ARCHAEOLOGICAL INVESTIGATIONS AT EHRBAR (8LV282), LEVY COUNTY, FLORIDA

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Technical Report 17
Laboratory of Southeastern Archaeology
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Cover photo: Top to bottom: Kris Hall, Paulette McFadden and Roz Crews excavating Test Unit 2 at Ehrbar (8LV282), May 2012. Micah Monés is in background.

MANAGEMENT SUMMARY

Archaeological testing at Ehrbar was performed from March 5–6, 2012 on the property of Elizabeth Ehrbar by the Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida. Bucket auger samples collected across the property revealed intact midden deposits at two locations, prompting the excavation of test units in each. Test Unit 1 was located to the west of the house, adjacent to the carport, and Test Unit 2 was located in the rear yard to the north of the house. Test Unit 1 contained midden deposits consisting of dense oyster and scallop shell in a dark organic-rich sediment matrix with very few artifacts. Excavators encountered multiple areas of concreted midden, likely the result of burning. Test Unit 2 contained two different types of midden deposits. Very dark organic-rich sediments containing vertebrate fauna and very little shell were crosscut by areas of similar sediments with very dense shell, vertebrate fauna, and a high frequency of paleofeces. The morphology of this stratum suggest the materials were deposited in discrete episodes, likely in basket loads. Artifacts recovered from Test Unit 2 include lithic debitage and two stemmed bifaces, one of which is possibly a Newnan type. The observed differences in deposits between the two test units suggests that different activities were taking place at each location. The area of Test Unit 1 may have been located closer to a household where fire was used and the area was cleared of debris, while Test Unit 2 was likely an area of secondary deposition. Radiocarbon samples obtained from the base of midden deposits in each unit date the earliest deposits to between 4300–4510 calibrated years before present, during the Late Archaic Period. Preliminary faunal analysis suggests that the environment was drier and salinity levels were higher during the early stages of occupation, with conditions becoming wetter and more brackish through time. Artifacts dating to the later Woodland Period are present near the surface in both test units, but they are mixed with modern materials. It is likely that archaeological deposits of later pre-Columbian age have been significantly disturbed by more modern landscape modifications, including logging and residential development. Recommendations for future investigations include additional subsurface testing on nearby properties where intact deposits can be identified and more in-depth analysis of faunal materials. Chapter 1 of this report provides brief background information, including physiographic setting and previous research. Methods and results of test unit excavations are provided in Chapter 2, followed by the preliminary results of faunal analysis in Chapter 3. Finally, Chapter 4 presents conclusions and recommendations for further research.

ACKNOWLEDGMENTS

Fieldwork at Ehrbar (8LV282) was executed by a crew from the Laboratory of Southeastern Archaeology: Roz Crews, Kris Hall, Paulette McFadden, Micah Monés, Andrea Palmiotto, Sydney Roberson, and Ken Sassaman. Access to the Ehrbar property was granted by Elizabeth Ehrbar, who is a long-time member of the Cedar Key Historical Society. Her love of history and stewardship of the archaeological remains on her property were the inspiration for the name of this component of the archaeological site. Her daughters, Lisa and Enid Ehrbar, were also instrumental in facilitating this project by providing access to the home and information about the recent activities on the property. Ken Sassaman's guidance and input were critical to the completion of this project. His enthusiastic support for the research goals of his students is much appreciated. Funding for the Ehrbar project was provided by the Hyatt and Cici Brown Endowment for Florida Archaeology.

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CHAPTER 1
BACKGROUND AND PREVIOUS RESEARCH

Paulette S. McFadden

8LV282 is a pre-Columbian archaeological site situated in the Gulf Boulevard area of the northern Gulf Coast town of Cedar Key, Florida. This large archaeological site contains cultural materials that date to as early as the Late Archaic, around 4,300 years ago. It has been significantly impacted by road and house construction beginning by at least the 1960s when development of the town expanded toward the northeast. Despite the destruction of many areas of the site, intact archaeological remains were available for sampling and research on a privately owned lot that had received little disturbance since the initial construction of the home in 1974. This component of 8LV282 has been designated Ehrbar. In 2012, the Laboratory of Southeastern Archaeology, at the invitation of the property owner, began testing to recover archaeological data as part of an overall research project that has been outlined in the initial Lower Suwannee Archaeological Survey report (Sassaman et al. 2011).

BACKGROUND

The Lower Suwannee Archaeological Survey (LSAS), a long-term research project initiated by the Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida, focuses on the 47-km-long coastline that stretches from Horseshoe Beach to the north to Cedar Key to the south, and includes the Lower Suwannee and Cedar Keys National Wildlife Refuges (Figure 1-1). Past research, although relatively sparse in this area, suggests that large aboriginal populations lived in this coastal area over a period of at least 4,500 years (Sassaman et al. 2011), and new research will contribute to the poorly understood pre-Columbian history of the northern Gulf Coast of Florida.

The research project also focuses on understanding how humans have related to the environment in the past, and how these relationships changed through time as the environment changed. Cyclical changes in daily and seasonal tides, along with changeable weather conditions, were normal along the coast, and the dynamic nature of this environment likely necessitated flexible cultural structures that enabled people to incorporate variable conditions into routine daily life. The routines of daily life became part of the landscape in the form of middens, mounds, and other material remains. These remains, through their durability and persistence on the landscape, would likely have created the perception of permanence for those who lived in the continuously changing coastal region. Punctuated events, like high-energy storms, had the potential to cause significant morphological changes to the coastline, and during periods of rapid sea-level rise, shoreline transgressions could be substantial in this low-gradient region. Normal variation was incorporated into existing cultural structures; however, these punctuated events could have been traumatic and necessitated changes that could integrate the new conditions that resulted from the environmental shift.

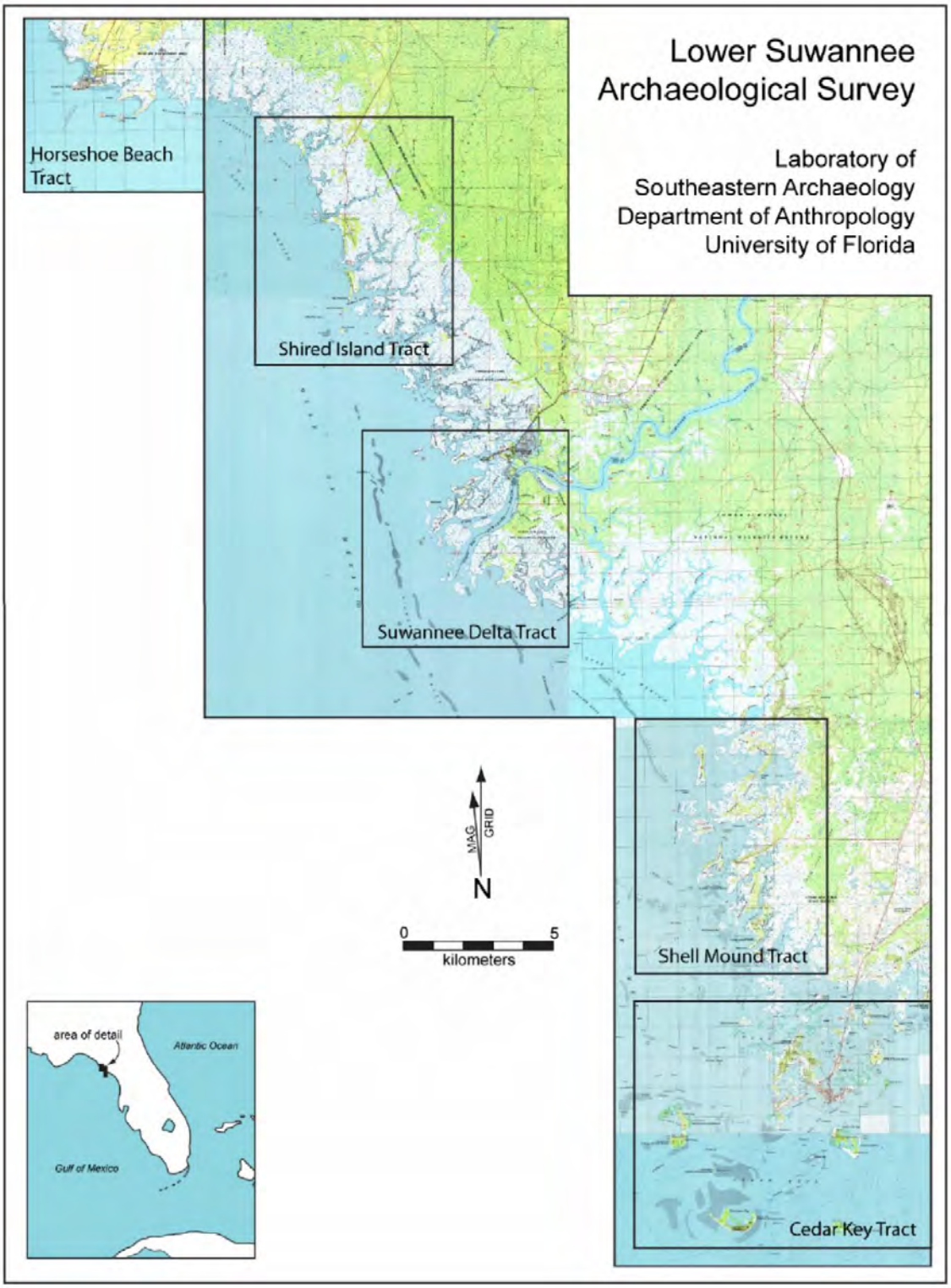

Figure 1-1. Topographic map of LSAS study area with inset maps of five defined research tracts (Sassaman et al. 2011).

The LSAS study area is separated into five tracts, each of which contain multiple archaeological sites. From north to south, these tracts are Horseshoe Beach, Shired Island, Suwannee Delta, Shell Mound, and Cedar Key (Figure 1-1). Ehrbar is located in the Cedar Key tract (Figure 1-2), the largest of the five with the most recorded archaeological sites (n = 34). The tract is composed entirely of islands, 12 of which are encompassed by the Cedar Keys National Wildlife Refuge (Sassaman et al. 2011).

The town of Cedar Key is located on Way Key and is accessed via state route 24, which links the island to the mainland through a series of bridges. Initially the town of Cedar Key was located on Atsena Otie, a small island approximately one kilometer to the south of Way Key. During the 1850s, the Eberhard Faber Mill on Atsena Otie and the Eagle Pencil Company Cedar Mill on Way Key made pencil slats that were shipped to their pencil factories in New York. Railroad construction that facilitated shipment of the pencil slats, along with other materials, made Way Key easily accessible and population increases and development there outpaced that of Atsena Otie. After the town of Cedar Key was destroyed in 1896 by a large hurricane, the town was moved from Atsena Otie to Way Key (McCarthy 2007).

Physiographic Setting

The Cedar Keys tract is predominately composed of limestone substrate with a very thin quartz sand sediment drape. In many areas, the limestone outcrops and dissolution and collapse of the limestone has created a complex karstic topography. Many of the small islands dotting the shallow-water environment are the remnants of relict paleodunes that formed sometime around the end of the Pleistocene and into the early Holocene when the coastline was still as much as 200 km to the west. Consistent with other inland dunes that formed throughout the southeastern United States, these landforms accreted during a period of glaciation and drier climatic conditions sometime between 30,000 and 15,000 years ago (Iverster 2003). After about 4,000 years ago, these dunes were subject to reworking by marine processes as the land around the dunes was inundated by sea-level rise (Wright et al. 2005). Midden deposits, including massive amounts of oyster shell, cap many of these small islands and in some cases have protected them from inundation by transgressive seas by increasing their elevation.

Oyster bars created by the eastern oyster (*Crassostrea virginica)* characterize the offshore environment in the Cedar Keys tract. These bivalves thrive in subtidal and intertidal zones of brackish water and are ubiquitous in the Big Bend region of Florida (Kilgen and Dugas 1989). Prior to 1993, substantial oyster reefs in the Cedar Keys area were commercially fished, and the oystering industry was the main economic driver of Cedar Key. The “Storm of the Century” in 1993 caused massive damage to the reef systems and many of them collapsed. Continued sea-level rise and reductions in fresh water inputs have increased salinity levels in the area prohibiting reformation of the reefs (Seavey et al. 2011). Commercial clamming is now the main fishing industry in Cedar Key.

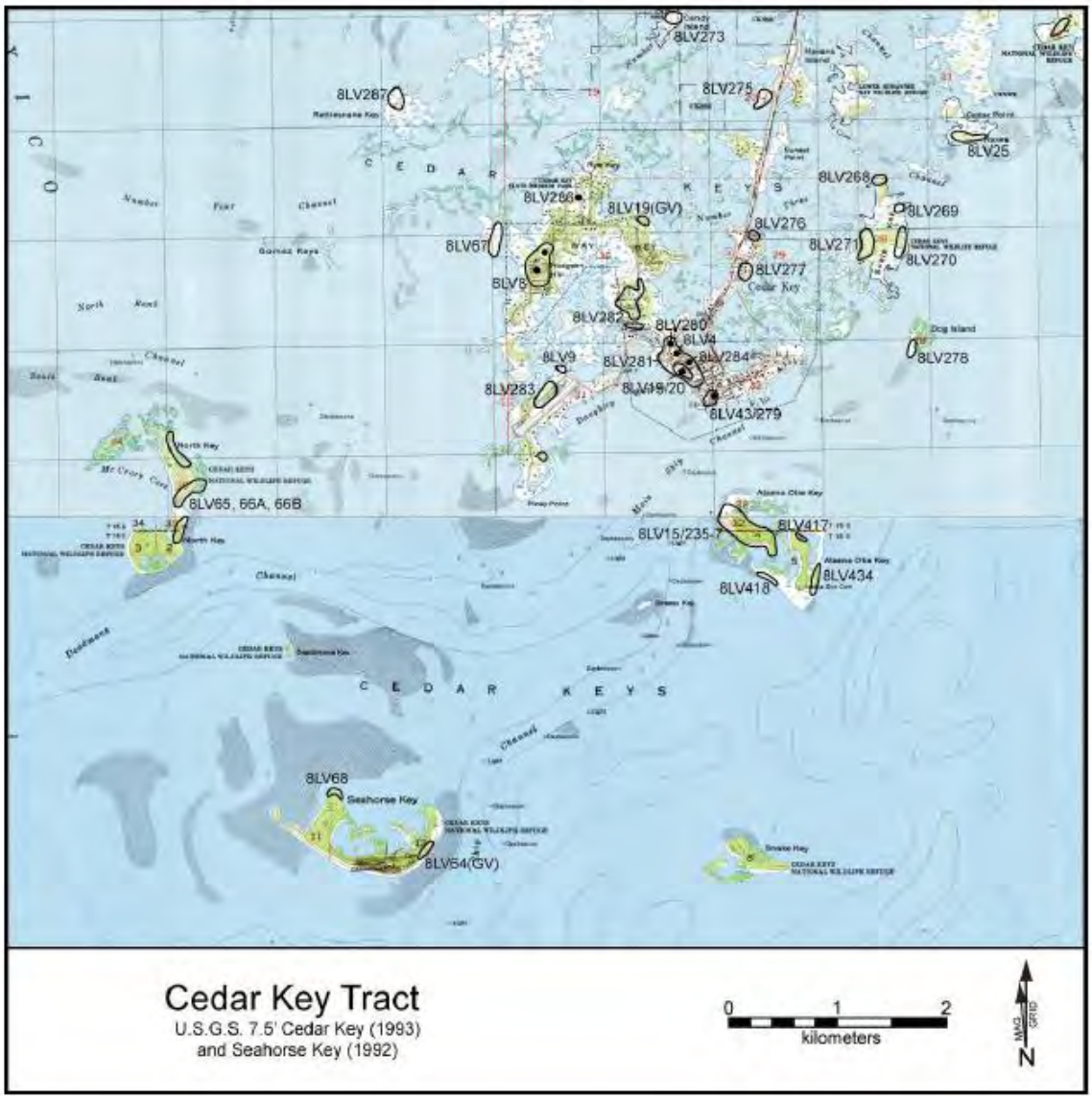

Figure 1-2. Topographic map of Cedar Key tract with locations of recorded archaeological sites (Sassaman et al. 2011).

