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Lithic Debitage from a Mt. Taylor Site: Salt Springs (8MR2322) Excavations from a Submerged Spring Bed

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LITHIC DEBITAGE FROM A MT. TAYLOR SITE:

SALT SPRINGS (8MR2322) EXCAVATIONS
FROM A SUBMERGED SPRING BED

By

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I dedicate this thesis to my family... my parents, Sandra and James, for their encouragement since I was a child and announced that I wanted to be an archaeologist. To my husband, Bill, for his love, support and for putting up with me. Finally to my daughters, Emma and Charlotte, for making me smile.

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ABSTRACT

Lithic debitage was recovered from archaeological salvage excavations from an intact organic anaerobic deposit that was uncovered during the replacement of a retaining wall along the northeastern shore of Salt Springs in the Ocala National Forest, Florida. Radiocarbon dating from this organic deposit has yielded dates from 5450-4407 cal. B.P. placing this deposit within the Mt. Taylor period. Two different techniques of analysis have developed to review lithic debitage – Individual Flake Analysis and Aggregate Analysis and were used to differentiate core reduction from tool production during the Mt. Taylor occupations at the Salt Springs site (8MR2322). This combination of lithic debitage analysis techniques has been applied to lithic debitage recovered during excavations. Along with the other recovered lithics, faunal, botanical, the lithic debitage demonstrated that the site was used to produce and retouch tools, suggesting seasonally short-term occupations during the Mt. Taylor period.

CHAPTER ONE

INTRODUCTION

Modified bone, lithics, and botanicals were recovered during emergency salvage excavations of an archaeological site that included parts of a submerged former spring shoreline at Salt Springs. A wide assortment of bone tools, including soft hammers (billets) and awls, was also recovered from an anaerobic, organic zone lying beneath a shoreline shell-midden deposit. Once the shell midden had been removed by heavy machinery, the organic zone was revealed and archaeologically excavated using controlled methods. The recovered lithic materials included Newnan and other projectile points, scrapers, microscrapers (or needles), and utilized flakes. Many of these lithics were thermally altered and most were made from Ocala Group chert. The Newnan and Marion projectile points, coupled with radiocarbon dates, indicate that the deposit dates to the Mt. Taylor period (ca. 6000–4000 B.P.). This date range was supported by the absence of pottery. The only prehistoric ceramics recovered from the salvage project were from higher strata in the adjacent shell midden and consisted of Orange fiber-tempered and St. Johns Check Stamped sherds. The well-preserved faunal and other organic materials recovered from this anaerobic organic zone were sent to other institutions for further study. The results are discussed in chapter four.

It is the well-preserved floral and faunal materials that make these excavations both interesting and significant. Most archaeological sites lack the organic preservation seen at Salt Springs, and, typically, only lithic materials remain at most Mt. Taylor sites. The data from the flora, fauna, and lithics present a rare opportunity to develop a more holistic understanding of a Mt. Taylor–period settlement. Anaerobic environments have also preserved material from Mt. Taylor deposits at but a few other sites, such as Groves' Orange Midden (8VO2601) and the Lake Monroe Outlet Midden (8VO53), providing a fuller view of site function. My thesis is largely limited to the lithic component of the excavations, but I do include the preliminary botanical and faunal analyses to support my interpretation.

The Middle Archaic Mt. Taylor period (6000–4000 B.P.) is thought to be a time when indigenous people/groups in Florida were nomadic hunters and gatherers. The Salt Springs data provide the opportunity to test this proposition. In coastal sites of the Late Middle Archaic and Late Archaic, evidence for increased sedentism has been developed by archaeologists using a variety of floral and faunal data. The question remains whether a similar achievement was made by inland groups. I examine the lithic assemblage recovered from the 2009 excavations and, based on this analysis, support the argument that during the Mt. Taylor period, Salt Springs was used as a short-term site for hunting and butchering, as well as a possible portage or point from which to launch canoes (see chapter four). I argue against its use as a long-term, multi-seasonal occupation site.

While earlier lithic research centered on formal tool descriptions and determinations of tool use and function, more recently, researchers have developed several methods to analyze debitage to gain a better understanding of Native American lithic reduction practices, techniques, and lithic utilization. Lithic materials from the Salt Springs organic zone are compared with other Mt. Taylor sites, including Groves' Orange Midden (8VO2601), Lake Monroe Outlet Midden (8VO53), Silver Glen Springs (8MR123), and the type site, Mt. Taylor (8VO19), to help define the role that Salt Springs played in settlement during the Mt. Taylor period. To this end, two analytical methods for lithic debitage—aggregate analysis (Ahler 1989) and platform facets (Magne 1989)—are combined to provide insights.

Aggregate (or mass) analysis can be used for quick analysis of large assemblages of debitage using graduated screens by individuals who are not lithic specialists (Ahler 1989). Ahler supported the aggregate analysis technique because of its replicability and nominal inter-observer error (less than 5 percent). In addition, aggregate analysis also can include weight as a defining criterion. This method operates under the primary principle that flakes reduce in size during the progressive stages of the lithic manufacturing process before reaching the final product. Ahler (1989:89) proposed a second principle, which is that "Variation in load application in the flintknapping procedure (e.g., percussion versus pressure loads, or change in placement point of loading) produces corresponding variations in both flake size and flake shape." Together, these two principles facilitate quick analysis by providing quantifiable measures of size and shape.

As opposed to aggregate analysis, individual flake analysis (IFA), or attribute analysis, requires not only a closer examination of flake attributes, but also additional knowledge and time that is not always available for every project. The several different IFA approaches include: examination of platform or dorsal scars (Magne 1989); Sullivan and Rozen's technique (SRT) to determine flake completeness (1985), and Cowan's flake scatters (1999). Each technique uses a different set of attributes to measure production and reduction practices, as discussed in chapter two.

There may never be one all-inclusive method or technique for analyzing lithic debitage, but a better understanding of the role lithics played in prehistoric Native American lives may be gained through multiple analytic methods (Andrefsky 2001; Magne 2001). As Magne (2001:23) stated, "That multiple lines of evidence can be more accurate indicators of reduction realities than any single line of (technique) evidence is encouraging, since redundant measures, to a reasonable amount, can serve as internal checks to reliability."

To that end, Bradbury and Carr (2004:67) combined aggregate analysis and IFA to develop a pragmatic approach, which they called aggregate trend analysis, to provide a broader spectrum of information while decreasing inter-observer error. They explained that the advantage of aggregate analysis is that it reduces inter-observer error when compared with an IFA technique. But aggregate analysis also has its shortcomings in that each flake is not observed for reduction or use evidence. As such, utilized flakes may sometimes go unrecorded. One example of this problem can be found in bipolar flakes from bipolar reduction practices. These flakes are not discerned through aggregate analysis, which is not designed to record individual flake features. It is only through close visual inspection that bipolar flakes can be recognized. Bradbury and Carr (2004) combined Magne's method of dorsal scar and platform scar counts with Ahler's aggregate-analysis technique to solve this problem. I used Bradbury and Carr's technique obtained from their observations of flintknapping reduction to analyze the Salt Springs debitage.

The goal of using these two different techniques—aggregate analysis and IFA—is to determine lithic reduction strategies and tool use at Salt Springs during the Mt. Taylor period. Through the analytical comparisons of data resulting from the two techniques, I derived the lithic production stages and lithic technological usage. If the Salt Springs deposit was created as the result of a long-term occupation, the following observations from the lithic analysis would be expected: (1) flakes from every stage of reduction, including large percentages of cortical flakes; (2) high percentages of flakes greater than a quarter-inch in size along with blocky debris (or shatter); (3) hammerstones, cores, and raw material needed to produce the tools and residual flakes; (4) all tools required for formal production (i.e., preforms, tools requiring thinning, finished tools, and broken tools); and (5) a medium to high percentage of scrapers necessary to process hides. In the absence of any or all of these data, a short-term occupation is inferred.

For this study, representative samples from all excavation units were examined, but only flakes from secure, undisturbed contexts were analyzed. Lithic specimens from spoil piles and trench clean-ups were not used. Flakes and material from poorly controlled contexts are included in the discussion, but they were not used for the comparative analysis. It is important to note that the analyzed lithic specimens are primarily from strata below the shell-midden deposits. Most of the shell midden overlying the anaerobic organic-layer study area had been mechanically removed by backhoe before archaeological excavations began. The lithics recovered from the shell-midden aspect of the site during the fall 2008 excavations will not be included in this study, due in part to the possibility that they were brought in by modern construction activities. However, a discussion of the 2008 excavations is included in chapter five.

Chapter Overview

In chapter two, I review the debitage-analysis literature, concentrating on those methods used in this study.

In chapter three, I provide an overview of the site and summarize previous archaeological research conducted at Salt Springs, including past excavations by SouthArc, Inc. My overview of other Mt. Taylor sites in the surrounding area includes the Lake Monroe Outlet Midden, Mt. Taylor, Silver Glen Springs, and Groves' Orange Midden. I compare their artifact assemblages to the Salt Springs artifacts.

Chapter four consists of an environmental overview. I discuss the geology and ecology of the local area, including recent geological studies relative to the springs. I include the results of the soil coring conducted during the October 2008 field season. I also evaluate the unit profiles and stratigraphy recorded during both field seasons and review the botanical and faunal material recovered from the spring 2009 excavations.

In chapter five, I introduce the excavation methodologies and goals of the archaeological excavations. Units were excavated using different methods depending on several variables, which I outline in this chapter.

In chapter six, I describe formal and informal lithic tools in general before discussing the stone tool kit from Salt Springs in detail.

In chapter seven, I present the flake comparison analysis and discuss the results of the two different lithic debitage analysis methodologies.

In the final chapter eight, I summarize my findings, consider the evidence for my argument that Salt Springs is a short-term site, and make recommendations for future research.

CHAPTER TWO

ARCHAEOLOGICAL DEBITAGE ANALYSIS

Debitage Research

Archaeological lithic studies over the last thirty years have expanded to include lithic debitage. Amick (1994:9) argued to move past empirical relationships to theoretic concepts through methodological development and modern experimentation. As lithic analysis moved past descriptive and typological analysis, theoretical applications of lithic information have provided an expansive view of past human behavior. Debitage studies, in particular, have benefited from this process. These waste products of stone-tool manufacturing are the most frequently occurring artifacts at many sites because of the durability of stone and the relatively large number of flakes generated for every finished tool. But previously, lithic debitage was viewed as less significant than formal tools, which were seen as more direct and obvious reflections of past behaviors. Lithic debitage was considered to be discard from which little useful data could be derived. This attitude changed with the introduction of archaeological analysis techniques, such as Ahler's aggregate analysis (1989) (also called mass analysis), Sullivan and Rozen's attribute-based analysis (1985), and Magne's dorsal scar and platform scar counts (1989), all from which behavioral and technological inferences could be made through analyses of lithic waste products.

Andrefsky's *Lithic Debitage: Context, Form, Meaning* (2001) was one of the first texts in which the entire volume was dedicated to debitage analysis. This volume provided an overview of debitage studies to date, as well as several chapters on recent approaches. A few years later, Hall and Larson's *Aggregate Analysis in Chipped Stone* (2004) became the first volume focused entirely on aggregate analysis. Although Andrefsky (1997:126) had experimented with aggregate analysis early in his career; his early experiments still required that each flake be observed and that the presence of cortex be recorded to determine which reduction techniques were utilized. Later Andrefsky (2001:6) would characterize four debitage typologies—application load, technological, cortex, and freestanding—that when applied through either aggregate or individual flake analyses (IFA), could be used to draw the anthropological inferences about human behavior at a site. Andrefsky stressed the importance of individual flake examination because of the information that could be lost if they were merely treated en mass.

Aggregate Analysis

One of the greatest challenges facing debitage analysis is the large quantities of flakes recovered from archaeological sites in relation to the time and money available for analysis. Aggregate analysis reduces inter-observer error by removing the need for a trained lithic technologist to examine the debitage collection and the possibility of bias associated with recording attributes. It creates a technological typology in which the various size classes of flakes that result from specific stages of tool production can be quantified as a percentage of a total flake assemblage that is used to infer lithic practices.

The theoretical approach to aggregate analysis is based on the concept of *chaîne opératoire*, in which the flakes are always smaller than the piece from which they originated and thus can never be larger than the original core (Ahler 1989). Ahler (1989:86) also pointed out that "as a waste product from past human activities, flaking debris is likely to have been deposited at or very near its locus of origin within past cultural systems. This is in contrast to stone tools, which may have been deposited at the last of a long sequence of production and use locations." Thus the flakes themselves have the potential to provide behavioral information in addition to the use information of the finished tool.

Ahler's aggregate analysis allows large quantities of flakes to be analyzed to provide information about the technology (i.e., hard hammer, soft hammer, pressure flaking) required to produce the archaeological assemblage. In this method, a series of nested screens of standard size is used to sort flakes. Screen-mesh sizes typically range from one-eighth to one inch. Ahler noted the importance of using standardized geological screens, since hardware-cloth aperture openings tended to vary among manufacturing companies. Once recovered, the flakes from each screen are plotted as bivariate ratios providing the data needed to draw inferences on the technological reduction practices behind the archaeological assemblages (Ahler 1989).

Aggregate analysis allows the analysis of large amounts of flakes with relatively little labor when compared to IFA. With regard to aggregate analysis, Larson (2004:5) observed that this approach provides assemblage-level characterization of the technology and allows for comparison between assemblages. The analysis is not, on its own, capable of determining different utilization areas within sites, but when combined with non-lithic criteria can be used to compare intra-site assemblages. That is, all aggregate analyses encounter issues when the assemblage has mixed lithic technologies present. The various lithic technologies include: core reduction, cobble reduction, bipolar reduction, biface edging, biface thinning, and pressure flaking. In many cases these reduction techniques are used in a variety of tool-manufacturing processes, the differences among which may not be significant enough to register distinct tool-making/reducing processes.

Also included in the Hall and Larson (2004) volume is a unique approach to aggregate analysis called refitting, which is the time-intensive process of piecing together flakes to determine the original core form and the sequence in which the flakes were removed. This requires an archaeological context in which the bulk of the lithic reduction has occurred in one location so that the majority of flakes from one core can be recovered. Bleed (2004:186) argued that though this process is labor intensive, it considers all of the flakes as one unit rather than considering the importance of the individual flake. The information that can be gained through refitting includes the sequence of reduction, as well as the cognitive approach utilized by the flintknapper during reduction. The Salt Springs assemblage was insufficient to attempt refitting.

Individual Flake Analysis

I used a number of IFAs in my study of the Salt Springs lithic debitage. The triple cortex method uses the terms primary, secondary, and tertiary to identify the amount of cortex remaining on the flake as one of the bases of classification. Primary flakes, typically the largest, are characterized as having over 50 percent cortex present on the dorsal side. Secondary flakes have less than 50 percent of cortex on the dorsal side. Tertiary flakes have no cortex remaining. With this method, there is also the category of debris (shatter) in which neither ventral nor dorsal side can be determined.

Using the triple cortex method, inferences of site function can be obtained from identifying the relative amounts of each type of flake. For example, if a higher percentage of primary flakes is present, the site is likely a quarry or a primary reduction site. The greatest problem with this approach is inter-observer reliability and the inability to produce similar results with modern flintknapping experiments (Andrefsky 2000). Determining the relative percentage of cortex on individual flakes is somewhat subjective. As such, specific percentages of each class may vary among researchers. The usefulness of the triple cortex typology depends on concise and replicable assessments.

Sullivan and Rozen's (1985:759) attribute-based analysis takes a similar approach to triple cortex, but uses the relative retention of percussive evidence rather than cortex to provide an arguably more replicable methodology. The method requires the recognition of four categories: complete flake, which retains its platform, bulb of percussion, and most of its terminating margins; incomplete flake (platform-remnant bearing), which retains the platform, but the termination or margins are no longer present or have resulted in stepping fractures; flake fragment, which retains rings of percussion on the ventral side, but lacks the platform; and, finally, debris (shatter), which retains insufficient evidence to determine either the dorsal or ventral side. The termination of the flake is also an attribute: *feathered* has thin sharp edges; *hinging* has rounded termination; and *step* has flake termination at a break of about 90 degrees relative to the angle of percussion.

As with triple cortex, this method requires that each flake be individually examined in order to reduce inter-observer error. Andrefsky (2001:2) recognized Sullivan and Rozen's method as a challenge to other lithic analysts to develop similar techniques that reduced inter-observer error. But, as with the triple-cortex method, a problem with this technique was found when modern flintknapping experiments proved inconclusive in discriminating among reduction stages. Today, however, after modification, the technique is widely practiced and, in combination with other analyses, remains a useful method for flake description from which lithic practice can be inferred. For example, the over-application of a load will cause undesirable results, such as step terminations, while the correct application of load produces a complete flake with feather terminations.

A third IFA technique is Magne's dorsal scar and platform scar counts. It requires examination of individual flakes for the presence or absence of scars on both the dorsal side and the striking platform (Magne 1989). Through experimentation and review of archaeological material, Magne developed this technique to determine reduction stages: early, middle, or late. He theorized and showed through practice that the amount of dorsal and platform scars increases as the flintknapper reaches the end stage of tool production. Thus, a low number of scars indicates that the flake was produced earlier in the reduction process. The drawback of this technique is that it takes training to recognize the scars and to adequately count them. Although Magne (1985:118–119) reported a success rate of only 76.13 percent, in replicated studies over 40 percent inter-observer errors were identified (Bradbury and Carr 2004:69).

Present Study

Bradbury and Carr's (2004) aggregate-trend analysis provides a pragmatic approach that facilitates the need for expedience while obtaining useful cultural information. This approach is a combination of Magne's (1989) platform scar count, Ahler's (1989) aggregate analysis, and Sullivan and Rozen's (1985) attribute-based analysis. Each of these techniques has drawbacks that can be partially mitigated by the combination of multiple lines of evidence that serve as analytic checks on the others. The process is still time intensive because it requires that each flake be viewed and weighed. But the approach provides a method of recognizing the difference between core reduction and tool production. The problem of differentiating between bipolar core reduction and other reduction techniques remains, but when all data are compared, differences in the standard deviation can be distinguished to assist in discerning different human behaviors behind lithic tool reduction and production activities. Analysis of the lithic debitage from Salt Springs, using Bradbury and Carr's aggregate-trend method, help in assessing similarities and differences in the Salt Springs assemblage when compared to other Mt. Taylor sites and allow inferences about site use to be made.

CHAPTER THREE

SALT SPRINGS BACKGROUND

Overview

The Salt Springs Recreation Area is in the Ocala National Forest in Marion County, Florida. Salt Springs (Figure 3.1) is a second magnitude spring pumping out 76.38 cubic feet per second of water via several boils (Scott et al. 2004:239). Situated 100 miles from the mouth of the St. Johns River, the springs are an important contributor to the St. Johns River and its ecosystem (see chapter four). Located near the small town of Salt Springs, the recreational area is a destination for swimmers, campers, and fishermen. Several other large springs are nearby in the Ocala National Forest (e.g.,

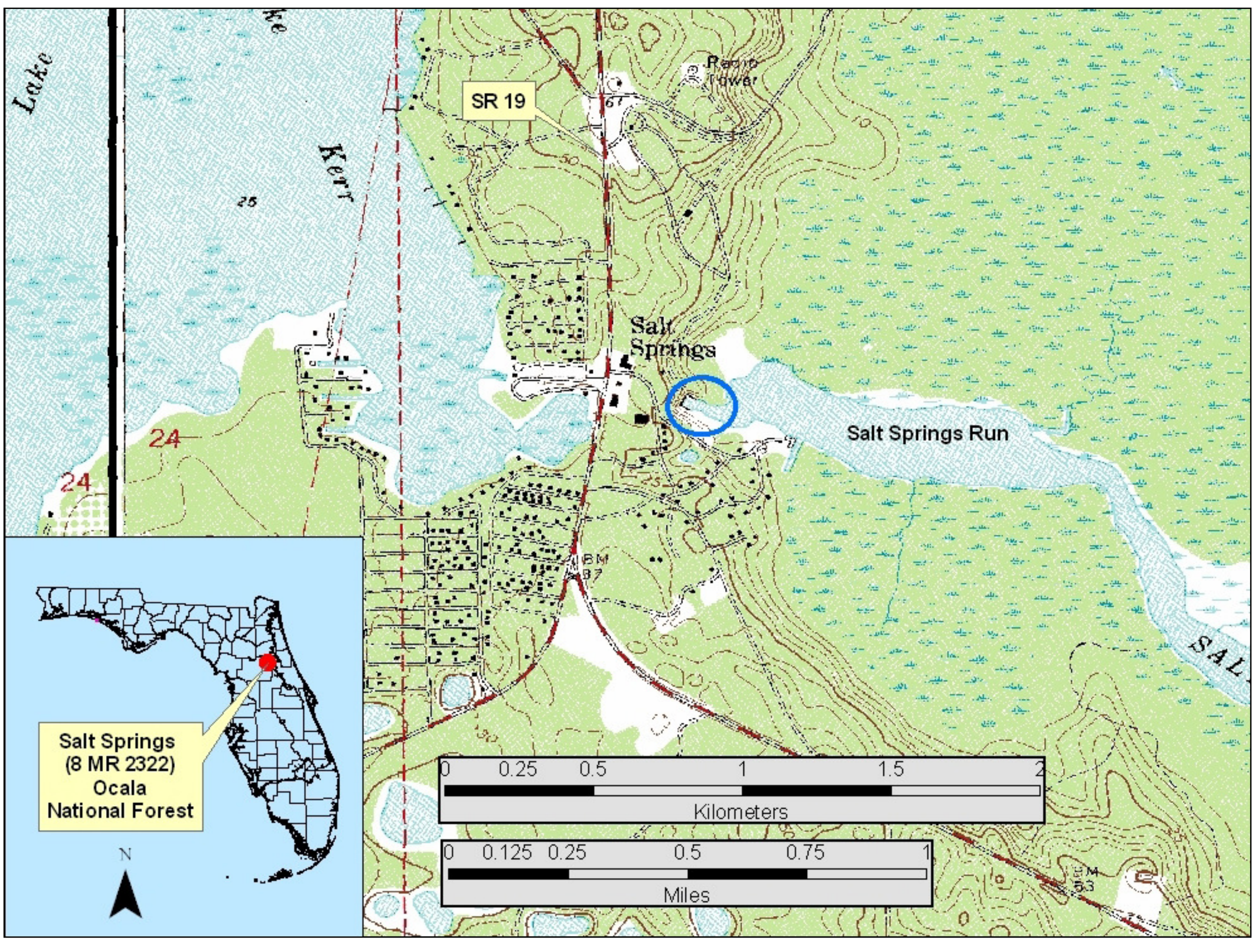

Figure 3.1. USGS Salt Springs 1984 quadrangle map showing location of Salt Springs.

Silver Glen Springs, Juniper Springs). Silver Springs, another nearby popular attraction, is also in Marion County but not in the national forest.

Site History

Salt Springs was described by William Bartram in 1766 during his travels down the St. Johns River with his father John Bartram. William Bartram returned in 1774 and reported that the brackish waters of Salt Springs allowed marine species, such as sting rays and blue crab, to thrive amidst an otherwise freshwater ecosystem of rivers, lakes, and marshes. Bartram wrote:

> I seated myself upon a swelling green knoll, at the head of the crystal bason [sic]. Near me, on the left, was a point or projection of an entire grove of the aromatic *Illisium floridanum*; on my right and all around behind me, was a fruitful Orange grove, with Palms and Magnolias interspersed; in front, just under my feet was the enchanting and amazing fountain, which incessantly threw up from dark rocky caverns below, tons of water every minute, forming a bason, capacious enough for large shallops to ride in, and a creek of four or five feet depth of water, and near twenty yards over, which meanders six miles through green meadows, pouring its limpid waters into the great Lake George, where they seem to remain pure and unmixed. About twenty yards from the upper edge of the bason, and directly opposite to the mouth or outlet to the creek, is a continual and amazing ebullition, where the waters are thrown up in such abundance and amazing force, as to jet and swell up two or three feet above the common surface: white sand and small particles of shells are thrown up with the waters, near to the top, when they diverge from the center, subside with the expanding flood, and gently sink again, forming a large rim or funnel round about the aperture or mouth of the fountain, which is a vast perforation through a bed of rocks, the ragged points of which are projected out on every side (Bartram 1955 [1791]:149–150).

Before Bartram, there is no written record of the springs. Bartram, however, noted the presence of orange groves, which would suggest that the Spanish had settled in the area before his arrival. To date, however, no evidence of Spanish occupation has been found immediately around Salt Springs. During the Second Spanish period (1784–1821), a land grant was given to Joseph Hernandez in 1817 for 10,000 acres that included Salt Springs. Hernandez received another 20,000 acres on both sides of the St. Johns River and along Lake George. After the end of the Second Spanish period, Hernandez's claim was confirmed, and it was noted that several acres had been improved and planted, but not those around Salt Springs (Spanish Land Grant Records 1821:237).

Over the next 150 years, the land around the springs changed hands several times. Ultimately the springs became a popular swimming and fishing location. By the turn of the nineteenth century, the land around the springs had been planted with pine for turpentine production for naval stores, but most of the area remained undeveloped. Marjorie Kinnan Rawlings visited in the early 1940s and was photographed crabbing in the spring (Rawlings 1941–1942: Photo No. MKR061) (Figure 3.2). Figure 3.3 shows a steep shoreline with boaters in the springs before the concrete retaining wall was built in the 1950s on the western end of the spring (Figure 3.4). This wall was likely

Figure 3.2. Marjorie Kinnan Rawlings crabbing at Salt Springs in 1941 or 1942. Rawlings Collection 1941–1942: Photo No. MKR061.

placed to slow the erosion. Accelerating erosion can be compared in Figures 3.3 and 3.4 if you notice the tree with the arrow pointing to it and the degree of the slope behind it.

In 1977, Salt Springs was purchased by the United States Forest Service (USFS) and incorporated into the Ocala National Forest. The USFS constructed wooden retaining walls as well as wooden steps into the water to help swimmers in and out of the springs. After 20 years of use by thousands of visitors, the wooden walls and steps began to rot and became a hazard. The springs were closed in 2007 and did not reopen until September 2009 upon completion of new concrete retaining walls and steps.

