Graveline:
A Late Woodland Platform Mound on the Mississippi Gulf Coast

Edited by John H. Blitz and Lauren E. Downs

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Preface and Acknowledgments

Preface

This volume reports the results of the Graveline Archaeological Project, an investigation of the Graveline Mound site (22JA503), a Late Woodland period platform mound in Jackson County, Mississippi. The research was conducted by the Department of Anthropology, University of Alabama, with funds provided by the Mississippi Department of Archives and History (MDAH) and the Mississippi Development Authority through a grant from the United States Department of Housing and Urban Development. Fieldwork at the Graveline Mound began on April 30, 2010 and continued to July 31, 2010. Post-fieldwork laboratory analysis continued to June 1, 2011. As with any such project, the results are the product of the skill, cooperation, dedication, and support provided by the project team. We were fortunate to have a field and laboratory crew with these admirable characteristics and we thank them for their hard work.

Graveline Archaeological Project field crew. Back row, from left: Lauren Downs, Jeremy Davis, Daniel Turner, Shawn Lambert, Adam Phillips, Ashley Korpela, Rachel Briggs, John Blitz. Front row, from left: Paul Eubanks, Erik Porth; not pictured: Andrew Scruggs, Daniel LaDu, and Elizabeth Davis.

Members of the Graveline Archaeological Project

Principal Investigator: John Blitz

Field Director and Project Manager: Lauren Downs

Archaeologists: Rachel Briggs, Jeremy Davis, Paul Eubanks, Daniel LaDu, and Erik Porth.

Field Technicians: Ashley Korpela, Shawn Lambert, Adam Phillips, Andrew Scruggs, and Daniel Turner.

Cook: Elizabeth Davis.

Laboratory: Lauren Downs, assisted by Terri Robinson, Claire Thompson, and Elizabeth Wilson. We thank our co-authors and collaborators who have pieced together the soil, chemical, and ecofact evidence to interpret Graveline Mound and the people who once lived there: Fred Andrus (marine shell staple isotope analysis); Jay Johnson, Bryan Haley, and Eddie Henry (geophysical survey and mapping); Ashley Peles and Margaret Scarry (botanical remains); Susan Scott (faunal remains); Sarah Sherwood (geoarchaeology); and Eleanora Reber (ceramic residues).

Artifact Illustrators: Shawn Lambert and Erik Porth.

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This volume is an edited and abridged version of the report submitted to MDAH in October 2011. All artifacts and records generated by the project are stored at MDAH in Jackson.

John H. Blitz and Lauren E. Downs

University of Alabama

Chapter 1
The Graveline Archaeological Project

John H. Blitz and Lauren E. Downs

On the Mississippi Gulf coast there is an earthen mound built by American Indians between 1400 and 1200 years ago. Among the many ancient mounds in Mississippi, Graveline Mound is of special interest due to its unusual coastal location, the poorly known time period in which it was built, and the intact deposits that are preserved there.

This archaeological site is significant in several respects. (1) There have been relatively few modern investigations of platform mounds built in the early Late Woodland period, a time when larger, more sedentary settlements were forming around such mounds in the lower Southeast. (2) Multi-stage construction of platform mounds, if continuous over intervals longer than a single generation, suggests that places such as Graveline Mound were the scene of special activities tied to more permanent or formal changes in social organization. (3) Woodland platform mounds preserve artifacts, ecofacts, features, and soils that can provide evidence to identify these special activities. (4) Graveline Mound is one of only two confirmed Woodland platform mounds on the Mississippi Gulf coast. (5) Five smaller mounds exist within 500 m of Graveline Mound, the largest such concentration of ancient mounds on the coastal strand between northwest Florida and Louisiana. (6) Small samples of decorated pottery recovered from the mound reveal an intriguing mix of styles from regions to the east and west.

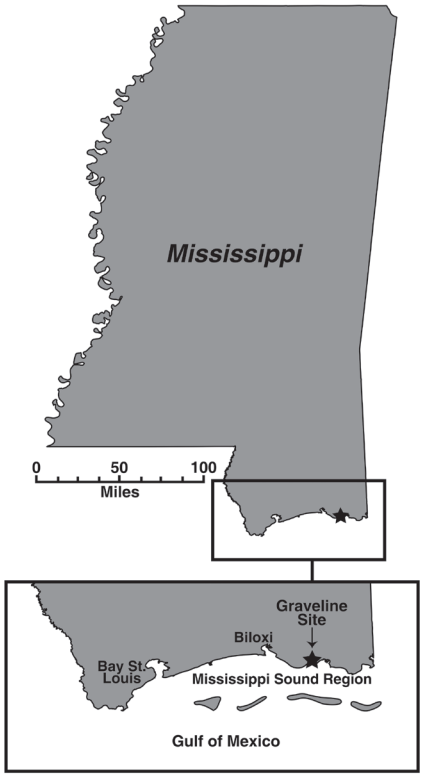

Figure 1-1. Location of Graveline Mound site (22JA503) in Mississippi.

These factors, and the site's potential to answer questions that have concerned archaeologists for quite some time, motivated the Mississippi Department of Archives and History (MDAH) to sponsor this investigation of Graveline Mound by a field crew from the University of Alabama, Department of Anthropology, in the summer of 2010. In this chapter we introduce the site and its environmental setting, review the history of investigations at Graveline Mound, establish the anthropological significance of Woodland platform mounds, present research questions we hoped to answer with our investigation, and outline procedures and methods we followed to obtain the evidence we needed to achieve our research goals.

Site and Setting

Graveline Mound site (22JA503) is a pre-Columbian earthen platform mound in Jackson County, Mississippi (Figure 1-1). The site is located on a small undeveloped lot, surrounded by houses and roadways, in a residential subdivision of the City of Gautier. Threatened by encroaching development, the site property was acquired in 2000 by The Archaeological Conservancy (TAC), a non-profit organization dedicated to preserving America's archaeological heritage. Graveline Mound is listed on the National Register of Historic Places.

Resting on a flat terrace formation of Pleistocene age at 5.9 m above mean sea level, the mound is 165 m north of Mississippi Sound on the northern coast of

the Gulf of Mexico (Figures 1-2 and 1-3). Site 22JA503 is a flat-topped mound, 30 m north to south and 25 m east to west and stands 1.65 m in height above the surrounding level terrain (Figures 1-4 and 1-5). In the 1990s the mound's rectangular shape was still discernable to the casual observer, but erosion due to hurricanes, looting, and fallen trees have altered the original shape. Until recently, there was a noticeable 8-by-5-m projection of earth from the southern flank of the mound, interpreted as a ramp access to the summit, but now this feature is mostly obliterated.

The physiographic and biotic characteristics of the region are available in detail elsewhere (Blitz and Mann 2000:5-11; Cross et al. 1974), so we will draw on these sources only to highlight the basic environmental conditions that influenced cultural activities at the site. The climate is subtropical: short mild winters, long hot summers, high humidity, and abundant rainfall (as much as 1.52 m annually). This portion of the Gulf Coastal Plain is a physiographic zone known as the Coastal Meadows, a pine-palmetto flatland with sandy, poorly drained soils of Late Pleistocene age extending 24-36 km from shore. Rivers and streams flowing from the interior cut across the Coastal Meadows, creating a riparian-swamp biotic community along these waterways dominated by hardwoods. Here, animals of great economic importance to the indigenous people—white-tailed deer, wild turkey, black bear, grey and fox squirrels—reached their greatest abundance due to the concentration of acorns, hickory nuts, and other mast foods.

The Coastal Meadows physiographic zone is subdivided into smaller environmental units based on landform and biotic communities; the two units at Graveline Mound site are Mississippi Sound and the Tidal Marsh-Estuary environments. The dominant feature of the landscape is Mississippi Sound, a shallow (3-6 m deep) body of the Gulf that forms a barrier island and lagoon system on the continental shelf. The barrier islands shelter a coastline of deltas, bays, and beaches, and the large amount of freshwater entering the Sound creates expansive tidal salt marshes and estuaries. The Tidal Marsh-Estuary ecosystem is an incubator of enormous quantities of fish and shell-

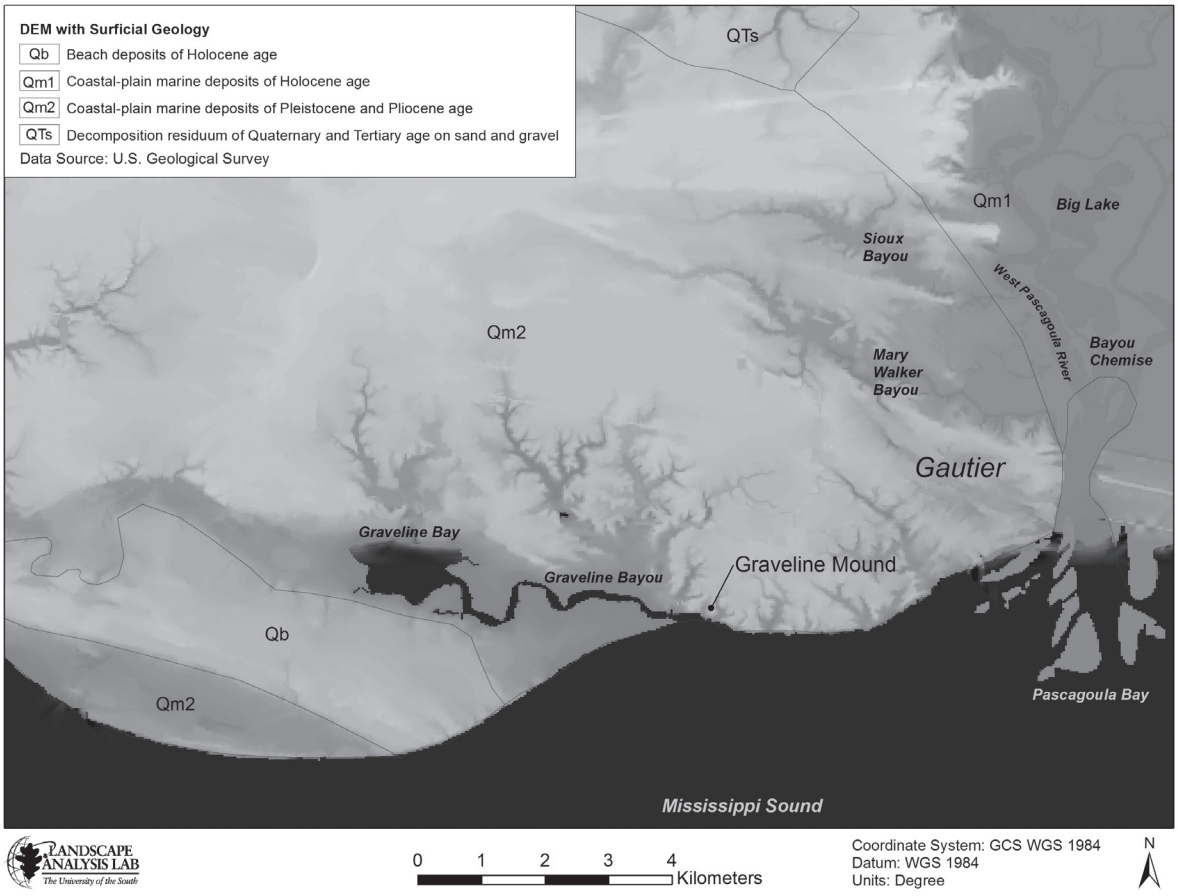

Figure 1-2. Location of Graveline Mound on Mississippi Sound. © 2013 Society for American Archaeology, reprinted by permission from *American Antiquity*, Volume 78, Number 2.

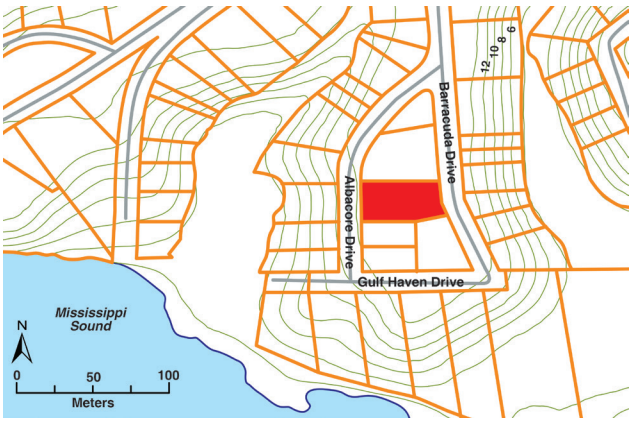

Figure 1-3. Topography and modern features of the Graveline Mound location. The Archaeological Conservancy property is marked in red.

fish, the largest biomass concentration in the region. Consequently, it was the shallow-water littoral zone, and not the pine-palmetto flatwoods or riparian hardwood forests, that contributed the bulk of wild foods consumed by the indigenous inhabitants for those time periods documented in the archaeological record (Jewell 2000).

In the immediate vicinity of Graveline Mound, freshwater springs flow from the terrace formation where the site is situated and small bayous enter the Sound within a few hundred meters of the site. Although hurricanes shape and reshape the shoreline through time, similar resources would have been available 1400 years ago within a short distance from the site. Dugout canoe travel along Mississippi Sound was recorded by the earliest European observers (McWilliams 1953:43; Swanton 1946:589-598), prehistoric sites are present on the barrier islands (Boudreaux 2009), and dugouts have great antiquity in the Southeast (Milanich 1994:70), so we can be confident that similar watercraft were used by the Late Woodland period inhabitants. From the Graveline locale, east-to-west coastal travel was quite feasible, and the small bayous and bays offered sheltered landings. Long distance travel by water to the north, away from the littoral zone, was more problematic because only two major rivers, the Pascagoula and Pearl, extend any appreciable distance into the interior. While the mouth of the Pascagoula River is only 5 km east along the coast from the Graveline Mound, the fact that the site is no closer suggests that efficiency of access to the river was not a primary concern in site location. Moreover, any of a number of locations along this stretch of the coast would have satisfied the need for littoral food sources close at hand. In short, we cannot point to a specific characteristic of the Graveline Mound location that would have favored the choice of this place for mound construction over many others. We will return to the issues of environment, subsistence, and regional settlement in later chapters.

History of Site Investigations

Prior to 2010 what was known about Graveline Mound came from three previous investigations, each limited in scope and reporting. First on the scene was the antiquarian C. B. Moore, who described the mound as the largest of a group of seven mounds and the only one with a flat summit. Moore's report of his 1905 investigation is brief, so we recite his "Mounds near Graveline Bayou, Jackson County" in full:

> Beginning not far from the eastern side of Graveline bayou, back from the bluff that overlooks the sound at this place, are seven mounds of sand, all within three-quarters of a mile from the bayou, on property of Mr. J. L. Ford, of Scranton, Miss.

Figure 1-4. Tree-covered Graveline Mound after clearing of underbrush, view to the northeast, May 2010.

Figure 1-5. Eastern half of the Graveline Mound after clearing of underbrush, view to the south, May 2010.

> All these mounds are circular in outline with the exception of the largest, which is oblong in horizontal section, about 6 feet in height, with basal diameters of 81 feet north and south and 93 feet east and west, the sides almost corresponding to the cardinal points of the compass. The summit plateau of this oblong mound is 38 feet north and south and 50 feet east and west. Each of the seven mounds was carefully examined by us without discovery of human remains. A few bits of earthenware were met with, only one of which bears decoration (Moore 1905:297).

Moore did not publish a site map, but his description of the location and dimensions of the flat-topped mound leave no doubt this is 22JA503. Except when he encountered burials with artifacts, the object of his collecting mania, Moore rarely dug his "trial holes" deeper than four feet (Knight 1996:7; Sheldon 2001:8), and so we assumed at the beginning of our investigations that Moore left most of the mound intact.

In the late 1970s the mound received renewed attention. A member of the Mississippi Archaeological Association found three pottery vessels at the site during construction of a subdivision road that encircles the property (Stone 1977; Blitz and Mann 2000: Figure A.8). Soon thereafter, a second period of investigation took place when a group led by Dale Greenwell excavated into Graveline Mound three times between 1978 and 1980. A brief summary of their findings was published (Greenwell 1984:147) and a more detailed unpublished report is on file at the MDAH (Greenwell 2000). Greenwell opened a 3.6-by-2.3-m area on the southern summit and a 5.0-by-2.5-m area on the southeastern flank of Graveline Mound. From top to bottom, these two excavations revealed about a meter of sterile sand, followed by two distinct strata with artifact associations that Greenwell interpreted as the summits of mound stages or platforms, and finally a thin occupation surface resting on subsoil at 2.05 m below the mound summit. Greenwell found scattered small post molds at this lowest occupation surface, but none formed a clear pattern. Only a small quantity of pottery (n=79) was recovered from the mound; decorated types were mostly late varieties of Marksville Incised, and additionally, seven grog-tempered sherds with black or red paint, and three sand-tempered incised sherds (Greenwell 2000:18). Greenwell identified five mounds several hundred meters to the east and a single mound to the west of 22JA503. He also noted that extensive shell middens were once present along the shoreline to the southeast and southwest of Graveline Mound, but were eroded away by hurricanes in 1947 and 1969 (Greenwell 2000:4).

The third investigation of 22JA503 occurred in 1992 as part of a research project investigating post-Archaic culture history and process on the Mississippi Gulf coast (Blitz and Mann 2000). Blitz and Mann were able to relocate five of the nearby mounds mentioned by Moore and Greenwell: two low conical mounds at Graveline West, site 22JA729 (where a third mound was destroyed by Hurricane Camille in 1969), and a group of three well-preserved conical mounds at Graveline East, site 22JA730. All of these mounds are on private lands within 500 m of Graveline Mound. The 1992 excavations were confined to Graveline Mound (22JA503). A topographic map was made, and a series of 2-m deep holes were hand augered at 5-m intervals across the mound and for a short distance off-mound. Although off-mound deposits were not found, mound auger samples revealed alternating layers of loose and compacted sand indicating multiple mound stages. A single 2.0-by-1.0-m test unit was placed where augering detected a midden deposit on the eastern mound flank (Blitz and Mann 2000:35). The resulting 1.9-m vertical profile exposed a sequence of seven distinct strata interpreted as stages of mound construction (Blitz and Mann 2000:36). The final construction stage was a thick cap of sand devoid of artifacts. A small sample of artifacts and organic remains was recovered, almost all from midden accumulated on the mound flank. We quote the investigation conclusions at length:

> Auger tests and the mound-side dump exposed in Unit 1 reveal that some stages were occupation surfaces with associated food consumption activities that deposited faunal remains, broken utilitarian and fine ware pottery, carbonized wood, charred fragments of basketry or matting, and fired clay.… Horizontal exposure was too limited to determine if structural remains were present on the mound summit; at least one post was placed at the mound perimeter. The ceramic sample, although small, is a highly distinctive assemblage diagnostic of a painted pottery horizon style distributed across the Gulf Coastal Plain from Florida to Louisiana.… To summarize, the Graveline Mound was constructed in the early Late Woodland period, an interval in the local sequence we designate the Graveline phase. It is the largest mound of what may be a multiple mound center.… If the mounds are coeval, Graveline is the only known coastal multiple-mound center between the Florida northwest coast and Loui-

> siana participating in the Quafalorma horizon and, presumably, an associated ceremonialism [i.e., platform mounds with special-purpose painted pottery] (Blitz and Mann 2000:38).

Blitz and Mann secured two radiocarbon dates that bracketed the Graveline phase to AD 400-700 and identified numerous sites with Graveline phase components (none with mounds) in the eastern Mississippi Sound region (see Chapter 6).

The Anthropological Significance of Woodland Platform Mounds

Like their later Mississippian counterparts, Woodland mounds such as Graveline Mound are earthen platforms, usually in the form of a truncated pyramid, with flat summits for mound-top activities. Platform mounds were built up in a series of construction episodes consisting of alternating layers of soil, with some layers forming activity surfaces and some layers used as fill events. After a period of time, the current summit activity surface was buried under a new layer of soil, a cycle of rebuilding that increased the mound's height and breadth. Also, like later platform mounds, pre-Mississippian platforms were scenes of various special-purpose activities not present in off-mound contexts.

Fewer modern excavations of Woodland platform mounds have occurred compared to later mounds. Consequently, there is much we do not understand about their use and cultural significance. Efforts to synthesize characteristics of Woodland platform mounds (100 BC-AD 800) have revealed similarities to Mississippian platforms, but there are important differences as well. Moreover, considerable diversity exists, both within multiple-mound sites and across regions (Brown 1994; Jefferies 1994; Knight 1990; Lindauer and Blitz 1997; Pluckhahn 1996). Consulting these references, we can identify some characteristics shared by Woodland platform mounds, but generalizations remain difficult. Some examples of Woodland platforms have hearths, small pits, and scattered post molds on the summits, but otherwise lack definable summit structures; other examples do have structures. Some structures were charnel houses, while others have structures with no clear evidence of mortuary activities. Human remains are present in some mounds but absent in others. Some mounds have midden on the summit surfaces, while other mounds have surfaces that are quite clean. Most known examples of Woodland platform mounds have associated midden deposits and highly decorated ceramics suggesting mound-summit feasting in a ritual format.

If we confine the time span to the post-Hopewell, AD 400-800 interval of the Graveline Mound and look at platform mound sites excavated with modern techniques in adjacent regions (e.g., Annewakee Creek, Summerour, and Kolomoki, Georgia; Greenhouse and Gold Mine, Louisiana; McKeithen, Florida; Toltec, Arkansas), several trends are apparent that separate these early Late Woodland period platform mounds from the antecedent Middle Woodland platform mounds of the 200 BC-AD 400 time span. (1) More AD 400-800 platform mounds have structural remains on the summits, the beginning of a change in use related to greater restriction of mound-top activities to emphasize social differentiation (Lindauer and Blitz 1997:191-192) (2) Nonlocal artifacts of stone, copper, shell, and other minerals are few or absent, pottery being the exception (Kidder 2002:8; Pluckhahn 2003:99-104), in marked contrast to the wide circulation of exotic symbols during the Middle Woodland period, i.e., the "Hopewell Interaction Sphere" (Caldwell 1964). (3) There is more intensive off-mound occupation at some of these sites, with substantial habitation debris suggesting villages or similar long-term settlements, in contrast to the sparse occupation debris and implied periodic use common at many Middle Woodland mound sites (Cobb and Nassaney 2002:534-535; Lindauer and Blitz 1997:175; Pluckhahn 1996:208). (4) The more substantial habitation areas and lack of nonlocal goods at AD 400-800 platform mound centers indicate greater investments in the intensification of local resources and the emergence of corporate groups concerned with territoriality (Cobb and Nassaney 2002:534-539; Milanich 2002:359-361). (5) There is evidence of substantial mound-top feasting and other ceremonials that enhanced corporate group status (Knight 2001; Lindauer and Blitz 1997:186-187, 191-192).

In reviewing characteristics of post-Hopewell Late Woodland platform mounds of the AD 400-800 time span, three related factors have implications for how the social groups that built the mounds were organized and the degree of social hierarchy or differentiation that was present. These issues can be posed as questions. (1) Were Late Woodland period platform mound sites vacant ceremonial centers with short-term use by dispersed, non-residential groups, or

were these places residential centers with long-term use and habitation at or near the mound site? (2) Was mound use communal, open, and socially inclusive, or was it focused on a closed and socially exclusive segment of the community? (3) Were mounds built and used in short time spans, or were they built in sequential stages with continuous use over generations? To address these issues, we constructed two models that can be evaluated with physical evidence from sites such as Graveline Mound: the Vacant Center model and the Residential Center model.

The Vacant Center model defines Woodland platform mound sites as ceremonial centers with episodic use by multiple dispersed groups not in long-term residence at the site. Cross-culturally, vacant ceremonial centers are scenes of episodic aggregation for intense ritual, alliance, and exchange, which serves to temporarily integrate groups living elsewhere and reinforces collective or shared identities (see DeBoer and Blitz 1991 for a contemporary ethnographic example). Temporary use of vacant centers by small groups occurred on an ad hoc basis for life-crisis rituals, such as funerals. Larger aggregations were scheduled by a ritual calendar corresponding to the seasonal availability of surplus foods. Exchange and acquisition of non-local materials were emphasized to bind non-kin into reciprocal relationships of debt and partnership, to create allies that could be called upon for help in times of food shortages or to assist in collecting seasonal surpluses, and to acquire the ritual paraphernalia needed for ceremonials. Such periodic aggregations resulted in widespread circulation of shared symbols and products. The social, ritual, and settlement characteristics of the Vacant Center model have been attributed to many Middle Woodland period ceremonial centers (Dancey and Pacheco 1997; Carr 2008; Walthall 1985). Notably, however, most Middle Woodland centers do not have platform mounds; there are some that do, and most of these sites are located in the Southeast (e.g., Garden Creek, North Carolina; Mandeville, Georgia; Marksville, Louisiana; Walling, Alabama).

The Residential Center model proposes that sites with Woodland platform mounds had sedentary, multiple-season habitation at the ritual precinct. Sedentary occupation of a center would permit a social group in long-term residence to exert continuous control over ritual activities. Abundant, concentrated foods locally available throughout the year were a necessary prerequisite for residential centers. In addition to supporting large sedentary communities, secure food surpluses were amassed for the ceremonials that provided a social context for status competition (Hayden 1990). Because status competition was funded by local resources and household labor, and because abundant food surpluses reduced the risk of shortages, extensive networks of alliance and exchange between dispersed groups did not play as vital a social role as they did at vacant centers. As a result, non-local symbols and materials that facilitated and motivated the extensive alliance-exchange networks were devalued (Braun 1986).

The two models imply differences in community leadership and organization. At vacant centers, temporary aggregations would support only temporary, situational leadership in which authority was restricted and defined by aggregation activities. Consequently, we might expect ritual facilities, such as platform mounds at vacant centers, would only be maintained and used periodically or for short intervals. In contrast to the episodic use of such facilities at vacant centers, we would expect platform mounds at residential centers to show evidence of continuous maintenance and use, establishing a long-term context for residential leaders to sponsor ceremonials, expand their social roles, and develop permanent positions of authority.

The archaeological correlates and physical evidence that would allow us to evaluate these two models consists of artifacts and features left by mound and site activities, the periodicity and duration of mound building as revealed by the strata and physical properties of the platform, and ecofacts that provide clues to the seasonality of site occupation. These data are unavailable or poorly documented for most Middle Woodland and Late Woodland centers with platform mounds, even at some of the more thoroughly studied sites mentioned above.

In the Vacant Center model, mound-summit structures should either be temporary constructions without substantial walls in order to facilitate open access and inclusive communal use, or they would be absent altogether. Indeed, these characteristics are considered characteristic of Woodland platform mounds (Lindauer and Blitz 1997; Knight 2001). Mound building episodes at vacant centers should be discontinuous or confined to an interval as short as a single generation, a result of the informal or situational leadership found in societies without inherited or institutionalized offices (i.e., "sequential hierar-

chy," Johnson 1982). For example, a mound may have been established due to the efforts of a single charismatic individual or the brief efforts of a social group and then abandoned soon thereafter. Vacant centers should have non-local objects or raw materials deposited as the result of alliance and exchange activities among dispersed groups. Ecofacts from vacant centers should show a patterned seasonality of site occupation, based on the assumption that vacant centers were not used at all times of the year.

Following the Residential Center model, mound summits should have permanent, substantial structures with walls that obscured activities from public view and reinforced a more exclusive access (Lindauer and Blitz 1997). Mound building episodes at residential centers should be continuous over a time span longer than a single generation, the result of formal leadership found in societies with inherited or institutionalized offices (i.e., "simultaneous hierarchy," Johnson 1982). These characteristics of mound use are commonly found in later Mississippian communities where evidence of social ranking is abundantly clear, but perhaps these conditions first appear in Woodland times at residential centers with platform mounds. Ecofacts from residential centers should indicate year-around occupation.

The Graveline Archaeological Project Research Questions

Models are ideal constructs used to frame key issues and guide research. Models generate expectations that can be evaluated with evidence from the archaeological record, and the degree to which expectations are confirmed, rejected, or reevaluated provides new insights and generates more accurate or appropriate interpretations. Although this brief review of Woodland platform mounds suggests that some Middle Woodland platform mound centers have characteristics of the Vacant Center model and some Late Woodland platform mound centers have characteristics of the Residential Center model, the models need not represent an evolutionary or developmental sequence, nor are they to be reified into societal types. Social groups with a range of demographic, subsistence, and organizational practices might establish centers that fit the expectations of either model. More to the point, models must be operationalized if they are to be useful to archaeologists. We did this by posing research questions appropriate to Graveline Mound as an example of an early Late Woodland platform mound site and by choosing archaeological methods to retrieve the physical evidence necessary to answer our questions.

Based on earlier investigations at Graveline Mound, we had some limited but important information available to us when we secured grant funds from the Mississippi Department of Archives and History to excavate here. We knew the site was unique for the region and that the pottery from the mound exhibits ceramic styles shared with archaeological cultures known as Troyville to the west in the lower Mississippi Valley and Weeden Island to the east in the northwest Florida/southwest Georgia/south Alabama region. Furthermore, we knew that site 22JA503 was a pre-Mississippian, multi-stage platform mound built sometime in the AD 400-800 interval, although this time frame was based on only two radiocarbon dates and cross-dating the more informative ceramic types. But we did not know if there were off-mound occupations adjacent to the mound, nor did we know if the nearby conical mounds also dated to the Graveline phase. Caution seemed justified about the wide range of site diversity during this era, as well as the specific circumstances of the site's regional setting on the coastal strand. In sum, we did not know if Graveline Mound shared characteristics of the Vacant Center model or the Residential Center model.

Given how little was known about the site and this time period in regional prehistory, we sought answers to several basic research questions about Graveline Mound and its immediate environs on TAC property:

1. *Was the mound construction sequence and dating accurately documented?* Answers to this question permit comparisons with contemporaneous sites.

2. *Was the mound constructed in a short or long time span?* Answers to this question address the issue of whether the platform was tied to single-generation episodes and weak social differentiation or longer-term use related to institutionalized status and strong social differentiation (Lindauer and Blitz 1997).

3. *Are there features, artifacts, ecofacts and other material evidence associated with summit surfaces and middens? Are there structural remains on the summit surfaces?* Answers to these questions identify mound-related activities.

4. *Are there adjacent off-mound deposits? If so, how are mound and non-mound assemblages similar or different?* Answers to these questions place mound development and use in a larger community context. Special-purpose mound activities and uses can be compared and contrasted with general purpose habitation area activities and uses.

5. *Is there a pre-mound or sub-mound occupation? If so, how are mound and sub-mound assemblages similar or different?* Answers to these questions may reveal clues about the social context in which such mounds were initiated.

6. *Was the mound and site occupied seasonally or year-around?* Answers to this question can assess whether Graveline Mound best fits the Vacant Center or Residential Center models.

Archaeological Procedures and Methods

In order to gather evidence required to answer our research questions, we chose a series of data recovery methods for our field investigations.

- *Site preparation:* In consultation with Jessica Crawford (TAC), we removed undergrowth and some small trees from the mound and selected adjacent areas in a manner that did not impact deposits or substantially alter the preserve property.

- *Mapping:* A topographic map was made of the mound, the 1992 permanent datum was relocated, and a metric grid imposed over the mound and adjacent TAC property using a total station.

- *Subsurface survey:* This pre-excavation procedure consisted of (1) a geophysical remote sensing survey of the mound and (2) a series of shovel test pits and hand auger samples placed at 5-m intervals from the lower mound flank/base and extending off-mound (not on the mound summit). The goals of remote sensing were to detect and map the presence of burned surfaces, hearths, or features without excavation and to determine placement of excavation units. The goals of the shovel/auger testing were to detect off-mound occupations (none were found in the limited 1992 investigation), create artifact density-distribution maps, and determine placement of off-mound excavation units. The intent of the subsurface survey and off-mound excavation units was to gather data to answer Research Questions 3 and 4.

- *Mound excavation procedure:* The primary mound excavation goal was to sample each mound construction stage while minimizing adverse impacts to the protected mound. This was accomplished with a series of 2.0-by-1.0-m units penetrating the mound and exposing a profile along a single east-west base line extending from the mound base perimeter, up the mound flank, and across the mound summit. These east-west excavation units did not provide a continuous profile, but were sufficient to correlate and trace strata between units. The secondary mound excavation goal was to recover a larger sample of artifacts and ecofacts than was found in the 1992 excavations. The third mound excavation goal was to identify features on the mound summit stages. We chose these three mound excavation procedures to gather data to answer Research Questions 1, 2, 3, 5, and 6.

- *Data recovery:* Horizontal and vertical contextual control was maintained by reference to the metric grid and datum elevation, as recorded by the total station and leveling transit. All excavated soil was passed through ¼-inch mesh; most soil from midden and features was screened through 1/16-inch mesh. Artifacts recovered from Graveline Mound were analyzed in the archaeological laboratories at the Department of Anthropology, University of Alabama, in Tuscaloosa. Artifact analysis was necessary to address research questions 1 through 5. Ecofacts and soils were analyzed in the labs of the respective scientists at their home institutions. Soil from mound strata exposed in the excavation unit profiles was sampled to gather data to understand the mound and site formation processes required to answer Research Question 2. Selected strata and feature contents were processed by flotation to recover vertebrate remains, botanical remains, and mollusk shells needed to answer

Research Questions 3 and 6. No human remains were found at Graveline Mound site.

- *Radiocarbon Dating:* The eight radiocarbon samples submitted for AMS dating were drawn from midden deposits generated by mound-related activities and containing diagnostic ceramic types. The samples address Research Questions 1 and 5.

Summary

Based on our understanding of the previous excavations at Graveline, we began our 2010 investigation with the expectation that the site was of anthropological significance because the platform mound was the only mound in the region known to date to the early Late Woodland period, a time when sedentary settlements were forming in the lower Southeast. The mound was constructed in multiple stages, perhaps spanning several generations of use, raising the possibility that it was a place of special activities tied to more permanent changes in social organization. Five smaller mounds exist nearby, perhaps representing a large community. And decorated pottery recovered from the mound revealed a mix of styles common in regions to the east and west. Our next step was to formulate specific research questions about mound form, history, and function that we hoped could be answered with evidence recovered by excavation. In the following chapters, the 2010 field investigations are described and the manner in which this evidence was obtained is discussed, beginning with the remote sensing surveys.

Chapter 2
Site Survey and Test Excavations
Lauren E. Downs

In conjunction with topographic mapping and a geophysical remote sensing survey of Graveline Mound by a team from the University of Mississippi (see Johnson et al. 2013), the University of Alabama crew initiated a subsurface survey that employed augers, shovel test pits (STPs), and two excavation units to sample areas not directly on the mound. Due to proximity of the mound to residential development, the subsurface survey conducted at the site was confined to surrounding undeveloped property owned by TAC.

Goals of the Site Survey

Off-mound testing and limited excavation was performed at Graveline Mound site to determine if evidence of cultural activities or occupation at the site may have extended to the area immediately surrounding the mound. While no evidence of off-mound occupation was found during 1992 investigations, that survey and testing project was confined largely to the mound, with limited off-mound exploration (Blitz and Mann 2000:36). Because of this, how neighboring early Late Woodland peoples may have used the area surrounding the mound, and, more importantly, how such use may have been related to construction and function of the mound were unknown prior to the current project. The primary goals of our subsurface survey and off-mound test excavations at Graveline Mound site were to gather data to answer Research Questions 4, 5, and 6, as follows:

4. *Are there adjacent off-mound deposits? If so, how are mound and non-mound assemblages similar or different?*

5. *Is there a pre-mound or sub-mound occupation? If so, how are mound and sub-mound assemblages similar or different?*

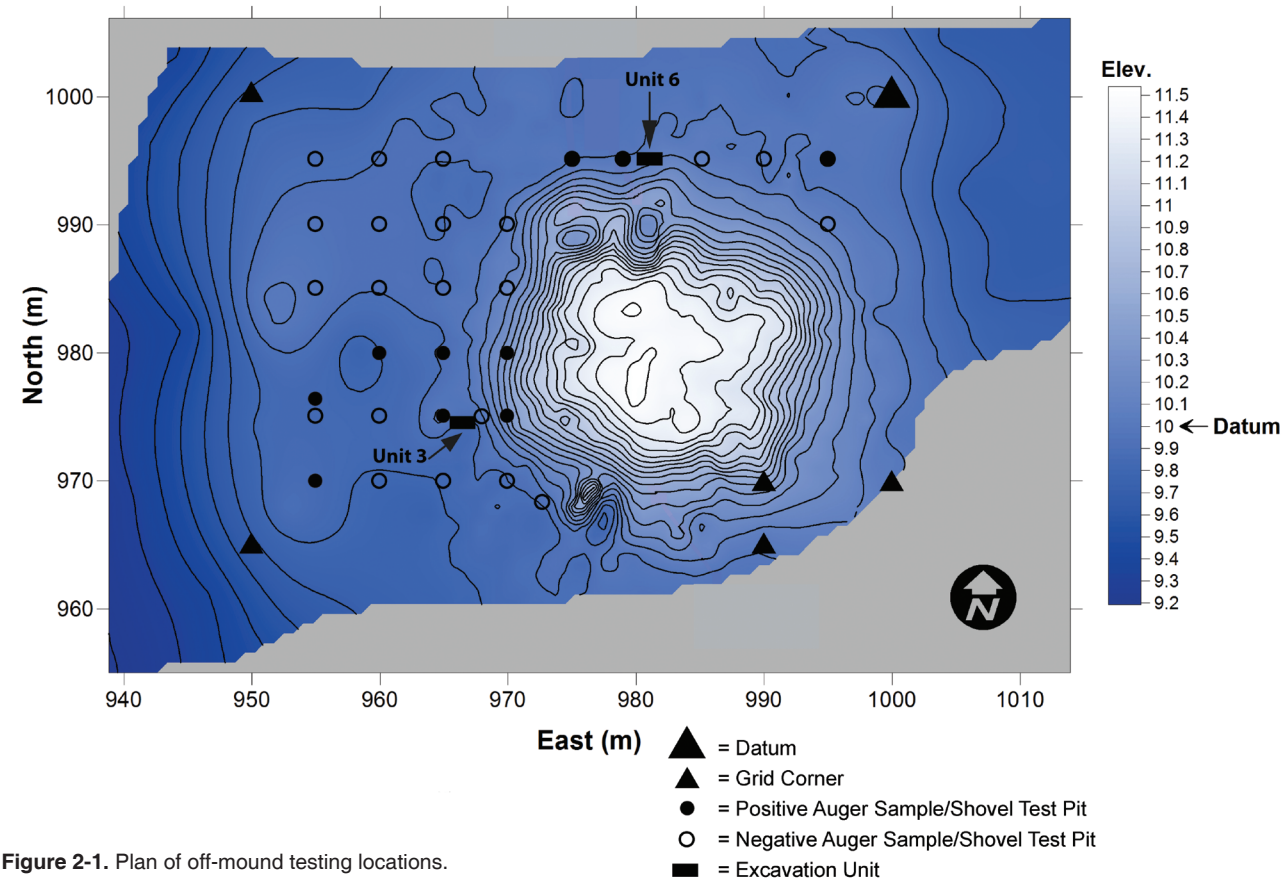

Figure 2-1. Plan of off-mound testing locations.

6. *Was the mound and site occupied seasonally or year-round?*

Answers to these research questions allow for the assessment of the relationship between mound and off-mound use at the site (Question 4), site use prior to mound construction (Question 5), and the seasonality of site occupation, especially as it relates to the Vacant Center or Residential Center models of site use (Question 6). Data required to answer these questions were secured by two means: a subsurface survey comprised of hand auger samples and shovel test pits, and two small excavation units.

Figure 2-2. Off-mound shovel testing, view north.

Off-Mound Subsurface Survey: Auger and Shovel Tests

Archaeological investigations began in 2010 at Graveline Mound with a geophysical survey conducted by the Center for Archaeological Research from the University of Mississippi (see Johnson et al. 2013) with the goal of locating and mapping archaeological features associated with the site without the need for additional or unnecessary excavation. In conjunction with that survey, a 50-by-34-m control grid oriented to magnetic north was established on site, extending to the perimeters of TAC property. In the northeast corner of this grid, a datum set by Blitz and Mann (2000:35) in 1992 was re-established and assigned an arbitrary elevation of 10.00 m.

Following the initial phase of geophysical remote sensing, auger tests (n=33) were placed along the control grid at 5-m intervals, commencing from the lower mound base and continuing off-mound to the perimeter of the property (Figure 2-1). A limited number of STPs (n=9) were excavated in off-mound areas as a means of further investigating anomalous auger samples and to provide additional stratigraphic data (Figure 2-2). Auger test samples were taken by hand with a bucket auger with a diameter of approximately 15 cm. The bucket auger proved extremely effective in sandy soils and permitted soil to be removed in 25-cm segments, making it easier to detect and record strata. STPs holes were 40 cm in diameter. Both auger and shovel tests were excavated to subsoil, which was en-

Table 2-1. Off-Mound Auger and Shovel Test Locations.

	Auger Tests								Shovel Tests			
	N976 E955	**N975 E970**	**N975 E965**	**N980 E960**	**N980 E965**	**N980 E970**	**N995 E975**	**N995 E980**	**N970 E955**	**N980 E960**	**N995 E980**	**N995 E995**
Decorated Pottery												
Marksville Incised, *var. unspecified*	-	-	-	-	-	-	-	-	-	-	1	-
Unclassified Exterior Incised on Baytown Plain, *var. unspecified*	-	-	-	-	-	-	-	-	-	-	1	-
Undecorated Pottery												
Baytown Plain, *var. unspecified*	-	-	-	1	1	-	1	1	-	-	1	-
Pottery <1/2 Inch												
Decorated	-	-	-	-	-	-	-	-	-	-	-	-
Undecorated	-	-	-	-	-	2	-	-	-	-	2	-
Lithics												
Secondary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	1	-	-	-
Fire Cracked Rock	1	-	-	-	-	1	-	-	-	-	-	-
Other												
**Charcoal/Botanical	-	4.7g	100.0g*	-	-	1.4g	-	-	-	1.1g	-	6.5g
Artifact Totals	1	0	0	1	1	3	1	1	1	0	5	0

*Post-depositional disturbance. **Not included in artifact total.

countered between 50 and 100 cm below ground surface. All excavated soil was screened through ¼-inch mesh and re-deposited into original sampling holes.

Results of these tests indicated a relatively uniform stratigraphic sequence of three strata or soil zones found throughout the off-mound testing area. The sequence consisted of (1) a dark yellowish-brown (10YR4/2) humus and organically enriched sand approximately 10 cm in thickness, which gradually transitioned to (2) a lighter, homogeneous yellowish-brown sand (10YR5/4) that ranged between 30 and 100 cm in thickness and was largely devoid of cultural material. Differing amounts of charred organic material were observed within the upper portions of this second zone, most likely due to episodes of modern burning or lot clearing. Evidence of such episodes was also observed in mound excavations (see Chapter 3). The third and final stratum was a pale brown to white compact sand (10YR7/4) indicative of subsoil. Though depth of subsoil varied from 50 to 100 cm below ground surface, no discernable spatial pattern of varying subsoil depths was observed, further confirmation that the off-mound stratigraphic sequence was quite uniform.

Overall, our off-mound auger and shovel testing revealed little evidence of substantial habitation deposits in areas tested. Just eight auger sampling locations and two shovel test pits resulted in positive recovery (Table 2-1). Many of these locations yielded only single artifacts or a scattering of charred organic material thought to result from historic or recent site use. Though no diagnostic artifacts were found during testing, the few recovered ceramics are generally consistent with Woodland occupation in the region.

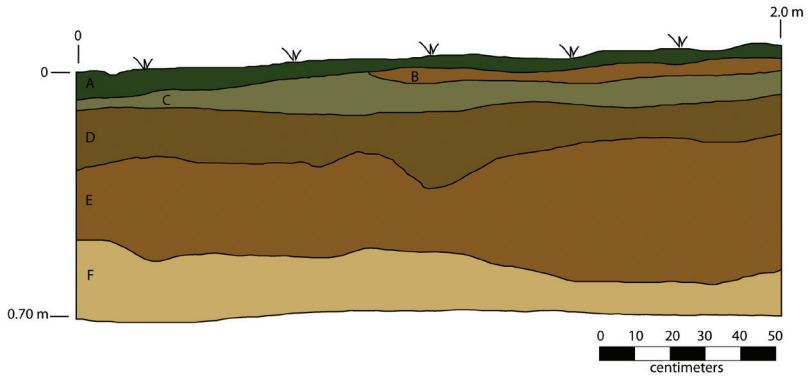

Figure 2-3. North Profile, Unit 6: (a) sod/humus; (b) Stratum 1, slope wash, homogeneous brown sand (10YR5/3); (c) Stratum 2, historic/modern burning, dark grayish-brown sand (10YR4/2) flecked with charcoal and other burned organic material; (d) Stratum 3, lower flank mound remnant/slumping of the northern mound flank, mottled dark grayish-brown sand (10YR4/2) with charcoal flecks and artifacts scattered throughout; (e) Stratum 4, a thick, homogeneous, light yellowish-brown sand (10YR5/4) characteristic of off-mound contexts across the site; (f) Stratum 5, subsoil, compact pale brown to white sand (10YR7/4).

Off-Mound Subsurface Survey: Test Excavations

Results of auger and STP sampling indicated no substantial habitation debris around Graveline Mound. Nevertheless, we wanted to be certain this was the case, and the few recovered prehistoric artifacts motivated us to examine those areas more intensively. In addition, we wanted to better understand the off-mound stratigraphic sequence adjacent to the mound, in particular the extent to which soil and artifacts from the mound may have spread by erosion. Two off-mound sample points (N995 E980 and N975 E965) were selected for further testing with 2.0-by-1.0-m excavation units. These two units, Unit 6 and Unit 3, were oriented to the east-west axis of the site grid in alignment with additional on-mound excavation units (see Chapter 3). Both units were excavated well into subsoil in order to enhance our understanding of the relationship between mound stratification and the natural landform on which it rests.

Unit 6

Unit 6, the off-mound 2.0-by-1.0-m excavation unit located closest to the mound, was placed in the vicinity of positive subsurface tests in the north-central portion of the site (see Figure 2-1). Positioned about 2 m north of the mound, the STP at N995 E980 recovered the largest artifact sample collected in off-mound survey at Graveline Mound site (Table 2-1). The stratigraphic sequence observed in Unit 6 duplicated that found in other tested off-mound areas of the site, with a few notable differences observed in profile (Figure 2-3). One difference was a thin, inconsistent layer of homogeneous brown sand (10YR5/3) directly underlying the humus (Zone 1). Not noted in other off-mound areas of the site, this brown sand likely represents a recent episode of wash re-deposited from the nearby mound flank during heavy rains or storm surges. Below the wash zone was a dark grayish-brown band (10YR4/2) of sand flecked with charcoal and other burned organic material originally observed, though less well defined, in auger and shovel test

profiles (Zone 2). Zone 2 is believed to be the result of a widespread episode of modern burning that occurred across much of the site. Zones 1 and 2, in conjunction with the humus/root mat, represent the first layer of soil observed at the auger and shovel testing sample points outlined above. However, the narrow profile view of those tests did not allow for their differentiation until we dug the excavation unit. Immediately below Zone 2 was an undulating layer of mottled dark grayish-brown sand (10YR4/2) with charcoal flecks and artifacts scattered throughout (Zone 3). Zone 3 was not found in other off-mound contexts. Given the proximity of Unit 6 to the mound base, coupled with evidence for mound deflation and broadening over time, this zone likely represents a lower flank mound remnant or, alternatively, slumping of the northern mound flank, rather than an off-mound occupation as originally suggesting by shovel testing. Under this was Zone 4, a thick, homogeneous, light yellowish-brown sand (10YR5/4) characteristic of off-mound contexts across the site. Zone 4 in Unit 6 is the second layer of soil noted in auger and shovel testing. Below Zone 4 was the final stratum, Zone 5, a compact layer of pale brown to white sandy subsoil (10YR7/4).

Unit 3

Auger testing conducted at N975 E965, located about 5 m west of the mound, revealed a significant amount of charcoal and other burned organic remains thought to be associated with off-mound structural or hearth features. Unit 3 was positioned adjacent to this positive test to further explore our auger survey results. Upon excavation, it became clear that post-depositional disturbance in the southwestern portion of the 2.0-by-1.0-m unit was the source of the charred organic remains recovered during auger testing and

Table 2-2. Off-Mound Excavation Unit Artifact Recovery.

	Unit 3									Unit 6					
	Level A	Level B	Level C1	Level C2	Level D1	Level E1	Level F2	Level G1	Level G2	Level B	Level C	Level D	Level E	Level F	West Profile
Decorated Pottery															
Larto Red, *var. unspecified*	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Marksville Incised, *var. Marksville/Yokena*	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Marksville Incised, *var. Spanish Fort*	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Marksville Incised, *var. Steele Bayou*	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Marksville Incised, *var. Yokena*	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Marksville Incised, *var. unspecified*	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Unclassified Exterior Filmed on Baytown Plain, *var. unspecified*	-	-	-	-	-	-	-	-	-	-	-	6	-	-	1
Unclassified Exterior Incised on Baytown Plain, *var. unspecified*	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-
Undecorated Pottery															
Baytown Plain, *var. Fitler*	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Baytown Plain, *var. unspecified*	-	3	-	-	1	-	-	-	-	-	6	7	5	-	-
Pottery <1/2 inch															
Decorated	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Undecorated	-	-	-	-	-	-	-	-	-	-	4	7	-	-	-
Lithics															
UID Chert Projectile Point	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Primary Chert Flake – Unutilized	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-
Tetiary Chert Flake – Unutilized	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-
Secondary Tallahatta Quartzite Flake – Unutilized	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Tertiary Tallahatta Quartzite Flake – Unutilized	-	-	-	1	-	-	-	-	-	-	-	-	1	1	-
Hematitic Sandstone	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Other															
**Charcoal/Botanical	16.7g*	172.4g*	676.5g*	14.7g*	710.0g*	734.2g*	-	-	0.2g	-	21.6g	296.2g	6.5g	-	-
Artifact Totals	0	3	0	1	2	0	1	1	1	1	12	28	8	2	1

that this material was unrelated to prehistoric occupation at the site.

The stratigraphic sequence found in Unit 3 was among the most complex encountered on site, as well as being distinct from both Unit 6 and the surrounding auger and shovel testing locations (Figures 2-4 and 2-5). Directly below the humus layer in Unit 3 was a thin, dark grayish-brown band (10YR4/2) of sand and charred remains consistent with the episode of modern burning (Zone 2) observed in Unit 6 and many other testing locations. Unlike Unit 6, no evidence of slope wash (Zone 1) or mound slumping (Zone 3) was observed either above or below this zone in Unit 3. Underlying Zone 2 in Unit 3 was a band of varying thickness (10 to 50 cm) comprised of mottled yellowish-brown (10YR5/6) sand, somewhat similar to characteristic Zone 4 observed elsewhere off-mound, but less homogenous in composition and lighter in soil color. Below this zone was a thick deposit (20 to 70 cm) of light yellowish brown sand (10YR6/4), which transitioned with depth to include strong brown clay mottling (7.5YR5/6). While the upper portion of this deposit is reminiscent of standard subsoil (Zone 5) observed in other off-mound locations, the inclusion of clay appears to be a unique feature of the subsoil in this portion of the site. Cross-cutting the lower portion of this deposit in the eastern half of the unit was a series of very thin, alternating cross bands of sand (Figure 2-6). The positioning of these cross bands suggests the presence of a pit that was slowly filled over time by small washes of soil (Sarah Sherwood, personal communication 2010). Whether or not such a pit might have been of cultural construction, no cultural material was recovered in association with the deposit. Beneath these cross bands in the east, and beneath Zone 5 elsewhere in the unit, was a very soft, pale brown sand (10YR7/3) variously overlain and underlain by a compact, strong brown sandy clay (7.5YR4/6). As noted above, the inclusion of clay within the matrix of the subsoil was not observed in other off-mound areas tested and appears to be specific to this section of the site.

Off-Mound Artifact Recovery

Artifact recovery from both off-mound excavation units was limited (Table 2-2). While no diagnostic

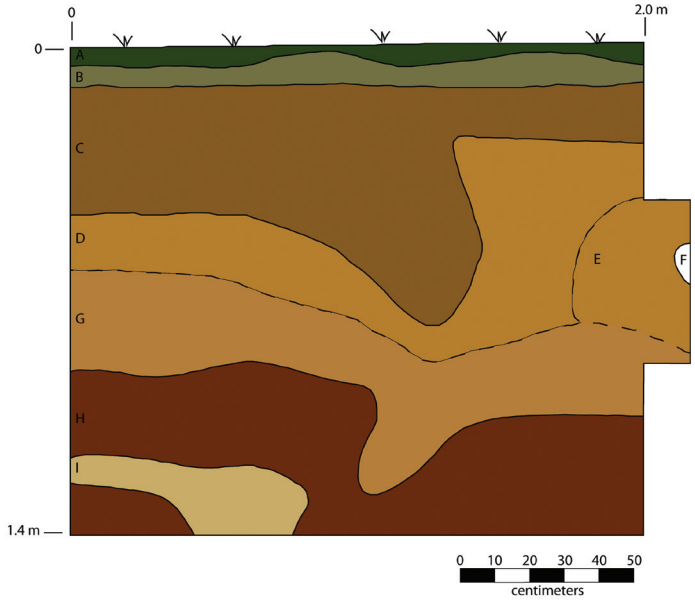

Figure 2-4. North Profile, Unit 3: (a) sod/humus; (b) Stratum 2, historic/modern burning, dark grayish-brown band (10YR4/2) flecked with charcoal and other burned organic material; (c) Stratum 4, a band of varying thickness (ranging between 10 and 50 cm) comprised of a mottled yellowish-brown sand (10YR5/6); (d)(e)(g) Stratum 5, a thick deposit (20 to 70 cm) of light yellowish brown sand (10YR6/4), which transitioned with depth to include strong brown clay mottling (7.5YR5/6); (f) thin, alternating cross bands of light yellowish brown (10YR6/4) and brown (10YR5/3) sand; (h) subsoil, compact, strong brown sandy clay (7.5YR4/6); (i) subsoil, very soft, pale brown sand (10YR7/3).

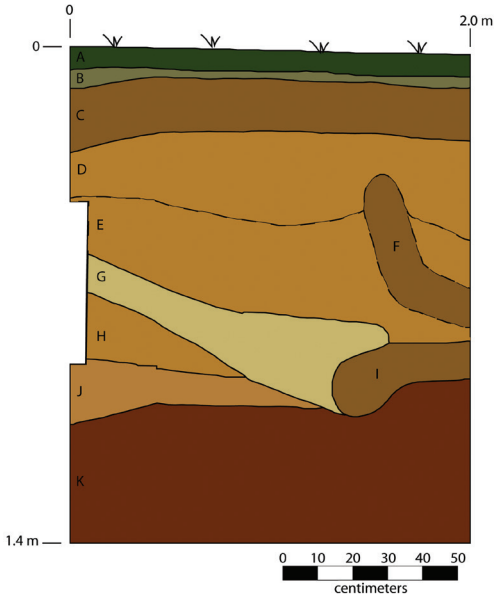

Figure 2-5. East Profile, Unit 3: (a) sod/humus; (b) Stratum 2, historic/modern burning, dark grayish-brown band (10YR4/2) flecked with charcoal and other burned organic material; (c) Stratum 4, a band of varying thickness (ranging between 10 and 50 cm) comprised of a mottled yellowish-brown sand (10YR5/6); (d)(e)(h)(j), Stratum 5, a thick deposit (20 to 70 cm) of light yellowish brown sand (10YR6/4), which transitioned with depth to include strong brown clay mottling (7.5YR5/6); (f)(i), slightly darker bands of brown sand (10YR5/3) within Stratum 5; (g) thin, alternating cross bands of light yellowish brown (10YR6/4) and brown (10YR5/3) sand; (k) subsoil, compact, strong brown sandy clay (7.5YR4/6).

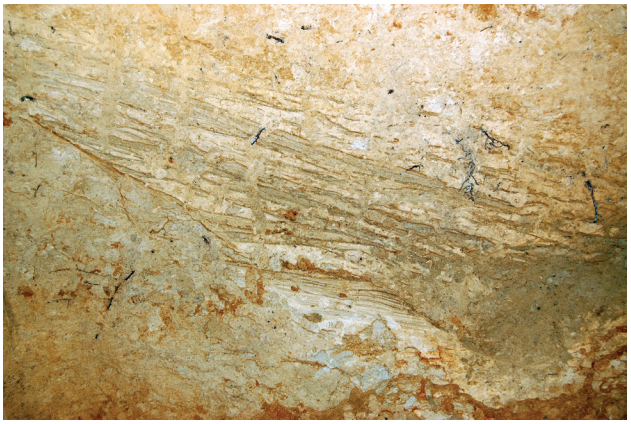

Figure 2-6. East Profile, Unit 3, close-up of cross bands.

ceramics were found in Unit 3, those potsherds recovered from Unit 6 are highly consistent with diagnostic ceramics from the mound, suggesting a similar assemblage and depositional history. Further, as the majority of the cultural material encountered in Unit 6 was associated with a probable mound remnant/mound slump, this material is likely related to activity on the mound rather than an off-mound occupation. Diagnostic ceramics from this zone (Zone 3) include Larto Red, *var. unspecified* and Marksville Incised, *vars. Spanish Fort, Steele Bayou*, and *Yokena*, all of which are associated with the Graveline phase. Artifact assemblages directly related to construction and use of Graveline Mound are discussed in greater detail in Chapters 3 and 5.

Remote Sensing Survey Results Summary

Results of the University of Mississippi's remote sensing survey of the Graveline Mound site are presented in detail elsewhere (Johnson et al. 2013). In brief, ground-penetrating radar (GPR) was the most successful geophysical technique used at Graveline Mound. The GPR survey identified the horizontal and vertical extent of shell and non-shell bearing midden deposits and features that were later encountered in excavation Units 1, 4, 5, 8, 10, and 13. These deposits represent debris on and around an intact mound surface that was used between construction episodes. A possible buried surface was also identified in the GPR survey as a collection of high amplitude reflections patterned in the outline of the mound roughly 80 cm below the current ground surface. However, this collection of anomalies does not correlate to any of the strata mapped in the excavation units and therefore may simply represent natural subsurface phenomena. In addition, an electrical resistivity tomography (ERT) survey identified low resistivity anomalies corresponding horizontally to the ovoid midden deposits mapped with the GPR survey. Profile images of the GPR and the ERT data along the E982.75 and E987.75 lines corroborate that the low resistivity anomalies match the locations of anomalies considered midden deposits in the GPR data.

Summary

A subsurface survey of 33 bucket auger samples, nine shovel test pits, and two 2.0-by-1.0-m excavation units was conducted in the area immediately surrounding Graveline Mound, extending 20 m from the mound base. We wanted to know if there were off-mound cultural deposits at the site, determine if off-mound assemblages were similar or different from mound assemblages, and gather data from off-mound deposits to evaluate season of occupation. The majority of off-mound auger and shovel tests were negative. In all, no deposits or cultural features suggestive of occupation or heavy utilization of the off-mound area were encountered immediately surrounding the mound. Instead, activity at the site appears to have been focused on the mound. Whatever activity took place in the adjacent off-mound area was too ephemeral to leave lasting material evidence. That is not to say that early Late Woodland peoples were not residing nearby, such as at the shoreline shell middens that once existed about 165 m west of the mound. But they were not doing so within the confines of TAC property. Furthermore, no evidence of a pre-mound occupation was found that extended to off-mound areas of the site. Finally, the lack of substantial off-mound deposits suggested that the site was not occupied year-round, but utilized seasonally. Despite these findings, we were not ready to reject the Residential Center model and accept the Vacant Center model until we examined the mound.

Chapter 3
Mound Excavation: Strata, Features, and Chronology

John H. Blitz and Lauren E. Downs

Following geophysical remote sensing surveys and off-mound subsurface testing at Graveline Mound site, the University of Alabama crew conducted large-scale excavations on the mound. Results of these excavations, as they relate to mound construction and chronology, are presented in this chapter. Specialized analyses of artifacts, zooarchaeological remains, and paleoethnobotanical remains generated from these excavations appear in subsequent chapters.

Goals of the Mound Excavation

Excavations were initiated on the mound to determine mound and site chronology, mound form and function, and site use. Prior to the current project, relatively little was known about the construction and use of Graveline Mound, what function the mound had in a coastal early Late Woodland context, or the precise time span it occupied in regional prehistory. The principal goals of mound excavations at Graveline were to gather data to answer the research questions presented in Chapter 1 and evaluate the Vacant Center-Residential Center issue. Off-mound testing (presented in Chapter 2) failed to find any evidence of an off-mound occupation, allowing us to answer Research Question 4 with a definitive "no." The remaining research questions we hoped to answer by mound excavation at Graveline were as follows:

1. Was the mound construction sequence and dating accurately documented?

2. Was the mound constructed in a short or long time span?

3. Are there features, artifacts, ecofacts and other material evidence associated with summit surfaces and middens? Are there structural remains on the summit surfaces?

5. Is there a pre-mound or sub-mound occupation? If so, how are mound and sub-mound assemblages similar or different?

6. Was the mound and site occupied seasonally or year-around?

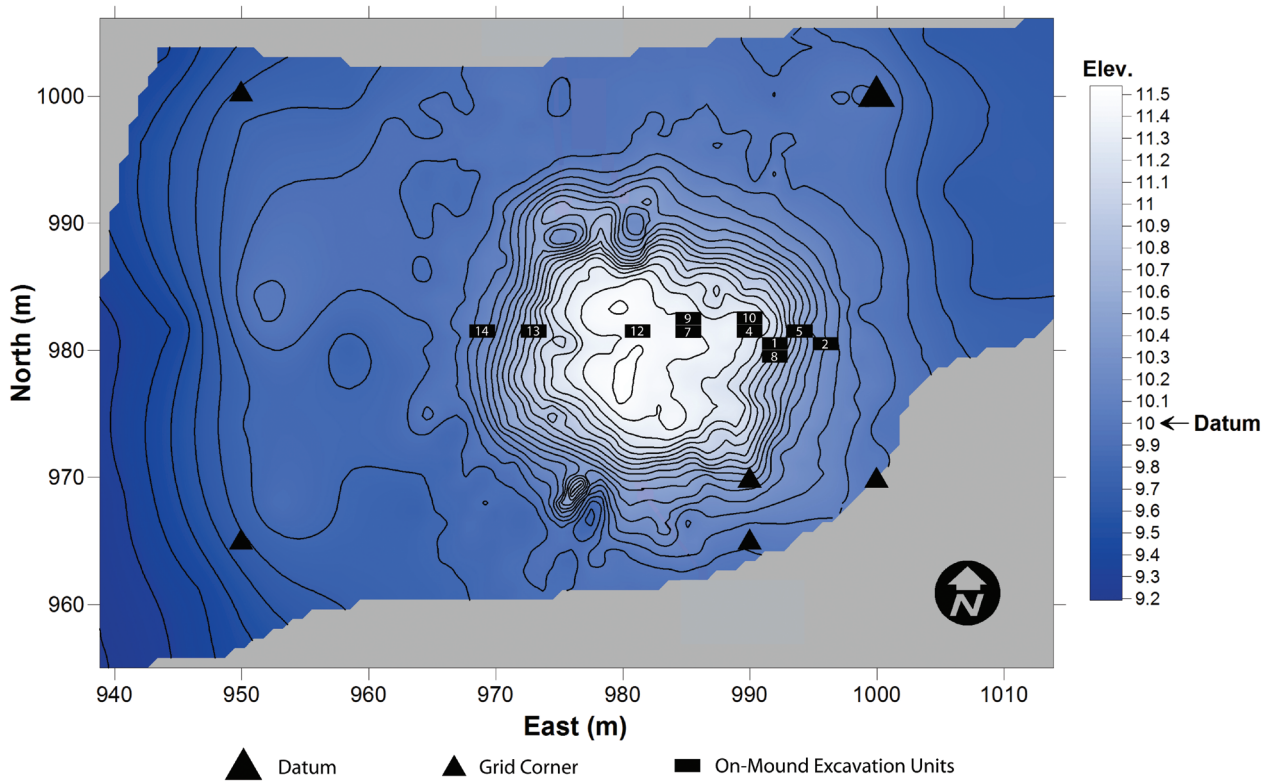

Figure 3-1. Plan of mound excavation units.

Answers to these questions permit evaluation of the sequence and timing of mound construction, especially as they relate to short-term single-generation use with limited social differentiation or long-term multi-generational use linked to institutionalized status and strong social differentiation (Questions 1 and 2); mound related cultural activities on site (Question 3); site use prior to mound construction (Question 5); and the seasonality of site use, particularly as it relates to the Vacant Center or Residential Center models of site occupation and the relationship of Graveline to contemporaneous sites in the region (Questions 1 and 6). Data necessary to address these questions were acquired through excavation of three areas of Graveline Mound: the eastern mound flank, the central mound, and the western mound flank.

Layout and Orientation of Units

The majority of our excavations conducted at Graveline were placed on the mound with the goal of providing much needed data on mound construction, use, and function at the site. A total of eleven 2.0-by-1.0-m units were excavated into the mound (Units 1, 2, 4, 5, 7, 8, 9, 10, 12, 13, and 14), three of which were positioned in contiguous 2.0-by-2.0-m blocks. Excavation was initiated on an additional 2.0-by-1.0-m unit (Unit 11) situated on the mound summit between Units 4/10 and 7/9, but quickly abandoned due to its proximity to a large, deeply rooted tree.

Units were expanded into contiguous 2.0-by-2.0-m blocks as necessary in order to maximize recovery. We aligned these units along an east-west axis to expose a cross-sectional view of mound stratification along a base line that extended from the mound base perimeter to the mound summit at Northing 981 (Figure 3-1). These units allowed for the deep vertical profiles needed to understand mound construction history and use. Units were organized along this east-west base line in a step-wise fashion to sample each mound construction stage, and to maximize the likelihood of encountering mound surface features. The position of this base line, as well as individual excavation units, was based on the results of previous testing by Blitz and Mann (2000) at the site. Looters pits and other surface disturbances were avoided, as were the locations of Greenwell's 1970s excavations on the southern mound summit and southeastern mound flank (see Chapter 1). On the eastern mound flank, units were located in the vicinity of midden deposits identified by Blitz and Mann (2000), with the goal of recovering a large sample of artifacts and ecofacts from these deposits. On the mound summit and western mound flank, units were distributed along the base line at regular intervals in areas where disturbance was minimal.

Excavation and Recovery Methods

Mound units were excavated by arbitrary levels (10 cm) within natural/cultural strata. These strata were identified as "zones" by excavators in the field, with each set of levels and zones being specific to each individual unit in order to expedite excavation. All excavated soil was passed through mesh screen of varying size according to context. Non-midden soils were passed through ¼-inch mesh, while all midden soils were screened with 1/16-inch mesh to enhance recovery of micro artifacts and ecofacts (vertebrate remains, botanical remains, and mollusk shells). Abundant samples were secured from each construction stage, as well as all features contained within these stages (see Appendix B). Recovered artifacts were analyzed in the archaeological laboratories at the Department of Anthropology, University of Alabama, in Tuscaloosa (see Chapter 4). Ceramic residue samples (Chapter 5), vertebrate remains (Chapter 6), and plant remains (Chapter 7) were analyzed by specialists at their home institutions. Soil samples were recovered and the results of their study are presented elsewhere (Sherwood et al. 2013). Mollusk shells were also collected and results of oxygen isotope analyses to determine season of capture will be made available in a subsequent publication. Multiple radiocarbon samples from feature and midden contexts were submitted for AMS dating, the results of which are presented below.