Previous Research

A comprehensive discussion of past archaeological work at Cedar Key is available in Sassaman et al. (2011). For the purposes of brevity, and to avoid redundancy, this chapter provides only a brief summary of the archaeological background and context for the town of Cedar Key, with a more detailed discussion of site number 8LV282, now designated as the Ehrbar site.

Sassaman et al. (2011:39) describes Way Key, the modern location of the town of Cedar Key, as an "expansive and complex…anthropogenic landscape." R. E. C. Stearns

(1869) and Jeffries Wyman (1870) provide some of the earliest descriptions of mounds on Way Key, many of which have since been destroyed. The earliest reported excavations were conducted by A. W. Vogeles (1879), W. W. Calkins (1877-1880), A. Ecker (1878), and S. T. Walker (1883). These excavations recorded stratigraphic data and collected artifacts and human remains from the mounds. C. B. Moore (1918) excavated two sites in Cedar Key in 1917-18, one of which was described as an aboriginal cemetery. Gordon Willey and John Goggin conducted survey work in the 1940s, collecting artifacts spanning the Late Archaic to Late Woodland, with the majority dating to the Weeden Island period. Lastly, during preparatory work ahead of construction of the Cedar Key Lions Club building, several burials were exposed, initiating investigation by Calvin Jones (1992), who determined that these burials were likely part of the aboriginal cemetery described by Moore. The protected remains of the sand and shell mound remain on the property and are one of the last remaining mounds in the town of Cedar Key.

The anthropogenic landscape of the past on Way Key has been severely impacted through development of the modern town of Cedar Key, and some of the locations of the mounds described in early accounts are unknown. However, using a panorama lithograph from 1884 (Figure 1-3), Sassaman et al. (2011) identified eight areas of topographic anomalies that were possibly the remnants of mounds and other earthworks. These areas, designated by the dashed outlines seen in Figure 1-4, attest to the magnitude of the landscape modification performed by the pre-Columbian inhabitants of the area.

In 1989, University of Florida archaeologists surveyed the area of the Cedar Keys (Borremans and Moseley 1990). The survey focused on identifying and recording archaeological sites and examining artifact collections housed at the Florida Museum of Natural History and held by local residents. They located 50 archaeological sites, 28 of which were unrecorded, and concluded that shell middens constitute the majority of site types within the survey area, but mounds of various kinds were also identified, including burial mounds and platform mounds. The surveyed sites span the Early to Late Woodland Periods, and Borremans and Moseley (1990) note that no intact Archaic Period sites were found during the survey. This statement must be qualified by the fact that there was no subsurface testing during the survey and the survey did not access sites that were encompassed by the Lower Suwannee and Cedar Keys Wildlife Refuges. More recent work in the LSAS project area has uncovered intact Archaic Period deposits close to the Cedar Key tract at Deer Island (Monés et al. 2012) and McClamory Key (Sassaman 2013) in the Shell Mound tract, Cat Island in the Suwannee Delta tract (Sassaman et al. 2011), and Bird Island in the Horseshoe Beach tract (McFadden and Palmiotto 2012).

The archaeological deposits in the northwestern area of the city of Cedar Key were first recorded by Borremans and Moseley (1990). The area was given the state-assigned site number 8LV282 (Figure 1-5) and designated as the Gulf Blvd. site. Ehrbar, so named in honor of Mrs. Elizabeth Ehrbar, who is a long-time member of the historical society at Cedar Key and who owns the property on which the excavations occurred, is a locus within the larger Gulf Blvd. site. The site report for 8LV282 lists the site type as

Figure 1-3. Panorama lithograph of Cedar Key, Florida (produced for Levy County by J.J. Stoner, Madison, Wisconsin; lithograph by Beck and Pauli, Litho, Milwaukee, Wisconsin).

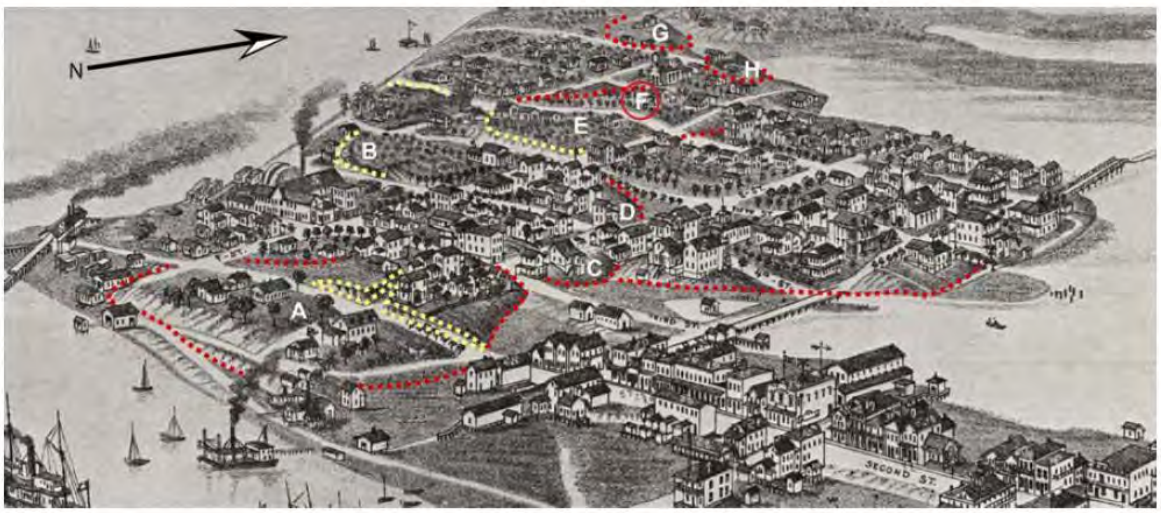

Figure 1-4. Portion of 1884 panoramic lithograph of Way Key, showing landscape features that appear to coincide with 19th-century descriptions of shell and sand mounds (Sassaman et al. 2011:37).

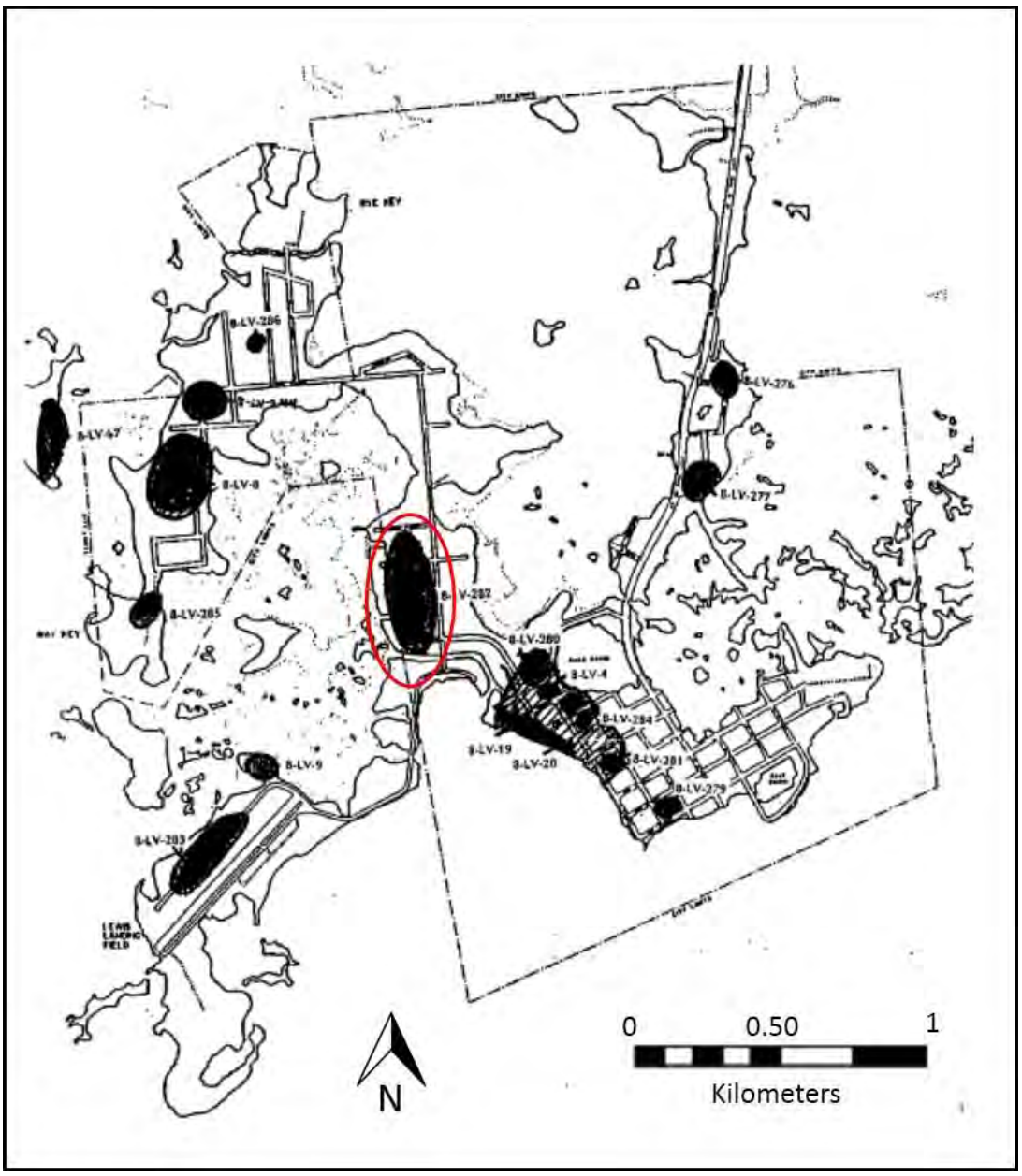

Figure 1-5. Map of Cedar Key with archaeological sites. Ehrbar, 8DI282, is circled in red (Borremans and Moseley 1990).

prehistoric shell midden and a variable density artifact scatter. Borremans and Moseley (1990) describe the site in more detail as follows:

> This is not one concentrated site, but a zone of shell midden that covers the area in varying density. Due to construction of roads, it is difficult to pinpoint the beginning and end of a site. It actually appears that the entire area could be considered one zone of prehistoric activity (Borremans and Moseley 1990).

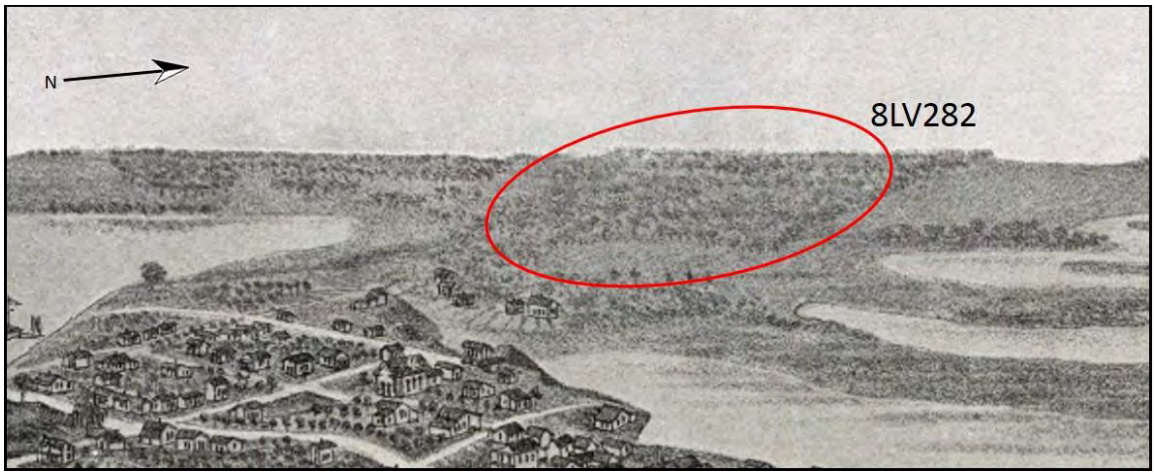

Figure 1-6. Portion of 1884 panoramic lithograph of Way Key, showing area of Ehrbar, 8DI282.

None of the earliest written accounts of archaeological sites mention this area, and no previous excavation work has been performed at 8LV282. The lack of previous descriptions and research is likely due to the absence of large mounds, which attracted the bulk of earlier archaeological excavation. The survey by Borremans and Moseley, likewise, do not provide much detail about the site since the focus of the survey was to identify and document many sites over a large geographic area.

Ehrbar has experienced significant disturbance and archaeological remains near the surface have been scoured and displaced, evidenced by the observed mixing of pre-Columbian pottery sherds with modern materials, such as glass, plastic, and metal. Recent activities on the landscape that impacted those remains can be reconstructed by referencing historical documents to determine when development began. The area is visible in the 1884 panoramic lithograph, but it is largely undeveloped (Figure 1-6). A small cluster of structures situated in the area where the Cedar Key school now sits appears to be at the northwestern extent of development during that time. The Gulf Blvd. area (circled in red) appears to be wooded; however, it is likely that the area was logged to supply wood and other products to local industries. Red cedar was harvested to be milled into pencil blanks by the Eberhard Faber and Eagle Pencil Companies, and bald cypress and cabbage palms were harvested for lumber and the manufacture of palm fiber brushes (Florida Department of State n.d.).

Modern development of the area for residential use occurred sometime between 1920 and the early 1960s. A search of all available Sandborn Fire Insurance maps for Cedar Key from 1884 through 1920 reveals no evidence of structures. The earliest available aerial photography shows that the Gulf Boulevard area had largely been cleared and most of the roads were in place in 1961 (Figure 1-7). The photograph is grainy, but it appears that only a few houses had been constructed on the south side of Whiddon Avenue in 1961, with the bulk of the Gulf Boulevard area still undeveloped.