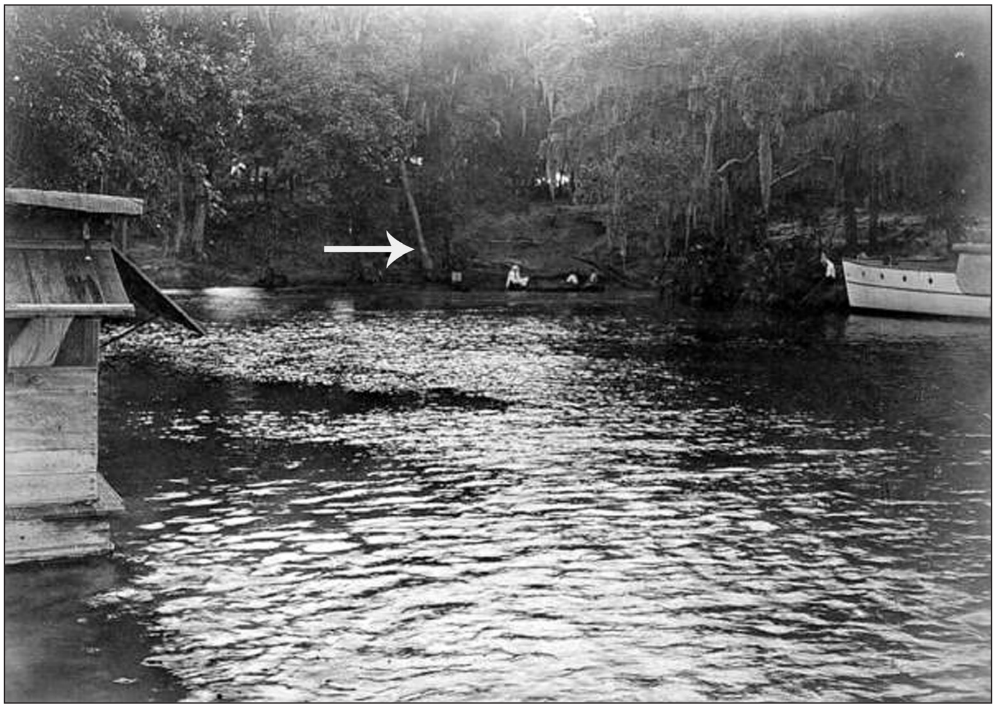

Figure 3.3. Salt Springs in the 1930s looking west from the spring run to the head (Florida Memory Project #GE1262). Note the arrow pointing to a tree that is present in Figure 3.3.

Figure 3.4. Boys playing at Salt Springs in the late 1970s (Florida Memory Project fw00765). Note the arrow pointing to a tree that is present in Figure 3.2.

Previous Archaeology in the General Vicinity of Salt Springs

In 1894, Clarence B. Moore visited the shell midden at what later would be designated the Salt Springs Run site (8MR2), which is downstream from Salt Springs (Figure 3.5). Moore excavated a unit measuring 5.5 by 5.3 by 3.5 feet in which at “about three feet down was found, within a half a foot of the bottom of the shell deposit, a lance-head of graceful pattern, perfect in every respect; the only lance-head, as far as the writer has been able to learn, ever found at a considerable depth from the surface in any of the shell heaps of the St. John’s” (Moore 1893:11). This was the only lithic artifact he discussed. He mentioned the presence of Salt Springs upriver, but did not note any archaeological site along its shore.

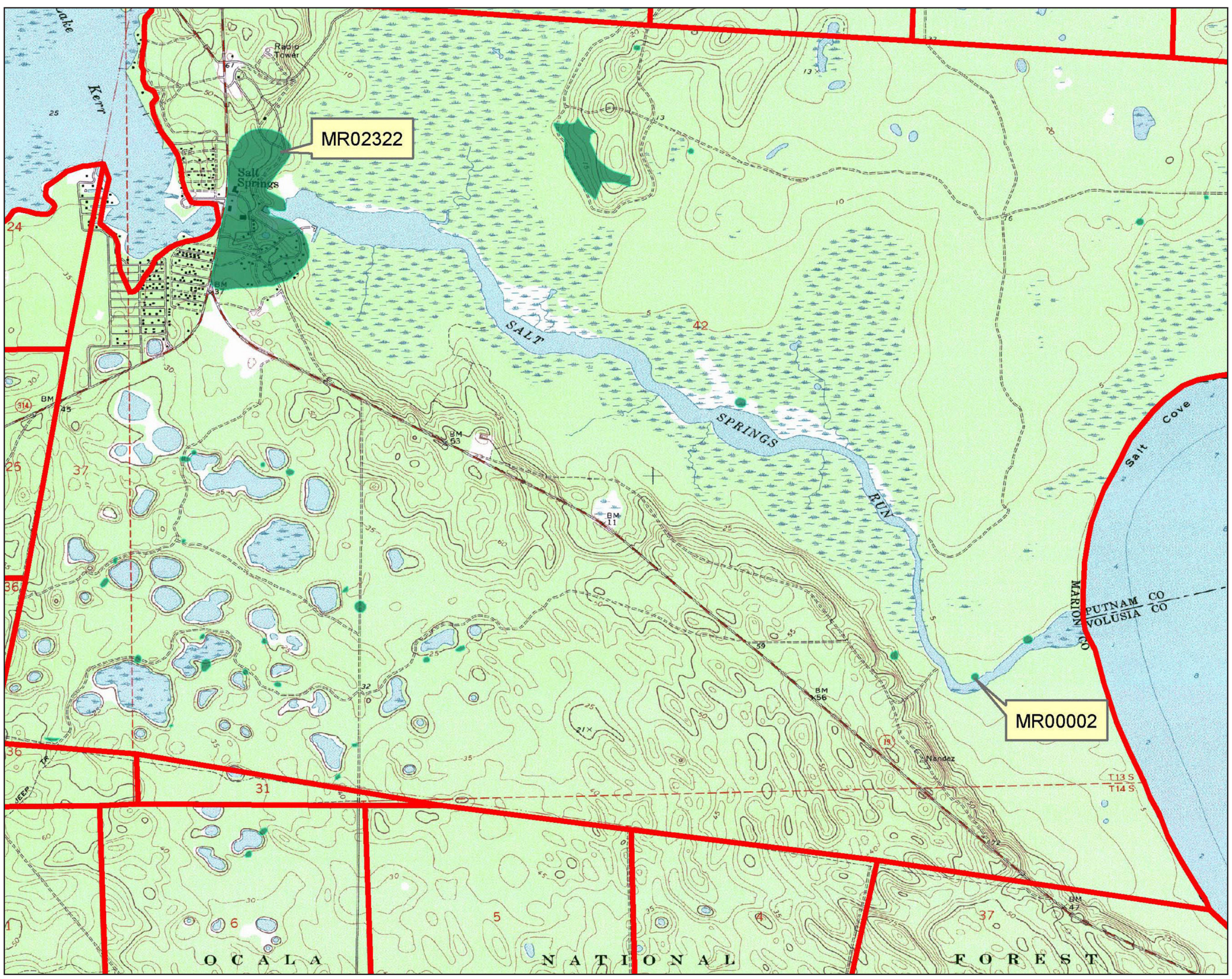

Figure 3.5. 1984 USGS Salt Springs quadrangle map showing location of Salt Springs 8MR2322 and Salt Springs Run Shell Midden 8MR2 (FDHR 2010).

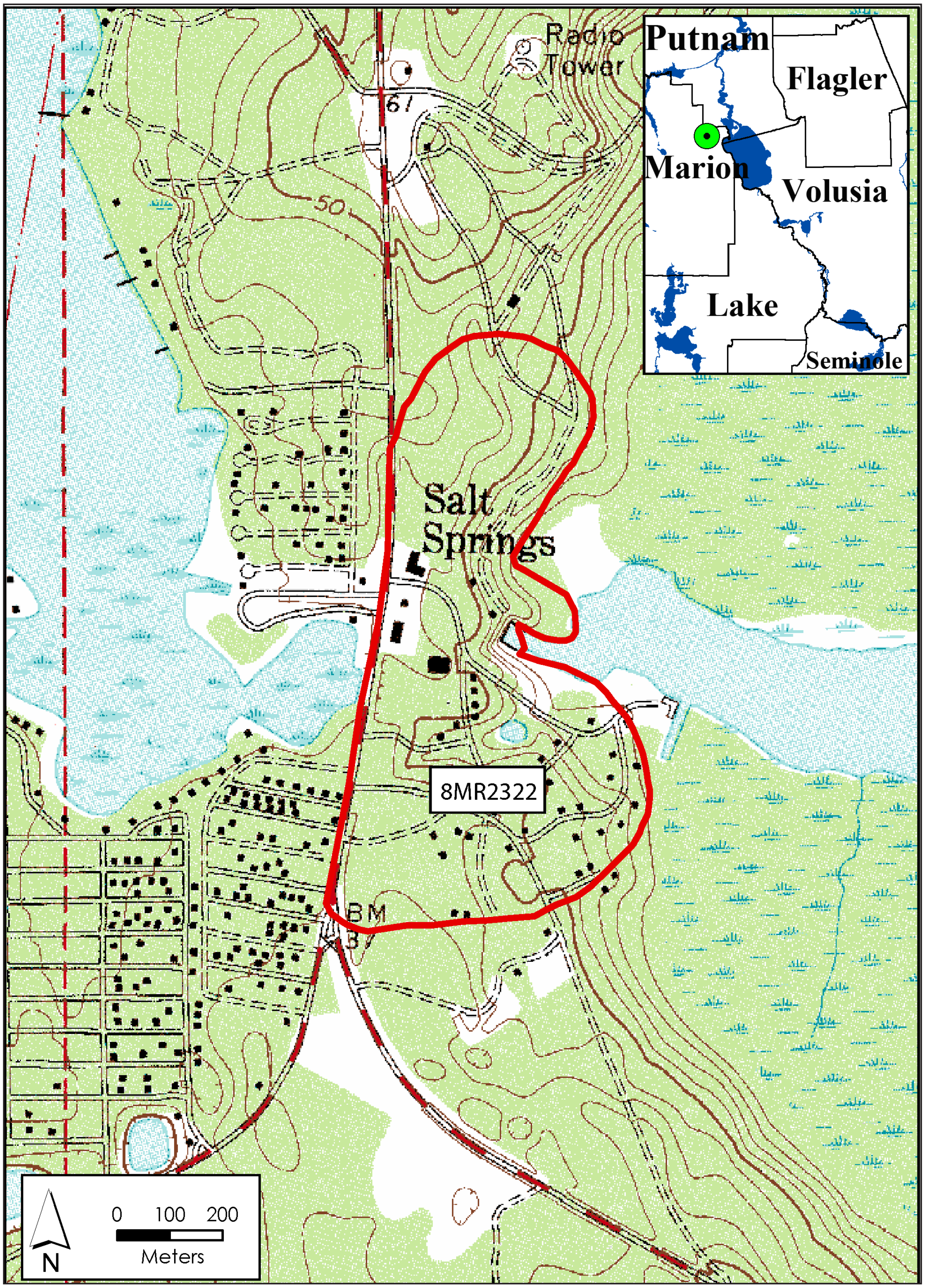

Figure 3.6. 1984 USGS Salt Springs quadrangle map showing the location of the combined sites (FDHR 2010)

In 1935, the Civilian Conservation Corps assisted with various projects in the Ocala National Forest and surrounding areas, including, with the help of a team led by A. E. Abshire, the inventory and excavation of several archaeological sites containing shell that had been previously unrecorded. The team surface collected the shell midden at the Salt Springs Run site (8MR2) and noted that some of the shell had been removed for road construction (Abshire 1935:13). Referring to the midden as *Kjokkenmoddinger* (Danish for kitchen garbage piles), they recovered very little pottery but several lithic artifacts, including projectile points and scrapers. Where these specimens are located today is unknown as is their typological classifications. Abshire and his crew also found and recorded several new archaeological sites during their time in the Ocala National Forest, but none around the springs.

Previous Archaeology at Salt Springs

The Salt Springs site (8MR2322) is the latest Florida Master Site File designation of the prehistoric occupation around and within the springs. The site boundaries were established from survey data (Dickinson and Wayne 1994) that encompassed the boundaries of three previous sites listed in the Florida Master Site File: 8MR4, 8MR770, and 8MR810 (Figure 3.6). The historic site 8MR473 is also located within these boundaries, but is not included as part of site 8MR2322.

The Salt Springs Recreation Area site (8MR4) was first recorded in 1951 (Plowden 1951). Based on a few potsherds collected from an eroding spring bank, it was described as a St. Johns period village site on the south side of the springs. After the USFS purchased the springs in 1977, Alan Dorian (1982:1), the Ocala National Forest archaeologist at the time, suggested that shell-midden deposits around the north side of the spring pool were secondary deposits mined from a nearby site, 8MR2. Dorian recorded the site 8MR770 in 1985. Based on a St. Johns Plain sherd, he defined the site as a St. Johns I or II site adjacent to State Road 19. Lewis Wilson (1986) defined 8MR810, which consists of the submerged cultural components in the spring bed. Wilson, an archaeology student from the University of Florida, recovered Native American ceramics, a complete Levy point, and chert flakes from the spring bed using flipper fanning to uncover the artifacts. A sketch map shows that the site extends three feet into the spring bed.

Site 8MR473 is the Townsend House, located on five acres of land adjacent to the Salt Springs Recreational Area. The Townsend property included a grocery and naval stores distillery for turpentine (FDHR 2010). The Townsend House still stands on privately owned land near the springs. This historic house is in a deteriorated condition but remains a visible fixture of Salt Springs' agricultural years when slash and longleaf pine were planted to provide the needed sap for the naval stores production. Turpentining or pine sap extraction was a major industry in central

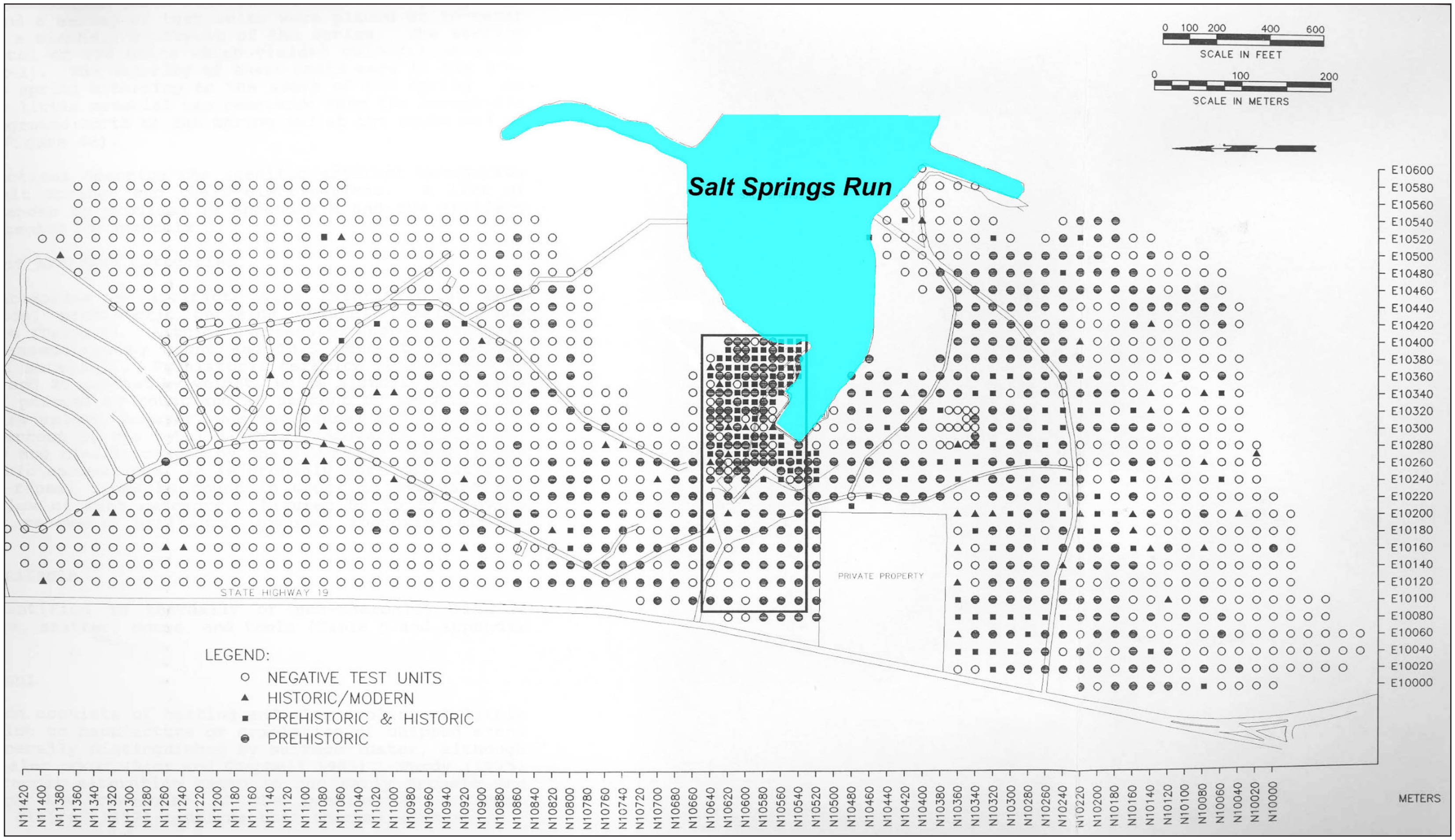

Figure 3.7. Location of positive and negative shovel test units (adapted from Dickinson and Wayne 1994:113).

Florida by the early 1900s (Bond 1987:189), and fragments of Herty cups, which were used to catch the sap from the pine trees, are still found on the surface around the springs.

In 1994, the USFS contracted SouthArc Inc. to undertake an extensive survey of the area around the springs to determine the location of archaeological sites that could be potentially impacted by any long-term development of the Salt Springs Recreational Area. SouthArc conducted a systematic, 20-meter grid, Phase 1 archaeological shovel test survey around the Salt Springs basin as well as historical background research (Figure 3.7). Tightening the grid to 10 meters around the immediate area of the springs, SouthArc excavated over 1,500 shovel tests to depths no greater than a meter. Because of the logistical problems of surveying wetlands, no investigations were conducted within the springs where 8MR810 was located or along the spring run. Upon completion of their survey and after consultation with staff from the Florida Master Site File, Dickinson and Wayne, authors of the SouthArc report, recommended that the above-mentioned sites (8MR4, 8MR810, 8MR770) be placed under one site designation, 8MR2322 (Dickinson and Wayne 1994:214).

The bulk of the artifacts recovered during the 1994 survey dated from the St. Johns period and included St. Johns Plain and St. Johns Check Stamped pottery and Pinellas projectile points. Also found were a Late Paleoindian Bolen point and Archaic-period artifacts, such as Newnan projectile points and Orange period fiber-tempered pottery. Prehistoric artifacts were often found mixed with Herty cup sherds in a shell midden on the north side of the springs, indicating modern disturbance. During the course of shovel testing, Dickinson and Wayne concluded that much of the area immediately around the north side of the springs had been heavily disturbed by earlier construction and logging activities. Dickinson and Wayne believed that the shell midden was likely redeposited during previous landscaping activities, with the fill possibly brought in from 8MR2, as Dorian (1982) had suggested. But they also proposed that undisturbed deposits might be present under the disturbed materials and that submerged portions of the run and basin could potentially yield undisturbed resources (Dickinson and Wayne 1994:215). They determined that a St. Johns–period village or encampment might be located on the south side of the springs and recommended that additional research be conducted prior to any future construction activities and that archaeologists monitor these activities (Dickinson and Wayne 1994:218).

By the turn of the twentieth century, the wooden walls and steps built in the 1980s had deteriorated and become a hazard. For safety, the springs were closed in 2007. In 2008 and 2009, excavations were conducted by the NPS in partnership with the USFS to mitigate the impact of replacing the north side retaining wall. In the spring of 2009, a coffer dam was built around the wooden wall to facilitate its removal. During removal, a 1.5-meter-deep shell midden was found to overlie an organic layer, which represented an earlier Salt Springs shoreline now 1 meter below the current spring water surface and 1.5 meters below the current shoreline. AMS ^{14}C assays dated the

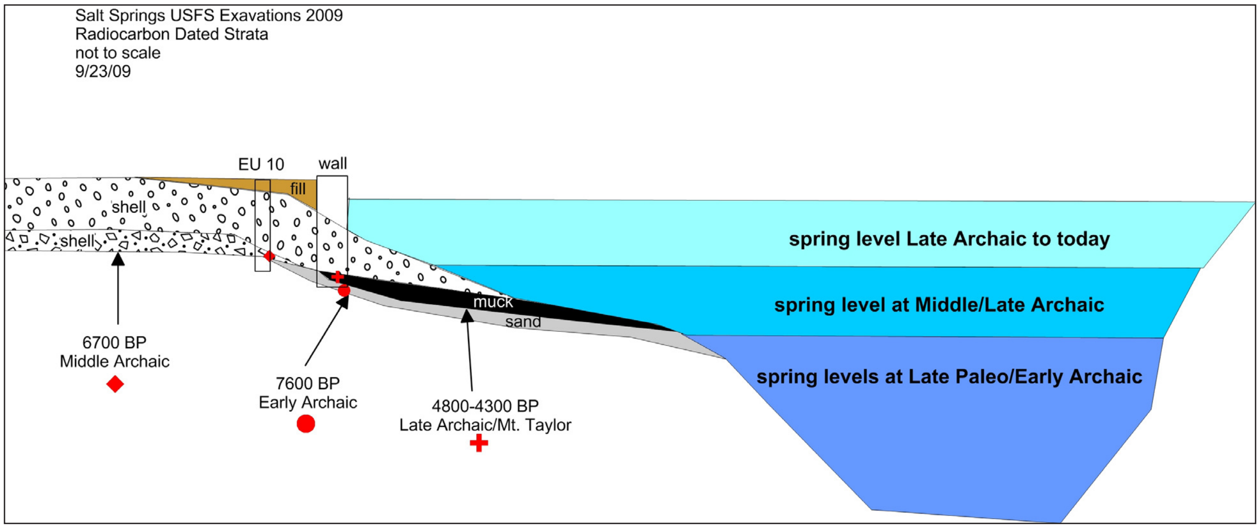

Figure 3.8. Representation of radiocarbon-dated strata and possible changing spring levels.

organic level to the Mt. Taylor period. Below the organic layer, on the surface of an ancient sand dune, a late Paleoindian Stanfield projectile-point base and end scraper suggested an even earlier use of the area. The organic-level dates of the Salt Springs 2009 excavations range from 5450 to 4407 cal. B.P. (Table 3.1). But an earlier date for the possible late Paleoindian Stanfield projectile point base and end scraper (Excavation Unit 14, Level 3) ranged from 8449 to 8374 cal. B.P. The organic layer of the submerged Mt. Taylor shoreline, as well as the terrestrial Paleoindian deposit, demonstrate the effects that the rise of sea level has had on the different occupations (Figure 3.8).

Mt. Taylor Sites in the Region of Salt Springs

Named for the Mt. Taylor site (8VO19), sites of the Mt. Taylor period are restricted geographically to the St. Johns River basin and its tributaries (Goggin 1998:41). The likely first archaeological recognition of what would later be referred to as Mt. Taylor occurred in 1867, when Jefferies Wyman conducted archaeological excavations on shell heaps along the St. Johns River and documented the occurrence of a nonceramic horizon (Wyman 1868). In the mid-nineteenth century, a preceramic phase was a new concept since most believed Native Americans had only occupied the Americas for a few hundred years before Columbus's arrival. But Wyman's discovery challenged this myth as huge shell deposits lacking pottery were recognized. Wyman (1868:399-401) described the Old Enterprise site (8VO55) as a massive shell mound measuring 18 to 20 feet high, 130 feet east-west at its base, and 140 feet north-south. Located along the shores of Lake Monroe, the mound was large enough that a hotel had been built on it in the 1840s. By the time Wyman visited the site, the hotel was gone, shoreline recession had undermined the integrity of the midden, and shell mining likely had occurred (Wyman 1868:400–401). By the late 1800s, a large section of the Old

Enterprise site had been carted away to be used as building material or eroded away due to the wave activity of Lake Monroe (Dall 1885:184; Purdy 1994a:326).

Near the end of the century, Moore (1892) also excavated along the St. Johns River and documented a preceramic phase at a few sites including Salt Springs Run (8MR2). These early excavations did not include detailed stratigraphic profiles, but did provide artifacts and evidence of a preceramic phase along the St. Johns River. As previously mentioned, one possible Mt. Taylor–period site was identified at 8MR2, where Moore (1894:11) found a "lance-head" in a preceramic context.

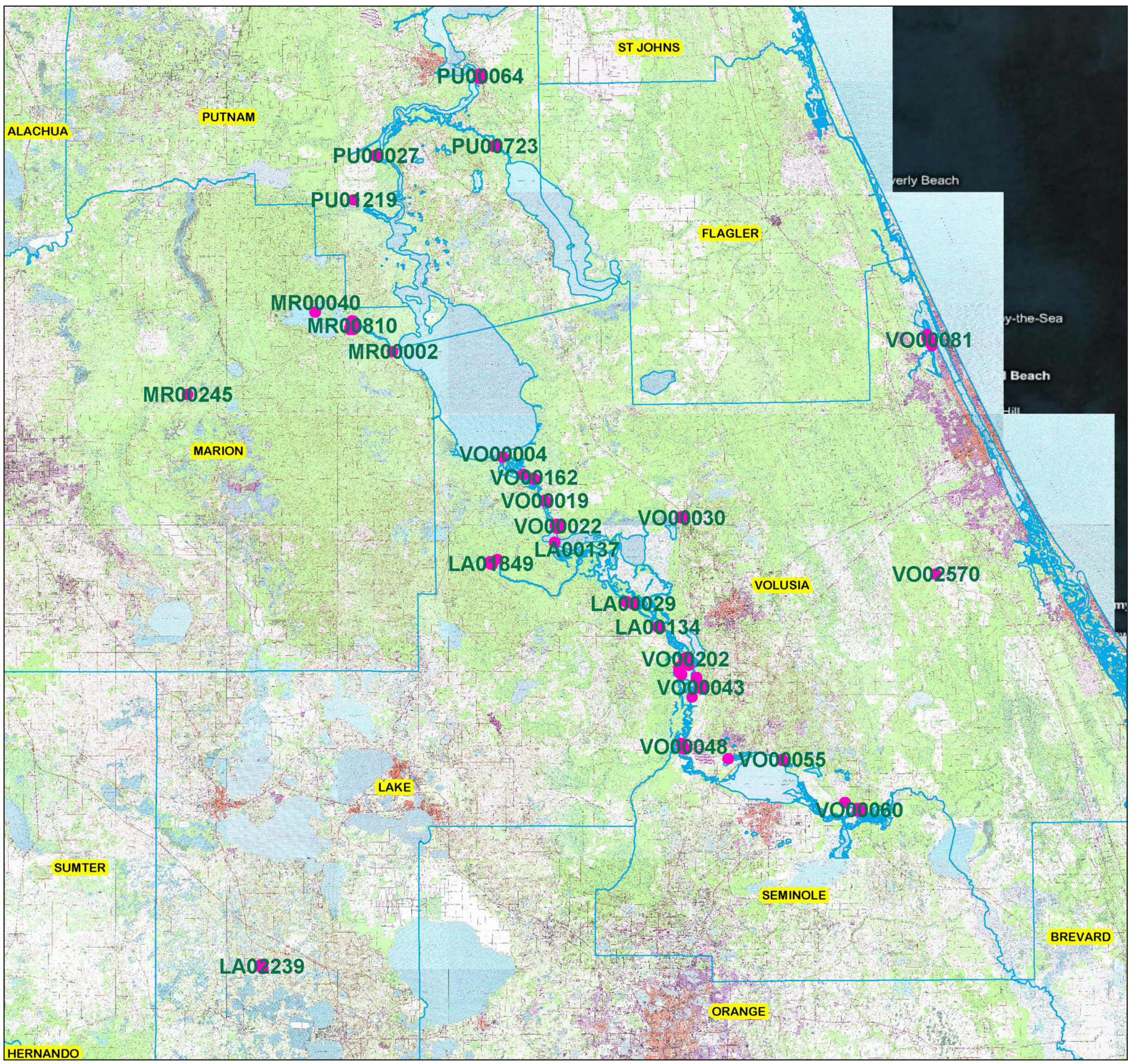

Figure 3.9. USGS quad maps showing location of Mt. Taylor–period sites for Putnam, Marion, Lake and Volusia Counties (FDHR 2010).

