YOU KNOW THE PLACE: IDENTIFYING A SPECIAL-USE SITE IN A REGION OF ENDURING BIOTIC RICHNESS

by

Lauren Anne Walls

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ABSTRACT

YOU KNOW THE PLACE: IDENTIFYING A SPECIAL-USE SITE IN A REGION OF ENDURING BIOTIC RICHNESS

Lauren Anne Walls

A common feature of many archaeological sites along the Gulf Coast is the shell midden sans evidence of associated domestic structures or primary activity areas. Deposits like these are present at the Thompson’s Landing (8ES950) site on the University of West Florida campus. This paper explores the potential for inferences to be made about past human behaviors based on prehistoric refuse structure and content. Group size, occupation span, and the variety of resources exploited are examined through the archaeological, ethnobotanical, and zooarchaeological analyses of a set of shell middens dating to the Woodland and Mississippi periods.
CHAPTER 1

INTRODUCTION

This study is an analysis and interpretation of faunal and floral materials from the Thompson’s Landing site (8ES950), located on Thompson’s Bayou in Escambia County, Florida. At this site, five discreet subsurface shell middens evidence use of the locale over a sustained period of time. These shell middens were deposited at different periods in prehistory, and they clearly hold a wealth of information about the people that created them. Intensive analysis of the faunal remains, as well as the floral materials contained within the archaeological deposits at the site has, thus far, been lacking. This research is focused on identifying characteristics of the Thompson’s Landing site that will shed light on the specific nature of its use history. Archaeological ethnobotany, zooarchaeological analysis of vertebrate faunal and shellfish remains, as well an examination of primary and secondary formation processes will be employed to this end. The analysis of the data resulting from these methods necessitates a theoretical consideration of both the structure and nature of the refuse deposits at the site and the behavior of the individual actors and small groups that created them. Culturally significant behaviors may become apparent using this interpretive framework.

Research Questions and Goals

The objectives of this research are twofold. First and foremost, the purpose of this study is to determine whether floral and faunal analysis of the midden materials at Thompson’s Landing can provide enough information to allow for a convincing characterization of the site and its inhabitants. And, as a follow up inquiry, do these findings support Cheryl Claassen’s (1985) characterization of the site as a Mississippian village site. Complementary multi-scalar methods and corresponding theoretical considerations not previously employed in past
investigations at this site are used to attempt to answer questions that have not yet been addressed about the nature of the site. The specific questions that pertain to this research are as follows:

1. What environmental resources attract people to this region in general and to Thompson’s Bayou, specifically?
2. What can be inferred about human behavior based on the nature and structure of the refuse deposits at Thompson’s Landing?
3. Is Claassen’s designation of the Thompson’s Landing site appropriate?

To answer the questions listed above, I analyzed floral materials and vertebrate and invertebrate faunal remains from the shell midden deposits using a suite of standard ethnobotanical and zooarchaeological methods. The data gathered from these analyses work to elucidate the breadth of the prehistoric diet, refuse management strategies, and the size of groups and degree of relative mobility of the coastal hunter-gatherers and fisher-folk that left their mark on Thompson’s Landing.

Previous Research

The Thompson’s Landing archaeological site is located on the University of West Florida (UWF) main campus, approximately 10 miles northeast of downtown Pensacola in Escambia County, Florida. The site is on a sandy ridge toe in a hardwood hammock that overlooks Thompson’s Bayou, a brackish estuary fed by the Escambia Bay to the east.

In 1983, the Thompson’s Landing archaeological site was tested as part of the Escambia Bay Drainage Archaeological Research Project (EBDARP), spearheaded by Dr. Judith A Bense. This was a project geared towards understanding the prehistoric adaptations of human populations in the Pensacola region, specifically focused on settlement and subsistence
patterning. The Thompson’s Landing site was subsequently recommended as eligible for inclusion on the National Register of Historic Places. This recommendation was based on the recovery of cultural material that suggested a long occupational sequence, spanning the Middle Archaic through the Mississippi Period (approximately 4000 B.C. – A.D. 1600). Additionally, intact shell midden deposits were identified across the site extending between 20 and 100 centimeters below the surface.

As a continuation of EBDARP, UWF, in conjunction with Appalachian State University (ASU), hosted a summer archaeological field school in the Escambia Bay drainage in 1984. During this season of excavation, a team of students led by Dr. Judith Bense and Dr. Cheryl Claassen of ASU, a leading expert in the archaeology of shell middens, tested middens at five different sites in the estuaries of the northern part of Escambia Bay. Moccasin Mound (8SR85), Thompson’s Landing (8ES950), and another site approximately 60 meters southwest (8ES947) of the Landing were investigated on the western side of the bay. Gilligan’s Island (8SR143) and a small site in a low lying open field near Pace Mill Creek (8SR169) were visited on the east side of the bay. The field school students collected grab samples and column samples from the shell midden features on these sites to be used in Claassen’s seasonality and procurement strategy research that would play into the overall goals and themes of the EBDARP project. The intensity of the sampling varied from site to site.

Dr. Claassen collected samples from two Mississippian features at Thompson’s Landing. Feature 1 was said to contain numerous Mississippian sherds, perforated alligator teeth and scutes, a projectile point, a bone awl, and a large piece of a steatite bowl (Claassen 1985). Feature 2 contained a thick lens of Atlantic rangia (Rangia cuneata) and Carolina marsh clam
(Polymesoda caroliniana). The shell from the excavated features was analyzed for seasonality, procurement strategies, and environmental indicators.

The 1990 UWF Archaeology Institute undertook a large scale survey encompassing 125 acres of the UWF main campus scheduled for development and 875 acres that were not going to be immediately impacted by development. The goal of the survey was to locate and gather sufficient information to make recommendations on the potential significance of all archaeological sites in the area (Bense and Phillips 1990). Investigations of sites that lay within or adjacent to the construction impact areas were focused on bounding the sites vertically and horizontally, and recovering sufficient data to assess the potential significance of these cultural resources. Thompson’s Landing was one of these sites. The well drained slopes adjacent to drainage and wetlands, and the hardwood hammock setting of Thompson’s Landing are recognized indicators in the region of having high probability for containing archaeological deposits. The report generated as part of this survey indicated that the site was approximately 75 by 75 meters in size and that it encompassed the north end of the landform.

As part of the 1990 campus survey, the site was systematically shovel tested at 30 m intervals. Only two shovel tests returned cultural material. The first contained eight shell tempered ceramics, and the second held one sand tempered sherd and a single Atlantic rangia shell. The report also indicates that shell midden deposits were found to extend to 100 centimeters below the surface, although the location of these particular deposits is not disclosed.

Recent Research

The site was visited by UWF archaeologists for a third time in the summer of 2011 under the direction of Dr. Ramie Gougeon. Field school students excavated units, trenches, and blocks across the entirety of the site. In total, 39 units were excavated. Their positioning on the
landscape was roughly oriented on a grid of three transects running laterally, from east to west, across the site. Initially, units were placed approximately 15 m apart along each of the three transects; areas were later expanded based on the presence and integrity of cultural materials and features.

An arbitrary datum was established on the south end of the site and has been used as a reference point in all subsequent investigations of the site. An unimproved in-road cuts through the middle of the site, along the apex of the landform. This road leads from the north edge of the UWF campus to a wooden dock that extends into Thompson’s Bayou. In the 1960s, at the time of the construction of the campus, this road was lined with gravel and crushed shell and led the way to the picnic area that was developed at the landing. The road does appear in 1920’s aerial photographs of the area, but may not have been lined until later. Four concrete picnic tables and a single exposed 5 by 5 m concrete aggregate slab were set in the shady areas south of the Bayou to the east and west of the access road. Leading up to the development of the UWF campus, Thompson’s Landing was frequented by local fishermen and was the reported location of a fish camp and bait shop. Since the campus was developed though, the area has been off limits to fishermen and is now a protected wildlife area.

Evidence of continued use of the site area throughout prehistory and up through the present day was abundant during the 2011 summer excavations. Areas of intact prehistoric shell midden deposits abutted the intrusive gravel road bed. In other areas, mid twentieth century light construction material dumps displaced prehistoric deposits; even a few isolated middens likely associated with the historic fish camp were uncovered. The Thompson’s Landing site is incredibly extensive and has a considerably long use history. For this reason, the scope of this
research has been limited to a manageable data set gathered as part of a controlled research strategy which was developed and implemented in the spring, summer, and early fall of 2012.

Approximately six weeks of the 2012 UWF Campus terrestrial field school was spent at the Thompson’s Landing site preforming an auger test survey, a soil resistivity survey, and excavations in an area of the site that was not extensively tested during the summer of 2011. This season of fieldwork on the site was part of the author’s predetermined research design. The explicit goal of the geophysical and manual auger test surveys was to identify subsurface shell midden deposits across the center of the site. The area targeted in the survey to the east of the gravel in-road had the highest elevation, well drained soils, and a heavy covering of underbrush. These characteristics can indicate an area of moderately intact archaeological context that can be attributed, in part, to minimal foot traffic and erosion. Five discreet areas of subsurface prehistoric midden deposits were identified using the survey methods listed above. These five deposits form the data set upon which this research is based. Much more detail will be provided about the particular field methods used to identify and excavate these small shell middens in the third chapter.

*Interpretive Framework*

My goal in theorizing about the cultural deposits at the Thompson’s Landing site is to make inferences about human communities and their behaviors based on the nature and contents of the discreet shell middens there. Following the work of Masakazu Tani (1995) and Michael Schiffer (1972, 1976), this framework will utilize the behaviorally significant information left by cultural formation processes to interpret cultural elements of refuse behaviors of the different groups at Thompson’s Landing. Cultural formation processes are a set of certain behaviors that alter the state of materials in their systemic and archaeological context (Tani 1995). An approach
concerned with such processes will involve a consideration of not only the contents of the deposits, but other attributes such as size, location, shape, and artifact density. With this model in place, it may be possible to assess how these groups were acting as resource maximizers and if they were employing culturally based practices in respect to the ways that they deposited their trash. In order to assess the socio-cultural dynamics that may have been at work in the communities at Thompson’s Landing, it is first necessary to identify the variables that make this site desirable and viable for human exploitation by providing associations to modern ecological conditions. The scope of resources in the natural environment of the Escambia Bay Drainage area, and Thompson’s Bayou specifically, can be found in the following chapter.

Thesis Outline

The goals, objectives, and research questions pertaining to this project are discussed in this introductory chapter, along with the site description and previous archaeological investigations at the Thompson’s Landing site. Included with a short discussion of previous work at the site is a brief mention of the cultural materials recovered and conclusions made by previous investigators, if any were made. A detailed description of the environmental setting of the Thompson’s Landing site can be found in the second chapter. This includes the modern distribution of resources, specifically animals and plants found in the natural communities surrounding the site. The third chapter deals with the cultural context of the site. The details of the survey and excavation undertaken as part of this research are discussed in detail in the fourth chapter, Field and Laboratory Methods, which is broken down into five sections. The first section will cover the sampling methods employed during the 2012 excavation of Thompson’s Landing: the auger test and resistivity surveys. This is followed by unit excavation, feature and column sample collection in section two. The third section addresses the details of the flotation
of the midden materials: obtaining and modifying the float tank, testing the flotation system, analyzing the float samples, and the creation of a comparative ethnobotanical collection. The fourth section of the methods chapter outlines the zooarchaeological procedures put in place to quantify and qualify faunal remains. The last section of the fourth chapter deals with the five radiocarbon assays obtained for the site. The fifth chapter provides the results of the laboratory analysis where each feature is addressed separately. In the last chapter, the specific cultural formation processes that are evident at the site are addressed. Human behaviors are then inferred from the nature and structure of the midden deposits. Lastly, conclusions about the site use throughout history are drawn and the implications of these conclusions are discussed.
CHAPTER 2
ENVIRONMENTAL SETTING

The state of Florida is well known for its rich biotic diversity. The landscape encompassed by the state boundaries has supported the lives of human inhabitants for over 12,000 years, and parts of it have been continuously occupied by plants and animals for 25 million years. The state’s latitudinal position bridges the temperate zone and the tropics. This positioning, combined with the humidity created by the warm oceans surrounding Florida’s peninsular body, accounts for the biological richness of the place (Myers and Ewel 1990).

Florida’s first people, the Paleoindians, were nomadic hunters of mammoths, bison, camels, and giant tortoises. They likely entered this region in pursuance of their large, migrating food source. After the extinction of the megafauna and climate changes occurring around 5,000 years ago, people had to diversify their subsistence economy. The contents of archaeological middens across the state are a testament to this diversification. Fish, game, shellfish, and plants dominated native economies until about 600 years ago, when agriculture became prevalent to some local communities. Even before the advent of domestication and mass crop production, people in Florida were adept at acquiring the resources that they needed to survive, and in many cases, thrive. Some communities never adopted full-scale agriculture, such as the Seminole in South Florida. Groups like this relied on fishing, shellfish collecting, and gathering alone to support large numbers of people well into the historic period. This said, it will be most helpful to explore the local ecosystem and determine exactly what flora and fauna could have and would have been exploited by pre-agricultural people living here. But first, a brief treatment of the climate, topography, and geology is in order to further characterize the environmental setting in Escambia County and even more specifically at Thompson’s Landing.
Physiography, Topography, and Geology

Escambia County is located in the extreme western end of the Florida Panhandle. It is bordered to the east by Santa Rosa County and by Baldwin County, Alabama to the west. It is also bordered by the state of Alabama to the north, and by the Gulf of Mexico to the south. It lies within the East Gulf Coastal Plain physiographic province (Fenneman 1938; Hunt 1974). The Coastal Plain extends from the Gulf and Atlantic coasts inland, covering 160-200 miles north of the Florida Panhandle (Marsh 1966). During the Pliocene epoch, over one million years ago, sea level was high and Citronelle formations blanketed much of what is now the Gulf coast. The sands, clays, and gravels that make up the geology of the area are a result of millennia of deltaic alluvial activity from the high energy streams that drained the continental interior. These soft sandy deposits have been deeply eroded by a complex network of streams that have produced a highly dissected, yet relatively flat land surface.

These modern climate conditions were not present when humans first occupied this region of the southeastern United States (Bense 1994; Bense and Phillips 1990). At the end of the Pleistocene epoch approximately 12,000 years ago, the climate was much drier and cooler than it is today. After the end of the glacial episode, climates began to warm and conditions became even drier. This global warming and drying culminated with the Altithermal period, lasting from 7000-3000 B.C. About 3000 B.C., a period of cooling characterized by increased moisture and numerous short-term temperature fluctuations began, and still continue today.

Escambia County lies within two of the topographic subdivisions of the Coastal Plain: the Coastal Lowlands and the Western Highlands (Marsh 1966). The Coastal Lowlands is relatively flat, and is made up of nearly level marine terraces that sit, on average, about 100 feet above sea level. The Western Highlands consists of a southward sloping plateau that is deeply incised by
networks of streams. Topographic relief in the hills of the Western Highlands is much more extreme than that in the Coastal Lowlands, reaching 280 feet above sea level in northern Escambia County. Thompson’s Landing is in the Western Highlands.

Escambia County is bordered and drained by two key rivers. The Escambia River is a long, relatively unaltered river that drains the eastern side of the county and forms Escambia Bay to the south. The Perdido River is a shorter river to the west that drains the northwestern portion of the county into Perdido Bay. Generally, these river systems are characterized by well-developed dendritic drainage patterns. The streams on the west side of the Escambia River are relatively long in contrast to the shorter streams that drain the east side. They are many times longer, and have fairly straight, parallel channels that trend southeastward, reminiscent of trellis drainage (Marsh 1966). The stream valleys of these river systems are V-shaped with long, somewhat steep slopes. The terraces and stream bottoms belonging to the Escambia and Perdido rivers and their tributaries are long and narrow with steep slopes and narrow ridgetops surrounding them. Around the smaller tributaries, the slopes are shorter and the ridgetops are broader (Marsh 1966).

In the Western Highlands area, it is common for the ridges along rivers and tributaries to be composed of very deep, loosely compacted, well-drained sandy material overlying sandy clays or sandy clay loams. Thompson’s Landing sits on one such ridge, bounded to the north by Thompson’s Bayou, which is fed by a tributary of the Escambia River called Thompson’s Branch. Although modified by 20th century developments, the drainage and surrounding land formations clearly exhibit the qualities described above (Gougeon 2013).

The soils at Thompson’s Landing are deep and well-drained in the central part of the site where the landform is high and flat. These sands overlay Pleistocene deposits of Citronelle
gravel. The low, frequently inundated floodplain swamp surrounding the site to the east and west is composed of Dorovan Muck and Fluvoquents (USDA Web Soil Survey 2013).

*Modern Climate*

The northwest region of Florida has a warm, humid-temperate climate (Williams 2004). In summer, the days are warm, long, and humid with an average temperature of about 80 degrees Fahrenheit. Winters in this region are mild and short averaging about 54 degrees Fahrenheit. In coastal areas, the Gulf of Mexico moderates the high temperatures in summer and the lower temperatures in the winter, but only a few miles inland the cooling effects of the Gulf are greatly diminished. There are a total of approximately 300 frost-free days in a typical year, and snowfall is rare.

The total annual precipitation in this area ranges from about 62 to 65 inches (Williams 2004). More than one half of the total precipitation falls between the months of April and September, with the greatest amount falling in July and August. This often occurs in the form of heavy thundershowers and showers during the afternoon and evening. These types of showers are widely scattered, short, and excessive. They will often drop two to four inches of rain within a period of an hour or two. According to the Escambia County Soil Survey, the hazard of erosion increases when more than ½-inch of rain falls in less than two hours (Williams 2004).

*Natural Communities*

The natural communities surrounding Thompson’s Landing have been identified by a University of West Florida Research Associate, scientific botanist James R. Burkhalter, who personally communicated the information to the author in the Fall of 2013. The communities surrounding the site are floodplain swamp forest in lower elevations and sandhills in the higher elevations and undeveloped areas of the UWF campus. The site itself sits within a mesic...
hammock, a well-developed closed canopy forest of hardwoods. Each community and its resource potential will be discussed briefly in turn. A complete study of the botanical life on the University of West Florida main campus was produced by David Gibson (1992). It contains information about the species of all of the plants discussed below as well as the coverage that each species contributes to the campus biome.

A trifecta of terms is usually used to characterize many different kinds of vegetative communities based on the water content of the soils: xeric, mesic, or hydric. A xeric community is established in places with well-drained soils that do not hold moisture; it is relatively dry. A hydric community is wet, and constantly or very frequently inundated with water. The mesic community is well-balanced, and in many cases the thick leaf litter, created by the hardwoods that inhabit it, retains significant soil moisture. These three community types will be discussed below. Each falls into one of the above categories; the floodplain swamp is hydric, the hardwood hammock is mesic, and the sandhills are xeric.

During the second half of the twentieth century, Thompson’s Landing was cleared and used as a picnic area by the ever-growing University of West Florida. A few scattered concrete benches and tables were erected in the highest, flattest area of the site. This picnic area was maintained by the University and frequented by students until the mid-1990s at which point only the road was maintained by annual removal of encroaching secondary growth (John Phillips, personal communication). While cleared, the site was surrounded by a mesic, hardwood forest. After clearing activities on the site ceased, the natural successional understory became reestablished. Though the hardwood species surrounding the site are much older than those sitting directly on it, all of the species indicative of a mesic hammock natural community are present.
Mesic Hammock

A mesic hammock is a hardwood forest community that occurs in areas of moderate to high elevation as fringes or small patches on the borders of floodplains, rivers, and marshes along the both the Gulf and Atlantic coasts of Florida. It is composed of an open or closed canopy dominated by live oak (*Quercus virginiana*), with cabbage palm (*Sabal palmetto*) often present in the canopy and subcanopy (FNAI 1990). On the UWF campus, the mesic hammock community is dominated by Laurel or Darlington oak (*Quercus hemishpaerica*) with spruce pine (*Pinus glabra*) and Yaupon holly (*Ilex vomitoria*) (Gibson 1992:174-176). The shrubby understory is composed of epiphytes (ferns, orchids, and bromeliads), cabbage palm (*Sabal palmetto*), beautyberry (*Callicarpa americana*), and wax myrtle (*Myrica cerifera*). The herb layer in the mesic hammock is often sparse or patchy and made up of panic grasses (*Dichanthelium* spp.), basket grass (*Oplismenus hirtellus*), and sedges (*Cyperus* spp.). The soils here are generally sand mixed with organic matter, and are usually dry underfoot. In the low-lying areas to the immediate east, west, and south of the site, bottomland species diversify the floral assemblage. Typical species here include water oak, live oak, red maple, loblolly pine, Atlantic white cedar, diamond-leaf oak, southern magnolia, loblolly bay, swamp tupelo, American beech, dahoon holly, Florida elm, wax myrtle, swamp dogwood, stiffcornel dogwood, and American hornbeam (FNAI 1990). The vast majority of these plants have been identified on and around Thompson’s Landing.

The animal life in this natural community is diverse and unique. Typical animals that can be found in a mesic hammock include marbled salamander, mole salamander, three-lined salamander, slimy salamander, five-lined skink, ringneck snake, gray rat snake, eastern king snake, cottonmouth, wood duck, red-tailed hawk, turkey, yellow-billed cuckoo, screech-owl,
great-horned owl, ruby-throated hummingbird, acadian flycatcher, pileated woodpecker, hermit thrush, cedar waxwing, yellow-throated warbler, opossum, gray squirrel, flying squirrel, raccoon, mink, gray fox, bobcat, white-tailed deer (FNAI 1990).

Sandhills

Approximately one mile to the southwest and half a mile to the northwest of Thompson’s Landing lie well-developed and relatively undisturbed sandhills natural communities. These gently rolling hills represent different accessional stages or gradations of xeric upland forest. Sandhills are characterized as a forest of widely spaced pine trees with a sparse understory of deciduous oaks and a fairly dense ground cover of grasses and herbs on rolling hills of sand. The soils here are sandy, deep, and well-drained. The most typical plant associations are dominated by longleaf pine, turkey oak, and wiregrass. Other typical plants in the sandhills community include bluejack oak, sand post oak, sparkleberry, persimmon, winged sumac, Indian grass, wild buckwheat, queens delight, yellow foxglove, partridge pea, milk pea, wild-indigo, and golden-aster. Typical animals encountered in the sandhills of northwest Florida are barking treefrog, spadefoot toad, gopher toad, gopher tortoise, worm lizard, fence lizard, mole skink, indigo snake, pine snake, crowned snake, bobwhite, ground dove, red-headed woodpecker, fox squirrel, and pocket gopher (FNAI 1990).

Sandhills communities, like scrub, are pyrogenic, or maintained by fire (Meyers and Ewel 1990). The sandhills pine dominated forest is regenerated by fire-induced seed release from individuals with closed cones. In the Firestone-Barr Wildlife Management Area surrounding the site, fire is prescribed regularly. The accumulation of dead trees and grasses, pine straw, and dead saw palmetto fronds provide fine-textured, highly flammable fuel for natural and man-made
fires. Prescribed burns are applied to minimize the risk of damaging wild fires in these pyrogenic communities (Chandler et al. 1983).

**Floodplain Swamp and Floodplain Forest**

Floodplain forests are hardwood forests that occur on slight elevations within floodplains and are usually flooded for part of the year. These forest types are largely restricted to the alluvial rivers of the panhandle. They have a relatively short hydroperiod, typically one to six months out of the year, unrivaled species richness of woody vegetation, and support a diverse array of animals (FNAI 1990; Myers and Ewel 1990). The dominant trees are mixed mesophytic hardwoods, such as overcup oak, water hickory, diamond-leaf oak and swamp chestnut oak. The understory in a floodplain forest may be sparse and open or dense and nearly impenetrable.

Typical plant species found in the floodplain forests of northwest Florida include bluestem palmetto, willow oak, green ash, Florida elm, sweetgum, blackgum, hackberry, water oak, American hornbeam, tulip poplar, coastal plain willow, black willow, eastern cottonwood, river birch, silver maple, box elder, catalpa, sweetbay magnolia, hawthorn, swamp azalea, lanceleaf greenbrier, poison ivy, peppervine, redtop panicum, caric sedges, silverbells, and American wisteria (FNAI 1990). The animal species found in the floodplain forest may also be found in the floodplain swamp and are listed below.

Similar in biotic richness and existing at only slightly lowered elevations is the floodplain swamp, made up of buttressed hydrophytic trees such as cypress and tupelo with a very sparse ground cover. The floodplain swamp occurs on flooded soils along stream channels and in low spots on oxbows within river floodplains. It is common along the Escambia River to find floodplain forest communities on sandy terraces giving way to floodplain swamps on the low-lying stream channels surrounding them.
In addition to the hydrophytic trees mentioned above, other typical plants found in the floodplain swamp include water tupelo, swamp titi, wax myrtle, dahoon holly, myrtle-leaved holly, large gallberry, possumhaw, hurrah-bush, white alder, leather fern, royal fern, marsh fern, soft rush, laurel greenbrier, hawthorn, swamp privet. The animals in this type of natural community include both temporary and permanent residents. Animals that can be found in the floodplain swamp and floodplain forest include nine species of salamander, southern toad, cricket frog, bird-voiced treefrog, gray treefrog, bullfrog, river frog, alligator, river cooter, stinkpot or musk turtle, Southeastern five-lined skink, broadhead skink, mud snake, rainbow snake, redbelly water snake, brown water snake, black swamp snake, cottonmouth, yellow-crowned night heron, wood duck, swallowtail kite, pileated woodpecker, Cardinal, Carolina wren, veery, towhee, opossum, southeastern shrew, short-tailed shrew, beaver, wood rat, rice rat, cotton mouse, golden mouse, bear, raccoon, and bobcat (FNAI 1990). These plants and animals depend heavily on the presence and natural fluctuations of these swamps for survival and reproduction.

