EXCAVATIONS AT BROWN'S COMPLEX MOUND 5, PINELAND SITE COMPLEX, PINE ISLAND, FLORIDA

By

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A THESIS PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
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To Dennis and Bernice Grout

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abstract of Thesis Presented to the Graduate School
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Michael Wylde

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Chair: William H. Marquardt
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In 2009, an opportunity presented itself to archaeologically investigate Brown's Complex Mound 5, a feature located on private property within the Pineland Site Complex on Pine Island, Florida. Excavations at Mound 5 during 2009 and 2010 have added to the overall temporal and spatial knowledge of the 63-acre archaeological site complex. This paper situates the findings from Mound 5 in the context of other contemporary deposits, with a focus on the pottery and faunal assemblages. Based on the analysis of stratification, pottery, faunal remains, and radiocarbon dates, Mound 5 is determined to be a largely intact component of the Brown's Complex dating to between A.D. 450 and A.D. 650.

CHAPTER 1
INTRODUCTION

The Pineland Site Complex (consisting of sites 8LL33, 8LL34, 8LL36, 8LL37, 8LL38, 8LL757, and 8LL1612) is located in the village of Pineland on the northwest coast of Pine Island in Lee County, Florida. Located in a rich environmental setting, the region known archaeologically as the Caloosahatchee Culture Area is centered in the Charlotte Harbor estuarine system of coastal southwest Florida (Figure 1-1). Over twenty years of research at the site have focused on a historical ecology approach that relies on interdisciplinary data (Marquardt and Walker eds. 2013). In this thesis, I examine a previously unexcavated feature associated with the Brown's Complex (8LL33): Mound 5 (BCM5) (Figures 1-2,1-3).

I address several questions in this research: (1) is the feature an intact part of the ancient Brown's Complex, or a historic redeposition of ancient midden materials? (2) if the feature is of precolumbian origin, to what period(s) does it date? (3) how does the pottery assemblage reflect temporality and inter-site contact?, and (4) how does the faunal assemblage reflect temporal and environmental change at Pineland?

To answer these questions, I conducted excavations (BCM5 M-1, M-2, and M-3) in 2009 and 2010 with the help of volunteers from the Randell Research Center (RRC). The goal of the excavations was to establish the stratigraphic sequence within the BCM5 feature and to collect samples for ceramic and zooarchaeological analyses to be conducted at the RRC and the Florida Museum of Natural History (FLMNH). All pottery sherds were collected from each of the three excavation units, and column samples for faunal analysis were collected from M-3.

In this thesis I present the environmental and cultural background of the Pineland Site Complex (Chapter 2). The excavation and laboratory analysis methods employed to collect data, and the methods used in the identification of pottery types, vessel form analysis, and petrographic analysis, and the analysis of the faunal samples are reported (Chapter 3). The stratigraphic composition and radiocarbon dating of Mound 5 are reported (Chapter 4), and the results of the analysis of historic artifacts, pottery type identification, and petrographic analysis are then discussed (Chapter 5). Results of the zooarchaeological analysis are considered in a separate section (Chapter 6). A discussion of the results and their implications for the temporality, environmental markers, and composition of BCM5 (Chapter 7) is followed by conclusions derived from the analyses and suggestions for future research concerning the pottery and faunal assemblages (Chapter 8).

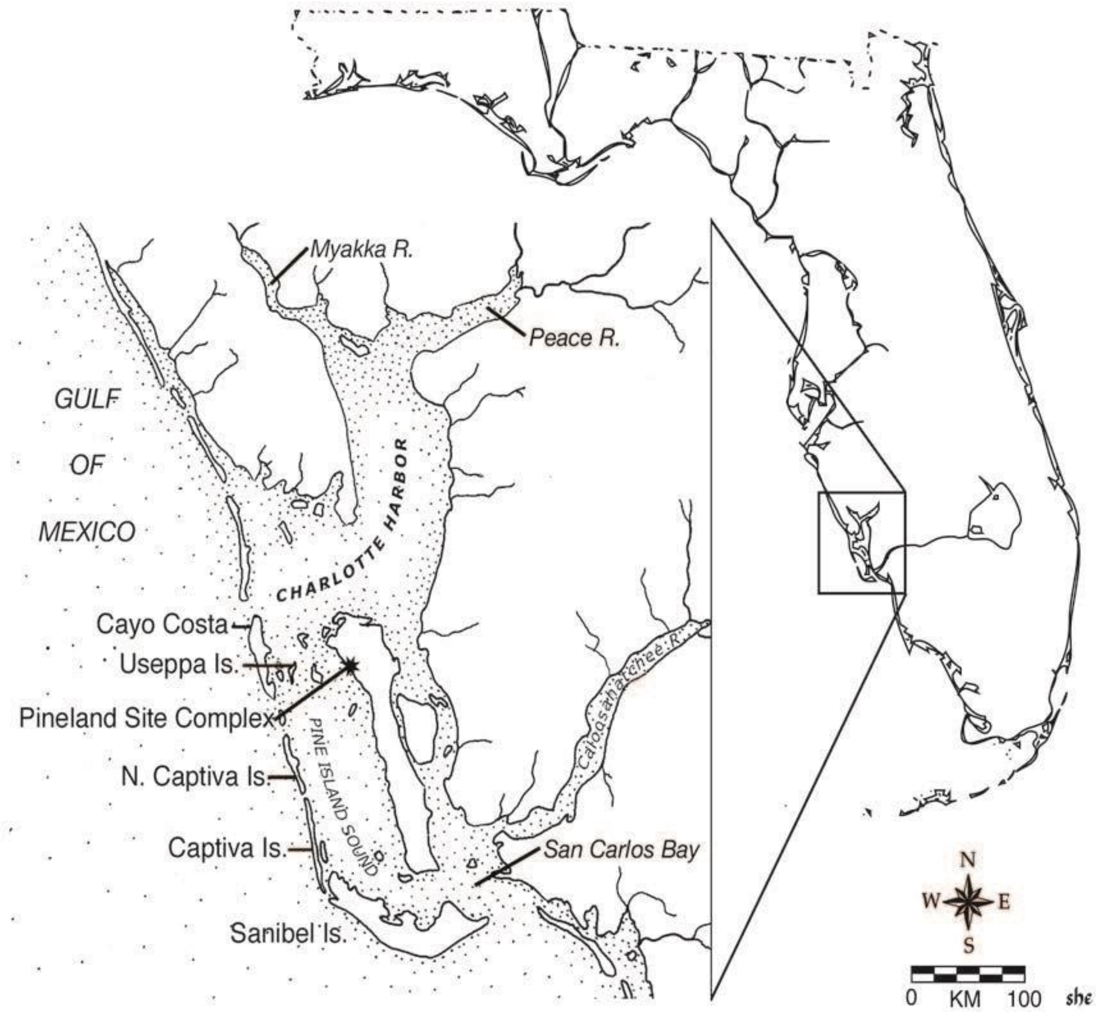


Figure 1- 1. Map of Florida with Pineland Site Complex indicated.

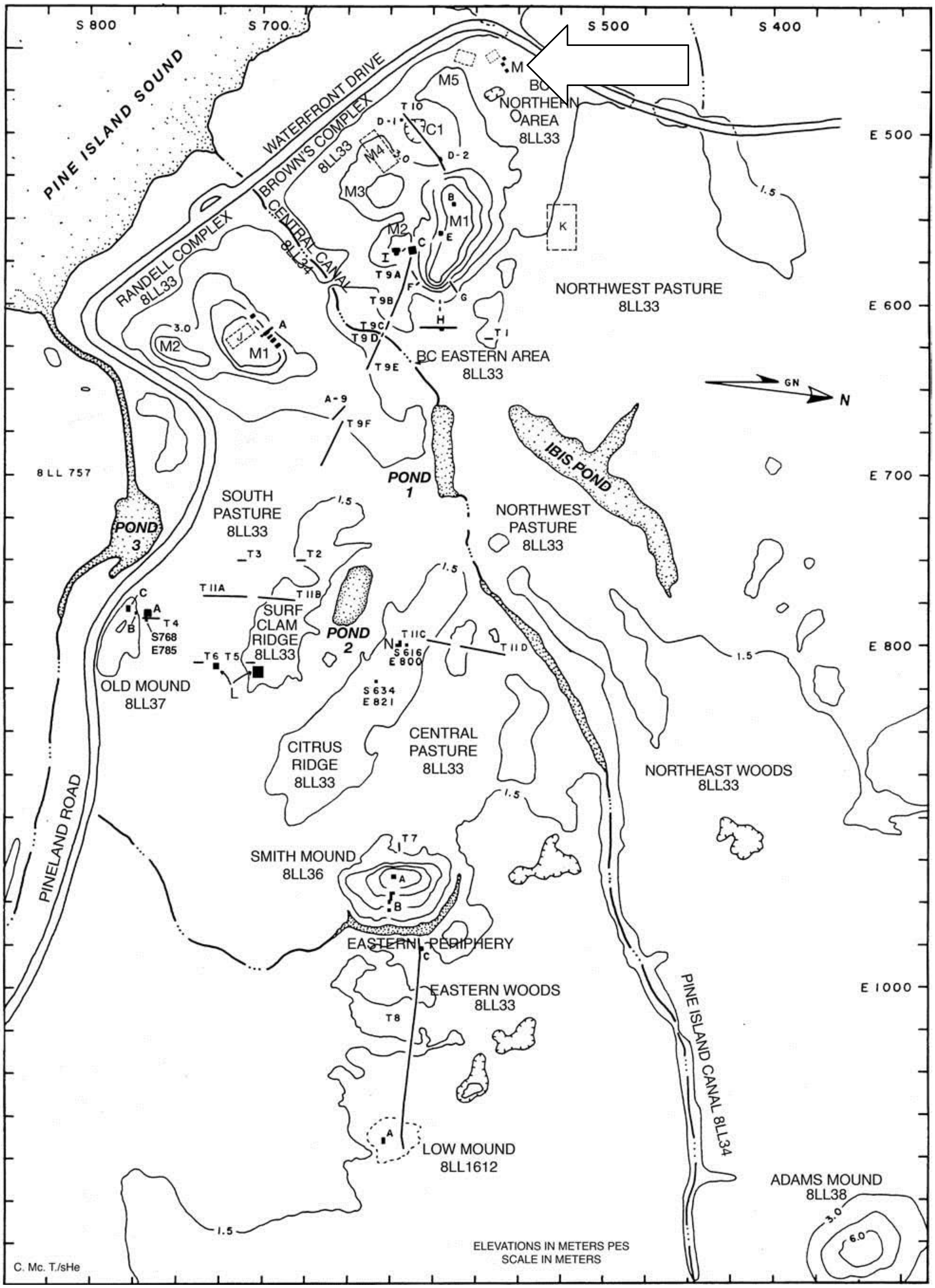


Figure 1-2. Pineland Site Complex. Arrow, top center, indicates area of excavation.

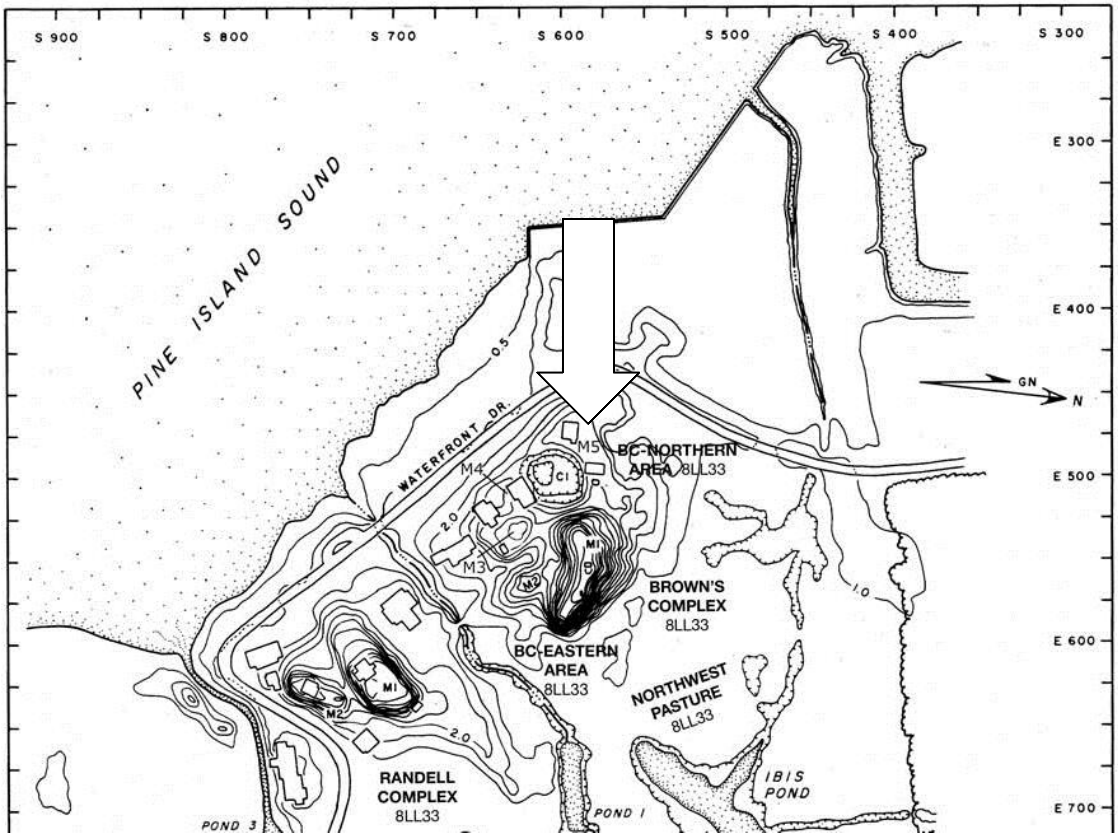


Figure 1-3. Pineland Site Complex detailed topographic map. Arrow indicates M5.

CHAPTER 2
ENVIRONMENTAL AND CULTURAL BACKGROUND

Located between 26º and 27½º latitude, the Caloosahatchee Culture Area lies at the northern limit of the subtropical or tropical wet/dry savannah. The Myakka, Peace, and Caloosahatchee Rivers combine with runoff from the mainland, bringing freshwater into the ecosystem. Mainland freshwater mixes with marine waters entering through several openings to the Gulf of Mexico. These inshore, mixed, estuarine waters are bordered on their western margins by a series of sandy barrier islands (Walker 2013:23).

The rich marine and estuarine ecosystems fostered the development of indigenous cultures that were thriving at European contact in the sixteenth century. By this time, the Calusa culture had made a hunter-fisher-gatherer lifestyle sedentary and highly complex, with a stratified social order that had come to politically control the entire southern peninsula of Florida (Marquardt 1987, 1992a:1-2, 2001).

This region has been largely ignored or misunderstood by anthropologists well into the twentieth century, even in comprehensive texts such as *Archaeology of the Southeastern United States, Paleoindian to World War I* (see Bense 1994). The Pineland Site Complex was explored and sketched by Frank Hamilton Cushing in 1895 and 1896, and explored by C. B. Moore in the early 1900s (Cushing [1897] 2000; Kolianos and Weisman 2005a, 2005b) . Since 1988, professional archaeological work at the Pineland Site Complex has been conducted under the supervision of William Marquardt and Karen Walker of the Florida Museum of Natural History (FLMNH).

The research conducted at the Pineland Site Complex has been guided by the principle of historical ecology. Marquardt and Walker (2013:793) believe that “cultural change cannot be understood in the absence of environmental context, nor can environmental conditions be considered the principal determinants of cultural patterns." From this perspective, the cultural remains found at Pineland are not seen as a separate entity from their environmental context. Changes in environment and resources over time, as well as the changes in human population and culture, mutually constitute one another, exist in dynamic interaction, and are ever-changing (Marquardt and Crumley 1987; Marquardt 1992b:423; Marquardt 2013:5). The present study functions under these principles by an examination of culture and environment focused on the pottery and faunal assemblages at Mound 5.

Pottery-based Chronology at Pineland. Chronologies created based on the frequencies of perceived pottery types has a long history in North America beginning in the early twentieth century with work by Kroeber, Spier, and Ford (Trigger 1996:296-297). When a pottery sequence is interpreted as having a temporal dimension, seriation becomes a relative dating technique (Rice 1987:436). Dunnell (1970:312-315) suggested that seriation could not be applied to chronology unless three conditions were met: that all units included in a seriation be of comparable duration, that all units belong to the same cultural tradition, and that all units come from the same locality. When these conditions are met, seriation, combined with other techniques, "will continue to be an important archaeological tool" (Marquardt 1978:302).