In 1952, John Goggin synthesized the limited knowledge of the aceramic sites in the middle of the St. Johns River Basin and described Mt. Taylor–period cultural traits in *Space and Time Perspective in Northern St. Johns Archeology, Florida.* Goggin characterized Mt. Taylor sites as freshwater shell middens situated near the St. Johns and its tributaries (Goggin 1998:41). The shell middens consisted primarily of banded mysterysnail (*Viviparus georgianus*), Florida applesnail (*Pomacea paludosa*), and mussels (*Elliptio* spp.). Terrestrial faunal remains tended to occur in lesser quantities than aquatic faunal remains. Chipped lithic tools were the predominant artifact types, although bone tools were also common.

Relatively few sites of the Mt. Taylor period are known due to a smaller population between 6000 and 4000 years ago and the destruction of sites by mining and development (Figure 3.9). The Florida Master Site File identifies fifty-six sites in the St. Johns Basin that contain partial or whole Mt. Taylor components (FDHR 2010). Volusia County has the highest occurrence with twenty-six sites, followed by Putnam County with only eight. The only Mt. Taylor site to be listed in the National Register of Historic Places is the type site Mt. Taylor (8VO19). Silver Glen Springs (8MR123), Groves' Orange Midden (8VO2601), and the Lake Monroe Outlet Midden (8VO53) are not yet described in the Florida Master Site File as having Mt. Taylor components, even though they are known to contain them.

The Mt. Taylor site and, recently, a few other period sites have undergone extensive archaeological exploration. Located along the banks of Lake Monroe in Volusia County, Groves' Orange Midden and the Lake Monroe Outlet Midden both yielded well-preserved botanical and faunal materials from inundated areas. The modified bone materials recovered from these sites are decorated with lines and other geometric designs (Horvath 2000b; Wheeler and McGee 1994a:358). Groves' Orange Midden also produced wooden paddles, wooded handles, and several decorated bone artifacts. From the Lake Monroe Outlet Midden site, several bone tools, (possibly fids), drilled and utilized shark teeth, and beads were recovered.

The Mt. Taylor site (8VO19) in the Lake George State Forest near the St. Johns River has been heavily impacted by looting and shell mining. This site was first recorded by Moore (1893:12–13, 113–115) who conducted several excavations in 1893. Moore noted that it was one of the highest shell mounds on the St. Johns River with deposits over 25 feet thick. Moore also observed that no ceramics were found within the entire midden, but, instead, it contained distinct strata and lithics within the various strata. Moore excavated four trenches and recovered arrowheads, bone awls, and shell tools.

Goggin (1949) used the descriptions from Moore's excavations to provide a typology for the Mt. Taylor period. He also visited the Heye Foundation, Museum of the American Indian in New York (now part of the National Museum of the American Indian, Smithsonian) to assess the artifacts that Moore recovered from his excavations. Goggin described several of Moore's projectile points as Florida Archaic stemmed points and bone pins with incised geometric designs. After Goggin, archaeologist Scott Nidy visited the site in 1973. Nidy updated the Florida Master Site File form for the Mt. Taylor site noting that some of Moore's trenches were still visible. Nidy also documented the destruction caused by shell mining in the 1920s. In 1997, the Cultural and Recreational Land (C.A.R.L.) Archaeological Survey conducted several auger tests and cleaned Moore's open trench profiles to document the Mt. Taylor site in preparation for listing on the National Register of Historic Places (Wheeler and Newman 1997). No ceramics were recovered during the C.A.R.L. survey, but a queen conch (*Strombus gigas*) celt was surface collected and well-preserved wood was recovered from the auger testing.

Groves' Orange Midden (8VO2601) was reported to Barbara Purdy University of Florida, by the property owner. Purdy and her team surveyed along the north shore of Lake Monroe before venturing out into the lake (Purdy 1994a). She identified midden material that contained well-preserved organic material. Initial excavations were conducted along the shores of the lake in 1989. The first season produced well-preserved floral and faunal remains but only one 1-by-1-meter unit was excavated. In the following years, a coffer dam was constructed around the area, and expanded excavations were conducted. The range of artifacts provided better insight into the Mt. Taylor material culture. Artifacts included modified and unmodified floral materials; modified and unmodified faunal materials; lithics; wooden handles, paddles and other decorated objects; bone beads and pins; and drilled shark teeth. Newsom noted that the *Cucurbita pepo* seeds recovered were wild gourd seeds, not domesticates (Newsom 1994:404). Groves' Orange Midden was used from the Middle to Late Archaic, and aquatic resources, as opposed to terrestrial mammals, were the primary harvest for food consumption.

Silver Glen Springs (8MR123), a second magnitude spring group in the Ocala National Forest is only a few miles from Salt Springs (Scott et al. 2004), is also currently a recreational area. Wyman (1875:38) first recognized that the large shell midden at the springs was an artificial construction. Moore (1892) recorded Silver Glen Springs during his expedition to the St. Johns River, but did not note any excavations. Ray Willis, a USFS archaeologist, recorded the site on the Florida Master Site File as 8MR123 in 1975 and documented surface collections. Since the site was largely on private property at the time, he did not excavate. Between the time of Moore's visit and Willis's recording, the site was draglined for shell, heavily altering the midden that Wyman (1875:38) referred to as "...the most gigantic deposits met with on the waters of the St. Johns."

Following acquisition of the site by the USFS in 1990, a crew from the Florida State University Department of Anthropology conducted test excavations at Silver Glen Springs (Marrinan et al. 1990; Stanton 1995). During this project, two column samples, each 1 meter square, were excavated in the midden. Radiocarbon samples of carbonized wood indicated that the midden was deposited between 5620 and 4320 B.P. (3670 and 2370 B.C., uncorrected). The absence of ceramics and the radiocarbon dates supported the argument for a Mt. Taylor occupation. Terrestrial and aquatic subsistence resources were exploited simultaneously, although aquatic biomass appears to have been the major contributor based on analysis of one-quarter-inch and one-eighth-inch screen samples. Examples of material culture included bifacial lithic tools, bone pins, a shell bead, and a shell bowl (Stanton 1995:76–84). At present, an archaeological survey directed by Asa R. Randall and Kenneth Sassaman of the University of Florida is further documenting the site.

Lake Monroe Outlet Midden (8VO53), 4 kilometers west of Groves' Orange Midden, was first recorded by John Goggin in the 1950s as a St. Johns II site, the exact location of which was unclear. Researchers at the Florida Museum of Natural History believed it to be within the vicinity of Interstate Highway 4 as it passed over Lake Monroe. Then, in 1999, prior to new construction for I-4, Archaeological Consultants Inc. and Janus Research began surveying and excavating in the same area that Goggin had referred to as the location for the Lake Monroe Outlet Midden. During the course of the survey, they located a partially submerged midden that had been damaged by the initial construction of I-4, as well as from looting activities. Intact strata were observed, and the excavations revealed a wide array of artifacts that included modified and unmodified faunal material. They concluded that the Lake Monroe Outlet Midden was not a St. Johns II site but a preceramic Archaic site. The recovery of Newnan and several Florida Archaic Stemmed points, along with six radiocarbon dates ranging from 3660 to 3340 B.C., placed the site within the Mt. Taylor period. The Lake Monroe Outlet Midden also contained a wide array of lithics tools and debitage. Human remains were found within the midden. These were left in place, and further excavations in the area of the remains were suspended (Archaeological Consultants Inc. 2001:9-7). Horvath, who compiled the report for (Archaeological Consultants Inc.), concluded that the site was a freshwater shell midden and a lithics workshop where microliths were manufactured for bone- and shell-bead production. A mortuary function was also acknowledged, but its nature was not explored.

Over 15,000 flakes were recovered during these excavations. Using the triple cortex method, the Archaeological Consultants Inc. analysts determined that 94 percent of the assemblage was tertiary or non-decortication flakes of varying size. Microdebitage and micro tools were recovered in high density from one unit. This area was interpreted to be a lithics workshop. The Lake Monroe Outlet Midden lithics included specimens of Ocala Group and Peace River Quarry chert, agatized coral, sandstone, and soapstone. The Ocala Group chert can be obtained in nearby Marion County, but there are no known quarry locations near Lake Monroe. Archaeological Consultants Inc. suggested that all of the chert was brought to the site, most likely via water transport. Agatized coral appears to have been the preferred material, representing over 58 percent of the lithic material (Archaeological Consultants Inc. 2001:5-9).

These submerged Mt. Taylor midden sites have provided a unique opportunity to explore aspects of the Mt. Taylor period that are not usually encountered at Mt. Taylor archaeological sites on dry land. The organic material that has been so well preserved by inundation has allowed archaeologists a chance to view a broader picture of early Native American lifeways along the St. Johns River.

Table 3.1. Radiocarbon Dates from Salt Springs

UGAMS#	Sample #	FS#	Provenience	Avg Cal BP	Descrip.	Cal BC	Cal BP	Conv. BP	2 Sigma
7493	FS154U10CS	154.002	EU 10, zone 6	6332	Shell	4469-4295	6419-6245		
7494	FS141U45CS	141.005	EU 45, Lv 5	5792	Shell	3938-3745	5888-5695		
7495	FS137U45CS	137.007	EU 45, Lv 1	5282	Shell	3436-3227	5386-5177		
7496	FS147U10CS	147.002	EU 10, zone 4	3535	Shell	1683-1486	3633-3436		
7497	FS149U10CS	149.001	EU 10, zone 5	3584	Shell	1732-1535	3682-3485		
7498	FS406U12CS	406	EU 12	6169	Charcoal	4305-4133	6255-6083		

Beta#	Sample #	FS#	Provenience	Weight (g)	Descrip.	Associated Artifacts	Conv. BP	C13	Sigma
284423	FS254U28C1Z1	254	EU 28, Zone 1		Seed		4390	-25.1	40
284424	FS260U28C1Z6	260	EU 28, Zone 6		Seed		4540	-25.2	40
284425	FS262U28C1Z8	262	EU 28, Zone 8		Seed		5230	-28.2	40
284426	FS346U28L9	346	EU 28, Lv9		Seed	Utilized flake	5940	-26.2	40

Beta#	Sample #	FS#	Provenience	Avg Cal BP	Descrip.	Cal BC	Cal BP	Conv. BP	2 Sigma
284423	FS254U28C1Z1	254	EU 28, Zone 1	5205	Seed	3260-3250	5210-5200	4390	
284424	FS260U28C1Z6	260	EU 28, Zone 6	5185	Seed	3370-3100	5320-5050	4540	
284425	FS262U28C1Z8	262	EU 28, Zone 8	6160	Seed	4220-4200	6170-6150	5230	
284426	FS346U28L9	346	EU 28, Lv9	6775	Seed	4930-4720	6880-6670	5940	

Table 3.1- Continued

UGAMS#	Sample #	FS#	Provenience	Avg Cal BP	Descrip.	Cal BC	Cal BP	Conv. BP	2 Sigma
7493	FS154U10CS	154.002	EU 10, zone 6	6332	Shell	4469-4295	6419-6245		
7494	FS141U45CS	141.005	EU 45, Lv 5	5792	Shell	3938-3745	5888-5695		
7495	FS137U45CS	137.007	EU 45, Lv 1	5282	Shell	3436-3227	5386-5177		
7496	FS147U10CS	147.002	EU 10, zone 4	3535	Shell	1683-1486	3633-3436		
7497	FS149U10CS	149.001	EU 10, zone 5	3584	Shell	1732-1535	3682-3485		
7498	FS406U12CS	406	EU 12	6169	Charcoal	4305-4133	6255-6083		

Beta#	Sample #	FS#	Provenience	Weight (g)	Descrip.	Associated Artifacts	Conv. BP	C13	Sigma
284423	FS254U28C1Z1	254	EU 28, Zone 1		Seed		4390	-25.1	40
284424	FS260U28C1Z6	260	EU 28, Zone 6		Seed		4540	-25.2	40
284425	FS262U28C1Z8	262	EU 28, Zone 8		Seed		5230	-28.2	40
284426	FS346U28L9	346	EU 28, Lv9		Seed	Utilized flake	5940	-26.2	40

Beta#	Sample #	FS#	Provenience	Avg Cal BP	Descrip.	Cal BC	Cal BP	Conv. BP	2 Sigma
284423	FS254U28C1Z1	254	EU 28, Zone 1	5205	Seed	3260-3250	5210-5200	4390	
284424	FS260U28C1Z6	260	EU 28, Zone 6	5185	Seed	3370-3100	5320-5050	4540	
284425	FS262U28C1Z8	262	EU 28, Zone 8	6160	Seed	4220-4200	6170-6150	5230	
284426	FS346U28L9	346	EU 28, Lv9	6775	Seed	4930-4720	6880-6670	5940	

CHAPTER FOUR

RECONSTRUCTION OF THE ARCHAIC-PERIOD ENVIRONMENT AT SALT SPRINGS

Introduction

Based on recent geological and archaeological studies at Salt Springs, including and primarily the NPS–USFS 2009 excavations, I discuss four aspects of the Mt. Taylor–period environment at the springs: lithics, soil and groundwater, flora, and fauna. I infer from the data and discussions that the people of the Mt. Taylor culture at Salt Springs had no local knappable lithics from which to make stone tools; occupied the springs when water levels were lower; lived off a forest and freshwater environment similar to those surrounding the springs today; and captured and consumed animals also present in today's nearby environments. My goal is to describe environmental setting relative to resources identified archaeologically from the site.

Hydrology and Geology

Salt Springs is located in the Central Highlands physiographic zone of Marion County, part of the Ocala Uplift that is manifest in the rolling hills (Randazzo and Jones 1997:7). These limestone karst hills are dotted with springs and lakes that provide freshwater to the area. With the Ocklawaha River to the west and the St. Johns River to the east, Salt Springs is located between the two major freshwater streams in peninsular Florida.

Marion County has over fifteen first-, second-, and third-magnitude springs including Fern Hammock Springs, Juniper Springs, Orange Springs, Rainbow Springs Group (four), Salt Springs, Silver Glen Springs, and Silver Springs Group (three). Salt Springs is a second-magnitude spring producing an annual mean of 76.37 cubic feet per second (Scott et al. 2004:239). Salt Springs derived its name from the sodium content of the waters caused by the underground water weathering of sodium-bearing minerals (Scott et al. 2004:34). With sodium levels at 982 milligrams per liter (down from a high of 1,500 milligrams per liter in 1946) (Scott et al. 2004:238), the salinity of Salt Springs is considerably higher than that at Silver Glen Springs (238 milligrams per liter) (Scott et al. 2004:242) and Juniper Springs (2.3 milligrams per liter) (Scott et al. 2004:228). As such, the water of Salt Springs is not potable and sufficiently saline to support marine species.

The underground karst system plays an important role in the rivers for most of Florida. Rain water is filtered through the limestone via a series of small openings to re-emerge in springs and seeps. Beginning with Lake Kerr water flows underground (and under State Road 19) to remerge in Salt Springs and then continue down Salt Springs Run and into Lake George (Figure 4.1), an expanded portion of the St. Johns River. The St. Johns River flows along the eastern side of Florida and has been important in both historic and prehistoric times for moving people and goods. The St. Johns River is also unique because it is the only large river in the United States that flows from south to north (Randazzo 1997:12). Due to the river's low topography and connection to the Atlantic Ocean, daily water levels are influenced by tide as far south as the Salt Spring Run and the springs itself. It is not unusual to find salt or brackish water fish and shellfish throughout the St. Johns River system, not only Salt Springs.

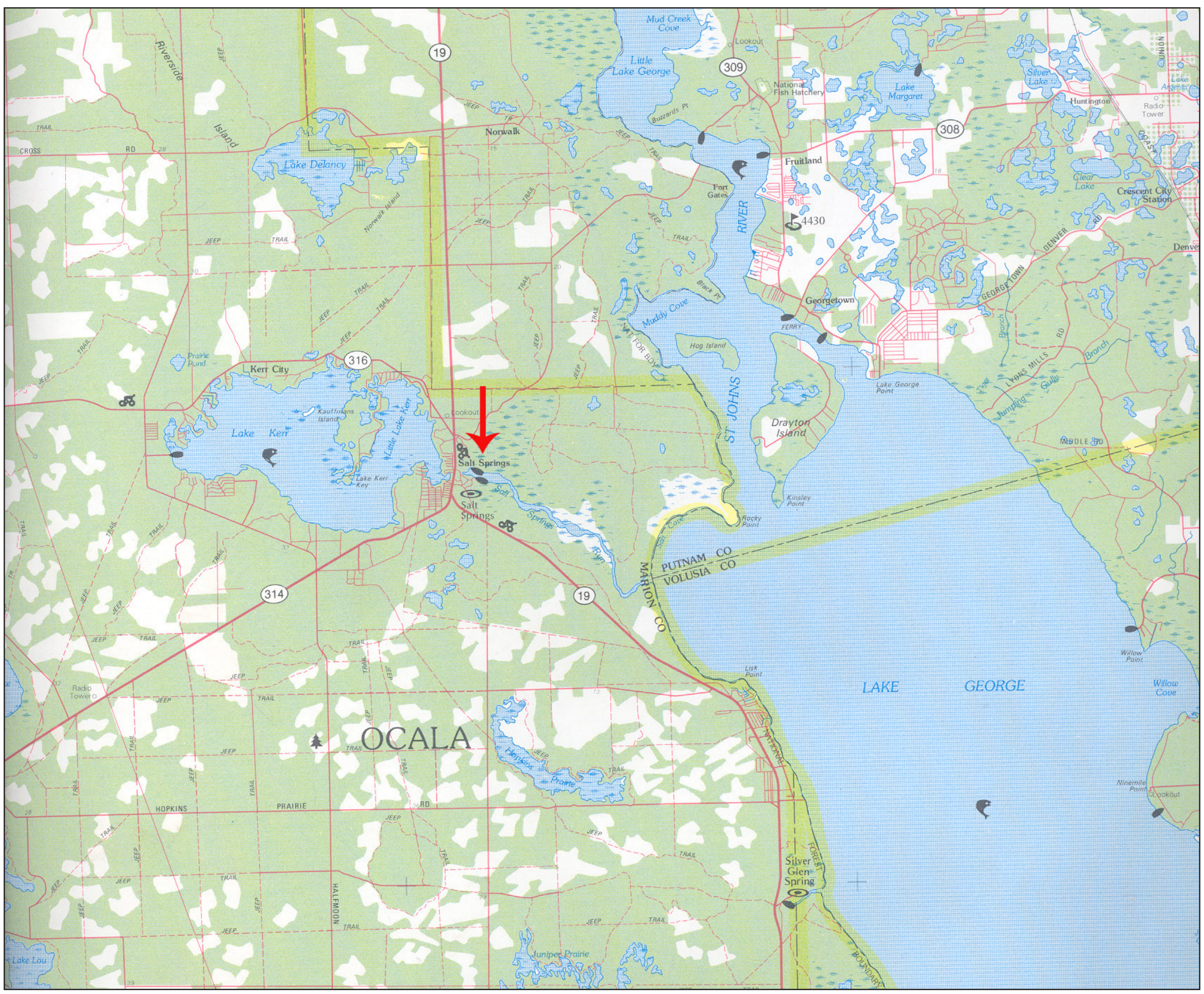

Figure 4.1. Map showing location of Salt Springs in relation to Lake Kerr and Lake George.

Groundwater and Surface Geology at Salt Springs

Entrix Inc. was contracted by the NPS in 2008 to identify the groundwater depths, C-soil horizon, and shell midden, if any, along the north shore of Salt Springs. The goal was to determine the stability and traits of the geological matrices next to the wooden retaining wall in order to identify locations where mitigative archaeological excavations could be placed (Figure 4.2). To obtain core samples, Entrix used a Geoprobe Track Rig to push 1-meter-long plastic tubes directly into the ground. If the deposits of interest were deeper than 1 meter, they doubled up the tubing to obtain 2-meter-long samples.

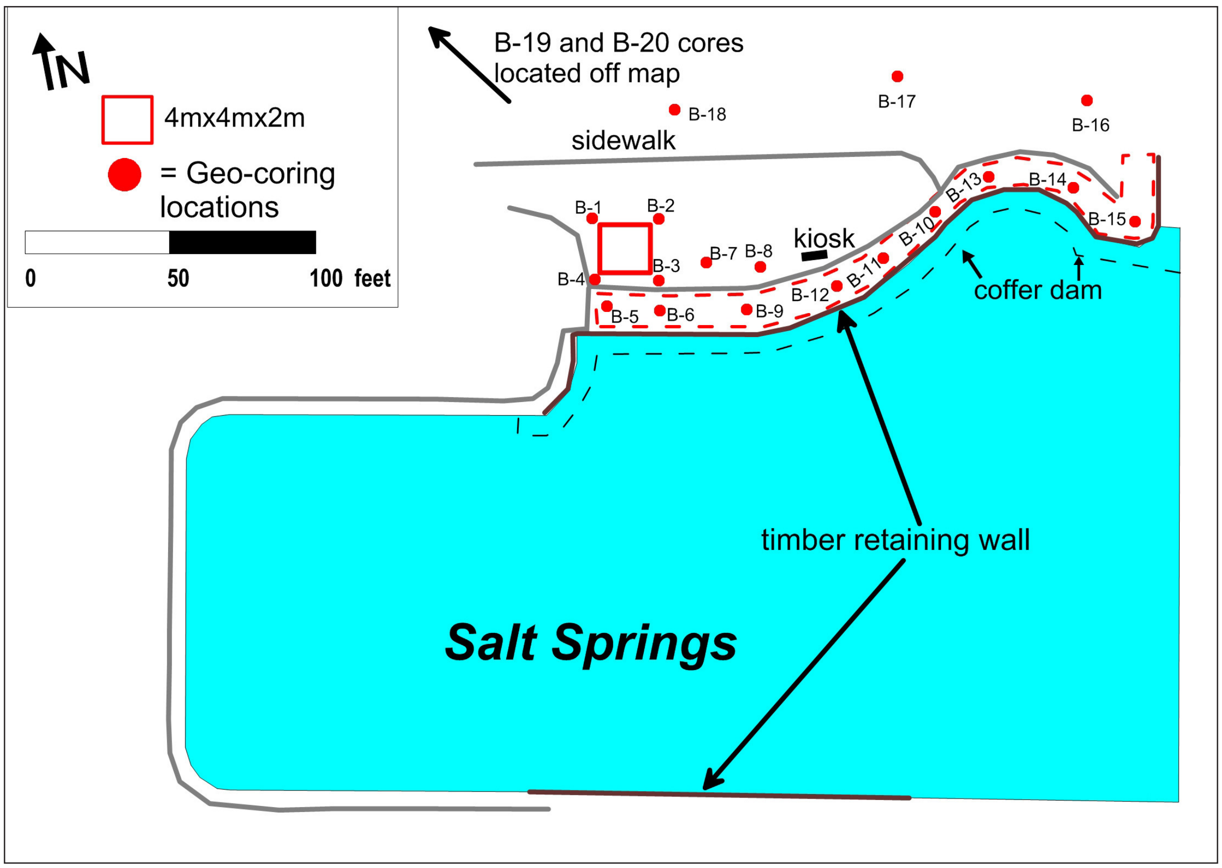

Figure 4.2. Locations of 4-by-4-by-2-meter excavation unit and cores prior to construction of new concrete wall in 2009.

As each core was removed, its contents were photographed and depth of each stratum recorded. The soil was then screened using quarter-inch mesh to recover artifacts. Entrix plotted the core locations with GPS and georeferenced them to the St. Johns Water Management District benchmarks. Results of the core analyses showed that high ground water and shell midden were

Figure 4.3. Core from the southwest corner of the 4-by-4-meter excavation unit (B4).

located along the eastern portion of the retaining wall (B10–B16). Unfortunately, the high water prevented successful removal of 1- or 2-meter-deep core samples; the water intermixing with the shell and soil resulted in slurry that ran out the bottom of the core during retrieval. Thus, recovery of a complete column of soil/shell was not possible and the midden depth (which began near ground surface) could not be determined, although probes in the area suggested it was more than 1 meter deep.

Assuming that the shell midden had been deposited on dry land, the Entrix study demonstrated that ground water and, by extension, the level of the spring adjacent to the midden had risen over a meter since the midden had been deposited. Because the high water prevented excavation in the shell midden near the retaining wall, a mitigative 4-by-4-meter unit was placed above ground-water levels. Ultimately, the archaeologists concluded this was disturbed or borrowed midden, but the negative results from the unit required that the shell midden be monitored during the 2009 removal of the adjacent wooden retaining wall. However, the new Entrix study, along with earlier archaeological studies (Dickinson and Wayne 1994; Dorian 1982) confirmed not only that higher water levels were present in the past (probably during the Mt. Taylor period), but that the

Figure 4.4. Marion projectile point from Salt Springs (EU 30, Level 3, FS 330.01) containing *Lepidocyclina* sp. casts.

shell-midden deposits likely overlay Pleistocene dune deposits (a feature originally suggested by Dorian), as evidence by cores taken near the retaining wall (e.g., Figure 4.3).

Lithic Resources

Hornsby Springs in Alachua County (8AL124) is an example of a first-magnitude spring that stops flowing during periods of drought, exposing the underground caves and chert outcrops, which can be harvested for their raw material. Even though the limestone bedrock of Salt Springs is exposed during periods of drought, it did not produce the raw materials used on site for lithic-tool manufacturing.

"Chert is fine grained, sedimentary rock composed of silica (SiO^2) in various mineral phases and frequently containing minor impurities" (Upchurch et al. 1982:1). The Ocala Group is an Eocene Formation chert limestone that is light gray to yellowish brown (Upchurch et al. 1982:82). Among the characteristics that distinguish the Ocala Group from other chert limestones are the presence of Orbitoides foraminifera (*Lepidocyclina* sp.) (Figure 4.4) and pectin casts observable

Figure 4.5. Stanfield projectile-point base from Salt Springs (EU 13, Level 3, FS 247.01) made from Hawthorne Formation breccia

in an otherwise homogenous matrix. Thermally altered Ocala Group chert turns pink or red and glossy. However, tannic acid present in groundwater may leach the color from the chert making it difficult to determine any alteration.

The limestone karst that forms the bedrock across most of Florida is not a ready source of chert; undoubtedly prehistoric peoples orally passed on quarry locations through sequential generations. In 1982, Upchurch, Strom, and Nuckels published the study *Methods of Provenance Determination of Florida Cherts*. They divided the different chert outcrops found in Florida into quarry clusters and provided visual and chemical markers to determine the provenance of lithic material found at archaeological sites. Ocala chert boulders can be found eroding out of rivers and sinkholes, but no archaeological quarry sites are known to occur near Salt Springs. Ocala Group chert could possibly be obtained along the banks of Lake Kerr, Lake George or the St. Johns River.