*Escambia River and Escambia Bay Vertebrate and Invertebrate Fauna*

Southeastern riverine systems are often coupled with a variety of different ecoregions and provide a wide range of biological niches, from headwater streams to coastal plain rivers. The Escambia River and Pensacola Bay are no exception, the biotic richness of these waterways, especially during the years before industrial development in the region, is unrivaled outside of the southeast.

The Escambia River has its headwaters in Alabama, and is called the Conecuh in that state. Fifty-four of its 92 mile extent is in the state of Florida. The Escambia is the fourth largest river in Florida and harbors the richest assemblage of native North American freshwater fish of
any Florida river with 85 native freshwater species. Important species in the main river stem include largemouth bass, bream (shellcracker and bluegill), and flathead catfish. Longnose, spotted and alligator gar can also be found in the main river stem. Striped bass are regularly stocked for sport fishing in the Escambia River by the Florida Fish and Wildlife Commission. Other sport fish targeted in the river include spotted bass, warmouth, black crappie, and shadow bass. During the months of October through January saltwater fish species such as sea trout, flounder, and redfish can be caught at the mouth of the river and surrounding delta.

According to a report focusing on the ecology of the Pensacola Bay System, the northwestern reaches of the Escambia Bay, approximately one and a half nautical miles from Thompson’s Landing, support high degree of trophic diversity and taxonomic richness, specifically regarding epibenthic animals (Livingston 2001). Unfortunately, as a result of decades of industrial runoff and hypoxia due to algae blooms, the degraded conditions of the sediments in the Pensacola Bay System no longer support comparatively healthy epibenthic communities. The current ecosystem has been classified as depauperate. Livingston (2001) provides fish capture data from specimen collections he made at multiple points both in deep water and in shallower areas near marsh vegetation around Upper and Lower Escambia Bay. The data indicates the presence of species that often signal anthropogenic stress such as the Atlantic bumper (Chloroscombrus chrysura) in the western parts of Escambia bay, which has historically been affected by more anthropogenic activity than other areas (Livingston 2001). The Atlantic croaker (Micropogonias undulates) and spot (Leiostomus xanthurus), both of the family Scianaedae, were the two dominant fish species identified in central and upper Escambia bay during the study. The remainder of the fish species sampled from the bay were exceedingly small bodied, such as striped mullet (Mugil cephalus), tidewater silverside (Menidia peninsulae), and
pinfish (*Lagodon rhomboids*). The species diversity and size biases reported for fish in the Pensacola Bay System have clearly been affected by urban and industrial developments since the early nineteenth century.

Before these changes had major effects on the Escambia Bay estuaries, one could expect to find other, larger fish species in greater abundance than we see today. Sheepshead (*Archosargus probatocephalus*) is one such species. Juveniles tend to congregate around seagrass beds where they can target soft-bodied organisms for food, but there is a dietary shift towards hard-shelled organisms, such as bivalve mollusks, in adults. They can usually be found in areas of topographic relief such as oyster reefs, piers, wrecks, and breakwaters. They tend to move offshore during the cooler months and return to nearshore waters, estuaries, and bays after spawning takes place in the spring. Although the fish is difficult to clean, the flesh is quite delicious.

Shellfish species historically targeted for human consumption that live in these waterways include three main species: Atlantic rangia (*Rangia cuneata*) and Carolina marsh clam (*Polymesoda caroliniana*) as well as eastern oyster (*Crassotrea virginica*). Each species has a particular optimal set of environmental conditions needed for the development of a healthy shellfish community.

The Atlantic rangia prefers a combination of low salinity, high turbidity, and a substrate of sand, mud, and vegetation (LaSalle and de la Cruz 1985). The highest concentration of this species along the Gulf coast is associated with shallow water areas, typically no deeper than six meters. Adults are often concentrated in clumps, moving little after settling in the sediment, whereas juvenile specimen are more mobile and tend to disperse themselves in a less concentrated fashion. Atlantic rangia have been collected up to 25 miles upstream in Gulf coastal
deltaic rivers, but due to the need for salinity shock for spawning, they tend to be positioned adjacent to potential sources of salt or fresh water (Tarver and Dugas 1973). In addition to human predation, Atlantic rangia are preyed upon by fish, crustaceans, mollusks, and ducks.

Although they prefer low salinity (less than 15 ppt), Atlantic rangia can tolerate a wide range of salinities, and as a result, a major competitor is the Carolina marsh clam (Odum 1967). These clams have identical feeding habits, but tend to be spatially separated. For example, the Carolina marsh clam is found primarily in intertidal areas or in small numbers in the shallow nearshore subtidal areas. In contrast, Atlantic rangia live largely in the subtidal zone (Olsen 1973). According to Claassen (1985), Atlantic rangia tends to be the dominant species when the two competitors share an environment.

The eastern oyster, like the Carolina marsh clam and Atlantic rangia, can tolerate a broad range of environmental conditions. Preferred conditions include a slightly higher salinity, between 15 and 30 ppt is optimal for growth and reproduction. This salinity also ensures that the threat of marine predators is reduced. In general though, eastern oysters prefer shallow, well-mixed estuaries, lagoons, and nearshore bays and can tolerate widely fluctuating temperatures, salinities, and suspended solid concentrations (Stanley and Sellers 1986). The substrate that the sessile, adult eastern oyster attaches to will determine the shape of the shell; a soft substrate results in a slender, sparsely ornamented, thin and somewhat fragile shell, while a hard substrate produces a more rounded and ornamented shell with radial ridges and foliated processes.

In addition to the animals discussed above, many reptiles frequent the waterways, sandhills, and forests surrounding Thompson’s Landing. Species of turtles that can be found include the pond slider, Escambia Map turtle, common box turtle, stinkpot or musk turtle, alligator snapping turtle, and the Florida softshell turtle. This region currently supports a small
community of gopher tortoises, which is ever dwindling as its preferred habitats have been dramatically reduced in size as a result of suburban expansion. The American alligator can also be found in small numbers in the brackish waters of the floodplain swamp and cypress marshes, but it prefers the fresher waters of the streams and rivers surrounding the bays. The various types of snakes, lizards, frogs, and toads that can be found in the area are listed in the natural communities descriptions previously discussed in this section.

Environmental Summary

The environmental conditions in and around Thompson’s Landing during prehistory were most likely comparable to modern conditions with a few minor exceptions. Sources of possible disparity between the prehistoric and modern conditions at the site originate with physical and chemical alterations made to the waterways near Thompson’s Branch of the Escambia River. Additional impacts on the natural environment include the long-term effects of twentieth and twenty-first century industrial operations on the river and around the Pensacola Bay System.

The environment experienced at Thompson’s Landing today is, as any landscape may be conceptualized, a product of history. A detailed review of the historical environmental record of the region is not part of this study, but a brief treatment of that research would provide further insight into the disparity between the modern and prehistoric environment. The plants and animals listed as part of the natural communities descriptions above are native species and do not include introduced species. Since we know that the climate was analogous to what we have today, it is safe to look to modern conditions as a proxy for what historic conditions might have been like.
CHAPTER 3
REGIONAL CHRONOLOGY AND CULTURE HISTORY

Introduction

Prehistoric Northwest Florida has fostered the emergence, development, transition, and abandonment of many culture types throughout the 15,000 years that people have lived in the region. Cultural complexes pertinent to this research are Deptford, Santa Rosa-Swift Creek, Early and Late Weeden Island, as well as Early Pensacola (Table 1). The Woodland Stage (1000 B.C. - A.D. 1200) encompasses the Deptford, Santa Rosa-Swift Creek, and Weeden Island cultures in Northwest Florida. The Early Pensacola culture dates to the Middle Mississippi Stage (A.D. 1200 - A.D. 1450). Each cultural phase will be discussed in this chapter.

Table 1. Cultural Sequence for Northwest Florida.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Period</th>
<th>Culture</th>
<th>Date Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paleoindian</td>
<td>Early-Late</td>
<td>13,000 B.C.- 8,000 B.C.</td>
<td></td>
</tr>
<tr>
<td>Archaic</td>
<td>Early-Late</td>
<td>8,000 B.C.- 1,000 B.C.</td>
<td></td>
</tr>
<tr>
<td>Woodland</td>
<td>Early</td>
<td>Deptford</td>
<td>1,000 B.C.- A.D. 200</td>
</tr>
<tr>
<td></td>
<td>Middle</td>
<td>Santa Rosa-Swift Creek</td>
<td>A.D. 200 - A.D. 800</td>
</tr>
<tr>
<td></td>
<td>Late</td>
<td>Weeden Island I, II</td>
<td>A.D. 200 - A.D. 1000</td>
</tr>
<tr>
<td>Mississippi</td>
<td>Early-Middle</td>
<td>Pensacola</td>
<td>A.D. 1250 - A.D. 1450</td>
</tr>
</tbody>
</table>


Woodland Stage (1000 B.C. – A.D. 1000)

Following the Paleoindian and Archaic Stages, the Woodland Stage is the third major stage of cultural development in eastern North America. The Woodland Stage in eastern North America began between 1200 and 1000 B.C., and lasted until approximately A.D. 1000 across
much of the southeast (Anderson and Sassaman 2012; Bense 1994). The Woodland Stage is divided into three phases: Early, Middle, and Late, based on archaeological material culture assumed to be reflective of social changes.

The emergence of this stage is marked by the widespread use of pottery and the development of regional cultures. Separate culture groups manifested across the region and began to differentiate themselves by distinctive ceramic manufacturing and decorative techniques throughout the Woodland period. Although sea-level fluctuated until approximately 400 B.C. (Bense 1994:124), the climate of the Woodland Stage was much as it is today. Others have made an argument for continued sea level variability well into the Mississippi period that would have affected the availability and distribution of aquatic resources, specifically in Florida’s estuaries (Marquardt and Walker 2012). Populations grew up around river valleys and along the coast. In the interior, it is believed that this growth was a result of the increased domestication of crops such as chenopodium, sunflower, marsh elder, and squash, all of which are part of the Eastern Agricultural complex (cf. Fritz 1997; Gremillion 1997). The pan-regional exchange of goods and ideas also increased dramatically and is evident in the material record of the Woodland Stage.

The Middle Woodland period ushered in large scale ritualized ceremonialism and saw the establishment of mound centers based primarily on mortuary ritual. Ceremonialism and elaborate ritual traditions were part of a range of diverse cultural institutions throughout the Woodland stage. On the northern margins of the southeastern culture region, around the first millennium B.C. until about A.D. 300, well known mortuary traditions of Adena and Hopewell flourished (Anderson and Sassaman 2012: 117). Traditions on the Gulf Coast and extreme southern parts of the southeastern culture area do not seem to be articulated with the ceremonial complexes of the
Lower Mississippi Valley and are presumed to have developed independently. One such example is the Swift Creek ceremonial exchange, a cross Gulf Coastal regional network of shared ideas and culture, originally examined by Sears (1962). Sears characterized the Swift Creek Green Point Complex based on shared salient lifeways that he inferred from archaeological data excavated in Florida by C.B. Moore between 1893 and 1918.

Settlements during the early phase of the Woodland Stage were generally small and dispersed. Many sites show evidence of stationary communities with well-defined structures, large subterranean storage pits, and dense occupational middens, while other sites from the same period contain single or small isolated clusters of features (storage pits, shallow processing basins, and earth ovens) which suggest much shorter term occupations, with intensive and brief exploitation of locally available resources by isolated domestic units (Anderson and Sassaman 2012:121). During the Middle Woodland period, settlement patterning shifted to a tradition of dispersed hamlets and small villages that were moved often and were reoccupied over many generations. Mound sites and ritual centers were a big part of the landscape of the Middle Woodland, but there is little evidence to suggest that these sites were the center of settlement clusters; rather, as Anderson and Sassaman (2012:124) indicate, they were likely the facilities of particular clans and lineages.

The Late Woodland phase was a period of uneven social and cultural developments arising from further population growth and settlement consolidation. Warfare erupted and new mound traditions appeared, specifically civic-ceremonial centers. The interconnectivity of groups in the Gulf Coast region increased at this time, while the interior groups saw a decline of this connectivity as a result of community independence and autonomy, especially due to sustainable
and advanced ceramic technologies and the adoption of the bow and arrow around A.D. 600 (Blitz 1988; Nassaney and Pyle 1999).

Before delving into the cultural and temporal divisions ascribed to Woodland stage groups in northwest Florida, I should note a caveat. The generalized cultural associations discussed below are based on taxonomic divisions initially established in the formative years of academic archaeology. During these early years, the integration of culture-historical information was emphasized in order to identify separate Woodland archaeological cultures that were active and interactive in the southeastern region during this period. In recent decades the theoretical positioning of Southeastern academic archaeology has become more dynamic, in that the focus has moved away from the culture-historical model that emphasized ceramic typologies, towards a model that sees ceramic manifestations of culture as only one means of understanding the prehistoric cultures that are studied.

Deptford

The Deptford culture, one of the earliest archaeologically recognized post-Archaic cultures, is represented by sites located along the Gulf Coast of Florida and Atlantic Coast of South Carolina, Georgia, and northeast Florida (Milanich 1994). Deptford sites are also found in the interior of these states along river valleys and in other locales, but as Milanich points out, inland and coastal sites were established for different purposes (1994:114). Like most Southeastern cultural groups, Deptford culture is distinguished archaeologically by a unique ceramic tradition and shows temporal overlap with other Woodland period cultures, specifically Swift Creek and Santa Rosa-Swift Creek. The Deptford culture grew out of the Late Archaic populations that resided in south-central Georgia and along Florida’s northern Gulf Coast. According to Bense, Deptford first emerged on Florida’s eastern Gulf Coast around 500 B.C. and
had spread to the western Gulf Coast by about 200 B.C. where it persisted until around A.D. 100 (1994:111). Whereas Late Archaic peoples had used fibers to temper the paste for ceramic vessels, Deptford populations used a combination of variously sized sand quartz particles and clay lumps to temper the paste for their ceramics. Although many sherds of this temper at Woodland period sites are undecorated, the only culturally distinct markers are those that have been stamped with carved or cord-wrapped wooden paddles prior to firing. Common decorative motifs include simple and linear check stamped, simple linear stamped (Milanich 1994: 243-322).

Milanich has argued that during the Early Woodland stage in Florida, small Deptford sites were generally concentrated along the Gulf Coast with equally small inland sites established for special uses, such as hunting or other resource procurement (1994:114). It has been proposed that unlike the Middle and Late Woodland Deptford village sites in Georgia and south Alabama, these inland western Gulf coast sites may have been used by the same populations inhabiting coastal sites throughout the Middle and Late Woodland Periods. A major component of many Deptford sites along the coast are shell heaps or shallow, horizontally distributed sheet middens. These shell bearing middens often contain potsherds, animal bones from food waste, and other refuse from living activities. In many cases the midden deposits are clustered and represent communal living situations where trash from each house structure or group is deposited separately, or it may be generally tossed in ‘out of the way’ area and after years trampled down and spread out, creating a large amorphous sheet midden. In either case, the shell midden is a common archaeological component of Deptford period coastal sites.
Santa Rosa-Swift Creek

The Swift Creek culture originated in central and southern Georgia around 100 B.C., and had made an appearance in northwest Florida by about A.D. 150 (Milanich 1994:144). The complicated ceramic stamping technique that the culture is named for grew out of and eventually supplanted the Deptford tradition in Georgia and northern Florida and continued for approximately 600 years, ending in A.D. 800 (Stephenson et al. 2002:335). This ceramic tradition is characterized by curvilinear and rectilinear designs, sometimes incorporating animal motifs, and vessel types such as the globular bowl and conoidal based pots.

The ceramic signature of the Swift Creek tradition can be found across the panhandle of Florida, and there is a definite archaeological delineation between the northeastern and northwestern culture regions. Swift Creek type ceramics and sites are found in the northeastern panhandle of Florida, west of the Aucilla river drainage. Santa Rosa-Swift Creek culture is concentrated west of the Apalachicola river drainage. Milanich reports that the western panhandle of Florida was a ceramic transition zone during the Swift Creek period (1994:150). Archaeological evidence of the Santa Rosa-Swift Creek culture can be seen, according to Willey (1998:544), in the fusion of two obviously different sets of ideas about ceramic production, where conoidal based pots are decorated with a paddle stamping technique and at the same time, globular bowls, collared jars, and more unusual forms are decorated with incision, punctuation, rocker stamping, or red zoned painting. The geographical range of Swift Creek pottery in this region is much greater than the distribution of “true” Swift Creek sites. True Swift Creek village sites occur mainly in the panhandle of Florida, while Swift Creek complicated stamped ceramics can be found at sites across the state, as well as in Georgia and South Carolina. This wider
distribution reflects long-distance exchanges of peoples, ideas, and, evidently, ceramic decorating traditions (cf. Wallis 2011).

The presence of Swift Creek ceramics at sites well outside of the traditional area, such as Pinson Mounds in western Tennessee, the Seip and Turner sites in Ohio, and the Mann site in southwestern Indiana is a subject of considerable anthropological focus (Stephenson et al. 2002). Ongoing research explores the potential for the Swift Creek design motifs to enhance our knowledge of social interaction among and within prehistoric Woodland period communities (Pluckahn 2000; Saunders 1998; Snow 1998; Wallis 2011).

The vast majority of Santa Rosa-Swift Creek sites are located along the coastal strip in northwest Florida; the very few small sites in the interior are presumed to have been used for special-purpose or short-term activities (Stephenson et al. 2002). These coastal sites all contain shell midden components in three common configurations: ring shaped, linear, and small or discreet. The most obvious and well-studied of these is the ring or horseshoe-shaped midden, which has been argued to represent a pattern of communal living where the center of the ring is a plaza that is intentionally swept clean and the shell ring is built up by the intentional dumping of household refuse. Smaller, less developed rings are thought to be remnants of short term occupations. Swift Creek peoples, like their Deptford predecessors, extensively exploited the abundant coastal and estuarine resources in the Florida panhandle and left archaeologically visible remains as evidence.

Weeden Island

Weeden Island cultures were active in the northwest Florida region from about A.D. 200-300 until A.D. 1000, and are traditionally divided into two periods, with Weeden Island I ending around A.D. 750 and Weeden Island II persisting until A.D. 1000 (Milanich 2002:354). The
extent of the Weeden Island culture area stretches from Mobile Bay east and south to the Okefenokee Swamp and north in the Coastal Plain into southeast Alabama and southern Georgia. Ceramic signatures of Weeden Island I cultures include the presence of Swift Creek-related types of complicated-stamped pottery and Weeden Island punctated, incised, and plain ceramic types including ornate and stylized designs, as well as animal effigy vessels. The Weeden Island II period ceramic assemblage is marked by a decreased utilization of elaborate vessels, by complicated-stamped, punctated, and incised designs and by the presence of another type, Wakulla Check Stamped, which most often shows up as the decorative motif on simple bowls at Weeden Island village sites after A.D. 750, and represents the continuation of a pattern begun in the Deptford phase.

Weeden Island I populations practiced very similar economic adaptations to the environment as their Deptford and Santa Rosa-Swift Creek predecessors, setting themselves up in prime locations for collecting resources from the ecologically rich salt marshes and shallow inshore waters. Most Weeden Island sites do not front on open Gulf waters, but rather they tend to be concentrated on estuaries, lagoons, sounds, and small saltwater bays near a reliable freshwater source (Percy and Brose 1974:19). Milanich notes that early Weeden Island sites in northwest Florida are often found in forested locales, specifically mesic hammocks, near a permanent freshwater source, within easy walking distance of the coast (2002:358). Since this habitat type blankets the hammock belt of northwest Florida, it is no surprise that clusters of village sites were established to provide easy access to the total range of habitat diversity. These village sites contain annular middens, featuring overlapping Weeden Island I and Santa Rosa-Swift Creek components, and are thought to articulate with special-use shelling and fishing middens nearer the coast. Further evidence of the cultural continuum of Swift Creek-Weeden
Island I come from the presence of burial mounds and horseshoe shaped middens at larger village sites.

Late Weeden Island cultural divergence occurred in northwest Florida after A.D. 750, and is often referred to as Wakulla culture. This distinctive cultural development was initially based on the divergent ceramic assemblages noted above, but has come to encompass changes in mound ceremonialism, settlement system, and economic emphases (Milanich 2002). Villages are less nucleated than earlier sites, yet more numerous, and tend to occur in localities where earlier sites are not present. Population increases during this period spawn this trend of village growth and fissioning, and kin based burial patterns in mound internments become the norm. Nascent agricultural communities sprung up across the region between A.D. 750 and A.D. 1000, and as a result, new social and political phenomena were needed to help deal with the relative social instability that came with the change (Percy and Brose 1974). In some cases, the descendants of Late Weeden Island cultures developed into Mississippian cultures, and in other cases, no such trajectory was followed. Contemporary research is well underway to address the development of proto-Mississippian local cultures in a region where, in some places, agriculture did not become a major subsistence economy until European contact (Russo et al. 2006; Turner et al. 2005; Worth 2012).

The Mississippi Stage (A.D. 1000-1450)

The period from A.D. 1000 to A.D. 1600 is the traditional temporal delineation for the Mississippi Stage in the southeastern United States. Florida though, exists at what many southeastern archaeologists now call the “Edge of the Mississippian World” (Ashley and White 2012). This designation of the areas encompassed by Florida’s state lines calls forth the concept of a place in which the archaeological manifestations of late prehistoric cultures do not fit the
“Mississippian” mold. As T.R. Kidder points out, the terms Mississippi and Mississippian are not synonymous; “Mississippian” refers to a way of life while “Mississippi” stage or period references the range of time in which cultures display a specific set of characteristics (2007:196-97).

Those characteristics that make a culture Mississippian have been a subject of debate for over fifty years and can be boiled down to include the presence of shell tempered pottery, maize farming, the construction of temple mounds, and wall-trench houses. The more salient features of Mississippian societies include an economy based on maize agriculture, maintained institutionalized inequality and chiefdom-level political organization, as well as long-distance interaction and exchange networks involving the movement of exotic items (stone, shell, and copper) with recurrent motifs and religious iconography (Ashley and White 2012:9). These traits, which have roots in Woodland cultures, are all representative of unique developmental trajectories that progressed along different lines across the Southeast based on local cultures, histories, and environments (Blitz and Lorenz 2002; Cobb and Garrow 1996). As such, the Southeast was not a politically or socially homogenous landscape during this period and it is important to recognize that non-Mississippian hunter-gatherers, fishers and shellfish collectors, and gardeners existed within the frontiers and backwaters of the Mississippian world.

Additionally, during the Mississippi stage in Florida, indigenous cultures were not closed systems; in fact, they were incredibly dynamic and fostered a high degree of interaction across cultures through trade, gift-giving, intermarriage, emulation, alliance, warfare, migration and the resulting diffusion of ideas (Anderson and Sassaman 2012; Ashley and White 2012).
Pensacola

During the early Mississippi period in northwest Florida there are two major areas of cultural influence. The Pensacola culture area, encompassing the physical extent of the presence of Pensacola pottery, stretches from south-central Alabama west along the coast to southeastern Louisiana and east beyond Panama City in Florida (Harris 2012:278). The pottery series is characterized by plain and decorated shell-tempered wares. The Bottle Creek site and surrounding area, considered the core of this region during the Mississippi period, was a fully developed Mississippian mound complex with evidence of maize, habitation middens, plazas, and at least 18 mounds (Brown 2003). Ceramics from this site exhibit articulation with the Mississippian iconography present at Moundville to the north. The second area of cultural influence is that of Ft. Walton, with population centers at Apalachicola Valley and Tallahassee Hills. The ceramics from this complex are sand and grit tempered and have a geographic range extending from as far west as Mobile Bay to the Aucilla River in the east. The cultures at the core of each of these two overlapping areas are better understood now than they were 20 years ago, but the cultural expressions of the smaller Mississippi period populations existing in the margins are more enigmatic and less clearly defined (Harris 2012:279). Whether or not there is a third, unique culture represented in the overlap is still a subject of debate.

Sites from the Mississippi period in the Pensacola region are heavily concentrated around the bays, bayous, and major rivers and are sparse in the interior. Harris suggests that the ease of travel between the bays and estuaries may be one reason for this settlement pattern (2012:290). This path of least resistance may have been a main artery for exchange networks interacting across the Gulf coast between the two core regions. As Brown points out, Bottle Creek was strategically situated low in the delta at the confluence of two major rivers, the Tombigbee and
the Alabama, at the geographical center of the northern Gulf coast, in an area that may have been chosen for political or economic reasons (2003). The sites existing between the two core areas share some characteristics with their neighbors to the east and west, but generally exhibit less dependence on agriculture, fewer mounds, and probably smaller populations.