Mound Strata

Mound excavations at Graveline succeeded in isolating stratified deposits of mound construction (Figure 3-2). In the discussion below, unit-specific excavation levels and zones assigned in the field have been combined into unified mound strata, labeled A, B, C, etc., from top to bottom, in the general order in which they were encountered by the archaeologists. Excavation units are grouped into analytical units based on mound location: eastern mound flank, central mound, and western mound flank. The A, B, C ordering of strata is specific to the each of these three locations. Four major episodes of mound construction or

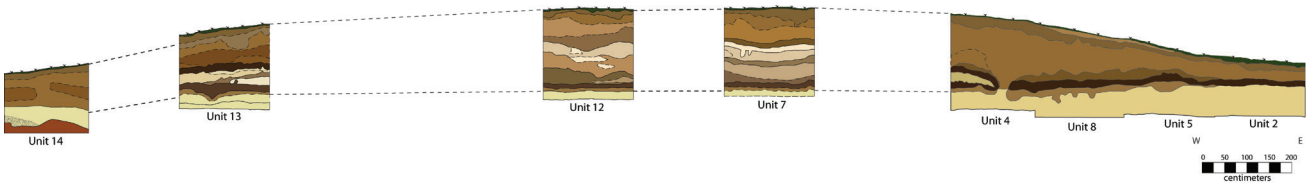

Figure 3-2. Cross-section view of mound stratification along east-west grid line, north profiles. The dotted lines demarcate the horizontal and vertical extent of the mound.

deposition were identified: Pre-Mound Surface, Initial Mound, Mound Midden, and Mound Cap. At the end of this chapter, we summarize and correlate the mound strata in chronological order, illustrating in schematic form a single stratigraphic sequence from oldest to most recent deposits.

Eastern Mound Flank (Units 1, 2, 4, 5, 8, and 10)

Excavations situated on the eastern flank of Graveline Mound were the most extensive conducted on site, as well as the most informative. Six 2.0-by-1.0-m units were excavated into the mound to the depth of subsoil. To enhance recovery, four of these units (Units 1 and 8 and Units 4 and 10) formed 2.0-by-2.0-m contiguous blocks. These six units provided a complete profile of the eastern mound flank, from base of mound to edge of summit (Figure 3-3).

Excavations in the eastern flank of Graveline Mound revealed a sequence of four major depositional events in the mound's history. The most recent of these events were several thin strata of humus and slope wash resulting from modern erosion and past excavations (Figures 3-3 and 3-4; strata A-C). Beneath them was a thick Mound Cap, approximately 1 m in thickness, composed of a loose, lightly mottled yellowish brown (10YR5/6) sandy fill largely devoid of artifacts (Figures 3-3 and 3-4; stratum D). Notably, no perceptible breaks in the Mound Cap fill indicative of multiple episodes of construction were observed during excavation. Furthermore, no features were found on the surface or within the fill of the Mound Cap. All of this suggests to us that the Mound Cap was deposited fairly rapidly across the eastern portion of the mound and represents a significant mound building episode.

Immediately below the Mound Cap on the eastern mound flank was an organically rich stratum of debris, which we designate as the Mound Midden (Figures 3-3 and 3-4; stratum F). The Mound Midden was composed of dark grayish brown (10YR4/1) sand enriched by abundant organic remains. Ranging between 20 and 40 cm in thickness, the Mound Midden was most dense in the western portion of the flank

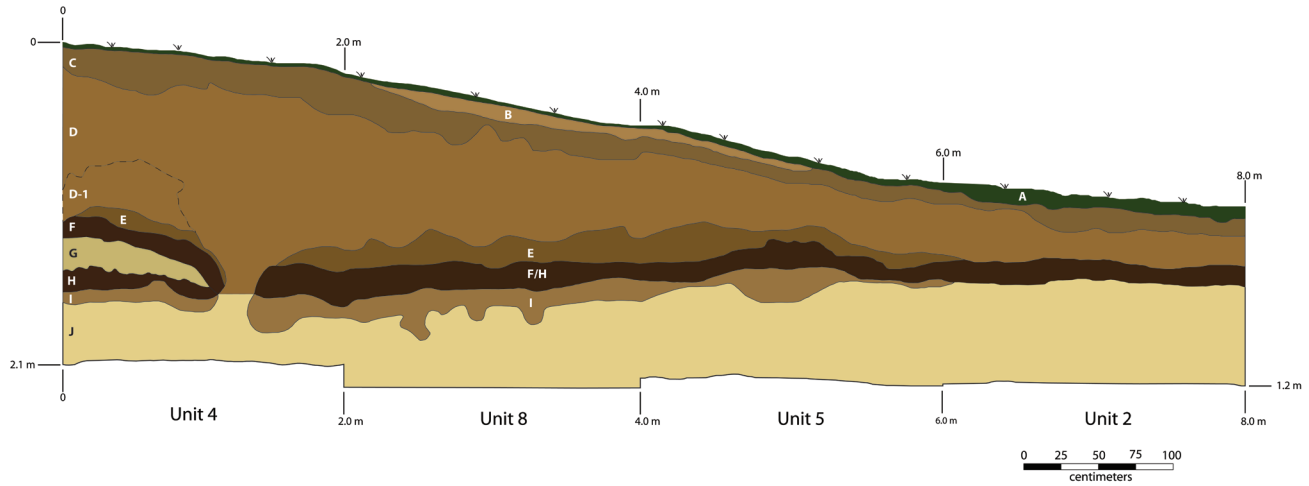

Figure 3-3. Eastern Mound Flank, Units 2, 4, 5, and 8, North Profile: (a) root mat; (b) recent/modern slope wash from previous excavations, pale brown sand (10YR6/3); (c) historic/modern humus, grayish brown sand (10YR5/2); (d) Mound Cap, lightly mottled, loose yellowish brown sand (10YR5/6); (d1) Mound Cap, moderately mottled, loose yellowish brown sand (10YR5/6) with pale brown sand (10YR6/3); (e) transitional mottling of the Mound Cap, yellowish brown sand (10YR5/6), with Mound Midden, dark grayish brown sand (10YR4/1); (f) Mound Midden, organically enriched dark grayish brown sand (10YR4/1) with abundant faunal and shell remains and ceramic fragments; (g) Initial Mound, homogeneous, loose very pale brown sand (10YR7/3) devoid of artifacts; (h) Pre-Mound Surface, organically enriched original ground surface, compact dark grayish brown sand (10YR3/2); (i) leaching from Pre-Mound Surface, compact, light brownish gray sand (10YR6/2), into sub-soil; (j) sterile sub-soil, compact, very pale brown sand (10YR7/3) lightly mottled with a strong brown sandy clay (7.5YR5/6) increasing with depth.

closest to the center of the mound and thinned as it continued eastward toward the mound perimeter. In profile, the Mound Midden appeared a uniform, homogeneous sheet of debris. When exposed in horizontal excavation, however, the Mound Midden proved to be composed of discrete, individual pockets or dump heaps of well-preserved shell, faunal remains, broken pottery, charcoal, and desiccated organic material. When these heaps could be identified and distinguished as dump episodes, they were given separate feature numbers. Several small post molds penetrated midden deposits in this portion of the mound.

Directly below the Mound Midden, along the west edge of the mound flank closest to the mound center, was a deposit of sand 25-30 cm thick. This low flat building event represents the initial stage of mound construction (Figures 3-3 and 3-4; stratum G). This Initial Mound was composed of loose, sterile very pale brown (10YR7/3) sandy fill devoid of cultural material or features. Upon completion it served as a surface for activities, and on that basis we interpret the Initial Mound as the first stage of mound construction. One edge of the Initial Mound was identified, but not enough of this construction stage was exposed to determine its full dimensions. Lack of evidence for the Initial Mound in the adjacent central mound units to the west indicates that it did not extend more than 4 m in that direction. Either Initial Mound construction covered a small area, or it had a more linear shape that continued in a north-to-south alignment under unexcavated areas of the mound. As with the Mound Cap, there were no obvious breaks in Initial Mound fill to indicate multiple episodes of construction. However, geoarchaeologist Sarah Sherwood noted the presence of "rip-up clasts" and possible fine-scale slope wash within the Initial Mound, perhaps indicative of staged construction or mid-construction exposure of sufficient duration for wash to accumulate. Nevertheless, the Initial Mound appears to have been erected relatively quickly and utilized in conjunction with activities that produced and deposited the overlying Mound Midden deposits. Two major episodes of activity and deposition in the mound's history were construction of the Initial Mound and the subsequent Mound Midden deposits that accumulated over and around it. These episodes appear linked to a feasting event or series of such events.

Figure 3-4. Eastern Mound Flank, Unit 4, West Profile. See Figure 3-3 caption for descriptions of strata.

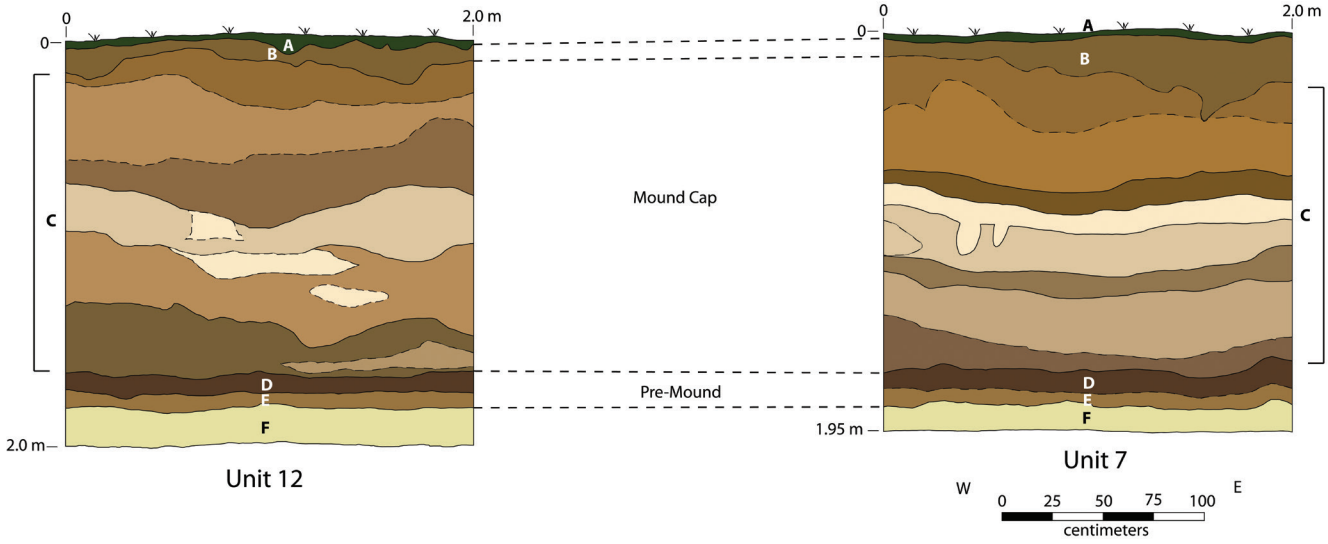

Figure 3-5. Central Mound, Units 7 and 12, North Profile: (a) root mat; (b) historic/modern humus, grayish brown sand (10YR5/2) flecked with charcoal and oxidized soil indicative of an episode of historic/modern burning; (c) Mound Cap, alternating layers of light and dark basket loaded sand; (d) Pre-Mound Surface, organically enriched original ground surface, compact dark grayish brown sand (10YR3/2); (e) leaching from Pre-Mound Surface, compact, light brownish gray sand (10YR6/2), into sub-soil; (f) sterile sub-soil, compact, very pale brown sand (10YR7/3) lightly mottled with a strong brown sandy clay (7.5YR5/6) increasing with depth.

At the base of the Initial Mound, and below the adjacent Mound Midden deposits in areas where the Initial Mound was not present, was a buried stratum that we designate the Pre-Mound Surface (Figures 3-3 and 3-4; stratum H). This stratum represents the fourth, major depositional episode recognized at the mound site. Ranging between 10 and 15 cm in thickness, the Pre-Mound Surface was composed of organically enriched, compact dark grayish brown (10YR3/2) sand and was found to extend throughout the eastern flank units. In areas where the Mound Midden overlies the Pre-Mound Surface, the two were largely indistinguishable, both during excavation and in profile. Instead, these two strata formed a single expansive mass of dark, organically enriched soil (Figures 3-3 and 3-4; stratum F-H). In areas where the two could be differentiated, geoarchaeologist Sarah Sherwood (personal communication, 2010) found abundant soil clasts that extended upward from the Pre-Mound Surface, evidence of an active, utilized surface prior to deposition of the Initial Mound, Mound Midden, and Mound Cap. Several post molds penetrated the Pre-Mound Surface, at least some of which originated in the Mound Midden stratum above, and are likely associated with activity related to the Initial Mound. Directly below the Pre-Mound Surface throughout the eastern mound flank was sterile subsoil composed of a compact, very pale brown (10YR7/3) sand, which was lightly mottled with a strong brown (7.5YR5/6) sandy clay that increased with depth.

Central Mound (Units 7, 9, and 12)

Following excavations on the eastern flank, an additional three 2.0-by-1.0-m units were excavated into the summit of Graveline Mound along the east-west base line. The easternmost units, Units 7 and 9, were positioned to form a larger, contiguous 2.0-by-2.0-m block. In so doing, we hoped to locate strata initially encountered in the eastern mound flank units.

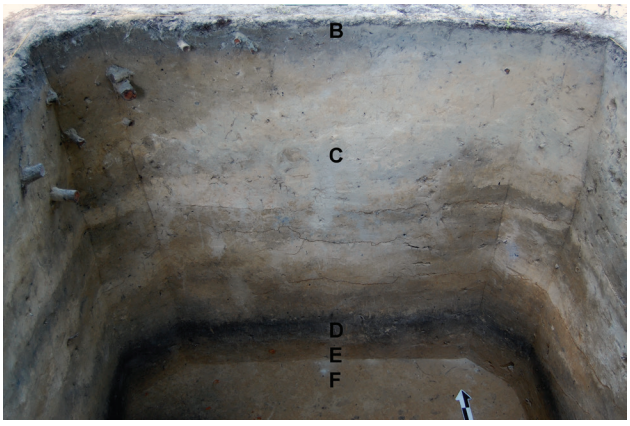

Figure 3-6. Central Mound, Unit 9, North Profile. See Figure 3-5 caption for descriptions of strata.

As seen in the eastern mound flank units, a thick cap of sand about 1.5 m in thickness was observed directly beneath the root mat and humus of the mound summit (Figures 3-5 and 3-6; strata A-C). Unlike that observed in the eastern mound flank units, however, this cap in the central portion of the mound was not a homogeneous blanket of yellow brown sand. Instead, the Mound Cap in this location consisted of zoned fills that alternated between layers of clean, loose, coarse white or lightly colored sand and compact, darkly mottled and anthropogenically enriched layers.

The excavators deliberated as to whether these darker layers were occupation or activity surfaces and if the lighter-colored fill layers were part of the Initial Mound identified in the eastern mound flank units or construction stages for additional such platforms. The following observations suggest that these layers were not platforms with activity surfaces or an extension of the Initial Mound, but a series of zoned fills. First, the darkly mottled soils had the appearance of secondarily deposited anthropogenic fill with very few artifacts and lacking shell concentration features, and thus quite different from Mound Midden found in the eastern mound flank units. Second, the lighter-colored layers did not appear as consolidated or level in profile as the Initial Mound, nor were any features present. Third, Sherwood's geoarchaeological analysis of the zoned fills found no evidence of erosion, a stable activity surface, or a developing A soil horizon that would indicate a disconformity or hiatus in the addition of the zoned fills. Thus the construction of the Mound Cap fills was a rapid event. Finally, the terminal layer of the Mound Cap, although altered by post-depositional disturbances such as tree roots, was composed of plinthite, a reddish-colored, sand and clay material derived from the surrounding subsoil. This material provided a hard and durable terminal layer for the mound (see Sherwood et al. 2013). These observations support a conclusion that the layers were rapid fill events and are best considered part of the Mound Cap encountered in the eastern mound flank units, not platform constructions or activity surfaces.

Neither the Initial Mound nor the associated Mound Midden appeared to extend to the central portion of the mound. The Pre-Mound Surface encountered in eastern mound flank units extended through-

out the central mound units at the base of the Mound Cap. As observed elsewhere, the Pre-Mound Surface was a dark, organically enriched surface composed of grayish brown (10YR3/2) sand, below which was subsoil (Figures 3-5 and 3-6; strata D-F). No cultural features were associated with the Pre-Mound Surface in the central portion of the mound and few artifacts were recovered.

Western Mound Flank (Units 13 and 14)

On the western mound flank, two 2.0-by-1.0-m units were excavated on the east-west baseline extending from the mound perimeter to the upper mound flank. Placement of units along this baseline was constrained, in part, by avoidance of heavily eroded (and looted) portions of the mound. Despite extensive surface disturbance, the western mound flank units did provide valuable stratigraphic data regarding mound construction.

The thick Mound Cap noted in the eastern and central portions of the mound was found to extend across the mound to the western flank. The Mound Cap was located directly beneath several thin strata of humus and slope wash related to modern erosion (Figures 3-7 and 3-8; strata A-C). Once again, no features were found on or within the Mound Cap. In the upper portion of the western mound flank (Unit 13), the Mound Cap very closely resembled its appearance in the central mound units, with multiple layers of alternating light and dark basket-loaded sandy fill (C1 and C2). In the lower portion of the western mound flank (Unit 14), however, the heavily banded Mound Cap became increasingly homogeneous, more closely resembling that of the eastern mound flank. This change in appearance of the Mound Cap probably marks the western extent of the original mound. The most likely explanation for similar appearances of the Mound Cap at the eastern and western mound flanks is because these are locations where more slope wash settled on the lower perimeter of the mound due to post-depositional erosion. There is also evidence of considerable disturbance of some sort in Unit 14 (Sarah Sherwood, personal communication, 2011).

Unit 13 deposits, however, are intact and very informative. Stratum D was loose, very dark brown (10YR2/2) sand with abundant pottery and charcoal, but relatively sparse bone and shell remains. Significantly more pottery was recovered from stratum D in Unit 13 than from any other provenience on the site. This pottery sample is highly consistent with ceramics encountered elsewhere on the mound. We deliberated as to the origin of this organically rich layer. Was stratum D mound fill re-deposited here from elsewhere or was it midden accumulated as a result of mound

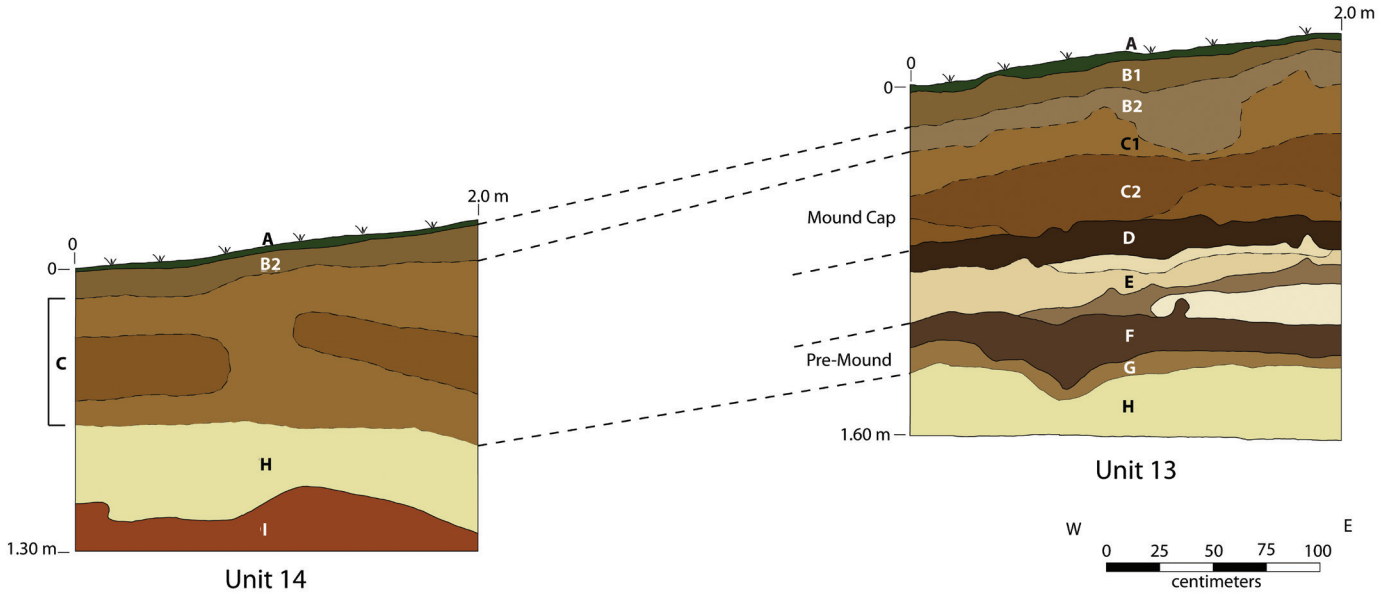

Figure 3-7. Western Mound Flank, Units 13 and 14, North Profile: (a) root mat; (b1) recent/modern slope wash, light yellowish brown sand (10YR6/4); (b2) historic/modern humus, grayish brown sand (10YR5/2); (c1-2) Mound Cap, alternating layers of light and dark basket loaded sand; (d) Mound Midden, very dark brown sand (10YR2/2) with abundant ceramic fragments and charcoal; (e) Initial Mound construction stage, very pale brown sand (10YR7/3) devoid of artifacts; (f) Pre-Mound Surface, organically enriched original ground surface, compact dark grayish brown sand (10YR3/2); (g) leaching from Pre-Mound Surface, compact, light brownish gray sand (10YR6/2), into sub-soil; (h) sterile sub-soil, compact, very pale brown sand (10YR7/3) lightly mottled with a strong brown sandy clay (7.5YR5/6) increasing with depth; (i) sterile sub-soil, compact, strong brown sandy clay (10YR5/6).

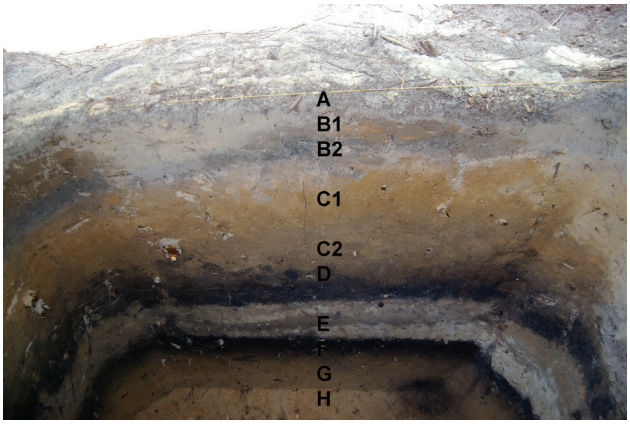

Figure 3-8. Western Mound Flank, Unit 13, North Profile. See Figure 3-7 caption for descriptions of strata.

activities at this location? We concluded the latter was the case, because beneath stratum D lay stratum E, a 25-40-cm thick deposit of compact sand. Like the Initial Mound platform found in eastern mound flank units, stratum D was another low, flat building event resting on the Pre-Mound Surface. It is similar in thickness, occurs at the same depth, and has artifacts and midden accumulated on top. Furthermore, it has the same soil composition as the Initial Mound encountered in the eastern mound flank units (Sherwood et al. 2013). Due to limited horizontal exposure, we do not know the size or configuration of this mound construction event, but it appears coeval with the Initial Mound in the eastern mound flank units. In other words, we exposed the initial mound construction erected on the Pre-Mound Surface in two locations: an Initial Mound in the eastern mound flank area and this one in the western mound flank area.

This, however, confronted us with a puzzle. Why was Initial Mound construction absent in the central mound excavation units? In the mound strata summary, we argue that these two construction stages, although spatially separate, are equivalent events. Both of these stages were Initial Mound construction, both stages were foci of activities, and both have Mound Midden accumulated on their surfaces.

Unlike the Initial Mound, which was not encountered in central mound units, the organically enriched, active Pre-Mound Surface extended across the mound from eastern to western flank. However, as with the Mound Cap, the organically stained Pre-Mound Surface was present only in the upper portion of the western mound flank in Unit 13, close to the center of the mound, and it trailed out and disappeared in the intervening unexcavated area between Units 13 and 14 (Figure 3-7; stratum F). As with the central mound units, no features were associated with the Pre-Mound Surface on the western mound flank. Below the Pre-Mound Surface was a layer of organic staining (G) leached downward from the Pre-Mound Surface. Next encountered was the compact, very pale brown (10YR7/3) sand and culturally sterile subsoil seen elsewhere on site, which yielded to brown sandy clay (10YR5/6) with depth in lower western mound flank Unit 14 (Figure 3-7; stratum I). Though some light clay mottling within the subsoil was observed in other mound contexts, none were as pronounced as that in Unit 14. Off-mound, however, a similar, high-clay content subsoil was encountered in Unit 3, located just west of the mound, suggesting that higher clay content may be a unique feature of the subsoil in the western portion of the site. This subsoil is the likely source of the plinthite used as the terminal Mound Cap layer.

Mound Features

Here we move from extensive mound strata, fills, and platforms to discuss smaller, spatially discrete deposits. Thirty-nine features were recorded during excavation of Graveline Mound (Appendix A). Of these, 31 features were prehistoric and 8 features proved to be non-cultural stains or disturbances, such as tree roots. All 31 prehistoric features were found in the eastern mound flank, Units 4, 5, 8, and 10 (Table 3-1). Twenty-six features were found on the Pre-Mound Surface or within the Mound Midden accumulated on the Pre-Mound Surface, and five features were found within or on the Mound Midden accumulated on the Initial Mound (Figure 3-9). However, these vertical and horizontal distinctions of feature provenience may be relatively unimportant because there is evidence that they represent a single behavioral context. In other words, because the eastern mound flank Initial Mound sealed and covered only a small portion of the surrounding Pre-Mound Surface, most of the features associated with both the Pre-Mound Surface and the Mound Midden probably resulted from activities that occurred at the Initial Mound. No prehistoric features were found in the Mound Cap fill, in the central mound units, or in the western mound units. The following discussion is restricted to the prehistoric features, of which there are four descriptive types: shell concentrations, pottery concentrations, charcoal concentrations, and post molds.

Table 3-1. Mound Features.

Feature Number	Provenience	Feature Type	Context	Maximum Dimensions		
				E-W	N-S	Depth
Feature 4 A/B/C	Unit 4, Level M3, N1, N2, O	Shell Concentration	Midden	73 cm	35 cm	26 cm
Feature 5 A/B/C/D	Unit 4, Level M3, N1, O	Shell Concentration	Midden	54cm	63 cm	39 cm
Feature 6A/B	Unit 5, Zone 5, Levels A, B, B2	Shell Concentration	Midden	66 cm	56 cm	22 cm
Feature 7A	Unit 5, Zone 5, Level B2	Shell Concentration	Midden	50 cm	41 cm	8 cm
Feature 8A/B	Unit 5, Zone 5, Level B2/ Zone 6, Level A	Discrete Midden Deposit	Midden	50 cm	30 cm	12 cm
Feature 9A	Unit 5, Zone 5, Level B2/Zone 6, Level A	Discrete Midden Deposit	Midden	53 cm	57 cm	10 cm
Feature 10A	Unit 5, Zone 5, Level B2/Zone 6, Level A	Discrete Midden Deposit	Midden	40 cm	52 cm	10 cm
Feature 11	Unit 8, Zone 4, Level B/C	Possible Post Mold	Midden	6 cm in diameter		22 cm
Feature 12	Unit 8, Zone 4, Level C/D	Possible Post Mold	Midden	6 cm in diameter		21 cm
Feature 13	Unit 8, Zone 4, Level D/Zone 5, Level A	Possible Post Mold	Midden	7 cm in diameter		5 cm
Feature 14	Unit 8, Zone 4, Level D/Zone 5, Level A	Possible Post Mold	Midden	9 cm in diameter		7 cm
Feature 15 A/B/C	Unit 8, Zone 5, Level A,B,C	Shell Concentration	Midden	60 cm	30 cm	20 cm
Feature 16	Unit 8, Zone 4, Level D/Zone 5, Level A	Possible Post Mold	Midden	9 cm in diameter		
Feature 17 A/B/C/D/E/F/G	Unit 8, Zone 5, Level A,B,C/Zone 6, Levels A,B,C,D	Shell Concentration	Midden	80 cm	50 cm	15 cm
Feature 18 A/B/C/ D/E/F	Unit 8, Zone 5, Level B,C/Zone 6, Levels A,B,C,D	Shell Concentration	Midden	80 cm	50 cm	15cm
Feature 19 A/B/C	Unit 8, Zone 5, Level C,D/Zone 6, Level A	Shell Concentration	Midden	50 cm	27 cm	13 cm
Feature 20 A/B/C/D	Unit 8, Zone 6, Levels A,B,C,D	Shell Concentration	Midden	90 cm	35 cm	20 cm
Feature 21	Unit 8, Zone 6, Level B	Pottery Concentration	Midden/Pre-Mound	35 cm	20 cm	3 cm
Feature 22	Unit 8, Zone 6, Level B	Charcoal Concentration	Midden/Pre-Mound	50 cm	15 cm	2 cm
Feature 23	Unit 8, Zone 6, Level B/C	Post Mold	Midden/Pre-Mound	5 cm in diameter		5 cm
Feature 24	Unit 8, Zone 6, Level C/D	Post Mold	Midden/Pre-Mound	10 cm in diameter		24 cm
Feature 25	Unit 8, Zone 6, Level C/D/Zone 7, Level A	Post Mold	Midden/Pre-Mound	10 cm in diameter		15 cm
Feature 26	Unit 8, Zone 6, Level C/D	Post Mold	Midden/Pre-Mound	8 cm in diameter		14 cm
Feature 27A	Unit 8, Zone 6, Level D	Charcoal Concentration	Midden/Pre-Mound	20 cm	27 cm	3 cm
Feature 29	Unit 8, Zone 7, Level A	Pottery Concentration	Midden/Pre-Mound	20 cm	37 cm	14 cm
Feature 30	Unit 8, Zone 7, Level B	Post Mold	Midden/Pre-Mound	11 cm in diameter		19 cm
Feature 31	Unit 8, Zone 7, Level B	Post Mold	Midden/Pre-Mound	10 cm in diameter		17 cm
Feature 32	Unit 8, Zone 7, Level B	Post Mold	Midden/Pre-Mound	8 cm in diameter		12 cm
Feature 35	Unit 10, Zone 5, Levels B,C	Shell Concentration	Midden	26 cm	23 cm	6 cm
Feature 36	Unit 10, Zone 5, Level C	Shell Concentration	Midden	26 cm	29 cm	5 cm
Feature 37 A/B	Unit 10, Zone 5, Level E	Shell Concentration	Midden	90 cm	40 cm	18 cm

Shell Concentrations (n = 15): Features 4, 5, 6, 7, 8, 9, 10, 15, 17, 18, 19, 20, 35, 36, 37

Shell concentration features found in Units 4, 5, 8, and 10 were distinct heaps composed of marine shells, carbonized material, vertebrate remains, and discarded potsherds (Figure 3-10). Marine shells, especially of marsh clam and oyster, were the most common items in the features. These were not the midden-filled pits commonly encountered at prehistoric sites in the Southeast. Instead, we interpret the Graveline Mound shell concentration features as piles created by construction activity in which trash was collected in a container and dumped onto a surface. The resulting piles were relatively small, with irregular to circular outlines in plan view, varying from 26 to 68 cm across and 13 to 41 cm in thickness. Some shell concentration features had a dome-like shape in profile, others had a flatter configuration, as if leveled and spread. Some shell concentrations appeared to be a single pile formed by dumping one load of trash; others consisted of multiple overlapping piles created by several dump loads.

Shell concentration features were well preserved, a situation we attribute to a formation process in which

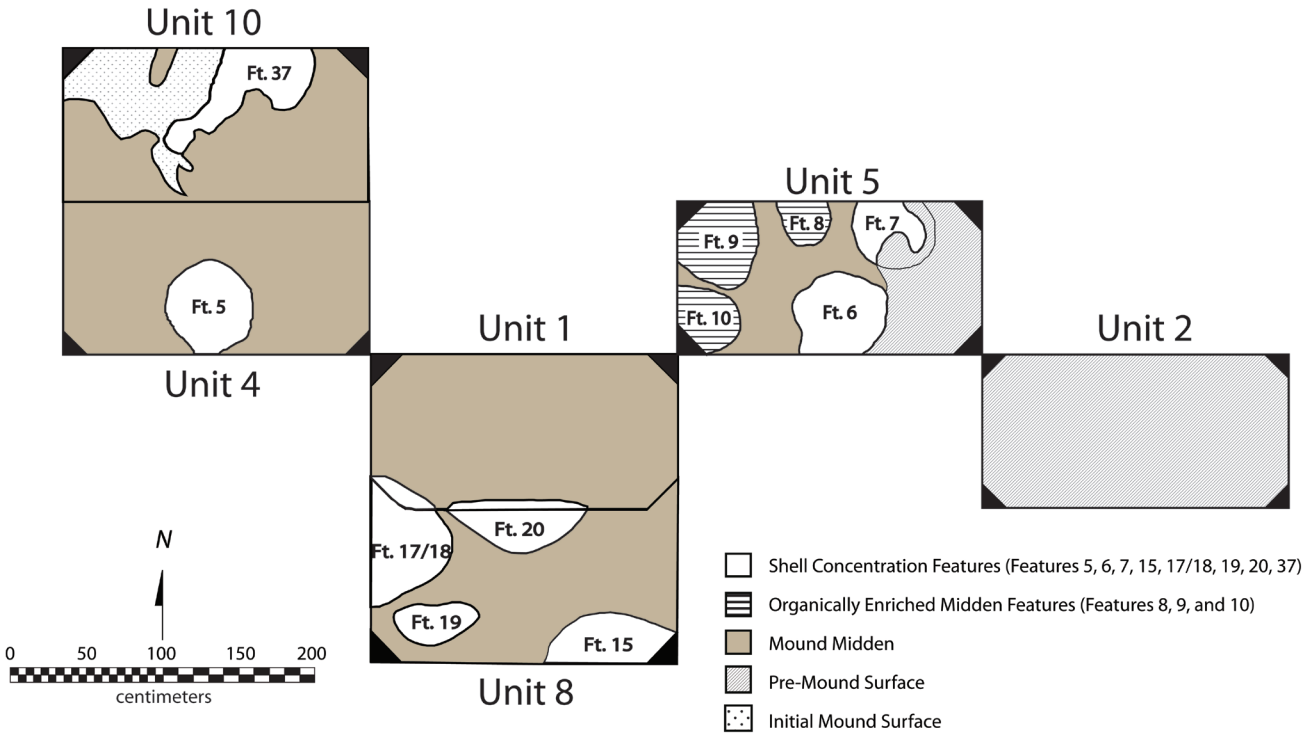

Figure 3-9. Plan of Eastern Mound Flank features overlaying the Initial Mound and Pre-Mound Surface, Units 1, 2, 4, 5, 8, and 10.

the trash was not moved far and the resulting piles were not exposed long before being covered by sandy fill. As evidence of this, we note that the halves of bivalve shells in these dumps were often still joined together and the surfaces of potsherds in these features were not eroded by exposure to the elements. Further, articulated faunal remains, especially those of fish, were excavated in situ, lending additional credence to the hypothesized rapid redeposition and limited exposure period. There is no habitation or occupation debris in the tested areas surrounding the mound, so we assume the shell concentration features resulted from debris generated by activities in the mound area. This is an interesting observation, for it raises the question as to why people did not dump the garbage debris further away. The debris was produced in the context of activities associated with the Pre-Mound Surface and Initial Mound, collected into receptacles (presumably to clean surfaces), then redeposited in a way that relocated, yet did not remove, the debris from this important locale.

We interpret shell concentration features as the end product of a ritualized activity involving food consumption in a place of special cultural significance, spatially removed from mundane domestic contexts. We conclude that the debris itself was regarded as special, perhaps sacred, and thus kept in

Figure 3-10. Example of a Shell Concentration feature: western half of Unit 8, Features 17/18 (north) and 19 (south). Features 17/18 and 19 are concentrations of shell, faunal bone, pottery fragments, and charred organic material. Note the well-preserved faunal bone along the southeastern edge of Feature 17/18, including an articulated fish vertebral column.

close proximity to the ritual space. In support of this assertion, we note that mound-flank middens composed of materials re-deposited from cleaning mound summit surfaces are associated with many excavated Woodland and Mississippian mounds (Lindauer and Blitz 1997:173). Mound-flank dumps exhibit spatial and directional patterning in some late prehistoric examples (Smith and Williams 1994). This pattern of cleaning the ritual space and dumping the collected material into a heap that was maintained, regarded as sacred, and kept within the confines of the ritual precinct continued into historic times at the ceremonial Square Grounds of indigenous southeastern peoples (Knight 1989:283).

Pottery Concentrations (n=2): Features 21, 29

Two features consisted of small piles of potsherds found on the Pre-Mound Surface in Unit 8 (Figure 3-11). Because the pottery concentrations (and the shell concentrations) contained sherds from different incomplete vessels, it is unlikely they formed as the result of smashing single pots in place (see Chapter 4, Table 4-1). Instead, we think pottery concentration features were formed by the same processes as the shell concentration features: cleaning of trash at an activity location and disposal nearby. As was the case with the contents of shell concentration features, these broken bits were not treated as mundane trash. Rather, the potsherds in pottery concentration features, many of which are decorated, were linked to vessels used in special-purpose activities, and because of this special use these pieces were retained within the ritual space even after discard.

Figure 3-11. Example of a Pottery Concentration feature: central portion of Unit 8, Feature 21. Feature 21 is a loose concentration of broken pottery fragments from several different vessels, many of which are decorated.

Charcoal Concentrations (n = 2): Features 22, 27

Two charcoal concentration features were found on the Pre-Mound Surface. These features were irregularly shaped, thin deposits of charred organic matter which appeared distinct from the surrounding midden or organically stained matrix. Although composed of carbonized material and some ash, we interpret the formation process and cultural significance of charcoal concentration features to be similar to that of shell and pottery concentrations: by-products of special activities retained within the confines of the ritual precinct even after discard. Though most material recovered from these concentrations was too fragmentary for any additional description, Feature 22 appears to represent partial remains of cane lattice work (Figure 3-12).

Post Molds (n=12): Features 11, 12, 13, 14, 16, 23, 24, 25, 26, 30, 31, 32

"Post mold" is our generic label for post features, soil stains where posts or similar structural elements were at one time set into the ground, but have since rotted away or been removed. The fill of some post molds contained small potsherds and charcoal. Post molds, which were only found on the Pre-Mound Surface in Unit 8, were circular in plan view, with two size ranges: 5-6 cm and 8-11 cm in diameter. Excluding three obviously truncated examples (Features 13, 14, and 23), post mold depths were variable, from 12 to 24 cm. This variability is due, in part, to the difficulty of recognizing post molds in the dark, organically stained matrix. Most post molds were widely spaced without obvious pattern, which was not unexpected given the limited horizontal exposure of our excavations. Alignment was apparent only for post features 23, 24, 25, and 26, which formed a curvilinear arrangement spaced 30-35 cm apart (Figure 3-13). There is little evidence about how the posts were used, but the small sizes of the posts are notable. A large sample of post molds from site 1BA134 in coastal Alabama, which had a substantial Middle-to-Late Woodland occupation, averaged 21.8 cm in diameter (Price 2008:93). In comparison, the much smaller post diameters at Graveline Mound suggest use in light-frame constructions, such as temporary shelters, drying racks, or partitions composed of flexible saplings and cane. The presence of the possible cane lattice work (Feature 22) mentioned above lends additional evidence for the use of such light frame constructions.

Certainly, there was nothing to indicate heavy-frame permanent structures.

Detailed Descriptions of Specific Features

Most relevant feature data are provided in Table 3-1, in the artifact and ecofact chapter tables, and in Appendices. Here we discuss only those individual features with radiocarbon dates and/or diagnostic pottery, or those that otherwise provide important insights into cultural activities at Graveline Mound. Features were only encountered in the eastern mound flank, Units 4, 5, 8, and 10. A feature's contents was subdivided and labeled A, B, C, etc., during excavation if it intruded through more than one level.

Features within the Mound Midden Deposited on the Initial Mound: Units 4 and 10

Feature 5

Feature Type: Shell concentration
Provenience: Unit 4, Zone 5, Levels M3, N1, O
Shape and Dimensions: Irregular in plan view; 54 cm E-W by 63 cm N-S, maximum thickness 39 cm
Beta Analytic Sample #: 285563
Graveline Sample #: 24
Sample Type: Charcoal
Radiocarbon Age: 1400 +/-40 BP (2 σ cal AD 590-670)
Associated Diagnostic Artifacts: Larto Red, *var. unspecified*; Marksville Incised, *var. Spanish Fort*; Marksville Incised, *var. Steele Bayou*

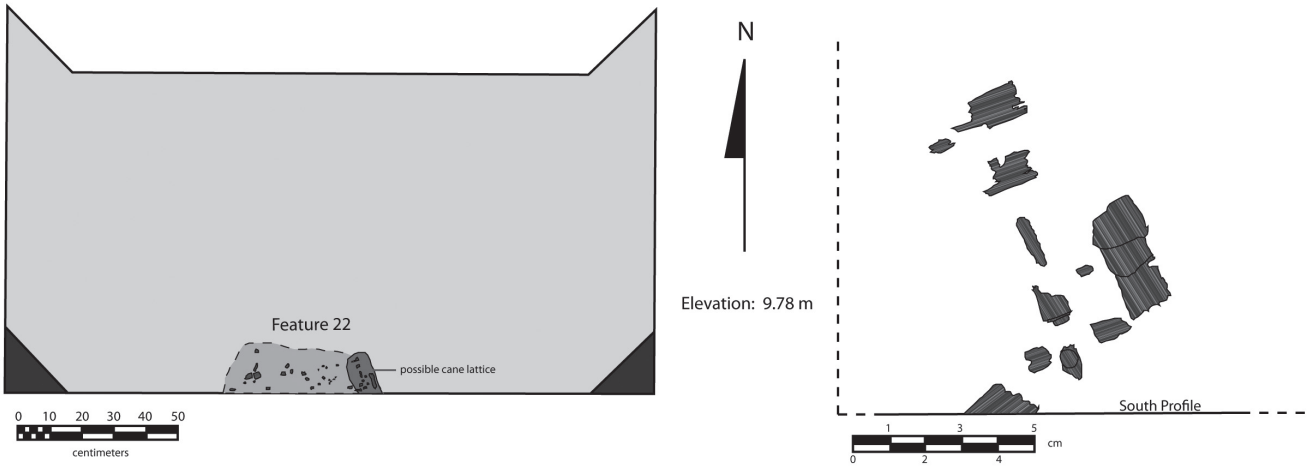

Figure 3-12. Possible burned cane lattice work, Feature 22. Fragments running east-west were found to underlie those running north-south in situ during excavation.

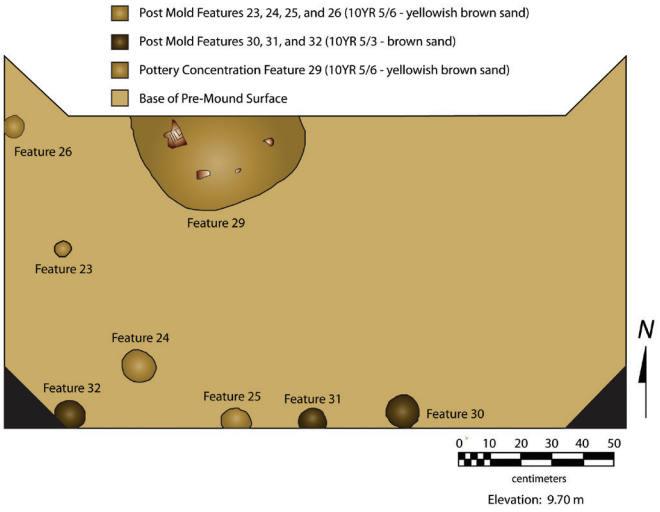

Figure 3-13. Post molds and related features on the Pre-Mound Surface: Unit 8, Features 23, 24, 25, 26, 29, 30, 31, 32, Zone 7, Level B base.

Figure 3-14. Plan of Feature 5 shell concentration: Unit 4, Level N1, Feature 5B base.

Description: This shell concentration was encountered in Unit 4, Zone 5, at Level M3 (5A), penetrated through Level N (5B) and Level O (5C), and terminated at Level P (5D). The radiocarbon sample is from 5B. The feature was contained within the Mound Midden (Zone 5) that formed over the Initial Mound, and was located at the center of the unit and extended to the southern wall. This feature contained very dark grey (10YR3/1) organically stained sand with shell, animal bone, charcoal, and potsherds found throughout the fill (Figure 3-14). Shell is predominately marsh clam with smaller quantities of oyster and periwinkle. Feature 5, like other Mound Midden deposits, is interpreted as evidence of food preparation or consumption with food disposal on or near the Initial Mound. One other feature in Unit 4, Feature 4, was distinguished from Feature 5 based on perceived differences in shell and sand; however, these deposits likely represent the same dump event based on their spatial proximity.

Feature 37
Feature Type: Shell concentration
Provenience: Unit 10, Zone 5, Levels E, F, G
Shape and Dimensions: Irregular in plan view; 90 cm E-W by 40 cm N-S, maximum thickness 18 cm
Beta Analytic Sample #: 285568
Graveline Sample #: 186
Sample Type: Charcoal
Radiocarbon Age: 1530 +/-40 BP (2 σ cal AD 420-610)
Associated Diagnostic Artifacts: none

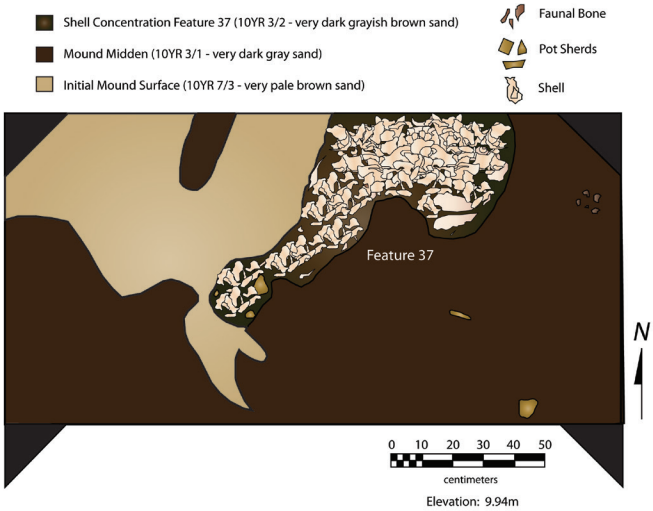

Figure 3-15. Plan of Feature 37 Shell Concentration: Unit 10, Zone 5, Level E, Feature 37B base.

Description: Feature 37 was located within the Mound Midden that accumulated atop the Initial Mound. This feature, subdivided into 37 A-C, was a shell concentration composed of a mix of marsh clam, oyster, and periwinkle, with small fragments of faunal bone and charcoal (Figure 3-15). Feature 37 was irregular, yet roughly linear in shape, running along the north profile wall, with the bulk of the shell concentrated in the west and thinning to the east. Pottery was limited to one plain, grog-tempered potsherd of the type Baytown Plain, *var. unspecified*.

Features on the Pre-Mound Surface: Units 5 and 8

Feature 17/18/20
Feature Type: Shell concentration
Provenience: Unit 8, Zones 4-7
Shape and Dimensions: All are irregularly shaped in plan view (see Table 3-1 for dimensions)
Beta Analytic Sample #: 285565
Graveline Sample #: 75
Sample Type: Charcoal
Radiocarbon Age: 1310 +/-40 BP (2 σ cal AD 650-780).
Associated Diagnostic Artifacts: Larto Red, *var. unspecified*; Marksville Incised, *var. Yokena*

Description: This feature was a large pile of shell, somewhat divided into layers or pockets dominated by either oyster or clam. For this reason the feature was given three numbers, each attributed to a different pocket of shell. This feature was part of the Mound Midden accumulating on the Pre-Mound Surface, the redeposited product of activities associated with the Initial Mound. It penetrated four zones (4-7) and, in contrast to other features in Unit 8, certainly represents more than a single dump of shell. Feature 17 was dumped first, followed by 18, and then 20 in overlapping fashion on a slight incline (Figure 3-16). Features 17 and 18 were not clearly distinct from one another (Figure 3-17). Rather, they appeared to grade into one another, with a greater proportion of oyster being recovered from Feature 17 than from Feature 18. The radiocarbon sample is from Feature 18A. Feature 20, lying directly beneath Feature 18, consisted almost entirely of marsh clam, with oyster and periwinkle shell accounting for about 5 percent of the assemblage (unlike Features 17 and 18).

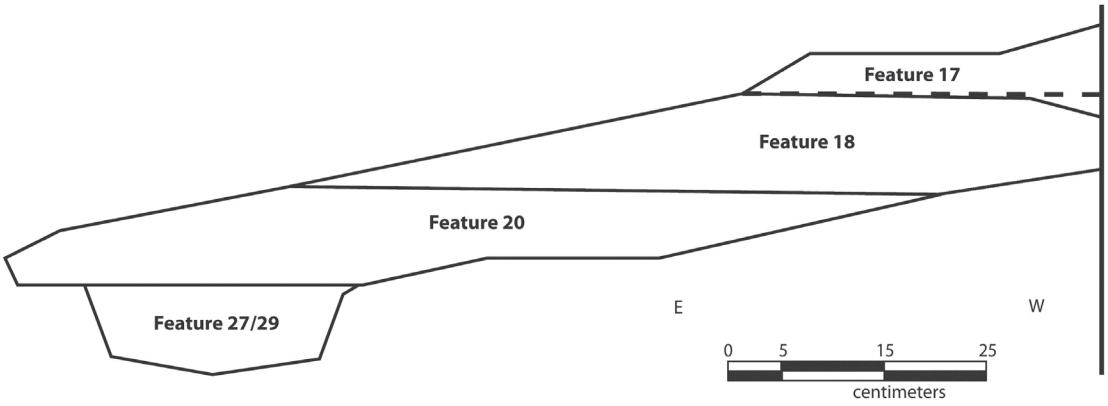

Figure 3-16. Schematic profile of Features 17, 18, and 20, as viewed from the north.

Feature 15
Feature Type: Shell concentration
Provenience: Unit 8, Zone 5, Levels A-C, Zone 6, Level A
Shape and Dimensions: Irregular in plan view; 60 cm E-W by 30 cm N-S, maximum thickness 20 cm
Beta Analytic Sample #: 285564
Graveline Sample #: 109
Sample Type: Charcoal
Radiocarbon Age: 1530 +/-40 BP (2 σ cal AD 420-610)
Associated Diagnostic Artifacts: Larto Red, *var. Larto*

Description: Feature 15 was a shell concentration, roughly circular in shape, composed predominately of oyster shell, along with small amounts of marsh clam, periwinkle, small faunal bone, pottery fragments, lithic tools, and charcoal (Figure 3-17). Located in the southeastern corner of the unit, only the portion of Feature 15 that intruded into Unit 8 from the south wall was excavated. In profile, the feature extended south into unexcavated areas of the mound. Though defined as a shell concentration, Feature 15 also incorporated a cluster of artifacts located immediate to the west. Here, two lanceolate projectile points, ceramics, a polished saltwater catfish bone, and a fragment of a ceramic pendant were recovered. Additional artifacts from the lower portion of the shell concentration include an undecorated rim sherd, a red-filmed Larto Red, *var. Larto* sherd, and a probable deer bone. We interpret Feature 15 as midden debris redeposited from activities at the Initial Mound.

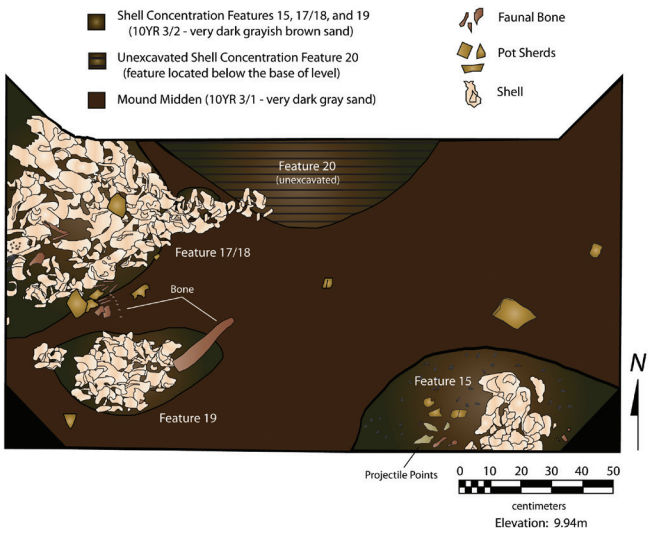

Figure 3-17. Plan of Features 15, 19, and 17/18/20 Shell Concentrations: Unit 8, Zone 5, Level C, Features 15B, 17B/18A, and 19A base.

Feature 21
Feature Type: Pottery concentration
Provenience: Unit 8, Zone 6, Level B
Shape and Dimensions: Irregular in plan view; 35 cm E-W by 20 cm N-S, 3 cm thick
Beta Analytic Sample #: 285566
Graveline Sample #: 115
Sample Type: Charcoal
Radiocarbon Age: 1350 +/-40 BP (2 σ cal AD 640-710 and 750-760)
Associated Diagnostic Artifacts: Larto Red, *var. Larto*; Marksville Incised, *var. Yokena*

Description: Feature 21 was a concentration of about 50 sherds, located just southeast of Feature 20 (see Figure 3-11). Most of these sherds were oriented horizontally in the matrix. However, several sherds distributed a few centimeters beyond the main concentration were oriented vertically. The fact that several of those outlyiers re-fit with sherds from the main cluster demonstrates their association with the dump

episode that created the feature. As with Features 17/18/20 and 15, Feature 21 likely formed as redeposited debris generated on or around the Initial Mound. Multiple types of pottery are represented in Feature 21, including utility ware, low-end fine ware (roughly incised), and high-end fine ware (e.g., burnished, red-painted, and/or meticulously incised). Some sherds appear to have been poorly fired and crumbled during recovery. A few small clay lumps (about the size of marbles) were encountered in the main cluster. The radiocarbon sample was taken from a secure context within the feature (under and between sherds in the main part of the concentration).

Feature 27/29
Feature Type: Charcoal concentration
Provenience: Unit 8, Zone 6, Level D (Feature 27) and Zone 7, Level A (Feature 29)
Shape and Dimensions: Irregular in plan view; 20 cm E-W by 27 cm N-S, 17 cm thick
Beta Analytic Sample #: 285567
Graveline Sample #: 137
Sample Type: Charcoal
Radiocarbon Age: 1300 +/-40 BP (2 σ cal AD 650-780)
Associated Diagnostic Artifacts: (Feature 29) Larto Red, *var. Larto*; Unclassified Exterior Curvilinear Incised on Baytown Plain, *var. Fitler*

Description: Feature 27 was first recognized as a concentration of large charcoal chunks included with a lump of clay (Figure 3-18). Burned shell and some small faunal bone were also recovered. The charcoal chunks appeared to represent several whole logs that were deposited here, then fell apart. The radiocarbon sample was taken from this charcoal. Feature 27 may not represent a "hearth" or "campfire" directly, but is probably sweepings from such a feature nearby. Feature 27, located directly beneath Feature 17/18/20 (see Figure 3-16), formed or filled a small depression located at the base of the Mound Midden, directly on the Pre-Mound Surface. The charcoal and clay lump lay at the top and several sherds at the bottom of the depression, separated by approximately 3 cm of sand. At the base of the feature was a large rectilinear-incised, scalloped-rim sherd (Marksville Incised, *var. unspecified*). This lower portion that included the sherds was given a separate feature number, Feature 29, due to the slight separation of material. However, both are likely part of the same depositional event (see Figure 3-13 for Feature 29 in plan view). Although Feature 27/29 was positioned at a slightly lower elevation than the other shell, pottery, and charcoal concentration features, at the base of the Mound Midden accumulations on the Pre-Mound Surface, we think it, too, represents the same behavioral context: activities associated with the adjacent Initial Mound.

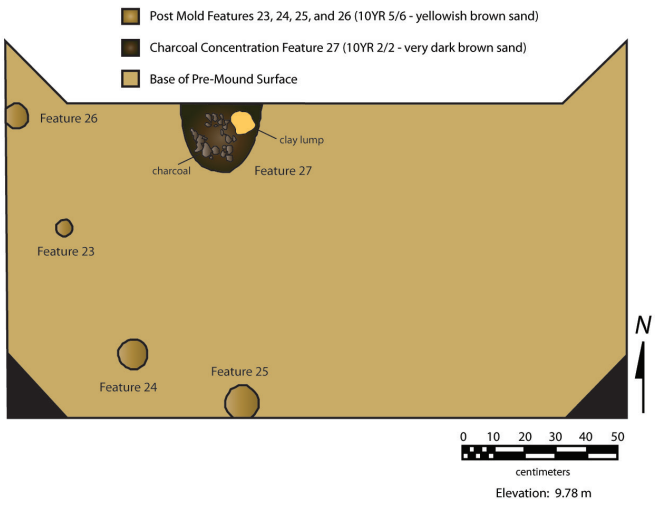

Figure 3-18. Plan of Feature 27 Charcoal Concentration: Unit 8, Zone 6, Level D base.

Radiocarbon Dating

Eight samples from Graveline Mound were submitted to Beta Analytic Inc., of Miami, Florida, for radiocarbon assays. All samples were charcoal from carbonized wood. Our goal was to date features (six samples) and strata (two samples) with decorated pottery. At the Beta Analytic laboratory, all samples underwent cleaning to remove any adhering modern material and were then assayed using Accelerator Mass Spectrometryy (AMS). The resulting dates are presented in Table 3-2. The 2 σ date range for all eight samples is cal AD 420 to 780. Figure 3-19 illustrates the 2 σ probability plots of the dates. Dated features and strata can be grouped based on their 2 σ range overlap into two different time spans: an early group and a late group. The early group (Features 15B and 37A) is statistically similar and spans cal AD 420 to 610. The late group (Features 21, 18A, and 27A, and two samples from the western mound flank, Zone 6 stratum) spans cal AD 590 to 780, with slight overlap in dating range with the early group. In the late group, three samples (18A, 27A, and Unit 13 Zone 6) are statistically similar. We interpret the late group dating range as the most likely time of Initial Mound construction and deposition of the features that composed the Mound Midden.

Table 3-2. Radiocarbon Dates from Graveline Mound.

Beta Analytic Sample	Provenience	Radiocarbon Years Before Present	2 σ Calibration in Calendar Years
285563	Feature 5B	1400 +/- 40 BP	AD 590 to 670
285564	Feature 15B	1530 +/- 40 BP	AD 420 to 610
285565	Feature 18A	1310 +/- 40 BP	AD 650 to 780
285566	Feature 21	1350 +/- 40 BP	AD 640 to 710 and 750 to 760
285567	Feature 27A	1300 +/- 40 BP	AD 650 to 780
285568	Feature 37A	1530 +/- 40 BP	AD 420 to 610
285569	Unit 13, Zone 6	1300 +/- 40 BP	AD 650 to 780
285570	Unit 13, Zone 6	1370 +/- 40 BP	AD 610 to 690

Two samples from shell concentrations within the Mound Midden (Features 5B and 37A) that accumulated directly over the Initial Mound could be considered the best samples to date activities on or associated with the Initial Mound. The date from Feature 5B is particularly informative as it is associated with Graveline phase diagnostic pottery (Marksville Incised, *var. Spanish Fort* and *var. Steele Bayou*). Bear in mind that some features on the Pre-Mound Surface not covered by the Initial Mound may be residues of activities on the Initial Mound and thus of similar age. The other sample positioned over the Initial Mound, Feature 37A, is less instructive here since it falls in the early group date range. However, Feature 37A has no associated diagnostic artifacts, and we suspect the sample dates charcoal that predates use of the Initial Mound due to mixing. Blitz and Mann (2000: Table 7.5) submitted two samples from Graveline Mound "stratum D" in their 1992 test unit, a provenience that likely corresponds to the Mound Midden. These 1992 samples yielded 2 σ calibrated dates of AD 562 to 668 (Beta 66712, marine shell sample) and AD 644 to 768 (Beta 66112, carbonized wood sample), which do not diverge significantly from the 2010 late group sample dates. Blitz and Mann proposed an initial "guesstimate" of AD 400 to 700 for the Graveline phase time span. With the new dates at hand, our re-estimation of the Graveline phase time span is AD 550-800. Given the feature formation processes observed during the 2010 excavation, mound activities probably spanned a much shorter interval. Discussion of radiocarbon dates continues in Chapter 4 in an effort to correlate the relative ceramic chronology of the Graveline phase with phases in adjacent areas of the Gulf coast and to place the site in a wider cultural-historical context.

Summary of Mound Construction Sequence and Chronology

Our excavations revealed strata, produced by events at Graveline Mound, which we can now correlate and order based on superposition into a single chronological sequence. With assistance from Sarah Sherwood, project geoarchaeologist, we illustrate the Graveline Mound stratigraphic sequence in schematic form, with strata numbered in order from earliest to most recent (Figure 3-20). Stratum Ab is the buried soil surface (Pre-Mound Surface). Ia is the first mound construction stage (Initial Mound). Although separate deposits in Units 4 and 13, from their similarity we consider them equivalent events in the history of the mound. Ib is the Mound Midden that accumulated as result of activities on or adjacent to Ia. This is the provenience for the majority of artifacts and ecofacts associated with Graveline Mound. Some of this midden enriched and covered those portions of Ab not sealed by Ia. II is zoned fill, subdivided a and b to distinguish a possible short term, but stable, surface at the top of IIa –a consistent darker layer. But otherwise, II can be considered one intensive and rapidly built stage. Stratum III, the final stage of construction, is a terminal capping layer consisting of a homogeneous deposit of plinthite with extensive bioturbation. We collectively refer to strata II and III as the Mound Cap.

To recast this summary in behavioral terms, the first signs of human activity occurred on the Pre-Mound Surface (the original sub-mound ground surface), which was darkened by organic enrichment from human activities, and where a few small post were placed. Because a small portion of this activity surface was covered by the Initial Mound, we presume that at least some of the activities on the Pre-Mound Surface occurred prior to construction of the Initial Mound. Next, a low raised building-stage of sand, the Initial Mound, was constructed on the Pre-Mound

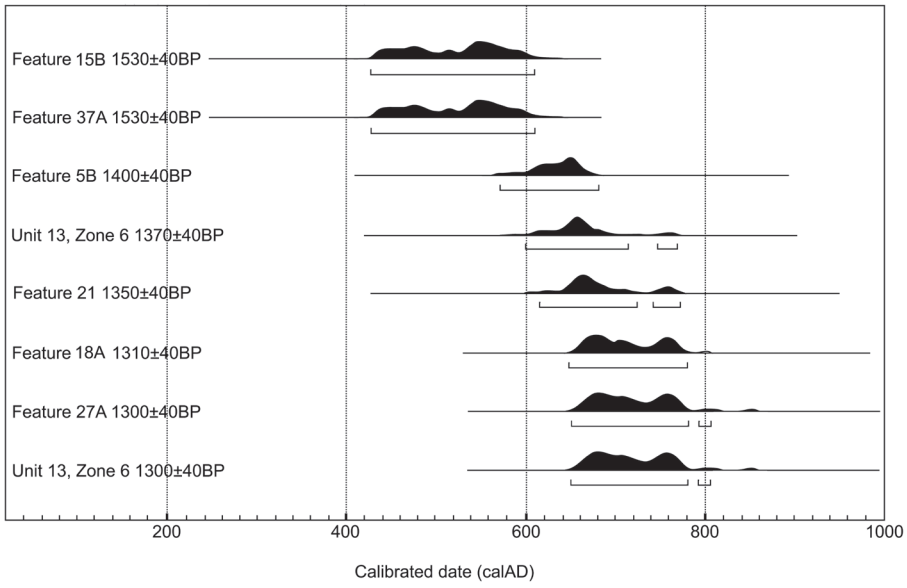

Figure 3-19. Radiocarbon dates, 2 σ probability plots, Graveline Mound. Oxcal v 4.1.7 Bronk Ramsey (2010); r:5 Atmospheric data from Reimer et al (2009).

Surface, present in both the eastern and western mound flank excavations, but absent in the central mound excavations. The Initial Mound was the scene of activities that included food consumption and cleaning and redeposition of trash. This accumulation of trash on and around the Initial Mound, collectively referred to as the Mound Midden, represents the third major depositional episode in the mound chronology. The Mound Midden comprised multiple dump-event deposits designated as features and recognized as concentrations of shell, faunal remains, pottery, and charcoal. Mound Midden deposits overlie both the Initial Mound and the surrounding Pre-Mound Surface. As a result, some, perhaps most, of the debris that accumulated on the Pre-Mound Surface actually post-dates creation of the Initial Mound. Finally, the Mound Cap, a huge quantity of mostly sterile sand composed of zoned fills, was deposited over the Mound Midden, Initial Mound, and all surrounding portions of the Pre-Mound Surface.

Three aspects of mound construction were difficult to interpret. First, variations in the Mound Cap stratification in the eastern, central and western units were puzzling. The central mound stratification in the Mound Cap was more complex, with more zoned fills, than that found in the eastern or western Mound Cap profiles, suggesting the possibility that these were occupation surfaces of multiple mound stages. We concluded that, although the Mound Cap was layered with zoned fills, there was no clear evidence—in the form of artifacts, features, or stratification—that any of these layers of the Mound Cap were used as a surface for activities, such as those found on the Initial Mound. Put another way, we did not find conclusive evidence that layering in the Mound Cap represented additional mound summits used as occupation surfaces, stacked up as a series of platforms above the Initial Mound.

A second aspect of mound construction that proved difficult to interpret was the final mound summit configuration. The mound is not dome shaped, but a rectilinear, flat-topped platform, suggesting that the final summit was used as an activity surface. Also, there was a possible ramp, observed in earlier decades in a now obliterated area of the mound, and thus unconfirmed as a ramp. An ascent ramp only makes sense if the mound summit was used for activities. However, no evidence of activities on the final mound summit was found. The possible ramp may have been a slump or similar post-construction disturbance, so these observations do not constitute the sort of evidence needed to reject our conclusion that the Mound Cap was a rapid and final building event that sealed all previous activity surfaces and terminated the use of Graveline Mound.

The third puzzling aspect of mound construction was the absence of Initial Mound construction and associated Mound Midden (Figure 3-20, Ia and Ib) in the central mound units. We have Initial Mound construction on the eastern mound flank and on the western mound flank. These two deposits are similar in soil composition and elevation, and both rest on the Pre-Mound Surface, but they do not extend across the central mound to join together. Although the horizontal extent of our excavations are insufficient to show how the east and west portions of the Initial Mound are physically related, we interpret them as a single construction event, revealed when our excavations along the east-west grid line bisected a low linear embankment, exposing one segment on the east flank and one segment on the west flank. A linear embankment enclosing an open central space would explain

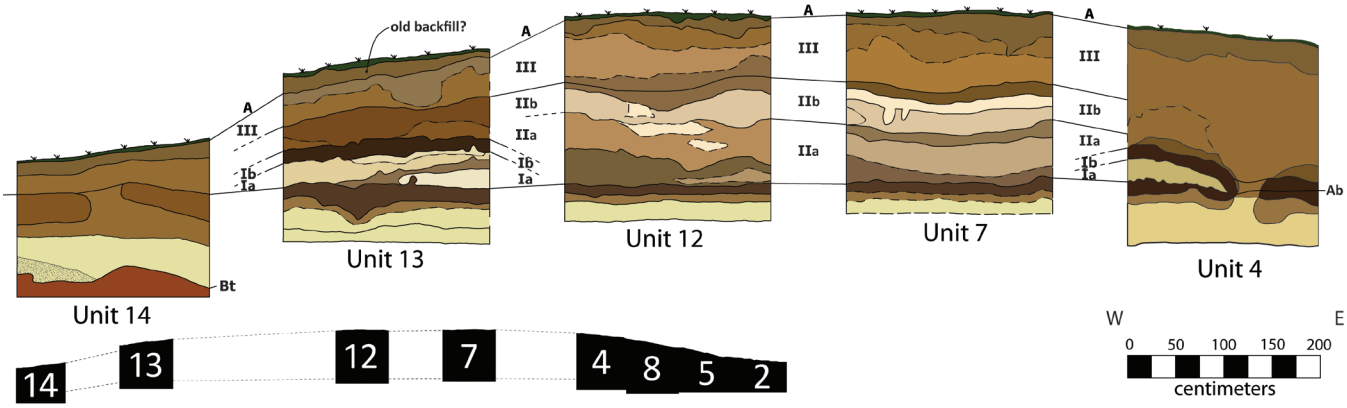

Figure 3-20. Schematic cross-section of mound stratification along east-west grid line, north profile. In the upper diagram, the horizontal distance between units is shortened and Units 8, 5, and 2 are omitted. The lower diagram illustrates the relative distance between the mound excavation units. The strata key is: Ab, buried soil horizon, pre-mound ground surface enriched with midden; Ia, clean sand initial mound construction stage; Ib, midden, temporary or short-term surface; II, zoned fill, with IIa and IIb subdivision to distinguish a possible short-term surface at top of IIa, otherwise II is one rapidly built stage; III, mound construction consisting of homogeneous mixed Bt source, with probable extensive bioturbation.

why we did not find the initial construction stage in the central mound units. If this enclosed central space was kept clean of debris while in use, with resulting trash dumped outside the linear embankment, this would explain why we did not find Mound Midden in the central mound units. Furthermore, the GPR data (Johnson et al. 2013) identifies an oval anomaly beneath the mound at the same depth as the Initial Mound. While none of these observations confirm that the Initial Mound was a linear embankment enclosing a space for ritual activities, this interpretation best fits the available evidence (Sherwood et al. 2013).