The Hawthorne Formation, which extends from Florida's east coast to the panhandle, is an Eocene Formation that produces opaline rocks. But most of the Hawthorne Formation chert is brecciated, a process resulting in chalcedony that did not opalize completely and voids discolored

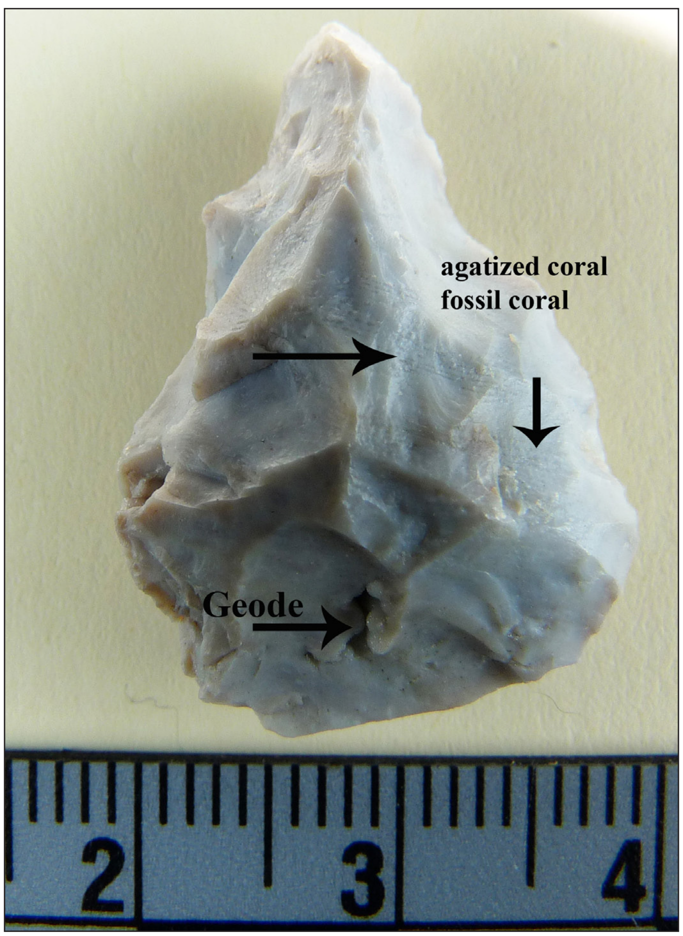

Figure 4.6. Agatized coral awl from Salt Springs (EU 19, Level 1. FS 183.1l).

along their edges. Breccias are rocks that are similar to conglomerates in that they have inclusions made of a denser material that can be viewed without a microscope. The Paleoindian Stanfield projectile-point base recovered from EU 13 (Figure 4.5) was made from Hawthorne Formation chert.

The only other chert-like stone from the 2009 Salt Springs lithic assemblage was agatized coral, which is commonly found along the Suwannee River and less commonly in the Tampa Bay area (Figure 4.6). Since it is agatized, it is not a true chert in that it is not a crypto-crystalline material. But like chert, it is a knappable stone capable of being formed into tools. The agate or chalcedony replacing the coral often leaves behind fossilized coral structures. Geodes may be formed during the same process, leaving voids that can make it difficult to reduce the raw stone into a predictable pattern. Thermal alteration is needed to make the agatized coral more predictable in the reduction process. Purdy (1994b:390) noted that among the lithics from Groves' Orange Midden "…an overwhelming majority of the bifaces and thinning flakes appeared to have been heat altered because they were glossy, but they were not pink or red as they would have been if they had been made of chert from Florida's central highlands." She went on to state that many of them were made from agatized coral as well. From the Lake Monroe Outlet Midden, over 55 percent of the agatized coral was also thermally altered (Archaeological Consultants Inc. 2001:5-9).

In summary, the immediate Salt Springs environment lacks suitable resources for lithic-tool manufacture, both during Mt. Taylor times and today. The distribution of lithic quarry and limestone formations appropriate for tool making are distant from the springs and suggest that trade or travel would have been necessary to obtain them—a point I return to in my concluding chapter.

Botanical Research

During the 2009 excavations at Salt Springs, well-preserved wet botanical materials were found in abundance within the excavation units. Through a contract with Lee Newsom at Pennsylvania State University (PSU), student Johanna Talcott assisted the field archaeologists with the recovery of botanical materials and their short-term preservation. Because this was an emergency salvage project, soil was water-screened through quarter-inch mesh to speed up the process. This method is sufficient to recover lithics and well- preserved bone relatively intact, but too rough to recover more fragile botanical remains without some damage and loss. During her time at Salt Springs, Talcott processed the botantical samples for transportation to PSU. She also helped excavate two column samples from which the recovery of botanical materials could be undertaken in a more controlled environment.

Over one hundred 5-gallon buckets and fifteen other containers containing botanical material were sent to PSU for analysis. Among the materials were included a notched wooden staff or totem (Figure 4.7), woven reeds that may be a mat, and burnt gourd rinds (Figure 4.8). In the fall of 2009, Newsom, with the assistance of Talcott and other students, began the sorting and analysis, producing a preliminary botanical report (Newsom 2010:2) that identified substantial amounts of waterlogged plant materials, including carpentry debris (wood chips), possible basketry, and abundant rind and seeds from two genera in the pumpkin/squash family (Cucurbitaceae), *Curcurbita* sp. and *Lageneria* sp. (Figure 4.9; Table 4.1). The carpentry debris is of interest since wood is rarely recovered from archaeological sites. It demonstrates evidence of canoe-making or other woodworking activities exploiting tree species still found at the springs today were (Table 4.2).

Figure 4.7. Possible wood totem or staff (pieces cross-mend).

Table 4.1. Botanical remains from the organic zone at Salt Springs (from Newsom 2010).

Scientific Name	**Common Name**
Arecaceae	Sabal palms
Arecaceae, *Serenoa repens*	Saw palmetto
Bromeliaceae, *Tillandsia usneoides*	Spanish Moss
Caprifoliaceae, *Viburnum* sp.	Viburnum
Fagaceae, *Quercus* sp.	Oaks
Fagaceae, *Quercus virginiana*	Live oak
Juglandaceae, *Carya* sp.	Hickory
Magnoliaceae (cf.)	Magnolia
Rosaceae, *Prunus* sp.	Chokecherry
Rosaceae, *Rubus* sp.	Blackberry
Cucurbitaceae, *Cucurbita* sp.	Gourd (squashes)
Cucurbitaceae, *Lagenaria* sp.	Gourd (bottle gourd)
Passifloraceae, *Passiflora* sp.	Passion Flower

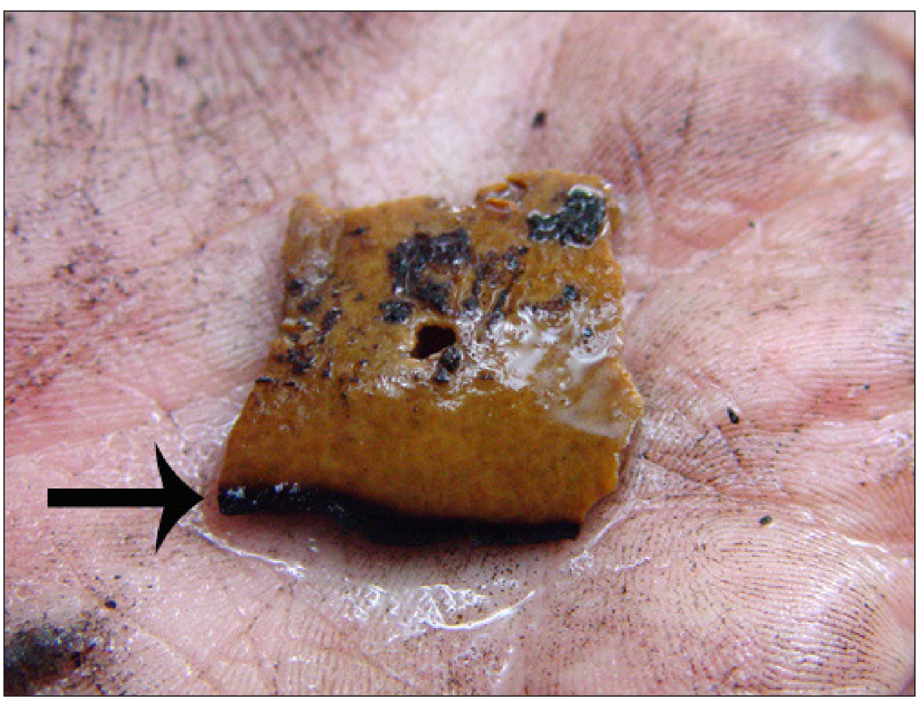

Figure 4.8. Burnt and punctured gourd rind (arrow points to burnt edge).

Figure 4.9. Field photograph of gourd seeds still attached to rind.

Vitaceae, *Vitis/Ampelopsis* sp.	Grapes

Talcott conducted additional research on the *Lagenaria* sp. remains, which included examining seed size and rind thickness to determine if gourds were intentionally cultivated at Salt Springs or were wild plants. Talcott (2010:48) noted that the size of the seeds (coefficient of variation for L = 7.78 mm and W = 9.94 mm) demonstrated that the seeds were larger than those found at Groves' Orange Midden (coefficient of variation for L = 6.26 mm and W = 7.91 mm). Since wild seeds are smaller in size, the larger seeds are possible indicators of intentional cultivation (Talcott 2010:48). To date, thirty-one fragments of bottle gourd rind have been recovered and identified from the Salt Springs excavations. The rind thickness averages 2.07 millimeters, only slightly greater than the 2-millimeter threshold for domestication, which Talcott suggests may be a mixture of both wild and domesticated gourds from the excavations (Talcott 2010:48). Analysis of the floral remains from the Salt Springs excavations is ongoing, and additional examinations may provide new insight into the possibility of bottle-gourd domestication.

In addition to the archaeological botanical remains at Salt Springs, the modern trees around the springs were documented. Based on preliminary analysis, many of the remains of plants and trees found archaeologically are from species still found around the springs today, including live oak (*Quercus virginiana*) and magnolia (*Magnolia grandiflora*). However, as demonstrated by the Entrix study, the variation in water levels has resulted in differences in relative plant abundance and distribution, as drier conditions may have placed the forest marginally closer to the springs, and today's expansive wetland possibly more distant.

Table 4.2. Modern trees around Salt Springs.

Scientific Name	**Common Name**
Quercus virginiana	Live oak
Quercus laurifolia	Laurel oak
Sabal palmetto	Cabbage palm
Magnolia grandiflora	Southern magnolia
Acer rubrum	Red maple
Morella cerifera	Wax myrtle
Taxodium distichum	Bald cypress
Liquidambar styraciflua	Sweet gum
Cornus foemina	Swamp dogwood
Fraxinus pennsylvanica	Green ash
Prunus serotina	Black cherry
Celtis laevigata	Hackberry

Faunal Research

All faunal materials from the 2009 excavations were recovered by water-screening in the field through quarter-inch mesh. Recovered materials were then brought to the SEAC facilities where the faunal remains were separated into modified (tools and possible tools) and unmodified categories. Due to time and labor constraints, modified remains were desalinated, but unmodified specimens were washed and then immediately dried for potential analysis if funding should ever become available. Invertebrate remains were rare in the anaerobic, organic layer from which the faunal samples were taken.

Ultimately, Brian Worthington (2010) analyzed the vertebrate faunal remains from two excavation units, EU 16 and EU 17. These units were nonrandomly chosen for two reasons: the density of faunal material was relatively high compared to that recovered in other units, and the projectile-point types and radiocarbon assays definitively marked the deposits as Mt. Taylor. Worthington examined the utilized, thermally altered and nonaltered faunal remains from the excavated levels of the units using standard zooarchaeological methods. He identified mammals, fishes, reptiles, birds, and amphibians from both units. Level two of EU 16 proved to have the highest density of faunal remains with 1,120.34 grams in total. Both excavation units demonstrated a persistent exploitation of vertebrates with similar frequencies. Though amphibians and birds were identified, they represented a small portion of the remains with only a few individuals identified, suggesting they were not preferred consumables.

Worthington identified *Canis* spp. remains, which included a radius, humerus, and dentary fragment. He concluded that both wild and domesticated dogs were present at the site (Worthington 2010). The occurrence of domesticated dog remains at Salt Springs is not unique for Mt. Taylor sites. A few have been documented at Groves' Orange Midden (Wheeler and McGee 1994b). Also, the absence of remains of saltwater fish and crabs, abundant in the springs today, brings into question how like or unlike today's faunal populations are compared to those of the past. I cannot answer the questions with the limited data. But Worthington does conclude, that the fauna identified in his sample could have come from the immediate springs environments.

One goal of this analysis was to determine the relative quantities of vertebrates recovered from terrestrial as opposed to aquatic environments. Deer (Figure 4.10) accounted for most of the NISP (49.15 percent), weight (75.85 percent), and biomass (77.83 percent) of the terrestrial species; terrestrial species represented the largest biomass with 52.36 percent of all species. Aquatic species were nearly as abundant, although fishes, which represented the largest number

Figure 4.10. Deer antler and skull cap in situ from EU 16.

of individuals identified, had a total biomass of only 12.4 percent. Since the faunal materials were recovered from a shoreline deposit and fish and even deer might die naturally along the spring bank, Worthington investigated the question of natural versus human deposition of faunal remains. The abundance of burnt and modified bone that he identified supported the argument that these were human-made deposits. Worthington (2010:19) concluded that the faunal remains from Salt Springs supported the hypothesis that during the Mt. Taylor period, people continued to rely on hunting, even as they presumably were adapting to a fishing subsistence strategy.

Table 4.3. Terrestrial fauna recovered from Salt Springs excavations.

Scientific Name	**Common Name**
Odocoileus virginianus	White-tailed deer
Procyon lotor	Raccoon
Mephitis mephitis	Striped skunk
Didelphis virginiana	Opossum
Sigmodon hispidus	Hispid cotton rat
Sylvilagus, sp.	Cottontail rabbit
Canis spp.	Dog
Picathartidae (cf.)	Vulture
Gopherus polyphemus	Gopher tortoise
Terrepene carolina	Eastern box turtle
Lutra canadensis	River otter

One feature that makes Salt Springs unique is the lack of shell species within the organic zone that are commonly found at other Mt. Taylor sites. At Groves' Orange Midden, Lake Monroe Outlet Midden, and Silver Glen Springs, the banded mysterysnail (*Viviparus georgianus*) and freshwater mussels (*Elliptio* sp.) dominated the faunal remains (Archaeological Consultants Inc. 2001; Stanton 1995; Wheeler and McGee 1994b). But none was recovered from the units Worthington analyzed. One possible reason may be due to the high salinity of the springs, which mysterysnail and freshwater mussels cannot tolerate. The closest habitats for them are downstream from the springs and spring run where there is an influx of freshwater.

Certainly, the Salt Springs archaeological site is abundant with mysterysnail, apple snail, and mussels. But these are found landwards and *above* the Mt. Taylor period organic layer. Few radiocarbon dates have been run on these shell deposits, but one date suggested that the deposition of shell occurred after the organic layer was deposited. The absence of shell may thus be due to a temporal change in shell exploitation. It is also possible that deposition of shell refuse occurred elsewhere on the site. Not enough shell from across the site has been analyzed or radiocarbon dated to dismiss the possibility of shell collection during the Mt. Taylor period, however.

CHAPTER FIVE

FIELD METHODOLOGY

Pre-Construction Excavations, 2008

Following the recommendations of SouthArc, USFS partnered with the NPS's Southeast Archeological Center (SEAC) to undertake mitigation and monitoring of archaeological resources before the removal of the wooden retaining wall and its replacement with a concrete retaining wall. In the fall of 2008, SEAC began archaeological excavations on the northeast side of the springs near the wooden wall. SEAC used SouthArc's report (Dickinson and Wayne 1994) to determine possible locations for excavation units that would mitigate the adverse effects on the archaeological site known to exist there, 8MR2322. In addition, as discussed in chapter 4, Entrix Inc. was retained to obtain soil cores along the north bank of the springs just behind the retaining wall to determine the suitability of the soils for excavation and the presence and depth of midden. These cores, however, failed to recover deep-strata samples. Cores, additional shovel tests, and 1-by-1-meter units were then placed in the Area of Potential Effect (APE) to determine which, if any, areas on the north side of the springs contained undisturbed archaeological deposits. With these data in hand, SEAC placed a 4-by-4-meter unit in a shell midden on the bank slope of the springs north of the APE for the concrete wall, but within the APE for logistical staging of supplies, traffic, and spoil (Figures 4.2, 5.1, and 5.2).

The excavation unit was established using a Leica transit to set the northwest corner as the datum point. This datum was georeferenced to St. Johns River Water Management District (SJRWMD) benchmarks. The unit was then subdivided into four 2-by-2-meter units designated EU 1 through EU 4. The north units EU 1 and EU 2 were situated upslope from EU 3 and EU 4. Using shovels, the units were excavated in arbitrary 10-centimeter levels and then troweled before photographing. The excavated material was screened through quarter-inch hardware cloth. Once the 2-by-2-meter units were level with each other, they were excavated at the same time, but the materials from each unit were screened and collected separately (Figure 5.3).

A total of fourteen levels was excavated to 3.08 meters below datum over the course of four weeks. After reaching Level 14, excavations of a 50-by-50-centimeter unit was conducted in EU 2 (Figure 5.5) until standing water was reached at a depth of 348 centimeters below datum (cmbd). This excavation was conducted to determine if there were any additional cultural zones (Figure 5.6).

Figure 5.1. The 4-by-4-meter excavation unit near the stairs and sidewalks.

Figure 5.2. Salt Springs looking east before excavations.

Figure 5.3. Initial excavations of EU 1 and EU 2, looking southeast.

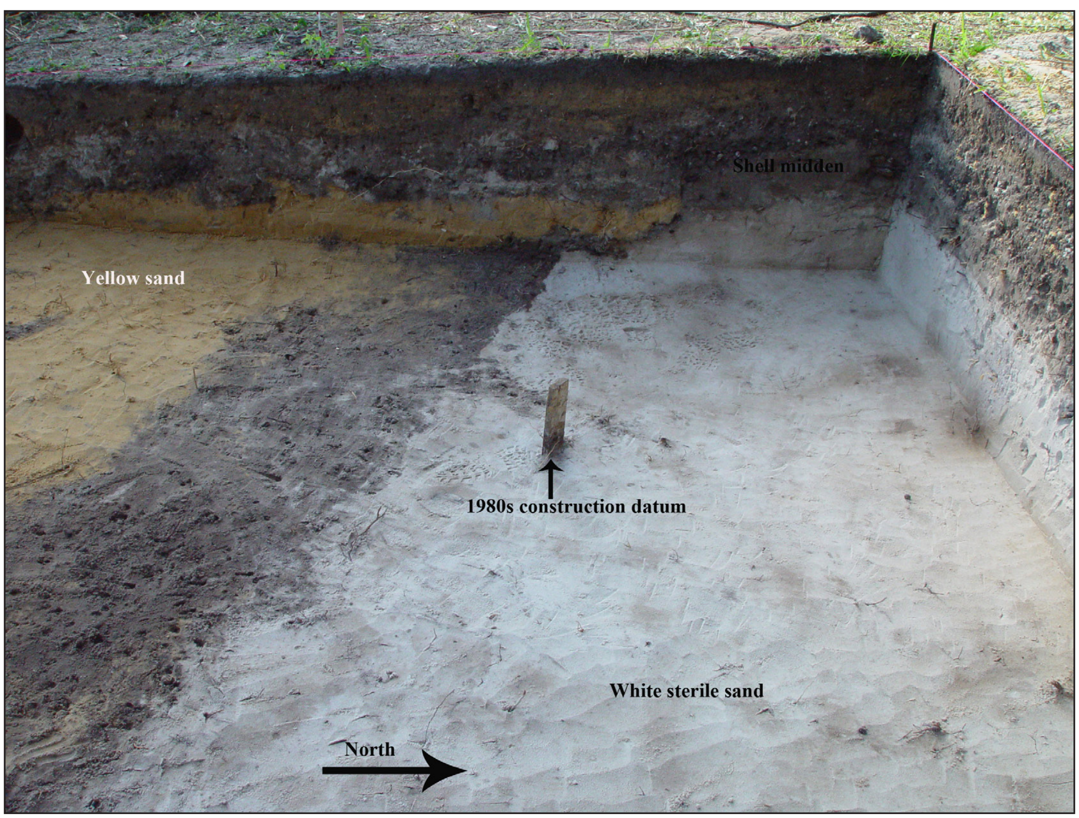

Figure 5.4. The western wall profile of EU 1 showing the location of the construction stake.

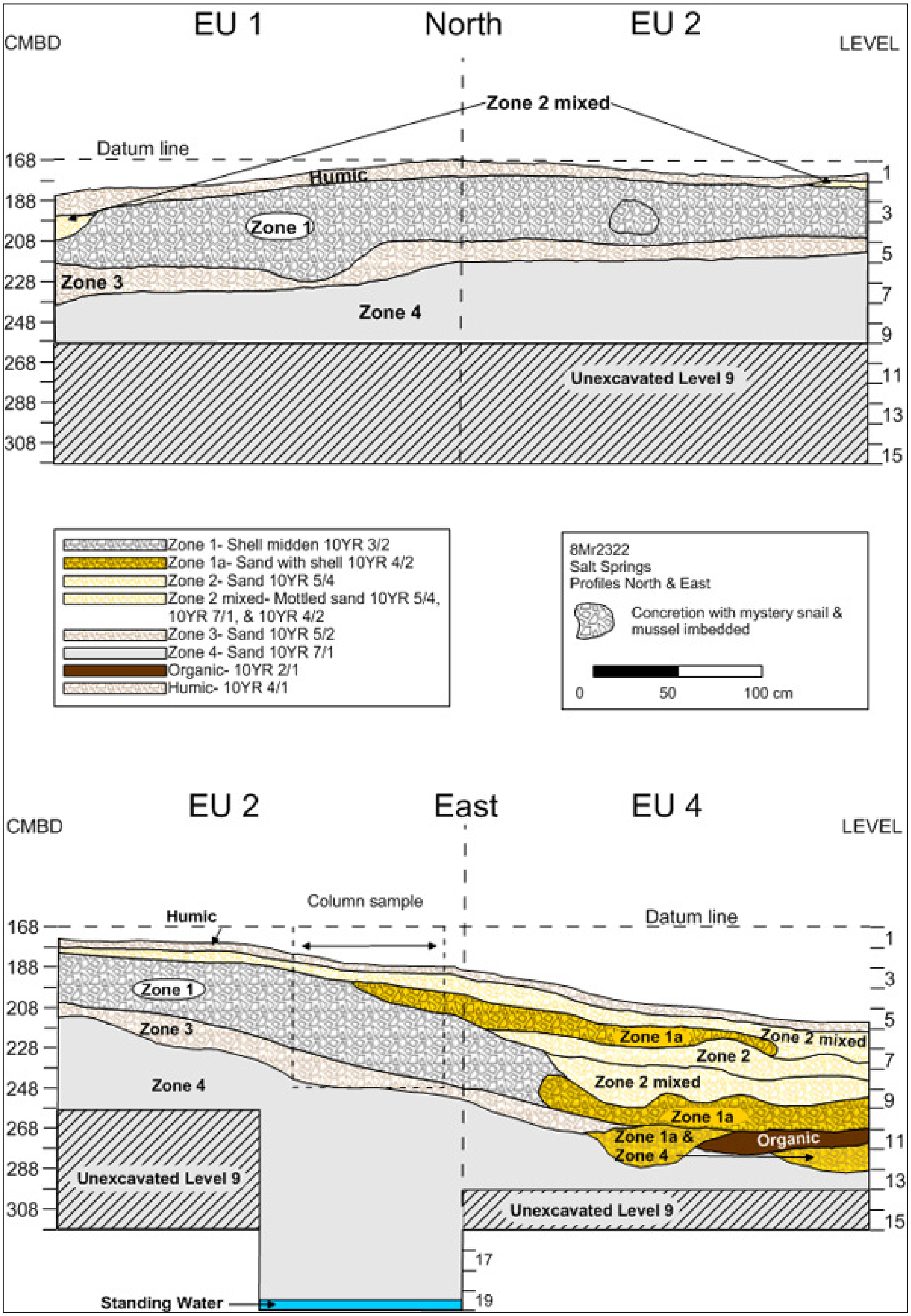

Figure 5.5. Excavation unit profiles of the north and east walls.

Figure 5.6. The 4-by-4-meter excavation unit with a 50-by-50-centimeter unit dug to 348 cmbd in the lower left corner.

Shell midden was encountered immediately below the topsoil in all four units. The shell matrix consisted primarily of banded mysterysnail (*Viviparus georgianus*), with occasional Florida apple snail (*Pomacea paludosa*) and freshwater mussel (*Elliptio* spp.). Within the midden, shell concretions were intermixed with lithics, Native American pottery, modern coins, and other modern materials. When shell midden lies at the water table and dissolved calcium carbonate from the shell above percolates to the table and precipitates around the shell, a hardened mass of shell and calcium carbonate, or a shell concretion, can form. Separating the artifacts or bones encased in the concretion may be difficult or impossible. Randomly distributed pieces of concretions in the shell midden throughout the 4-by-4-meter unit, well above the water table, suggested that the midden had been mined from a site where the environmental conditions were more conducive to the formation of concretions.

Excavations were halted once the white sterile sands were reached. Profile drawings were then completed for each of the four walls. As illustrated in Figures 5.4 and 5.5, the mined shell-midden material was encountered immediately under the humic layer. The shell midden zones were alternately mixed with sand and concreted shell material and contained Herty cup sherds and modern (late twentieth-century) coins, attesting to further disturbance. Yellow sand encountered under the shell midden also turned out to be modern fill brought in during the 1980s construction

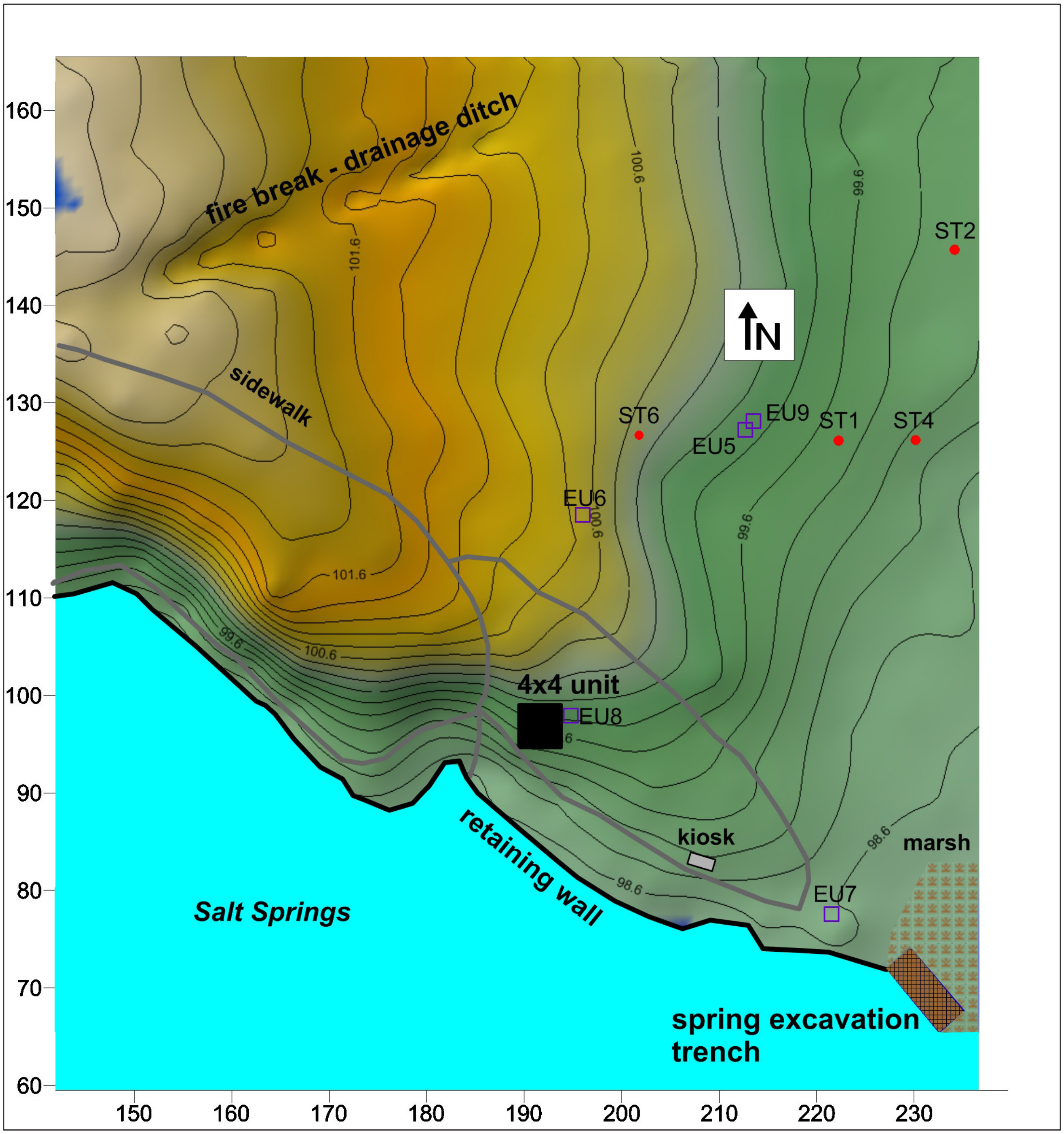

Figure 5.7. Contour map showing locations of excavation units, shovel tests, and the excavation trench.

of the wooden retaining wall. A wooden stake found in white sterile sand (the C horizon) below the shell midden and yellow sand at 238 cmbd indicated the level of construction activity before the yellow sand and shell were deposited as fill. Ultimately, SEAC archaeologists determined that the area of the excavation unit had been heavily disturbed by past construction and recreational activities, even though it contained archaeological resources, such as the shell midden.