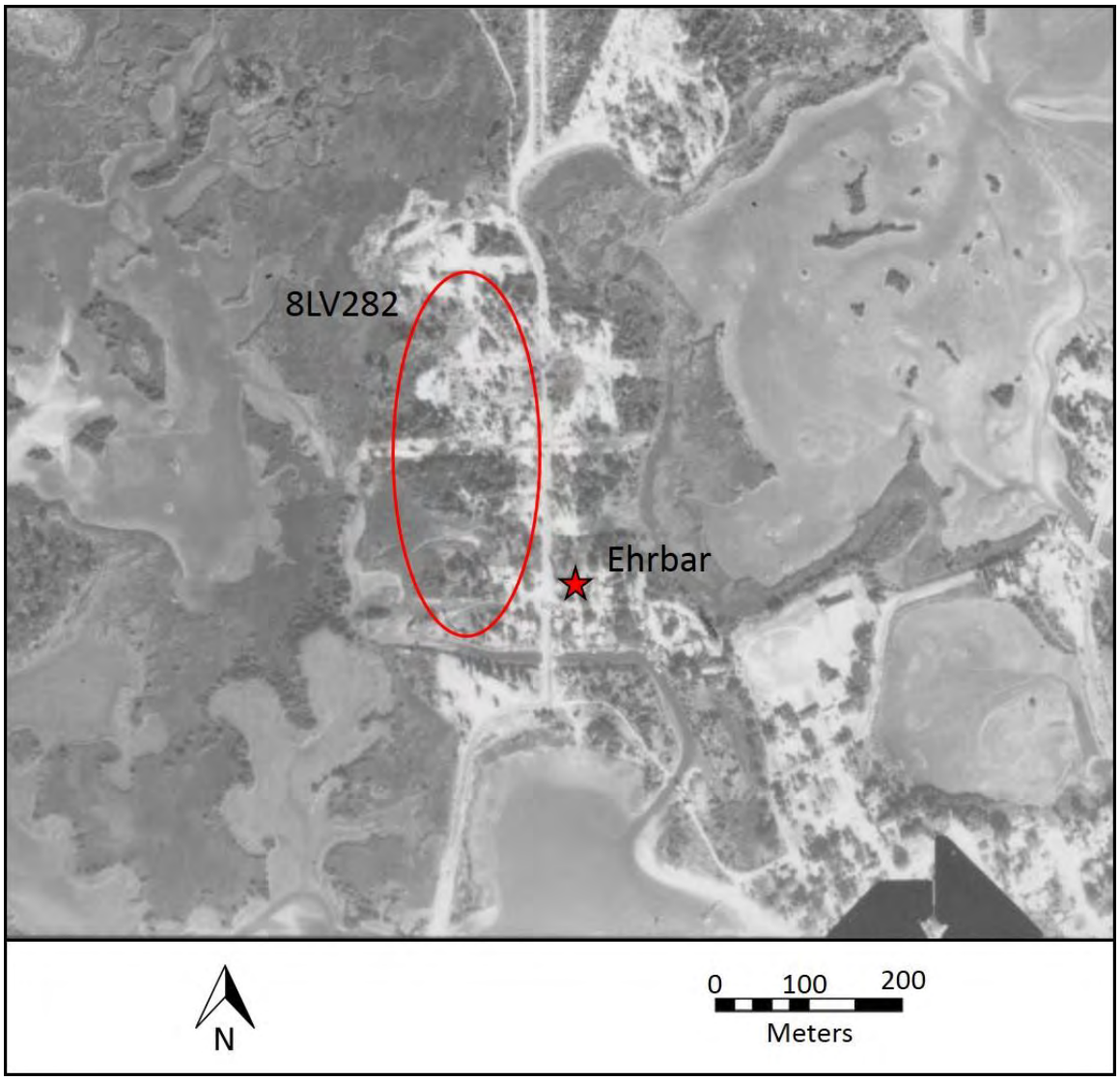

Figure 1-7. Aerial photograph of the Gulf Boulevard area of Cedar Key from 1961 (University of Florida Digital Collections).

The Ehrbar property is located near the juncture of Whiddon Avenue and Gulf Boulevard (Figure 1-8) on the southeastern edge of 8LV282. The house was constructed in 1974 and there is no evidence of a previous structure on the lot. The property slopes downward in elevation approximately 10 centimeters from its highest point at the northwest corner of the house to the lowest point in the southeast corner of the lot. Large trees shade the property and there is virtually no grass beneath. As a result, pre-Columbian artifacts have been found on the ground surface, including lithics, pottery sherds, and shell (predominately oyster and small clams). Improvements to the house include the addition of a screened porch area and a covered carport in the early 2000s. With the exception of clearing and necessary construction related activities and a small area in the northeast corner that contains pet burials, the lot remains largely undisturbed. No fill dirt has been imported and no excavations have occurred.

Figure 1-8. Map of Cedar Key showing location of Ehrbar 8DI282 designated by the red star.

In conclusion, Ehrbar is a locus on the edge of a large archaeological site that is situated in the Gulf Boulevard area of the town of Cedar Key on the northern Gulf Coast of Florida. Way Key, on which the town of Cedar Key is located, has been the focus of several surveys and archaeological investigations because of the significant number of mounds located on the Island. The Gulf Blvd. area, in contrast, has received virtually no attention. An apparent absence of intact archaeological sites that predate the Woodland Period in the Cedar Keys area, as reported by Borremans and Moseley (1990), make Ehrbar significant because it contains Late Archaic midden deposits and can provide important information about the early occupations and environmental conditions in the Cedar Key tract. Mixing of Woodland Period pottery with modern debris near the surface suggest that there were later pre-Columbian occupations at Ehrbar; however, the area has been heavily disturbed by logging, and later by road construction and residential development. Luckily, the privately owned lot of Mrs. Ehrbar has experienced little disturbance since the initial construction of the home and provided an excellent opportunity to sample the intact archaeological remains. The results of excavations at Ehrbar can be compared to sites that have been investigated elsewhere in the LSAS study area, thus putting it into context with the wider cultural and environmental setting of the pre-Columbian northern Gulf Coast.

CHAPTER 2
METHODS AND RESULTS OF TEST UNIT EXCAVATIONS

Paulette S. McFadden

Seven auger samples were collected from various areas of the Ehrbar property. Auger samples from lower elevations on the property contained shell and pre-Columbian artifacts, but the archaeological deposits have been disturbed. Two locations at the highest elevation of the property, near the location of the house, were chosen for excavation of 1 x 2-m test units where augering revealed intact archaeological remains (Figure 2-1). Test units were excavated in arbitrary 10-cm levels using standard archaeological techniques (see Figure 2-2 and Figure 2-7). All materials were screened through 1/4-in hardware cloth, and artifacts and vertebrate faunal remains were bagged by level for later analysis. Level forms were completed after each level, which recorded depths for each corner and center from the local datum, observations of content and composition, and any obvious features. All four profiles were cleaned, photographed, and drawn to scale after excavation was completed and bulk samples were collected. All recovered materials were bagged and transported to the Laboratory of Southeastern Archaeology in Gainesville for analysis.

At the laboratory, the materials collected during level excavation were washed, sorted, and cataloged. A small portion of each bulk sample was screened to collect the sediment matrix for additional soil analysis, with the remainder of the samples processed using a flotation tank. The light fraction of each sample was preserved for future analysis. The heavy fraction was sorted and classified, with the exception of materials that were smaller than 1/8-in, which were curated for future analysis.

TEST UNIT 1

Test Unit 1 (TU1) was placed immediately to the west of the house and oriented north to south. A datum was established at the ground surface on the northwest corner of the unit prior to the initiation of excavation. In addition to the materials recovered during level excavations, additional bulk samples were collected from a 50 x 50-cm column in 10-cm levels within the identified archaeostrata from the north profile of TU1.

Photographs of the west and east profiles of TU1 are provided in Figures 2-4 and 2-5. Scaled drawings of all four profiles of this test unit are provided in Figure 2-6. Table 2-1 provides description of the strata identified in Figure 2-6, and an inventory of the archaeological materials recovered by level and column strata is provided in Table 2-2.

Five discreet strata were identified in TU1. Stratum I, the uppermost stratum that extends down to 22 cm BD, consists of very dark brown medium sand with medium to light roots and virtually no vegetation on the surface. Historic artifacts, including glass, metal, and plastic, were scattered at or near the surface. Within a few centimeters of the surface, pre-Columbian artifacts and faunal remains were exposed in the northeast corner

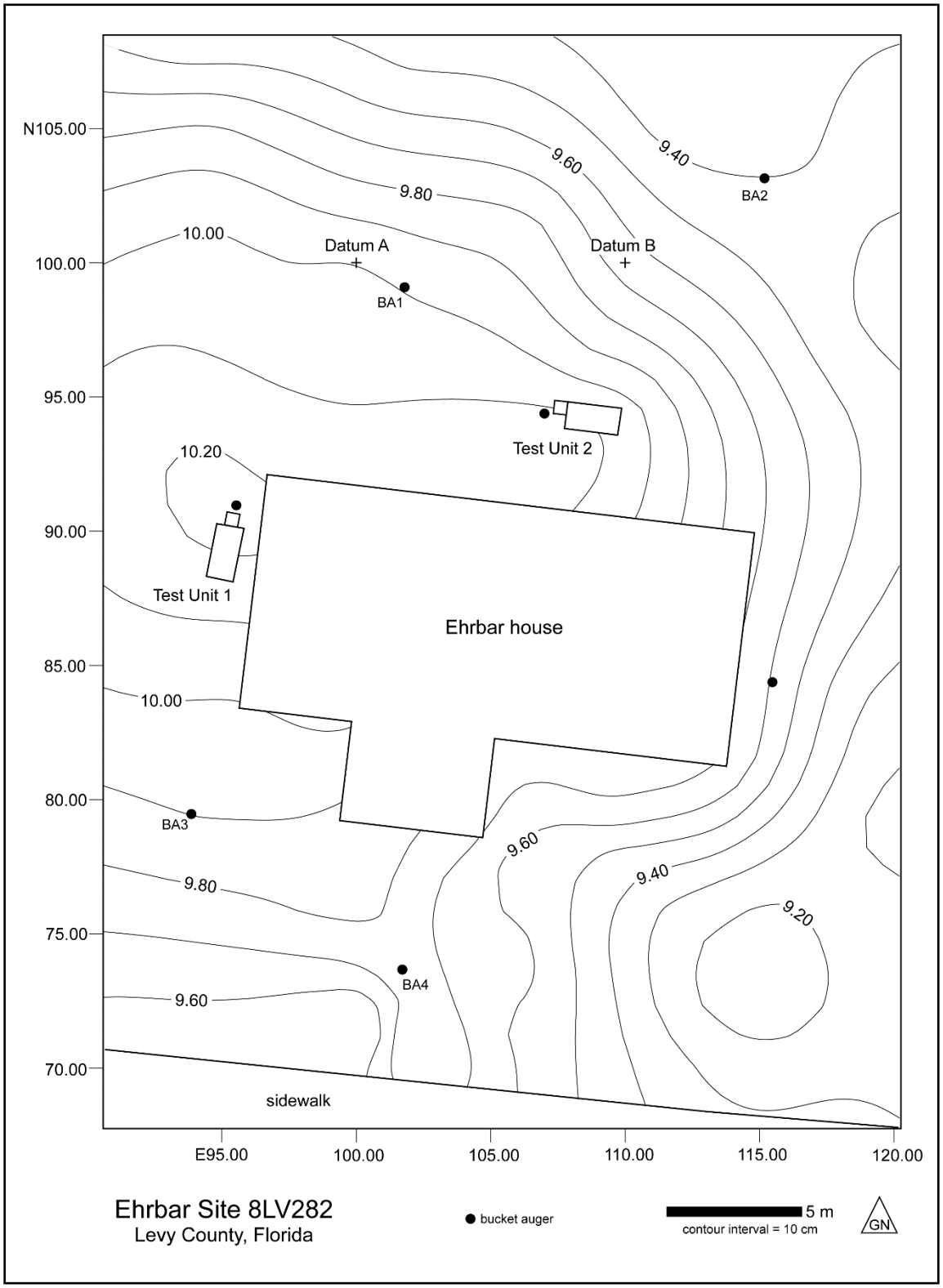

Figure 2-1. Topographic map of Ehrbar locus of 8LV282, showing locations of auger samples and test units.

Figure 2-2. LSA crew excavating Test Unit 1 at 8LV282 on March 5, 2012.

Table 2-1. Stratigraphic Units of Test Unit 1, 8LV282.

Stratum	Max. Depth (cm BD)	Munsell Color	Description
I	22	10YR2/2	Very dark brown loamy medium sand.
II	56	10YR2/1	Dense shell midden consisting of scallop, oyster, gastropod, and variable density of vertebrate fauna in black sandy matrix with some concretions.
III	60	10YR6/3	Pale brown fine sand with a few shells and vertebrate fauna.
IV	29		Intrusion of small mammal remains.
V	53	10YR2/1	Shell in black concreted matrix.

of the unit. The sediments became darker over the entire unit toward the bottom of Stratum I and additional cultural materials were recovered, including a bone pin and antler tine. Historic artifacts continued to be present in the lower elevations of this stratum and the remains of a small mammal were recovered in the southeastern portion. The mixing of pre-Columbian artifacts with historic artifacts suggest that this area has been highly disturbed, which is expected due to its close proximity to the home, and archaeological deposits in this stratum are not intact. At the base of this stratum, there is a fairly sharp contact with the underlying midden stratum.

Stratum II extends to a maximum depth of 56 cm BD and consists of very dark, organic-rich sediments that contained dense shell, mostly oyster and scallop. Densities of both shell and vertebrate fauna remain consistent throughout the stratum; however, faunal analysis (see Chapter 3) revealed that relative scallop frequencies increased with depth, going from a ratio of scallop to oyster of 1:7 in the upper portion to 1:1 at the base of the midden. Fish was the most common type of vertebrate fauna, but mammals, birds, and reptiles were also present. In general level excavation, only one piece of modified bone was recovered, however, 10 lithics and one shell tool were recovered from bulk samples taken from this stratum. No pottery was recovered, which suggested that the midden deposits could be pre-ceramic in age. A charcoal sample recovered from the base of this midden returned a conventional AMS assay of 3940 ± 30 B.P., or a two sigma calibrated date range of 4300–4510 B.P., placing the midden deposits in the Late Archaic period.

Pockets of concreted shell were encountered in several areas of the unit at around 40 cm BD, and a large area of concreted shell was uncovered at 42 cm BD in the northern portion of the unit. This area, designated in the field as Feature 1 (Figure 2-3), was described as black concreted midden with scallop, oyster, and vertebrate fauna, and was interpreted as a possible concreted hearth. With the exception of the concreted nature of the deposits, there was no change in content of the deposits that would differentiate it from other areas of the midden, and after the area was drawn to scale and photographed, it was excavated as general level fill.

Figure 2-3. Feature 1 in northern portion of TU1, 8LV282.

The lowermost stratum, Stratum III, extends down to and below the maximum depth of the unit at 60 cm BD. There is an indistinct gradation between Stratum II and Stratum III, likely because organic matter has leached downward from the midden into underlying sediments and blurred the contact between the original ground surface and the midden deposits. The finer-grained sediments of Stratum III are pale brown in color and contain no artifacts and virtually no vertebrate faunal remains or shell. Excavation was terminated at 60 cm BD because cultural materials were no longer present in this stratum of natural subsoil.

