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Terminal-occupation community patterns at Lyon's Bluff (22OK520) in Oktibbeha County, Mississippi:sedimentological, molluscan, artifactual, and geophysical evidence

S Marshall Bierly

TERMINAL-OCCUPATION COMMUNITY PATTERNS AT LYON'S BLUFF (22OK520) IN OKTIBBEHA COUNTY, MISSISSIPPI: SEDIMENTOLOGICAL, MOLLUSCAN, ARTIFACTUAL, AND GEOPHYSICAL EVIDENCE

By

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Terminal-Occupation Community Patterns at Lyon's Bluff (22OK520)
in Oktibbeha County, Mississippi: Sedimentological,

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Prehistoric cultures are often studied by intrasite artifact variation and quantity without much consideration of how prehistoric populations interacted locally and regionally. Archaeologists can identify and study patterns associated with activities within a specified radius in order to gain an understanding of cultural operations. Identifying a social framework for a prehistoric society allows the investigation of group organization such as status differentiation, shared rituals, and the construction and maintenance of earthworks and living areas. That facilities were constructed for specialized use within a community is evidenced by the presence of earthworks and mounds at many sites (Lewis et al. 1998:16-17). Less well understood is how community patterns reflect social organization.

The purpose of this thesis is to better document the number and distribution of structures at Lyon's Bluff, a Mississippian to Protohistoric-period mound site in Oktibbeha County, Mississippi. The focus will be on the last part of the occupation at the

site, i.e., on materials recovered from the plowzone. A method employing molluscan remains and sedimentological evidence is used that allows for the delineation of structure locales using plowzone samples. Additional evidence is provided by artifact distributions and geophysical (magnetic gradiometer) data.

DEDICATION

To my

Parents, my sister and her family;

Thanks for all the encouragement and support.

ACKNOWLEDGEMENTS

I want to say thank you to my committee members, Drs. Evan Peacock, Janet Rafferty, and S. Homes Hogue. Without their consideration I might not have pursued a higher degree. They are dedicated professionals and a credit to teaching.

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CHAPTER I

PROBLEM STATEMENT

Prehistoric cultures are often studied by intrasite artifact variation and quantity without much consideration of how prehistoric populations interacted locally and regionally. Archaeologists can identify and study patterns associated with activities within a specified radius in order to gain an understanding of cultural operations. Identifying a social framework for a prehistoric society allows the investigation of group organization such as status differentiation, shared rituals, and the construction and maintenance of earthworks and living areas. That facilities were constructed for specialized use within a community is evidenced by the presence of earthworks and mounds at many sites (Lewis et al. 1998:16-17). Less well understood is how community patterns reflect social organization.

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Earthen mounds are frequently discussed as the principal form of architecture in the prehistoric Southeast, particularly when associated with Mississippian societies. Functional understanding of such constructions has been achieved through archaeological investigations and early historical accounts. Mississippian mound centers typically are treated as the political and religious seats of authority (Blitz 1993a:70; Kidder 1998:123). To date, archaeologists generally agree that Mississippian mounds were closely related to belief systems, and/or authoritative figures and were the loci of ritual activities that may have involved the distribution of food and other resources (Anderson 1994:16). Mounds show distinct variability, however, some of which is related to length of settlement occupation and changes in population size. Mound structures were modified through renovations and rebuilding that altered their diameter and height.

Beyond the mound features, variability between mound sites is currently very poorly understood. Many sites provide direct evidence of structures beneath or spatially proximate to mounds. These sub or near-mound structures may represent special purpose areas within a community. This has been suggested for sub-mound structures, e.g., at the Lubbub Creek Cutoff (1PI33 and IPI85) in western Alabama: "The premound complex of structures represents the establishment of a special-activity precinct centrally located within the community, yet spatially demarcated and architecturally distinct from it" (Blitz1993a:82).

Documenting the number of structures and their spatial association with larger or more elaborate architecture is one way to assess site function (Lewis et al. 1998:17). Human activities such as food preparation, building construction, waste disposal and even burials were, to some extent, carried out in certain locations for a reason. The

spatial layout of structures and features, together with any recovered artifacts, may offer insight as to what function(s) the structures served, and whether there was any notable change in function over time.

Documenting structures also is a way to estimate the duration of occupation (Mistovich 1995:173). Many sites show evidence of structures having been built repeatedly in the same location over time. This has been recognized in the form of multiple daub layers, superimposed posthole patterns, and sequent floor surfaces. Both daub and wood charcoal have been used to infer mode of construction, rebuilding, and the demolition of structures (Peacock and Reese 2003:78). Soils may show leveling of an area for the placement of structures, while proportions of lithics and ceramics in and around structural features may provide evidence relating to function. Structures document a level of human activity associated with their construction and maintenance and, to a degree, may contribute to the understanding of the evolution of a community, if it can be demonstrated that structures were built before, after, or concurrently with other site features (Mistovich 1995:171-175).

Many archaeological sites contain earthworks that were constructed well after prehistoric people had built structures and settled in the locale. Formal construction met a functional or cultural requirement at the time (Willey and Phillips 2001:156). Conversely, many sites contain earthworks that were built in conjunction with the first structures and then later abandoned (e.g., Rafferty 1995:137). Subsequent occupations in the locale may or may not have been related to the people who originated the construction and who may have used the earthworks for other purposes, or not at all. In consideration of the possible information to be gained, it is important to establish

structures as being key indicators of a site's chronological development and functional evolution.

At present, models of prehistoric/Protohistoric community plans in the Southeast suffer from deficient information resulting from structure floors not being recognized and/or not being considered in research questions. Reports discussing community settlement often try to explain settlement changes by focusing work efforts on mounds or other monumental architecture (Muller 1997:71-72). Occupational phases are created, established on pottery styles and other diagnostic artifacts recovered from testing of mounds (Dunnell 1971:158; 1990:19; Willey and Phillips 2001:21-22). Gross changes in mound chronology then are used to infer when changes occurred in the community. This approach offers little ability to understand as to why changes occurred, and more specifically, how such changes actually relate to settlement in the area. In order to address the current deficiency in our understanding of community settlement patterns near mound architecture, my research will be directed towards the recovery and delineation of various intrasite structural elements associated with the final occupation at the Lyon's Bluff site (22OK520) in Oktibbeha County, Mississippi.

Various types of analyses are used to extract information from the Lyon's Bluff site concerning the quantity and location of structures within the palisade during the site's later occupancy. The analysis includes water screening of systematic shovel test samples through ¼ inch and 1/16 inch screen, fine screening soil samples to recover sand, and the association of tests containing sand and/or pill clams with Mississippi State University's magnetic gradiometer image of the site. The spatial distribution of daub and other artifacts provides complementary information on structure locations, functions, and

contemporaneity. This information is then used to characterize the community plan across the period of final occupancy (Marshall 1977; Galloway 2000; Peacock and Hogue 2005). Comparisons will be made with other Mississippian mound sites in the Mid-South. Testing to see if Lyon's Bluff was a nucleated settlement will allow for a clearer assessment of a community plan associated with mound architecture in the Southeast.

CHAPTER II

PLOWZONE ARCHAEOLOGY

A lot of archaeological material has been affected by agricultural operations. This has positive and negative aspects for archaeologists. Artifacts may be revealed through tillage, but this action disturbs the provenience and often degrades the condition of the artifacts. Tilled artifacts are a good indication of prehistoric activity and may offer an indication of where to excavate, but the plowzone otherwise is typically considered to be of little archaeological value. Artifacts from a plowed context only were considered to be an indication of prehistoric activity, containing no significant information relative to site occupation beyond the presence of components based on diagnostic artifacts. A lack of vertical provenience only reinforced the idea that plowed surfaces did not contain useful information for serious inquiry. Only in the past 30 years or so have plowed materials become an integral part of archaeology (Dunnell and Simek 1995:305).

Newer survey methods have concentrated on regional studies with the understanding that "field research had to be treated as a formal sampling problem" (Dunnell and Simek 1995:305). Plowed fields are not randomly distributed. Farmers use their environment by avoiding certain soil types and geomorphic features while exploiting others. The rate of soil deposition varies. Many areas do not readily accumulate sediments, leaving any archaeological materials susceptible to tilling

implements. Other areas become buried and are not affected by agricultural use. Site formational studies have demonstrated that modern mechanical tillage is not the only thing which affects archaeological materials. Deposited cultural materials are subject to cultural and natural processes moving them horizontally and vertically, affecting their location and appearance. Past disturbances are not always visible in the archaeological record, as the processes of bioturbation continually alter the soil matrix. All of these factors are worthy of study, as so much of the Southeast and other parts of the world have been plowed. In consideration of the variables associated with site formation and the preservation of archaeological materials, "It is no longer intellectually defensible to dismiss 'disturbed' deposits and plowed materials as insignificant either in resource management or in research contexts" (Dunnell and Simek 1995:305-6).

Executive Order 11593: Protection and Enhancement of the Cultural Environment was signed into law to better preserve and protect the natural and cultural resources within the United States. The National Park Service became responsible for establishing standard procedures in order to determine site eligibility (King 2004:24-25). Once archaeologists were forced to identify and evaluate all archaeological materials as potentially eligible, they gradually began to accept that information could be obtained from plowed materials. However, that acceptance has been slowed by the expansion of commercial archaeology. Cultural resource management (CRM) firms are designed to operate at the pace of the business community. Time and monetary constraints often cause CRM companies to practice good business at the expense of a comprehensive investigation, artifact analysis, and a thorough report. It is not uncommon for CRM firms to use measures to hasten work in the field. This includes stripping the "disturbed"

plowzone with heavy equipment in order to concentrate on “intact deposits” beneath (Peacock and Rafferty 2007:15).

The inherent damage caused by mechanical plowing is seen in the breakage and spatial displacement of artifacts. Archaeologists have studied these factors to address the level of disturbance a site has experienced from repeated plowing. Lateral displacement has been studied by tracing artifact movement through refitting, repeated collection and/or recording, and other experiments. Studies also have been done to determine the association of plowed materials and their relation to subsurface artifacts/features (e.g., Rafferty 2001:347). These empirical studies generally show that lateral displacement is not great and that disturbances are not random within the limits of agricultural plots (Dunnell and Simek 1995:306).

As a result of tillage, the plowzone can be considered as a depositional unit. Soil is dynamically removed and re-deposited over a determinable area and gives the plowzone as a unit a “contemporary stratigraphic age” (Dunnell and Simek 1995:306). As a depositional unit, the plowzone can be argued to represent an occupation consisting of a linear area or space, an area of volume which represents continuance, and a period of time represented by artifacts. A point of the current investigation was to demonstrate that viable research can come from plowed surfaces or other seemingly disturbed areas while minimally impacting materials beneath the plowzone.

CHAPTER III

LYON'S BLUFF SITE (22OK520)

The Lyon's Bluff site (22OK520) is a palisaded, single-mound and habitation complex located south of Line Creek in Oktibbeha County, Mississippi (Figure 1). The site is located in the Black Belt prairie region, so named for the presence of dark, calcareous soils. These soils mark a fertile plain, generally 25–30 miles (40 km) wide and stretching approximately 310 miles (500 km) across central Alabama and into northeastern Mississippi, but narrowing at its northern and eastern extremes (Brown 2003:2-5). The Black Belt is a subdivision of the East Gulf Coastal Plain physiographic province; it is underlain by Selma Chalk, formed from Upper Cretaceous marine deposits. It forms a crescent-shaped region extending from McNary County in extreme southern Tennessee, south through east-central Mississippi and east to Russell County, Alabama near the Georgia state line. Depending on the exact consistency of the parent material, the chalk weathers into a variety of soil types that support a mosaic of habitats ranging from prairie to forest. Areas of prairie vary intermittently between well-drained and slowly permeable alkaline soils, whereas the oak-hickory forests of the Black Belt are associated with strongly acidic soils formed on relict alluvium that overlies the chalk (Peacock and Schauwecker 2003:2-3).

The soils in Oktibbeha County consist of Leeper-Marietta-Catalpa series with somewhat poorly drained, to moderately well drained, non-acid soils that have a dominantly clayey to loamy subsoil (Brent 1973:11, 16, 20). Soils with these characteristics are strongly associated with the natural drainage systems in the area, such as Line Creek, Ash Creek and Trim Cane Creek. The soils adjacent to these riverine areas are part of the Kipling-Sumter-Gullied land association. These soils consist of somewhat poorly drained to well-drained soils that have dominantly clayey subsoil that developed from chalk. .These soils are severely gullied in some areas.

The Lyon's Bluff site area has been used primarily as agricultural fields for approximately the past eighty years. Outside of the hay field containing the mound, several low rises throughout the property have been described as prehistoric "house mounds" (Marshall 1986b) and are found over an area of at least 20 acres. Unimproved farm roads that run across the property contain loose artifacts such as pottery sherds, daub and other archaeological remains that are thought to be associated with prehistoric structures. The field that contains the mound and palisade features, as recorded in earlier fieldwork by Mississippi State University (Alvey et al.2004; Peacock and Hogue 2005; Rafferty et al. 2003;), is approximately 200 m along the east-west axis by 140 m along the north-south axis (28,000 square meters). The nearest permanent water source is Line Creek, located immediately north of the site. The site has been the subject of an entire *Mississippi Archaeology* publication in 2000, and has two recent investigations by MSU's field schools in 2001 and 2003.

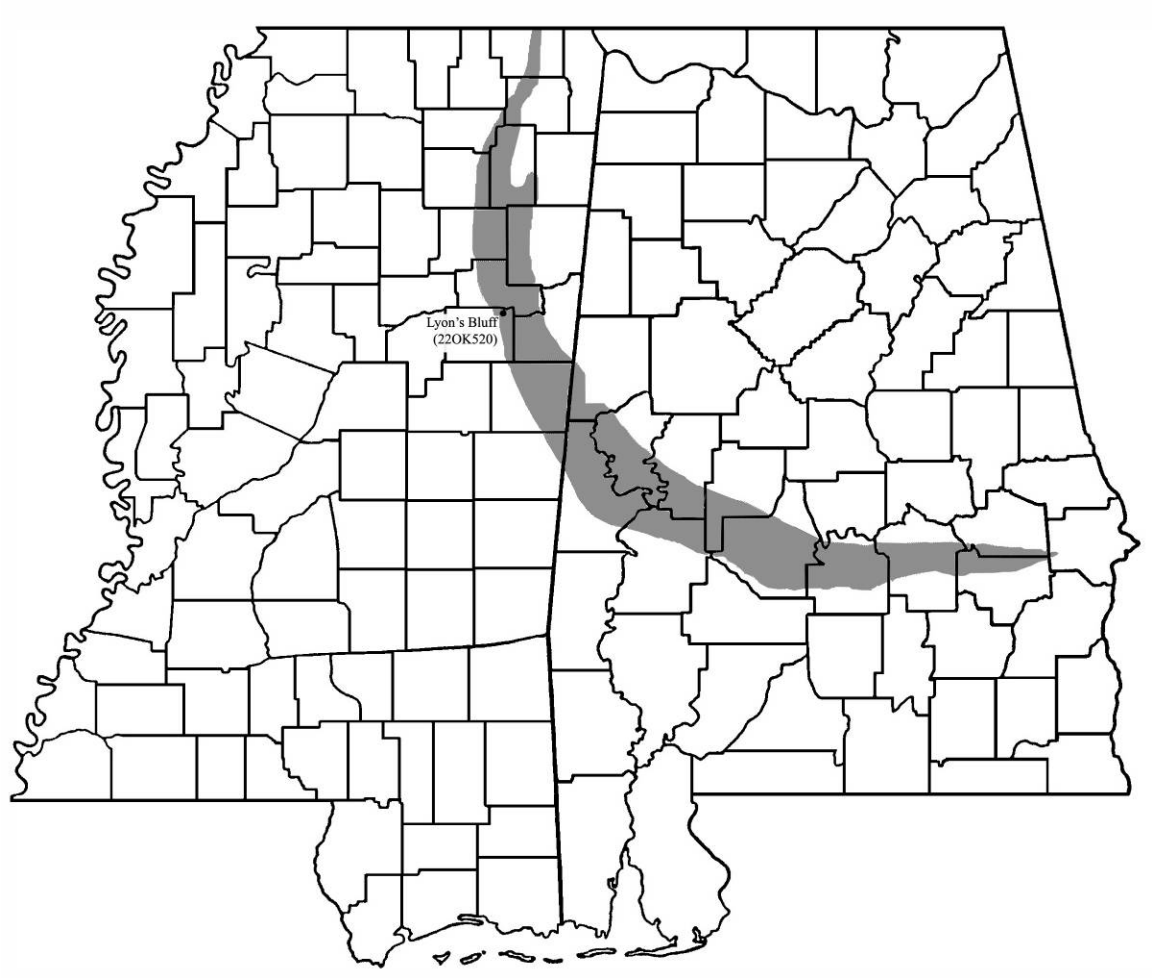

Figure 3.1. Black Prairie Region of Mississippi and Alabama. Adapted from Peacock and Reese (2003: Figure 5.1).

The first recorded excavations were by Moreau B.C. Chambers in 1934 and 1935, and these provided some basic information about the site (Galloway 2000). Chambers' excavations included four units along the northern edge of the site, a fifth and sixth located next to the mound on the west, and two trenches in the mound (Galloway 2000). Unfortunately, screening was not employed during these investigations, as was frequently the case during this time. Chambers recorded multiple human burials, artifacts, and soil

descriptions in a field journal that included sketch drawings of the burials and excavations, but little else. His work does provide a description of numerous human burials located near the mound, as well as a general description of the soils and composition of the mound strata (Galloway 2000:38-77). Through interviews conducted decades later, it was learned that the artifacts were shipped for analysis to a Works Progress Administration (W.P.A.) center in Louisiana (Galloway 2000). They have recently been relocated and are stored at the Mississippi Department of Archives and History, Jackson.

In the late 1960's and early 1970's, Richard Marshall conducted extensive excavations in the areas northeast and south of the mound. These excavations focused on the location and removal of numerous human burials. The excavations were well documented, photographed, and recorded using contemporary field methods, although screening was only intermittently employed and Mr. Marshall never published the results of any artifact analysis. He did describe some structures and publish some radiocarbon dates in a few preliminary papers (Marshall 1977, 1985, 1986a, 1986b)

During the 2001 and 2003 field school seasons, Mississippi State University (MSU) conducted testing and excavations in several locations on and near the mound. These excavations, under the direction of Evan Peacock, revealed a probable palisade, evident as a deep wall trench in unit 0N60W. As part of the fieldwork, a magnetic gradiometer image was made that included the mound and suspected palisade. The palisade was confirmed, and is visible on the magnetometer image enclosing the main site area on the west and south (Figure 2). Unit 0N60W had fortuitously intersected a four-sided, west-projecting bastion.

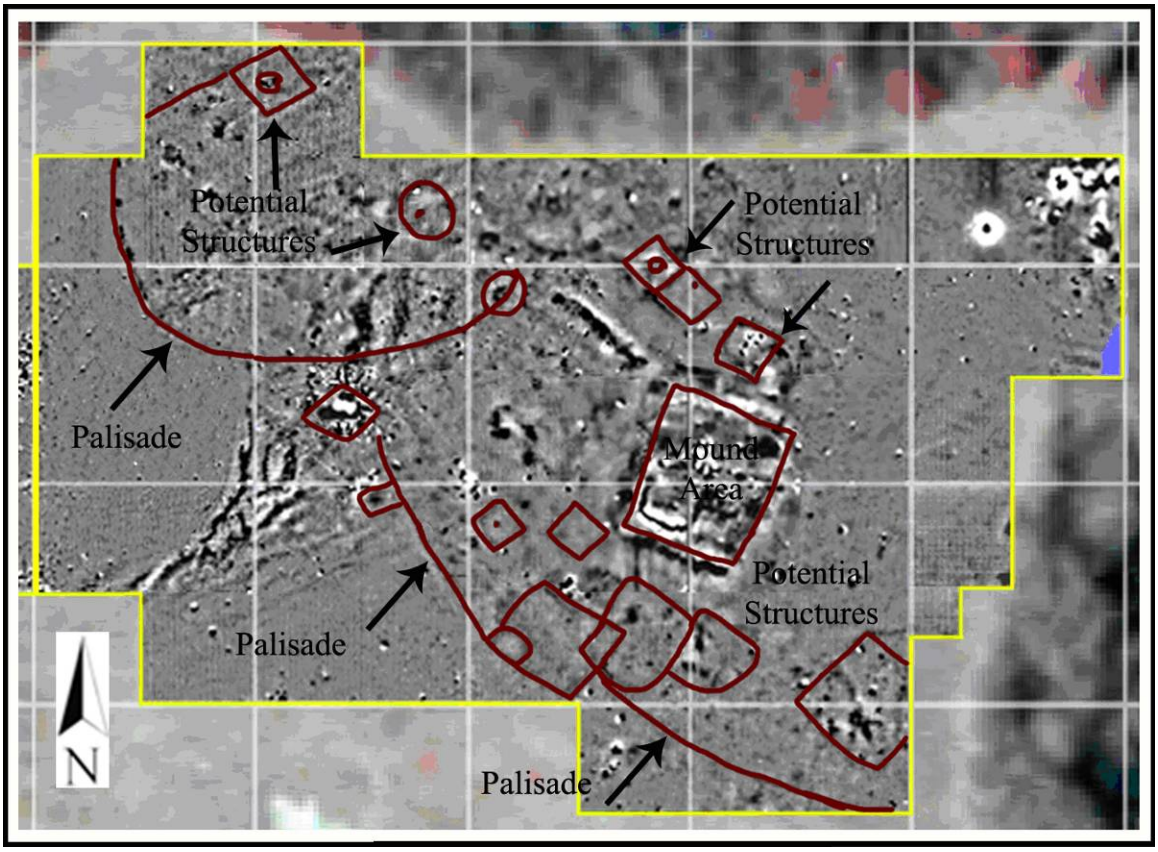

Figure 3.2. Magnetometer image showing probable structure features.

It is known that much of the site contains dense midden material, that there are multiple human burials within the palisade, that sand floors were constructed in structures at the Lyon's Bluff site (Figure 3), and that they contain pill clams (Peacock 2002). Burned houses produced daub (Marshall 1977; Peacock and Reese 2003; Seltzer 2007). For this thesis, samples obtained from systematic shovel testing were processed for pill clams, daub, and sand; overall artifact density also is examined. These analyses were designed to pinpoint the locations of structures that may or may not be entirely incorporated into the plowzone. The results are compared to the magnetometer image.

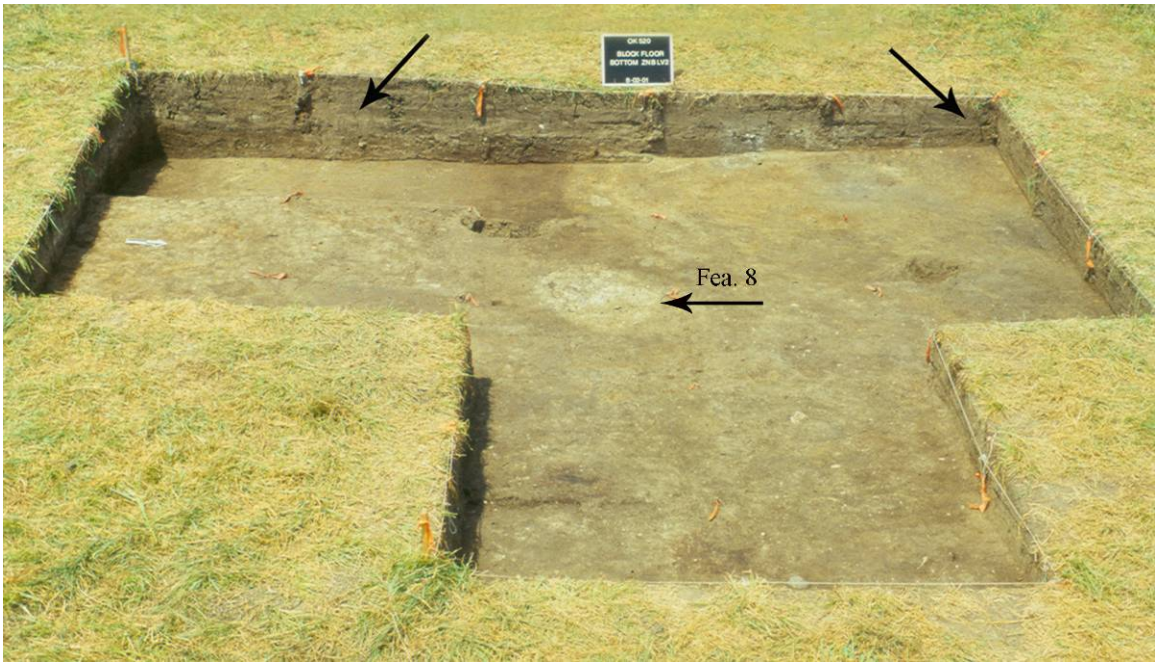

Figure 3.3. Photo of MSU 2003 test unit with central hearth feature (Fea. 8); note the sand layer visible in wall profile, and the earlier sand floor exposed in plan in the northern (right) half of the unit.

Mollusks as Indicators of House Floors

Pelecypoda: Sphaeriidae (Pill clams)

Sand house floors were revealed during the 2001 and 2003 MSU field school excavations. Examination of the sand revealed several dozen pill clams. Subsequent screening of the soil test samples also revealed pill clams and small river snail shells (Peacock personal communication).