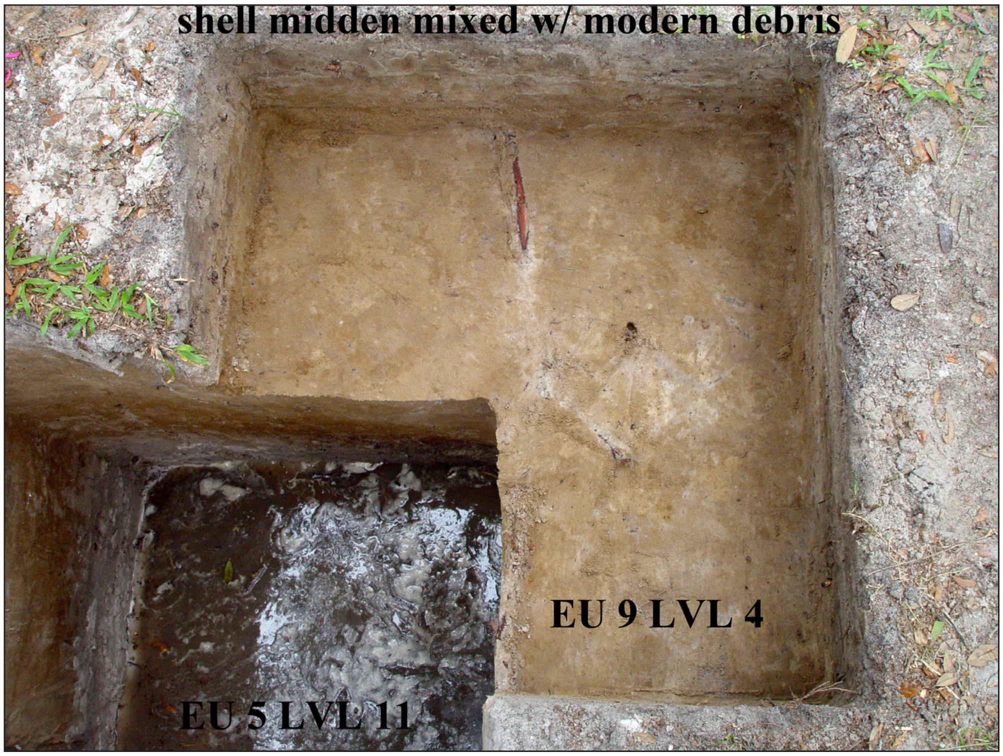

Figure 5.8. EU 5 and EU 9.

Five additional excavation units were opened on the north side of the springs (Figure 5.7) in advance of the staging activities for the construction of the retaining wall. EU 5 was placed to the north of the 4-by-4-meter unit in a largely undisturbed area, as indicated by both SEAC's and SouthArc's shovel-test results. This 1-by-1-meter unit was excavated with the same methodology as the 4-by-4-meter unit. Level 1 proved to be disturbed with modern debris, but the lower levels were undisturbed, yielding St. Johns pottery in Level 3, Orange fiber-tempered pottery in Level 4, and a Newnan point in Level 5. A Kirk Serrated point was also recovered from Level 5. EU 5 was excavated to a depth of 1.3 meters below surface before groundwater was encountered. A stain in the northeast corner of the unit was intriguing, so another unit, EU 9, was opened adjacent to EU 5. Thus the southwest quarter of EU 9 was also the northeast quarter of EU 5 (Figure 5.8).

Located near a posthole in which Orange-series fiber-tempered pottery was recovered, EU 6 was excavated to 1.2 meters below surface. This unit also contained shell midden material intermixed with modern refuse.

EU 7, a 1-by-1-meter unit, was located near the northeastern edge of the spring pool. The soil from this unit was water screened, but then quickly abandoned only 70 centimeters below the surface when groundwater entered the unit. Shell midden concretions were found once again mixed with modern debris.

EU 8 was only a 50-by-50-centimeter unit located along the eastern wall of EU 2. Excavated for the purpose of collecting faunal materials for analysis, EU8 was water screened using one-eighth-inch hardware cloth.

In summary, all of this testing in the APE of the retaining wall and logistical footprint demonstrated that even though the area contained shell midden deposits with faunal remains and Native American pottery, modern coins and garbage were also present in many of the same levels. The entire northern shoreline of the spring pool contained shell deposits that were severely disturbed by earlier construction activities. North of this area, however, undisturbed deposits existed, such as those found in EU 5. SEAC recommended that construction of the new retaining wall commence, but that archaeologists monitor the construction for potential archaeological discoveries.

Spring Excavations 2009

In February 2009, a coffer dam was placed between the springs and the wooden retaining wall on their northeast shore. The water was pumped out from around the wall, and the construction company began removing the wall. In March 2009, SEAC archaeologists returned to Salt Springs to monitor the construction activities. While monitoring the removal of the retaining wall, they identified a shell midden on the landward side of the wall in an area previously submerged and/or too wet to survey. They also identified a newly exposed, but normally inundated organic layer containing artifacts in the footprint beneath the old wall. It was apparent that the shell midden had previously overlain the layer, but had been removed to facilitate placement of the wooden wall in 1982. This anaerobic layer contained unusually well-preserved faunal (bone and shell) and botanical materials (leaves, wood, seeds), the latter of which are not usually present in terrestrial sites. The presence of rare gourd seeds suddenly made the site a very significant resource, and construction was temporarily halted to allow for an emergency investigation.

With the discovery of the rare remains and with limited time and funds to investigate, principal investigator Mike Russo from SEAC called on the Florida archaeological community for help. Archaeologists from state and federal agencies answered, graciously volunteering their services. Faculty and graduate students from Florida State University, the University of Florida, and Pennsylvania State University, volunteers from the Florida Division of Historical Resources and the USFS, along with USFS archaeologists from the other National Forests of Florida (NFF) came to help with the emergency excavations. USFS firefighters, who were in the forest to fight local fires, helped the archaeologists between fires.

To investigate the organic layer, thirty-four 1-by-1-meter units were established in the wall footprint. Ultimately, time constraints and logistical problems permitted the excavation or partial excavation of only twenty-seven units. Using a Leica transit to establish a datum on land,

Figure 5.9. Panoramic view of excavation trench with several open units.

two SJRWMD benchmarks were mapped along with initial unit elevations. These are the same benchmarks used for the 4-by-4-meter unit. Unfortunately, due to time constraints, final elevations were not standardized in the field for the excavation as a whole, but will be when the final report has been completed. In lieu of this eventuality, the northwest corner of each unit became the unit datum; in the case where the northwest corner was at a higher elevation than the rest of the unit, it was recorded as negative. The unit datums were recorded with the transit and related to the SJRWMD benchmarks. All measurements were taken in centimeters by pulling strings with line levels and measuring tapes from the unit datum (Figure 5.14).

Controlled excavations were conducted over three weeks during March and April 2009 (Figure 5.9 and Figure 5.10) in an area usually covered by up to 2 meters of water (Figure 5.12). After the initial overburden of topsoil and shell midden was removed using a backhoe, units and drainage ditches were excavated with shovels and trowels. To facilitate entry into the excavation area, loose lumber from the removed wall was placed to form makeshift stairs. A small sump pump was set on the eastern and lowest end of the excavation area; a ditch was placed on its south side to facilitate drainage to the sump. The sump water was then pumped down to a larger sump at a lower level behind the dam, 160 meters west of the excavation (Figure 4.2). As the units were excavated, the archaeological drainage ditch and sump-pump area were also dug deeper to allow water to continue flowing out of the excavation area. This did not always work smoothly. After one night of heavy rain, the small pump failed, and the units were covered with water when crews returned in the morning. When working properly, the pump ran continuously, including overnight, keeping water levels low, yet not too low to cause botanical remains to dry out and deteriorate before they

Figure 5.10. Jeffrey Shanks and Johanna Talcott excavating column sample 1.

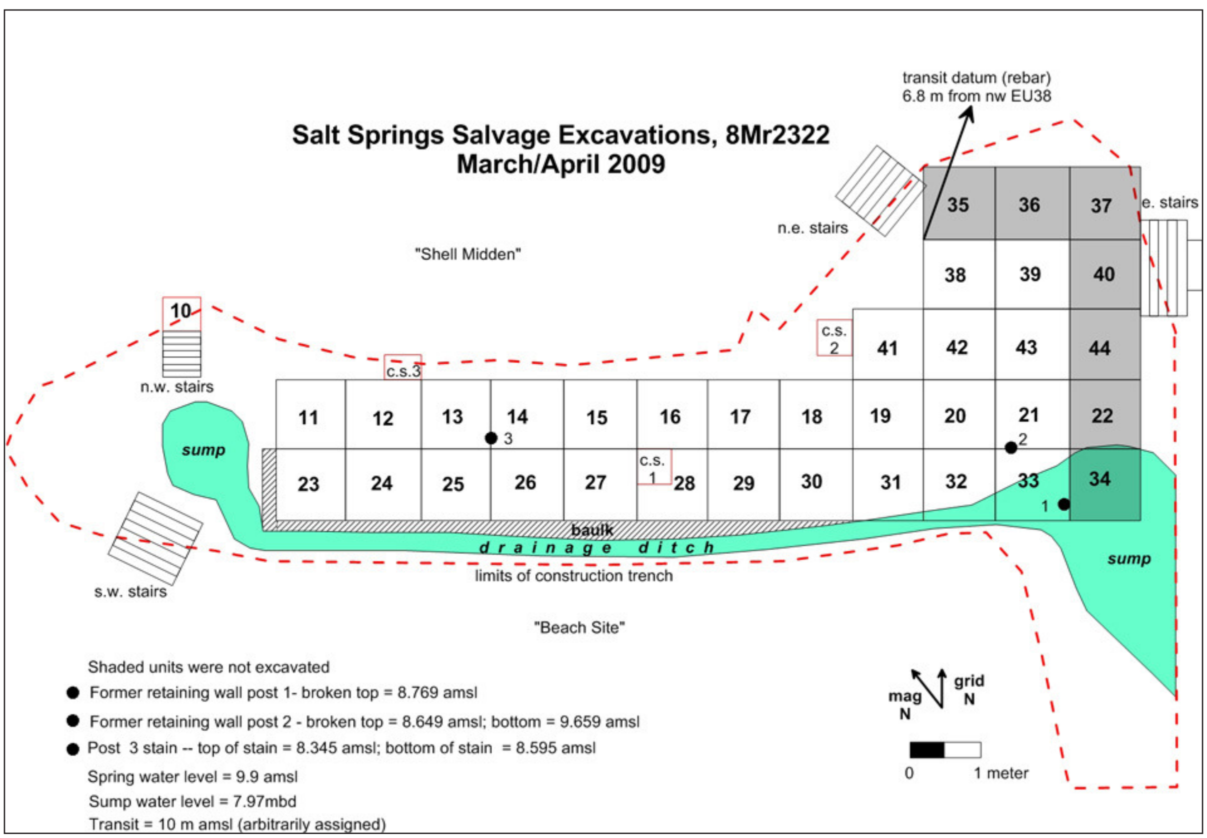

Figure 5.11. Map showing locations of excavation units and column samples.

Figure 5.12. Mike Russo and USFS firefighter in trench before archaeological excavations. USFS project Engineer Daris Matos in foreground, standing on present-day spring bed.

could be excavated (Figure 5.13).

The excavation methodology changed continuously during the project due to ever-changing time constraints, the different abilities of a shifting crew, and other factors. The southern edges of EU 23 through EU 32 were dug slightly lower to facilitate drainage into the sump ditch. Most of the units were excavated in arbitrary 10-centimeter levels to between 50 and 60 cmbd. At this point, the same sterile white sand seen in the earlier excavations was encountered in most units. Excavations were not completed in several units due to time constraints.

Field specimen (FS) numbers were assigned to each level of each unit. Once finished, the level was photographed, and excavation unit level forms were completed. During construction additional artifacts were brought to us by the construction workers and volunteers who found them in spoil. Unearthed from various areas around the springs, the contexts for the artifacts were lost. Thus, they were placed together under FS 160, which included surface finds from around the site and from areas as distant as the south side of the springs where million-year-old whale bones and shark teeth were recovered. All these artifacts were analyzed and included in the review of lithic artifacts from the spring season.

Figure 5.13. Botanical material near faunal material in EU 18, Level 2.

Figure 5.14. Looking east, trench excavation with archaeological drainage ditch on right.

Few of the archaeologists were able to stay for the entire project (Figure 5.14). Depending on their regular jobs, they stayed as long as they could. As archaeologists rotated in, they were assigned an excavation unit and a flagging color. Volunteers and firefighters assigned a corresponding flagging color would water screen the soil/botanical remains through quarter-inch hardware cloth (Figure 5.15). By color coding the units and screens, multiple people could rotate in and out without mixing up the excavated materials.

Figure 5.15. Water screening near Coffer Dam.

The USFS firefighters provided small pumps that were placed in the springs and attached to garden hoses to supply water for screening. Artifacts recovered from the quarter-inch screens were bagged separately from the botanical materials. Although having an inexperienced crew water screen fragile botanical materials in an exposed environment was relatively rough on the materials, it was a necessary compromise in order to recover as much as possible before construction of the wall destroyed the area around the site.

Figure 5.16. Johanna Talcott with buckets of botanical material.

Botanical materials were placed in large resealable plastic bags containing spring water, double bagged, then put into five gallon buckets. Once sealed in the buckets, the botanical materials were ready for short-term curation while awaiting analysis. These buckets were stored in our makeshift wet laboratory (the Salt Springs Recreation Area restrooms, which were closed to the public) (Figure 5.16) until they could be transported to SEAC in Tallahassee. Once at SEAC, all bags of botanicals (except column samples) were sorted again (see chapter six) before being shipped to PSU for analysis.

To recover small and fragile materials, three additional column samples (CS) were placed after the units were established and excavations had begun. The location of CS 1 was chosen when, after several levels were removed from EU 27, the preserved profile of the adjacent EU 28 demonstrated unusually varied strata (Figure 5.10). The northwest quarter of EU 28 served as the column sample which was recovered in natural levels rather than arbitrary 10-centimeter levels (Figure 5.10).

The location of CS 2 was chosen to recover float samples for botanical analysis. Eleven natural levels were recovered, but excavations were not finished before the coffer dam failed near the end of the project and brought excavations to a halt.

CS 3 was located in a baulk next to an area where the Paleoindian Stanfield projectile point was recovered. It was hoped that a more specific stratum (rather than somewhere in the 10-centimeter arbitrary level from where the point came) could be identified where the Archaic organic layer ended and the Paleo ground surface began. The attempt was unsuccessful.

Stratigraphy of Excavation Trench

Excavations ceased when the coffer dam failed and took two days to repair. Once the dam was fixed, the water was once again pumped out of the excavation area, and the north wall was cleaned up for profile drawing (Figure 5.17 and 5.18). From top to bottom, the first stratum depicted is Zone 4, the “disturbed” yellow fill sand that was likely added in the 1980s during the construction of the wooden retaining wall. (The 4-by-4-meter unit excavated in 2008 contained the same introduced soil overlying and between disturbed shell strata [see Figure 5.4].) Zone 5 is loose shell midden of *Viviparus georgianus* mixed with modern material (shell concretions mixed with Herty cup sherds and loose shell) similar to the shell midden found in the 4-by-4-meter unit. Zone 6 is undisturbed shell midden. Radiocarbon dates of 6380±30 cal B.P. make this deposit older than the topographically lower organic zone. Zone 7 consists of loose *Viviparus georgianus* mixed with large grain coarse dark gray sands. This zone was most likely not deposited subaqueously. The relatively poor state of artifact and bone preservation suggests exposure to air and sun and is distinct from the bone found in Zone 8—the dark black, organic zone below Zone 7 on which

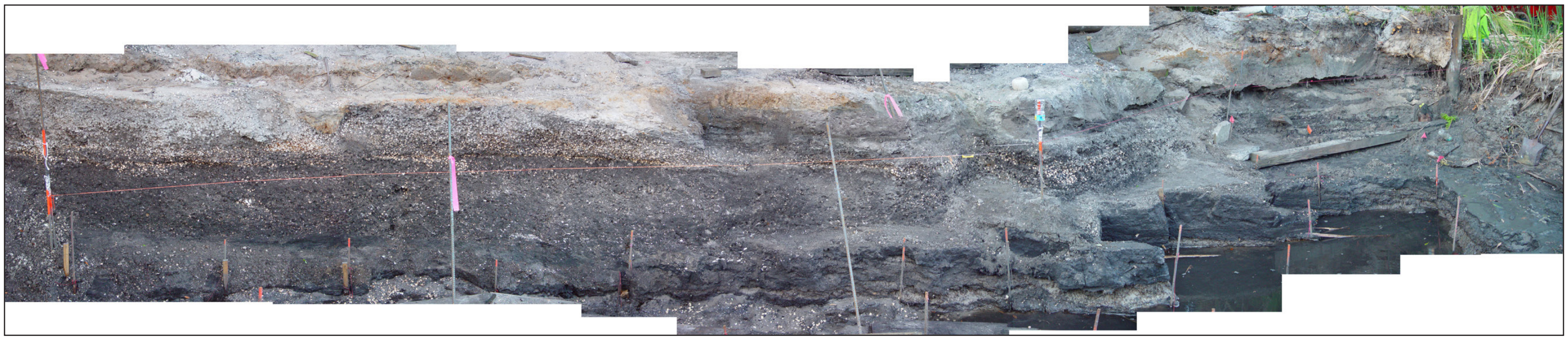

Figure 5.17. Panoramic view of the north wall of the excavation trench.

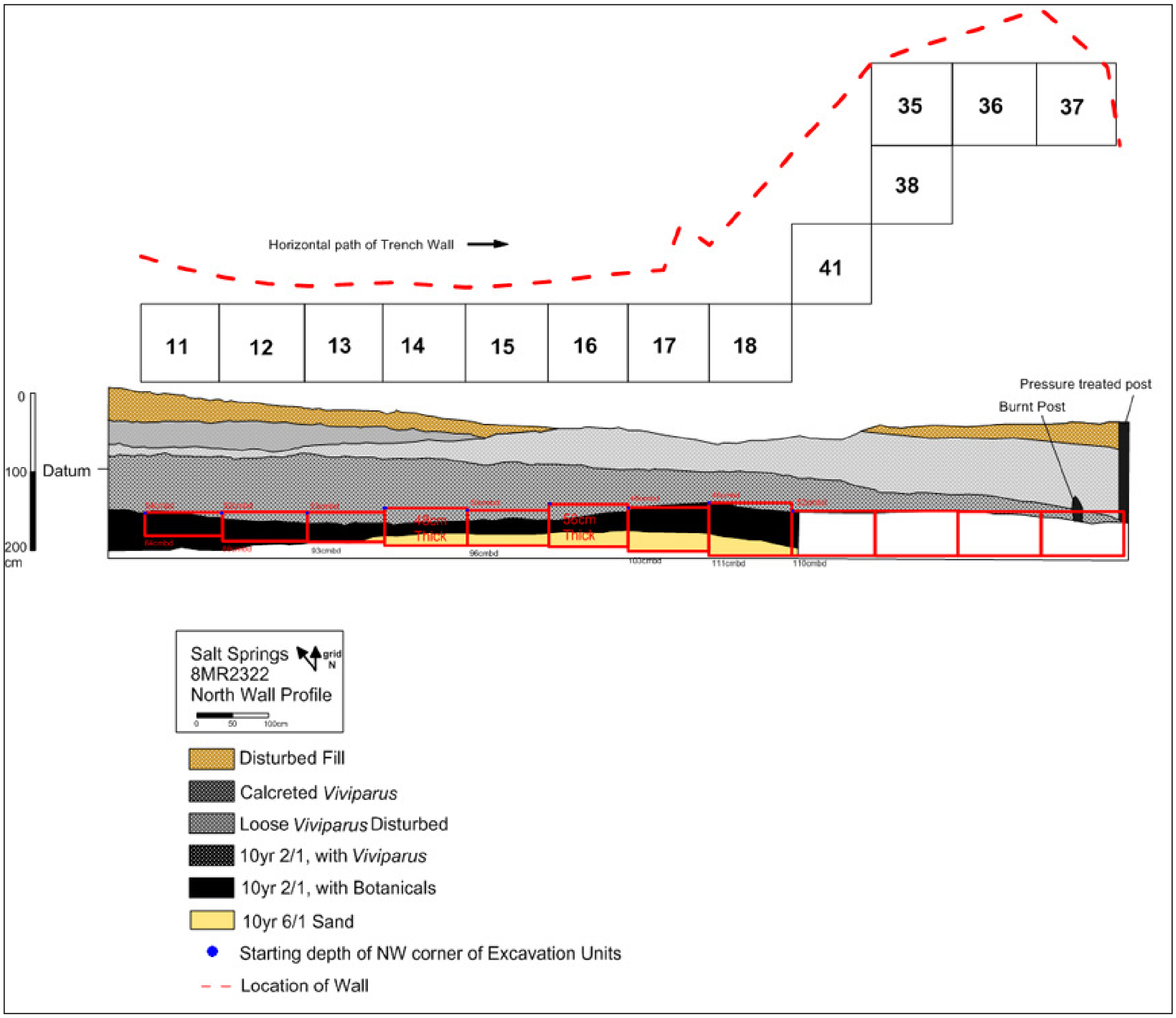

Figure 5.18. Profile drawing of the north wall of the excavation trench.

the excavations were focused. White sterile sand similar to that in the lowest levels of the 4-by-4-meter excavation unit probably represents the C horizon. Artifacts and bone found in the interface between the organic Zone 8 and the white sterile sand showed signs of degradation, suggesting that the surface of the sand was likely exposed to the air rather than submerged under water.

Additional Archaeological Excavations

As the profiles of the excavation walls were being drawn, the construction company was backfilling in preparation for forming and pouring the new concrete retaining wall. The scope of work for the agreement between SEAC and USFS was only for the area affected by construction, which is why SEAC did not undertake any additional excavations. The coffer dam was to remain in place through the summer of 2009. Russo contacted Ken Sassaman of the University of Florida to inform him of this unique opportunity to conduct excavations on the bottom of the springs. Since Sassaman was already scheduled to conduct a summer archaeological field school at nearby Silver Glen Springs and Juniper Springs, he decided to include Salt Springs. He spent a week excavating eight 1-by-1-meter units in a row perpendicular to SEAC's excavation trench. These excavations followed the slope down to the springs and were all topographically lower than any of the SEAC excavations. Sassaman's units have yielded dates that are about 1,000 years older than those from the excavations of the organic layer. Six of Sassaman's dates range from 5710 to 5130± 50 cal B.P. Sassaman and his students are currently working on the analysis and will produce a report at a future date. Also, Sassaman did not encounter the organic zone that was seen during the SEAC excavations, but rather excavated shell midden a meter deep until seeping water prevented further excavations to sterile soil. With these older dates, it will be interesting to see what changes in material use may have occurred over time.

CHAPTER SIX

METHODOLOGY OF LITHIC TOOL ANALYSIS

Laboratory Methods

Upon the completion of field work, most artifacts and botanical remains were brought to SEAC in Tallahassee for processing and analysis. At SEAC, all artifacts were kept wet, and salinity tests were conducted. These demonstrated that the residual salinity in the artifacts was too high for long-term preservation. For bone, the initial readings were over 1,000 parts per million (ppm) of soluble salts, while the lithics were reading 600 ppm. Salinity was a concern, even for the lithics, because salt crystals could possibly expand during the drying process and cause bone and lithics to fracture. As such, analysis was delayed while the artifacts were slowly desalinated over a period of six months.

During the long process of desalination, the artifacts were kept wet in water deionized to less than 10 ppm. The water was replaced on a daily basis to slowly decrease the salinity levels until reaching the desired levels—less than 20 ppm for all artifact types. Once the desired levels were reached, the artifacts were removed from the water, cleaned before being air dried, and rebagged for eventual analysis. Given the high volume of unmodified faunal remains, the project could not afford to desalinate this artifact class of unmodified shell and bone.

Botanical samples were not desalinated but left bagged in the buckets. The bags were opened only for brief periods of time to search for artifacts missed during earlier field screening. The selected artifacts were added to those already in the process of desalination. After sorting, all the botanical samples were shipped to Pennsylvania State University for analysis by Lee Newsom and her students. During botanical analysis, a few additional lithic flakes were recovered and shipped back to SEAC. All botanical materials remain at Pennsylvania State University.

FS numbers designated in the field formed the basis for assigning lot numbers for the various artifact classes identified during analysis. The count, weight, and portions of the lithic class were recorded for all flakes. The length, width, and thickness of projectile points were measured and recorded. All data was entered into Microsoft Excel 2007 spreadsheets (Appendix 1). All lithics were individually examined using *Methods of Provenance Determination of Florida Cherts* (Upchurch et al. 1982) to determine lithic source. The source was recorded in the comments section of the analysis spreadsheets. Lithics from different chert provenances were lotted separately. All of the artifacts from the fall 2008 excavations were also included in the initial analysis, but have been excluded from this study. Typologies were assigned to lithic tool types using Andrefsky's *Lithics: Macroscopic Approaches to Analysis* (2000). The typologies for the projectile points were made using Bullen's *A Guide to the Identification of Florida Projectile Points* (1975), Whatley's *An Overview of Georgia Projectile Points and Selected Cutting Tools* (2002), and Cambron and Hulse's *Handbook of Alabama Archaeology, Part I, Point Types* (1964).