Stratum IV was an intrusive disturbance that extended downward from Stratum I into Stratum II to a maximum depth of 30 cm BD and contained the remains of a small domestic cat. Stratum V was an area of concreted shell and black, highly-organic sand. The roughly circular area is entirely encompassed by Stratum II and extends from 30 to 45 cm BD in the southern portion of the east profile. This area of concreted shell in the profile correlates with other concreted areas that were encountered at the same depths throughout the unit.

Figure 2-4. West profile of TU1, 8LV282.

Figure 2-5. East profile of TU1, 8LV282.

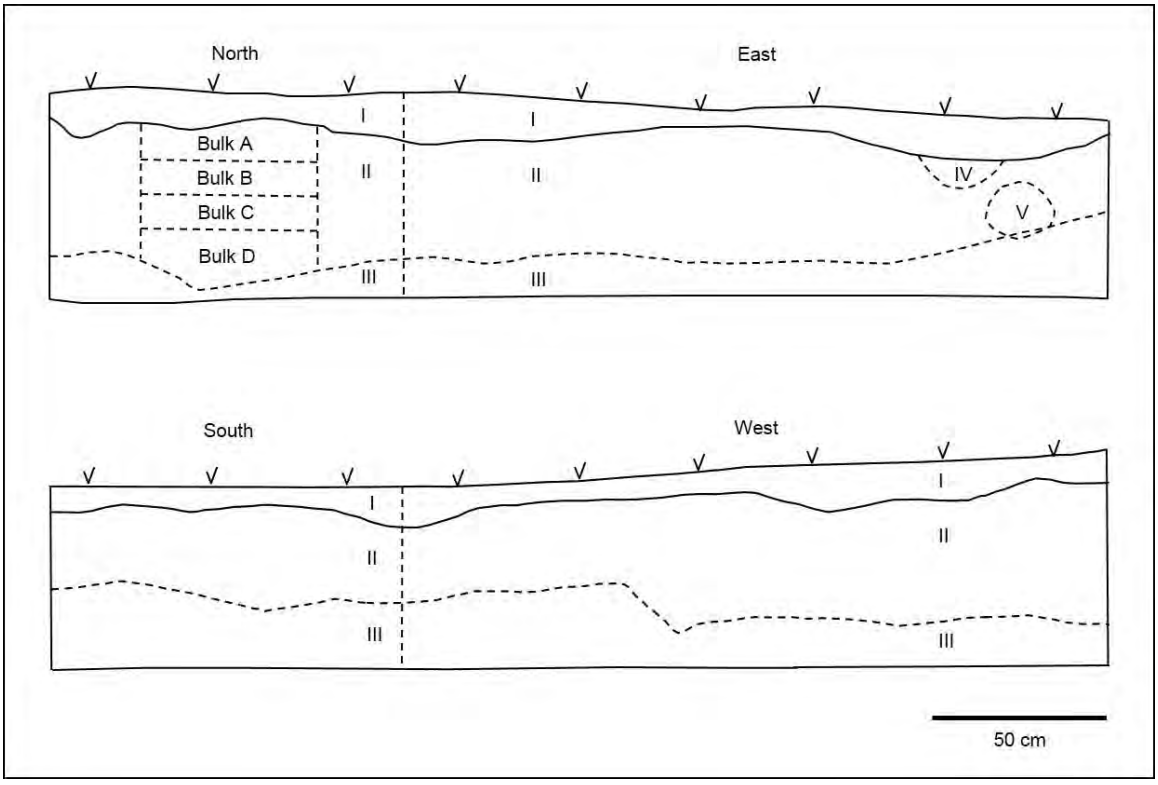

Figure 2-6. Stratigraphic profiles for TU1, 8LV282.

Table 2-2. Inventory of Materials Recovered from Test Unit 1, 8LV282.

	Pottery (n)	Lithics (n)	Shell Tool (n)	Mod. Bone (n)	Vert. Fauna (g)	Shell (g)[1]	Concret./ Pebbles (g)	Charcoal (g)	Other (g)[2]
Level									
A				1	26.8	12.1	36.7		50.0
B	1	1		2	156.8	140.2	149.7		22.2
C					390.5	137.6	226.3		0.5
D				1	81.5	209.6	84.9		4.4
E					59.5	77.9	179.7		
F					0.5	24.9	49.0		
Total	1	1		4	715.6	602.3	726.3		77.1
Bulk									
II-A			1		134.7	8357.9	151.8	0.1	
II-B		5			107.2	8860.0	200.7	0.3	0.1
II-C		1			137.7	8293.2	183.0	0.2	
II-D		4			173.9	11,525.1	196.5	0.1	
Total		10	1		553.5	37,036.2	732.0	0.7	0.1

[1] Includes marine, fresh, and terrestrial shell.
[2] Includes glass, metal, and plastic fragments.

TEST UNIT 2

Test Unit 2 (TU2) was placed behind the house and was oriented east to west. A datum was established in the southwest corner of the unit prior to beginning excavation. After level excavation was complete, bulk samples were collected from a 50 x 50-cm column in 10-cm levels within the identified archaeostrata from the west profile of TU2 and a small bulk sample was collected from Stratum III from the east profile.

Photographs of the south and north profiles of TU2 are provided in Figures 2-8 and 2-9. Scaled drawings of all four profiles of this test unit are provided in Figure 2-10. Table 2-3 provides description of the strata identified in Figure 2-10, and an inventory of the archaeological materials recovered by level and column strata is provided in Table 2-4.

TU2 was located approximately 10 meters northeast of TU1. Despite the close proximity of the two test units, there were significant differences in both the cultural materials that were recovered and the nature of the midden deposits that were encountered. Five distinct strata were identified in TU2, with the uppermost stratum of brown sand with sparse roots extending to a maximum depth of 25 cm BD. This upper stratum is the only one of the five that contained pottery. Twenty-two identifiable sherds were recovered, the majority of which are sand-tempered plain sherds, but also including Pasco plain and check-stamped sherds. Lithic materials were also recovered in this stratum, including one stemmed biface made from white fossilized coral at 19 cm BD and the broken tip of a chert drill. The majority of the lithic artifacts in Stratum I were shatter, angular pieces of broken chert that showed no evidence of modification. The pre-Columbian cultural materials in this uppermost stratum were mixed with modern materials, such as screws and nails, plastic fragments, and modern pottery sherds.

The frequencies of vertebrate fauna and shell increase with depth in Stratum I, likely due partially to mixing of these uppermost sediments with the underlying midden deposits of Stratum II, but also due to the uneven nature of the stratigraphy that caused deposits from multiple strata to periodically be present in the same excavation level. Stratum II consists of yellowish brown sand that contains moderate to sparse shell and faunal remains. It slopes downward from west to east to a maximum depth of 42 cm BD. The frequency of pottery falls significantly; only two sherds, one sand-tempered plain and one sand-tempered check stamped, were recovered from Stratum II. Lithics, mostly shatter, continued to be present as well and were more consistent with the frequency of occurrence in Stratum I. Historic artifacts, such as nails and glass, also continued to be present in this stratum.

Portions of Stratum II, Stratum III, and Stratum IIIb were present in Level D (30-40 cm BD) due to the sloping morphology of the stratigraphy. For this reason, Level D was zoned into two portions and each portion was excavated separately. Zone A was described in the field as very dark brown sand with medium density of oyster, scallop, and conch shell and was the emerging top of Strata III and IIIb. Zone B was described as

Figure 2-7. LSA crew excavating Test Unit 2 at 8LV282 on March 5, 2012.

Table 2-3. Stratigraphic Units of Test Unit 2, 8LV282

Stratum	Max. Depth (cm BD)	Munsell Color	Description
I	25	10YR5/3	Brown fine sand with sparse roots.
II	42	10YR5/4	Yellowish brown fine sand with sparse roots.
III	69	10YR3/1	Very dark gray fine sand with sparse roots.
IIIb	65	10YR3/1	Very dark gray fine sand with medium density shell.
IV	86	10YR6/2	Light brownish gray fine sand with no shell.

light to medium brown sand with no shell and represents the diminishing remainder of Stratum II. Cultural materials from the two zones were bagged separately and are reported separately in Table 2-4. No remnants of Zone B, Stratum II, remained after completion of Level D excavation.

Strata III and IIIb consisted of very dark gray sand matrix containing varying densities of shell, with Stratum IIIb being encompassed by Stratum III and distinguished by its obvious increase is shell density. Both strata constitute the majority of midden deposits in TU2. Four bulk samples were recovered from the midden strata; Bulks III-A

Figure 2-8. South profile of TU2, 8LV282.

Figure 2-9. North profile of TU2, 8LV282.

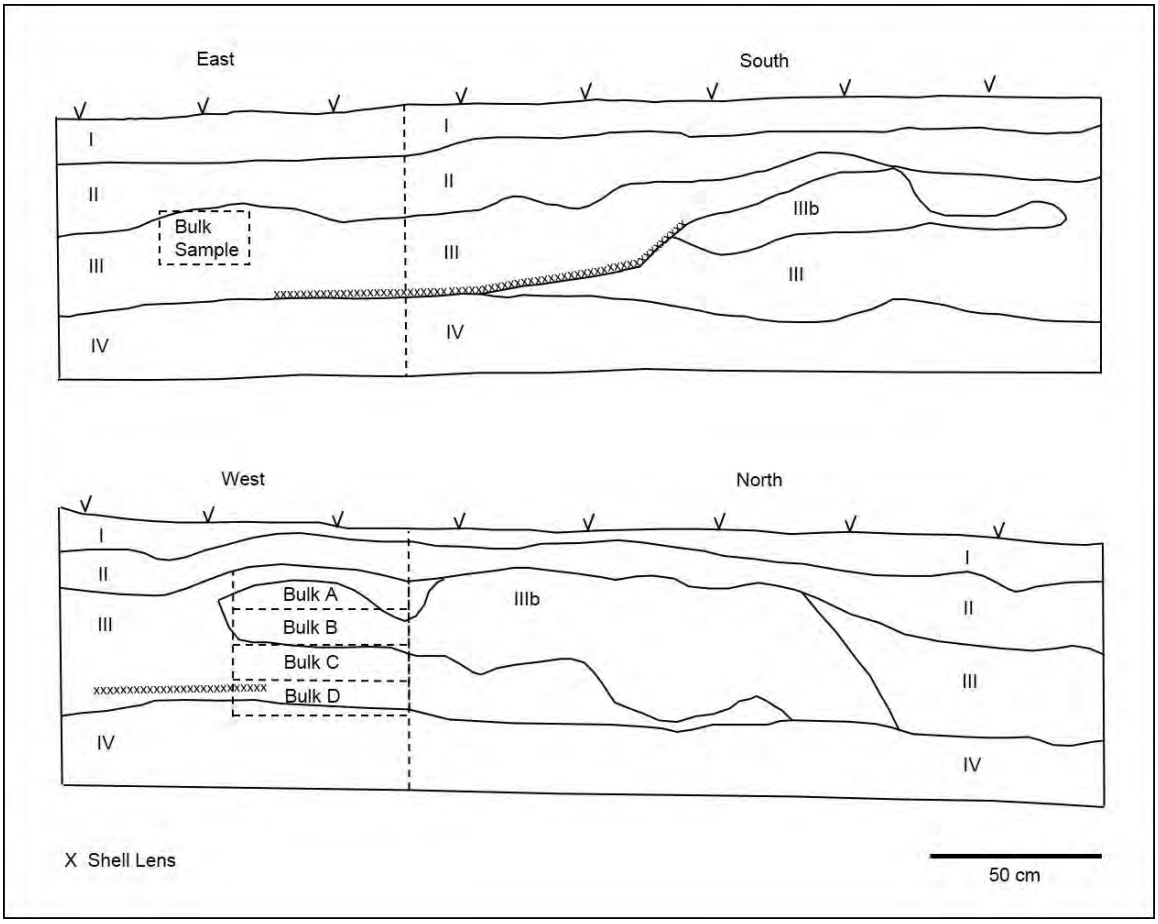

Figure 2-10. Stratigraphic profiles for TU2, 8LV282.

and III-B were collected from Stratum IIIb and Bulks III-C and III-D were recovered from Stratum III. Stratum III extends to a maximum depth of 69 cm BD and contained moderate densities of vertebrate fauna and shell. Analysis of Bulk III-D from the base of Stratum III suggest that the faunal assemblage is not significantly different from that of TU1. Two modified gastropod shells were recovered from level excavation in the upper portion of the midden strata and one modified bone was recovered from a bulk sample. Lithics, including a stemmed biface recovered at 61 cm BD in the western portion of the unit, continued to be present in much reduced frequencies; however, no pottery was recovered from the midden strata. The lack of pottery suggests that these midden deposits accumulated during the Late Archaic, contemporaneously with the deposits in TU1. A radiocarbon date was obtained from charcoal at the basal portion of Stratum III and returned a conventional age of 3950 ±30 B.P., which is a two sigma calibrated date range of 4300–4510 B.P. This date puts the midden from TU2 at the same age of the midden from TU1 and supports the suggestion that the two areas accumulated at the same time.

Table 2-4. Inventory of Materials Recovered from Test Unit 2, 8LV282.

	Pottery (n)	Lithics (n)	Shell Tool (n)	Mod. Bone (n)	Vert. Fauna (g)	Shell (g)[1]	Concret./ Pebbles (g)	Charcoal (g)	Other (g)[2]
Level									
A	13	3			6.5	1.7	37.6		13.6
B	28	36			117.3	52.2	104.8		26.6
C	2	25			437.5	20.7	283.1		1.9
D-Zone B		33			65.2	3.30	34.2		
D-Zone A			2		339.7	27.0	144.6		
E		2			132.1	38.5	8.7		
F					143.3	23.6	2.1		
G		2			27.2	8.8	0.3		
H		1			0.5		0.6		
Wall		1			3.8	1.3	3.0		
Total	43	103	2		1273.1	177.1	619.0		
Bulk									
III-A		17			611.9	3584.3	205.4	0.2	
III-B		4			474.7	4117.6	353.6	0.1	0.1
III-C		5		1	321.5	3601.1	111.2	0.1	
III-D		2[3]			139.8	1398.7	114.1	0.2	
III-East		1			56.4	27.9	12.1	0.1	
Total		29		1	1604.3	12,729.6	796.4	0.7	

[1] Includes marine, fresh, and terrestrial shell.
[2] Includes glass, metal, and plastic fragments.
[3] Includes one soapstone bead.

Stratum IIIb extends to 65 cm BD and contained the same types of materials as Statum III, but with significant increases in frequencies of shell, faunal materials, and small sand concretions. Of note was a significant amount of paleofeces in Stratum IIIb in contrast with the very small amounts present in Stratum III. The rounded morphology of Stratum IIIb suggests that the materials were the result of secondary deposition, likely in discrete episodes. Strata III and IIIb grade into Stratum IV, which extends below the terminus of the excavated unit at 86 cm BD. This lowermost stratum is light brownish gray fine sand that contains no cultural materials.

ARTIFACT ASSEMBLAGE FROM TEST UNITS

Pottery

Table 2-5 provides pottery frequencies by level for TU2, with representative sherds shown in Figure 2-11. Sherds recovered from TU2 that exhibited diagnostic characteristics of a particular culture-historical type were designated as such. In the

Table 2-5. Absolute Frequency of Pottery Sherds from TU2, 8LV282.