The mode of subsistence of these groups was still based wholly on estuarine resources and evidence for maize agriculture away from population centers mentioned above is almost nil. A major reason for the absence of the cultivation of domesticated plants prior to the protohistoric and historic periods is the geography of the region. Aside from small pockets of arable land, extensive floodplains do not exist along the rivers emptying into the Gulf Coast. The nutrient rich soils that accompany floodplain landscapes are not present, thus the crops fostered by such an environment are also not present. The explanation offered for the sudden presence and increased dependence on cultivated plants during the protohistoric and historic periods in the Pensacola region is based on increased trade and exchange through well-developed networks (Harris 2012:293).

The best evidence for regional connections with the broader Mississippian world during this period comes from a few key sites: Hickory Ridge cemetery (8ES1280), Aden Bayou (8SR17), Naval Live Oaks cemetery (8SR36), and the Butcherpen Mound Complex (8SR29) (Harris 2012). These sites are located in the overlapping area between the core regions discussed above, and artifacts recovered from them as well as in situ features exhibit clear articulation with Mississippian ideology. The Head collection, with provenience at the Naval Live Oaks cemetery site, contains large numbers of whole ceramic vessels with Southeastern Ceremonial Complex-type motifs such as the Pensacola Incised bird effigy and Fort Walton incised six-sided bowls (Harris 2012:288). Also from this collection are engraved copper birds and gorgets, shell beads,
chunky stones, and other worked shell objects. Aden Bayou is a large Mississippi period village site on the east side of Pensacola Bay. Excavations at the site uncovered at least one structure, a large clay lined pit, Pensacola ceramics, and a bird effigy. Hickory Ridge, a large Mississippi period cemetery west of Pensacola, contained burials with exotic grave goods, Moundville imports, and Bottle Creek phase Pensacola pottery. Clearly these sites attest to the presence of Mississippian influenced culture in this region during the early Mississippi period.

It is not a stretch to say that the Mississippi Stage peoples in northwest Florida do not strictly fit the maize-dependent, socially stratified, overtly religious mold set forth by their interior contemporaries. They do, however, display a particularly unique brand of Mississippian life. These and other blends of enigmatic cultural features present in similar late prehistoric communities are only beginning to be teased out by archaeologists in regions across Florida. Issues associated with the Mississippian-ness of late prehistoric Floridians, as well as the nuanced features of cultures present in this region during this period, have been addressed expertly by the contributors to an edited volume used heavily in this section (Ashley and White 2012).
CHAPTER 4
FIELD AND LAB METHODS

Introduction and Background

In this section I will discuss the three methods of archaeological investigation that were implemented during the 2012 field season at Thompson’s Landing as well as the details of the design and setting of the fieldwork. These methods include a soil resistivity survey, gridded auger testing, and test unit excavation and the procedures associated with each. Additionally, I will address the sampling methods I chose to use for collecting feature, control, and comparative field samples.

The Combined Maritime and Terrestrial Field School offered by UWF is in session for ten weeks, from mid-May until the end of July. During this time, enrolled students are split into two sessions; each group spends five weeks learning terrestrial field skills and five weeks acquiring maritime field skills. As part of each five week terrestrial session, the students are exposed to approximately two and half weeks of reconnaissance level survey (phase I) and the same amount of time preforming test excavation (phase II) on a known site. During the summer of 2012, the testing and excavation part of the field school was undertaken at Thompson’s Landing (8ES950).

The instructive framework of the phase II excavations at the site allowed for a great deal of flexibility in the research design and sampling strategies. The crews were able directly to practice a variety of techniques and principles as part of the field school. We formed small teams to foster an educational experience that emphasized the importance of a familiarity with diverse array of field skills as well as cooperation with fellow excavators. A downside to the format of this field work was the relative inexperience and small size of the crew. A major implication was
that work progressed slowly at times, and that the amount of data we were able to collect was limited. That being said, the sample sizes collected appear to be robust enough to answer some very specific and carefully considered questions.

Field research at the site during the 2011 season was designed to explore the landform and locate areas of the site suitable for carrying out multiple research programs on prehistoric subsistence and settlement patterns, as well as Historic Indian lifeways away from Pensacola’s well-known Spanish and British eras. During that season, an arbitrary grid was established across the site. Individual 1 by 1 m test units were excavated at 25 m intervals along three transects running east to west. Later, field school students opened a trench and a block of units at the north end of the site along with a few judgmental units around particularly concentrated areas of cultural materials or features. Ultimately students excavated 39 1 by 1 m test units and a 4 by 0.5 m exploration trench (Figure 1).

Shell midden deposits ranging in size, shape, composition and location on the landform were identified. The largest midden excavated during the 2011 season was designated Block A. It was an undulating lens midden of clams covered by crushed oyster with a surface area of at least 10 by 10 m, with pockets that extended 30 to 60 cm below the surface. Intermixed with the faunal remains was cultural material spanning the Archaic through Mississippian Stages as well as modern material buried as much as 40 cm below the surface. Although this large multi-component deposit contained a wealth of faunal material, the size and evidence of disturbance did not make it ideal for inclusion in this study. For the purposes of this research, I decided to look for smaller, discrete shell midden deposits, which were indicated by surface scatters and the presence of smaller lenses of shell bearing strata in some of the units excavated during the 2011 season.
Figure 1. Map of 2011 excavations at 8ES950.
Remote Sensing and Gridded Survey

The potential of the site to contain abundant and variable evidence of the use and reuse of the place as a shellfish gathering locale inspired my anthropological interest in Thompson’s Landing and helped guide the research strategy undertaken in the 2012 field season. This strategy included a search for discreet shell midden deposits across a 20 by 45 m area. The part of the site chosen for investigation was an area with what seemed to be the highest elevation on the landform, cross-cutting the western half of the 2011 transects in a north-south direction.

This spot was chosen for a few reasons: first, it was likely to have the most well drained soils; second, it was not extensively investigated during the 2011 field season; and third, it seemed like the most reasonable place to perform the soil resistivity survey. The secondary growth in this area was thick, but the long, gentle slope to the low mucky sands below appeared more likely to contain intact cultural deposits than the slope of the eastern side of the landform, which drops sharply off into a shallow channel. The goal of the 2012 season was to undertake a soil resistivity survey of the focus area, followed by a gridded soil survey using a spoon auger to ground truth remote sensing anomalies and identify discreet shell midden deposits.

Due to unfortunate technical difficulties, the remote sensing equipment planned for this survey, the Geoscan RM15, had to be sent away for repairs early in the summer following a demonstration and tutorial session attended by the UWF field school supervisory crews. In the absence of this equipment, and bearing in mind the limits of the crew and length of the field season, we decided to proceed with the slightly more invasive auger test survey that was expected to follow the remote sensing survey.

With the hopes that the remote sensing equipment would be returned before the field season would end, one of the four grids was not set up for auger testing during the first session at
the site so that the remote survey data could be used as a comparative set against the auger grids that had been tested. The plan, in part, was to identify the resistivity signature of midden deposits by ground truthing highly or lowly resistant areas with the spoon auger testing, if any such areas could be detected. I had hoped that this two-fold approach would prove as a methodological experiment to test the viability of the remote sensing equipment to detect the shallowly buried, variably concentrated shell midden deposits. The working hypothesis was that the soil resistivity meter would be able to read the difference between the conductivity of soil containing discreet shell midden deposits and those soils that did not contain such deposits.

Unfortunately, the equipment never worked. Survey of all four grids was attempted once, and grids 2 and 4 were surveyed twice. Because the results of these surveys were inconclusive, the placement of the test units as part of this project was not based on the resistivity survey.

Before any survey methods could be employed, intensive clearing of secondary growth was necessary. Although the current landscape features a dock, picnic tables, and benches the area is not maintained by the standards that can be seen at other naturally wooded areas of the campus. The distance from the parking lot on the most northern edge of campus and the regulations against fishing tends to limit the amount of traffic to the Landing. As a result, only a few meters along the edges of the gravel and shell road are regularly kept clear of debris and secondary growth. The brush clearing efforts on the site during the 2012 season were focused on the four 10 m by 10 m grids chosen for the resistivity and the spoon auger survey. Students used machetes, loppers, hand clippers, brush axes, and rakes to clear away the secondary growth and ground cover in these areas.

After the grids had been cleared, and it was discovered that the soil resistivity meter was not functioning properly, the crew set to work on staking out Grid 1 and Grid 3 for the auger
survey. Grid 4 was cleared and surveyed during the second session of the field season following the same procedure. Using a manual transit for instructive purposes, the corners of the grids were determined and marked with wooden stakes. Subsequently, students marked the southeast corner of each 1 m by 1 m square within the grid using a pin flag. A field recording form was created to keep track of the soil profile and contents of each test. Teams of two students at a time worked their way across the grids, probing the southeast corner at each interval and recording the information based on the coordinates, which were tied into the preexisting grid established for the site. The diameter of the spoon auger was 3.5 cm, and each test was excavated to 100 cm below the surface or until an impasse was encountered. Each time, the soil profile and the approximate depth of shell and cultural material, when present, was recorded. All of the auger test survey forms have been duplicated and housed at UWF curation facilities.

The auger test survey was completed on grids 1, 3, and 4. In total 352 individual tests were excavated. A handful of tests could not be excavated due to the presence of large trees and, in the case of Grid 1, the gravel roadbed along the eastern side. Forty seven tests were positive for shell at varying depths; 36 of these were concentrated in the north half of Grid 1. The remaining positive tests were in two clusters in the north half of Grid 4, with one particularly dense concentration that was evident across the shared boundary of grids 3 and 4. The auger test survey results were compiled on a hand drawn map indicating the presence and corresponding depth of shell deposits across the three grids (see Figure 2). I used the data on the map to decide where to place the larger excavation units. The coordinates provided for the units discussed below are referring to the southeast corner in all cases.
Unit Excavation and Sample Collection

Two individual 1 m² test units were placed in the north half of Grid 1. The first unit opened was called Unit 41 and was located at 1026 N 991 E. Shell was present on the surface here, as well as in auger tests in the southwest and northwest corners. Unit 43, located at 1028 N 989 E, was opened 2 m north and 1 m east of Unit 41. The auger tests in the northeast and southeast corners of this unit indicated the presence of shell. A single unit, Unit 42, was opened in the southeast corner of Grid 3, at 1005 N 985 E, to investigate three positive auger tests clustered there. In the second session of the field season, Unit 46 was opened at 1004 N 984 E to continue to investigate the densely concentrated, isolated shell midden that was quartered by the

Figure 2. 2012 Auger test survey results.
placement of Unit 42. Two additional units were excavated in the north half of Grid 4. Unit 47 was placed at 1003 N 978 E, where positive auger tests in the southwest and northwest corners indicated shell more than 20 cm below the surface. Unit 49 was placed at 1003 N 980 E, just one meter east of Unit 47. The auger test in the northwest corner of the unit indicated a shallow shell deposit.

![Figure 3. 2012 Unit placement within midden concentrations.](image)

The test units were excavated according to the standard procedures set forth by the University of West Florida Archaeology Institute. Square shovels were used to excavate in
arbitrary 10 cm levels in most non-feature contexts. Trowels were used to clean the walls and floors of the units for mapping and photographing, as well to excavate features. Generally, the students were instructed to open exploratory .25 m by .25 m windows into the midden features, rather than excavate it in uniform levels. In a few cases, unique sections of the features were identified and excavated separately. For instance, the deposit in Unit 47 was pedestal and bisected. The specific method of excavation for each of the five features that are analyzed in detail will be discussed in the next chapter. Non-feature material was screened through 1/8 in (0.32 cm) window screen while feature materials, specifically the shell midden features, were screened through 1/16 in (0.16 cm). In all cases but one, every bit of material remaining in the 0.16 cm screen was collected and taken back to the lab for processing. The one exception was the discard of 1,700 grams of clam shells from Feature 550 in Unit 41.

Bulk soil samples were taken from four of the five shell midden features to be processed using flotation (Table 2). No sample was obtained from Feature 550 in Unit 41. Two samples were obtained from Feature 552; one was collected from Unit 42 and the other from Unit 46. The midden material and sediment was taken from a small area of each feature from a range of approximately 5 to 10 vertical centimeters within the deposits. Sample size varied from 4 to 5.5 liters. The samples were collected using trowel, spoon, and hand to gently scoop the material into a bucket to measure the volume, then transferred to 4 mm thick, 1 gallon plastic artifact bags for transfer to the lab. In the lab, bags were left open to dry for a number of days before being transported for flotation.
Table 2. Soil Sample Provenience and Volume.

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Coordinates</th>
<th>Feature Designation</th>
<th>Provenience</th>
<th>Soil Sample Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 41</td>
<td>1026 N 991 E</td>
<td>550</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Unit 42</td>
<td>1005 N 985 E</td>
<td>552</td>
<td>Level 2</td>
<td>5.5 liters</td>
</tr>
<tr>
<td>Unit 43</td>
<td>1028 N 989 E</td>
<td>551</td>
<td>Level 2</td>
<td>5.25 liters</td>
</tr>
<tr>
<td>Unit 46</td>
<td>1004 N 984 E</td>
<td>552 A</td>
<td>Level 2</td>
<td>4.0 liters</td>
</tr>
<tr>
<td>Unit 47</td>
<td>1003 N 978 E</td>
<td>556 B</td>
<td>Level 3</td>
<td>4.0 liters</td>
</tr>
<tr>
<td>Unit 49</td>
<td>1003 N 980 E</td>
<td>557</td>
<td>Level 3</td>
<td>4.0 liters</td>
</tr>
<tr>
<td>Column Sample</td>
<td>995 N 971 E</td>
<td>-</td>
<td>-</td>
<td>8.8 liters</td>
</tr>
</tbody>
</table>

In addition to the bulk soil samples collected from the features, a column sample of 100 cm of soil was collected from just outside of the southwestern corner of grid four in an area with little documented cultural activity. The coordinates of the collection site were 995 N 971 E. This sample was obtained to be used a comparative data set against the shell midden soil samples. It was collected in August of 2012, a few weeks after the field season wrapped up. A small bucket auger, with an internal circumference of 0.7 cm, was used to collect the sample in 15 cm increments to maintain vertical control. The total volume of this sample was 8.8 liters.

*Flotation Tank and Associated Procedures*

Until recently, the Archaeology Institute at UWF did not have the necessary tools to process flotation samples in the lab or in the field. But during the summer of 2012, that situation changed. The Institute purchased a simple flotation barrel from an independent party for use in processing new and backlogged soil samples. I collected samples for flotation from the middens at Thompson’s Landing with this newly available level of analysis in mind.
Beginning in earnest in September 2012 I began to get to know our tank, how it worked, and how it did not work. Our newly obtained flotation tank held 30 gallons of water and used a loose piece of fine window mesh (0.106 cm) that was clipped into a basin shape at the top of the barrel, an agitation apparatus inside of the barrel, and a sluiceway and catch-basket to funnel and collect floated botanicals. This system was powered by constantly running, non-recycled water flowing from two hoses; one was attached to the agitation apparatus, while the other was used to spray water from above and rinse samples from buckets and screens. While effective, the system was somewhat wasteful.

The first modification of the system, which will hereafter be referred to as system A, was the construction of basket insert to catch the heavy fraction and to line the sluiceway to the secondary catch basket (Figure 4). From the outset, there were problems with the loose mesh that was supposed to line the top of the barrel and catch the heavy fraction. In its place, Fritz Sharar of the University of West Florida’s Marine Services Center and I constructed a fitted basket insert with a sluice using an aluminum pan, 0.106 cm window mesh, and a plastic o-ring to hold everything in place. This heavy fraction basket hangs approximately 25 cm below the lip of the barrel, with the sluice sitting level with the water line so that floating botanicals could easily spill over to the catch basket. Being able to easily insert and remove the mesh used to process a single sample was much easier than the loose mesh and separate sluice that came with the setup. It was also much easier with the pan design to transfer the large heavy fraction that is common with coarse grained sandy soil samples. Still in place in system A was the catch basket for floated materials: a hanging iron plant holder supporting a large bottomless plastic bowl outfitted with a 0.05 mm geological sieve inside. The water spilling from the sluice in the barrel flowed right through the sieve, so that all material larger than 0.05 mm was caught in it.
As with all flotation systems, the recovery rate of any setup should be regularly tested, especially if physical modifications are being made. The poppy seed test is a common form of testing the recovery of flotation systems. A known quantity of a charred exotic seed (commonly poppy seeds as they are uniform in size, inexpensive, and easy to obtain) are added to soil samples prior to flotation (Wagner 1982). The seeds are mixed into the top few inches of the soil sample so that they enter the flotation system early in processing, exposing them to the longest period of potential loss (Pearsall 2000). After the sample is floated, it is examined and the number of poppy seeds recovered and their condition is recorded. The rate of recovery is then expressed as a percentage. Although the poppy seed test does not give a completely flawless representation of what percentage of archaeological seeds are being recovered by flotation, the
test is a good way of ascertaining the effectiveness of a particular system and can be used to compare recovery rates across different flotation setups (Pearsall 2000).

I performed the poppy seed test twice. To test the efficiency of system A, I chose to add 100 charred poppy seeds to a sterile 2 liter sample taken from a sandy playground area on the UWF campus. With this setup, the process had a 90 percent recovery rate. I performed a second poppy seed test after modifying the tank to system B (described below). Fifty charred poppy seeds were added to a 5 liter clayey soil sample from the Molino site (8ES3473). Forty seven seeds were recovered in this test, resulting in a 94 percent recovery rate.

After using system A to process the control column sample and the first few midden samples, I decided that the constantly flowing water was quite exorbitant and rather wasteful. I started to look around online for systems that recycled water and were machine powered. I came across a wide variety of flotation tank setups, from a bulky, generator powered, stainless-steel Flote Tech TM to simple ‘green’ hand-pump recycling systems. It was clear from this search that a little bit of ingenuity could go a long way. I consulted with Steve Mclin, also at the Marine Services Center, about the modifications that I wanted to make to the system and together we decided to combine the recycling system with machine power to make a battery powered, efficient, portable flotation tank.

The new, upgraded tank was ready for use in early February 2013 (Figure 5). It is completely portable and can process between 10 and 20 liters of soil each time it is filled with water. The main barrel holds 30 gallons and the reservoir barrel holds 20 gallons. A Jabsco washdown pump recycles water at a rate of 2.9 gallons (10.9 liters) per minute from the reservoir barrel into the agitation fixture and a separate hose arm. The pump is powered by a 12 volt deep cycle marine battery that needs to be charged after approximately 15 - 20 hours of use.
Using this new system, I processed the remaining soil samples from the 2012 excavation season at Thompson’s Landing. Since these samples contained numerous bulky clam shells, a modification of the standard process was called for. I placed a 1/4 in (0.6 cm) box screen across the top of float tank to catch the clam shells as the sample was poured into the barrel. The sample was poured into the tank at a slow and intermittent pace, about a cup or two at a time. The agitators were not turned on until all of the shells larger than 0.6 cm had been cleaned out and put into a bag to be processed as part of the heavy fraction in the lab. The small shaker screen was then taken off of the tank and the battery for the recirculation pump was switched on, which allowed water to flow through the agitation apparatus. The heavy fraction was caught by the

Figure 5. Flotation system B.
mesh of the insert basket, while the light fraction floated and was channeled out of the barrel into
the geological sieve situated in a deep aluminum bucket hanging from a handle affixed above the
spillway chute. After the entire sample was processed in this manner the heavy and light fraction
were rinsed into water permeable fabric pouches and hung from a clothesline to dry. The
pouches of floated materials were transported back to the lab to be sorted, identified, and
cataloged.

In the lab, the heavy and light fractions were examined separately, yet materials were
cataloged together, being from a single provenience. The procedure for processing was as
follows. Each fraction was emptied from its fabric pouch into an archival artifact box lid. After
the fraction was weighed and the weight recorded, the fraction was poured into a standard test
sieve (ATSM E-11 Specification). The sieves were stacked 6.3 mm, followed by 3.35 mm, then
1.7 mm, with a pan at the bottom to catch the smallest material. Each sieve caught a “split” of the
fraction. Each split was transferred into an archival box lid and labeled for sorting.

Of the heavy fraction splits, artifacts and faunal remains were sorted from the 6.3 mm
and 3.35 mm splits. These materials were sorted and cataloged according to artifact type. The
largest pieces of carbonized wood were collected from this fraction, as well as the light fraction,
for carbon dating. The larger of the heavy fraction splits were not examined under magnification.
The heavy fraction from the pan and 1.7 mm split was examined in small quantities in a clear
glass petri dish under a fluorescent light with magnification when needed. Only botanical
materials were retained from this split. Those botanicals that were recovered from the heavy
fraction were combined with those from the light fraction upon identification and quantification.
After examining the entire heavy fraction it was recombined, weighed, bagged, and catalogued
as ‘Heavy Fraction – sorted’.
Since the flotation of soil samples causes botanical materials to concentrate, all samples had to be hand sorted. This meant that the light fraction of each soil sample, including the column sample and poppy seed tests, had to be meticulously sorted through to remove all modern twigs, leaves, roots. Splits larger than 3.35 mm were sorted in archival box lids by naked eye, sometimes with the aid of an illuminated magnifying lens. A representative sample of carbonized wood was collected from the larger splits of the light fraction as well. In some cases this wood was combined with that from the heavy fraction in order to make up the 20 grams needed for radiocarbon dating. Splits smaller than 3.35 mm were sorted in a glass petri dish under an illuminated microscope with 10x magnification. From all splits of the light fraction, carbonized and modern seeds both whole and broken were collected for identification where possible. Once seeds had been identified, they were counted, cataloged, and stored separately by type in small glass vials. These were wrapped for protection and stored with the remainder of the artifacts and faunal remains from the flotation sample.

Before I began this research, the Archaeology Institute was not in possession of a comparative collection of modern or archaeological seeds from local contexts. My research was going to be very difficult without such a resource, so, in the Fall of 2012 I began collecting plants from Thompson’s Landing and surrounding areas on and around the UWF campus. Eventually my collection area grew to encompass most of southern Escambia and Santa Rosa counties. I focused mainly on plants that had durable seed or nut components and collected when the plants were producing fruits or nuts. This strategy worked to familiarize me with the plants, and specifically the durable parts of plants, in the focus area that may be present in the shell midden flotation samples that I collected.
Many of the local angiosperms have fruits and berries with thick skin and sticky flesh. In order to have a clean seed specimen to add to the comparative collection, I used a solution of water and fabric softener to soak and then dissect the fruits to remove their seeds or drupes. This process worked best for Yaupon holly, chinaberry, coral and dune greenbrier, Carolina cherry laurel, and magnolia. Some seeds were easier to collect from the berries, such as American beautyberry, which slide out cleanly. See Table 3 for a list of comparative specimens collected. It is important to note that I also collected samples from a few modern cultigens and invasive species, but I did not ever obtain samples of early archaeological cultigens such as chenopodium, amaranth, goosefoot, or gourd. I relied on published images for characterizations of these and other specimens common to prehistoric archaeological contexts in the Southeast. A few major online resources that I used throughout this process were: USDA Natural Resources Conservation Service Plants Database, USF Atlas of Florida Vascular Plants, and the Lady Bird Johnson Wildflower Center at the University of Texas.

My technique for identifying and quantifying the seeds and plant parts that were recovered from the midden and column samples began by separating all of the seeds from a particular provenience based morphological differences. After the seeds and plant parts had been separated into smaller divisions based on familiar shared characteristics or distinctive types, the groups of unknown seeds were similarly separated. Seeds that could be identified using the comparative collection or recognition based on localized research were identified to the lowest (most specific) taxonomic group possible. The characteristics of these seeds were always cross referenced in Martin and Barkley’s *Seed Identification Manual* (1961) and online using the various plant identification websites mentioned above. Sometimes it was relatively easy to recognize the family or order to which a particular seed belonged, but narrowing the
identification beyond that could be overly time consuming without the guarantee of a positive identification of the seed. The identification of record was most often the family, subfamily, or genus level followed by a disclaimer that the specimens compared favorably with the type listed. As this was the researcher’s first experience with paleoethnobotany, a conservative approach was deemed most responsible. This process was used for whole seeds and distinctive fragments of broken ones. All seeds and fragments were counted.

Table 3. Specimens in Ethnobotanical Comparative Collection.

<table>
<thead>
<tr>
<th>Native</th>
<th>Native</th>
<th>Native</th>
<th>Introduced/Exotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern Magnolia&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Bayberry</td>
<td>Yaupon Holly&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Loquat</td>
</tr>
<tr>
<td>Water Oak&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Gallberry&lt;sup&gt;a&lt;/sup&gt;</td>
<td>American Holly</td>
<td>Mimosa</td>
</tr>
<tr>
<td>Turkey Oak&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Sparkleberry&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Carolina Cherry Laurel&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Chinese Privet</td>
</tr>
<tr>
<td>Overcup Oak&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Swamp Blackberry&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Persimmon&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Allspice</td>
</tr>
<tr>
<td>White Oak&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Coral Greenbrier&lt;sup&gt;a&lt;/sup&gt;</td>
<td>American Beautyberry&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Japanese Yew</td>
</tr>
<tr>
<td>Laurel Oak&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Dune Greenbrier&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Button Bush</td>
<td>Chinaberry</td>
</tr>
<tr>
<td>Pecan&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Smallflower Paw Paw&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Yellow Anise&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>Hickory&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Cabbage Palmetto&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Wild Garlic&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>Blackgum&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Muscadine&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Ragweed&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
</tr>
<tr>
<td>Atlantic White Cedar&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Peppervine&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Black Walnut&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-</td>
</tr>
</tbody>
</table>

<sup>a</sup> indicates plants with documented ethnohistorical uses in Florida (Austin 2004). See Appendix B for scientific names.