Lithics

The lithics recovered during the spring 2009 excavations represent a unique opportunity to examine the lithic technologies of a Mt. Taylor period at a particular site. By examining not only the lithic tools but also the lithic debitage, a broader picture of the Salt Springs site and the Mt. Taylor period may be drawn. There were 3,363 lithic specimens recovered during the 2009 excavations for a total weight of 4,369.4 grams. Only 119 or 3.5 percent of the lithics are tools, either expedient or formal, with a total weight of 1,407.9 grams. The preferred material is Ocala Group chert, which makes up 82 percent of the lithics; agatized coral comprises just 9 percent; the remaining 9 percent consists of Hawthorne formation and other cherts.

Expedient Tools

Expedient tools are lithic tools that are manufactured quickly and require little skill to produce, utilized flakes for example. Utilized flakes, or flake tools, are flakes on which additional modification has occurred in the form of intentional retouch or chipping of the edge or edges from use (Andrefsky 2000) (Figure 6.1). In most cases at Salt Springs, several chips were removed from one edge during use before the flake was discarded. Figure 6.1 (a) is from EU 16, Level 5, which also had a high density of faunal remains. This utilized flake shows chipping along all edges except where the platform is located. Fifty-five utilized flakes with a total weight of 211.8 grams came from the 2009 excavations. Seven of the utilized flakes were surface collected, forty were recovered from the excavation units, and the remaining eight were from clean-ups. Cortical remnants were present on 17 percent of the utilized flakes.

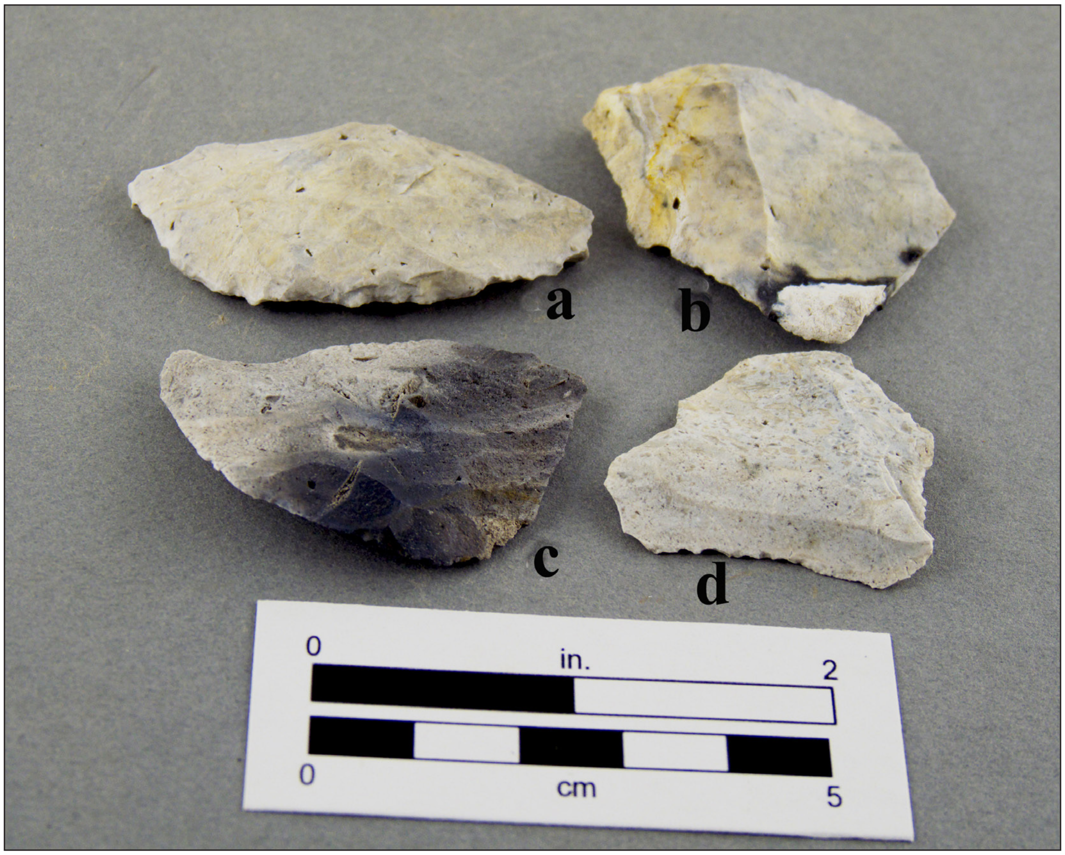

Figure 6.1. Examples of utilized flakes: (a) FS 351.1, (b) FS365.7, (c) FS369.9, (d) FS 369.10.

Formal Tools

Formal tools take additional time and skill to manufacture and, in many cases, are diagnostic because of their stylistic variances (Andrefsky 2000). Adzes, projectile points, and knives are examples of formal tools that are knapped bifacially. Bifaces are lithics in which two faces meet to form a single edge that is characterized by evidence of intentional reduction or utilization (Andrefsky 2000) (Figure 6.2). Of the sixteen bifaces recovered from Salt Springs, five (124.7 grams) were from disturbed contexts. Five were only fragments, possibly from projectile points but too small to be accurately categorized as such. Figure 6.2a is the entire blade from a projectile point or knife. It may come from a Sarasota point, but the type is difficult to determine without the stem. Many of the bifaces appear to be stem fragments that snapped from whole points during use (Figure 6.2, j–o). Ten of the bifaces were thermally altered. The preforms shown in Figure 6.2, c–d, broke during reduction and show no evidence of usage. All but one of the bifaces is made of Ocala Group chert. Blade fragment (Figure 6.2g) is made from Tallahatta quartzite, an imported chert found in the Florida Panhandle. The specimen was heated, causing a pot-lid fracture and the outer layer to change color.

Figure 6.2 Bifaces and projectile point fragments: (a) FS 117.02, (b) FS 322.01, (c) FS 382.02, (d) FS 303.13, (e) FS 253.12, (f) FS 202.08, (g) FS 215.04, (h) FS 363.11, (i) FS 369.11, (j) FS 180.03, (k) FS 214.03, (l) FS 202.07, (m) FS 188.6, (n) FS 231.1, (o) FS 201.9.

Projectile points. Newnan and Marion projectile points are indicative of the Mt. Taylor period. All of these types from Salt Spring are made from Ocala Group chert. Newnan points are thin medium to large stemmed points with flaking that is regular and well made (Bullen 1975:31) (Figure 6.3). Farr (2006:92–95) points out that the finely made (i.e., not thick) Newnan, Hillsborough, and Marion points are unique to Florida. He suggests that Hillsborough points are actually a sub-type of Newnan points, which are characterized by straight tangs and stem base (Farr 2006:94). But others (e.g., Bullen 1975) suggest they can be distinguished: Hillsborough projectile points have downward sloping blades with a pointed stem. The one Hillsborough point (Figure 6.3f) recovered from Salt Springs measures 8.35 centimeters long, 4.14 centimeters wide, and 0.83 centimeters thick, with a stem 1.83 centimeters wide. Found near EU 45, the Hillsborough has shell midden conglomerate still attached to it.

One Newnan point (Figure 6.3d) has cortex present on one side. This point measures 4.50 centimeters long, 4.38 centimeters wide, and 0.68 centimeters thick, with a stem 1.44 centimeters wide. Another Newnan point (Figure 6.3g) is missing one of the tangs. It measures 5.94 centimeters long, 3.57 centimeters wide, and 0.69 centimeters thick, with a stem 1.91 centimeters wide. Another Newnan point (Figure 6.3e) strays from the ideal with its drooping tangs. It is 5.70 centimeters long, 3.66 centimeters wide, 0.57 centimeters thick, and 1.74 centimeters at a fractured stem. This point was recovered from EU 42, Level 5—one level below where a Marion projectile point was found (Figure 6.3a). Marion points can be distinguished from Newnan points by their rounded stem bases and tangs that angle upward. The Marion point mentioned above has a patina that developed after it was broken. It measures 5.28 centimeters long, 3.91 centimeters wide, and 0.94 centimeters thick, with a stem 1.44 centimeters wide. The patina may have been caused by tannic acids leached from the nearby wooden retaining-wall. The two other Marion points (Figure 6.3, b–c) demonstrate the large foraminifera found in the Ocala Group chert. The Figure 6.3c Marion point came from the same provenience (EU 39, Level 3) as a charcoal sample that returned a radiocarbon date of 4910±30 cal B.P. Charcoal recovered from the same unit and level (EU 17, Level 4) as the Figure 6.3b Marion point was radiocarbon dated to 4967±30 cal B.P.

Figure 6.3. Newnan, Marion and Hillsborough projectile points: (a) Marion, FS 378.04, (b) Marion, FS 343.02, (c) Marion, FS 330.01, (d) Newnan, FS 192.01, (e) Newnan, FS 397.07, (f) Hillsborough, FS 135.01, (g) Newnan, FS 166.04.

The only Paleoindian projectile point recovered (EU 13, Level 3) was a Stanfield projectile point base (Figures 4.5 and 6.4). The point is 4.33 centimeters long, 3.93 centimeters wide, 3.20 centimeters across the base, and 0.96 centimeters thick. Basal thinning occurred, and there is no evidence of fluting—a common feature of Paleoindian points. The Stanfield point, considered a Late Paleoindian into Early Archaic transitional style, demonstrates the transition from fluted to stemmed projectile points.

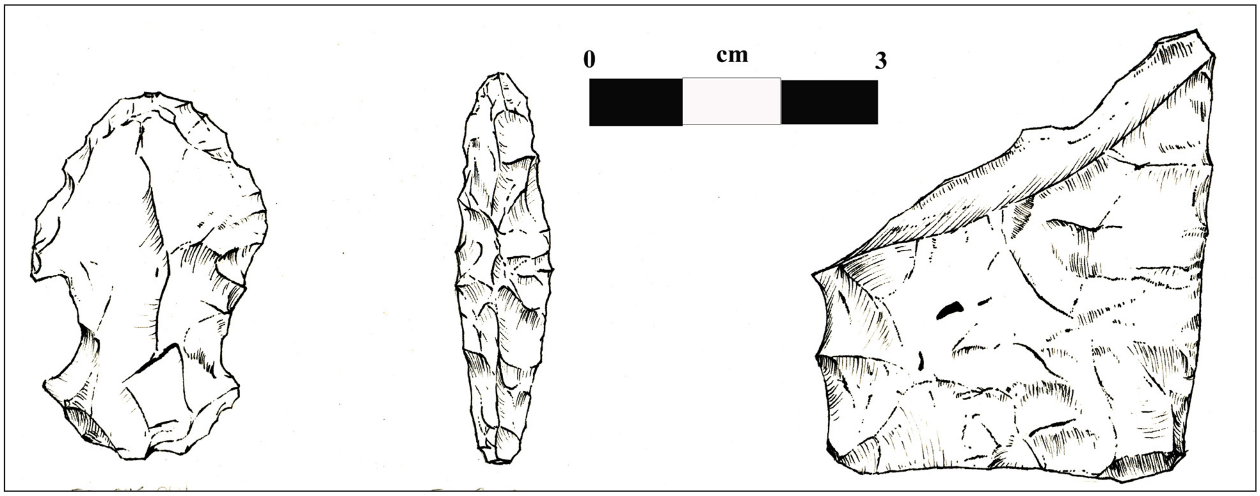

Figure 6.4. Line drawings of the unifacial end scraper FS 246.01, awl FS 327.02, and Stanfield projectile base FS 247.01 (illustrated by Brian Worthington at two times magnification).

Additional projectile points (Figure 6.5) recovered during the 2009 excavations included Clay, Hernando, and Putnam points, as well as an untyped Middle Archaic point. Clay projectile points date to the preceramic Late Archaic period (ca. 5000–3000 B.P.) (Bullen 1975:27). Two Clay projectile points were made from Ocala Group chert (Figure 6.5, a and c). The a point was fractured due to inclusions in the chert material. It measures 5.35 centimeters long, 4.35 centimeters wide, 0.85 centimeters thick, and 2.06 centimeters in stem width. It was recovered from EU 38, Level 2, along with a scraper, several flakes, and modified bone. Apparently, after reaching the final stage of production, the flintknapper encountered inclusions but tried to save the point until it finally fractured. The c point was utilized, then retouched. But, during retouching, a large flake was removed that altered the profile creating a humpback effect.

Putnams are also preceramic Late Archaic points. Figure 6.5b shows a small Putnam, measuring 6.09 centimeters long, 2.80 centimeters wide, 0.90 centimeters thick, and 1.20 centimeters in stem width. Roughly made from Ocala Group chert, this Putnam point was thermally altered and shows evidence of retouch. It was recovered from EU 19, Level 6. Charcoal from this same provenience was radiocarbon dated to 5415±30 cal B.P.

Found throughout Florida and Georgia, Hernando projectile points are well-made, small to medium points that demonstrate a regular flaking pattern (Whatley 2002:51). They feature a triangular blade and basal notches (Bullen 1975:24). The basal notches, however, are weakly represented on the Salt Springs example (Figure 6.5d), which was recovered from a spoil pile. Made from Ocala Group chert, this point was thermally altered and is missing part of the stem. It measures 4.19 centimeters long, 3.03 centimeters wide, 0.8 centimeters thick, and 1.03 centimeters in stem width. Bullen (1975) dated Hernando points to between 500 B.C. and A.D. 200, which makes the Hernando point the youngest point recovered during excavations.

An untyped Middle Archaic projectile point (Figure 6.5e) was retouched several times before a large flake was removed and the point discarded. One of the tangs droops down while the other is angled upward. The stem is very narrow and may have come to a point, but is now broken. Made from Ocala Group chert, this point was thermally altered before being retouched. It measures 4.24 centimeters long, 3.52 centimeters wide, 0.70 centimeters thick, and 0.98 centimeters in stem width.

Figure 6.5. Examples of projectile points: (a) Clay, FS 293.01; (b) Putnam, FS 358.06; (c) Clay, FS 411.03; (d) Hernando, FS 160.33; (e) Middle Archaic, FS 339.01.

Flake tools. Andrefsky (2000:xxvi) defined a scraper as "a flake tool that has a retouched angle of approximately 60 to 90 degrees." Eleven scrapers (Figures 6.6 and 6.7), weighing a total of 83.1 grams, were recovered from the 2009 excavations. The scraper illustrated in Figure 6.6a came from EU 17, Level 6. Made of agatized coral, it was overheated to the point of producing crazing fractures.

A large humpback scraper (Figure 6.6 c) was recovered from EU 14, Zone 7, during the "clean up" troweling conducted before profiling the northern wall. Purdy (1980) referred to the unifacial humpback scrapers as "planes" that were used for woodworking. Scraper c may have also functioned as a core, as evidenced by the removal of several large flakes. Humpback scrapers have been found at other Mt. Taylor sites, such as the Senator Edwards site (8MR122) (Purdy 1980). Abshire (1935) noted that several "turtlebacked" scrapers, likely synonymous with "humpback," were collected from the nearby Salt Springs Run site (8MR2).

Of the two endscrapers illustrated in Figure 6.6, d is a unifacial hafted endscraper from EU 14, Level 3. A piece of wood recovered from the same provenience was radiocarbon dated to 8410±30 cal B.P. (Table 6.1). Thus the endscraper predates the Mt. Taylor period. In line with the date, it has a similar hafting form found in Late Paleoindian/Early Archaic Bolen projectile points. A Paleoindian Stanfield projectile point was found in the same strata (level) in an adjacent unit. The Figure 6.6d endscraper is unifacial and polished where it was hafted. The other endscraper (Figure 6.6e) is made from Hawthorne Formation breccia and was recovered from EU 16, Level 4. Also found in this same level was a bone pin and several debitage flakes.

Eight other nondescript scrapers were made from Ocala Group chert; two (a and b) are shown in Figure 6.6.

Figure 6.6. Scrapers: (a) FS 365.9; (b) FS 229.1; (c) FS 221.1, a humpback scraper; (d) FS 246.01, a hafted endscraper; and, (e) FS 249.01, an endscraper.

Microscrapers are defined as having chipping along two or more edges and measuring 3 centimeters or less in size. The five microscrapers or needles recovered (Figure 6.7) were unifacial. One scraper (Figure 6.7g) was discovered during the botanical analysis. Because of its small size, it had been overlooked in the field. Two complete microscrapers (Figure 6.7, g and i) retain bulbs of percussion and platforms; step fractures along the lateral edges was evidence of usage. The use pattern is suggestive of scraping and possibly graving activities. In the Archaeological Consultants Inc. report (2001), it was suggested that the needles recovered from Lake Monroe Outlet Midden were in fact the distal ends of Jaketown perforators. This may true of the Figure 6.6 examples f, h, and j. Scraper j is fractured into two pieces; the smaller piece was found in EU 43, Level 6, and the larger in adjacent unit EU 39, Level 3. (These may actually be the same level/stratum, but each unit's datums have not yet been rectified by the project director.)

Figure 6.7. Microscrapers: (f) FS 293.12; (g) FS 228.07, (h) FS 273.14; (i) FS 292.08; (j) FS 398.06 (top) and 354.08 (bottom).

Awl or perforators are pointed on the distal end, which is used to pierce various materials. Four awl/perforators with a total weight of 15 grams were recovered. The awl illustrated in Figure 6.8a is from EU 19, Level 1. Made from agatized coral, it is roughly flaked and has been thermally altered. The largest awl, Figure 6.8b, weighs 7.3 grams and is also roughly flaked. It was recovered from EU 42, Level 3. A double-ended perforator made of Ocala Group chert (Figure 6.8c) was recovered from EU 26, Level 4. Flakes were removed in a collateral pattern in forming a longitudinal ridgeline. This compares with two double-ended perforators recovered from the Lake Monroe Outlet Midden (Archaeological Consultants Inc. 2001:5-27). But these were roughly made and lacked the degree of refinement seen on perforator c.

Figure 6.8. Examples of awls/perforators from Salt Springs: (a) FS 183.1, (b) FS 349.11, (c) FS 327.02.

Of the three cores and one adz recovered during the 2009 excavations, all but one core were from spoil-pile collections. The original locations of the spoil-pile cores and adz are unknown. Each core has several large flakes removed from all faces. The two spoil-pile cores (Figure 6.9) had small amounts of crushing from use as hammerstones. Excavated from EU 20, Level 4, the third core was thermally altered.

The adz (Figure 6.10) is made of Ocala Group chert darkened by tannic staining. An archetypal example of a chipped stone adz, it is well formed and preserved. Flakes had been removed in a controlled fashion, creating a ridgeline down the middle of the adz, which shows signs of polish on its use end.

Figure 6.9. Cores, FS 160.66.

Figure 6.10. Adz, FS 160.60.

Antler Tools for Lithic Tool Production

To manufacture chipped stone tools, other stones, called hammerstones, may be used as the percussive tools for knapping. Purdy (1980) noted that the Senator Edwards site (8MR122) had very few hammerstones and suggested that the percussion hammers used to manufacture lithic tools were in fact bone hammers (Purdy 1980:108). Many of the antler fragments recovered from the Salt Springs excavations are quite large compared to the antlers of modern deer in Florida. Several large antler fragments from the excavations show evidence of use as billets (Figure 6.11), and the ends of antlers shed from the deer show signs of battering (Byrd 2011). Given the low occurrence of hammerstones at Mt. Taylor sites, it is probable that antlers or some other dense bone were preferred for use as billets.

It has been suggested that socketed deer tines were used for making lithic tools that required pressure flaking (e.g., Wheeler and McGee 1994a:358). To accomplish this task, antler tines were removed and hollowed out to accommodate a stick that was hafted to the tine. A number of such

Figure 6.11. Antler billets: (a) FS 369.15, (b) FS 349.13.

socketed deer tines (Figure 6.12) were recovered from Salt Springs. The tines from the antlers shown in Figure 6.11 were cut and removed before possible or intended use of the antlers as billets (Byrd 2011:92). The tine shown in Figure 6.12 was drilled out, and the drilled grooves are still present (Figure 6.12, right).

Figure 6.12. Socketed antler tine (FS 181.03) with carved grooves, exterior and interior.

Summary

The lithic tools recovered during the trench excavations are consistent with lithics recovered from other Mt. Taylor sites, such as Groves' Orange Midden and Lake Monroe Outlet Midden (Archaeological Consultants Inc. 2001; Purdy 1994b). Considered to be a development of the Middle to Late Archaic period (Ste. Claire 1987), thermal alteration at Salt Springs (45 percent of all tools recovered) does not occur in as high a percentage as at the Lake Monroe Outlet Midden (88.1 percent) (Archaeological Consultants Inc. 2001:5-9). This finding may be due to the higher use of agatized coral at Lake Monroe, which needs to be thermally altered to increase its workability. The projectile points recovered from the organic levels at Salt Springs fall within the Florida Archaic stemmed-point tradition and are consistent with projectile points from other Mt. Taylor sites. The radiocarbon assay dates from materials recovered along with the projectile points provide dates from the Mt. Taylor period for Salt Springs.

Table 6.1. Lithic Tools with Associated Dates.

FS.Lot	Provenience	Depth (cm)	Name/ Type	Count	Weight (g)	Part	Date/ Period
135.001	Surface near EU 45	Surf	PP/K, Hillsborough	1	31.7		Mid Archaic
166.004	Drainage Trench	S. wall, Zone 8	PP/K, Newnan	1	14.5		Mid Archaic
177.002	EU 18, LV 2	10-20 bd	PP/K, Sarasota	1	4.7	Blade	Late Archaic
180.003	EU 42, LV 2	10-20 bd	PP/K	1	1.4	Stem	4502; 4916 cal B.P.
192.001	EU 15, LV 2	0-10 bd	PP/K, Newnan	1	11.6		Mid Archaic
221.001	EU 14, Trench wall fall	Zone 7	Scraper, Humpback	1	54.9		Mid Archaic
246.001	EU 14, LV 3	20-30 bd	End Scraper, Hafted	1	5.5		8449-8374 cal B.P.
247.001	EU 13, LV 3	20-30 bd	PP/K, Stanfield	1	15.7	Base	Transitional Paleo
293.001	EU 38, LV 2	15-21 bd	PP/K, Clay	1	18.1	Base	Late Archaic
330.001	EU 30, LV 3	20-33 bd	PP/K, Marion	1	18.9		4973-4846 cal B.P.
339.001	EU 30, LV 5	40-50 bd	PP/K, Middle Archaic	1	5.9		Mid Archaic
343.002	EU 17, LV 4	20-35 bd	PP/K, Marion	1	19.4	Base	5063-4871 cal B.P.
358.006	EU 19, LV 6	30-40 cmbd	PP/K, Putnam	1	10.6		5450-5381 cal B.P.
378.004	EU 42, LV 4	30-40 bd	PP/K, Marion	1	19.4		Mid Archaic
397.007	EU 42, LV 5	40-50 bd	PP/K, Newnan	1	12.1		Mid Archaic

CHAPTER SEVEN

AGGREGATE ANALYSIS AND INDIVIDUAL FLAKE ANALYSIS: APPLICATION AT SALT SPRINGS

Bradbury and Carr's (2004) innovative approach in flake analysis combined Ahler's (1989) mass analysis, Magne's (1989) dorsal and platform scar count and Sullivan and Rozen's (1985) attribute analysis. By using these three approaches, Bradbury and Carr were able to overcome the shortfalls of each when used separately. Their new aggregate trend analysis allowed for a quicker study of debitage collections and decreased inter-observer error, while providing a method to account for characteristics of individual flakes.

Methodology of Present Study

Individual Flake Analysis

I used the presence of thermal alteration and cortex to analyze the individual flakes from Salt Springs. My analysis of thermal alteration required simply determining the absence or presence of heat treatment. To analyze the cortex, I used the triple cortex method whereby primary flakes have over 50 percent cortex present on the dorsal side; secondary flakes, less than 50 percent; and tertiary flakes, no cortex. Debris consisted of flakes whose ventral and dorsal sides could not be determined.

Aggregate Analysis

Bradbury and Carr (2004) conducted forty-three flintknapping experiments. Lithic flakes were sifted through a series of standard geological screens measuring one-quarter to one inch. They chose not to use the one-eighth-inch screen since most archaeological projects do not use mesh smaller than one-quarter inch to recover lithics. They recorded individual flake weights and the screen size used to recover the flakes. Each flake was examined using Sullivan and Rozen's attribute analysis, which measures the relative completeness of flakes: complete, platform-remnant bearing (PRB), fragment, or blocky debris. If the flake was either complete or PRB, then the platform was viewed to determine the number of scars. Magne's technique was adjusted by only recording if there were 0, 1, or 2 or more platform scars. These data were entered into an ANOVA statistical program to determine the relative use (percentages) for each of the reduction techniques in the assemblage. This provided a baseline of reduction trends to compare among inter- and intrasite archaeological collections. The various reduction methods from which flake and debris measures were obtained included: hard-hammer core; bipolar core; hard- and soft-hammer biface edge (biface edging is the shaping of the preform); soft-hammer biface thinning; soft-hammer and pressure-flaked final biface; and hard-hammer uniface.

In Bradbury and Carr's (2004:73) study, debris occurred in less than 2 percent of tool production, but 13 and 17 percent during core and bipolar reduction, respectively. That is, tool production results in less blocky debris than core and bipolar reduction. Mixing total flake and debris assemblages from five of the experimental reduction assemblages, Bradbury and Carr (2004:77–79) ran an experiment to see if they could still discern tool production from reduction activities. They concluded, in part, that low percentages of debris still showed a consistent trend to be associated with higher amounts of biface reduction, that is, tool production activities.

Lithic Analysis at Salt Springs

Bradbury and Carr (2004:66) stated that by employing a variety of attributes and analytical methods, the accuracy of information gathered concerning lithic manufacturing activities will be insured. My intent for the Salt Springs study was to reduce the deficiencies of each of the individual techniques to overcome any inter-observer error. That is, the methods I employed should produce similar results in the hands of another analyst investigating the same assemblage.

For the entire Salt Springs 2009 project 3,155 flakes weighing 2,055 grams were recovered, but many of these came from disturbed contexts outside the excavation units. I analyzed 1,218 flakes (total weight 758.8 grams) from controlled contexts at Salt Springs. For individual flakes, I identified each as either primary, secondary, tertiary, or debris using the triple cortex method. I recorded evidence of flake utilization and thermal alteration.

Each lot of artifacts was then hand manipulated and sifted through a series of nested screens—one-eighth inch, one-quarter inch, one-half inch, three-quarter inch, and one inch (Figures 7.1 and 7.2). The one-eighth-inch screen was included in this study because many small flakes were recovered from the botanical collections. The data of each flake were recorded for screen size, weight (grams to the nearest 0.1), completeness, platform facet count (0, 1, 2, or more), and lithic chert material type. Platform facet count was determined using a hand lens at 10X magnification. Platform facets occur on the top of the platform and ventral side of the flake, while platform preparation scars occur on the dorsal side and dorsal platform edge. Each flake must be oriented correctly to identify the correct number of platform facets, which are not to be confused with platform preparation scars. Platform facet count became difficult as the size of the flake decreased. Based on Bradbury and Carr (2004), the facet count should increase as the flake size decreases.