	--Sand-Tempered--					
	Plain	Check	Pasco	Crumb	Other[1]	Total
Level						
A	2	5	1	4	1	13
B	9	3		15	1	28
C	1	1				2
Total	12	9	1	19	2	43

[1]Historic Pottery

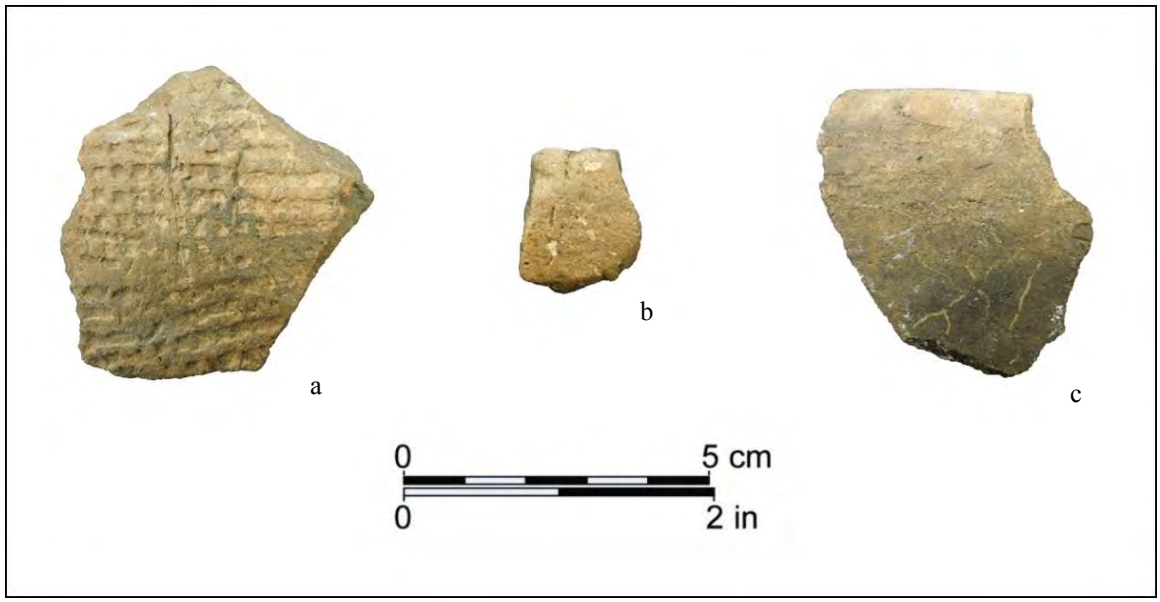

Figure 2-11. Examples of sherds recovered from TU2, a) check-stamped, b) Pasco Plain, c) sand-tempered plain.

absence of diagnostic attributes, sherds were classified by descriptive characteristics of temper and surface treatment, for example, "sand-tempered plain" or "sand-tempered check-stamped." Sherds that were smaller than ½ inch in maximum dimension were classified as "crumb" sherds. The pottery assemblage from TU2 consists of 24 identifiable sherds, all of which were recovered from level excavation. No sherds were recovered from the bulk samples. An additional 19 sherds were classified as crumb sherds and excluded from analysis.

A single historic pottery sherd was recovered from TU1. All of the pre-Columbian pottery was recovered from Stratum I of TU2, with the majority of the assemblage concentrated in the upper 20 cm. Only two sherds, one sand-tempered plain and one sand-tempered check-stamped, were recovered from Level C (20-30 cm BD),

and these were likely in the upper few centimeters of the level above the Stratum II deposits that were encountered at around 25 cm BD. No pottery was recovered below Level C (30 cm BD). The lack of pottery below these upper levels is not surprising given the pre-pottery date of the midden deposits.

The assemblage is dominated by sand-tempered plain sherds (*n* = 12), with the majority concentrated between 10 and 20 cm BD. Check-stamped sherds (*n* = 9) were the next largest class of sherds and were present in consistent frequencies in the upper two levels from 0 to 20 cm BD. Only one Pasco sherd was recovered from level A, above 10 cm BD. Two historic sherds were recovered, one from each of the two upper levels. The presence of Deptford LCS, Pasco, and historic sherds in the upper 20 cm BD suggests that the uppermost deposits of TU2 have been disturbed and mixed.

Lithic Artifacts

Frequencies of lithic artifacts in test units by level and strata are provided in Tables 2-6 and 2-7; photos of lithic tools and a soapstone bead from TU2 are provided in Figures 2-12 and 2-13, respectively. A total of 141 lithics were recovered from test unit excavations, the majority (n = 130) of which came from TU2. Shatter (n = 108) constitutes the vast majority of the lithic assemblage and is the largest category in both test units. Flakes (n = 29) are the next largest lithic group. Two bifaces and a drill fragment were recovered from level excavations, and the soapstone bead was recovered from Bulk III-D at the basal portion of the midden in TU2.

A total of six chert flakes and five pieces of chert shatter were recovered from TU1 and represent the entirety of the lithic assemblage for that test unit. Only one flake was recovered during level excavations above 20 cm BD. The remaining flakes were recovered from the bulk samples, with the majority (n = 4) from the basal portion of the midden. All of the shatter (n = 5) was recovered from the bulk sample that was collected from the upper 10 cm of the midden deposits.

The characteristic angular pieces of white and pink mottled chert shatter recovered during test unit excavation were largely limited to the upper portions of both units. In TU1, five pieces of shatter were recovered from between 20-30 cm BD in the upper portion of the midden. In TU2, the shatter was all concentrated in the upper 40 cm BD in level excavation but present in only the upper 30 cm BD in the bulk samples. The presence of shatter in archaeologically intact midden deposits suggests that it is not of modern origin.

The only lithic tools recovered came from TU2. A Newnan-like point (Figure 2-12a) made on white fossilized coral was recovered at 19 cm BD in the southwestern portion of the unit. It measures 5.7 cm from tip to base and 3.1 cm at its greatest width at the shoulders. The shoulders are asymmetrical, likely due to imperfections in the lithic

Table 2-6. Absolute Frequencies of Lithic Artifacts from TU1, 8LV282.

	Flake	Shatter	Total
Levels			
A			
B	1		1
C			
D			
E			
F			
Total	1		1
Bulk			
II-B		5	5
II-C	1		1
II-D	4		4
Total	5	5	10

Table 2-7. Absolute Frequencies of Lithic Artifacts from TU2, 8LV282

	Flake	Shatter	Biface	Drill Fragment	Soapstone Bead	Total
Level						
A	1	2				3
B	1	34	1			36
C	3	21		1		25
D	3	30				33
E	2					2
F						
G	1		1			2
H	1					1
Wall						
Total	12	87	2	1		102
Bulk						
III-A	1	16				17
III-B	4					4
III-C	5					5
III-D	1				1	2
III-East	1					1
Total	12	16				29

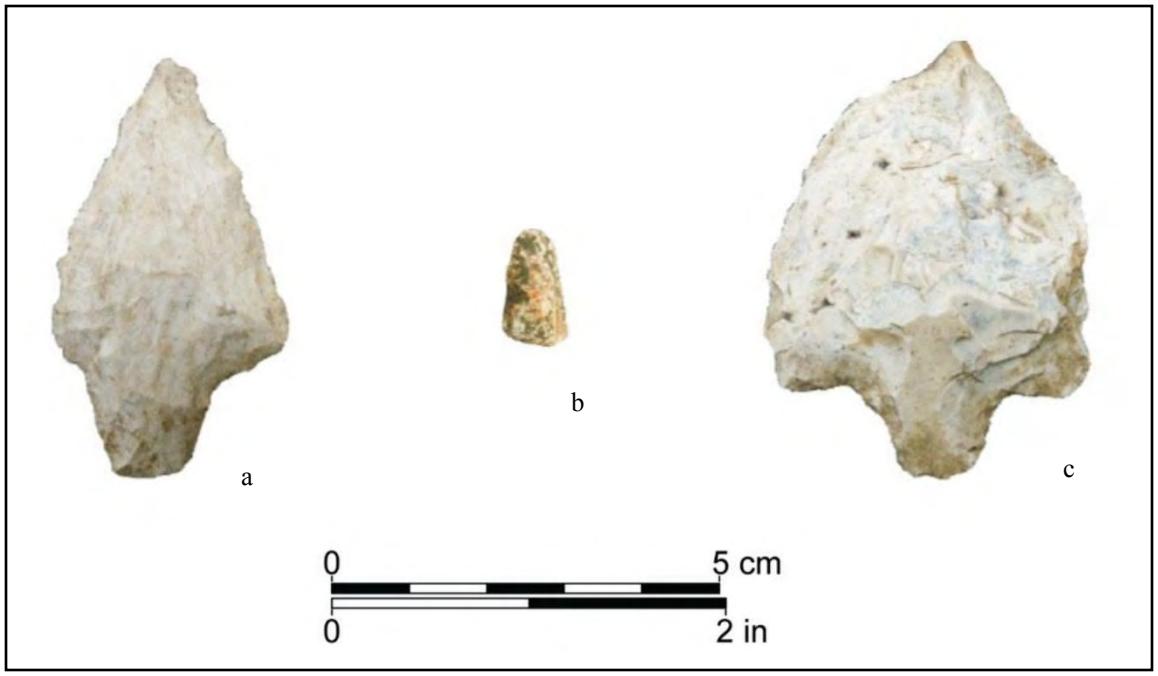

Figure 2-12. Lithic tools recovered from TU2, a) Newnan type point on fossilized coral, b) drill fragment, c) undiagnostic stemmed biface.

material that were removed during manufacture rather than from usewear, evidenced by the irregular pattern of flaking scares on the reverse side of the biface. The tip is intact and there is evidence of usewear.

The second biface (Figure 2-12c) was recovered at 61 cm BD in the southwestern portion of TU2. This white chert biface measures 5.9 cm from tip to base and 4.2 cm at the shoulders, its widest point. It has a short, slightly contracting stem and a wide body. The chert material is of rather poor quality, with multiple inclusions and imperfections. Attempts to remove lithic material during manufacture terminated in multiple step fractures that resulted in a thick biface with an irregular surface topography. The tip appears to have been modified, suggesting that this biface was recycled.

A drill fragment (Figure 2-12b) of pinkish white mottled chert was recovered from between 20-30 cm BD in TU2. It measures 1.6 cm long by 0.9 cm wide and is the tip portion of a drill. The dull, rounded edges and blunt tip suggest rather extensive usewear prior to fracture. Finally, a soapstone bead (Figure 2-13), measuring 0.6 cm in diameter, was recovered from the bulk sample at the base of the midden deposits of TU2. Its inclusion in the lowermost bulk sample suggests that it was deposited fairly soon after the midden began to accumulate.

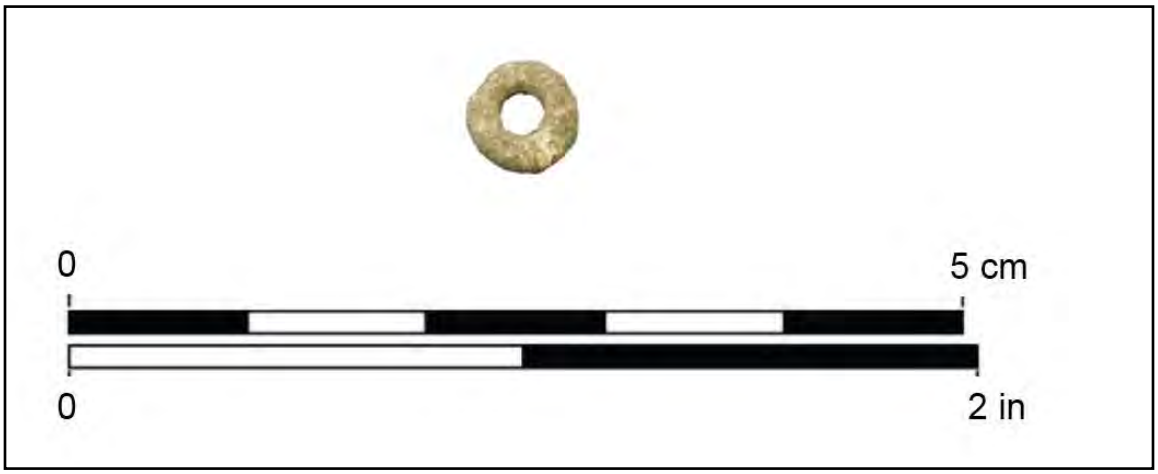

Figure 2-13. Soapstone bead recovered from TU2.

Modified Shell

Three shell tools made from lightning whelk (*Busycon contrarium*) were recovered from test unit excavations (Figure 2-14), one from TU1 and two from TU2. The shell tool from TU1 (Figure 2-14a) was recovered from the upper 10 cm of the intact midden deposits. It measures 8.6 cm from the tip of the whorl to the base of the shell. Overall, the shell is fairly degraded. The whorl is largely intact, but is missing a small portion, and the base has been truncated by attrition and displays some beveling due to usewear. A large portion of the body of the shell is missing due to breakage, as is a portion of the aperture. There is a small round hafting hole, measuring 1.2 cm in diameter, on the intact portion of the body.

Both of the shell tools recovered from TU 2 came from the emerging midden deposits designated as Zone A of Level D between 30-40 cm BD. The larger of the two shell tools recovered from TU2 (Figure 2-14b) is badly degraded and missing a significant portion of the body, whorl, and aperture. It measures 10.2 cm from the highest point of the broken whorl to the base. No hafting hole or aperture notch can be identified; however, the heavy attrition and slight beveling at the base are indicative of usewear. The second shell tool (Figure 2-14c) is missing all of the whorl, half of the body, and a significant portion of the aperture. There is no evidence of a hafting hole or aperture notch. The base of the shell is highly degraded, but the truncated morphology of the base suggests usewear rather than breakage as it is much more uniform than the morphology of the broken edges elsewhere on the shell.

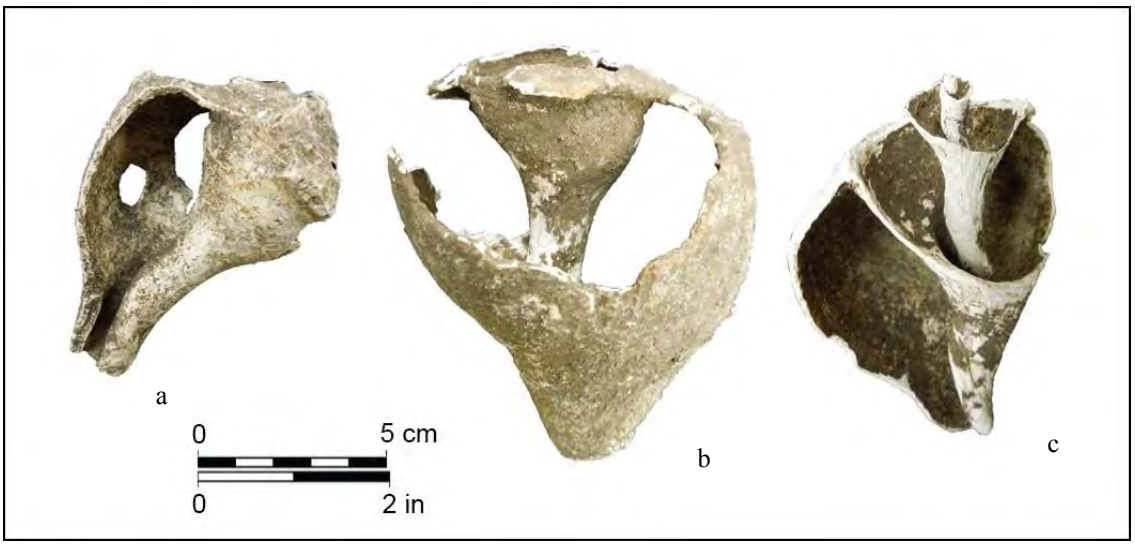

Figure 2-14. Modified lightning whelk (*Busycon contrarium*) shells, a) TU 1, b) and c) TU2, 8LV282.