During the process of identifying botanical materials from the midden deposits, I did differentiate between carbonized and non-carbonized seeds, as reflected in the detailed catalog of specimens from each provenience. In cases where there were distinct carbonized or non-
carbonized seeds that could not be identified using the techniques listed above I enlisted the aid of two scientific botanists: Dr. Ramon Leon- Gonzalez, an assistant professor of Weed Science in the University of Florida West Florida Research and Education Center, and James R. Burkhalter, a research associate at the University of West Florida and long-time curator of the Michael J. Cousins Herbarium. Dr. Leon confirmed a few of the identifications that I made and suggested some alternate routes to identification that he regularly employs in his field, specifically to germinate the unknown seed. Even though some of the specimens may have been relatively young and possibly even modern, I decided against this method because the seeds probably weren’t viable due to the archaeological context from which they were recovered. Mr. Burkhalter, with his vast knowledge of plant life on the UWF campus, helped in identifying plant communities, as well as providing access to the Herbarium and expertise in genus and species level comparison of seeds using the expansive 20,000 specimen collection. If the seed could still not be identified, a sketch was made and detailed notes on the distinguishing characteristics were recorded.

Since there were no domesticated or even cultivated plant remains present in the Thompson’s Landing midden deposits, any further analysis of the recovered botanical material was not necessary. A consideration of the native plant assemblages from each midden deposit will follow in the next chapter.

Zooarchaeological Methods

Faunal remains were identified and quantified for five shell midden features from the Thompson’s Landing site. In the field, the shell midden deposits were designated as features as soon as they were recognized. See Table 6 in the next chapter for provenience information and characteristics of the features. With the guidance of Cathy Parker, the in-house faunal specialist
at UWF, specimen identifications and determination of the appropriate methods of quantification for this project were made, and will be discussed below.

In the field, feature materials were screened through 0.16 cm mesh; anything that did not fall through the screen was collected in artifact bags and brought back to the lab. This screen size ensured that most small bones and all shells were retained for analysis (Reitz and Wing 2008; Irvy Quitmyer, personal communication). Back at the lab, artifact bags containing the feature materials were dumped out onto trays for drying overnight. After the contents had been dried and re-bagged, they were set aside for detailed analysis.

I conducted the identification of vertebrate and invertebrate fauna from all of the midden flotation samples. The vertebrate fauna from all other feature proveniences were identified by undergraduate and graduate students in the 2012 Archaeological Lab Methods class at UWF under the supervision of Jan Lloyd and Cathy Parker. I checked each of these samples for accuracy and consistency before inclusion in this study. Specimens were identified down to the lowest possible taxonomic level using the UWF zooarchaeological collection created and maintained by Cathy Parker and various reference manuals (Emerson and Jacobson 1976, Walls 1975). Vertebrate specimens that could not be identified, usually because of the small size and degradation of the bones, were grouped together as indeterminate animal or mammal bone. In many cases, when species could not be identified, a higher level of taxonomic categorization was used. For example, in many cases, the fish remains could only be classified as bony fish, or superclass Osteichthyes, the division containing all ray-finned and lobe-finned fishes. But in cases where distinguishing characteristics were present, such as the hard palate of the family Scianedae or skull fragments of the order Siluriformes, those lower level designations were given.
All midden materials were put through the same set of procedures in the lab. The first step of the process required a secondary screening of the entire provenience using a series of graded screen sizes. A 1/2 in (1.27 cm) box screen was set on top of a 1/4 in (0.64 cm) box screen, followed by a 1/16 in (0.15 cm) box screen. The materials were poured directly from the artifact bags into a stack of screens over a sorting tray. The fine sediments fall through the smallest screen size, and are discarded. Everything else was retained and sorted according to size designation. Cultural material was removed from the 1.27 cm and 0.64 cm screens and cataloged as usual. Ceramic sherds that fell through to the 0.64 cm screen were classified as >1/2 in. untyped sherds and were not sorted by type or temper. All vertebrate fauna from the 1.27 cm and 0.64 cm screens were identified regardless of size. The material from the 0.15 cm screen was not sorted through due to the time consuming nature of the process. The less than 0.64 cm fraction was bagged, weighed, recorded, and retained.

Initially, shells were sorted according to taxonomic designation and size, each type was weighed and all whole shells were counted. The categorical breakdown of shells is as follows: whole shells greater than 1.27 cm, shell fragments greater than 1.27 cm, whole shells less than 1.27 cm, and fragmentary shells less than 1.27 cm. When dealing with the clam shells that made up the bulk of the midden deposits I employed a procedure to classify known and unknown species in each provenience. Basically, the main two molluscan components of the features are Atlantic rangia and Carolina marsh clam, two species of marsh clam that can look strikingly similar in an archaeological context. The main differentiating characteristic, as with most bivalves, is the hinge. This is where the two shells of the creature interlock. If this part of the shell was present on the specimen, it was identified to the species level. If there was no hinge, yet the shell displayed clam-like morphology, the specimen was identified as an indeterminate
clam. So, in cases where species of mollusk could not be identified, the next highest taxonomic category was used. Each midden deposit has the identification of each species and indeterminate specimens recorded, and will be discussed in the next chapter.

Upon my secondary analysis of the faunal materials from the Thompson’s Landing middens, specimens were counted according to number of individual specimens present (NISP) and the minimum number of individuals represented (MNI) were calculated. The NISP, or specimen count, is primary data and it is used to calculate the MNI, which is secondary data, and is based on the actual elements present. For the purposes of this research, NISP, MNI, and biomass contributions were calculated for each taxonomic group in every feature provenience. Indeterminate animal bone was not counted. NISP was not counted for indeterminate clams because of the high volume of small pieces and relatively little useful information that would have been gained from such a measure. During this process of secondary analysis, all identifiable elements of a taxon were side sorted, and without counting any repeated elements, the MNI was calculated. MNI was not calculated for the indeterminate clam category because hinges were not present in the specimens, therefore non-repeating elements were not present. Since biomass provides more relevant data, this was calculated for the indeterminate clam present in each provenience. If there was evidence of shucking, exposure to direct heat or butchering on the shell or bones, it was noted at this point. Weight in grams was recorded for the total number of each taxon in each provenience.

I decided to calculate biomass for these materials as well, because NISP and MNI counts have the potential to overly represent easily recognizable species (Jackson and Scott 2002). Using this method would allow me to assess the relative prominence of each taxon based on meat weight contributions. Biomass calculation, or allometric scaling, is based on the
relationship between whole body dimensions and skeletal and shell dimensions and can be used
to estimate body size (Reitz and Wing 2008). The meat weight is inferred using this calculation,
and only applies to the actual bone recovered. In other words, only the meat that would have
adhered to the amount of shell or bone present is being estimated, not the weight of the entire
animal from which a single element represents. The following is the formula that I used to
calculate biomass, and the constant values for taxon in this region can be found in Table 4:

\[ Y = aX^b \; ; \; \log Y = \log a + b (\log x) \]

Y = estimated sample biomass (g) contributed by
specimens in archaeological sample
X = bone weight(g) of archaeological sample
a = Y intercept
b = slope

Table 4. Constant Values for Estimated Biomass Calculations.

<table>
<thead>
<tr>
<th>Taxon</th>
<th>Y intercept</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mammalia</td>
<td>1.12</td>
<td>0.90</td>
</tr>
<tr>
<td>Aves</td>
<td>1.04</td>
<td>0.91</td>
</tr>
<tr>
<td>Alligator mississippiensis</td>
<td>0.91</td>
<td>0.89</td>
</tr>
<tr>
<td>Testudines</td>
<td>0.51</td>
<td>0.67</td>
</tr>
<tr>
<td>Osteichthyes</td>
<td>0.90</td>
<td>0.81</td>
</tr>
<tr>
<td>Non-Perciformes</td>
<td>0.85</td>
<td>0.79</td>
</tr>
<tr>
<td>Siluriformes</td>
<td>1.15</td>
<td>0.95</td>
</tr>
<tr>
<td>Sciaenidae</td>
<td>0.81</td>
<td>0.74</td>
</tr>
<tr>
<td>Sparidae</td>
<td>0.96</td>
<td>0.92</td>
</tr>
</tbody>
</table>
Marine Gastropods   -0.16       0.92
Bivalvia           0.02        0.68
*Polymesoda caroliniana*   0.01       0.83
*Rangia cuneata*    -0.78       1.07
*Crassotrea virginica*   -0.77      0.97


**Radiocarbon Dating**

In March of 2013, five samples of charred wood from the Thompson’s Landing shell middens were sent to Beta Analytic Inc. for standard radiometric dating. The cost of the analysis was funded by a grant obtained from the Scholarly and Creative Activities Committee at UWF during the 2012-2013 Spring award cycle. The amount of this award was $1000. Due to the high cost of the analysis, far exceeding the amount awarded for my research, an additional $950 was provided by the University of West Florida Archaeology Institute.

Each sample of charred wood weighed approximately 20 grams and was collected exclusively from each one of the five shell midden deposits; see Table 5 for radiocarbon sample data. In every case, the wood was amassed from multiple proveniences originating from a single midden feature. The high volume of sample material needed for Standard Radiometric analysis required that I pool together the wood obtained from the bulk carbon samples collected in the field, screened midden materials, as well as wood collected from flotation samples. In pooling the material for testing, I made sure to choose proveniences that were in very close proximity and in a shared context within each feature. This method of collection was justified by the working assumption that the small shell middens were deposited quickly, perhaps even in a
single event, and not reused later or for some extended amount of time. This assumption has been supported by tight confidence intervals in the results from most of the samples.

Charred wood was the best choice of material for carbon dating in this case because of the relative affordability of standard testing and simplicity of the analysis compared to other materials. The samples were processed by the Beta Analytic Radiocarbon Dating Laboratory in Miami, Florida. The charred material was subjected to a series of washes as part of the standard pretreatment process to remove potential contaminants to the sample. Two major concerns in obtaining radiocarbon dates from archaeological materials are *in situ* sample contamination and post excavation contamination. The former can be cause by rootlets from younger or even modern plants and carbon rich sediments, such as can be found in a shell midden, where carbonates leech into the soil from the shell. Contamination of samples after excavation can come from bag labels, a number of chemicals used in archaeology conservation labs, and cigarette ash. To reduce the chances of these contaminates from affecting the apparent age of a carbon sample, the charred material is scraped clean of sediments and rootlets and the outer surfaces are scraped away. Next, the material is crushed and put through a series of acid/alkali/acid washes before it is tested.

Table 5. Radiocarbon Sample Data.

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Lab Designation</th>
<th>Provenience</th>
<th>Sample Size and Type</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>8ES950FEA550</td>
<td>Beta-345259</td>
<td>Feature 550-Level 2 and 3 feature matrix</td>
<td>20 g Charred material</td>
<td>RadiometricPLUS</td>
</tr>
<tr>
<td>8ES950FEA551</td>
<td>Beta-345260</td>
<td>Feature 551-Flotation sample and Level 2 feature matrix</td>
<td>20 g Charred material</td>
<td>RadiometricPLUS</td>
</tr>
<tr>
<td>8ES950FEA552</td>
<td>Beta-345261</td>
<td>Flotation samples, and a hand collected sample from Level 2</td>
<td>20 g Charred material</td>
<td>RadiometricPLUS</td>
</tr>
<tr>
<td>Beta-</td>
<td>Feature 556</td>
<td>20 g Charred material</td>
<td>RadiometricPLUS</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------</td>
<td>-----------------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td>8ES950FEA556</td>
<td>Flotation sample, hand collected carbon sample from Level 3, and Level 3 feature matrix</td>
<td>20 g Charred material</td>
<td>RadiometricPLUS</td>
<td></td>
</tr>
<tr>
<td>Beta-</td>
<td>Feature 557</td>
<td>20 g Charred material</td>
<td>RadiometricPLUS</td>
<td></td>
</tr>
<tr>
<td>8ES950FEA557</td>
<td>Flotation sample and Level 3 feature matrix</td>
<td>20 g Charred material</td>
<td>RadiometricPLUS</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 5

RESULTS

In the following sections, the results of the excavation and subsequent analytical methods applied to the shell midden features will be addressed. Specific information on each feature will be presented in turn. Included in these detailed descriptions are feature excavation procedures, physical characteristics, contents recovered, and radiocarbon dating results. All interpretation of the results will be reserved for the Discussion chapter. Table 6 shows the general characteristics of the features that I analyzed.

Table 6. General Feature Characteristics

<table>
<thead>
<tr>
<th>Feature Number</th>
<th>Provenience</th>
<th>Shape</th>
<th>Estimated Size</th>
<th>Thickness</th>
<th>Sections</th>
</tr>
</thead>
<tbody>
<tr>
<td>550</td>
<td>Unit 41</td>
<td>Sheet-like, with pockets</td>
<td>&gt;1 m²</td>
<td>10 cm</td>
<td>-</td>
</tr>
<tr>
<td>551</td>
<td>Unit 43</td>
<td>Sheet-like, with pockets</td>
<td>&gt;1 m²</td>
<td>10 - 20 cm</td>
<td>-</td>
</tr>
<tr>
<td>552</td>
<td>Unit 42 and 46</td>
<td>Circular, mounded basin</td>
<td>&gt;2 m²</td>
<td>&lt;20 cm</td>
<td>A and B</td>
</tr>
<tr>
<td>556</td>
<td>Unit 47</td>
<td>Circular, shallow basin with smeared upper level</td>
<td>&gt;1 m²</td>
<td>9 – 14 cm</td>
<td>A and B</td>
</tr>
<tr>
<td>557</td>
<td>Unit 49</td>
<td>Sheet-like, dispersed</td>
<td>&lt;1.5 m²</td>
<td>8 – 10 cm</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 7 provides a detailed list of the botanical contents of the column sample that was collected from an area a few meters to the southwest of Grid 4. The number of each type of specimen found in each 15 cm increment is given. Unknown #1 (Unk#1) is a specimen that was found in all levels of the column sample and to some degree in all of the midden soil samples. It is a small, smooth, round, black specimen. Generally the surface is unmarked, but a small percentage of these have an opening that could be an attachment point for a stem, or perhaps
radical emergence. In some cases, two specimens were found fused together. The size of Unk#1 varies, and ranges from 2.0 mm to as small as 0.2 mm in diameter. It appears to be carbonized throughout, and has a slight indication of what may be a seed coat. It is not similar to any seed I have studied to date. Neither Dr. Ramon Leon-Gonzalez nor Mr. James Burkhalter were able to propose even a preliminary identification for the specimen. Due to its ubiquitous presence in the samples from this area, and the ambiguity of its characteristics, I am inclined to think that it may not be a seed at all. In fact, it could be a somewhat unique carboniferous output of some part of the ecosystem on the campus. I did not encounter Unk#1 in great numbers in soil samples from Molino (8ES3473) or the Wernike Site (8SR2183), which I also processed using the new flotation system. Since this unknown specimen was present in such large numbers I did not count or collect more than 200 from any sample. In these cases, the presence of this specimen will be indicated in the following sections as >100 or >200 Unk#1. Other unknown specimens were encountered, collected, counted, and when the specimen had distinguishing or unique characteristics, it was illustrated in the laboratory analysis notes. These will be described along with the feature in which they were encountered.
Table 7. Contents of Column Sample.

<table>
<thead>
<tr>
<th>Depth in cm below surface</th>
<th>Hickory</th>
<th>Oak</th>
<th>Holly</th>
<th>Muscadine</th>
<th>Blackgum</th>
<th>Pokeweed</th>
<th>Bayberry</th>
<th>Blackberry</th>
<th>Unk #1</th>
<th>Winter Buds</th>
<th>Drupe</th>
<th>Other Unknown*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-15</td>
<td>2</td>
<td>-</td>
<td>40</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>72</td>
<td>2</td>
<td>-</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>15-30</td>
<td>-</td>
<td>-</td>
<td>26</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>51</td>
<td>3</td>
<td>-</td>
<td>13</td>
</tr>
<tr>
<td>30-45</td>
<td>1</td>
<td>-</td>
<td>13</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>49</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>45-60</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>60-75</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>11</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>75-90</td>
<td>-</td>
<td>1</td>
<td>14</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>90-100</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

*Note: Unknown specimens counted are whole and >1.5 mm in size. None are carbonized.

Feature 550

Feature 550, a sheet-like shell midden composed primarily of Atlantic rangia (*Rangia cuneata*) shells, was excavated in Unit 41 at 1026 N 991 E. This midden feature was apparent on the surface when excavation began. During the 2011 field season, a student attempting to divert rain water away from a nearby block of test units overturned some of the shell-bearing strata that we designated Feature 550 during the 2012 field season. The feature sits a few meters to the west of the shell and gravel road, just inside the wooded area. A picnic table and benches sit about 7 meters further to the west.
Although some Atlantic rangia shells were visible on the ground surface of this test unit, the concentrated midden deposit was not encountered until excavators removed the 8 cm thick root mat. After the root mat was removed and surface of the feature exposed, it was clear that the deposit followed the slope of the landform, with shell becoming visible, first in the east half of the unit, then in the west half, after dipping slightly towards the marsh. An exploratory window into the feature was opened in the southwest quadrant of the test unit (Figure 6). This allowed excavators to determine the vertical extent of the deposit. The quadrant was excavated to 23 cm below the surface, at which point the midden deposit had given way to the underlying non-shell-bearing strata. The remainder of the feature was then excavated to 24 cm below the surface, across the unit. After the initially encountered lens of shell, the feature was comprised of small dispersed pockets of shell extending to the depth given above.

Figure 6. Unit 41: Feature 550 level 2-3.
Unfortunately, the midden bearing stratum of Feature 550 was not screened through the standard 1/16 in (0.16 cm) screen, and adding insult to injury, approximately 1,700 grams of indeterminate clam shell was discarded in the field. As this was the first feature excavated during the field season, we did not know exactly what to expect or how efficient the student workers would be. As a result, my approach to sampling early in the season was somewhat experimental. Feature materials were initially put through a 0.16 cm screen, but the large grain sand particles that make up the Troup sands at the site caused quite a lot of sediment buildup in the finer screen sizes. The soils were also wet from a weekend of heavy afternoon rains, which caused further frustration at the screens. The 1,700 grams of shell from the uppermost level of the midden was weighed and discarded as part of another experimental field sampling procedure aimed at reducing the size of the final curated collection. As this would result in inadequate samples for my study, however, new sampling procedures were set in place that allowed for the collection of all materials from the midden contexts. The fine screening method using 0.16 cm screen was restored in third level of the unit, from 20 cm to 24 cm below surface, within the feature.

The Feature 550 shell midden blanketed the surface of the ground below the root mat, and a thin layer of very dark brown, loosely compacted, sand with organic material that persisted to 14 cm below surface. This discreet midden feature encompassed the entire 1 m² for about 6 vertical centimeters, after which point only sparse pockets of shell were evident. The shape of the midden was amorphous in plan view, and sheet-like with dispersed pockets in profile view. The extent of the midden very likely extends beyond the walls of this 1 m by 1m test unit, as the shell-laden strata is clearly evident in all four profile maps of the unit walls. While the exact horizontal extent of the Feature 550 shell midden is uncertain, it is at least 1 m².
See Table 8 for the enumeration of faunal materials from Feature 550. Atlantic rangia are the most numerous shellfish in this deposit. The shell weight of this species is 3,518.7g, which is calculated to represent 937.36 g of edible biomass, or edible meat. There were 848 individual specimens of *Rangia cuneata* identified, with a minimum number of 452 individual animals. The next most abundant fauna in the midden is indeterminate clam, which is composed of 2,981.6 g of shell and represents 422.1 g of biomass. The weight of the shells of Carolina marsh clam (*Polymesoda caroliniana*) total only 151.3 g, which results in a biomass calculation 88.26 grams. This species is represented by 176 specimens, with a minimum number of 100 individual animals. The eastern oyster shell weight of 2.2 g represents a mere 0.36 g of biomass. While these two shell fragments *may* be from two individual animals, unless the fragments are identifiable hinges, an MNI of one oyster is indicated.

Table 8. Faunal Assemblage from Feature 550.

<table>
<thead>
<tr>
<th>Taxa (Common Name)</th>
<th>Weight</th>
<th>NISP</th>
<th>MNI</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Rangia cuneata</em> (Atlantic rangia)</td>
<td>3,518.7</td>
<td>848</td>
<td>452</td>
<td>937.36 g</td>
</tr>
<tr>
<td><em>Polymesoda caroliniana</em> (Carolina marsh clam)</td>
<td>151.3</td>
<td>176</td>
<td>100</td>
<td>88.26 g</td>
</tr>
<tr>
<td>Bivalvia (indeterminate clam)</td>
<td>2,981.6</td>
<td>-</td>
<td>-</td>
<td>422.10 g</td>
</tr>
<tr>
<td><em>Crassostrea virginica</em> (eastern oyster)</td>
<td>2.2</td>
<td>2</td>
<td>1</td>
<td>0.38 g</td>
</tr>
<tr>
<td>Osteichthyes (indeterminate bony fish)</td>
<td>1.0</td>
<td>7</td>
<td>-</td>
<td>11.01 g</td>
</tr>
<tr>
<td>Testudines (indeterminate turtle)</td>
<td>0.7</td>
<td>2</td>
<td>-</td>
<td>2.55 g</td>
</tr>
<tr>
<td>Mammalia (indeterminate mammal)</td>
<td>0.2</td>
<td>2</td>
<td>-</td>
<td>3.10 g</td>
</tr>
</tbody>
</table>
The majority of the clams show evidence of being shucked. Shucking is the mechanical act of prying open a bivalve shell, which produces a characteristic notch in the outer lip of the animal’s protective valve. A notch with a 90° angled, horizontal fracture and 1 cm² surface area was most commonly seen on the clam shells in Feature 550. Those shells that do not appear to have been shucked may have opened as a result of exposure to heat, such as boiling in water or roasting over fire. In this feature, about 10% of the whole shells do not show evidence of being shucked.

The vertebrate faunal remains consist of 7 indeterminate specimens of bony fish (1 g), 2 indeterminate specimens of mammal (0.2 g), and 2 specimens of an indeterminate species of turtle (0.7 g). The fish remains are generally unremarkable and do not show any evidence of being burned. A single 0.3 g haemal spine segment appears to have been cut or broken at the time of deposition. The raw weight of the fish bones represented 11.01 g of biomass. Indeterminate mammal bones contributed 3.1 g of meat to the diet. The turtle specimens in Feature 550 are fragments of long bones of the leg—said to be the meatiest part of the animal. These bones represented 2.55 g of biomass.

Many ceramic sherds were also contained within this shell midden. Table 9 provides a complete listing of the types of ceramics recovered. The most abundant ceramic types, in terms of number and combined weight of sherds, are sand tempered plain and grit tempered plain—neither of which is temporally or culturally diagnostic. A single sherd of Mission Red, var. San Luis (Melcher 2011) was found in Level 2. This is a protohistoric ceramic that may represent European colonial influence on late prehistoric aboriginal ceramic styling. A large piece of undecorated sand tempered pottery with an adorno, or possibly podal support (although the piece does not look like a base), was piece plotted and hand collected from Level 2, at 19.5 cm below
the surface. A West Florida cord marked sherd was also found in Level 2. This particular type of ceramic surface treatment has been associated with both Santa Rosa-Swift Creek and Weeden Island cultural complexes (Willey 1998).

Table 9. Ceramic Assemblage from Feature 550.

<table>
<thead>
<tr>
<th>Type</th>
<th>Provenience within Feature</th>
<th>Count</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission Red, var. San Luis</td>
<td>Level 2, 14-20 cmbs</td>
<td>1</td>
<td>1.4 g</td>
</tr>
<tr>
<td>West Florida cord marked</td>
<td>Level 2, 14-20 cmbs</td>
<td>1</td>
<td>9.5 g</td>
</tr>
<tr>
<td></td>
<td>Level 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sand tempered- plain</td>
<td>Level 3, 14-24 cmbs</td>
<td>18</td>
<td>47.9 g</td>
</tr>
<tr>
<td></td>
<td>Hand collected from</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sand tempered- plain with adorno</td>
<td>Level 2 at 19.5 cmbs</td>
<td>1</td>
<td>36.4 g</td>
</tr>
<tr>
<td>Sand tempered- brown slipped- plain</td>
<td>Level 2, 14-20 cmbs</td>
<td>1</td>
<td>1.5 g</td>
</tr>
<tr>
<td>Sand tempered- brown slipped- stamped</td>
<td>Level 2, 14-20 cmbs</td>
<td>2</td>
<td>3.7 g</td>
</tr>
<tr>
<td>Sand and grit tempered- plain</td>
<td>Level 3, 20-24 cmbs</td>
<td>2</td>
<td>4.3 g</td>
</tr>
<tr>
<td>Grit tempered- plain</td>
<td>Level 2, 14-20 cmbs</td>
<td>16</td>
<td>19.8 g</td>
</tr>
<tr>
<td>Grit tempered- check stamped</td>
<td>Level 2, 14-20 cmbs</td>
<td>2</td>
<td>12.9 g</td>
</tr>
<tr>
<td>Grit tempered- punctuated</td>
<td>Level 2, 14-20 cmbs</td>
<td>2</td>
<td>7.6 g</td>
</tr>
<tr>
<td>Grit and grog tempered- plain</td>
<td>Level 3, 20-24 cmbs</td>
<td>1</td>
<td>2.1 g</td>
</tr>
<tr>
<td>Grog tempered- incised</td>
<td>Level 2, 14-20 cmbs</td>
<td>1</td>
<td>3.5 g</td>
</tr>
<tr>
<td>Charcoal and grog tempered- plain</td>
<td>Level 2, 14-20 cmbs</td>
<td>2</td>
<td>0.9 g</td>
</tr>
<tr>
<td>&lt;1/2 inch sherds- not sorted by type</td>
<td>Throughout Feature</td>
<td>18</td>
<td>6.4 g</td>
</tr>
</tbody>
</table>
Two small non-utilized flakes of sandstone (0.1 g, 0.4 g) and a sandstone anvil stone (133.8 g) were recovered in Level 2, and a third non-utilized flake of Tallahatta sandstone (0.3 g) was found in Level 3. No soil sample was collected from this feature, so very little botanical material was recovered. Only two individual specimens were identified: in Level 2, 14 to 20 cm below surface, a seed that compares favorably with specimens collected from the drupe of a Carolina cherry laurel (*Prunus caroliniana*); and from Level 3, 20 to 24 cm below the surface, a single carbonized acorn (*Quercus* spp.).