Figure 7.1. Nested U.S. standard geological sieve screens.

Figure 7.2. Flakes in the three-quarter-inch screens.

The flake data were entered into a Microsoft Excel spreadsheet to generate the percentages and averages summarized in Tables 7.1, 7.2, and 7.3. The percentage of blocky debris present in the Salt Springs assemblage was 5.17 percent—somewhat less than that found for core reduction in Bradbury and Carr's study, where the averages were 13.9 percent for blocky debris; 1.4 percent for biface edging; 0.2 percent for biface thinning; and 0 percent for final biface and uniface. The occurrence of 5.17 percent of blocky debris from the Salt Springs collection suggests that core reduction or bipolar reduction were not the primary activities at the site. The result, however, is higher than that found with other lithic reduction techniques. Because the flakes from the two studies were from two different types of chert—Ocala chert fractures more readily than Fort Payne chert—the Salt Springs results are ambiguous. However, other data support tool production rather than core reduction at this site.

The analysis of facet count supports my conclusion that the debris data indicates that neither core nor bipolar reduction were primary lithic activities at the site. For the Bradbury and Carr (2004) study, a facet count of two or more produced 1 percent or less of the total lithic assemblage for core and bipolar reduction. A much higher total assemblage percentage of 25.53 percent (Table 7.1) from Salt Springs suggests that neither of these activities frequently occurred. The highest percentage of flake size with two or more facets was from the one-quarter-inch (60.13 percent) and one-eighth-inch (22.83 percent) groups. This is consistent with Bradbury and Carr's (2004) finding: increased facet count occurred with decreases in flake size. One exception was a single large utilized flake from the 1-inch screen that had two or more facets—a finding not anticipated by this approach.

Table 7.1. Flakes with two or more facets (representing 25.53 percent of the total assemblage of 1,218 flakes).

Screen Size	N=	Percentages
1-inch	1	0.32
¾-inch	12	3.86
½-inch	40	12.86
¼-inch	187	60.13
⅛-inch	71	22.83
Total	**311**	**100.00**

Average flake weights also support the idea of tool production as opposed to core reduction at Salt Springs. Bradbury and Carr's (2004) study showed an average weight of one-quarter-inch flakes to be between 0.35 and 0.37 grams for tool production, which is half that of core reduction.

The average weight for the same size flakes from the Salt Springs assemblage was 0.34 grams (Table 7.2). The average weight of all the flakes from the assemblage equaled 0.62 grams, which is still below the average weight of 0.94 grams from Bradbury and Carr's core reduction experiment.

Table 7.2. Average weight of flakes by screen size.

Screen Size	N=	Weight in Grams	Average Weight in Grams
1-inch	6	72.1	12.02
¾-inch	26	127.6	4.91
½-inch	151	276.8	1.83
¼-inch	734	249.4	0.34
⅛-inch	301	32.9	0.11
Total Assemblage	**1,218**	**758.8**	**0.62**

As found in the Bradbury and Carr experiment, the percentage of flakes from the one-quarter-inch and one-eighth-inch screens also supports tool production activities. The percentages from these two screen sizes were combined (84.98 percent) so that the Salt Springs results could be compared to the Bradbury and Carr results, which did not include one-eighth-inch flakes. Results of the one-quarter-inch flakes from the Bradbury and Carr study were: 60.1 percent, core reduction; 100 percent, pressure flaking; 83.2 percent, biface edge reduction; and 84.6 percent, bipolar reduction. However, since the difference between bipolar and biface edging was not significant in the Salt Springs lithics assemblage, interpretation of bipolar reduction continues to be problematic.

Table 7.3. Percentage of flakes for each screen size.

Screen Size	N=	Percentages
1 inch	6	0.49
¾ inch	26	2.13
½ inch	151	12.40
¼ inch	734	60.26
⅛ inch	301	24.72
Total Flakes	**1,218**	**100.00**
Combined ¼ and ⅛ inch	**1,035**	**84.98**

The triple-cortex-method results for Salt Springs showed a higher percentage of secondary flakes than tertiary flakes. Primary flakes comprised of only 0.08 percent of the Salt Springs assemblage. With the low percentage of primary flakes and the high percentage of secondary flakes it appears that Salt Springs was a secondary reduction site. This finding suggests that the chert was extracted from another location and the exterior cortex removed before being transported to Salt Springs, where the reduction process continued.

Table 7.4. Triple cortex results.

Flake Type	N=	Weight in Grams	Percentage of Count
Primary	102	183.8	8.4
Secondary	602	503.0	49.4
Tertiary	451	100.6	37.0
Debris	63	45.8	5.2
Total	**1,218**	**833.2**	**100.0**

Results

As suggested by Bradbury and Carr (2004), by combining different debitage analytical techniques, the Salt Springs assemblage can be better understood as a complete assemblage. Using the aggregate trend analysis developed by Bradbury and Carr (2004), 1,218 flakes were examined from the Salt Spring 2009 excavations. The high occurrence of flakes one-quarter inch or smaller (84.98 percent), along with the percentage of incidence of two or more platform facets (25.53 percent) suggests that Salt Springs was a tool production site during the Mt. Taylor period. These percentages are well within the range of Bradbury and Carr's results from their tool production experiments. The percentage of debris (5.17 percent) is somewhat higher than that obtained by Bradbury and Carr for tool production, but it is still lower than the results for core or bipolar reduction. This higher occurrence may be related to the nature of the Ocala Group chert, which usually contains many foraminifera and fractures more easily in an irregular fashion compared to the Fort Payne chert used by Bradbury and Carr. The low percentage of primary flakes (8.4 percent) from the triple cortex method also suggests that Salt Springs was not a primary reduction site.

Although not directly related to the question of tool production versus core reduction, I learned that over 691 flakes (57 percent of total flakes) from the Salt Springs assemblage (Table 7.5) exhibited thermal alteration. Thermal alteration occurs after the initial stage of reduction is completed and the cortex is no longer present to absorb the heat.

Only seven flakes (0.06 percent) were made from agatized coral. At the Lake Monroe Outlet Midden, agatized coral represented 58.9 percent of the assemblage (Archaeological Consultants Inc. 2001:5-9). This difference in preferred lithic material may be a function of site locations. Ocala Group chert is available in Marion County where Salt Springs is located, even though there are no known quarry sites nearby. Most of the lithic material at Salt Springs is made from Ocala

Group chert (91.7 percent) (Table 7.5) and can be readily acquired further north along the St. Johns River. Only 7.5 percent is Hawthorne Formation, and the remaining 0.2 percent is made up of various other cherts and quartz.

Table 7.5. Chert type preferences.

Chert Types	N=	Percentage
Ocala Group	1,117	91.7
Agatized coral	7	0.6
Hawthorne Formation	91	7.5
Quartz and nonlocal cherts	3	0.2
Total	**1,218**	**100.0**

CHAPTER EIGHT

CONCLUSIONS AND RECOMMENDATIONS

Review

The spring 2009 excavations at the Salt Springs site (8MR2322) were located on the spring bed and conducted behind a coffer dam. This permitted examination of an archaeological assemblage with a well-preserved Mt. Taylor–period component. A rich organic zone under a zone of undisturbed shell midden was preserved by the anaerobic environment of the spring bottom. This organic zone provides a unique opportunity to view an archaeological assemblage that contains not only both modified and unmodified lithic materials, but also a wide array of faunal and botanical materials, the preservation of which was, in part, due to their submergence in anaerobic spring water. Such conditions were present at only a few other archaeological sites in central Florida. Radiocarbon dates from 5450 to 4407±30 cal B.P. and diagnostic projectile points place the excavated materials from the anaerobic organic layer in the Mt. Taylor period.

I focused the present study on the lithic assemblage recovered from the 2009 Salt Springs excavations on the spring bottom. Based on my analysis, I suggest that during the Mt. Taylor period, Salt Springs was used as a short-term site for hunting and butchering, as well as a point to launch canoes or as a landing. The lithic evidence does not support long-term, multi-seasonal occupation.

The Mt. Taylor period is a regional cultural expression of the Middle to Late Archaic period occurring along the St. Johns River and its tributaries. Mt. Taylor cultures did not make pottery, and their sites are well known for large shell middens consisting of banded mysterysnail (*Viviparus georgianus*), Florida apple snail (*Pomacea paludosa*), and bivalves (*Elliptio* spp.) (Goggin 1998:41). The Mt. Taylor sites are also recognized by their Florida Archaic stemmed point tradition, which includes Newnan, Marion, Hillsborough and Putnam points. These medium to large points demonstrate the technological transition from the large fluted unstemmed points of the Paleoindian period. Excavations of other inundated sites, such as Groves' Orange Midden (8VO2601) and the Lake Monroe Outlet Midden (8VO53), have uncovered other well-preserved material that adds to our understanding of the Mt. Taylor material culture. This material includes decorated bone tools with recurrent geometric patterns, shell and bone beads, and lithic tools.

In addition to formal lithic tools, a substantial quantity of lithic debitage was recovered during the Salt Springs excavations. By combining different analytical techniques, such as aggregate and individual flake analysis methods to examine the lithic debitage, a more detailed view of the lithic activities can be discerned than that provided by analysis of the formal tools alone. The Salt Springs lithic assemblage was examined using Bradbury and Carr's (2004) aggregate trend method, which employs Ahler's aggregate analysis and Magne's platform facet count, thus reducing the potential deficiencies of using one or another of the separate methodologies.

For this study, 1,218 lithic flakes and debris (or shatter) were analyzed. The high occurrence of one-quarter inch or smaller flakes (84.98 percent), along with the high percentage of two or more platform facets (25.53 percent), suggests that during the Mt. Taylor period, Salt Springs was a tool production site and not a core reduction site. The low density of cores and the relatively few cortical primary flakes recovered supports this conclusion. That is, although flakes from all stages of reduction are present at the site, only 8.4 percent were primary flakes. Combined with the percentages of debris (5.2 percent), secondary flakes (49.4 percent), and tertiary flakes (37 percent), these data suggest that core reduction was not the main activity. The higher percentages of secondary and tertiary flakes suggest that tools were being completed or sharpened at the site.

Similar lithic analysis techniques were used on materials from the Lake Monroe Outlet Midden (ACI 2001). These produced results that differed in some aspects from those at Salt Springs. Compared to Salt Springs, the Lake Monroe Outlet Midden contained higher percentages of debris and one-quarter-inch and one-eighth-inch flakes. Given the high percentages of these smaller flakes and the low percentages of cortical flakes, the evidence suggests that, like Salt Springs, the site was not a primary reduction site. But the density of lithic material from the Lake Monroe Outlet Midden (over 15,000 flakes) is far greater than that recovered during the Salt Springs excavations. For example, Unit B of the Lake Monroe Outlet Midden yielded 14,531 lithics (ACI 2001:5-1) from 27.7 cubic meters, or 525 flakes per cubic meter, compared to the Salt Springs' yield of 3,363 lithics from 16 cubic meters, or 210 flakes per cubic meter. In addition to this higher density of lithic debitage, a greater variety of modified and decorative items (e.g., bone and shell beads, decorated bone pins), more diversity in subsistence remains, and the presence of human remains suggest that a greater number of social and daily maintenance activities occurred at the Lake Monroe Outlet Midden site. Among its multiple functions, it was likely a residential base camp and a locality for the manufacture of microlithic tools used in the production of bone and shell beads (ACI 2001:10-1).

I suggest that, if Salt Springs had operated as a long-term residential site like the Lake Monroe site, higher numbers of preforms, cores, hammerstones, adzes, bannerstones, and primary flakes would have been recovered. Only one preform, one adz, and three cores/hammerstones were recovered at Salt Springs. Bannerstones, which are ground stones with holes used as weights for atlatls or spears and sometimes found in ritual contexts, have been recovered from Groves' Orange Midden (Wheeler and McGee 1994a:373) and other Mt. Taylor sites, but were not present at Salt

Springs.

Because occupants of long-term residential sites spend more time there and engage in a greater number of activities, I suggest that unfinished tools that had fractured during manufacturing or thermal alteration should be present. Formal tools, such as projectile points and scrapers, were recovered at Salt Springs, but in low frequencies. In total, only sixty-five formal tools (mostly Newnan, Marion and Hillsborough projectile points, scrapers, awls, and needles) were recovered during excavations.

Ocala Group chert was the highest occurring raw material (91.7 percent) for the specimens used in this study. Although no known quarry sites are located near Salt Springs (FDHR 2010), this chert might come from boulders in other sinks or springs or be eroding out of bedrock that has been exposed by the St. Johns River or possibly located around Lake George. I suggested earlier (in chapter 6) that this chert is locally available, unlike the more exotic and dominant stone found in assemblages at long-term residential sites (Lake Monroe Outlet and Groves' Orange middens). This high occurrence of locally available chert material at Salt Springs suggests less or different trade connections or mobility than that found at residential sites. But, it does not directly speak to the question of short-term site use.

Evidence other than lithics may inform us as to the intensity of site use at Salt Springs. Although results are preliminary, the vertebrate faunal remains from the organic zone at Salt Springs demonstrated a relatively higher reliance on terrestrial species for subsistence when compared to other Mt. Taylor sites (e.g., Quitmyer 2001; Stanton 1995; Wheeler and McGee 1994b). According to Worthington (2010), white-tailed deer accounted for 78 percent of the biomass of terrestrial species and almost all of the modified bone.

Cut marks found along the scapula and other major joints of the deer demonstrate that deer were being hunted and processed at Salt Springs in high numbers. The low frequency of scrapers (n=10) recovered suggests that the final processing and hide preparation of the deer may have occurred at another location. The types of scrapers recovered (e.g., microscrapers) are known for wood processing or other activities that require smaller tools.

The preliminary reports on plant materials from Salt Springs identify both *Cucurbita* sp. and *Lagenaria* sp., the latter of which is important to understanding how these plants were used and/or domesticated in the New World. Many of the gourd-seed specimens were found still attached to the rind, with only a few fragments demonstrating modification. It has been suggested that bottle gourds were likely used as net floats or rattles (Talcott 2010:46) and may have been harvested from this location for that purpose. This and the great abundance of fish remains (Worthington 2010) suggest that occupants of the site were not only deer hunters, but fishers. Some of the recovered wood chips may, in fact, be carpentry debris from the manufacturing of canoes (Newsom 2010). One lithic adz, two shell celts, and two shell cutting edges support this hypothesis, although because four of these came from disturbed contexts, their association with the organic layer is uncertain. The evidence for both hunting and fishing indicates multiple uses of the site; it was not simply a processing station. There are many butchering and burnt markings on bones, suggesting that both fishing and hunting and food preperation were practiced at the site (Worthington 2010).

The high sodium content of the springs, however, would have presented a problem for long-term occupation since the water is not potable. Occupants would have had to portage to Lake Kerr or canoe downstream to Lake George to reach reliable sources of drinking water. But, it is also possible that the springs may have attracted humans for salt and other minerals in the water. These likely provided needed nutrients for both humans and animals. The salt might also have been used to preserve the meat of the animals attracted to the site and hunted by the people (Marshall 1979:406).

Conclusion

The results of the aggregate trend method demonstrate that during the Mt. Taylor period, Salt Springs was a tool production or tool modification site. Along with the results from the triple cortex study showing a low occurrence of primary flakes, an interpretation of tool production or modification as opposed to core reduction is supported. The low occurrence of tools, combined with the flake studies, suggests that the site had short-term use in the annual cycle. All of the Mt. Taylor–period projectile points recovered from this site were broken and showed signs of being retouched or resharpened, suggesting use and discard at the site. These tools were likely used in hunting and subsistence activities; faunal analysis shows a high biomass of deer being processed and consumed and their bones discarded at the site. Subsistence and botanical remains are still being studied, and conclusions on their potential to answer questions on the type and length of activities that occurred at the site await final analyses.

The materials recovered from the organic zone at Salt Springs may represent a transitional period from a reliance on hunting to a higher reliance on aquatic resources. It may also suggest that shell midden usually associated with Mt. Taylor sites was situated further ashore or at another location and that this particular area of the site reflects a processing area. The organic zone at Salt Springs may represent an area where certain activities were occurring, such as canoe making (from evidence of carpentry debris), animal rendering and processing, and lithic tool utilization and retouch. By taking into account the preliminary faunal and lithic analyses presented in this thesis, a short-term occupation of the site is suggested. Additional botanical and faunal research may provide insight into the seasonality of occupation or discredit the short-term usage argument. The nearby Salt Springs Run (8MR2) site contains a large Mt. Taylor shell midden and is located adjacent to freshwater resources. That site may have been the long-term occupational site for the people who used the Salt Springs area.

Recommendations

The organic zone at Salt Springs represents a unique feature not usually found at most Florida archaeological sites. It offered the opportunity to explore how people of the Mt. Taylor period adapted to their surroundings by using the resources of the St. Johns River and its tributaries that were necessary for their survival.

The aggregate trend method used on the lithic debitage recovered from Salt Springs could also be applied to the debitage from Groves' Orange Midden to determine if there were any differences in activities between these two Mt. Taylor sites. Ongoing excavations at Silver Glen Springs may produce additional debitage collections that can be examined using the aggregate trend method.

Once the botanical and additional modified faunal remains studies (Byrd 2011) are reviewed, these data can be incorporated to construct a comprehensive view of the role that Salt Springs played during the Mt. Taylor period.

Supplementary excavations behind the current retaining wall would provide an opportunity to gather more samples for radiocarbon dating to see if any part of the intact shell midden there is contemporary with the organic zone. It would also provide a chance to compare the lithic debitage from the undisturbed shell midden with the debitage recovered from the organic zone. These comparisons, along with the data gathered from Sassaman's 2009 University of Florida excavations, will provide a more complete view of the activities and lives of the people who utilized the Salt Springs site during the Middle to Late Archaic periods. Further excavations at the Salt Springs Run site may provide helpful data to compare to the Salt Springs fauna and lithic assemblages to ascertain if that site held long-term occupations not seen at Salt Springs.

APPENDIX ONE

TRIPLE CORTEX ANALYSIS

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
168.001	EU 16, LV 1	0-10 bd	Flake, Primary	3	3.5	Ocala Group
168.002	EU 16, LV 1	0-10 bd	Flake, Primary	1	1.1	Thermally Altered; Ocala Group
168.003	EU 16, LV 1	0-10 bd	Flake, Secondary	17	21.8	Ocala Group
168.004	EU 16, LV 1	0-10 bd	Flake, Secondary	3	5.5	Thermally Altered; Ocala Group
168.005	EU 16, LV 1	0-10 bd	Flake, Tertiary	13	2.3	Ocala Group
168.007	EU 16, LV 1	0-10 bd	Debris	4	2.4	Ocala Group
169.001	EU 16, LV 2	10-20 bd	Flake, Primary	6	9.0	Ocala Group
169.002	EU 16, LV 2	10-20 bd	Flake, Secondary	20	11.5	Ocala Group
169.003	EU 16, LV 2	10-20 bd	Flake, Secondary	4	1.5	Thermally Altered; Ocala Group
169.004	EU 16, LV 2	10-20 bd	Flake, Tertiary	21	2.4	Ocala Group
169.005	EU 16, LV 2	10-20 bd	Flake, Tertiary	4	0.4	Thermally Altered; Ocala Group
169.006	EU 16, LV 2	10-20 bd	Debris	2	0.7	Thermally Altered; Ocala Group
169.007	EU 16, LV 2	10-20 bd	Debris	5	1.2	Ocala Group
170.004	EU 17, LV 1	0-10 bd	Flake, Primary	4	7.9	Ocala Group
170.005	EU 17, LV 1	0-10 bd	Flake, Secondary	2	9.6	Platform prep & battering
170.006	EU 17, LV 1	0-10 bd	Flake, Secondary	8	8.6	Ocala Group
170.007	EU 17, LV 1	0-10 bd	Flake, Secondary	4	6.1	Thermally Altered; Ocala Group
170.008	EU 17, LV 1	0-10 bd	Flake, Tertiary	7	1.5	Ocala Group
170.009	EU 17, LV 1	0-10 bd	Flake, Tertiary	2	0.3	Thermally Altered; Ocala Group
170.010	EU 17, LV 1	0-10 bd	Debris	3	2.8	Ocala Group
171.003	EU 17, LV 2	10-20 bd	Flake, Primary	3	13.3	Ocala Group
171.004	EU 17, LV 2	10-20 bd	Flake, Secondary	4	16.1	Thermally Altered; Ocala Group
171.005	EU 17, LV 2	10-20 bd	Flake, Secondary	3	9.5	Ocala Group
171.006	EU 17, LV 2	10-20 bd	Flake, Secondary	8	2.8	Ocala Group
171.007	EU 17, LV 2	10-20 bd	Flake, Tertiary	7	8.3	Thermally Altered; Ocala Group
171.008	EU 17, LV 2	10-20 bd	Flake, Tertiary	18	1.8	Ocala Group
171.009	EU 17, LV 2	10-20 bd	Flake, Tertiary	1	0.7	Quartz

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
171.010	EU 17, LV 2	10-20 bd	Debris	3	1.0	Ocala Group
172.005	EU 24, LV 1	-13-0 bd	Flake, Secondary	1	1.0	Hawthorne Formation
172.006	EU 24, LV 1	-13-0 bd	Flake, Tertiary	1	0.3	Thermally Altered; Hawthorne Formation
173.007	EU 41, LV 1	0-10 bd	Flake, Primary	4	5.9	Ocala Group
173.008	EU 41, LV 1	0-10 bd	Flake, Secondary	6	6.1	Thermally Altered; Ocala Group
173.009	EU 41, LV 1	0-10 bd	Flake, Secondary	5	5.3	Ocala Group
173.010	EU 41, LV 1	0-10 bd	Flake, Tertiary	4	1.0	Thermally Altered; Ocala Group
173.011	EU 41, LV 1	0-10 bd	Flake, Tertiary	6	0.9	Ocala Group
173.012	EU 41, LV 1	0-10 bd	Debris	3	3.4	Ocala Group; One Thermally Altered
174.003	EU 24, LV 2	0-10 bd	Flake, Secondary	1	1.3	Ocala Group
174.004	EU 24, LV 2	0-10 bd	Flake, Secondary	3	0.6	Hawthorne Formation
175.005	EU 41, LV 2	10-20 bd	Flake, Primary	10	11.3	Ocala Group
175.006	EU 41, LV 2	10-20 bd	Flake, Secondary	8	15.0	Ocala Group
175.007	EU 41, LV 2	10-20 bd	Flake, Secondary	5	2.3	Thermally Altered; Ocala Group
175.008	EU 41, LV 2	10-20 bd	Flake, Secondary	8	5.0	Thermally Altered; Ocala Group
175.009	EU 41, LV 2	10-20 bd	Flake, Secondary	19	5.9	Ocala Group
175.010	EU 41, LV 2	10-20 bd	Flake, Tertiary	5	0.4	Thermally Altered; Ocala Group
175.011	EU 41, LV 2	10-20 bd	Flake, Tertiary	12	1.1	Ocala Group
175.013	EU 41, LV 2	10-20 bd	Debris	3	3.8	Ocala Group
176.002	EU 18, LV 1	0-10 bd	Flake, Secondary	2	1.7	Ocala Group
176.003	EU 18, LV 1	0-10 bd	Flake, Tertiary	3	0.5	Ocala Group
176.004	EU 18, LV 1	0-10 bd	Debris	2	5.8	Ocala Group
179.002	EU 25, LV 1	-9-0 bd	Flake, Secondary	2	2.4	Thermally Altered; non-local chert
179.003	EU 25, LV 1	-9-0 bd	Flake, Secondary	5	2.6	Ocala Group
179.004	EU 25, LV 1	-9-0 bd	Flake, Tertiary	2	0.4	Ocala Group
180.009	EU 42, LV 2	10-20 bd	Flake, Secondary	4	7.2	Thermally Altered; Ocala Group
180.010	EU 42, LV 2	10-20 bd	Flake, Secondary	6	5.9	Ocala Group
180.011	EU 42, LV 2	10-20 bd	Flake, Tertiary	2	0.4	Thermally Altered; Ocala Group
180.012	EU 42, LV 2	10-20 bd	Flake, Tertiary	5	0.6	Ocala Group
180.013	EU 42, LV 2	10-20 bd	Flake, Primary	6	16.8	Ocala Group
180.016	EU 42, LV 2	10-20 bd	Flake, Secondary	7	9.9	Ocala Group
181.006	EU 25, LV 2	0-10 bd	Flake, Secondary	1	1.3	Thermally Altered; Ocala Group
181.007	EU 25, LV 2	0-10 bd	Flake, Secondary	1	0.2	Ocala Group

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
181.008	EU 25, LV 2	0-10 bd	Flake, Tertiary	1	0.1	Thermally Altered; Ocala Group
181.009	EU 25, LV 2	0-10 bd	Flake, Tertiary	2	0.5	Hawthorne Formation
185.005	EU 38, LV 1	0-10 bd	Flake, Primary	2	7.3	Ocala Group
185.006	EU 38, LV 1	0-10 bd	Flake, Secondary	5	3.3	Thermally Altered; Ocala Group
185.007	EU 38, LV 1	0-10 bd	Flake, Secondary	4	12.6	Ocala Group
185.008	EU 38, LV 1	0-10 bd	Flake, Secondary	1	3.9	Hawthorne Formation
185.009	EU 38, LV 1	0-10 bd	Flake, Tertiary	2	0.3	Thermally Altered; Ocala Group
185.010	EU 38, LV 1	0-10 bd	Flake, Tertiary	3	0.6	Ocala Group
187.005	EU 19, LV 2	10-14 bd	Flake, Secondary	5	1.7	Ocala Group
187.006	EU 19, LV 2	10-14 bd	Flake, Secondary	5	0.8	Thermally Altered; Ocala Group
187.007	EU 19, LV 2	10-14 bd	Flake, Secondary	5	0.9	Ocala Group
187.008	EU 19, LV 2	10-14 bd	Flake, Tertiary	2	0.2	Thermally Altered; Ocala Group
187.009	EU 19, LV 2	10-14 bd	Flake, Tertiary	4	0.3	Ocala Group
187.010	EU 19, LV 2	10-14 bd	Debris	2	0.2	Ocala Group
188.002	EU 18, LV 3	20-30 bd	Flake, Primary	6	5.7	Ocala Group
189.001	EU 23, LV 1	0-10 bd	Flake, Secondary	1	2.8	Hawthorne Formation
189.002	EU 23, LV 1	0-10 bd	Flake, Tertiary	1	0.4	Thermally Altered; Ocala Group
190.010	EU 14, LV 1	0-10 bd	Flake, Tertiary	3	0.5	Thermally Altered; Ocala Group
190.011	EU 14, LV 1	0-10 bd	Flake, Tertiary	5	0.8	Ocala Group
190.012	EU 14, LV 1	0-10 bd	Debris	1	0.1	Ocala Group
190.013	EU 14, LV 1	0-10 bd	Flake, Secondary	1	0.4	Thermally Altered; Ocala Group; Pot-lid Frac from heating
191.002	EU 23, LV 2	10-20 bd	Flake, Secondary	1	1.2	Ocala Group
191.003	EU 23, LV 2	10-20 bd	Flake, Secondary	1	0.7	Ocala Group; Platform prep
191.004	EU 23, LV 2	10-20 bd	Flake, Secondary	2	1.5	Ocala Group
191.005	EU 23, LV 2	10-20 bd	Flake, Secondary	1	0.2	Ocala Group; Platform Prep
192.002	EU 15, LV 2	0-10 bd	Flake, Primary	4	4.8	Ocala Group
192.003	EU 15, LV 2	0-10 bd	Flake, Secondary	6	4.1	Ocala Group
192.004	EU 15, LV 2	0-10 bd	Flake, Secondary	1	9.9	Thermally Altered; Platform prep; Ocala Group
192.005	EU 15, LV 2	0-10 bd	Flake, Secondary	8	7.1	Thermally Altered; Ocala Group
192.006	EU 15, LV 2	0-10 bd	Flake, Secondary	19	11.5	Ocala Group
192.007	EU 15, LV 2	0-10 bd	Flake, Secondary	1	1.2	Hawthorne Formation
192.008	EU 15, LV 2	0-10 bd	Flake, Tertiary	5	0.8	Thermally Altered; Ocala Group