Building a pottery-based chronology for the Caloosahatchee Culture Area is challenging because its prehistory is often dominated by undecorated sand-tempered wares with little obvious differentiation through time. However, studies by Luer and Almy (1980), Milanich et al. (1984), and especially Cordell (1992, 2005, 2007, 2013) demonstrate the chronological potential of southwest Florida pottery types. Widmer's (1988:83-87) "Caloosahatchee Sequence" has served as a useful ceramic chronology for the culture area, but research by Cordell (1992, 2005, 2013) has refined Widmer's sequence based on extensive study of characteristics of paste and decoration, as well as technological and formal variability. Much of this research has directed attention to the Belle Glade pottery type as a temporal marker at the Pineland Site Complex.

The Caloosahatchee I period (500 B.C. to A.D. 500) is characterized by sand-tempered and laminated sand-tempered plain pottery, and perhaps most importantly, an absence of Belle Glade ceramics. Work at the Pineland site suggests that A.D. 500 or earlier is an appropriate estimate for the Caloosahatchee I to II transition (Cordell 2013:501). The Caloosahatchee I period (500 B.C. to A.D. 500) is also identified with the climate episode known in the North Atlantic and elsewhere as the Roman Warm Period, a time of warmer climatic conditions globally. The appearance and increase of Belle Glade ceramics along with the sand-tempered plain wares distinguish Caloosahatchee II (A.D. 500 to A.D. 1200). Cordell (2013) subdivides Caloosahatchee II into IIA (A.D. 500-800), the introduction of Belle Glade pottery, and IIB (A.D. 800-1200), when Belle Glade pottery becomes a predominant component of the assemblage. Recent research has further defined Caloosahatchee IIA into IIA-early (A.D. 500-650) and IIA-late (A.D. 650-800) (Cordell 2007, 2013). Caloosahatchee IIA and IIB correspond with the climatic cooling of the Vandal Minimum (A.D. 550-850) and the climate warming of the Medieval Warm Period (A.D. 850-1200), respectively.

CHAPTER 3
EXCAVATION AND LABORATORY METHODS

In 2009 permission was granted by property owner Randy Wayne White to conduct excavations at Mound 5 of the Brown's Complex (BCM5), adjacent to the campus of the Randell Research Center, to assess possible impacts of modifications to the property proposed by the owner. These modification plans were later abandoned by Mr. White in light of the discoveries made during the 2009-2010 excavations.

Excavation Methods

The initial excavation unit (M-1) was established near the high point of the feature (Figure 4-1) using the primary datum for the Pineland Site Complex, located on the stairs of Brown's Complex Mound 1. The 2-x-2-m unit was positioned with its northern profile parallel to the northern boundary/ property line of the parcel owned by Mr. White, which defines the boundary with the Randell Research Center property to the north. Two-by-two-meter units were used on all three excavations to expose maximum southern profiles of the feature. Excavation units were divided into 10-cm arbitrary levels for provenience control, and 50-x-50-cm units were established in the southwest corners of M-2 and M-3 for extraction of bulk samples for faunal analysis. Excavation sheets were filled out for each 10-cm level of the excavations, and included a sketch of the excavation level, a list of mapped artifacts, observations of the molluscan component not collected, and other observations relevant to the excavation unit and level. Profiles were drawn by hand of each of the four profiles in each unit, and photos were taken as each level was completed.

Excavation M-1 was halted because of the presence of human remains less than 10 cm below the surface, near the highest elevation of the present-day mound feature (Figure 4-1). A length of metal tubing, perhaps for a gas line, running southeast to northwest across M-1, had been dug into the mound surface at some point during modern occupation of the site. The human remains consisted of 22 teeth and several phalanges; the teeth were identified by UF bioarchaeology graduate student Gypsy Price as being from one individual (report on file, Anthropology Accession 2009-3, FLMNH). The remains may have been more deeply buried by subsequent midden accumulation; contexts including Caloosahatchee III and IV components may have been removed to level the mound for the construction of a dwelling in the early twentieth century. After consultation with the FLMNH and then-State Archaeologist Ryan Wheeler, the remains were reinterred in situ.

Pottery sherds were collected during the excavation of three units (M-1, M-2, and M-3) using 1/4-inch-mesh screens; most identifiable pottery was collected from the 1/4-inch screen. When possible, sherds were mapped and recorded to provide the most accurate provenience possible. Pottery was also collected from the 50-x-50-cm faunal sample in Excavation M-3. The faunal sample collected from the 50-x-50-cm column was processed using 1/4-inch (6.35 mm), 1/8-inch (3.17 mm), and 1/16-inch (1.59 mm) screens. Excavation M-2 (Figure 4-2) includes levels 83 through 96 in the Pineland Elevation System; Excavation M-3 (Figure 4-3) includes levels 87 through 96 (see Walker and Marquardt 2013:53-59 for Pineland Elevation System). Excavations in M-2 and M-3 were stopped at Level 96 because it is at the present-day water table. As noted above, Excavation M-1 was halted due to the presence of human remains directly below the surface in a disturbed context. Because of the small sample collected and the disturbed context, pottery sherds and faunal remains from Excavation M-1 are not considered in the present study.

Excavation M-2 at Brown's Complex Mound 5 was initially chosen for extraction of a zooarchaeological sample after M-1 was closed due to the presence of human remains. A standing column method, where a 50-x-50-cm column would be left standing in the southwest corner of the 2-x-2-m excavation to be collected after the excavation unit was completed, proved ineffective. Due to the stratigraphic composition of the feature, with over 1.5 m of loose whole shell in Stratum III, both the profiles and the standing column proved unstable. Another factor involved was that the excavation remained closed and covered with tarps over the summer rainy season, and rain and runoff from a nearby structure added to the instability of profiles and column sample.

Excavation M-3, begun in 2010, was positioned down-slope from M-2, one meter to the east. Collection strategy employed here was to designate the 50-x-50-x-10-cm zooarchaeological sample in the southwest corner of the excavation, and to remove each 50-x-50-x-10-cm sample as each 10-cm level of the entire excavation was complete. This method proved very effective, allowing the exact extraction of each sample with much better control of the profiles. Samples were collected for each 10-cm level from Level 81 through Level 96.

Pottery Analysis Methods

One thousand nine hundred twenty-nine sherds were recovered from the excavations, with 883 from Excavation M-2 and 837 from M-3. Of these, 1,362 sherds were considered too small for analysis (see Cordell 1992:107; 2013:383), leaving 558 sherds available for consideration. For quantification, focus is placed on Sand-tempered Plain, Belle Glade Plain, St. Johns Plain, Sandy St. Johns, and St. Johns Check Stamped pottery types. Other types were found in quantities too small to be statistically robust. Sherds were washed, dried, and labeled with catalog numbers prior to being transported to the South Florida Collections at the FLMNH for curation. A complete data table for all Mound 5 pottery proveniences is on file at FLMNH as well (Accession 2009-3).

Belle Glade wares are one of the most temporally significant of the pottery types found for the Caloosahatchee II period at the Pineland Site Complex. As for vessel form, the attributes most useful for making temporal distinctions in Belle Glade pottery include rim thickness, the difference between rim and body thickness, and lip/rim shape (Cordell 2013:494). Sherds were analyzed for rim thickness using calipers placed 3 cm below the rim of the vessel sherd. If more than 5% of the vessel rim was present, profiles were drawn to establish vessel shape as well as orifice diameter.

Thirty-six rim sherds were chosen from Excavation M-3 with proveniences within Level 91. This assemblage consists of 20 sherds of Belle Glade ware, seven Sand-tempered Plain sherds, seven St. Johns sherds (including St. Johns Check Stamped and Sandy St. Johns types), one sherd of Pineland paste, and one small sherd of Pinellas paste, and includes all rim sherds collected from levels 89 through 93. It has been suggested that vessel forms of Belle Glade Plain are typically outslanting, shallow bowl forms designed to enable nesting of several bowls within one another, a desirable feature for tradeware pottery (Cordell 2013:502). Vessel form analysis was also done on the twenty Belle Glade Plain sherds from Mound 5 mentioned above.

Petrographic Analysis Methods

Because of the lack of design elements on most of the pottery types found at Pineland, identification can at times be problematic. When analyzing the Mound 5 assemblage, there were 43 sherds that I found could not be attributed with any confidence to either Belle Glade Plain or a variety of St. Johns Plain. Of those sherds, 39 were identified as Sandy St. Johns type by Cordell (personal communication, 2011). These two types of Florida plainware, Belle Glade and St. Johns, have what Cordell describes as “overlapping criteria for and persistent inconsistencies in their recognition” (Cordell 2007:117). Quartz sand and sponge spicules from freshwater sponges are the predominant compositional elements in both Belle Glade and Sandy St. Johns paste types

(Cordell 2007:120). Austin (2004) developed a key to assist in the identification of undecorated pottery in the Kissimmee River and Lake Okeechobee region which can be used along with a 70X microscope to examine fresh breaks, but this method of analysis is still somewhat subjective. Cordell (2007) used a small sample of Belle Glade Plain and Sandy St. Johns sherds to begin to establish more specific identifiers using petrographic analysis to distinguish between the two types. Normally, in petrographic analysis, minerals are identified by their optical properties (Rice 1987:376). In the case of the Belle Glade Plain and Sandy St. Johns wares, the thin-sectioning process can also be used to identify and quantify an organic element, the fresh-water sponge spicules present in both paste types, as well as sand or quartz grain quantities and size differences. Thin sections cut from sherds are applied to a slide, ground to a thickness of 0.03 mm, covered by thin glass, and examined under a polarizing microscope (see Rice 1987:377-379). To obtain samples, "thin sections are made parallel to the vertical axis of the vessel" for analysis (Rice 1987:380); in the case of spiculate wares, the "preferred orientation of sponge spicules...is parallel to the horizontal planes of a pottery vessel" such as rims and coil fractures; horizontal cuts for thin sections allow the most efficient point counts of paste elements such as the linear sponge spicules (Cordell 2007:117).

Because there was a small sample of both of these types in the Mound 5 pottery assemblage, Cordell suggested another examination of Belle Glade and St. Johns by microscopic petrographic analysis to explore further the relationship between these two common pottery types. Funding for the thin sectioning and slide production was provided by Ann Cordell through the Ceramics Technology Laboratory and William Marquardt through the Randell Research Center research fund. Samples from Excavation M-3 would be provided from the controlled proveniences surrounding Level 91 and the adjoining Level 92. Ten sherds were chosen for analysis, including three Belle Glade sherds, three Sandy St. Johns, two St. Johns Plain, and two St. Johns Check Stamped. The sherds were prepared at the Ceramics Technology Laboratory by Cordell, who also analyzed the thin sections. Her methods are as follows:

> Point counts were made for quantifying relative abundance of inclusions. This procedure involved using a petrographic microscope with a mechanical stage and generally followed recommendations by Stoltman (1989, 1991, 2000). A counting interval of 1 mm by 1mm or 1x 0.5mm was used, depending on size or area of sherd within the thin sections. Each point or stop of the stage was assigned to one of the following categories: clay matrix, void, silt particles, sponge spicules, and very fine through very coarse quartz and other aplastics of varying compositions. For cases in which fewer than 200 points were counted (n=4), the thin sections were rotated 180^{o} on the mechanical stage and counted a second time (after Stoltman 2000:306). Point counts were made using the 25X objective (with plane-polarized light) in order to obtain accurate counts of sponge spicules. Size of aplastics was estimated with an eyepiece micrometer with reference to the Wentworth Scale (Rice 1987:38). A comparison chart of percent particle abundance (Rice 1987:349) was also used for estimating relative abundance of constituents occurring in low frequency**.** All analyses were conducted by Ann S. Cordell in the FLMNH Ceramic Technology Laboratory (FLMNH-CTL). Raw point-count and percentage data are listed. By convention, the total counts exclude the number of counted voids (Stoltman 1991:107). Point-count data were used to calculate Stoltman's sand size index (2000:314) for siliceous sands. A second set of sand size indices is also listed which takes into account the size difference between very fine and fine particle sizes. In the second index, very fine grains are given a value of 0.5 while fine grains have a value of 1. Counts of silt and other matrix constituents (sponge spicules, phytoliths, ferric concretions, clay lumps) were excluded from these calculations.
>
> (Cordell, personal communication, 2011)

Zooarchaeological Analysis Methods

Faunal remains were collected from three 2-meter-square units (Excavations M-1, M-2, and M-3) using 1/4-inch (6.35 mm) screens. Excavation units were divided into 10-cm arbitrary levels for provenience control. Molluscan remains from the general excavation levels within the units were noted by volunteers as to type and frequency and subsequently discarded. Bulk samples including bone and shell were also collected from a 50-x-50-cm column sample in the southwest corner of M-3 for each 10-cm level. These samples were processed using 1/4-inch

(6.35 mm), 1/8-inch (3.17 mm), and 1/16-inch (1.59 mm) screens and all faunal remains, including mollusk shells, were retained for analysis. As noted above, M-1 was halted due to the presence of human remains directly below the surface. Because of the small sample collected, faunal remains from M-1 are not considered in the present study. Excavation M-2 includes levels 83 through 96 in the Pineland Elevation System; Excavation M-3 includes levels 87 through 96 (see Walker and Marquardt 2013:53-59). Excavations in M-2 and M-3 stopped at Level 96 because it is at the present-day water table. When possible, notable specimens of bone and shell were mapped and recorded in the general levels to provide the most accurate provenience possible. Two samples were chosen for analysis from M-2, Stratum III, levels 84 and 85, a dense shell midden layer characterized by large quantities of visible mollusk shell. This stratum is comparable to Stratum III in M-3 that yielded a radiocarbon date of A.D. 650 (cal 2σ A.D. 620-680) (catalog number 2009-3-552/17, Beta-288024). The sample consists of vertebrate remains only, collected in 1/4- inch screens, from levels 84 and 85 of M-2. Bulk samples were collected from M-3 in a 50-x-50-cm column in the southwest corner of the unit, one sample per 10-cm level. Two samples noted above (levels 91 and 96) were chosen to represent Stratum III and the barely exposed Stratum IV, respectively. A sample was also analyzed from Level 95, 1/4- inch (6.35 mm) sample only, just above Stratum IV.

Zooarchaeological samples from M-3 were processed at the Randell Research Center classroom site using a set of three stacked screens: 1/4- inch (6.35 mm), 1/8-inch (3.17 mm), and 1/16-inch (1.59 mm.). Samples that were excavated and composed of dry material were screened dry; samples from lower levels where rainwater or tidal water had intruded were wet screened. Volunteers screened materials in front of the classroom at the Randell Research Center Calusa Heritage Trail and at the Ruby Gill House lab at Pineland, and did a preliminary sorting and separation of artifacts, shell, bone, and burned wood. Screening at the classroom was scheduled to take place during weekly public tours of the site, thus providing a closer look at excavation and processing methods for the general public. At the end of the excavation process, all excavated materials were sent (after fumigation) to the FLMNH South Florida collections for analysis and final curation.

The faunal samples discussed here were analyzed using the comparative collections housed at the Environmental Archaeology (EA) lab at FLMNH, the Archaeology Teaching Lab at UF's Zooarchaeology Lab at UF, and also at the Randell Research Center. Some specimens were verified with the help of Karen Walker, Susan deFrance, and EA collection manager Irv Quitmyer. Taxonomic nomenclature followed previously published work on Pineland as well as the Integrated Taxonomic Identification System (Banks et al. 2004; deFrance and Walker 2013; Walker 1992). Field guides on local present-day species were used for environmental and habitat data. The results will be compared to previous work by deFrance and Walker (2013), as well as a sample analyzed by UF undergraduate student Jason Breslin from BCM5, M-3-91. Specimens were quantified using the basic methods of determining number of identified specimens (NISP), minimum number of individuals (MNI), as well as shell and bone weight (Reitz and Wing 1999:191).

CHAPTER 4
STRATIGRAPHY AND RADIOCARBON DATING

The environmental and cultural history discussed above is expressed in the stratigraphy of Mound 5, and may be compared to contemporaneous excavation units on the Pineland Site. Excavation M-1 only proceeded a little over 10 cm into the surface of the mound before the presence of human remains halted excavations. This stratum, identified as Stratum I (Figures 4-1, 4-2, 4-3, 4-4, 4-5, and 4-6), consists of medium grayish sand, roots, crushed, broken and whole small mollusks, and abundant historic debris. Historic debris consisted of bricks, rusted metal, tar paper, cans, modern ceramics, buttons, and glass of various types. This debris can be dated back to the late nineteenth century by a glass medicine bottle (discussed below). Due to the late-nineteenth and early twentieth century history of gardening and modification at Pineland, this amount of disturbance and debris are to be expected, and historic disturbance is encountered on most surface areas of the Pineland Site (see Marquardt and Walker 2013:858-869). The southwest corner of excavation M-2, levels 80-88, shows an hourglass shaped pit filled only with sand and what appear to be flecks of charred wood (Figure 4-3), and the south profile of excavation M-3 also shows a deep sand pit extending from the surface (Level 87) past Level 92, filled with clean sand and the sherds of a modern terra cotta pot (Figure 4-5). All historic debris collected is curated in the South Florida range, FLMNH.