Sphaeriidae are tiny bivalves, in the class Pelecypoda, commonly called fingernail, pea, or pill clams. They occur worldwide and most bodies of water have at least one species. Pill clams have two shell valves that are hinged at the animal's dorsal margin. The exterior of the shell has thin growth lines, or striae. Pill clams are usually less than 1cm in length. The umbo, or beak, is poorly developed and is located on the dorsal margin of the outside of each valve (Harrington 1962:10).

"The position of the umbo on the dorsal margin of the shell can be used to distinguish between the two major genera, Sphaerium and Pisidium. In Sphaerium the posterior end of the shell is longer than the anterior end and consequently the umbo is anterior of the middle of the shell. Pisidium, on the other hand, has a larger anterior end of the shell and its umbos are in the posterior half of the valve" (Fox 2001:5).

Pill clams and river snails are too small to be considered as a food source. Their presence on site is thus an indication of incidental human transport, or via flooding. If pill clams were deposited by floods, then they should be ubiquitous and not patterned in their horizontal distribution at the site (Peacock 2002). Recovered sand and pill clams thus provide strong evidence of a sand floor and/or alteration/modification such as

building-up or the leveling of the natural ground surface. The natural aquatic habitat of pill clams, and the depths at which sand layers have been recorded in plans and on profiles, strongly suggests that pill clams appear as a result of river sand being intentionally deposited by prehistoric peoples (Peacock personal communication).

Figure 3.4. Photo of several pill clams (Pelecypoda) recovered during testing by MSU's 2003 field school.

Freshwater Snails

Freshwater snails "occur across a variety of habitats. Most species prefer clean, stable, and firm river bottoms; some prefer the soft substrates more common to ponds and lakes. A few wide-ranging snail species can easily survive in polluted habitats" (Johnson 2003:4). Three taxa of small river snails found at Lyon's Bluff also are used as markers

of where sand floors have been incorporated into the plowzone. They are *Pleurocera acutum, Pyrgulopsis* sp. and *Somatogyrus* sp. (Burch 1980: 111, 122, 163).

The genus *Pleurocera* is found in the Great Lakes drainages, the Mississippi River, and in other drainages along the Gulf of Mexico. Pleurocerids are found in a variety of aquatic habitats, with particularly high species diversity in the Tennessee and Mobile River basins. The shells of the *Pleurocera* (Figure 3.5) are narrowly to elongately conic with a short anterior canal, 20-40 mm in height (Sides 2004:16-17).

Pyrgulopsis and *Somatogyrus* are in the family Hydrobiidae. Hydrobiidae consist of mostly freshwater gastropods. In the southeastern United States the group is widely distributed, living in small to large streams and rivers, lakes and estuarine marshes (Clark 2004:20).

Pyrgulopsis (Figure 3.5.) is found in a variety of habitats, ranging from small springs to rivers. 'The shell of the Pyrgulopsis is thick and heavy, somewhat conical in shape and much elongated. The whorls are rather flat to slightly convex and usually exhibit nine to eleven whorls. The color of the shell varies with some specimens showing variable banding. An adult is about 1 1/8 inches long with a width at the widest point of 3/8 inch" (Kansas Department of Wildlife Parks 2000). "They can be regarded as bottom dwellers, since they burrow under the sand and may also burrow under layers of decaying leaves and organic materials. This snail is a detritus feeder, mainly eating algae and diatoms" (Kansas Department of Wildlife Parks 2000).

Somatogyrus been recorded throughout the eastern United States and is found in small to large rivers on and under stones and rocks. *Somatogyrus* (Figure 3.5.) is distributed from the Mississippi River drainage system east to Atlantic coastal streams,

and south to the Gulf coastal drainage systems. "Shell morphology varies widely from flattened planispiral shaped to conic, and the size varies from 1mm to almost 10 mm in height" (Clark 2004:20).

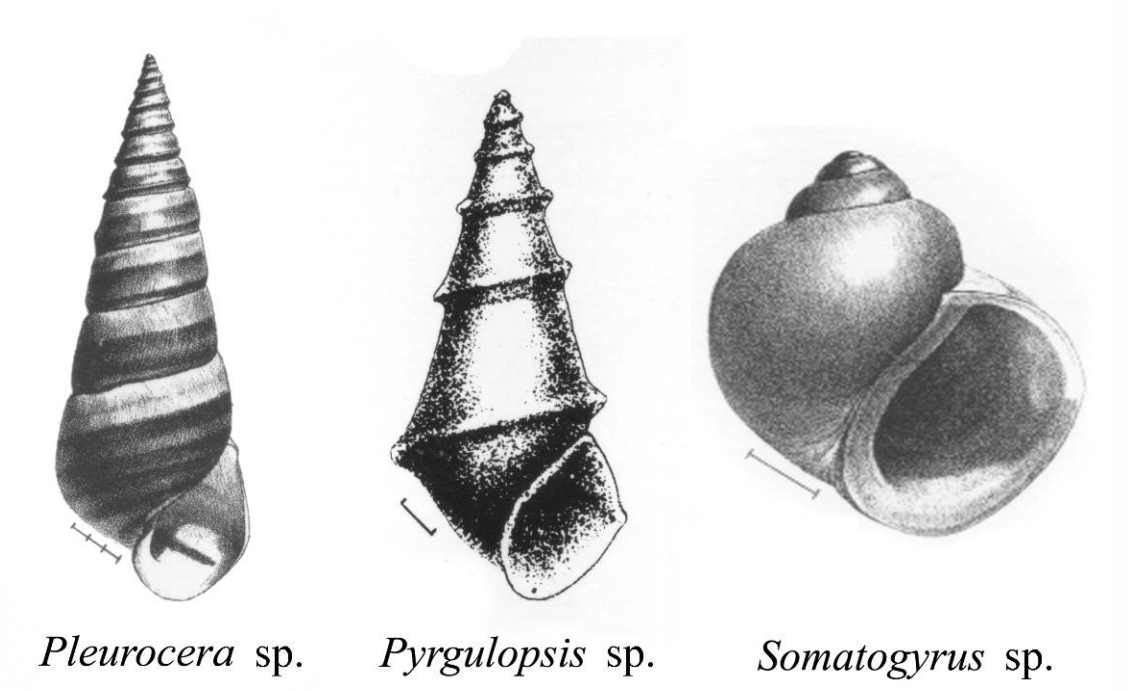

Figure 3.5. Drawings of, *Pleurocera*, *Pyrgulopsis* and *Somatogyrus* shells. From North American Freshwater Shells: Specials List, Ranges and Illustrations (Burch 1980: Figs. 195, 273, 521). Measurement lines = 1 mm or are divided into millimeters.

CHAPTER IV

FIELD METHODS

The methods adopted for this archaeological investigation of the Lyon's Bluff site consisted of mapping and systematic excavation of shovel test holes. Soil was removed from the plowzone at regular intervals and washed through screens to look for pill clams and quartz sand. Their co-occurrence in a patterned distribution would support the interpretation (Peacock (2002) that creek-derived sand found in the wall profiles and in plan in test units was deliberately placed on the floor area within structures (cf. Galloway 2000).

The different excavations at Lyon's Bluff (e.g. Chambers, Marshall, and Peacock) have documented the depth of the plowzone to approximately 30 centimeters with the plowzone at Lyon's Bluff representing the final occupation. Excavations at Lyon's Bluff during MSU's 2001 and 2003 field schools, as well as the soil descriptions from Chambers (Galloway 2000) and photos from Marshall's excavations (on file, Cobb Institute of Archaeology, Mississippi State University), have shown that discrete layers of quartz sand, which is believed to be from the bed of Line Creek, occur at depths of up to

30 cm and greater at the site. In order to focus on the last occupation and to minimize the destructive impact upon the site, testing for this thesis was done only within the plowzone.

A 10m² Cartesian grid pattern was placed over the testing area using a survey transit. Points were named on the basis of their distance north/south and east/west from the main site datum point, named 0N0E. This same datum, located on the mound, was used in the MSU excavations (Peacock and Hogue 2005). The north/south axis lines extended from the datum south to the palisade wall, as determined from the magnetometer image (Rafferty et al. 2003), and north to Line Creek (Peacock 2002). The east/west axis ran from the edge of the bluff line on the east to a low area located outside of the smaller palisade feature along the western portion of the site (Alvey et al. 2004:; Rafferty et al. 2003).

For practical purposes, the plowzone (Zone A in Peacock and Hogue 2005) was considered to be the final occupation layer. Links to subsurface features may be demonstrated by correspondence between plowzone materials and structure locations on the magnetometer image (Rafferty et al. 2003).

Testing was conducted at 10 m intervals. Adjacent transects were offset by 5m to provide better spatial coverage of the site. This method was chosen after laying regular and offset 10 m transects over the magnetic gradiometer image of the palisaded area of

the site (Figure 4.1); shovel test points on the offset transects more frequently overlay structures seen on the magnetometer image. Pin flags marked test unit locations. Test unit coordinates were written on two pieces of flagging tape and then tied to the pin flag. Placement of the tests were 75cm northwest of the pin flags to offset the test grid from earlier shovel testing by MSU (James 2006), and so that the tests would be in the approximate center of where 1x1m units would fall on the site grid. Excavation was done with a standard hand shovel and trowel and concentrated on the recovery of approximately 3.0 liters of soil. Thru excavation of ca. 30 cm diameter shovel holes. This was to minimize site disturbance by sampling only from the plowzone and to insure that each test sample was of equal size. This method of sampling coincides with the depth of some of the known 'sand floors', indicated on wall profiles and plans as occurring just beneath the plowzone (Galloway 2000; Marshall 1986a; Peacock and Hogue 2005). The disturbance of the plowzone, as well as its varying depth, strongly suggested that analysis should concentrate on a pre-determined volume of soil, as opposed to the more traditional approach of digging to exact horizontal or vertical dimensions. A 3-liter sample of excavated soil was placed into a plastic bag along with one of the pieces of flagging tape containing the test unit coordinates. After the bag was tied, the second piece of flagging tape was tied to the outside of the bag. When all tests were dug, the pin flags were removed.

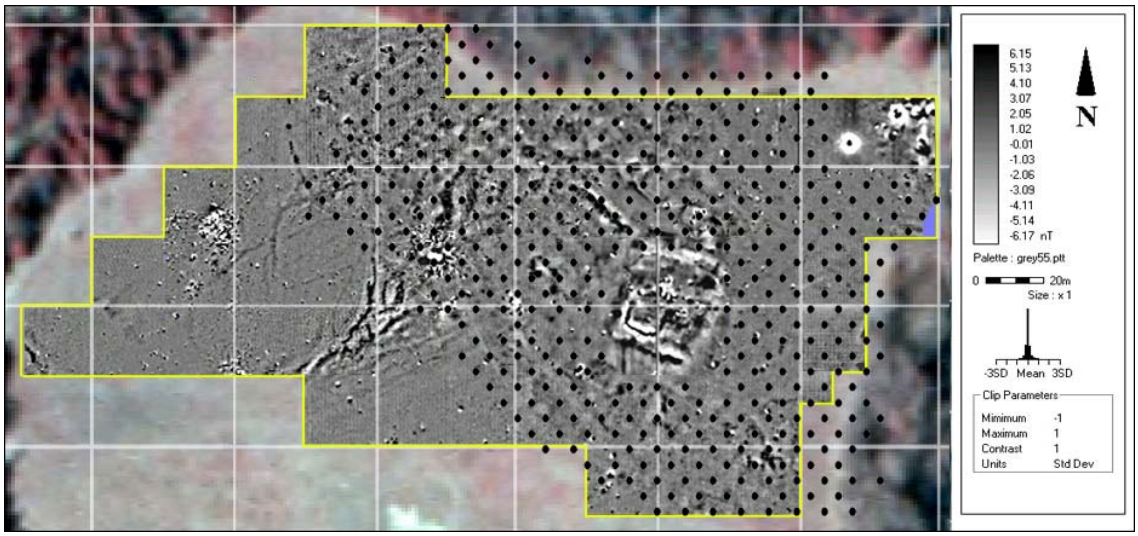

Figure 4.1. 2003 Gradiometer image of the Lyon's Bluff site revealing 10m2 offset transects and shovel test locations.

CHAPTER V

LABORATORY METHODS

Prior to any soil processing, a sub-sample volume of 500 grams was taken from each 3-liter shovel test sample. The sub-sample was wet screened through U.S.A. Standard Test Sieves (No. 18, 60, 125 and 230) in order to recover sand. The sieve mesh sizes were used to separate sand grains into coarse (0.5 – 1mm), medium (0.25 - 0.4mm), and fine sand (0.125 - 0.25mm) particles (Wentworth 1922). Based on soil descriptions of the Black Belt prairie region of Mississippi and specifically from the Oktibbeha County soils book (Brent 1973), recovered sand was treated as being associated with prehistoric ground alteration or the construction of floors within structures rather than being considered a natural soil constituent. Percentages of sand sizes by weight were compared with recovered pill clams, aquatic snails, and daub in order to estimate the likelihood that a particular locale represented a prehistoric structure floor.

The remaining soil was wet screened through 1/4″ and $^{1}/_{16}$” screen. Artifacts were grouped by material type: e.g., lithics, daub, ceramics, and bone. Both the

$^{1}/_{4}$" wire mesh and the fine-mesh materials were examined for pill clam valves or valve fragments, and identifiable aquatic snails.

Identifiable pill clams and other riverine mollusks were counted and tabulated per shovel test. Unidentified shell was weighed but not counted. All pill clams were identified to the level of genus where possible. Shells were only counted if they were of the small aquatic taxa described earlier. Broken shells and shell pieces were identified if possible using two of the listed diagnostic pill clam attributes: beak/umbo, lateral teeth and/or growth lines on the surface of the shell. Aquatic snails were identified and counted if greater than half of the shell was found.

Daub is formed when the clay that once covered the walls of prehistoric structures became fired when the structures burned (Peacock and Reese 2003:70). The presence of daub within any shovel test provides strong evidence of a structure having been burned at or very near to the shovel test locale from which the daub was recovered. Weight of recovered daub rather than counts was used as structural evidence due to the impacts on this friable material within the plowzone.

Lithics and pottery were counted separately per shovel test. Due to breakage associated with plowing (Dunnell and Simek 1995), bone was only weighed. Bone was inspected by Dr. S. Homes Hogue for the possibility of human remains, and none were recovered.

Sand weight and pill clam quantities were plotted on isomaps to show the distribution of each within the palisade. Other isomaps were created from all other artifacts to show distributions as they relate to known and hypothesized structure locations.

CHAPTER VI

ARTIFACTS AND SEDIMENT ANALYSIS AND RESULTS

All artifacts recovered during shovel testing were identified and catalogued. All of the artifacts were separated into the following groups: daub, ceramics, bone, lithics, sand, aquatic snails, and pill clams. These groups were then further analyzed.

Variance is a measure of how much the data in a certain collection are scattered around the mean (average). A low variance means that the data are tightly clustered; a high variance means that they are widely scattered. The standard deviation of each artifact set was used to display and to discuss the data. This method was used to minimize bias in arbitrarily choosing values which, when displayed, would seemingly represent concentrations of artifacts. Each data set was interpolated and displayed using the Surfer® software program. Artifact data were interpolated using a regression technique of Kriging to determine the display value of artifact concentrations (http://www.reference.com/browse/wiki/Kriging). The variables used in Kriging are user-defined. In this case, the value of a specific point was averaged with every closest neighboring point. The interpolated value was then displayed using contour lines. Each

contour line represents one standard deviation above the mean. A value of two standard deviations and greater is considered to indicate the presence of a prehistoric structure.

Daub

The presence of daub within any shovel test is strong evidence of a structure having been burned at or very near to the shovel test locale the daub was recovered from. Daub was used to support the past presence of prehistoric structures, along with the sand and pill clam evidence. Daub found without sand and/or pill clams provided evidence of a structure, but was not used as an estimate for the community pattern unless a discrete concentration could be discerned.

Daub is prevalent throughout much of the site due to disturbances associated with the plowzone (Figure 6.1). Daub values were analyzed using the standard deviation of the total sum (Figure 6.2). Using this criterion, a minimum of eight structures is represented in the daub data. These potential structures are identified as A, B C, D, E, F, H, and I. Two structures (G and K) were identified based on previous work by Mississippi State University and the magnetometer image. Contour lines were also compared with the magnetometer image, as will be discussed later.

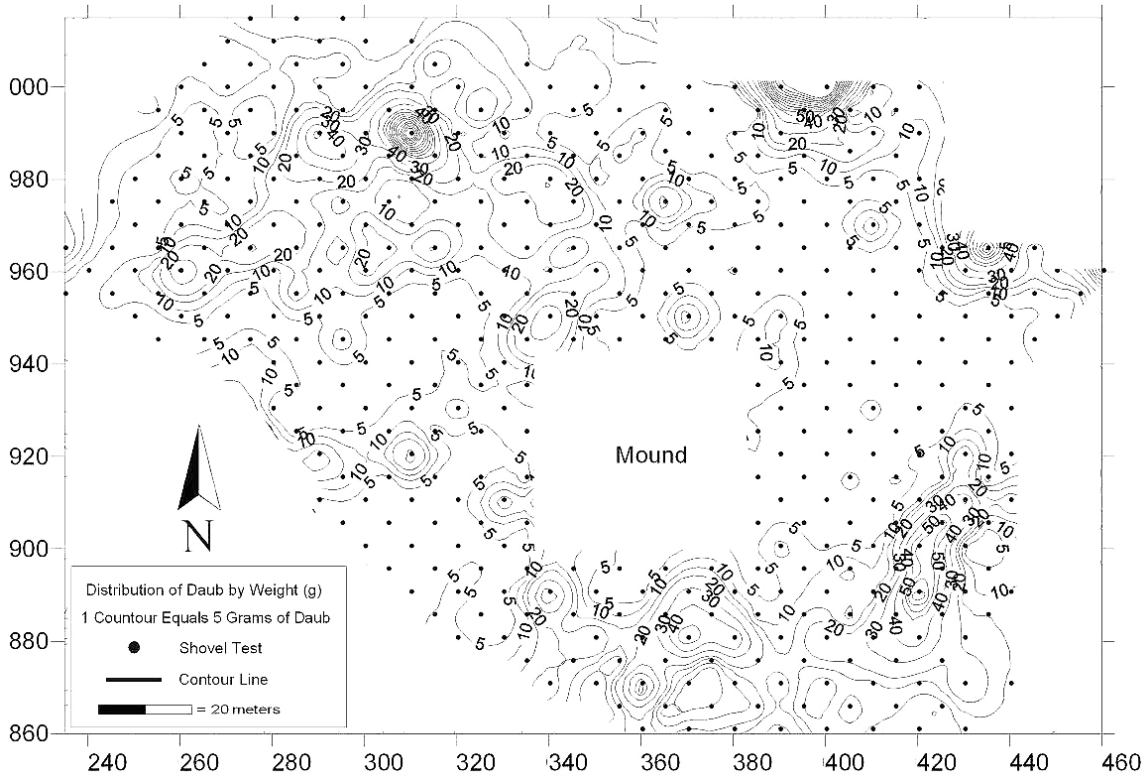

Figure 6.1. Distribution of Daub by weight (g) at Lyon's Bluff (22OK520). Isomap showing daub distribution by weight (g) throughout the survey area. One contour interval represents 5 grams of daub

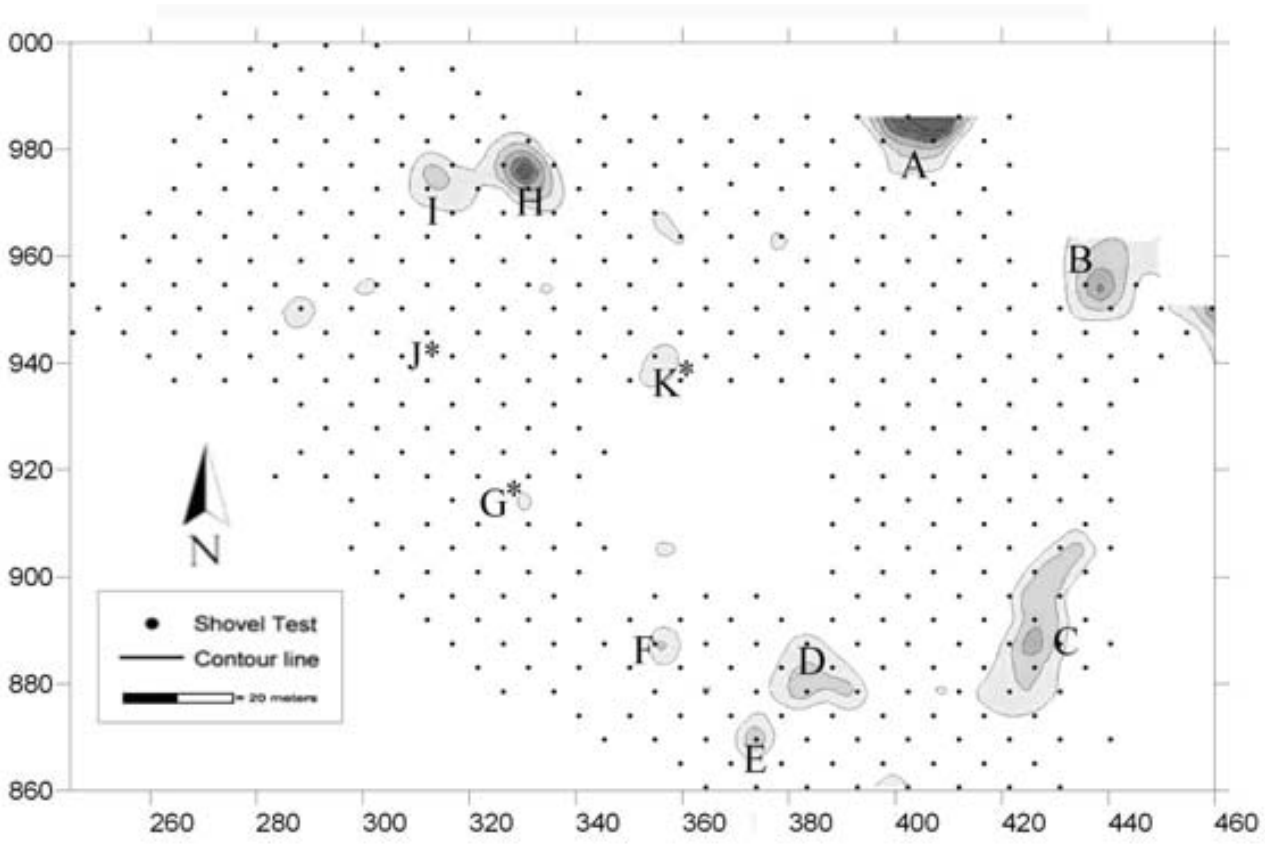

Figure 6.2. Identified Daub Concentrations at Lyon's Bluff (22OK520). Isomap showing daub distribution by weight (g) throughout the survey area. One contour interval represents one standard deviation above the mean. Concentrations at two or more standard deviations are considered to represent structure locales. Potential structures are identified by the letters A-K. Asterisk denotes structures identified by other criteria.

Sand

The basis for this investigation is the hypothesis that sand was intentionally collected and used as floor surfaces within structures. Consequently, any recovered sand should provide evidence of a prehistoric structure or other intentional construction such as fill zones. From the soil descriptions in the Soil Survey of Oktibbeha County, Mississippi (Brent 1973:11, 16, 20), sand should not be present in either of the two

surface soil types listed in the survey area. Accordingly, sand recovered from every shovel test was measured. However, this should not imply that recovered sand was only the result of prehistoric/Protohistoric human action.

Sand-sized quartz grains can be present in clayey and loamy soils (Billy Kingery personal communication). These soil types are present throughout the survey area and help explain why a measure of sand is associated with each shovel test. In addition, the survey area has been repeatedly plowed over the past 80 years. This manner of disturbance would, over time, cause distinct surface features, such as house mounds, and subsurface features, such as sand floors, to become blurred and difficult to distinguish from the surrounding soil matrix.

The distribution of sand across the site varies greatly, but when displayed by standard deviations above the mean, it shows concentrations thought to be associated with prehistoric transport of sand onto the site (Figure 6.3). As discussed below, this is supported with the presence of pill clams and three species of river snails found directly associated with sand.

Sand was weighed and then was plotted using the standard deviation of the mean weight as a unit of measure. Sand values two times the standard deviation and greater are considered directly associated with prehistoric earth-moving activity or house floor construction (Figure 6.4). Sand concentrations were compared with daub concentrations to support the likelihood of a prehistoric structure having been present.