Modified Bone and Antler

Two pieces of modified bone and two pieces of modified antler (Figure 2-15) were recovered from TU1 and one piece of modified bone was recovered from TU2 (Figure 2-16). A fragment from the distal portion of an awl (Figure 2-15a) was found in the upper 10 cm of TU1. The fragment, which is rounded and tapered to a point, exhibits some polishing and may be an antler tine. The undecorated piece measures 2.2 cm from the tip, which is largely intact with the exception of a small area of breakage from the side portion of the tip, to the broken portion at its base. A second distal portion of an awl (Figure 2-15b), also likely an antler tine, was recovered from between 10–20 cm BD. A bit larger, at 4.4 cm in length, this distal fragment is nearly identical in morphology to the awl fragment found above it, including a broken portion near the tip.

The distal portion of a bone pin (Figure 2-15c) was found in the same area as the antler tine awl, between 10–20 cm BD in TU2. The fragment has a fresh break, which was sustained during excavation, but crossmends nicely. The highly polished, undecorated pin measures 6.2 cm long from the tapered tip to the lateral snap at its base and is likely a portion of a deer bone. A medial portion of a bone pin (Figure 2-15d) was also recovered from between 30–40 cm BD. This undecorated fragment of bone is highly polished, but it is heavily encrusted with concreted sand and the black color suggests that it was burned. The only modified bone recovered from TU2 is very small, only 0.9 cm in length. The small size prohibits identification of the type of bone material or the species of origin, but it is likely the tip of an awl.

Figure 2-15. Modified bone and antler from TU1, a) and b) antler tine awl fragments, c) and d) bone pin fragments, 8LV282.

PALEOFECES

Of interest, and not addressed in the faunal analysis in Chapter 3, is the amount of paleofeces that was recovered during test unit excavations, a total of 441.2 grams (Table 2-8 and Figure 2-17). Paleofeces is the preserved remains of human fecal material. Significant information can be extracted from this material, including information about diet and health (Faulkner 1991), sex determination (Sobolik et al. 1996), and settlement and subsistence patterns (Sutton 1998). In the case of Ehrbar, the spatial distribution between the two test units and between different strata in TU2, suggests that these materials were purposefully deposited in specific locations, and the presence or absence of these materials can inform on some of the types of activities that were performed in each location.

Table 2-9. Absolute Frequencies by Weight of Paleofeces from TU1 and TU2, 8LV282.

	TU1 (g)	TU2 (g)	Total (g)
Levels			
A			
B		17.5	17.5
C			
D			
D – Zone A			
D – Zone B		4.4	4.4
E		4.8	4.8
F			
G		0.5	0.5
Total		27.2	27.2
Bulk			
II-B			
II-C			
II-D	2.7		2.7
III-A		181.4	181.4
III-B		200.0	200.0
III-C		3.8	3.8
III-D		1.1	1.1
III-East		2.5	2.5
Total	2.7	411.3	414.0

Figure 2-17. Paleofeces recovered from TU2, 8DI282.

The vast majority of paleofeces, by weight, came from bulks III-A and III-B of TU2 (381.4 g), which were both collected from Stratum IIIb. In contrast, relatively minor amounts were recovered from level excavations and from bulks III-C and III-D of the same unit, a total of 32.6 g. Only 2.7 g were recovered from TU1. These findings suggest that TU2 is an area of secondary deposition for debris that included paleofeces. It is largely absent from the area of TU1, which implies that this was not an appropriate area to dump debris.

CONCLUSION

Two test units were excavated on the Ehrbar property. Test Unit 1 was placed in the side yard, to the west of the house, and excavated to a depth of 60 cm BD, revealing intact midden deposits in a matrix of very dark, organic-rich sand. Modern materials, including glass, metal, and plastic, were present in the upper levels of the unit above the midden deposits. With the exception of fragments of modified bone, few artifacts were recovered from the midden. Multiple areas of the midden were heavily concreted, including a large portion of the northern half of the unit, which may be due to burning. Test Unit 2 was placed in the back yard, to the north of the house, and excavated to a depth of 80 cm BD. The midden deposits of this test unit were fundamentally different from those of TU1 in that there were no concreted areas and there were two different types of deposits. Overall, the midden was composed of very dark, organic rich sandy sediments; however, certain areas of the midden contained higher frequencies of shell, particularly scallop shells, that appear to have been the result of secondary deposition. Artifacts recovered from Test Unit 2 include modern materials mixed with pre-Columbian pottery and a biface in the upper levels of the test unit above the midden deposits. An additional biface and a drill fragment were recovered from level excavations and a soapstone bead was found in a bulk sample from the base of the midden deposits. A substantial amount of paleofeces was found in Test Unit 2, particularly from the area of the midden that appears to contain discrete areas of secondary deposition. No pottery was recovered from the intact midden deposits in either of the test units and radiocarbon dates from the basal portions of both intact deposits place the onset of midden accumulation during the pre-ceramic Late Archaic period.

CHAPTER 3
ANALYSIS OF VERTEBRATE FAUNA

Andrea Palmiotto

Bulk samples were collected from 50-x-50-cm areas in the profiles of two test units excavated at the Ehrbar site (8LV282). This chapter includes relative shellfish ratios within TU1 (Table 3-1) and the analysis of faunal remains, 1/8-in and larger, from TU1 Str IID, and TU2 Str IIID (Table 3-2).

Radiocarbon assays place both TU1 Str IID and TU2 Str IIID within the Late Archaic period, ca. 4300-4510 cal. BP (Chapter 2). During this time period, the shoreline was located several kilometers west of its present-day location (McFadden and Palmiotto 2012). The types of fishes and shellfish in the Ehrbar assemblages suggest occupation during warmer, possibly drier, months, and perhaps proximity to a tidal creek.

METHODS

Faunal materials were sorted to the smallest taxonomic level possible. Identifications were made using the Florida Museum of Natural History's Zooarchaeological Comparative Collection. The number of individual specimens per taxon (NISP) and taxon weights were recorded. The minimum number of individuals (MNI) was calculated based on size and siding of identified elements per taxon.

Diversity estimates provide a means of comparing the range of taxa represented in a sample. The following formula (from Reitz and Wing 2008:235) was used to calculate diversity:

$$H' = -\Sigma [(pi) (\ln (pi))],$$

where H' is the diversity value. Pi is calculated by dividing the MNI of each taxon by the total MNI of the sample. The diversity value is the absolute value of the sum of pi multiplied by the natural log of pi. Diversity values range between 0 and 5, where the higher the value, the higher the diversity.

Equitability measures how evenly a taxon occurs with regard to other taxa in a sample. The following formula (from Reitz and Wing 2008:235) was used to calculate equitability:

$$V' = H' / \ln (S),$$

where V' is the equitability estimate. H' is the diversity value, and S represents the number of taxa for which MNI was determined. Equitability is the diversity value divided by the natural log of S. Equitability values range between 0 and 1, where the higher the

value, the more evenly all taxa were used. An equitability value closer to 0 indicates an intense focus on one or few taxa.

RESULTS

Zooarchaeological results are presented in terms of MNI and NISP. Table 3-1 describes shellfish ratios from TU1. Table 3-2 presents a tabulation of zooarchaeological materials at the class level by stratum. Table 3-3 provides a summary of MNI, diversity, and equitability for each provenience. Tables 3-4 and 3-5 provide records of the species identified from each assemblage.

Shellfish ratios of scallops, eastern oysters, and crested oysters vary among strata in TU1 (Table 3-1). The highest ratios of shellfish densities occurred during the earliest occupations of the site and were lower during later occupations. TU1 Str IID and TU2

Table 3-1. Summary of Bulk Sample Size and Shellfish Ratios from 8LV282, TU1.

Provenience	Sample size (L)	Eastern oyster (n)	Crested oyster (n)	Scallop (n)	CO:EO	S:EO
TU1 Str IIA	20.5	369	32	48	1:12	1:7
TU1 Str IIB	26.5	406	46	90	1:9	1:5
TU1 Str IIC	26	226	53	165	1:4	1:1
TU1 Str IID	36	297	47	252	1:6	1:1
Total	109	1298	178	555	1:7	1:2

Table 3-2. Class Frequencies of Vertebrate Remains from 8LV282, TU1 Str IID and TU2 Str IIID.

Provenience	Mammals	Birds	Reptiles	Sharks/Rays	Fishes	Total
TU1 Str IID	3.5	1.8	3.5	1.7	89.5	100.0
TU2 Str IIID		4.3	8.7	4.4	82.6	100.0

Str IIID have similar species distributions; however, they differ in terms of quantities of species. Marine fishes contribute an average of 86 percent individuals to the assemblages, followed by reptiles with an average of 6 percent. A small number of sharks/rays, birds, and mammals were also identified.

In TU1 Str IID, 57 individuals were identified. Twenty-two taxa were identified, 16 of which were fishes. The most common taxa in terms of MNI are silver perch (*Bairdiella chrysoura*), pinfish (*Lagodon rhomboides*), sea trout (*Cynoscion* sp.), toadfish

(*Opsanus* sp.), and porgy (*Calamus* sp.) (Table 3-4). Diversity was 2.38 and equitability was 0.77 (Table 3-3), suggesting focus on specific species (i.e., silver perch).

In TU2 Str IIID, 23 individuals were identified. Fifteen taxa were identified, 11 of which were fishes. The most common taxa in terms of MNI are silver perch, sea catfish (Ariidae), mullet (*Mugil* sp.), pinfish, and pigfish (*Orthopristis chrysoptera*) (Table 3-5). Diversity was 2.57 and equitability was 0.95, suggesting a slightly more even use of species in this area compared to TU1, although differences in sample size could account for this variation.

DISCUSSION

Eastern oyster (*Crassostrea virginica*) shell is generally the most common type of shellfish remain constituting the matrix of shell deposits in the lower Suwannee region (e.g., deposits at 8LV42, 8DI52, 8LV75, and 8LV76). When other types of large shellfish are found in high quantities (e.g., low-salinity marsh clams in shell deposits on 8DI29 (Sassaman et al. 2011)), this is both environmentally and culturally relevant. What makes the Ehrbar site unusual is the quantity of scallop (*Argopecten* sp.) shells in the midden (Table 3-1).

Salinity levels within estuaries range between 0 (freshwater) and 35 (oceanic water) practical salinity units (psu). While oysters can be found over a wide variety of conditions, scallops thrive in seagrass areas when salinity levels are higher than 24 psu. They are most abundant in the summer (SMS 2011). Another species that acts as an environmental indicator is the crested oyster (*Ostrea equestris*). This species is found in eastern oyster beds when salinity levels are higher than 28 psu (Wells 1961:249, 252). Therefore, the relative ratios of crested to eastern oyster, and potentially scallop to eastern oyster, are useful as indicators of relative salinity levels.

The fishes found in the lower Suwannee region also can be found over a wide range of conditions. However, silver perch are small schooling fish that prefer higher salinities (ca. 24+ psu). They are common throughout the year, but they are most abundant in June and July (Kuntz 1915; NERRS n.d.). They spawn in late spring and summer in tidal creeks (FFWCC n.d.; NERRS n.d.). Porgies are high-salinity reef fish (Tyler-Jedlund 2009). Pinfish are tolerant of a wide temperature and salinity range and can be found in a multitude of habitats (SMS 2011), but local fishermen report pinfish being most common on the Gulf coast between spring and late fall (Florida Sport Fishing n.d.). Pigfish are small fish that are found with pinfish in estuaries during warmer parts of the year when salinity levels are higher than 15 psu (Cortney et al. 2011). Toadfish are hardy fish found in seagrass habitats that can remain alive in waters with low dissolved oxygen levels that other species cannot tolerate (FLMNH n.d.).

Shellfish ratios from TU1 indicate the highest salinities occurred during the earliest site occupations (Stratum IID) and that water levels were relatively less saline during later occupations. Both scallop-to-eastern-oyster and crested-to-eastern-oyster

Table 3-3. Diversity and Equitability Summaries of Vertebrate Remains from 8LV282, TU1 Str IID and TU2 Str IIID.

Provenience	MNI	# of Taxa	Diversity	Equitability
TU1 Str IID	57	22	2.38	0.77
TU2 Str IIID	23	15	2.57	0.95

ratios support this interpretation (Table 3-1). The most common fishes found in TU1 Str IID and TU2 Str IIID (Tables 3-4 and 3-5) are suggestive of occupation during warmer weather and high salinity levels. Because silver perch pool in tidal creeks and high quantities of silver perch were found at Ehrbar, and knowing that the shoreline was displaced westward from its present-day location, it is possible that the Ehrbar site was located in proximity to a tidal creek.

Additionally, the diversity of both assemblages is low-to-medium (Table 3-3), which, in this case, may suggest a particular environmental setting rather than variable conditions. When compared with a coeval faunal assemblage from Bird Island, a site located several kilometers north of Cedar Key (McFadden and Palmiotto 2012), the environmental interpretation of the Ehrbar assemblage holds. A wide range of species, including an array of freshwater fishes, was identified from Bird Island, and the assemblage had a higher diversity (3.06, Palmiotto 2012). Overall, the Bird Island assemblage was markedly different from the Ehrbar assemblages, and not indicative of any particular set of environmental conditions.

CONCLUSIONS

In summary, analyses from the Late Archaic assemblages from the Ehrbar site are indicative of site occupation during warm weather and relatively dry conditions (associated with high salinity levels). Shellfish ratios and fish abundances support this interpretation, as well as comparison with other faunal assemblages in the region. Additionally, the high quantities of silver perch, if they were not collected from a distance and carried to the site, may suggest that the Ehrbar site was located nearby a tidal creek, as the shoreline was located further west during the Late Archaic period.

Ongoing work in the lower Suwannee region helps elucidate interpretations about people's interactions with the world around them, fluctuating environmental conditions, and site seasonality patterns. Results from Ehrbar will provide valuable data that can be compared to other sites, thus contributing to a broader (and more detailed) picture of lifeways in the region through time.