BCM5 Stratum II is characterized by a mixture of dark grey sand with crushed, broken, and whole shell, bone, and pottery sherds. Small amounts of historic material were identified in Stratum II, and were perhaps intrusive from Stratum I, as they were small in size and far less frequent. Stratum IIA was identified in Excavation M-3, shown in the north and east profiles, differing from Stratum II in the near absence of sand and complete absence of historic debris (Figure 4-4).

Stratum III in Excavations M-2 and M-3 differed from Stratum II in that the majority of the gastropod shell was whole, with little to no sand present. Lightning whelk dominates the gastropod assemblage, with large numbers of pearwhelk, crown conch, tulip, and fighting conch present, and many other species in smaller quantities; large numbers of bony fishes are represented in the stratum, as well as small numbers of birds, land vertebrates, and reptiles (Tables 6-1, 6-2, 6-3, and 6-4). In addition to faunal remains, large quantities of pottery sherds were collected from Stratum III. Another criterion used to identify this stratum was the complete absence of historic material. Using a single fighting conch (*Strombus alatus*) shell (catalog number 2009-3-552/17, Beta-288024), a measured radiocarbon age of 1310 +/- 40 BP resulted, and a Cal range ($\pm 2\sigma$) A.D. 580 to 700 was assigned to Stratum III. This would place the stratum in the Caloosahatchee IIA period, perhaps covering the transition from IIA-early to IIA-late (Marquardt and Walker 2013:827-839). A detailed description of deposits dating to this period is provided by Marquardt and Walker (2013:832-835). Broadly contemporaneous deposits dated using marine shells are found at Surf Clam Ridge, Old Mound, Brown's Complex Operation C, Brown's Complex Mounds 1, 2, and 4, and at Randell Complex Mound 1 (Marquardt and Walker 2013:890-891).

Below Stratum III, a layer of very dark, damp sediment and crushed shell is present. In both M-2 and M-3, these levels were difficult to excavate and sample due to constant shifts in tide and seasonal rains. In comparison to the sample from Stratum III Level 91, the sample from Stratum IV Level 96 has higher numbers of lightning whelk, pearwhelk, and crown conch (Tables 6-3 and 6-5). Comparatively fewer bony fishes are found in the Stratum IV faunal sample (Tables 6-3 and 6-5). Again using a single fighting conch shell (catalog number 2009-3-708/1, Beta-288025), a measured radiocarbon age of 1520 +/- 40 BP resulted, and a Cal range

($\pm 2\sigma$) A.D. 360 to 550 was assigned to Stratum IV. If accurate, this date would place Stratum IV in the Caloosahatchee I-late period (Marquardt and Walker 2013:811-827). A detailed description of deposits dating to this period is found in Marquardt and Walker (2013:823-827). Broadly contemporaneous deposits at the Pineland Site have been identified at Surf Clam Ridge, Citrus Ridge, Old Mound, and Brown's Complex Operation C (Marquardt and Walker 2013:891-892).

Due to the topography of BCM5 and its location close to the present-day shoreline, excavations were halted at Stratum IV due to the presence of the water table.

Figure 4-1. Operation M, Excavation M-1 on BCM5, Pineland Site Complex.

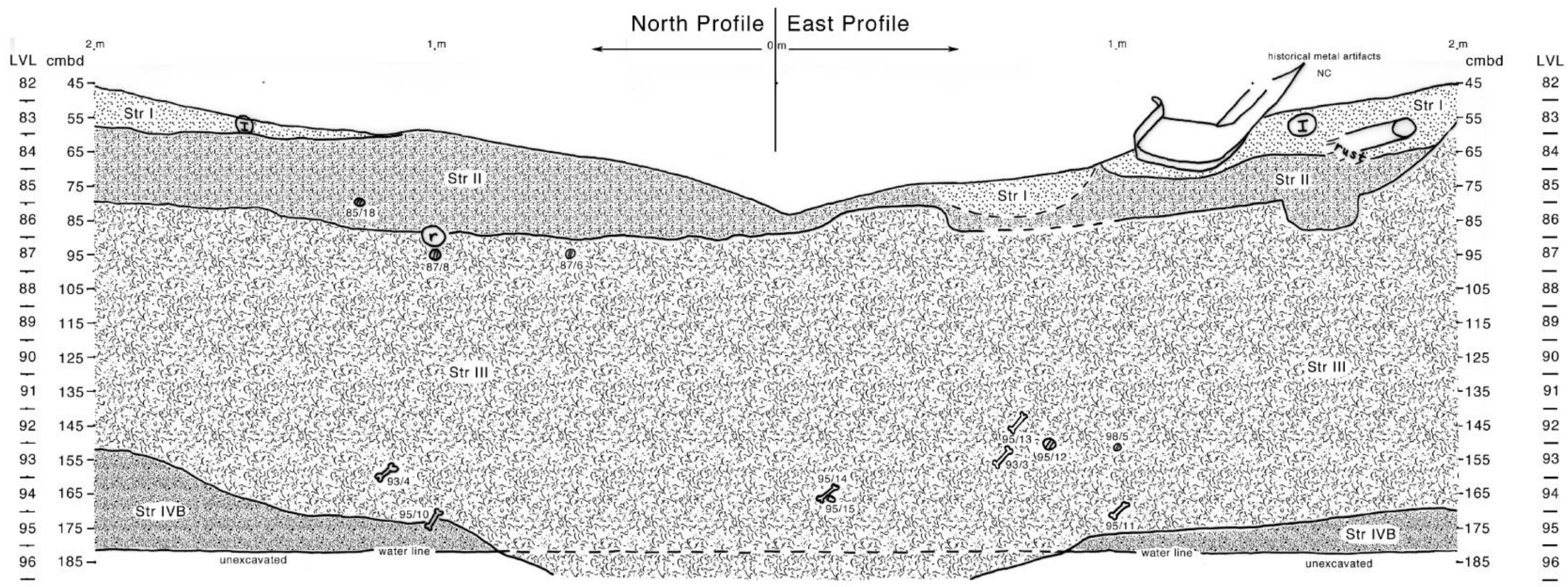


Figure 4-2. BCM5, M-2, North and East Profiles. Stratum I consists of medium grayish sand, roots, crushed, broken, and whole small shells, and abundant historic debris. Stratum II consists of a mixture of dark grey sand with crushed, broken and whole shell, bone and pottery sherds, with small amounts of historic debris in upper levels; Stratum III differs from Stratum II in that the majority of gastropod shells were whole, with little or no sand present; Stratum IV consists of dark, damp sediment and crushed shell, with bone and pottery sherds.

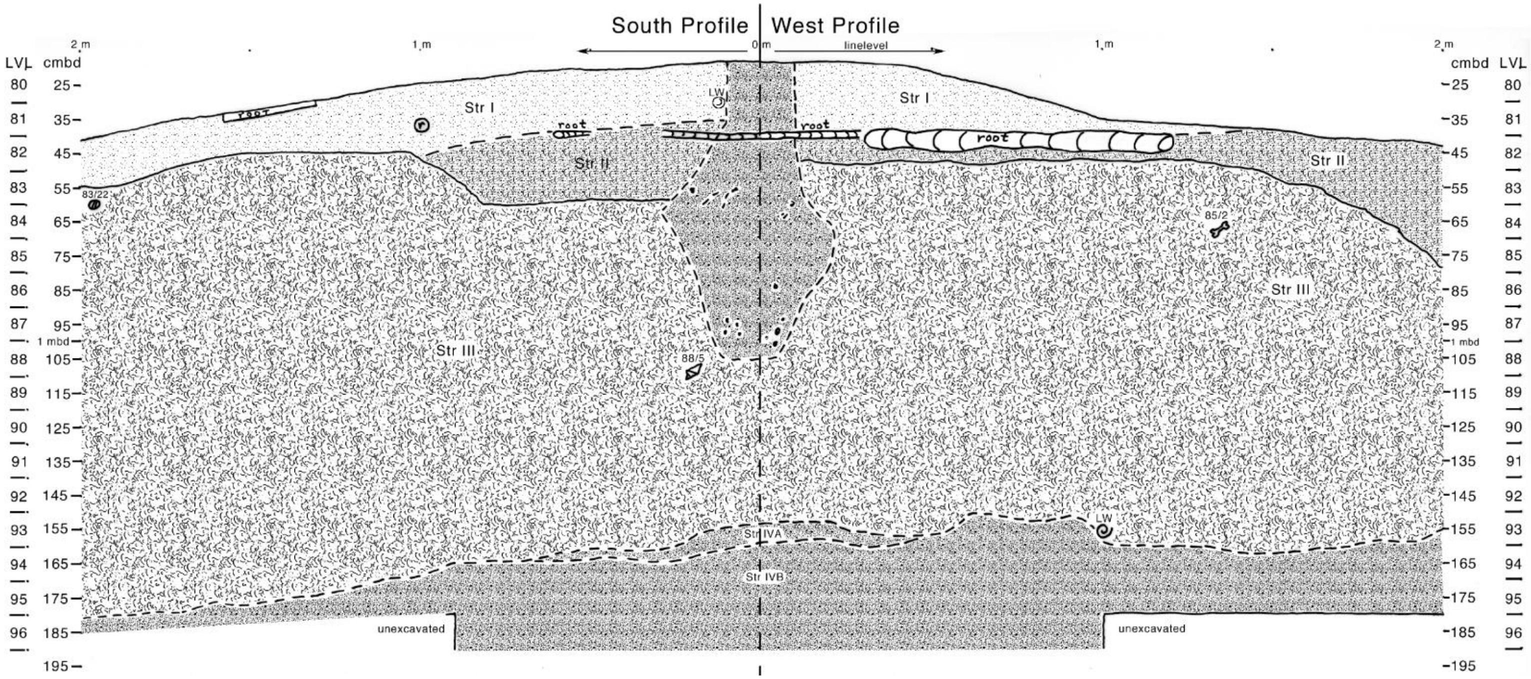


Figure 4-3. BCM5, M-2, South and West Profiles. Stratum I consists of medium grayish sand, roots, crushed, broken, and whole small shells, and abundant historic debris; large tree roots are indicated. Stratum II consists of a mixture of dark grey sand with crushed, broken and whole shell, bone and pottery sherds, with small amounts of historic debris in upper levels; Stratum III differs from Stratum II in that the majority of gastropod shells were whole, with little or no sand present; Stratum IV consists of dark, damp sediment and crushed shell, with bone and pottery sherds. A historic intrusion is shown at the southwest corner of the excavation.

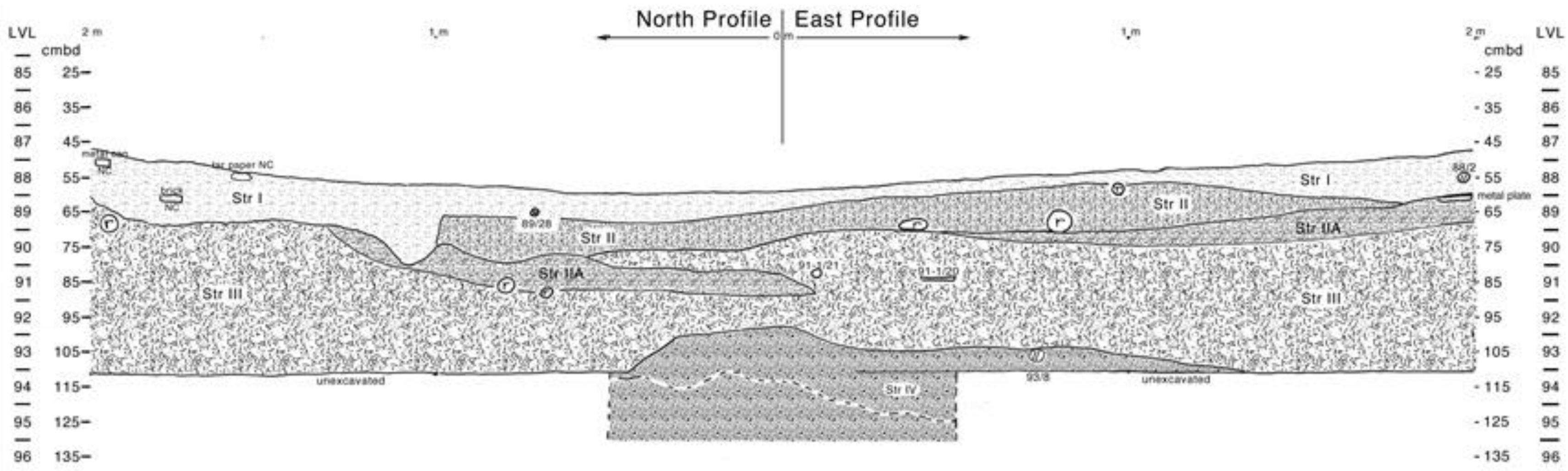


Figure 4-4. BCM5, M-3, North and East Profiles. Stratum I consists of medium grayish sand, roots, crushed, broken, and whole small shells, and abundant historic debris. Stratum II consists of a mixture of dark grey sand with crushed, broken and whole shell, bone and pottery sherds, with small amounts of historic debris in upper levels. Stratum IIA differs from Stratum II in the near absence of sand and complete absence of historic debris. Stratum III differs from Stratum II in that the majority of gastropod shells were whole, with little or no sand present; Stratum IV consists of dark, damp sediment and crushed shell, with bone and pottery sherds.

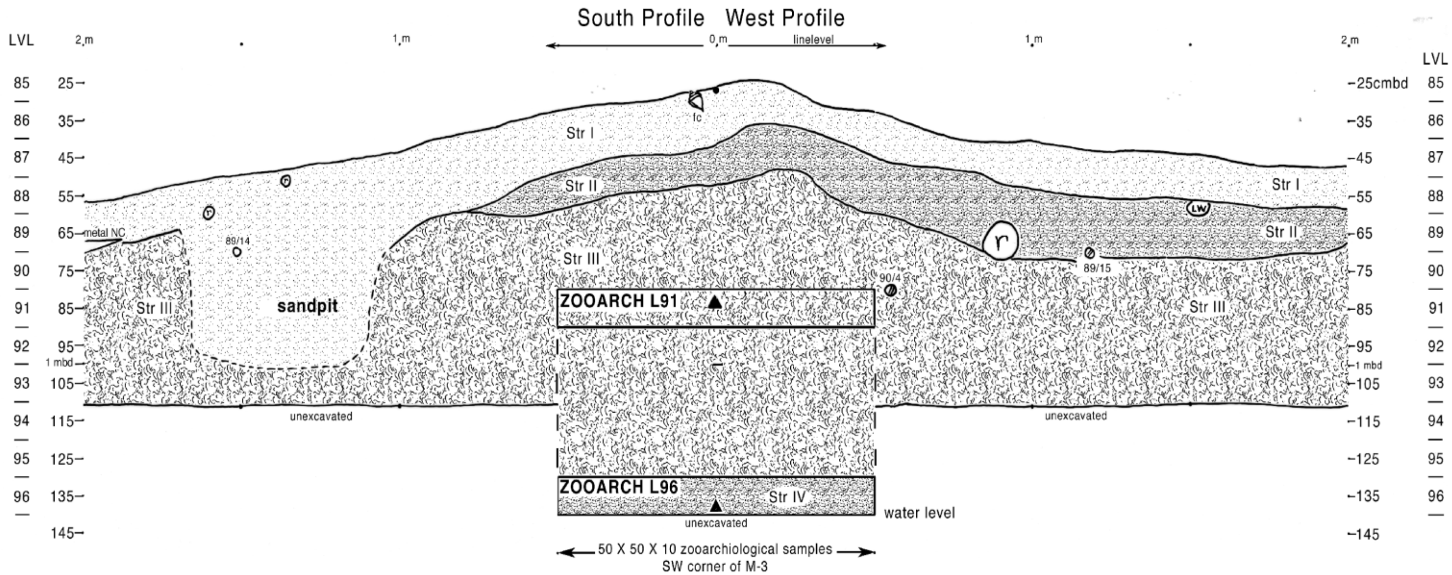


Figure 4-5. BCM5, M-3, South and West Profiles. Stratum I consists of medium grayish sand, roots, crushed, broken, and whole small shells, and abundant historic debris. A pit filled with sand may be seen in the south profile. Stratum II consists of a mixture of dark grey sand with crushed, broken and whole shell, bone and pottery sherds, with small amounts of historic debris in upper levels. Stratum III differs from Stratum II in that the majority of gastropod shells were whole, with little or no sand present; Stratum IV consists of dark, damp sediment and crushed shell, with bone and pottery sherds.