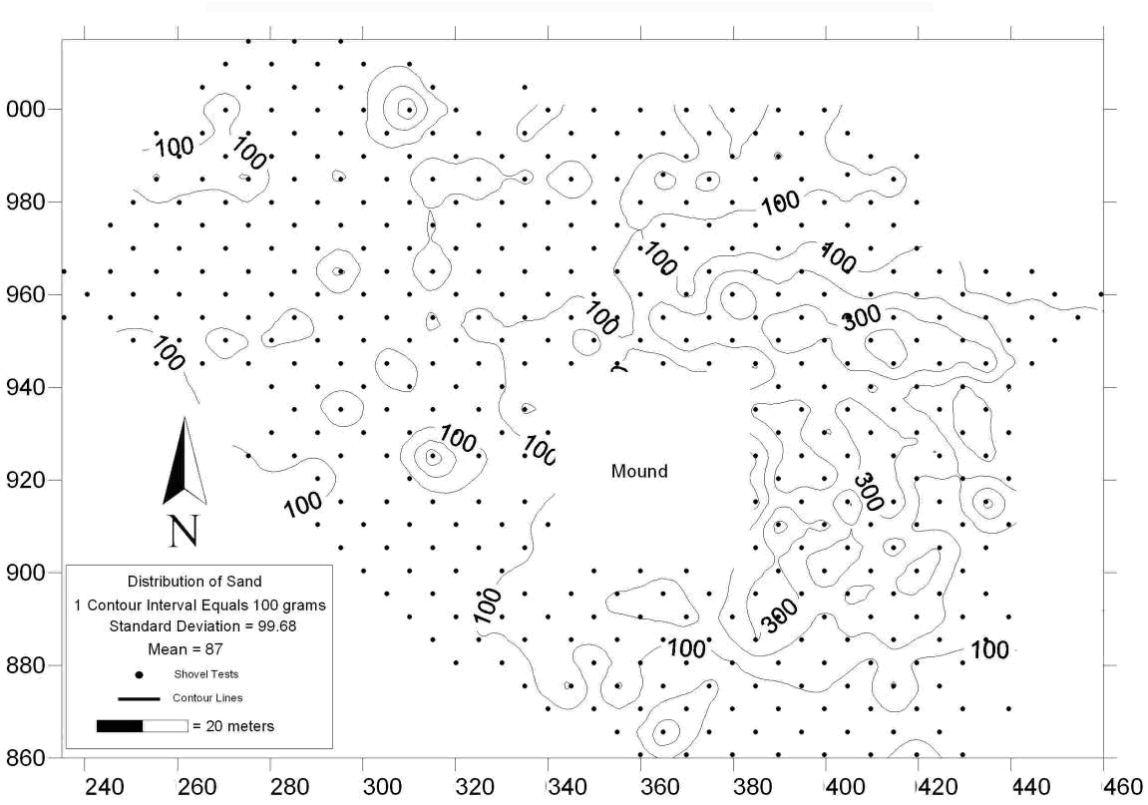

Figure 6.3. Distribution of Sand (g) at Lyon's Bluff (22OK520).
Isomap showing the distribution of sand (*g*) throughout the survey area. One contour interval equals 100 grams, approximately 1 standard deviation above the mean. Note the concentrations of sand associated with Structures G, H, and I.

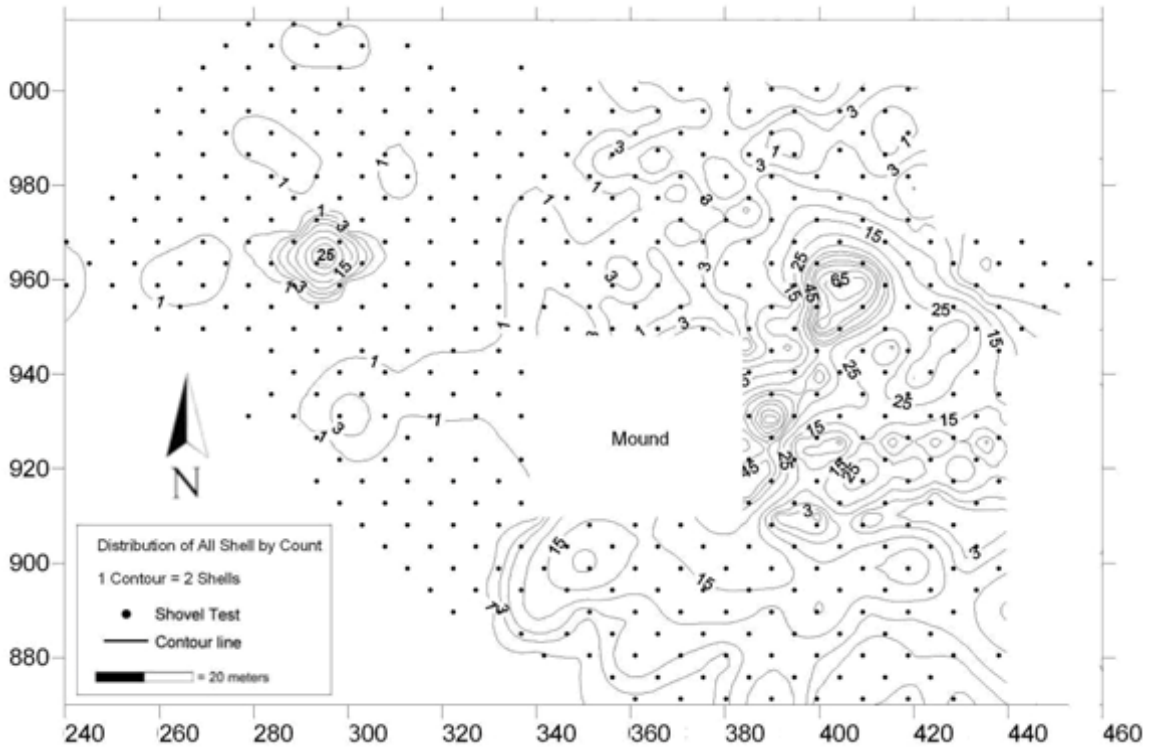

Figure 6.4. Distribution of Sand (g) and Daub (g) at Lyon's Bluff (22OK520). Isomap of sand and daub distribution by weight (g) throughout the survey area. One contour interval represents one standard deviation above the mean. Concentrations at two or more standard deviations above the mean are considered to represent structure locales or other construction. Letters show the structure locations as interpreted from the daub and shell analysis. Structures G and K were identified based upon the gradiometer image.

Pelecypoda: Sphaeriidae (Pill Clams) and River Snails

The presence of pill clams, river snails, and sand at Lyon's Bluff is representative of prehistoric earth-moving activity. The mollusks were unintentionally relocated along with sand taken for use by prehistoric peoples. The number of pill clams and river snails collected with river sand is a random occurrence. Not all collected sand contained pill clams and river snails, and collected sand could contain any number of the different shell species. Concentrations of pill clams and river snails were compared with sand

concentrations to provide evidence of sand being intentionally deposited by prehistoric peoples.

Concentrations of pill clams and river snails were displayed in two data sets. One displayed the overall distribution. Many shovel tests only contained one pill clam or river snail (Figure 6.5). The other contour display focused on the concentrations of pill clams and river snails (Figure 6.6) above one standard deviation. A high concentration east of the mound likely represents construction and maintenance of a plaza area (Carlock 2006), as discussed further below. A single concentration in the western part of the tested area (Figure 6.6) likely represents the location of a sand floor that for unknown reasons was not discernable in the sedimentological analysis. This concentration of shell is considered to be directly associated with sand deposition and very likely represents a structure floor referred to as Structure J.

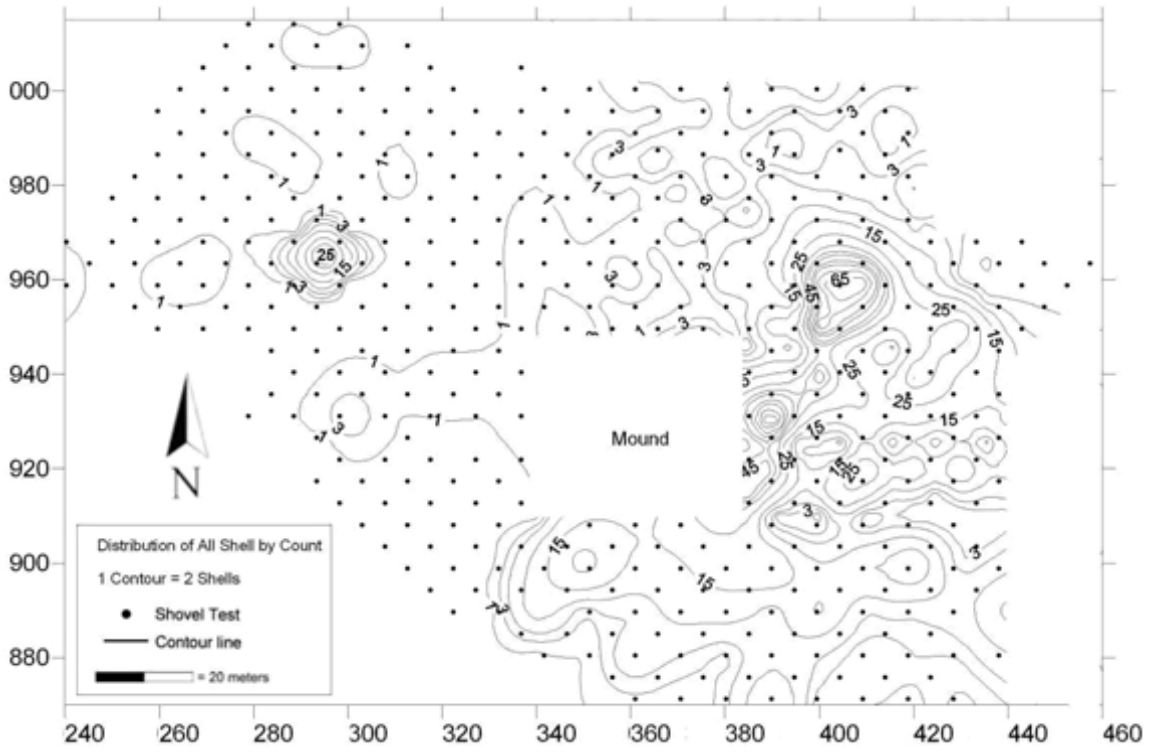

Figure 6.5. Distribution of Pill Clams and River Snails at Lyon's Bluff (22OK520). Isomap showing the distribution of pill clams and river snails throughout the survey area. One contour equals 2 shells.

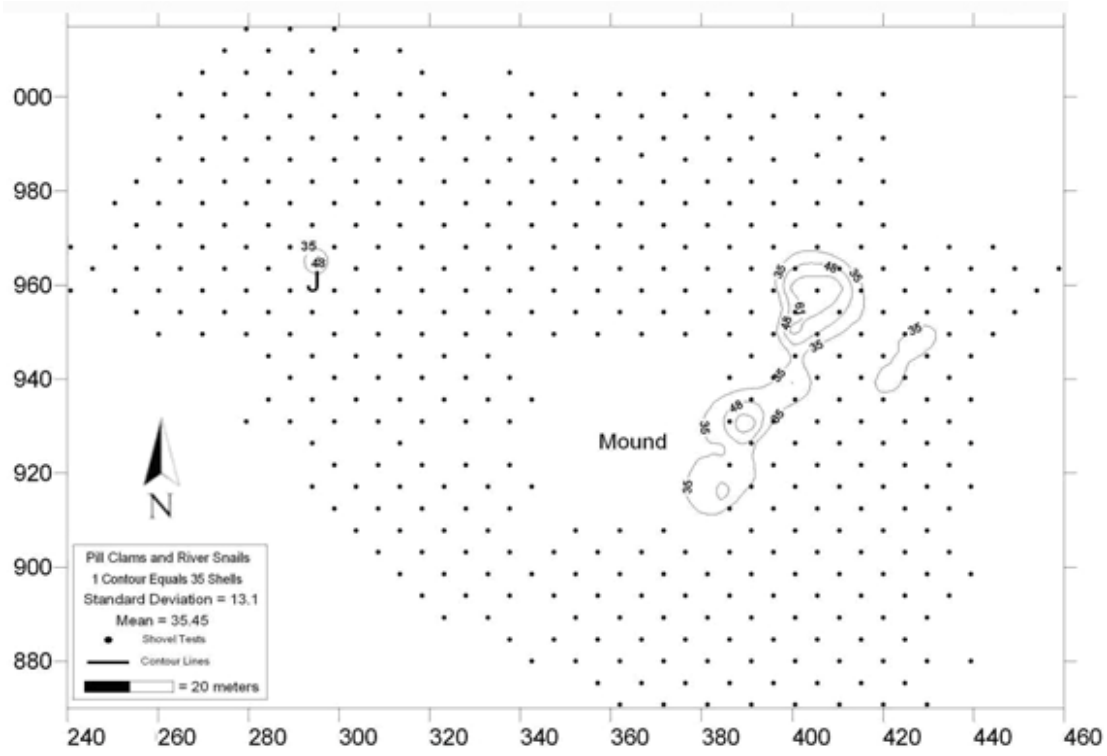

Figure 6.6. Distribution of Pill Clams and River Snails at Lyon's Bluff (22OK520). Isomap showing the distribution of pill clams and river snails throughout the survey area. Contour intervals begin at the mean and continue one standard deviation above the mean. Structure J was located by a significant concentration of pill clams and river shells.

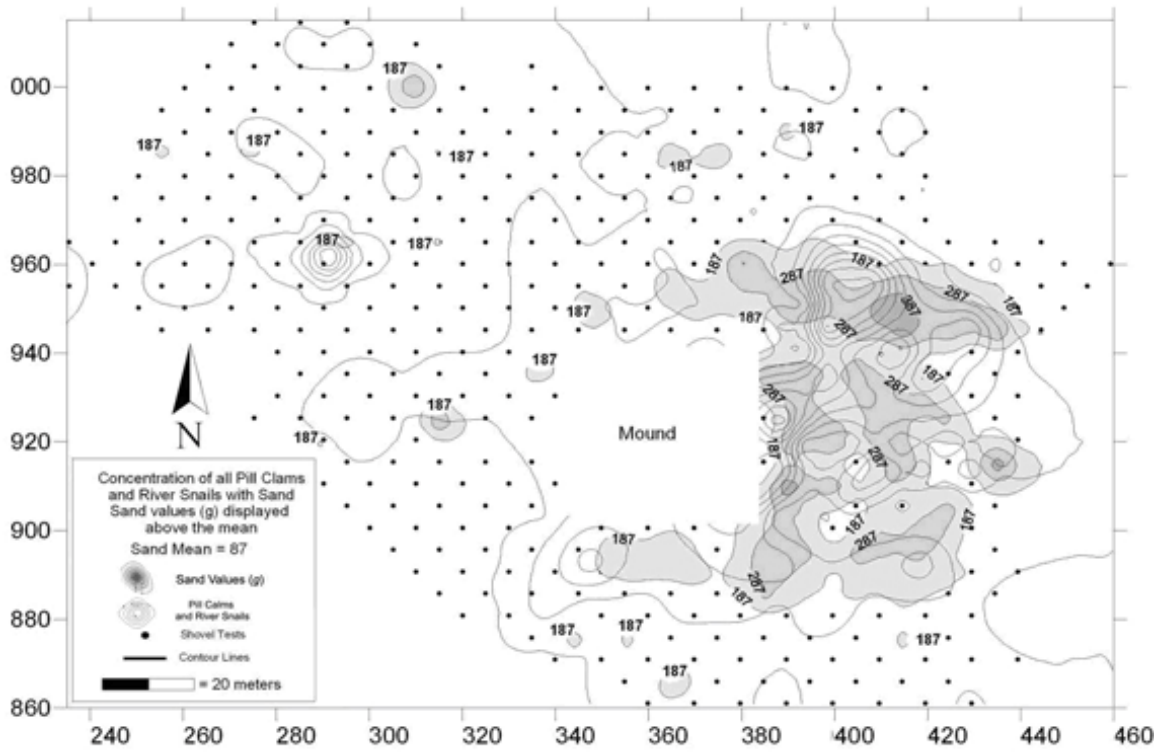

Figure 6.7. Distribution of Sand, Pill Clams and River Snails at Lyon's Bluff (22OK520). Distribution of Sand (g), Pill Clams and River Snails (#) at Lyon's Bluff. Sand contours begin at one standard deviation above the mean. Shell contours = 2 shells (from Figure 6.6).

Seriation of Pottery Types

A seriation employing ceramic temper types was done to examine the relative chronology of structures throughout the survey area. Each assemblage from structure locales reflects the ceramic values at one or more levels above the mean based on the shovel tests touching and/or intersecting the daub, sand, and shell contours (Figures 6.2, 6.4, 6.6). The seriation presented represents a ceramic assemblage defined by the presence of mussel shell-tempered, sand-tempered, fossil shell-tempered and grog-tempered pottery (Figure 6.8, and Table 6.1). The seriation is based on temper modes

because the very low incidence of decoration or surface treatments other than plain precluded the use of these dimensions.

The seriated assemblages form a temporal sequence, as fossil shell-tempered pottery is securely dated in Oktibbeha County to the Protohstoric period, after ca. 1500, with sand and grog-tempered pottery increasing after fossil shell temper reached its peak (Rafferty 2001:263). Assemblages C and H would not seriate and were removed.

The assemblages correspond with the locations of the different structures. Nine assemblages were seriated and ordered chronologically. Because there is fossil shell, grog, and sand-tempered pottery, these assemblages (except D) reflect a relatively short occupation during Protohistoric times. No clear spatial patterns over time in community layout are noted. This does not mean there were no settlement pattern changes: the concentration of Protohistoric ceramics from other areas of Lyon's Bluff (i.e., outside the palisade) has been noted in another work (James 2006). It means that during the occupation arbitrarily defined by the plowzone, no evident changes in community layout or site function occurred.

Table 6.1. Ceramic data used for seriation from Lyon's Bluff (22OK520).

Assemblage	Sand-Temper	Shell-Temper	FS-Temper	Grog-Temper	Total Sherds
A	5	34	4	0	43
B	8	49	1	0	58
C	16	148	2	4	170
D	2	91	1	2	96
E	3	65	4	1	73
F	1	35	3	5	44
G	2	40	10	0	52
H	11	114	8	0	133
I	2	155	14	0	171
J	6	153	13	1	173
K	0	76	6	0	82

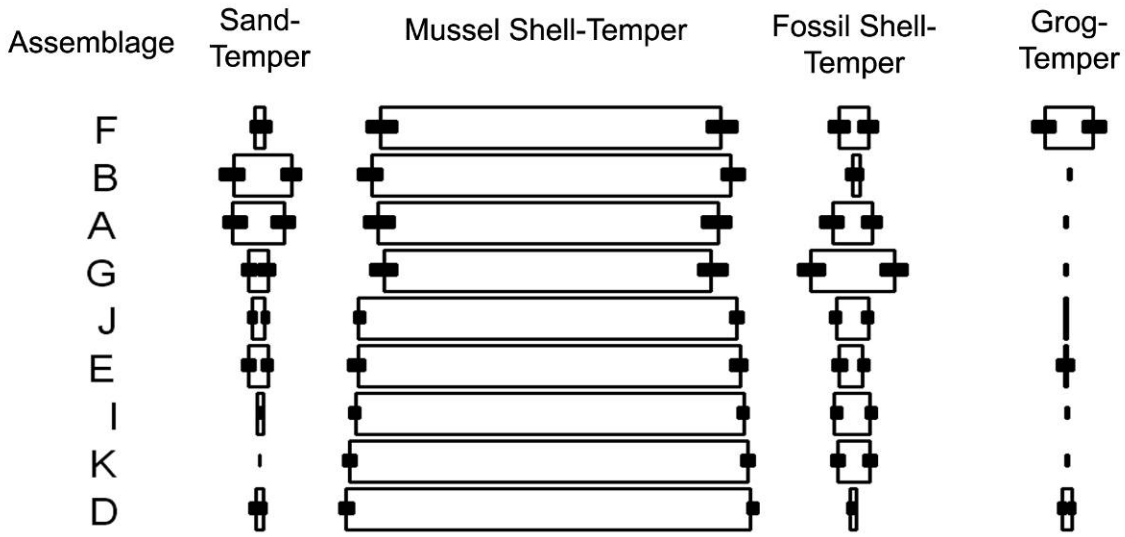

Figure 6.8. Frequency seriation of pottery by temper from Lyon's Bluff (22OK520).

The seriation, together with the pottery maps, shows that there is a change in use of the main site area, widespread midden in Mississippian and early in the Protohistoric

periods is followed by use of a series of large houses that circle this part of the site (Figure 6.9). There appears to have been little midden deposition at this time as the grog- and sand-tempered pottery is not widespread. Thus, the contrast between the map information and the seriation shows a distinct change in site organization. The plaza would seem to have been in use throughout the late Mississippian /Protohistoric.

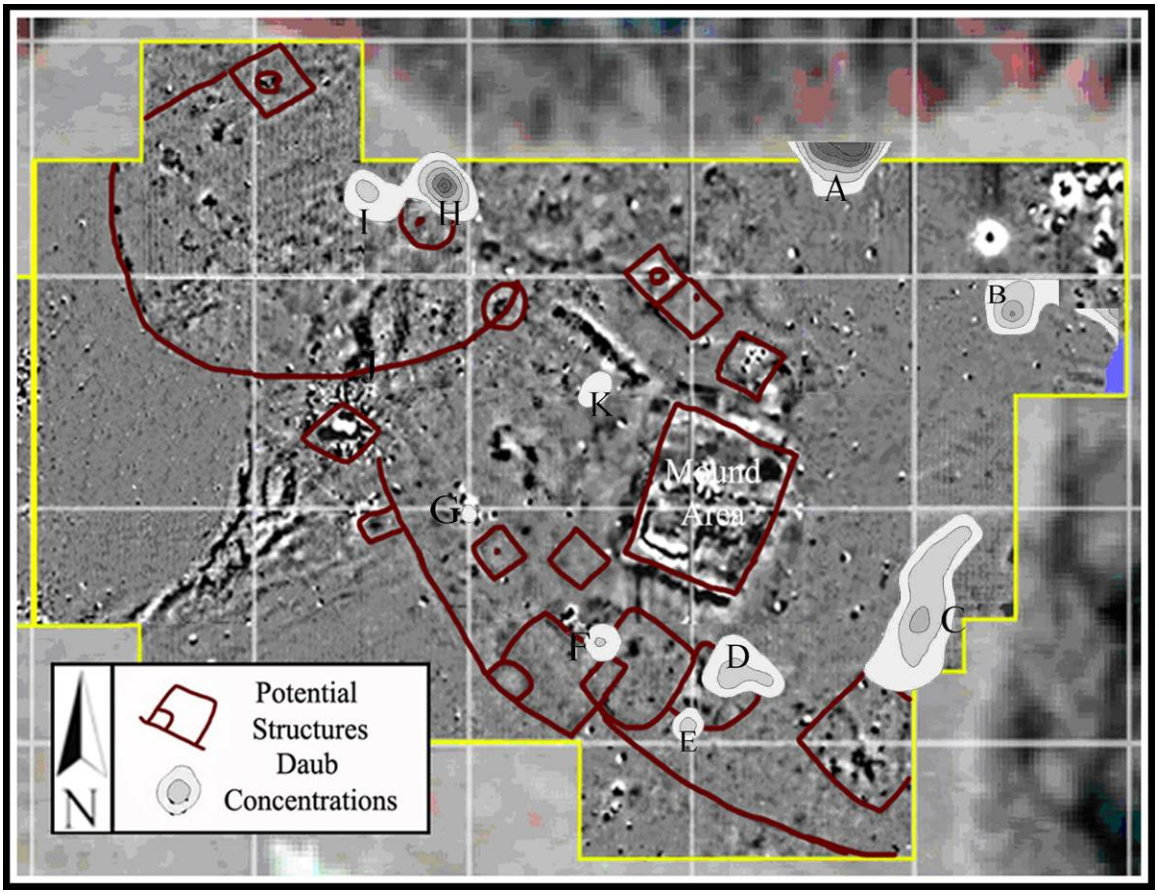

Figure 6.9. Magnetometer image showing probable structure features with identified probable structures identified by Daub, Sand, Pill Clam and River Snail concentrations.

Lithics

All lithics (Figures 6.10 and 6.11) were identified and separated into two basic material groups: chert and sandstone.

Specialized tools and artifacts provide evidence of site activities and may be associated with site features (Figures 6.10 and 7.1). They may also indicate different functional areas within the survey area. Shaped flaked stone and lapidary objects were plotted and their position was compared with potential structure floors. The shovel holes producing most of the microdrills were found in the northwest portion of the site are strongly associated with structures H and I. Based on the location of the microdrills and the seriation of the structures, this portion of the survey area was used to manufacture lapidary tools during the Late Mississippian/Protohistoric period.