We now have a good estimate of Graveline Mound's absolute chronology. An early group of two dates fall into the AD 420 to 610 time span and a later group of six dates fall into the AD 590 to 780 time span. Thus it is highly probable that the Initial Mound was built after AD 420. We suspect it occurred after AD 590. We have no absolute date for the Mound Cap, but assuming that the Initial Mound was covered shortly after activities there ceased, as suggested by the presence of well-preserved shell and faunal remains, then this event probably occurred no later than AD 780. Based on the ceramic assemblage, discussed in Chapter 4, Graveline Mound is a single component site of the Graveline phase. As a result of our excavations at Graveline Mound, we now have answers to several of the research questions reiterated at the outset of this chapter (Questions 1, 2, 3, 5, and 6). We will answer these questions in Chapter 8.

Chapter 4
Artifact Analysis

Lauren E. Downs and John H. Blitz

Following the conclusion of excavations at Graveline Mound site, all recovered artifacts were transported to the archaeological laboratories at the University of Alabama for analysis. The Graveline Mound assemblage contains a total of 1,836 (9,250.3 g) artifacts. The overwhelming majority are associated with the Mound Midden and feature contexts discussed in Chapter 3. Even the minor quantities of artifacts recovered in the off-mound testing effort, discussed in Chapter 2, are re-deposited materials that originated at the mound. The recovered assemblage is composed of two general artifact classes: ceramics and lithics. With the exception of a single polished catfish bone found in Feature 15, no bone tools or shell artifacts were found during our excavations at Graveline Mound.

Goals of the Artifact Analysis

Excavations at Graveline Mound site, summarized in Chapters 2 and 3, reveal much about construction and use of the mound and the surrounding area. Additional data on the recovered artifacts were needed to fully address the research questions presented in Chapter 1. Artifact analysis permits (1) identification of mound-related activities, (2) placement of mound construction and use in the regional ceramic phase sequence and (3) assessment of the cultural-historical relationships of Graveline Mound across the Gulf Coastal Plain.

Ceramic Artifacts

Ceramics (pottery) constitute the largest artifact class recovered from Graveline Mound site. The ceramic assemblage consists of 1,689 sherds (7,775.6 g), all of which are prehistoric. In fact, no material indicative of an indigenous historic occupation was found at Graveline Mound. Notably, the ceramic assemblage is well-preserved and exhibits little evidence of widespread damage or erosion. This lack of surface erosion suggests the assemblage was not exposed for any great length of time prior to being covered by episodes of mound building. Ceramics were recovered from all excavated contexts on site, including off-mound STPs and excavation units, mound fill, mound and pre-mound surfaces, and, most commonly, midden and related features corresponding to the Mound Midden and Initial Mound deposits described in Chapter 3.

Ceramics recovered from these features represent the best preserved, least disturbed provenience at the site and were generated by activities on and around the mound (Table 4-1).

Methods

In the laboratory, all ceramic fragments recovered during excavation were passed through ½-inch mesh. Pottery measuring less than ½ inch was not typed due to the small size of the sherds, but instead weighed, counted, and identified as either decorated or undecorated (see Appendices D and E). A total of 666 sherds (360.5 g) measuring less than ½ inch were recorded in the Graveline Mound assemblage. No further analysis was conducted on pottery less than ½ inch in size. The remaining pottery in the Graveline Mound assemblage, a total of 1,023 (7,415.1 g) sherds, measured greater than ½ inch, suitable for detailed analysis.

Four categories of measurement were used in the ceramic analysis: (1) temper-ware groups, (2) type-variety, (3) modes, and (4) ceramic residue. (The ceramic residue analysis is presented in Chapter 5.) To place the Graveline Mound ceramic assemblage into a relative chronology and facilitate comparison to archaeological sequences elsewhere, we followed the type-variety classification widely used in the lower Southeast. Primary references most useful for this purpose include: Blitz and Mann (2000) for the Mississippi Sound region; Brown (1998), Phillips (1970), Toth (1988), and Williams and Brain (1983) for the lower Mississippi Valley; and Jenkins (1981), Fuller (1998), Wimberly (1960), and Willey (1949) for the northwest Florida-southwest Georgia-south Alabama regions to the east. Other valuable references include Bitgood (1989), Dumas (2008), Ford (1951, 1952), and Jeter et al. (1989). Established type-varieties were utilized to classify both decorated and undecorated sherds within the Graveline Mound assemblage, when possible. When such a classification was not warrant-

Table 4-1. Ceramics Recovered in Features.

Feature Number	Provenience	Ceramic Type and Variety	Count	Weight (g)
Feature 4 A/B/C	Unit 4, Levels M3, N1, N2, O	Unclassified Exterior Incised on Baytown Plain, *var. unspecified*	3	3.6
		Baytown Plain, *var. Fitler*	1	1.3
		Baytown Plain, *var. unspecified*	5	5.1
Feature 5 A/B/C/D	Unit 3, Levels M3, N1, O	Larto Red, *var. unspecified*	2	15.2
		Marksville Incised, *var. Spanish Fort*	3	85.7
		Marksville Incised, *var. Steele Bayou*	1	7.0
		Baytown Plain, *var. Fitler*	3	11.5
		Baytown Plain, *var. unspecified*	9	56.6
Feature 6A/B	Unit 5, Zone 5, Levels A, B, B2	Baytown Plain, *var. unspecified*	6	58.5
Feature 8A	Unit 5, Zone 5, Level B2/Zone 6, Level A	Baytown Plain, *var. unspecified*	1	8.3
Feature 9A	Unit 5, Zone 5, Level B2/Zone 6, Level A	Baytown Plain, *var. unspecified*	5	15.2
Feature 10A	Unit 5, Zone 5, Level B2/Zone 6, Level A	Baytown Plain, *var. Fitler*	1	0.6
		Baytown Plain, *var. unspecified*	8	36.0
Feature 15 A/B/C	Unit 8, Zone 5, Levels A, B, C/Zone 6, Level A	Larto Red, *var. Larto*	1	4.3
		Marksville Incised, *var. unspecified*	1	7.2
		Baytown Plain, *var. Fitler*	1	1.1
		Baytown Plain, *var. unspecified*	8	85.3
Feature 17/18/20 A/B/C/D/E/F/G	Unit 8, Zone 5, Levels A, B, C/Zone 6, Levels A, B, C, D	Marksville Incised, *var. Yokena*	2	40.3
		Unclassified Exterior Incised and Filmed on Baytown Plain, *var. unspecified*	1	1.7
		Baytown Plain, *var. unspecified*	10	101.5
		Unclassified Sand Tempered Pottery	2	21.6
Feature 19 A/B/C	Unit 8, Zone 5, Levels A, B, C	Baytown Plain, *var. unspecified*	1	1.9
Feature 21	Unit 8, Zone 6, Level B	Larto Red, *var. Larto*	5	30.2
		Larto Red, *var. unspecified*	16	58.8
		Marksville Incised, *var. Yokena*	4	10.2
		Baytown Plain, *var. Fitler*	10	20.3
		Baytown Plain, *var. unspecified*	25	82.1
Feature 24	Unit 8, Zone 6, Level C/D	Baytown Plain, *var. unspecified*	1	4.9
Feature 25	Unit 8, Zone 6, Level C/D/Zone 7, Level A	Baytown Plain, *var. unspecified*	2	3.8
Feature 29	Unit 8, Zone 7, Level A	Larto Red, *var. Larto*	1	5.4
		Unclassified Exterior Incised on Baytown Plain, *var. Fitler*	1	8.0
		Baytown Plain, *var. unspecified*	1	6.2
Feature 30	Unit 8, Zone 7, Level B	Baytown Plain, *var. unspecified*	3	53.5
Feature 32	Unit 8, Zone 7, Level B	Baytown Plain, *var. unspecified*	1	1.6
Feature 35	Unit 10, Zone 5, Levels B, C	Marksville Incised, *var. Spanish Fort*	1	23.8
		Baytown Plain, *var. unspecified*	3	35.2
Feature 36	Unit 10, Zone 5, Level C	Marksville Incised, *var. Spanish Fort*	1	28.9
Feature 37	Unit 10, Zone 5, Level E	Baytown Plain, *var. unspecified*	4	27.1

ed, due to small sample size or material that did not fit existing types or varieties, we opted simply to describe the material at hand.

Temper-Ware Groups

The first step in our ceramic analysis was to place plain, undecorated pottery into temper-ware groups. A total of 783 (5,293.5 g) plain or undecorated potsherds are present in the Graveline Mound assemblage. Following Blitz and Mann (2000:107), temper-ware groups are based on combinations of temper (material and particle size), surface finish (burnished or unburnished), and ceramic fabric (texture and hardiness) that result in a specific pottery ware. We utilized five temper-ware groups for this purpose: (1) fine sand temper; (2) grit-sand temper; (3) grog temper; (4) grog-grit temper; and (5) grog-sand temper. No fiber tempered or shell tempered pottery was recovered during excavations at Graveline Mound site.

Fine Sand Temper. Pottery in this temper-ware group is characterized by inclusion of sand grains no greater than 1 mm in size to the clay paste. Outside the Mississippi Sound region, pottery belonging to this group is classified variously as Baldwin Plain and O'Neal Plain (north Alabama and Mississippi) or Franklin Plain (southwest Alabama/northwest Florida). Limited amounts of sand tempered pottery (n=7) were recovered from midden deposits and associated features and mound fill contexts at Graveline Mound. The presence of sand tempered wares hints at a possible relationship or interaction between Graveline Mound and Middle-to-Late Woodland populations to the east, where sand temper predominates.
Sample size: 7 (50.2 g)
Sample contexts: Mound Midden, Mound Cap
Chronological position: Middle to Late Woodland
References: Blitz and Mann (2000), Dumas (2008), Jenkins (1981)

Grit-Sand Temper. This group includes pottery with a gritty texture that is tempered with coarse sand grains and crushed rock larger than 1 mm in size. Pottery belonging to this group is classified as either O'Neal Plain or Bayou La Batre Plain in regions east of Mississippi Sound. As with the fine sand temper group, the Graveline Mound sample is currently too small to merit a specific type classification.
Sample size: 2 (2.9 g)
Sample contexts: Mound Midden
References: Blitz and Mann (2000), Dumas (2008)

Grog Temper. Grog tempered pottery is characterized by the addition of crushed pottery to the clay paste. The overwhelming majority of the pottery in the Graveline assemblage is grog tempered. In keeping with established type-variety systems employed in Mississippi Sound and neighboring regions, grog tempered pottery recovered from Graveline is classified as Baytown Plain.

Baytown Plain. This plain ware type encompasses exceptionally broad spatial and temporal ranges. Established by Phillips (1970:47-48), Baytown Plain subsumes most grog tempered plain wares in the lower Mississippi Valley and Gulf Coastal Plain. Because the Mississippi Sound region is separate from the lower Mississippi Valley heartland, where many of the varieties of Baytown Plain initially were established, much of the grog tempered material recovered from Graveline Mound does not fit well within established varieties. Therefore, the majority of grog tempered material in the Graveline Mound assemblage is classified as Baytown Plain, *var. unspecified*.

Baytown Plain, *var. Fitler.* This variety of Baytown Plain was described by Phillips (1970:49-50) as a compact, very fine, grog tempered plain ware with smooth, polished to matte surface. At Graveline Mound, it is a finely textured ware with small grog inclusions measuring less than 1 mm in diameter. Surface colors range from buff to brown to gray with buff to gray cores. Vessel walls are extremely thin, generally ranging between 2 and 5 mm. Sherds classified at Graveline Mound as Baytown Plain, *var. Fitler* represent a distinctive group of grog tempered fine ware. The majority of sherds classified as *var. Fitler* are associated with Mound Midden contexts and, therefore, directly related to mound activity.
Sample size: 67 (132.6 g)
Sample contexts: Mound Midden, Mound Cap, Off-Mound
Chronological position: Late Marksville, Baytown, and Coles Creek periods in the lower Mississippi Valley
Reference: Phillips (1970)

Baytown Plain, *var. Satartia.* This variety of Baytown Plain is characterized by grog inclusions between 2 and 3 mm in size, with a compact paste and smooth surface (Phillips 1970:53-54). *Satartia* may be distinguished from the similar, yet slightly earlier, *Reed* variety of Baytown Plain by smaller grog inclusions, thinner vessel walls, and harder paste. Characteristic *Satartia* rim forms include the "Arcadia," "DeSha,"

long-wedge shaped, interior beveled jar or beaker, interior beveled bowl, "peaks," and "corners" modes (Phillips 1970:54). Three Baytown Plain, *var. Satartia* rims are present in the Graveline Mound assemblage; however, they are too small to determine rim mode or vessel shape.
Sample size: 10 (81.3 g)
Sample contexts: Mound Midden, Mound Cap
Chronological position: Middle to late Marksville period in the lower Mississippi Valley
References: Phillips (1970), Williams and Brain (1983)

Baytown Plain, *var. unspecified*. As mentioned above, most of the grog tempered plain ware recovered from Graveline is classified as Baytown Plain, *var. unspecified*. This is a classification dissimilar from Baytown Plain discussed above and it forms a distinctive group. In contrast to the smoothed or polished fine wares of *var. Fitler* and *var. Satartia*, our *var. unspecified* has the appearance of a coarse utility ware. It is a medium textured ware that is less compact than many varieties of Baytown Plain. Grog inclusions are moderate in size, generally measuring 1-2 mm in diameter. Surfaces are unpolished and range in color from buff to brown, with brown to gray cores. Vessel wall thickness ranges between 5 and 8 mm. Though data are limited, the most prevalent vessel form is the restricted globular jar. Rims are simple, typically either slightly rounded or flattened. The rounded, thickened "Weeden Island" rim mode is present but uncommon.
Sample size: 632 (4,890.1 g)
Sample contexts: Pre-Mound Surface, Initial Mound, Mound Midden, Mound Cap, Off-Mound
Chronological position: Marksville, Baytown, and Coles Creek periods in the lower Mississippi Valley
References: Phillips (1970), Williams and Brain (1983)

Grog-Grit Temper. This temper-ware group includes pottery with crushed potsherds and stone inclusions with a gritty texture. With only a single sample from the Graveline Mound assemblage represented in this group, little else can be said about it.
Sample size: 1 (4.5 g)
Sample contexts: Mound Midden

Grog-Sand Temper. Pottery in this grouping is characterized by crushed potsherds and fine sand inclusions with a slightly sandy texture. Grog-sand tempered pottery was recovered from both Mound Midden and Mound Cap contexts in very limited quantities. As with the fine sand and grit-sand temper-ware groups, this Graveline Mound sample is too small to warrant a type classification.
Sample size: 4 (49.0 g)
Sample contexts: Mound Midden, Mound Cap

Decorated Types and Varieties

The second step in our ceramic analysis was to sort decorated pottery into type-varieties. The Graveline Mound ceramic assemblage contains a total of 240 (2121.5 g) decorated potsherds. All were analyzed using the established type and variety system noted above. In cases in which a type classification was possible, but the samples were either too small or too damaged for further classification or when the material did not fit within established varieties, pottery was classified as an "unspecified" variety of an established type. If a type classification was not possible, pottery was described based on temper-ware group and decoration. In the type-variety system, as used in the sources cited above, pottery with similar decorations, but different composition and temper, are usually classified as different, distinct types. This practice should not obscure the fact, established long ago (Ford 1952) and widely acknowledged, that similar decorations on pottery of different temper is found across the Gulf Coastal Plain. We refer to type-varieties with similar decoration, but different temper, as cognate type-varieties (Blitz and Mann 2000:108).

Fine Sand Tempered. Decorated pottery tempered with fine sand belongs to the Weeden Island series and represents a rare, but intriguing, portion of the Graveline Mound assemblage. A total of three decorated fine sand tempered sherds were recovered from Mound Midden and Mound Cap contexts at Graveline Mound.

Carrabelle Incised, *var. unspecified.* This type-variety is characterized by closely spaced, narrow (<1.5 mm) fine incisions in a rectilinear pattern, often line-filled triangles, on a buff paste, without punctations.
Tradition: Gulf
Series: Weeden Island
Phase: Graveline, Tates Hammock (?)
Comment: Among the three sherds of Carrabelle Incised, *var. unspecified* is a single rim with a folded exterior and single incised line directly below a rounded, incurvate lip. Probable vessel form is a small restricted globular jar.
Sample size: 3 (13.8 g)

Sample context: Mound Midden
References: Blitz and Mann (2000), Willey (1949), Wimberly (1960)

Weeden Island Red, *var. unspecified:* Red film applied to the exterior of fine sand tempered pottery.
Tradition: Gulf
Series: Weeden Island
Phase: Graveline, Tates Hammock (?).
Comment: The single example is slipped with a reddish-orange to pinkish-orange film. Similarly filmed grog tempered sherds are classified as Larto Red, *var. unspecified* (see below).
Sample size: 1 (12.5 g)
Sample context: Mound Midden

Grog Tempered. As with the plain ware discussed above, the majority (97.5%) of decorated pottery recovered from excavations at Graveline Mound site is grog tempered. Described above, this ware is classified as Baytown Plain. Grog tempered types and varieties were assigned based on established descriptions of decoration, though it should be noted that most are executed on the local Graveline paste (Baytown Plain, *var. unspecified*, as defined above).

Churupa Punctated, *var. unspecified.* This type-variety has broad, U-shaped incisions in curvilinear patterns that zone alternate areas of hemiconical punctuations.
Tradition: Gulf
Series: Marksville
Phase: Godsey, Graveline
Comment: Churupa Punctated is the cognate type to the grit-sand tempered type Santa Rosa Punctated.
Sample size: 3 (6.3 g)
Sample context: Mound Midden, Mound Cap
References: Brown (1998), Phillips (1970), Toth (1988), Williams and Brain (1983)

Evansville Punctated, *var. unspecified.* This type-variety has unzoned punctations on the exterior of grog tempered vessels.
Tradition: Gulf
Series: Coles Creek
Phase: Graveline, Tates Hammock
Comment: Two sherds fall into the Evansville Punctated type. One exhibits triangular punctations, while the other has shallow, squared punctations. The presence of Evansville Punctated is known to be associated with the Late Woodland Tates Hammock phase in the Mobile Bay region. Based on these two finds, it appears first in Graveline phase context as a minority type. Outside of the region in the lower Mississippi Valley, the catch-all *Evansville* variety has a large chronological range, spanning the late Marksville, Baytown, and Coles Creek periods.
Sample size: 2 (6.1 g)
Sample context: Mound Midden, Mound Cap
References: Blitz and Mann (2000), Brown (1998), Phillips (1970), Williams and Brain (1983)

Hollyknowe Pinched, *var. Hollyknowe:* Pinched ridges formed between the thumb and forefinger creating linear patterns on a wet paste.
Tradition: Gulf
Comment: A shallow, broad incised line zones the pinched ridges along the shoulder of the vessel in our single example. The cognate sand tempered type is Tucker Ridge-pinched of the Weeden Island series. The chronological span is Late Marksville and Baytown periods in the lower Mississippi Valley.
Sample size: 1 (27.5 g)
Sample context: Mound Midden
References: Brown (1998), Phillips (1970), Williams and Brain (1983)

Larto Red, *var. Larto.* Red film applied to the exterior and/or interior surfaces of plain, grog tempered pottery.
Tradition: Gulf
Series: Marksville (Troyville)
Phase: Graveline, Tates Hammock (?)
Comment: Red-filmed pottery becomes more abundant in archaeological assemblages across the Gulf Coastal Plain and in the lower Mississippi Valley after AD 500. The cognate sand tempered type is Weeden Island Red. We have classified all sherds with bright red pigment and no other surface treatment as *var. Larto*.
Sample Size: 7 (39.9 g)
Sample Context: Mound Midden.
References: Brown (1998), Phillips (1970), Williams and Brain (1983)

Larto Red, *var. unspecified.*
Tradition: Gulf
Series: Marksville (Troyville)
Phase: Graveline, Tates Hammock (?)
Comment: Pottery classified as Larto Red, *var. unspecified* represents a unique group of pottery recovered from Graveline Mound that may be distinguished from *var. Larto* by the shade of red film. Whereas those sherds classified as *var. Larto* exhibit a strong or bright red film, the *var. unspecified* sherds are slipped with a distinctive reddish-orange to pinkish-orange shade of filming. Overall, the *var.*

unspecified pottery is somewhat coarser and slightly thicker than the *var. Larto* examples. Most are filmed on the exterior only. Further, many are associated with Mound Midden contexts. As noted above, the single example of Weeden Island Red also has this distinctive reddish-orange film. Several other reddish-orange filmed sherds with exterior incisions also were recovered from the Graveline assemblage (see "Unclassified Grog Tempered" below).
Sample size: 50 (268.6 g)
Sample context: Mound Midden, Mound Cap
References: Brown (1998), Phillips (1970), Williams and Brain (1983)

Marksville Incised, *var. Goose Lake:* Broad, U-shaped, dry-paste incisions forming rectilinear designs of line-filled triangles (Figure 4-1d).
Tradition: Gulf.
Series: Marksville
Phase: Graveline
Comment: The *Goose Lake* variety of Marksville Incised may be distinguished from the earlier *var. Prairie*, based on paste, with *Goose Lake* being found on a coarser Baytown Plain, *var. Sartartia* paste and *Prairie* being associated with the softer Baytown Plain, *var. Marksville* paste. In the Graveline Mound assemblage, the depth of incised lines varies on examples of *Goose Lake,* with some being quite shallow (<1 mm) and others fairly deep (3-4 mm).
Sample size: 5 (72.9 g)
Sample context: Mound Midden, Mound Cap
References: Blitz and Mann (2000), Brown (1998), Phillips (1970)

Marksville Incised, *var. Leist:* Closely spaced, pointed (V-shaped in profile), curvilinear wet-paste incisions creating concentric circles, loops, meanders, and pear-shaped patterns.
Tradition: Gulf
Series: Marksville
Phase: Graveline
Comment: The overall effect of *var. Leist* patterns often are reminiscent of complicated stamping. One such example is present in the Graveline Mound assemblage. *Leist* appears to be the cognate type-variety of the sand-tempered Indian Pass Incised of the Weeden Island series.
Sample size: 2 (12.9 g)
Sample context: Mound Cap
References: Blitz and Mann (2000), Brown (1998), Phillips (1970), Williams and Brain (1983)

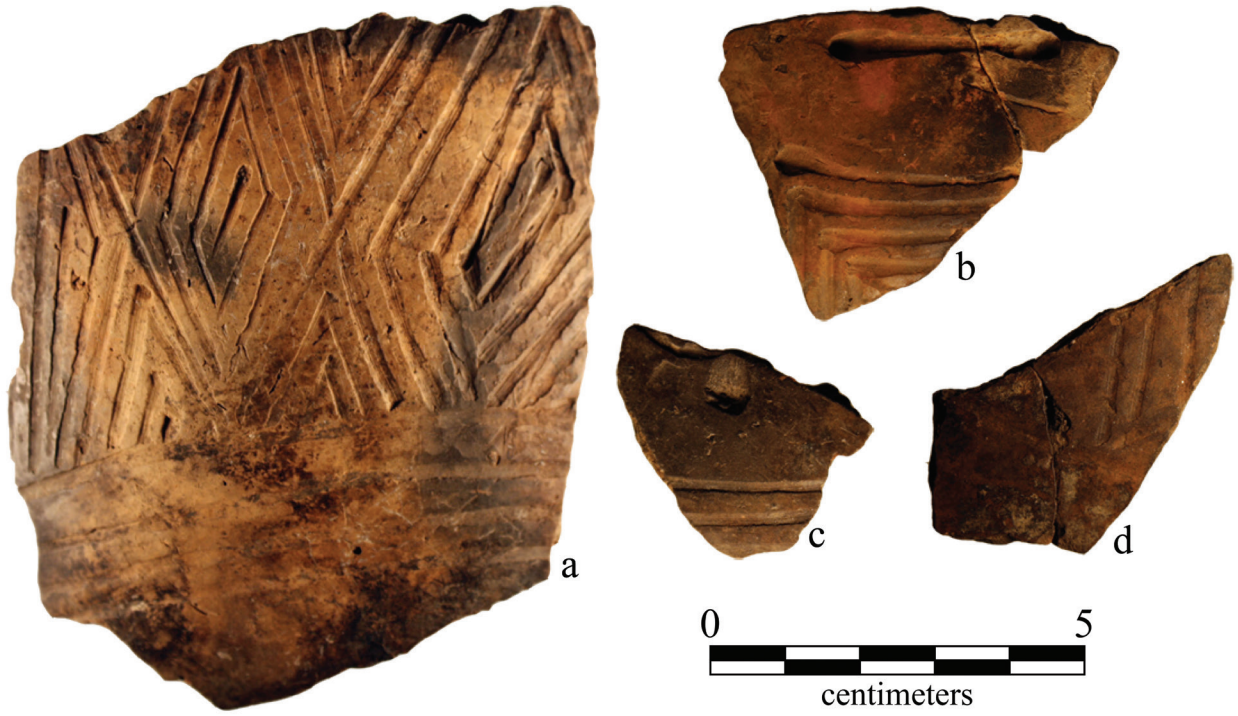

Figure 4-1. Varieties of Marksville Incised pottery: (a) *var. Spanish Fort* with rectilinear design (Mound Midden context, Unit 4, Level N1, Feature 5B); (b) *var. Steele Bayou* (Unit 13, Level L); (c) *var. Steele Bayou* (Mound Midden context, Unit 4, Level N1); (d) *var. Goose Lake* (Unit 10, Zone 5, Level F) (actual size).

Marksville Incised, *var. Marksville:* Closely spaced, broad U-shaped incisions forming both curvilinear and rectilinear designs, including circles, concentric loops, and squares on a dry-paste. Line width is equal to the space between incisions.
Tradition: Gulf
Series: Marksville
Phase: Greenwood Island (100 BC–AD 200/300)
Comment: All examples of Marksville Incised, *var. Marksville* recovered at Graveline Mound are from a single vessel that was broken prior to or at the time of deposition. Though very fragmentary, the vessel form is a small to medium sized bowl or globular jar. The presence of Marksville Incised, *var. Marksville* is an anachronism in this context, as all available regional evidence indicates that this type-variety dates much earlier than the other types in the assemblage. We think it unlikely that the fragmented vessel is an heirloom or that it was produced at this late date. Instead, we suspect that the pot was discarded on the Pre-mound Surface and then much later these sherds were incorporated into the Mound Midden that accumulated on this surface.
Sample size: 8 (31.5 g)
Sample context: Mound Midden
References: Blitz and Mann (2000), Brown (1998), Phillips (1970), Toth (1988)

Marksville Incised, *var. Spanish Fort:* Broad wet-paste incisions forming both curvilinear and rectilinear designs. Often incised lines form concentric meander patterns, but line-filled triangles also occur with some frequency.
Tradition: Gulf
Series: Marksville
Phase: Graveline
Comment: *Spanish Fort* is the most prevalent variety of Marksville Incised at Graveline Mound. Examples of *Spanish Fort* were recovered from all general mound contexts (Pre-Mound Surface, Mound Midden, and Mound Cap), as well as Off-Mound. Rectilinear, line-filled triangles appear to be slightly more common *var. Spanish Fort* designs at Graveline Mound, although curvilinear patterns also are frequent (Figure 4-1a). Vessel modes are difficult to identify from small sherds, but at least one small hemispherical bowl is clearly present (Figure 4-2), as well as the restricted globular jar.
Sample size: 29 (593.4 g)
Sample context: Pre-Mound Surface, Mound Midden, Mound Cap, Off-Mound
References: Blitz and Mann (2000), Brown (1998), Phillips (1970), Williams and Brain (1983)

Marksville Incised, *var. Steele Bayou:* Broad, U-shaped, dry-paste incisions forming curvilinear designs in lo-

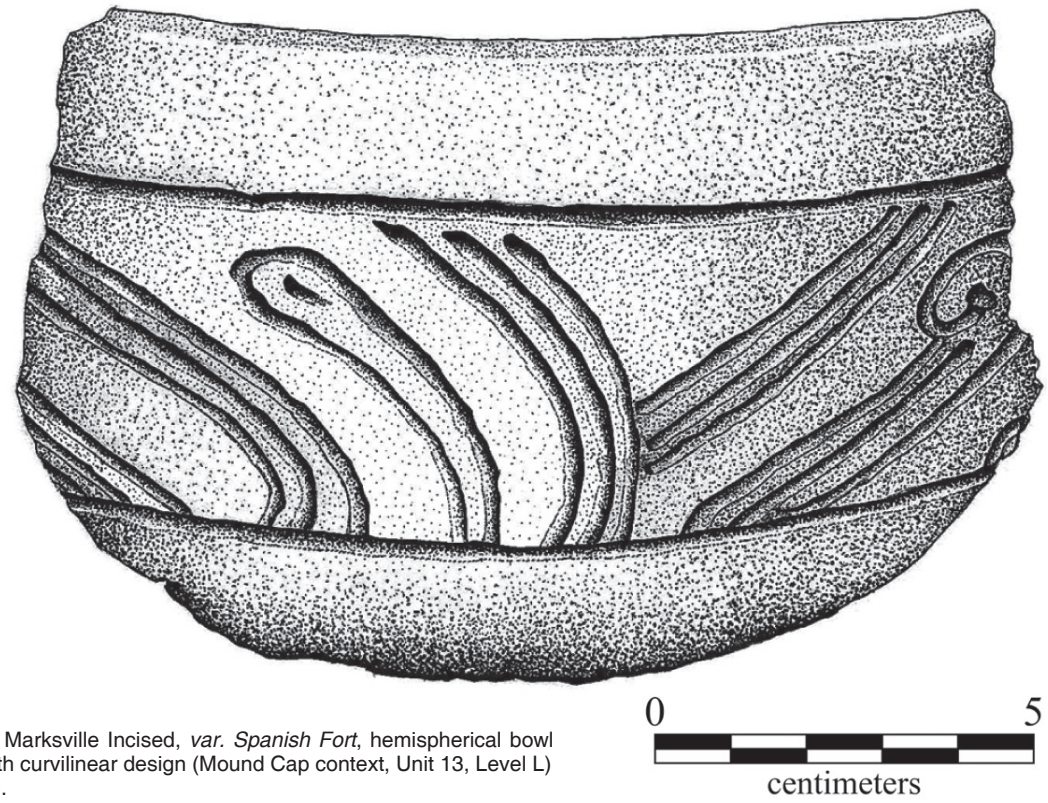

Figure 4-2. Marksville Incised, *var. Spanish Fort*, hemispherical bowl fragment with curvilinear design (Mound Cap context, Unit 13, Level L) (actual size).

bate or flower-like patterns. Incisions often are accented on the ends by hemiconical punctations (Figure 4-1b-c).
Tradition: Gulf
Series: Marksville
Phase: Graveline
Comment: Most examples from Graveline Mound are small, but conform well to the established descriptions of the variety.
Sample size: 5 (56.1 g)
Sample context: Mound Midden, Mound Cap, Off-Mound
References: Blitz and Mann (2000), Brown (1998), Phillips (1970), Williams and Brain (1983)

Marksville Incised, *var. Yokena:* Broad U-shaped incisions of closely or widely spaced lines forming curvilinear and rectilinear designs, including circles, concentric loops, and squares, on a dry paste.
Tradition: Gulf
Series: Marksville
Phase: Godsey, Graveline
Comment: Marksville Incised, *var. Yokena* is a cognate of the sand tempered Basin Bayou Incised type from the northwest Florida/southwest Georgia/south Alabama region.
Sample size: 14 (36.1 g)
Sample context: Mound Midden, Mound Cap
References: Blitz and Mann (2000), Brown (1998), Phillips (1970), Williams and Brain (1983)

Marksville Incised, *var. unspecified:* Broad, U-shaped incisions executed on both wet and dry pastes forming rectilinear and curvilinear patterns.
Tradition: Gulf
Series: Marksville
Comment: The *unspecified* variety is our catch-all for Marksville Incised material that does not fit within established varieties of the type. Several sherds placed in this category, however, are of particular note due to their unusual characteristics. One such example is a wet-paste, rectilinear incised beaker fragment with a scalloped rim depicting nested squares. It was recovered from the base of the Mound Midden directly overlying the Pre-Mound Surface on the eastern mound flank (Unit 8, Feature 29) (Figure 4-3).
Sample size: 39 (283.5 g)
Sample context: Mound Midden, Mound Cap, Off-Mound.
References: Brown (1998), Phillips (1970)

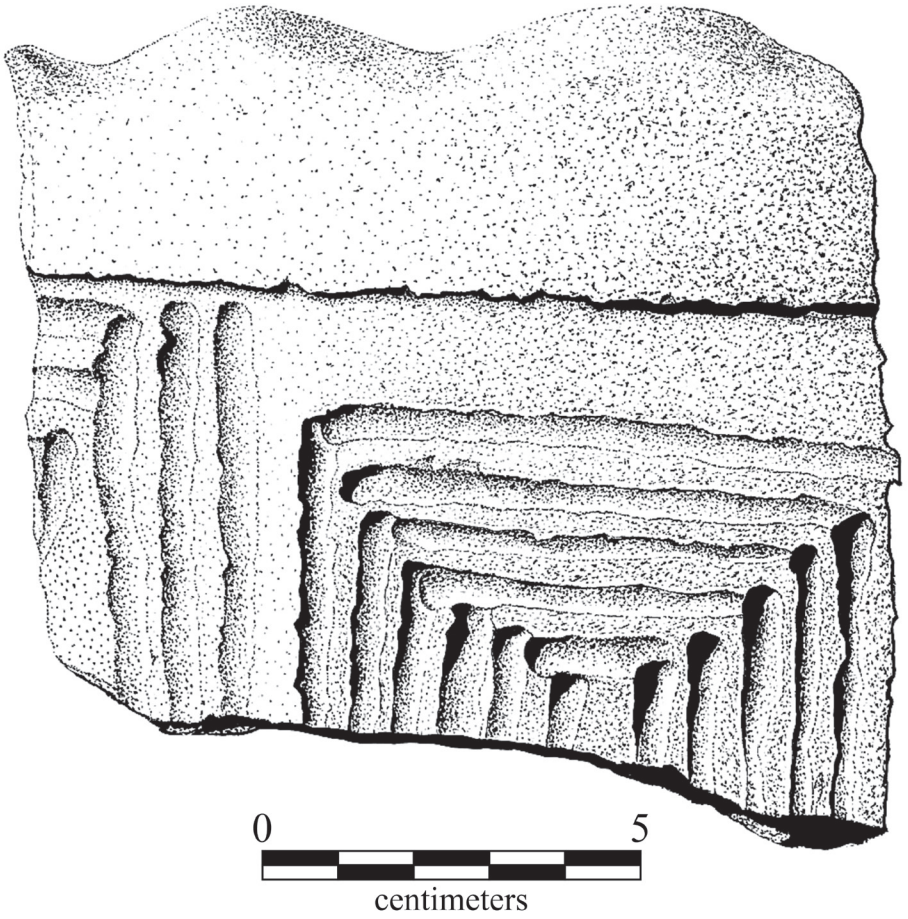

Figure 4-3. Marksville Incised, *var. Unspecified* beaker fragment with a scalloped rim (Mound Midden, Feature 29) (actual size).

Tchefuncte Red, *var. unspecified:* Dark red film applied to the exterior of poorly tempered pottery.
Tradition: Gulf
Series: Tchefuncte
Phase: Apple Street, Greenwood Island
Comment: This is another sherd out of cultural context, most likely redeposited into the Mound Cap with fill material brought from elsewhere.
Sample size: 1 (11.4 g)
Sample context: Mound Cap
References: Brown (1998), Phillips (1970), Williams and Brain (1983)

Unclassified Grog Tempered

Zoned Red: Red film zoned by incised lines. These sherds have red filmed zones outlined by broad, U-shaped, dry-paste incisions.
Tradition: Gulf
Series: Marksville (Troyville)
Phase: Graveline
Comment: Zoned red grog tempered pottery is rare on the Gulf Coastal Plain and therefore has not been well defined in type-variety classifications. Phillips (1970:63) defined an early Marksville type, Catahoula Red Filmed, but it does not apply here. He defined Woodville Zoned Red for the Baytown period but he limited it to interior incised. Phillips (1970:64) noted that zoned red treatments were also present on sherds of *var. Steele Bayou* and *var. Yokena*, and those types are found in the Graveline Mound assemblage. It seems best to view these zoned red sherds as part of the increased visibility of painted pottery across the Gulf Coastal Plain after AD 500 (Blitz and Mann 2000:38) and cognate to the sand tempered type, Weeden Island Zoned Red. One example has an incised circle filled with red pigment (Figure 4-4). Another example is a rim sherd with both interior and exterior red film, as well as black paint. In this example, the black paint is confined to the upper rim lip, possibly in an "x" pattern.
Sample size: 5 (30.7 g)
Sample context: Mound Midden
References: Brown (1998), Ford and Willey (1940), Phillips (1970)

Exterior Black Filmed on Baytown Plain, *var. Fitler*
Comment: These samples exhibit an eroded, exterior black film and do not fit into established types and varieties for Mississippi Sound or the surrounding regions.
Sample size: 2 (4.9 g)
Sample context: Mound Cap

Exterior Incised on Baytown Plain, *var. Fitler*
Comment: Sherds placed in this category were too small or eroded for type classification, often with only a single incised line apparent.
Sample size: 1 (8.0 g)
Sample context: Mound Midden

Exterior Black Filmed on Baytown Plain, *var. unspecified*
Comment: These samples exhibit an eroded, exterior black film and do not fit into established types and varieties for Mississippi Sound or surrounding regions. One sherd has a repair hole.
Sample size: 4 (40.6 g)
Sample context: Mound Cap

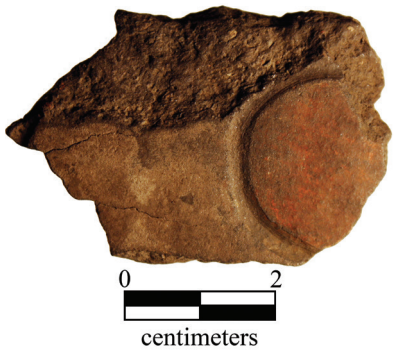

Figure 4-4. Zoned red grog tempered sherd (actual size).

Exterior Incised on Baytown Plain, *var. unspecified*
Comment: Sherds placed in this category were too small or eroded for type classification, often with only a single incised line apparent.
Sample size: 34 (295.9 g)
Sample context: Pre-Mound Surface, Mound Midden, Mound Cap, Off-Mound

Exterior Incised on Larto Red, *var. unspecified.*
Comment: The decoration is broad, U-shaped incisions (1-2 mm) executed on a dry paste and covered with a red film. As with the Larto Red, *var. unspecified*, the color of the film is much closer to red-orange than red. One example exhibits exterior and interior red film with narrow lines (< 1 mm) and a narrow vessel wall (3 mm). If we had larger examples, we would probably classify these sherds as Marksville Incised with red filming.
Sample size: 5 (12.6 g)
Sample context: Mound Midden

Non-Vessel Ceramic Objects. Two non-vessel ceramic objects are present in the Graveline Mound assemblage. The first is a fragment of a ceramic pendant or similar ornament with rounded, tapered edges, an elongated shape, and a single circular perforation on a Baytown Plain, *var. unspecified* ware (Figure 4-5). This object was found in association with Feature 15, a shell concentration within the midden deposit on the eastern flank of Graveline Mound (see Chapter 3 for a description of Feature 15). The second object is a Baytown Plain, *var. unspecified* fragment with the edges ground and rounded to form a circular shape.
Sample size: 2 (9.6 g).
Sample context: Mound Midden.

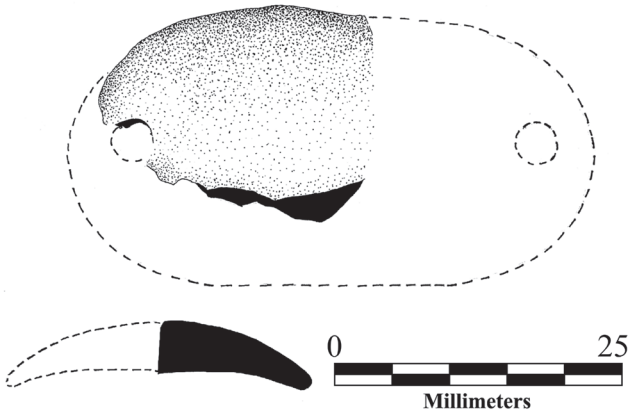

Figure 4-5. Ceramic ornament/pendant fragment on a Baytown Plain, *var. unspecified* paste (Mound Midden, Unit 8, Zone 5, Level C, Feature 15A) (larger than actual size).

Vessel Modes: Shape and Rims

Vessel modes are defined as attribute clusters that crosscut types and varieties and allow for additional interpretation regarding vessel function and technology. We examined two modes in our analysis of the Graveline Mound ceramic assemblage: (1) vessel shape, and (2) rim treatment (decoration or form). With the exception of a possible rim adorno described below, no ceramic appendages (podal supports, handles, or adornos) were present in the Graveline Mound assemblage.

Recognizing vessel shape in the Graveline Mound assemblage was complicated by the small size of most potsherds. Though well-preserved, most sherds in the Graveline Mound assemblage are no larger than two inches (5.08 cm) across. Despite this difficulty, we identified four vessel forms: (1) hemispherical bowls, (2) shallow bowls, (3) restricted globular jars, and (4) straight-sided beakers. At least one additional vessel form, the barrel-shaped beaker, has been found at the mound (Blitz and Mann 2000:41), although not represented in the 2010 excavation assemblage.

Identification of rim modes was also hindered by small sherd size. Five rim modes are present: (1) "Weeden Island" rim mode; (2) folded exterior/rim strap; (3) folded exterior/rim strap with single incised line; (4) scalloped lip; and (5) single incised line. With the exception of the Weeden Island mode, the forms of rim decoration present in the Graveline Mound assemblage are too persistently common over a wide area to provide meaningful data.

"Weeden Island" Rim: Bulbous, rounded, thickened rims present on decorated and undecorated pottery of both fine sand and grog tempered wares.

Comments: As the name suggests, this rim mode is diagnostic of Weeden Island pottery after ca. AD 500, with a center of distribution to the east of the Mississippi Sound region. It is rare in the Graveline assemblage. At Graveline, this rim mode is associated with small to medium sized restricted globular jars.
Sample size: 6
Sample context: Mound Midden
References: Blitz and Mann (2000), Willey (1949), Wimberly (1960) (see also Brown [1982], "Onion Lake" rim mode)

Folded Exterior: This rim is a thickened lip which gives the appearance of being folded over atop the exterior of the vessel and flattened/squared in profile.
Sample size: 1
Sample context: Mound Midden, Mound Cap

Folded Exterior and Single Incised Line: Folded exterior and a single, broad U-shaped incision placed on the exterior of the vessel directly below the lip.
Comments: One example is a Carabelle Incised, *var. unspecified* globular jar, while the other is Baytown Plain, *var. unspecified* plain ware.
Sample size: 2
Sample context: Mound Midden

Scalloped Rim: Rounded notches present in the rim lip.
Comments: This form of rim decoration is present on both Baytown Plain, *var. unspecified* plain ware and a Marksville Incised, *var. unspecified* straight-sided beaker (described above).
Sample size: 2
Sample context: Mound Midden

Single Incised Line: A single, broad U-shaped incision placed on the exterior of the vessel directly below the lip.
Comments: Represented in the sample are two restricted globular jar rims.
Sample size: 3
Sample context: Mound Midden

Lithic Artifacts

In comparison to earlier time periods, lithic (stone) tools and debitage are less common in artifact assemblages dating after AD 200 in the Mississippi Sound region (Blitz and Mann 2000:99). The Graveline Mound site is no exception. By comparison to the ceramic assemblage, lithic artifacts found at Graveline

Mound are extremely limited. A total of 147 (1,474.7 g) stone artifacts were recovered at Graveline Mound, representing 8.0 percent of the overall artifact assemblage. All lithic artifacts were made of flaked stone. No ground stone artifacts were recovered from Graveline Mound. Lithic artifacts were found in most excavated contexts on site, including off-mound STPs and excavation units, mound fill, mound midden, and pre-mound surfaces. Like the ceramic assemblage, most of the lithic assemblage was associated with mound midden and feature contexts.

Methods

Lithic materials were counted and weighed, and raw material type was identified for each specimen in the assemblage. Lithics were then placed into artifact classes based on morphology and presumed function, and examined for evidence of utilization or use wear. Lithic studies consulted in our examination of the Graveline Mound assemblage included McGahey (2000) and Williams and Brain (1983).

Raw Material Types

Six raw material types are present in the Graveline Mound lithic assemblage (Table 4-2). Local raw material types recovered from Graveline Mound include coastal agate, Citronelle gravel chert, and sandstone. The majority of lithic material in the Graveline Mound assemblage consists of Citronelle gravel chert (60.0%), with sandstone the next most prevalent (19.7%) raw material on site. Non-local raw material types present in the assemblage include mica (n=1) (closest source, the Alabama Piedmont), novaculite (n=1) (Ouachita Mountains), and Tallahatta sandstone, *aka* "Tallahatta quartzite" (n=8) (east Mississippi/south Alabama). Whereas novaculite and Tallahatta sandstone are associated with secondary contexts (Mound Cap, Pre-Mound Surface, and Off-Mound), the mica fragment, albeit small, was recovered from a secure feature context (Unit 4, Feature 4) within the Mound Midden.

Lithic Artifact Classes

Following identification of source materials, all lithics were placed into artifact classes (Table 4-3). Six artifact classes are identified in the Graveline Mound assemblage, including (1) debitage, (2) biface, (3) uniface, (4) micro-tool, (5) core, and (6) fire cracked rock. A miscellaneous category is used for unmodified stone.

Debitage. The largest category of lithic artifacts recovered from Graveline Mound is debitage. A total of 78 (59.2 g) lithic flakes are present (53.1% of the assemblage) (Table 4-4). Lithic debitage is associated with most contexts, including Mound Cap, Mound Midden, Pre-Mound Surface, and Off-Mound. Most debitage was chipped from the local Citronelle gravel chert, though a limited number are made of coastal agate, novaculite, Tallahatta sandstone, and unidentified quartzite. After the source material was identified, each flake was classified as primary, secondary, or tertiary, according to the point at which it was removed from the flake core. Lithic debitage was examined for evidence of use after removal from the core and classified as either utilized or unutilized. Each stage of lithic tool production is represented in the debitage, with the quantities of primary, secondary, and tertiary flakes being fairly evenly distributed. This suggests at

Table 4-2. Lithic Raw Material Types.

Stone Type	Local	Count	Percent	Weight (g)	Percent Weight
Agate	Yes (?)	1	0.6%	1.1	0.01
Chert – Citronelle Gravel	Yes	88	60.0%	1157.5	78.5
Chert – Hematitic	Yes	2	1.4%	3.5	0.2
Chert – UID	Unknown	5	3.4%	51.7	3.5
Mica	No	1	0.6%	0.1	0.01
Novaculite	No	1	0.6%	0.1	0.01
Sandstone – Hematitic	Yes	17	11.6%	77.9	5.3
Sandstone – Limonitic	Yes	7	4.8%	59.9	4.1
Sandstone – Other	Unknown	5	3.4%	93.8	6.4
Quartzite – Tallahatta	No	8	5.4%	14.2	1.0
Quartzite – Other	Unknown	12	8.2%	14.9	1.0
Total		**147**		**1474.7**	**100.0**

Table 4-3. Frequency of Lithic Artifact Categories.

Lithics Class	Count	Percent
Debitage	78	53.1%
Biface	6	4.0%
Uniface	1	0.7%
Micro-Tool	1	0.7%
Core	2	1.4%
Fire Cracked Rock	3	2.0%
Unmodified Stone	56	38.1%
Total	**147**	**100.0%**

least some expedient tool production on or near the site. Of the 80 lithic flakes recovered from Graveline Mound, only one was utilized for an additional purpose after its removal from the flake core. This specimen is described below as a micro-tool.

Bifaces. Six bifaces are present in the Graveline Mound assemblage, five of which are hafted (Table 4-5). Two are made of non-local Tallahatta sandstone and the remaining four are chert (two of local Citronelle gravel and two of heat-treated unidentified chert). They are associated with Mound Midden, Mound Cap, Pre-Mound Surface, and Off-Mound contexts. They may have had multiple functions, such as projectile point or knife.

Edwards Stemmed, *var. unspecified:* Small to medium-size narrow points with straight stems and bases. Average length, 52 mm; average width, 20 mm; average thickness, 7 mm (McGahey 2000:194).
Raw material type: Unidentified chert (heat treated)
Chronological position: AD 1-700
Comment: Examples are rather crudely made from heat-treated chert, probably local Citronelle gravel, resulting in a mottled red to pink color. Both were recovered from Feature 15, a shell concentration within the Mound Midden (Figure 4-6 d).
Sample size: 2 (11.2 g)
Sample context: Mound Midden
References: McGahey (2000), Phillips (1970), Williams and Brain (1983)

Table 4-4. Frequency of Debitage Raw Material Type by Count and Weight.

Raw Material Type	Count	Percent	Weight (g)	Percent Weight
Agate	1	1.3	1.1	1.9
Chert – Citronelle Gravel	65	83.3	50.7	85.6
Novaculite	1	1.3	0.1	0.2
Quartzite – Tallahatta	6	7.7	2.8	4.7
Quartzite – Other	5	6.4	4.5	7.6
Total	**78**	**100.0**	**59.2**	**100.0**

Table 4-5. Frequency of Lithic Artifact Class by Raw Material.

Lithic Artifact Class	Raw Material	Count
Bifaces	Chert – Citronelle Gravel	1
	Chert – UID (heat altered)	3
	Tallahatta Quartzite	2
Unifaces	Chert – Citronelle Gravel	1
Micro-Tools	Chert – Citronelle Gravel	1
Total		**8**

Gary Stemmed, *var. unspecified:* Small to medium sized points with triangular blades and tapered stems with pointed or rounded bases. Average length is 55 mm; average width is 18 mm; average thickness is 8 mm (McGahey 2000:192).
Raw material type: Tallahatta sandstone
Chronological position: AD 1-700
Comment: Specimen measures 34 mm in length, 19 mm in width, and 7 mm in thickness (Figure 4-6a).
Sample size: 1 (4.5 g).
Sample context: Mound Cap
References: McGahey (2000), Williams and Brain (1983)

Little Bear Creek: Small to large thick points with straight, long stems. Average length, 54 mm; average

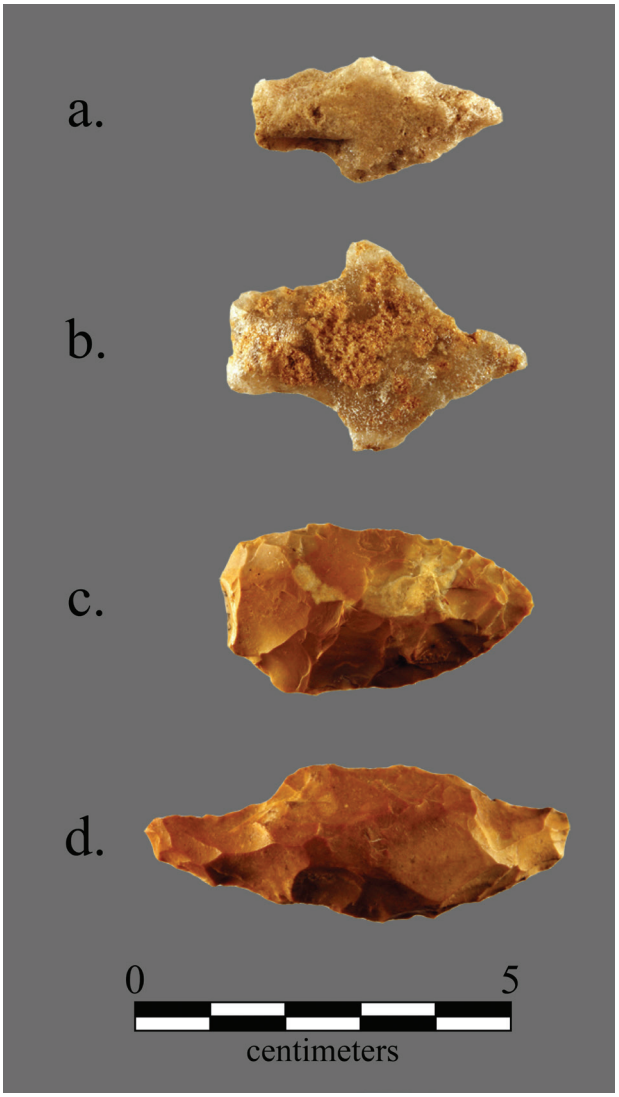

Figure 4-6. Projectile point/knifes: (a) Gary Stemmed, Tallahatta sandstone (Unit 12, Level O); (b) Little Bear Creek, Tallahatta sandstone (Unit 1, Level R); (c) unidentified biface, Citronelle gravel chert (Unit 1, Level K); (d) Edwards Stemmed, unidentified chert (Unit 7, Level B) (actual size).

width, 28 mm; average thickness, 10 mm (McGahey 2000:152).
Raw material type: Tallahatta sandstone
Chronological position: Late Archaic period (2,500-1,500 BC)
Comment: Specimen measures 44 cm in length, 28 mm in width, and 12 cm in thickness (Figure 4-6b). This example exhibits evidence of being heavily reworked. It was recovered from a sub-mound context below the Pre-Mound Surface in Unit 1. Though not associated with Graveline Mound construction and use, it does suggest an earlier occupation in the vicinity of the site during the Late Archaic period.
Sample size: 1 (6.9 g)
Sample context: Pre-Mound Surface
References: DeJarnette, Kurjack, and Cambron (1962), McGahey (2000)

Projectile Point/Knife 1: Distal fragment with a broad, straight base.
Raw material type: Unidentified chert (heat treated)
Chronological position: unknown
Comment: Specimen is made of heat-treated chert, probably the local Citronelle gravel, resulting in a mottled reddish brown color. Base measures 21 mm in width.
Sample size: 1 (2.3 g)
Sample context: Off-Mound

Projectile Point/Knife 2: Unhafted, broad, convex-sided biface.
Raw material type: Citronelle gravel chert
Chronological position: Woodland period
Comment: Specimen measures 42 mm in length, 23 mm in width, and 10 cm in thickness (Figure 4-6c).
Sample size: 1 (9.2 g)
Sample context: Mound Midden
References: Williams and Brain (1983)

Uniface. A single uniface is present in the Graveline Mound assemblage, chipped from local Citronelle gravel chert. The wear pattern suggests function as a drill. It was recovered from a Mound Cap context (Unit 9). At least one other example of a probable drill is present in the assemblage, also from a Mound Cap context (see micro-tool below).

Micro-Tool. We define micro-tools as utilized lithic artifacts measuring less than 10 mm in size. The single example is a utilized tertiary flake made of local Citronelle gravel chert. Wear indicates possible use as a drill. It was recovered from the Mound Cap (Unit 13).

Cores. Two flake cores were found at Graveline Mound, both associated with Mound Midden contexts. This indicates that, despite the paucity of local stone resources, at least some lithic manufacture was occurring on or near the Graveline Mound site. Interestingly, one core is of local Citronelle gravel chert and the other is a non-local quartzite. The chert core is heat altered (likely fire cracked) and shows evidence of at least nine flake scars. Some cortex remains on the core. The non-local core is quite small, having been repeatedly reduced, and shows evidence of four flake scars. The presence of a non-local core suggests movement of unfinished raw materials from quarry source to site.

Fire Cracked Rock. Fire cracked rock is included in the lithic assemblage as a byproduct of human activity. Fire cracked rock is produced when lithic material is exposed to extreme temperatures or changes in temperature. Because fire cracked rock is uncommon at Graveline Mound, analysis was limited to counts, weights, and identification of raw material type for each sample. All fire cracked rock recovered from Graveline Mound site is local Citronelle gravel chert.

Cultural Activities at Graveline Mound Inferred from Artifact Analysis

The functional and technological characteristics of the ceramic and lithic artifacts provide important insights into cultural activities at the mound. While artifacts recovered from the Pre-Mound Surface, Off-Mound test units, and the Mound Cap were in secondary contexts, artifacts from the features and Mound Midden were deposited as a direct result of activities that took place at the mound, especially on and immediately around the Initial Mound. Because it demarcated a social space segregated from habitation areas—a social context removed from the mundane pursuits of everyday life—we have reason to suspect that the associated activities and the artifacts used and discarded there were, in some sense, special. Unfortunately, we lack a well-dated assemblage from a Graveline phase habitation site to compare with the mound assemblage, to understand how the artifacts and the inferred activities might be similar or different. Blitz and Mann (2000:33, Tables B.10-B.12) secured a small sample of artifacts, mostly ceramics, and two radiocarbon samples from strata that appeared to be undisturbed at the Harvey site (22HR534), a habitation site

located on the coastal strand in urban Biloxi (Blitz and Mann 2000:32-34; Boudreaux 2009:99-101; Greenwell 1986). The sample from Harvey had the same late Marksville Incised ceramic type-varieties found at Graveline (i.e., *var. Leist, var. Goose Lake, var. Spanish Fort*), but absent from earlier Middle Woodland assemblages in the region. On that basis, Blitz and Mann identified these late Marksville Incised type-varieties as *terminus post quem* diagnostics of the Graveline phase and assigned the Harvey site to the Graveline phase. With results of the 2010 Graveline Mound excavations in hand, significant differences between the Harvey and Graveline Mound site components are now apparent. For reasons stated below, we cannot be confident the two sites represent same-phase components.

Despite a lack of good comparative data, some functional implications of the Graveline Mound ceramic assemblage are informative. We note the dichotomy of fine ware and coarse utility ware. The undecorated fine wares Baytown Plain *var. Fitler* and *var. Sataria* are smoothed, polished, more compact, and have finer temper than the coarse ware Baytown Plain, *var. unspecified*. Undecorated fine ware has thinner vessel walls (2-5 mm) compared to coarse ware wall thickness (5-8 mm). Much of the Larto Red pottery probably had a serving function; almost half (48%) are filmed only on the interior of the vessel, and these sherds tend to be slightly thinner than exterior filmed sherds, measuring between 3 and 6 mm in thickness. The small size of sherds in the assemblage prevents an adequate quantification of vessel shape and size or an understanding of how surface treatment and decoration correlate with vessel modes. All vessel shapes have decorated examples, but the assemblage has a large proportion of decorated serving vessels, especially small bowls and beakers. In particular, the painted, filmed and/or incised cup-size beakers and small jars imply that consumption of individual servings of liquids was an important activity.

Not much information about cultural activities can be gleaned from the paltry lithic assemblage from Graveline Mound. Little was found and most is of uncertain cultural provenience in the secondary contexts of Mound Cap fill and Pre-Mound Surface. The Gary and Edwards Stemmed biface tools are similar to examples recovered at Harvey and other Woodland sites in the region. They were hafted for use as dart points or knives. The only non-local stone from secure context, a fragment of mica, was used for some unknown non-utilitarian purpose and permits us to say that people at Graveline Mound had access to a distant resource.

Graveline Mound in Cultural-Historical Context: Chronological Issues

Across the Gulf Coastal Plain, archaeologists have constructed time-space frameworks for pre-Columbian culture history by grouping similar artifact assemblages at multiple sites or strata into sub-phases, phases, and periods. Ideally, phases should be based on a range of physical evidence beyond artifacts, such as settlement, subsistence, and architecture. In practice, however, most post-Archaic phases in the lower Southeast are ceramic phases: time spans when similar ceramic assemblages were in use at sites in a local archaeological sequence. Typically, these ceramic phases are constructed by sorting pottery attributes of decoration and temper into type-variety classifications, as we have done. Because archaeologists in this region rely on small brittle potsherds for their relative chronologies, modes of vessel shape or form have been of secondary importance in most pottery classifications, where chronology is the goal. Type-variety classification has significant flaws, which we need not belabor here, but its pervasive use has created a comparative framework.

Chronological boundaries in phase sequences are sometimes determined by type-variety frequency pottery seriations. More commonly, as is the situation in the Mississippi Sound region, a *terminus post quem* dating logic has been used to construct relative chronologies, in which the beginning of a new phase is marked by the initial appearance of a common type-variety or mode in the local sequence. The sketchy and uneven distribution of radiocarbon dates for Woodland periods across the Gulf Coastal Plain often means that relative ceramic chronologies are only loosely tethered to absolute chronologies. Traditionally, the lack of radiocarbon dates has encouraged cross-correlation relative dating based on the assumption that similar types in supposedly better dated sequences in adjacent regions date to the same time span in the local sequence, even though the dissemination of ceramic types from one area to another introduces a temporal lag or "doppler effect" that may skew the alignment of relative chronologies in local sequences (Deetz and Dethlefsen 1965).

Use of the type-variety system has proven quite successful for integrating and organizing data within regional sequences. But it often fails at a larger scale of analysis to acknowledge cognate types with similar or identical decorative treatments executed on different pastes, and therefore given different type names, even though similarity of decoration was the focus of earlier synthesis attempts (Ford 1952). Because archaeologists seek to recognize local variation and diversity of style, pottery varieties proliferate and often become more of a descriptive exercise than a useful means to assess chronological subdivisions or social differentiation. Adding to these difficulties is the inconvenient fact that many ceramic attributes in the lower Southeast were in use for long time spans or otherwise are not particularly useful for fine-grained seriation. So, while we know the pre-Columbian culture history in broad outline, good excavation data are still very unevenly distributed along the north-central Gulf coast. The result is ceramic phases in coastal Mississippi and adjacent areas that often remain poorly defined with long and imprecise time spans, with insights on settlement, subsistence, and social process lagging behind. Fortunately, recent excavations along the coast are bringing the Middle and Late Woodland periods into sharper focus, but efforts to compare assemblages are still handicapped by lack of well-dated excavation samples.

The Graveline Phase in Regional Context

Keeping in mind the caveats stated above, we turn to the Graveline phase to reconsider its chronological placement and culture-historical relationships in light of the new data presented in this report. The Middle-to-Late Woodland period sequence in the eastern Mississippi Sound sub-region was defined by excavations at three sites in the early 1990s: Godsey (22HR591) and Harvey (22HR534), both earth-and-shell midden habitation sites, and Graveline Mound (Blitz and Mann 2000). Ceramic samples from the three sites are compared in Table 4-6. Based on these excavations and the identification of similar components in a survey of regional sites and collections, two sequential ceramic phases were defined. The Godsey phase was originally dated AD 200-400, followed by Graveline, AD 400-700. The ceramic attributes that define the Godsey and Graveline phases are regional versions of the Marksville ceramic series, which is geographically centered on the lower Mississippi Valley.

Graveline Mound is the single-component type site of the Graveline phase. Radiocarbon dates reviewed in Chapter 3 fall into an early group (two assays in the AD 420-610 span) and a late group (six assays in the AD 590-780 span). Only three artifacts in the Graveline Mound assemblage diverge from that timeframe, including a Late Archaic projectile point and a Tchefuncte Red sherd, both redeposited centuries prior to the Graveline Mound radiocarbon range. There is a high probability that the eight Marksville Incised, *var. Marksville* sherds, all from a single vessel in Feature 18, are also a redeposit. The time span of this ceramic type terminates prior to AD 600, and Feature 18 produced an early group radiocarbon dates. These sherds and the two early dates suggest some activity in the vicinity prior to mound construction around AD 590. The important point here is that all datable Graveline phase diagnostic ceramic types are associated with late group dates. This is the basis for our re-estimation of the Graveline phase time span to AD 550-800.

The Godsey site (22HR591), located 1 km east of the Harvey site, was excavated in 1993 and has since been destroyed by storms and urban development. Pottery recovered from Godsey, the phase type site, is grog tempered with Marksville Incised, *var. Yokena*, Marksville Stamped, *var. Godsey* (zoned crenulated rocker stamped) and *var. Troyville* (zoned plain rocker stamped), and Churupa Punctated, *var. Thornton* as majority types. Also present are rim-top impressions or notches and small conical podal supports.

Compare the Godsey site ceramic assemblage with the Harvey site ceramic assemblage in Table 4-6. Harvey has the same decorated type-varieties as Godsey, but differs from Godsey in the additional presence of Marksville Incised, *var. Leist*, *var. Goose Lake*, and *var. Spanish Fort*, and trace amounts of Larto Red. Decorated pottery from Graveline Mound shares Marksville Incised, *var. Yokena*, *var. Spanish Fort*, *var. Goose Lake*, and *var. Steele Bayou* with Harvey, and differs by a significant increase in counts of Larto Red. Also at Graveline, but not at Harvey, are minor amounts of unclassified grog tempered zoned red and black-filmed sherds. The high frequency of Marksville Stamped at the Godsey and Harvey sites, but absence at Graveline (the re-deposited Marksville Stamped, *var. Marksville* sherds, noted above, being the exception) suggested to Blitz and Mann that the Harvey assemblage fell chronologically between the Godsey and Graveline Mound assemblages. On that basis they assigned the Harvey assemblage to the Graveline phase.

In light of the new dates from Graveline Mound, assigning Harvey to the Graveline phase is problematic. The two radiocarbon dates for Godsey and the two for Harvey span AD 244-548 and show considerable overlap (Blitz and Mann 2000: Table 7.5), but fall earlier than the group 2 dating span for Graveline Mound (AD 590-780). Plus, the abundance of red-filmed and other painted pottery at Graveline Mound, but not at Harvey, presents a further puzzle. Several alternative interpretations of these assemblage differences come to mind, even while we lament our lack of adequate means to evaluate these choices at present. (1) The Harvey site assemblage is composed of undetected mixing of Godsey phase and Graveline phase components. (2)The Harvey assemblage is chronologically intermediate to the Godsey and Graveline assemblages, a time after Godsey when late Marksville Incised varieties *Leist*, *Goose Lake*, and *Spanish Fort* appear, but before the appearance of Larto Red and other painted pottery found at Graveline. Or (3) the differences between the Harvey and Graveline assemblages are functional; that is, the presence of Larto Red and additional rare painted pottery types reflects special-purpose use of serving vessels in a mound-related ritual context not present at the Harvey site.

What broader cultural-historical relationships existed across the coast and into the interior during the AD 250-800 time span that brackets the Godsey and Graveline ceramic phases? Beginning with the pottery type-varieties, rim mode, and podal supports of the Godsey phase, we see markers for Issaquena, a cultural entity of the Late Marksville period in the lower Mississippi Valley, variously defined as a phase (Greengo 1964), ceramic complex (Phillips 1970) or archaeological culture (Jeter et al. 1989). Noting this similarity, Blitz and Mann described the Godsey ceramic phase as a regional expression of "Coastal Issaquena" (Jeter et al. 1989:138-141), meaning an interval following intermittent participation in the Hopewell interaction sphere, when regional populations were making certain type-varieties and the rim-top impressions characteristic of the middle time span of the Marksville ceramic series continuum (see Phillips 1970:757-858). The appearance of Marksville Incised, *var. Yokena* and Marksville Stamped, *var. Godsey* in the local archaeological sequence are the diagnostic type-varieties that mark the initiation of the Godsey ceramic phase.

