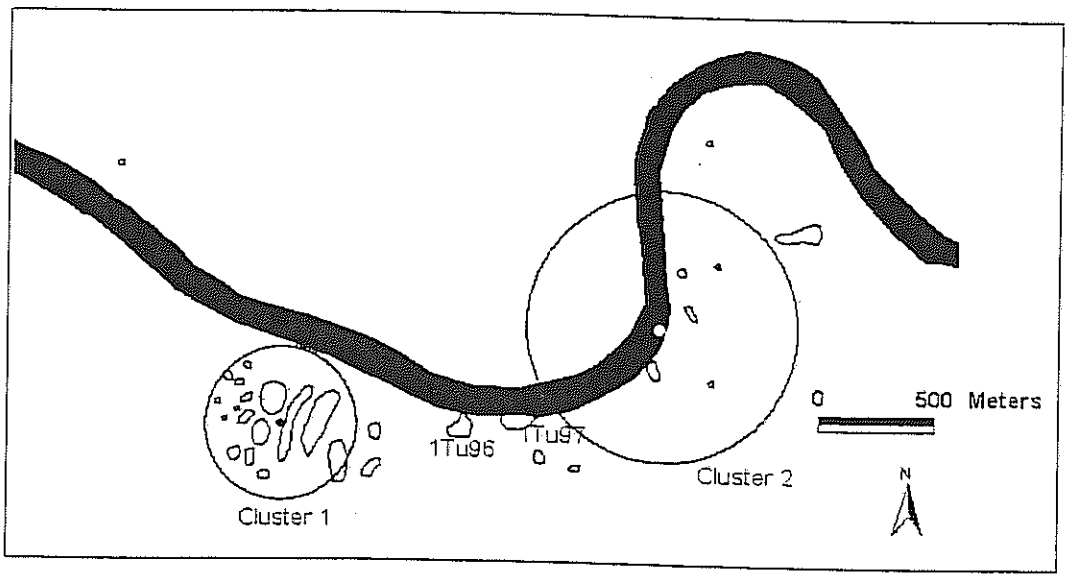

Figure 31. Sites Tu96 and Tu97 and their cluster assignments.

two. It may be helpful here to distinguish between clusters of rural settlements and loose aggregations of such sites. For example, Cluster 2 in the three cluster solution consists of four sites, relatively evenly spaced, in an almost linear fashion. In fact, the coefficient of determination of this cluster, which can be used as an indicator of a linear trend, is .64 showing a somewhat linear configuration (Kintigh and Ammerman 1982:42-43). This may indicate a single household periodically moving along the river, or alternatively four households living side by side along the river. These sites, however, do not seem to be clustering in the same manner as those in Cluster 1. Cluster 3, whose coefficient of determination of .17, indicating no linear trend, may be a result of clustering for local environmental reasons since these sites are located together on a point bar. However, both of these groups of sites produced by k-means analysis do not pass the test of plausibility and thus are suspect as actual clusters in contrast to Cluster 1.

Another measure of the degree of clustering within these sites which may be a more accurate indicator of actual clustering is the mean nearest neighbor distance within each cluster relative to that of the other clusters, without taking into account the expected mean nearest neighbor distance, as in formal Nearest Neighbor Analysis. The mean distances between first nearest neighbors in Clusters 2 and 3 are 189 meters and 284 meters, respectively, while for Cluster 1 it is 91 meters. Cluster 1, then, is a far more compact cluster of sites than the groups of sites within Clusters 2 and 3.

As seen previously, Mississippian rural settlements strongly tend to be located within 400 meters of a major waterway. All of the sites in Clusters 2 and 3 are located within 300 meters of the main channel of the Black Warrior River. The sites in Cluster 1, however, are located as far as 700 meters from the river. Also, for all the sites in Clusters

2 and 3, the shortest distance between each site and the Black Warrior River does not intersect any other site. This is not true for the sites in Cluster 1. These observations combined suggest that the occupants of the sites in Cluster 1 chose to live in close proximity to other households, even though that meant that some would have to be farther away from the river. Others, such as those in Clusters 2 and 3, may have chosen to live closer to the river instead of in a dense cluster of other sites.