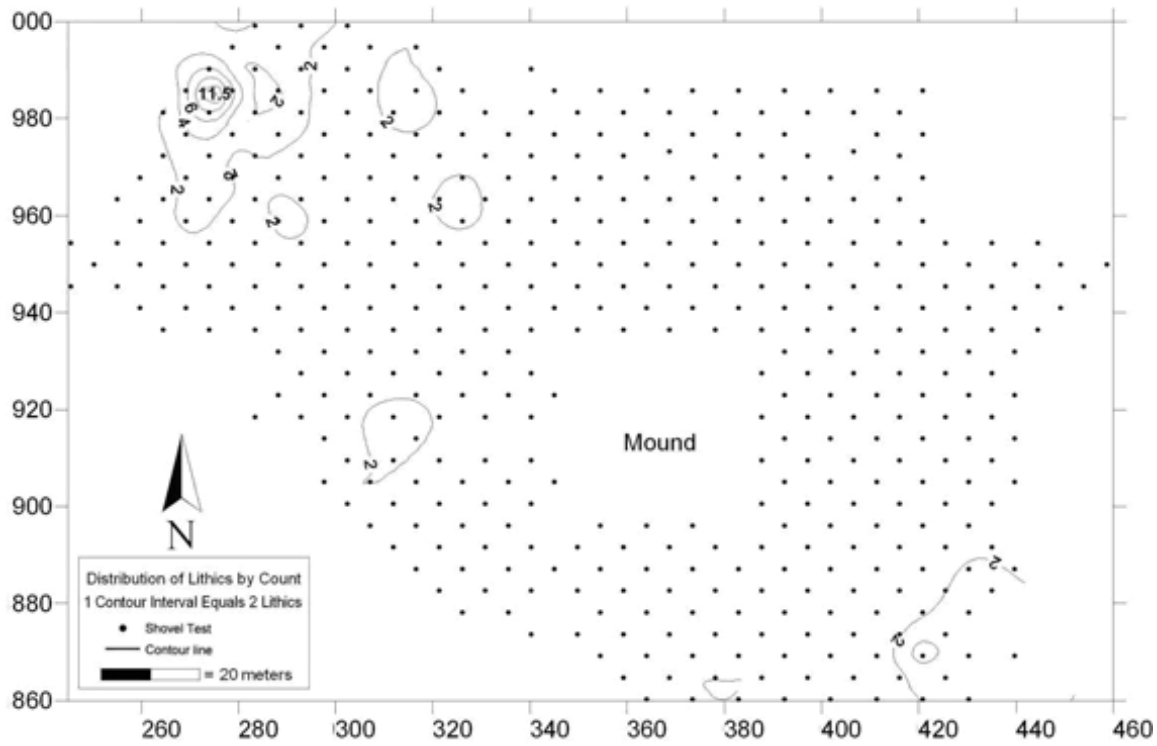

Figure 6.10. Distribution of Lithics at Lyon's Bluff (22OK520). Distribution of lithic materials throughout the survey area. One contour line equals 2 lithics. Note the heavy concentration in the northeast corner of the survey area

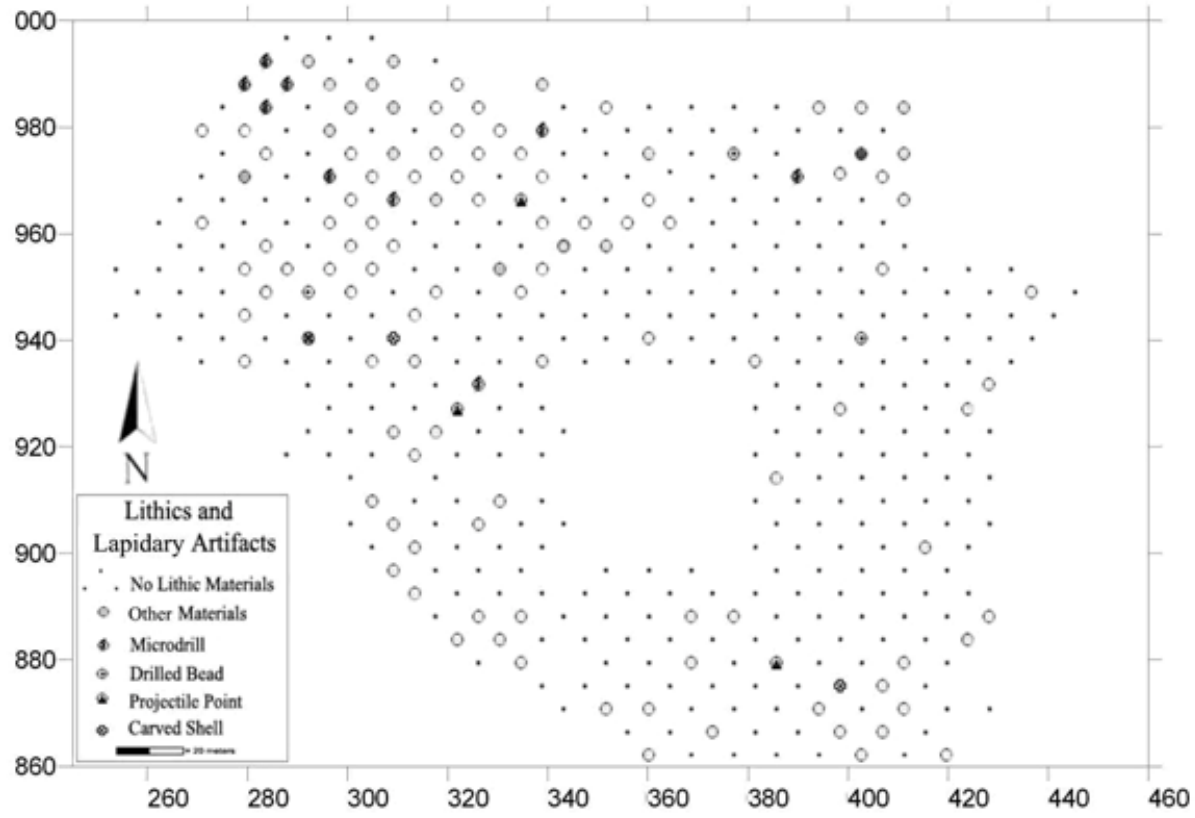

Figure 6.11. Lithic Materials and Diagnostic Artifacts at Lyon's Bluff (22OK520). Distribution of lithic materials and diagnostic artifacts throughout the survey area. Note the concentration of microdrills in the northwest portion of the survey area.

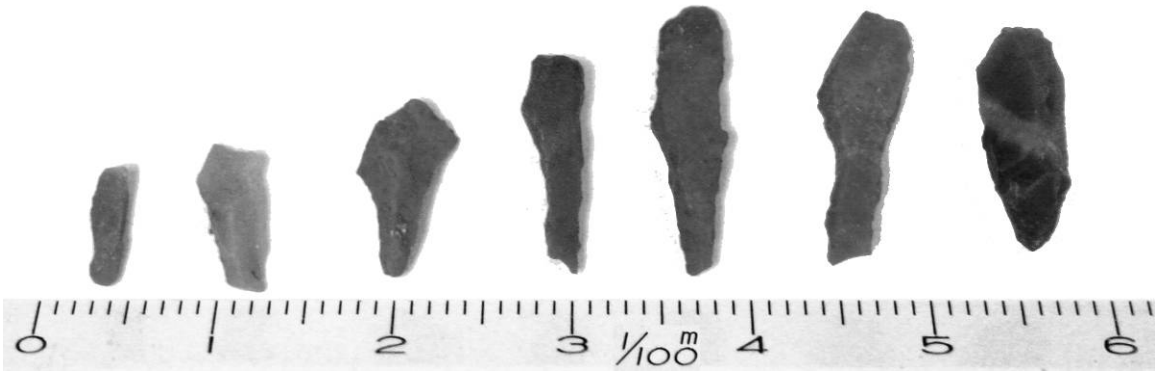

Figure 6.12. Several microdrill artifacts recovered from survey area.

CHAPTER VII

INTERPRETATION OF STRUCTURES

A total of eleven potential structures (Figures 6.2, 6.4, 6.8, and 7.1) were identified in the field containing the mound and palisade features, as defined by earlier fieldwork from Mississippi State University (Alvey et al. 2004; Peacock and Hogue 2005, Rafferty et al. 2003) at Lyon's Bluff. Also noteworthy is the gentle slope which extends from the mound east and northeast. This area is a suspected 'plaza' area, as noted by Carlock (2006). The plaza gently slopes eastward from the mound approximately 50m along the east-west axis and roughly 90m along the north-south axis. The hypothesis that this area was a plaza is supported by sand, pill clams, and river snails, which are at their highest concentrations in this area. The suspected plaza area is also almost completely void of pottery, daub, and lithics.

Structure A is located in the tree line at 75N/35E in the northeast corner of the project area, adjacent to Line Creek. The daub concentration is six times the mean. There is a very high concentration of pottery in the locale (Figure 8.1). Ceramics associated with Structure A are predominantly sand-tempered. Evidence of Structure A does not appear on the gradiometer image as it is located outside of the image survey area.

Structure B is located in the northeast section of the project area. The sand and river shell(s) associated with the Structure floor B are not significantly different than that of the presumed plaza area 10m–15m to the southeast. However, the concentration of daub and ceramics around this potential structure floor contrasts with those of the plaza to the southeast; daub concentrations four times the mean `were found at the edge of the shovel-test grid. This potential structure is located at the northeastern edge of the plaza. Shovel testing was avoided north of Structure B, as this area was extensively tested by Richard Marshall in the late 1960's and early 1970's. The disturbances can be seen in the northeast corner of the gradiometer image (Figure 3.2). Ceramics associated with the Structure floor B are mostly mussel shell-tempered, and the 2nd most common temper is sand (Figures 8.3 and 8.5).

A third prospective structure, Structure C, is located in the southeast of the survey area approximately 60m southeast of the datum and 25m west of Line Creek. Daub concentrations two standard deviations above the mean cover an area approximately 450m^2. The center of this area contains daub three times the standard deviation above the mean. The artifact concentrations place this potential structure at the edge of the plaza area. The levels of sand and pill clams and river shell from this area are similar to the levels farther east and north. However, the level of daub, ceramics, and other artifacts greatly diminishes north and east of this area. Sand-tempered ceramics twice the standard deviation are associated with daub. Mussel shell-tempered ceramics one standard deviation above the mean are also associated with daub. Given the size of the daub concentration, it may be that two structures are represented here. There are disturbances on the southeast corner of the gradiometer image likely associated with

Structure C. A large rectangular structure is interpreted on the gradiometer image here (Figure 6.9).

Two potential structures located south of the mound are visible as large areas of daub two standard deviations above the mean. One concentration is near 37S 33E and is labeled Structure D; the other at 50S 0E is Structure E. Near structures D and E are small isolines representing daub one standard deviation above the mean weight. These contours likely represent repeated use of this area for house/structure construction. The sand, pill clams, and river snails associated with these structures are indistinguishable from the southern portion of the mound. A few sand-tempered pottery one standard deviation above the mean is associated with both Structures D and E. Shell-tempered sherds are associated with Structure E. There are slight disturbances on the southern portion of the gradiometer image which correspond to the locations of Structures D and E. Structure D seems to correspond to a rectangular structure outlined on Figures 3.2 and 6.9.

Structure F is located approximately 35m southwest of the datum at 30S 20W and is indicated by daub two standard deviations above the mean. The amount of sand, pill clams, and river snails associated with this structure is similar to that in the area of structures D and E. Ten meters west, however, there is an abrupt change in artifact density. Contrasting artifact densities place this potential structure at the southwestern edge of the mound. North and south of this area are smaller concentrations of daub one standard deviation above the mean (Figure 7.1). These contours likely represent repeated use of this general area for house/structure construction. There is evidence of Structure F

on the gradiometer image. A concentration of grog- tempered is associated with this potential structure.

Structure G is situated near 0N 40W. The quantity of daub associated with this is only one standard deviation above the mean; however, the area coincides with a possible structure identified on the gradiometer image (Figures 3.2 and 6.9). Adjacent to the daub concentration is a concentration of sand two times the standard deviation.

Structure H is situated near 70N 50W at the edge of the tree line in the northwest corner of the project area. This area contains daub levels six times mean. This area is on and adjacent to an unimproved road used to enter and egress the area containing the Lyon's Bluff mound. Proximity to the road and the tree line along the northern edge of the project area are likely to have reduced the effects of plowing and other ground altering events. Southeast and southwest of prospective Structure H are smaller concentrations only one standard deviation above the mean weight. It is likely that these smaller concentrations represent daub from other structures and repeated use of this general area for house/structure construction. Structure H is associated with mussel-shell and fossil- shell tempered ceramics one standard deviation above the mean and sand tempered ceramics twice the mean. This area is only partially covered in the gradiometer image.

Twenty meters west of Structure H is potential structure I. Structure I is indicated by daub levels twice the mean at 70N 70W. Structure I shares its lowest contour line value with Structure H. The lowest contour only represents one standard deviation above the mean but is an indication that this area was used repeatedly for house/structure construction. Further evidence of episodic construction is seen in the artifact distribution.

A large concentration of pill clams and river snails four times the mean is situated approximately 10 meters south of structures H and I. There is no obvious indication of Structures H and I on the gradiometer image, but they appear to be close to the circular structure shown on Figures 3.2 and 6.9. There are signs of some type of disturbance west of the circular structure on the gradiometer image. This may be partially due to farm related use of the access road located immediately north of the area. Two large concentrations of daub one standard deviation above the mean are located 20 and 40 meters southwest of Structure H. Structure I is associated with mussel shell- and fossil shell-tempered ceramics one standard deviation above the mean.

Structure J is located northwest of the mound near 35N 65W. The sand and daub values are only one standard deviation above the mean, however the number of pill clams and river shells associated with this area is associated with the deposition of sand. Structure J may have been situated immediately behind the northern palisade, although more work is needed to verify this (Figure 7.1).

Structure K is located northwest of the mound near 15N 25W. The sand and daub values are only one standard deviation above the mean. There is clearly an indication of some type of structure visible on the gradiometer image (Figures 3.2 and6.9).

There are a few small daub concentrations north and northwest of Structure K. The gradiometer image shows several anomalies but they were not identified as structures because there was not enough artifact evidence to support this. As with Structures H and I, this area is very close to the access road located immediately north of the area. Disturbances to this portion of the site from farm related use could have affected artifact recovery.

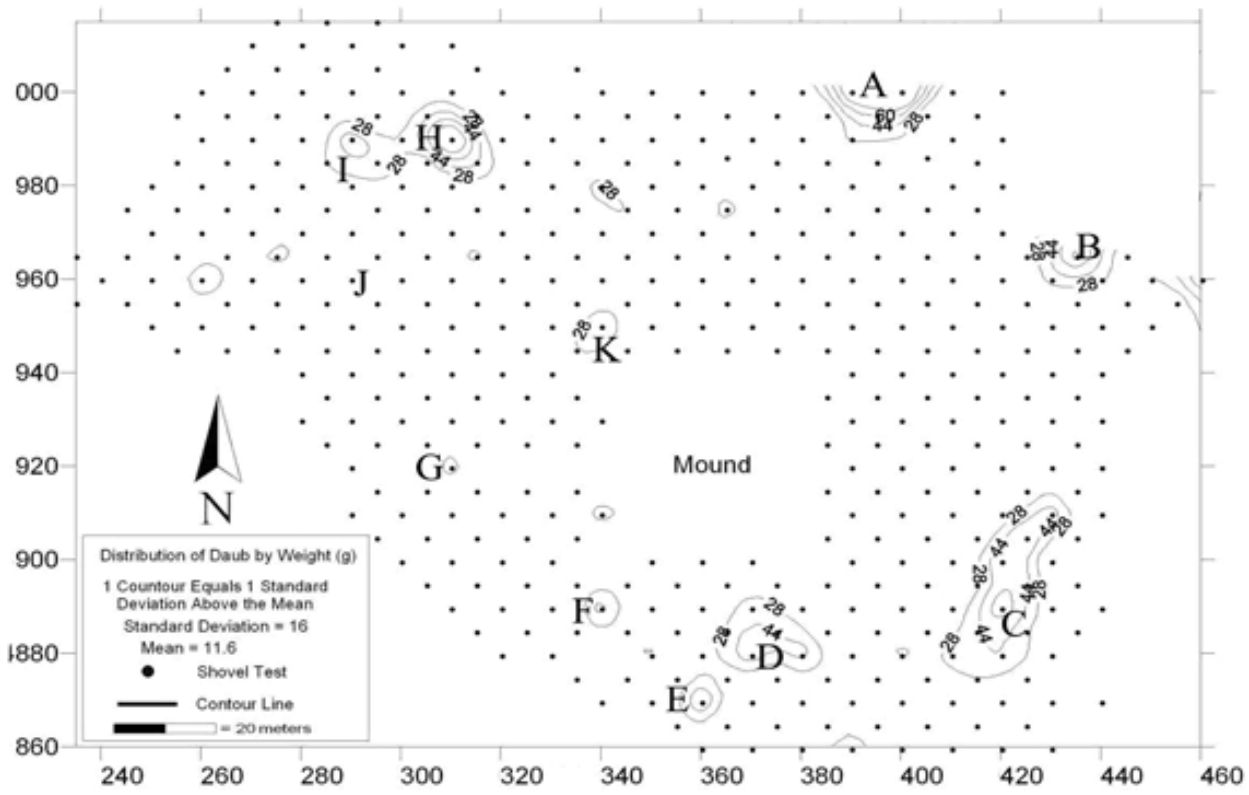

Figure 7.1. Distribution of Daub by weight (g) at Lyon's Bluff (22OK520). Isomap showing daub concentrations (*g*) thought to be associated with potential prehistoric structures. Contour levels begin at one standard deviation above the mean. Contour interval represents total grams of daub

CHAPTER VIII

CHRONOLOGY AND CHANGE IN SETTLEMENT ORGANIZATION

Ceramics were analyzed using the temper/surface finish system. Ceramic temper/surface varieties were used to provide an average date for the plowzone materials based on styles. A primary reason for using the temper/surface finish system is that comparability with previous ceramic analysis is maintained (Peacock and Hogue 2005). The types of temper identified are mussel shell, fossil shell, grog, and sand. The distribution of all pottery is shown in Figure 8.1.

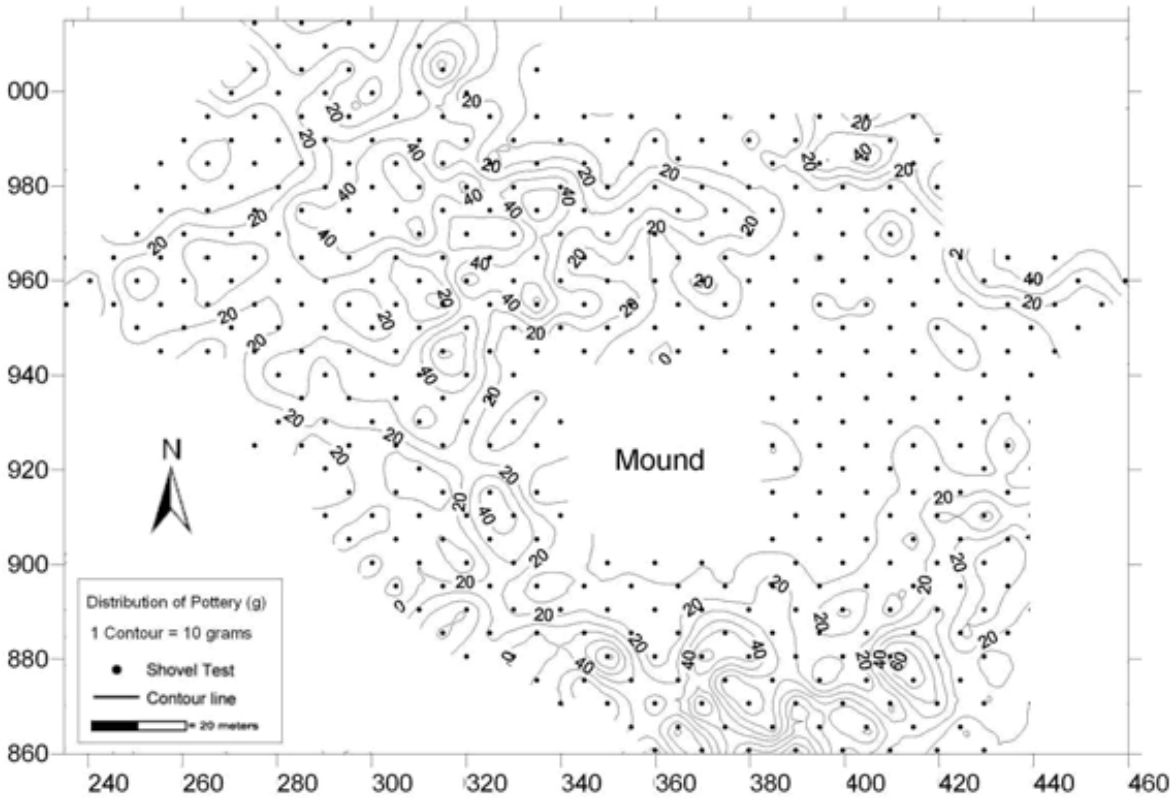

Figure 8.1. Distribution of Pottery by Weight (g) at Lyon's Bluff (22OK520). Distribution of all pottery by weight (*g*) throughout the survey area. One contour line equals10 grams of pottery. Note the general absence of pottery east/northeast of the mound.

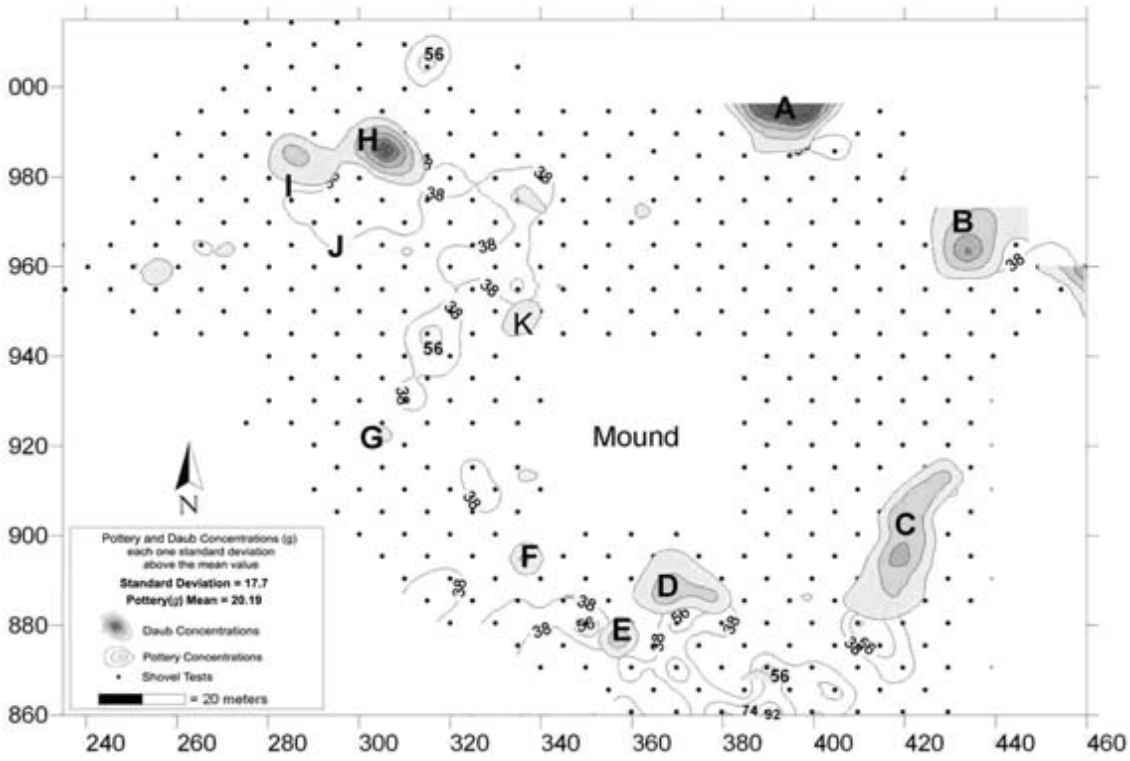

Figure 8.2. Distribution of all Pottery and Daub at Lyon's Bluff (22OK520). Isomap showing distribution of all pottery by weight (*g*) with daub concentrations (*g*) throughout the survey area. One contour interval represents one standard deviation above the mean.

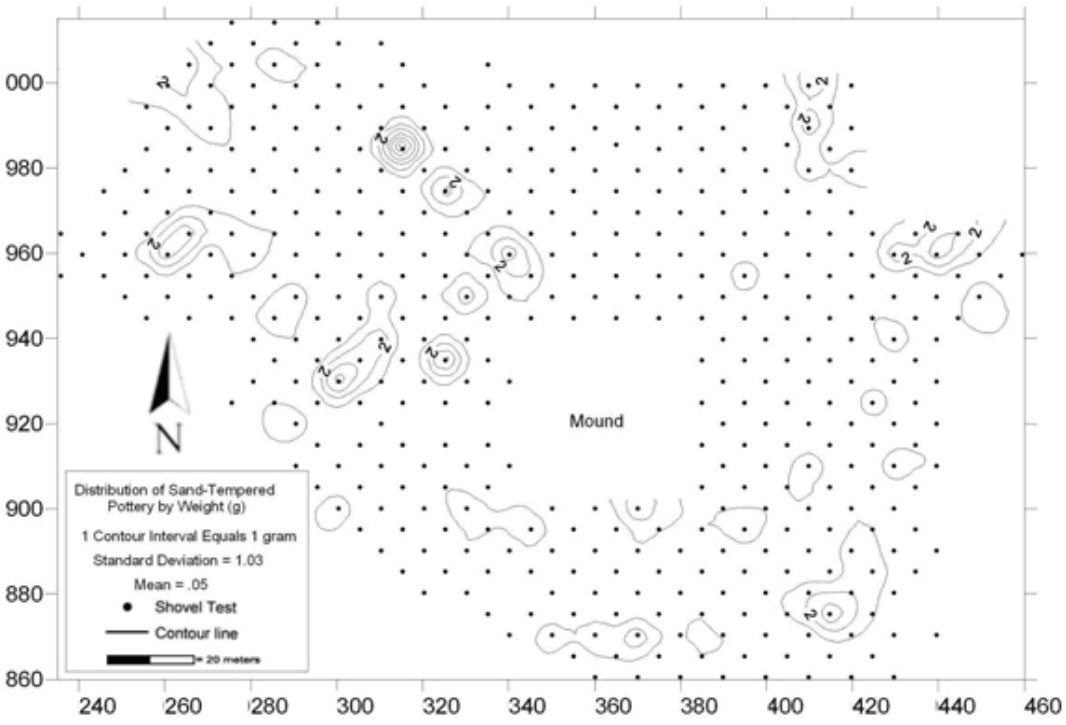

Figure 8.3 Distribution of Sand Tempered Pottery at Lyon's Bluff (22OK520). Isomap showing distribution of all sand-tempered pottery by weight (g) throughout the survey area. One contour interval equals 1gram of pottery.