CHAPTER 5
RESULTS OF ARTIFACT ANALYSIS

Artifact Analysis

Historic material was found above the remains of the Mound 5 feature dated to Calusa times. The copper tubing from Excavation M-1, the post hole in M-2, and the sand-filled pit in M-3 all show the taphonomic effects of historic disturbance on the site. Large amounts of broken glass, ceramics, and metal were removed and collected from Strata I and II, and are curated in the FLMNH South Florida collections (2009-3). One artifact (catalog number 2009-3-423/1) in particular, a glass medicine bottle marked “Sloan’s N&B Liniment Dr. E. S. Sloan Boston”, was dateable to the late nineteenth century (Baldwin 1972:452). The bottle was found intact in M-3 Level 88 amidst other historic debris. Two shirt studs, one made of bone and one of glass, were identified as typical of the late nineteenth or early twentieth century by Gifford Waters of FLMNH (personal communication, 2011). Many other historic artifacts were found in the upper levels of BCM5, including mother-of-pearl buttons and the metal plate from the inside of a harmonica.

One notable artifact from Excavation M-2 is a worked piece of bone that was not recognized as such during the washing and sorting of the bone component. Approximately 2.5 x 3.5 cm, it has a hole drilled in it and some use wear on the intact edge, and at a glance looks much like a shark tooth. The material is bone, and may be from sea turtle (Irvy Quitmyer, personal communication, 2011). While drilled shark and fossil shark teeth are known from Calusa sites, this would be the first “imitation” shark’s tooth found locally. The artifact is curated in the South Florida collections at the FLMNH.

Other artifacts collected from Mound 5 excavations include shell hammers, cutting tools, net gauges, and numerous net weights. All are curated in the South Florida collections at FLMNH under accession number 2009-3.

Pottery Analysis

The pottery sample from the Mound 5 excavations has helped to provide secondary evidence for the temporality of this component of the Brown's Complex at Pineland. Based on frequency by level, rim and lip shape, and vessel wall thickness of the Belle Glade type, the Mound 5 assemblage from Stratum III can be placed firmly in the transitional period of Caloosahatchee IIA-early to IIA-late.

Excavation M-2 (Figures 4-2 and 4-3) showed a definitive stratigraphic temporal progression in Belle Glade frequencies level by level, with much heavier frequency in the upper levels (levels 83 through 88), and very few in lower levels (levels 89 through 96). Strata were assigned to the units based on the inclusion of historic debris and changes in depositional and sedimentary characteristics. Stratum III, a stratum described as dense shell with little organic sediment (levels 83 through 92), yielded 73 Belle Glade sherds; Stratum IV, described as having little shell and dark organic sedimentary elements (levels 93 through 96) yielded only seven (Figure 5-3). Excavation M-3 also exhibited a top-heavy deposit of Belle Glade, with 69 Belle Glade sherds in levels 89 through 92 and only 11 in levels 93 through 96.

Belle Glade wares are one of the most temporally significant of the pottery types found at the Pineland Site Complex. As for vessel form, the attributes most useful for making temporal distinctions in Belle Glade pottery include rim thickness, the difference between rim and body thickness, and lip/rim shape (Cordell 2013:494). The difference is thought to be especially significant in the transition from Caloosahatchee IIA-early to Caloosahatchee IIA-late, ca. A.D. 650, the radiocarbon date for M-3 Level 91. Belle Glade Plain pottery from Caloosahatchee IIA-early contexts tends to have a mean wall thickness of 6 mm, with flat, squared lip shapes, while Belle Glade Plain vessels from Caloosahatchee IIA-late contexts display a decrease in flat/squared lips and an increase in flat/beveled lips and a slightly thinner body thickness of 5.5 mm; both IIA-early and IIA-late have rims that range from .5 to 1 mm thicker than vessel walls (Cordell 2013:491). The Belle Glade Plain rim assemblage represented here exhibits a mean rim thickness of 6.7 mm, and a median thickness of 7.05 mm (Figure 8). If these rims are .5 to 1 mm thicker than the vessel walls, this would yield an average wall thickness of 6.55 mm, falling neatly into the transition from Caloosahatchee IIA-early and Caloosahatchee IIA-late (see Cordell 2013:497, 500). Because these samples are from different contexts clustered around a date of A.D. 650, this vessel attribute falls within the expected range of vessel wall thicknesses.

Rim form is also temporally significant in Belle Glade Plain assemblages at Pineland, as noted above. The sample examined by Cordell shows a Caloosahatchee IIA-early assemblage consisting mostly of vessels with flat/square lips, and a IIA-late sample showing a decrease in flat/square lips and an increase in flat/beveled interior and flat/expanded rims (Cordell 2013:497, 500). The 20 sherds of Belle Glade ware in the Mound 5 assemblage show an almost even split in rim types, with eleven flat/squared rim types and nine flat/beveled rims. Although this observation is somewhat subjective, the mix of styles does fit with a mid-seventh century provenience for the Pineland Site Complex, and could represent a transitional period in rim styles.

It has been suggested that vessel forms in Belle Glade Plain are typically outslanting, shallow bowl forms designed to enable nesting of several bowls within one another, a desirable feature for tradeware pottery (Cordell 2013:499, 502). All of the twenty vessels identified as Belle Glade Plain in the Mound 5 assemblage exhibit outslanting bowl forms, and the size ranges represented could have been nested within one another. If the Belle Glade wares found at the Pineland Site Complex were being transported by canoe from the interior peninsula around Lake Okeechobee, size would be a limiting factor for transport; the largest bowl forms identified in this study would conform to the average width for the numerous dugout canoes found in Florida, the bowls having a maximum width of approximately 14 cm.

The Caloosahatchee III (A.D. 1200 to A.D. 1350) component does not appear to be present in the Mound 5 excavations, and would be represented by the addition of occasional St. Johns Check Stamped and Englewood ceramics, the former thought to be a tradeware, the latter of a specialized ritual-mortuary context. As mentioned above, Excavation M-1 was halted because of the presence of a human burial less than 10 cm below the surface, near the highest elevation of the present-day mound feature (Figure 4). The burial may have been more deeply buried by subsequent midden accumulation; contexts including Caloosahatchee III and IV components may have been removed to level the mound for the construction of a dwelling in the 1920s.

Finally, the petrographic distinctions between Belle Glade and the various sub-types of St. Johns could eventually be made clearer by the continued collection of thin-section samples from various south Florida sites to further define the differences and similarities in these types. Cordell believes that there is more variation among Belle Glade than previously thought. There appears to be much to still learn about where, how, and why these spiculate wares were produced, used, and traded among the ancient populations of Florida.

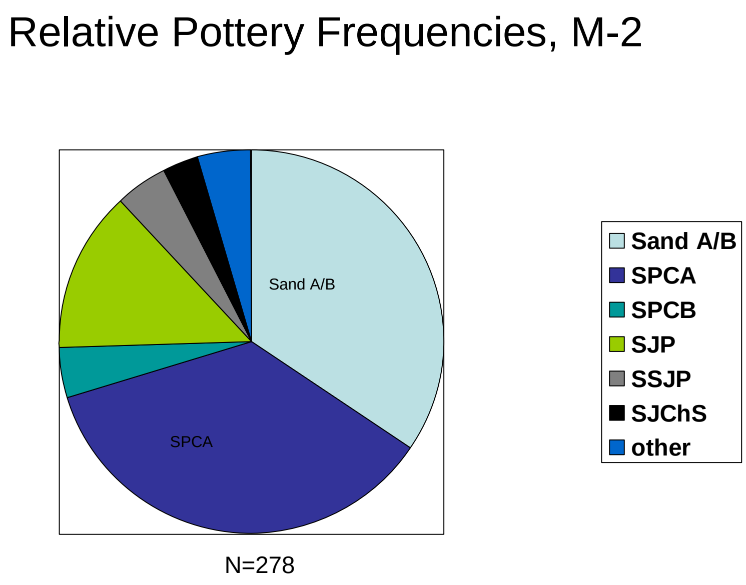


Figure 5-1. Relative Pottery Frequencies, M-2.

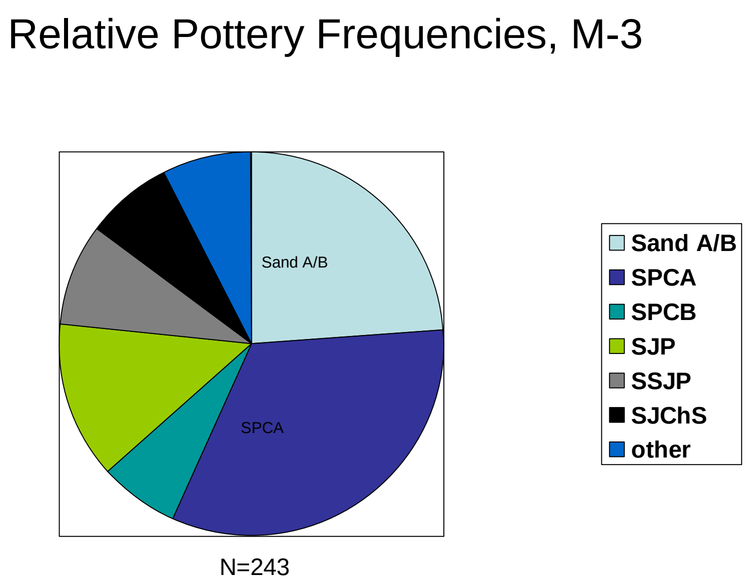
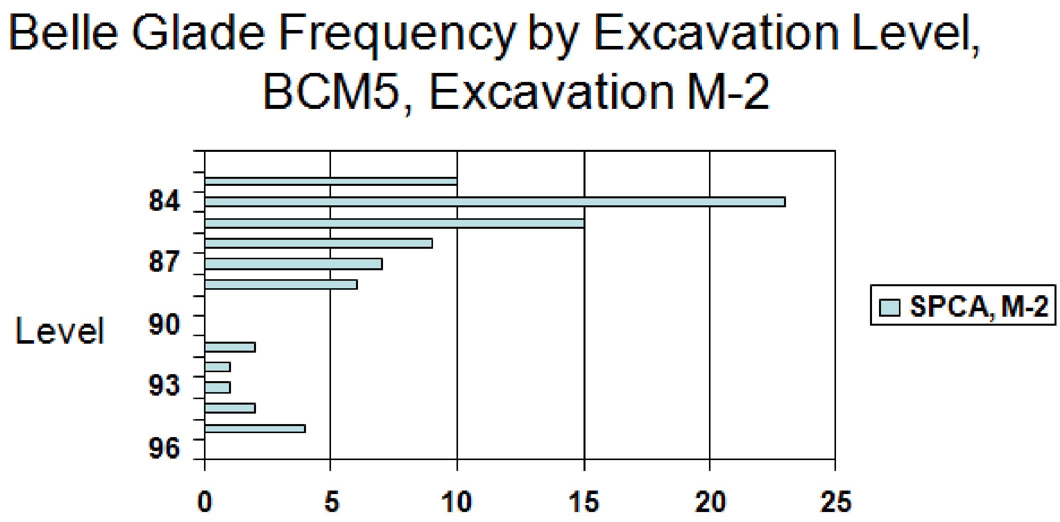


Figure 5-2. Relative Pottery Frequencies, M-3.



	96	95	94	93	92	91	90	89	88	87	86	85	84	83	
SPCA, M-2	0	4	2	1	1	2	0	0	6	7	9	15	23	10	

Figure 5-3. Belle Glade Frequency by Level, M-2.

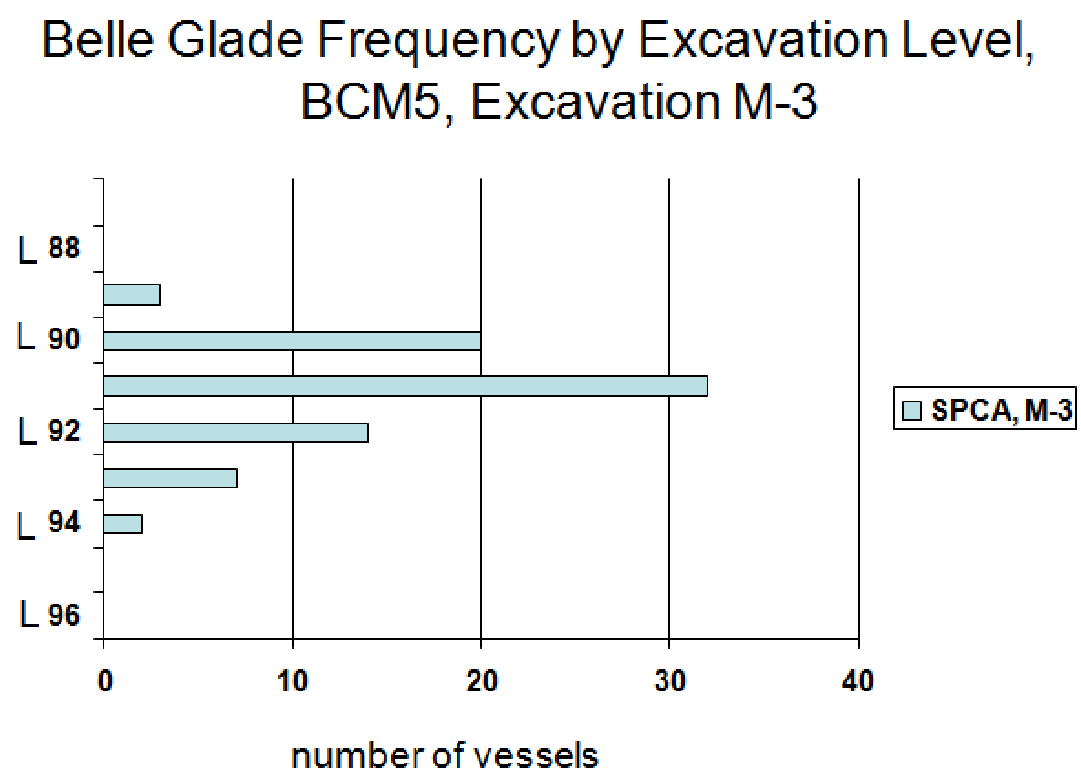


Figure 5-4. Belle Glade Frequency by Level, M-3.

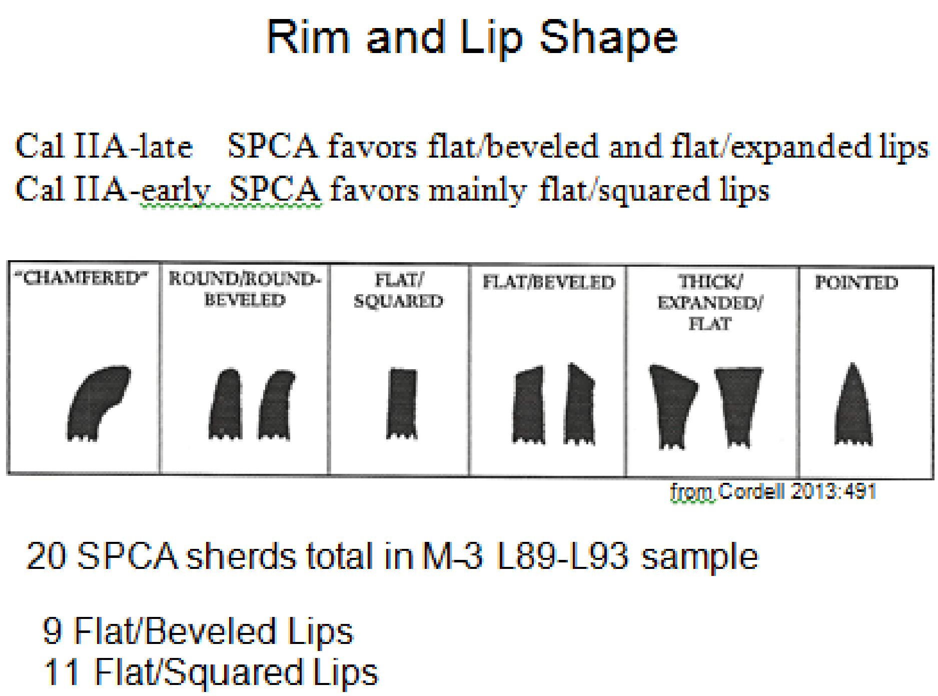


Figure 5-5. Belle Glade Rim and Lip Shape.