The subsequent Graveline phase has ceramic attributes shared with Troyville, another cultural entity of the southern lower Mississippi Valley dating to the Baytown period. Troyville is variously conceived as an arbitrary temporal-spatial unit (Ford 1951) or an archaeological culture (Belmont 1982; Bitgood 1989). Like Issaquena, we prefer to limit the Troyville concept to a set of widely shared ceramic styles: a ceramic subseries that is the terminal expression of the long Marksville ceramic series continuum, with emphasis

Table 4-6. Frequency of Ceramic Type-Varieties from Excavations at the Godsey, Harvey, and Graveline Sites. Source: Godsey and Harvey data from Blitz and Mann 2000.

	Godsey	Harvey	Graveline
UNDECORATED			
Grog tempered plain	462	662	783
Sand tempered Plain	1	7	7
GROG TEMPERED DECORATED			
Churupa Punctated, *var. unspecified*	1	2	3
Churupa Punctated, *var. Thornton*	13	1	0
Evansville Punctated, *var. unspecified*	0	0	2
Hollyknowe Pinched, *var. Hollyknowe*	0	0	1
Indian Bay Stamped, *var. Spencer Bayou*	6	1	0
Marksville Incised, *var. unspecified*	50	56	39
Marksville Incised, *var. Yokena*	60	12	14
Marksville Incised, *var. Marksville*	0	0	8
Marksville Incised, *var. Goose Lake*	0	2	5
Marksville Incised, *var. Leist*	0	11	2
Marksville Incised, *var. Spanish Fort*	0	1	29
Marksville Incised, *var. Steele Bayou*	0	1	5
Marksville Stamped, *var. unspecified*	0	55	0
Marksville Stamped, *var. Godsey*	18	53	0
Marksville Stamped, *var. Marksville*	1	0	0
Marksville Stamped, *var. Troyville*	8	5	0
Marksville Stamped, *var. Manny*	1	0	0
Larto Red, all varieties	0	1	57
Unclassified zoned red	0	0	5
Unclassified incised and red-filmed	0	0	5
Unclassified black-filmed/painted	0	0	5
SAND TEMPERED DECORATED			
Weeden Island Red	0	0	1
Weedend Island Incised	0	1	0
Carrabelle Punctated	0	2	0
Carrabelle Incised	0	0	3

on elaborate incised designs (Marksville Incised, *var. Goose Lake*, *var. Steele Bayou* and *var. Spanish Fort*, French Fork Incised) and a rise in painted/filmed decoration (i.e., Larto Red). The rim-top impressions and small conical podal supports of the Godsey phase are absent (at least in the Graveline Mound assemblage). The Graveline phase is best described as "Coastal Troyville" (Jeter et al. 1989:152-156), for it lacks the cord-marked ceramics found in contemporary phases with Troyville styles to the north. Red-filmed, red zoned, and other painted pottery and unusual effigy vessels were in use from Florida to Louisiana during this time span, especially in mound contexts (e.g., Belmont and Williams 1981; Belmont 1982; Milanich et al. 1984; Pluckhahn 2003). Because the Godsey and Graveline phases have not been found in stratigraphic superposition, the claim that they represent sequential phases is based primarily on associated radiocarbon dates and similarities to lower Mississippi Valley relative ceramic chronologies. Our revised estimate of the Godsey phase time span is AD 250-550 and the revised Graveline phase time span is AD 550-800.

Spatial distribution of the Graveline phase is difficult to determine. Based on surface collections, Blitz and Man (2000: Figure 4.8) identified 44 sites with Godsey and Graveline components, mostly earth or shell middens in the eastern Mississippi Sound sub-region. Many of these sites are now damaged or destroyed (Boudreaux 2009). Given the special purpose assemblage at Graveline Mound, it may be more appropriate to discuss nearby mound sites, but we do not even know the ages of the five other mounds within 500 m of Graveline Mound. Farther afield, in the western Mississippi Sound sub-region, three excavated mound sites have ceramic assemblages that fall within the AD 250-800 Godsey-to-Graveline time span: Indian Camp (16ST6), Jackson Landing (22HA515), and Ramsey (22HA528). Indian Camp is a small platform mound on the Louisiana side of the Pearl River mouth (Webb 1982). Jackson Landing, on the coastal strand near the Pearl River mouth, is a mound enclosed by a very large earthen embankment (Boudreaux 2011; Williams 1987). Ramsey (22HA528) is a small mound surrounded by extensive midden deposits on high ground above Saint Louis Bay in urban Bay Saint Louis (Kowalski 2012). The latter two sites are under investigation at the time of this writing, and we defer comment until results become available. Suffice to say, these three sites have grog tempered ceramic assemblages in which the majority decorated types are middle-to-late varieties of Marksville Stamped and/or Marksville Incised.

Looking east, recent excavations at the coastal habitation site of Plash Island (1BA134) have clarified the regional sequence in the Mobile Bay area for the AD 250-800 time span (Price 2008). The Porter phase (AD 300-600), previously considered to be restricted to the Middle Woodland period, has some similarities with the contemporaneous Godsey phase. Decorated Porter ceramics are composed of about 28 percent Marksville series pottery, but Porter differs from the Godsey phase in the dominance (72%) of sand tempered Santa Rosa series pottery (Dumas 2008:156). Mobile Bay populations at this time produced both of these pottery series, but Santa Rosa pottery types in the Mississippi Sound region are so rare as to represent the occasional import or local copy (Blitz and Mann 2000:39). In other words, Marksville and Santa Rosa are two Gulf Tradition ceramic series sharing cognate types of similar decoration, but different tempering agents. Dumas (2008:167) discusses the subsequent Tates Hammock phase (AD 600-850) and proposes an early Tates Hammock sub-phase dominated by incised and punctated Weeden Island series pottery and minor amounts of sand tempered check stamped and fabric–marked pottery. She states that "this proposed early Tates Hammock sub-phase would be coeval with the Graveline phase in coastal Mississippi" (Dumas 2008:167), which in light of the new radiocarbon dates for Graveline is accurate. However, the composition of ceramic decoration in the two phases is quite different. It is not entirely clear how much grog-tempered Marksville series pottery or red-filmed pottery is present in early Tates Hammock assemblages, and the incised/punctated Weeden Island series pottery that dominates the Alabama Tates Hammock phase is rare in coastal Mississippi. Later, the "late Tates Hammock subphase assemblage has no Troyville-like pottery, and grog tempered wares [were] in general decline" (Dumas 2008:167).

No doubt these similarities and differences are shaped by temporal, spatial and functional variables. For the AD 250-800 time interval along the coast, grog tempered pottery decreases in frequency relative to sand tempered pottery at archaeological sites progressing from Mississippi into northwest Florida, even though similar decoration is placed on vessels of either temper (i.e., cognate types). This is a distribution pattern at a spatial scale that must have cross-cut local social groups. The social condition most condu-

cive to this distribution pattern of similar decorative styles was open social integration with few barriers to reciprocal interactions with neighboring social groups. Interaction probably occurred in a down-the-line, chain-like manner along coastal routes (Blitz and Mann 2000:118).

The estimated terminal date for the Graveline phase, based on radiocarbon dates, is AD 800. Blitz and Mann (2000:44-47) observed that archaeological sites from the time span immediately following the Graveline phase in coastal Mississippi have cord-marked, brushed, and check-stamped pottery and minor amounts of incised Coles Creek series pottery. They extended the Tates Hammock phase west from Mobile Bay to include these sites and estimated the date range at AD 700-1200, but also stated the phase interval was probably too long. Dumas (2008:170) points this out and suggests these sites "correspond roughly to the Coden phase in Alabama," which is estimated to date AD 850-1100. This correlation is reasonable, since the recent radiocarbon dates from Plash Island and Graveline Mound move the estimated time spans for the Middle-to-Late Woodland phases in coastal Mississippi and Alabama several centuries forward than previous estimates. Meaningful comparison will require well-dated excavated sites. It may be significant that these Late Woodland paddle-stamped pottery styles do not appear on the Mississippi coast until after AD 800, even though they were in common use for several centuries prior to this time just 100-200 miles to the interior, in northern and central Mississippi and Alabama. Post-AD 800 coastal sites also have small triangular arrow points, the first appearance of the bow in the regional sequence. These style and technology shifts suggest cultural discontinuity and changes that terminated the Graveline phase social order and associated pottery tradition. While the abruptness of the change may be more apparent than real, due to inadequate data, perhaps possession of the bow facilitated movement of new peoples from the interior to the coast (Blitz and Mann 2000:45). A revised chronology for the archaeological sequence in the eastern Mississippi sub-region is presented in Table 4-7.

Summary

With analysis of ceramic and lithic artifacts completed, we can recognize the special space encapsulated by the Graveline Mound platform as the scene of food consumption that emphasized painted and incised serving vessels. Small decorated beakers, thin-walled, interior red-filmed bowls, and small jars point to consumption of individual-sized servings, particularly of liquids. Smashed pots, along with food refuse, were not removed from the platform special space, but deposited at the scene and buried by subsequent mound construction. Across the Gulf Coastal Plain during the early Late Woodland period, structures like Graveline Mound were erected. These platforms were consecrated, bounded, and monumentalized places that elevated and separated participants in special rituals from daily activities, and where foods were served in highly decorated vessels. This emphasis on serving vessels raises an obvious question: what foods and liquids were served in the vessels at Graveline? Analysis of the organic residues that remain on the vessel fragments is one way to answer this question.

Table 4-7. Archaeological Sequence for the Eastern Sub-Region, Mississippi Sound.

Period	Date	Phase
Colonial	AD 1699 – 1775	La Pointe
Mississippi	AD 1550 – 1699	Bear Point
	AD 1350 – 1550	Singing River
	AD 1200 – 1350	Pinola
Late Woodland	AD 800 – 1200	Tates Hammock (?)
	AD 550 – 800	Graveline
Middle Woodland	AD 250 – 550	Godsey
	100 BC – AD 250	Greenwood Island
Late Gulf Formational	800 – 100 BC	Apple Street
Middle Gulf Formational	1200 – 800 BC	Claiborne

Chapter 5
Absorbed Residue Analysis of Pottery Sherds

Eleanora A. Reber

In the last chapter, the analysis of ceramic decoration, composition, and form revealed much about the relative chronology of the mound and helped position the Graveline Mound site in a larger cultural-historical context. Most of the ceramics are small potsherds found in features formed by dumping collected food remains and other trash on and around the Initial Mound. The potsherds were from jars, bowls, and small beakers, including incised and painted serving vessels, as well as an undecorated utility ware for cooking or storage. Clearly, the consumption of foods and liquids was central to activities performed at this carefully built and precisely demarcated place. Identification of animal and plant remains in following chapters provides direct evidence of what was consumed at the mound, but preservation factors may limit our reading of the complete menu. Chemical analysis of residues absorbed into ceramic sherds is another parallel and powerful line of evidence to identify what was consumed here and perhaps help us understand why these comestibles, medicines, and liquids were an important part of ancient ceremonies.

Twelve pottery sherds and associated soil samples from the Graveline Mound site were submitted to the Archaeological Residue Laboratory, University of North Carolina at Wilmington (UNCW), for absorbed residue analysis. Of these, eleven sherds and one soil sample were analyzed, including two rim sherds, two vessel bases, and seven body sherds. All of the pottery analyzed was plain, buff-colored, grog tempered pottery (Baytown Plain). The pottery was found in a variety of feature contexts within the mound, as described in Table 5-1.

Absorbed Residue Analysis

Absorbed residue analysis involves extraction of compounds absorbed within the ceramic matrix of a potsherd through cooking or other pot use. Residues generally result from slow absorption of chemical components of resources processed in a pottery vessel over its use-lifetime. In order to be preserved within the matrix of the pottery, components must be hydrophilic enough to dissolve in cooking liquid, but hydrophobic enough that they do not wash out of the pot during archaeological deposition. Lipids chemically fit this description most closely, and therefore lipids make up the large majority of chemical components in absorbed pottery residues.

In absorbed residue analysis, compounds extracted from the residues are analyzed chemically. One preferred method of analysis, and the one used in this study, is gas chromatography/mass spectrometry (GC/MS). This technique allows for separation of complex mixtures of compounds and identification of a wide range of compounds by means of the chemical fingerprint, or mass spectrum, of each separated molecule type. Once compounds have been identified, the analyst tries to identify their source or sources, keeping in mind that the lipids probably underwent some degree of hydrolysis, oxidation, or microbial breakdown over the period of archaeological deposition.

In general, all lipid residues can be interpreted using two major techniques: biomarker and relative compound abundances. Biomarkers are compounds unique to a certain resource or class of resources, and the biomarker approach allows identification of specific resources or classes of resources. Sitosterol, a plant sterol, is a biomarker for plants. The relative abundance approach utilizes relative amounts of various common compounds to give general interpretations about the composition of the residue. For example, the presence of large abundances of unsaturated fatty acids often indicates that a residue originated primarily in either plant or marine resources. Both the biomarker and the relative abundance approach were used while interpreting residues in this study.

The goal of the residue analysis portion of this study was to determine the presence and quality of residues from the Graveline Mound pottery sample and to see if information from the pottery residues could throw light on pottery use at this unusual early Late Woodland platform mound.

Methods

Absorbed residues were extracted using the methodology published by Evershed et al. (1990). Sherds were cleaned with a solvent-washed model drill to

Table 5-1. UNCW Residue Lab Number, Sherd Provenience and Description, Residue Interpretation, and the Reasons for Each Interpretation.

Sample	Provenience and Description	Interpretation	Reason
RL 212	Graveline Sample 35A Unit 4, Fea 4B shell concentration. Rim sherd of plain, grit tempered vessel with well-defined collar and constriction.	Lots of residue, not particularly intact, plant resin present, wide range of plant/fish and meat resources, but more plant or fish resources present, evidence of decomposing trash, sunscreen contamination.	No triacylglycerols, triterpenoids, cholesterol and plant sterols present, wide range of alkanols, fatty acids fairly unsaturated suggested primarily plant or fish resources, cyclic octaatomic sulfur in TLE, acetylsalicylic acid and galoxolide contamination.
RL 213	Sample 38A Unit 5, Z. 5, L. B2 Fea 10A, midden. Plain, grit tempered body sherd.	Not that much residue, not that intact, mixture of plant/fish and meat resources, but primarily plant/fish, with possible fish roe or fatty tissue from brain or liver present; fish roe seems more likely.	No triacylglycerols, cholesterol and plant sterols, fatty acids highly unsaturated, including $C_{20:4}$ and $C_{20:1}$, not many alkanes.
RL 214	Sample 41A, Unit 5, Z. 5, L. B2, Fea 9A, midden. Rim sherd of plain, grit tempered vessel.	Not that much residue, not that intact, plant resin present, wide range of plant/fish and meat resources, sunscreen and bug spray contamination.	No triacylglycerols, triterpenoids present, cholesterol and plant sterols present including avenasterol, fatty acids wide-ranging and fairly unsaturated, wide range of alkanols including OL_{32} but not including OL_{16}, parsol MCX, DEET contamination present.
RL 215	Sample 44A, Unit 5, Z. 5, L. B2, Fea 9A, midden. Plain, grit tempered body sherd.	Not that much residue, not that intact, mixture of plant and meat resources, sunscreen and bug spray contamination.	No triacylglycerols, small amounts of cholesterol and plant sterols present, fatty acids highly unsaturated, alkanols have odd bimodal distribution—$OL_{12\text{-}14}$ and traces of $OL_{22\text{-}26}$, indicating fish probably not present, parsol MCX and DEET contamination present.
RL 216	Sample 48A, Unit 5, Z. 5, L. B2, Fea 8A, midden. Plain, grit tempered body sherd.	Lots of residue, primarily plant and/or fish resources, with some meat present, fish roe or fatty tissue from liver or brains possible; could be either one.	Not triacylglycerols, fatty acids unsaturated, including $C_{20:4}$ and $C_{20:1}$, cholesterol and large quantities of plant sterols present, including avenasterol, alkanol fraction primarily OL_{16} and OL_{18}.
RL 217	Sample 59A, Unit 4, L. P1. Plain grit tempered body sherd.	Extremely unusual residue; moderate amount of very intact residue comprised of a mixture of non-pine plant resin, lots of pine resin, possible fish roe or fatty tissue from brain or liver present; fish roe seems more likely, and unknown but unusual compounds. Sherd underwent burning or sooting, some sunscreen and bug spray contamination present.	Triacylglycerols present, triterpenoids present, strange heavy compounds in sterol region—couldn't identify them, plant sterols present, no cholesterol, DDHA, DHA, palustric acid, pimaric and isopimaric acid present, fatty acids very unsaturated included $C_{20:4}$, wide range of alkanols with OL_{16} and OL_{18} most abundant, anthracene series in N, homomenthyl salicylate and DEET contamination.
RL 218	Sample 66A, Unit 4, L. P2, Fea 48, shell concentration. Plain, grit tempered body sherd.	Not that much residue, fairly intact, mixture of plant/fish and meat resources, possibly primarily plant, small amount of pine resin present, small amount of bug spray and sunscreen contamination.	Diacylglycerols but no triacylglycerols, cholesterol and plant sterols present, fatty acids moderately unsaturated, wide range of alkanols, trace of DHA, salicylate and DEET contamination.
RL 219	Sample 61A, Unit 8, Z. 5, L. A, midden. Plain, grit tempered base sherd, concave base.	Fair amount of residue present, not that intact, wide range of plant/fish and meat resources present, probably primarily plant, sunscreen and bug spray contamination.	No triacylglycerols or diacylglycerols, cholesterol and plant sterols present, fatty acids look more plant-based with longer-chain fatty acids than other residues, moderately wide range of alkanols, OL_{16} and OL_{18} most abundant, homomenthyl salicylate and DEET contamination.
RL 220	Sample 79A, Unit 8, Z. 5, L. C, Fea 15A, shell concentration. Plain, grit tempered base of vessel—possibly bottle?	Small amount of fairly intact residue, mixture of plant/fish and meat resources, but primarily plant or fish, with possible fish roe or fatty tissue from brain or liver present; fish roe seems more likely.	Triacylglycerols present, large amounts of plant sterols and some cholesterol present, fatty acids very unsaturated, including $C_{20:4\text{-}1}$, wide range of alkanols with OL_{16} and OL_{18} most abundant.
RL 221	Sample 165A, Unit 10, Z. 5, L. C, Fea. 37A, shell concentration. Plain, grit tempered body sherd.	Large amount of fairly degraded residue, mixture of plant/fish and meat resources, plant resin present, probably some soil contribution.	No triacylglycerols, triterpenoids present, cholesterol and plant sterols present including avenasterol, cholestanol present, indeterminately unsaturated fatty acids, wide range of alkanols with OL_{12} most abundant, AL_{29} present.
RL 222	Sample 187A, Unit 10, Z. 5, L.E, Fea 37A, shell concentration. Plain, grit tempered body sherd.	Fair amount of residue, not that intact, mixture of wide range of primarily plant and meat resources, plant resin present, some soil contribution, possible fish roe or fatty tissue from brain or liver present; fish roe seems most likely.	No triacylglycerols, cholesterol and plant sterols present, including avenasterol, coprostanol present, possible triterpenoid present, wide range of unsaturated fatty acids including $C_{20:4}$, wide range of alkanols with OL_{16} and OL_{18} most abundant, and OL_{32} present.
RL 223	Sample 187B Soil Sample, Unit 10, Z. 5, L. E, Feature 37A shell concentration. Brown sandy loam containing a lot of shells, associated with RL 222.	Fungal load, non-pine plant resins present, pine resin present, some fertilizer or manure present.	No triacylglycerols or diacylglycerols present, LOTs of mystery 316 compound present, wide range alkanols present, with OL_{24} most abundant and OL_{32} present, triterpenoids present, but not the one in 222, DHA present, sitosterol, stigmasterol, cholesterol present but not campesterol, ergosterols, coprostanol and cholestanol present, amide, p-ethoxy benzoic acid ethyl ester.

remove surface impurities, and crushed in a solvent-washed mortar and pestle. An internal standard of 10µL n-tetratriacontane was added, and the sherd was extracted with approximately 10 mL of 2:1 v/v chloroform/methanol per 2 g of powdered sherd.

Once sampled, each sample vial was ultrasonicated for 20 min x 2, with a 10 min cooling period. Samples were centrifuged at 2000 rpm for 20 min, the supernatant was pipetted into solvent-washed vials, and samples were then filtered through solvent-washed 220-440 mesh amorphous silica gel to remove the remaining fine clay particles from the residue-impregnated solvent.

The clean solvent/residue mixture was evaporated under N_2 gas and mild heat to dryness. An aliquot of this residue was derivatized with approximately 200 µl N,O-bis(trimethylsilyl)fluoroacetamide (BSTFA) +1% trimethylchlorosilane (TMCS) and analyzed in a Fisons 8065 gas chromatograph interfaced to a Trio 1000 mass spectrometer, using a DB-1HT 15 m x .32 mm column with .1µl film thickness and with a column head pressure of 7.5 psi. Temperature was held at 50˚ for 2 min, then ramped at 10˚/min until 350˚, followed by a 10 min hold at that temperature. Total runtime was 42 min. Prior to analysis each day, the GC/MS was tuned with DFTPP to EPA standards to ensure consistent and precise mass spectrometry. This portion of the analysis is called the total lipid extract (TLE), since it contains all the components in the residue without saponification. Residue samples were also separated into neutral and fatty acid (FA) fractions for better quantification and analysis of the various compounds in the residue.

Approximately 60 percent of the total residue extracted from sherds was transferred to solvent-washed culture tubes, then saponified with 2 mL NaOH/methanol and heated at 75˚ for 1 h. The saponified residues were then extracted with 3 x 2 mL hexane, which was blown down. This extraction became the neutral fraction and contained compounds, such as alkanes, long-chain alcohols, sterols, and terpenoids. This fraction was stored under N_2 gas and refrigeration until analyzed using the same instrument and temperature program as the TLE.

The remainder of the residue, containing primarily free fatty acids, was acidified to pH 3-4 with 2 M HCl, and extracted with 3 x 2mL hexane into cleaned and solvent-rinsed culture tubes. This solution was evaporated, stored under N_2 and refrigerated until analyzed. Approximately half of the fatty acid fraction was derivatized to trimethylsilyl esters with BSTFA and analyzed using the same instrument and column as the TLE, but with a temperature program ramping from 50-150˚ C at 15˚C min^{-1}, followed by 150-250˚ C at 3˚ C min^{-1}, and a 10 min hold at 250˚ C.

Blanks were run in parallel with the archaeological samples and used to control for laboratory contamination. Blanks were generally clean for this project. Samples were run in a semi-blind fashion; each sample was assigned a lab number for analysis and the true provenience of a sample was never used until interpretation began. Lab numbers and original sample numbers, as well as a basic interpretation of all residues in the project with comments and sample type, is given in Table 5-1.

How to Interpret a Lipid Residue

When interpreting a lipid residue, several different classes of compounds are examined. Fatty acid relative abundances, particularly in terms of chain length and saturation, are examined to determine the general overall composition of the residue, as described above. Saturation is the number of double bonds present in a carbon chain. Fatty acids are generally written in the form $_{\text{Carbon chain length: \# of double bonds}}$. Fatty acids most commonly occur linked to a glycerol backbone in the form of triacylglycerols, which are the most abundant constituents of fats and oils in nature. Free fatty acids, although present in normal lipids, occur in only small amounts and tend to dissolve in water more easily than the glycerol forms (Evershed 1993; Evershed, et al. 1992) and many others.

In most cases, fatty acids with more unsaturated fatty acids, particularly $C_{16:1}$ and $C_{18:1}$, and more $C_{16:0}$ than $C_{18:0}$, tend to originate in either vegetables or fish. Fatty acids with less unsaturated fatty acids and more $C_{18:0}$ than $C_{16:0}$ tend to be comprised primarily of meat lipids. Odd chain fatty acids often originate in bacterial or fungal lipids. Also, fatty acids with shorter chain lengths tend to wash out of absorbed residues earlier, while more unsaturated fatty acids are more prone to hydrolysis or oxidation. Due to these and other issues described at length in other publications (Evershed 2008; Reber and Evershed 2004), this preliminary interpretation of fatty acid composition must be paired with interpretation of other compound types. In most cases, a residue containing highly unsaturated fatty acids can only be interpreted as 'primarily plant/

fish' in origin, due to the difficulty of distinguishing between unsaturated fatty acids originating in plants and fish. In this project, this is a particular handicap.

Sterols are one of the compound types most likely to produce general category biomarkers. Cholesterol is a biomarker for the presence of meat resources, while a series of plant biomarkers, including sitosterol, campesterol, and stigmasterol, indicate the presence of plant resources. The presence of cholesterol or plant sterols can help support a fatty acid composition interpretation, as well as definitively determining whether plant and meat resources were present in the lipid residue. Unfortunately, sterols are not as common as fatty acids and are not always present. When they are present, however, they provide valuable and clear information concerning vessel contents. In this study, every sample contained sterols, some rather obscure.

Terpenoids are another compound type particularly useful in interpreting residues. They are plant biomarkers. Pentacyclic triterpenoids are commonly found in non-pine plant resins and surface waxes (Glastrup 1989; Harborne and Tomas-Barberan 1991; Langenheim 2003). Diterpenoids, particularly those with pimarane and abietane carbon skeletons, are often biomarkers for pine resin. Labdane diterpenoids occur both in pine resins and in resin from other plants, and thus can be used as a category biomarker for plant resin, but not for any particular class of plants.

Alkanols are long-chain alcohols; carbon chain lengths of 12-34 are often found in lipid residues. Alkanols often originate in wax esters, linked to alkanes. As such, alkanols give valuable information concerning the presence of waxes in the lipid residue. Waxes occur in all resource types, but even-chain alkanols are particularly prevalent in higher plant waxes (Kolattukudy 1976). In this report, alkanols are notated by the form $OL_{\text{chain length}}$. By carefully examining references on plant waxes, sometimes a plant resource or a range of resources may be identified partially through alkanol composition. For example, very long-chain alkanols, such as OL_{32} are rare in most plants, but relatively common in panicoid grasses (Bianchi et al. 1984; Reber et al. 2004). Panicoid grasses are a large subfamily of about 2000 grasses, including maize and many other grasses from around the world. The presence of this compound indicates that a panicoid grass or grasses may be present in the residue. Additionally, most (but not all) plant waxes consist of a small number of alkanols esterified with a range of alkanes, or of a range of alkanols with a gradual increase in abundance of chain length to the most abundant alkanol, followed by a gradual decrease in chain length abundances (Kolattukudy 1976). Residues containing a wide range of alkanols, particularly those of very different chain length and not fitting either of these patterns, probably indicate that more than one plant resource is present.

Alkanes are unsaturated carbon chains, usually originally found linked to alkanols in waxes, or to sterols. Alkanes are described in this paper in the form $AL_{\text{carbon chain length}}$. Like alkanols, they occur in all resource classes. Higher plant alkanes usually have odd carbon chains; highly branched alkanes often indicate microbial or fungal breakdown of the original wax ester. Furthermore, the alkane AL_{29} can be used as a biomarker for higher plant epicuticular wax (Evershed 2008: 898). They can also be used to determine whether more than one resource source is present in a lipid, similarly to the way alkanols are used.

It is important to remember that all residue interpretation must be done with some knowledge of the local biome of the site being investigated, or at least with the awareness that such knowledge is needed. For example, coniferous resins can be easily identified in a residue through the presence of abietane and pimarane diterpenoids, which are well-established biomarkers for this type of resin. Determining the source of such a resin, however, requires a more specific knowledge of what coniferous trees would be found near the site and likely to be utilized by the ancient inhabitants. From a residue standpoint, a coniferous resin from upstate New York and one from Mississippi look basically identical, but the interpretation of the source and use of the resin would almost certainly be different in the two places, based on environmental and cultural considerations. This is why collaboration between residue analysts, site archaeologists, and paleoethnobotanists is so crucial to a successful residue analysis.

Results and Discussion

Of the eleven absorbed residues analyzed, interpretable residues were found in all of them. Only three of the eleven contained residue described as 'fairly intact,' however, meaning that di- and/or tria-

cylglycerols were present in the TLE portion of the residue in at least trace amounts. The intact residues were RL 217 (Sample 59A), RL 218 (Sample 66A), and RL 220 (Sample 79A).

Ten of the eleven archaeological residues from the site were comprised of lipids derived from plant and/or fish with some meat present, as indicated by the presence of both plant sterols and small amounts of cholesterol in the neutral fractions (Table 5-2) and the general fatty acid profile. Some of these residues contained a wider range of resources than others, but this mixture seems to have been commonly processed in the pots analyzed from Graveline.

One residue was unlike the more common mixture; RL 217 was an extremely unusual residue, discussed below. In general, plant resources seem to have been a major contributor to the archaeological residues from this site, based on the fact that plant sterols were present in all archaeological residues, some in large quantities (Table 5-3).

Six of the eleven sherds contained bug spray and/or sunscreen contamination, as interpreted by the presence of DEET, salicylates (common ingredients in many sunscreens) or Parsol (another common sunscreen ingredient). This made interpreting the residues tricky, since different sunscreens can be assumed to contain differing inactive ingredients that might mimic potential archaeological compounds. Furthermore, fatty acids present in sunscreen or bug spray would not be separate in this type of analysis from archaeological fatty acids, and so the contamination probably led to a shift in fatty acid interpretations towards a more plant-based conclusion. This is assuming that most sunscreens and bug sprays contain plant-based or unsaturated oils rather than animal-based or saturated oils. A quick scan of popular brands of sunscreens and bug sprays suggests that this is the case. Unfortunately, this laboratory is not familiar with the appearance of aloe vera residues, and therefore we do not know whether all of the triterpenoid compounds in the samples are from archaeological sources or from sunscreen contamination. Aloe is probably the most likely source of such a triterpenoid contamination.

It is also worth noting that the sunscreen and bug spray contamination was noticeable even after all the sherds were cleaned with a model drill bit prior to sampling. It therefore looks as though sunscreen absorbs easily into pottery and may be a problematic form of contamination in crews that regularly apply sunscreen (as they should). Residue samples taken in the field should thus ideally be taken with a clean trowel or when wearing gloves. [Editors Note: These procedures were followed in the field, but apparently sweaty archaeologists "drip"].

Highly Unsaturated Fatty Acids, Possibly Deriving from Fish

Five of the eleven archaeological residues—RL 213 (Sample 38A), 216 (Sample 48A), 217 (Sample 59A), 220 (Sample 79A), and 222 (Sample 187A)—contained an unusually high abundance of the polyunsaturated fatty acid $C_{20:4}$. It appears to match most closely with arachidonic acid ($C_{20:4}$ w-6), although the position of the double bonds can be difficult to determine using straight mass spectrometry, since $C_{20:4}$ w-3 is also a common unsaturated fatty acid. Its presence is interesting because such highly unsaturated fatty acids almost never survive in the archaeological record. This fatty acid was often, but not always (see Table 5-3) present with other 20-carbon unsaturated fatty acids, such as $C_{20:3}$ and $C_{20:1}$. Arachidonic acid is an unusual fatty acid that is generally found in two major sources: in fish oil (particularly in fish roe wax) (Kolattukudy 1976), and also in the brain, liver, and other fatty organs of mammals (Nagy et al. 1969). Normally, it is not possible to determine where this polyunsaturated fatty acid originated (Reber 2009). In this project, however, the faunal record may allow us to determine the source of the $C_{20:4}$ in at least some of the residues.

In four of the five residues (RL 213, 217, 220 and 222) containing this compound from Graveline Mound, the fatty acids were remarkably unsaturated (see Table 5-3) and were interpreted as originating primarily from plant or fish resources. In one of these residues (RL 217, discussed in detail below) there was no cholesterol present at all. Given the location and faunal record from Graveline Mound, which is comprised almost entirely of fish, it seems probable that the $C_{20:4}$ from these four residues originated in fish or fish roe oil. This may be the case for RL 216 also, but since the fatty acid composition is not as unsaturated as the other four samples, it is less probable.

In this report, then, $C_{20:4}$ will be used to provide an interpretation of fish roe or possible liver or brain tissue, with 'fish' seeming the most likely interpretation for the four residues that are most highly unsaturated.

Table 5-2. Percent of Total Lipid Extract Fraction for Each Compound in Each Absorbed Residue, with the Compounds Organized by Type and Then by Carbon Chain Length. Diacylglycerols (DAGs) and triacylglycerols (TAGs) cannot be easily identified using straight mass spectrometry, and so these are identified by the elution time, which should track roughly with increasing chain length. The soil sample, RL 223, is separated from the archaeological residues by a thicker line.

Compound	RL 212	RL 213	RL 214	RL 215	RL 216	RL 217	RL 218	RL 219	RL 220	RL 221	RL 222	RL 223
$C_{12:0}$	-	1	1	-	3	-	-	-	-	-	-	-
$C_{13:0}$	-	-	-	-	-	-	-	-	-	-	-	-
$C_{14:0}$	-	3	-	-	-	1	2	-	4	1	2	1
$C_{15:0}$	1	1	-	-	-	-	-	-	-	1	2	-
$C_{16:1}$	-	-	-	-	-	-	-	-	6	-	1	-
$C_{16:0}$	18	15	9	4	17	9	24	-	28	23	35	2
$C_{17:0}$	3	1	1	-	-	-	3	-	1	4	3	-
$C_{18:2}$	-	3	11	-	12	-	-	-	1	-	-	-
$C_{18:1}$	2	4	5	-	6	6	3	2	9	-	8	1
$C_{18:0}$	19	15	17	4	17	14	27	23	21	33	24	1
$C_{19:0}$	1	-	1	-	-	-	1	1	-	2	1	-
$C_{20:0}$	3	-	2	-	-	-	2	15	-	5	3	-
$C_{21:0}$	-	-	-	-	-	-	-	1	-	1	-	-
$C_{22:0}$	1	-	2	-	-	-	1	10	-	3	1	-
$C_{23:0}$	-	-	1	-	-	-	-	1	-	1	-	-
$C_{24:0}$	-	1	1	-	-	1	1	3	-	1	-	-
$C_{26:0}$	-	1	-	-	-	-	-	-	-	-	-	-
C_{16}br	-	1	-	-	-	-	-	-	1	-	-	-
C_{17}br	1	1	1	-	-	-	1	1	-	1	5	1
C_{18}br	-	1	-	-	-	-	-	-	-	6	-	-
C_{19}br	1	1	1	-	-	-	-	-	-	4	-	-
C_{20}br	-	-	-	-	-	-	-	-	-	1	-	-
MAG 14	-	-	-	-	-	-	1	-	-	-	-	-
MAG 16:1	-	-	-	-	-	-	-	-	1	-	-	-
MAG 16	2	1	1	-	1	1	4	1	1	1	1	-
MAG 17:1	-	-	-	-	-	-	-	-	-	-	-	-
MAG 18:1	-	-	-	-	-	-	-	-	1	-	1	-
MAG 18	1	1	3	1	3	1	2	1	1	-	1	1
TAG 30.14 (16:1, 16:1, 16)	-	-	-	-	-	-	-	-	1	-	-	-
Wax? 20.97	-	-	-	-	-	-	-	-	-	-	-	1
Cyclic octaatomic sulfur	26	-	-	-	-	-	-	-	-	-	-	-
Acetylsalicylate	5	-	-	18	-	-	2	-	6	-	-	-
Acetylsalicylic acid	2	3	3	8	9	-	-	-	-	-	-	1
p-ethoxy benzoic acid ethyl ester	-	-	-	18	-	-	-	-	-	-	-	3
Homomenthyl salicylic acid	-	-	-	-	4	1	-	1	-	-	-	-
Parsol MOX (Sunscreen)	-	-	-	1	-	-	-	-	1	-	-	-
DEET	-	-	1	1	-	3	-	3	-	-	-	-
Tetramethyl phenanthrene	-	-	-	-	-	3	-	-	-	-	-	-
Isopimaric acid	-	-	-	-	-	2	-	-	-	-	-	-
Pimaric acid	-	-	-	-	-	2	-	-	-	-	-	-
Palustric acid	-	-	-	-	-	1	-	-	-	-	-	-
Didehydroabietic acid	-	-	-	-	-	2	-	-	-	-	-	-

Table 5-2 (continued).

Compound	RL 212	RL 213	RL 214	RL 215	RL 216	RL 217	RL 218	RL 219	RL 220	RL 221	RL 222	RL 223
Dehydroabietic acid	-	-	-	-	-	17	-	-	-	-	-	1
Diterpenoid 14.96	-	-	-	-	-	1	-	-	-	-	-	-
CAS 138-43-4	-	-	-	-	-	-	-	5	-	-	-	-
Isomultiflorenone?	-	-	1	-	-	-	-	-	-	-	-	-
Coprostanol	-	-	-	-	-	-	-	-	-	-	-	1
Cholesterol	-	2	-	-	-	-	-	-	-	-	-	2
Campesterol	-	7	5	3	1	2	1	1	3	-	1	1
Stigmasterol	-	-	1	-	1	-	-	-	-	-	-	2
Sitosterol	-	3	4	-	5	-	-	1	2	-	-	4
Cholestanol	-	-	-	-	-	-	-	-	-	-	-	1
D5-Avenasterol	-	-	2	-	3	-	-	-	-	-	-	-
Benzo(k)fluoranthene	-	-	-	-	-	1	-	-	-	-	-	-
Benzo(e)fluoranthene	-	-	-	-	-	1	-	-	-	-	-	-
Tribenzoanthracene?	-	-	-	-	-	4	-	-	-	-	-	-
OL_{12}	1	-	-	-	-	-	-	-	-	-	-	-
OL_{14}	1	-	-	1	1	-	-	1	1	-	-	-
OL_{16}	1	-	-	-	-	-	-	-	-	1	-	1
OL_{18}	1	-	1	-	1	1	2	-	1	-	2	2
OL_{22}	-	-	-	-	-	-	-	-	-	-	-	1
OL_{24}	-	1	-	-	-	-	-	-	-	-	1	3
OL_{26}	-	1	1	-	-	-	-	-	-	-	-	2
OL_{28}	-	-	-	-	-	-	-	-	-	-	1	1
OL_{30}	-	-	-	-	-	-	-	-	-	-	1	2
OL_{32}	-	-	-	-	-	-	-	-	-	-	1	-
$AL_{17:1}$	-	-	-	2	-	-	-	-	-	-	-	1
AL_{17}	-	1	1	2	-	-	-	-	1	-	-	-
$AL_{18:1}$	-	-	-	1	-	-	-	-	-	-	-	-
$AL_{19:1}$	-	-	-	9	2	-	-	2	1	-	-	2
AL_{19}	-	-	-	-	-	-	-	-	-	-	-	1
$AL_{21:1}$	-	-	-	1	-	-	-	-	-	-	-	1
AL_{29}	-	-	-	-	-	2	6	-	-	-	1	-
AL_{31}	1	-	-	-	-	-	2	-	-	-	1	1
AL_{17}br	-	-	1	5	1	-	-	-	-	-	-	2
AL_{18}br	1	1	2	7	2	-	-	1	2	-	-	4
$AL_{19:1}$br	-	-	-	-	-	-	-	-	-	1	-	-
AL_{19}br	-	2	4	1	-	-	1	-	-	-	1	-
AL_{20}br	-	1	1	1	1	-	1	-	-	-	-	1
AL_{21}br	-	-	-	-	1	-	-	-	-	-	-	-
AL_{22}br	-	-	-	1	1	-	1	1	-	-	-	1

Table 5-2 (continued).

Compound	RL 212	RL 213	RL 214	RL 215	RL 216	RL 217	RL 218	RL 219	RL 220	RL 221	RL 222	RL 223
$AL_{23:1}$br	-	-	-	-	-	-	-	-	-	-	-	1
AL_{24}br	-	-	-	-	-	-	-	-	-	-	-	1
AL_{25}br	-	-	-	-	1	-	-	-	-	-	-	1
?6.79	-	6	-	-	-	-	-	-	-	-	-	-
?9.03 cyclo AL	-	-	-	1	-	-	-	-	-	-	-	-
?10.03 Very branchy	-	-	-	-	-	-	-	-	-	-	-	1
?10.71	-	-	-	-	-	-	1	-	-	-	-	-
?10.73 ethanone?	-	-	-	-	-	-	-	-	-	-	-	1
?10.76	-	-	-	-	-	1	-	6	-	1	1	-
?11.11 Cyclo AL	-	-	2	2	1	-	1	-	1	-	-	1
?11.68	-	-	-	-	-	-	1	-	-	-	-	-
?11.75	-	-	-	-	-	-	-	-	-	1	-	-
?11.82	-	-	-	-	1	-	-	-	-	-	-	-
?12.93 cyclo AL	-	-	2	1	2	-	-	-	-	-	-	2
?13.07	-	-	-	-	-	-	1	-	-	-	-	1
?13.81	-	-	-	-	-	-	-	-	-	-	-	1
?14.39	-	-	-	-	-	-	-	-	-	-	-	1
?14.96 cyclo AL	-	-	-	-	-	-	-	-	-	-	-	1
?14.81	-	-	-	-	-	-	-	-	-	-	-	1
?15.65	-	-	-	-	-	1	-	-	-	-	-	-
?15.93	-	-	-	-	-	1	-	-	-	-	-	-
?16.00 diol or triol	1	-	-	-	-	-	-	-	-	-	-	-
?16.27	-	-	-	-	-	-	-	14	-	-	-	-
?16.48	-	-	-	-	-	1	-	-	-	-	-	-
?17.34 amide	-	-	-	-	-	-	-	-	-	-	-	16
?18.22	-	-	-	-	-	1	-	-	-	-	-	-
?18.62	-	-	-	-	-	3	-	-	-	-	-	-
?18.79	-	-	-	-	-	1	-	-	-	-	-	-
?19.04	-	-	-	-	-	3	-	-	-	-	-	-
?19.64 Sterol	-	-	1	-	-	-	-	-	-	-	-	-
?19.71	-	-	-	-	1	-	-	-	-	-	-	-
?19.79	-	-	-	-	-	1	-	-	-	-	-	-
?19.84	-	2	-	-	-	-	-	-	-	-	-	-
?20.27	-	-	-	-	-	1	-	-	-	-	-	-
?20.52	-	4	-	-	-	-	-	-	-	-	-	-
?21.02 Triterpenoid	-	-	-	-	-	-	-	-	-	-	-	1
?21.11 diol or triol	-	-	1	-	-	-	-	-	-	-	-	-
?21.76 Triterpenoid	-	-	-	-	-	-	-	-	-	-	-	1
?22.04 Triterpenoid	-	-	-	-	-	-	-	-	-	-	-	1
?22.37	-	-	-	-	-	2	-	2	-	-	-	12
?22.45	-	11	-	-	-	-	1	-	-	1	-	-
?22.53	-	-	3	-	-	-	-	-	-	-	-	-
?22.69	1	-	-	2	2	-	-	-	-	-	-	-

Given the difficulty in distinguishing between unsaturated plant and fish fatty acids described above, almost any residue described as containing highly unsaturated fatty acids could have originated in fish resources as well as plant. The ubiquity of plant sterols in residues from this site, however, indicate that plant resources were processed in all archaeological samples analyzed from this site.

Special-Use Vessel

RL 217, Sample 59A, was a plain grog tempered body sherd that physically appeared no different from the other sherds in the study. Its residue, however, was unique in this study. It did not contain cholesterol, and was not interpreted as a mixture of meat and plant/fish resources. It contained a group of related pimarane diterpenoids, indicating a coniferous resin, as well as a group of triterpenoids indicating a non-coniferous plant resin. Plant sterols were extremely abundant, and fatty acids were highly unsaturated, including $C_{20:4.}$ This residue was comprised primarily of pine and non-pine plant resins, with possible fish or organ-meat presence (probably fish, as described above) that underwent burning or sooting.

The presence of several polyaromatic compounds common to soot or burned wood (see Table 5-3) indicated the presence of sooting or burning. Such compounds probably originated in soot from a wood fire, but these compounds were not present in any other residues from the site. They are also not usually found in such large amounts if only traces of soot were found in the residue; this residue was exposed to measurable quantities of burning wood or wood smoke. There were also a large number of unknown compounds that could not be identified. They may have originated from one of the plant resin resources, or from another unknown resource. In any case, this residue looks completely different from all others in the study and the vessel containing the residue can probably be interpreted as some sort of special-use vessel.

Plant Resins

Triterpenoids, indicating the presence of non-pine plant resins, were present in five of the residues analyzed in the study, including RL 217 mentioned above (Sample 59A); RL 218 (Sample 66A), 220 (Sample 79A), 221 (Sample 165A), and 222 (Sample 187A). Triterpenoids were generally present in small amounts, and the only triterpenoid identified in the study was amyrin, found in RL 217 (discussed above). Since triterpenoids can originate in many different types of non-pine plant resources, their presence supports the importance of plants in the resources processed in the Graveline site pottery.

Pine resins, indicated by the presence of diterpenoids, were present in two of the residues analyzed in the study: RL 217 as mentioned above, and RL 213 (Sample 38A). In the case of RL 213, the only diterpenoid present was dehydroabietic acid (DHA), the very stable diterpenoid that tends to be the oxidative byproduct for both abietane and pimarane diterpenoids. As a result, we can interpret RL 213 as containing only a small amount of highly oxidized pine resin. In such cases, the pine resin may have been used as a flavoring, the pot may have been used temporarily to process pine needles for medicinal or other purposes, or some pine could have fallen in the vessel by accident (Reber and Hart 2008). The DHA in RL 213 could also have originated from the soil; this compound was present in the soil sample analyzed from Graveline. RL 217, however, since it contained so many different diterpenoids, clearly contained pine resin in large quantities.

Soil Contribution

One soil sample, RL 223, associated with RL 222, was analyzed for this study. Unsurprisingly, there did seem to be some interaction between soil and sherd, both between RL 222 and 223 specifically, and in other sherds. All sherds in this project contained varying amounts of an unknown heavy compound that eluted at about 21.23. This compound seems to have originated in the soil on the site; it is present in measurable quantities only in the soil sample. Likewise, many of the sherds in the project contained an unknown that strongly resembled benzodioxole, a common insecticide (see Table 5-3). This compound is present in large quantities in the soil sample, and probably moved from the soil into the sherds.

Similarly, the soil sample also contained both cholestanol and coprostanol, which are biomarkers for fertilizer and manuring and which are often found in soil that was once farmed (Bull et al. 2002). Coprostanol was also identified in RL 222, and cholestanol in RL 221 (see Table 5-3). It seems most parsimonious to argue that these compounds originated in the soil and washed into the residues.

Hopanes were identified in RL 214 and 221 (see-Table 5-3); these types of compounds were not iden-

Table 5-3. Percentage of Fatty Acid Fraction for Every Residue in This Study. Compounds are listed by compound class, and then by chain length. The soil sample, RL 223, is separated from the archaeological residues by a thicker line.

Compound	RL 212	RL 213	RL 214	RL 215	RL 216	RL 217	RL 218	RL 219	RL 220	RL 221	RL 222	RL 223
$C_{9:0}$	-	-	-	-	-	-	-	1	-	-	-	-
$C_{12:1}$	-	-	-	1	-	1	-	-	-	-	-	-
$C_{12:0}$	-	2	3	3	2	4	2	1	1	1	1	1
$C_{13:0}$	-	-	-	-	-	-	1	-	-	-	-	1
$C_{14:1}$	1	2	1	3	2	16	2	-	1	-	4	-
$C_{14:0}$	4	2	3	4	2	6	5	2	1	1	5	3
$C_{15:0}$	-	-	-	-	-	-	2	1	-	1	2	2
$C_{16:1}$	8	12	3	14	15	9	3	3	40	-	5	6
$C_{16:0}$	36	18	17	16	20	12	30	12	16	28	35	15
$C_{17:0}$	3	1	2	-	1	1	2	2	-	3	2	2
$C_{18:2}$	1	6	14	3	15	-	-	1	1	-	1	3
$C_{18:1}$	9	28	10	38	12	21	6	9	29	15	15	12
$C_{18:0}$	24	11	22	8	20	2	22	20	4	30	17	4
$C_{19:1}$	-	-	-	-	-	-	-	-	-	-	-	1
$C_{19:0}$	2	-	1	-	-	-	-	1	-	1	-	1
$C_{20:4}$	-	-	-	-	1	2	-	-	1	-	1	-
$C_{20:3}$	-	-	-	-	-	-	-	-	2	-	-	-
$C_{20:1}$	-	1	1	-	-	-	-	-	1	-	-	1
$C_{20:0}$	3	-	3	-	-	-	1	11	-	3	2	1
$C_{21:0}$	-	-	1	-	-	-	-	1	-	1	-	-
$C_{22:1}$	-	-	-	-	-	-	-	-	-	-	-	3
$C_{22:0}$	1	-	2	-	-	-	-	8	-	2	1	2
$C_{23:0}$	-	-	1	-	-	-	-	1	-	1	-	-
$C_{24:0}$	-	-	1	-	-	-	-	3	-	1	1	2
$C_{26:0}$	-	-	-	-	-	-	-	-	-	-	-	1
C_{14}br	-	-	-	-	-	-	-	-	-	-	-	1
C_{15}br	1	1	2	-	1	1	1	1	-	1	1	3
$C_{16:1}$br	-	-	-	-	-	-	-	-	-	-	-	-
C_{16}br	-	1	2	1	-	-	2	1	-	2	2	4
$C_{17:1}$br	-	-	-	-	-	-	-	-	-	-	-	-

Table 5-3 (continued).

Compound	RL 212	RL 213	RL 214	RL 215	RL 216	RL 217	RL 218	RL 219	RL 220	RL 221	RL 222	RL 223
C_{17}br	3	3	3	1	1	1	2	2	-	5	1	3
C_{18}br	-	-	-	1	-	1	-	-	-	-	-	-
C_{19}br	1	-	1	-	-	-	-	-	-	2	-	-
C_{20}br	-	-	-	-	-	-	-	2	-	1	-	-
Palustric?? Acid	-	-	-	-	-	2	-	-	-	-	-	-
Diterpenoid 11.47	-	-	-	-	-	-	-	-	-	-	-	1
Dihydroisopimaric acid	-	-	-	-	-	1	-	-	-	-	-	-
Isopimaric acid	-	-	-	-	-	1	-	-	-	-	-	-
Dehydroabietic acid	-	-	-	-	-	13	-	-	-	-	-	2
1,1'methylene bis 4-hydroxy benzene	-	-	-	-	-	1	-	-	-	-	-	-
Dedihydrotestoster-one?	-	-	-	-	-	2	-	-	-	-	-	-
Benzodioxole?	-	1	1	3	-	-	-	4	-	1	-	3
?6.66	-	-	-	-	-	-	-	1	-	-	-	-
?8.32	-	-	-	-	-	-	-	-	-	-	-	1
?8.55	-	-	-	-	-	-	-	2	-	-	-	-
?9.04	-	-	1	-	-	-	-	-	-	-	-	-
?10.45	-	1	-	-	-	-	-	-	-	-	-	1
?13.58	-	-	-	-	-	1	-	-	-	-	-	-
?15.66	-	-	-	-	-	-	-	-	-	-	-	1
?15.94	-	-	-	1	-	-	-	-	-	-	-	-
?19.36 Amide	-	-	-	-	-	-	-	-	-	-	1	-
?20.86 Amide	-	-	-	-	-	-	-	-	-	-	-	13
?20.69	-	-	-	-	-	-	-	-	-	-	-	2
?20.94	-	1	-	-	-	-	-	-	-	-	-	-
?31.23	-	-	-	-	-	-	-	-	-	-	-	1
Methoxybenzaldehyde	-	-	1	-	-	-	-	-	-	-	-	-
Methyl ethoxybenzo-ate	-	-	-	-	-	-	-	2	-	-	-	-
DEET	-	-	-	-	-	-	-	4	-	-	-	-
Diisooctyl adipate	-	-	-	-	-	-	19	-	-	-	-	-

tified in the soil sample analyzed, but are common in soil and unusual in anthropogenic residues, as they usually originate in petroleum and its byproducts. Ideally, the associated soil samples for RL 214 and 221 would be analyzed to look for the presence of hopanes. Since these soil samples were not analyzed, however, it seems at least plausible that these compounds did wash into the soil and originated from the petroleum pollution common in modern soils, particularly near the Gulf coast. RL 212 (Sample 35A) contained cyclic octaatomic sulfur, a well-known byproduct of trash pits and rotting organic material. This compound is not unexpected in any trash or midden context, but in this case it only appeared in one residue in the study. It would be interesting in the future to analyze Sample 35B to see if the associated soil also contained this compound, which seems likely, as there was no obvious fungal signature in RL 212, and since this compound is normally found in soil and not residues.

In general, there appears to have been little interaction between soil and sherds. While triterpenoids appeared in both RL 222 (Sample 187A) and RL 223 (the associated soil sample), they were not the same triterpenoid. The soil contained a triterpenoid from non-pine leaf litter, while the archaeological residue contained a different triterpenoid derived from a non-pine leaf processed in the pot at some point. Although there were plant sterols in the soil sample, there was no campesterol in the soil, a plant sterol that appeared in all the archaeological residues (see Table 5-3). Cholesterol is present in the soil sample and in nearly all of the archaeological residues. It is worth noting, however, that cholesterol does not appear in RL 217 (Sample 59A), a fact that is important to that residue's interpretation. In general, although there was some soil contribution to archaeological residues, it can fairly easily be untangled. Interpretation of archaeological residue from Graveline Mound almost certainly reflects the contents of the pottery vessels sampled.

Conclusions

Four major conclusions can be drawn from the residue analysis of eleven sherds from Graveline Mound site. First, there are interpretable residues present in pottery from the site; all of the sherds analyzed in this study contained such residue. Although preservation is not outstanding, it is perfectly adequate for most interpretive purposes, and sterols were identified in all residues from the site.

Second, all of the residues in this study, except RL 217, contained a mixture of plant/fish and meat resources, with plants playing an important role in the residues analyzed. Since this was a consistent finding in nearly all residues sampled, this would appear to be a commonly used mix of resources in pottery from the mound.

Third, given the highly unsaturated nature of the fatty acids in many of the residues, the presence of $C_{20:4}$ in five of the eleven residues analyzed, and the importance of fish remains in the faunal collection from the site, it seems likely that fish or fish roe was processed in at least four of the five residues containing $C_{20:4}$. It therefore seems probable that a mixture of plants, fish, and small amounts of meat was commonly processed in pots from the site. This is an unusually precise level of identification for pottery sherds using only fatty acids. This finding would not be possible without complementary results from the faunal analysis.

Fourth, there does seem to be at least one special-use vessel among the sherds analyzed. RL 217 contained no meat, a large preponderance of both coniferous and non-coniferous resin, probable fish, and seems to have undergone sooting or burning. It is not clear what this vessel was used for, but it was definitely used to process different contents than the other vessels sampled in this study. This is an especially interesting conclusion because the sherd did not appear to be physically different from any of the other sherds analyzed in this project. Only absorbed residue analysis allowed the identification of this sherd as a piece of a special-use pot from the Graveline Mound site.

Chapter 6
Vertebrate Faunal Analysis

Susan L. Scott

Numerous samples from the University of Alabama's 2010 excavation of Graveline Mound site were submitted for vertebrate faunal analysis. Bones from seven excavation units were examined, including Units 1, 4, 5, 8, 9, 10 and 12. Of these, large samples of bone from mound fill came only from Units 4 (1,255 fragments), 5 (893 fragments), and 8 (4,479 fragments). A total of 7,321 fragments were analyzed, which collectively weighed less than a kilogram (916.6 g). Despite the delicacy of the fragments examined, 95 percent were identifiable, minimally, to taxonomic class, and 96 to 98 percent of them fish.

The Faunal Sample

Stratigraphic control was largely maintained during excavation, producing many features, most of them recognizable as shell concentrations of oyster and/or clam. Because some of the concentrations appeared to be rapid accumulations or even individual basket loads, many of which overlapped, bone came from aggregates of up to five different features, making analysis of independent features very difficult. For the purposes of analysis, the challenge of blended deposits was exacerbated by the quantity of fish. For that reason, and due to sample size, only three excavation units are examined in this report—Units 4, 5, and 8—and they are reported as complete units here, although notable inclusions in specific features are discussed. (Bone from these three units and the smaller samples from Units 1, 9, 10, and 12 are included in the database on file at MDAH.)

Roughly one third of the bone was recovered during excavation. The remainder was obtained from soil samples that were screened in the lab through ¼- and ⅛-inch hardware cloth. All of the ¼-inch material was analyzed, and between 20 and 100 percent of the ⅛-inch bone was analyzed, depending on the size of the sample. Such sampling makes quantification of Minimum Number of Individuals (MNI) difficult and inexact, because the sample cannot easily be extrapolated for analysis. MNI is calculated based only on the actual elements identified. Fish size via counts (NISP) and weight is, however, extrapolated for the following report. Even though the fine (1/16-inch) screen material was not processed for the report, it contained many additional fish bones, especially vertebrae less than 3 mm in diameter.

Bone preservation at the site was excellent, although many fragments were extremely friable and some fell apart if they were handled extensively. All of the remains were identified using the comparative collection at the University of Southern Mississippi, which is adequate for most taxa other than birds and marine mammals. Bird bones are provisionally identified here, until the fragments can be examined using a more comprehensive collection. One element, which is provisionally identified as dolphin, was a porous long bone with an apparently unfused epiphysis that is definitely not a terrestrial mammal, reptile or fish. With these two exceptions, all bones were identified to the most specific level possible, given the surviving morphology of the fragment. Element, side, degree of fragmentation, portion, age, and sex were recorded for birds and mammals, when possible. For fish remains, length was estimated by comparing the fragment to a range of specimens of different size. Vertebral diameter was recorded for fish vertebrae. Carnivore and rodent gnawing was noted, along with charring and the occasional butchering mark. If a fragment was notably eroded or leached, that condition was recorded in comments.

Unit 8 Sample

The largest faunal sample from the site came from Unit 8, a 2.0-by-1.0-m unit on the eastern mound flank. As the midden in the area sampled by Unit 8 was very dense, 23 soil samples were taken and are included in the analysis, contributing nearly half of the bone fragments analyzed. Total NISP for Unit 8 is 4,287, of which 1,797 came from 20-percent samples. Extrapolated NISP is more than 13,000 fragments, over 99 percent of them fish (87% extrapolated weight).

Fish Taxa

Identified taxa (Table 6-1, Figure 6-1) include mainly marine fish: shark/ray, menhaden, hardhead and gafftop catfish, jack, snapper, tripletail, king mackerel, sheepshead, mullet, flounder, and numerous marine

Table 6-1. Unit 8 Species.

	NISP	Charred	Weight (g)	MNI
Bat (Chiroptera)	1	0	0.1	1
cf. Dolphin (Delphinidae)	1	0	23.4	1
Large Mammal	14	9	2.4	-
Medium Mammal	1	1	0.1	-
Small Mammal	4	2	0.2	-
Unidentified Bird/Small Mammal	7	1	0.6	-
Small Goose (Anserinae)	1	0	5.9	1
Large Goose (Anserinae)	2	0	3.7	1
Large Duck (Anatidae)	2	0	0.7	1
Wild Turkey (*Meleagris gallopavo*)	1	0	0.5	1
Unidentified Large Bird	7	1	3.2	-
Alligator (*Alligator mississippiensis*)	2	0	43.7	1
Box Turtle (*Terrapene carolina*)	1	0	0.1	1
Pond Turtle (Aquatic Emydidae)	1	0	1.5	1
Sea Turtle (Cheloniidae/ Dermochelydae)	1	1	0.7	1
Unidentified Turtle	24	8	5	-
Snake (Colubridae)	1	0	0.1	1
Unidentified Reptile	1	0	0.4	-
Shark/Ray (Cartilagenous Fish)	3	1	0.7	1
Atlantic Sturgeon (*Acipenser oxyrhyncus*)	9	0	7	1
Gar (Lepisosteidae)	1	1	0.2	1
Shad (Clupeidae)	4	0	2.4	-
Gizzard Shad (*Dorosoma cepedianum*)	2	0	0.1	1
Gulf Menhaden (*Brevoortia patronus*)	75	5	2.1	24
Unidentified Catfish (Siluriformes)	3	0	0.1	-
Catfish (Ictaluridae)	2	0	0.1	-
Channel Catfish (*Ictalurus punctatus*)	1	0	0.1	1
Channel/Blue Catfish (*I. punctatus/furcatus*)	5	0	1.7	5
Marine Catfish (Ariiadae)	57	19	3.7	-
Sea Catfish (*Arius felis*)	66	14	4	15
Gafftop (*Bagre marinus*)	24	3	3.3	8
Finfish (Perciformes)	24	3	2.4	-
Bass (*Micropterus* sp.)	1	0	0.2	1
Largemouth Bass (*M. salmoides*)	1	0	0.1	1
Jack (Carangidae)	5	0	0.2	4
Snapper (Lutjanidae)	2	0	0.1	2
Trippletail (*Lobotes surinamensis*)	1	0	0.7	1
King Mackerel (*Scomberomerus cavalla*)	1	0	0.1	1
Sheepshead (*Archosargus probatocephalus*)	17	2	3	6
Marine Drum (Scianidae)	22	0	3.2	-
Sea Trout (Cynoscion spp)	48	1	6.7	8
Spot (*Leiostomus xanthurus*)	3	0	0.1	2
Croaker (*Micropogonius undulatus*)	74	3	5.1	16
Black Drum (*Pogonias cromis*)	66	7	49.1	10
Red Drum (*Scianops ocellata*)	12	0	0.6	5
Mullet (*Mugil* sp)	84	2	11.5	11
Flounder (*Paralichthys* sp)	36	1	3.7	12
Unidentified Marine Fish (Osteichthyes)	25	0	38	-
Unidentified Fish (Osteichthyes)	3,519	680	138	-
Total Identified Bone	4,265	693	380.6	-
Unidentified Bone	192	70	5.9	148
Deer Antler	0	0	0	-
Gar Scales	11	4	1.4	-
Crab	9	9	2.3	4
Total Bone/Crustacean	**4,477**	**776**	**390.2**	**152**

Table 6-1 (continued).

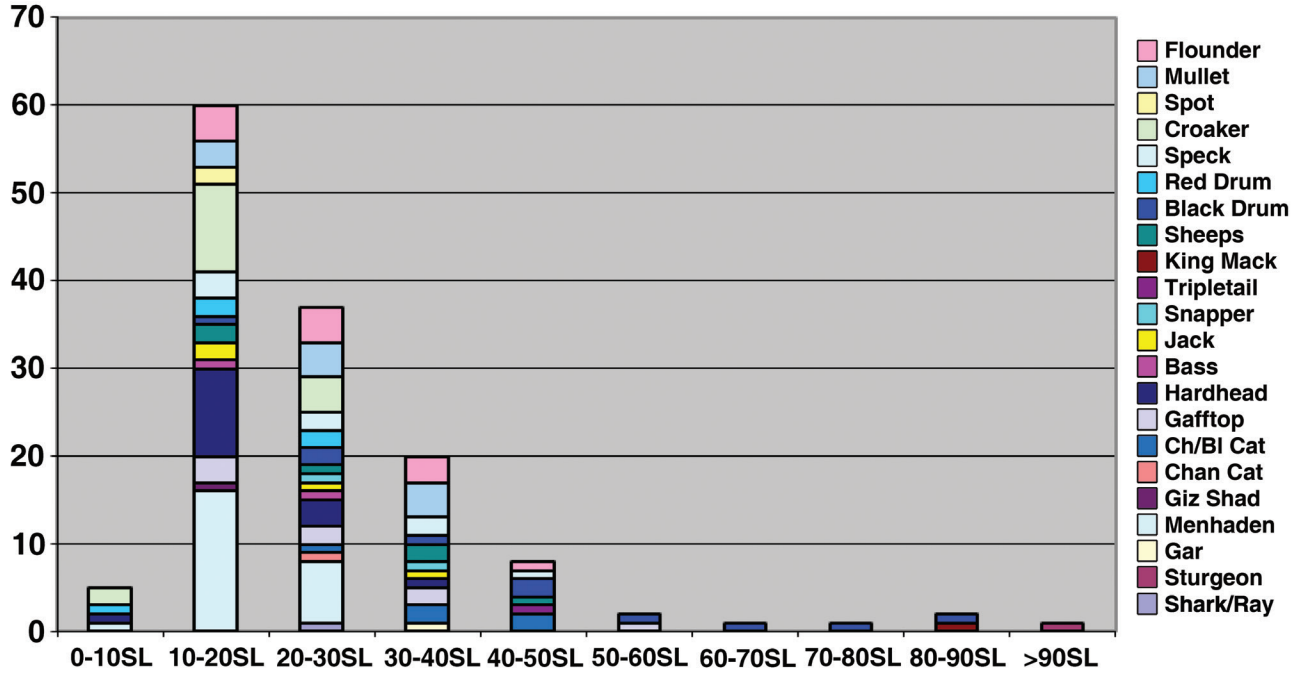

Figure 6-1. Unit 8 fish minimum number of individuals (MNI).

drum (sea trout, spot, croaker, black drum, and red drum). Assessing relative importance of these taxa is fraught with obstacles, because bone density and species diagnostics vary, which in turn radically affects the species list. Nevertheless, it is clear that shad, marine catfish, mullet, flounder, and marine drum were the most ubiquitous in the sample. Most of the identified freshwater fish came from Unit 8: gizzard shad from Zone 4, Feature 17a; freshwater catfish from Zone 5 iterations of Feature 17/18; and largemouth bass from Zone 6, Feature 17g/18f/20d/27a. The single gar vertebra and 11 scales are a remarkably poor recovery for a fish that usually produces an abundance of identifiable elements (mostly ganoid scales) at inland and even many coastal sites situated near brackish water. Another notable inclusion is a huge Gulf sturgeon, identified in Zone 5, Features 17/18, 17a/18, and 17b/18. (Sturgeon was also identified in Unit 1, but is not reported here.)

Table 6-2. Likely Presence of Adult Fish Near Shore.

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Menhaden	-	-	x	x	x	x	x	x	x	x	x	x
Sheepshead	-	-	x	x	x	x	x	x	x	x	x	x
Croaker	-	-	-	x	x	x	x	x	-	-	-	-
Red Drum	x	x	x	x	x	x	x	x	-	-	-	-
Sea Trout	x	x	-	-	-	-	-	-	-	-	x	x
Flounder	-	-	-	x	x	x	x	x	-	-	-	-

Non-Fish Taxa

Non-fish taxa include an unidentified bat (distal humerus), geese, ducks, and wild turkey (male), alligator, box and pond turtles, sea turtle, and a Colubrid (non-poisonous) snake. The alligator recovered from Unit 8 is a large portion of the skull of an individual estimated to be well over 2 m in length, found associated with Feature 19A. Finally, the probable dolphin bone came from Feature 15c in Zone 6.

Season of Procurement

Seasonality of this deposit (collectively) can be estimated by the presence of adult fish that spawn offshore during certain months of the year (Table 6-2, adapted from Jewell 2000:165). Juvenile fish of all species, dependent on estuarine nurseries for their early development, could be found nearshore year round. Taxa indicative of primarily warm season occupation by the presence of adult forms include menhaden, sheepshead, croaker, red drum and flounder. All of these taxa would have been available nearshore between April and August, although adult sheepshead tend to be more numerous after water temperature drops in early fall, after mid-September.

Table 6-3. Unit 8 Fish MNI.