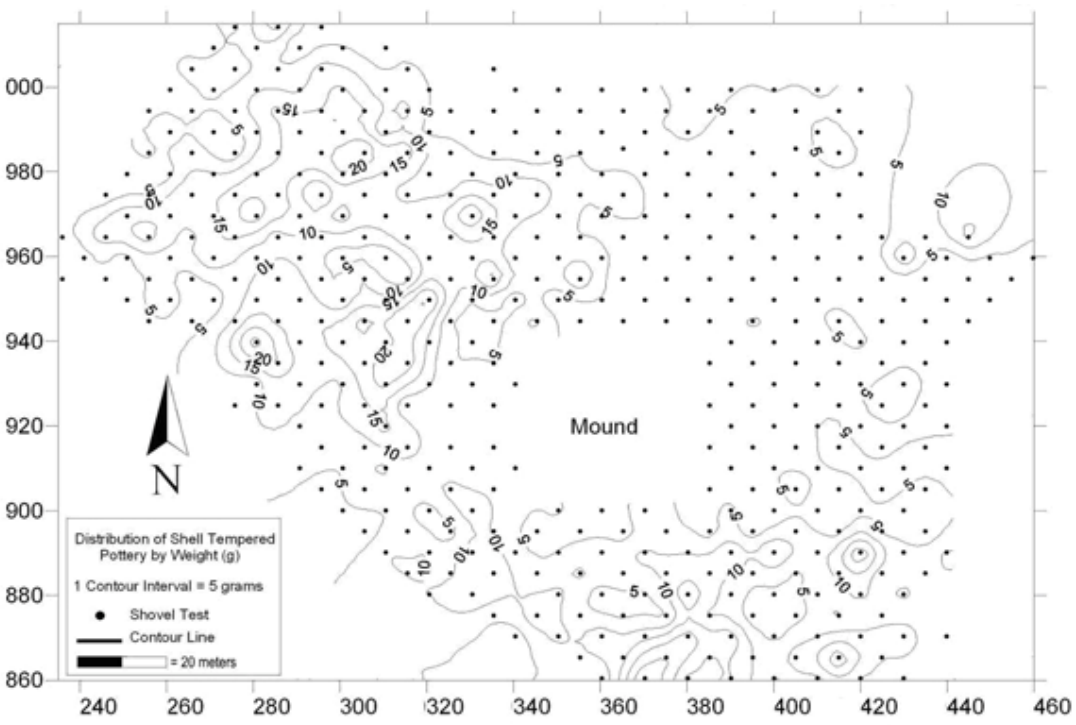

Figure 8.4 Distribution of Mussel Shell Tempered Pottery at Lyon's Bluff (22OK520). Isomap showing distribution of all mussel shell tempered pottery by weight (g) throughout the survey area. One contour interval equals 5 grams of pottery.

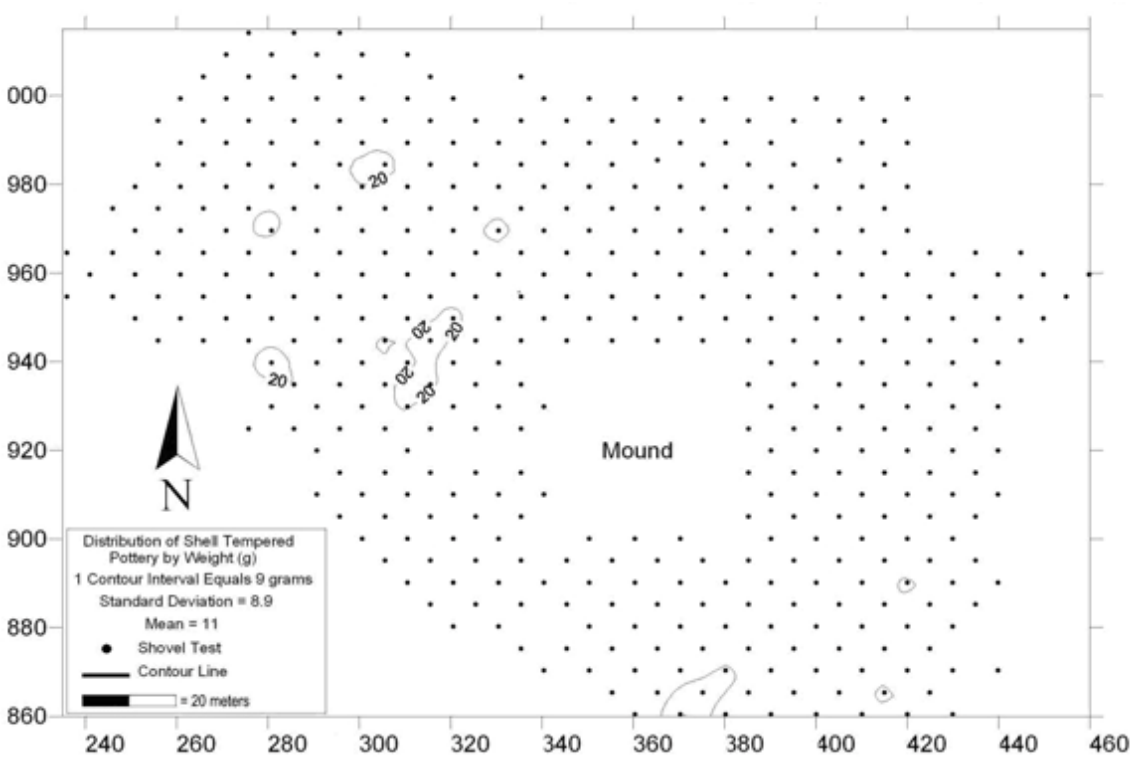

Figure 8.5. Distribution of Mussel Shell Tempered Pottery at Lyon's Bluff (22OK520). Isomap showing distribution of all mussel shell-tempered pottery by Standard deviation throughout the survey area. One contour interval equals one standard deviation above the mean.

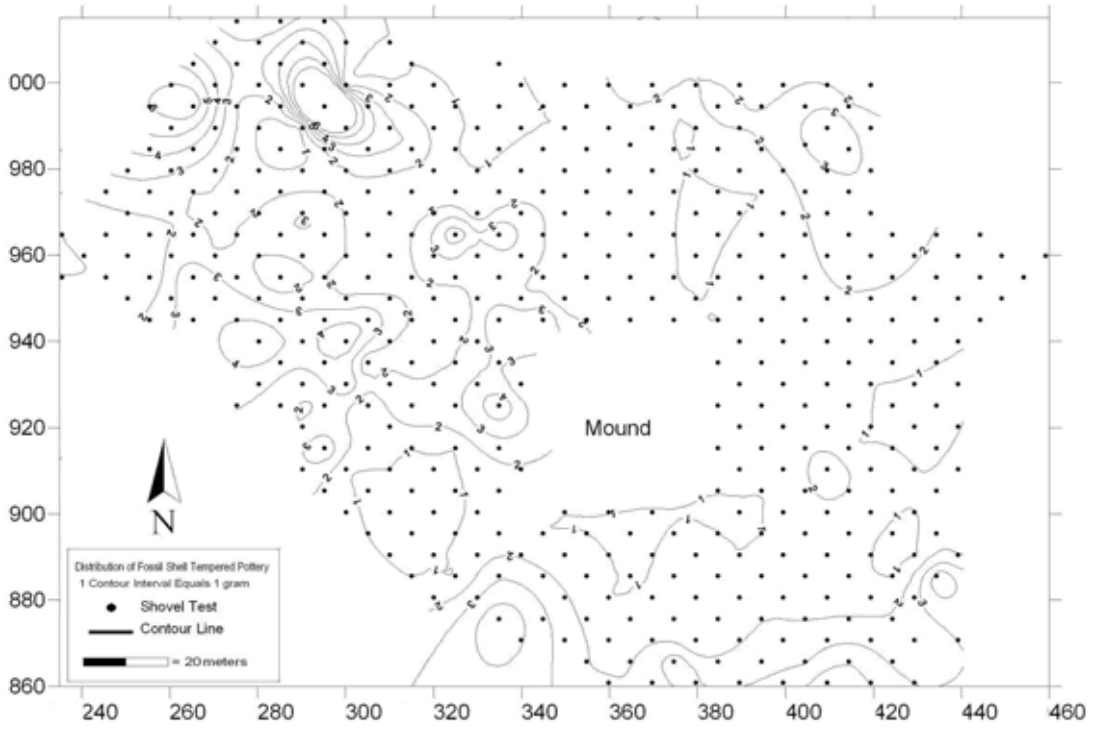

Figure 8.6. Distribution of Fossil Shell Tempered Pottery at Lyon's Bluff (22OK520). Isomap showing distribution of all fossil shell tempered pottery by weight (g) throughout the survey area. One contour interval represents one sherd.

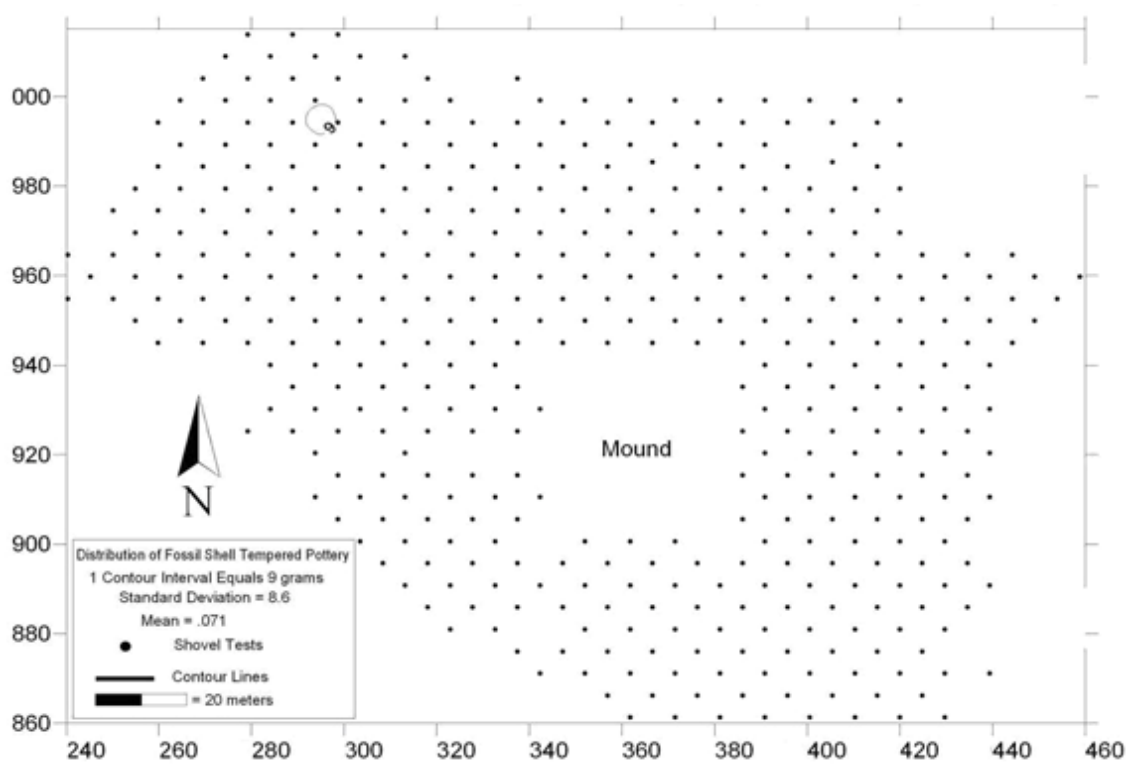

Figure 8.7. Distribution of Fossil Shell Tempered Pottery at Lyon's Bluff (22OK520). Isomap showing distribution of all fossil shell tempered pottery by weight (g) throughout the survey area. One contour interval represents one standard deviation above the mean

Ceramics with fossil-shell inclusions were identified as fossil shell-tempered (Figures 8.6 and 8.7). Grog-tempered ceramics were identified by the presence of any fired or dried clay particles. Grog inclusions are easily recognized since they are generally lighter in color than the surrounding ceramic matrix (Peacock 1997, 2003) (Figures 8.8 and 8.9). If neither grog nor any other inclusive particles, other than sand, were present, then the ceramics were classified as sand-tempered (Figure 8.3).

The lack of mussel shell sherd concentrations presumably indicates the presence of the widespread Mississippian midden, especially west and south of the mound. The same is

true for fossil shell-tempered sherds, indicating a widespread Protohistoric midden. In contrast, the sand and grog tempered sherds are more concentrated.

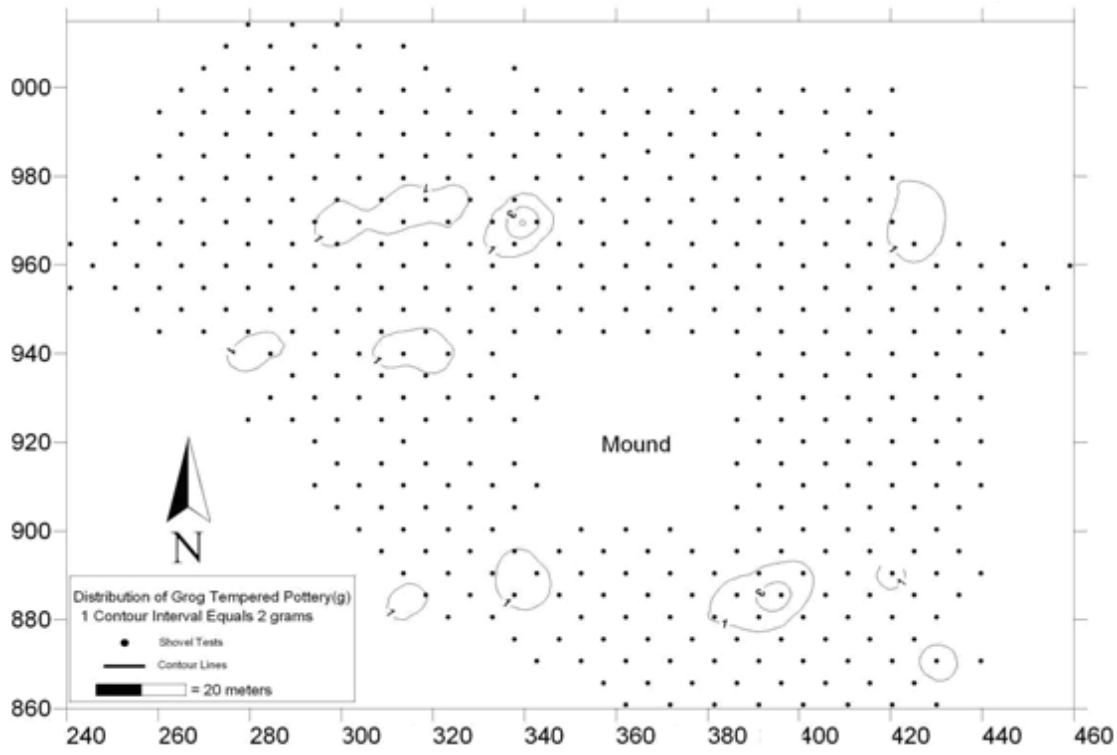

Figure 8.8. Distribution of Grog Tempered Pottery at Lyon's Bluff (22OK520). Isomap showing distribution of all grog tempered pottery by weight (g) throughout the survey area. One contour interval represents two grams.

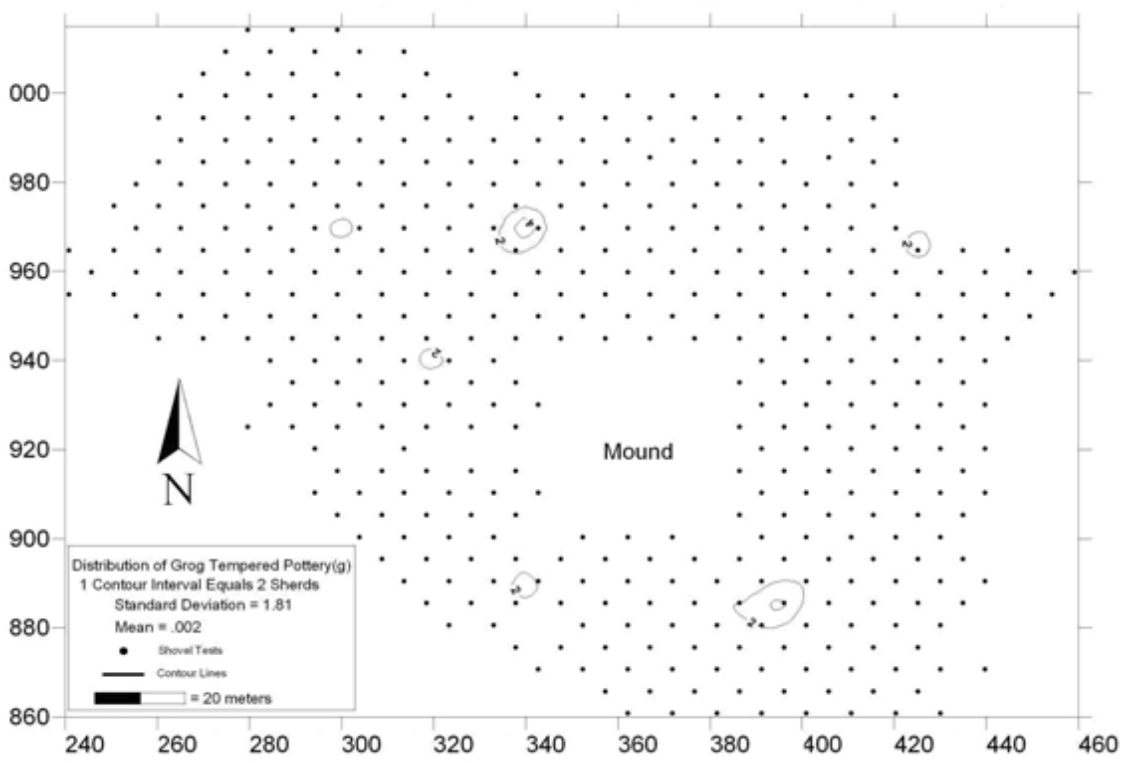

Figure 8.9. Distribution of Grog Tempered Pottery at Lyon's Bluff (22OK520). Isomap showing distribution of all grog tempered pottery by weight (g) throughout the survey area. One contour interval represents one standard deviation above the mean

CHAPTER IX

COMPARISON TO OTHER MOUND SITES

Archaeologists have been dealing with ideas of community size, level of development, and authoritative power for decades. This subject is brought up regularly in the Southeast in regards to community activity, settlement patterns and regional chronology. For this discussion, a farmstead is considered to consist of one to a few households (≤ 4) that relied primarily upon small-scale agriculture supplemented with hunting and gathering (Rogers 1995:7-23). According to traditional models (e.g., Blitz 1993), groups of farmsteads or transitory camps were usually based near and were economically involved with local mound centers. Local mound centers, depending on their authority, could direct cooperative efforts that benefited the outlying populations through the redistribution of food surpluses and desired materials.

Lubbub Creek Cutoff (1PI33)

The Lubbub Creek Cutoff (1PI33) is a Mississippian to Protohistoric period (A.D.900 –1600) site located within the Black Belt physiographic province of the Gulf Coastal Plain in western Alabama (Figure 9.1). Lubbub Creek is one of several dozen mound sites located along Lubbub Creek, a major tributary of the Tombigbee River (Blitz 1993a:31-33). The linear 'network' of sites is considered to be generally

contemporaneous with the dates of the Mississippian period and is further subdivided into regional phases in order to discuss the archaeological culture history (Blitz 1993a:33-34). Realistically however, any detailed study should consider each site to be a unique cultural phenomenon with its own specific history (Rafferty 1996:230).

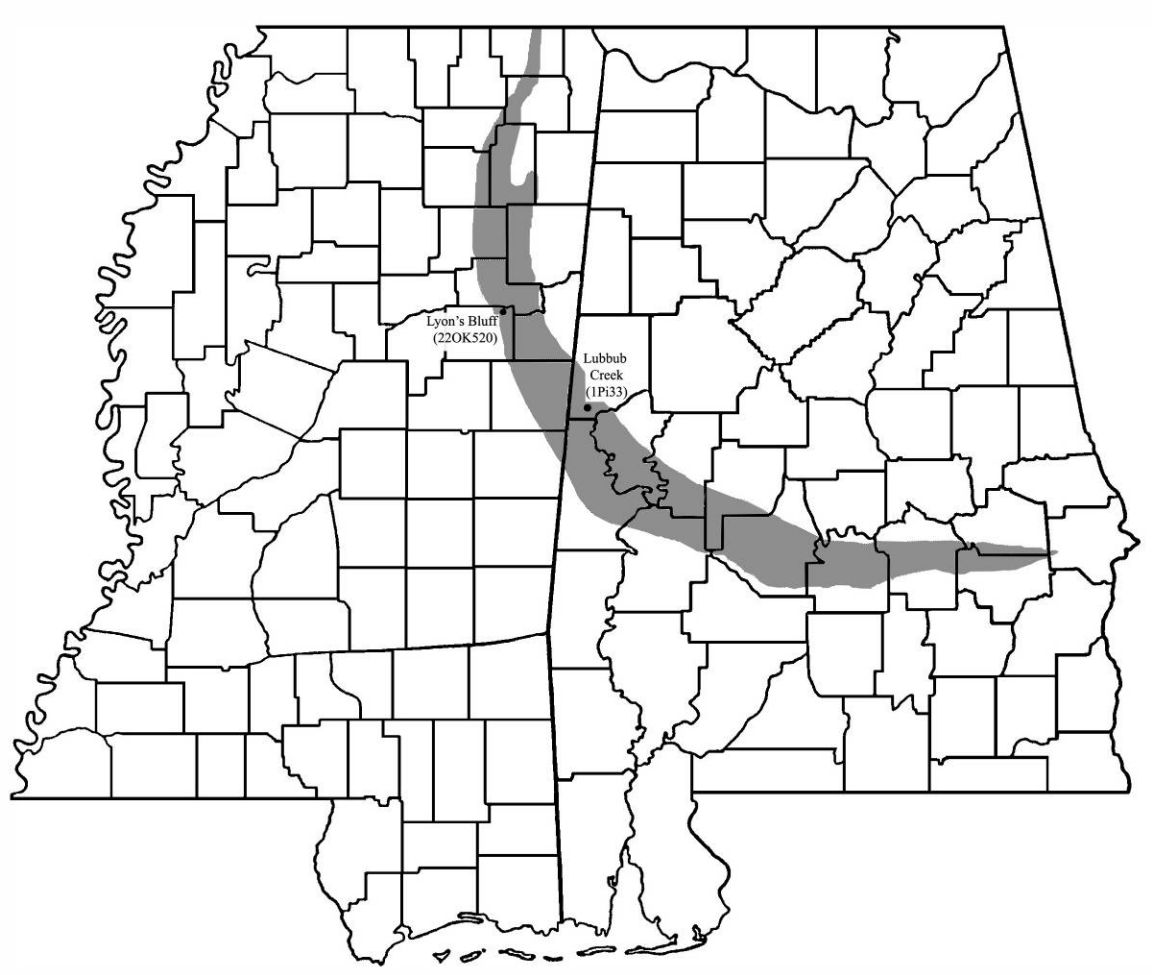

Figure 9.1. Location of Lubbub Creek (1PI33) and Lyon's Bluff (22OK520) within the Black Prairie region of Mississippi and Alabama.

Late Mississippian/Protohistoric sites situated along the Tombigbee River in Mississippi and Alabama are designated Summerville IV phase (A.D. 1450/1500-ca.

1600) (Blitz 1993a:51). The Late Mississippian/Protohistoric Summerville IV occupation at Lubbub Creek has been discussed at length in reference to political structure and socio-economic relation to Moundville (Blitz 1993a:126-127). This is primarily done by the identification of accepted Mississippian goods such as copper, shell, diagnostic stone, ceramic artifacts, and the analysis of their quantity and range of distribution between the sites. One of the principal kinds of artifacts discussed at the Lubbub Creek site is the various types of pottery recovered. Vessel forms produced during this time show little change from earlier phases, but there are notable changes in appliqué and surface decoration. Examples of these changes include 'punctation, vertical incision from the lip, and rare painted decorative treatments', but the majority of the ceramic assemblage typically is plain (Blitz 1983:128-129; 1993b:51).

The chronology of Summerville IV is poorly understood, particularly when it ended. "The Protohistoric ceramic chronology in the central Tombigbee region still requires a great deal of basic sequence definition coupled with more absolute dates" (Blitz 1993a:51;). Radiocarbon dates from Lyon's Bluff correspond to the dates of occupation at Lubbub Creek (Marshall 1977:53-57; Peacock and Hogue 2005).

The community at Lubbub Creek relied on sedentary agricultural practices as a primary means of subsistence. Changes in community organization over time are seen in a large defensive ditch. The ditch is an addition to a defensive palisade which had been built, maintained and expanded around the community area for defense. Structures and pits at Lubbub Creek are more prevalent during the Summerville IV phase because the ditch and palisade reduced the area of settlement to four hectares, with the mound still functioning as the center of the community (Blitz 1993a:118-119).

The ceramic distributions at Lubbub Creek were examined using (1) large-scale intrasite distribution; (2) mound and village samples; and (3) sets of features referred to as household clusters. These varying measures were chosen to better discuss ideas of specific social and behavioral practices (Blitz 1993a:128).

Ceramics at Lubbub Creek were first examined in terms of those associated with the mound versus those associated with the village. (Blitz 1993a:93,135). The mound and village ceramics at Lubbub Creek showed no significant differences in the proportions of vessel shapes or in the ratio of serving to cooking wares, something also true at Moundville. At both sites, a small proportion of ceramics demonstrated important differences between mound and village vessel sizes, which is consistent with the mounds' proposed function as centers of community rituals or feasts. Ceramics from the mound at Lubbub have a more restricted range of vessel size and are disproportionately larger than the village samples (Blitz 1993b).