A small amount intrusive material was found throughout Level 2 of Feature 550, including four pieces of bottle glass with a combined total weight of 4.1 g, a single piece of glass from an indeterminate source (0.6 g), a machine made nail (2.9 g), and a few nail fragments (0.2 g). Another intact modern nail (1.7 g) was taken from Level 3 of the feature.

Results of radiocarbon dating of the Feature 550 sample can be found in Table 10. The measured radiocarbon age of the charred material from sample Beta-345259 is 1900±30. The age is given in years before present, where “present” is AD 1950. This age has been corrected for isotopic fractionation. The 1-sigma calibrated age of the sample, with a 68% probability, is 70 to 130 cal A.D.. The 2-sigma calibrated age of the sample, with a 95% probability, is 30 to 40 cal A.D. and 50 to 140 cal A.D.. The 2-sigma calibration is used for interpretation. The intercept of the radiocarbon age with the calibration curve is 80 cal A.D..
Table 10. Radiocarbon Dating Results for Feature 550.

<table>
<thead>
<tr>
<th>Lab Designation</th>
<th>Conventional Radiocarbon Age</th>
<th>13C/12C Ratio</th>
<th>1 Sigma calibrated result (68% probability)</th>
<th>2 Sigma calibrated results (95% probability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-345259</td>
<td>$1900 \pm 30$ BP</td>
<td>-25.2 o/oo</td>
<td>70 to 130 cal A.D.</td>
<td>50 to 140 cal A.D.</td>
</tr>
</tbody>
</table>

Feature 551

Feature 551 was excavated within Unit 43, at 1028 N 989 E, just two meters north and two meters west of Unit 41. This amorphous sheet-like shell midden was comprised mainly of *Rangia cuneata* shells, and appeared to blanket the ground surface beneath root mat similar to Feature 550. The shell lens of the midden became completely visible after the root mat was removed as part of Level 1, and the top of Level 2 was cleaned for mapping and photographing. Feature 551, was excavated within 10 cm levels and followed the natural shape of the feature. All feature fill from this test unit was screened through 1/16” (0.16 cm) mesh. Once the feature was wholly exposed at 10 cm below surface, an exploratory quadrant was excavated in the southwest corner to explore the extent of the shell bearing strata. This quadrant was excavated using trowels to get through the midden and spoons to specifically target the pockets of shell beneath; Level 2 extended from 10 to 20 cm below the surface and Level 3 was between 20 and 30 cm below the surface. In the southwest quadrant, the midden deposit petered out within Level 3, by about 26 cm below surface.

Once the midden contents had been excavated from the southwest quadrant, the remaining three quadrants of the 1 m² unit were excavated in a similar fashion. The midden-bearing strata in Level 2 was dark grayish brown, loose sand with a moderately compact shell lens. In Level 3, the sediment was dark yellowish brown, loose sand, with pockets of
concentrated shell. The midden clearly dissipated at about 27 cm below the surface, at which point sparse clumps of shells persisted in a few areas, with the deepest pocket extending to 39 cm below the surface (Figure 7). Spoons were used to excavate these pockets, taking care to remove only the midden-bearing soil. A 5.25 liter soil sample of the shell midden feature was collected from the southeast corner of the unit at 10 cm below the surface.

Figure 7. Unit 43: Feature 551 Level 3.

Similar to the shell midden in Feature 550, the midden found in Feature 551 appears to extend beyond the walls of the 1m² test unit. It has a sheet-like appearance with uneven thickness in the upper level, giving way to abnormally dispersed pockets extending deep into the next natural stratigraphic layer. The vertical distribution of midden materials in this test unit indicates disturbance of the shell midden deposit contained within. It is likely that this deposit extends horizontally beyond the walls of the unit, and may even be associated with the deposit excavated in Unit 41.
More than fifteen thousand grams of shellfish remains were collected from Feature 551. This shell midden also held a number of prehistoric ceramic fragments and several items of invasive historic materials. A small amount of vertebrate faunal remains were recovered, along with the floral assemblage contained within the soil sample. Table 11 shows the primary and secondary data derived from analysis of the taxa in this feature.

Table 11. Faunal Assemblage from Feature 551.

<table>
<thead>
<tr>
<th>Taxa (Common Name)</th>
<th>Weight</th>
<th>NISP</th>
<th>MNI</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Rangia cuneata</em> (Atlantic rangia)</td>
<td>9,719.0 g</td>
<td>2,729</td>
<td>1,359</td>
<td>2,789.53 g</td>
</tr>
<tr>
<td><em>Polymesoda caroliniana</em> (Carolina marsh clam)</td>
<td>510.9 g</td>
<td>570</td>
<td>235</td>
<td>85.67 g</td>
</tr>
<tr>
<td>Bivalvia (indeterminate clam)</td>
<td>6,193.3 g</td>
<td>-</td>
<td>-</td>
<td>750.33 g</td>
</tr>
<tr>
<td><em>Crassostrea virginica</em> (eastern oyster)</td>
<td>48.6 g</td>
<td>45</td>
<td>10</td>
<td>7.61 g</td>
</tr>
<tr>
<td>Osteichthyes (indeterminate bony fish)</td>
<td>1.5 g</td>
<td>8</td>
<td>-</td>
<td>14.8 g</td>
</tr>
<tr>
<td>Arius felis (hardhead catfish)</td>
<td>0.3 g</td>
<td>2</td>
<td>1</td>
<td>4.64 g</td>
</tr>
<tr>
<td>Animalia (indeterminate animal)</td>
<td>3.9 g</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The shellfish species identified in Feature 551 include Atlantic rangia, Carolina marsh clam, and eastern oyster. There was also a large amount of indeterminate clam in the deposit. Atlantic rangia is by far the most abundant mollusk found in this midden, weighing a total of 9,719 grams. There were 2,729 individual specimens of Atlantic rangia, representing an MNI of 1,359. The biomass, or estimated meat weight, of the Atlantic rangia specimens at capture was calculated to be 2,789.53 grams. The second most abundant taxonomic class in this feature sample was indeterminate clam, which weighed 6,193.3 g and represented a biomass of 750.33 g.
of edible shellfish. Only 510.9 g of Carolina marsh clam was present, representing a total of 570 individual specimens, a minimum number of 235 individual animals, and contributing 85.67 g of meat. There was a very small amount of eastern oyster in Feature 551, with a total of 48.6 g of shell representing 7.61 g of biomass. Forty-five individual specimens of eastern oyster were tallied, but this number represented only 10 individual oysters. With a shell weight of 48.6 g, these oysters contributed only 7.61 g of dietary protein.

Most of the whole and fragmented Atlantic rangia in this feature show evidence of being shucked. Some of the Carolina marsh clams show evidence of a similar treatment. Those shells that do not appear to have been forced open by shucking likely opened on their own, probably as a result of exposure to a heat source such as fire or boiling water.

Similar to Feature 550, there are very few vertebrate faunal remains in this shell midden. However, in the case of Feature 551 there is not an inherent collection bias against small bones resulting from the use of a larger screen size than is typically recommended for shell midden contexts. In midden material taken from Feature 551, indeterminate animal bone totaling 3.9 g was recovered. A total of 1.8 g of bony fish, representing 19.5 g of biomass, was found in the Feature 551 midden materials. Two pieces of a hardhead catfish (Arius felis) bone, weighing 0.3 g and representing 4.64 g of biomass, were identified within that taxonomic category. None of the fish bones or the indeterminate bone shows evidence of being burned or butchered.

Table 12 provides a listing of the ceramics recovered from Feature 551. The most numerous type of ceramic in the feature is non-diagnostic, plain sand tempered, of which 13 sherds were counted. Seven sherds of sand tempered ceramics with a check stamped design were found throughout the midden. Deptford and Weeden Island cultural complexes, from the Early and Late Woodland periods respectively, are associated with sand and grit tempered wares that
often bear a check stamped design (Milanich 1994, Willey 1998). A single piece of sand tempered ceramic with a possible complicated stamp design was found in Level 3. This fragment is too small to determine the stamp style, although a curvilinear element may be present. A large shell tempered sherd was hand collected from 24 cm below the surface in the northwest corner of Unit 43, where it was vertically oriented in the soft sand. This sherd is a diagnostic type from the Mississippi period and is called Pensacola plain, which is part of the Pensacola Culture series discussed by Harris (2012).

Table 12. Ceramic Assemblage from Feature 551.

<table>
<thead>
<tr>
<th>Type</th>
<th>Provenience</th>
<th>Count</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sand tempered- plain</td>
<td>Level 2, 10-20 cmbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sand tempered- burnished</td>
<td>Level 3, 20-26 cmbs SW quadrant</td>
<td>2</td>
<td>1.1 g</td>
</tr>
<tr>
<td>Sand tempered- incised</td>
<td>Level 2, 10-20 cmbs</td>
<td>3</td>
<td>7.2 g</td>
</tr>
<tr>
<td>Sand tempered- check stamped</td>
<td>Level 3, 20-26 cmbs SW quadrant</td>
<td>7</td>
<td>19.6 g</td>
</tr>
<tr>
<td>Sand tempered- complicated stamped</td>
<td>Level 3, 20-26 cmbs</td>
<td>1</td>
<td>4.2 g</td>
</tr>
<tr>
<td>Sand and greg tempered- plain</td>
<td>Level 3, 20-26 cmbs</td>
<td>4</td>
<td>9.1 g</td>
</tr>
<tr>
<td>Grit tempered- plain</td>
<td>Level 2, 10-20 cmbs</td>
<td>1</td>
<td>1.4 g</td>
</tr>
<tr>
<td>Charcoal and grit tempered- plain</td>
<td>Level 2, 10-20 cmbs</td>
<td>1</td>
<td>1.2 g</td>
</tr>
<tr>
<td>Pensacola- plain</td>
<td>Hand collected from 24 cmbs</td>
<td>1</td>
<td>40.0 g</td>
</tr>
<tr>
<td>&lt;1/2 inch sherds- not sorted by type</td>
<td>Throughout feature</td>
<td>48</td>
<td>21.9 g</td>
</tr>
</tbody>
</table>
Two non-diagnostic lithic artifacts were found in Feature 551. Both are non-utilized flakes. One is Tallahatta sandstone, and the other is low grade iron rich sandstone common to the Pensacola area.

Intrusive materials were found in Level 2 and Level 3 of the feature. In Level 2, a fence staple (6 g), four pieces of glass from an indeterminate source (1.8 g), a single piece of bottle glass (1.1 g), and a can key (1.8 g) were found. A large screw (13.3 g) was piece plotted at 17 cm below the surface in the southwest quadrant of the unit. Other materials found in Level 2 of the southwest quadrant include a whole machine made nail (0.8 g), a few nail fragments (0.4 g), and a piece of glass from an indeterminate source (0.4 g). In the third level of this section were more nail fragments (2.6 g) and a crown bottle cap (2.7 g). In Level 3 of the feature, outside of the southwest quadrant, between 20 and 39 cm below the surface, was a single piece of glass (1.3 g).

The 5.25 liter soil sample, taken from the southeast corner of Feature 551 at 10 cm below surface, was processed using flotation and yielded an abundance of botanical materials. Many of the identifiable specimens were not carbonized or charred. The most abundant types of seeds this soil sample were Unk#1 (n >100) and non-carbonized Callicarpa americana, or beautyberry (n >100). The second most numerous seed identified was of a type that compared favorably with a swamp sedge called Cyperus tetragonus (n= 71). Polygonum, a knotweed also in the sedge family, was identified, but could not definitely be narrowed down to the species level (n= 41). Twenty two specimens that compared favorably with a number of species of panic grass (Panicum spp. cf.) were found. Prunus caroliniana, or Carolina cherry laurel, was represented by three individual specimens. Two blackberry (Rubus cf.) seeds and a single smooth sumac (Rhus glabra) seed were recovered. A single bayberry seed (Morella cf.) was identified. Thirteen grass
seeds were isolated; no further classification was assigned due to carbonization on the outside of the specimens. Immature acorns from an unknown species of oak were recovered (n=5). Of the indeterminate specimens, there were 41 charred or carbonized whole seeds, 36 charred or carbonized seed fragments, and 11 carbonized nut shell fragments. Table 13 lists the entire botanical recovery for Feature 551.

Table 13. Floral Assemblage from Feature 551.

<table>
<thead>
<tr>
<th>Specimen ID</th>
<th>Count</th>
<th>Carbonized/Charred</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nuts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acorn</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acorn shell fragments</td>
<td>Quercus spp. cf.</td>
<td>5</td>
</tr>
<tr>
<td>Acorn shell fragments</td>
<td>Quercus spp. cf.</td>
<td>12 x</td>
</tr>
<tr>
<td><strong>Starchy seeds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knotweed cf.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedge cf.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shrubs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beautyberry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smooth Sumac cf.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sawtooth Blackberry cf.</td>
<td>Rubus argutus cf.</td>
<td>2</td>
</tr>
<tr>
<td>Bayberry cf.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grasses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panic Grass cf.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indeterminate Grass</td>
<td>Poaceae spp. cf.</td>
<td>13 x</td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carolina cherry laurel</td>
<td>Prunus caroliniana</td>
<td>3</td>
</tr>
</tbody>
</table>
### Indeterminate ID

<table>
<thead>
<tr>
<th>Item</th>
<th>Count</th>
<th>Excel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole seeds</td>
<td>41</td>
<td>x</td>
</tr>
<tr>
<td>Seed fragments</td>
<td>36</td>
<td>x</td>
</tr>
<tr>
<td>Unk#1</td>
<td>&gt;100</td>
<td>x</td>
</tr>
<tr>
<td>Nut shell fragments</td>
<td>11</td>
<td>x</td>
</tr>
</tbody>
</table>

Radiocarbon dating results from the Feature 551 sample can be found in Table 14. The measured radiocarbon age of the charred material from sample Beta-345260 is 1110±30. The age is given in years before present, where “present” is AD 1950. This age has been corrected for isotopic fractionation. The 1-sigma calibrated age of the sample, with a 68% probability, is 890 to 980 cal A.D.. The 2-sigma calibrated age of the sample, with a 95% probability, is 880 to 990 cal A.D. The 2-sigma calibration is used for interpretation. The intercepts of the radiocarbon age with the calibration curve are 900 cal A.D., 920 cal A.D., and 970 cal A.D..

Table 14. Radiocarbon Dating Results from Feature 551.

<table>
<thead>
<tr>
<th>Lab Designation</th>
<th>Conventional Radiocarbon Age</th>
<th>13C/12C Ratio</th>
<th>1 Sigma calibrated result (68% probability)</th>
<th>2 Sigma calibrated results (95% probability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-345260</td>
<td>1100±30 BP</td>
<td>-28.4 o/oo</td>
<td>890 to 980 cal A.D.</td>
<td>880 to 990 cal A.D.</td>
</tr>
</tbody>
</table>
Feature 552

The Feature 552 shell midden was by far the largest and most intact deposit encountered during the 2012 field season. This roughly circular, mounded midden was excavated in two 1m² test units that shared a corner in what appeared to be roughly the center of the deposit. Unit 42, which was excavated in the first half of the field season, uncovered the north east quarter of the midden and Unit 46 uncovered the south west quarter. I will first describe the excavation and sampling strategy for Feature 552 in Unit 42, and then I will outline the procedures used in Unit 46, where the same feature was excavated in sections A and B.

In Unit 42, 1005 N 985 E, the Feature 552 shell midden became evident in Level 2, at between 11 cm (in the south half) and 13 cm (in the north half) below the surface. The top of the feature was brushed clean and photographed. The non-feature matrix surrounding the shell midden was excavated to 20 cm below surface, or the bottom of Level 2; the thick midden deposit was then pedestaled and mapped. The shell midden soil matrix was gray, loose, fine grain sand, which contained many small roots. The feature had more surface area at 20 cm below the surface than at 16 cm below surface, giving a mounded appearance to the midden. A 5.5 liter soil sample was collected from 11 to 26 cm below the surface in the southwest corner of the unit. Feature 552 was then bisected and the north half was excavated to determine the shape of the deposit in profile. The feature was excavated within 10 cm arbitrary levels to maintain vertical control. As a result of this strategy, in the north half, Feature 552 was excavated from 13 cm to 20 cm below surface in Level 2, then from 20 cm to 30 cm below the surface in Level 3, at which point the deposit terminated. An image of the profile of the north bisection was taken facing south (Figure 8). This illustrates the basin shape containing the mounded shell midden deposit. The south half of Feature 552 in Unit 42 was similarly excavated within 10 cm arbitrary
levels, from 11 cm to 20 cm below the surface in Level 2, then from 20 cm to its termination at 26 cm below surface in Level 3. After the remainder of the unit was excavated to 70 cm below the surface, a deep basin-shaped stain became evident in the north wall profile.

Figure 8. Unit 42: Feature 552 north bisection profile view level 1-4.

In Unit 46, 1004 N 984 E, Feature 552 was excavated in two sections. Feature 552 A is the uppermost part of the deposit; it is a different section of the same shell midden deposit that was excavated in Unit 42. Section A was uncovered, cleaned, mapped and photographed at 4 cm below the surface and was removed in Level 2 and the top of Level 3. In plan view, the feature was rounded and also appeared mounded, tapering off at the southern and western edges. A 4 liter soil sample was collected from the center of the midden in the northeast corner of the unit. Section A of Feature 552 terminated at 24 cm below the surface on average, where section B became obvious underlying the midden. Section B of Feature 552 is a unique leach zone that was not seen under or around any of the other midden features on site. It was an approximately 7 cm to 10 cm thick zone of soil beneath the shell midden that retained the qualities of the midden matrix without the high volume of shell that was characteristic of Feature 552 and 552A. This
was a uniquely preserved surface beneath the midden that did not follow the same stratigraphic pattern seen in the Feature 550 and 551 deposits; even in Unit 42, the only subsoil noted beneath the deposit was the loose yellowish brown sand that is common across the site between approximately 30 cm and 60 cm below the surface. In this case, the soil underlying Feature 552 in Unit 46 was mottled very dark gray and dark brown, loose fine grain sand that appeared to blanket the ground beneath the midden extending beyond the edges. A 3.5 liter soil sample was collected from Feature 552B, but was not analyzed as part of this project. This section persisted for about 10 vertical centimeters and had two distinct zones of soil beneath it that were excavated separately. The zone of sediment beneath the heaviest concentrations of shell retained a grayish brown hue while the outer ring of soil was much lighter gray with very obvious areas of leaching. None of the materials from Section B of Feature 552 were processed for this project due to time constraints and the intended scope of my research.

Taken as a whole, the Feature 552 midden was made up of clam shells and animal bone that were deposited in a shallow basin, roughly 200 cm north-south by 140 cm east-west. The midden deposit was slightly mounded in profile. The southwest and northeast edges of the deposit were discovered with the excavation of these test units, indicating that the surface area of the feature can be estimated to be slightly less than 2 m². The edges of this midden deposit were very well defined and none of the refuse material appeared to stray from the horizontal limits of the feature. The average thickness of the shell midden deposit was determined to be 20 cm or less, across the area of deposition.
<table>
<thead>
<tr>
<th>Taxa (Common Name)</th>
<th>Weight</th>
<th>NISP</th>
<th>MNI</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Rangia cuneata</em> (Atlantic rangia)</td>
<td>22,334.9 g</td>
<td>4001</td>
<td>2071</td>
<td>6,226.33 g</td>
</tr>
<tr>
<td><em>Polymesoda caroliniana</em> (Carolina marsh clam)</td>
<td>4,894.3 g</td>
<td>1323</td>
<td>710</td>
<td>1,871.43 g</td>
</tr>
<tr>
<td>Bivalvia (indeterminate clam)</td>
<td>3,087.0 g</td>
<td>-</td>
<td>-</td>
<td>562.86 g</td>
</tr>
<tr>
<td><em>Crassostrea virginica</em> (eastern oyster)</td>
<td>31.6 g</td>
<td>14</td>
<td>6</td>
<td>5.67 g</td>
</tr>
<tr>
<td>Osteichthyes (indeterminate bony fish)*</td>
<td>25.7 g</td>
<td>134</td>
<td>-</td>
<td>178.17 g</td>
</tr>
<tr>
<td><em>Alligator mississippiensis</em> (alligator)</td>
<td>4.1 g</td>
<td>2</td>
<td>1</td>
<td>30.69 g</td>
</tr>
<tr>
<td>Testudines (indeterminate turtle)</td>
<td>6.28 g</td>
<td>50</td>
<td>-</td>
<td>21.1 g</td>
</tr>
<tr>
<td><em>Odocoileus virginianus</em> (white-tailed deer)</td>
<td>34.6 g</td>
<td>1</td>
<td>1</td>
<td>320.01 g</td>
</tr>
<tr>
<td>Mammalia (indeterminate mammal)</td>
<td>5.3 g</td>
<td>12</td>
<td>-</td>
<td>65.13 g</td>
</tr>
<tr>
<td>Gastropoda (conch, whelk)</td>
<td>5.4 g</td>
<td>1</td>
<td>1</td>
<td>3.26 g</td>
</tr>
<tr>
<td>Aves (indeterminate bird)</td>
<td>0.3 g</td>
<td>3</td>
<td>-</td>
<td>3.88 g</td>
</tr>
<tr>
<td>Animalia (indeterminate animal)</td>
<td>6.5 g</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Note: Specimens within this class are tabulated in Table 15b.

The primary and secondary data recorded for the faunal remains from Feature 552 include the materials from this feature in both Unit 42 and Unit 46, and this data is presented in Table 15a. The bivalve species identified include Atlantic rangia, Carolina marsh clam, and eastern oyster. Indeterminate clams and a single columella from a marine gastropod were also identified. The most abundant invertebrate in the sample was Atlantic rangia, which weighed 22,334.9 g, and was made up of 4,001 individual specimens, representing a minimum number of 2,071 individual animals. This recovered amount of Atlantic rangia has a biomass of 6,226.33 g.
grams. The 1,323 individual specimens of Carolina marsh clam in this feature weighed 4,894.3 g and represented a minimum number of 710 individual animals. The biomass contribution of the Carolina marsh clam was 1,871.43 grams. The indeterminate clam in feature 552 and 552 A weighed a total of 3,087 g and contributed 562.86 g of estimated meat weight to the deposit. Just as seen in the other two middens, the eastern oyster is minimally represented here. In this feature only 14 individual specimens were counted, representing only 6 individual animals. The weight of the oyster shell was 31.6 g, which makes up 5.67 g of biomass. The single marine gastropod columella, possibly from a whelk (Busycon sp.), weighed 5.4 g and had a biomass of 3.26 grams.

Upon examining the treatment of the Atlantic rangia shells, it was noted that 2,573 individual specimens showed evidence of shucking. Of the Carolina marsh clam specimens, approximately 785 showed similar signs of processing for consumption as food. As in the other middens discussed, the majority of clam specimens had been shucked.

There were many fish remains recovered from Feature 552 (Table 15b). In total, this class of faunal remains weighed 25.7 grams. Most of them could not be identified beyond the superclass designation Osteichthyes. Eighty-one individual specimens of bony fish, weighing exactly 20.2 g and representing 126.81 g of biomass, were identified. Many of these elements were highly fragmented bones of the skull, small spines, and unremarkable vertebrae. A total of eleven spines and vertebrae show evidence of burning.

Lower level taxonomic classification of the bony fish remains was made possible by the presence of certain diagnostic skeletal elements. In this feature, specimens from four unique families were identified. From the family Sparidae, 17 individual specimens from at least 3 sheepshead (Archosargus probatocephalus) were recovered. This species has an easily recognizable jaw with unique anterior teeth that rather closely resemble human incisors. Twelve
specimens from this feature appear to come from one individual fish; they refit to form much of the mandible, a portion of the dentition and an operculum. They are not burned, nor is there any evidence of butchering. The meat weight represented by the 4.4 g of bone and teeth was calculated to be 40.1 grams.

Table 15b. Bony Fish Assemblage from Feature 552.