	0-10SL	10-20SL	20-30SL	30-40SL	40-50SL	50-60SL	60-70SL	70-80SL	80-90SL	>90SL	Total
Shark/Ray	-	-	1	-	-	-	-	-	-	-	**1**
Sturgeon	-	-	-	-	-	-	-	-	-	1	**1**
Gar	-	-	-	1	-	-	-	-	-	-	**1**
Menhaden	1	16	7	-	-	-	-	-	-	-	**24**
Giz Shad	-	1	-	-	-	-	-	-	-	-	**1**
Chan Cat	-	-	1	-	-	-	-	-	-	-	**1**
Ch/Bl Cat	-	-	1	2	2	-	-	-	-	-	**5**
Gafftop	-	3	2	2	-	1	-	-	-	-	**8**
Hardhead	1	10	3	1	-	-	-	-	-	-	**15**
Bass	-	1	1	-	-	-	-	-	-	-	**2**
Jack	-	2	1	1	-	-	-	-	-	-	**4**
Snapper	-	-	1	1	-	-	-	-	-	-	**2**
Trippletail	-	-	-	-	1	-	-	-	-	-	**1**
King Mack	-	-	-	-	-	-	-	-	1	-	**1**
Sheeps	-	2	1	2	1	-	-	-	-	-	**6**
Blk Drum	-	1	2	1	2	1	1	1	1	-	**10**
Red Drum	1	2	2	-	-	-	-	-	-	-	**5**
Speck	-	3	2	2	1	-	-	-	-	-	**8**
Croaker	2	10	4	-	-	-	-	-	-	-	**16**
Spot	-	2	-	-	-	-	-	-	-	-	**2**
Mullet	-	3	4	4	-	-	-	-	-	-	**11**
Flounder	-	4	4	3	1	-	-	-	-	-	**12**
Total	**5**	**60**	**37**	**20**	**8**	**2**	**1**	**1**	**2**	**1**	**137**

Sixty-one individuals of these taxa were identified in Unit 8, of which 38 are of adult size (Table 6-3). Of the 38 present, all indicate occupation between April and August. In addition, gafftop catfish and croakers are both fairly abundant in the sample and are notoriously absent from shoreline habitats in winter (McClane 1978:119). Adult sea trout (*Cynoscion* sp.) are usually more abundant nearshore between November and February, and five adult (of eight) individuals in the sample may indicate limited occupation in the cooler months. However, the bulk of the evidence from Unit 8 points to early to mid-spring procurement.

This seasonality assessment is reiterated by two large cycloid scales (probably from red or black drum), both of which exhibited pristine edges. One was assessed as late winter, with a clearly defined terminal band. The other suggests very early spring procurement, with slight growth beyond the denser winter annulus (in Zone 6b). Both are associated with Features 17/18/20.

An interesting inclusion in this deposit is a very large Gulf sturgeon, a taxon currently on the endangered species list, about which little is known. Gulf and Atlantic sturgeon are anadromous fish. Adult fish ascend freshwater rivers in late winter to early spring (February to April) to spawn, returning to marine habitat in early autumn (September/October). During the cooler months the adults and older juveniles congregate in shallow sea-grass beds nearshore or in the open Gulf to feed on bottom dwelling organisms. The presence of a sturgeon in the assemblage indicates capture between September and April. Gulf sturgeon can exceed 200 lbs; the scutes and skull fragments in the sample exceed 4 mm in thickness.

Unit 4 Sample

Fish Taxa

Of the nearly 1,200 identifiable bone fragments in the Unit 4 sample, over 96 percent are fish. By weight, fish contributed 90.7 percent of bone weight, 90.8 percent if the ⅛-inch screen sample material is included (only six soil samples were taken from the unit). Like Unit 8, the species list is dominated by marine fish, with one freshwater inclusion, channel or blue catfish (associated with Feature 4b in Levels n1/n2) (Tables 6-4 and 6-5, Figure 6-2).

Table 6-4. Unit 4 Species List.

Taxon	NISP	Charred	Weight (g)	MNI
Raccoon (*Procyon lotor*)	3	0	2.8	1
Large Dog/Wolf (*Canis* sp.)	1	0	1	1
Rabbit (*Sylvilagus* sp.)	1	0	0.4	-
Swamp Rabbit (*Sylvilagus aquaticus*)	1	0	0.5	1
Whitetail Deer (*Odocoileus virginianus*)	1	0	0.2	1
Large Mammal	4	2	0.9	-
Small Mammal	2	0	0.2	-
Unidentified Bird/Small Mammal	5	4	0.4	-
Goose (Anserinae)	2	2	0.3	-
Large Goose	2	0	3.3	1
Unidentified Large Bird	1	0	0.1	-
Unidentified Medium Bird	1	1	0.1	-
Alligator (*Alligator mississippiensis*)	2	0	0.4	1
Mud/Musk Turtle (Kinosternidae)	1	1	0.2	1
Sea Turtle (Cheloniidae/ Dermochelydae)	3	3	3.8	1
Unidentified Turtle	12	9	3.5	-
Shark/Ray (Cartilagenous fish)	3	0	0.1	1
Gulf Menhaden (*Brevoortia patronus*)	4	0	0.3	1
Unidentified Catfish (Siluriformes)	3	0	0.4	-
Channel/Blue Catfish (*Ictalurus punctatus/furcatus*)	1	0	0.1	1

Table 6-4 (continued).

Taxon	NISP	Charred	Weight (g)	MNI
Marine Catfish (Ariiadae)	14	7	0.3	1
Sea Catfish (*Arius felis*)	19	6	12.5	4
Gafftop (*Bagre marinus*)	7	6	1.8	3
Finfish (Perciformes)	5	1	0.1	-
Crevalle Jack (*Caranx hippos*)	1	0	2.1	1
Tripletail (*Lobotes surinamensis*)	1	0	0.1	1
Sheepshead (*Archosargus probatocephalus*)	6	2	3.7	1
Marine Drum (Scianidae)	8	0	14.4	-
Sea Trout (*Cynoscion* spp.)	7	1	0.9	3
Croaker (*Micropogonius undulatus*)	5	0	0.1	3
Black Drum (*Pogonias cromis*)	31	1	26.5	5
Red Drum (*Scianops ocellata*)	8	0	11.7	5
Spadefish (Ephippidae)	1	0	0.1	1
Mullet (*Mugil* sp.)	34	2	5.4	7
Flounder (*Paralichthys* sp.)	2	0	3	2
Unidentified Marine Fish	14	2	1.9	-
Unidentified Fish (Osteichthes)	960	146	89.9	-
Total Identified Bone	1,176	196	193.5	48
Unidentified Bone	90	56	3.1	-
Deer Antler	0	0	0	-
Gar Scales	0	0	0	-
Total Bone	**1,266**	**252**	**196.6**	**48**

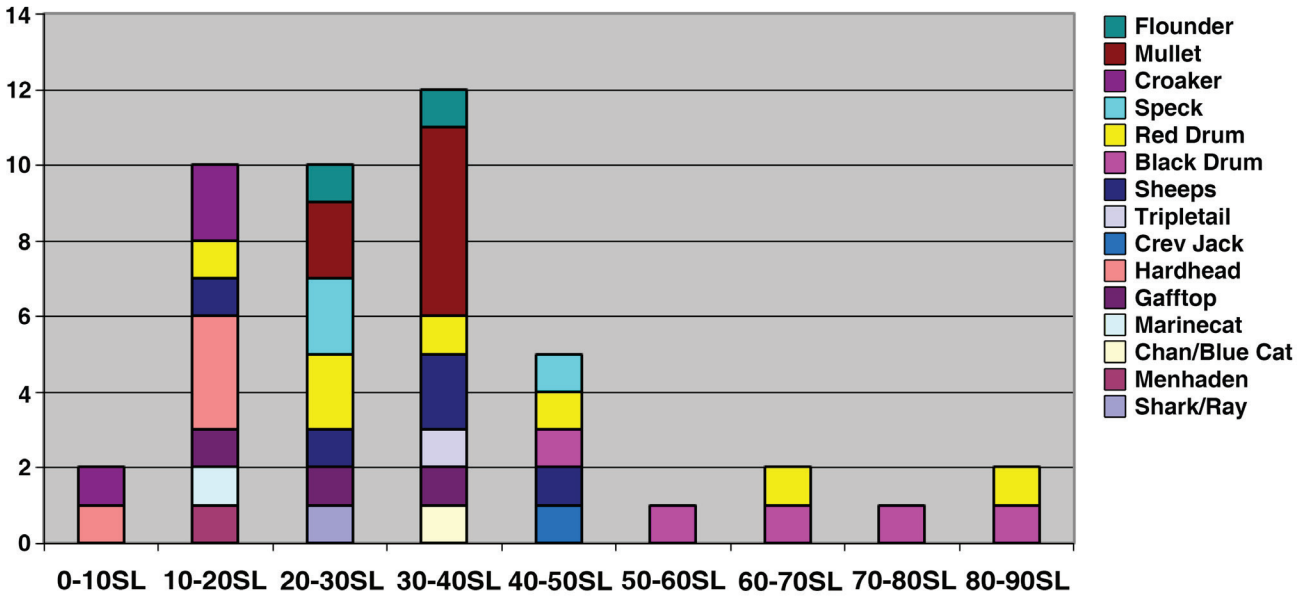

Figure 6-2. Unit 4 fish minimum number of individuals (MNI).

Table 6-5. Unit 4 Fish MNI.

Taxon	0-10SL	10-20SL	20-30SL	30-40SL	40-50SL	50-60SL	60-70SL	70-80SL	80-90SL	Total
Shark/Ray	-	-	1	-	-	-	-	-	-	-
Menhaden	-	1	-	-	-	-	-	-	-	1
Chan/Blue	-	-	-	-	-	-	-	-	-	-
Cat	-	-	-	1	-	-	-	-	-	1
Marinecat	-	1	-	-	-	-	-	-	-	1
Gafftop	-	1	1	1	-	-	-	-	-	3
Hardhead	1	3	-	-	-	-	-	-	-	4
Crev Jack	-	-	-	-	1	-	-	-	-	1
Tripletail	-	-	-	1	-	-	-	-	-	1
Sheeps	-	1	1	2	1	-	-	-	-	5
Blk Drum	-	-	-	-	1	1	1	1	1	5
Red Drum	-	1	2	1	1	-	1	-	1	7
Speck	-	-	2	-	1	-	-	-	-	3
Croaker	1	2	-	-	-	-	-	-	-	3
Mullet	-	-	2	5	-	-	-	-	-	7
Flounder	-	-	1	1	-	-	-	-	-	2
Total	**2**	**10**	**9**	**12**	**5**	**1**	**2**	**1**	**2**	**44**

Non-Fish Taxa

Relative to other units, Unit 4 yielded a more varied array of mammals, including the only identifiable deer bone in the entire assemblage, a dew claw from a trophy-sized individual in Feature 5c. An upper first molar of a large dog/wolf was recovered from the general Level n1. The tooth was very poorly preserved and attempts to glue it together to measure it merely created more fragments. Portions of the skull and first two cervical vertebrae of a sub-adult raccoon (malar, atlas, and axis) were recovered in Features 5a and 5b. Finally, a swamp rabbit tibia and an unidentifiable rabbit rib were recovered in Feature 5b.

Again, like Unit 8, sea turtle, alligator, and at least one large goose were present in the assemblage. A single mud/musk turtle peripheral, indicating freshwater procurement, was found in Feature 4b (Levels n1/n2), the same provenience as the channel or blue catfish. The alligator was found in Level n1, represented by two vertebrae, one of them associated with Feature 5b. Sea turtle was identified in Levels n1 and o, associated with Features 5b and 5c.

Season of Procurement

Because Unit 4 is a much smaller sample, MNI for fish is much smaller, but adults of all of the species associated with warm weather availability are present: menhaden, sheepshead, red drum, croaker, and flounder. Both gafftop catfish and croakers, absent in cool weather, are abundant in the assemblage. New marine fish taxa not encountered in Unit 8 include juvenile crevalle jack, spadefish (Ephippidae) and tripletail. Young members of all three taxa are common in estuarine waters.

Unit 5 Sample

Another relatively small sample, Unit 5, produced 836 identifiable bones, 98 percent of them fish (Table 6-6). Because Unit 5 contained relatively large fragments of alligator and sea turtle, fish comprise only 63.4 percent of extrapolated bone weight. Portions of an alligator shoulder girdle (scapula and coracoid) from an individual estimated to be at least 2.5 m long were recovered in Feature 7a (Zone 5, Level b2), with more large fragments (unidentifiable longbone and skull) removed from the wall during profiling. Four sea turtle fragments were found in Feature 6. The fish assemblage produced no new taxa, but an abundance of adults of the species known to be located nearshore during warm weather. Aside from a presumably commensal rodent incisor in Feature 6, there were no identifiable birds or mammals, although small unidentifiable fragments of large mammal and small mammal/bird were recovered. Most of the bone came from features and general level fill in Zone 5.

Table 6-6. Unit 5 Species List.

Taxon	NISP	Charred	Weight (g)	MNI
Unidentified Rodent (Rodentia)	1	0	0.1	1
Large Mammal	1	0	0.1	-
Medium Mammal	2	2	0.3	-
Unidentified Bird/Small Mammal	2	2	0.2	-
Alligator (*Alligator mississippiensis*)	4	0	54.2	1
Mud/Musk Turtle (Kinosternidae)	2	1	0.3	1
Sea Turtle (Cheloniidae/Dermochelydae)	4	0	6.6	1
Unidentified Turtle	13	11	1.5	-
Unidentified Reptile	1	1	0.9	-
Shark/Ray (Cartilagenous Fish)	2	0	9.5	1
Gulf Menhaden (*Brevoortia patronus*)	10	2	0.1	4
Marine Catfish (Ariiadae)	13	5	0.1	1
Sea Catfish (*Arius felis*)	20	6	3.2	5
Gafftop (*Bagre marinus*)	18	8	0.9	8
Finfish (Perciformes)	4	1	0.1	-
Sheepshead (*Archosargus probatocephalus*)	7	1	4.3	3
Marine Drum (Scianidae)	3	0	0.1	-
Sea Trout (*Cynoscion* spp)	5	1	1	4
Croaker (*Micropogonius undulatus*)	7	0	0.1	4
Black Drum (*Pogonias cromis*)	48	34	40.8	7
Red Drum (*Scianops ocellata*)	4	0	4.6	4
Mullet (*Mugil* sp)	18	0	2	4
Flounder (*Paralichthys* sp)	9	2	0.3	2
Unidentified Marine Fish	9	4	0.1	-
Unidentified Fish	627	255	26.4	-
Total Identified Bone	834	336	157.8	51
Unidentified Bone	57	44	3.5	-
Deer Antler	0	0	0	-
Gar Scales	2	0	0.2	-
Total Bone	**893**	**380**	**161.5**	**51**

Summary

The vertebrate faunal samples from the three excavation units are very similar, with the contribution of fish to the midden always dominant. Due to the nature and small size of the remains, stochastic factors, the few truly large animals represented in the remains occasionally make the abundance of fish remains seem a bit less important. However, the fact that only a few bones from a limited number of large animals were present in the samples emphasizes just how important fish were to the subsistence activities occurring on and around Graveline Mound.

Tables 6-3 and 6-5 show the standard length composition for fish remains. All but a few of the individual fish in each assemblage have a standard length below 40 cm. Procurement of such an assemblage, particularly the abundant small fish, strongly suggests use of a seine. Given the presumed ceremonial nature of the mound, it seems likely that capture may have been a communal activity in the early spring when numerous small fish would have been available nearshore. The seasonality profile of the adult fish in the samples points to a predominantly warm season occupation.

Chapter 7
Plant Remains

Ashley A. Peles and C. Margaret Scarry

Graveline Mound site is located in the Coastal Meadows physiographic zone, a pine-palmetto flatwoods that transition to the Longleaf Pine Hills 15 to 20 miles inland. The mound is adjacent to the Tidal-Marsh Estuary ecosystem of Mississippi Sound, the largest biomass concentration in the region. It was this ecosystem that supplied the fish and shellfish remains at Graveline Mound, nearly 99 percent of the fauna consumed by the indigenous inhabitants, despite the availability of terrestrial mammals, birds, and reptiles distributed across the Coastal Meadows. But compared to terrestrial ecosystems, the Tidal-Marsh Estuary is deficient in one resource universally valued by humans—plants. Nevertheless, chemical analysis of residues in potsherds from Graveline Mound reveals that plants and plant products were contained in these vessels. What plants were utilized by the people of Graveline Mound site and how were they used? Plant remains recovered from Graveline Mound provide evidence to answer these questions.

Excavations on the mound focused on three areas: the Eastern Mound Flank, the Central Mound, and the Western Mound Flank. A total of 47 flotation samples representing 20 contexts were collected and analyzed for this report (Table 7-1). All but one of the plant samples came from midden or feature contexts contained in units on the Eastern Mound Flank. A small number of general samples were taken from the Mound Midden, while the majority of flotation samples collected came from discrete features, including shell, charcoal, and pottery concentrations, as well as post molds. Eleven out of fifteen features sampled were shell concentrations—well-preserved features characterized by large amounts of marine shell. The features are interpreted as being the results of single trash deposition events (trash collected in a container and dumped on the surface), with the debris resulting from activities in the immediate vicinity. Charcoal and pottery concentrations had similar origins, differing only in their primary make-up. Remains of one char-

Table 7-1. Flotation Samples Examined for Botanical Remains.

Provenience	Feature Type	Soil Samples Analyzed	Liters Collected	Plant Weight (g)	Wood Weight (g)
Feature 4	Shell Concentration	33	4.00	9.93	9.92
Feature 5	Shell Concentration	22, 23, 53	10.00	45.70	45.68
Feature 6	Shell Concentration	27, 98	7.25	8.24	8.24
Feature 7	Shell Concentration	31	3.00	4.16	4.16
Feature 8	Shell Concentration	47, 71	7.25	8.18	8.15
Feature 9	Shell Concentration	43	22.10	77.65	77.48
Feature 10	Shell Concentration	37	3.25	8.04	8.02
Feature 11	Post Mold	36	0.25	0.33	0.33
Feature 15	Shell Concentration	56, 78, 108, 111	22.15	61.49	61.33
Feature 17/18/20	Shell Concentration	67, 73, 84, 87, 90, 91, 94, 95, 96, 102, 107, 113, 120	46.1+	118.63	117.91
Feature 19	Shell Concentration	85, 97	6.50	11.06	11.01
Feature 24	Post Mold	125	2.00	1.24	1.24
Feature 27	Charcoal Concentration	130, 135	2.00	13.64	13.64
Feature 29	Pottery Concentration	141	2.50	1.33	1.33
Feature 37	Shell Concentration	184, 200, 202	12.75+	55.19	55.09
Unit 1	General Midden	12	3.75	1.57	1.57
Unit 4	General Midden	19, 29, 57, 69	16.75	21.81	21.80
Unit 5	General Midden	63	3.00	9.12	9.11
Unit 8	General Midden	77, 104	6.50	11.70	11.64
Unit 9	General Midden	127	3.50	1.24	1.24

Table 7-2. Carbonized Plant Taxa.

Common Name	Taxonomic Name	Seasonality	Count
Nuts			
Acorn	*Quercus* sp.	Fall	13
Hickory	*Carya* sp.	Fall	18
Hickory cf.	*Carya* sp. cf.	Fall	1
Nutmeat cf.			2
Fruits			
Blackgum	*Nyssa sylvatica*	Late Summer/Fall	1
Cabbage palm cf.	*Sabal palmetto* cf.	Fall	3
Grape	*Vitis* sp.	Summer	2
Grape cf.	*Vitis* sp. cf.	Summer	1
Persimmon	*Diospyros virginiana*	Fall	1
Prickly Pear	*Opuntia* sp.	Late Summer/Fall	1
Starchy and Oily Seeds			
Amaranth	*Amaranthus* sp.	Late Summer/Fall	1
Bearsfoot	*Smallanthus uvedalius*	Late Summer/Fall	2
Goosefoot	*Chenopodium* sp.	Late Summer/Fall	2
Wild Rice cf.	*Zizania aquatica* cf.	Late Summer/Fall	4
Miscellaneous			
Grass family cf.	Poaceae cf.		1
Morning glory	*Convulvus/ Ipomoea* sp.		1
Pokeweed	*Phytolacca* sp.	Summer	1
Sedge family	*Cyperaceae*		4
Composite family	*Compositae*		1
Composite family cf.	*Compositae* cf.		1
Wild bean cf.	*Strophostyles* sp. cf.	Late Summer/Fall	1
Yaupon	*Ilex vomitoria*	Fall	7
Bud			2
Cane stem	*Arundinaria* sp.		5
Unidentified husk			19
Unidentified seed			8
Unidentifiable seed			61
Unidentifiable			9

coal and one pottery concentration were analyzed for plant remains, although the two features (Feature 27 and Feature 29) are thought to represent part of the same depositional event. The small size of post molds at the Graveline Mound site suggests that light-frame constructions were being employed–likely temporary shelters, racks, or partitions composed of flexible saplings and cane. Samples from two post molds were also analyzed. Finally, one sample (SS#127) was taken from Unit 9, placed in the Central Mound. Here, no Mound Midden was recovered. However, the Mound Cap in this portion of the mound was composed of layers of alternating white sand and darker, anthropogenically enriched sand derived nearby and redeposited as fill.

Use of Plants During Woodland Times

The Woodland era is often seen as a time of elaboration of Late Archaic trends, including increasing evidence for storage technology, widespread trade networks, more sedentary land use patterns, and the earliest indication of plant domestication (Gremillion 2003). This pattern is repeated in the types of plant remains found. During the Late Archaic period and continuing in the Woodland periods, plant husbandry was based on small grains, oily seeds, cucurbits, and greens in interior riverine areas. During the Middle Woodland period, people intensified cultivation of starchy grains and larger oily achenes, including chenopod, maygrass, knotweed, little barley, sumpweed, and sunflower (Fritz 1993; Yarnell 1993). As the first clear evidence of year round habitation is found during this period, it is perhaps unsurprising that some groups adopted farming economies (Gremillion 2003). Small amounts of maize began to appear in the Middle and Late Woodland periods. Related skeletal evidence confirms that maize did not become a dietary staple until the Mississippi period (Johannessen 1993; Scarry 2003a). Throughout these time periods, however, it is important to remember that there was considerable regional variation in people's reliance on gathered and cultivated plants. Particularly in regards to coastal sites, Fritz (1993:41) has argued that "numbers of seeds from Woodland-period sites in Mississippi and Alabama, for example, are much lower thanfrom those farther north, and there is reason to doubt that pre-Mississippian gardeners of the deep South produced comparable amounts of food."

Although few data are available to provide a pattern for coastal sites, there is information for regions surrounding the coastal area. In the lower Southeast, groups consumed mainly hickory, acorn, persimmon, maypop, grape, blackberry/raspberry, blueberry, and elderberry. Hickory and acorn dominate Archaic and Woodland assemblages and are supplanted by maize after the Late Woodland period. Although groups in these areas clearly knew about and grew some native crops, they seem not to have been very important foods. Principle plant foods in the lower Mississippi Valley include acorn, persimmons, saw palmetto berries, grapes, blackberries/raspberries, and pecans; there is little evidence for the cultivation of native starchy or oily seeded crops (Fritz and Kidder 1993; Scarry 2003a). Instead, populations in these areas may have been complex foragers, relying on acorns, roots, and tubers for carbohydrates, gathering a variety of other wild plant foods, and heavily exploiting terrestrial and aquatic fauna (Scarry 2003a).

As more botanical analyses have been done and more information aggregated, it has become clear there is a wide degree of variability between regions during these time periods, particularly exemplified by the Late Woodland (AD 400-1000). Unfortunately, this is also a period for which there is relatively little botanical information available for the Gulf coast, so even small assemblages become important for the information they provide. In addition to the importance of Graveline Mound as representative of an early Late Woodland site, it is also important because there has been little research done on mound sites along the Gulf coast. What is known of this region is that, perhaps due to rich marine resources, people appear to have followed a different pattern of plant use than did their contemporaries at inland sites. Thus, the macrobotanical remains from Graveline Mound represent a unique opportunity to gain insights about the use of plants at a coastal Woodland period platform mound.

Methods and Materials

All of the plants remains analyzed from the Graveline Mound site were recovered by flotation of samples from both feature and general midden contexts. Soil samples were gathered in the field, then measured in liters before being floated. All samples were processed by Claire Thompson at the University of Alabama, using tanks in the Office of Archaeological Research. That flotation tank utilizes 1/32-inch mesh screens to catch the heavy fraction, while the light fraction is collected in cheese cloth bags and hung to dry. Once dry, the samples were bagged and collected in containers for analysis. All materials from both the light and heavy fractions was sent to the archaeobotanical lab at the Research Laboratories of Archaeology at the University of North Carolina, Chapel Hill, for analysis.

Analysis of samples from Graveline Mound followed standard archeobotanical procedures. Both light and heavy fractions were weighed and put through a graded series of geological sieves (2 mm, 1.41 mm, .71 mm) in order to make sorting easier. Plant materials greater than 2 mm in size were sorted, identified, and quantified. All materials in the smaller sieve sizes were scanned; seeds and nut shell were removed, identified, and weighed, but the samples were otherwise unsorted.

Identifications of seeds and non-wood plant material were made to the lowest taxonomic level possible. Primary characteristics used to classify materials are size, shape, and surface characteristics. Identifications were made by reference to pictorial seed manuals (e.g., Martin and Barkley 1961) and, when possible, confirmed by reference to a modern comparative collection. Ashley Peles and Amanda Tickner sorted the samples and made most identifications. C. Margaret Scarry made or confirmed identifications of difficult or unusual specimens. Unidentified plants were grouped into four categories: unidentified husk, unidentified seed, unidentifiable seed, and unidentifiable. Unidentified husk represents curved plant material with a checkerboard-like structure that appears to be the degraded husk of an unidentified plant. Remains categorized as unidentified seed are those for which taxonomic identifications were not determined. Unidentifiable seeds are fragments of damaged seeds that lack diagnostic characteristics necessary for identification. The last category—unidentifiable—includes amorphous plant material that does not appear to be wood, but lacks other identifying characteristics.

For the purposes of the analysis, all nutshell, seeds, and other plant remains are quantified according to absolute count; no attempt was made to estimate the actual number of nuts or seeds in the samples. Results of the analysis are presented in a number of tables; counts shown in each table are the numbers of specimens of each taxon. Table 7-1 lists the provenience from which each flotation sample was collected, providing information about the type of features,

the number of soil samples and volume in liters for those samples, as well as the weight of plant and wood remains recovered. Plant weight is reported as the sum of wood remains in the "greater than 2 mm" fraction plus the weight of seed and nut remains from the sample. Table 7-2 provides common and taxonomic names of the plants identified, indicates the seasonality of edible plants, and indicates the number of specimens recovered from each category. Tables 7-3 and 7-4 show the distribution of plant food remains by context, with Table 7-3 arranged by feature, while Table 7-4 is arranged by midden soil sample. Appendix F gives the detailed breakdown by sample of the remains summarized in Tables 7-2 to 7-4.

Results

A total of 47 soil samples were scanned from the Graveline Mound site, representing 184.6 liters of soil. Another 18 samples were floated, but were not analyzed and are held for curation. Macrobotanical analysis resulted in the recovery of 173 plant remains weighing a total of 1.36 g, as well as 468.89 g of wood charcoal. The majority of soil samples were taken from feature contexts, except for a small number (n=9) taken from general midden contexts. Because the number of plant remains recovered is so small and they date to a short time span, the assemblage is treated as a whole for the purposes of this report.

Determining why such a paucity of seed remains was recovered is always a difficult, if not impossible, task. It is important to remember that most carbonized seed and nut remains recovered from southeastern sites are inedible by-products discarded when food is processed for storage or consumption. Therefore they can easily underrepresent the importance of particular plants to any group. Small quantities enter the record as a result of cooking accidents. If plant debris was not deposited in the fire, then there may be no reason to expect to find large numbers of carbonized seeds. If the shell concentrations in Graveline Mound are akin to individual basket loads of feasting debris, then the scarcity of plant foods may indicate preliminary processing was done elsewhere. Indeed, there does not appear to be a residential area in the immediate vicinity of the mound. If the Graveline Mound remains derive from feasts on or near the mound, much of the plant food may have been edible parts that would leave little to be discarded in the aftermath of a feast. Plant foods may well have been processed elsewhere and brought to the mound ready for consumption. If this were the case, then those plants that require processing prior to consumption (i.e., acorn, hickory, amaranth, etc.) would have left evidence at a village site and not necessarily at the mound site.

Another, possibly complementary, factor is that plant remains may not have been major resources for the people in this area due to the richness of marine and terrestrial fauna. This is a possibility that has been suggested by other researchers (i.e., Fritz 1993; Scarry 2000), but there is still too little information available from comparable coastal sites to reliably assess the importance of plants in the Gulf coastal diets.

Plant Remains at Graveline Mound

Although plant remains from Graveline Mound look fairly varied for such a small number of seeds, examination of Table 7-3 shows that most of the seeds are only found in a few samples or feature contexts. Additionally, slightly more than 66 percent of the total plant remains were recovered from only three contexts: Features 9, 15, and 17/18/20. These three features together account for almost 50 percent (in liters) of the soil floated from the entire site, so it is perhaps unsurprising they also contained the highest numbers of plant remains.

Nuts

The largest numbers of identified plant remains come from hickory (*Carya* sp.) and acorn (*Quercus* sp.) respectively. Hickory nut remains are present in eight contexts, while acorn nuts are present in five contexts. Additionally, nutmeat was recovered from one sample in Feature 15. Both hickory and acorn are common taxa found throughout Eastern Woodlands sites. Until the historic period nuts were the most important wild plant foods for most Native American peoples of this region. Both hickory and acorn ripen in the fall and have woody shells that must be removed in order to get to the meat. Hickory meat is a high energy food, containing high fat content and moderate protein, but it does lack critical amino acids. It is difficult, however, to separate the nutmeat from thick-shelled hickories. In order for hickory nuts to be used as a dietary staple people must employ an efficient processing method. Rather than being processed for

Table 7-3. Plant Remains Recovered from Graveline Site Feature Contexts.

Taxa	Shell Concentration											Charcoal Concentration	Pottery Concentration	Post Mold	
	4	5	6	7	8	9	10	15	17/18/20	19	37	27	29	11	24
Nuts															
Acorn	-	-	-	-	-	6	3	-	-	-	-	-	-	-	-
Hickory	-	1	-	-	-	-	-	3	7	3	2	1	-	-	-
Nutmeat	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-
Fruits															
Black Gum	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Cabbage Palm	-	1	-	-	-	-	-	1	-	-	1	-	-	-	-
Grape	-	-	-	-	-	1	1	1	-	-	-	-	-	-	-
Persimmon	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Prickly Pear	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Starchy and Oily Seeds															
Amaranth	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Bearsfoot	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Goosefoot	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wild Rice	-	-	-	-	-	1	-	2	1	-	-	-	-	-	-
Miscellaneous															
Composite Family	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-
Grass Family	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
Morning Glory	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Pokeweed	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Sedge	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-
Wild Bean	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yaupon	-	-	-	-	-	4	2	-	1	-	-	-	-	-	-
Bud	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Cane Stem	-	-	-	-	-	-	-	3	2	-	-	-	-	-	-
Unidentified Husk	1	-	-	-	-	-	-	1	14	-	-	-	-	-	-
Unidentified Seed	-	1	-	-	-	3	2	-	-	-	-	-	-	-	-
Unidentifiable Seed	1	4	1	-	-	11	1	6	29	-	1	-	-	-	-
Unidentifiable	-	-	-	-	6	-	-	3	-	-	-	-	-	-	-
Totals	**2**	**7**	**1**	**0**	**6**	**31**	**9**	**23**	**61**	**3**	**5**	**1**	**0**	**0**	**0**

their meat, it appears that hickory nuts may have been processed for oil. This was done by crushing the nuts and mixing them with water so the nutshells sink and the oil rises to the top, where it can be skimmed off; the crushed nuts could also be formed into balls and stored to be processed later (Talalay et al. 1984; Gardner 1997; Fritz et al. 2001; Scarry 2003a).

Acorn was also a staple food throughout the Eastern Woodlands. Oaks are divided into two broad groups—white and red—of which redoak acorns require additional processing to remove tannic acid. Acorns are a good source of carbohydrates, but provide little protein. Before storing, they must be parched to prevent sprouting, kill insect infestations, and reduce mold problems. Acorns were used primarily as a source of starch. The kernels could be pounded in mortars and used to make a paste to thicken broths or ground into meal that was baked to make bread or mixed with water for gruel. Occasionally oil was extracted by pressing and boiling kernels, although this would have been more time consuming than with hickory due to acorn's low fat content (Petruso and Wickens 1984; Scarry 2003a). Acorn nutshell fragments are often underrepresented at sites due to their fragility, so the fact that acorn and hickory nut fragments were recovered in almost equal numbers is an interesting feature of the Graveline Mound assemblage.

Fruits

Fleshy fruits are generally low in protein, fat, and carbohydrates, so they were not a dietary staple. However, as a supplemental resource they were important for contributing essential vitamins and minerals. In addition, many fruits have a number of medical uses. Fruits seeds recovered from Graveline Mound include black gum (*Nyssa sylvatica*), cabbage palm (*Sabal palmetto*), grape (*Vitis* spp.), persimmon (*Diospyros virginiana*) and prickly pear (*Opuntia* spp). Black gum, while little mentioned as a food, may have been used in soups and mixed with legumes (Hollenbach and Vavresek 2008). Medicinally, black gum has a number of uses, including as a compound given for worms and diarrhea. The ooze from its roots can be used as an eye medicine, and decoctions of the inner bark can be used to induce vomiting when a person is unable to retain food (Moerman 2004). Cabbage palm fruits, hearts, and leaf buds can be eaten, but collection of the hearts of buds results in death of the plant. Seeds and berries of cabbage palm could be used for headaches and to lower fevers. Additionally, the fiber and wood of the plant have a number of indirect food-related uses, such as making food paddles, fish drags, and fish poison (US Department of Agriculture – Natural Resources Conservation Service 2011). Grape, in particular, has numerous medicinal usages (Moerman 2004), one of which is the tannic quality of the leaves that make it effective in treating diarrhea, thrush, and kidney problems (Williams 2000).

Most fruits are available for collection throughout the growing season, although an exception to this is persimmon, which ripens in the fall (Scarry 2003a). The bark and unripe fruits of persimmon are used in medical preparations and to treat sore throats, toothaches, stomachaches, and diarrhea (Williams 2000). Fleshy fruits can be eaten raw, added to stews and soups, or added to composite foods, such as pemmican. They can also be dried and stored for winter use, with some, notably persimmon, being made into bread (Scarry 2003a). Additionally, although little mentioned, prickly pear produces edible fruits and pads. Prickly pear has a wide range of medicinal uses, but all recorded appear to be in the context of western North American indigenous groups (Moerman 2004), so it is unclear if it may have had similar uses in the Southeast.

Starchy and Oily Seeds

Four species of starchy and oily seeds were recovered from the Graveline Mound site, although in very small numbers. Amaranth (*Amaranthus* sp.), goosefoot (*Chenopodium* sp.), and wild rice (*Zizania aquatica*) are considered starchy seeds (primarily sources of carbohydrates), while bearsfoot (*Smallanthus uvedalius*) is considered an oily seed (good source of protein and fat). While domesticated goosefoot has been recovered from contexts as early as ca. 1800 BC (Smith and Cowan 2003), both of the goosefoot seeds recovered from Graveline Mound appear to be the wild form. In the wild, many plants that produce starchy and oily seeds colonize open ground, are abundant seed producers, and in favorable conditions may grow in relatively pure stands, producing large quantities of easily collected seeds. Wild rice differs from the more common sources of starchy and oily seeds in that it grows in water along the edges of lakes and slow moving rivers. Although not commonly found in the lower Southeast, wild rice was occasionally gathered and consumed by Southeast groups, and has been recovered from two Mississippian sites, Moundville and Bottle Creek. Amaranth, bearsfoot, goosefoot, and wild rice all ripen from late summer into the fall. In general, the grains were first parched, then used in stews or "gruels," or ground into meal that could be added to stews or made into bread. Oily seeds were also consumed in similar ways, although sometimes they were first removed from their woody pericarps. While the uses of the seeds of these plants are most often enumerated, it is important to remember that both chenopod and amaranth have edible leaves that are good sources of vitamins and minerals (Scarry 2003a).

Miscellaneous Taxa

Roughly 70 percent of the seeds recovered fall into the miscellaneous category, a number of which are in various unidentified categories described above. A small number of seeds are likely to be background environmental noise—species that are common in the surrounding areas, but without any particular uses. This includes seeds from the grass family and the composite family. The rest of the plant remains categorized under "miscellaneous" deserve mention for both their primary and secondary uses.

A small number of fragmentary cane stems (*Arundinaria* sp.) were recovered, although cane is not considered a food. Cane is common in the coastal areas, so it may be recovered simply as part of the environment. However, split cane was widely used to make baskets, mats, and for wattle in structure walls. Cane can also be used to make light-frame constructions, a use that is particularly intriguing given the small post molds detailed in the excavation description and the possible remnants of burned cane lattice in Feature 22 (see Chapter 3). Perhaps the recovered cane stems represents temporary structures that were burned and abandoned.

Table 7-4. Plant Remains Recovered from Graveline Site General Midden Contexts.

Taxa	Unit 1	Unit 4				Unit 5	Unit 8		Unit 9
	12	19	29	57	69	63	77	104	127
Nuts									
Acorn	-	-	-	-	1	2	1	-	-
Hickory	-	-	-	-	1	1	-	-	-
Starchy and Oily Seeds									
Bearsfoot	-	-	-	-	-	1	-	-	-
Goosefoot	-	-	1	-	-	-	-	-	1
Miscellaneous									
Wild bean cf.	-	-	1	-	-	-	-	-	-
Bud	1	-	-	-	-	-	-	-	-
Unidentified Husk	-	-	-	1	-	-	2	-	-
Unidentified Seed	2	-	-	1	-	-	1	-	-
Unidentifiable Seed	-	-	-	-	2	1	2	-	-
Totals	**3**	**0**	**2**	**2**	**4**	**5**	**6**	**0**	**1**

The one possible *Strophostyles* seed is from one of several genera called wild beans. While not a substantial portion of the diet, legumes like wild beans are a good source of carbohydrates and proteins. It is possible the wild bean recovered was simply part of the local environment, but the plant's characteristics also mean that people would have had easy access for collection and may well have used it for food (Scarry 2003a).

Pokeweed (*Phytolacca* sp.), of which one charred seed was recovered, is an aggressive invader of disturbed ground. Although its young leaves can be cooked as a spring green, it is probably most easily recognized for its dark purple berries. The berries are edible after cooking and can be used as a source of dye or ink. The berries and roots are also used medicinally as internal or external anti-rheumatics. Root preparations can be applied to ulcers, swellings, bunions, and other skin-related ailments. Depending on the preparation, application, and dosage, pokeweed can be used as both an anti-diarrheal and a cathartic agent (Williams 2000).

Morning glory (*Convolvulus*/*Ipomoea* spp.), represented by one seed, aggressively invades open areas around habitations and fields. Although most members of the Convolvulus and Ipomoea families are inedible, one important species, Man-of-the-earth morning glory (*Ipomoea pandurata*), has a large edible root. Seeds of some varieties also have powerful cathartic qualities and during the historic period are known to have been used to treat tuberculosis. Additionally, some species have psychotropic compounds in them similar in effect to LSD (Williams 2000). According to Williams (2000:213), although the Aztecs used morning glory seeds to induce visions, there is no recorded usage by North American native groups for this particular purpose. The recovery and possible usage of morning glory at Graveline Mound is particularly interesting because morning glory is often relegated to background noise status at other, later sites, because it tends to invade cultivated fields. With no crops species recovered, it is unlikely that this is the source, and may be an indication that the importance of morning glory recovered at other sites should be reconsidered.

Perhaps the most interesting specimens recovered from Graveline Mound were seven yaupon holly (*Ilex vomitoria*) seeds. Yaupon is an evergreen shrub with simple, alternate leaves and red, berry-like fruits that appears along the Gulf coast. Medicinally, yaupon can be used as a dermatological aid, a decoction of the bark and/or leaves can be used for eyedrops, as well as being used as an antidiarrheal, cathartic, emetic, and general aid. Yaupon's more widely known use is for ritual purposes, however. It was the main component of the "black drink," a caffeine-rich beverage used at social and ceremonial events by several Southeast groups. The black drink was consumed in large quantities, followed by ritual purging (Hudson 1979; Williams 2000; Scarry 2003b).

Discussion

Although the total number of coastal sites analyzed is small, the Graveline Mound site adds itself to

a growing number of analyses allowing for a rough chronology of plant use for this area, and providing comparison between coastal sites and other areas of the Eastern Woodlands. Nearby sites that provide data for comparison include one Early Woodland site (1MB414), two late Middle Woodland sites (Jackson Landing and Godsey), one other Late Woodland site (1CK236), and two Mississippian sites (Singing River and Bottle Creek).

Site 1MB414, located close to the Tombigbee River in southwest Alabama, is the source of food remains recovered from ten pit features dating to the Early Woodland period. Notable taxa recovered include acorn, hickory, black gum, grape, huckleberry, persimmon, and plum/cherry. No starchy or oily seeds were recovered. As noted above, acorn and hickory were important dietary components for Eastern Woodlands peoples, and represent the majority of plant food remains recovered from this site. The amount of hickory nut fragments (n=736) far outnumbers the amount of acorn nut fragments (n=26), although it is difficult to tell if this is from differential preservation favoring hickory, or because hickory was more important dietarily (Hollenbach and Vavrasek 2008).

The Jackson Landing site (22HA515) provides plant remains from a late Middle Woodland mound site in coastal Hancock County, Mississippi, on a terrace overlooking a tributary of the Pearl River. Analyzed samples fcome from general mound contexts, features located on the summit of the mound, and a midden beneath and away from the mound. Recovered plant food remains include nuts, fruits, and possible crop remains. Both acorn and hickory were recovered, although at this site acorn (n=95) far outnumbered hickory (n=12), suggesting it may have been particularly important for the people using the mound. Thin-shelled hickory (likely pecan) and a fragment from the Juglandaceae family were also recovered. Fruits identified consist of cabbage palm and persimmon, taxa common to the area and known to have been commonly consumed. The last taxon of note is what may possibly be fragments of both a maize cupule and maize kernels. The use of maize in the lower Southeast is low and sporadic until the Late Woodland, perhaps more so on the coast, so its possible recovery in a Middle Woodland context is intriguing. C. Margaret Scarry (1993) has suggested that early use of maize was limited and more important for ritual reasons than as food; recovery at the Jackson Landing site may further confirm this conclusion (Hollenbach 2011).

The Godsey site (22HR591) also contains remains from the late Middle Woodland period, specifically AD 200-400 [Editors Note: A revised Godsey phase time span is AD 250-550]. This site is in the same coastal area of Mississippi as the Graveline Mound site and is a midden of earth and shell deposits. Samples were collected from general levels, as well as specific features. Plant food remains from this site include nuts, fruits, starchy and oily seeds, and seed remains from plants that could have been used as greens. Nuts recovered consist of the standard hickory (n=46) and acorn (n=14), with acorn likely being somewhat underrepresented due to its fragility. Few fruits were recovered, but those that were include blackberry/raspberry, persimmon, and prickly pear. Starchy and oily seeds consist of goosefoot/chenopod and knotweed, while greens include cleaver, pokeweed, and purslane (Scarry 2000).

1CK236 is a Late Woodland site located on the lower Tombigbee River in southwest Alabama, dating to late in the McLeod Phase (AD 400-1000). Samples were collected mainly from medium-sized pit features, as well as one deep, stratified pit feature. The majority of the remains comprise hickory (n=345) and acorn (n=262) nut fragments, with small numbers of hazelnut and walnut. Fruits recovered were limited to blackberry/raspberry and sumac. Starchy seeds include goosefoot, knotweed, and maygrass, with pokeweed representing greens. Lastly, a number of maize cupules and maize kernels were recovered, which are seen as evidence of emergent agriculture at this site (Mickelson 1999).

Available data from nearby Mississippian sites comes from two sources, one of which is the Singing River site (22JA520) located in coastal Mississippi, not far from both the Graveline Mound and Godsey sites. Dating from AD 1250-1550, Singing River is a complex site including a mound and an earth-shell midden. The plant remains analyzed actually come from two different phases within the Mississippi period at this site: the Pinola phase (AD 1200-1350) and the Singing River phase (AD 1350-1550). In this short description, both phases are considered together. Nuts recovered from the site include acorn (n=24) and hickory (n=23). A number of fruits were found, comprising elderberry, huckleberry, palmetto, persimmon, and sumac. As far as starchy and oily seeds, both chenopod and bearsfoot were recovered, while

purslane represents greens. Maize was recovered from both phases of the site, indicating that residents were engaged in limited crop production (Scarry 2000).

Bottle Creek (1BA2), a Mississippian site in southwest Alabama (AD 1250-1550), provides a comparison for understanding what coastal groups were doing during this time period. Located in the Mobile-Tensaw Delta, Bottle Creek is a multi-mound site—the largest Mississippian site in the region. Samples were analyzed from each of the five mounds that are part of the main mound complex, deriving from both midden and feature contexts. Results included acorn and hickory nuts; fruits of blackberry/raspberry, maypop, and persimmon; starchy and oily seeds of amaranth, chenopod, knotweed, little barley, maygrass, sunflower, and wild rice; pokeweed and purslane for greens; miscellaneous taxa, including morning glory and yaupon; and large amounts of maize. Five of the starchy/oily seeds were grown as crops in this period in the Eastern Woodlands (chenopod, knotweed, sunflower, maygrass, and little barley), but the evidence for this at Bottle Creek is ambiguous. Despite this, it is clear that the people living at Bottle Creek relied heavily on maize for subsistence, with the potential native crops being far less important. Surprisingly few acorn and hickory were recovered; this may also be due to the inhabitants' reliance on maize. Almost certainly the yaupon and possibly the morning glory and wild rice represent evidence of ritual activities occurring at the mounds (Scarry 2003b).

The sequence of sites available for comparison on the Gulf coast appear to support the hypotheses and conclusions of other researchers, namely that wild taxa and crops do not appear to have been as important along the coast as in other inland sites, perhaps due to the relative abundance of aquatic and terrestrial resources. As across much of the Eastern Woodlands, people relied primarily on acorn and hickory nuts, although their relative importance may vary across sites. At all sites, small numbers of a range of fruits were recovered, the most common being persimmon. Starchy and oily seeds were also recovered in small amounts at most sites, supporting the idea that native crops (even in their wild state) never became an important part of the subsistence economy for people living along the coast. Small amounts of seeds from greens were also recovered. The only positively identified crop to be identified from coastal sites thus far is maize. Following trends across the Eastern Woodlands, maize does not appear to become of dietary importance until the Mississippi period. Recovery from one mound context in the late Middle Woodland period may provide support for the idea that maize was used primarily as a ritual food until later periods. Additionally, its variable recovery across sites may also support conclusions that the importance of particular plants at coastal sites is variable between groups. This appears to be true even for the Mississippi period, during which the Singing River site inhabitants do not appear to have relied heavily on maize, while Bottle Creek inhabitants appear to have engaged in much greater reliance on plant husbandry.

Clearly, the Graveline Mound site fits within and complements these trends. No cultigens were recovered, so it does not appear that early Late Woodland peoples were relying on domesticated species in this area to any degree. Modest amounts of acorn and hickory were recovered, indicating their utilization, but any comments about their relative importance are tempered by the fact that their processing was likely done off-site. Small numbers of fruits were recovered, all of which would have been available in the area and were important supplements to other plant and animal foods. Small numbers of starchy and oily seeds were also recovered, indicating that people relied upon wild taxa to some (likely small) degree. Wild rice is a particularly interesting find for the Graveline Mound site, having been found at only two other sites (both Mississippian) in the region. Greens, outside of goosefoot and amaranth, are represented by pokeweed. One possible wild bean seed was also recovered, which, like many of the other plants, would have been important as a supplemental species. While there are other miscellaneous taxa recovered, the most interesting are morning glory and yaupon. Both have qualities that would have made them useful and/or important in ritual contexts, further supporting the idea that people mainly used Graveline Mound for ritual and feasting functions. The low recovery of wild rice, morning glory, and yaupon at coastal sites, except for mound contexts, may be further indication of special ritual components of such mound sites.

Summary

Although the number of seeds recovered from Graveline Mound is not large, it does provide some clues to the types of foods that were being consumed, possibly being used for medicine, and likely being used in feasting and ritual contexts. Given that people

were not living in the area immediately surrounding the site, the by-products of foods that required processing would be expected to leave few traces in the mound deposits. Instead, those plant remains that were recovered were likely the small amounts that accidentally fell or were thrown into fires during meals or other activities. The plant food remains recovered suggest that the people at Graveline Mound collected wild nuts, fruits, and starchy and oily seeds, and did not grow any native cultigens. The seasonality of taxa recovered suggests an occupation period between summer and fall, but this conclusion must be tempered by the fact that many of the taxa recovered can be stored in different forms to last beyond the season in which they ripen. However, a limited seasonal occupation may be supported by excavation evidence suggesting that the mound site contains characteristics of a Vacant Center model, built within a fairly short period of time and used for episodic aggregation of groups living elsewhere. Blitz and Downs (Chapter 1) further suggest that "larger aggregations [may have been] scheduled by a ritual calendar corresponding to the seasonal availability of surplus foods."

The existence of particular taxa that are not commonly recovered from Woodland habitation sites—wild rice, morning glory, and yaupon—further supports the conclusion that the mound was built and used mainly for ritual purposes. Wild rice, although naturally found in this area and occasionally recovered at other sites, is nonetheless uncommon and may have been reserved for ritual feasting. Morning glory is often interpreted as a weedy, crop-following plant, but given the context of the Graveline Mound site, may have been used ritually to induce visions. Lastly, yaupon is a primary component of the black drink, a beverage known to have been consumed in ritual contexts. While leaves were used to brew the tea, the berries adhere closely to the branches and might well be collected if the leaves were harvested either by hand stripping or by cutting branches and later stripping the leaves. The rest of the plant food remains recovered are likely to have been components of meals served during feasting. All of these factors together combine to provide an example of the various plants that may have been consumed in a ritual context for a period and area where data are sorely lacking.

Chapter 8
Graveline Mound Site Interpretations

John H. Blitz and Lauren E. Downs

Now that we have presented the physical evidence collected in our 2010 investigation of Graveline Mound, we can offer a synthesis and interpretation of these findings to answer the research questions posed in Chapter 1. As we have seen, Graveline Mound is a flat-topped earthen platform constructed between AD 550 and 800. The mound has anthropological and historical significance not only for understanding the region's pre-Columbian past, but also as a well-preserved example of a pre-AD 800 platform mound in the lower Southeast. Relatively few such mounds have been studied with modern archaeological techniques and fewer still are situated in a coastal environment.

Vacant Centers and Residential Centers

We began our investigation by posing two models of Woodland platform mound sites that summarize interpretations of such sites based on previous excavations in the lower Southeast. The Vacant Center model defines Woodland platform mound sites as ceremonial centers with short-term use by dispersed, non-residential groups, where mound use was communal, open, and socially inclusive, and where mounds were built and used in short time spans. In contrast, the Residential Center model defines these places as residential centers with long-term use and habitation at the mound site, where mound use was focused on a closed and socially exclusive segment of the community, and where the mounds were built in multiple, sequential stages with continuous use over generations.

Models are ideal constructs that simplify the real world and are only as good as the assumptions on which they are based. Their value for the archaeologist is to focus and direct investigations in order to evaluate the validity of assumptions and connect research to broader theoretical issues. Without such efforts, archaeological investigations are little more than technical descriptions. What we really wanted to know was how Graveline Mound fit into the range of possibilities marked out by this simple Vacant Center-Residential Center dichotomy. The coastal environment was the wild card. Of course, it is one thing to generate research questions to evaluate competing models and another to obtain the evidence that provides definitive answers. We think we have been more successful than not in obtaining answers to our research questions, but we leave that to the reader to assess. First, by way of summary, we provide a synopsis of excavation evidence for mound form, chronology, activities, and seasonality of use.

Synopsis of the Graveline Mound Investigation

Graveline Mound (22JA503) is an early Late Woodland flat-topped platform mound, unusual for its location on Mississippi Sound, an arm of the Gulf of Mexico. Five additional mounds (sites 22JA729, 22JA730) lay within 500 m east and west of Graveline Mound. However, these remain uninvestigated and we do not know if they are coeval with the centrally located and larger Graveline Mound. In addition, an extensive shell midden once existed along the shoreline within 200-250 m of Graveline Mound.

Graveline Mound is listed on the National Register of Historic Places, owned by The Archaeological Conservancy, and protected by the City of Gautier. The mound was investigated and dug into by C. B. Moore in 1905, by a local resident in 1977, by Dale Greenwell in 1978-1980, and by John Blitz and Baxter Mann in 1992. In May-July 2010, the University of Alabama's Graveline Archaeological Project, funded by a grant from the Mississippi Department of Archives and History, excavated the mound. At that time the mound measured 30 m north to south, 25 m east to west, and stood 1.65 m in height.

Johnson et al. (2013) conducted geophysical subsurface surveys of Graveline Mound with gradiometer, ground-penetrating radar (GPR), down-hole magnetic susceptibility, and electrical resistivity tomography (ERT). Down-hole magnetic susceptibility and gradiometer surveys were not informative due to the sandy site matrix. GPR and ERT surveys identified the horizontal and vertical extent of shell concentrations and midden deposits later encountered in excavation.

An off-mound subsurface survey was initiated to determine if evidence of cultural activities or occupation at the site may have extended to the area immediately surrounding the mound. Thirty-three

auger tests and nine shovel test pits were placed along the 50-by-34-m control grid at 5-m intervals, commencing from the lower mound base and continuing off-mound to the perimeter of The Archaeological Conservancy property. No middens or anthropogenic soils were found. Only ten tests yielded artifacts, and then only one or two artifacts each. Two off-mound sample points were selected for further testing with 2.0-by-1.0-m excavation units. These units produced artifacts and ecofacts, but this material was the result of redeposition down slope from the mound. Off-mound subsurface survey revealed no evidence of any substantial habitation deposits in areas tested.

Next, eleven 2.0-by-1.0-m units were excavated into the mound, six of which were positioned to form contiguous 2.0-by-2.0-m blocks. These units spanned the entire mound along a central east-west axis to expose the deep vertical profiles and horizontal surfaces needed to understand mound construction history and use. From oldest to most recent, four major episodes of deposition were identified: Pre-Mound Surface, Initial Mound, Mound Midden, and Mound Cap.

The Pre-Mound Surface was the original ground surface prior to mound construction. There was no evidence of substantial occupation and only minor indications of human activity on this surface before the mound was constructed. Built on the Pre-Mound Surface, the Initial Mound was the scene of special-purpose, short-term activities that included feasting, cleaning, and the redeposit of trash. Initial Mound strata were not present in central mound units, nor did trash accumulate there. Our best explanation for the presence of the Initial Mound under the east and west sides of Graveline Mound, and its absent in the central intervening space, is that it consisted of a single linear embankment enclosing a ritual space that was carefully cleaned and subsequently covered by the Mound Cap. Accumulated trash on and around the Initial Mound, collectively referred to as the Mound Midden, represents the third major depositional episode in mound chronology. The Mound Midden was composed of multiple dump events, deposits designated as features representing concentrations of shell, vertebrate faunal remains, botanical remains, pottery, and charcoal. The trash resulted from activities, such as feasting on seafood, generation of ash and charcoal perhaps as a result of food preparation, consumption of food and medicinal plants, and breakage of highly decorated pottery. These activities took place in the central space enclosed by the Initial Mound embankment, which was cleaned of debris, the resulting trash placed in containers, and then dumped on the Initial Mound embankment or to its exterior side. Mound Midden deposits overlie both the Initial Mound and those portions of the Pre-Mound Surface to the exterior side of the Initial Mound. Thus, most of the debris that accumulated on the Pre-Mound Surface postdates creation of the Initial Mound. A few small, scattered post molds were identified on the Pre-Mound Surface, but these were probably intrusions that originated at the time of Mound Midden accumulation.

Finally, the Mound Cap, a huge mass of mostly sterile sand, was deposited over the Mound Midden, Initial Mound, and all surrounding portions of the Pre-Mound Surface with evidence of mound-related activities. While multiple zoned fills are revealed in the Mound Cap profiles, there was no artifact or stratification evidence that the Mound Cap was used again as another surface for activities. We interpret construction of the Mound Cap as a rapid, possibly single-event, termination ritual that sealed all previous activity surfaces at Graveline Mound. A sturdy layer of plinthite, a durable sand-and-clay soil, was the final Mound Cap layer that resulted in Graveline Mound's flat-top, rectangular, platform configuration. With this review, and the results of artifact, ecofact, ceramic residue, and radiocarbon dates at hand, we can now answer our original research questions and evaluate the two models.

Research Question 1: Was the mound construction sequence and dating accurately documented?

We discovered that the mound construction sequence had not been adequately documented prior to the 2010 investigation. In their 2-m-long profile of Graveline Mound, Blitz and Mann (2000: Figure 4.7) identified strata that correspond to the Mound Cap, Mound Midden, and possibly the Initial Mound. From the extensive 2010 profile exposures, it is now evident that five additional strata Blitz and Mann interpreted as mound construction stages are, instead, linear zones of fill, down-slope erosion deposits, and other fill events, rather than occupation surfaces.

The mound ceramic assemblage consists of well-made Baytown Plain pots, while the decorated types are almost entirely Larto Red and late varieties of Marksville Incised (*var. Spanish Fort*, *var. Steele Bay-*

ou, *var. Yokena*). Absent are ceramic attributes common in the preceding phase (i.e., podal supports, Marksville Stamped, rim-top impressions) or in the subsequent phase (i.e., check-stamping, cord-marking) of the regional sequence. Pottery decorated with red, zoned red, red-on-buff, black, or combinations of red and black pigments also occurs. These styles are widely distributed from northwest Florida to the lower Mississippi Valley at this time.

Our new radiocarbon dates refine mound chronology and the Graveline ceramic phase to the more accurate interval of AD 550-800. However, comparison of the Graveline Mound ceramic assemblage to other non-mound assemblages in the area remains problematic due to poor comparative data and the possibility that Graveline Mound ceramics differ from ceramics at coeval non-mound habitation sites because of special mound activities, such as feasting.

Research Question 2: Was the mound constructed in a short or long time span?

An answer to this question addresses the issue of whether platforms such as Graveline Mound were linked to single-generation episodes of use and weak social differentiation or more long-term use related to hereditary elites and strong social differentiation (Lindauer and Blitz 1997). The relatively long time spans of radiocarbon assays are of little help here. The simple answer is that all evidence indicates a short-time span for mound construction and use. Construction and use could easily have occurred within a single generation and be related to the activities of a corporate group or charismatic individual, such as a religious practitioner or aggrandizing "big man." Unlike at many Mississippian and other post-AD 800 platform mounds, there is no indication here of long-term, multi-generation use related to institutionalized status and strong social differentiation or hierarchy. Indeed, the mound did not have a sequence of construction stages that served as multiple occupation surfaces, as we originally thought. Instead, Graveline Mound consisted of a single construction stage, the Initial Mound embankment, which demarcated a place for activities of short duration, after which it was rapidly covered by the layered fill deposits of the Mound Cap to create a flat-topped summit.

No human remains were found during investigations at Graveline Mound. While Graveline Mound was not a "burial mound," it was a "mound burial" in the sense that the entire ritual space, the Initial Mound embankment and portions of the surrounding Pre-Mound Surface that had debris from ritual activities, was buried and sealed under the final Mound Cap. As best we can determine, this capping was a rapid event. We consider construction of the Mound Cap to be a termination ritual that consecrated and memorialized the ritual space. Thereafter, there was no reuse of, nor revisits to, Graveline Mound that we can detect.

Research Question 3: Are there features, artifacts, ecofacts and other material evidence associated with summit surfaces and middens? Are there structural remains on the summit surfaces?

To reiterate, features were the result of food consumption activities at the mound. Potsherds of incised and pigmented bowls, jars, and beakers, some thin-walled and small in size, probably functioned mainly as serving vessels. Although we did not identify any hearth remains, thicker-walled plain ware fragments, some with sooting, suggest that food was prepared and cooked here as well. The bones, shells, ash, charcoal, and other carbonized plant remains generated by these activities were repeatedly collected and dumped to form a midden. Spatially distinct dumping episodes were defined as features; some appeared to have been deposited all at once from a single container. Because debris was not removed from the mound location, we conclude that the debris itself was regarded as special, perhaps sacred, and thus kept in proximity to the ritual space.

The majority of the faunal food remains are fish bones and shells of oysters and marsh clams, with incidental numbers of small mammal, reptile, and bird bones. The negligible consumption of white-tailed deer is significant, for deer dominate faunal assemblages at interior sites in the Woodland periods. The remains of nuts, fruits, and an assortment of seeds from useful plants were present in low quantities, but no definite cultigens were identified. If the social group that used Graveline Mound was engaged in any form of food production, it was not occurring at this location. Also present were seeds of yaupon, a stimulant, and morning glory, a known hallucinogen, as well as other plants with medicinal properties. The chemical profiles of residues absorbed into potsherds confirm that some vessels used at the mound once contained fish and plant foods, as well as pine resins. All of these animal and plant resources could be procured locally.

The artifact assemblage is composed almost entirely of potsherds. Small amounts of debitage indicate minor use or maintenance of stone tools. Several hafted bifaces—knives or dart points—are present. A perforated ceramic ornament, a worked catfish spine, and a tiny piece of mica round out the inventory. There were a few small scattered post molds present, but no evidence that any substantial shelters, buildings, or walls were ever erected at the mound.

Research Question 4: Are there adjacent off-mound deposits? If so, how are mound and non-mound assemblages similar or different?

No deposits or signs of habitation were found in the immediate vicinity surrounding the mound.

Research Question 5: Is there a pre-mound or sub-mound occupation? If so, how are mound and sub-mound assemblages similar or different?

While the Pre-Mound Surface beneath and adjacent to the Initial Mound had some organic staining, there was no evidence of any substantial habitation, occupation, or use of this surface before construction of the Initial Mound. With no important history of prior use evident, this place was detached from any localized and established residential community or family abode. Consequently, no clues were found that might inform us about the social context or circumstances in which the mound was initiated, other than the rather self-evident conclusion that it became important to mark this place with a ceremonial facility, and thus create a visible claim to a location with no obvious prior investment of labor.

Research Question 6: Was the mound and site occupied seasonally or year-round?

An answer to this question helps us determine if Graveline Mound best fits the Vacant Center or Residential Center models. We used size and species of fish as seasonality measures. The seasonality profile of adult fish points to a predominantly warm season occupation when key species were near shore. All but a few fish in each assemblage have a length below 40 cm. Most of the fish were available early spring through summer. Sea turtle would have been available only when the water was warm. Fish scale annuli indicate early spring capture. The presence of abundant small fish indicates mass capture techniques, such as seines. Based on these observations, season of capture and consumption at the mound occurred in early spring into summer.

A preliminary analysis of the oxygen isotope season of capture record for oyster and marsh clam shells from Graveline Mound, while not yet completed, indicates that, of 29 shells examined, 40 percent indicate spring and 34 percent indicate summer capture. Only one shell may have been collected in winter and three in fall (Andrus et al. 2011). Plant remains are less accurate seasonal indicators, due to their ability to be stored long after harvest. But the available botanical evidence from Graveline Mound does not contradict the faunal seasonality evidence of a warm season occupation. These data are consistent with a model for seasonal site use in the early spring to summer months.

Graveline Mound as a Vacant Ceremonial Center

To sum up, use of the site began on the pre-mound ground surface, which was not a habitation site, but did experience some activity of rather ephemeral nature, perhaps related to preparation for mound construction. This location was enclosed by construction of a low embankment of sand, which demarcated a space where special activities occurred from early spring into summer. These activities included consumption of seafoods and other foods, ingestion of medicinal plants, and use and breakage of decorated pottery vessels. Ceramic residues confirm that the broken pottery once held fish and plant preparations, plus compounds of pine resin and unidentified plants. The basket-dumped heaps of discarded food remains and broken pottery were not so voluminous that they could not have accumulated in a short time interval by the actions of a small group of people. No substantial shelter was built in the ritual enclosure and no human remains were found. Activities in the ritual enclosure were short-term, and then this space and the associated midden dumps were buried, with no evidence of use thereafter. So Graveline Mound was a platform mound in the sense that its final form was a flat-topped rectangular platform, but it did not have the long-term, multiple occupation stages common for Mississippian platform mounds. None of the midden dumps extended beyond the area covered by final mound construction and there was no adjacent habitation area. Graveline Mound was a special place of brief occupancy, with a size and scale of construction

that would not have accommodated many people and not for any length of time. There is no evidence of social hierarchy and no indication of permanency until final mound construction sealed and commemorated all that came before. After that, the mound's flat summit offers the only clue that people may have returned to the mound, but no evidence was found that they did so.

Graveline Mound best fits the Vacant Center model as a ceremonial place of short-term use by groups not in residence at the site, where activities in the ritual space were not hidden, but open to view, and where mounds were built and used for short time spans. The ceremonial facility of the mound was removed and isolated from any domestic contexts. As a vacant center, Graveline Mound was likely used by a small social group in the spring/summer. We can only speculate on the nature of ritual activities that took place there. Sharing of food often accompanies rites of passage, intensification or renewal, so feasting on fish and shellfish may only have been of secondary importance to the events that transpired there. One aspect of the Vacant Center model that does not fit the Graveline Mound situation was the prediction that vacant centers would have evidence for exchange of non-local goods used to maintain and symbolize reciprocal social networks. Small amounts of Tallahatta sandstone, available on the upper coastal plain, and a single piece of mica, available in the Piedmont physiographic region of Alabama, are the only identified non-local materials. Non-local goods were unimportant to the activities at Graveline Mound.

Even though the mound is not a habitation site, we conclude it is not enough to label Graveline Mound a vacant center. Given the diversity of southeastern mound sites, the other uninvestigated mounds and middens known to be 500 m away may prove to have associated habitation remains or evidence of different activities, performances, and rituals—other places where long-term process and short-term event intersect in an ancient social landscape that we have yet to fully understand.

Appendix A
Unit Summaries

These unit summaries are the standardized forms used in the Graveline Archaeological Project to provide a systematic description of each excavation unit. The forms were filled out by the excavators soon after the completion of the unit and are transcribed here with minimal editing as primary documentation. Units were excavated by arbitrary levels (10 cm) within natural/cultural strata. These strata were identified as "zones" by excavators in the field and in these unit summaries, with each set of levels and zones being specific to each individual unit in order to expedite excavation. Note that in the results of excavations discussed in the preceding chapters, the unit-specific excavation levels and zones used during excavation have been combined into unified mound strata labeled A, B, C, etc., from top to bottom in the general order in which they were encountered by the archaeologists. Excavation units are grouped into analytical units based on location: Eastern Mound Flank, Central Mound (summit), Western Mound Flank, and Off-Mound.

Unit 1

Unit Dimensions: 1-by-2 m
Unit Level: A-U
On Mound Unit: Eastern Flank
Excavated Depth of Unit Below Ground Surface: 2.06 m
Dates Excavated: May 12-28, 2010
Excavated By: Jeremy R. Davis and Shawn P. Lambert
Recorded By: Jeremy R. Davis and Shawn P. Lambert

1. Unit description/location:

Unit 1 is a 1-by-2 m unit oriented east-west. It was placed on the east flank of the mound just below the mound summit edge, two meters west of Unit 2, directly southwest of Unit 5, and directly southeast of Unit 4.

2. Excavation objective:

Unit 1 was excavated in order to locate Blitz and Mann's (2000) former excavation unit, if possible, and to define local stratigraphy. The unit was excavated horizontally from the highest point in arbitrary 10 centimeter levels within natural levels; however, natural breaks were difficult to recognize. Blitz and Mann's 1992 unit was not encountered in the Unit 1 excavation.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

A – Entire root mat removed. Decomposing, organic fill found throughout except at the mid portion of the northern wall where excavators encountered loose yellow-brown stain. No artifacts.

B – Highest 10-cm of unit (down-slope, eastern portion of unit not excavated past base of level A); loose yellow-brown sand mottled with grayish brown sand expanded to a roughly rectangular area thought at the time possibly to be Blitz and Mann's unit. No artifacts.

C – Highest 10-cm of unit. Some of the down-slope eastern portion of the unit(base of level A) remained untouched. Mottled yellow-brown sand associated with Level B's possible "Blitz and Mann unit" expanded to cover most of level base. Excavators recognized that this was not the 1992 unit. Homogenous yellow-brown sand is present in southwest corner. Finds: one Marksville Incised sherd.

D – Western half was homogenous yellow brown sand; eastern half was yellow-brown sand mottled with grayish brown sand. Possible posthole (likely root stain) noticed in northwestern corner was not considered a feature. No artifacts.