At Lubbub, ceramic distributions were further analyzed at the intra-site level between structures. Clusters of structure features were identified by clay floors, post holes, hearths, graves, pits, and small sheet middens. Several structure features were identified but were not used because subsequent occupations obscured feature characteristics. "Only the most spatially distinct household clusters were used in the analysis" (Blitz 1993a:136). It is uncertain whether the house features from any one occupation are coeval, yet they clearly represent a single period of occupation at Lubbub Creek, if an occupation is understood to be an artifact at the scale of assemblage that shows continuity in space, time, and form (Rafferty 2001:347).

The household clusters throughout the Summerville phases at Lubbub Creek are similar in terms of design, orientation and material remains.

Blitz (1993a:136) describes these houses:

> Oak and pine were the source of the poles used in the framework, and impressions on fired daub indicate that these structures were covered with a sheathing of cane. There is little direct evidence about the form of the roof. The absence of interior post molds indicates that most structures were of flexible pole construction in which the pole framework bent inward and lashed together at the top to form a dome-shaped structure.

Each house feature produced similar artifacts used for hunting and agricultural practice. Lithic tools and debitage were not abundant at Lubbub Creek. These circumstances have been frequently noted at late prehistoric sites where inhabitants relied on wood, bone and other degradable materials. It also appears to be the case at Lyon's Bluff (Peacock, personal communication). Some of the house features also produced chert microdrills thought to have been used in the manufacture of shell beads (Blitz 1993a:136-137).

In order to gain a better understanding of function between the house features, Blitz attempted to compare the type and diversity of ceramics by the different house feature locations, but this effort was later abandoned as there is no effective method available to solve the equifinality problem of changes in pottery style, function, or duration of use.

Bessemer Mound Site (1JE12-14)

The Bessemer site (1JE12-14) is an early Mississippian period (A.D.1000 –1200) site located southwest of Birmingham, Alabama and approximately 50 kilometers northeast of Moundville. The site is situated west of Valley Creek, a major tributary of the Cahaba River, and contains three mounds and a living area. The Smithsonian did preliminary excavations in the 1880s. Subsequent excavation units and trenches were done on the three mounds and throughout the site by the University of Michigan and Birmingham-Southern College field schools and the Works Progress Administration in the l930's and 1940's. Most of the information known about this site comes from the work done during this period (DeJarnette and Wimberly 1941:1-2; Welch 1994:1).

Centrally located in the site is an oval-shaped mound (1JE12). The oval mound can be described as an oval platform with a small mound on the end. The oval-shaped base is approximately 43 meters long, 30.5 meters wide and 5 meters high. "The height of the upper mound, which is on the smaller (western) end of the platform, is about 2 meters and the diameter of the flattened top is about 9 meters. The western slope of the smaller mound is continuous with the oval platform" (Rafferty 1995:126; Welch 1994:3).

Between 1934 and 1935, 1JE12 was completely excavated by Carl Guthe, David DeJarnette, and Steve Wimberly. DeJanette observed four episodes of mound construction with contemporaneous structural occupation and evidence. The structures are described as being square or rectangular shaped with many posts set closely in wall trenches (Welch 1994:5).

The burial mound (1JE13) is located about 200 meters east of 1JE12, adjacent to Valley Creek. The base of the mound is somewhat oblong measuring roughly 18 x 27

meters, and being about 2 ½ meters high. Excavations and trench profiles of JE13 revealed several episodes of mound building concurrent with mortuary activity. The site report notes that beneath the mound there were a series of singly set posts in a diamond-shaped pattern. "This diamond enclosed the primary mound, but it is not clear whether the area was fenced previously or at the same time as the mound"(Welch 1994:10). In a refuse pit feature next to the first mound construction stage, several types of Moundville Incised var. pottery were found. The sherds establish the use of two types of Moundville Incised pottery before the final stage of the mound (Welch 1994:10).

The westernmost earthwork (1JE14) is a rectangular platform mound. It is approximately 80 meters long along its north/south axis and approximately 60 meters wide along its east/west axis, with a height of 3.4 meters. While much of the Smithsonian site information contrasted with the recordings taken in the 1930's, both sets of investigations opined that 1JE14 contained many structures (Welch 1994:7-8). 1JE14 showed at least five episodes of mound construction which broadened and raised the mound, each with structural evidence and episodes of rebuilding. The latter stages were difficult to delineate due to erosion, farming, and historical digging, which disturbed feature boundaries (Welch 1994:8-9).

DeJarnette and Wimberly excavated numerous 10 x10 meter excavation units adjacent to 1JE14. These were downplayed in the final report because the research methods of the time used stratigraphic layers and artifact variation to identify cultural horizons, and there were no defined strata within the plowzone. Portions of the plowzone adjacent to 1JE14 were stripped to expose structural remains. Beneath the plowzone numerous square and rectangular wall trenches were recorded, in addition to a set of

posthole stains forming a roughly circular-shaped fence line. The recorded wall trenches and posthole features below the plowzone were easy to identify and chronologically arrange. However, features within the plowzone were not clearly identified and their distance from the individual mounds made it impossible to determine their stratigraphic relationship. Wimberly noted in a 1939 progress report, "that the presence to sherds with two different tempers indicated two separate cultures. The village midden has been nearly obliterated by plowing and it is doubtful whether any stratigraphy can be worked out'" (Welch 1994:9).

Reexamination of the structural diagrams around JE14 show structural evidence prior to its construction and, as mound development changed, structures began to be oriented closer to the mound. Many structures contain no evidence of trash pits, fires or hearths, which suggests that they were not used at living areas. In addition, a comparison of the stratigraphy of the three mounds and sub-mound features supports the idea that there were structures present prior to any mound construction and that three mounds were constructed around the same time (Welch 1994:13-14).

Many reports have been written about the Bessemer site and its relation to the understanding of Late Woodland/Early Mississippian settlements. The Bessemer site used to be considered a very early Mississippian site subsidiary to Moundville, based on similar pottery styles (Bozeman 1982:39, Steponaits 1983:167-168). However its distance from Moundville and different environmental surroundings were cause to question this interpretation. "Today there is a better understanding of Moundville's internal chronology and applying that to Bessemer indicates that the Bessemer site has an earlier and longer history. The Bessemer site is now considered to be an adjacent

Mississippian chiefdom or polity showing some similarity to Moundville and perhaps being subject to Moundville's economic control" (http://museums.ua.edu/oar/NEH /JeffCo/Bessemer.html).

The White Mound Site (1HA7)

The White site (1Ha7) is located about 35 kilometers southwest of Tuscaloosa, Alabama along a relict levee at the south end of an oxbow lake. The site consists of a single rectangular mound and village covering 1.3 hectares. This mound site is one of six similar single mounds located in relative close proximity to Moundville. Excavations were conducted by Walter B. Jones and David DeJarnette of the Alabama Museum of Natural History (AMNH) in the winter of 1930-1931. Unfortunately, no site map was made and the precise location of the excavation is unknown. A total of 29 burials were excavated, some with accompanying artifacts. Pottery from the excavations was also retained (Welch 1991:34-39).

In 1979 Christopher Peebles's University of Michigan Museum of Anthropology (UMMA) Moundville project conducted further excavations in order to define the site boundaries. The excavations revealed that the mound was constructed in two episodes with a succession of overlying, prepared sand floors atop the initial mound summit. The summit was between 1½ and 2 ½ meters high, although its shape and boundaries were undeterminable. The second construction episode created a split-level rectangular mound nearly 3 meters high, extending 44 meters along its east-west axis and 36 meters along the north-south axis. The western summit was about 50 centimeters higher than the east

An attempt was made to discern the site boundary, but this was done with judgmental shovel tests and measurements were mapped by pacing. No visible structure features were seen in the excavation units on the mound summit. This is attributed to centuries of forest growth and historic disturbance, which includes a duck hunting cabin used by Walter Jones during the 1930's excavations (Welch 1991:38).

Ceramic analysis from mound excavation units and shovel tests around the mound were compared with Steponaitis's (1983) chronology of Moundville ceramics. The artifact chronology indicated the area was occupied much earlier than the mound construction, in The Late Woodland (A.D. 500 -1000) period. The 1930's ceramic chronology ranged from Moundville I (A.D. 1050-1250) through Moundville IV (A.D. 1550-1650). The later excavation data, pottery analysis and radiocarbon dates concluded both mound construction events occurred during Moundville III (ca. A.D. 1300-1450) (Welch 1991:45-55).

Subsequent excavation units were opened in 1983 under Paul Welch to study the concentration and extent of the Moundville III occupation. After several days into the excavations it was recognized that the Moundville III occupation was much smaller than initially thought. In an attempt to locate structure features such as floors and wall trenches, an 8 x .5 meter excavation trench was dug northeast of the mound. The southern end of the trench intersected the 1930's burial excavation. At the northern end were the remains of a midden overlay a partially intact structure floor. A suspected section of wall trench was also seen in a 1x1 meter unit east of the excavation trench, but no further evidence of the feature was seen when the unit was expanded. A 3 meter long trench east of the mound intersected "a probable sunken house floor bounded by a wall

trench" (Welch 1991:45). No further excavation units were possible do to time constraints. Because this particular wall trench is wide, it is speculated to be the foundation of a palisade around the mound. Ten percent of the sherds recovered from the wall trench fill were shell tempered. The presence of shell-tempered ceramics suggests a Mississippian date; however, there is no further information available (Welch 1991:44-45).

Pottery analysis of the 1983 work provided new insight into the occupational history of the site. Minor occupations appeared throughout the area between the Early Woodland (3000 – 2000 B.C.E.) and Middle Woodland (2000 B.C.E - A.D. 500). Occupation(s) towards the end of the Late Woodland appeared by A.D. 850/900 and lasted approximately 100 years. The ensuing ceramic chronology represents very little change in the area over the next 400 years. Recovered ceramics are thought to have belonged to small and/or extended farmsteads. "Less than .01% of the shell tempered pottery recovered display modes that occur no later than the late Moundville II (A.D. 1250 - 1400)" (Welch 1991:45).

There remains the question of when specifically the Moundville III occupation began around the area of the White site (1Ha7). Welch addresses problems surrounding this issue. There were sampling differences between the 1979 and 1983 excavations which concentrated work efforts on different areas of the site. Skipped or non-tested areas would misrepresent concentrations of early ceramics. Another problem is that fine lined ceramics characteristic of earlier Moundville I (A.D. 1050 - 1250) and Moundville II (A.D. 1250 – 1400) may have lost exterior design motifs due to weathering. This would skew the representative ceramic samples. A third potential problem in dating the

earliest occupation is the possibility that the soil was collected and used as fill for the first stage in building the mound. (Welch 1991:46)

Ceramics from the 1930-31 AMNH burial excavations provide the strongest evidence the site was occupied earlier than the late Moundville III (A.D. 1400 - 1550). However, this can be misleading because the burials don't necessarily represent site occupation or construction activities such as mound building. Secondly, there are few whole vessels from the burials and it would be presumptuous to conclude they represent examples of Moundville burial goods (Bozeman 1982:249-50, Welch 1991:51).

The spatial organization of structures at the White site during the Moundville III occupation is not known. Using the spatial extent of the artifact assemblage and elevation readings off of the mound, the area of maximum extent of the site was estimated to be .57 ha (5700m^2). From the findings thus far it is thought that the mound and mound structural remains were functionally distinct from structural remains elsewhere at the site (Welch 1991:50-51).

Shiloh Indian Mounds (40HR7)

The Shiloh Indian Mounds site (40HR7) is located near Savannah, Tennessee on the western banks of the Tennessee River. The site consists of at least fourteen mounds which date between the Early Mississippian (A.D. 900 – 1250) and Middle Mississippian (A.D. 1250 – 1450), and includes more than 100 houses and a 900-meter-long palisade with bastions. Although the site is part of a protected national park, river bank erosion began to undermine the site in the 1970's, eventually prompting a comprehensive project by the National Park Service Southeast Archeology Center to investigate the erosional

damage and mitigate further damage. A report detailing the sites' history, which included several excavations, was published following completion of the first part of the salvage work (Welch 2006:1- 40).

The mound complex has been the subject of numerous investigations over the past 140 years. However it is only in the last forty years that archaeologists have begun to study earlier excavations at the site and examine the settlement and mound construction at Shiloh (Welch 2006:16- 40). Understanding the chronology of mound construction helps in the understanding of spatial relationships between intrasite features in order to better interpret settlement and occupation. Specifically it can reveal the duration and chronology of use, as well as any function(s) (Rafferty 2001:237).

The culmination of the earlier work at Shiloh has provided a clearer interpretation of site chronology within Shiloh and elsewhere along the Tennessee River. It is now understood that Shiloh was occupied during the Late Woodland (A.D. 500 - 900). Prehistoric people continued to settle along the Tennessee River north and south of Shiloh. "Within 44 kilometers upriver and 24 kilometers downriver of Shiloh, there are at least five and possibly as many as nine other Mississippian mound sites" (Welch 2006:252). Originally it was thought that the mounds along the Tennessee River, particularly Shiloh, were related to the Moundville earthworks. A reassessment of archaeological sites and artifacts along the Tennessee River showed that the artifacts from this area were somewhat distinct from those further southeast around Moundville. The ceramic and chronological evidence suggested the mound sites emerged synchronically in the Early (A.D. 900 – 1250) and Middle Mississippian (A.D. 1250 - 1400).

Approximately 14 kilometers north of Shiloh is the Savannah multi-mound site which was also palisaded. Shiloh and Savannah are seen as partially contemporary large mound centers, although the Savannah mounds appear to have been constructed after those at Shiloh. The spatial arrangement of small isolated farmsteads and sites with one or two mounds, with palisaded multi-mound centers along the Tennessee River, is a strong indication that the Shiloh and Savannah mounds held some type of influence over the other mound settlements in the region (Welch 2006:252-256).

The idea that the mounds along the Tennessee River represent a distinct phase or culture is relatively new. The inclusion of non-mound archaeological settlement data from the region with settlement data near mounds alters the earlier conceived mound only boundary, or that the site boundary was the mound(s) itself. Less is known about the function of the single and two-mound sites associated with the Shiloh mounds. These mound sites may or may not have had a nucleated population and likely served as a locus for outlying farmsteads (Welch 2006:256).

Ceramic evidence supports that Shiloh and its neighboring mounds were constructed during the Early and Middle Mississippian, yet little is known about their chronologies and duration of occupation. This is difficult to investigate, as many of the outlying mound sites are largely obliterated due to unlawful construction, looting, and erosion (Welsh 2006: 257). Previous research at Shiloh has not fully addressed intra-site chronology. It is thought that the mound development of Shiloh began from a Late Woodland occupation. At some time in the Mississippian period a palisade was constructed around the house structures and mound area not adjacent to the river. The palisade contained evenly spaced bastions and showed evidence of maintenance and

repairs. Shiloh and the other mound sites along the Tennessee River were abandoned by A.D. 1400 (Welch 2006: 253-255).

Moundville (1TU500)

Moundville is located in Hale County, Alabama along the Black Warrior River approximately 23 kilometers south of Tuscaloosa. The Moundville site covers an area of approximately 1.2 kilometers², consisting of twenty-six earthen mounds. The site was occupied during the Early and Middle Mississippian (A.D. 900 -1450). During the height of its occupation (A.D. 1200-1300), Moundville was the largest prehistoric settlement in the southeast with a population of about one thousand with around ten thousand living in the Black Warrior valley (Scarry 1993:158; Knight and Steponitis 1998:17-18, Welch 1991:143)

The plan of the community was roughly square and protected on three sides by a bastioned wooden palisade. The enclosure surrounded a central plaza with twenty-six earthen mounds which were used for residence structures, mortuary practices, and other purposes. “The arrangement of the mounds and plaza gives the impression of symmetry and planning” (Knight 1998:49).

Mound A is the largest mound and occupies the center of the plaza. Mound B is the next largest mound and lies north of Mound A. It is a steep pyramid with two ramps, rising to a height of nearly 18 meters. The site held a large resident population during the Middle Mississippian (Knight 1998:48-51; Welch 1991:58-59). There is strong evidence that Moundville had a highly stratified society (Steponaitis 1983:167-168). This can be

seen among the excavated burials with their grave goods. Some include rare artifacts that may be associated with particular political or religious offices. Evidence shows that Moundville was sustained by tribute of food and labor provided by the people who lived in the nearby Black Warrior Valley floodplain farmsteads as well as other smaller mound centers. Moundville's growth and prosperity were made possible by intensive cultivation of maize, beans, fruits and other indigenous plants (Scarry 1993:160-168). There was also an import of luxury items such as copper, mica, galena, and marine shell (Bozeman 1982:21; Knight and Steponaitis 1998:17, Welch:1991:175-78). The inhabitants of Moundville produced artifacts bearing a high degree of skilled workmanship, making the site a model in the study of Mississippian artifacts.

The emergence and decline of Moundville are has been well studied over the past thirty years (Bozeman 1982; Knight and Steponaitis 1998; Scarry 1993; Steponaitis 1983; Welch 1991). The river valley appears to have been well inhabited and contained a few small single-mounds in the Early Mississippian period prior to the creation of the larger mounds, plaza area and construction of the palisade around A.D. 1200 (Scarry 1993:160; Welch 1991:23-27). 'By A.D. 1350, the Moundville community underwent a functional change. The site lost the characteristics of a well populated community, but retained the ceremonial and political functions' (Knight and Steponaitis 1998:19-21). Further decline ensued, marked by abandonment of some mounds and the loss of religious importance in others. There was also a decrease in the importation of goods which had given prestige to the nobility. By A.D. 1500, most of the area was abandoned, with only a few portions of the site still occupied (Knight and Steponaitis 1998:21-24).

Owl Creek (22CS502)

The Owl Creek Mounds (22CS502) are located in Chickasaw County, Mississippi on an upland ridge in the Black Prairie near the Pontotoc Ridge physiographic province (Rafferty 1995:4). The mounds enclosed an area of about 1 hectare while the entire site encompasses approximately 4 hectares. The site was occupied during the Middle (100 B.C. – A.D. 300 and Late (A.D. 300 – A.D. 800) Woodland periods but contain little evidence of year-round residential use during the Mississippian period (Rafferty 1995:139). Five of six radiocarbon dates fall close to the Early Mississippian period (A.D. 1000 – A.D. 1200), specifically between A.D. 1133 and 1219, and one dates to the Late Woodland period, A.D. 770 (Rafferty 1995:41-45).

Dr. Rush Nutt documented the Owl Creek site in 1805. His record listed the site as having seven mounds and a ditch encompassing the entire site about 30 meters from the mounds. The first recorded excavations were done by Moreau B.C. Chambers in 1935 for the Mississippi Department of Archives and History (MDAH). Chambers dug several excavation trenches into three of the mounds and a pit between two of the mounds. He also made a rough sketch map showing the five mounds, the nearby waterways, and earthen trench encompassing the mounds (Rafferty 1995:6-9).

The U.S. Forest Service currently manages two of the mounds; the others are located on private property. Archaeological investigations by Mississippi State University in 1991-1992 revealed structural remains on three mounds. Numerous other structural remains were uncovered including “55 postholes and parts of ten wall trenches” (Rafferty 1995:139).

In the site report Rafferty concluded that, due to the small quantity of artifacts diagnostic of the Mississippian period in the non-mound portion of the site, the site was inhabited during the Woodland period, but used as a vacant ceremonial center during the Mississippian period (Rafferty 1995:139-140). Owl Creek was only occupied for around one hundred years during the Mississippian period. The site was likely used for a short time by a small group, or perhaps had no resident population at all (Rafferty 1995:139-140).

Curry Site (22OK578)

The Curry site (22OK578) is a Mississippian period single-mound site located on the boundaries of the Black Prairie-Interior Flatwoods physiographic provinces in Oktibbeha County, Mississippi. The site is located roughly 25 kilometers south of Lyon's Bluff (22OK520) and within 40 kilometers of dozens of likely farmsteads and mound sites. A number of other single-mound sites are also relatively close, including Butler, Coleman, and Chowder Springs in Lowndes County. The number of inhabited mound sites and associated off-mound sites in this region supports the idea that the economic function of Mississippian mound occupations was to some extent a result of an exchange of imported materials (Palmer 2007:1-7). Accordingly, smaller single-mound sites, such as the Curry Mound, would have served as outlying centers for the non-mound settlements and farmsteads in the region (Palmer 2007:106).

The Mississippi State University field school first documented the Curry site in 1975 during a pedestrian survey. Professor Crawford Blakeman identified the mound

and collected several shell-tempered sherds, pieces of daub and miscellaneous lithic debitage (Palmer 2007:7).

Mississippi State University archaeologists relocated the Curry site in 2004 for thesis research. Numerous shovel test pits were placed throughout the central part of the site to sample the spatial extent of artifact density and an excavation unit was placed on top of the mound to gain an understanding of mound construction and use. A gradiometer was used on and off the mound to identify potential structure features such as house walls or a palisade.

There was no evidence of a palisade found, although the majority of the shovel testing and excavation concentrated on the mound area. The profile of the mound excavation unit showed several episodes of mound construction accomplished by collecting basket loads of earth from near the mound area. “It is unknown if there was a pre–mound structure, but it is certain that there was at least one large structure built after the first stage of mound construction. No structures were present on the mound after the last stage of mound construction” (Palmer 2007:105).

Based upon diagnostic artifacts and features associated with the different mound building episodes, it has been speculated that the site changed over time. Many Mississippian period sites demonstrate a change in site function and settlement. Based upon diagnostic artifacts and features associated with the different mound building episodes it has been speculated the mound contained a small village during the Middle Mississippian period (Palmer 2007:105). The later mound building episode contained no structural evidence; however, the variety and quantity artifacts recovered north of the mound suggest the site remained occupied into the Protohistoric period.

Table 9.1. Comparison of mound site attributes.

Site Name		Lubbub Creek	Bessemer	White	Shiloh	Moundville	Owl Creek	Curry	Lyon's Bluff
Single Mound		X		X				X	X
Multi-Mound			X		X	X	X		
Palisaded		X	X		X	X			X
Area(m^2)	Within Palisade	~14,000	~14,000	undetermined	~27,000	~390,600	n/a	?	~400
Height	of Occupation	Mississippian	Late Woodland	Late Woodland	Early Mississippian	Middle Mississippian	Late Woodland	Late Mississippian	Late Mississippian
Structures Associated	With Mound	X	X	X	X	X	X	X	X
Number of Domestic(?)	Structures	>10	5-10	5-10	>10	>10	none	1	>10
Midden	Development	X	X	X	X	X	none	X	X

CHAPTER X.

CONCLUSIONS

The Lyon's Bluff site (22OK520) is a palisaded, single-mound and habitation complex with a long history. Its location along the western margin of the Tombigbee River Valley and the spatial relation to other mound and non-mound sites supports the understanding of Lyon's Bluff as a center for smaller settlements within the region. Previous surveys and excavations have documented the mound and surrounding area, recording burials, construction of the mound, and length of occupation. Absolute dates and ceramics offer evidence that the site was continuously occupied from the Mississippian into the Protohistoric period. A total of eleven structures were identified in this thesis. A seriation by temper was made of the ceramic assemblages with the idea it could be used as a relative means of dating the various potential structures. While the structures were relatively dated from earliest to latest, no spatial patterns in community layout were noted, and the seriation demonstrates the short occupation represented by the recovered ceramics. In essence, the structures can be argued to represent a portion of the terminal occupation community plan for the site.

Sand is associated with some of the identified potential structures and with the area east of the mound. The concentrations of sand, pill clams, and river snails suggests the latter area saw repeated deposits of sand related to construction and/or maintenance of

a plaza. There were very few artifacts recovered from the plaza and no evidence of any structure in the plaza area. Structure C is located on the southeastern edge of the plaza.

Structures D, E, F, G, and K were very close to the mound. The concentration of daub and pottery from this portion of the site is an indication that the area was used for repeated construction. The denser concentrations of artifacts associated with probable structures A and B is likely due to those areas being within the wooded perimeter along the northern and eastern edges of the survey area, so that artifacts are less scattered, producing a higher volume per shovel test. Some of the interesting artifacts which were recovered near probable structures G and H in the west/northwest part of the survey area were a limestone bead, a shell bead, and 12 lithic drills. According to the seriation, it would seem the only significant level of fossil-shell tempered pottery was recovered from this area.

The layout of the palisade and structures in relation to the mound at Lyon's Bluff is very similar to that at Lubbub Creek. Both sites were occupied over the entire span from ca. AD 1200 – 1500 or later, and each contained a single mound surrounded by domiciliary structures. The mound area at each site was surrounded by a palisade which shows signs of maintenance. The ceramic assemblage at Lyon's Bluff is very similar to the assemblage from Lubbub Creek. It is unknown whether there was direct or indirect exchange between Lyon's Bluff and Lubbub Creek, or between Lubbub Creek and Moundville.

The Moundville complex is a chronological cornerstone for Southeastern archaeology. Moundville site material reflects art, changes in social status, house and mound architecture, and economic cycles. The main body of the site contained a palisade

which enclosed numerous mounds centered on a central plaza. The population at Moundville apparently declined at about the time that Lyon's Bluff and Lubbub Creek populations increased.

The Bessemer Mounds were constructed prior to the mound at Lyon's Bluff and probably reflect a Late Woodland/Early Mississippian settlement. The work to date suggests that the site area was occupied prior to any sort of mound construction. There is evidence of fourteen structure patterns on or near the rectangular mound (1JE14). Structure No. 12 was associated with a curved, double-walled enclosure. The burial mound (1JE13) was surrounded by a double-walled fence or palisade.

The mounds at Owl Creek date to the Early Mississippian Period. The range of radiocarbon dates suggests that the site was only occupied for a short time. The number of structures within the site is not known, but numerous post holes have been recorded, mostly within the mounds. There was no evidence of a wooden palisade or ditch which supposedly encompassed the five mounds.