<table>
<thead>
<tr>
<th>Taxa (Common Name)</th>
<th>Weight</th>
<th>NISP</th>
<th>MNI</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteichthyes (indeterminate bony fish)</td>
<td>20.2 g</td>
<td>81</td>
<td>-</td>
<td>126.81 g</td>
</tr>
<tr>
<td>Sciaenidae (drums)</td>
<td>0.2 g</td>
<td>18</td>
<td>1</td>
<td>1.96 g</td>
</tr>
<tr>
<td><em>Archosargus probatocephalus</em> (sheepshead)</td>
<td>4.4 g</td>
<td>17</td>
<td>3</td>
<td>40.40 g</td>
</tr>
<tr>
<td><em>Arius felis</em> (hardhead catfish)</td>
<td>0.1 g</td>
<td>1</td>
<td>1</td>
<td>1.58 g</td>
</tr>
<tr>
<td><em>Lepisosteus</em> sp. (Gar)</td>
<td>0.8 g</td>
<td>16</td>
<td>1</td>
<td>7.72 g</td>
</tr>
</tbody>
</table>

Drums, from the family Sciaenidae, can often be identified by their unique grinding teeth—useful in processing a diet of mollusks and crustaceans. Eighteen such teeth were recovered from the float sample collected from Section A of Feature 552. A hardhead catfish (*Arius felis*), of the family Aridae, was represented by a single, very small unburned fragment of skull weighing 0.1 gram. This species has a unique patterning on the exterior surface of the neurocrania which allowed positive identification of this small specimen. Sixteen individual specimens of Gar (*Lepisosteus* sp.), of the family Lepistidae were identified. These scales, scale fragments, and two vertebrae weighed 0.8 g and may have come from a single individual. The amount of edible biomass represented by these identified remains is 7.72 g.

This midden deposit contained the remains of white-tailed deer, alligator, various small mammals, turtles, and birds. Indeterminate animal bone was present, and weighed 6.5 grams.
the mammal bone recovered, only the deer could be identified to the species level. Twelve individual mammal bones were identified, a few of which refit: three long bones from two raccoon sized animals, six long bones from one or more smaller specimens, and a single tooth root that had been burned in high heat. Apart from this tooth root, the bones showed no clear evidence of burning, and the smaller specimens showed no evidence of butchering. The raccoon-sized mammal long bones showed evidence of helical fracture.

A white-tailed deer (*Odocoileus virginianus*) humerus was recovered from between 20 and 30 cm below surface in the north half of Feature 552 in Unit 42. This specimen was subject to a helical fracture that separated the bone into two pieces (Figure 9). Only one half of the element was recovered, but the bone splinters at the broken end were recovered and refit to the end of the bone. This spiral fracturing treatment could indicate the purposeful removal of bone marrow at the time of consumption (Outram 2002). Enloe (1993) also observed a range of cone shaped splinter patterns in his examination of Nunamiut marrow cracking at caribou processing sites. Typically, marrow extraction is most common in subsistence economies that rely heavily on animal products, and do not have regular access to the nutrients that can be obtained from such a pure source of animal fat. It would not be a stretch to suggest that people eating this particular portion of venison would also have benefitted from the consumption of marrow contained within other long bone fragments found in the midden. The humerus itself weighs 34.6 g and represents 320.01 grams of meat weight.
Fifty pieces of turtle bone (Testudines) were tabulated from this feature. Forty seven of these were carapace and plastron fragments, and 90 percent of them showed evidence of being burned. Two fragments of bone from the leg were found; one was broken in two pieces, the other was calcined. The total weight of the turtle remains is 6.28 g, which represents of 21.2 g of biomass. Two scutes from one alligator (*Alligator mississippiensis*) were found in the midden. They weighed 4.1 g together and represent 30.69 g of meat weight. No other alligator bones were found in the feature. Three individual pieces of bird bone were found, and each weighed only 0.1 g. They could all be from the same animal, but the species classification or any other information could not be gleaned from the incredibly small amount that could be identified.

The ceramic assemblage of Feature 552 is less diverse than Features 550 and 551. Details about the assemblage can be seen in Table 16. The most abundant type, almost exclusive in the sample, were shell tempered wares. This is a Mississippi period tempering tradition, which originated in the Southeast around A.D. 1000. In this area, late Mississippian subregional variants characterized by shell tempering with incised and punctate designs are part of the Pensacola Culture (Harris 2012:275). Shell tempered ceramic sherds with no discernable
decoration were found throughout the feature and totaled 129 in number. Four small pieces of shell tempered ceramic with indeterminate incised designs were identified along with a single fragment that appears to have a punctate design. Five sherds of Moundville Incised, *var. Bottle Creek* (Fuller 2003) were found in Level 2 of the feature in Unit 42. This type is part of the Pensacola Culture and typically forms the largest single decorated category in Pensacola assemblages. The vessel type bearing this decorative motif is the utilitarian collared jar (Fuller 2003). The third level in Unit 46 contained a large rim sherd from a D'Olive incised, *var. D'Olive* vessel (Figure 10). This vessel form is a large shallow shell tempered bowl with a flared rim (Fuller 2003; Steponaitis 2009). The D'Olive type is similarly associated with Mississippi period potters in the Pensacola Culture area. A very small undecorated grit tempered sherd was also found in Level 3 of Unit 46. Throughout the feature were 586 sherdlets that were not completely sorted by type, but were made up mostly of shell tempered pieces.

Table 16. Ceramic Assemblage from Feature 552.

<table>
<thead>
<tr>
<th>Type</th>
<th>Provenience</th>
<th>Count</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell tempered plain</td>
<td>U42 level 2 and 3, 11-26 cmbs</td>
<td>129</td>
<td>457.45 g</td>
</tr>
<tr>
<td>Shell tempered punctated</td>
<td>U46 section A, level 2, 4-20 cmbs</td>
<td>1</td>
<td>1.2 g</td>
</tr>
<tr>
<td></td>
<td>U42 south half, level 3, 20-22 cmbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>U42 soil sample, 11-26 cmbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell tempered incised</td>
<td>U46 section A, level 2, 4-20 cmbs</td>
<td>4</td>
<td>6.1 g</td>
</tr>
<tr>
<td>Moundville Incised, <em>var. Bottle Creek</em></td>
<td>U42 south half, level 2, 11-20 cmbs</td>
<td>5</td>
<td>15.8 g</td>
</tr>
<tr>
<td>D'Olive Incised, <em>var. D'Olive</em></td>
<td>U46 level 3, 20-28 cmbs</td>
<td>1</td>
<td>40.7 g</td>
</tr>
<tr>
<td>Grit tempered plain</td>
<td>U46 level 3, 20-28 cmbs</td>
<td>1</td>
<td>0.6 g</td>
</tr>
<tr>
<td>&lt;1/2 inch sherds not sorted by type</td>
<td>Throughout feature</td>
<td>586</td>
<td>72.0 g</td>
</tr>
</tbody>
</table>
Figure 10. D’Olive Incised, var. D’Olive rim sherd.

The floral assemblage from Feature 552 can be found in Table 17. The materials from the two separate soil samples have been combined for ease of presentation of the data. Both samples were taken from the center of the shell midden deposit at approximately the same relative level within the deposit (the depths below surface are different because the units had two different datum corners from which all measurements were taken). Five specimens of an unknown species of acorn were identified, along with 19 fragments of carbonized acorn shell. These acorn specimens were identified by the relative thickness of the shell compared to the thickness of the other 56 carbonized fragments that could be from hickory, or pecan nuts. Seven uncharred specimens of an unknown species of knotweed (Polygonum spp.) were identified. Several shrub and small tree-type plant parts were found including four carbonized Yaupon holly (Ilex vomitoria) seeds, an indeterminate non-carbonized seed from a berry in the holly family (Ilex
spp.), 17 seeds from the beautyberry bush, two swamp blackberry seeds, and 15 bayberry seeds, 11 of which were carbonized and fragmented. A single muscadine (*Vitis rotundifolia*) seed was found, this was the only fleshy fruit specimen. A greenbrier drupe (*Smilax spp. cf.*), which appeared to have intact carbonized flesh, and another partial drupe, were identified. Twenty one specimens of a grass that compared favorably with those from the genus Panicum were identified (*Panicum* spp. cf.). One carbonized seed that appeared very similar to poison ivy (*Toxicodendron radicans* cf.) and one non-carbonized seed from the Pea family (*Fabaceae* spp. cf.) were also recovered. Unknown specimen #1 was abundant in these two soil samples; well over 200 specimens were counted. Unidentified seeds from both samples totaled 34 while charred or carbonized fragments totaled 43.

Table 17. Floral Assemblage from Feature 552.

<table>
<thead>
<tr>
<th>Specimen ID</th>
<th>Count</th>
<th>Carbonized/Charred</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nuts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acorn</td>
<td>Quercus spp.</td>
<td>5</td>
</tr>
<tr>
<td>Acorn shell fragments</td>
<td>Quercus spp. cf.</td>
<td>19</td>
</tr>
<tr>
<td><strong>Starchy seeds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knotweed cf.</td>
<td>Polygonum spp. cf.</td>
<td>7</td>
</tr>
<tr>
<td><strong>Tuberous roots</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenbrier</td>
<td>Smilax spp. cf.</td>
<td>2</td>
</tr>
<tr>
<td><strong>Shrubs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yaupon holly cf.</td>
<td>Ilex vomitoria cf.</td>
<td>4</td>
</tr>
<tr>
<td>Holly</td>
<td>Ilex spp.</td>
<td>1</td>
</tr>
<tr>
<td>Beautyberry</td>
<td>Callicarpa americana</td>
<td>17</td>
</tr>
</tbody>
</table>
The only intrusive material in the entire shell midden feature was a single piece of slag (0.1 g) and two small unidentified objects. This evidence seems to indicate that the midden has lain relatively undisturbed since it was deposited.

The radiocarbon dating results from the Feature 552 sample can be found in Table 18. The measured radiocarbon age of the charred material from sample Beta-345261 is 730±30 BP. The age is given in years before present, where “present” is AD 1950. This age has been corrected for isotopic fractionation. The 1-sigma calibrated age of the sample, with a 68% probability, is 1270 to 1280 cal A.D.. The 2-sigma calibrated age of the sample, with a 95%
The probability, is 1260 to 1290 cal A.D. The 2-sigma calibration is used for interpretation. The intercept of the radiocarbon age with the calibration curve is 1280 cal A.D..

Table 18. Radiocarbon Dating Results from Feature 552.

<table>
<thead>
<tr>
<th>Lab Designation</th>
<th>Conventional Radiocarbon Age</th>
<th>13C/12C Ratio</th>
<th>1 Sigma calibrated result (68% probability)</th>
<th>2 Sigma calibrated results (95% probability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-345261</td>
<td>720±30 BP</td>
<td>-25.8 o/oo</td>
<td>1270 to 1280 cal A.D.</td>
<td>1260 to 1290 cal A.D.</td>
</tr>
</tbody>
</table>

Feature 556

Feature 556 was a differentially concentrated shell midden excavated in Unit 47, at 1003 N 978 E. This deposit was uncovered at 20 cm below the surface and appeared to be a smeared thin shell lens that encompassed the west half of the unit and was made up of a loosely compacted sand and clam shells. There immediately appeared to be a difference between the north and south halves of the midden; the sandy matrix was black in the north half and dark grayish brown in the south half. Clusters of clam shells were concentrated in the south while very few clams, a large oyster, and modern intrusive material spread across the north half of the unit. The two sections were called 556 A in the north and 556 B in the south. Section A encompassed most of the west half of the unit, with a north to south extent of approximately 70 horizontal centimeters. The midden deposit in the southwestern corner of the unit was called section B, and covered an area of approximately 30 cm north to south by 70 cm east to west.

The substrate surrounding the feature was excavated to 30 cm below the surface before Feature 556 was excavated. This allowed us to explore the extent of the feature and determine its horizontal and vertical range within the unit. The surrounding soil was not uniform in color or texture. It was designated at 22 cm below surface in Level 3 to have two zones: Zone 3A in the northern parts of the east half and Zone 3B in the southeastern corner of the unit (see Figure 11).
Zone 3A was very dark grayish brown sand, while Zone B was the natural subsoil, a dark yellowish brown loose sand. The zones were excavated and screened separately. Zone 3A gave way to a linear light gray, sandy soil feature, called 558, in Level 4 of Unit 47.

Figure 11. Feature 556 shell midden with section B outlined.

Feature 556, sections A and B were excavated separately following the stratigraphy of the deposit. Section A had a vertical extent of approximately 10 cm, and was characterized by loose black and dark gray sand, intrusive materials, a smattering of clam shells, and a single large oyster. The dark gray and black sandy sediment containing these materials gave way to light gray sand at 30 cm below the surface.

Feature 556, sections A and B, appeared to have been disturbed in the upper level. The top 10 cm, from 20 to 30 cm below the surface, contains numerous intrusive materials. The soil discoloration and horizontal distribution of midden matrix in this level indicates a physical intrusion that effectively spread materials from the primary feature location in the south half of the unit to the north, resulting in a shallow smearing of the shell midden.
Section B of Feature 556 was comprised of tightly packed clam shells in compact very dark grayish brown sand, concentrated in the southwest quadrant of the unit. This part of the midden was excavated from 20 to 30 cm below the surface. A 4.0 liter float sample was collected from Feature 556 B from 20 to 30 cm below the surface. At 30 cm, with the western wall of the unit and feature visible, it became obvious that the deposit had a basin shape in profile. Feature 556 B was bisected along the north south axis, and the east half was removed. The shell matrix of the feature terminated at 35 cm below surface and was underlain by a thin dark brown shell free leach zone to 40 cm below the surface. A soil sample was collected from this context, but was not processed as part of this project. The midden deposit maintained the small, roughly shallow basin shape to terminal depth.

The feature materials discussed below were collected and analyzed under the assumption that the upper level of the shell midden was disturbed sometime in the last 100 years. This event likely exposed the upper layer of the prehistoric shell midden to intrusive deposits of modern materials that will be quantified in the following pages. Since it is presumed that most, if not all faunal materials from Feature 556 A and B were deposited at one time or in close succession, the results of analysis have been tabulated _en masse_, not split by section. The researcher admits this may result in multiple interpretive biases that will be addressed in the following chapter. The faunal remains from Feature 556 are presented in Table 19.
Table 19. Faunal Assemblage from Feature 556.

<table>
<thead>
<tr>
<th>Taxa (Common Name)</th>
<th>Weight</th>
<th>NISP</th>
<th>MNI</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Rangia cuneata</em> (Atlantic rangia)</td>
<td>6,258.7 g</td>
<td>1,120</td>
<td>591</td>
<td>1,713.64 g</td>
</tr>
<tr>
<td><em>Polymesoda caroliniana</em> (Carolina marsh clam)</td>
<td>1,012.7 g</td>
<td>270</td>
<td>143</td>
<td>438.62 g</td>
</tr>
<tr>
<td>Bivalvia (indeterminate clam)</td>
<td>1,066.9 g</td>
<td>-</td>
<td>-</td>
<td>207.20 g</td>
</tr>
<tr>
<td><em>Crassostrea virginica</em> (eastern oyster)</td>
<td>84.4 g</td>
<td>11</td>
<td>5</td>
<td>12.56 g</td>
</tr>
<tr>
<td>Osteichthyes (indeterminate bony fish)</td>
<td>2.6 g</td>
<td>45</td>
<td>-</td>
<td>26.50 g</td>
</tr>
<tr>
<td><em>Sciaenidae</em> sp. (drum)</td>
<td>0.8 g</td>
<td>1</td>
<td>1</td>
<td>7.40 g</td>
</tr>
<tr>
<td><em>Lepisosteus</em> sp. (Gar)</td>
<td>0.3 g</td>
<td>3</td>
<td>1</td>
<td>2.73 g</td>
</tr>
<tr>
<td><em>Alligator mississippiensis</em> (alligator)</td>
<td>0.7 g</td>
<td>1</td>
<td>1</td>
<td>5.92 g</td>
</tr>
<tr>
<td>Animalia (indeterminate animal)</td>
<td>0.6 g</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

As observed in all of the other features, Atlantic rangia is the most abundant shellfish species in the Feature 556 midden. This deposit contained a total of 6,258.7 g of Atlantic rangia shell, made up of 1,120 individual specimens which represent a minimum of 591 individual animals. The meat weight calculated for that amount of Atlantic rangia is 1,713.64 grams. The Carolina marsh clam specimens weighed almost the same amount as the fragments of indeterminate clams, 1,012.7 g to 1,066.9 g respectively. The number of individual specimens of Carolina marsh clam in the feature is 270, which represents a minimum number of 143 individuals whose biomass equals 438.62 g. The estimated biomass of the indeterminate clam specimens is 207.2 grams. As stated previously, indeterminate specimens were weighed but not counted, nor was MNI estimated for them. A single large eastern oyster, weighing 38.6 g with a thick margins and a rounded shell, was noted and excavated in section A. This oyster’s size and
shape suggests that it was collected from a high salinity (15 ppt or higher) site with a hard substrate. The total weight of the 11 individual specimens of eastern oyster is 84.4 g. This amount of shell likely came from 5 individual animals and has an estimated biomass of 12.56 grams.

A very small amount of indeterminate bone, 0.6 g, was recovered from Feature 556. Bony fish remains were found in a slightly higher quantity, weighing 2.6 g. These remains included 28 pieces of indeterminate bony fish including spines, vertebra, and skull fragments. Those elements represent 16.02 grams of biomass. Fewer than ten of the spines showed evidence of burning. Ten grinder teeth and a pre-maxillary fragment from a drum (Sciaenidae sp.) were identified; these represent a biomass of 7.4 grams. The only other identifiable fish parts recovered were three Gar (Lepisosteus sp.) scales, which represent 2.73 grams of biomass. A single alligator (Alligator mississippiensis) scute weighing 0.7 g and representing 5.92 g of biomass, was found in the intact section of 556 B, from 30 to 40 cm below the surface.

Very few ceramics were found in Feature 556. These have not been displayed in table format due to the small size of the assemblage. Only the top 10 cm of Feature 556 B contained ceramic sherds. These included an undecorated sand tempered sherd (1.9 g), an incised sand tempered sherd (0.6 g), and two shell tempered sherds (2.5 g). Three small sherds of and unknown type came from the north half Feature 556 between 20 and 30 cm below the surface.

The presence of intrusive materials in this midden deposit was limited to the upper 10 cm of Feature 556, sections A and B, from 20 to 30 cm below the surface. In the north half, an intact machine-made nail was piece-plotted and hand collected from 20 cm below surface; another whole modern nail, iron container fragments (9 g), a bullet (.22 cal), and a small asphalt shingle fragment were also found in section A. The south half of the feature contained a single piece of
clear curved glass, four grams of iron container fragments, a small section of steel wire, a cigarette butt, and another small asphalt shingle fragment. These materials are clearly indicative of a twentieth century disturbance to the upper level of this prehistoric shell midden feature.

The floral assemblage from Feature 556 can be found in Table 20. This 4.0 liter sample of midden contained a variety of botanical materials. Most of the identifiable specimens were not charred or carbonized and may represent the season of disturbance, possibly introduced during or directly following the intrusive event, or perhaps, natural seed rain. These non-carbonized botanicals include one acorn (Quercus spp. cf.), 11 specimens from an unknown species of sedge, seven seeds from an beautyberry (Callicarpa americana) bush, three possible specimens of woodland lettuce (Lactuca floridana cf.), two specimens that compared favorably with smooth panic grass (Panicum spp. cf.), and a single possible specimen of poison ivy (Toxicodendron radicans). Indeterminate specimens were tallied as follows: 16 whole carbonized seeds, 14 carbonized seed fragments, more than 200 specimens of Unk#1, and 29 fragments of specimen Unknown specimen #4.

Table 20. Floral Assemblage from Feature 556.

<table>
<thead>
<tr>
<th>Specimen ID</th>
<th>Count</th>
<th>Carbonized/Charred</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nuts</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acorn</td>
<td>Quercus spp.</td>
<td>1</td>
</tr>
<tr>
<td>Acorn shell fragments</td>
<td>Quercus spp. cf.</td>
<td>21</td>
</tr>
<tr>
<td><strong>Starchy Seeds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedge cf.</td>
<td>Cyperaceae spp. cf.</td>
<td>11</td>
</tr>
<tr>
<td><strong>Shrubs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant Type</td>
<td>Species</td>
<td>Quantity</td>
</tr>
<tr>
<td>--------------------</td>
<td>--------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Beautyberry</td>
<td><em>Callicarpa americana</em></td>
<td>7</td>
</tr>
<tr>
<td>Herbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodland lettuce</td>
<td><em>Lactuca floridana</em> cf.</td>
<td>3</td>
</tr>
<tr>
<td>Grasses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panic grass cf.</td>
<td><em>Panicum</em> spp. cf.</td>
<td>2</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poison ivy</td>
<td><em>Toxicodendron radicans</em> cf.</td>
<td>1</td>
</tr>
<tr>
<td>Indeterminate ID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole seeds</td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>Seed fragments</td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>Unk #1</td>
<td></td>
<td>&gt;200</td>
</tr>
<tr>
<td>Unk#4 fragments</td>
<td></td>
<td>29</td>
</tr>
</tbody>
</table>

Specimen Unk#4 is an unknown carbonized seed or nut shell that has only been found in fragments in this midden deposit, Feature 552 in a very small amount (lumped in with the unknown carbonized nut shell fragments), as well as in Feature 557. This specimen has a few notable characteristics; it is approximately 1.5 mm in thickness and is internally separated into chambered vertical segments. Each of these segments has a domed top, which gives the surface an overall lumpy appearance.

The radiocarbon dating results from the Feature 556 sample can be found in Table 21. All of the material for this sample came from Level 3 of the feature. The measured radiocarbon age of the charred material from sample Beta-345262 is 1120±30 BP. The age is given in years before present, where “present” is AD 1950. This age has been corrected for isotopic
fractionation. The 1-sigma calibrated age of the sample, with a 68% probability, is 900 to 920 cal A.D. and 940 to 990 cal A.D.. The 2-sigma calibrated age of the sample, with a 95% probability, is 890 to 1020 cal A.D. The 2-sigma calibration is used for interpretation. The intercepts of the radiocarbon age with the calibration curve are 900 cal A.D., 910 cal A.D., and 970 cal A.D..

Table 21. Radiocarbon Dating Results from Feature 556.

<table>
<thead>
<tr>
<th>Lab Designation</th>
<th>Conventional Radiocarbon Age</th>
<th>1 Sigma calibrated result (68% probability)</th>
<th>2 Sigma calibrated results (95% probability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-345262</td>
<td>1100±30 BP</td>
<td>900 to 920 cal A.D.</td>
<td>940 to 990 cal A.D.</td>
</tr>
</tbody>
</table>

A second 20 gram carbon sample was amassed from the deeply buried, intact section of the 556 B midden deposit but was not submitted as part of this project due to budgetary limitations. It is possible though, that this sample could provide a more secure date for deposition of the primary feature.

**Feature 557**

Feature 557 was a thin, sparsely concentrated, undulating shell midden uncovered at 23 cm below the surface in Unit 49, 1003 N 980 E. This shell midden feature was amorphous in plan view, but the matrix containing the deposit-- dark grayish brown loose sand with pockets of clam shell-- was distinguishable from the surrounding natural subsoil of dark yellowish brown compact sand. The entire unit floor was cleaned down to the top of Level 3 to determine if the shell midden had a shape in profile. No shape was detectable (Figure 12).
Because this midden feature had no discernable or cohesive shape, it was excavated in whole as part of Level 3, from 23 to 32 cm below the surface. The thickest part of the deposit was less than 10 cm, and was barely visible in the Unit 49 wall profiles. A 4.0 liter soil sample was collected for flotation from the center of the midden at 24 cm below surface. The shape of this midden deposit was an undulating lens with some concentrated pockets of shell, none of which extended beyond the depth of 32 cm below the surface. There is a chance that the midden may have extended horizontally to the west, but it was not picked up in any of the auger tests along the 979 E grid line. This suggests that if there is more dispersed shell midden to the west, it likely does not exceed a width of 1.5 meters. The limited size and depth of this deposit supports the conclusion that this is the smallest of the shell middens excavated as part of this project.
Table 22. Faunal Assemblage from Feature 557.