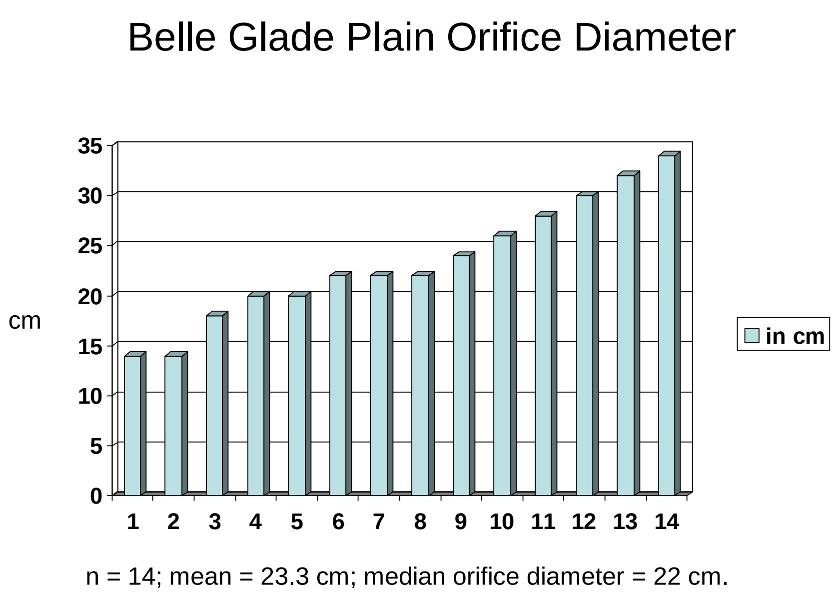


Figure 5-6. Belle Glade Orifice Diameter

CHAPTER 6
RESULTS OF ZOOARCHAEOLOGICAL ANALYSIS

In the Charlotte Harbor region, zooarchaeological records have been used to indicate that indigenous populations and their distribution have varied through time at multiple scales (deFrance and Walker 2013:305). The faunal sample expected at the Pineland site may include species from marine, estuarine, riverine, and coastal upland contexts, and to include temporal changes, as it is set in a dynamic environmental region where “an assemblage from one time period may be different from one of another time period due to a geophysical change such as a minor fluctuation in sea level” (Walker 1992:267). Much of the Calusa cultural chronology has been identified as contemporaneous with larger changes in climate (Walker 2013). The radiocarbon date of A.D. 650 for M-3, Stratum III, places the midden within Caloosahatchee IIA (A.D. 500-800), which corresponds with the climate shift beginning ca. A.D. 550 known as the Vandal Minimum. The cool Vandal Minimum follows the Roman Warm Period in climate history. A cataclysmic volcanic eruption in A.D. 536 may have been responsible for a climatic downturn that set off falling temperatures, the reformation of glaciers, plague and crop failures in Europe, and sea level regression worldwide beginning in the sixth century (Keys 1999). This widespread event has been identified at Pineland by changes in the faunal assemblage and other evidence (deFrance and Walker 2013; Marquardt and Walker 2013:827-836). From recovered vertebrate remains, one indication of seasonal procurement, possible local environmental change, and even broad scale climatic changes at Pineland are the presence of numerous ducks (deFrance and Walker 2013:322).

The two faunal samples for Excavation M-2 analyzed here include vertebrate bone only, from a 1/4-in screen, and represent Stratum III. Vertebrate faunal remains collected from M-2, Level 84 (Table 6-1) yielded 737 identified specimens representing sharks and rays, bony fishes, one amphibian, turtles, birds, and mammals, weighing a total of 332.9 gm. These remains were found to represent a minimum of 50 individual animals (MNI). Bony fishes represent 75 percent of the total sample by weight and 68 percent of the MNI, as one would expect from an estuarine island environment. Sharks and rays represent 10 percent of MNI, and mammals 8 percent, turtles 6 percent, birds 4 percent, and amphibians 2 percent of the sample.

The M-2 Level 85 vertebrate sample (Table 6-2) yielded 441 identified elements, weighing 207 gm. These remains represent 37 individuals (MNI); bony fishes again dominate the vertebrate sample with 22 individuals representing 59 percent of MNI. Birds represent 16 percent, sharks and rays 11 percent, mammals eight percent, and turtles five percent.

Sample M-3 Level 91 (Table 6-3) represents Stratum III stratigraphically. The sample was processed using 1/4-in, 1/8-in, and 1/16-in screens, and both vertebrate and invertebrate remains were analyzed. Gastropods are represented by 2,238 individuals (MNI) from 25 taxa, bivalves are represented by 358 individuals from14 taxa, bony fishes by 15 individuals from nine different taxa, and other vertebrates including reptile, bird, and mammals accounting for only six individuals from five taxa.

For sample M-3 Level 95 (Table 6-4), half of the 1/4-in-screened material was analyzed for both invertebrates and vertebrates, representing the portion of Stratum III just above Stratum IV (Figure 4-5). Gastropods are represented by 14 taxa with an MNI of 1,037 individuals. Six different bivalve species were indentified, represented by 30 individuals. Due in part to sample and screen-size bias, vertebrates are represented by only two MNI for cartilaginous fishes and one for hardhead catfish (*Ariopsis felis*).

Sample M-3 Level 96 (Table 6-5) represents Stratum IV (Figure 4-5). Prior to (and during) excavation, this sample was submerged by water (from the bottom up) and flooded with early seasonal rains, and was processed by wet screening. Both invertebrates and vertebrates remains were analyzed. Thirty-seven taxa of gastropods were identified, representing 4,036 individuals ranging from large lightning whelks (*Busycon sinistrum*) to tiny land snails less than 2 mm long. Twelve species of bivalve were identified, represented by 153 MNI. Fourteen species of bony fishes were identified, altogether represented by 55 individuals. Other vertebrates account for eight MNI, and include amphibians and reptiles (one toad, one snake, and three turtles), ducks and other birds, and one mammal, the commonly occurring cotton rat.

Contributions of shellfish as dietary components have been previously examined at Pineland. As in previous studies in the region (see deFrance and Walker 2013; Walker 1992), certain species dominate these coastal/estuarine assemblages. All of the samples analyzed in the present Mound 5 study (where invertebrates were considered) are dominated by large numbers of lightning whelks, pearwhelks (*Busycotypus spiratus*), and crown conchs (*Melongena corona*). Some significant differences in relative abundance are observable between the two strata analyzed. In M-3 Level 91, lightning whelks account for 52.39% of total food MNI and 52.93% of invertebrate food MNI; in M-3 Level 96, it is 37.9% of total food MNI and 39.31% of invertebrate food MNI. Crown conchs show an inverse relationship with the lightning whelks, representing just over 8% in food MNI for Level 91 and near 16% in Level 96. The large numbers of crown conch in the Level 96 assemblage, among other reasons, have called into question the measured radiocarbon age of 1520 +/- 40 BP, Cal range ($\pm 2\sigma$) A.D. 360 to 550 for this level, and may be re-examined with further dating (Walker, personal communication, 2011). Crown conch has been used as an indicator of stressed environment at Pineland, thriving when bivalves such as oysters are compromised by changing salinities and water levels (Walker 1992:285-286).

Bivalves are represented mostly by eastern oyster (*Crassostrea virginica*) and ribbed mussel (*Geukensia demissa*). In M-3 Level 91 oysters comprise over 10% of total MNI and over 15% of food MNI; ribbed mussel is over 2% of MNI and over 3% of food MNI. In M-3 Level 96, oyster is well over 2% of total MNI and over 7% of food MNI; ribbed mussel numbers are considerably lower, with less than 1% in all MNI categories. Both species have fairly specific environmental requirements. Ribbed mussels prefer to live in and around black mangrove roots; previous studies have postulated that the Calusa may have cleared mangrove from the shoreline, and the low numbers found in Stratum IV may reflect this practice.

A related find is a possible pearl found in a fine-screened sample from M-3 Level 96; if proven as such it would be the first found in an archaeological context at Pineland. It is curated in the FLMNH South Florida collections (catalog number 2009-3-708/1). Pearls can be produced by many species of gastropods and bivalves other than oysters, and the Calusa were known to collect and value them (see Fontaneda 1945).

The sharks identified in all samples are of the families Carcharhinidae and Sphyrnidae. The Carcharhinidae are requiem, or sand, sharks, and are known to be difficult to identify, both in life and archaeologically (Hoese and Moore 1998:128; Kozuch and Fitzgerald 1989). Species such as blacknose shark (*C. acrinotus*), bull shark (*C. leucus*), and blacktip or spinner shark (*C. limbatus/brevipinna*) have been identified previously at Pineland, as well as tiger and lemon sharks (deFrance and Walker 2013:313). Sphyrnidae represent the hammerhead sharks, "only superficially distinct from the carcharhinids" in life, perhaps more so in archaeological contexts due to hour-glass shaped vertebra (Hoese and Moore 1998:131). Because of the cartilaginous nature of most shark anatomy, teeth and vertebrae are usually the only elements to preserve archaeologically. While teeth may be diagnostic to species, the vertebrae can vary widely in each individual and are difficult to identify to species, and these were the only elements found in the samples analyzed here.

Sharks may have been caught for food, but are also useful for raw materials such as skin for sandpaper and teeth for drilling, cutting, and carving tools (Kozuch and Fitzgerald 1989:146). Large numbers of shark centra found in Florida sites coupled with the difficulty in catching live sharks suggests that purposeful shark hunting was practiced (Kozuch and Fitzgerald 1989:147).

As mentioned above, bony fishes make up the bulk of vertebrate MNI in Mound 5 samples. Recognized as vertebrates of great dietary importance are many small species of fish including pinfish (*Lagodon rhomboides*) and pigfish (*Orthopristis chrysoptera*) (deFrance and Walker 2013:309). Although a single pinfish vomer was identified in the M-2 Level 84 sample (Table 6-1), elements of these tiny fish are not expected to be found in 1/4-in screens, and express the bias known to exist between fine and coarse screened samples. Pinfish and pigfish are represented by 36 individuals in M-3 Level 96. Dietary contributions based on projected meat weight and screen bias issues have been previously explored at Pineland and will not be re-examined in this report (see deFrance and Walker 2013:306).

Sea catfish are recognized as an important resource at Pineland. The hardhead catfish inhabits bays and shallow Gulf waters, and has diverse feeding habits that make it adaptable to different conditions; the gafftopsail catfish (*Bagre marinus*) is also common in the same basic habitat (Hoese and Moore 1998:161). Combined MNI of the Ariidae family for the M-2 sample average to eight individuals (MNI); an average for Caloosahatchee IIA composite contexts for Ariidae is 47 (deFrance and Walker 2013:320). However, the projected average MNI based on composite samples for the abundant hardhead catfish in Caloosahatchee IIA contexts is 40, while the average MNI in M-2 (Stratum III) is eight, in M-3 Level 91 (Stratum III) it is two, and M-3 96 (Stratum IV) it is two as well.

Other remains that indicate high MNI in the M-2 and M-3 samples include jacks (*Caranx* sp.), sheepshead (*Archosargus probatocephalus*), and seatrout (*Cynoscion* sp.). Jacks and sheepshead have robust skeletal elements that are easily identifiable, as do trout to a lesser extent; their numbers archaeologically may be a result of preservation and taphonomic bias. Another family, the Tetradontidae (puffers and blowfish), is also represented in the samples, and also have elements such a dentaries and premaxillae that have a high preservation bias.

Sciaenidae (croakers) and Mugildae (mullets) are also represented. Most of the Sciaenids are identified as red drum (*Sciaenops ocellatus*); the Sciaenids are typical of large, inshore Gulf fishes, and have a greater number of species than all other families. They also rank among the top three families in terms of biomass, along with mullet and the much smaller anchovies (Hoese and Moore 1998:239). Still very popular as a sport and food fish, red drum can be quite large, up to 5 feet (1.5 m) (Hoese and Moore 1998:243). Mullet are still a subsistence food on Pine Island today, caught with cast nets since the ban on gill nets in the 1990s. Mullet are present year-round, and striped mullet (*Mugil cephalus*) is one of the most abundant fish in shallow Gulf waters (Hoese and Moore 1998:173). Different mullet species spawn at different times of the year, making them form large schools seasonally (Hoese and Moore 1998:172-173). Because of their high numbers and high biomass contribution, both of these families of fishes would have been of economic and dietary importance to the Calusa at Pineland.

One notable specimen of bony fishes was a dorsal spine identified as belonging to a Goliath grouper (*Epinephalus itajarra*). These aquatic giants are long-lived and can reach a weight of 700 lbs (320 kg); a large specimen would have provided much food for Pineland residents. Goliath grouper are known to be “easily taken,” and are now protected from fishing in Florida (Hoese and Moore 1998:203).

One amphibian specimen in the form of a vertebra from a siren (cf. *Siren lacertina*) was found in Excavation M-2, Level 84. This genus is not significant enough to make it into listed species for Pineland (deFrance and Walker 2013:310-315), and was probably not a regular dietary component. One element from M-3 Level 96 was identified as belonging to the southern toad (*Bufo terrestris*).

Turtles were identified in all Mound 5 samples examined. Both M-2 Level 84 and Level 85 yielded an MNI of 1 for the snapping turtle (*Chelydra serpentina*); because these levels are consecutive stratigraphically, these elements may represent the same individual. No snapping turtle has been identified in Caloosahatchee IIA contexts. Normally found in shallow ponds, lakes, and streams, they have been known to stray into estuarine environments (Conant and Collins 1991:42). The turtle may have been captured locally, or transported to Pineland by canoe with considerable care, because this species is known to be aggressive and dangerous in close quarters. A single gopher tortoise (*Gopherus polyphemus*) specimen was identified in M-2 Level 84 and 85. A dry land animal, this species has been used as food in ancient times and up until the present. Although it is a burrower, it would not have chosen an area close to the water’s edge, and was probably a food item. Gopher tortoise is not listed in composite averages for Caloosahatchee IIA by deFrance and Walker (2013:341). Box turtle (*Terrepene carolina*) was identified by a fragment of carapace in M-2 Level 84 and in M-3 level 96; this species is also not recognized in Caloosahatchee IIA composite contexts by deFrance and Walker (2013:337). One mud turtle (*Kinosternon subrubrum*) was identified in M-3 Level 91.

Bird remains from Mound 5 M-2 sample include 58 specimens, with eight individuals calculated (MNI), all of which were identified as ducks. M-3 Level 91 yielded two possible Anatidae identifications, none were identified in M-3 Level 95, and two in M-3 Level 96, one of which was identified as a probable *Aythya collaris* (ring-necked duck). The humerus proved to be especially useful in these identifications, and further research may help further clarify the identification of these elements to species level. These ducks, such as scaups and ringnecks, are migratory in nature, normally present in Florida from October through April (Kale and Maehr 1990:112-114). The presence of ducks could be interpreted as a proxy for seasonal exploitation; they may also represent environmental change on a local or even larger scale. Migratory patterns may have been influenced by cooling in northern latitudes, forcing ducks to migrate earlier and stay longer in southern latitudes (deFrance and Walker 2013:322).

Mammal remains representing four different species were found in the two M-2 1/4-in samples examined. Cotton rat is represented by specimens indicating three individuals, opossum (*Didelphis virginianus*) by one element, and raccoon (*Procyon lotor*) by one element. White-tailed deer (*Odocoileus virginianus*) is represented by 14 elements, but only results in one individual in each level, which, again, may represent the same individual. The M-3 samples also show relatively low mammalian remains. M-3 Level 91 had one individual (MNI) each of opossum, raccoon, and white-tailed deer. M-3 Level 95 (a half size sample of 1/4-in only) contained no mammal remains. M-3 Level 96 identified only a single hispid cotton rat.

Lastly, I was able to collect a large sample of tiny land snail shells in the 1/16-in (1.59-mm) screens at M-3, levels 91 and 96; 770 identified specimens (MNI) were collected from Level 91, and 2533 from Level 96. A sample of 134 individuals representing eight species were identified in the Level 91 assemblage, and 1060 individuals representing 23 species were identified from Level 96. The sedimentary composition of Level 96 lends itself to the aggregation of tiny fauna, as the dense sediment level of what could have been a "floor" or living surface traps more debris than the loose shell of Stratum III above it.

Excavation M-3 was open (although covered with a tarp when not active) for over a year, allowing many tiny creatures access to the damp, cool location over time. Many species of land snails are considered calciphiles, and would have sought out the slowly decomposing marine shells found in middens for the growth of their own shells in ancient times as well as modern. The location of the carport constructed uphill of M-3 would also have washed debris, leaf litter, and unlucky land snails into the open excavations during periodic heavy rains common at Pineland from June to November.