Table 3-4. Species List for <1/8-in Faunal Materials from 8LV282, TU1 Str IID

Taxa	Common Name	NISP (n)	NISP (%)	MNI (n)	MNI (%)	Wt (g)	Wt (%)
Mammalia	Mammals	6	0.1			2.7	1.4
Odocoileus virginianus	White-tailed deer	1		1	1.8		
cf. *Rodentia*	Rodents	1		1	1.8	0.1	0.1
Aves	Birds	4	0.1	1	1.8	1.1	0.6
Serpentes	Snakes	3	0.1	1	1.8		
Testudines	Turtles	3	0.1			0.3	0.2
Cheloniidae	Sea Turtle	2		1	1.8	2.1	1.1
Chondrichthyes	Sharks/rays	11	0.3	1	1.8	0.5	0.3
Actinopterygii	Fishes	3873	94.3				
Lepisosteus sp.	Gar	3	0.1	1	1.8		
Clupeidae	Herring/shad	17	0.4			0.67	0.3
Brevoortia smithi	Yellowfin menhaden	3	0.1	1	1.8	0	0.0
Ariopsis felis	Hardhead catfish	1		1	1.8	0.4	0.2
Bagre marinus	Gafftopsail catfish	1		1	1.8		
Ariidae	Sea catfishes	2				0.2	0.1
Opsanus sp.	Toadfish	35	0.9	4	7.0	2.6	1.3
Fundulus sp.	Killifish	15	0.4	1	1.8	0.2	0.1
Centropomus undecimalis	Snook	1		1	1.8	1.1	0.6
cf. *Caranx hippos*	Crevalle jack	1		1	1.8	0.3	0.2
Orthopristis chrysoptera	Pigfish	1		1	1.8		
Lagodon rhomboides	Pinfish	25	0.6	6	10.5	0.6	0.3
Calamus sp.	Porgy	15	0.4	3	5.3	1.9	1.0
Mugil sp.	Mullet	19	0.5	2	3.5	3.5	1.8
Bairdiella chrysoura	Silver perch	51	1.2	22	38.6	2.4	1.2
Cynoscion nebulosus	Spotted seatrout	10	0.2	4	7.0	2.7	1.4
Sciaenops ocellata	Red drum	3	0.1	1	1.8	0.8	0.4
Diodontidae	Pufferfishes	1		1	1.8	0.2	0.1
TOTAL		235	100.0	57	100.0	195.6	100.0

Table 3-5. Species List for <1/8-in Faunal Materials from 8LV282, TU2 Str IIID.

Taxa	Common Name	NISP (n)	NISP (%)	MNI (n)	MNI (%)	Wt (g)	Wt (%)
Vertebrata	Vertebrates					10.1	7.5
Gavia immer	Common loon	1		1	4.3	3.8	2.8
Serpentes	Snakes	4	0.1	1	4.3	0.6	0.4
Testudines	Turtles	2	0.1			0.8	0.6
Kinosternidae	Mud/musk turtles	2	0.1	1	4.3	0.3	0.2
Chondrichthyes	Sharks/rays	7	0.3	1	4.3	0.2	0.1
Actinopterygii	Fishes	2655	97.0			113.7	84.5
Ariopsis felis	Hardhead catfish	3	0.1	3	13.0	0.4	0.3
Opsanus sp.	Toadfish	4	0.1	1	4.3	0.9	0.7
Belonidae	Needlefishes	3	0.1	1	4.3	0.2	0.1
Fundulus sp.	Killifish	19	0.7	1	4.3	0.2	0.1
Orthopristis chrysoptera	Pigfish	6	0.2	2	8.7	0.1	0.1
Lagodon rhomboides	Pinfish	8	0.3	2	8.7	0.2	0.1
Calamus sp.	Porgy	3	0.1	1	4.3	1.1	0.8
Bairdiella chrysoura	Silver perch	11	0.4	4	17.4	0.3	0.2
Cynoscion nebulosus	Spotted seatrout	2	0.1	1	4.3	0.6	0.4
Mugil sp.	Mullet	7	0.3	2	8.7	1.1	0.8
Leiostomus xanthurus	Spot	1		1	4.3		
TOTAL		2738	100	23	100	134.6	100

CHAPTER 4
CONCLUSIONS AND RECOMMENDATIONS

Paulette S. McFadden

Radiocarbon dates and analysis of materials from the two excavated test units at Ehrbar suggest that the earliest occupation dates to the Late Archaic, sometime after about 4510 cal BP, and that deposition occurred at both locations contemporaneously. No intact archaeological deposits from later periods were found at the location, but Woodland Period potsherds mixed with modern materials provide evidence of later occupations that have been disturbed during residential development. Given the lack of documentation of mounds at Ehrbar by early explorers and researchers, it is unlikely that significant landscape modification in the form of substantial earthworks occurred during pre-Columbian periods in this particular area.

Archaeological evidence suggests that different types of activities were occurring at each of the two test unit locations. Analysis of the materials from the two test units implies that different activities were taking place at each of the locations. The types of vertebrate and invertebrate faunal remains in each of the test units are consistent; however, the cultural materials and the nature of the deposits are very different. The area of TU1 was likely a living area, probably close to a house, where fires were burned and debris was routinely cleared. TU1 contained multiple areas of concretion, likely the result of burning, and the midden deposits were more uniform in terms of distribution of shell. Very few artifacts were recovered from the unit, with the exception of four fragments of modified bone. In contrast, TU2 appears to have been an area of secondary deposition where food remains, human waste, and other debris, including lithic debitage were deposited after being transported in some type of vessel. TU2 had no concreted areas and the midden deposits were segregated into areas of faunal remains in dark organic sediments punctuated by discrete areas of similar deposits with dense shell. The rounded morphology of the dense shell deposits suggests that the materials were deposited in episodes from some type of container. Additionally, the relatively high frequency of paleofeces is restricted to these deposits and supports the hypothesis that this was an area of secondary deposition.

The deepest midden materials contained equal ratios of scallop and oyster shells that were deposited at a time when the shoreline was located near its present location. Sediments from marine cores collected at the Suwannee Delta, just north of Cedar Keys, show that shoreline transgression slowed just prior to 3,810 cal. BP, allowing for the establishment of an oyster reef bioherm that stabilized the shoreline near its modern location (Wright et al. 2005:633). Faunal analysis suggests that environmental conditions at the time of initial midden accretion were dryer than present with higher salinity levels offshore. These findings are consistent with climate records that indicate a global cooling event between 4800 and 4500 BP, with a possible associated megadrought in subtropical areas of North America (Booth et al. 2005, Wanner et al. 2011). The higher ratio of

oysters to scallops with elevation in TU1 suggests that the marine environment became more brackish through time as the climate warmed and fresh water inputs increased.

In conclusion, Ehrbar contains archaeological remains dating to the Late Archaic and likely represents two portions of a village area. The area of TU1 is likely near a household where fires burned and debris was cleared. The area of TU2 appears to be an area of secondary deposition that includes shells, lithic debitage, and human waste.

FUTURE WORK

Ehrbar is significant in that it is one of a number of intact Late Archaic sites in the LSAS research area. Most of these early sites are immediately threatened by coastal erosion due to sea-level rise and some are nearly completely destroyed. Excavations at Ehrbar provide an opportunity to investigate a domestic occupation that dates to this early period and perhaps learn how activities were segregated within the village area.

The people who lived at Ehrbar where temporally situated on the cusp of major environmental and social shifts that occurred throughout the southeastern United States (e.g. Thomas and Sanger 2010). At several other sites in the LSAS research area, Late Archaic deposits are separated from Woodland Period deposits by a culturally sterile layer of sediment, suggesting a period of abandonment after about 3500 cal. BP (McFadden and Palmiotto 2012, Sassaman 2012). The absence of intact deposits that contain materials suggestive of later occupations at Ehrbar could be the result of a similar stratigraphic break in occupations, with any later deposits being disturbed by residential development. Further research at the site can provide paleoenvironmental data that can be compared to other sites to reconstruct the nature of environmental changes along the northern Gulf Coast and determine if site abandonments were widespread or localized in this region.

A more detailed and comprehensive analysis of faunal remains will be a necessary component in future research at this site. For instance, the disparity of the diversity and equitability measures between TU1 and TU2 needs to be resolved. This disparity could be indicative of conscious choices made at different times by different people, or it could be a product of the differing natures of the deposits. The bulk sample from TU2 that was used in the comparative analysis was collected from an area of the midden that did not contain debris that appeared to have been the result of secondary deposition. Analysis of a bulk sample from one of these deposits would likely return different results. Additionally, bulk samples from the upper portions of the midden may inform on environmental changes through time that are indicated by changes in species distribution.

REFERENCES CITED

Booth, Robert K., Stephen T. Jackson, Steven L. Forman, John E. Kutzbach, E.A. Bettis, III, Joseph Kreig, and David K. Wright
2005 A Severe Centennial-Scale Drought in Mid-Continental North America 4200 Years Ago and Apparent Global Linkages. *The Holocene* 15:321-328.

Borremans, Nina Thanz, and Michael E. Moseley
1990 *A Prehistoric Site Survey of the Cedar Keys Region of Coastal Levy County, Florida*. Department of Anthropology, University of Florida, Gainesville.

Calkins, W. W.
1877-1880 Notes of Personal Investigations among the Shell Mounds of Florida. *Proceedings of the Davenport Academy of Natural Sciences*, 1876-78, vol. 2, pp.225-229. Davenport, Iowa.

Cortney, L. O., M. A. DiMaggio, S. W. Grabe
2011 *Species Profile: Pigfish,* Orthopristis chrysoptera. Southern Regional Aquaculture Center, Publication No. 7209.

Ecker, A.
1878 Zur Kenntniss des Körperbaues früherer Einwohner der Halbinsel Florida. *Archiv. Für Anthrop*., vol. 10, pp. 101-114.

Faulkner, C.T.
1991 Prehistoric Diet and Parasitic Infection in Tennessee: Evidence from the Analysis of Desiccated Human Paleofeces. *American Antiquity* 56:687-700.

Florida Department of State Division of Historical Resources
n.d. Florida Historical Markers Program - Marker: Levy. http://www.flheritage.com/preservation/markers/markers.cfm?ID=levy. Accessed 09/13/2013.

Florida Fish and Wildlife Conservation Commission (FFWCC)
n.d. Silver Perch. Electronic document. http://myfwc.com/wildlifehabitats/profiles/fish/saltwater/drums/silver-perch. Accessed 10/01/2012.

Florida Museum of Natural History (FLMNH)
n.d. Ichthyology: Biological Profiles. Electronic document. www.flmnh.ufl.edu/fish/Education/bioprofile.htm. Accessed 10/01/2012.

Florida Sport Fishing
n.d. Pinfish. Electronic document. http://floridasportfishing.com/magazine/baitfish-profiles/pinfish.html. Accessed 10/01/2012.

Ivester, Andrew H. and David S. Leigh
2003 Riverine Dunes on the Coastal Plain of Georgia, USA. *Geomorphology* 51:289-311.

Jones, B. C.
1992 *Archaeological Evaluation of Lions Club Lot in Cedar Key, Florida: Salvage of Historic Burials and Preservation of Weeden Island (Pasco) Burial Area*. Florida Archaeological Reports 9. Bureau of Archaeological Research, Division of Historical Resources, Florida department of State, Tallahassee.

Kilgen, Ronald H., and Ronald J. Dugas
1989 *The Ecology of Oyster Reefs of the Northern Gulf of Mexico: An Open File Report.* Prepared for the U.S. Department of the Interior, Fish and Wildlife Service.

Kuntz, A.
1915 The Embryology and Larval Development of *Bairdiella chrysura* and *Anchovia mitchilli*. *Bulletin of the Bureau of Fisheries* 33(1):3-19.

Library of Congress
n.d. *Cedar Key, FLA*. Lithograph produced for Levy County by J. J. Stoner, Madison, Wisconsin; lithograph by Beck and Pauli, Litho, Milwaukee, Wisconsin. Library of Congress, Washington, D.C. Digital source: commons.wkimedia.org/wiki/File:Cedar-key_florida-1884-historicalmap.png. Accessed June 15, 2010.

McCarthy, Kevin
2007 *Cedar Key Florida: A History*. The History Press, Charleston.

McFadden, Paulette S., and Andrea Palmiotto
2012 *Archaeological Investigations at Bird Island (8DI52), Dixie County, Florida.* Technical Report 14. Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida, Gainesville.

Monés, Micah P., Neill J. Wallis, and Kenneth E. Sassaman
2012 *Archaeological Investigations at Deer Island, Levy County, Florida*. Technical Report 15. Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida, Gainesville.

Moore, Clarence B.
1918 The Northwest Florida Coast Revisited. *Journal of the Academy of Natural Sciences of Philadelphia* 16:514-580.

National Estuarine Research Reserve System (NERRS)
n.d. Species Gallery for the Ashepoo-Combahee-Edisto (ACE) Basin, South Carolina. Electronic document. http://www.nerrs.noaa.gov/doc/siteprofile/

acebasin/html/sppgal/sgfish.htm. Accessed 10/01/2012.

Palmiotto, Andrea
2012 *It's Always Sunny, Except When it's Not: Regional Seasonality Patterns in the Lower Suwannee Region, Florida.* Paper presented at the 69th annual Southeastern Archaeology Conference, November 7-10, 2012, Baton Rouge, LA.

Reitz, Elizabeth J., and Elizabeth S. Wing
2008 *Zooarchaeology*. University Press, Cambridge.

Sassaman, Kenneth E.
2012 Preliminary Report on Archaeological Investigations at Shell Mound (8LV42), Levy County Florida. Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida.

2013 Report on excavations at McClamory Key. Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida, Gainesville, in preparation.

Sassaman, Kenneth E., Paulette S. McFadden, and Micah P. Monés
2011 *Lower Suwannee Archaeological Survey 2009-2010: Investigations at Cat Island (8DI29), Little Bradford Island (8DI32), and Richards Island (8LV137).* Technical Report 10. Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida.

Seavey, J.R., W.E. Pine, III, P. Frederick, L. Sturmer, and M. Berringan
2011 *Decadal Changes in Oyster Reefs in the Big Bend of Florida's Gulf Coast*. Electronic Document. http://www.wec.ufl.edu/postdoc/seavey/Seaveyetal2011.pdf. Accessed 9/12/2011.

Smithsonian Marine Station at Fort Pierce (SMS)
2011 Expanded Species Reports, electronic document. http://www.sms.si.edu/irlspec/Compl_Reports.htm. Accessed 10/01/2012.

Sobolik, Kristin D., Kristen J. Gremillion, Patricia L. Whitten, and Patty Jo Watson
1998 Technical Note: Sex Determination of Prehistoric Human Paleofeces. *American Journal of Physical Anthropology* 101:283-290.

Stearns, R. E. C.
1869 Rambles in Florida. *The American Naturalist* 3:349-356.

Sutton, Mark Q.
1998 Cluster Analysis of Paleofecal Data Sets: A Test of Late Prehistoric Settlement and Subsistence Patterns in the Northern Coachella Valley, California. *American Antiquity* 63:86-107.

Thomas, David Hurst, and Matthew C. Sanger (editors)
2010 *Trend, Tradition, and Turmoil: What Happened to the Southeastern Archaic?* American Museum of Natural History Anthropological Papers, No. 93.