Excavations at the White Mound have focused on different research questions. Similar to the Bessemer Mounds, the site contains evidence that it was occupied prior to any sort of mound construction. There is evidence of structures and a midden deposit east/northeast of the mound. Evidence of a palisade was noted in a trench profile southeast of the mound, but the dimensions of this feature are not known.

The mound complex at Shiloh has also been the subject of different research over the years. The work to date demonstrates that the area along the Tennessee River containing Shiloh was substantially occupied in the Late Woodland and that the mounds date to the Late Woodland and Early Mississippian. The palisade at Shiloh is around

most of the site, including dozens of house structures, unlike many later mound settlements in which only certain areas of the site were protected.

There was only one mound-top structure documented at the Curry Mound and the site did not contain evidence of a palisade. The distance to Lyon's Bluff and the similar ceramic assemblage is probable evidence that the sites were contemporary.

The work at Lyon's Bluff suggests that during the Late Mississippian it contained a palisaded, nucleated settlement with eleven to fifteen structures. Work also suggests that during the Protohistoric Period the settlement may have become less nucleated, with many house mounds within and outside the palisaded portion of the site. The age of the western house mounds is unknown although current thesis research at Mississippi State University addresses this question.

The mound and identified structures differs somewhat from the diagram presented by Marshall (source). First, Marshall suggested that the mound plaza was located on the west side of the mound. The concentration of sand identified suggests that the mound plaza was located on the eastern side of the mound. Second, Marshall's diagram of the site displayed houses uniformly oriented facing the mound along the banks of Line Creek. The identified structures only represent a portion of the final occupation, but their locations do not correspond with the

The field methods chosen for this episode of work at Lyon's Bluff demonstrate the validity of using ecofacts and artifacts from the plowzone and how they can be used successfully to address archaeological questions about structures and settlement patterns. Too often the plowzone is stripped away when it may contain information to

understanding the final stages of occupation. Future research at other sites may be approached using these methods with minimal impact upon a site.

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APPENDIX A

DATA FROM ARTIFACT ANALYSIS FOR

LYON'S BLUFF (220K520)

DECEMBER 2005

FIELDWORK

APPENDIX A

Data from Artifact Analysis for Lyon's Bluff (22OK520) December 2005 Fieldwork

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
0n	30e	1	4	0	42	3	0	9	10.78	5	3.78	4	0.84	1	1.30		
0n	40e	2	1	0	6	2	0	3	8.07	1	1.11	2	1.12	0	0.00		
0n	50e	3	3	3	26	5	0	4	9.32	1	0.16	9	3.93	0	0.00		
0n	80e	4	0	0	10	1	0	0	0.00	5	1.73	2	1.66	0	0.00		
0n	70e	5	0	0	23	2	0	6	7.38	40	29.90	3	2.06	0	0.00		
0n	60e	6	0	1	22	0	0	8	12.12	9	6.63	10	7.83	0	0.00		
0n	70w	7	0	0	0	0	0	28	27.77	27	26.26	10	4.33	0	0.00		
10n	60e	8	0	0	15	2	0	4	2.21	2	0.67	1	0.63	0	0.00		
10n	30e	9	5	0	68	3	0	4	0.43	9	1.48	1	0.15	0	0.00		
10n	40e	10	0	1	16	1	0	4	4.88	2	0.86	1	0.35	0	0.00		
10n	50e	11	2	2	21	0	0	1	0.47	10	7.66	3	2.90	0	0.00	Hist. Nail	
10n	80e	12	0	1	15	1	0	2	0.97	2	1.89	8	5.43	0	0.00		
10n	20w	13	0	0	3	0	0	13	15.04	14	4.49	5	1.46	0	0.00		
10n	30w	14	0	0	1	0	0	10	6.26	10	9.55	14	1.31	0	0.00		
10n	40w	15	0	0	1	0	0	15	27.89	6	14.46	12	4.79	0	0.00		
10n	50w	16	0	0	1	0	0	41	45.81	20	7.46	25	11.97	1	0.37		
10n	80w	17	0	0	0	0	0	7	10.20	1	0.34	4	0.84	0	0.00		
10n	60w	18	0	0	5	0	0	18	22.67	4	1.46	11	5.16	2	0.55		
10n	70w	19	0	0	1	0	0	23	18.15	0	0.00	4	1.17	0	0.00	mod. Metal	
10s	60e	20	0	0	0	1	0	10	34.32	13	8.51	6	3.43	0	0.00		
10s	50e	21	0	0	0	0	0	17	17.13	6	3.15	4	1.22	0	0.00		
10s	30e	22	0	1	0	0	0	10	8.11	2	3.71	8	1.64	0	0.00		
10s	40e	23	0	0	0	0	0	6	3.60	2	0.78	3	0.77	0	0.00		
10s	80e	24	0	1	0	1	0	17	30.31	23	27.12	20	5.21	0	0.00		
10s	20w	25	0	0	0	0	0	15	16.93	9	34.73	2	0.38	0	0.00		
10s	30w	26	0	0	0	0	0	15	42.93	10	26.00	20	4.29	0	0.00		
10s	40w	27	0	0	0	0	0	17	26.79	4	2.81	12	5.57	1	0.27		
10s	50w	28	0	0	0	0	0	12	19.97	0	0.00	3	0.65	0	0.00		
10s	60w	29	0	0	0	0	0	9	7.19	5	2.53	5	1.44	1	0.48		
10s	70e	30	0	0	1	0	0	23	48.37	48	55.31	12	6.49	0	0.00		
10s	70w	31	0	0	0	0	0	16	17.79	5	1.92	2	1.46	0	0.00	chalk	
15n	75e	32	0	0	0	0	0	5	9.80	6	2.32	22	18.60	1	3.87		
15n	65e	33	0	1	0	0	0	1	2.07	0	0.00	2	0.32	0	0.00		
15n	55e	34	0	0	0	0	0	4	7.15	2	0.49	4	0.48	0	0.00		

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
15n	45e	35	0	0	0	0	0	5	4.70	5	1.22	6	5.76	1	0.51		
15n	35e	36	1	0	0	1	0	0	0.00	5	2.31	3	1.12	0	0.00		
15n	25e	37	2	2	26	1	0	2	0.47	3	7.21	2	0.47	0	0.00		
15n	25w	38	0	0	0	0	0	8	8.62	4	2.06	7	2.11	0	0.00		
15n	35w	39	0	0	0	0	0	24	19.48	7	3.64	9	3.71	0	0.00		
15n	45w	40	0	0	0	0	0	39	36.14	8	3.80	22	8.89	1	1.26	point	
15n	55w	41	0	0	0	0	0	29	30.09	9	3.51	23	8.29	0	0.00		
15n	65w	42	0	0	0	0	0	25	29.98	6	1.81	13	4.32	0	0.00		
15n	75w	43	0	0	2	0	0	25	30.87	11	6.33	16	5.36	0	0.00		
15s	45e	44	0	1	26	1	0	12	7.91	6	3.02	4	1.14	0	0.00		
15s	55e	45	0	0	5	2	0	3	5.53	9	4.65	4	0.85	0	0.00		
15s	25e	46	0	0	50	2	0	5	6.28	3	1.21	2	1.13	0	0.00		
15s	35w	47	0	0	3	1	0	19	35.81	9	3.13	19	6.78	0	0.00		
15s	75e	48	0	0	6	0	0	6	4.13	6	3.86	6	5.82	0	0.00	Charcoal	
15s	25w	49	0	0	2	0	0	13	28.10	5	3.35	7	2.59	0	0.00		
15s	35e	50	0	0	8	2	0	1	4.25	8	3.59	1	0.22	0	0.00		
15s	65e	51	0	0	2	0	0	10	16.85	85	63.50	12	3.73	1	4.16		
15s	45w	52	0	0	0	0	0	10	7.97	1	0.49	4	5.52	0	0.00		
15s	55w	53	0	0	0	0	0	11	10.01	3	2.27	2	0.79	2	1.19		
15s	65w	54	0	0	0	0	0	2	4.57	2	1.28	0	0.00	0	0.00		
20n	80e	55	0	0	9	2	0	2	5.05	2	0.61	5	1.30	1	0.45		
20n	70e	56	1	0	18	3	1	6	8.54	3	2.19	5	1.84	0	0.00		
20n	60e	57	2	2	39	1	0	6	2.62	0	0.00	3	0.51	0	0.00		
20n	50e	58	0	1	19	1	0	3	1.91	0	0.00	4	1.29	0	0.00		
20n	40e	59	6	1	40	4	0	6	4.59	3	1.48	4	1.66	0	0.00		
20n	30e	60	3	0	18	3	1	6	8.57	6	11.32	4	2.73	0	0.00		
20n	40w	61	0	0	2	0	0	27	48.63	12	5.56	23	7.37	1	0.43	micro drill	
20n	50w	62	0	0	1	0	0	28	32.96	9	3.76	16	9.49	0	0.00		
20n	70w	63	0	0	0	0	0	18	25.18	2	0.71	8	2.42	0	0.00		
20n	80w	64	0	0	0	0	0	34	38.37	7	11.30	17	7.27	0	0.00	mussel	
20n	30w	65	0	1	1	0	0	9	15.02	16	7.38	3	2.57	0	0.00		
20n	60w	66	0	0	2	0	0	29	37.79	5	2.81	8	5.25	0	0.00		
20s	50e	67	0	1	14	0	0	8	16.70	6	4.20	2	0.42	0	0.00		
20s	40e	68	0	0	9	0	0	3	2.24	4	3.68	6	1.75	0	0.00		
20s	60e	69	1	1	19	2	0	11	29.80	86	62.49	11	4.70	0	0.00		
20s	30e	70	0	3	16	4	0	10	10.88	2	13.15	9	3.53	0	0.00		
20s	0e	71	0	0	13	1	0	3	3.53	3	1.19	10	2.97	0	0.00		
20s	70e	72	0	0	3	0	0	1	1.23	1	1.16	2	0.80	0	0.00		
20s	10e	73	0	0	13	1	0	12	10.44	11	4.45	14	6.99	0	0.00	missing	
20s	10w	74	0	0	30	1	0	7	8.67	10	7.96	4	1.23	0	0.00		
20s	30w	75	0	0	0	0	0	22	30.84	7	3.78	12	9.25	0	0.00		

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
20s	40w	76	0	0	0	0	0	3	1.03	5	3.96	0	0.00	0	0.00		
20s	50w	77	0	0	0	0	0	10	22.06	4	3.33	4	1.24	0	0.00		
20s	60w	78	0	0	0	0	0	11	27.08	6	4.90	4	0.86	1	0.65		
25n	25e	79	0	0	0	0	0	5	3.24	12	9.00	5	1.16	1	0.54		
25n	35e	80	0	0	3	0	0	8	3.07	3	1.42	3	0.67	0	0.00		
25n	45e	81	0	2	16	5	0	4	1.26	1	0.36	3	0.54	0	0.00		
25n	55e	82	0	0	2	0	0	8	2.00	3	0.75	4	0.50	0	0.00	1	
25n	65e	83	0	0	34	2	0	6	17.97	3	4.64	4	1.06	0	0.00		
25n	75e	84	0	0	19	3	0	1	0.39	0	0.00	6	3.81	0	0.00		
25n	85e	85	0	0	5	1	0	10	10.38	9	7.48	17	15.93	0	0.00		
25n	105w	86	0	0	0	0	0	7	13.64	0	0.00	2	1.33	0	0.00	chalk	
25n	5e	87	0	0	5	0	0	1	0.44	1	0.19	0	0.00	0	0.00	fish scale	
25n	15e	88	0	2	13	1	0	2	5.28	3	0.79	5	1.04	0	0.00		
25n	5w	89	0	0	1	0	0	2	1.22	10	4.83	5	1.94	0	0.00		
25n	15w	90	0	0	0	0	0	17	14.41	22	14.98	7	1.51	0	0.00		
25n	25w	91	0	0	1	2	0	14	21.58	28	29.40	6	1.87	1	1.34		
25n	35w	92	0	0	0	0	0	17	20.92	9	4.02	16	7.34	0	0.00		
25n	45w	93	0	0	0	0	0	37	66.39	9	5.19	22	9.33	0	0.00		
25n	55w	94	0	0	0	0	0	26	24.88	2	1.30	7	4.21	1	0.16	mod. metal	
25n	65w	95	0	0	0	0	0	21	34.86	3	14.82	6	1.93	1	0.69		
25n	75w	96	0	0	0	0	0	25	30.71	0	0.00	7	2.20	0	0.00		
25n	85w	97	0	0	0	0	0	17	23.81	4	10.55	13	5.02	0	0.00		
25n	95w	98	0	0	0	0	0	5	2.82	3	2.43	6	1.73	1	0.52		
25s	45e	99	0	0	13	2	0	15	20.75	19	18.19	9	4.68	0	0.00		
25s	55e	100	0	1	9	0	0	17	9.52	30	15.12	4	2.11	0	0.00		
25s	35e	101	0	2	19	1	0	6	9.46	15	8.04	6	2.27	0	0.00		
25s	75e	102	0	0	5	0	0	4	10.25	9	6.54	5	1.32	0	0.00		
25s	65e	103	0	0	5	0	0	10	23.64	53	50.99	15	6.93	0	0.00		
25s	15e	104	0	1	30	1	0	11	9.06	19	16.40	6	2.02	0	0.00	mussel	
25s	5e	105	0	0	11	0	0	8	10.71	14	6.35	8	4.26	0	0.00		
25s	5w	106	0	0	9	1	0	7	14.79	8	5.56	9	3.65	0	0.00		
25s	15w	107	0	0	6	2	0	8	11.68	16	10.56	88	113.99	0	0.00		
25s	25w	108	0	0	3	0	0	0	0.00	2	1.34	2	0.47	0	0.00		
25s	35w	109	0	0	0	0	0	19	22.46	8	5.90	17	11.08	0	0.00		
25s	45w	110	0	0	0	0	0	19	24.62	3	2.21	2	1.06	0	0.00		
25s	25e	111	0	0	6	1	0	13	27.78	0	0.00	5	3.12	0	0.00		
25s	55w	112	0	0	0	0	0	3	2.57	6	4.56	3	0.83	2	0.74		
30n	90e	113	0	0	4	0	0	7	20.62	5	6.57	5	2.04	0	0.00		
30n	80e	114	0	0	6	1	0	5	6.97	5	3.69	7	1.72	0	0.00		
30n	70e	115	0	3	38	2	0	2	1.88	5	1.79	2	0.54	0	0.00		
30n	60e	116	1	1	29	1	1	3	13.87	1	1.02	3	0.62	0	0.00	Pyrgulopsis	

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
30n	50e	117	2	2	34	1	0	4	2.66	2	1.16	1	0.17	0	0.00	bead	0.56
30n	40e	118	1	1	61	4	0	4	9.00	1	0.26	0	0.00	0	0.00		
30n	30e	119	1	1	17	2	0	2	3.08	2	13.77	5	2.01	0	0.00		
30n	80w	120	0	0	0	0	0	19	17.68	0	0.00	7	3.13	1	0.21	carved	
30n	0e	121	0	0	0	0	0	5	1.40	0	0.00	1	0.61	1	0.20		
30n	20e	122	0	0	2	0	0	5	7.78	4	1.59	2	0.74	0	0.00	mussel	
30n	10w	123	0	0	5	0	0	12	14.77	0	0.00	5	1.33	0	0.00		
30n	20w	124	0	0	3	0	0	13	11.45	14	43.13	19	10.10	0	0.00		
30n	30w	125	0	0	0	0	0	16	14.69	11	6.58	14	6.83	0	0.00		
30n	40w	126	0	0	0	0	0	29	51.09	9	4.29	14	3.68	0	0.00		
30n	50w	127	0	0	0	0	0	18	22.61	0	0.00	16	7.99	0	0.00		
30n	60w	128	0	0	0	0	0	11	11.29	4	3.56	13	6.79	0	0.00	animal	
30n	70w	129	0	0	0	0	0	30	29.38	6	3.47	12	2.70	0	0.00		
30n	90w	130	0	0	0	0	0	8	12.15	0	0.00	11	2.90	0	0.00	chalk	
30n	100w	131	0	0	0	0	0	9	21.32	3	6.29	10	6.35	0	0.00	mussel	
30n	110w	132	0	0	0	0	0	6	27.52	0	0.00	4	1.44	0	0.00	mod. Nail	
30n	10e	133	0	0	3	0	0	6	5.47	5	27.13	2	1.40	0	0.00		
30s	60e	134	0	0	6	0	0	33	34.96	50	74.27	17	9.35	0	0.00	daub	
30s	50e	135	0	0	5	0	0	8	4.45	14	11.10	2	0.44	0	0.00		
30s	40e	136	2	0	14	0	0	26	35.55	13	13.66	18	5.18	0	0.00		
30s	30e	137	0	0	7	0	0	21	18.28	12	4.70	6	1.40	0	0.00		
30s	70e	138	0	1	6	0	0	7	4.98	6	11.76	1	0.61	0	0.00		
30s	80e	139	1	3	12	1	0	15	24.55	19	11.24	17	8.31	1	0.20		
30s	20e	140	0	2	9	1	0	11	20.86	6	12.98	3	0.83	1	1.56		
30s	10e	141	0	0	11	0	0	18	28.79	47	37.15	13	6.11	1	0.26		
30s	0e	142	0	0	4	1	0	9	19.76	2	1.39	11	4.00	0	0.00		
30s	10w	143	0	0	3	0	0	10	10.37	0	0.00	9	9.07	0	0.00		
30s	20w	144	0	0	11	1	0	16	16.42	61	53.92	7	3.60	0	0.00	odolith,	
30s	30w	145	0	0	0	0	0	16	17.73	2	1.82	6	2.18	2	0.50		
30s	40w	146	0	0	0	0	0	24	53.26	5	7.16	14	8.30	1	3.60		
30s	50w	147	0	0	0	0	0	18	34.02	0	0.00	1	0.49	0	0.00	chalk	
35n	15e	148	0	0	1	0	0	8	12.89	2	4.13	6	1.73	0	0.00		
35n	25e	149	0	0	5	0	0	3	3.00	2	0.50	0	0.00	0	0.00		
35n	35e	150	0	0	4	1	0	11	13.51	3	3.45	5	2.43	0	0.00		
35n	45e	151	1	5	55	3	0	2	12.68	8	5.12	0	0.00	0	0.00		
35n	55e	152	1	0	36	0	0	3	7.67	7	4.88	2	0.64	0	0.00		
35n	65e	153	1	0	18	0	0	5	1.77	7	4.63	3	0.69	0	0.00		
35n	75e	154	0	0	4	0	1	2	10.52	5	2.88	3	1.59	0	0.00	Pyrgulopsis	
35n	85e	155	0	0	2	1	0	9	18.53	8	6.06	14	6.30	0	0.00		
35n	95e	156	0	0	1	1	0	10	14.05	10	10.03	26	15.08	0	0.00		
35n	95w	157	0	0	0	0	0	20	33.44	16	15.77	25	8.57	1	9.93		

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
35n	45w	158	0	0	0	0	0	1	2.03	4	1.23	2	1.23	0	0.00		
35n	5e	159	0	0	0	0	0	3	3.33	4	1.20	1	0.25	0	0.00		
35n	5w	160	0	0	0	0	0	28	26.35	16	11.67	23	7.18	0	0.00		
35n	15w	161	0	2	2	0	0	22	43.16	8	20.36	7	3.07	0	1.00		
35n	25w	162	0	0	2	0	0	40	67.07	12	7.66	23	10.12	0	0.00		
35n	35w	163	0	0	0	0	0	30	29.96	12	5.62	12	3.61	0	0.00		
35n	65w	164	0	0	0	0	0	14	11.58	11	8.41	16	5.44	0	0.00		
35n	75w	165	0	0	2	0	0	36	27.14	18	20.79	13	4.81	0	0.00	mouse bag	
35n	85w	166	0	0	0	0	0	19	19.64	3	1.41	11	5.68	0	0.00	chalk	
35n	105w	167	0	0	0	0	0	12	24.00	5	9.53	13	7.87	0	0.00		
35n	115w	168	0	0	0	0	0	8	11.92	9	9.03	5	1.93	0	0.00		
35n	125w	169	0	0	0	0	0	6	2.98	1	0.36	1	0.15	0	0.00		
35n	55w	170	0	0	0	0	0	23	27.89	3	4.70	13	5.59	1	3.75		
35s	55e	171	0	0	0	0	0	17	39.76	36	39.75	8	8.09	0	0.00		
35s	45e	172	0	0	0	0	0	8	13.55	13	7.55	3	1.36	0	0.00		
35s	25e	173	2	3	0	2	0	20	23.81	21	9.23	17	3.75	0	0.00		
35s	75e	174	0	0	2	0	0	16	23.71	8	15.57	4	1.88	3	1.21		
35s	5w	175	0	0	0	0	0	21	19.02	19	10.83	30	9.13	0	0.00		
35s	65e	176	0	0	0	0	0	11	5.42	45	30.35	4	0.91	0	0.00		
35s	5e	177	0	0	0	0	0	15	15.71	43	28.82	17	6.87	0	0.00		
35s	15w	178	0	0	0	0	0	12	44.07	21	14.44	25	6.02	0	0.00		
35s	25w	179	0	0	0	0	0	25	42.46	12	7.43	18	6.12	0	0.00		
35s	45w	180	0	0	0	0	0	21	52.79	7	5.64	4	1.37	1	17.90	sandstone	
35s	35e	181	0	0	0	0	0	15	20.33	31	15.82	5	3.71	0	0.00		
35s	35w	182	0	0	0	0	0	14	26.60	3	1.04	9	4.05	1	1.13		
35s	15e	183	0	0	0	1	0	19	57.26	51	41.83	35	21.43	0	0.00		
40n	0e	184	0	1	4	0	0	9	8.02	9	5.52	5	2.51	0	0.00		
40n	70e	185	0	0	2	0	0	28	37.90	23	33.98	16	5.66	0	0.00	sandstone	
40n	10e	186	0	0	1	0	0	9	31.14	3	2.18	3	1.33	0	0.00		
40n	10w	187	0	0	2	0	0	14	19.07	24	19.95	6	1.74	0	0.00	human	0.24
40n	20w	188	0	0	3	0	0	17	20.26	13	9.41	7	2.24	0	0.00		
40n	30w	189	0	0	0	0	0	33	44.98	23	9.81	43	14.35	2	0.05		
40n	40w	190	0	0	0	0	0	25	58.99	9	5.51	15	8.40	0	0.00		
40n	50w	191	0	0	0	0	0	9	11.00	11	7.54	8	2.09	1	0.39		
40n	60w	192	0	0	0	0	0	11	23.80	19	24.16	21	5.87	0	0.00	Human	
40n	70w	193	0	0	3	0	0	22	30.11	12	11.27	12	3.78	3	0.93	Fossil Shell	
40n	80w	194	0	0	0	0	0	14	19.07	8	5.44	10	4.73	0	0.00	pearl bead	
40n	90w	195	0	1	1	0	0	32	33.59	20	15.51	62	12.42	3	3.32	2	
40n	100w	196	0	0	2	0	0	23	22.79	40	43.02	24	8.72	0	0.00		
40n	110w	197	0	0	0	0	0	16	42.35	20	9.08	12	8.99	0	0.00		
40n	120w	198	0	0	2	0	0	8	4.56	0	0.00	5	1.11	0	0.00		

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
40n	100e	199	0	1	1	0	0	8	45.00	16	74.73	21	6.43	0	0.00	daub,	
40n	20e	200	0	0	8	0	0	5	7.86	9	6.17	6	2.45	0	0.00		
40n	30e	201	1	0	8	0	0	1	3.75	2	0.54	1	0.19	0	0.00		
40n	40e	202	5	3	55	2	1	1	1.05	7	3.08	3	1.35	0	0.00	Pyrgulopsis	
40n	50e	203	1	1	65	2	0	1	0.34	2	1.00	1	0.25	0	0.00	missing	
40n	60e	204	2	0	12	1	0	3	2.73	10	3.96	10	3.62	0	0.00		
40n	80e	205	0	0	1	1	0	22	46.15	18	32.22	12	7.01	0	0.00		
40n	90e	206	0	0	1	1	0	12	20.25	25	27.15	25	8.45	1	0.53		
40s	40e	207	0	0	4	1	0	6	10.71	42	32.57	9	3.82	0	0.00		
40s	50e	208	0	0	1	0	0	20	81.98	32	32.82	20	21.86	0	0.00		1.05
40s	60e	209	0	0	3	0	0	22	35.74	58	45.10	7	1.44	1	0.55		
40s	30e	210	0	1	7	0	0	18	19.59	9	10.83	10	6.05	1	0.22	point tip	
40s	10e	211	0	0	5	0	0	12	70.32	32	60.07	16	21.77	1	0.29		
40s	0e	212	1	0	5	2	0	10	12.15	30	20.81	9	6.38	0	0.00		
40s	10w	213	0	0	1	0	0	20	81.98	32	32.82	20	21.86	0	0.00		
40s	30w	214	0	0	0	0	0	24	46.17	11	4.46	19	8.60	2	6.06		
40s	70e	215	0	0	3	0	0	8	37.50	22	18.83	14	4.82	0	0.00		
40s	20w	216	0	0	0	0	0	21	29.78	15	6.48	11	3.58	0	0.00		
40s	20e	217	0	0	2	0	0	39	58.34	31	54.29	22	11.13	0	0.00	?	
45n	85e	218	0	0	3	0	0	27	47.85	17	12.27	29	13.30	0	0.00	charcoal	
45n	75e	219	0	0	1	0	0	15	42.33	88	82.26	15	4.68	0	0.00	daub	
45n	65e	220	0	0	6	3	0	14	28.81	20	9.45	9	6.00	0	0.00		
45n	45w	221	0	0	0	0	0	19	27.47	21	33.38	12	8.06	0	0.00	?	
45n	55e	222	1	1	17	1	0	1	1.32	1	0.33	1	0.56	1	0.15		
45n	45e	223	3	1	38	3	1	1	0.69	1	0.57	2	0.83	0	0.00	Pyrgulopsis	
45n	35e	224	2	0	16	2	0	6	12.16	2	0.66	4	0.84	0	0.00		
45n	25e	225	0	1	6	1	0	3	3.18	0	0.00	4	1.77	0	0.00		
45n	15e	226	0	1	1	0	0	4	2.86	2	1.65	1	0.29	0	0.00		
45n	5e	227	0	0	0	0	0	4	8.37	9	4.41	5	3.15	0	0.00		
45n	5w	228	0	0	3	0	0	15	17.91	11	8.61	6	2.96	0	0.00		
45n	15w	229	0	0	1	0	0	12	10.61	6	2.17	7	1.82	0	0.00		
45n	25w	230	0	0	0	0	0	33	49.86	15	19.14	27	11.19	1	0.29		
45n	35w	231	0	0	0	0	0	24	36.16	15	10.54	20	5.91	3	3.54	sandstone	
45n	55w	232	0	0	0	0	0	14	19.03	16	22.87	14	4.20	0	0.00		
45n	65w	233	2	1	54	3	0	20	40.14	9	4.47	14	7.27	1	0.58	?	
45n	75w	234	0	1	0	0	0	18	31.77	7	22.38	9	4.47	2	0.40		
45n	85w	235	0	0	0	0	0	25	37.68	44	34.34	23	7.31	4	38.69	core,	
45n	105w	236	0	0	0	0	0	23	22.85	0	0.00	14	6.14	0	0.00		
45n	115w	237	0	0	0	0	0	16	13.56	3	1.59	9	3.06	0	0.00		
45n	125w	238	0	0	1	0	0	24	27.44	26	27.44	7	1.81	0	0.00		
45n	95w	239	0	0	2	0	0	23	41.56	17	21.20	20	11.01	1	0.36		