The importance of proximity to single-mound sites as demonstrated above can also be seen with regard to Cluster 1. The digitally reconstructed location of the Landbridge mound is just 80 meters northeast of the northwesternmost site included in Cluster 1. Assuming that the mound and the sites within this cluster are contemporaneous, there is an obvious locational relationship between the cluster of rural settlements and the single-mound site.

The foregoing analysis is a quantitative method for demonstrating clustering of points, or, in this case, sites. In order for such an analysis to be accurate, however, a relatively large area must have been contiguously surveyed. Other than the area analyzed above, there are no other tracts within the survey transects that can be said to meet this requirement. It is possible though, based solely on a visual inspection of the distribution of Mississippian rural settlements within the survey transects, that other clusters of sites are present (Figure 32). Three such potential site clusters occur in close proximity to single-mound sites: Foster's Landing or Wiggins mound (Figure 33), Gray's Landing mound (Figure 34), and Hill's Gin Landing mound (Figure 35). If valid, these three can be considered mound-based clusters. A fourth potential cluster is located in Geofluvial Context 2 on a Pleistocene terrace east of the floodplain and can be considered a non-

mound based cluster. A fifth cluster, located on the opposite side of the river two river kilometers upstream from the Gray's Landing mound, is within Geofluvial Context 1 and

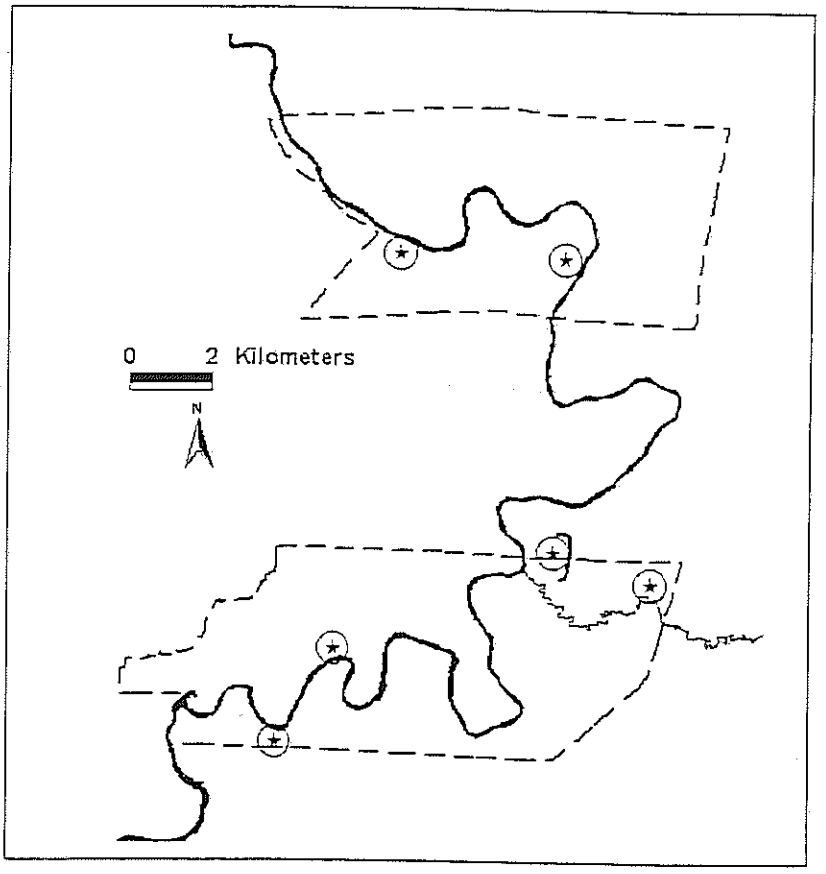

Figure 32. Potential site clusters within the survey transects (includes the Braughton Field or Landbridge mound cluster).