E – Homogenous yellow-brown sand found across entire base of level except along the mid-portion of the north wall where a concentration of black sand and charcoal was encountered. This was designated Feature 1*, which was excavated in three 10 centimeter levels designated Features 1A (in Level E), 1B (in Level F), and 1C (in Level G). Feature 1 soil was bagged as a sample. No artifacts. *Feature 1 was later determined not to be a cultural feature.

F – Compact yellowish-brown sand and very pale brown sand was throughout western half of unit; looser yellowish brown sand was in eastern half. Feature 1 remains distinct. No artifacts.

G – Very light charcoal inclusions occurred throughout fill. Yellowish-brown sand mottled with

very pale brown sand found throughout level (except Feature 1). Finds: One stone chip.

H – Compact yellowish-brown sand and very pale brown sand throughout western half of unit; looser yellowish brown sand in eastern half; water staining in north-south band across middle of unit. No artifacts.

I – Compact yellowish-brown sand and very pale brown sand throughout most of unit; organic staining in southeast corner marked beginning of midden layer, but was not recognized as such until Level J and dubbed K1; ephemeral water straining in approximately same location as mapped for base of level H. Finds: One small undecorated sherd (likely from organic stain in southeast corner).

J – Compact charcoal-flecked yellow-brown sand throughout most of level; excavators recognized larger pieces of charcoal than encountered in immediately previous levels. Finds: Two rim sherds from K1 midden area, 1 tabular hematitic sandstone, 1 tabular ("tongue-shaped" and possibly ground on one end) hematitic concretion.

K1 – Midden. Dark grayish brown and yellowish-brown sand. Finds: Shell, one projectile point (excurvate blade, pressure-flaked margin), and three undecorated sherds.

K2 – Non-midden. Water stain similar to that of Level H now in east-west band across center of unit; mottled soil on either side of stain.

L1 – Midden. Dark grayish sand mottled with yellowish-brown sand across most of level base. Faunal bone, shell (bivalves and periwinkle); majority of artifacts from southwestern corner.

L2 – Last remnants of yellow-brown sand in northwest corner.

M – All midden, grayish brown sand throughout except for black sand in southwestern corner. Finds: Faunal (shell, fish, and turtle bone), sherds, lithic core and debitage, ceramics (decorated and undecorated).

N – All midden except at eastern wall where excavators encountered a sub-midden layer free of artifacts. Large shell concentration in mid-south wall. Decline in number of artifacts from previous level; numerous sherds, fish bone, shell, lithic debitage. One C-14 sample and soil sample from southwest corner.

O – Remainder of midden. Stopped at base of midden approximately 5 cm below base of level N. Finds: Shell from southwestern corner (some whole bivalves wrapped in foil and saved as samples), bone, ceramics (less than previous midden layers).

P – Brown circular root stains, compact grayish brown sand (midden staining), with yellowish-brown sand in eastern and south part of unit. No artifacts.

Q – Yellowish-brown sand mottled with light yellowish-brown sand throughout unit; multiple brown circular root stains. Finds: Shell fragment likely fell from wall. No artifacts.

R – Loose yellowish-brown sand on eastern half of unit; compact yellowish-brown sand mottled with pale brown sand in western half of unit. Finds: Heavily reworked, Late Archaic Little Bear Creek point of Tallahatta quartzite recovered from western part of unit; small chunk of hematite, one faunal, one local chert debitage.

S – Western 3/4ths of unit is yellowish-brown sand mottled with very pale brown sand anddarker lamellae; eastern 1/4th is loose yellowish brown sand mottled with light yellowish-brown sand. No artifacts.

T – Compact yellowish-brown sand mottled with white sand and darker lamellae; subsoil. Finds: One local chert debitage.

U – Compact very pale yellowish brown sand with darker lamellae. No artifacts.

Auger tests at base of unit to test for buried strata. Layer of dark sand with charcoal flecks encountered in northwest test. Two additional tests (not profiled) done between northwest test and center test. These were practically identical to center, southeastern, southwestern, and northeastern tests, so the decision was made not to continue to a deeper depth.

4. List and describe features by level, and correlate feature to strata:

Feature 1 was encountered at the base of level E, overlapping north wall into unexcavated soil. It was amorphous/very roughly circular. Full of charcoal. Feature was 30 cm in depth; excavated in three 10-cm levels (dubbed Feature 1A, Feature 1B, Feature 1C). Feature was determined not to be cultural. Probable root stain. No artifacts.

5. Correlate strata and/or features with contiguous units:

Down-slope midden wash (free of artifacts) encountered at approximately same depth in Unit 2.

6. Disturbances/mixing:

No mixing. Soil at 30 to 95 cm below surface disturbed by root stain/burn (Feature 1)—see north profile.

7. Interpretation: Create analytical provenience units (associated strata/levels/features) and arrange in stratigraphic order (include temporal phases of analytical unit if known).

Zone 1 (A Horizon): (some in Levels A-E; Feature 1 encountered at Level E) Zone 1 is composed of decayed/decaying organic material above a level of 10YR4/1 dark gray sand. Only one artifact, a Marksville Incised sherd, was recovered from this zone.

Zone 2 (sand cap/mound layer): (some in Levels B-E; Levels F-H almost totally Zone 2 soil; some in levels J-L). Zone 2 is the uppermost mound layer, a cap of relatively loose and homogenous 10YR5/4 yellowish brown sand.

Zone 3 (sand cap/mound layer): (some in levels G-L). Zone 3 is the lower mound layer of relatively compact 10YR5/4 yellowish brown sand mottled with 10YR4/3 brown sand. Most of the artifacts recovered from this layer derive from its lower limits, overlying the midden layer.

Zone 4 (Late/Middle Woodland period midden): (Levels K1, L1, M, and N) Zone 4 is a midden layer of dark sand ranging from 10YR2/1 black to 10YR4/2 dark grayish brown sand in color. The darkest and thickest portion (approx. 25 cm thick) of the midden was encountered in the southwest portion of the unit. The thinnest portion (approx. 5 cm thick) was encountered in the extreme northwest portion of the unit). In Zone 4, excavators encountered pockets of faunal remains - shell, bone, and some preserved botanicals (hickory nut?). These pockets were discrete. Two were composed almost entirely of marsh clams while a third was composed of mussel (?) shell. This third concentration also yielded the bulk of the animal bone that was recovered from the midden. The midden as a whole yielded undecorated (Baytown Plain) and decorated (Marksville Incised, and Marksville Incised and Painted) ceramics, one projectile point, one core, and one drill of local Citronelle stone, lithic debitage, and several Carbon-14 samples.

Zone 5: (Archaic?) (some of Levels M, N, and R; Levels O, P, and Q are entirely Zone 5) This zone was initially thought to be sterile, but it yielded artifacts including a Little Bear Creek point (Late Archaic) of Tallahatta quartzite, and several local flakes. The uppermost portion of this layer is characterized by a compact 10YR5/6 yellowish brown sand mottled 10YR4/2 dark grayish brown sand. It is stained by the midden that directly overlies it. This zone transitions to a loose 10YR5/6 yellowish brown sand mottled with 10YR6/4 light yellowish brown sand.

Zone 6 (subsoil): (Level R is partially Zone 6; Levels S-U are entirely Zone 6) Unit 1 subsoil is characterized by compact 10YR7/3 very pale brown sand with 10YR4/6 dark yellowish brown lamellae.

Unit 2

Unit Dimensions: 1-by-2 m
Unit Level: A to M and Lower (auger tests)
On Mound Unit: Eastern Flank
Excavated Depth of Unit Below Ground Surface: 1.40 m
Dates Excavated: May 5-20, 2010
Excavated By: Rachel V. Briggs, Paul N. Eubanks, and Daniel R. Turner
Recorded By: Rachel V. Briggs and Daniel R. Turner

1. Unit description/ location:

Unit 2 is a 2-by-1-m unit on the eastern flank of the mound 2 m east (and down-slope) of Unit 1.

2. Excavation objective:

The first stratum was excavated stratigraphically; the rest of the excavation was in controlled 10-cm levels within natural levels in order to determine stratification at the base of the eastern flank of mound. Excavated through subsoil.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

A – Natural excavation, humus layer, concluded with soil change to mound sand cap/wash in NW corner.

B – 10-cm arbitrary, mound construction/wash from mound, see profile drawings and level form for Munsell.

C – 10-cm arbitrary, mound construction/wash from mound, see profile drawings and level form for Munsell.

D – 10-cm arbitrary, mound construction/wash from mound, see profile drawings and level form for Munsell.

E – 10-cm arbitrary, mound construction/wash from mound, top of buried "A" horizon, see profile drawings and level form.

F – 10-cm arbitrary, buried "A" horizon, see profile drawings and level form for Munsell.

G – 10-cm arbitrary, bottom of buried "A" horizon, top of "B" horizon, see profile drawings and level form for Munsell.

H – 10-cm arbitrary, "B" horizon, see profile drawings and level form for Munsell.

I – 10-cm arbitrary, "B" horizon, see profile drawings and level form for Munsell.

J – 10-cm arbitrary, "B" horizon, beginning of gradual transition to "C" horizon, see profile drawings and level form.

K – 10-cm arbitrary, gradual transition from "B" to "C" horizon, see profile drawings and level form.

L – 10-cm arbitrary, "C" horizon in the northwest, transition in the east, see profile drawings and level form.

M – 10-cm arbitrary, "C" horizon, see profile drawings and level form for Munsell.

4. List and describe features by level, and correlate feature to strata:

No features identified.

5. Correlate strata and/or features with contiguous units:

No contiguous units are open yet.

6. Disturbances/mixing:

There was bioturbation throughout, including root disturbances from two nearby trees (one along the south wall and one near the west wall); additional disturbance from a rotten tree hole along the south wall.

7. Interpretation:

Approximately 5 profile strata revealed though 13 levels (12 of which were 10-cm arbitrary) show only one phase of mound construction between the humus layer and a buried "A" horizon. This possible episode of mound construction can be attributed to the final stage (sand cap) or wash from higher on the mound (given the unit's position on the eastern flank of the mound). Characterized by 10YR4/4 dark yellowish brown compact sand, this cultural layer appears in levels B through E. All other levels are associated with natural strata (root mat/ humus layer, buried "A" horizon below the aforementioned episode of mound construction, "B" horizon, and "C" horizon).

Root mat/humus layer: NW corner (~20 cm thick), NE corner (~20 cm thick)

Mound construction/ wash from mound: NW corner (~38 cm thick), NE corner (~20 cm thick)

Buried "A" horizon: NW corner (~13 cm thick), NE corner (~13 cm thick)

"B" horizon: NW corner (~36 cm thick), NE corner (~42 cm thick)

"C" horizon: NW corner (~32 cm thick), NE corner (~23 cm thick)

Unit 3

Unit Dimensions: 1-by-2 m
Unit Level: A-H
Off Mound Unit
Excavated Depth of Unit Below Ground Surface: 1.41 m
Dates Excavated: May 13-24, 2010
Excavated By: Erik S. Porth and Adam L. Phillips
Recorded By: Erik S. Porth

1. Unit description/ location:

Unit 3 is located off-mound in the western portion of the site. It is near the southwestern flank corner of the mound. Unit 3 is a 1-by-2-m unit located on an East/West grid. The unit was excavated to sterile subsoill at a depth of 90 to 100 cm below ground surface. Below this depth, an exploratory level was excavated to provide a comparative off-mound context for Dr. Sarah Sherwood.

2. Excavation objective:

A bucket auger test located just north of N975 E965 indicated a large concentration of charcoal around 30-35 cm in depth. The objective of Unit 3 was to determine if the charcoal was in fact cultural. Ceramic sherds were associated with the charcoal and the surrounding matrix.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

A – Removed the humus layer to expose a matrix of 10YR3/1, a very dark gray, very fine silty sand and 10YR5/4, a yellowish brown, very fine sand.

B – A 10-cm arbitrary level that exposed an area of 10YR3/6 dark yellowish brown sand mottled with 10YR6/6 brownish yellow sand. A charcoal concentration in the southwest quadrant was designated Feature 2.

C1 – This level was excavated as a 10-cm arbitrary level to expose the extent of the ash and charcoal scatter surrounding Feature 2.

C2 – This level was excavated in an area of 10YR6/8 brownish yellow compact sand.

D1 – This level continued to expose the area around Feature 2.

D2 – This level continued to expose the sterile soil around D1 using a 10-cm arbitrary level.

E1 and E2 – These levels continued to expose a matrix of charcoal and ash surrounded by lighter brown sand (E2). Both of these levels were excavated in 10-cm arbitrary levels to expose the soil extents and differences.

F1 and F2 – These levels continued to expose soil differences in 10-cm arbitrary levels. Afterwards it was determined (through split-coreauger tests) that the ash, charcoal, and oxidized sand was fairly shallow at the base of Level F.

G1 and G2 – These levels were excavated in 15 cm arbitrary levels. At the base of Level G, the differences went away and exposed a large area of sterile, very compact sand.

H – This level exposed very compact sterile sand in 15 cm levels.

*An additional 50 cm of soil was removed below the base of Level H as an exploratory level to examine the natural subsoil on site in consultation with Sarah Sherwood. As this soil was sterile and devoid of cultural material, it was not screened.

4. List and describe features by level, and correlate feature to strata:

Feature 2 was the only feature in Unit 3. It was a concentration of charcoal scatter, in particular a large burnt log. This feature was located in Levels B through D; it was removed as two separate charcoal samples that were large chunks of charcoal. In Level B, there was a large ceramic sherd that was uncovered during excavation within the ash area. After the charcoal was removed, excavations in Level D exposed a small, thin heat altered sherd. Feature 2 was determined not to be a cultural feature during the course of excavation.

5. Correlate strata and/or features with contiguous units:

Unit 3 is an isolated unit. There are no contiguous units.

6. Disturbances/mixing:

There were multiple rodent burrows within the unit that were located between 20 and 60 cm. They were mostly evident in the north profile. The base of Level B contained a large root that extended through the center of the eastern half of the level. The main disturbance in Unit 3 was a large root burn (Feature 2) and associated gray and brown soils in the western half of the unit. It extends into Level F.

7. Interpretation:

The humus layer and associated stain extend to a depth of 2-10 cm across the unit. Directly below the humus layer is a layer of 10YR5/3 brown silty sand. This was a very loose layer of soil with intrusive roots. In the western portion of the unit, there is an area of 10YR3/6 very dark gray ash. This layer is lose and intermixed with dense concentrations of charcoal. An area of 10YR3/6 very dark gray ash intermixed with 10YR3/4 dark yellowish brown extends to a depth of about 70 cm below ground level in the west-central portion of the unit. This entire level is filled with dense charcoal. It becomes more concentrated and smaller with depth. Feature 2 is about 20-by-20 cm and located in the west-southwest of the unit. It was a tree/root burn (probably modern) that extended to a depth of around 60 to 70 cm below the ground surface.

This area of ash, charcoal and oxidized sand is surrounded by a mottled area of 10YR6/8 brownish yellow sand and 10YR7/6 yellow compact sand. This area is located in the northwest corner, continues along the north wall and comprises the entire eastern half of the unit. It increases to the south and to the center as the charcoal concentration decreases. At around 30-40 cm below the extreme eastern portion of the unit, an area of sterile 10YR7/4-6 very pale brown to yellow mottles with 10YR5/8 yellowish brown very compact san begins. As the unit continued to a terminal depth of around 90-100 cm below ground surface, the sterile areas expanded to the center. There was also another area of this mottled matrix at around 90 cm in the southwest corner of the unit. After the charcoal scatter was excavated, the underlying matrix was an area of 10YR6/8 brownish yellow and 10YR7/6 yellow compact sand across the majority of the unit.

Unit 4

Unit Dimensions: 1-by-2 m
Unit Level: A-V
On Mound Unit: Eastern Flank
Excavated Depth of Unit Below Ground Surface: 2.12 m
Dates Excavated: May 14-June 17, 2010
Excavated By: Paul N. Eubanks and Ashley S. Korpela
Recorded By: Paul N. Eubanks and Ashley S. Korpela

1. Unit description/location:

Unit is 1-by-2 m dimensions located on the eastern flank of the mound on the east-west baseline directly adjacent to Unit 1 such that the SE corner of Unit 4 meets the NW corner of Unit 1.

2. Excavation objective:

Working on levels of 10-cm or natural soil change, the objective was to locate any possible structures, features, midden, or Blitz and Mann's previous test unit. It was also important to find evidence for the construction of the mound. The excavation continued until reaching sterile subsoil.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata.

A – The first level to be excavated. The objective was to remove the first 10-15 cm of humus and humus stained soil to expose the lighter yellow gray loam and sand beneath. Base of level was lighter yellow-grey sand with some humus staining still evident. No artifacts were found and this level correlates to Zone 1 and 2 – Root Mat and Humus Staining.

B – The Level B objective was to remove a 10-cm arbitrary level to expose the sterile yellow sand cap or to a natural soil change. This resulted in a fill of loose grey humus stained sand (10YR6/2) shifting to a lighter yellow-tan sand (10YR6/4) in areas (especially the west) with darker areas of humus stained loam and sand remaining in the east. Only artifacts were small fragments of charcoal and this level correlates to Zone 2 – Humus Staining.

C – The level C objective was a 10-cm arbitrary level into the sterile yellow-tan sand cap (10YR6/4) or to a natural soil change. The base consisted of a homogeneous yellow-tan sterile sand cap (10YR6/4) with some mottling /leaching of the humus sand (a loose grey and brown loam/sand) in the eastern 1/3 of the unit. Fill was consistent with base as well, no artifacts were found.

D – The Level D objective was a 10-cm arbitrary level in the yellow-tan sand cap (10YR6/4) or to a natural soil change. Much the same as level C, the fill was a homogenous yellow-tan sand (10YR6/4). Most of the humus mottling in the eastern end of the unit had been removed. Base was consistently the homogenous yellowish brown sand (10YR6/4). Artifacts included one large Baytown Plain rim with a single incised line parallel to the rim and several large mussel shells, some small charcoal fragments, and several sand concretions.

E – The Level E objective was a 10-cm arbitrary level within the yellow-tan sand cap (10YR6/4) or until a natural soil change. Similar to level D, the fill and base soil was loose and homogeneous 10YR6/4 yellow-tan sand. Artifacts included 1 Baytown Plain sherd, shell, and charcoal.

All 3 Levels B, C, D correlate to Zone 3–Mound Fill.

Levels F, G, H, I, J, K, L –

F – The Level F objective was a 10-cm arbitrary level or natural soil change. Fill was mostly 10YR6/4 yellow tan sand but slightly more compact than the previous level. It was also lightly mottled with 10YR7/4 very pale brown sand in the southern half of the unit. There was a shell concentration in the south-center of the unit, but it was not present in the base. The 10YR6/4 yellow tan matrix gives way to a somewhat compact 10YR3/2 very dark grayish brown sand and some darker lamellae in the western half of the unit. Artifacts included shell with a light scattering of charcoal.

G – The Level G1 objective was a 5-cm arbitrary level to expose more of the 10YR3/2 very dark grayish brown sand from Level F. This level failed to expose the very dark grayish brown sand in the eastern half of the unit. The base of this level was the same as Level F. Artifacts included shell and ceramics with a light scattering of charcoal.

G2 – The Level G2 objective was a 5 cm arbitrary level to expose more of the 10YR3/2 very dark grayish brown sand from Level F and G1. Again, this level failed to expose the 10YR3/2 very dark grayish brown sand in the eastern half of the unit. The base of this level was the same as Levels F and G1. There were no artifacts aside from a light scattering of charcoal.

H – The Level H objective was a 10-cm arbitrary level or natural soil change with expectations to uncover more of the 10YR3/2 very dark grayish brown sand from Levels F-G2. The fill and the base were 10YR6/4 yellowish tan sand lightly mottled with 10YR7/4 very pale brown sand. Artifacts included one Baytown plain rim and one sand/grit-tempered incised sherd. This level also contained Feature 3, which was later determined not to be cultural in origin.

I-The Level I objective was a 10-cm arbitrary level or natural soil change. The fill and the base were 10YR6/4 light yellowish brown sand lightly mottled with 10YR7/4 very pale brown sand, but some areas were mottled with 10YR3/1 very dark gray sand (with some charcoal- we originally thought this might be a root disturbance, but we later discovered that this was an initial pocket of midden) and 10YR5/4 yellowish brown sand. All soils were compact, and there were no artifacts.

J-The Level J objective was a 10-cm arbitrary level or natural soil change. The fill and the base were 10YR6/4 light yellowish brown sand lightly mottled with 10YR7/4 very pale brown sand. The "root disturbance" in the eastern wall was still present and contained 10YR5/4 yellowish brown sand mottled with 10YR3/1 very dark gray sand with a light scattering of charcoal. There were no artifacts.

K-The Level K objective was a 10-cm arbitrary level or natural soil change. The fill and the base were 10YR6/4 light yellowish brown sand lightly mottled with 10YR7/4 very pale brown sand. The "root disturbance" in the eastern wall was still present and contained 10YR5/4 yellowish brown sand mottled with 10YR3/1 very dark gray sand with a light scattering of charcoal. Artifacts included two sherds.

L-The Level L objective was a 10-cm arbitrary level or natural soil change. We stopped at a natural soil change, which we deemed to be a midden. This midden consisted of 10YR3/1 very dark gray sand. We divided the base of this level into three levels M1, M2, and M3. M1 was 10YR5/4 yellowish brown sand mottled with 10YR7/4 very pale brown sand. M2 was 10YR5/2 grayish brown sand and extends from the southwestern corner through the middle of the unit to the northeastern corner of the unit. M3 was 10YR3/1 very dark gray sand mottled with 10YR5/4 yellowish brown sand and was located in the northeastern and northwestern corners of the units. Artifacts included charcoal, two burnished rim sherds, one sand/grit-tempered incised rim sherd, one sand/grit-tempered plain rim sherd, three body sherds, one piece of coastal agate, and one sand/grit-tempered body sherd (refit).

Levels F – L correspond to Zone 4-Mound Fill.

Levels M, N, O –

M1-Level M1 was a 10-cm arbitrary level or to natural soil change. The fill was 10YR5/4 yellowish brown sand mottled with 10YR7/4 very pale brown sand (mound fill). The base was the same as the fill but it was also mottled with 10YR5/2 gray brown sand except one area was 10YR3/1 very dark gray sand. There were no artifacts in this level.

M2-The Level M2 objective was a 10-cm arbitrary level or until natural soil change (midden). The fill was a 10YR5/2 grayish brown sand (mound fill). The base was 10YR3/1 very dark grayish sand (midden). The level base contained the onset of Feature 4, a shell concentration feature.

M3-The level M3 objective was 10-cm arbitrary level or until natural soil change. The level fill was 10YR3/1 very dark gray sand (midden). The west side of the unit consisted of 10YR7/4 very pale brown sand. The southeastern quadrant consisted of 10YR5/4 yellowish brown sand. The rest of the unit consisted of 10YR3/1 very dark gray sand. There is a shell concentration, Feature 5A, in the center of the unit. The artifacts included a plain sherd, some rim and body sherds, some of which are Marksville incised. There is also a ceramic base fragment that was taken as a sample for interior residue, and a base sherd.

N1-The Level N1 objective was a 10-cm arbitrary level or until natural soil change. The goal of this level was to remove the remainder of the midden deposit to a maximum depth of 10 cm. The fill was the level was 10YR3/1 very dark gray sand (midden). In the north-center of the unit we encountered a shell concentration that we believe is an extension of Feature 5, this context will be excavated separately. Artifacts included bone, charcoal, a chert cobble, pottery (Marksville Incised, *var. Spanish Fort*), and shell. We piece-plotted a grog and sand/grit-tempered incised and punctated sherd. Feature 4 was re-encountered in the level, designated Feature 4B, and it extended into Level O.

N2-The Level N2 objective was a 10-cm level or natural soil change to expose midden in the southeastern corner of the unit. The fill was 10YR5/4 yellowish brown sand. The base is composed in the

western half of the unit of 10YR7/4 very pale brown sand that is quite loose. The center of the unit contains the base of Feature 4A, which is composed of 10YR3/1 very dark grey sand, and the base of Feature 5B which is composed of 10YR3/1 very dark grey sand and contains a shell concentration. The eastern half of the unit is split by midden in the northeastern quadrant which is 10YR3/1 very dark grey sand known as N1. While the southeastern quadrant contains 10YR5/4 yellowish brown sand and is quite compact known as N3 [Initial Mound]. Artifacts include charcoal, ceramics, and shell.

O1-The level O1a objective was to remove the rest of the midden from the eastern half of the unit or until 10-cm of soil has been removed. The fill of this level was 10YR3/1 very dark gray sand [Pre-Mound Surface]. During excavation it was discovered that the 10YR3/1 very dark gray sand midden [Pre-Mound Surface] underlay the 10YR5/4 yellowish brown sand [Initial Mound] in the southeast corner of the unit. This context was excavated as level O1b and brought down level to O1a. The base of this level was 10YR7/4 very pale brown very loose sand in the western half of the unit (level O3), 10YR3/1 very dark gray sand (midden) in the northeastern corner of the unit, and 10YR5/4 yellowish brown very compact sand in the southeastern corner of the unit. Artifacts from O1a included a plain sherd, shell, charcoal, bone, and a small flake. This level was originally called level O1, but during excavation of O2 it was discovered that O2 overlaid the midden which is O1 and so it was retroactively given an "a" and "b" designation.

O2-The level O2 objective was to shave off the top of this level (should only be a few cm) to expose the midden in the southeastern corner of the unit. The fill was 10YR5/4 yellowish brown fairly compact sand. The area of the southeastern quadrant that is designated O2 base came to 10YR3/1 very dark gray sand (midden) and will become O1b. The northern quadrant, O1a, was also 10YR3/1 very dark gray sand (midden) while the western half of the unit was still 10YR7/4 very pale brown sand which was excavated as O3. Artifacts included shell, bone, and charcoal.

O1b- The level O1b objective was to excavate 10-cm of soil to make the base of the unit level with 01a or until a natural soil change. Fill of this level was 10YR3/1 very dark gray sand (midden). The base was 10YR7/4 very pale brown very loose sand. During the excavation of O1a it was discovered that the midden [Pre-Mound Surface] continued below 02—a compact yellow brown sand episode of mound fill—seemingly distinct from the yellow fill located in the western part of the unit based on color and compactness, thus this portion of the midden was excavated separately after the excavation of the overlying yellow brown mound fill (O2). Artifact included shell, bone, and 1 plain body sherd.

O3-The level O3 objective was to bring the unit level with the bases of O1a and O1b or until natural soil change. The fill of this level was 10YR7/4 very pale brown sand. About 4 cm above level with O1a and O1b (i.e., 299 cm with an IH of 287) moderated mottling with 10YR3/1 very dark gray sand (midden) was discovered. We leveled of the level here instead of going down to target excavation depth (303 cm). The eastern half that is 10YR3/1 very dark gray sand (midden) [Pre-Mound Surface] is to be excavated as P1. Artifacts included shell and one plain basal sherd.

Levels M, N, and O are part of Zone 5 – midden.

P1– The objective of this level was a 10-cm arbitrary level or until natural soil change. Fill of this level was 10YR3/1 very dark gray sand (midden) [Pre-Mound Surface]. Only the midden area (10YR3/1 very dark gray sand) was excavated and the base is 10YR4/3 brown sand mottled with 10YR4/2 dark grayish brown sand except for a few spots along the south wall and eastern balks which were 10YR3/2 very dark grayish brown and 10YR3/1 very dark gray sand. The western half was the unit was the same as O3's base (we did not excavate this area- it will be excavated as P2 in one level). Artifacts included a plain sherd, shell, and bone. This level was part of Zone 6 – Leaching from midden.

P2- The objective of this level was a 10-cm arbitrary level or until natural soil change. Fill was this level was 10YR6/5 light yellowish brown sand with variable mottling of 10YR4/2 dark grayish brown sand (leaching from midden). Within cm of the surface, we came upon 10YR3/1 very dark gray sand which we have deemed a second midden [Pre-Mound Surface]. We stopped and leveled off at the start of the midden, except in the eastern quadrant of the unit in which the midden was at first unrecognizable. The midden was 10YR3/1 very dark and compact sand mottled with a looser 10YR7/4 very pale brown sand. The base (see plan view of P2) consists of mostly 10YR3/1 very dark gray sand (midden) except the eastern half of the unit where 10YR4/2 dark grayish sand is located. While it

is believed this is still midden it is a slightly different color. Artifacts included shell, one small pottery sherd and charcoal.

Q- The objective was to bring the entire floor (midden) [Pre-Mound Surface] down to level with P1 (315 cm with an IH of 291 cm) or until natural soil change. The fill of the unit was 10YR3/1 very dark gray sand (midden) lightly mottled with 10YR7/4 very pale brown sand (mound fill from above or below) along the western half of the unit, and 10YR4/2 dark grayish brown sand in the eastern half (also part of the midden). The base of this level was mostly 10YR4/2 dark grayish brown sand mottled moderately with 10YR5/2 grayish brown sand and lightly mottled with 10YR3/1 dark grayish brown sand (midden) but along the north wall there is a small area of 10YR3/1 dark grayish brown sand (midden). In the NE corner there is an area of 10YR5/4 yellowish brown sand (not midden). Artifacts including charcoal, shell (not a lot for a "midden" context).

Level P2 and Q – Zone 7 into and including Zone 8 – Mound Fill and probable pre-mound surface.

R1- The objective for this level was 10-cm arbitrary level or until natural soil change with a goal of exposing the 10YR5/4 yellowish brown relatively loose sand that is probably under the remainder of the midden in the unit which was exposed in the NW corner during excavation of level Q. Fill of this level was 10YR5/2 dark grayish brown sand (midden leaching). Base of the western portion of the unit was 10YR5/4 yellowish brown sand mottled with 10YR4/2 dark grayish brown sand, while the eastern half of the unit was a little darker and was 10YR4/2 dark grayish brown sand lightly mottled with 10YR5/4 yellowish brown sand except two areas in the eastern half that are small leftovers of some midden leaching that are 10YR3/2 very dark grayish brown sand. Artifacts included shell, sherdlets, one piece of coastal plain chert, one fish vertebrae, two pieces of dense hematite and some pieces of charcoal.

R2– The objective for this level was to bring this area down 10-cm to level with R1 or until natural soil change. Fill of this level was 10YR5/4 yellowish brown sand (sterile mound fill) After only excavating the NW quadrant of the unit that was designated R2 on the R1 plan view form, the soil at the base was still 10YR5/4 yellowish brown sand (sterile mound fill). The artifacts included small pieces of charcoal.

Level R1, R2 – Zone 9 – Humus Leaching.

S- The objective of the level was 10-cm arbitrary level or until natural soil change. The fill and base were both 10YR5/4 yellowish brown sand (sterile mound fill) very lightly mottle with 10YR7/4 very pale brown sand and 10YR4/2 dark grayish brown sand. Artifacts included charcoal, some small lithic flakes, and one sherdlet.

T- The objective of the level was 10-cm arbitrary level or until natural soil change. The fill and base were both iron-rich 10YR6/6 brownish yellow sand lightly mottled with 10YR7/4 very pale brown sand. Soil was also very compact and we believe this is a transition and the beginning layer of the sterile subsoil. Artifacts included 1 citronelle chert flake, and very minimal charcoal pieces.

Level S, T – Zone 10 – Sterile subsoil.

U-The objective was 10-cm arbitrary level or until natural soil change. The fill and base were both iron-rich 10YR6/6 brownish yellow sand lightly mottled with 10YR7/4 very pale brown sand. No artifacts.

V- The objective was 10-cm arbitrary level or until natural soil change. The fill was iron-rich 10YR6/6 brownish yellow sand (sterile sub-soil). Base was sterile, iron-rich, compact 10YR6/4 light yellowish brown sand lightly mottled with 10YR7/4 very pale brown sand. The ferrous lines of soil are 10YR5/8 yellowish brown sand. No artifacts.

Level U, V – Zone 11 – Sterile subsoil.

4. List and describe features by level, and correlate feature to strata.

Feature 3 – Base of Level H – Zone 4: possible post hole along the southern wall in the central part of the unit, consisted of very dark grayish brown sand (10YR3/2) with concentrations of charcoal and shell, dimensions of 16 cm E-W x 11 cm N-S before excavation. Feature later was determined not to be cultural. Probable root stain.

Feature 4A) – Base of Level MII – Zone 5: circular shell concentration in the center of the unit , consisted of grey brown sand (10YR5/2) containing bone, pottery, shell, and a small piece of mica, dimensions of 20 cm E-W x 19 cm N-S before excavation.

Feature 5A – Base of Level MIII – Zone 5: amorphous shell concentration in the central part of the unit, with some of the feature continuing to the southern wall, consisted of very dark gray sand (10YR3/1) containing shell, bone and a light scattering of charcoal, as well as

pottery sherds including rims, dimensions of 50 cm E-W x 49 cm N-S before excavation.

Feature 5B – Base of N1 – Zone 5: amorphous shell concentration in the central part of the unit, consisted of very dark gray sand (10YR3/1) containing large pieces of shell, bone, and pottery sherds, dimensions of 54 cm E-W by 63 cm N-S before excavation.

Feature 4B – This feature was contained in N1 and N2 – Zone 5: amorphous shell concentration in central part of the unit, consisted of very dark gray sand (10YR3/1) containing large pieces of shell, bone (including numerous vertebrae of the same size), and pottery sherds, dimensions of 73 cm E-W by 35 cm N-S before excavation.

Feature 5C – feature contained in O – Zone 5: amorphous shell concentration in central part of the unit, consisted of very dark gray sand (10YR3/1) containing large pieces of shell, bone (including a tooth), charcoal, and pottery sherds, dimensions of 20 cm E-W by 45 cm N-S before excavation.

Feature 4C – feature contained in O – Zone 5: oval shell concentration in central part of the unit, consisted of very dark gray sand (10YR3/1) mottled with very pale brown sand (10YR7/4) containing pieces of shell and charcoal, dimensions of 14 cm E-W by 10-cm N-S before excavation.

Feature 5D – feature contained in O3 into P – Zone 5 and 6: oval shell concentration in central part of the unit, consisted of very dark gray sand (10YR3/1) mottled with very pale brown sand (10YR7/4) containing pieces of shell and trace amounts of charcoal and bone dimensions of 16 cm E-W by 24 cm N-S before excavation. This was the end of the feature.

Samples taken:

#14 – Level I: Feature 3 – Soil/Flotation Sample
#15 – Level I: Feature 3 – Radiocarbon Sample
#17 – Level MIII (Top): Feature 4A – Soil/Flotation Sample
#18 – Level MIII (Top): Feature 4A – Radiocarbon Sample
#19 – Level MIII: Soil/Flotation Sample
#20 – Level MIII: Radiocarbon Sample
#21 – Level MIII: Ceramic Residue Sample (A & B).
#22 – Level MIII: Feature 5A – Soil/Flotation Sample
#23 – Level N1: Feature 5B – Soil/Flotation Sample
#24 – Level N1: Feature 5B – Radiocarbon Sample
#29 – Level N1: Soil/Flotation Sample
#30 – Level N1: Radiocarbon Sample
#33 – Level N1/N2: Feature 4B – Soil/Flotation Sample
#35A/B – Level N1/N2: Feature 4B – Ceramic Residue Sample
#53 – Level O3: Soil/Flotation Sample
#57 – Level P1: Soil/Flotation Sample
#59A/B – Level P1: Ceramic Residue Sample
#60 – Level P1: Radiocarbon Sample
#66A/B – Level P2: Ceramic Residue Sample
#69 – Level Q: Soil/Flotation Sample
#82 – Wall Clean-Up, Base of Midden: Radiocarbon Sample
#83 – Wall Clean-Up, Top 5 cm of Midden: Radiocarbon Sample

5. Correlate strata and/or features with contiguous units:

The midden, as well as second dark strata, which we believe tobe the original ground surface, converge in the eastern half of the unit and were seen as a single stratum in the Unit 1 profiles. However, after looking closer at the strata in Unit 1, color changes can be seen that indicate a difference in the two in that area as well.

6. Disturbances/mixing:

Throughout the unit there was abundant root disturbance, especially in the uppeR40 cm of the unit. There also is a possible disturbance in the south wall, around the area where the midden and original ground surface converge. The disturbance extends south and creates a gap in the line of dark strata. It is unknown what this could be.

7. Interpretation: create analytical provenience units (associated strata/levels/features) and arrange in stratigraphic order (include temporal phases of analytical unit if known):

This unit contained three features. These features were distinguished as such by concentrations of shell and bone. While formally designated as Features 3, 4, and 5, it was speculated that these were in actuality the same feature based on their spatial proximity. The presence of these features suggested that food preparation or consumption along with food disposal occurred on or near the mound. Recovered artifacts included sand and grog tempered ceramics, lithics, shell, charcoal, and bone. Decorated modes on the ceramics included: incising, red filming (interior), false rim folds (an incised line 1-4 cm below the lip of the vessel). These modes are indicative of the Weeden

Island I period as defined by Willey (1949:396-397). Given the absence of check stamping, a Weeden Island II correspondence was not inferred. Zones 1-2 are the mound's modern surface, they include the root mat and humus staining. Zones 3-4 are mound fill, and Zone 5 is a midden. Zone 6 is leaching from the midden, and Zone 7 is mound fill. We speculate that Zone 8 is the premound surface. While Zone 8, like Zone 5, is dark gray in color, this zone had almost no artifacts, unlike Zone 5 which contained the densest concentration of cultural material. Zone 9 is humus leaching from Zone 8, and Zones 10 and 11 are sterile subsoil, becoming increasingly mottled with ferrous staining. In the eastern balk on the northern wall, a small layer of 10YR6/2 light brownish gray sand is slightly lighter than the surrounding 10YR6/2 matrix. This may be the remnant of an old excavation unit possibly from Blitz and Mann or Greenwell.

Unit 5

Unit Dimensions: 1-by-2 m
Unit Level: Zones 1-8
On Mound Unit: Eastern Flank
Excavated Depth Below Ground Surface: 1.70 m
Dates Excavated: May 24 – June 17, 2010
Excavated By: Rachel V. Briggs and Daniel R. Turner
Recorded By: Rachel V. Briggs and Daniel R. Turner

1. Unit description/location:

Unit 5 is a 1-by-2-m unit on the eastern flank of the Graveline Site mound. Its southeast corner is the same as the northwest corner of Unit 2, and its southwest corner is the same as Unit 1's northeast corner. It is the second unit in the line of units running west across the mound.

Table A-1. Corresponding Excavation Forms.

Corresponding Excavation Forms/Identified Zones and Levels—Levels and Strata	Soil Description	Notes
Root Mat: Zone 1	10YR5/2 (grayish brown) silty sand	Excavation of this zone ceased on the west part of the unit when we reached 2a (see below).
Zone 2, Level A	10YR4/4 (yellowish brown) sand	10-cm arbitrary level. Some charcoal, lots of roots; probably wash down the mound from previous excavations.
Zone 2, Level B	10YR5/2 (grayish brown) silty sand, mottled with 2a (see above)	10-cm arbitrary level. What was the probably the surface prior to the late 20th century activities on the mound.
Zone 2, Levels C and D	10YR5/3 (brown) silty sand	Both 10-cm arbitrary levels with final level terminated at stratigraphic change. Mound. Mound Construction Episode 2; as the strata travelled east, became indistinguishable from 3b.
Zone 3, Levels A and B	10YR5/4 (yellowish brown) loose sand, yields to 10YR6/4 (light yellowish brown) loose sand mottled with 10YR5/2 (grayish brown) silty sand	Two 10-cm arbitrary levels, with final level terminated at stratigraphic change. Mound Construction Episode 1. The second level was largely a mix of Mound Construction Episode 1 with large amount of white sand (perhaps wash); patches of white are not as apparent in the west half perhaps due to bioturbation/later mound construction episode.
Zone 4, Level A	10YR5/4 (yellowish brown) loamy sand heavily mottled with 10YR4/3 (brown) silty sand, eventually yielding to the latter	Midden/Buried "A" associated with the midden. Stratigraphic excavation.
Zone 5, Levels A, B1, and B2	10Y/R5/4 (yellowish brown) loamy sand, heavily mottled with 10YR4/3 (brown) silty sand, eventually yielding to the latter	Midden/Buried "A" associated with midden. Arbitrary 10-cm excavation.
Zone 6, Level B1; Zone 6, Level B2	10YR4/2 (dark grayish brown) sandy loam mottled with 10YR4/3 (brown) sandy loam and 10YR5/3 (brown) sandy loam	Transition between midden and the underlying "B" horizon.
Zone 7, Level A; Zone 7, Level B; Zone 7, Level C; Zone 7, Level D	10YR5/4 (yellowish brown) loamy sand	Arbitrary 10-cm excavations. "B" horizon; located beneath midden and corresponds to Unit 2.
Zone 8, Level A; Zone 8, Level B	10YR6/4 (light yellowish brown) silty sand	Arbitrary 10-cm excavations. "C" horizon; what we're calling subsoil; increase in soil concretions and ferruginous soil with depth.

2. Excavation objective:

The objective for Unit 5 was to attain stratigraphic data that would inform our understanding of the mound construction process. In particular, the location of Unit 5 was chosen in order to understand the transition from midden (seen in Unit 1) to no midden/buried A-horizon (seen in Unit 2). Note that this unit was excavated statigraphically, not arbitrarily, and thus the removal of zones in 10-cm controlled levels was the main excavation technique employed.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

All features appeared in Zone 5 and ended either at the bottom of Zone 5 or in the top cm of Zone 6 (see Tables A-2 and A-3).

5. Correlate strata and/or features with contiguous units:

The bundle of features that we witnessed in Zone 5 of this unit is probably related to the midden seen in Unit 1. Because we were on the southern extremity of the midden, we did not see the same homogeneity they saw. Instead, the strongest concentration was in the northern wall while the rest of the unit represented a gradual tapering of deposits until it yielded to what we interpreted as a buried "A" in Unit 2.

6. Disturbances/mixing:

Throughout the unit there was a considerable amount of root disturbance. We spent a considerable amount of time removing and working around roots, as well as investing soil changes that turned out to be bioturbation. The highest amounts of disturbances were associated with the bundle of features in the north wall of the unit (Features 8, 9, and 10). Surprisingly, the root disturbances increased with depth.

7. Interpretation: create analytical provenience units (associated strata/levels/features) and arrange in stratigraphic order (include temporal phases of analytical unit if known).

We think the stratigraphy in this unit represents the east tapering off of the midden [Pre-Mound Surface] located beneath the mound. In the western part of the unit, we saw a very dark, homogenous deposit approximately 80 cm below the surface, with a maximum depth of approximately 30 cm. The deposit gets lighter in color and more mottled starting about 1 meter east of the west profile and continuing into the east profile. Discrete deposits (identified in this unit as Features 6, 7, 8, 9, and 10) are also absent in the east, co-occurring with a drastic decrease in ecofacts and artifacts. As mentioned above, we believe that Features 6, 7, 8, 9, and 10 represent discrete deposits within the midden. The occurrence of these deposits may be higher in this unit than in the other midden deposit-eastern flank units because Unit 5 is located on the very edge of the midden, this providing a snapshot of the patchy edge of the larger cultural deposit. In particular, Features 6, 7, and 8, located in the center of the unit with Feature 6 in the South Profile, and Features 7 and 8 in the north profile, represent deposits of eco- and artifacts surrounded by a dark soil that is different from the surrounding matrix (Zone 5). With

Table A-2. Features, Levels and Dimensions.

Feature, Levels and Dimensions	Soil Description	Notes
Feature 6 A and B—66 cm E/W by 56 cm N/S; 29 cm deep	1. 10YR3/1 (very dark gray) sandy loam 2. 10YR2/1 (black) sandy loam with lots of shell, bone, and a few ceramics	1. Dark soil concentration surrounding the shell concentration. 2. The shell concentration was much darker, much richer.
Feature 7—50 cm E/W by 41 cm N/S; 14 cm deep	10YR 4/1 (dark gray) sandy loam	A fair amount of bioturbation went through this feature.
Feature 8—34 cm E/W by 29 cm N/S; 12 cm deep	1. 10YR3/1 (very dark gray) sandy loam 2. 7.5YR4/3 (brown) 3. 10YR3/1 (very dark gray) sandy loam with higher amount of charcoal	1. Bioturbation with oyster shell in the east part of the feature. 2. Band of brown soil running at the top of the feature. 3. Band of charcoal and ash in the west part of the feature.
Feature 9—53 cm E/W by 57 cm N/S; 10 cm deep	10YR2/1 (black) with lots of roots, charcoal, and some ash	Lower part of the feature had far less charcoal and much more ash.
Feature 10—41 cm E/W by 44 cm N/S; 12 cm deep	10YR2/1 (black) with lots of roots, charcoal, and some ash	That matrix that largely makes up the feature.

the exception of Feature 6 (which had a distinct and concentrated amount of aquatic shell), the area around the edge of the features was heavily disturbed—all show evidence of past episodes of rodent and root disturbances while Features 9 and 10 show modern evidence in the form of large tree roots running through them. Most of the past episodes occur on the surface and on the edges of the deposits, and highlight the space differentiating the discrete deposits (such as the western edge of Feature 7/eastern edge of Feature 8, evidenced in the unit plan views and highlighted by an episode of bioturbation in the north profile). The distinct edges became less so in the western part of the unit—though the edge between Features 6 and 10 and Features 8 and 9 were fairly clear, the edge between Features 9 and 10, though very apparent on the surface, became ambiguous and then disappeared with depth, yielding to the homogenous 10YR3/2 that characterizes the upper midden on the eastern flank of the mound.

The discrete deposits were also identified based on their contents. Feature 6, as mentioned above, was identified by the large amount of shell apparent on the surface and throughout. Feature 7 was first identified by the protrusion of faunal bone. Upon toweling off the surface, a clear soil matrix was identified, as well as another bone fragment. As of yet, most of the bone from this feature has not been identified. Shell was also recovered in this feature, though the quantity was far less and did not contain nearly as much angel wing/mussel shell as Feature 6 (though 1 large sea snail/Nautilus shell was recovered). Feature 8, located to the west of Feature 7, contained few artifacts and was mostly distinguished by its fill. Feature 9, located adjacent to the northwest baulk of the unit and to the west of Feature 8, contained a substantial amount of charcoal and thin, indiscrete lenses of ash, a distinguishing characteristic it shared with Feature 10 (located in the southwestern baulk) and what helped to make the two indistinguishable with depth.

Excavation of the aforementioned features revealed no clear base due to heavy bioturbation and a progressively indistinguishable surrounding matrix. However, the profile walls seem to support our initial interpretation of discrete deposits. Largely separated by episodes of bioturbation, the dark soil concentrations that apparent during excavation were still visible, though most of their boundaries were demarcated by episodes of bioturbation. As mentioned above, we do not believe this decreases the likelihood that these represent discrete deposits; on the contrary, we think these events are located where they are because they are cultural distinctions, such as one might expect between slightly spaced deposits, between each episode. Regardless, the transition zones above and below the deposits as well as the associated bioturbation limited our ability to accurately determine dimensions for each of the feature deposits.

In addition to the midden, features, and their associated transition zones, two episodes of mound construction (as well as potential slumping) appeared above the midden and its associated deposits. Both of these episodes are characterized by homogenous fill with few to no artifacts. Though they are distinct from one another in the western profile and were apparent during excavation of the western part of the unit (noticed as a gradual distinction between Zones 2 and 3 in our Unit Level forms, corresponding to 3a through 3e on our profiles), they do not remain distinct in the Northern and Southern profiles, and eventually become indistinguishable from one another in the Eastern profile.

Table A-3. All Samples Taken from Features.

Feature and Level	Soil Sample Numbers:	Radiocarbon Sample Numbers:	Ceramic Sample Numbers:	Other Sample Numbers:
Feature 6, Level A	27	28	-	-
Feature 6, Level B	-	-	-	-
Feature 7, Level A	31	34	-	-
Feature 8, Level A	47	49	48a, 48b, 50a, 50b	-
Feature 8, Level B	71	-	-	-
Feature 9, Level A	-	42, 45, 46	41a, 41b, 44a, 44b	43 (whole feature for flotation, includes soil sample)
Feature 10, Level A	37	39	38a, 38b	-

Unit 6

Unit Dimensions: 1-by-2 m
Unit Level: A-H
Off Mound-Unit
Excavated Depth of Unit Below Ground Surface: 0.85 m*
Dates Excavated: May 24-28, 2010
Excavated By: Erik S. Porth and Adam L. Phillips
Recorded By: Erik S. Porth

1. Unit description/ location:

Unit 6 is located directly north of "Depression 2" on the north flank of the mound. Some slump from the depression is present along the southern side of the unit (at ground level). The unit was placed on the site grid to the east of N995 E980. The unit was placed here to determine the distribution and density of the cultural material in this off mound location the shovel test is located in the southwest quadrant of the unit.

2. Excavation objective:

The objective of Unit 6 was to expand upon an arbitrary shovel test at N995 E980: the bucket augers test was negative. The shovel test at this coordinate uncovered Marksville Incised sherds. Unit 6 was to provide an off-mound stratigraphic and artifact sample. A 1-by-2-m unit was placed to the east (N994.5 E980) of the coordinated. All levels were excavated in 10-cm arbitrary levels or to natural soil change.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

A- The level was a shallow level excavated to remove a humus layer and expose the underlying soil matrix.

B- The level was filled with a silty sand and a light charcoal scatter across the unit. A mottled pattern of darker soil continued in the central and western portion of the unit though to Level C.

C- Charcoal continues throughout the level's fill and across the base. This mottling continued through to the base of Level D, as does charcoal. The sand shifts from a silty sand to lose sand.

D- In this level there is still an area of silty sand in the north central area of the Level D base.

E- This level was mostly homogenous fill of yellowish brown sand.

F- In this level the fill became more compact close to the base, and the area of distinct soil continued through the center of the unit.

G- The soil was more compact, with many large roots and other disturbances disappearing. The bas of Level G was distinguished by a compact, sterile layer of sand. This compact sand continued to the base of Level H.

H- This base also had an area of very compact sand along the western wall. Five split auger tests were placed in the base of Level H to determine the depth of sterile soil.

*An additional 56 cm of soil was removed below the base of Level H in the eastern and western ends of the units as exploratory pits to examine the natural sub-soil on site in consultation with Sarah Sherwood. As this soil was sterile and devoid of cultural material, it was not screened.

4. List and describe features by level, and correlate feature to strata:

Unit 6 contained no features, but did include disturbances (see below).

5. Correlate strata and/or features with contiguous units:

There are no units attached to Unit 6.

6. Disturbances/mixing:

Unit 6 was excavated to expand upon a previous shovel test. The shovel test is located in the south west quadrant and extends to a depth of around 60 cm and disappeared at level G base. There were also a large density of roots in the western half of the unit, especially in the first 30 cm. Bioturbation was light, with a animal burrow noted by soil discoloration at the base of Level F.

7. Interpretation:

Unit 6 was a fairly shallow unit, termination at a depth of 60-80 cm. The humus layer is between 4-8 cm in depth, followed by a thin layer of 10YR5/3 homogeneous brown sand in the eastern half of the nit, as seen in the profile [beginning halfway along the north wall and continuing halfway onto the south profile]. This layer of a possible historic or modern burn extends underneath the humus/root mat in the western portion of the unit and underneath the homogenous brown sand in the east. This soil is a 10YR4/2 dark grayish brown sand intermixed with

charcoal flakes throughout. This layer corresponds to the bases of Level B and the fill of Level D, all of Level D, and the top portion of Level E. This concentration corresponds to a layer of 10YR4/2 dark grayish brown sand mottled with 10YR5/4 light yellow brown sand. Some charcoal was concentrated at the top of the layer, decreasing with depth. The mottling increases with depth (20-30 cm). Some of these sherds were Marksville Incised and Baytown Plain. One sand tempered sherd was found at the base of Level D.

At a depth of 30-60 cm, there is a homogenous layer of 10YR5/4 light yellow brown sand that was sterile and contained no material remains. This layer is more compact than previous layers, but the layer beneath it is very compact. It is very compact, 10YR7/4 very compact pale brown with some mottling of a 10YR5/4 light yellow brown sand. Both of these layers were the Levels F through H.

Unit 7

Unit Dimensions: 1-by-2 m East-West
Unit Level: A-Q
On Mound Unit: Summit/Central Mound
Excavated Depth of Unit Below Ground Surface: 1.66 m
Dates Excavated: June 1-16, 2010
Excavated By: Erik S. Porth and Adam L. Phillips
Recorded By: Erik S. Porth

1. Unit description/ location:

Unit 7 is located on the summit of Graveline Mound. It is placed on an East-West grid, with the eastern edge of Unit 7 located 3 m to the west of the western points of Unit 4.

2. Excavation objective:

The excavation objective for Unit 7 was twofold: obtain important stratigraphic information about the mound construction stages, as well as the opportunity to excavate possible summit structural remains. The excavations in Unit 7 were to be conducted in 10-cm arbitrary levels or to a natural soil change.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

All levels were excavated in 10-cm intervals.

A- The level is a thin root mat.

B- The level is a soft layer of silty sand that exhibited staining, roots, and charcoal flecks. Level B is consistent with other levels on site that may have been a historic burn.

C- The level is heavily mottled but with loose soils. An area of distinct mottling is present throughout Level C and D.

D- The level has discrete areas of compact and loose soils.

E- The eastern portion was softer sand than the rest of the unit.

F- The level was fairly homogenous with small areas of loose sand.

G- The level had an area of dark soil in the north northeast quadrant. This area shifted to the center of the unit at the base of Level H.

H- The base was also heavily mottled.

I- The base showed clear basket loading (through mottling) while Level I fill was fairly sterile.

J- The fill is very compact and "sterile" fill. The eastern portion of Level J base is heavily mottled.

K- The fill consists of various compactions.

L- The fill is consistent with the fill from Level K, but in the southeast corner there was an area of darker soils with charcoal flakes throughout.

M- About 8 cm below the beginning of this soil change (within Level M) the dark soil gives way to a less concentrated mottled matrix.

N- The level is consistent with previous levels in compaction but is fairly homogenous at the base.

O- Possible loading activity is evident in this level, but is faint throughout the center and eastern portions of the unit.

P- There is an area of dark soil continuing from Level O.

Q- The base is fairly homogenous and consists of a dark silty sand.

*Remainder of Unit 7 was excavated with Unit 9.

4. List and describe features by level, and correlate feature to strata:

Unit 7 did not contain any features.

5. Correlate strata and/or features with contiguous units:

Located directly below a thin root mat is a stained layer with charcoal flecks throughout. This potential "historic burn" layer correlates well to layers in Units

1, 3, and 6. Unit 4 encountered a dark midden layer at around 120-130 cm that was not present in Unit 7, however, the very dark "pre-mound" layer is evident throughout the fill and base of Level Q.

6. Disturbances/mixing:

There were multiple disturbances throughout Unit 7. Many of these are concentrations of small roots and rootlets. There were some large roots within the first 20 cm, especially in the northeast quadrant. A small cut-down tree was present in the southwest quadrant and its taproot extended a considerable depth. Small root clusters found very loose sand throughout the unit, which is evident in the profile and disturbed stratigraphy. Particularly, the north wall has experienced taphonomy that is fairly deleterious to interpretation.

7. Interpretation:

Unit 7 did not contain any features. A layer of humus staining is present directly below a thin root mat and extends to a depth of between 10 and 25 cm below the ground surface. This layer is marked by a light brownish gray sand (10YR6/2) with charcoal flecks throughout. This layer was comprised of root disturbances, roots, and rootlets. Directly below this layer is a fairly homogeneous layer of mound fill that is mottled with very pale brown sand (10YR7/6) yellowish brown sand (10YR5/4) and yellow sand (10YR7/6). These levels were relatively sterile with very little artifacts recovered. At a depth of 60-75 cm below ground surface and underlying the homogenous layers (Zones 3 and 4 in the north profile) is a dark band. This layer of fairly compact sand is mottled matrix of yellowish brown (10YR5/6) and dark grayish brown (10YR4/2). This layer is distinct in the south profile, through the east profile and into the north profile. It is represented as Zone 4B, but has been heavily disturbed by root taphonomy. This layer consisted of charcoal flecks and artifacts. Located directly below this dark band is a layer of "sterile" mound fill in the north profile. Zone 6 is another dark layer underlain with sterile fill. The sterile layers would be fairly homogenous at the base of the unit, while the darker layers would be heavily mottled at the unit base and full of charcoal ad ceramic artifacts. This pattern matches Greenwell's excavations on the summit: a dark layer covered by a sterile fill layer this sterile fill is potentially the living surface, with the dark layers representing the humus/ artifact layer. These layers are separated by about 20-40 cm of fill. In the southwest corner there is another dark band that follows the contour of the previous two layers. This is a possible earlier mound construction stage that is located near the center of the mound. At the base of Level Q and extending about 2-4 cm into the profile is a layer of very dark grayish brown (10YR3/2) fairly compact sand. Very few artifacts were recovered from this layer, but is did contain small flecks of charcoal. In the extreme northwest portion of the unit there is an underlying layer of black silty sand (10YR 2/1) that is semi compact. These black layers would have been the pre-mound. This is about 5-10 cm higher than the layer of black, pre-mound soil in Unit 4. Differences in compact and loose soils represent basket loading. The remainder of Unit 7 was excavated with Unit 9.

Unit 8

Unit Dimensions: 1-by-2 m
Unit Level: Zones 1-8
On Mound Unit: Eastern Flank
Excavated Depth of Unit Below Ground Surface: 1.93 m
Dates Excavated: May 12-28, 2010
Excavated By: Jeremy R. Davis and Shawn P. Lambert
Recorded By: Jeremy R. Davis

1. Unit description/location:

Unit 8 is a 1-by-2-m unit oriented east-west. It was placed on the east flank of the mound just below the mound summit edge as a southward extension of Unit 1. Combined Units 1 and 8 form a 2-by-2-m unit.

2. Excavation objective:

Unit 8 was excavated in order to from a 2-by-2 meter unit out of Unit 1 and to allow further exploration of the midden zone. Unit 1's south profile served as a guide, so hat Unit 8 could be accurately excavated in natural zones. Non-midden zones (#s 1-4, 7, and 8) were excavated in arbitrary 10-cm levels labeled alphabetically. Midden zones (#s 5, 6, and half of 7) and all features except postholes were excavated in arbitrary 5 cm levels. See question 3 for description of levels and question 4 for description of features.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

Zone 1: Root mat Level A- Entire root mat removed; decomposing, organic fill throughout. Shell fragments.

Zone 2: Grayish brown sand, organic-rich zone; all levels composed of the same type of soil. This zone is somewhat thin, but still excavated in four 10-cm levels (A-D) because it is following the slope of the mound. These levels were excavated alongside Zone 3, Levels B-E. The levels of the top three zones were excavated in the following order: 1A, 3A (encountered just under the root mat), 3B, 2A, 3C, 2B, 3D, 2C, 3E, 2D, 3F. No artifacts were recovered from Zone 2.

Zone 3: Loose yellowish-brown sand with increasing amounts of charcoal flecks with depth. Zone 3 begins just under the root mat in the western half of the unit. Excavated in six 10-cm levels (A-F).

Levels A & B- No artifacts

Level C- 1 shell fragment

Level D- 1 sherd and 1 stone flake

Level E & F- No artifacts

Zone 4: Mottled yellowish-brown and brown sand with more charcoal flecks than seen in Zone 3. By Level B, water staining recognized in north and west portions. Zone 4 excavated in four 10-cm levels (A-D).

Level A- Yellowish-brown sand mottled with brown sand and light gray sand. More compact than Zone 3.

Level B- Contains one small posthole: Feature 11. Artifacts in Level B fill: 1 drum tooth, small sherds, 1 burned bone fragment.

Level C- Contains two small postholes: Feature 11 and 12. Whitish subsoil "basket load" is present in along mid-portion of north wall. No artifacts.

Level D- Contains five features (postholes and shell concentrations): 13-17. Artifacts in Level D fill: light ceramics, lithic debitage, small bone and shell fragments.

Zone 5: Very dark grayish brown sand with charcoal flecks partly mottled with light yellowish brown sand. Zone 5 was excavated with small hand tools, mostly trowels, but also bamboo picks and brushes in more delicate contexts. It was excavated in fouR5 cm arbitrary levels (A-D). Additionally, many samples were taken from Zones 5: samples of midden fill for flotation, two ceramic residue samples (and their related residue/botanical sample), radiocarbon samples from various contexts, samples of faunal bone, and one pigment sample. The plan views of all four levels of Zone 5 were drawn in great detail. On some forms, Zone 5 may be labeled as the "upper midden." This term reflects our notion at the time that Zone 5 and 6 represented two distinct middens- a lower one indicating a pre-mound feast. It was later determined that the dark grayish soil of Zone 6 was not a midden, but was in fact a buried A horizon mixed with some of the so-called "upper midden."

Level A- Contains Feature 17/18. Artifacts in Level A fill: oyster shell, yellow pigment, lithic debitage, small bone, drum teeth, small sherds.

Level B- Contains Features 15 and 17/18. Artifacts in Level B fill: small bone, sherds, shell concentrations, possible pigment.

Level C- Zone 5 Level C soil contains larger charcoal chunks than either Level A or B. Contains Features 15, 17/18, and 19. Artifacts in Level C fill: shell, bone, undecorated and decorated sherds, lithic debitage. A poorly preserved mammal long bone was encountered partially overlying Feature 19. Photos of this bone were sent to Dr. Keith Jacobi who described it as "too fragmentary to identify, but possibly a human tibia."

Level D- Contains Feature 15B, 17C/18B, and 19A. Artifacts in Level D- possible poorly fired clay, shell fragments, petrified wood chunk, small faunal bone.

Zone 6: Very dark gray sand with charcoal flecks- "lower" midden. Zone 6 was excavated with small hand tools, mostly trowels, but also bamboo picks and brushes in more delicate contexts. It was excavated in fouR5 cm arbitrary levels (A-D). Additionally, many samples were taken from Zone 6, almost entirely from within features: soul samples for flotation, radiocarbon samples from various contexts, samples of faunal bone.

Level A- Contains Features 15B, 19B/C, and 17D/18C/20A, 21. An area of homogenous brown sand containing charcoal flecks an large charcoal chunks encountered in mid-portions of south wall. Trace amounts of shell and bone were recovered from this area. The brown sand was intruded by a pocket of loose yellowish brown sand. Artifacts recovered from Level A fill: tight cluster of sherds and bone from are just southeast of Features 17D/18C/20A (see Zone 6 Level A plan view—later dubbed Feature 21), decorated and undecorated sherds, bone, shell (clam and oyster), long mammal bone first encountered in Zone 5 Level C. Samples from Level A fill: #110 from "lower midden" context in NE corner of unit (soil

sample for flotation to recover microfaunal/faunal remains).

Level B- Contains Features 17E/18D/20B (shell concentrations), 21 (sherd cluster), and 22 (possible cane latticework). Artifacts in Level B fill: small sherds.

Level C- Contains Features 17F/18E/20C (shell concentrations) and 23-26 (postholes). Level includes all remaining midden soil except that from around Features 17F/18E/20C. Artifacts recovered from Level C fill: three sherds.

Level D- Contains Features 17G/18F/20D (single layer of clam shell), 17G/18F/20D/27A (charcoal concentration and clay lump), 26 (posthole), and 28 (number assigned to possible posthole, but later determined not to be a feature). No artifacts.

Zone 7: Compact yellowish brow sand mottled with brown sand. Zone 7 was excavated with shovels and trowels in three levels (A-C). Levels A and B were each 5 cm thick arbitrarily. Level D was 10-cm thick.

Level A- No features. Artifacts from Level A: sherds.

Level B- Contains Features 30-33 (postmolds). Artifacts from Level B: small sherds, small animal bone, mussel shell fragments, burned shell.

Level C- No features. No artifacts.

Zone 8: Yellowish-brown sand transitioning with depth to light yellow-brown sand mottled with strong brown sand clay lamellae. Zone 8 was excavated in five arbitrary 10-cm levels (A-E). Subsoil zone. No artifacts were recovered from Zone 8. Auger tests at base of unit to test for buried strata- center and northeast, northwest, southeast, and southwest corners.

4. List and describe features by level, and correlate feature to strata:

Postholes:

Feature 11 (4B): Feature 11 is a very well-defined small posthole filled with dark brown sand approximately 22 cm in depth. Feature terminates at the top of Feature 17, a concentration of shell and animal bone first encountered in Zone 4 Level D. All soil from Feature 11 was bagged as Sample #36 (soil sample for flotation in lab). Feature yielded only small shell fragments.

Feature 12 (4C): Feature 12 is a small posthole similar to Features 11 and 13 (though not as well-defined as the former) and encountered at a similar depth. It was filled with very dark grayish brown sand with charcoal fragments and was approximately 21 cm in depth. This feature overlaps the south wall of Unit 8 into Unit 1, so we were able to see it clearly in profile. Very small shell fragments. Feature 13(4D): Feature 13 is a small posthole similar to Features 11 and 12 (though not as well-defined as the former). It probably intruded into the midden, but became indistinguishable from surrounding soil at that depth and, therefore, only excavated to 4 cm.

Feature 14 (4D): Feature 14 is similar to Feature 13 in that it was difficult to trace into the midden zone. It was only excavated to 7 cm in depth. A large base sherd was recovered from the north wall of the feature, but the feature yielded no other artifacts. This sherd appeared not to be in the feature, but overlapping into it from surrounding midden. It was bagged as a residue sample from Zone 5 Level B.

Feature 16 (4D): Feature 16 is similar to Features 11-14. It also was difficult to trace into the midden, though it probably intrudes into it. It was excavated to a depth of 6 cm. Artifacts (shell) were found but bagged with the soil sample (#58).

Feature 23 (6C): Feature 23 was not recognized until the midden zone had been completely removes. The excavated portion was only 5 cm in depth (bagged as Sample #124 for flotation in the lab). The unexcavated potion extends through Feature 17/18 and manifests there as a circular void with some items (e.g., a probable bird bone) intruding from the surrounding faunal concentration. To me, this suggests that the post was in place when the shell feature was deposited and was not removed until a little while after the feast (long enough after so that the pile of shell and animal remains had settled to the point that not much of it fell into the hole when the post was extracted). The post may also have rotted in place, though it did not appear so to the excavators. This void is noted on the plan views showing Feature 17/18, but is not labeled there as Feature 23. No artifacts were recovered from this feature and the excavated portion is quite narrow.

Feature 24 (6C): Feature 24 is a posthole first recognized at the base of Zone 6 level B. it is 24 cm in depth, and straight-sided with a rounded base. A large sherd was recovered from the base of the posthole and three small sherds and two small bones came from elsewhere in the feature. All soil was bagged for flotation as Sample #125.

Feature 25 (7A): Feature 25 is a posthole encountered at the base of Zone 6 Level C. It is approximately 15 cm in depth and yielded one sherd and two small sherds. It can be seen in profile in the pictures and drawings of Unit 8's south wall. All soil from Feature 25 was bagged as a sample for flotation (#116).

Feature 26 (6D): Feature 26 is a posthole approximately 14 cm in depth and absent of artifacts. Like Feature 23, it also was likely encountered in the midden zone, though not recognized until the midden had been removed. Also like Feature 23, it was likely in place before the shell concentration and pulled after that pile of refuse had settled somewhat, for while excavating Feature 17/18, it appeared that the shell and bone had been deposited against and partially around some sort of obstruction (i.e., the Feature 26 post). All soil from Feature 26 was collected as a sample for flotation (#128).

Feature 28 (7A): Not a feature.

Feature 30 (7B): Feature 30 is a posthole approximately 19 cm in depth. Its profile can be seen in pictures and drawings of Unit 8's south wall. Two sherds were recovered from feature 30. All soil was bagged as a sample for flotation (#144).

Feature 31 (7D): Feature 31 is a posthole approximately 17 cm in depth. Its profile can be seen in pictures and drawings of Unit 8's south wall. A single periwinkle was recovered from Feature 31. All soil was bagged as a sample for flotation (#145).

Feature 32 (7B): Feature 32 is a posthole approximately 12 cm in depth. Its profile can be seen in pictures and drawings of Unit 8's south wall. Two sherds and pieces of petrified wood were recovered from Feature 32. All soil was bagged as a sample for flotation (#146).