The identification of land snails is a specialization shared between malacologists and entomologists; some of the land snails found in North America have been studied by entomologists as vectors for disease (J. Slapcinsky, personal communication, 2011). Land snails in general are an understudied component of very localized environments; it is hard to travel far in life on your own when you're only a 3.8-mm long island dagger (*Pupoides modicus*), or a 2.4-mm long bottleneck snaggletooth (*Gastrocopta contracta*). Some tiny molluscs have become global travelers in the modern era, however. The *Hawaiia miniscula*, present in the Mound 5 assemblage, was named when discovered in Hawaii, but was later found to originate in the continental U.S., having travelled to Hawaii with imported tropical plants (John Slapcinsky, personal communication, 2011). Several of the species found in the Mound 5 excavations are non-indigenous.

Lacking a present-day comparative collection for Pineland, it is difficult to assess which land snails are archaeological in nature and which are modern intruders to the excavation, with the exception of the species that are known to be introduced in modern times. Regardless of site taphonomic issues, the assemblage could provide useful information on environmental conditions of very specific parts of the site; while some of the species, such as the bottleneck snaggletooth mentioned above, are found in so many habitats "that it seems impossible to pinpoint its requirements," others can provide very specific environmental information (Hubricht 1985:8). Collection and identification of a present day assemblage would be a first step, followed by a closely controlled and rapid excavation specifically focused on the collection of land snails from fine-screened samples. In the analysis of the current sample, I have sought to provide a baseline assemblage with which to further study this little known component of the ecological structure at the Pineland Site. A brief discussion of the species identified and their environmental requirements follows.

The globular drop snail (*Oligyra orbiculata*) is identified as *Helicina orbiculata* in Burch (1962:37) and Hubricht (1985:3). Its range is the southeastern U.S. including Florida. It is a semi-arboreal calciphile, preferring sunny locations, roadsides, and glens, and is "not as abundant in woods" (Hubricht 1985:355). Ten members of this family were identified in the Level 96 assemblage, including three juveniles.

Looping snails are represented by two species. The beautiful truncatella (*Truncatella pulchella*) is the most abundant species of the genus in Florida, a fact verified in the Mound 5 assemblage. It has a range that includes Florida, Texas, and the West Indies (Hubricht 1985:4). It is found in and under seaweed, "in the strand at or above (the) high tide line, usually in rocky places," and is "never found on sandy beaches" (Hubricht 1985:4). The Caribbean truncatella (*Truncatella caribaeensis*) is usually found with the beautiful truncatella, but sometimes occurs alone (Hubricht 1985:5). These two species were identified by Andrea Palmiotto in her analysis of Old Mound fauna for her 2011 UF Master's thesis on Pineland (Palmiotto 2011). In the BCM5 excavations there were seven individuals of beautiful truncatella identified in Level 91, and 21 in Level 96. The Caribbean truncatella is represented by five individuals in Level 91 and 4 in Level 96.

Pupoides modicus, the island dagger snail discussed above, has a range including Georgia, coastal Florida and the Everglades, although Hubricht claims it is "restricted to peninsular Florida and the Bahamas" (Burch 1962:47; Hubricht 1985:8, 69). It is described as a species preferring "bare ground, roadsides, old quarries, glades, waste ground, (and) calcareous areas" and can be found crawling on the ground or up plant stems in wet weather (Hubricht 1985:8). Two species of *Gastrocopta* are also represented. The bottleneck snaggletooth discussed above, is "found in so many habitats that it seems impossible to pinpoint its requirements" (Hubricht 1985:8). It ranges from Maine to Florida, and west to Mexico. It can be found in low wet places as well as dry, and "appears to be a calciphile" (Hulbricht 1985:8). *G. pellucida*, the slim snaggletooth snail, is also widely distributed, ranging from New Jersey to Florida, and west to California. It is usually found in open, grassy places or open woods, often in dry, sandy places. In Florida, it can sometimes be found on the undersides of palmetto leaves (Hubricht 1985:10). Only 12 bottleneck snaggletooth shells were identified in Level 91, but there were 132 in Level 96. The slim snaggletooth was represented by five individuals in Level 96. Two individual bottleneck snaggletooth shells were reported in Caloosahatchee IIA contexts by deFrance and Walker (2013:318); the slim snaggletooth has not been reported at Pineland until now.

Hebetodiscus singleanus (listed as *Helicodiscus singleanus* in Hubricht 1985:22), commonly known as the smooth coil, is another snail with an expansive territory, found from

New Jersey to Florida and west to South Dakota and even California in open, grassy places, roadsides, and meadows (Burch 1962:192; Hubricht 1985:110). One individual was identified in Level 91, but 192 smooth coil shells were identified in Level 96. This is a species of interest to malacologists according to John Slapcinsky of FLMNH; little is known of its true environmental preferences (personal communication, 2011). The disparity in numbers between Stratum III and Stratum IV is notable. Seventeen individuals have been reported from four Caloosahatchee IIA contexts at Pineland previously (deFrance and Walker 2013:318).

I found little information available on the species *Glyphyalinia umbilicata*, the Texas glyph; one individual was identified (by John Slapcinsky) in Level 96. *Nesovitrea dalliana*, the depressed glass, inhabits the northeastern, north central, and southwestern United States as well as south Florida coastal counties and the Everglades (Hubricht 1985:23,116). It is listed under the taxonomic name *Retinella dalliana* in Burch (1962:102). The depressed glass snail is identified as a calciphile, found under leaf litter, logs and rocks in low, wet places and the margins of swamps. This environment perfectly describes the current conditions at the base of Mound 5; seven individuals were represented in Level 91, and 53 in Level 96. The aptly named *Hawaiia miniscula* averages as small as 1.8 mm, and little of its preferences are known other than as a species of bare ground, “never found in leaf litter” (Hubricht 1985:29). Its range is described as “the U.S. in general” (Burch 1962:106). As mentioned above, this species has travelled widely as a “hitchhiker” with tropical and greenhouse plants, but is indigenous to Florida. Three hundred sixty-six were identified in the Level 96 assemblage; deFrance and Walker report five individuals in Caloosahatchee IIA contexts (2013:318). Another widely dispersed species of this family, *Zonotoides arboreus*, is found “in all states except Nevada” (Burch 1962:117). Commonly known as the quick gloss snail, it is usually found on rotting logs and in floodplains, upland woods, and along roadsides; it is also described as a "common urban snail" (Hubricht 1985:32). The quick gloss snail is one of the species of land snail studied by entomologists, as it was implicated in the spread of lungworms in domestic sheep (Burch 1962:18). There were 16 individuals identified in Level 91, and 17 in Level 96.

A non-indigenous snail, the two-tone gulella, is currently found listed as both *Huttonella bicolor* and *Gulella bicolor*. It is probably African in origin, first identified in Brazil in 2008 and Dominica in 2009, and was introduced to Florida (J. Slapcinsky, personal communication, 2011). There were 2 individuals identified in Level 96. DeFrance and Walker (2013:318) report one individual in a Caloosahatchee IIB context.

Another non-indigenous species identified, the tiny awlsnail (*Lamellaxis micra*), is also known as *Alopeas micra* (see Burch 1962:125). The origins of this snail are somewhat unclear; it is considered native to the West Indies, Mexico, and Bolivia, and was also first identified as non-native in Dominica in 2009. It is considered introduced in Florida (J. Slapcinsky, personal communication, 2011). A small number were identified in M-3, with one in Level 91 and three in Level 96.

The lyrate fringed-snail (*Thalysanophora plagioptycha*) (Burch 1962:135) is common in the West Indies, Central America, coastal Florida and in the Everglades; it can be found on the undersides of palm leaves and under stones, usually in "rather wet places" (Hubricht 1985:34,145). It is represented here by one individual from Level 96.

All three species of awlsnails found in the M-3 excavations are non-indigenous. *Subulina octona*, the miniature awlsnail, is a native of the Caribbean, Cuba, and Venezuela. It now inhabits greenhouses in Europe and Asia, and is introduced and thriving in Florida, transported with tropical plants and soils. Fifty-four were identified in the Level 96 assemblage; three specimens of *S. octona* were identified by deFrance and Walker in Caloosahatchee IIB contexts (2013:318). *Allopeas gracile*, the graceful awlsnail, is represented by 30 individuals in the same provenience, and *Opeas hannense*, the dwarf awlsnail, by one individual.

The bayou physa, *Physella hendersoni*, are sinistral, air breathing, freshwater organisms with delicate transparent shells. Ten were found in the Level 96 assemblage. Polygyrid snails are found in great abundance in both archaeological and present day contexts at Pineland.

Table 6-1. Taxa, BCM5, M-2-84, 1/4-in, bone only.

Taxon	**Common Name**	**NISP**	**Percent of Total NISP**	**Weight of Bone (gm)**	**Percent of Total Bone Weight**	**MNI**	**Percent of Total MNI**
Carcharhinus sp.	sharks	26	0.04	18	0.05	1	0.02
Sphyrna sp.	sharks	5	0.01	2.9	0.01	1	0.02
Dasyatidae	stingrays	2		0.4		1	0.02
Chondrichthys	sharks,rays	22	0.03	11.2	0.03	2	0.04
Total Chondricthys	**total cartilaginous fishes**	**55**	**0.07**	**32.5**	**0.10**	**5**	**0.10**
Ariopsis felis	hardhead catfish	10	0.01	1.7	0.01	2	0.04
Bagre marinus	gafftopsail catfish	2		0.5		1	0.02
Ariidae	sea catfishes	34	0.05	7.6	0.02	6	0.12
Opsanus sp.	toadfish	4	0.01	1.7	0.01	1	0.02
Centropomus sp.	snook	1		0.6	0.04	1	0.02
Epinephalus sp.	grouper	1		7.9	0.02	1	0.02
Caranx sp.	jacks	7	0.01	4.6	0.01	3	0.06
Archosargus probatocephalus	sheepshead	27	0.04	12.8	0.04	5	0.10
Lagodon rhomboides	pinfish	1				1	0.02
Cynoscion sp.	seatrout	19	0.03	5.3	0.02	3	0.06
Sciaenops ocellatus	red drum	5	0.01	4	0.01	2	0.04
Micropogonias undulatus	croaker	1				1	0.02
Sciaenidae	drums	2				1	0.02
Mugil sp.	mullet	8	0.01	1.8	0.01	2	0.04
Paralichthys sp.	flounder	1				1	0.02
Chilomycterus sp.	burrfish	1		0.9		1	0.02
Diodon sp.	porcupine fish	2		0.7		2	0.04
Osteichthys	bony fishes	426	0.58	88.6	0.27		
Total Osteichthys	**total bony fishes**	**552**	**0.75**	**138.7**	**0.45**	**34**	**0.68**
Siren sp.	sirens	1		0.2		1	0.02
Total Amphibia	**total amphibians**	**1**		**0.2**		**1**	**0.02**
Chelydra serpentina	snapping turtle	5	0.01	7.8	0.02	1	0.02
Gopherus polyphemus	gopher tortoise	2		6	0.02	1	0.02
Terrepene carolina	box turtle	1				1	0.02

Table 6-1. Continued.

Taxon	**Common Name**	**NISP**	**Percent of Total NISP**	**Weight of Bone (gm)**	**Percent of Total Bone Weight**	**MNI**	**Percent of Total MNI**
Testudines	turtles	16	0.02	11.4	0.03		
Total Testudines	**total turtles**	**26**	**0.04**	**25.2**	**0.08**	**3**	**0.06**
Aythya sp.	scaups	6	0.01	4	0.01	2	0.04
Aves	birds	27	0.04	8.1	0.02		
Total Aves	**total birds**	**33**	**0.04**	**12.1**	**0.04**	**2**	**0.04**
Sigmodon hispidus	cotton rat	4	0.01	0.4		2	0.04
Procyon lotor	raccoon	1		0.2		1	0.02
Odocoileus virginianus	white-tailed deer	5	0.01	18.6	0.06	1	0.02
Mammalia	mammals	9	0.01	9.8	0.03		
Total Mammalia	**total mammals**	**19**	**0.03**	**29**	**0.09**	**4**	**0.08**
Sample Total		**737**		**238.1**		**49**	

Table 6-2. Taxa, BCM5, M-2-85, 1/4-in bone only.

Taxon	Common name	NISP	Percent of NISP	Weight of Shell/Bone (gm)	Percent of Shell/Bone Weight	MNI	Percent of Total MNI
Carcharhinus sp.	sharks	27	0.06	15.4	0.07	2	0.05
Sphyrna sp.	sharks	1		0.4		1	0.03
Dasyatidae	stingrays	1		0.4		1	0.03
Total Chondrichthys	**total cartilaginous fishes**	**29**	**0.07**	**16.2**	**0.08**	**4**	**0.11**
Ariopsis felis	hardhead catfish	5	0.01	1.1	0.01	2	0.05
Ariidae	sea catfish	37	0.08	6	0.03	5	0.14
Strongylura sp.	needlefish	2		0.3		1	0.03
Caranx sp.	jacks	6	0.01	6.1	0.03	1	0.03
Archosargus probatocephalus	sheepshead	16	0.04	7.6	0.04	3	0.05
Cynoscion sp.	seatrout	15	0.03	5.8	0.03	2	0.05
Sciaenops ocellatus	red drum	9	0.02	3.5	0.02	2	0.05
Sciaenidae	drums	7	0.02	4.2	0.02	1	0.03
Mugil sp.	mullets	11	0.02	1.6	0.01	3	0.08
Paralichthys sp.	flounder	2				1	0.03
Tetradontidae	burrfishes	1				1	0.03
Osteichthys	bony fishes	223	0.51	51.6	0.25		
Total Osteichthys	**total bony fishes**	**334**	**0.76**	**87.8**	**0.42**	**22**	**0.59**
Chelydra serpentina	snapping turtle	1		0.9		1	0.03
Gopherus polyphemus	gopher tortoise	1		0.9		1	0.03
Testudines	turtles	13	0.03	8.2	0.04		
Total Testudines	**total turtles**	**15**	**0.03**	**10**	**0.05**	**2**	**0.05**
Aythya sp.	scaups	7	0.02	4.9	0.02	6	0.16
Aves	birds	18	0.04	3.4	0.02		
Total Aves	**total birds**	**25**	**0.06**	**8.3**	**0.04**	**6**	**0.16**
Didelpheus virginianus	opossum	1		1		1	0.03
Sigmodon hispidus	cotton rat	1				1	0.03
Odocoileus virginianus	white-tail deer	9	0.02	33.4	0.16	1	0.03
Mammalia	mammals	27	0.06	14.5	0.07		
Total Mammalia	**total mammals**	**38**	**0.09**	**48.9**	**0.24**	**3**	**0.08**
Sample Total		**441**	**100.00**	**171.2**	**100.00**	**37**	**100.00**

Table 6-3. Taxa, BCM5, M-3-91, 1/4, 1/8, 1/16-in.