is adjacent to the Black Warrior River. If this cluster proves not to be related to the Grays Landing mound, which is the nearest single-mound site, this could potentially be a non-mound based floodplain cluster. If, on the other hand, this cluster is related to the Grays Landing mound, Gray's Landing would have been central to two distinct clusters of rural settlements. Any other site clusters that may exist within the transects, whether mound-based or not, have yet to be recorded. It is important, however, to note that of the 100

Mississippi period sites within the survey transects, only three are located more than one kilometer from their nearest recorded neighbor. The average distance between recorded sites of this type is only 259.15 meters. It should be recognized, however, that only approximately 15 percent of the survey transects have been surveyed in highly discontinuous tracts. The mean distance I have reported between rural settlements should therefore not be judged as accurate. It does suggest, however, that Mississippian people living in non-mound rural settlements in the Black Warrior Valley deliberately chose to live in close proximity to other such settlements, aside from environmental considerations, producing decidedly clustered distributions on the landscape.

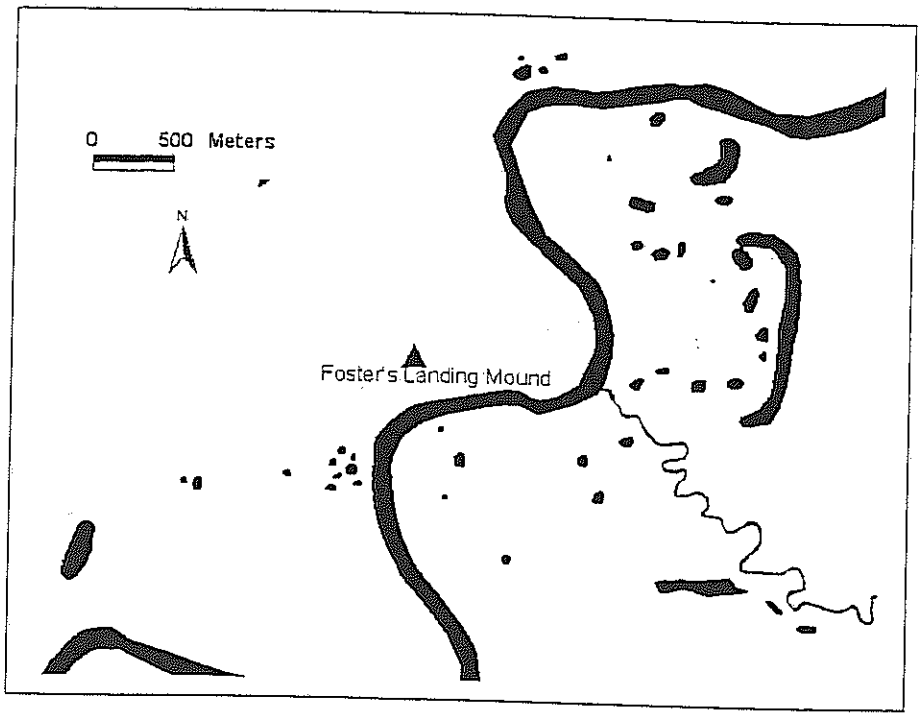

Figure 33. The Foster's Landing mound cluster.