<table>
<thead>
<tr>
<th>Taxa (Common Name)</th>
<th>Weight</th>
<th>NISP</th>
<th>MNI</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rangia cuneata (Atlantic rangia)</td>
<td>1,142.2 g</td>
<td>335</td>
<td>176</td>
<td>284.56 g</td>
</tr>
<tr>
<td>Polymesoda caroliniana (Carolina marsh clam)</td>
<td>182.3 g</td>
<td>95</td>
<td>51</td>
<td>92.69 g</td>
</tr>
<tr>
<td>Bivalvia (indeterminate clam)</td>
<td>514.7 g</td>
<td>-</td>
<td>-</td>
<td>107.35 g</td>
</tr>
<tr>
<td>Crassostrea virginica (eastern oyster)</td>
<td>4.6 g</td>
<td>11</td>
<td>1</td>
<td>0.74 g</td>
</tr>
<tr>
<td>Osteichthyes (indeterminate bony fish)</td>
<td>8.1 g</td>
<td>39</td>
<td>-</td>
<td>61.32 g</td>
</tr>
<tr>
<td>Sciaenidae sp. (drums)</td>
<td>0.1 g</td>
<td>2</td>
<td>1</td>
<td>1.17 g</td>
</tr>
<tr>
<td>Archosargus probatocephalus (sheepshead)</td>
<td>3.3 g</td>
<td>3</td>
<td>1</td>
<td>24.70 g</td>
</tr>
<tr>
<td>Lepisosteus sp. (Gar)</td>
<td>0.1 g</td>
<td>2</td>
<td>1</td>
<td>1.15 g</td>
</tr>
<tr>
<td>Mammalia (indeterminate mammal)</td>
<td>0.1 g</td>
<td>1</td>
<td>-</td>
<td>1.66 g</td>
</tr>
<tr>
<td>Animalia (indeterminate animal)</td>
<td>0.2 g</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

The species ratios of shellfish remains from this deposit somewhat resemble the other assemblages in species ratios (see Table 22). Atlantic rangia was the most abundant species in this midden. This deposit contained a total of 1,142.2 g of Atlantic rangia, made up of 335 individual specimens which represented a minimum of 176 individuals. The meat weight calculated for Atlantic rangia from this feature is 284.56 grams. The Carolina marsh clam specimens weighed far less than the fragments of indeterminate clams, 182.3 g to 514.7 g respectively. The estimated biomass of the indeterminate clam specimens is 107.35 grams. As in previous samples, indeterminate specimens were not counted nor was MNI estimated for them. There were 95 specimens of Carolina marsh clam in Feature 557, which represents a minimum number of 51 individuals whose biomass equals 92.69 grams. There were 11 small fragments of
eastern oyster that weighed 4.6 grams. These pieces could all have come from a single oyster. The small amount of shell represents only 0.74 g of biomass. Most of the clam specimens appear to have been shucked as a means of opening, but as with the other middens, there were many that showed no evidence of such treatment.

The bony fish taxonomic category contains 51 individual specimens of teeth, scales, spines, vertebra, and skull fragments; 39 of these are from indeterminate species. Thirty indeterminate spines and spine fragments and a single vertebra show evidence of burning. The three remaining indeterminate vertebra and six skull fragments also show evidence of burning. Fish remains from three families were identified within this small sample. From the family Sciaenidae, drum was represented by two palate fragments and 5 grinder teeth. A single, large sheepshead (*Archosargus probatocephalus*) operculum was identified and refit from two individual pieces. Two small fragments of scales from a Gar (*Lepisosteus* sp.) were also identified. The indeterminate animal bone in this midden weighed only 0.2 grams and is made up mostly of crumbs that could easily belong to any of the fish mentioned above. A single piece of mammal bone was found within the midden deposit. This tiny specimen appears to be a burned claw fragment.

Two plain sand tempered ceramics sherds were recovered from this midden. These weighed 6.0 grams combined. An untyped sherdlet, weighing 0.2 g was also found. Only one possibly intrusive object was found within the loosely packed midden matrix; a piece of lead shot with a diameter of 2.3 mm was found in the heavy fraction of the flotation sample.

The botanical materials identified from the soil sample were as limited as the rest of the assemblages that made up this midden deposit (see Table 23). None of the identifiable seed types from the 4 liter soil sample were carbonized. They included 11 specimens of indeterminate sedge.
(Cyperaceae spp. cf.), eight possible specimens of panic grass (*Panicum* spp. cf.), two beautyberry seeds, and one cherry laurel (*Prunus caroliniana*) seed. Indeterminate specimens recovered included >100 examples of Unk#1, six small, whole carbonized seeds, 16 fragments of carbonized seeds, and six winter buds.

Table 23. Floral Assemblage from Feature 557.

<table>
<thead>
<tr>
<th>Specimen ID</th>
<th>Count</th>
<th>Carbonized/Charred</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Starchy Seeds</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sedge</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td><strong>Grasses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panic Grass cf.</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Shrubs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beautyberry</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Miscellaneous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carolina cherry laurel</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Indeterminate ID</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whole Seeds</td>
<td>6</td>
<td>x</td>
</tr>
<tr>
<td>Seed Fragments</td>
<td>16</td>
<td>x</td>
</tr>
<tr>
<td>Unk#1</td>
<td>100</td>
<td>x</td>
</tr>
</tbody>
</table>
The charred material sent for carbon dating this feature was collected from the soil sample and feature matrix in Level 3 of the unit. The measured radiocarbon age of the charred material from sample Beta-345263 is $970 \pm 30$ BP. The age is given in years before present, where “present” is AD 1950. This age has been corrected for isotopic fractionation. The 1-sigma calibrated age of the sample, with a 68% probability, is 1030 to 1050 cal A.D. and 1080 to 1130 cal A.D. and 1130 to 1150 cal A.D.. The 2-sigma calibrated age of the sample, with a 95% probability, is 1020 to 1160 cal A.D. The 2-sigma calibration is used for interpretation. The intercepts of the radiocarbon age with the calibration curve are 1040 cal A.D., 1110 cal A.D., and 1120 cal A.D..

Table 24. Radiocarbon Dating Results from Feature 557.

<table>
<thead>
<tr>
<th>Lab Designation</th>
<th>Conventional Radiocarbon Age</th>
<th>13C/12C Ratio</th>
<th>1 Sigma calibrated result (68% probability)</th>
<th>2 Sigma calibrated results (95% probability)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beta-345263</td>
<td>950±30 BP</td>
<td>-26.0 o/oo</td>
<td>1130 to 1150 cal A.D.</td>
<td>1020 to 1160 cal A.D.</td>
</tr>
</tbody>
</table>

The characteristics of the fauna, flora, and artifact assemblages in each of these shell midden deposits will be interpreted in the next chapter as part of an overall attempt to understand the prehistoric uses of Thompson’s Landing. From these middens, it is clear that there was an enduring motivating factor that drew people here for millennia. The contents and the structure of these deposits will be examined for the traits that will provide information specifically concerning the type and duration of activities occurring at the Landing.
CHAPTER 6
DISCUSSION AND CONCLUSIONS

This chapter addresses the results and implications of the field work and lab analysis of the Thompson’s Landing shell midden deposits. Assessment of group size, dietary breadth, catchment range and native plant exploitation are inferred from the refuse at the site; these are characteristics of the actual assemblage in each of the deposits and are only one aspect of this interpretation. The span and number of occupational episodes and the depth of waste management planning, based on the structure of refuse deposits, provides a wealth of information that sheds light on the history of human activity at Thompson’s Landing. The primary focus of this discussion is the behaviors that can be inferred from an assessment of the refuse. A discussion of the nature and structure of the refuse deposits in question leads to an overarching emphasis of the importance of short term special use sites, such as the one at Thompson’s Landing, to developing a broader understanding of the prehistoric communities that utilized them.

No theoretical program in archaeology can explain all of the variability in human behavior that created a particular assemblage or set of assemblages, but with a well-developed foundation in the processes that structure a particular set of behaviors it is possible to gain insights regarding the underlying behaviors, motivations, and cultural practices. It is with this in mind that I will harness the ideas and concepts put forth by Michael Schiffer (1972, 1976, 1999) and lesser known but important works by Masakazu Tani (1991, 1995) to try to explain the variability seen in the Thompson’s Landing deposits. I will begin with a brief outline of the aims of behavioral archaeology then make the argument that cultural formation processes have left significant information in the archaeological record at the site that can be used for behavioral
inference. This will ultimately lead to a better understanding of the nature of the cultural material in question.

For decades, archaeologists have been amassing conceptual tools for interpreting a behavioral past. These tools include models of inference based on principals put forth by experimental and ethnoarchaeologists for coping with the variability that formation processes introduce into the archaeological record (Schiffer 1976, 1999). Behavioral archaeology has what Schiffer (1999) calls “ambitious goals” that are really the same as the broad goals of the social and behavioral sciences, but the subject matter deals with people-artifact relations in all times and places. The interpretive models developed in this vein allow archaeologists to base inferences about human behavior from the material culture that they encounter.

Cultural formation processes (CFPs) are defined by Tani (1995) as a set of specific behaviors that alter the state of materials in systemic and archaeological contexts. CFPs are related to and constrained by certain characteristics of activities. Refuse deposits, discreet shell middens in this case, are the product of CFPs. The types of activities occurring at the site are indicated mainly by the material assemblages and non-refuse features, while the structure of the refuse can provide insight to nuanced behaviors that go beyond the primary site function.

Two types of CFPs are responsible for the formation of refuse deposits: primary deposition, such as initial discard, and secondary activity area maintenance or waste management practices, which alter the state of the material that has been discarded (Tani 1995). Tani (1995) points out that although activity area maintenance is a secondary formation process, it is not secondary in importance. In fact, these are the processes that are the key to understanding refuse structure and the particular behaviors underlying waste management decisions.
Primary discard is the act of throwing something away. It is this act that introduces a variety of materials into the archaeological record and establishes initial variability into refuse deposits. Modes of primary discard can be seen to exist along a continuum of formality. Types of primary discard include dropping, tossing, placing, and dumping (Tani 1995). The most casual of these is simply dropping or leaving refuse material where it is generated, whether it is at the location of breakage or at an actual activity area. Schiffer (1972) points out that dropped refuse is usually cleaned up quickly in sedentary communities. Simple primary refuse like this is limited in archaeological contexts to either micro-refuse that is missed by activity area maintenance practices such as sweeping or raking, or may occur in areas where maintenance is not performed, such as along roads or foot paths (Clark 1991). Ethnoarchaeological evidence from the Hohokam in Arizona, Tzeltal Maya, and Kalinga communities cited by Tani (1995:235) supports these patterns of micro-refuse and in-transit refuse dropping.

Tossing is an act of primary discard that occurs when refuse is pitched away from the core of an activity area to the periphery of the area. This is a casual form of discard that can occur along with dropping at locations of short-term occupation. Tossing can create concentric patterns of refuse distribution that have been shown to display size sorted characteristics (Binford 1978; Simms 1988). These deposits are often made up of larger objects because smaller ones tend to be dropped in the activity area. Tani (1995) suggests that the concentration of artifacts in such a deposit is rarely very dense and that it may be easier to identify a deposit created by tossing when it occurs in conjunction with a residual primary refuse deposit. Observing this relationship would allow that researcher to identify the primary activity area, of which the residual deposit is a more reliable marker.
Placing is a precondition of dumping, whether or not said dumping of accumulated or collected refuse ever actually occurs. This level of waste management occurs most often in situations that preclude acts like dropping or tossing refuse, such as within a structure, where refuse is put in a bin or basket, or even piled up, to be relocated to a sanctioned refuse area later (Tani 1995). Included in the set of behaviors that can be called “placing” is the act of provisional discard, which indicates the placement of an object that may or may not be of use in the future. For example, a broken vessel may be placed aside for repair or reuse.

Materials that are never moved from the area of placement, be it for final dumping or repurposing, are called primary clustered refuse. These types of deposits are most often seen in the abandonment stage of archaeological sites (Schiffer 1987; Stevenson 1982). Tani (1995: 236) cites cases in which clustered primary refuse deposits were observed at lithic quarry sites, ceramic production sites, and short-term occupation sites where the secondary maintenance of the refuse is never carried out.

Secondary formation processes alter the state of already deposited refuse materials and include activities such as sweeping, raking, and cleaning of activity areas, as well as refuse area management. These types of activities can create patterns of their own in the archaeological record by affecting the size, shape, and number of refuse deposits created by primary depositional processes (Clark 1991; Tani 1995). Processes like pedoturbation and bioturbation (Schiffer 1987) that are not associated with maintenance also alter the state of a refuse deposit. These formation processes can cause significant degradation of the archaeological record and must be considered when assessing the physical state and information potential of a particular deposit.
Secondary refuse deposits are created by activity area maintenance and can be as rigorous as constant sweeping, raking, and buildup of accumulated materials or can be as minimal as dumping basketfuls of refuse in a general area away from activity and foot traffic. A common morphological pattern in secondary refuse structure is the crescent or doughnut shaped midden that forms around the periphery of an activity area. This pattern is observed in ethnographic and archaeological contexts, supported by evidence from around the world, and can be seen at sites throughout the Southeastern culture area and specifically along the coasts of Florida (Bense 1998; Newman and Weisman 1992:168; Mikell 2012: 17; Thompson et. al 2004).

On a small scale, mobile groups tend to deposit their refuse nearer the area where the refuse is generated. Tani (1995:237) says that these deposits are so close to the activity area that they may be considered “primary refuse”: the “pattern is expected when refuse is unobtrusive, such as ceramic sherds and organic debris, and where the space is available for such disposal.” They are analogous to the ‘door dumps’ made by more sedentary communities, where refuse dumped just outside of the doorway of a structure is quickly dispersed by subsequent activities.

Associative factors in the relationship between CFPs and behaviors are the intensity of occupation, group size, and duration of activity at a site. The main factor determining the intensity of activity area maintenance is the intensity of site occupation. The ratio of secondary to primary refuse at a site is a direct reflection of population size and intensity of occupation. Larger populations inhabiting a site for a longer period of time will create more secondary refuse than primary refuse (Schiffer 1976:31). The inverse of this relationship may also be proposed; an occupation of lesser intensity will have a smaller ratio of secondary to primary refuse produced, the maintenance of which is a direct function of the length of time that the area is used (cf. Binford 1983).
Other important behavioral determinants of CFPs are the factors that govern how refuse is sorted and where it is dumped. Hayden and Cannon (1983:119) point to three considerations: hindrance, effort, and value. Understandably, hindrance is potentially the most important determinant since it affects the ability of people to appropriately and effectively use their immediate activity areas. Effort, of course, refers to the energy or cost that it takes to maintain a refuse deposit. Value refers to the potential for reuse or repurposing refuse. The intensity of refuse management at a particular site is correlated to these factors. Tani (1995:239) indicates that the net hindrance potential of refuse has two critical components: the refuse itself (which does the hindering) and the activities taking place in an area (which may be hindered).

Maintaining the net hindrance of refuse at a site creates the ratio of primary to secondary deposit types (Tani 1995).

The physical characteristics of the refuse and the surface upon which it is deposited are important elements that determine the level of hindrance that refuse may cause. When refuse materials are of low value, unobtrusive, or have low hazard potential they may require only casual maintenance. In non-industrialized societies the most hazardous refuse materials are often sharp objects, such as lithic debitage, which are maintained more attentively. A soft sandy substrate provides a more conducive surface to receive refuse and reduce the level of hindrance to activities than does a hard surface.

When assessing the structure of refuse, the other component of net hindrance, organization of activities at a site appear to be the determining factor. Since the same types of activities could be arranged in ways that produce a number of different patterns, Tani (1995:240) encourages breaking down the organization of activities into basic elements. The elements that he identifies are variety, mobility, and duration. Where variety refers to the range of activities in
an area at a given time, mobility refers to the ease of relocating an activity elsewhere, and duration is the length of time that an area is used for an activity. When taken together, the intensity of activity-area use in a given time period can be defined. Because the elements of variety, mobility, and duration are closely tied to waste management CFPs, they are potentially inferable from refuse structure (Tani 1995).

All factors that affect the maintenance of refuse and activity areas at a site are anticipated entities. The CFPs reflect the planned activity duration, which may be measured not solely on its state in the archaeological record, but actually how it was anticipated to be structured during the occupation. This is especially important to recognize this depth of planning at sites with multiple short-term occupations since each group represents a different episode of decision making.

Applying the model outlined above to the Thompson’s Landing data set enables me to make inferences about the variety and location of refuse generating activities, as well as the occupation spans of the different occupational episodes at the site. First I will address the structure of each refuse deposit and postulate about the behavior that created it, followed by a short discussion about the assemblage within the deposit. The exploitation of highly localized resources, evident from the assemblages, will be a major factor in the consideration of the site as a whole.

*Feature 550 and 551*

The auger test survey of Grid 1 revealed a swath of subsurface shell deposits concentrated in the northeast corner. The grid abuts the gravel and shell road in this corner; only seven tests were not performed to completion due to an impasse created by the road fill material; these were clustered along the eastern most line of the grid. The tests that were considered positive in this section of the site were those that showed evidence of shell or artifacts below the
root mat. Subsurface shell was indicated across the northeast quadrant of the grid (refer to Figure 2 in Chapter 4). Our excavation in Units 41 and 43 revealed a sheet-like shell midden feature at the same relative depth below surface. The similarity in the structural characteristics and contents of the feature lead me to conclude that Feature 550 and Feature 551 are part of the same large deposit.

This refuse deposit likely extends horizontally beyond the limits of the test units and blankets the ground beneath the root mat across an area of approximately 5 m² in the northeast corner of Grid 1, between the general area of the units and the gravel road. The structure of the deposit in its entirety is somewhat elusive as there were no clear edges or corners uncovered in our limited excavations. The vertical extent of the deposit though, coupled with the midden surface that could be seen in plan view during excavation of the test units, does provide some clue as to the formation processes that resulted in its creation.

The sheet-like structure could be part of a primary clustered deposit created by tossing refuse to a peripheral area. The activity area in which the refuse is generated is most likely nearby. This central activity area could be the core of camp or mealtime site. I base this conclusion on the composition of the assemblage, which is made up primarily of clam shells. Shells interspersed with a small amount of faunal material and multiple sherds likely indicate multiple mealtime episodes. The net hazard of the refuse is generally low, as is the value, which increases the likelihood that it was generated nearby and casually tossed aside away from the core activity or eating area. As for the nearby activities of eating, cooking, and the need for sleeping areas, the short term considerations are the most influential to decision making. The obstruction of walking areas, the risk of attracting insects and scavengers, and exposure to the
odors associated with fresh fish and shellfish remains are concerns that could have affected refuse behaviors in this situation.

The deposit may be representative of multiple similar episodes of very short term occupations. It is likely that a surface deposit with such far reaching horizontal distribution would be reused simply because of its unobtrusive presence on the landscape. The pattern of disposal could be what Wilk and Schiffer (1979) call the “Arlo Guthrie trash-magnet effect” whereby existing trash essentially attracts the disposal of subsequent trash. The ceramic assemblage in both Feature 550 and 551 indicate the discard of multiple types of broken ceramics, more than would likely be destroyed during a single meal, or week of meals. The diagnostic ceramics from both features are associated with cultures present in the Woodland, Mississippian, and protohistoric periods, such as West Florida cord marked, Pensacola plain, and Mission Red, var. San Luis sherds respectively. Non-diagnostic wares that could be associated with any of the local prehistoric cultural groups were also abundant (see Table 9 and Table 12).

A gap of over 700 years between the radiocarbon dates obtained from these features further supports the interpretation that they represent a large deposit created over a long period of time. The sample material from Feature 550 in Unit 41 had two possible date ranges: A.D. 30 to 40 and A.D. 50 to 140 (2 Sigma calibrated results). This is the earliest radiocarbon date at the site, and falls into the Early Woodland period. This coincides with the terminal Deptford period which ends around A.D. 200. Grit and sand tempered ceramics, some with check stamped designs, were abundant in the midden and could represent a Deptford component to the assemblage (cf. Marrinan and White 2007). This leads me to suspect that we may have evidence of Early Woodland short-term use of the Thompson’s Landing site.
The 2 Sigma calibrated radiocarbon date from the Feature 551 midden in Unit 43 was A.D. 880 to 990. The intercept of the radiocarbon age of the charred material occurred at three points along the calibration curve. Beta Analytic has indicated that short-term variations in atmospheric C14 can affect the calibration of radiocarbon age to calendar age of a sample in instances when the material originates at a period when atmospheric carbon deviated from the norm (Darden Hood, Beta Analytic Inc., personal communication). This appears to be one such instance. The 110 year period indicated by the C14 dating falls into the terminal Woodland period. The Weeden Island II cultural complex was expressed at this time in the Gulf coastal region (Milanich 2002:354). Sand tempered check stamped ceramics from the midden could be representative of the Wakulla tradition, previously dated from A.D. 750 to 1000. The presence of Wakulla pottery in this midden may suggest that the tradition extends deeper into the second millennia than previously suspected. This component of the feature appears to provide evidence of the use of the site in the Late Woodland period.

Over 2,000 clams make up the shellfish remains collected from Feature 550 and 551. This amount of shellfish has a biomass of 5,073.25 g, which is equal to 178.9 oz. standard weight. Feature 550 had a comparatively diverse array of vertebrate faunal remains made up of bony fish, turtles, and mammal bone. Feature 551, however, contained only bony fish remains. Due to the high level of fragmentation, only two small pieces of the fish remains were identified to the species level: the distinctive skull fragments of a hardhead catfish. The rest were indeterminate skull, spine, and vertebral elements of bony fish. It is likely that when the fresh animal remains were tossed into the discard the pile, they were subject to scattering by scavengers, activities which, in part, could be responsible for the low numbers of identifiable
I would argue that this particular extensive deposit shows evidence of post depositional disturbance, most likely from centuries of trampling and small scale construction activities associated with the twentieth century fish camp and later park development at the time of the construction of the campus. Direct evidence for disturbance comes from the abundant intrusive materials in both levels of the features in both units. The sheet-like nature of the deposit, in conjunction with the soft substrate at the site, would also have lent itself nicely to bioturbation—specifically from tree root activity—could have significantly contributed to vertical mixing of materials and possibly caused the deep pockets of shell found displaced in the underlying stratigraphic layer. Any potential internal stratigraphy of this shell deposit was impossible to recognize.

The botanical sample recovered from the 5.25 liter flotation sample of the midden matrix was robust. Unfortunately only a few of the identifiable specimens were carbonized—namely 12 possible acorn shell fragments and 13 indeterminate grass seeds. If the acorn shells are contemporaneous with the original deposit, then they represent a possible fall occupation at the site. The grass seeds are more enigmatic, in that they appear carbonized on the outside, yet are light brown on the inside. The rest of the specimens appear to be modern, possibly the result of natural seed rain on the site (see Table 13). Of those specimens, all of the plants are native to Escambia County, and many can be found on or around the site today. They also represent a rich and bountiful body of plant life that has characterized the Thompson’s Landing area for thousands of years. These plants would have been a secondary or tertiary advantage to utilizing the site as a protected camping and eating area. Forty one whole carbonized seeds could not be
identifiable from the sample. These are possibly ancient seeds that entered the midden at the time of its deposition. Without further analysis and comparative research, they will not reveal any more than can already be said about native plant use on the site.

Since the structure of the shell midden deposit has been disturbed, and because excavation was limited to only two units, it is difficult to come to any concrete conclusions about the behaviors that created it. It can be said that a long stretch of time is represented by the radiocarbon dates and ceramic types present. This temporal stretch though, does not seem to indicate constant site use, but rather low-intensity, short-term episodic use, specifically for the consumption of fish and shellfish collected in the immediate vicinity. As will be seen in the comparison of other deposits across the site to this feature, time depth of the occupational spans in the other midden deposits is far more obvious if the deposit has been secondarily maintained.

*Feature 552*

The Feature 552 shell midden feature appears to have been a maintained secondary deposit, most likely created by the dumping of refuse materials into a shallow basin nearby a short-term occupation, such as a campsite. This occupation was a short-term episode, possibly lasting for a few days or more, that occurred in the Mississippi period. Secure temporal evidence comes from the measured radiocarbon age of the charred material and the presence of numerous Mississippian ceramics within the deposit. The midden assemblage appears to be the result of a group foraging, fishing, and hunting effort. Animal elements in the midden suggest cooperative catchment that extended into the southern parts of Escambia Bay. Plant remains suggest a possible “coming together” event.

The calibrated radiocarbon age of the charred material from the shell midden is A.D. 1260 to 1290. One intercept with the calibration curve ensured that the calibrated date range was
small, leaving only a 30 year window in which this deposit could have been laid down. The presence of ceramics that can be tied exclusively to Mississippi period traditions further support these results (see Table 16). These include plain, punctated, and incised shell tempered wares associated with the Pensacola culture, a D’Olive incised rim sherd, and a Moundville Incised body fragment that retained an attachment point for a handle. The vessel forms represented by the latter two fragments are recognized Mississippian types that indicate food sharing and storage or transport. The D’Olive vessel is a large open plate form and the Moundville Incised is probably the remains of a collared jar. These forms and their interpreted typical uses indicate a level of planning of activities related to food preparation and service not observable in the other assemblages (Hally 1986). Moreover, the sheer number of fragments of plain shell tempered wares suggest that that an entire vessel, possibly a Moundville Incised collared jar with handles, broke during the group’s stay at the site.

The invertebrate faunal remains in the midden were made up of at least 2,781 individual clams, six oysters, and one marine gastropod, possibly a whelk. While the clams could have easily been gathered from the shoals along the northern edge of Escambia Bay and in the brackish bayou, the oysters and the marine gastropod would have been collected from a point further south where the salinity of the bay is higher. The large number of specimens collected and the wide catchment area involved indicate a group gathering effort, likely aided by boats, with baskets and/or nets for collecting/transporting materials back to Thompson’s Landing. The biomass of the collected invertebrates in the deposit is 8,669.55 g, which is equal to 305.8 ounces of edible meat.

The diverse and abundant vertebrate faunal assemblage from Feature 552 is unrivaled in this data set. The meat weight represented by the bony fish remains within the midden is 178.17
g, which is equal to 6.28 ounces. Drums, sheepshead, sea catfish, and gar were identified among the 134 individual specimens. Mikell (2012:25) suggests that the presence of drum, sheepshead, and sea catfish, specifically smaller individuals and along with smaller species in middens at the Mack Bayou site are evidence of the use of nets (dip or seine) or traps, or both. The types listed above are grouping fish that tend to aggregate at times in sea grass beds and on or around shell beds, specifically *Rangia cuneata* beds, and could have been caught in this way (Alden et. al 1998). Larger fish could have been taken with hook and line, gigs, or spears as well (Larson 1980; Reitz and Wing 2008). Unfortunately, there is no evidence for net impressed ceramics at Thompson’s Landing, like those found at Mack Bayou, that would lend further support to this possibility.