Taxon	Common Name	NISP	Percent of Total Invert/Vert NISP	MNI	Percent of Total Invert/Vert MNI	Percent of Total MNI	Food MNI	Percent of Total Invert/Vert Food MNI	Percent of Total Food MNI	Weight of Shell/Bone (gm)	Percent of Total Bone/Shell Weight
Truncatella caribaeensis	Caribbean truncatella	5	0.11	5	0.19	0.11				0.04	
Truncatella pulchella	beautiful truncatella	7	0.16	7	0.27	0.16				0.03	
Modulus modulus	buttonsnail	6	0.13	6	0.23	0.13				1.18	
Cerithium muscarum	flyspeck cerith	18	0.40	18	0.69	0.40				2.04	0.01
Cerithium sp.	cerith	3	0.07	3	0.12	0.07				0.12	
Strombus alatus	Florida fighting conch	4	0.09	4	0.15	0.09	4	0.23	0.23	220.66	0.65
Crepidula plana	eastern white slippersnail	7	0.16	7	0.27	0.16				0.61	
Crepidula fornicata	common slippersnail	2	0.04	2	0.08	0.04				1.03	
Crepidula aculeata	spiny slippersnail	3	0.07	3	0.12	0.07				1.1	
Crepidula sp.	slippersnail	1	0.02	1	0.04	0.02				1.44	
Neverita duplicata	shark eye	12	0.27	12	0.46	0.27				91.7	0.27
Mitrella sp.	dovesnail	3	0.07	3	0.12	0.07				0.36	
Busycon sinistrum	lightning whelk	1012	22.41	911	35.04	20.18	911	52.93	52.39	6622.75	19.65
Busycotypus spiratus	pearwhelk	243	5.38	227	8.73	5.03	227	13.19	13.05	1497.43	4.44
Melongena corona	crown conch	227	5.03	145	5.58	3.21	145	8.43	8.34	666.62	1.98
Nassarius vibex	bruised nassa	5	0.11	5	0.19	0.11				0.62	
Fasciolaria lilium hunteria	banded tulip	55	1.22	45	1.73	1.00	45	2.61	2.59	173.99	0.52
Fasciolaria tulipa	true tulip	19	0.42	17	0.65	0.38	17	0.99	0.98	201.53	0.60
Fasciolaria spp.	tulip	22	0.49	22	0.85	0.49	22	1.28	1.27	44.29	0.13
Melampus coffeus	coffee melampus	1	0.02	1	0.04	0.02				0.25	
Melampus sp.	melampus	2	0.04	2	0.08	0.04				0.4	
Gastrocopta contracta	bottleneck snaggletooth	12	0.27	12	0.46	0.27				0.02	
Lamellaxis micra	tiny awlsnail	1	0.02	1	0.04	0.02					
Euglandia rosea	rosey wolfsnail	1	0.02	1	0.04	0.02				0.1	
Hebetodiscus singleanus	smooth coil	1	0.02	1	0.04	0.02					
Guppya gundlachi	glossy granule	1	0.02	1	0.04	0.02					
Nesovitrea dalliana	depressed glass	7	0.16	7	0.27	0.16				0.01	
Zonotoides arboreus	quick gloss	16	0.35	16	0.62	0.35				0.09	
Polygyra sp.	liptooth	84	1.86	84	3.23	1.86				1.24	
land snail UID		653	14.46	653	25.12	14.46				1.22	
Gastropoda	gastropods	204	4.52	16	0.62	0.35				199.1	0.59
Total Gastropoda	**total gastropods**	**2637**	**58.41**	**2238**	**86.08**	**49.57**	**1371**	**79.66**	**78.84**	**9729.97**	**28.87**
Geukensia demissa	ribbed mussel	185	4.10	57	2.19	1.26	57	3.31	3.28	59.28	0.18

Table 6-3. Continued

Taxon	Common Name	NISP	Percent of Total Invert/Vert NISP	MNI	Percent of Total Invert/Vert MNI	Percent of Total MNI	Food MNI	Percent of Total Invert/Vert Food MNI	Percent of Total Food MNI	Weight of Shell/Bone (gm)	Percent of Total Bone/Shell Weight
Noetia ponderosa	ponderous ark	1	0.02	1	0.04	0.02	1	0.06	0.06	10.68	0.03
Pinnidae	penshell	20	0.44	2	0.08	0.04	2	0.12	0.12	17.17	0.05
Argopecten irradians	bay scallop	7	0.16	4	0.15	0.09	4	0.23	0.23	33.85	0.10
Crassostrea virginica	eastern oyster	409	9.06	267	10.27	5.91	267	15.51	15.35	1246.28	3.70
Ostreola equestris	crested oyster	12	0.27	12	0.46	0.27				10.25	0.03
Carditamera floridana	broad-ribbed carditid	1	0.02	1	0.04	0.02				1.18	
Cardiidae	cockles	3	0.07	1	0.04	0.02	1	0.06	0.06	0.24	
Spisula solidissima	Atlantic surfclam	12	0.27	6	0.23	0.13	6	0.35	0.35	73.58	0.22
Anomalocardia auberiana	pointed venus	1	0.02	1	0.04	0.02				0.18	
Polymesoda carolina	Carolina marshclam	1	0.02	1	0.04	0.02	1	0.06	0.06	5.73	0.02
Polymesoda maritima	southern marsh clam	1	0.02	1	0.04	0.02				0.34	
Chione sp.	venus	1	0.02	1	0.04	0.02				0.45	
Parastarte triqueta	brown gemclam	3	0.07	3	0.12	0.07					
Bivalvia	bivalves	61	1.35							23.17	0.07
Total Bivalvia	**total bivalves**	**718**	**15.90**	**358**	**13.77**	**7.93**	**339**	**20.45**	**20.24**	**1482.38**	**4.40**
Mollusca	mollusks	14	0.31							1.66	
Vermicularia fargoi	wormshell	1	0.02	1	0.04	0.02				0.35	
Balanus spp.	acorn barnacles	77	1.71	2	0.08	0.04				3.61	0.01
Total Cirripedia	**total barnacles**	**78**	**1.73**	**3**	**0.12**	**0.07**				**5.62**	**0.02**
Echinoidea	sea urchins	9	0.20	1	0.04	0.02	1	0.06	0.06	0.16	
Total Invertebrata	**total invertebrates**	**3456**	**76.54**	**2600**	**100.00**	**57.59**	**1724**	**100.00**	**98.96**	**11212.35**	**33.27**
Carcharhinidae	sharks	6	0.13	1	4.76	0.02	1	4.76	0.06	6.61	0.02
Chondrichthyes	cartilaginous fishes	3	0.07	1	4.76	0.02	1	4.76	0.06	0.18	
Total Chondricthyes	**total cartilaginous fishes**	**9**	**0.20**	**2**	**9.52**	**0.04**	**2**	**9.52**	**0.12**	**6.79**	**0.02**
Ariopsis felis	hardhead catfish	5	0.11	2	9.52	0.04	2	9.52	0.12	1.15	
Ariidae	sea catfishes	10	0.22							0.52	

Table 6-3. Continued.

Taxon	Common Name	NISP	Percent of Total Invert/Vert NISP	MNI	Percent of Total Invert/Vert MNI	Percent of Total MNI	Food MNI	Percent of Total Invert/Vert Food MNI	Percent of Total Food MNI	Weight of Shell/Bone (gm)	Percent of Total Bone/Shell Weight
Caranx sp.	jackfish	5	0.11	2	9.52	0.04	2	9.52	0.12	1.04	
Archosargus probatocephalus	sheepshead	2	0.04	1	4.76	0.02	1	4.76	0.06	0.44	
Lagodon rhomboides	pinfish	1	0.02	1	4.76	0.02	1	4.76	0.06	0.2	
Cynoscion nebulosus	spotted seatrout	6	0.13	2	9.52	0.04	2	9.52	0.12	0.82	
Cynoscion sp.	seatrout	1	0.02	1	4.76	0.02	1	4.76	0.06	0.12	
Sciaenops ocellatus	red drum	1	0.02	1	4.76	0.02	1	4.76	0.06	0.56	
Sciaenidae	drum fishes	2	0.04			0.00				0.38	
Mugil sp.	mullet	6	0.13	1	4.76	0.02	1	4.76	0.06	0.98	
Chilomycterus sp.	burrfish	2	0.04	1	4.76	0.02				0.46	
Tetradontidae	puffer/burrfish	4	0.09	1	4.76	0.02	1	0.06	0.06	0.11	
Osteichthys	bony fishes	906	20.07								
Total Osteichthys	**total bony fishes**	**969**	**21.46**	**13**	**61.90**	**0.29**	**12**	**61.90**	**0.75**	**13.57**	**0.04**
Kinosternon subrubrum	mud turtle	1	0.02	1	4.76	0.02	1	4.76	0.06	0.8	
Anatidae	ducks	4	0.09	2	9.52	0.04	2	9.52	0.12	1.48	
Didelphis virginiana	opossum	2	0.04	1	4.76	0.02	1	4.76	0.06	3.19	0.01
Procyon lotor	raccoon	1	0.02	1	4.76	0.02	1	4.76	0.06	0.21	
Odocoileus virginianus	white-tailed deer	1	0.02	1	4.76	0.02	1	4.76	0.06	1.48	
Total Mammalia	**total mammal**	**4**	**0.09**	**3**	**14.29**	**0.07**	**3**	**9.52**	**0.12**	**4.88**	**0.01**
Vertebrata UID	vertebrates	90	1.99							9.87	0.03
Total Vertebrata	**total vertebrates**	**103**	**2.28**	**21**	**100.00**	**0.47**	**21**	**100.00**	**1.21**	**35.48**	**0.11**
Sample total		**4515**	**100.00**	**2621**		**58.05**	**1727**		**100.00**	**33704.29**	**100.00**

Table 6-4. Taxa, BCM5, M-3-95, ¼ in. only.

Taxon	Common Name	NISP	Percent of Total Invert/Vert NISP	MNI	Percent of Total Invert/Vert MNI	Percent of Total MNI	Food MNI	Percent of Total Invert/Vert Food MNI	Percent of Total Food MNI	Weight of Shell/Bone (gm)	Percent of Total Shell/Bone Weight
Modulus modulus	buttonsnail	1	0.06	1	0.09	0.09				0.38	0.01
Cerithium sp.	cerith	1	0.06	1	0.09	0.09				0.33	0.01
Strombus alatus	Florida fighting conch	1	0.06	1	0.09	0.09	1	0.10	0.09	53.10	1.76
Crepidula sp.	slippersnail	1	0.06	1	0.09	0.09				0.96	0.03
Neverita duplicata	shark eye	4	0.26	2	0.19	0.19	2	0.19	0.19	7.67	0.25
Busycon sinistrum	lightning whelk	582	37.65	393	36.80	36.69	393	37.36	37.25	1410.00	46.65
Busycoptus spiratus	pear whelk	184	11.90	138	12.92	12.89	138	13.12	13.08	374.55	12.39
Melongena corona	crown conch	384	24.84	249	23.31	23.25	249	23.67	23.60	648.78	21.46
Nassarius vibex	bruised nassa	3	0.19	3	0.28	0.28			0.00	0.52	0.02
Fasciolaria lilium hunteria	banded tulip	108	6.99	91	8.52	8.50	91	8.65	8.63	105.88	3.50
Fasciolaria tulipa	true tulip	11	0.71	7	0.66	0.65	7	0.67	0.66	94.91	3.14
Fasciolaria sp.	tulip	163	10.54	147	13.76	13.73	147	13.97	13.93	123.69	4.09
Pleuroploca gigantea	horse conch	2	0.13	1	0.09	0.09	1	0.10	0.09	6.60	0.22
Euglandia rosea	rosy wolfsnail	1	0.06	1	0.09	0.09				2.49	0.08
Polygyra sp.	liptooth	1	0.06	1	0.09	0.09				0.01	
Total Gastropods	**total gastropods**	**1447**	**93.60**	**1037**	**97.10**	**96.83**	**1029**	**97.81**	**97.54**	**2829.87**	**93.63**
Geukensia demissa	ribbed mussel	3	0.19	1	0.09	0.09	1	0.10	0.09	0.51	0.02
Noetia ponderosa	ponderous ark	1	0.06	1	0.09	0.09	1	0.10	0.09	15.62	0.52
Crassostrea virginica	eastern oyster	71	4.59	20	1.87	1.87	20	1.90	1.90	109.89	3.64
Ostreola equestris	crested oyster	1	0.06	1	0.09	0.09	0			1.47	0.05
Carditamera floridana	broad-ribbed carditid	6	0.39	6	0.56	0.56				5.87	0.19
Mercenaria campechiensis	southern quahog	10	0.65	1	0.09	0.09	1	0.10	0.09	57.09	1.89
Total Bivalvia	**total bivalves**	**92**	**5.95**	**30**	**2.81**	**2.80**	**23**	**2.19**	**2.18**	**190.45**	**6.30**
Menippe mercenaria	stone crab	1	0.06	1	0.09	0.09	1	0.10	0.09	0.96	0.03
Total Invertebrata	**total invertebrates**	**1540**	**100.00**	**1068**	**100.00**	**99.72**	**1052**	**100.00**	**99.72**	**3021.26**	**99.96**
Chondrichthys	cartilaginous fishes	4	0.26	2	66.67	0.19	2	66.67	0.19	0.94	0.03
Ariopsis felis	hardhead catfish	2	0.13	1	33.33	0.09	1	33.33	0.09	0.33	0.01
Total Vertebrata	**total vertebrates**	**6**	**0.39**	**3**	**100.00**	**0.28**	**3**	**100.00**	**0.28**	**1.27**	**0.04**
Sample total	**total**	**1546**	**100.00**	**1071**		**100.00**	**1056**		**100.00**	**3022.55**	**100.00**

Table 6-5. Taxa, BCM5, M-3-96, 1/4, 1/8, 1/16-in.

Taxon	Common name	NISP	Percent of Total Invert/Vert NISP	MNI	Percent of Total Invert/Vert MNI	Percent of Total MNI	Food MNI	Percent of Total Invert/Vert MNI	Percent of Total Food MNI	Weight of Shell/Bone (gm)	Percentage of Total Shell/Bone Weight
Oligyra orbiculata	globular drop	4	0.07	4	0.10	0.09					
Helicina orbiculata	helicina	3	0.05	3	0.07	0.07					
Helocinid sp.	helicinas	3	0.05	3	0.07	0.07					
Truncatella caribaeensis	Caribbean truncatella	4	0.07	4	0.10	0.09				0.03	
Truncatella pulchella	beautiful truncatella	21	0.35	21	0.50	0.49				0.08	
Modulus modulus	buttonsnail	2	0.03	2	0.05	0.05				0.54	0.01
Cerithium muscarum	flyspeck cerith	8	0.13	8	0.19	0.19				0.82	0.01
Cerithium atratum	dark cerith	1	0.02	1	0.02	0.02				0.15	
Strombus alatus	Florida fighting conch	4	0.07	2	0.05	0.05	2	0.13	0.12	63.51	0.75
Crepidula aculeata	spiny slippershell	1	0.02	1	0.02	0.02				0.45	0.01
Neverita duplicata	shark eye	6	0.10	5	0.12	0.12	5	0.33	0.30	32.63	0.38
Mitrella sp.	dovesnail	1	0.02	1	0.02	0.02				0.05	
Busycon sinistrum	lightning whelk	1492	24.82	625	14.88	14.66	625	39.31	37.90	3621.8	42.65
Busycoptus spiratus	pear whelk	728	12.11	386	9.19	9.05	386	24.28	23.41	1353.94	15.94
Melongena corona	crown conch	466	7.75	258	6.14	6.05	258	16.23	15.65	956.63	11.26
Nassarius vibex	bruised nassa	3	0.05	3	0.07	0.07				0.51	0.01
Nassarius sp.	nassas	1	0.02	1	0.02	0.02				0.06	
Fasciolaria lillium hunterii	banded tulip	44	0.73	32	0.76	0.75	32	2.01	1.94	116.16	1.37
Fasciolaria tulipa	true tulip	35	0.58	10	0.24	0.23	10	0.63	0.61	301.93	3.56
Fasciolaria sp.	tulip	164	2.73	130	3.10	3.05	130	8.18	7.88	190.61	2.24
Olivella sp.	olive	3	0.05	3	0.07	0.07				0.1	
Boonea impressa	impressed odostome	2	0.03	2	0.05	0.05				0.01	
Allopeas gracile	impressed odostome	2	0.03	2	0.05	0.05				0.01	
Acteosina sp.	barrel-bubble	1	0.02	1	0.02	0.02					
Melampus coffeus	coffee melampus	7	0.12	7	0.17	0.16				1.31	0.02
Melampus sp.	melampus	9	0.15	9	0.21	0.21				0.42	
Microtralia occidentalis	tiny melampus	8	0.13	8	0.19	0.19					
Physella hendersoni	bayou physella	10	0.17	10	0.24	0.23				0.03	
Gastrocopta contracta	bottleneck snaggletooth	132	2.20	132	3.14	3.10				0.14	
Gastrocopta pellucida	slim snaggletooth	5	0.08	5	0.12	0.12					

Table 6-5. Continued.