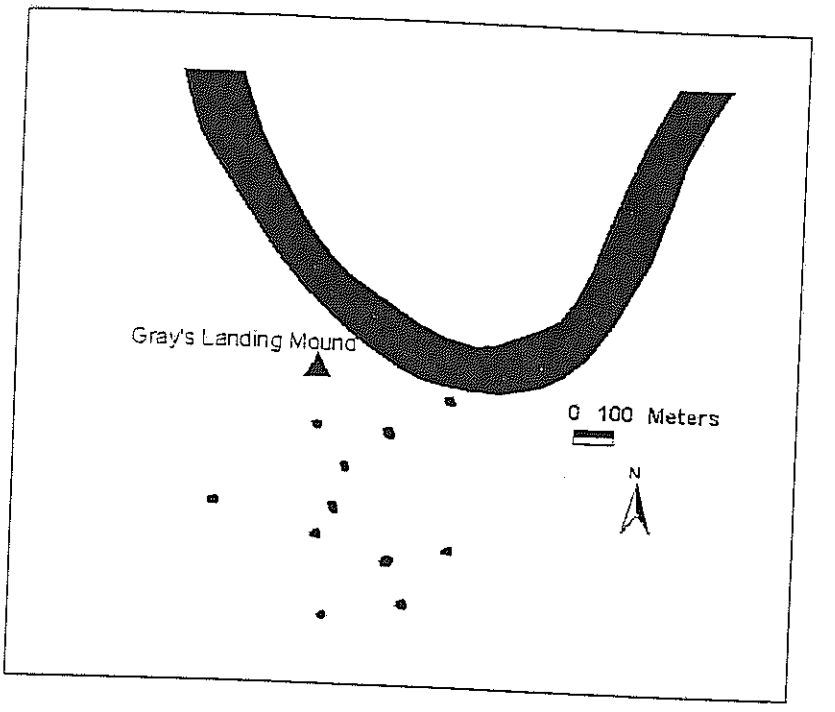

Figure 34. The Gray's Landing mound cluster.

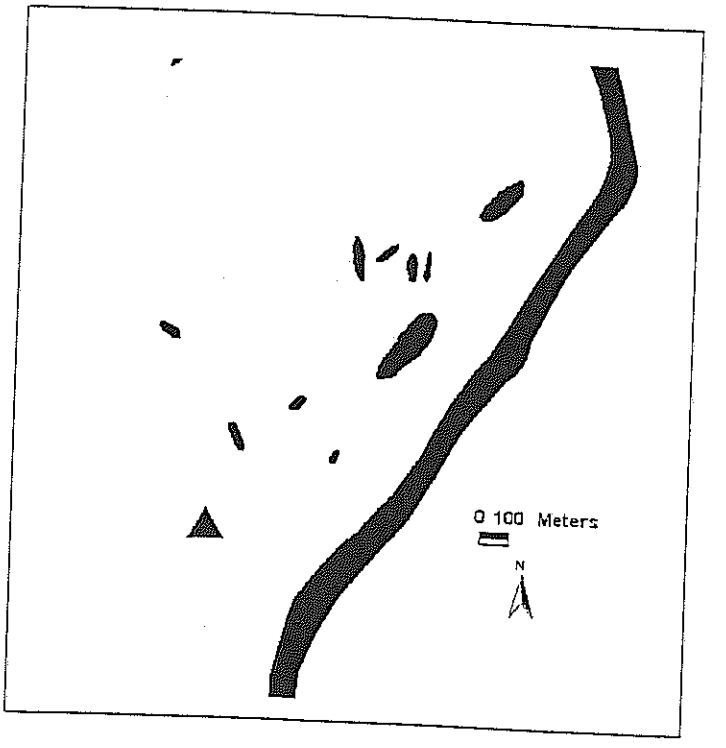

Figure 35. Hill's Gin Landing mound cluster.

Chapter 4: Conclusions and Recommendations

The results of this research suggest that the distribution of rural settlements in the Mississippi period Black Warrior Valley was influenced by proximity to a major waterway, Geofluvial Context, proximity to single-mound sites, and proximity to other rural settlements. While the influence of close proximity to the Moundville site appears to be unimportant in rural site location, distance to Moundville may nonetheless be a locational influence. While the determinants analyzed in this thesis appear to be of great importance in rural settlement location, additional unexamined or unknown determinants (i.e., resource availability, proximity to non-riverine transportation routes, etc.) may also have been influential.