Remains from an indeterminate number of turtles were also recovered, although species was not identified in this class of animals, aquatic individuals could have been taken with traps or nets (Mikell 2012:26). Of fifty individual pieces, 47 were burned carapace and plastron fragments. The Florida Seminole reportedly cooked turtles alive in their shells, which would result in the charring of the carapace and the plastron (Skinner 1913: 76-77). Alternatively, this could indicate that the shells were tossed into a campfire to avoid the unpleasant odor of their decay. The burned pieces may also be further evidence of secondary refuse maintenance, whereby vertebrate remains were burned and the ashes were dumped in the midden with the rest of the mealtime refuse.

Two alligator scutes were also identified. These did not show evidence of burning or butchering and may be representative of a group hunting situation, or food sharing. No other alligator bones were identified in the assemblage. Meat from this reptile may have been shared among a network of people organized into smaller units that undertook hunting, gathering, and
fishing activities in this area at the same time (cf. Binford 1987). Further evidence to support the theory of a group hunting event comes from the white-tailed deer humerus discussed in Chapter 5 (Figure 7). This was the only deer bone found in the midden. It is a possibility that the deer was butchered and divided into portions; then each member of the hunting party was able to take a share of meat away (cf. Binford 1987). The section of the leg that was recovered shows signs of marrow cracking, evidence that the fat inside the marrow cavity was consumed. The bones of other small mammals in the midden provide indirect evidence for trapping or snaring as a means of procuring other sources of meat from the forest surrounding the area. The deer, and other small mammals such as rodent and opossum, are forest edge animals that may have been attracted to the human activity in the area (Linares 1976; Mikell 1987). The long bones of at least one of the small mammals shows evidence of similar marrow extraction techniques observed in the deer humerus. This feature also contained bird bones, which could be remains of a solitary, or a shared meal. Without identifying the avian bone fragments, it is difficult to postulate how or where the animal was captured, or the role it played in this particular event.

A total of seventy five carbonized nut shell fragments were found in the Feature 552 flotation samples, 19 of which compared favorably with oak acorns. The remainder of the shells could have come from any of the nut-bearing trees in the area, including hickory, walnut, and pecan. These trees generally produce nuts in the summer, which then mature later in the season and persist into the fall. The nuts can be used in a number of ways. Nut meats are a convenient, high-energy, high-protein food source. Nut shells can be used as fuel to start, and then maintain, a fire (Hally 1981:733). Nuts are also an important food for many animals; in late fall and winter the white-tailed deer has been observed to frequent oak-dominant hammocks during the rut in pursuit of acorns that drop there (Hudson 1976:245). This is the time of year when the deer are at
their maximum weight, and the forest is at its most productive at least relative to human dietary needs.

Four carbonized Yaupon holly seeds were found in the Feature 552 midden. The use of the leaves and twigs of the Yaupon holly to make a special tea for ceremonial consumption has been well documented in many Southeastern Indian groups (Hudson 2004). The tea has been called the “black drink” due to the dark color of the liquid upon decoction. The drink served several purposes as a social beverage, as a medicine, and as an emetic. Its use has been tied to ritual purity and to peacemaking (Hudson 2004:2-3). The presence of these carbonized seeds in the midden suggests that the Yaupon holly, and possibly the “black drink”, played some part in the episode at Thompson’s Landing that generated this refuse. Hudson states that the lack of historical evidence of Gulf Coastal native groups using black drink is “probably due to incomplete documentation or to a disruption of aboriginal patterns before the first European observers arrived” (2004: 2). In this case there is archaeological evidence for its possible use in this region, and at what appears to be a relatively small scale event.

Other carbonized plant parts that were identified from the midden were bayberry, greenbrier, and poison ivy. There was documented ethnohistorical use of the bayberry plant (Morella caroliniensis) by the Houma Indians of Louisiana, who boiled the berries to create a wax that could be used to make candles (Speck 1941:56). This though, was not likely the use that occurred at the Thompson’s Landing site during the Woodland or Mississippi periods. Roots of the greenbrier (Smilax spp.) are edible, and known to have been used by many historic Southeastern Indian groups (Hudson 1976:285). These tuberous roots, from all species in the genus, are the best when collected in fall and winter. Swanton quotes both Bartram (1792) and Harriot (1893) who each observed the preparation of foodstuffs made from the fibrous root of the
greenbrier plant in the historic Southeast (Swanton 1946:25-26). Poison Ivy (*Toxicodendron radicans*) has documented historic uses in this region, both as an emetic and a tonic (Hamel and Chiltosky 1975:41; Speck 1941:59).

The remainder of the botanical assemblage from Feature 552 is non-carbonized or unidentified. Non-carbonized seeds present in the midden are likely the result of natural seed rain on the site. Comparatively, this deposit has the most robust archaeological floral assemblage among all of the features examined as part of this research.

The intact structure of the feature and the dearth of intrusive modern materials seem to indicate that few post depositional processes have had any visible negative effects on this midden. Other than the natural taphonomic processes and effects of bioturbation, this midden does not appear disturbed by subsequent occupations at the site.

The structure of the refuse deposit as a whole indicates a depth of planning not seen in Features 550, 551, or 557. The organization of refuse into a pile suggests that it was located away from the other activities occurring on the site at the time. It was probably created by dumping basketfuls of shell, animal bones, broken ceramics, and plant remains from one or more primary activity areas that were used for eating, cooking, and sleeping among other activities that are less archaeologically visible.

*Feature 556*

The Feature 556 shell midden has two components: a disturbed upper layer (A) with an intact clustered deposit (B) beneath. The deposit in section B maintained a shallow basin shape in profile that suggests that the material was put into a depression in the sandy sediment. This refuse structure would suggest a secondarily maintained deposit that was created either by tossing the material into a pile, or by dumping material collected from a primary activity area. By
whatever means, the refuse appears to be the result of some amount of planning. This level of refuse planning probably indicates a short-term stay at the site, perhaps several days, and may have occurred during the terminal Woodland period, sometime between A.D. 890 and A.D. 1020. The deposited refuse supports the inferred occupation span.

The 2 Sigma calibrated radiocarbon date from the Feature 556 midden was A.D. 890 to 1020. The intercept of the radiocarbon age of the charred material occurred at three points along the calibration curve. Beta Analytic has indicated that short-term variations in atmospheric C14 can affect the calibration of radiocarbon age to calendar age of a sample in instances when the material originates at a period when atmospheric carbon deviated from the norm (Darden Hood, Beta Analytic Inc., personal communication). Like the observations made in Feature 551 above, this appears to be another such instance. The 130 year period provided by the C14 dating falls into the terminal Woodland period. The temporal range suggested by the radiocarbon dating results significantly overlap with results from Feature 551 in Unit 43. The two shell tempered sherds recovered from the feature 556 midden may or may not be the result of post-depositional disturbance. If the calibrated radiocarbon date of the charred material from the feature is accurate, then this would be the earliest occurrence of shell tempered pottery in this region. The emergence of shell tempering in the region currently dates to A.D. 1250, which is 230 years beyond the upper limit of the calibrated C14 date. The other two ceramic fragments recovered, one plain and one incised sand tempered sherd, are not diagnostic, and do provide any further insight to the cultural affiliation of the people who generated this refuse.

The faunal assemblage was made up of 739 bivalves, five of which were oysters. The biomass represented by these animals is 2,372.02 g which is equal to 83.7 ounces. As discussed above, the oysters would have been gathered further south in the Escambia Bay than the clams.
Their presence indicates a wider catchment area than the Landing site alone, and was probably facilitated by water transport. The fish remains represent a miniscule biomass of 26.5 g, or less than one ounce. The identifiable elements of bony fish are from a sheepshead and a gar, fish that could have been caught with a hook and line, speared, or by a netting method (dip or seine) (Mikell 2012:25-26). The sheepshead would have been taken from the bay, while the gar would have been caught in the river or Thompson’s Branch.

A single alligator scute was found in the intact section of the midden deposit. This could potentially be part of a meal, and may indicate a connection to the Feature 552 deposit only 7 m to the east. That deposit also contained alligator scutes, though no other alligator bone present. A small number of oysters were also recovered. The presence of shell tempered ceramics does hint at a possible disparity between the artifacts and the radiocarbon date. Whether or not this deposit actually dates to a later time is yet to be seen, but should remain a definite possibility.

The botanical assemblage recovered from the Feature 556 shell midden contained 21 carbonized nut shell fragments that compared favorably with acorn shells. These may be representative of a fall occupation at the site and that nuts could have been used for food or fuel, or both. The rest of the assemblage is most likely modern, and has the appearance of a profile of the plants that contribute to the present seed rain on this part of the site. The carbonized materials in the sample were not identifiable to any taxonomic level; thus only further comparative analysis and subsequent identification will likely lead to any conclusions about plant use as part of the suite of activities occurring during this occupational episode.

Post-depositional disturbance has made a major impact on the structure of this midden. The upper levels are visibly smeared, yet the lower layers maintain an intact basin shape. The amount and type of intrusive materials indicate that the midden was disturbed sometime in last
century. This does not mask the shape of the bottom of the deposit, however, so some conclusions about its anticipated structure can be drawn.

An understanding of the Feature 556 shell midden remains somewhat elusive, even after this analysis. The placement of the refuse was evidently planned, but the level of secondary maintenance is still unclear. Though the upper levels were disturbed, the depth of the base of the deposit below surface may mean that the refuse was placed in a depression or shallow hole. This level of refuse management, based on the placement of low hazard materials away from an activity area, suggests that the people who created the deposit stayed on the site for more than a single meal. It is possible that they were camping and fishing at the Landing some time around the terminal Woodland and Early Mississippi periods.

**Feature 557**

The Feature 557 shell midden is dispersed and seems to lack all of the characteristics of a secondarily maintained refuse deposit. This shallow shell midden appears to have been very casually deposited, perhaps a tossing or dumping episode. The restricted horizontal limits of the deposit, when considered with its miniscule vertical extent, lead me to believe that the refuse in this deposit was generated in a single mealtime event, or perhaps a single camping episode. The pattern of deposition suggests that the faunal material and small amount of ceramic material was tossed or strewn on the ground surface. This represents little planning depth and further supports the proposition that the material resulted from a single short occupation episode.

The 2 Sigma calibrated radiocarbon dating results indicate a possible 140 year window of time in the early Mississippi period from A.D. 1020 to A.D. 1160, in which this midden could have been laid down. The presence of two sand tempered ceramic sherds in the midden assemblage does not negate this position. Multiple intercepts with the radiocarbon calibration
curve were observed in the results, a laboratory spokesperson has indicated that short-term variations in atmospheric C14 can affect the calibration of radiocarbon age to calendar age of a sample, in instances when the material originates at a period when atmospheric carbon deviated from the norm (Personal communication, Darden Hood, Beta Analytic Inc.). Feature 557 appears to be a third such instance.

The lack of intrusive material, other than a single very small piece of lead shot, suggests that the deposit is relatively intact. None of the botanical materials from the flotation sample taken from the midden were carbonized (see Table 23). The seeds recovered do not appear to be archaeological in origin; rather, they are most likely from natural seed rain. The large surface area, and the shelly matrix of the deposit could encourage smaller materials to percolate down into the deposit over time (cf. Schiffer 1987). I do not believe that the floral assemblage in this deposit is reflective of the prehistoric occupation.

The amount of faunal material in the deposit seems to support the theory of a short occupation span. The remains are made up of at least 227 individual clams, representing a total of 484.6 g of biomass. This includes the meat weight of the indeterminate class of fragmented clams. The amount of shellfish biomass is equal to 17.9 oz. of edible meat. Comparatively this is the smallest of the four distinct midden deposits in terms of shell volume. Three different types of fish were identified in this midden. A drum was identified by its grinder teeth, a sheepshead by an operculum, and a gar by a few scale fragments (see sections Feature 556 and Feature 552 for catchment methods for these fish). The remainder of the fish bones included spines, vertebra, and skull/cranial fragments. In sum, bony elements that were recovered weighed 8.1 g and represented 61.32 g of edible meat weight, which is equal to 2.2 oz. standard weight. Some of the fish bones were burned, possibly as a result of being cooked over fire. Weathering and prolonged
environmental exposure caused most of the bones to be friable and crumble easily (Personal communication, Cathy Parker).

The nature of the deposit, spread haphazardly across the ground surface, left the material exposed to scavengers, trampling, and other degrading formation processes. It appears though, that post-depositional degradation of this deposit was limited to natural processes. Once the deposit was laid down, it appears to have been undisturbed. These findings support my position, that this deposit is representative of a short-term occupation by a small group of people, who utilized this site during the Mississippi period for the same reasons that it was utilized during the Woodland period—as special-use resources procurement site.

Conclusions

What is clear from all of the shell midden deposits is that the procurement of a very specific set of resources was the main motivation for people to frequent the Thompson’s Landing locale. These resources included shellfish and carnivorous fish from the waterways, turtles and alligators from the floodplain swamps and in the bayou, reptiles, birds and mammals that could be had in the mesic hammock and sandhills, and the numerous native plants in the surrounding woodlands. This biotic richness drew people to Thompson’s Landing, especially in late summer and fall, when the forest was teeming with animals and plant foods that could augment the bounty that could be caught and gathered from the waterways.

One of the questions that I set out to answer with this research was whether or not Claassen’s designation of the site a possible Mississippian village holds true (1985:135). From the analysis of this data set, I have concluded that it does not. Instead, this research suggests that the Landing was a repeatedly visited short-term resource extraction camp. Without excavation of activity areas and more extensive coverage of the site, vital clues to the extent of Mississippi
period utilization of the site may still remain elusive, but the refuse structure of the Mississippi period deposits suggest a varied occupational history for Thompson’s Landing, one that does not seem to include something as structured or intensively occupied as a village. If these deposits had been the result of a village type settlement I would expect to see more secondarily maintained refuse, such that would suggest more rigorous waste management planning. In addition to the structure, the refuse assemblages are lacking artifacts that would indicate an intensive settlement. In fact, archaeological evidence beyond that from mealtime activities is in absence in these shell midden deposits. This is not to say that a structured settlement never existed on this site, but, this data set does not provide evidence for one.

Cheryl Claassen’s 1985 article, published after her participation in the EBDARP survey, makes two very valid conclusions that I will reiterate. First, Mississippi period populations used the Atlantic rangia and Carolina marsh clam populations in much the same way that earlier Woodland groups did, only with the expansion of catchment area to include lower parts of Escambia Bay. This proposed pattern of resource exploitation appears to hold true. She concludes that Mississippian groups transported the gathered shellfish to mealtime camps and village sites established in the immediate vicinity for cooking and consumption. Her assumption that the two midden features at Thompson’s Landing are part of a Mississippian village is based solely on the presence of high number of ceramic sherds. I would argue that there is not enough evidence to make such a conclusion at this time. Secondly, the sites visited as part of EBDARP all appear to have a late summer-fall season of utilization. This research supports that observation.

Further research into the function of the Thompson’s Landing site should be focused on reexamining the contents and structure of previously excavated shell midden features. There is a
wealth of information wrapped up in these features that can be teased out using a model of inference based on cultural formation processes. Comparison of the shell midden features excavated in the 1984 and 2011 field seasons to the features examined as part of this project could lead to an even more developed site use history and could possibly reveal the presence of a structured settlement. Research focused on the seasonality of the invertebrate remains could further elucidate resource exploitation and seasonal use of the site. Analysis of the size of the present species could also shed more light on the management and intensity of collection activities. These are just a few of the questions that could be addressed by future researchers interested in the history of the Thompson’s Landing site.

In a region that holds claim to innumerable shell midden deposits, complementary field methodologies, analyses, and interpretive frameworks must be employed to gain the most information from these often ephemeral traces of prehistoric life. This kind of detailed analysis of refuse disposal is an excellent indicator of what activities were being carried out the site. Features such as these can provide insight to the bigger picture of the function of multi-component sites like Thompson’s Landing and should not be dismissed even when other features related to primary activity areas and domestic architecture are lacking. Their research potential should not be overlooked.
REFERENCES CITED

Alden, Peter, Rick Cech, and Gil Nelson

Anderson, David G. and Kenneth E. Sassaman

Ashley, Keith and Nancy Marie White

Austin, Daniel F.

Bartram, William

Bense, Judith A.


Bense, Judith A. and John C. Phillips

Binford, Lewis R.

Binford, Lewis R.
1983 In pursuit of the Past. Thames and Hudson, London.

Binford, Lewis R.
Blitz, John H.  

Blitz, John H. and Karl G. Lorenz  

Brown, Ian W.  

Chandler, Craig, Phillip Cheney, Philip Thomas, Louis Trabaud, and Dave Williams  

Claassen, Cheryl  

Clark, John E.  

Cobb, Charles R. and Patrick H. Garrow  

Emerson, William K. and Morris K. Jacobson  

Enloe, James G.  

Fenneman, N.W.  
Florida Natural Areas Inventory
1990 *Guide to the natural communities of Florida*. Tallahassee, FL.

Fritz, Gayle J.

Fuller, Richard S.

Gibson, David J.

Gougeon, Ramie A.
2013 *Phase I Cultural Resources Assessment Surveys of the Proposed UWF West Campus Land Exchange and Staging Area in Escambia County, Florida*. Report of Investigations Number 184, Archaeology Institute, University of West Florida Pensacola.

Gremillion, Kristen J.

Hally, David J.


Hamel Paul B. and Mary U. Chiltoskey

Harriot, Thomas

Harris, Norma J.
Hayden, Brian and Aubrey Cannon  

Hudson, Charles  


Hunt, Charles B.  

Jackson, H. Edwin and Susan L. Scott  

Kidder, Tristram R.  

Larson, Lewis H.  

LaSalle, Mark W. and Armando A. de la Cruz  

Linares, Olga  

Livingston, Robert J.  

Marquardt, William H. and Karen J. Walker  
Marrinan, Rochelle and Nancy Marie White  

Marsh, Owen T.  

Martin, Alexander C. and William D. Barkley  

Melcher, Jennifer A.  

Mikell, Gregory A.  

Milanich, Jerald T.  

Myers, Ronald L. and John J. Ewel  

Nassaney, Michael S., and Kendra Pyle  

Newman, Christine L. and Brent R. Weisman  
Odum, H.T.  

Olsen, Lawrence A.  
1973 Food and Feeding in Relation to the Ecology of Two Estuarine Clams, Rangia Cuneata (Gray) and Polymesoda Caroliniana (BOSC). PhD dissertation, Florida State University.

Outram, Alan K.  
2002 Bone Fracture and Within-Bone Nutrients: An Experimentally Based Method for Investigating Levels of Marrow Extraction. In Consuming Passions and Patterns of Consumption edited by Miracle Preston and Nicky Milner, pp. 51-64. McDonald Institute for Archaeological Research, Cambridge.

Pearsall, Deborah M.  

Percy, George W. and David S. Brose  

Pluckhahn, Thomas J.  

Reitz, Elizabeth J. and Dan Cordier  

Reitz, Elizabeth J. and Elizabeth S. Wing  

Reitz, Elizabeth J. and Irvy R. Quitmyer  

Reitz, Elizabeth J., Irvy R. Quitmyer, H. Stephen Hale, Sylvia J. Scudder and Elizabeth S. Wing  
Russo, Michael, Margo Schwadron, and Emily M. Yates
2006 Archaeological Investigation of the Bay View Site (8BY137): A Weeden Island Ring Midden, Tyndall Air Force Base, Panama City, Florida. Submitted to Tyndall Air Force Base, Panama City Florida.

Saunders, Rebecca

Schiffer, Michael B.


Sears, William H.

Simms, Stephen R.

Skinner, Alanson

Snow, Frankie

USDA

Speck, Frank G.
1941 A List of Plant Curatives Obtained From the Houma Indians of Louisiana. Primitive Man 14:49-75.
Stanley, Jon G. and Mark A. Sellers

Stephenson, Keith, Judith A. Bense, and Frankie Snow

Steponaitis, Vincas P.

Stevenson, Marc G.

Swanton, John R.

Tani, Masakazu


Tarver, Jonnie W. and Ronald J. Dugas

Thompson, Victor D., Matthew D. Reynolds, Bryan Haley, Richard Jeffries, Jay K. Johnson, Laura Humphries

Turner, Bethany L., John D. Kingston, Jerald T. Milanich
2005 Isotopic Evidence of Immigration Linked to Status During the Weeden Island and Suwannee Valley Periods in North Florida. Southeastern Archaeology 24(2): 121-136.
Wagner, Gail

Wallis, Neil J.

Wilk, Richard and Michael B. Schiffer

Willey, Gordon R.

Williams, Andrew C.

Wing, Elizabeth and Antionette Brown

Worth, John E.
APPENDIXES
Appendix A. Vertebrate and Invertebrate Species
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<table>
<thead>
<tr>
<th>Vertebrate Taxon (Common Name)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteichthyes (indeterminate bony fish)</td>
</tr>
<tr>
<td><em>Lepisosteus</em> sp. (Gar)</td>
</tr>
<tr>
<td>Siluriformes (catfish)</td>
</tr>
<tr>
<td><em>Arius felis</em> (hardhead catfish)</td>
</tr>
<tr>
<td><em>Archosargus probatocephalus</em> (sheepshead)</td>
</tr>
<tr>
<td>Sciaenidae (drums)</td>
</tr>
<tr>
<td>Testudines (indeterminate turtle)</td>
</tr>
<tr>
<td><em>Alligator mississippiensis</em> (alligator)</td>
</tr>
<tr>
<td>Aves (indeterminate bird)</td>
</tr>
<tr>
<td>Mammalia (indeterminate mammal)</td>
</tr>
<tr>
<td><em>Odocoileus virginianus</em> (white-tailed deer)</td>
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<tr>
<td>Animalia (indeterminate animal)</td>
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<table>
<thead>
<tr>
<th>Invertebrate Taxon (Common Name)</th>
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<tbody>
<tr>
<td><em>Crassostrea virginica</em> (eastern oyster)</td>
</tr>
<tr>
<td><em>Rangia cuneata</em> (Atlantic rangia)</td>
</tr>
<tr>
<td><em>Polymesoda caroliniana</em> (Carolina marsh clam)</td>
</tr>
<tr>
<td>Gastropoda (unidentified marine gastropod)</td>
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<tr>
<td><em>Busycon</em> sp. (whelk)</td>
</tr>
<tr>
<td><em>Bivalvia</em> (indeterminate clam)</td>
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Appendix B. Plant Species
<table>
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<tr>
<th>Taxon (Common Name)</th>
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</thead>
<tbody>
<tr>
<td>Quercus spp. (oak)</td>
</tr>
<tr>
<td>Carya spp. (hickory)</td>
</tr>
<tr>
<td>Ilex spp. (holly)</td>
</tr>
<tr>
<td>Ilex vomitoria (Yaupon holly)</td>
</tr>
<tr>
<td>Morella spp. (bayberry)</td>
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<tr>
<td>Vitis rotundifolia (muscadine)</td>
</tr>
<tr>
<td>Phytolacca spp. (pokeweed)</td>
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<tr>
<td>Rubus argutus (swamp blackberry)</td>
</tr>
<tr>
<td>Nyssa sylvatica (blackgum)</td>
</tr>
<tr>
<td>Panicum spp. (panic grass)</td>
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<tr>
<td>Polygonum spp. (knotweed)</td>
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<tr>
<td>Cyperaceae spp. (sedge)</td>
</tr>
<tr>
<td>Callicarpa americana (beautyberry)</td>
</tr>
<tr>
<td>Rhus glabra (smooth sumac)</td>
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<tr>
<td>Poaceae spp. (indeterminate grass)</td>
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<tr>
<td>Prunus caroliniana (Carolina cherry laurel)</td>
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<tr>
<td>Smilax spp. (greenbrier)</td>
</tr>
<tr>
<td>Toxicodendron radicans (poison ivy)</td>
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<tr>
<td>Fabaceae spp. (indeterminate pea)</td>
</tr>
<tr>
<td>Lactuca floridana (woodland lettuce)</td>
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<tr>
<td>Magnolia grandiflora (southern magnolia)</td>
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</table>
Quercus nigra (water oak)
Quercus laevis (turkey oak)
Quercus lyrata (overcup oak)
Quercus virginiana (live oak)
Quercus hemisphaerica (laurel oak)
Carya illinoinensis (pecan)
Carya cordiformis (bitternut hickory)
Nyssa sylvatica (blackgum)
Chamaecyparis thyoides (Atlantic white cedar)
Juglans nigra (black walnut)
Ilex coriacea (gallberry)
Vaccinium arboreum (sparkleberry)
Asimina parviflora (smallflower paw paw)
Sabal palmetto (cabbage palm)
Ampelopsis arborea (peppervine)
Ilex opaca (American holly)
Diospyros virginiana (persimmon)
Cephalanthus spp. (button bush)
Illicium parviflorum (yellow anise)
Allium vineale (wild garlic)
Ambrosia spp. (ragweed)
Eriobotrya japonica (loquat)
Mimosa quadrivalvus var. floridana (mimosa)
Ligustrum sinese (Chinese privet)

Pimenta dioica (allspice)

Podocarpus macrophylla (Japanese yew)

Melia azedarach (chinaberry)