Shell Concentrations, Etc.:

Feature 15: Feature 15 is one of the more interesting cultural features encountered in Unit 8. Though mostly defined as the shell concentrations itself (composed almost entirely of oyster shell) it also includes some of the surrounding "finds," notably an odd cluster of artifacts directly to its west (see Feature 15B description). Only those parts of feature 15 that intrude into Unit 8 from its south wall were excavated. In profile, more bone and shell can be seen.

Feature 15A (4D/5A): Feature 15 is the top of an oyster shell concentration. Feature 15 yielded oyster, drum teeth, and small faunal bone. Two radiocarbon samples (#s 62 and 65) and three soil samples (#s 6,

Feature 15B (5B/C): Feature 15B is a concentration of shell (mostly oyster shell, but also clam and periwinkle) and bone. Two lanceolate projectile points, ceramics, a polished saltwater catfish bone, and a fragment of a ceramic pendant were recovered from just west of the feature in a cluster. Multiple samples of different kinds were taken from this context: a ceramic residue sample (#s 79 A and B), a soil sample for flotation (#108), and a radiocarbon sample (#109).

Feature 15C (6A): The third and final layer of Feature 15, a mix of oyster, one clam, bone, in addition to artifacts recovered from surrounding very dark brown soil. Artifacts recovered from feature include an undecorated rim sherd, a red-filmed sherd, and a probable deer bone (second largest bone from Unit 8).

Feature 17/18/20/27: Feature is a large pile of shell, somewhat divided into layer or pockets dominated by either oyster or clam. It is for this reason that the feature was given several numbers, each attributed to a different pocket of shell (see Figure 4-16). In total, it crosscuts four zones (#s 4-7) and, as opposed to other features in Unit 8, certainly represents more than a single dump of shell. Features 17 and 18 are not exactly distinct from one another. Rather, they appear more to grade into one another, with a greater proportion of oyster recovered from 17. Feature 20, while lying directly under Feature 18, is composed almost entirely of clam, approx. 95%, with mussel, oyster, and periwinkle accounting for the otheR5%. Over the course of these transitions, the feature "migrated" from the west wall of the unit to the middle of the north wall, where it had been mapped as a clam concentration in the south profile of Unit 1.

Feature 17A/18 (4D): 17A/18 is the top of a large shell concentration that ultimately extended to the base of Zone 6, if not a bit into Zone 7. Feature 17A/18 yielded small and very small bone (predominantly fish bones), fish scales (very fragile), clam and periwinkle.

Feature 17B/18A (5B): 17B/18A is the second layer of the shell concentration originating in the northwest corner of Zone 4 Level D. It was dominated by oyster, but with some clam and periwinkle and a small amount of snail (?). Artifacts include some small sherds, abundant small bone (especially drum teeth and scales). The feature also yielded a pigment sample (#74), two radiocarbon samples (#s 72 and 75), and a soil sample for flotation (#73, four bags).

Feature 17C/18B (5C): 17C/18B is the third layer of the shell concentration originating in the northwest corner of Zone 4 Level D. it consists almost entirely of oyster shell except on the west end where is consists almost entirely of clam shell. Artifacts include one large undecorated sherd, several small sherds, and animal bone. A soil sample for flotation (#91) was taken from this feature.

Feature 17D/18C/20A (6A): Here begins the Feature 20 subdivision of Feature 17/18/20/27. It is composed almost entirely of clam shell (with small amounts of periwinkle). At the western end of this layer is a thin lens of burned and crushed shell and small animal bone (including drum). This section directly underlies the oyster concentration called Feature 17/18. Several samples were taken from this feature: two soil samples for flotation (#s 102 and 107), one radiocarbon (#103), and sample of intact bivalves (#101).

Feature 17E/18D/20B (6B): The second layer of Feature 20 is about the same as the first, only without the lens of burned and crushed material. Two samples were taken from this feature: one soil sample for flotation (#113) and one faunal sample (#114).

Feature 17F/18E/20C (6C): The third layer of Feature 20 is composed of clam with some periwinkle and one oyster. At the base of the shell layer was encountered a concentration of large charcoal chunks (collected as Radiocarbon Sample #122). Two other samples were collected: a soil sample for flotation (#123) and a sample of whole bivalves (#121). No artifacts were recovered from this portion of the feature.

Feature 17G/18F/20D (6D): The fourth layer of Feature 20 is a single layer of clams under which Feature 27 was encountered. Two samples were taken from feature: a soil sample for flotation (#129) and sample of whole bivalves (#134).

Feature 17G/18F/20D/27A (6A): Feature 27 was first recognized as a concentration of large charcoal chunks included with a lump of clay. This may be associated with Feature 21 to the southeast, a loose cluster of several sherd concentrations. The charcoal chunks appear to represent several whole logs that were deposited here and then naturally fell apart. Feature 27 may not represent a "hearth" or "campfire," but is probably sweepings from such a feature nearby. Burned shell, periwinkle, and some small faunal bone were also recovered from Feature 27. This portion of Feature 17/18/20/27 appears to be a small pit, with the charcoal and clay lump at the top and several sherds, including a beautiful rectilinear-incised, scalloped-rim sherd, at the bottom. This lower portion that included the sherds was given a separate feature number (#29-see below). It is my inclination that Features 27 and 29 are associated more with the nearby sherd clusters (Feature 21) than with the overlying shell pile, though both were deposited at about the same time.

Feature 19: Feature 19 is a shell concentration separate from but probably related to Feature 17/18/20/27. The only noticeable differences between the two are size and, to a lesser, extent, composition-Feature 19 is much smaller and, while dominated by oyster, contains higher percentages of clam and mussel than the oyster-dominated portions of Feature 17/18/20/27. Preservation and recovery of bone within Feature 19 is about the same as that of other shell concentrations. This feature probably represents a single "basket load" of feasting refuse.

Feature 19A (5C): Feature 19A is an oyster shell concentration to the south of and separate from Feature 17/18/20. A large faunal bone was encountered in but, not removed from this layer. It was later determined that this was bone showing human-like characteristics, a possible tibia, but too fragmentary to tell. A soil sample for flotation (#85) was taken from this feature.

Feature 19B (5D): Feature 19B is the second layer of the shell concentration encountered south of Feature 17/18/20. At this layer, it is a mixed deposit of shell-mostly oyster, but also clam. Some bone (possible drum) was recovered from its southerly portion. The human-like bone was removed at this point as part of Zone 6, Level A, not as part of the feature. A soil sample for flotation (#97) was also taken.

Feature 19C (6A): Feature 19C is the last level of Feature 19, being only three cm thick and terminating at the base of Zone 6, Level A. Like Levels A and B of the feature, it is dominated by oyster shell but mixed with clam and periwinkle. Artifacts recovered include two small decorated sherds, one small undecorated sherd, and small animal bone (two vertebrae).

Feature 21: Feature 21 is a concentration of about 50 sherds, almost all of which are oriented horizontally. Some out lie the main concentration and may or may not be associated with the feature, per se. Some of these outliers are oriented almost vertically. Multiple types of pottery are represented in this cluster, including

utility ware, low-end fine ware (roughly incised), and high-end fine ware (e.g., burnished, red painted, and/or meticulously incised). Some sherds appear to have been very poorly fired and just about crumbled during recovery. A few small clay lumps (about the size of marbles) were encountered in the main cluster. One radiocarbon sample (#115) was taken from a very secure context within the feature (under and between sherds in the main part of the cluster).

Feature 22: Feature 22 is an arrangement of small and large charcoal pieces, some of which are obviously cane (i.e., round and hollow in cross-section), that was carefully excavated with brushes and bamboo picks in Zone 6 Level B. For the most part, these pieces are oriented either north-south or east-west. Thos running north-south overlie those running east-west in a sort of criss-cross pattern. For this reason, Feature 22 is thought to represent the remains of a cane latticework - not a reed mat, but a more solid construction such as a drying rack, litter, or screening wall. This is a very delicate arrangement of burned wood. A sizeable portion was removed from the middle before excavators realized that this was possibly more than a simple concentration of charcoal, though I recall removing at least one chunk of cane-like charcoal about 6 oR7 cm in length and perhaps 1.5 to 2 cm in diameter. The feature is confined to a pocket of brownish sand that is otherwise free of artifacts. Two floral samples were taken from this feature (#s 116 and 117).

Feature 29: Feature 29 is considered part of Zone 7 Level A. It is directly under Feature 27 but separated from it by about 3 cm of sand. The feature is pit-like. One rectilinear incised, scalloped rim sherd and several smaller sherds were recovered from this context. The rectilinear incised sherd was bagged as ceramic residue sample (#142) and soil from this feature was bagged as a sample for flotation (#141).

5. Correlate strata and/or features with contiguous units:

Unit 8 is the southern half of a 2-by-2-m unit formed by Units 1 and 8. It yielded a surprising number of features given that practically none were noted in Unit 1. The only Unit 8 feature that overlapped into Unit 1 is Feature 17/18/20/27; the upper oyster shell portion and lower clam shell portion of this feature were mapped on Unit 1's south profile. Notably, Unit 1 did not yield any postholes that might align with the loose semicircular formation of posts in Unit 8.

Other aspects of Unit 8 conformed to what one would expect of an extension of Unit 1: we noted no layers not noted in Unit 1. The main difference relates to the midden zone and buried A horizon/midden zone. In Unit 1, the separation between these two zones is easy to distinguish, especially in the west profile, but in Unit 8 the two appear more mixed, a pattern best noted in that unit's south profile.

6. Disturbances/mixing:

We noted no obvious disturbances in Unit 8, though it has yet to be determined whether Zones 3 and 4 are undisturbed mound fill zones or an erosional deposit of mound fill from the mound summit to west. Compared to mound summit units, we noted very few clear basket loads, a point in favor of the interpretation of Zones 3 and 4 as the result of erosion.

7. Interpretation: create analytical provenience units (associated strata/levels/features) and arrange in stratigraphic order (include temporal phases of analytical unit if known).

A more detailed discussion of the zones and features is found above. Here is a basic interpretation of Unit 8 stratigraphy and features.

Zone 1: Present-day root mat.

Zone 2: Present-day humus layer.

Zone 3: Uppermost layer of mound fill, possibly and erosional deposit from mound summit. Lacks any well-defined basket loads.

Zone 4: Lower layer of mound fill, also a possible erosional deposit form mound summit. Similar to Zone 3, but darker in color and with increased amounts of charcoal flecks. With the exception of a single white san pocket noted in the northern portion near the base of the zone, Zone 4 lacks any well-defined basket loads.

Zone 5 and 6: Operating under the assumption that we had already encountered distinct pre- and post- mound middens, we attempted to excavate these zones separately in Unit 8. It turned out that the zones were only roughly separate from one another and, throughout most of the unit, were decidedly mixed. For this reason, I think that we can now consider these two zones as one single layer of midden overlying, mixed with, and intruding into a buried A horizon (the Marksville period ground surface).

We are fortunate to have recovered numerous features in this midden/buried A zone. I believe that

their arrangement and associations allow for some localized and very general interpretations of the order of events related to constructing the early low mound at Graveline. I further believe that some of these interpretations are only made possible by the care with which the Unit 8 midden zone was excavated.

It's hard to say for sure whether ceramics were made at Graveline or were brought to the site. I suspect that a minority of ceramic vessels were made on site. This is possibly evidenced by the Features 22 and 27. Feature 22 included some very poorly fired sherds that could not have been transported from very far away. Mixed within this feature was a miniscule amount of some homogenous raw clay like none that we encountered anywhere else at the site. Feature 27, located only about 20 cm northwest of Feature 22, included a softball-sized lump of the same raw material partially underlying some small burned logs. Possible evidence that some ceramics were brought to the site is in the form of sherds bearing repair holes (recovered on the other side of the mound in Unit 13). Some ceramics might have been broken before the feast (e.g., the Marksville rectilinear incised, scalloped rim vessel found beneath Feature 17/18/20/27).

Light-frame constructions were built prior to the feast but remained partially in place for a time afterwards. This is evidenced by two postholes (Features 23 and 26) intruding through Feature 17/18. These posts are two of several that form a loose arc across Unit 8. It is difficult to say what this alignment might represent, but a burned can latticework recovered from Zone 6 suggests some possibilities.

Food was probably prepared on site and perhaps close to Unit 8. In any case, some of it was deposited there. When the feasting was done, the refuse was dumped in basket load-sized piles near and partially around or against a standing structure, the posts of which might have been pulled some tie after the feast.

Zone 7: Leaching zone beneath buried A horizon. The corresponding Zone in Unit 1 yielded a few late Archaic artifacts including a Little Bear Creek pint of Tallahatta Quartzite and flakes of the same material. No such artifacts were recovered in Unit 8's Zone 7.

Zone 8: Culturally-sterile subsoil.

Unit 9

Unit Dimensions: 1-by-2-m East-West
Unit Level: Zones 1-11
On Mound Unit: Summit
Excavated Depth of Unit Below Ground Surface: 1.95 m
Dates Excavated: June 21- July 21, 2010
Excavated By: Lauren E. Downs, Paul N. Eubanks, Adam L. Phillips
Recorded By: Lauren E. Downs, Paul N. Eubanks, Adam L. Phillips

1. Unit description/ location:

Unit 9 is located on the summit of Graveline Mound. It is directly north of Unit 7.

2. Excavation objective:

The excavation objective for Unit 9 was to obtain important stratigraphic information about the mound construction stages, as well as the opportunity to excavate possible summit structural remains. The excavations in Unit 9 were to be conducted in 10-cm arbitrary levels or to a natural soil change.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

Zone 1: Root mat, 10YR6/2 light brownish gray sand; artifacts include brick and rock conglomerations and a very light scattering of charcoal.

Zone 2A/B: Fill is 10YR6/2 light brownish gray sand. Base is the same as the fill slightly mottled with 10YR5/4 yellowish brown sand; artifacts included plain sherds, one incised sherd (Weeden Island Incised?), and a light scattering of charcoal.

Zone 3A/B/C/D/E: 10-cm arbitrary levels; Fill is 10YR5/4 yellowish brown sand lightly mottled with 10YR6/4 light yellowish brown sand and 10YR5/2 grayish brown sand becoming less mottled with 10YR5/2 grayish brown sand as the level progressed; Base is 10YR5/3 yellowish brown sand lightly mottled with 10YR6/4 light yellowish brown sand, this level is mound fill; in the SW corner there was some mottling with 10YR5/2 grayish brown relatively compact sand probably a result of root disturbance; the beginning of Zone 4 first appears in the eastern part of the unit; the base (mound fill) of Zone 3D (possible old humic/ occupational surface) was 2.5 YR5/4 light olive brown very compact (oxidized?) sand mottled with 10YR5/4 yellowish brown sand in the center of the unit. Along the western wall the base was 10YR5/4 yellowish sand mottled with 10YR5/2 grayish brown sand ; in the SE corner the base was 10YR5/4 yellowish brown sand mottled with 10YR6/4 light yellowish brown sand;

artifacts included 4 plain sherds, 1 pebble, 1 plain sand/grog tempered body sherd, and a light scattering of charcoal.

Zone 4A/B/C: Fill (mound fill) is 2.5YR light olive brown very compact sand mottled with 10YR5/4 yellowish brown sand, but in the SW corner of the unit where the fill was 10YR5/4 yellowish brown and mottled with 10YR5/2 grayish brown sand (see plan view of Zone 3C). This mottling shifted to the NW corner in a manner typical of a mound filling episode, Also some 10YR7/4 very pale brown with 10YR5/8 yellowish brown ferrous lines were present and 10YR5/4 yellowish brown sand. See plan view for the base, many soil colors with different textures, probably mound fill; artifacts included a scattering of charcoal, one punctated (and possibly incised) sherd; Radiocarbon Sample #118 taken from SW corner of unit at a depth of 195 cm. 4B fill is mound fill (see plan view for colors and textures); the base may be former mound surface along the eastern and western walls. Both of these areas contain charcoal, especially the western area. Radiocarbon Sample #119 was taken from the SW corner at a depth of 212 cm. Artifacts included a scattering of charcoal, bone, debitage, plain sherds, a flake, and a chert pebble.

Zone 5: Level A: Fill is possible mound surface mottled with mound fill (see plan view of Zone 4, Level B for details) Base is 10YR6/2 light brownish gray sand mottled with 10YR7/4 very pale brown sand and 10YR4/3 brown sand and 5YR5/8 yellowish red sand (see plan view). Possibly an occupational surface mottled with mound fill; artifacts included a sherdlet and plain sherd. Soil Sample #127 taken from central eastern wall at a depth of 127 cm and Radiocarbon Sample #132 taken from western wall at a depth of 132cm.

Level B1: Excavated in 5-cm increments. Fill is same as Zone 5A. Possible mound filling or surface episode. No artifacts but a light scattering of charcoal

Level B2: Excavated in 5-cm increments. Fill is mound surface or dark mound fill episode. Base is 10YR7/3 very pale brown loose sand mottled with 10YR5/8 yellowish brown compact sand in the eastern 1/3 of the unit. 7.5YR3/4 dark brown compact oxidized sand mottled with 7.5YR5/8 strong brown compact sand in the northern ½ and darker 10YR4/3 brown somewhat compact sand mottled with 10YR5/6 yellowish brown somewhat compact sand with 10YR6/6 brownish yellow sand. soil in the southern ½ (see plan view). Artifacts include 4 plain sherds, petrified wood. Radiocarbon Sample # 140 taken from western side of unit at a depth of 140 cm.

Zone 6: Level A: Fill is slightly homogeneous mound fill. Base is same as fill, but along the northern wall there is a pocket of dark soil which we suspect is a second layer of dark soil interspersed with 2 bands lighter soil. This may be 2 occupational layers. Artifacts include petrified wood, and a light scattering of charcoal. Radiocarbon Sample #143 was taken from the western wall at a depth of 143 cm.

Level B: 10-cm arbitrary level. Fill and base are basket loads of mound fill- different soils with different textures and colors (10YR5/4 yellowish brown somewhat compact sand lightly mottled with 10YR5/8 compact sand, 10YR8/2 very pale brown and very lose sand, 10YR6/2 light brownish gray loose sand, 10YR7/2 light gray loose sand, 10YR7/4 very pale brown loose sand, 10YR5/4 yellowish brown somewhat compact sand mottled with 10YR6/4 light yellowish brown loose sand and 10YR5/8 yellowish brown compact sand with 10YR7/4 very pale brown loose sand). Artifacts included a light scattering of charcoal and plain sherds. A radiocarbon sample was taken from the western ½ of unit at a depth of 242 cm.

Level C: 10-cm arbitrary level. Fill is basket loaded mound fill (10YR8/2 very pale brown very loose sand and 10YR7/2 light gray loose sand mottled with 10YR6/4 light yellowish brown somewhat loose sand, 10YR5/8 yellowish brown compact sand). Base in the south side of Unit 9 was mottled with 10YR3/1 very dark gray sand. Possible occupational surface. Artifacts included debitage.

Level C with Zone 7, Level A: 10-cm arbitrary level. Fill is mottled mound fill possibly mound surface (edge). Zone 6, Level C is the darker which is believed to be the mound surface. Zone 7, Level A is mound fill. They were excavated together because they were nearly artifact free. Both may be mound fill. Base is same as fill but areas with 10YR3/1 have gotten smaller (see plan view). Artifacts include debitage, petrified wood, and plain sherdlet.

Level D with Zone 7, Level B: 10-cm arbitrary level. Fill is possible mound fill or mound surface. Zone 6, Level C is darker, which is believed to be the mound surface. Zone 7, Level A is mound fill. They were excavated together because they were nearly artifact free. Both may be mound fill. Base is same as fill but areas with 10YR3/1 are smaller. A lithic was found.

Zone 8: Level A: Lighter band of fill underlying Zone 6-7. Base is along eastern wall mound fill. Fill is mottled (10YR7/4 very pale brown loose sand mottled with 10YR5/4 yellowish brown somewhat compact sand). Radiocarbon Sample #149 taken near eastern wall at a depth of 270 cm.

Level B: Natural level. Fill is lighter band of mound fill. Base is darker band throughout the majority of the unit. In some areas in the northern profile of unit 7, especially in the northeastern balk of Unit 7, is was difficult to see the difference between Zone 8 and Zone 9. It is estimated that the boundary is located in the southeastern corner of Unit 9. There was a scattering of charcoal.

Zone 9: Level A: 10-cm arbitrary level from the southeastern balk to even level. Fill is relatively dark mound fill of various soil colors with different textures (10YR5/2 grayish brown somewhat loose sand mottled with 10YR7/4 very pale brown somewhat compact sand, 10YR5/4 yellowish brown somewhat compact sand, 10YR4/2 dark grayish brown somewhat compact sand). Base is same as fill. Although in the southeastern quadrant Zone 10 is exposed. Zone 10 is even darker mound fill. Going off of the northern profile of Unit 7, the shift between Zones 9 and 10 are gradual. The darker mound fill may possibly be the top of Zone 10 but further excavation is needed. Radiocarbon Sample #151 was taken from along the eastern wall at a depth of 276 cm.

Level B: Excavated 10-cm and to natural soil change in eastern portion of unit. Fill is mostly lighter mound fill but the darker mound fill still remains in the western side of Unit 9. Base is darker fill that extends the western 2/3 of the unit gradually becoming lighter toward the eastern wall. Artifacts included Marksville Incised pottery (from darker soil). Radiocarbon Samples #153 and #154 were taken from the southwest corner at a depth of 289 cm.

Level C/ Zone 10, Level A: 10-cm level. Both zones are mound fill. Fill is loose light gray sand with a scattering of charcoal. It is loose mound fill in the eastern portion and darker mottled mound fill in the rest of the unit except the center where the soil was much darker (see plan view). There is a gradual transition to humic-stained soil the pre-mound surface. Base is top of Zone 11- mostly dark humic staining (pre-mound) surface (10YR3/1 very dark gray somewhat compact sand mottled with somewhat loose 10YR5/4 yellowish brown sand, 10YR5/8 yellowish brown compact sand and with 10YR5/6 yellowish brown somewhat loose sand with 10YR6/6 brownish yellow somewhat loose sand). Artifacts included plain sherds (re-fits and non- re-fits) and moderate-heavy scattering of charcoal. Radiocarbon Samples #155, #156, #157, and #158 were taken from the south-center of Unit 9 at the transition between Zones 10 and 11 at depths of 300 cm, 297 cm, 297 cm, and 303 cm respectively.

Zone 11: Level A: Excavate at 10-cm arbitrary level until reached natural level in eastern quadrant. Fill is dark, somewhat compact soil, possibly a pre-mound surface. Base is same as fill except in the eastern half a transition to lighter soil. Possibly sterile subsoil can be seen. (See plan view.) Marksville Incised pottery was recovered. Radiocarbon Samples # 159 and #161 were taken within the fill level and in the southeastern quadrant at 314 cm respectively. #161 was at bottom of Zone 11 Level A and possibly transitional subsoil.

Auger Test: Base of Zone 11D along the western wall of Unit 9. Fill is humic stained soil. Base is mottled subsoil and humic stained. Non-mottled subsoil was not reached because the auger was not long enough. This area was determined to be a tree disturbance due to its amorphous shape and lack of artifacts. It was also over a meter deep from its surface in Zone 11A to the base of the auger test.

Unit 9A: An exploratory 1-by-1-m window excavated in the floor of northwest quadrant of Unit 9 to explore a possible tree disturbance and make he entire unit level with the lowest point (i.e. the base of Zone 11, Level D from Unit 7 and 9).

Level A: Fill is 10YR6/4 light yellowish brown sand (sterile subsoil). Base is same as fill, but with humic-stained soil in the western ½ of the unit. Feature 38, a possible post mold or burial, but more likely a tree disturbance located in the western ½ of the unit, starting at 306 cm with and I.H. of 285 cm, and measuring 60-by-53 cm E-W.

Level B: This level was dug to make the remainder of the unit level with the base of Feature 38, Level B (about 10 cm of soil removed). Fill is 10YR6/4 light yellowish brown sterile subsoil. Base is same as fill except for the dark humic stain in the western ½ of the unit. 1 large quartz stone (unworked- non-cultural?).

Level C: this level made to even out base of Feature 38, Level C (a 10-cm level). Fill is sterile subsoil except from Feature 38—the tree stump.

4. List and describe features by level, and correlate feature to strata:

Feature 38: Unit 9A, Level B is a probable tree stump in the western ½ of Unit 9A reaching a depth of 352 cm and measuring 46-by-50 cm E-W. Fill is dark humic-stained soil with burned roots/charcoal. Soil Sample #191 and radiocarbon Sample # 192 were taken. In Level C, measures 45-by-48 cm E-W. Fill and base is dark humic-stained soil with burned wood.

5. Correlate strata and/or features with contiguous units:

Unit 9 is directly north of Unit 7 such that they are contiguous. Overall, the strata are very similar to that encountered in Unit 12. The root mat, modern "A" horizon, moundfill, and pre-mound surface zones all correlate directly with that of Units 7 and 9.

6. Disturbances/mixing:

Multiple tree and rodent burrows. Feature 38, discussed above, represents the largest disturbance encountered in the unit. It was determined to be a sub-mound tree stump.

7. Interpretation:

Zone 1: Root mat

Zone 2: Humic stained sand ("A" Horizon)

Zone 3: Moundfill - a light yellowish brown (10YR6/4) fine sand mottled with a grayish brown humic stained sand (10YR5/2). Fill is moderately compact with very light charcoal scattered throughout.

Zone 4: Moundfill – very loose, dry and coarse pale brown (10YR7/3) sand. Zone has a very mixed, churned appearance. Some root disturbance.

Zone 5: Moundfill – dark zone of fill (old midden, secondary context as fill) extending across entirety of Units 7 and 9 to about 10 cm. Increased charcoal scattered throughout and heavier artifact density.

Zone 6: Moundfill – a lighter, looser zone of coarse, very pale brown (10YR8/2) sand. Zone is very loose and unstable. Bands of lamellae run throughout.

Zone 7: Moundfill – a light, but much more compact pale brown (10YR7/3) sand. Dark yellow bands of lamellae run throughout.

Zone 8: Moundfill – a darker band of light grayish brown (10YR6/2) , very compact sand (possible old midden used as fill). Small charcoal flecks throughout. Lamellae run throughout.

Zone 9: Moundfill – a lighter, mottled compact zone of fill, composed of a very pale brown (10YR7/3) mottled with a compact, light gray (10YR7/2) sand. Lamellae run throughout.

Zone 10: Moundfill – a lighter, compact grayish brown (10YR5/2) sand directly overlaying the pre-mound surface.

Zone 11: Pre-Mound Surface/Enriched, Buried "A" Horizon – a dark grayish brown (10YR4/2), grades gradually into the subsoil below. Abundant clasts extend upwards from zone, indicating an active surface. Dark soil color suggests that it was quickly buried. In the west profile, a burned tree extends from the premound surface and into the subsoil beneath. A very dark gray (10YR3/1), somewhat loose with abundant charcoal and some burned, oxidized sand. Shape is amorphous and shifts with depth and becoming lighter.

Samples Taken:

118: Unit 9, Zone 4, Level A; a radiocarbon sample from the mound cap
119: Unit 9, Zone 4, Level B; a radiocarbon sample from the mound cap
127: Unit 9, Zone 5, Level A; a flotation sample from the mound cap
132: Unit 9, Zone 5, Level A; a radiocarbon sample from the mound cap
140: Unit 9, Zone 5, Level B2; a radiocarbon sample from the mound cap
143: Unit 9, Zone 6, Level A; a radiocarbon sample from the mound cap
147: Unit 9, Zone 6, Level B; a radiocarbon sample from the mound cap
149: Unit 9, Zone 8, Level A; a radiocarbon sample from the mound cap
151: Unit 9, Zone 9, Level A; a radiocarbon sample from the mound cap
153: Unit 9, Zone 9, Level B; a radiocarbon sample from the mound cap
154: Unit 9, Zone 9, Level B; a radiocarbon sample from the mound cap
155: Unit 9, Zone 9, Level C/ Zone 10, Level A; a radiocarbon sample from the mound cap
156: Unit 9, Zone 9, Level C/ Zone 10, Level A; a radiocarbon sample from the mound cap
157: Unit 9, Zone 9, Level C/ Zone 10, Level A; a radiocarbon sample from the mound cap
158: Unit 9, Zone 9, Level C/ Zone 10, Level A; a radiocarbon sample from the mound cap

159: Unit 9, Zone 11, Level A; a radiocarbon sample from the pre-mound
161: Unit 9, Zone 11, Level A; a radiocarbon sample from the pre-mound

Units 7 and 9

Unit Dimensions: 2-by-2 m East-West
Unit Level: On Mound Unit: Summit
Excavated Depth of Unit Below Ground Surface: 1.95 m
Dates Excavated: July 14-20, 2010
Excavated By: Lauren E. Downs, Paul N. Eubanks, Adam L. Phillips
Recorded By: Lauren E. Downs, Paul N. Eubanks, Adam L. Phillips

1. Unit description/ location:

Units 7 and 9 were excavated together as a single unit beginning in Zone 11, Level B.

2. Excavation objective:

The excavation objective for Units 7 and 9 was to obtain important stratigraphic information about the mound construction stages, as well as the opportunity to excavate possible summit structural remains. The excavations in Units 7 and 9 were conducted in 10-cm arbitrary levels or to a natural soil change.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

Zone 11: Level B: Excavated to natural soil change in most of unit. Fill is moderate to heavy concentrations of charcoal in the southeastern quadrant of Unit 9. (See plan form Unit 9, Zone 11, Level A). The drawing from that quadrant was determined to be a root burn due to its shape. Base is mostly sterile subsoil mottled with humic staining. Along the western wall of these units a humic-stained soil matrix continues below the target excavation depth. This sterile subsoil is somewhat looser than expected- this may be due to the water damage received a few weeks ago. Some debitage and a scattering of charcoal were encountered. Radiocarbon Samples #162 and # 163 were taken from the center of Unit 7 (beginning of subsoil) at a depth of 310 cm, and the SW corner of Unit 7 at a depth of 312 cm respectively.

Level C: Excavated as 10-cm arbitrary level. Fill is darker soil 10YR2/1 black somewhat compact sand. Base is relatively dark soil—this 10-cm level failed to expose a distinct natural soil change though the base is slightly lighter in Zone 11, Level C than it was in Zone 11, Level B though this level extends. Soil Sample #170 was taken from the western wall of Units 7 and 9 at a depth of 323-333 cm.

Zone 12: Level A: 10-cm arbitrary level unless soil change occurs first. Base of Zone 11, Level C will not be excavated, but will be taken out later as Zone 11, Level D. Fill is sterile subsoil. Base is sterile subsoil as well except at the base of Zone 11, Level C (see plan view). 2 chert flakes and 1 chert pebble were recovered.

Level B: This level was to make the unit floor level with the base of Zone 11, Level C. It is just shy of 10 cm (or natural soil change). Fill is sterile subsoil. Base is same as fill, except in the NW ¼ of the unit where the soil is darker- this is probably a natural disturbance such as a tree. Pieces of burned sand were found, but not saved.

Auger Test: Below base of Zone 12, Level B (see Unit Level Form drawing.)

Wall Clean Up: Zones 1-11B: Cleaning walls of Units 7 and 9. Radiocarbon Sample #169 was taken from the eastern wall of Unit 9, Zone 3 base at a depth of 205 cm.

4. List and describe features by level, and correlate feature to strata:

See Unit 9 for a description of Feature 38 (determined not to be cultural).

5. Correlate strata and/or features with contiguous units:

Unit 9 is directly north of Unit 7 such that they are contiguous. Overall, the strata are very similar to that encountered in Unit 12. The root mat, modern "A" horizon, moundfill, and pre-mound surface zones all correlate directly with that of Units 7 and 9.

6. Disturbances/mixing:

Root burn in Zone 11, Level B and probable tree disturbance in Zone 12, Level B.

7. Interpretation:

Zone 11: Pre-Mound surface/enriched, buried "A" Horizon – a dark grayish brown (10YR4/2), grades gradually into the subsoil below. Abundant clasts extend upwards from zone, indicating an active surface. Dark soil color suggests that it was quickly buried. In the west profile, a burned tree extends from

the premound surface and into the subsoil beneath. A very dark gray (10YR3/1), somewhat loose with abundant charcoal and some burned, oxidized sand. Shape is amorphous and shifts with depth and becoming lighter.

Zone 12: Subsoil: A light, compact and homogeneous very pale brown (10YR7/3) sand, becoming lighter with depth.

Unit 10

Unit Dimensions: 1-by-2 m
Unit Level: Zone 1-8
On Mound Unit: Eastern Flank
Excavated Depth of Unit: 2.10 m
Dates Excavated: June 21 – July 27, 2010
Excavated By: Daniel A. LaDu and Ashley S. Korpela
Recorded By: Daniel A. LaDu and Ashley S. Korpela

1. Unit description/location:

1-by-2-m unit placed on the eastern flank of the mound, just north of Unit 4. Unit was excavated to the same depth as Unit 4, with 8 zones marking the different stratigraphic layers of the mound.

2. Excavation objective:

Objective was to expand north of Unit 4 to create a 2-by-2-m unit to better see the stratigraphic changes and to investigate the first mound building episode, as well as the midden and enriched A horizon contexts.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

Unit was excavated by strata and placed into zones, with each of these zones having a different level within, based on 10-cm arbitrary levels (except those zones specified otherwise). 10-cm arbitrary levels were used in order o keep contexts in order, and zones were based on the north profile of Unit 4.

Zone 1- Root mat (removed as a single level)

Zone 1.5- Soil had been added to the flank of the mound and may be from previous excavations, is sitting on top of current humus/humus layer. Was also removed as a single level, one sand tempered plain sherd was found.

Zone 2- Level A-C- humus/ humus staining- This area was removed in three 10-cm arbitrary levels, with artifacts only appearing in Level 2B—one sand tempered plain pottery sherd and charcoal—and Level 2C contained only charcoal.

Zone 3- Level A-L-Moundfill- This area was removed in 10-cm arbitrary levels, with artifacts in multiple levels, and they included charcoal, sand concretions, pot sherds (decorated and undecorated), oyster shell fragments, and chert flakes.

Zone 4- One level, with objective to remove only the 10YR5/3 brown sand layer of midden. Artifacts included several pot sherds (both decorated and undecorated), shell, charcoal, and chert cobble.

Zone 5 – Level A-G- Midden-Levels were excavated in 5 cm arbitrary levels, or until natural soil change was encountered. Within this level, artifacts uncovered included pot sherds, bone, fish teeth, shell (oyster, clam, periwinkle; both whole pieces and fragments), charcoal, and burnt clay. Features in this level were 35, 36, 37A-C.

Zone 6- Moundfill- First episode of mound building on top of original ground surface. Removed as one level, about 10-30 cm thick, varying from eastern to western halves of the unit. Only artifacts were shell.

Zone 7-Original ground surface/enriched A Horizon—Levels A-C—Excavated in 10-cm arbitrary levels. Artifacts included shell and a pot sherd concentrated in Levels A and C, but these were in areas close to the shell concentration (Feature 37) in Zone 5.

Zone 8- Sterile subsoil- Levels A-D-Excavated in 10-cm arbitrary levels. No artifacts were present; some charcoal was excavated but not kept. Feature 39 A-D was encountered.

4. List and describe features by level, and correlate feature to strata:

Feature 34-Zone 5 Level A- Originally believed to be a post hole, turned out to be a root disturbance.

Feature 35- Zone 5 Level C- concentration of oyster shell, bone, and pottery sherds in the south/ central part of the unit.

Feature 36- Zone 5 Level C- concentration of shell, bone, and pottery sherds in the southwest corner of the unit.

Feature 37A-C- Zone 5 Level E, Level F, Level G- concentration of shell, bone, charcoal, and lithics, but was predominately a shell concentration with oyster, clam, and periwinkle. This was a linear shell concentration running along the north wall, with the bulk of the shell in the west and thinning in the east.

Feature 39A-D-Zone 8 Level A-D- depression filled with enriched A horizon soil and desiccated plant material, with small amounts of charcoal and orange sand concretions. Level A-B it was a circular concentration and became amorphous in C-D. This is presumed to be a tree disturbance.

5. Correlate strata and/or features with contiguous units:

This unit helped to better show the shape and placement of the midden and enriched A horizon zones that were encountered in both Unit 1 and Unit 4, overall, Unit 10 gave us a more complete look at how the mound was constructed and where trash was thrown in relation to that.

6. Disturbances/mixing:

Throughout the upper layers of the Unit, including Zones 1-3 there was a large number of roots/rootlets present that obstructed some of the profiles. The worst disturbance was in the North Wall along the west side that extended from Zone 3 through Zone 8, and may have extended higher to the surface, but was not visible in profile. This disturbance, probably due to tree and/or roots, obscured the transitions between Zones 3, 4, 5, 6, 7, and 8 in that area of the unit. Also, along the southern profile of unit 4, there is a gap between the edge of the original mound and the area of blending of the midden and enriched A horizon (Zones 4/5/7) to the east.

7. Interpretation: create analytical provenience units (associated strata/levels/features) and arrange in stratigraphic order (include temporal phases of analytical unit if known).

Our interpretation will describe what we were able to see in Units 4 and 10, and discuss how the successive cultural stratigraphy was deposited. Zone 8 is the sterile sub-soil, which was undisturbed except by Feature 39, which was deemed to be a decayed root disturbance. Above that, we saw evidence of the original ground surface (enriched A horizon/Zone7), complete with humus staining below. Sarah Sherwood's opinion suggested that the original ground surface was enriched with cultural and biological material prior to the construction of the mound. The mixing of both Zone 6 and Zone 7 visible in the profiles suggests that the surface was very active and thus exposed long enough to create that disturbance. With Zone 6, we see the first evidence of mound construction on the eastern flank of the mound. This zone was sterile soil that was probably removed from a sterile pre-mound context somewhere off-site. Zones 4 and 5 were the midden layer composed of deteriorated material that was probably thrown from the surface of the mound. The 10YR4/3 brown sand, 10YR4/2 grayish brown sand, and the 10YR4/4 dark yellowish brown san suggests that a variety of different materials were deposited and left different color staining. Feature 35, 36, and 37 were all contained within Zones 4 and 5, which were all predominately shell but also contained bone and pottery concentrations. Sometime after the midden was deposited additional mound fill layers were added to the mound bringing it to its present day height.

Samples Taken:

164: Zone 5, Level C, Feature 35A (midden): Radiocarbon
165 A&B: Zone 5, Level C, Feature 35A (midden): Ceramic Residue
166: Zone 5, Level C, Feature 35A (midden): Soil Sample/Feature Fill for Flotation
167: Zone 5, Level C, Feature 35A (midden): Fragile Faunal Material (Unidentified bone fragments)
168: Zone 5, Level C (midden): Radiocarbon
171: Zone 5, Level C, Feature 36 (midden): Soil Sample for Flotation
172: Zone 5, Level C, Feature 36 (midden): Radiocarbon
173: Zone 5, Level D (midden): Fragile Faunal Material (Oyster Shell)
174: Zone 5, Level D (midden): Soil Sample for Flotation
175: Zone 5, Level D (midden): Radiocarbon
176: Zone 5, Level D (midden): Radiocarbon
179: Zone 5, Level E (midden): Soil Sample for Flotation
180: Zone 5, Level E (midden): Radiocarbon
181: Zone 5, Level E (midden): Radiocarbon
182: Zone 5, Level E (midden): Radiocarbon
183: Zone 5, Level E (midden): Soil Sample for Flotation
184: Zone 5, Level E, Feature 37 (midden): Soil Sample for Flotation
185: Zone 5, Level E, Feature 37 (midden): Radiocarbon
186: Zone 5, Level E, Feature 37 (midden): Radiocarbon
187 A-B: Zone 5, Level E, Feature 37 (midden): Ceramic Residue

188: Zone 5, Level E, Feature 37 (midden): Fragile Faunal Sample
189: Zone 5, Level F, (midden): Soil Sample for Flotation
190: Zone 5, Level F, (midden): Radiocarbon
198: Zone 5, Level G (midden): Soil Sample for Flotation
200: Zone 5, Level G, Feature 37C (midden): Soil Sample for Flotation
201: Zone 5, Level G, Feature 37A (midden): Radiocarbon
202: Zone 5, Level F, Feature 37B (midden): Soil Sample for Flotation
203: Zone 7, Level A (Enriched A Horizon): Soil Sample for Flotation
205: Zone 7, Level D (Enriched A Horizon): Soil Sample for Flotation
206: Zone 8, Level B, Feature 39B: Soil Sample for Flotation
207: Zone 8 Level B, Feature 39B: Radiocarbon
208: Zone 8 Level C, Feature 39C: Soil Sample for Flotation
209: Zone 8, Level D, Feature 39D: Soil Sample for Flotation

Unit 12

Unit Dimensions: 1-by-2 m
Unit Level: A to base of Level U
On Mound-Unit: Summit/Central Mound
Excavated Depth of Unit Below Ground Surface: 2.03 m
Dates Excavated: June 24-July 13, 2010
Excavated By: Rachel V. Briggs, Daniel R. Turner, J. Andrew Scruggs,
Recorded By: Rachel V. Briggs, Daniel R. Turner, and J. Andrew Scruggs

1. Unit description/location:

Unit 12 is another unit excavated along the project's mound bisecting axis. It is 2 m west of Unit 7 and clearly located on the west side of the mound's summit. Based on surface observations alone, the closest looting/previous explorations are still 5 to 8 m west and north respectively.

2. Excavation objective:

The purpose of this unit was to continue the project goal of determining the various mound construction episodes/ the general stratigraphy of the mound.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

A- Root mat 10YR2/1 (black) sandy loam. Level correlates to Zone 1.

B- Stained humus layer underlying Level A. 10YR5/2 (grayish brown); sandy loam. Level correlates to Zone 2. It contained one plain ware sherd.

*Note: Level B overlaid a rather complicated stratum, full of numerous, different soils in terms of both color and texture. Also, a historic tree burn was uncovered, probably initiated by a lightning strike as corroborated by the presence of fulgarite in most preceding levels.

C- First evidence of a possible lightning burned tree and associated burned roots appeared in this level and persisted through Level J. The matrix was a mottled 10YR5/4 (yellowish brown) sand. Level correlates to Zone 3. Five sherds and one lithic were found.

D- The tree burn became incredibly localized by the base of this level. Matrix: 10YR6/3 (pale brown) sand; all was fairly normal texture. This level is predominately in Zone 3 with a slight extension into Zone 4. One flake and one very large body sherd was found.

E- In the 10-cm from Level D base to Level E base, the soil gradually gave way to a 10YR6/3 (pale brown) loose sand which was heavily mottled with 10YR5/4 (yellowish brown) sand. The burned soil around the tree burn also grew with this level. Level correlates to Zone 4. Four sherds and three flakes were found.

F- At this point, the levels became far less homogenous (though they were never that homogenous). The base of F was dominated by 5 distinct patches of soil: 1. This soil was located in western half and characterized as 10YR6/2 (light brownish gray) compact sand; 2. This soil was the growing tree burn and associated soil/roots; 3. An area of compact sand hugging the south profile and Munselled at two different colors, 10YR6/2 (light brownish gray) is probably a continuation of #1 and 10YR6/4 (light grayish brown); 4. This soil was the dominant matrix in the southeastern quarter and characterized by a mottled 10YR6/2 (light brownish gray) loosed sand; 5. This soil was a 10YR5/2 (grayish brown) sandy loam, rather compact, located in roughly the northeastern quarter and perhaps the top

of the highest "living surface"* identified in Unit 7. Ceramics and flakes found. Level is predominately in Zone 4, with some in Zone 5.

G- The stratigraphy did not get any more distinct in this level. The base revealed a similar patchy floor- the tree burn was still present and in certain ways growing, the loose 10YR6/3 in the southeastern quarter started yielding to a highly mottled 10YR6/3 sand that was more compact, the possible living surface shrunk while also spreading north and the compact sand in the western half changed color slightly, becoming a 10YR6/4 (light yellowish brown) mottled with 10YR5/2 sand. Ceramics and flakes were found. Level is within Zone 4/5 transition.

H- This was slightly less confusing; the tree burn was still present and, in fact, larger, while the western half yielded to a 10YR7/3 (very pale brown) sand that was far less compact and stretched in a highly marbled form into the southern half. In the southern half, however, was a darker patch of 10YR6/2 (light grayish brown) sand that was also mottled. Sherds and lithics were found. Level correlates to Zone 5.

I- The tree burn continued into this level. Perhaps most significant were the discrete, distinct pockets of beach sand (10YR 8/2 [very pale brown]) that appeared in the northwestern quarter, the southwestern quarter, and the southern quarter. Separating these pockets were areas of highly compact soils (10YR7/4 in the southwestern quarter and 10YR6/3 in the south profile). In this level, the unit also produced its first of two holes, perhaps, created by a root rotting in situ. Sherds and lithics were found. Level is within Zone 5/6 transition.

J- Though we had hoped that the 10YR8/2 would encompass the entire unit, it did not. Instead, the soil gave way to a marbled 10YR7/3 (very pale brown) that was very loose ad a 10YR5/4 (yellowish brown) that, though it first appeared around the tree burn, is much more compact and distinctly mottled, perhaps indicating that the growing patch is cultural. This level also produced the second hole, located close to the center of the south wall in the 10YR8/2. One decorated sherd and one lithic were found. Level predominately is in Zone 6, some in Zone 7.

Charcoal associated with the tree burn was found in all Levels A–J, though it was not kept. In additions to the tree burn, there were a large number of root disturbances in the profiles, as well as the unit itself. This unit has many holes in it.

K- Mottled and varied fill and base with soft loose sand throughout and darker stains in the northeastern and the SW quadrants of the unit. Light yellowish brown (10YR6/4), pale brown (10YR6/3), and very pale brown (10YR8/2) soil colors dominated the unit, although mottling persists throughout. Tree/ root disturbances remain in the north center and the southeastern portion of the unit. With the exception of natural disturbances, much of this level reflects an episode of mound construction associated with Zone 7 (top of Zone 7, transition from Zone 6). No artifacts were found.

L- Heavily mottled 10YR8/2 very pale brown and 10YR6/3 pale brown loose sand throughout with the root/tree disturbances still visible in north-center and SE of unit. A pocket of 10YR8/2 very pale brown loose sand in the south-center of the unit marked a possible discrete basketload. Level continues to correlate to mound fill associated with Zone 7. One pot sherd with possible punctation and charcoal found.

M- Fill and base characterized by 10YR6/3 pale brown loose sand lightly mottled with 10YR8/2 very pale brown loose sand and disturbed by the perpetual root/tree burns in the north-center and southeastern portion of the unit. Level correlates to mound fill denoted by Zone 7. No artifacts were found.

N- Fill and base similar to previous level with a more homogenous 10YR6/3 pale brown loose sand in the western half and increased mottling of 10YR8/2 very pale brown loose sand in eastern half; the root/tree disturbance in the north-center of the unit appeared larger, with the other in the southeastern maintaining a similar size and shape. Level correlates to mound fill associated with Zone 7. Charcoal present.

O- Two darker mottled patches appeared in the southeastern quadrant and along the western profile wall of the unit showing 10YR4/2 dark grayish brown compact sand mottled with 10YR6/3 pale brow loose sand and charcoal flecks. The large root/tree burn remained visible in the north-center of the unit while its counterpart in the southeastern quadrant temporarily gave way to the aforementioned mottled patch. The western half of the unit retained its 10YR6/3 pale brown loose sand matrix while the eastern half changed slightly to a 10YR7/3 very pale brown loose sand matrix. Level correlates to mound fill denoted by Zone 7 (bottom of Zone 7, top of Zone 8). One decorated sherd, one quartzite projectile point/ knife, one incised sherd, and some charcoal were found.

P- Mottled and varied fill and base; darker staining continued in east and west of unit with lighter, looser sand in the center. Overall, soil at base appeared darker than in previous levels with charcoal concentrations in the darker staining; the root/tree burn continued in the north-center of the unit. Level correlates to Zone 8. Charcoal was found.

Q- Mottled and varied fill and base; pockets of ash (10YR7/1 light gray) appeared along the northeastern and southeastern corners of the unit, mottled with charcoal and a darker matrix (10R6/2 light brownish gray heavily mottled with 10YR6/3 pale brown and 10YR7/1 light gray) than elsewhere in the unit. Another concentration of darker soil (10YR4/1 dark gray heavily mottled with 10YR5/2 grayish brown and 10YR5/3 brown) appeared along the south profile wall, although this was mottled as well with the lighter soil matrix (10YR6/3 pale brown loose sand lightly mottled with 10YR5/2 grayish brown sand) of the majority of the western half of the unit. Root/tree disturbances (north-center and southeast quadrant) remained present. Level correlates to Zone 8/9 transition. No artifacts were found.

R- Fill and base characterized by scattered light charcoal throughout and increased darker mottling with depth likely associated with pre-mound surface. The mottling is consistent but slightly lighter than the pre-mound surface uncovered in Unit 7. Root/tree staining remained in the north-center and southeastern quadrant of the unit. Munsell soil descriptions are as follows: west half 10YR5/2, grayish brown lightly compacted sand lightly mottled with 10YR5/3 brown sand and 10YR6/2 light brownish gray sand; eastern half 10YR5/2 grayish brown lightly compacted sand mottled with 10YR5/3 brown sand. Level correlated to Zone 9/10 transition. One small undecorated sherd found, and Charcoal Sample #148 taken.

S- Fill became increasingly lighter with depth and charcoal increased in size and frequency. At base, lighter soil (10YR5/4) became more predominant, with darker soil (10YR4/3) lightly mottling. Pale brown (10YR6/3) mottling primarily associated with root staining also appeared very light elsewhere. Root/tree disturbances remained present in the north-center and southeastern quadrants. Level correlates to Zone 10. Charcoal Sample # 150 was taken.

T- Fill and base characterized by a 10YR6/4 light yellowish brown sand matrix, lighter and less mottled in the eastern half of the unit; small charcoal concentration in the southwestern quadrant and root disturbance still present in the north-center of the unit. Loose sand is consistent throughout but does not resemble the compact sand of the subsoil found elsewhere. Level correlates to Zone 11. No artifacts found. Two auger tests were conducted at base of level.

U- Fill and base reflect a 10YR8/3 very pale brown compact sand with light lamellaeand some small to moderate charcoal inclusions. Root/tree disturbances remained present in the north-center and southeastern quadrant of the unit. Level correlates to sterile subsoil denoted by Zone 11. No artifacts found. Four auger tests were placed in the base of the level.

4. List and describe features by level, and correlate feature to strata:

No features were uncovered in this unit.

5. Correlate strata and/or features with contiguous units:

Overall, the strata are very similar to that encountered in Units 7 and 9. The root mat, modern "A" horizon, moundfill, and pre-mound surface zones all correlate directly with that of Units 7 and 9.

6. Disturbances/mixing:

Two major root/tree burns persisted in the north-center (from Level C through Level U) and in the SE quadrant (from Level K through Level U) of the unit. Major root disturbances dissected the west and southern profile walls, while a smaller root disturbance also appeared in the northern profile wall. Each of these obliterated the vertical columns within most strata appearing in these walls, although the damage was localized to the root columns (<10 cm wide). Another disturbance of unknown origin mixed the strata in the upper-to-middle eastern portion of the north profile, but did not completely obscure the separate strata.

7. Interpretation:

Zone 1: Root mat

Zone 2: Humic stained sand ("A" Horizon)

Zone 3: Historic/modern burning related to a tree burn - very hard, compact and oxidized sand (strongest in the north and west profile walls). Sand is a yellowish brown (10YR5/4).

Zone 4: Moundfill - fairly loose, homogeneous light yellowish brown sand (10YR6/4).

Zone 5: Moundfill – a darker, more compact brown sand (10YR5/3). Small charcoal flecks throughout. Grades into and mottled with a light yellowish brown compact sand (10YR6/4) in the east and north.

Zone 6: Moundfill – a very loose, coarse very pale brown sand (10YR7/3). Again, slightly mottled and less defined in the north and east.

Zone 7: Moundfill – a more compact, lighter light yellowish brown (10YR6/4) sand, mottled with a very compact yellowish brown (10YR5/4), some of the loose, light sand from Zone 6. Light charcoal flecks throughout.

Zone 8: Moundfill – a darker, but variable, compact dark grayish brown (10YR4/2), mottled with a lighter, fairly compact yellowish brown (10YR5/4) and grayish brown (10YR5/2). Lighter in the north (10YR5/4) and less defined in the east, more of a lighter grayish brown (10YR3/3). Light charcoal scattered throughout.

Zone 9: Pre-Mound Surface/Buried, Enriched "A" Horizon—a very compact, dark brown (10YR3/3). Light charcoal scattered throughout. Clasts evident and indicative of an active surface.

Zone 10: Subsoil – a very compact, yellowish brown (10YR5/4) sand. Subsoil that is still mottled with leeching from the above zone and transitions to a pure subsoil below.

Zone 11: Subsoil – a compact, lighter yellowish brown sand (10YR6/4), becoming lighter and more compact with depth.

Unit 13

Unit Dimensions: 2-by-1 m
On-Mound Unit: Western Flank
Excavated Depth of Unit Below Ground Surface: 1.90 m
Dates Excavated: July 14-30, 2010
Excavated By: J. Andrew Scruggs and Daniel Turner
Recorded By: J. Andrew Scruggs and Daniel Turner

1. Unit Description/Location

Unit 13 is a 1-by-2-m unit oriented along the east-west baseline bisecting the mound. It was placed on the upper west flank of the mound adjacent to the edge of the summit, 6 m west of Unit 12.

2. Excavation objective:

Unit 13 was excavated in order to record the mound's west flank stratigraphy. As it was placed along the east-west bisecting line, the unit should help uncover the stratigraphy along the mound, providing information about the mound's construction. The unit was excavated in two initial natural levels (consisting of the root mat and humus), followed by 10-cm arbitrary levels, or natural levels as applicable according to the stratigraphy of the mound.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

All arbitrary levels subject to change with obvious natural soil/stratigraphic change.

Zone 1: Initial root mat

Level A: Root mat removed, consisting of humus with roots and organic material - no artifacts.

Zone 2: Initial humus layer

Level B: Removed loose gray humus. Base still largely stained with humus, but also heavily mottled with mound fill (yellowish brown sand). One decorated sherd, some small undecorated sherds, and small lithic flakes found.

Zone 3A/B: Second root mat and humus layer - likely original root and humus layers preceding recent erosion event.

Level C: 10-cm arbitrary level from base of Level B in northeast corner. Western third of unit not excavated, as it was already below target elevation of Level C due to slope of western flank of the mound. Along with yellowish brown mound fill, humus staining still remains heavy. As the profile should indicate, a second root mat and humus layer lie beneath the initial two strata. This likely represents an erosive event which piled new a layer of dirt atop original humus and root mat. No artifacts found in Level C.

Zone 4: Mound Fill Stratum

Level D: 10-cm arbitrary level from base of Level C in northeast corner. At base of Level D, western and eastern portions of the base become level. Base largely consists of yellowish brown mound fill, though western portion still retains heavy gray humus staining. Some decorated and undecorated pottery and a lithic flake found. Some small charcoal pieces found but not retained.

Level E: 10-cm arbitrary level from base of Level D. Base consists of yellowish brown mound fill. Humic staining still persists in west, but begins to peter out

and covers less area. Two Marksville Incised sherds found.

Level F: 10-cm arbitrary level from base of Level E. As with base of Level E, the humus staining diminishes, now limited to only portions of the northwest corner. Some pottery found, including a decorated rim found in the mound fill portion (likely a re-fit with piece found in higher level).

Zone 5: Darker Mound Fill Stratum

Level G: 10-cm arbitrary level from base of Level F. Humic stain no longer present in the base. Base is yellowish brown mound fill, now with some darker mottling, which is more prevalent in eastern section. Some small sherds, lithic flakes, and charcoal found.

Level H: 10-cm arbitrary level from base of Level G. Darker soil becomes more prevalent in east, while the western portion remains yellowish brown. One large incised sherd (probable re-fit), some small to medium sherds, lithic material, and charcoal found.

Level I: 10-cm arbitrary level from base of Level H. The eastern portion yielded somewhat darker, more grayish soil, while the west largely remained yellowish brown, though it became darker as well. Multiple undecorated sherds found, especially within darker eastern soil, along with charcoal. A base and a decorated folded rim also found.

Level J: Natural level to peel back the yellowish fill and uncover darker underlying soil. Eastern portion not excavated, as it was already exposed at the base of Level I. Base of western portion becomes darkly mottled, similar to eastern portion. Some small sherds, lithic material, and charcoal found.

Zone 6A/6: Midden (re-deposited) area with high concentration of pottery. Zone 6A overlies Zone 6 as intermediary between mound fill and midden.

Level K: 10-cm arbitrary level from base of Level I, leveling base of eastern and western portions of unit. Fill and base continued to darken, especially in center and west. Likely represents the appearance of Zone 6A, which does not extend along entire unit (see profile drawings). Several decorated and undecorated sherds found, along with charcoal, bone, shell, a chert flake, and a small piece of tabular ferrous sandstone.

Sample # 192: Radiocarbon sample (charcoal) from dark midden area in east.

Level L: 10-cm arbitrary level from base of K to uncover extent of midden area. Dark midden continues in fill, but disappears at the base (except northwest corner), replaced by lighter sand (Zone 7). Several sherds found, abundant charcoal, some bone, and some lithic flakes.

Sample #194: Ceramic residue - large rim sherd.

Sample #195: Soil sample from dark midden.

Sample #196: Radiocarbon sample (charcoal from midden).

Sample #197: Second radiocarbon sample (charcoal from midden).

Level M: Natural level to excavate remaining midden in northwest corner of unit. Lighter matrix found at base, similar to lighter sand in majority of base. One chert pebble found.

Zone 7A/B: Mound fill of light sand. 7A is somewhat lighter, only appearing in east, while 7B represents majority of the zone.

Level N: 10-cm arbitrary level from base of Level M. Fill is light sand, which remains at base in western portion. Base along the east comes down atop Zone 8, a darker zone of mound fill. No artifacts found.

Zone 8: Dark band of mound fill that does not reach the western edge of unit, which remains part of Zone 7 (see plan views).

Level O: 10-cm arbitrary level from base of Level N. Similar to previous level, but soil in the east becomes lighter, likely reaching the top of Zone 9 at the base in the east. One lithic found.

Zone 9: Very light zone of loose sand, which does not reach to the western edge of unit. West remains part of Zone 7.

Level P: 10-cm arbitrary level from base of Level O. Excavation stopped at 6 cm because of soil change. Base became a dark band, heavily mottled with pale sand. This likely represents the beginning of Zone 10. No artifacts found.

Zone 10: Pre-mound surface consisting of dark sand - a buried "A" horizon representing original pre-mound ground surface.

Level Q: 10-cm arbitrary level from base of Level P. Fill remains dark, and the base become lighter, though still remaining largely dark. Probable transition between pre-mound and subsoil. No artifacts found. Sample #204: Soil sample from northeast corner.

Zone 11: Transitional zone between pre-mound surface and subsoil. Largely yellowish brown sand, somewhat compact.

Level R: 10 centimeter arbitrary level from base of Level Q. Lighter, yellowish-brown soil, but still mottled with some dark spots from pre-mound surface and probable roots. No artifacts found.

Zone 12: Light, compact subsoil; mostly homogenous.

Level S: 10-cm arbitrary level from base of Level R. Sterile yellowish-brown subsoil, lightly mottled with darker (still yellowish-brown) soil. No artifacts found.

Level T: 10-cm arbitrary level from base of Level S. Sand became lighter, but still compact. Two root disturbances found in southwest and northeast corners. No artifacts found.

Zone 13: Sterile subsoil, more pale and compact than in Zone 12, though very similar. Transition between 12 and 13 is gradual.

Level U: 10-cm arbitrary level from base of Level T to uncover at least 20 cm of subsoil along entire unit. Fill and base continue to uncover sterile, compact subsoil consisting of pale sand. The two root disturbances from Level T remain in northeast and southwest corners. No artifacts found.

Auger Tests from Base of Level U: 50-cm auger tests along each corner and center of unit, confirming the continuing layer of subsoil, uncovering lamellaebelow the base, along with compact, pale subsoil.

4. List and describe features by level, and correlate feature to strata:

Though a re-deposited midden was found in Zone 6 (Levels K-M), it was not given a feature number, nor was it excavated as a feature. It consisted of a very dark band of soil with high concentrations of charcoal and pottery, though little bone or shell was found (contrasting with midden areas found in east flank of the mound). Due to the absence of shell and bone, it was not initially clear whether this stratum was a midden.

5. Correlate strata and/or features with contiguous units:

The presence of new, eroded root mat and humus layer appears in both this unit and Unit 14, found approximately 2 m west along the western flank. However, the buried "A" horizon found in Zone 3 of this unit was enriched, whereas it was not in Unit 14. Other strata do not appear to be contiguous with other units (including the Zone 6 midden, which likely terminates somewhere between the western edge of this unit and eastern edge of Unit 14). One possible exception is the loose, pale sand found in Zone 9. A similar band of very loose sand was found in Unit 12 at the summit of the mound. Whether these represent parts of the same stratum, however, is unclear pending further analysis.

6. Disturbances/mixing:

As previously mentioned, an erosion event likely occurred, possibly related to Hurricane Katrina. This buried the original "A" horizon beneath Zones 1 and 2, a new root mat and humus.

Some wash from a tree or depression found along south profile, as seen in Zones 3C and 3D, gradually shifting into Zone 4.

Some wash/depression also seen in east profile extending from Zone 7 through Zone 9.

Two tree/root marks found in subsoil.

7. Interpretation: create analytical provenience units (associated strata/levels/features) and arrange in stratigraphic order (include temporal phases of analytical unit if known):

Zone 1: Initial root mat with abundant rootlets. Includes Level A.

Zone 2: Recent wash/overburden, probably eroded from higher point. Sand is yellow-brown mottled with a humus darker grayish brown material. Humus staining increases in east and south, whereas the yellowish sand is predominant in the west and north. Light charcoal is scattered throughout. Includes Level B.

Zone 3: Original "A" horizon, buried by Zone 2 in erosion event. Includes Zone 3B, a thin band of light wash in the north. Also includes Zones 3C and 3D, wash from a tree or depression. 3A (primary zone) is grayish sand. 3B consists of loose, white wash. 3C consists of interchanging bands of lighter and darker sand, and 3D is transitional between 3C and 4. Includes Level C.

Zone 4: Mound fill consisting of yellowish-brown sand, associated with most recent construction episode. Contains small amounts of charcoal, and is somewhat compact. Includes Levels D - F.

Zone 5: Slightly darker mound fill, associated with earlier construction episode. Lightly compact with some charcoal flecks. In the south, the zone becomes somewhat darker. Transition to Zone 6A is gradual, whereas transition to 6 is abrupt. Includes Levels G - J.

Zone 6: Dark band of midden [re-deposited; secondary context] with numerous sherds and abundant charcoal. Includes Zone 6A, which overlies the midden in the northwestern portion of the unit. 6A is lighter than 6, but still somewhat dark. Transition from 6A to 6 is gradual. Includes Levels K - M.

GM LED 01: A geophysical sample was taken from the profile wall of Zone 6, along the eastern portion of the profile wall.

Zone 7: Mound fill consisting of somewhat light sand. Includes Zone 7A in the south, consisting of lighter and coarser sand. 7B (the primary part of the zone) is slightly darker than 7A, and consists of coarse, loose sand lightly mottled with organic leeching from above. Includes Level N.

Zone 8: Mound fill consisting of dark brown sand, not reaching to western extreme of unit. Lightly compact grayish brown sand is mottled with the fill from Zones 7A and 7B, especially in the south. Includes Level O.

Zone 9: Mound fill consisting of very light, coarse, loose sand, not reaching to western extreme of unit. Pale sand is mottled with some of the darker fill from Zone 8 above and Zone 10 below. Includes Level P.

GM LED 02: Zone 9 includes a geophysical sample taken from the profile wall of Zone 9, along the eastern portion of the north wall.

Zone 10: Pre-mound surface consisting of dark sand. Sand grades gradually into lower subsoil, and small charcoal appears throughout. Includes Level Q.

GM LED 03: Zone 10 includes a geophysical sample taken from the profile wall of Zone 10, along the eastern portion of the north wall.

Zone 11: Transitional zone between pre-mound surface and lighter, yellowish-brown subsoil. Some humus leeching from overlying Zone 10 appears. Includes Level R.

Zone 12: Light, compact homogenous subsoil, consisting of yellowish-brown sand. Includes Levels S and T.

Zone 13: Continuing subsoil, consisting of even lighter and more compact sand. Includes Level U.

Unit 14

Unit Dimensions: 2-by-1 m
On-Mound Unit: Western Flank
Excavated Depth of Unit Below Ground Surface: 1.49 m
Dates Excavated: July 19-23, 2010
Excavated By: Jeremy R. Davis and Shawn P. Lambert
Recorded By: Jeremy R. Davis and Shawn P. Lambert

1. Unit description/location:

Unit 14 is a 1-by-2 m unit oriented along the east-west baseline bisecting the mound. It was placed on the lower western mound flank/mound perimeter, 2 m west of Unit 13.

2. Excavation objective:

Unit 14 was excavated in order to record the mound's west flank stratigraphy. As it was placed along the east-west bisecting line, the unit should help uncover the stratigraphy along the mound, providing information about the mound's construction. The unit was excavated in two initial natural levels (consisting of the root mat and humus), followed by 10-cm arbitrary levels, or natural levels as applicable according to the stratigraphy of the mound.

3. List and describe levels and correlate them to strata, and discuss relationship of excavation technique to levels/strata:

All arbitrary levels subject to change with obvious natural soil/stratigraphic change.

Zone 1: Root mat

Level A: very dark brown sand humic layer, root mat removed - no artifacts.

Zone 2: Humic layer underlying root mat removed to expose yellowish-brown sand. Fill is very dark brown sand with organic material. The base is yellowish-brown sand mottled with very dark brown sand- no artifacts.

Zone 3: Level A: 10-cm arbitrary layer of lightest soil. Yellowish-brown sand fill; sherds recovered.

Level B: 10-cm arbitrary level from base of Level A. Yellowish-brown sand fill and at base; 5 undecorated sherds recovered.

Level C: 10-cm arbitrary level from base of Level B. Fill and base yellowish-brown sand; 6 sherds (1 re-fit with decorated rim sherd from Unit 13).

Level D: 10-cm arbitrary level from base of Level C. Yellowish-brown sand fill; Base is brown sand (Zone 4) on east half and yellowish-brown sand (Zone 3) on west half (see plan view); artifacts include the following: 1 pigment-quality hematitic chunk, sherds.

Level E: 10-cm arbitrary level from base of Level D. Yellowish-brown sand fill; Base is yellowish-brown sand on west half and brown sand on east half (see plan view); concretions encountered.

Level F: 10-cm arbitrary level from base of Level E. Yellowish-brown sand fill; Base is brown sand in the western 1/3 of the unit, light yellowish-brown sand in the central 1/3 of the unit at top of Zone 5 with a scattering of charcoal (base of Zone 3, Level F) charcoal lightens in the western part of this section; brown sand in the eastern 1/3 of the unit with a scattering of charcoal that lightens near the eastern part of this section.

Zone 4: Level A: Brown sand (10YR4/3) fill; Base is brown sand (10YR5/3) mottled with yellow brown sand; 1 undecorated rim sherd recovered.

Level B: Fill is brown sand mottled with yellow-brown sand at the base.

Level C: Since Zone 5 was exposed in the center of the Unit, this level will only remove soil from the western and eastern 1/3 of the unit. Fill is brown sand mottled with yellow-brown sand transitioning to yellow-brown sand at the base of the level.; base is light yellow brown sand pocket in portion of western part of the unit, yellow-brown sand exposed elsewhere; natural transition; no artifacts recovered.

Zone 5: Level A: 10-cm arbitrary level. Fill and base are yellow-brown sand with light yellow brown sand in portions of western part of unit; no artifacts were recovered.

Level B: 10-cm arbitrary level. Fill is yellowish brown sand with light yellowish brown sand in some large portions; no artifacts were recovered.

Level C: 10-cm arbitrary level. Fill and base light yellowish brown sand; no artifacts were recovered.