The Black Warrior River and Big Sandy Creek are the major waterways navigable by canoe found in this section of the Black Warrior Valley. Rural settlements in the study area are always located within 1,200 meters of one of these waterways. More specifically, the majority of the sites in this sample (72 percent), are located within 400 meters of the Black Warrior River or Big Sandy Creek. In considering possible explanations for this preference, the function of these waterways in the lives of Mississippian people must be considered. Three obvious functions of these waterways are as transportation/communication routes, subsistence resources, and raw material sources. The Black Warrior River and Big Sandy Creek would have been important transportation routes to other Mississippian sites throughout the valley since both are easily navigable by canoe. If we can assume that the Black Warrior River and Big Sandy

Creek were the main transportation routes within the Moundville chiefdom, or even earlier, the location of sites, both mound and non-mound, near one of these waterways would have been very important in terms of communication routes between hinterland sites and the paramount center. If, as according to Steponaitis:

> Complex chiefdoms are usually organized according to a principle wherein a higher-ranking chief has control over a number of lower-ranking chiefs, each of whom, in turn, directly controls a certain territorial district or social unit (Steponaitis 1978:420)

then the paramount's control over lesser chiefs could be maintained via a major waterway. Also, if the secondary centers in the valley are in fact central to more than one cluster of non-mound sites (see above), the lesser-chiefs' control over these clusters could also be maintained through contact via a major waterway. The importance of a major waterway for transportation/communication in the Moundville chiefdom is also indicated when Mississippian site locations are compared to those of the Late Woodland period. Between Late Woodland and Mississippian times, sites were increasingly located closer to the Black Warrior River (Hammerstedt 2000:52). This suggests that the river became more important as political complexity increased in the Black Warrior Valley, presumably as an efficient transportation route between sites. In terms of subsistence resources, these waterways contained a variety of faunal species exploited as foodstuffs. Additionally, non-riverine fauna would also have used the river as a subsistence resource, providing easy access of such fauna to people inhabiting rural settlements. Aquatic resources, however, are also available away from a major waterway, in oxbows and backswamps. This suggests that the explanatory value of the importance of these waterways as subsistence resources is relatively low. Finally, these waterways would

have been sources of raw materials, especially for lithic technology as a chert source and ceramic technology as a clay and shell source. These materials, like subsistence materials, are also available away from these waterways, however. This explanation, then, has a low explanatory value as well. It should be pointed out that Pottsville sandstone is the most common unmodified stone found through surface collection at many of these rural settlements. Since this sandstone is only available north of the Fall Line along the Black Warrior River, it was most probably transported via boat. Although this was probably not the main reason for the location of rural settlements in close proximity to a major waterway, it does suggest that easy access to these waterways would have allowed for a more efficient transfer of non-local material than if these sites were located much further away from a major waterway.

Geofluvial Context was also an important determinant of rural settlement location. A clear preference for Geofluvial Context 1, or Holocene levees, point bars, and low terraces consisting of well-drained, loose sandy loam soils, was indicated in this analysis. The reasons for this preference are probably most closely related to agriculture and susceptibility to flooding. As an important contributor to caloric intake, maize agriculture was an important subsistence activity in the Mississippi period. This would have required that maize production be dependable. The soil types and relative elevations associated with Geofluvial Context 1 are very well-suited to this goal, since they are well-drained loamy soils which are not extremely susceptible to flooding. This Geofluvial Context generally occurs within close proximity to a major waterway. There are, however, several parts of the Black Warrior Valley in which this Geofluvial Context is located at a fair distance from a major waterway. Yet, as seen above, rural