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
45s	55e	240	0	0	6	0	0	35	69.02	29	29.17	20	5.35	1	0.13		
45s	45e	241	0	1	29	4	0	12	10.92	23	18.97	12	3.24	0	0.00	drilled tooth	0.19
45s	25e	242	0	0	0	0	0	18	26.77	34	19.28	5	1.55	0	0.00		
45s	5e	244	0	0	0	0	0	10	8.40	11	18.96	27	10.18	0	0.00		
45s	5w	245	0	0	3	0	0	17	27.76	18	16.39	12	4.27	0	0.00	human	
45s	25w	246	0	0	3	0	0	19	39.66	6	3.39	24	6.98	0	0.00		
45s	35e	247	0	0	2	0	0	16	38.68	27	14.55	16	4.35	0	0.00		
45s	65e	248	0	0	6	1	0	0	0.00	32	14.52	10	2.38	0	0.00	odolith	
45s	15e	249	0	0	1	1	0	10	17.37	29	18.64	11	2.28	0	0.00	mussel	
50n	20e	250	0	0	3	1	0	2	1.51	4	1.53	2	0.50	0	0.00		
50n	30e	251	0	1	5	0	0	7	24.28	6	5.29	7	3.70	0	0.00	3 mod.	
50n	40e	252	0	1	19	2	0	1	2.73	3	1.12	4	1.53	0	0.00		5.41
50n	50e	253	0	1	14	0	0	2	5.63	4	1.37	6	13.59	0	0.00		
50n	30w	254	0	0	0	0	0	29	34.50	21	22.03	10	5.96	0	0.00		
50n	60e	255	0	0	4	1	0	7	16.29	27	19.69	3	0.71	0	0.00		
50n	0e	256	0	0	2	0	0	4	1.72	9	4.05	5	1.58	0	0.00		
50n	10e	257	0	0	4	1	0	5	4.63	3	1.41	4	1.11	0	0.00		
50n	20w	258	0	0	3	0	0	21	25.91	10	4.39	9	3.43	0	0.00		
50n	40w	259	0	0	0	0	0	23	32.08	20	20.09	12	5.14	1	0.32	bead	
50n	50w	260	0	0	0	0	0	25	20.55	20	14.32	11	4.43	0	0.00		
50n	60w	261	0	0	0	1	0	37	58.19	15	9.50	19	15.44	0	0.00		
50n	70w	262	0	0	1	0	0	22	46.89	30	22.56	18	3.78	1	0.14		
50n	80w	263	0	0	1	0	0	31	38.55	31	18.56	17	7.33	1	2.11		
50n	90w	264	0	0	1	0	0	18	23.29	23	27.04	19	6.29	0	0.00		
50n	100w	265	0	0	0	0	0	20	22.70	9	5.82	40	16.30	1	0.20		
50n	110w	266	0	0	0	0	0	18	27.20	12	9.26	14	4.71	0	0.00		
50n	10w	267	0	0	0	0	0	2	2.00	10	4.25	3	1.00	0	0.00		
50s	60e	268	0	0	4	0	0	17	39.67	23	13.94	12	5.33	5	9.75		
50s	50e	269	0	0	2	1	0	16	49.96	20	11.44	4	2.82	1	0.17		
50s	40e	270	0	0	1	0	0	12	12.10	17	11.50	9	3.57	0	0.00		
50s	30e	271	0	0	14	2	0	26	56.59	9	4.51	13	5.98	1	0.60		
50s	20e	272	0	0	3	1	0	43	72.93	18	26.35	13	4.81	0	0.00		
50s	80e	273	0	0	3	0	0	6	9.38	10	8.73	5	4.41	0	0.00		
50s	70e	274	0	0	0	0	0	20	18.45	13	13.34	20	5.34	0	0.00		
50s	0e	275	0	0	2	0	0	21	31.56	32	29.58	12	5.25	0	0.00		
50s	10w	276	0	0	1	0	0	19	47.94	58	67.83	5	5.73	1	0.58		
50s	20w	277	0	0	0	0	0	4	9.50	5	3.28	5	2.81	1	0.17		
55n	85w	278	0	0	0	0	0	22	33.43	36	24.17	16	7.07	0	0.00		
55n	55e	279	0	0	3	0	0	3	14.94	11	4.49	1	0.36	0	0.00		
55n	45e	280	0	0	6	1	0	1	0.80	2	0.48	3	0.42	0	0.00		
55n	35e	281	0	0	8	1	0	3	1.12	5	2.02	5	2.29	0	0.00		

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
55n	25e	282	0	0	0	0	0	4	4.43	5	2.09	5	2.03	0	0.00		
55n	15e	283	0	0	1	0	0	7	15.91	9	8.97	4	1.47	0	0.00		
55n	5w	284	0	0	0	0	0	17	28.91	7	12.43	8	3.01	0	0.00		
55n	15w	285	0	0	0	0	0	14	36.57	10	6.30	12	6.06	2	0.53		
55n	25w	286	0	0	2	1	0	18	29.93	16	30.03	16	6.90	1	0.38		
55n	35w	287	0	0	0	0	0	41	63.09	21	14.33	38	14.00	1	0.57		
55n	45w	288	0	0	3	0	0	21	33.78	16	8.93	11	3.71	0	0.00	odolith	
55n	55w	289	0	1	0	0	0	23	29.30	18	10.36	20	5.67	0	0.00		
55n	65w	290	0	0	0	0	0	17	43.98	9	4.97	3	1.38	0	0.00		
55n	95w	291	0	0	0	0	1	26	44.48	12	5.62	17	5.92	2	6.10	?	
55n	105w	292	0	0	1	0	0	2	6.28	20	3.82	12	7.54	0	0.00		
55n	115w	293	0	0	3	0	0	3	3.40	0	0.00	5	1.77	1	0.49		
55n	5e	294	0	0	1	0	0	11	2.94	11	6.38	13	7.02	0	0.00		
55n	75w	295	0	0	0	0	0	27	38.65	20	38.64	12	8.60	2	1.00	2	
55s	55e	296	0	0	1	1	0	36	47.09	28	15.88	11	4.34	1	0.49		
55s	25e	297	0	0	3	0	0	22	33.86	22	10.65	14	14.77	2	33.18	sandstone;	
55s	35e	298	0	0	3	0	0	14	22.58	17	8.33	12	4.20	0	0.00		
55s	45e	299	0	0	0	0	0	18	45.89	20	8.85	7	2.40	0	0.00		
55n	15e	300	0	1	22	6	0	39	67.22	31	20.72	27	10.22	2	32.40	sandstone	
55s	65e	301	0	0	1	0	0	20	54.28	16	6.06	27	10.38	3	3.71		
55s	5w	302	0	0	0	0	0	11	6.74	9	3.79	2	0.74	0	0.00		
55s	5e	303	0	0	0	0	0	17	30.35	20	9.78	4	1.36	0	0.00		
5n	45e	304	0	0	0	0	0	3	1.77	1	0.25	0	0.00	0	0.00		
5n	55e	305	0	2	0	0	0	5	2.38	2	0.99	5	1.03	0	0.00		
5n	65e	306	0	0	0	1	0	17	22.11	2	0.94	2	0.21	0	0.00		
5n	35e	307	2	0	0	0	0	3	0.70	1	0.73	0	0.00	0	0.00		
5n	25e	308	6	2	117	6	0	4	2.77	6	2.39	2	6.85	0	0.00		
5n	25w	309	0	0	0	1	0	19	22.87	13	5.49	18	7.23	0	0.00		
5n	35w	310	0	0	2	0	0	14	16.71	15	8.62	9	5.12	0	0.00		
5n	75e	311	0	0	0	0	0	5	6.09	5	2.14	3	1.63	0	0.00		
5n	45w	312	0	0	0	0	0	15	25.87	11	7.10	9	6.45	0	0.00		
5n	55w	313	0	0	0	0	0	26	34.02	6	2.23	9	1.94	0	0.00		
5n	65w	314	0	0	0	0	0	14	10.22	9	8.57	14	5.61	1	6.85	sandstone;	
5n	75w	315	0	0	0	0	0	20	16.28	6	5.17	6	8.69	0	0.00		
5n	85w	316	0	0	0	0	0	14	21.01	2	0.78	5	1.49	0	0.00		
5s	65e	317	1	0	6	0	0	11	13.11	60	43.17	3	0.70	0	0.00		
5s	55e	318	0	1	9	0	0	12	16.41	5	4.47	4	1.42	0	0.00		
5s	35e	319	2	0	21	3	1	7	11.35	6	5.77	1	0.47	0	0.00	Pyrgulopsis	
5s	55w	320	0	0	0	0	0	0	0.00	0	0.00	0	0.00	0	0.00		
5s	45e	321	1	0	0	0	0	12	15.00	11	7.00	15	7.55	0	0.00		
5s	25w	322	0	0	2	1	0	8	0.60	7	1.99	9	3.75	0	0.00		

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
5s	75e	323	0	0	5	0	0	0	0.00	4	1.43	2	0.99	0	0.00		
5s	25e	324	5	1	46	6	1	4	10.47	6	2.00	9	2.05	0	0.00	Pyrgulopsis	
5s	35w	325	0	0	0	0	0	12	5.00	10	5.00	5	1.00	0	0.00		
5s	65w	326	0	0	0	0	0	17	50.01	6	3.06	7	1.44	2	1.74		
5s	45w	327	0	0	0	0	0	21	22.93	32	14.50	21	6.14	3	0.93		
5s	75e	328	0	0	0	0	0	0	0.00	2	0.90	2	0.90	0	0.00		
60n	20e	329	0	0	9	0	0	3	9.83	3	0.77	5	1.22	0	0.00		
60n	30e	330	0	0	8	0	0	4	7.69	6	1.80	1	0.15	0	0.00		
60n	40e	331	0	0	4	0	0	0	0.00	5	1.42	3	1.15	0	0.00		
60n	50e	332	0	0	3	1	0	6	3.14	12	6.37	2	0.66	0	0.00		
60n	10w	333	0	0	0	0	0	4	2.96	10	0.00	5	2.03	0	0.00		
60n	10e	334	0	0	0	0	0	9	5.44	2	1.60	7	2.30	0	0.00		
60n	0e	335	0	0	1	0	0	17	21.33	9	5.96	17	4.83	0	0.00		
60n	20w	336	0	0	1	0	0	24	35.14	14	4.75	16	8.22	1	0.86		
60n	60w	337	0	0	0	0	0	41	49.49	11	32.89	34	13.05	0	0.00		
60n	30w	338	0	0	0	0	0	21	41.82	9	20.47	18	6.23	1	0.26	micro drill	
60n	40w	339	0	0	0	0	0	16	45.54	35	26.89	27	5.77	2	0.49	point tip	0.24
60n	50w	340	0	0	1	1	0	33	58.86	37	20.30	27	8.88	2	4.90	human	0.21
60n	70w	341	0	0	2	0	0	29	55.09	16	8.54	42	17.98	3	0.80		
60n	80w	342	0	0	0	0	0	26	27.88	26	18.60	8	3.67	2	3.01	sandstone	
60n	90w	343	0	0	0	0	0	15	8.55	25	18.98	14	4.71	0	0.00	mod. Metal	2.50
60n	110w	344	0	0	0	0	0	5	5.19	10	9.00	4	1.34	0	0.00		
60n	100w	345	0	0	0	0	0	2	1.32	4	2.37	1	0.28	0	0.00		
60s	50e	346	0	0	0	0	0	21	3.46	14	7.16	8	2.71	0	0.00		
60s	40e	347	0	0	0	0	0	13	25.68	11	8.41	12	3.67	1	0.31		
60s	30e	348	0	0	5	0	0	28	32.86	12	9.33	20	8.43	0	0.00		
60s	20e	349	0	0	0	0	0	30	100.99	73	39.66	21	8.08	0	0.00	phalange	0.23
60s	10e	350	0	0	2	0	0	48	78.68	25	18.85	14	4.01	0	0.00		
60s	0e	351	0	0	0	0	0	11	13.55	20	19.19	4	1.02	0	0.00		
60s	70e	352	0	0	1	0	0	23	57.32	29	19.00	12	6.02	2	1.28		
60s	60e	353	0	0	0	0	0	17	19.78	16	10.42	14	7.44	2	0.72		
65n	5w	354	0	0	6	0	0	10	14.36	14	8.32	18	8.61	0	0.00		
65n	105w	355	0	0	1	0	0	14	9.94	19	13.21	11	3.83	0	0.00	mussel	
65n	15w	356	0	0	2	0	0	4	6.74	8	4.27	8	3.88	0	0.00		
65n	25w	357	0	1	1	0	0	9	17.97	14	5.99	9	3.61	0	0.00		
65n	35w	358	0	0	0	0	0	14	19.85	25	14.70	7	2.32	1	0.49		
65n	45e	359	0	0	4	1	0	5	3.37	17	8.43	6	1.61	0	0.00		
65n	55w	360	0	0	0	0	0	37	55.74	35	22.08	26	8.94	1	71.41	lg. lithic	
65n	65w	361	0	0	0	1	0	46	56.51	33	15.76	43	15.77	2	23.67	1	
65n	75w	362	0	0	1	0	0	22	37.26	40	44.13	11	2.89	1	0.64		
65n	85w	363	0	0	0	0	0	6	8.39	22	27.23	8	2.66	13	5.05	micro drill	0.14

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
65n	5e	364	0	0	8	0	0	2	4.63	10	3.76	14	9.05	0	0.00		
65n	15e	365	0	1	4	0	0	2	2.44	0	0.00	4	1.32	0	0.00		
65n	25e	366	0	0	2	0	0	1	3.50	8	4.32	4	1.11	0	0.00	mod. Metal	4.92
65n	35e	367	0	0	1	0	0	8	12.00	14	8.00	8	8.00	0	0.00		
65n	45w	368	0	0	1	0	0	20	43.70	16	7.33	14	5.94	4	25.02	micro drill,	0.05
65n	55e	369	0	0	1	0	0	18	20.58	80	47.63	12	3.11	2	0.72	sandstone	
65n	95w	370	0	0	0	0	0	14	18.20	16	9.00	8	9.74	1	6.08		
70n	50e	371	0	0	4	0	0	20	19.74	4	1.14	13	3.76	13			
70n	90w	372	0	0	0	0	0	25	31.36	32	19.62	19	5.39	17			
70n	20e	373	0	0	4	0	0	10	9.97	26	8.73	20	7.41	1	0.48		
70n	10e	374	0	0	4	0	0	8	12.12	10	6.02	7	2.41	7			
70n	10w	375	0	0	0	0	0	1	0.30	0	0.00	0	0.00	0	0.00	mod. Metal	0.79
70n	20w	376	0	0	0	0	0	1	0.25	0	0.00	1	0.10	0	0.00		
70n	30w	377	0	0	0	0	0	4	6.00	1	0.10	3	0.35	0	0.00		
70n	40w	378	0	0	0	0	0	7	7.10	5	2.44	4	1.86	1	0.40		
70n	50w	379	0	0	1	0	0	27	36.16	13	7.92	20	6.97	2	11.97	sandstone	
70n	60w	380	0	0	0	0	0	14	36.53	25	118.79	37	14.32	1	0.23		
70n	70w	381	0	0	1	0	0	24	36.78	40	27.26	12	4.36	3	159.59	sandstone	
70n	80w	382	0	0	2	0	0	24	32.00	42	55.70	12	4.51	2	2.83	sandstone	
70n	0e	383	0	0	1	0	0	0	0.00	2	0.50	1	0.08	0	0.00		
70n	100w	384	0	0	0	0	0	10	16.55	20	11.93	6	1.85	4	5.34	sandstone	
70n	30e	386	0	0	0	0	0	1	1.41	0	0.00	6	1.01	0	0.00		
70n	60e	387	0	0	1	0	0	2	3.07	48	30.57	12	4.86	0	0.00		
75n	85w	388	0	0	0	0	0	11	19.98	13	6.16	3	1.03	3	3.02		
75n	25w	389	0	0	0	0	0	1	0.24	2	0.60	2	1.90	0	0.00		
75n	95w	390	0	0	0	0	0	9	8.02	9	12.52	10	3.16	3	40.00	micro drill	
75n	15w	391	0	0	0	0	0	2	1.54	6	1.89	8	6.50	1	0.22		
75n	35w	392	0	0	0	0	0	4	7.61	11	7.34	11	4.55	0	0.00	sandstone	
75n	45w	393	0	0	0	0	0	14	29.07	9	32.68	8	4.67	2	1.73	sandstone	
75n	55e	394	0	0	0	0	0	20	30.10	15	11.60	12	3.88	2	2.69	sandstone	
75n	75w	395	0	0	0	0	0	18	22.03	26	16.66	4	1.36	0	0.93	Human	
75n	105w	396	0	0	2	1	0	22	22.64	17	13.33	14	4.32	3	2.30		
75n	65w	397	0	0	0	0	0	18	36.03	19	16.45	16	5.87	2	0.38		
75n	15e	398	0	0	2	0	0	6	7.40	9	4.70	7	1.82	0	0.00		
75n	25e	399	0	0	7	0	1	12	11.09	11	4.70	11	3.21	0	0.00	Pyrgulopsis	
75n	35e	400	0	0	2	0	0	2	3.66	0	0.00	3	0.85	0	0.00		
75n	55w	401	0	0	4	0	0	8	23.77	90	57.17	16	4.72	0	0.00		
75n	45e	402	0	0	3	0	0	1	0.16	0	0.00	1	0.14	0	0.00		
75n	5e	403	0	0	0	0	0	1	1.46	3	1.32	2	0.73	0	0.00		
75n	5w	404	0	0	0	0	0	3	1.64	4	7.11	2	0.37	0	0.00		
80n	20w	405	0	0	0	0	0	1	0.44	0	0.00	1	0.29	0	0.00		

N	E	Bag	Sph	Pisi	Somato	Pleuro	Pyrgu	Pot	Pot (g)	Daub	Daub	Bone	Bone	Lithics	Lithic	Diag	Diag
80n	10e	406	0	0	2	2	0	9	8.02	6	5.35	4	1.36	0	0.00		
80n	0e	407	0	0	3	0	0	1	0.36	2	0.84	2	0.17	0	0.00		
80n	10w	408	0	0	0	0	0	1	0.67	1	0.24	0	0.00	0	0.00		
80n	20e	409	0	1	3	0	0	13	31.14	13	10.14	15	6.69	1	23.70		
80n	40w	410	0	0	0	0	0	0	0.00	2	2.88	3	0.39	0	0.00		
80n	50w	411	0	0	1	0	0	8	7.09	9	11.34	3	0.52	1	0.21		
80n	60w	412	0	0	0	0	0	19	27.17	23	14.15	21	5.59	2	1.94		
80n	70w	413	0	0	0	0	0	12	4.13	11	3.88	9	3.27	3	5.27		
80n	80w	414	0	0	0	0	0	16	23.27	20	9.25	11	4.68	5	5.18		
80n	30e	416	0	0	7	2	0	8	15.13	13	6.47	5	2.21	0	0.00		
80n	40e	417	1	0	11	1	0	7	13.18	14	9.32	11	10.04	0		mussel	
80n	50e	418	0	0	4	0	0	6	12.55	40	98.13	23	12.56	0	0.00	daub	
80n	60e	419	0	0	3	0	0	9	16.08	75	139.15	25	4.87	1	2.74	sandstone	
80n	90w	420	0	0	1	0	0	8	8.23	8	3.51	2	0.64	2	1.20		
85n	95w	421	0	0	0	0	0	9	5.23	29	12.20	4	0.81	3	1.61		
85n	65w	422	0	0	2	0	0	19	32.08	22	14.14	26	13.24	14	17.78	2 micro	
85n	75w	423	0	0	0	0	0	18	25.92	15	11.27	8	2.07	14	10.91	1 microdrill	
85n	85w	424	0	0	0	0	0	25	26.54	31	15.00	20	8.69	4	2.84	mussel	
90n	90w	425	1	0	0	0	0	9	5.23	29	12.20	4	0.81	3	1.61		
90n	70w	426	2	0	0	0	0	19	32.08	22	14.14	26	13.24	14	17.78	2 micro	
90n	80w	427	0	0	0	0	0	18	25.92	15	11.27	8	2.07	14	10.91	1 microdrill	
90n	60w	428	0	1	1	0	0	2	2.93	11	4.98	9	3.37	0	0.00	Pyrgulopsis	
95n	85w	429	0	0	0	0	0	5	4.45	6	5.10	5	1.35	5	6.79		
95n	65w	430	0	0	0	0	0	3	1.76	3	1.48	2	0.65	1	0.54		
90n	50w	431	0	0	0	0	0	1	3.68	1	0.33	1	0.27	0	0.00		
85n	25w	432	0	0	0	0	0	0	0.00	0	0.00	0	0.00	0	0.00		
60n	10w	433	0	0	0	0	0	15	24.71	7	3.10	8	3.31	0	0.00		
85n	45w	434	0	0	0	0	0	5	4.45	6	5.10	5	1.35	5	6.79		
0n	50w	435	0	0	0	0	0	18	25.00	21	15.00	4	1.23	0	0.00		
50s	10e	436	0	0	1	0	0	23	70.79	52	28.72	18	8.52	1	5.54	sandstone	
60n	60e	437	2	1	6	1	0	8	3.79	44	38.59	12	3.38	0	0.00		
10n	70e	438	1	0	14	0	0	12	80.40	4	1.82	3	2.45	0	0.00		
95n	75w	439	2	0	0	0	0	33	43.55	16	10.10	21	6.48	1	1.91		
80n	100w	440	0	0	0	0	0	10	7.30	5	6.39	3	1.86	0	0.00		

APPENDIX B

MATHEMATICAL VALUES OBTAINED FROM

LYON'S BLUFF (22OK520)

DECEMBER 2005

ARTIFACTS

APPENDIX B

Mathematical Values Obtained from Lyon's Bluff (22OK520) December 2005 Artifacts

Pottery Count		Pottery Weight	
15.50	mean	20.19	mean
11	median	16.28	median
1	mode	0.00	mode
48	range	100.99	range
5786	sum	8846.57	sum
9.79	standard deviation	17.73	standard deviation
≈ 9.8		≈17.7	

Daub Count		Daub Weight	
13.55	mean	11.61	mean
9	median	6.06	median
9	mode	0	mode
90	range	139.15	range
5983	sum	5086.85	sum
16.30	standard deviation	16.20	standard deviation
≈ 16.3		≈ 16	

Bone Count		Bone Weight	
10.07	mean	4.44	mean
5	median	2.09	median

4	mode	0.00	mode
88	range	113.99	range
4410	sum	1944.61	sum
9.08	standard deviation	6.55	standard deviation
≈ 9.1		≈ 6.6	

Lithic		Shelss_All	
0.71	mean	5.9	mean
0	median	1	median
0	mode	0	mode
17	range	131	range
304	sum	2596	sum
3.08	standard deviation	15.8	standard deviation
≈ 3.1		≈ 16	

11.04	mean	0.71	mean
9	median	0	median
2	mode	0	mode
57	range	18	range
4715	sum	302	sum
0.96	standard deviation	8.63	standard deviation
≈ 8.9		≈ 8.6	

Sand Temper		Grog Temper	
0.002	mean	0.002	
0	median	0	mean
0	mode	0	median
8	range	5	mode
217	sum	87	range

1.22	standard deviation	1.77	sum
≈ 1.00		≈ 1.8	standard deviation

Sand Weight

123.00	mean
43.00	median
0.00	mode
470.00	range
53803.00	sum
99.68	standard deviation

≈100