Taxon	Common name	NISP	Percent of Total Invert/Vert NISP	MNI	Percent of Total Invert/Vert MNI	Percent of Total MNI	Food MNI	Percent of Total Invert/Vert MNI	Percent of Total Food MNI	Weight of Shell/Bone (gm)	Percentage of Total Shell/Bone Weight
Pupoides modicus	island dagger	7	0.12	7	0.17	0.16				0.01	
Opeas hannense	dwarf awlsnail	1	0.02	1	0.02	0.02					
Lamallaxis micra	tiny awlsnail	3	0.05	3	0.07	0.07					
Euglandia rosea	rosy wolfsnail	12	0.20	12	0.29	0.28				5.87	0.07
Subulina octona	miniature awlsnail	54	0.90	54	1.29	1.27				0.26	
Gulella bicolor	two tone gulella	2	0.03	2	0.05	0.05					
Hebetodiscus singleanus	smooth coil	192	3.19	192	4.57	4.50				0.15	
Glyphyalinia umbilicata	Texas glyph	1	0.02	1	0.02	0.02					
Guppya gundlachi	glossy granule	8	0.13	8	0.19	0.19				0.01	
Hawaiia miniscula	minute gem	366	6.09	366	8.71	8.59				0.31	
Nesovitrea dalliana	depressed glass	53	0.88	53	1.26	1.24				0.11	
Zonotoides arboreus	quick gloss	17	0.28	17	0.40	0.40				0.09	
Polygyra sp.	liptooth	158	2.63	158	3.76	3.71				2.72	0.03
cf. *Praticollela*	scrubsnail	3	0.05	3	0.07	0.07				0.04	
Thysanophora plagioptycha	lyrate fringed snail	1	0.02	1	0.02	0.02					
land snails UID		1479	24.60	1479	35.21	34.69				1.14	0.01
other gastropoda UID										461.2	5.43
Total gastropoda	**total gastropods**	**5527**	**91.93**	**4036**	**96.10**	**94.68**	**1448**	**90.75**	**87.51**	**7113.83**	**83.77**
Geukensia demissa	ribbed mussel	59	0.98	13	0.31	0.30	13	0.82	0.79	13.55	0.16
Pinnidae	penshell	2	0.03	1	0.02	0.02				3.28	0.04
Argopecten irradians	bay scallop	9	0.15	3	0.07	0.07	3	0.19	0.18	37.91	0.45
Anomia simplex	common jingle	2	0.03	2	0.05	0.05				0.74	0.01
Crassostrea virginica	eastern oyster	348	5.79	119	2.83	2.79	119	7.48	7.22	1065.58	12.55
Ostreola equestris	crested oyster	4	0.07	4	0.10	0.09				2.41	0.03
Carditamera floridana	broad-ribbed carditid	5	0.08	3	0.07	0.07				3.43	0.04
Dinocardium robustum	giant Atlantic cockle	3	0.05	1	0.02	0.02	1	0.06	0.06	16.08	0.19
Pectinidae/Cardiidae	scallops/cockles	28	0.47	1	0.02	0.02	1	0.06	0.06	8.96	0.11
Spisula solidissima	Atlantic surfclam	4	0.07	3	0.07	0.07	3	0.19	0.18	18.46	0.22

Table 6-5. Continued.

Taxon	Common name	NISP	Percent of Total Invert/Vert NISP	MNI	Percent of Total Invert/Vert MNI	Percent of Total MNI	Food MNI	Percent of Total Invert/Vert MNI	Percent of Total Food MNI	Weight of Shell/Bone (gm)	Percentage of Total Shell/Bone Weight
Mercenaria campechiensis	southern quahog	5	0.08	1	0.02	0.02	1	0.06	0.06	86.6	1.02
Parastarte triqueta	brown gemclam	3	0.05	2	0.05	0.05				0.01	
Total Bivalvia	**total bivalves**	**472**	**7.85**	**153**	**3.64**	**3.59**	**141**	**9.12**	**8.79**	**1257.01**	**14.80**
Echinoidea	sea urchins	1	0.02	1	0.02	0.02	1	0.06	0.06	0.05	
Vermicularia fargoi	Fargo's wormshell	1	0.02	1	0.02	0.02				0.96	0.01
Anthozoa	hard corals	1	0.02	1	0.02	0.02				3.82	0.04
Callinectes sapidus	blue crab	1	0.02	1	0.02	0.02	1	0.06	0.06	0.23	
Cirripedia	barnacle	9	0.15	7	0.17	0.16				0.08	
Total Invertebrata	**total invertebrates**	**6012**	**100.00**	**4200**	**100.00**	**98.52**	**1589**	**100.00**	**96.42**	**8375.98**	**98.63**
Chondrichthys	cartilaginous fishes	7	4.73	3	4.76	0.07	3	5.00	0.18	1.98	0.02
cf. *Lepisosteus*	gar	2	1.35	1	1.59	0.02					
Ariopsis felis	hardhead catfish	39	26.35	2	3.17	0.05	2	3.33	0.12	3	0.04
Ariidae	sea catfishes	5	3.38	1	1.59	0.02	1	1.67	0.06	0.38	
Epinephalus morio	red grouper	2	1.35	1	1.59	0.02	1	1.67	0.06	0.67	0.01
Caranx sp.	jackfish	5	3.38							2.86	0.03
cf. Carangidae	jacks	1	0.68	1	1.59	0.02	1	1.67	0.06	0.25	
Orthopristis chrysopterus	pigfish	11	7.43	8	12.70	0.19	8	13.33	0.49	0.15	
cf. *Orthopristis*	pigfishes	3	2.03	3	4.76	0.07	3	5.00	0.18	0.05	
Archosargus probatocephalus	sheepshead	3	2.03	2	3.17	0.05	2	3.33	0.12	0.46	0.01
Lagodon rhomboides	pinfish	34	22.97	25	39.68	0.59	25	41.67	1.52	0.23	
Cynoscion sp.	seatrout	1	0.68	1	1.59	0.02	1	1.67	0.06	0.1	
Sciaenops ocellatus	red drum	2	1.35	1	1.59	0.02	1	1.67	0.06	0.85	0.01
cf. Sciaenidae	drum fishes	2	1.35	1	1.59	0.02	1	1.67	0.06	0.47	0.01
Micropogonias undulatus	Atlantic croaker	2	1.35	2	3.17	0.05	2	3.33	0.12	0.08	
cf. Mugilidae	mullets	2	1.35	1	1.59	0.02	1	1.67	0.06	0.65	0.01
Paralichthys sp.	flounder	1	0.68	1	1.59	0.02	1	1.67	0.06	0.04	
Chilomycterus schoepfi	striped burrfish	4	2.70	1	1.59	0.02				0.96	0.01
Osteichthys UID	bony fishes									34.03	0.40
Total Osteichthys	**total bony fishes**	**126**	**85.14**	**55**	**87.30**	**1.29**	**53**	**88.33**	**3.21**	**47.21**	**0.56**
Bufo terrestris	southern toad	1	0.68	1	1.59	0.02				0.8	0.01

Table 6-5. Continued.

Taxon	Common name	NISP	Percent of Total Invert/Vert NISP	MNI	Percent of Total Invert/Vert MNI	Percent of Total MNI	Food MNI	Percent of Total Invert/Vert MNI	Percent of Total Food MNI	Weight of Shell/Bone (gm)	Percentage of Total Shell/Bone Weight
Colubridae	nonpoisonous snakes	1	0.68	1	1.59	0.02	1	1.67	0.06	0.6	0.01
Terrepene carolina	eastern box turtle	1	0.68	1	1.59	0.02	1	1.67	0.06	0.82	0.01
Testudines	turtles	5	3.38	2	3.17	0.05	2	3.33	0.12	1.57	0.02
cf. *Aythya collaris*	ring-necked duck	1	0.68	1	1.59	0.02	1	1.67	0.06	0.8	0.01
Anatidae	ducks	3	2.03	1	1.59	0.02	1	1.67	0.06	0.94	0.01
Aves	birds	8	5.41							1.11	0.01
Sigmodon hispidus	hispid cotton rat	2	1.35	1	1.59	0.02	1	1.67	0.06	0.25	
Total Vertebrata	**total vertebrates**	**148**	**100.00**	**63**	**100.00**	**1.48**	**60**	**100.00**	**3.64**	**62.39**	**0.73**
Sample Total		**6160**		**4263**		**100.00**	**1702**		**100.00**	**8492.47**	**100.00**

CHAPTER 7
DISCUSSION

The Pottery Assemblage at Mound 5

Caloosahatchee I period contexts at the Pineland site are characterized by the predominance of Sand Tempered Plain pottery types (Cordell 2013:403). The presence of Belle Glade sherds has been accepted as an indicator of the transition from Caloosahatchee I to Caloosahatchee II at the Pineland Site Complex. Cordell has further elaborated this temporal sequence by dividing Caloosahatchee II into IIA and IIB based on the appearance and increase in relative frequency of Belle Glade pottery. Belle Glade is a spiculate pottery presumed to be a non-local ware at Pineland, originating in the Belle Glade area near Lake Okeechobee, over 100 km from the Pineland site (Cordell 2013:499, 502). Belle Glade paste typically has "common to abundant" sponge spicules, very fine to medium quartz inclusions, a compact paste texture, and a chalky or gritty tactual quality (Cordell 2013:388).

An intensive analysis of the pottery assemblage recovered from Mound 5 shows a large Caloosahatchee IIA component centered on the transition from Caloosahatchee IIA-early to Caloosahatchee IIA-late, a temporal transition defined by Cordell (2013). It appears that there is a deposit of Belle Glade pottery in BCM5 Stratum III that could suggest a major influx of this pottery type from interior Florida in the seventh century. The Belle Glade pots were determined to be exclusively bowl forms, and to fall within certain size ranges. This combination of form and orifice diameter may be related to the function of the pots and their place in exchange (see Rice 1987; Wallis 2011:23-25). If the Belle Glade pots were being transported from the interior to the coast, it is likely that they were moved in dugout canoes; this would limit their size individually. It would also be most efficient to transport them in a nested position, one inside another, to maximize load potential. Vessel orifice diameter analysis presented here would make this a possibility (Figure 12).

Cordell's hypothesis that Belle Glade ware increases in frequency until it become the predominant type at Pineland may be observed in what appears to be a defined layer of highly frequent Belle Glade sherds in Level 91 of Excavation M-3 and levels 84-85 of Excavation M-2. The gradual increase in frequency is clearly observed in the stratification of Excavation M-3. One interesting factor in the development of this type is that it becomes increasingly popular through time at Pineland and elsewhere on the Southwest coast of Florida through Caloosahatchee III (A.D. 1200-1350), then decreases or disappears at many sites on the coast. What could be the explanation for this demise of a very popular tradeware? We can assume that resources in the interior were not exhausted, because the pottery continues to be used there. It is possible that this is an example of pottery as a proxy for human activities and even political situations; by Caloosahatchee III times, the Calusa had become a powerful political and military entity, collecting tribute and trade goods from many areas on the southern peninsula. Perhaps there was a political fission among groups, cutting trade relations between the coast and the interior. Calusa political and military rivalry with Tocobaga neighbors to the north may have interrupted their relations with the people of Belle Glade. A close examination of trade and temporality, including further exploration of pottery distribution and temporality, could be used to answer these questions about politics and trade in pre-columbian Florida.

The petrographic analysis performed on the small sample discussed above has added to our knowledge of the paste composition of types within the Belle Glade and St. Johns typologies. The continued collection and analysis of both types in thin section could eventually explain differences in production sites and methods.

The Mound 5 Zooarchaeological Assemblage

Lyman (2006:16) has suggested that "experience may be the best teacher in terms of the taxonomic level to which the identification of a particular specimen can confidently be taken." Because this is my first experience formally identifying zooarchaeological remains, my attributions are cautious, identifying to species only when I was fairly confident of a match with available comparative specimens. Still, with a wealth of studies available from this particular site, comparisons can be made.

Much focus has been placed on molluscan assemblages at Pineland. This is due to the fact that mollusks are less mobile than vertebrates, and therefore considered more susceptible to environmental change. Vertebrate fishes are more mobile, so perhaps more resistant to change; when the water gets too low, the fish go elsewhere. However, fish are more variable by season and subject to changes in tides, spawning patterns, and local weather conditions, as evidenced by fish die-offs in the Sound during cold snaps. Fish populations can change on a small scale, seasonally or even at different times of day. This may help explain intra-site differences as seen in the frequency of some species in the Mound 5 assemblage.

The vertebrate component can also be used to help identify temporality. Pineland assemblages in general show that the site's inhabitants have traditionally exploited a wide array of cartilaginous fishes, which could have entered the estuary on high tides (deFrance and Walker 2013:322). Sharks and rays are well represented in the Mound 5 samples, some exceptionally large; they could also have been acquired in near off-shore waters.

Bony fishes are ubiquitous in all contexts at the Pineland Site Complex. Although these numbers include small species recovered only in fine screen samples, the M-2 1/4-in samples show that bony fishes still dominate the assemblage. The earliest ethnohistoric records verify this; an early Spanish captive of the Calusa describes them as "great anglers" who "at no time lack fresh fish" (Fontaneda 1945:31). The Calusa used nets of varying sizes for catching fish, as evidenced by wet midden preserved examples of actual nets as well as the presence of net mesh gauges, floats, and weights (Marquardt 1992c:191-221).

The increasing presence of ducks may be seen to be an indicator of Caloosahatchee IIA and the Vandal Minimum. Perhaps a combination of cooling climate and lowering water levels in Pine Island Sound put pressure on the aquatic fauna; fishing nets could as easily be used to snare ducks, especially the diving species identified at Pineland.

Mammal remains are seen in low percentages, compared to aquatic species, in most contexts at Pineland. As discussed above, this may be an actual bias on the part of local subsistence practices. However, small sized faunal samples and fine screen sampling serve to over-represent small species and under-represent larger species. A methodology of combining a small faunal sample (50 x 50 x 10 cm) with a larger 1/4-in screen sample (2m x 2m x10 cm) for each level examined may better balance the size selection bias.

The South Florida region incorporates temperate and tropical biomes (Marquardt 2001:158). By the time of European contact, Calusa influence "stretched across the vast wetlands and flatlands of the southern Florida peninsula from the Gulf to the Atlantic coast and south to the Florida Keys," and in Charlotte Harbor, the Calusa heartland, "the combination of river outflow from the interior and the enclosing barrier islands furnished a protected, shallow, grassy estuary of extraordinary year-round productivity" (Marquardt 2001:158). In addition to the rich estuary, Pine Island offered expansive lands for the procurement of plant and animal resources as well as places to establish home-gardens (Newsom and Scarry 2013), and was close to the deeper waters of the Gulf of Mexico. Although resources for survival were rich, coastal groups did not live in isolation from the interior, as evidenced by trade goods and extra-local pottery types. Few lithic remains were found in the Mound 5 excavations, but the evidence of trade in the form of Belle Glade pottery is abundant.

The division of territorial resources among the Calusa and their neighbors was a complex social system. We do have some ethnohistoric sources to help explain societal structure; we know from Fontaneda (1945) that Calusa society was stratified in much the same way as the pre-contact Hawaiians, with high ranking chiefs controlling resources and practicing dietary differences from commoners (Titcomb 1972). Remote island sites such as Pineland, Big Mound Key/Boggess Ridge, or Mound Key in Estero Bay may prove good study areas for exploring the way in which resources were used within the Calusa homeland and as trade materials. Aerial photographs have suggested the possible existence of fish traps in estuarine contexts. The water features and canals on Calusa sites may have been used as fish impoundments; intensive fishing could feed a trade industry that tied coastal populations to inland societies. Indeed, the construction of the Pine Island Canal at Pineland constituted a major engineering project even by modern standards, requiring a centralized organization of labor and a considerable work force. The canal acted as a highway across Pine Island, allowing access to inland populations by way of the Caloosahatchee River. Economic advantages would be gained by ease of transport both to the interior and up and down the coast.

The Pineland Site Complex has proved important in itself as a rare surviving example of a large, complex coastal habitation site, occupied for a long period of Florida's prehistory. With the recent release of the comprehensive, synthetic work *The Archaeology of Pineland* (2013), and the pending application for National Historic Landmark status with the National Parks Service, Pineland is poised to take its place not only in the history of Florida, but in the history of the Southeast, the United States, and the world.

CHAPTER 8
CONCLUSION

Brown's Complex Mound 5, Excavation M-3 Level 91 (Stratum III) yielded a radiocarbon date of A.D. 650 (cal 2σ A.D. 620-680), indicating a Caloosahatchee IIA context. This date is of special interest because it is considered the transition period from Caloosahatchee IIA-early to Caloosahatchee IIA-late, a division partially based on a change in pottery assemblages at Pineland (Cordell 2013). An analysis of pottery found in Stratum III focused on diagnostic Belle Glade sherds corroborates this date, suggesting a statistically significant spike in Belle Glade pottery frequency in Excavation M-3 Level 91, and in Excavation M-2 Level 84. The continued study of Belle Glade pottery, its composition, origin, and paste distinctions will greatly enhance the understanding of the Pineland Site as it relates to the pre-columbian world of Florida and beyond. Although the petrographic analyses presented in this study may be less than conclusive, the formation of a library of petrographic samples will eventually elucidate the many questions associated with this deceptively nondescript plain ware. Combined with a faunal analysis of M-2 levels 84 and 85 (1/4-in.), M-3 Level 91 (1/4, 1/8, 1/16-in.), M-3 Level 95 (1/4-in), and M-3 Level 96 (1/4, 1/8, 1/16-in), the Mound 5 faunal assemblage will provide a sufficient sample size to verify the dating of Stratum 3 (M-2 Level 84 and M-3 Level 91) to the middle of the Caloosahatchee IIA period, as well as providing additional data on the nature of Caloosahatchee IIA faunal assemblages at the Pineland Site Complex. The discovery of several species of tiny land snails during the Mound 5 excavations provides baseline data for future archaeological, biological, and environmental studies at the Pineland Site that could illustrate micro-environmental conditions at the site both in the past and in the present. Now fully protected by local, state, and federal law, the Pineland Site will continue to provide resources for generations to come.

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BIOGRAPHICAL SKETCH

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