Mississippian settlements do not occur farther than 1,200 meters from a major waterway. Although not quantifiably demonstrated in this study, the influence of proximity to a major waterway and Geofluvial Context seem to contribute more or less equally to the location of rural settlements. Geofluvial Context 2, or Pliocene and Pleistocene terrace remnants featuring moderately well-drained to well-drained sandy loam soils, also have a relatively high site density. The major difference between this and Context 1 is that Context 2 has slightly lower soil productivity and a lesser susceptibility to flooding. Since Context 2 is made up of Pleistocene and Pliocene terrace remnants, flooding is extremely rare. This context within the survey transects occurs mostly on the eastern edge of the southern transect, and thus makes up only a minor percentage of the entire survey area (10.5 percent). Also, this context is, for the most part, located near the valley walls away from the Black Warrior River. In only one area does the river abut this Geofluvial Context. The Moundville site is located in this area. Thus, Geofluvial Context 2 was possibly as desirable in terms of drainage and soil productivity as Geofluvial Context 1, yet since it is mostly located far from a major waterway, few sites are actually located there. Geofluvial Context 3, or filled-in channel features, first terraces of streams, and other swampy areas consisting of poorly drained silty soil, has a very low site density, and was not preferable in terms of site location.

Clustering of rural settlements has been suggested, but not statistically demonstrated previously (Hammerstedt 2000; Hammerstedt and Myer 2001a). Unfortunately, the influence of proximity to other rural settlements could only be statistically demonstrated in one portion of the survey transects due to a lack of other large, contiguously surveyed areas. However, based on an informal examination of site

locations, it seems that there are at least five additional clusters of sites within the survey transects, bringing the total number of plausible clusters to six. While four of these site clusters are located adjacent to an outlying mound center, the other two are not. Reasons for the clustering of rural settlements are currently speculative at best, since no more than one site from any cluster has been subjected to subsurface testing.

The sites within a cluster would have belonged to the same self-identified community, with all the social obligations that are entailed in belonging to a community, including, but clearly not limited to, economic and religious obligations. A community can be defined as "the maximal group of persons who normally reside together in face-to-face association" (Murdock 1949:79). Based on ethnohistoric sources, many Southeastern Indians lived in neighborhoods or communities of dispersed settlements, with the individual settlements being separated by their agricultural fields (Swanton 1946:630). If single-mound sites are central to these communities, then there would have been only one decision-making level, located at the paramount center, above the local community. If, however, there are additional, non-mound based clusters that were subject to secondary centers, there would have been two decision-making levels above local communities, at both the secondary mound clusters and at the Moundville site. According to Anderson's (1994) method of distinguishing between simple and complex forms, the former situation would make the Moundville chiefdom a simple chiefdom, while the latter would make it a complex one. Either way, as has already been discussed, classifying chiefdoms as simple or complex based on this single dimension is far too simplistic (Beck 1997).

Although Late Woodland settlement patterns have not been considered in this thesis, it should be noted that many (76 percent) of the Mississippian sites in this sample have both shell-tempered pottery, a marker of Mississippian culture, as well as grog-tempered pottery, a marker of Late Woodland culture, and in some cases mixed grog- and shell-tempered pottery. While Late Woodland peoples are believed to have lived in large nucleated villages, many of the sites on which both grog tempered and shell tempered ceramics have been found are actually much smaller than earlier Late Woodland villages (Hammerstedt 2000). A possible explanation for this is that as maize became increasingly common in the terminal Late Woodland period, the settlement pattern changed to allow for more efficient production of maize. During the Mississippi period, then, these settlements, which were already clustered together, continued to be inhabited. This continuity of land usage suggests that single-mound site locations may not have influenced rural settlement locations, but vice-versa. Some amount of control would have been necessary with the rise of the paramount chiefdom over the population living in the hinterlands. By placing a single-mound center, with its associated elite within or adjacent to preexisting clusters of sites, this control could have been maintained throughout the duration of the chiefdom. This model seems increasing plausible when the Fosters Landing or Wiggins mound cluster is considered. Instead of a cluster of sites adjacent to the mound, there is instead a virtual ring of sites around this mound. While it is uncertain whether these sites are contemporaneous with each other or with the mound, this suggests the possibility that the mound, which may have previously been a rural non-mound settlement, was built in the midst of a cluster of rural sites.