Tyler-Jedlund, A. J.
2009 *Age, Growth, and Reproduction of* Calamus proridens *the Littlehead Porgy, from the Northeast Gulf of Mexico.* Master of Science, College of Marine Science, University of South Florida.

University of Florida Digital Collections
1961 *Aerial Photographs of Levy County – Flight 1CC (1961).* Electronic document. http://ufdc.ufl.edu.lp.hscl.ufl.edu/UF00071764/00025. Accessed 05/30/2013.

Vogeles, A. W.
1879 Notes on a Lost Race of America. *The American Naturalist* 13(1):9-11.

Walker, S. T.
1883 *The Aborigines of Florida. Annual Report of the Smithsonian Institution for 1881*, pp. 677-680. Washington, D.C.

Wanner, Heinz, Olga Solomina, Martin Grosjean, Stefan P. Ritz, and Markéta Jetel
2011 Structure and Origin of Holocene Cold Events. *Quaternary Science Reviews* 30:3109-3123.

Wells, H. W.
1961 The Fauna of Oyster Beds with Special Reference to the Salinity Factor. *Ecological Monographs* 31:239-266.

Wright, Eric E., Albert C. Hine, Steven L. Goodbred, Jr., and Stanley D. Locker
2005 The Effect of Sea-Level and Climate Change on the Development of a Mixed Siliciclasti-Carbonate, Deltaic Coastline: Suwannee River, Florida, U.S.A. *Journal of Sedimentary Research* 75:621-635.

Wyman, Jeffries
1870 Explorations in Florida. *Third Annual Report of the Trustees of the Peabody Museum of Archaeology and Ethnology*, pp. 8-9. Harvard University, Cambridge, Massachusetts.

APPENDIX A:

CATALOG

Provenience	Description	Fraction	Ct	Wt
TU1, Lvl A	Vertebrate Fauna	1/4-in		26.8
TU1, Lvl A	Invertebrate Fauna	1/4-in		12.1
TU1, Lvl A	Modified Bone	1/4-in	1	1.4
TU1, Lvl A	Glass Fragment	1/4-in		5.8
TU1, Lvl A	Metal Fragment	1/4-in		43.2
TU1, Lvl A	Plastic Fragment	1/4-in		1.0
TU1, Lvl B	Misc. Rock	1/4-in		149.7
TU1, Lvl B	Invertebrate Fauna	1/4-in		140.2
TU1, Lvl B	Vertebrate Fauna	1/4-in		156.8
TU1, Lvl B	Modified Bone	1/4-in	2	6.7
TU1, Lvl B	Glass Fragment	1/4-in		0.5
TU1, Lvl B	Flake, Chert	1/4-in	1	0.4
TU1, Lvl B	Metal Fragment	1/4-in		20.4
TU1, Lvl B	Plastic Fragment	1/4-in		1.3
TU1, Lvl B	Historic Pottery	1/4-in	1	25.2
TU1, Lvl C	Misc. Rock	1/4-in		226.3
TU1, Lvl C	Invertebrate Fauna	1/4-in		137.6
TU1, Lvl C	Vertebrate Fauna	1/4-in		390.5
TU1, Lvl C	Metal Fragment	1/4-in		0.5
TU1, Lvl D	Misc. Rock	1/4-in		84.9
TU1, Lvl D	Vertebrate Fauna	1/4-in		81.5
TU1, Lvl D	Invertebrate Fauna	1/4-in		209.6
TU1, Lvl D	Modified Bone	1/4-in	1	1.2
TU1, Lvl D	Metal Fragment	1/4-in		4.4
TU1, Lvl E	Misc. Rock	1/4-in		179.7
TU1, Lvl E	Vertebrate Fauna	1/4-in		59.5
TU1, Lvl E	Invertebrate Fauna	1/4-in		77.9
TU1, Lvl F	Misc. Rock	1/4-in		49.0
TU1, Lvl F	Vertebrate Fauna	1/4-in		0.5
TU1, Lvl F	Invertebrate Fauna	1/4-in		24.9
TU1, Str IIA	Charcoal	1/8-in		0.0
TU1, Str IIA	Misc. Rock	1/8-in		151.8
TU1, Str IIA	Invertebrate Fauna	1/8-in		8357.9
TU1, Str IIA	Vertebrate Fauna	1/8-in		134.7
TU1, Str IIA	Modified Shell, Whelk	1/8-in	1	56.2
TU1, Str IIB	Charcoal	1/8-in		0.3
TU1, Str IIB	Misc. Rock	1/8-in		30.0
TU1, Str IIB	Invertebrate Fauna	1/8-in		8860.0
TU1, Str IIB	Vertebrate Fauna	1/8-in		107.2
TU1, Str IIB	Misc. Rock	1/8-in		170.7

Provenience	Description	Fraction	Ct	Wt
TU1, Str IIB	Shatter, Chert	1/8-in	5	0.5
TU1, Str IIB	Metal Fragment	1/8-in		0.1
TU1, Str IIC	Charcoal	1/8-in		0.2
TU1, Str IIC	Misc. Rock	1/8-in		114.3
TU1, Str IIC	Invertebrate Fauna	1/8-in		8293.2
TU1, Str IIC	Vertebrate Fauna	1/8-in		137.7
TU1, Str IIC	Flake, Chert	1/8-in	1	0.1
TU1, Str IIC	Misc. Rock	1/8-in		68.7
TU1, Str IID	Charcoal	1/8-in		0.0
TU1, Str IID	Misc. Rock	1/8-in		196.5
TU1, Str IID	Invertebrate Fauna	1/8-in		11525.1
TU1, Str IID	Vertebrate Fauna	1/8-in		171.2
TU1, Str IID	Paleofeces	1/8-in		2.7
TU1, Str IID	Flake, Chert	1/8-in	4	3.3
TU2, Lvl A	Misc. Rock	1/4-in		37.6
TU2, Lvl A	Vertebrate Fauna	1/4-in		6.5
TU2, Lvl A	Invertebrate Fauna	1/4-in		1.7
TU2, Lvl A	Flake, Chert	1/4-in	1	0.4
TU2, Lvl A	Shatter, Chert	1/4-in	2	11.9
TU2, Lvl A	Metal Fragment	1/4-in		12.7
TU2, Lvl A	Plastic Fragment	1/4-in		0.9
TU2, Lvl A	Sand Temp. Check, Body	1/4-in	5	43.0
TU2, Lvl A	Pasco Plain, Body	1/4-in	1	3.8
TU2, Lvl A	Sand Temp. Plain, Body	1/4-in	2	5.1
TU2, Lvl A	Crumb Sherd	1/4-in	4	3.4
TU2, Lvl A	Historic Pottery	1/4-in	1	0.9
TU2, Lvl B	Misc. Rock	1/4-in		104.8
TU2, Lvl B	Vertebrate Fauna	1/4-in		99.8
TU2, Lvl B	Paleofeces	1/4-in		17.5
TU2, Lvl B	Invertebrate Fauna	1/4-in		52.2
TU2, Lvl B	Glass Fragment	1/4-in	2	4.1
TU2, Lvl B	Newnan Type Point, Chert	1/4-in	1	13.4
TU2, Lvl B	Shatter, Chert	1/4-in	34	123.7
TU2, Lvl B	Flake, Chert	1/4-in	1	1.7
TU2, Lvl B	Metal Fragment	1/4-in		22.4
TU2, Lvl B	Plastic Fragment	1/4-in		0.1
TU2, Lvl B	Sand Temp. Check, Body	1/4-in	3	32.9
TU2, Lvl B	Sand Temp. Plain, Body	1/4-in	7	35.5
TU2, Lvl B	Sand Temp. Plain, Rim	1/4-in	2	20.9
TU2, Lvl B	Crumb Sherd	1/4-in	15	9.2

Provenience	Description	Fraction	Ct	Wt
TU2, Lvl B	Historic Pottery	1/4-in	1	17.6
TU2, Lvl C	Misc. Rock	1/4-in		283.1
TU2, Lvl C	Invertebrate Fauna	1/4-in		20.7
TU2, Lvl C	Vertebrate Fauna	1/4-in		437.5
TU2, Lvl C	Glass Fragment	1/4-in		0.2
TU2, Lvl C	Drill Fragment, Chert	1/4-in	1	0.7
TU2, Lvl C	Flake, Chert	1/4-in	3	5.8
TU2, Lvl C	Shatter, Chert	1/4-in	21	49.9
TU2, Lvl C	Metal Fragment	1/4-in		1.7
TU2, Lvl C	Sand Temp. Plain, Body	1/4-in	1	4.9
TU2, Lvl C	Sand Temp. Check, Body	1/4-in	1	3.8
TU2, Lvl D, Zn A	Misc. Rock	1/4-in		144.6
TU2, Lvl D, Zn A	Invertebrate Fauna	1/4-in		27.0
TU2, Lvl D, Zn A	Vertebrate Fauna	1/4-in		339.7
TU2, Lvl D, Zn A	Modified Shell, Whelk	1/4-in	2	152.1
TU2, Lvl D, Zn B	Misc. Rock	1/4-in		34.2
TU2, Lvl D, Zn B	Vertebrate Fauna	1/4-in		60.8
TU2, Lvl D, Zn B	Invertebrate Fauna	1/4-in		3.3
TU2, Lvl D, Zn B	Paleofeces	1/4-in		4.4
TU2, Lvl D, Zn B	Flake, Chert	1/4-in	3	1.0
TU2, Lvl D, Zn B	Shatter, Chert	1/4-in	30	45.8
TU2, Lvl E	Misc. Rock	1/4-in		8.7
TU2, Lvl E	Vertebrate Fauna	1/4-in		127.3
TU2, Lvl E	Invertebrate Fauna	1/4-in		38.5
TU2, Lvl E	Paleofeces	1/4-in		4.8
TU2, Lvl E	Flake, Chert	1/4-in	2	1.8
TU2, Lvl F	Misc. Rock	1/4-in		2.1
TU2, Lvl F	Invertebrate Fauna	1/4-in		23.6
TU2, Lvl F	Vertebrate Fauna	1/4-in		143.3
TU2, Lvl G	Misc. Rock	1/4-in		0.3
TU2, Lvl G	Vertebrate Fauna	1/4-in		26.7
TU2, Lvl G	Invertebrate Fauna	1/4-in		8.8
TU2, Lvl G	Paleofeces	1/4-in		0.5
TU2, Lvl G	Biface, Chert	1/4-in	1	27.0
TU2, Lvl G	Flake, Chert	1/4-in	1	0.8
TU2, Lvl H	Misc. Rock	1/4-in		0.6
TU2, Lvl H	Vertebrate Fauna	1/4-in		0.5
TU2, Lvl H	Flake, Chert	1/4-in	1	2.1
TU2, Str IIIA	Charcoal	1/4-in		0.2
TU2, Str IIIA	Misc. Rock	1/8-in		13.3

Provenience	Description	Fraction	Ct	Wt
TU2, Str IIIA	Misc. Rock	1/4-in		192.1
TU2, Str IIIA	Invertebrate Fauna	1/8-in		223.2
TU2, Str IIIA	Vertebrate Fauna	1/8-in		350.5
TU2, Str IIIA	Invertebrate Fauna	1/4-in		3361.1
TU2, Str IIIA	Vertebrate Fauna	1/4-in		80.0
TU2, Str IIIA	Paleofeces	1/4-in		181.4
TU2, Str IIIA	Flake, Chert	1/4-in	1	0.5
TU2, Str IIIA	Shatter, Chert	1/4-in	16	15.4
TU2, Str IIIB	Charcoal	1/8-in		0.1
TU2, Str IIIB	Misc. Rock	1/8-in		134.2
TU2, Str IIIB	Misc. Rock	1/4-in		219.4
TU2, Str IIIB	Invertebrate Fauna	1/8-in		195.1
TU2, Str IIIB	Vertebrate Fauna	1/8-in		192.8
TU2, Str IIIB	Paleofeces	1/8-in		25.3
TU2, Str IIIB	Invertebrate Fauna	1/4-in		3922.5
TU2, Str IIIB	Vertebrate Fauna	1/4-in		81.9
TU2, Str IIIB	Paleofeces	1/4-in		174.7
TU2, Str IIIB	Glass Fragment	1/8-in		0.1
TU2, Str IIIB	Flake, Chert	1/4-in	4	0.8
TU2, Str IIIC	Charcoal	1/8-in		Trace
TU2, Str IIIC	Charcoal	1/4-in		Trace
TU2, Str IIIC	Misc. Rock	1/8-in		39.9
TU2, Str IIIC	Misc. Rock	1/4-in		71.3
TU2, Str IIIC	Invertebrate Fauna	1/8-in		165.4
TU2, Str IIIC	Vertebrate Fauna	1/8-in		166.1
TU2, Str IIIC	Paleofeces	1/8-in		2.0
TU2, Str IIIC	Modified Bone	1/8-in	1	Trace
TU2, Str IIIC	Invertebrate Fauna	1/4-in		3435.7
TU2, Str IIIC	Vertebrate Fauna	1/4-in		151.6
TU2, Str IIIC	Paleofeces	1/4-in		1.8
TU2, Str IIIC	Flake, Chert	1/4-in	5	32.3
TU2, Str IIID	Soapstone Bead	1/8-in	1	Trace
TU2, Str IIID	Charcoal	1/8-in		0.2
TU2, Str IIID	Misc. Rock	1/4-in		57.7
TU2, Str IIID	Misc. Rock	1/8-in		56.4
TU2, Str IIID	Invertebrate Fauna	1/4-in		1315.0
TU2, Str IIID	Vertebrate Fauna	1/4-in		55.6
TU2, Str IIID	Paleofeces	1/4-in		1.1
TU2, Str IIID	Invertebrate Fauna	1/8-in		83.7
TU2, Str IIID	Vertebrate Fauna	1/8-in		83.1

Provenience	Description	Fraction	Ct	Wt
TU2, Str IIID	Flake, Chert	1/4-in	1	Trace
TU2, Blk-East	Charcoal	1/8-in		0.1
TU2, Blk-East	Misc. Rock	1/4-in		6.0
TU2, Blk-East	Misc. Rock	1/8-in		6.1
TU2, Blk-East	Invertebrate Fauna	1/4-in		23.6
TU2, Blk-East	Vertebrate Fauna	1/4-in		18.8
TU2, Blk-East	Paleofeces	1/4-in		2.5
TU2, Blk-East	Invertebrate Fauna	1/8-in		4.3
TU2, Blk-East	Vertebrate Fauna	1/8-in		35.1
TU2, Blk-East	Flake, Chert	1/4-in	1	3.4
TU2, Wall	Misc. Rock	1/4-in		3.0
TU2, Wall	Vertebrate Fauna	1/4-in		3.8
TU2, Wall	Invertebrate Fauna	1/4-in		1.3

APPENDIX B

RADIOCARBON DATA

Prov.	Material	Beta Lab Number	Measured 14C Age BP	13C/12C Ratio	Conventional 14C Age BP	2-sigma Cal BP	1-sigma Cal BP
TU1 Str IID	Charcoal	329223	3940 ± 30	-24.9	3940 ± 30	4510 – 4300	4420-4410
TU2 Str IIID	Charcoal	329224	3980 ± 30	-26.9	3950 ± 30	4510 – 4300	4420–4410