Zone 6: Excavated into subsoil to expose stratigraphy for comparison to Unit 3 where Sarah Sherwood notes cultural activity at subsoil levels. Fill is very pale brown sand at upper portion of zone, sharply transitioning to strong brown sandy clay at about halfway through; Zone 6 is about 50 cm thick; no artifacts recovered.

4. List and describe features by level, and correlate feature to strata:

No features.

5. Correlate strata and/or features with contiguous units:

Zone 6 was excavated into subsoil to expose stratigraphy for comparison to Unit 3 where Sarah Sherwood noted possible cultural activity at subsoil levels.

6. Disturbances/mixing:

None observed.

7. Interpretation: create analytical provenience units (associated strata/levels/features) and arrange in stratigraphic order (include temporal phases of analytical unit if known):

Zone 1: Root mat

Zone 2: Humic stained sand ("A" Horizon) – very dark grayish brown (10YR3/2) sand with increased mottling of dark yellowish brown (10YR4/6) sand with depth.

Zone 3: Mound slope wash – dark yellowish brown (10YR4/6) sand mottled with yellowish brown (10YR3/4) sand and brown (10YR4/3) sand.

Zone 4: Moundfill - dark brown (10YR3/3) to brown (10YR4/3) sand with light charcoal flecks.

Zone 5: Subsoil – light yellowish brown (10YR6/4) sand mottled with dark brown (10YR3/3) sand, darker sand leeching from above zone.

Zone 6: Subsoil – very pale brown (10YR7/3) sand mottled with a strong brown (7.5YR5/6) sandy clay. Excavated as a single level (sterile) as a comparative subsoil context for Dr. Sarah Sherwood. Zone not screened.

Appendix B
Graveline Mound Site (22JA503) Features

Feature No.	Provenience	Feature Type	Context	Samples
Feature 1A/B/C	Unit 1, Levels E, F, & G	Not a feature	Mound Cap	2, 3, 4
Feature 2	Unit 3, Level B/C	Not a feature	Off-Mound	5, 6, 7
Feature 3	Unit 4, Level H	Not a feature	Mound Cap	14, 15
Feature 4	Unit 4, Level M3	Shell Concentration	Midden	17, 18, 33, 35A/B
Feature 5 A/B/D	Unit 4, Level M3/N1	Shell Concentration	Midden	22, 23, 24, 53
Feature 6A/B	Unit 5, Zone 5, Levels A & B2	Shell Concentration	Midden	27, 28, 98
Feature 7A	Unit 5, Zone 5, Level B2	Shell Concentration	Midden	31, 34
Feature 8A/B	Unit 5, Zone 5, Level B2/ Zone 6, Level A	Discrete Midden Deposit	Midden	47, 48A/B, 49, 50A/B, 49, 51, 71
Feature 9A	Unit 5, Zone 5, Level B2/ Zone 6, Level A	Discrete Midden Deposit	Midden	41A/B, 42, 43, 44A/B, 45,46
Feature 10A	Unit 5, Zone 5, Level B2/ Zone 6, Level A	Discrete Midden Deposit	Midden	37, 38A/B, 39
Feature 11	Unit 8, Zone 4, Level B/C	Possible Post Mold	Midden	36
Feature 12	Unit 8 Zone 4 Level C/D	Possible Post Mold	Midden	40
Feature 13	Unit 8, Zone 4, Level D/ Zone 5, Level A	Possible Post Mold	Midden	54
Feature 14	Unit 8, Zone 4, Level D/ Zone 5, Level A	Possible Post Mold	Midden	55
Feature 15 A/B/C	Unit 8, Zone 5, Levels A,B,C	Shell Concentration	Midden	56, 62, 65, 78, 79A/B, 104, 105, 106, 108, 109, 111
Feature 16	Unit 8, Zone 4, Level D/ Zone 5, Level A	Possible Post Mold	Midden	58
Feature 17 A/B/C/D/E/F/G	Unit 8, Zone 5, Level A,B,C/ Zone 6, Levels A,B,C,D	Shell Concentration	Midden	67, 73, 84, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 102, 101, 103, 107, 113, 114, 120, 121, 122, 123, 129, 134
Feature 18 A/B/C/D/E/F	Unit 8, Zone 5, Level B,C/ Zone 6, Levels A,B,C,D	Shell Concentration	Midden	73, 84, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 102, 101, 103, 107, 113, 114, 120, 121, 122, 123, 129, 134
Feature 19 A/B/C	Unit 8, Zone 5, Level C,D/ Zone 6, Level A	Shell Concentration	Midden	81, 85, 97, 112
Feature 20 A/B/C/D	Unit 8, Zone 6, Levels A,B,C,D	Shell Concentration	Midden	101, 102, 103, 107, 113, 114, 120, 121, 122, 123, 129, 134, 138
Feature 21	Unit 8, Zone 6, Level B	Pottery Concentration	Midden/Pre-Mound	115
Feature 22	Unit 8, Zone 6, Level B	Charcoal Concentration	Midden/Pre-Mound	116, 117
Feature 23	Unit 8, Zone 6, Level B/C	Post Mold	Midden/Pre-Mound	124
Feature 24	Unit 8, Zone 6, Level C/D	Post Mold	Midden/Pre-Mound	125
Feature 25	Unit 8, Zone 6, Level C/ Zone 7, Level A	Post Mold	Midden/Pre-Mound	126
Feature 26	Unit 8, Zone 6, Level C/D	Post Mold	Midden/Pre-Mound	128
Feature 27A	Unit 8, Zone 6, Level D	Charcoal Concentration	Midden/Pre-Mound	130, 131, 133, 135, 136, 137, 138
Feature 28	Unit 8, Zone 7, Level A	Not a feature	Midden/Pre-Mound	
Feature 29	Unit 8, Zone 7, Level A	Pottery Concentration	Midden/Pre-Mound	141, 142
Feature 30	Unit 8, Zone 7, Level B	Post Mold	Midden/Pre-Mound	144
Feature 31	Unit 8, Zone 7, Level B	Post Mold	Midden/Pre-Mound	145
Feature 32	Unit 8, Zone 7, Level B	Post Mold	Midden/Pre-Mound	146
Feature 33	Unit 8, Zone 7, Level B	Not a feature	Midden/Pre-Mound	
Feature 34	Unit 10, Zone 5, Level A	Not a feature	Midden	
Feature 35	Unit 10, Zone 5, Level B	Shell Concentration	Midden	164, 165A/B, 166, 167
Feature 36	Unit 10, Zone 5, Level C	Shell Concentration	Midden	171, 172
Feature 37A/B	Unit 10, Zone 5, Level E	Shell Concentration	Midden	184, 185, 186, 187, 188, 200, 201
Feature 38A/B	Unit 9A, Levels A-C	Not a feature	Sub-Mound	191, 193
Feature 39A/B/C	Unit 10, Zone 8, Levels A-D	Not a feature	Sub-Mound	206, 207, 208, 209

Appendix C
Samples Removed from Graveline Mound Site (22JA503)

Sample No.	Provenience	Sample Type	Context
1	N975 E965 Auger Test	Radiocarbon Sample	Not a feature
2	Unit 1, Level E, Feature 1	Flotation Sample	Not a feature
3	Unit 1, Level F, Feature 1B	Flotation Sample	Not a feature
4	Unit 1, Level G, Feature 1C	Flotation Sample	Not a feature
5	Unit 3, Level B/C, Feature 2	Radiocarbon Sample	Not a feature
6	Unit 3, Level B/C, Feature 2	Flotation Sample	Not a feature
7	Unit 3, Level C1, Feature 2	Radiocarbon Sample	Not a feature
8	Unit 1, Level L1	Flotation Sample	Midden
9	Unit 1, Level L1	Radiocarbon Sample	Midden
10	Unit 1, level L1	Radiocarbon Sample	Midden
11	Unit 3, Level F1	Soil Sample (yellow pigment)	Midden
12	Unit 1, Level N	Flotation Sample	Midden
13	Unit 1, Level N	Radiocarbon Sample	Midden
14	Unit 4, Level I, Feature 3	Flotation Sample	Midden
15	Unit 4, Level I, Feature 3	Radiocarbon Sample	Midden
16	Unit 4, Level M2	Radiocarbon Sample	Midden
17	Unit 4, Level M3, Feature 4	Flotation Sample	Midden
18	Unit 4, Level M3, Feature 4	Radiocarbon Sample	Midden
19	Unit 4, Level M3	Flotation Sample	Midden
20	Unit 4, Level M3	Radiocarbon Sample	Midden
21	Unit 4, Level M3	Ceramic Residue Sample (undecorated base fragment)	Midden
22	Unit 4, Feature 5	Flotation Sample	Midden
23	Unit 4, Feature 5B	Flotation Sample	Midden
24	Unit 4, Feature 5B	Radiocarbon Sample	Midden
25	Unit 1, Level N	Shell Sample (unopened bivalves)	Midden
26	Unit 1, Level O	Shell Sample (unopened bivalves)	Midden
27	Unit 5, Zone 5, Level A, Feature 6A	Flotation Sample	Midden
28	Unit 5, Zone 5, Level A, Feature 6A	Radiocarbon Sample	Midden
29	Unit 4, Level N1	Flotation Sample	Midden
30	Unit 4, Level N1	Radiocarbon Sample	Midden
31	Unit 5, Zone 5, Level B2, Feature 7A	Flotation Sample	Midden
32	Unit 7, Level C	Flotation Sample	Mound Cap
33	Unit 4, Level N1, Feature 4B	Flotation Sample	Midden
34	Unit 5, Zone 5, Level B2, Feature 7A	Radiocarbon Sample	Midden
35A	Unit 4, Level N1, Feature 4B	Ceramic Residue Sample (large undecorated rim sherd)	Midden
35B	Unit 4, Level N1, Feature 4B	Ceramic Residue Sample (soil sample)	Midden
36	Unit 8, Zone 4, Level B, Feature 11	Flotation Sample	Midden
37	Unit 5, Zone 5, Level B2, Feature 10A	Flotation Sample	Midden
38A	Unit 5, Zone 5, Level B2, Feature 10A	Ceramic Residue Sample (large undecorated body sherd)	Midden
38B	Unit 5, Zone 5, Level B2, Feature 10A	Ceramic Residue Sample (soil sample)	Midden
39	Unit 5, Zone 5, Level B2, Feature 10A	Radiocarbon Sample	Midden
40	Unit 8, Zone 4, Levels C/D, Feature 12	Post Mold	Midden
41A	Unit 5, Zone 5, Level B2, Feature 9A	Ceramic Residue Sample (large undecorated rim sherd)	Midden
41B	Unit 5, Zone 5, Level B2, Feature 9A	Ceramic Residue Sample (soil sample)	Midden
42	Unit 5, Zone 5, Level B2, Feature 9A	Radiocarbon Sample	Midden
43	Unit 5, Zone 5, Level B2, Feature 9A	Flotation Sample	Midden
44A	Unit 5, Zone 5, Level B2, Feature 9A	Ceramic Residue Sample (large undecorated body sherd)	Midden
44B	Unit 5, Zone 5, Level B2, Feature 9A	Ceramic Residue Sample (soil sample)	Midden
45	Unit 5, Zone 5, Level B2, Feature 9A	Radiocarbon Sample	Midden
46	Unit 5, Zone 5, Level B2, Feature 9A	Radiocarbon Sample	Midden
47	Unit 5, Zone 5, Level B2, Feature 8A	Flotation Sample	Midden
48A	Unit 5, Zone 5, Level B2, Feature 8A	Ceramic Residue Sample (undecorated body sherd)	Midden
48B	Unit 5, Zone 5, Level B2, Feature 8A	Ceramic Residue Sample (soil sample)	Midden
49	Unit 5, Zone 5, Level B2, Feature 8A	Radiocarbon Sample	Midden
50A	Unit 5, Zone 5, Level B2, Feature 8A	Ceramic Residue Sample (undecorated rim sherd)	Midden
50B	Unit 5, Zone 5, Level B2, Feature 8A	Ceramic Residue Sample (soil sample)	Midden
51	Unit 5, Zone 5, Level B2, Feature 8A	Radiocarbon Sample	Midden
52A	Unit 7, Level H	Radiocarbon Sample	Mound Cap
52B	Unit 7, Level H	Radiocarbon Sample	Mound Cap
53	Unit 4, Level P1, Feature 5D	Flotation Sample	Midden
54	Unit 8, Base of Zone 4, Level D/Zone 5, Level A, Feature 13	Flotation Sample	Midden
55	Unit 8, Base of Zone 4, Level D/Zone 5, Level A, Feature 14	Flotation Sample	Midden
56	Unit 8, Zone 5, Level A, Feature 15	Flotation Sample	Midden
57	Unit 4, Level P1	Flotation Sample	Midden
58	Unit 8, Zone 4, Level D/Zone 5, Level A, Feature 16	Flotation Sample	Midden
59A	Unit 4, Level P1	Ceramic Residue Sample (large undecorated body sherd)	Midden
59B	Unit 4, Level P1	Ceramic Residue Sample (soil sample)	Midden
60	Unit 4, Level P1	Flotation Sample	Midden
61A	Unit 8, Zone 5, Level A	Ceramic Residue Sample (large undecorated base fragment)	Midden
61B	Unit 8, Zone 5, Level A	Ceramic Residue Sample (soil sample)	Midden

Sample No.	Provenience	Sample Type	Context
62	Unit 8, Zone 5, Level A, Feature 15A	Radiocarbon Sample	Midden
63	Unit 5, Zone 6, Level A	Flotation Sample	Midden
64	Unit 5, Zone 6, Level A	Radiocarbon Sample	Midden
65	Unit 8, Zone 5, Level A, Feature 15A	Radiocarbon Sample	Midden
66A	Unit 4, Level P2	Ceramic Residue Sample (undecorated body sherd)	Midden
66B	Unit 4, Level P2	Ceramic Residue Sample (soil sample)	Midden
67	Unit 8, Zone 5, Level A, Feature 17	Flotation Sample	Midden
68	Unit 8, Zone 5, Level A	Radiocarbon Sample	Midden
69	Unit 4, Level Q	Flotation Sample	Midden
71	Unit 5, Zone 6, Level B2, Feature 8B	Flotation Sample	Midden
72	Unit 8, Zone 5, Level B	Radiocarbon sample	Midden
73	Unit 8, Zone 5, Level B, Feature 17B/18	Flotation Sample	Midden
74	Unit 8, Zone 5, Level B	Soil Sample (pigment)	Midden
75	Unit 8, Zone 5, Level B	Radiocarbon Sample	Midden
76	Unit 8, Zone 5, Level B	Radiocarbon Sample	Midden
77	Unit 8, Zone 5, Level B	Flotation Sample	Midden
78	Unit 8, Zone 5, Level C, Feature 15B	Flotation Sample	Midden
79A	Unit 8, Zone 5, Level C, Feature 15B	Ceramic Residue Sample (large undecorated base fragment)	Midden
79B	Unit 8, Zone 5, Level C, Feature 15B	Ceramic Residue Sample (soil sample)	Midden
80	Unit 8, Zone 5, Level C	Radiocarbon Sample	Midden
81	Unit 8, Zone 5, Level C, Feature 19	Radiocarbon Sample	Midden
82	Unit 4, South Wall Clean Up, Levels A-U	Radiocarbon Sample	Midden
83	Unit 4, Wall Clean Up, Levels A-U, SE Balk	Radiocarbon Sample	Midden
84	Unit 8, Zone 5, Level D, Feature 17C/18B	Flotation Sample	Midden
85	Unit 8, Zone 5, Level D, Feature 19A	Flotation Sample	Midden
86	Unit 7, Level P	Radiocarbon Sample	
87	Unit 8, Zone 5, Level C/D, Feature 17B/18A	Flotation Sample	Midden
88	Unit 8, Zone 5, Level A/B, Feature 17A/18	Radiocarbon Sample	Midden
89	Unit 8, Zone 5, Level B/C, Feature 17B/18A	Radiocarbon Sample	Midden
90	Unit 8, Zone 5, Level B, Feature 17A/18	Flotation Sample	Midden
91	Unit 8, Zone 5, Level D, Feature 17C/18	Flotation Sample	Midden
92	Unit 8, Zone 5, Level C/D, Feature 17C/18B	Radiocarbon Sample	Midden
93	Unit 8, Zone 5, Level C/D, Feature 17C/18B	Radiocarbon Sample	Midden
94	Unit 8, Zone 4, Level D/ Zone 5, Level A, Feature 17A	Flotation Sample	Midden
95	Unit 8, Zone 5, Level B, Feature 17A/18	Flotation Sample	Midden
96	Unit 8, Zone 5, Level D, Feature 17C/18B	Flotation Sample	Midden
97	Unit 8, Zone 5, Level D, Feature 19B	Flotation Sample	Midden
98	Unit 5, Feature 6 (From Profile)	Flotation Sample	Midden
99	Unit 8, Zone 5, Level D	Radiocarbon Sample	Midden

Sample No.	Provenience	Sample Type	Context
100	Unit 8, Zone 6, Level A	Radiocarbon Sample	Midden
101	Unit 8, Zone 6, Level B, Feature 17D/18/20A	Shell Sample (unopened bivalves)	Midden
102	Unit 8, Zone 6, Level B, Feature 17D/18C/20A	Flotation Sample	Midden
103	Unit 8, Zone 6, Level A/B, Feature 17D/18C/20A	Radiocarbon Sample	Midden
104	Unit 8, Zone 5, Level A/ Zone 4, Level D, Feature 15A	Flotation Sample	Midden
105	Unit 8, Zone 5, Level A/ Zone 4, Level D, Feature 15A	Radiocarbon Sample	Midden
106	Unit 8, Zone 5, Level A/ Zone 4, Level D, Feature 15A	Flotation Sample	Midden
107	Unit 8, Zone 6, Level A, Feature 17D/18C/20A	Flotation Sample	Midden
108	Unit 8, Zone 5, Level B/ Zone 8, Level C, Feature 15B	Flotation Sample	Midden
109	Unit 8, Zone 5, Level B/ Zone 8, Level C, Feature 15B	Radiocarbon Sample	Midden
110	Unit 8, Zone 6, Level A	Flotation Sample	Midden
111	Unit 8, Zone 6, Level A, Feature 15 C	Flotation Sample	Midden
112	Unit 8, Zone 6, Level A, Feature 19C	Flotation Sample	Midden
113	Unit 8, Zone 6, Level B, Feature 17E/18D/20B	Flotation Sample	Midden
114	Unit 8, Zone 6, Level B, Feature 17E/18D/20B	Shell Sample (unopened bivalves)	Midden
115	Unit 8, Zone 6, Level B, Feature 21	Radiocarbon Sample	Midden/ Pre-Mound
116	Unit 8, Zone 6, Level B, Feature 22	Radiocarbon Sample (cane lattice)	Midden/ Pre-Mound
117	Unit 8, Zone 6, Level B, Feature 22	Radiocarbon Sample	Midden/ Pre-Mound
118	Unit 9, Zone 4, Level A	Radiocarbon Sample	Mound Cap
119	Unit 9, Zone 4, Level B	Radiocarbon Sample	Mound Cap
120	Unit 8, Zone 6, Level C, Feature 17F/18E/20C	Flotation Sample	Midden
121	Unit 8, Zone 6, Level C, Feature 17F/18E/20C	Shell Sample (unopened bivalves)	Midden
122	Unit 8, Zone 6, Level C, Feature 17F/18E/20C	Radiocarbon Sample	Midden
123	Unit 8, Zone 6, Level C, Feature 17F/18E/20C	Flotation Sample	Midden
124	Unit 8, Zone 6, Level C, Feature 23	Flotation Sample	Midden/ Pre-Mound
125	Unit 8, Zone 6, Level C, Feature 24	Flotation Sample	Midden/ Pre-Mound
126	Unit 8, Zone 7, Level A, Feature 25	Flotation Sample	Midden/ Pre-Mound
127	Unit 9, Zone 5, Level A	Flotation Sample	Mound Cap
128	Unit 8, Zone 6, Level D, Feature 26	Flotation Sample	Midden
129	Unit 8, Zone 6, Level D, Feature 17G/18F/20D	Radiocarbon Sample	Midden
130	Unit 8, Zone 6, Level D, Feature 27A	Flotation Sample	Midden/ Pre-Mound
131	Unit 8, Zone 6, Level D, Feature 27A	Flotation Sample	Midden/ Pre-Mound
132	Unit 9, Zone 5, Level A	Radiocarbon Sample	Mound Cap
133	Unit 8, Zone 6, Level D, Feature 27A	Radiocarbon Sample	Midden/ Pre-Mound
134	Unit 8, Zone 6, Level D, Feature 17G/18F/20D	Shell Sample (unopened bivalves)	Midden
135	Unit 8, Zone 6, Level D, Feature 27A	Flotation Sample	Midden/ Pre-Mound
136	Unit 8, Zone 6, Level D, Feature 27A	Soil Sample (unfired clay lump)	Midden/ Pre-Mound
137	Unit 8, Zone 6, Level D, Feature 27A	Radiocarbon Sample	Midden/ Pre-Mound

Sample No.	Provenience	Sample Type	Context
138	Unit 8, Zone 6, Level D, Feature 27A	Flotation Sample	Midden/ Pre-Mound
140	Unit 9, Zone 5, Level B2	Radiocarbon Sample	Mound Cap
141	Unit 8, Zone 7, Level A, Feature 29	Flotation Sample	Midden/ Pre-Mound
142	Unit 8, Zone 7, Level A, Feature 29	Ceramic Residue Sample (decorated rim sherd and soil sample)	Midden/ Pre-Mound
143	Unit 9, Zone 6, Level A	Radiocarbon Sample	Mound Cap
144	Unit 8, Zone 7, Level B, Feature 30	Flotation Sample	Pre-Mound
145	Unit 8, Zone 7, Level B, Feature 31	Flotation Sample	Midden/ Pre-Mound
146	Unit 8, Zone 7, Level B, Feature 32	Flotation Sample	Midden/ Pre-Mound
147	Unit 9, Zone 6, Level B	Radiocarbon Sample	Mound Cap
148	Unit 12, Level R	Radiocarbon Sample	Mound Cap
149	Unit 9, Zone 8, Level A	Radiocarbon Sample	Mound Cap
150	Unit 12, Level S	Radiocarbon Sample	Pre-Mound
151	Unit 9, Zone 9, Level A	Radiocarbon Sample	Mound Cap
152	Unit 12, Level T	Radiocarbon Sample	Pre-Mound
153	Unit 9, Zone 9, Level B	Radiocarbon Sample	Mound Cap
154	Unit 9, Zone 9, Level B	Radiocarbon Sample	Mound Cap
155	Unit 9, Zone 9, Level C/ Zone 10, Level A	Radiocarbon Sample	Mound Cap
156	Unit 9, Zone 9, Level C/ Zone 10, Level A	Radiocarbon Sample	Mound Cap
157	Unit 9, Zone 9, Level C/ Zone 10, Level A	Radiocarbon Sample	Mound Cap
158	Unit 9, Zone 9, Level C/ Zone 10, Level A	Radiocarbon Sample	Mound Cap
159	Unit 9, Zone 11, Level A	Radiocarbon Sample	Pre-Mound
161	Unit 9, Zone 11, Level A	Radiocarbon Sample	Pre-Mound
162	Units 7 & 9, Zone 11, Level B	Radiocarbon Sample	Pre-Mound
163	Units 7 & 9, Zone 11, Level B	Radiocarbon Sample	Pre-Mound
164	Unit 10, Zone 5, Level C, Feature 35A	Radiocarbon Sample	Midden
165A	Unit 10, Zone 5, Level C, Feature 35A	Ceramic Residue Sample (undecorated body sherd)	Midden
165B	Unit 10, Zone 5, Level C, Feature 35A	Ceramic Residue Sample (soil sample)	Midden
166	Unit 10, Zone 5, Level C, Feature 35A	Flotation Sample.	Midden
167	Unit 10, Zone 5, Level C, Feature 35A	Faunal Sample	Midden
168	Unit 10, Zone 5, Level C	Radiocarbon Sample	Midden
169	Units 7 & 9, Wall Clean Up	Radiocarbon Sample	Pre-Mound
170	Units 7 & 9, Zone 11, Level C	Flotation Sample	Pre-Mound
171	Unit 10, Zone 5, Level C, Feature 36	Flotation Sample	Midden
172	Unit 10, Zone 5, Level C, Feature 36	Radiocarbon Sample	Midden
173	Unit 10, Zone 5, Level D	Flotation Sample	Midden
174	Unit 10, Zone 5, Level D	Flotation Sample	Midden
175	Unit 10, Zone 5, Level D	Radiocarbon Sample	Midden
176	Unit 10, Zone 5, Level D	Radiocarbon Sample	Midden
177	Units 7 & 9, Zone 11, Level D	Flotation Sample	Pre-Mound
178	Units 7 & 9, Zone 11, Level D	Flotation Sample	Pre-Mound
179	Unit 10, Zone 5, Level E	Flotation Sample	Midden
180	Unit 10, Zone 5, Level E	Radiocarbon Sample	Midden
181	Unit 10, Zone 5, Level E	Radiocarbon Sample	Midden
182	Unit 10, Zone 5, Level E, Feature 37	Radiocarbon Sample	Midden
183	Unit 10, Zone 5, Level E	Flotation Sample	Midden
184	Unit 10, Zone 5, Level E, Feature 37	Flotation Sample	Midden
185	Unit 10, Zone 5, Level E, Feature 37	Radiocarbon Sample	Midden
186	Unit 10, Zone 5, Level E, Feature 37	Radiocarbon Sample	Midden
187A	Unit 10, Zone 5, Level E, Feature 37	Ceramic Residue Sample (undecorated body sherd)	Midden
187B	Unit 10, Zone 5, Level E, Feature 37	Ceramic Residue Sample (soil sample)	Midden
188	Unit 10, Zone 5, Level E, Feature 37	Flotation Sample	Midden
189	Unit 10, Zone 5, Level F	Flotation Sample	Midden
190	Unit 10, Zone 5, Level F	Radiocarbon Sample	Midden
191	Unit 9A, Feature 38, Level B	Flotation Sample	Sub-Mound
192	Unit 13, Level K	Radiocarbon Sample	Mound Cap
193	Unit 9A, Feature 38, Level B	Radiocarbon Sample	Sub-Mound
194A	Unit 13, Level L	Ceramic Residue Sample (undecorated rim sherd)	Mound Cap
194B	Unit 13, Level L	Ceramic Residue Sample (soil sample)	Mound Cap
195	Unit 13, Level L	Flotation Sample	Mound Cap
196	Unit 13, Level L	Radiocarbon Sample	Mound Cap
197	Unit 13, Level L	Radiocarbon Sample	Mound Cap
198	Unit 10, Zone 5, Level G	Flotation Sample	Midden
200	Unit 10, Zone 5, Level G, Feature 37C	Flotation Sample	Midden
201	Unit 10, Zone 5, Level G, Feature 37A	Radiocarbon Sample	Midden
202	Unit 10, Zone 5, Level F, Feature 37B	Flotation Sample	Midden
203	Unit 10, Zone 7, Level A	Flotation Sample	Pre-Mound
204	Unit 13, Level Q	Flotation Sample	Pre-Mound
205	Unit 10, Zone 7, Level C	Flotation Sample	Pre-Mound
206	Unit 10, Zone 8, Level B, Feature 39B	Flotation Sample	Sub-Mound
207	Unit 10, Zone 8, Level B, Feature 39B	Radiocarbon Sample	Sub-Mound
208	Unit 10, Zone 8, Level C, Feature 39C	Flotation Sample	Sub-Mound
209	Unit 10, Zone 8, Level C, Feature 39 D	Flotation Sample	Sub-Mound

Appendix D
Pottery, Lithic, Charcoal, and Shell Totals by Unit and Level

Levels	Unit 1												
	D	E	I	J	K1	L1	M	N	O	Q	R	T	Profiles
Pottery < ½ in.													
Decorated	-	-	-	-	-	(1) <0.1	(5) 4.1	(2) 2.0	(1) 1.0	-	-	-	(1) 1.8
Undecorated	-	-	(1) 1.0	(1) 0.2	(3) 1.0	(8) 4.5	(36) 20.6	(21) 12.8	(2) 0.6	-	-	-	(2) 1.4
Lithics													
Miscellaneous Sandstone-Unmodified	-	-	-	(1) 17.5	-	-	-	-	-	-	-	-	-
Hematitic Sandstone	-	-	-	(1) 12.4	-	(1) 1.1	(1) 0.2	-	-	-	-	-	-
Limonitic Sandstone	-	-	-	-	-	(1) <0.1	(1) 0.4	-	-	-	-	-	-
UID Projectile Point	-	-	-	-	(1) 9.2	-	-	-	-	-	-	-	-
Chert Pebble-Unmodified	-	-	-	-	-	(1) 0.2	-	-	-	-	-	-	-
Chert Flaked Core	-	-	-	-	-	-	(1) 18.7	-	-	-	-	-	-
Fire Cracked Chert Flake	-	-	-	-	-	-	(1) 1.2	-	-	-	(1) 0.4	-	-
Secondary Chert Flake-Unutilized	-	-	-	-	-	(1) 0.5	(1) <0.1	(1) 0.6	-	-	-	-	-
Tertiary Chert Flake-Unutilized	-	-	-	-	-	(2) 0.3	(2) 0.3	-	-	-	-	(1) 0.2	-
Secondary Coastal Agate Flake-Unutilized	-	-	-	-	-	(1) 1.1	-	-	-	-	-	-	-
Quartzite Flaked Core	-	-	-	-	-	-	(1) 5.2	-	-	-	-	-	-
Tertiary Tallahatta Sandstone Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	(1) <0.1	-	-
Tallahatta Sandstone Projectile Point	-	-	-	-	-	-	-	-	-	-	(1) 6.9	-	-
Shell													
Clam	-	-	-	-	(41) 114.4	(1) 0.8	(10) 33.8	(69) 448.1	(36) 363.3	-	-	-	(22) 104.0
Oyster	-	-	-	-	-	(15) 15.7	(46) 146.2	(24) 115.5	(4) 18.3	-	-	-	-
Periwinkle	-	-	-	-	(4) 3.1	(5) 2.7	(26) 23.0	(4) 5.1	-	-	-	-	(4) 4.0
Miscellaneous	-	-	-	-	-	-	(50+) 16.9	(31+) 11.8	(40) 9.6	(1) 0.1	-	-	(22+) 7.0
Artifact Totals:	**8.7**	**77.5**	**(1) 1.0**	**(3) 30.1**	**(49) 127.7**	**(37) 28.5**	**(181+) 283.9**	**(152+) 595.9**	**(83) 392.8**	**(1) 0.1**	**(3) 7.3**	**(1) 0.2**	**(51+) 118.2**

Weights given in grams
( ) = number of pieces

Levels	Unit 2				Unit 3								
	A	C	D	F	A	B	C1	C2	D1	E1	F2	G1	G2
Pottery < ½ in.	-	-	-	-	-	-	-	-	-	-	-	-	-
Decorated	-	-	-	-	-	-	-	-	-	-	-	-	-
Undecorated	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithics													
Miscellaneous Sandstone-Unmodified	-	-	-	-	-	-	-	-	-	-	-	-	-
Hematitic Sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-
Limonitic Sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-
UID Projectile Point	-	-	-	-	-	-	-	-	-	-	-	(1) 2.3	-
Chert Pebble-Unmodified	-	-	-	-	-	-	-	-	-	-	-	-	-
Chert Flaked Core	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Cracked Chert Flake	-	-	-	-	-	-	-	-	-	-	-	-	-
Primary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	-	-	(1) 0.1
Secondary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	-	-	-
Tertiary Chert Flake-Unutilized	-	-	-	(1) <0.1	-	-	-	-	-	-	(1) 0.1	-	-
Quartzite Flaked Core	-	-	-	-	-	-	-	-	-	-	-	-	-
Tertiary Tallahatta Sandstone Flake-Unutilized	-	-	-	-	-	-	-	(1) 1.3	-	-	-	-	-
Tallahatta Sandstone Projectile Point	-	-	-	-	-	-	-	-	-	-	-	-	-
Charcoal	-	6.4	2.3	-	16.7	172.4	676.5	14.7	709.0+	734.2	-	-	0.2
Shell													
Clam	(1) 9.3	-	-	-	-	-	-	-	-	-	-	-	-
Oyster	-	-	-	-	-	-	-	-	-	-	-	-	-
Periwinkle	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous	-	-	-	-	-	-	-	-	-	-	-	-	-
Artifact Totals:	**(1) 9.3**	**6.4**	**2.3**	**(1) <0.1**	**16.7**	**172.4**	**676.5**	**(1) 16.0**	**709.0+**	**734.2**	**(1) 0.1**	**(1) 2.3**	**(1) 0.3**

Weights given in grams
( ) = number of pieces

Levels	Unit 4														
	B	C	D	E	F	G1	G2	H	I	L	M3	N1	N1/N2	N2	O
Pottery < ½ in.															
Decorated	-	-	-	-	-	-	-	-	-	-	(16) 11.1	-	-	-	-
Undecorated	-	(1) 0.4	-	-	-	(1) 1.8	-	-	-	-	(103) 57.2	(10) 6.5	(1) 0.4	-	-
Lithics															
Hematitic Sandstone	-	-	-	-	-	-	-	(1) 4.4	-	-	(2) 1.0	(1) 2.6	-	-	-
Chert Pebble-Unmodified	-	-	-	-	-	-	-	-	-	-	-	(1) 39.9	-	(1) 17.9	-
Hematitic Chert	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Primary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	(3) 11.1	-	-	-	-
Secondary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	(2) 3.6	-	-	-	-
Tertiary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	(2) 0.2	-	-	-	-
Quartzite Pebble	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mica	-	-	-	-	-	-	-	-	-	-	(1) <0.1	-	-	-	-
Charcoal	0.8	1.7	1.7	1.1	-	-	0.8	1.4	2.5	2.2	89.5	21.2	16.7	2.9	22.6
Shell															
Clam	-	-	-	-	-	-	-	(25) 8.7	-	-	(189) 1007.9	(199) 1475.1	(44) 315.9	(1) 0.5	(65) 658.0
Oyster	-	-	(21) 47.1	(12) 7.2	(70+) 33.0	-	-	-	-	-	(4) 4.0	(47) 288.4	(12) 8.1	-	(21) 199.2
Periwinkle	-	-	-	-	-	-	-	-	-	-	(38) 26.8	(19) 16.7	(3) 1.7	-	(4) 3.6
Miscellaneous	-	-	-	-	-	-	-	-	-	-	(395+) 71.5	(207+) 40.0	(45+) 8.1	(10) 1.3	(115+) 21.3
Artifact Totals:	**0.8**	**(1) 2.1**	**(21) 48.8**	**(12) 8.3**	**(70+) 33.0**	**(1) 1.8**	**0.8**	**(26) 14.5**	**2.5**	**2.2**	**(755+) 1283.9**	**(484+) 1890.4**	**(105+) 350.9**	**(12) 22.6**	**(205+) 904.7**

Weights given in grams
( ) = number of pieces

Levels	Unit 4												
	O1A/O2	**O1B**	**O2**	**O3**	**O3/P**	**P1**	**P2**	**Q**	**R1**	**R2**	**S**	**T**	**Profiles**
Pottery < ½ in.													
Decorated	(2) 1.0	-	-	-	-	-	-	-	-	-	-	-	(1) 0.3
Undecorated	(8) 3.3	(4) 0.3	(3) 1.4	-	-	-	-	-	(1) 0.2	-	(1) 0.3	-	(8) 5.8
Lithics													
Heat Altered Hematitic Chert	-	-	-	-	-	-	-	-	(2) 3.5	-	-	-	-
Primary Chert Flake-Unutilized	(1) 0.1	-	(1) 1.3	-	-	-	-	-	-	-	-	-	-
Secondary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	-	(1) <0.1	-
Tertiary Chert Flake-Unutilized	-	-	-	-	-	(1) <0.1	-	-	(1) 0.4	-	(1) <0.1	-	-
Quartzite Pebble	-	-	-	-	-	(1) 0.6	-	-	(1) 0.5	-	-	-	-
Charcoal	4.5	4.0	2.3		0.4	6.3	1.4	4.1	-	1.3	<0.1	-	14.9
Shell													
Clam	-	(3) 6.3	(2) 6.1	(6) 7.3	(24) 150.1	(8) 14.8	(3) 4.7	-	(3) 2.6	-	-	-	(5) 3.4
Oyster	-	-	-	(4) 14.6	(2) 36.5	(20) 7.9	-	-	-	-	-	-	(4) 1.5
Miscellaneous	(37+) 49.6	-	-	-	-	-	-	-	-	-	-	-	(2) ~0.1
Artifact Totals:	**(48+) 58.5**	**(7) 10.6**	**(6) 11.1**	**(10) 21.9**	**(26) 187.0**	**(30) 29.6**	**(3) 6.1**	**4.1**	**(8) 7.2**	**1.3**	**(2) 0.3+**	**(1) <0.1**	**(20) 26.0**

Weights given in grams
( ) = number of pieces

Levels	Unit 5											
	Zone 3			Zone 4	Zone 5			Zone 6			Zone 7	All Zones
	A	B	C	A	A	B1	B2	A	B1	B2	C	Profiles
Pottery < ½ in.												
Decorated	-	-	-	-	-	(3) 2.7	-	(2) 2.0	-	-	-	-
Undecorated	(1) 0.4	(2) 0.9	(2) 1.7	(1) 0.4	(3) 3.1	(8) 6.7	(14) 8.5	(20) 9.0	(1) 1.3	(1) 0.9	-	-
Lithics												
Hematitic Sandstone	-	-	-	-	(1) 0.8	-	-	(1) 7.1	-	-	-	-
Hematitic Sand Concretion	-	-	-	-	-	-	(1) 0.7	-	-	-	-	-
Chert Pebble- Unmodified	-	-	-	-	(1) 13.1	-	-	-	-	-	-	-
Chert Pebble/Concretion	-	-	-	-	(1) 19.7	-	-	-	-	-	-	-
Primary Chert Flake- Unutilized	-	-	-	-	(1) 0.2	-	-	-	-	-	-	-
Tertiary Chert Flake- Unutilized	(1) 0.1	-	-	-	-	-	(1) 0.8	-	-	-	(1) 1.0	-
Charcoal	-	-	-	-	6.7	-	9.7	13.9	-	-	-	4.5
Shell												
Clam	-	-	-	-	(121) 728.5	(6) 15.0	(73) 266.7	(11) 44.5	-	-	-	(26) 105.2
Oyster	-	-	-	-	(32) 277.5	(25) 54.3	(52+) 583.5	(40) 365.2	-	-	-	(33) 243.1
Periwinkle	-	-	-	-	(92) 117.2	(3) 0.6	(83) 98.8	(1) 0.9	-	-	-	(5) 2.8
Miscellaneous	-	-	-	-	(76+) 67.7	(12+) 11.3	(288+) 116.8	(100+) 41.1	-	(7) <0.1	-	(30+) 0.6
Artifact Totals:	**(2) 0.2**	**(2) 0.9**	**(2) 1.7**	**(1) 0.4**	**(328+) 1294.5**	**(57+) 90.6**	**(511+) 1085.5**	**(175+) 483.7**	**(1) 1.3**	**(8) 0.9**	**(1) 1.0**	**(94) 356.2**

Weights given in grams;
( ) = number of pieces

Levels	Unit 6				Unit 7												Units 7 & 9	
																	Zone 11	Zone 12
	C	D	E	F	D	E	G	H	I	J	K	L	M	N	O	P	Q	B	A
Pottery < ½ in.																			
Decorated	-	-	-	-	-	-	-	-	-	-	(1) 0.5	-	-	-	-	(1) 0.6	-	-	-
Undecorated	(4) 3.4	(7) 5.7	-	-	-	(2) 1.3	-	(1) 0.5	-	-	(1) 0.6	(3) 0.8	(2) 0.8	(1) 1.1	-	(14) 8.3	(4) 2.2	-	-
Lithics																			
Hematitic Sandstone	-	-	(1) 14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sandstone Pebble- Unmodified	-	-	-	-	-	-	-	-	(1) 18.1	-	-	-	-	-	-	-	-	-	-
Quartzite Pebble- Unmodified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(1) 0.3
Primary Chert Flake- Unutilized	(1) 0.6	(1) 1.7	-	-	-	-	-	(1) 3.9	-	-	-	(1) 1.4	-	-	-	-	-	-	-
Tertiary Chert Flake- Unutilized	-	(1) 0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(1) 0.3	(2) 0.7
Tertiary Tallahatta Sandstone Flake- Unutilized	-	-	(1) 0.4	(1) 0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Secondary Tallahatta Sandstone Flake- Unutilized	-	-	-	(1) 0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sandstone with Quartz & Chert Inclusions- Unmodified	-	-	-	-	-	-	-	(1) 29.1	-	-	-	-	-	-	-	-	-	-	-
Charcoal	21.6	96.2	6.5	-	1.5	3.4	4.9	132.9	39.8	2.6	6.6	1.4	2.0	23.4	19.0	26.4	53.6	-	-
Shell																			
Clam	-	-	-	-	-	-	-	-	-	(7) 13.8	-	-	-	-	(7+) 13.8	(3) 1.1	-	-	-
Artifact Totals:	**(5) 25.6**	**(9) 103.9**	**(2) 21.6**	**(2) 0.8**	**1.5**	**(2) 4.7**	**4.9**	**(3) 166.4**	**(1) 58.2**	**(7) 13.8**	**(2) 7.7**	**(4) 3.6**	**(2) 2.8**	**(1) 24.5**	**(7+) 32.8**	**(18) 36.4**	**(4) 55.8**	**(1) 0.3**	**(3) 1.0**

Weights given in grams
( ) = number of pieces

Levels	Unit 8							
	Zone 1	Zone 2	Zone 3	Zone 4				Zone 4/5
	A	C	D	A	B	C	D	D/A
Pottery < ½ in.								
Decorated	-	-	-	(1) 0.2	-	-	(1) 1.1	-
Undecorated	-	-	-	-	(1) 0.9	-	(3) 1.5	-
Lithics								
Hematitic Sandstone	-	-	-	-	-	(1) 0.8	-	-
Limonitic Sandstone	-	-	-	-	-	-	-	-
Chert Pebble-Unmodified	-	-	-	-	-	(1) 25.5	-	-
Sandstone Pebble-Unmodified	-	-	-	-	-	-	-	-
Quartzite Pebble-Unmodified	-	-	-	-	-	-	-	-
Fire Cracked Chert Flake	-	-	(1) 1.3	-	-	-	-	-
Primary Chert Flake-Unutilized	-	-	-	-	-	-	(2) 0.5	-
Secondary Chert Flake-Unutilized	-	-	-	-	-	(1) 1.2	-	-
Tertiary Chert Flake-Unutilized	-	-	-	-	-	-	(3) 0.9	-
Tertiary Quartzite Flake-Unutilized	-	-	-	-	-	(1) 0.2	-	-
Charcoal	0.2	-	-	0.7	-	0.6	0.6	-
Shell								
Clam	-	(1) 0.4	-	-	-	(10) 5.0	(46) 292.1	-
Oyster	(6) 1.7	-	-	-	-	-	(24+) 48.0	(24) 446.4
Periwinkle	-	-	-	-	-	-	(22) 19.6	(1) 1.4
Miscellaneous	-	-	-	(1) <0.1	-	-	(23+) 18.7	(25+) 10.0
Artifact Totals:	**(6) 1.9**	**(1) 0.4**	**(1) 1.3**	**(2) 0.9**	**(1) 0.9**	**(14) 33.1**	**(124+) 383.0**	**(100+) 457.8**

Weights given in grams
( ) = number of pieces

Levels	Unit 8											
	Zone 5					Zone 6				Zone 7		Profiles
	A	B	C	D	Profiles	A	B	C	D	A	B	
Pottery < ½ in.												
Decorated	-	-	-	-	-	(7) 5.8	(10) 8.0	(1) 1.0	-	-	-	(1) 1.2
Undecorated	(5) 2.9	(5) 1.8	(9) 4.2	(4) 5.3	-	(20) 13.5	(66) 28.4	(6) 2.6	(4) 2.1	(1) 0.9	(6) 2.5	(7) 3.7
Lithics												
Hematitic Sandstone	-	-	-	-	-	-	-	-	-	-	-	-
Limonitic Sandstone	(1) 9.0	-	-	-	-	-	-	-	-	-	(1) 1.2	-
Chert Pebble-Unmodified	-	-	-	-	-	-	-	-	-	-	-	-
Sandstone Pebble-Unmodified	-	-	-	-	-	(1) 1.8	-	-	-	-	-	-
Quartzite Pebble-Unmodified	-	-	-	(1) <0.1	-	-	-	-	-	-	-	-
Fire Cracked Chert Flake	-	-	-	-	-	-	-	-	-	-	-	-
Primary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	-	-
Secondary Chert Flake-Unutilized	(1) 1.7	-	(1) 0.3	-	-	-	-	-	-	-	-	-
Tertiary Chert Flake-Unutilized	(3) 0.8	-	(1) <0.1	-	-	-	-	-	-	-	-	-
Tertiary Quartzite Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	-	-
Charcoal	<0.1	4.4	3.7	1.0	-	1.4	1.9	<0.1	-	<0.1	1.0	-
Shell												
Clam	(2) 24.7	(44) 455.5	(2) 13.6	(21) 196.3	(5) 16.3	(17) 104.4	(658) 7649.9	(119) 1967.8	(57) 871.9	-	-	(14+) 144.4
Oyster	(38) 526.8	(404+) 5190.3	(194+) 1663.0	(203+) 2334.1	(16) 22.9	(56) 430.1	(55+) 415.3	(1) 18.0	-	(6+) 2.2	-	(64+) 117.8
Periwinkle	(5) 6.6	(8) 9.9	(1) 0.2	(5) 6.7	(1) 1.5	(3) 6.0	(11) 10.1	(1) 0.9	(13) 24.5	-	(1) 0.8	(2) 1.4
Miscellaneous	(n/a) 13.5	(205+) 98.9	(13+) 2.8	(125+) 61.6	(~120) 20.3	(~129) 21.5	(84+) 38.3	(3) 1.5	(77+) 26.7	(15+) 2.4	(9) 5.6	(n/a) 15.2
Artifact Totals:	**(221+) 586.0**	**(666+) 5760.8**	**(221+) 1687.8**	**(359+) 2605.0**	**(~142) 61.0**	**(~223) 584.14**	**(884+) 8151.9**	**(131) 1991.8**	**(151+) 925.2**	**(22+) 5.5**	**(17) 11.1**	**(88+) 283.7**

Weights given in grams
( ) = number of pieces

Levels	Unit 9						Unit 10		
	Zone 3	Zone 4		Zone 6/7		N/A	Zone 1.5	Zone 2	
	A	B	C	C/A	D/B	B		B	C
Pottery < ½ in.									
Undecorated	(2) 1.2	(2) 0.8	(1) 0.2	(1) 0.4	-	-	(1) 0.9	-	-
Lithics									
Chert Pebble-Unmodified	-	-	(1) 0.4	-	-	(1) 861.4	-	-	-
Fire Cracked Chert Pebble	-	-	-	-	-	-	-	-	-
Fire Cracked Sandstone Pebble	-	-	-	-	(1) 27.3	-	-	-	-
Primary Chert Flake-Unutilized	-	(1) 0.2	-	-	-	-	-	-	-
Secondary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-
Tertiary Chert Flake-Unutilized	-	-	(1) <0.1	-	-	-	-	-	-
Chert Uniface Possible Drill-Utilized	-	-	-	(1) 0.9	-	-	-	-	-
Charcoal	-	-	-	-	-	-	-	1.2	4.0
Shell									
Oyster	-	-	-	-	-	-	-	-	-
Miscellaneous	-	(1) <0.1	-	-	-	-	-	-	-
Artifact Totals:	**(2) 1.2**	**(4) 1.0**	**(3) 0.6**	**(2) 1.3**	**(1) 27.3**	**(1) 861.4**	**(1) 0.9**	**1.2**	**4.0**

Weights given in grams
( ) = number of pieces

Levels	Unit 10												
	Zone 3												Zone 4
	A	B	C	D	E	F	G	H	I	J	K	L	Midden
Pottery < ½ in.													
Undecorated	-	-	(1) 1.0	-	-	-	-	-	(2) 1.0	(2) 1.7	-	-	-
Lithics													
Hematitic Sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Cracked Chert Pebble	-	-	-	-	-	-	-	-	-	(1) 4.0	-	-	-
Limonitic Sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-
Chert Pebble-Unmodified	-	-	-	-	-	-	-	-	-	-	-	-	(1) 25.4
Secondary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	(1) 0.1	-	-	-
Charcoal	2.9	3.5	2.3	3.2	5.5	3.2	2.2	16.1	14.9	19.8	1.4	4.4	3.8
Shell													
Clam	-	-	-	-	-	-	-	-	-	-	-	-	(4) 9.5
Oyster	-	-	-	-	-	-	-	-	(1+) 31.2	-	-	-	(22+) 30.7
Periwinkle	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous	-	-	-	-	-	-	-	-	-	-	(1) 0.5	-	-
Artifact Totals:	**2.9**	**3.5**	**(1) 3.3**	**3.2**	**5.5**	**3.2**	**2.2**	**16.1**	**(3+) 47.1**	**(4) 25.6**	**(1) 1.9**	**4.4**	**(27+) 69.4**

Weights given in grams
( ) = number of pieces

Levels	Unit 10															
	Zone 5							Zone 6	Zone 7		Zone 8			North Profile	East Profile	South Profile
	A	B	C	D	E	F	G		A	B	A	B	C			
Pottery < ½ in.																
Undecorated	-	(1) 0.4	(20) 9.0	(10) 5.6	(19) 7.4	-	(1) 1.0	-	-	-	-	-	-	-	-	-
Lithics																
Hematitic Sandstone	-	-	(1) 16.0	-	-	-	-	-	-	-	-	-	(2) 6.3	-	-	-
Hematitic Sandstone Concretion	-	-	(1) 5.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Limonitic Sandstone	-	-	-	(2) 46.7	-	-	-	-	-	-	-	-	-	-	-	-
Chert Pebble-Unmodified	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chert Pebble/Concretion-Unmodified	-	-	(1) 18.5	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Cracked Chert Pebble	-	(1) 1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quartzite Pebble	-	-	-	-	-	-	-	-	-	-	-	(1) <0.1	-	-	-	-
Secondary Chert Flake-Unutilized	(1) 0.7	-	(2) 0.2+	-	-	-	-	-	-	-	-	-	-	-	-	-
Charcoal	8.6	4.1	15.6	3.7	3.4	6.1	2.0	0.9	1.1	-	0.6	-	-	0.9	4.3	-
Shell																
Clam	-	-	(6) 26.0	(82) 440.2	(166) 891.5	(92) 683.6	(74) 605.1	(5) 14.9	(3) 55.0	-	-	-	-	(51) 523.8	(2+) 11.8	-
Oyster	-	-	(18) 131.5	(157) 715.6	(276+) 2042.8	(265+) 1750.8	(137+) 1269.0	-	(1+) 2.1	-	-	-	-	(133) 1722.8	(10+) 192.7	(2+) 3.0
Periwinkle	-	-	(6+) 4.7	(10) 10.3	(9) 7.3	(8) 10.8	(110) 154.1	-	-	(1) 1.3	-	-	-	(12) 20.6	-	-
Miscellaneous	-	(8) 1.5	(61+) 22.1	(34) 14.5	(600+) 64.5	(297+) 106.0	(1156+) 248.1	-	-	-	-	-	-	(300+) 198.5	-	-
Artifact Totals:	**(1) 9.3**	**(10) 7.3**	**(116+) 249.1**	**(295) 1236.6**	**(1069+) 3016.9**	**(662+) 2557.3**	**(1478+) 2279.3**	**(5) 15.8**	**(4+) 58.2**	**(1) 1.3**	**0.6**	**(1) <0.1**	**(2) 6.3**	**(496+) 2466.6**	**(12+) 208.8**	**(2+) 3.0**

Weights given in grams;
( ) = number of pieces

Levels	Unit 12												
	C	D	E	G	H	I	J	L	N	O	P	R	Profiles
Pottery < ½ in.													
Undecorated	(2) 2.0	-	(1) 0.2	(2) 0.9	(4) 2.8	(3) 1.4	-	-	-	-	-	-	-
Lithics													
Chert Pebble-Unmodified	-	-	-	-	(1) 0.1	-	-	-	-	-	-	-	-
Primary Chert Flake-Unutilized	-	-	(1) 2.4	-	-	-	-	-	-	-	-	-	-
Secondary Chert Flake-Unutilized	-	(1) 0.2	-	-	-	-	-	-	-	-	-	-	-
Tertiary Chert Flake-Unutilized	-	-	(1) 1.0	-	-	-	-	-	-	-	-	-	-
Tertiary Novaculite Flake-Unutilized	-	-	(1) 0.1	-	-	-	-	-	-	-	-	-	-
Secondary Quartzite Flake-Unutilized	(1) 1.1	-	-	-	-	-	-	-	-	-	-	-	-
Tertiary Quartzite Flake-Unutilized	-	-	-	-	(1) 0.1	-	(1) 1.7	-	-	-	-	-	-
Gary Stemmed, var. u. Tallahatta Sandstone Projectile Point	-	-	-	-	-	-	-	-	-	(1) 4.5	-	-	-
Charcoal	-	-	-	<0.1	1.1	-	-	1.7	0.9	0.4	3.2	0.1	1.6
Shell													
Miscellaneous	-	-	-	-	-	-	(2) <0.1	-	-	-	-	-	-
Artifact Totals:	**(3) 3.1**	**(1) 0.2**	**(4) 3.7**	**(2) 0.9+**	**(6) 4.1**	**(3) 1.4**	**(3) 1.7+**	**1.7**	**0.9**	**1 4.9**	**3.2**	**0.1**	**1.6**

Weights given in grams
( ) = number of pieces

Levels	Unit 13													Unit 14 Zone 3	
	B	D	F	G	H	I	J	K	L	M	O	Q	Profiles	B	D
Pottery < ½ in.															
Decorated	-	-	-	-	-	-	-	(1) 0.9	(2) 0.7	-	-	-	-	-	-
Undecorated	(1) 0.9	(1) 0.7	-	(1) 1.0	(2) 1.3	(4) 2.6	-	(14) 7.6	(18) 10.1	-	-	-	-	(3) 2.0	-
Lithics															
Hematitic Sandstone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(1) 4.3
Limonitic Sandstone	-	-	-	-	-	-	-	(1) 2.5	-	-	-	-	-	-	-
Chert Pebble-Unmodified	-	-	-	-	-	-	(1) 5.9	-	(3) 38.3	(1) 9.6	-	-	(1) 32.5	-	-
Miscellaneous Quartzite	-	-	-	-	(1) 3.6	-	-	-	-	-	-	-	-	-	-
Primary Chert Flake-Unutilized	-	(1) 0.4	-	(1) 1.9	-	(1) 0.2	-	-	(1) 0.8	-	-	-	-	-	-
Secondary Chert Flake-Unutilized	-	-	-	-	-	-	-	(1) 0.4	(1) 0.8	-	(1) 4.7	-	-	-	-
Tertiary Chert Flake-Unutilized	(1) 0.4	-	-	(1) 0.7	-	-	-	-	-	-	-	-	-	-	-
Tertiary Chert Flake-Utilized; Possible Drill	-	-	-	-	-	-	-	(1) 0.5	-	-	-	-	-	-	-
Secondary Quartzite Flake-Unutilized	-	-	-	-	-	-	-	-	(1) 1.4	-	-	-	-	-	-
Tertiary Quartzite Flake-Unutilized	-	-	-	-	-	-	-	-	(1) 0.2	-	-	-	-	-	-
Charcoal	1.3	0.4	17.3	4.5	2.0	4.5	0.3	26.7	3.8	-	-	-	-	-	-
Shell															
Oyster	-	-	-	-	-	-	-	(8) 0.1	(3) 7.9	-	-	-	-	-	-
Miscellaneous	-	-	-	-	-	(3) 1.9	-	-	-	-	-	(1) <0.1	-	-	-
Artifact Totals:	**(2) 2.6**	**(2) 1.5**	**17.3**	**(3) 8.1**	**(3) 6.9**	**(8) 9.2**	**(1) 6.2**	**(26) 45.7**	**(30) 64.0**	**(1) 9.6**	**(1) 4.7**	**(1) <0.1**	**(1) 32.5**	**(3) 2.0**	**(1) 4.3**

Weights given in grams
( ) = number of pieces

Appendix E
Pottery, Lithic, Charcoal, and Shell Totals in Features

	Features													
Unit	Unit 4							5						
Zone								Zone 5						
Level	M3		N1	N1/N2	O		O3/P	A	B2					
Feature Number	4	5A	5B	4B	4C	5C	5D	6A	6B	7A	8A	9A	10A	6B-10A Clean Up
Pottery < ½ in.														
Decorated	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Undecorated	-	(11) 6.0	(6) 3.8	(1) 0.4	-	-	-	-	-	(4) 4.1	(3) 1.6	(7) 2.8	-	-
Lithics														
Mica	(1) <0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Hematitc Sand Concretion	-	-	-	-	-	-	-	-	-	(1) 0.7	-	-	-	-
Tertiary Chert Flake-Unutilized	-	-	-	-	-	-	-	-	-	-	-	-	(1) 0.8	-
Charcoal	0.9	2.3	11.2	16.7	1.6	21.0	0.4	2.1	-	2.5	-	-	4.3	2.9
Shell														
Clam	(84) 491.0	(82) 456.8	(194) 1464.1	(44) 315.9	(19) 86.1	(46) 571.9	(24) 150.1	(118) 720.6	(16) 98.5	(33) 119.1	-	-	-	(16) 23.5
Oyster	(2) 1.6	-	(28) 235.4	(12) 8.1	-	(21) 199.3	(2) 36.5	(32) 277.5	(32) 423.8	(10) 81.8	(7+) 57.2	-	-	-
Periwinkle	(11) 7.5	(20) 16.3	(17) 15.2	(3) 1.7	-	(4) 3.6	-	(92) 117.2	(64) 81.7	(10) 7.4	(1) 0.7	-	-	-
Miscellaneous	(100+) 12.3	(250+) 47.5	(185+) 37.9	(45+) 8.1	-	(115+) 21.3	-	(76+) 67.8	(186+) 71.0	(77+) 32.9	-	-	-	-
Artifact Totals:	**(198+) 513..3**	**(363+) 528.9**	**(430+) 1767.6**	**(105+) 350.9**	**(19) 87.7**	**(186+) 817.1**	**(26) 187.0**	**(318+) 1185.2**	**(298+) 675.0**	**(135+) 248.5**	**(11+) 59.5**	**(7) 2.8**	**(1) 5.1**	**(16) 26.4**

Weights given in grams
( ) = number of pieces

	Features											
Unit	Unit 8											
Zone	Zone 4		Zone 4/5	Zone 5			Zone 6					
Level	D		D/A	A/B/C	B/C/D	D	A		C		D	A/B/C/D
Feature Number	17	15A	17	15A/B	17/18	19A/B	15C	21	21	24	27A	20A/B/C/D
Pottery < ½ in.												
Decorated	-	-	-	-	-	-	-	(9) 7.1	(9) 7.1	(1) 1.0	-	-
Undecorated	-	(1) 0.3	-	(1) <0.1	(3) 2.6	(2) 2.4	-	(47) 19.8	(47) 19.8	(3) 1.2	(2) 0.8	-
Charcoal	-	-	-	0.3	0.1	-	-	-	-	-	-	-
Shell												
Clam	(31) 270.0	(10) 16.5	-	(6) 59.8	(53) 579.2	(4) 40.1	(3) 6.9	-	-	-	-	(776) 10513.4
Oyster	(4) 10.2	(20+) 37.8	(24) 446.4	(70) 761.1	(591+) 7355.6	(129) 1525.7	(13) 119.1	-	-	-	-	(51) 416.6
Periwinkle	(22) 19.6	-	(1) 1.4	(7) 7.5	(9) 12.0	(3) 3.9	-	-	-	-	(11) 20.7	(13) 13.6
Miscellaneous	(~16) 8.0	-	(25+) 10.0	(29+) 16.7	(189+) 98.5	(100+) 59.0	(~30) 3.7	-	-	-	(70+) 26.7	(57+) 32.9
Artifact Totals:	**(73) 307.8**	**(31+) 54.6**	**(50+) 457.8**	**(113+) 845.4**	**(845+) 8048.0**	**(238+) 1631.1**	**(~46) 129.7**	**(56) 26.9**	**(56) 26.9**	**(4) 2.2**	**(83+) 48.2**	**(897+) 10976.5**

Weights given in grams
( ) = number of pieces

	Features									
Unit	Unit 8						Unit 10			
Zone	Zone 7				Profiles		Zone 5			Zone 8
Level	A	A/B	B			C		E/F/G	A/B/C	
Feature Number	29	25	31	32	15	17/18	35A	36	37A/B/C	39A/B/C
Pottery < ½ in.										
Decorated	-	-	-	-	-	-	-	-	-	-
Undecorated	(1) 0.9	(1) 0.4	(1) 0.5	(1) 0.2	-	-	(5) 1.3	(5) 0.7	(3) 1.8	-
Lithics										
Hematitic Sandstone	-	-	-	-	-	-	-	-	-	(2) 6.3
Quartzite Pebble	-	-	-	-	-	-	-	-	-	(1) <0.1
Secondary Chert Flake- Unutilized	-	-	-	-	-	-	(1) <0.1	-	-	-
Charcoal	<0.1	-	-	-	-	-	-	0.2	2.3	0.6
Shell										
Clam	-	-	-	-	(8+) 94.2	-	-	(6) 26.0	(275) 1957.0	-
Oyster	(6+) 2.2	-	-	-	(9) 101.2	(50+) 385.6	(3) 83.5	(5) 11.1	(622+) 4688.9	-
Periwinkle	-	-	(1) 0.8	-	-	-	-	(6+) 4.7	(119) 164.9	-
Miscellaneous	(4) 0.9	(1) <0.1	-	-	-	-	(~25) 13.2	(23+) 2.3	(1927+) 395.4	-
Artifact Totals:	**(11+) 4.0**	**(2) 0.4**	**(2) 1.3**	**(1) 0.2**	**(17+) 195.4**	**(50+) 385.6**	**(~34) 98.0**	**(45+) 45.0**	**(911+) 7210.3**	**(3) 6.9+**

Weights given in grams
( ) = number of pieces

Appendix F
Plant Remains Recovered from Graveline Mound Site

Soil Sample	Feature	Unit	Zone	Level	Liters of Soil	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
Feature Contexts										
33	4B	4		N1/N2	4.00	0.01	9.92	Unidentified husk	1	0.01
								Unidentifiable seed	1	0.00
22	5A	4		M3	4.50	0.00	25.21			
23	5B	4		N1	3.50	0.00	15.29	Cabbage palm seed cf.	1	0.00
								Morning glory seed cf.	1	0.00
								Unidentifiable seed	3	0.00
53	5D	4		P1	2.00	0.02	5.18	Hickory	1	0.02
								Unidentifiable seed	2	0.00
27	6A	5	5	A	3.75	0.00	5.56			
98	6	5			3.50	0.00	2.68	Unidentifiable seed	1	0.00
31	7	5	5	B2	3.00	0.00	4.16			
47	8A	5	5	B2	4.00	0.00	7.67			
71	8B	5	6	B2	3.25	0.03	0.48	Unidentifiable	6	0.03
43	9	5	5	B2	22.10	0.17	77.48	Acorn	6	0.01
								Black gum seed	1	0.03
								Grape seed	1	0.01
								Wild rice seed cf.	1	0.02
								Sedge seed	3	0.00
								Composite family seed	1	0.00
								Yaupon seed	4	0.01
								Unidentifiable seed	11	0.09
								Unidentified seed	3	0.00
37	10	5	5	B2	3.25	0.02	8.02	Acorn	3	0.00
								Grape seed cf.	1	0.00
								Yaupon	2	0.01
								Unidentifiable seed	1	0.00
								Unidentified seed	2	0.01
36	11	8	4	B	0.25	0.00	0.33			
56	15A	8	5	A	5.50	0.05	10.67	Nutmeat	2	0.04
								Hickory	1	0.01
								Cabbage palm cf.	1	0.00
								Wild rice cf.	1	0.00
								Cane cf.	3	0.00
108	15B	8	5 and 8	B/C	2.00	0.00	12.67			
78	15B	8	5	C	5.50	0.03	19.00	Hickory	2	0.03
								Grape seed	1	0.00
								Grass seed	1	0.00
								Unidentified	3	0.00
111	15C	8	6	A	9.15	0.08	18.99	Wild rice cf.	1	0.00
								Unidentified husk	1	0.03
								Unidentifiable seed	6	0.05
94	17A	8	4 and 5	D/A	0.50	0.00	1.14			
67	17A	8	5	A	5.50	0.37	14.24	Pokeweed seed	1	0.00
								Wild rice cf.	1	0.00
								Cane	2	0.00
								Unidentified husk	12	0.36
								Unidentifiable seed	2	0.01
90	17A/18	8	5	B	1.50	0.01	4.11	Unidentifiable seed	7	0.01
95	17A/18	8	5	B	1.00	0.00	1.73	Yaupon seed	1	0.00
73	17B/18	8	5	B	15.75	0.17	47.76	Hickory	2	0.00
								Persimmon seed cf.	1	0.00
								Amaranth seed	1	0.00

Soil Sample	Feature	Unit	Zone	Level	Liters of Soil	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
								Sedge seed	1	0.00
								Composite family seed cf.	1	0.00
								Unidentifiable seed	11	0.17
87	17B/18A	8	5	C/D	5.25	0.06	8.84	Hickory	3	0.04
								Bearsfoot seed	1	0.01
								Unidentifiable seed	5	0.01
84	17C/18B	8	5	D	2.85	0.09	8.21	Hickory	1	0.06
								Prickly pear seed	1	0.01
								Unidentifiable seed	4	0.02
91	17C/18B	8	5	D	2.25	0.00	6.58	Hickory cf.	1	0.00
96	17C/18B	8	5	D	3.50	0.02	6.92	Unidentified husk	2	0.02
107	17D/18C/20A	8	6	A	?	0.00	0.76			
102	17D/18C/20A	8	6	B	3.00	0.00	12.67			
113	17E/18D/20B	8	6	B	3.00	0.00	2.19			
120	17F/18E/20C	8	6	C	2.00	0.00	2.76			
85	19A	8	5	D	3.00	0.05	7.54	Hickory	3	0.05
97	19B	8	5	D	3.50	0.00	3.47			
125	24	8	6	C	2.00	0.00	1.24			
130	27	8	6	D	0.50	0.00	4.14			
135	27	8	6	D	1.50	0.00	9.50	Hickory	1	0.00
141	29	8	7	A	2.50	0.00	1.33			
184	37A	10	5	E	7.00	0.07	16.60	Cabbage palm seed cf.	1	0.05
								Bud	1	0.02
								Unidentifiable seed	1	0.00
202	37B	10	5	F	5.75	0.03	13.16	Hickory	1	0.03
200	37C	10	5	G	?	0.00	25.33	Hickory	1	0.00
General Midden Contexts										
12		1		N	3.75	0.00	1.57	Bud	1	0.00
								Unidentified seed	2	0.00
19		4		M3	3.75	0.00	14.13			
29		4		N1	4.00	0.00	3.67	Goosefoot seed	1	0.00
								Wild bean cf.	1	0.00
57		4		P1	3.00	0.00	2.99	Unidentified husk	1	0.00
								Unidentified seed	1	0.00
69		4		Q	6.00	0.01	1.01	Acorn	1	0.00
								Hickory	1	0.01
								Unidentifiable seed	2	0.00
63		5	6	A	3.00	0.01	9.11	Acorn	2	0.00
								Hickory	1	0.01
								Bearsfoot	1	0.00
								Unidentifiable seed	1	0.00
77		8	5	B	3.00	0.06	3.90	Acorn	1	0.00
								Unidentified husk	2	0.05
								Unidentifiable seed	2	0.01
								Unidentified seed	1	0.00
104		8	6	A	3.50	0.00	7.74			
127		9	5	A	3.50	0.00	1.24	Goosefoot seed	1	0.00

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