According to this analysis, the location of single-mound centers has been shown to be strongly related to the location of rural settlements within the floodplain of the Black Warrior Valley. In Geofluvial Context 2, however, proximity to single-mound sites appears to have no relationship to rural settlement location. Perhaps those sites in Geofluvial Context 2 are clustered around other features of the landscape, such as land transportation routes, in which case there would be a joint effect, or some unknown factor acting on rural site locations outside of the floodplain.

The clustering of sites in close proximity to secondary mound centers should be viewed in the context of elite-non-elite relations, possibly for reasons relating to political consolidation (Rees 2001). As discussed in Chapter 2, a balance between potential routine interaction between elites and non-elites and potential exploitability of natural resources is preferable in chiefdom-level society. The former is important for a variety of political, economic, and religious reasons, while the latter is important in subsistence, as well as raw resource procurement. Thus, the settlement pattern within the Mississippi period Black Warrior Valley which features clustering of rural settlements, inhabited by non-elites, around secondary mound centers, inhabited by elites, comes closest to maximizing both of these goals (Figure 7; see Trigger 1968).

My analysis of the influence of proximity to the Moundville site in rural settlement location showed that site density in the immediate vicinity of Moundville is relatively low, as it is within the farthest interval away from Moundville. Within the middle two intervals (4 to 12 kilometers), however, the site density is higher. This suggests that this was the optimal distance for the location of rural settlements. Thus, there is no preference for locating sites within close proximity to Moundville. This

would be further evidenced if this were also the case to the south of Moundville, which is outside of our Black Warrior Valley Survey project area.

In conclusion, we now have a clearer picture of some of the social and environmental determinants affecting the location of rural settlements in the Mississippi period Black Warrior Valley. These sites can be said to follow a general pattern whereby: (a) they are located in close proximity (always within 1,200 meters, and primarily within 400 meters) to the Black Warrior River or Big Sandy Creek; (b) they strongly prefer locations in the floodplain within Geofluvial Context 1; (c) there is a preference for locating sites between four and 12 kilometers of the Moundville site whereas location close to Moundville is unimportant; (d) rural settlements within the floodplain are always located within four kilometers of the nearest single-mound site, and most often within one kilometer, while in contrast sites located on Pliocene-Pleistocene terraces exhibit no tendency to be located in close proximity to mound sites; and (e) rural settlements occur in close proximity to other rural settlements, often forming clusters of sites, especially in close proximity to single-mound sites.

Now that the Mississippi period rural settlement pattern in the Black Warrior Valley in Tuscaloosa County has been described, the settlement system, or social relationships between contemporaneous sites, should be examined. The problem with this, however, is that in order to do so, excavation data from a sufficient sample of rural settlements is necessary. At present, subsurface testing has been undertaken at only seven such sites. Additionally, excavation information from multiple sites within both the mound-based and non-mound based clusters is needed. Finally, more survey data of this kind are necessary from south of Moundville in Hale County. The results would

presumably be similar to those of this thesis, yet, since so little survey data is available, this remains to be seen.

Possibly one of the most common problems with settlement pattern data is that contemporaneity of sites must be assumed. The criterion used to determine inclusion in the sample was the presence of shell-tempered pottery. It should be remembered, however, that this ceramic technology was present in the Black Warrior Valley before the rise of the paramount chiefdom and was still in use after the decline of the chiefdom. Thus, sites from throughout the Moundville sequence, from before the rise of the paramount chiefdom, through its height, and probably past its decline, have no doubt been lumped together. While settlement patterns tend to change through time, especially with dramatic shifts in political and economic systems, the results of this analysis suggest that these five basic determinants remained relatively static throughout the Mississippi period in the Black Warrior Valley.

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