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
192.009	EU 15, LV 2	0-10 bd	Flake, Tertiary	32	3.2	Ocala Group
192.010	EU 15, LV 2	0-10 bd	Debris	3	1.5	Ocala Group
193.001	EU 14, LV 2	10-20 bd	Flake, Primary	3	4.1	Ocala Group
193.002	EU 14, LV 2	10-20 bd	Flake, Secondary	1	0.5	Ocala Group
193.003	EU 14, LV 2	10-20 bd	Flake, Secondary	4	2.2	Ocala Group
193.004	EU 14, LV 2	10-20 bd	Flake, Secondary	1	0.2	Thermally Altered
193.005	EU 14, LV 2	10-20 bd	Flake, Tertiary	3	0.5	Ocala Group
194.005	EU 20, LV 1	0-10 bd	Flake, Tertiary	5	0.8	Ocala Group
197.001	EU 15, LV 3	10-20 bd	Flake, Primary	2	19.3	Ocala Group
197.002	EU 15, LV 3	10-20 bd	Flake, Secondary	3	2.5	Ocala Group
197.003	EU 15, LV 3	10-20 bd	Flake, Secondary	3	6.1	Thermally Altered; Ocala Group
197.004	EU 15, LV 3	10-20 bd	Flake, Secondary	5	3.0	Ocala Group
197.005	EU 15, LV 3	10-20 bd	Flake, Tertiary	12	0.8	Ocala Group
197.006	EU 15, LV 3	10-20 bd	Flake, Tertiary	5	0.1	Thermally Altered; Ocala Group
197.007	EU 15, LV 3	10-20 bd	Debris	6	2.8	Ocala Group
198.002	EU 41, LV 3	20-30 bd	Flake, Primary	5	16.2	Ocala Group
198.003	EU 41, LV 3	20-30 bd	Flake, Secondary	7	7.6	Thermally Altered; Ocala Group
198.004	EU 41, LV 3	20-30 bd	Flake, Secondary	7	2.3	Ocala Group
198.005	EU 41, LV 3	20-30 bd	Flake, Secondary	4	0.7	Thermally Altered; Ocala Group
198.006	EU 41, LV 3	20-30 bd	Flake, Secondary	2	0.5	Thermally Altered
198.007	EU 41, LV 3	20-30 bd	Flake, Secondary	2	4.7	Agatized coral
198.008	EU 41, LV 3	20-30 bd	Flake, Secondary	10	3.2	Ocala Group
198.009	EU 41, LV 3	20-30 bd	Flake, Tertiary	3	0.2	Thermally Altered; Ocala Group
198.010	EU 41, LV 3	20-30 bd	Flake, Tertiary	15	1.0	Ocala Group
198.011	EU 41, LV 3	20-30 bd	Debris	2	0.8	
199.003	EU 20, LV 2	10-20 bd	Flake, Primary	10	17.4	Ocala Group
199.004	EU 20, LV 2	10-20 bd	Flake, Secondary	6	17.8	Ocala Group
199.005	EU 20, LV 2	10-20 bd	Flake, Secondary	2	5.3	Thermally Altered; Ocala Group
199.007	EU 20, LV 2	10-20 bd	Flake, Tertiary	5	1.1	Thermally Altered; Ocala Group
199.008	EU 20, LV 2	10-20 bd	Flake, Tertiary	27	5.2	Ocala Group
199.009	EU 20, LV 2	10-20 bd	Debris	4	1.2	Ocala Group
200.003	EU 13, LV 1	0-10 bd	Flake, Secondary	4	8.3	Ocala Group
200.004	EU 13, LV 1	0-10 bd	Flake, Secondary	2	1.2	Hawthorne Formation
200.005	EU 13, LV 1	0-10 bd	Flake, Tertiary	6	0.3	Ocala Group
200.010	EU 13, LV 1	0-10 bd	Flake, Tertiary	1	0.2	Thermally Altered; Ocala Group
202.001	EU 16, LV 3	20-30 bd	Flake, Primary	3	1.3	Ocala Group
202.002	EU 16, LV 3	20-30 bd	Flake, Secondary	6	1.2	Ocala Group

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
202.003	EU 16, LV 3	20-30 bd	Flake, Secondary	7	6.8	Thermally Altered; Ocala Group
202.004	EU 16, LV 3	20-30 bd	Flake, Secondary	13	7.2	Ocala Group
202.005	EU 16, LV 3	20-30 bd	Flake, Secondary	1	0.3	Ocala Group
202.009	EU 16, LV 3	20-30 bd	Flake, Tertiary	1	0.1	Hawthorne Formation
202.010	EU 16, LV 3	20-30 bd	Flake, Tertiary	6	0.4	Thermally Altered; Ocala Group
202.011	EU 16, LV 3	20-30 bd	Flake, Tertiary	24	2.1	Ocala Group
202.012	EU 16, LV 3	20-30 bd	Debris	2	0.4	
203.006	EU 27, LV 1	0-10 bd	Flake, Primary	4	11.7	Ocala Group
203.007	EU 27, LV 1	0-10 bd	Flake, Secondary	7	10.5	Ocala Group
203.008	EU 27, LV 1	0-10 bd	Flake, Secondary	5	2.6	Thermally Altered; Ocala Group
203.009	EU 27, LV 1	0-10 bd	Flake, Secondary	11	5.7	Thermally Altered; Ocala Group
203.010	EU 27, LV 1	0-10 bd	Flake, Secondary	20	10.0	Ocala Group
203.011	EU 27, LV 1	0-10 bd	Flake, Secondary	1	1.5	Hawthorne Formation
203.012	EU 27, LV 1	0-10 bd	Flake, Tertiary	1	0.1	Thermally Altered; Agatized Coral
203.013	EU 27, LV 1	0-10 bd	Flake, Tertiary	7	0.7	Thermally Altered; Ocala Group
203.014	EU 27, LV 1	0-10 bd	Flake, Tertiary	19	1.2	Ocala Group
203.017	EU 27, LV 1	0-10 bd	Debris	6	8.5	Ocala Group
206.002	EU 13, LV 2	10-20 bd	Flake, Primary	1	0.5	Ocala Group
206.003	EU 13, LV 2	10-20 bd	Flake, Secondary	6	2.7	Hawthorne Formation
206.004	EU 13, LV 2	10-20 bd	Flake, Secondary	4	2.4	Ocala Group
206.005	EU 13, LV 2	10-20 bd	Flake, Tertiary	3	0.3	Ocala Group
207.002	EU 19, LV 3	14-20 bd	Flake, Primary	3	1.2	Ocala Group
207.003	EU 19, LV 3	14-20 bd	Flake, Secondary	6	2.6	Thermally Altered; Ocala Group
207.004	EU 19, LV 3	14-20 bd	Flake, Secondary	9	1.9	Ocala Group
207.005	EU 19, LV 3	14-20 bd	Flake, Secondary	2	0.4	Ocala Group
207.006	EU 19, LV 3	14-20 bd	Flake, Secondary	2	0.9	Hawthorne Formation
207.007	EU 19, LV 3	14-20 bd	Flake, Tertiary	10	0.7	Ocala Group
207.008	EU 19, LV 3	14-20 bd	Flake, Tertiary	2	0.1	Thermally Altered; Ocala Group
207.009	EU 19, LV 3	14-20 bd	Debris	3	1.1	
210.002	EU 19, LV 4	20-30 bd	Flake, Primary	4	7.2	Ocala Group
210.003	EU 19, LV 4	20-30 bd	Flake, Secondary	7	2.5	Ocala Group
210.004	EU 19, LV 4	20-30 bd	Flake, Secondary	4	4.1	Thermally Altered; Ocala Group
210.005	EU 19, LV 4	20-30 bd	Flake, Secondary	2	1.2	Thermally Altered; Ocala Group
210.006	EU 19, LV 4	20-30 bd	Flake, Secondary	13	3.7	Ocala Group

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
210.007	EU 19, LV 4	20-30 bd	Flake, Tertiary	5	0.4	Thermally Altered; Ocala Group
210.008	EU 19, LV 4	20-30 bd	Flake, Tertiary	13	0.8	Ocala Group
210.009	EU 19, LV 4	20-30 bd	Debris	2	0.5	
219.004	EU 23, LV 3	20-30 bd	Flake, Primary	1	0.5	Ocala Group
219.005	EU 23, LV 3	20-30 bd	Flake, Secondary	2	3.4	Ocala Group
219.006	EU 23, LV 3	20-30 bd	Flake, Secondary	5	3.2	Hawthorne Formation
219.007	EU 23, LV 3	20-30 bd	Flake, Tertiary	1	0.1	Ocala Group
220.002	EU 24, LV 3	17-27 bd	Flake, Secondary	4	1.4	Hawthorne Formation
220.003	EU 24, LV 3	17-27 bd	Flake, Secondary	1	1.5	Ocala Group
220.004	EU 24, LV 3	17-27 bd	Flake, Tertiary	1	0.1	Hawthorne Formation
225.004	EU 27, LV 2	6-10 bd	Flake, Secondary	4	1.3	Thermally Altered; Ocala Group
225.005	EU 27, LV 2	6-10 bd	Flake, Secondary	4	1.2	Ocala Group
225.006	EU 27, LV 2	6-10 bd	Flake, Secondary	1	0.4	Ocala Group
225.007	EU 27, LV 2	6-10 bd	Flake, Tertiary	5	0.4	Ocala Group
225.008	EU 27, LV 2	6-10 bd	Flake, Tertiary	1	0.4	Bifacial flaking; half moon shape; edge removed during retouch
225.009	EU 27, LV 2	6-10 bd	Flake, Tertiary	1	0.1	Flaking along one edge; Ocala Group
225.011	EU 27, LV 2	6-10 bd	Flake, Tertiary	1	0.1	Thermally Altered; Ocala Group
225.012	EU 27, LV 2	6-10 bd	Flake, Primary	1	0.3	Ocala Group
227.002	EU 24, LV 4	27-32 bd	Flake, Secondary	1	5.8	Ocala Group
227.003	EU 24, LV 4	27-32 bd	Flake, Primary	1	1.3	Ocala Group
227.004	EU 24, LV 4	27-32 bd	Flake, Secondary	2	1.2	Hawthorne Formation
227.005	EU 24, LV 4	27-32 bd	Flake, Tertiary	1	0.1	Hawthorne Formation
242.002	EU 12, LV 1 & LV 2	3-20 bd	Flake, Secondary	1	0.9	Thermally Altered; Ocala Group
242.003	EU 12, LV 1 & LV 2	3-20 bd	Flake, Secondary	1	0.3	Thermally Altered; Ocala Group
242.004	EU 12, LV 1 & LV 2	3-20 bd	Flake, Secondary	3	0.9	Ocala Group
242.005	EU 12, LV 1 & LV 2	3-20 bd	Flake, Tertiary	1	0.1	Thermally Altered; Ocala Group
242.006	EU 12, LV 1 & LV 2	3-20 bd	Flake, Tertiary	1	0.1	
245.001	EU 12, LV 3	20-30 bd	Flake, Secondary	2	1.3	Hawthorne Formation
245.002	EU 12, LV 3	20-30 bd	Flake, Secondary	2	1.2	Hawthorne Formation
245.003	EU 12, LV 3	20-30 bd	Flake, Secondary	2	1.4	Ocala Group

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
245.004	EU 12, LV 3	20-30 bd	Flake, Secondary	4	1.9	Ocala Group
245.005	EU 12, LV 3	20-30 bd	Flake, Tertiary	2	0.2	Hawthorne Formation
246.005	EU 14, LV 3	20-30 bd	Flake, Secondary	1	1.1	Hawthorne Formation
246.006	EU 14, LV 3	20-30 bd	Flake, Secondary	2	0.3	Thermally Altered; Ocala Group
246.007	EU 14, LV 3	20-30 bd	Flake, Secondary	4	0.9	Hawthorne Formation
246.008	EU 14, LV 3	20-30 bd	Flake, Tertiary	3	0.2	Hawthorne Formation
246.009	EU 14, LV 3	20-30 bd	Flake, Tertiary	1	0.1	Ocala Group
246.010	EU 14, LV 3	20-30 bd	Debris	1	0.3	Ocala Group
247.004	EU 13, LV 3	20-30 bd	Flake, Secondary	3	7.9	Hawthorne Formation
247.005	EU 13, LV 3	20-30 bd	Flake, Secondary	8	3.4	Hawthorne Formation
247.006	EU 13, LV 3	20-30 bd	Flake, Tertiary	2	0.3	Ocala Group
247.007	EU 13, LV 3	20-30 bd	Flake, Tertiary	3	0.4	Hawthorne Formation
249.002	EU 16, LV 4	30-40 bd	Flake, Primary	3	3.3	Ocala Group
249.003	EU 16, LV 4	30-40 bd	Flake, Secondary	1	1.3	Thermally Altered; Ocala Group
249.004	EU 16, LV 4	30-40 bd	Flake, Secondary	3	0.8	Ocala Group
249.005	EU 16, LV 4	30-40 bd	Flake, Secondary	6	1.7	Thermally Altered; Ocala Group
249.006	EU 16, LV 4	30-40 bd	Flake, Secondary	1	0.6	Thermally Altered; Agatized Coral
249.007	EU 16, LV 4	30-40 bd	Flake, Secondary	8	1.7	Ocala Group
249.008	EU 16, LV 4	30-40 bd	Flake, Tertiary	6	0.4	Thermally Altered; Ocala Group
249.009	EU 16, LV 4	30-40 bd	Flake, Tertiary	6	0.3	Ocala Group
252.001	EU 12, LV 4	30-40 bd	Flake, Secondary	2	1.2	Ocala Group; Platform prep
252.002	EU 12, LV 4	30-40 bd	Flake, Secondary	2	2.5	Hawthorne Formation
252.003	EU 12, LV 4	30-40 bd	Flake, Tertiary	1	0.1	Hawthorne Formation
253.003	EU 21, LV 1, natural LV	0-23 bd	Flake, Primary	6	1.5	Ocala Group
253.004	EU 21, LV 1, natural LV	0-23 bd	Flake, Secondary	3	1.8	Ocala Group
253.005	EU 21, LV 1, natural LV	0-23 bd	Flake, Secondary	3	1.1	Thermally Altered; Ocala Group
253.006	EU 21, LV 1, natural LV	0-23 bd	Flake, Secondary	5	1.5	Thermally Altered; Ocala Group
253.007	EU 21, LV 1, natural LV	0-23 bd	Flake, Secondary	6	1.6	Ocala Group

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
253.008	EU 21, LV 1, natural LV	0-23 bd	Flake, Secondary	2	1.1	Hawthorne Formation
253.009	EU 21, LV 1, natural LV	0-23 bd	Flake, Tertiary	3	0.3	Thermally Altered; Ocala Group
253.010	EU 21, LV 1, natural LV	0-23 bd	Flake, Tertiary	11	0.8	Ocala Group
253.013	EU 21, LV 1, natural LV	0-23 bd	Debris	2	0.6	Ocala Group
264.004	EU 17, LV 3, natural LV	18-29 bd	Flake, Primary	1	1.0	Ocala Group
264.005	EU 17, LV 3, natural LV	18-29 bd	Flake, Secondary	2	0.4	Ocala Group
264.006	EU 17, LV 3, natural LV	18-29 bd	Flake, Secondary	3	1.1	Thermally Altered; Ocala Group
264.007	EU 17, LV 3, natural LV	18-29 bd	Flake, Secondary	4	1.0	Ocala Group
264.008	EU 17, LV 3, natural LV	18-29 bd	Flake, Tertiary	5	0.4	Thermally Altered; Ocala Group
264.009	EU 17, LV 3, natural LV	18-29 bd	Debris	1	0.3	Ocala Group
273.006	EU 19, LV 5, natural LV	13-39 bd	Flake, Secondary	5	1.2	Ocala Group
273.007	EU 19, LV 5, natural LV	13-39 bd	Flake, Secondary	2	0.4	Thermally Altered; Ocala Group
273.008	EU 19, LV 5, natural LV	13-39 bd	Flake, Secondary	3	1.5	Thermally Altered; Ocala Group
273.009	EU 19, LV 5, natural LV	13-39 bd	Flake, Secondary	8	2.3	Ocala Group
273.010	EU 19, LV 5, natural LV	13-39 bd	Flake, Tertiary	3	0.1	Thermally Altered; Ocala Group
273.011	EU 19, LV 5, natural LV	13-39 bd	Flake, Tertiary	6	0.2	Ocala Group
273.015	EU 19, LV 5, natural LV	13-39 bd	Debris	2	6.2	Ocala Group
275.002	EU 25, LV 5	30-40 bd	Flake, Secondary	2	0.9	Ocala Group
275.003	EU 25, LV 5	30-40 bd	Flake, Secondary	2	0.6	Ocala Group
275.004	EU 25, LV 5	30-40 bd	Flake, Secondary	3	0.6	Hawthorne Formation
280.007	EU 21, LV 2	10-20 bd	Flake, Primary	3	2.2	Ocala Group

FS.Lot	Provenience	Depth (cm)	Name/Type	Count	Weight (g)	Comments; Notes; References
280.008	EU 21, LV 2	10-20 bd	Flake, Secondary	7	3.4	Thermally Altered; Ocala Group; one large flake has platform prep
280.009	EU 21, LV 2	10-20 bd	Flake, Secondary	6	1.5	Ocala Group
280.010	EU 21, LV 2	10-20 bd	Flake, Tertiary	2	0.2	Thermally Altered; Ocala Group
280.011	EU 21, LV 2	10-20 bd	Flake, Tertiary	5	0.4	Ocala Group
280.014	EU 21, LV 2	10-20 bd	Debris	1	0.2	Thermally Altered; Ocala Group
281.003	EU 13, LV 4	30-40 bd	Flake, Secondary	2	1.2	Ocala Group
281.004	EU 13, LV 4	30-40 bd	Flake, Secondary	2	4.7	Ocala Group
281.005	EU 13, LV 4	30-40 bd	Flake, Secondary	3	3.2	Hawthorne Formation
281.006	EU 13, LV 4	30-40 bd	Flake, Tertiary	1	0.1	Ocala Group
281.007	EU 13, LV 4	30-40 bd	Flake, Tertiary	1	0.2	Hawthorne Formation
286.002	EU 24, LV 5	40-50 bd	Flake, Secondary	2	4.2	Hawthorne Formation
289.002	EU 20, LV 3	20-30 bd	Flake, Primary	4	1.3	Ocala Group
289.003	EU 20, LV 3	20-30 bd	Flake, Secondary	5	6.8	Ocala Group
289.004	EU 20, LV 3	20-30 bd	Flake, Secondary	2	2.8	Thermally Altered; Ocala Group
289.005	EU 20, LV 3	20-30 bd	Flake, Secondary	8	3.5	Thermally Altered; Ocala Group
289.006	EU 20, LV 3	20-30 bd	Flake, Secondary	11	5.4	Ocala Group
289.007	EU 20, LV 3	20-30 bd	Flake, Secondary	1	0.5	Thermally Altered; Agatized Coral
289.008	EU 20, LV 3	20-30 bd	Flake, Tertiary	9	0.6	Thermally Altered; Ocala Group
289.009	EU 20, LV 3	20-30 bd	Flake, Tertiary	8	0.8	Ocala Group
289.010	EU 20, LV 3	20-30 bd	Flake, Tertiary	1	0.1	Hawthorne Formation
289.011	EU 20, LV 3	20-30 bd	Flake, Tertiary	1	0.1	Agatized Coral

APPENDIX TWO

LITHIC TOOLS

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
135.001	Surface near EU 45	Surf	PP/K, Hillsborough	1	31.7	8.35 L; 4.14 W; 0.83 Thick; 1.83 Stem W	The base of the stem is broken
138.001	EU 45, LV 2	10-20	PP/K	1	28.8	5.25 L; 4.95 W; 11.5 Thick	Fragment knife; Pressure flaking along edges
160.018	Surface Collection & Spoil Pile		Flake, Utilized	1	12.1		Agatized coral; Several small flakes removed from two edges
160.019	Surface Collection & Spoil Pile		Flake, Utilized	1	5.0		Thermally Altered; Peace River Formation; Chipping along two edges
160.020	Surface Collection & Spoil Pile		Flake, Utilized	2	24.1		Ocala Group
160.021	Surface Collection & Spoil Pile		Flake, Utilized	1	9.8		Thermally Altered; Ocala Group; Flakes removed along two edges
160.022	Surface Collection & Spoil Pile		Flake, Utilized	1	23.7		Thermally Altered; Hawthorne Formation
160.024	Surface Collection & Spoil Pile		Preform	1	22.5		Ocala Group; Stem and base present; Broken during manufacturing

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
160.025	Surface Collection & Spoil Pile		PP/K	1	2.5	2.45 W; 1.45 L; 0.67 Thick	Thermally Altered; Ocala Group
160.026	Surface Collection & Spoil Pile		Pounder	1	46.1		Bifacially flaked; Pounding on tip; Ocala Group
160.027	Surface Collection & Spoil Pile		Awl/Perforator	1	2.1		Bifacially flaked; Ocala Group
160.029	Surface Collection & Spoil Pile		Flake, Utilized	1	3.2		Thermally Altered; Ocala Group; Flakes removed along two edges
160.030	Surface Collection & Spoil Pile		Biface	1	24.0		Thermally Altered; Ocala Group
160.031	Surface Collection & Spoil Pile		PP/K	1	3.2	2.07 L; 1.54 W; 1.01 Thick	Ocala Group; Tip remains
160.033	Surface Collection & Spoil Pile		PP/K, Hernando	1	8.6	4.19 L; 3.03 W; 0.8 Thick; 1.03 stem W	Thermally Altered; Ocala Group
160.060	Surface Collection & Spoil Pile		Adz	1	117.8	10.01 L; 5.24 W; 2.68 Thick	Adz shows evidence of polish and hafting
160.066	Surface Collection & Spoil Pile		Core	2	338.7		Flakes removed from several areas; Ocala Group
166.004	Drainage Trench	S. wall, Zone 8	PP/K, Newnan	1	14.5	5.94 L; 3.57 W; 0.69 Thick; 1.91 Stem W	Thermally Altered; one tang missing; Ocala Group
166.013	Drainage Trench	S. wall, Zone 8	Flake, Utilized	1	44.4		Ocala Group
167.017	Drainage Clean-up, Day 2		Flake, Utilized	1	1.5		Flaking along one edge; Ocala Group
168.006	EU 16, LV 1	0-10	Flake, Utilized	1	1.9		Chipping along two edges; Ocala Group

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
175.012	EU 41, LV 2	10-20	Flake, Utilized	1	7.5		Ocala Group; Chipping along two sides
177.001	EU 18, LV 2	20-Oct	PP/K	1	4.0	1.99 L; 2.83 W	Ocala Group
177.002	EU 18, LV 2	10-20	PP/K, Sarasota	1	4.7	4.34 L; 2.55 W; 0.44 Thick	Base broken above the tangs; Ocala Group
177.007	EU 18, LV 2	10-20	Flake, Utilized	2	6.5		Chipping along multiple edges; Ocala Group
179.001	EU 25, LV 1	-9-0	Flake, Utilized	1	0.4		Thermally Altered; possible drill; unifacial
180.003	EU 42, LV 2	10-20	PP/K	1	1.4	1.75 L; 1.27 W; 0.48 Thick	Thermally Altered; Hawthorne Formation
183.011	EU 19, LV 1	0-10	Awl/Perforator	1	3.5	2.50 L; 1.76 W; 0.94 Thick	Bifacial; Thermally Altered; Agatized coral
188.006	EU 18, LV 3	20-30	Biface	1	1.2	1.06L; 2.49 W; 0.65 Thick	Bifacial flaking; Possible base of PP/K; Ocala Group
192.001	EU 15, LV 2	0-10	PP/K, Newnan	1	11.6	4.50 L; 4.38 W; 0.68 Thick; 1.44 Stem W	Thermally Altered; One side retains cortex; Stem base is slightly rounded; Tip is missing; Ocala Group
192.013	EU 15, LV 2	0-10	Biface	1	0.6		Thermally Altered; Ocala Group
199.006	EU 20, LV 2	10-20	Flake, Utilized	1	2.7		Ocala Group; Chipping along two edges
201.009	EU 26, LV 1	0-10	PP/K	1	0.7	0.98 L; 1.28 W; 0.56 Thick	Thermally Altered; Ocala Group; Only stem remains; Basal thinning
202.006	EU 16, LV 3	20-30	Flake, Utilized	1	0.2		Chipping along one edge
202.007	EU 16, LV 3	20-30	Biface	1	0.9		Basal thinning; Ocala Group

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
202.008	EU 16, LV 3	20-30	PP/K	1	2.0		Mid-section of PP/K
203.015	EU 27, LV 1	0-10	Flake, Utilized	3	7.8		Chipping along edges; Ocala Group
203.016	EU 27, LV 1	0-10	Flake, Utilized	1	3.4		Chipping along one edge; Quartzite
214.003	EU 14, North wall fall clean-up		PP/K	1	0.7	0.87 L; 1.55 W; 0.51 Thick	Ocala Group; Part of a stem from a PP/K
215.004	EU 26, South wall baulk		PP/K	1	3.3	2.58 L; 1.69 W; 0.65 Thick	Mid-section of PP/K; Thermally Altered; Tallahatta Quartzite
221.001	EU 14, Trench wall fall, Zone 7		Scraper	1	54.9	7.27 L; 3.83 W; 1.86 Thick	Polish; Retouch flaking; Discarded after large flake removed
228.007	EU 26, LV 2	10-20	Scraper, Humpbacked	1	1.0		Hawthorne Formation; Chipping along all edges; Unifacial
229.001	EU 26, South wall baulk		Scraper	1	8.7	5.34 L; 1.83 W; 9.17 Thick	Unifacial end scraper; Flakes removed along all edges
231.001	EU 27, LV 3	10-20	PP/K	1	2.0	2.72 L; 1.73 W; 0.72 Thick	Tang and partial stem remain; Thermally Altered; Ocala Group
246.001	EU 14, LV 3	20-30	End Scraper, Hafted	1	5.5	3.48 L; 2.20 W; 0.76 Thick	Possible (uniface?) Bolen; Stem is as wide as tangs; Ocala Group; Basal thinning
247.001	EU 13, LV 3	20-30	PP/K, Stanfield	1	15.7	4.33 L; 3.93 W; 3.20 Base; 0.96 Thick	Basal thinning present
249.001	EU 16, LV 4	30-40	End Scraper	1	3.7		Hawthorne Formation
251.004	EU 11, LV 4	30-40	Flake, Utilized	1	5.2		Chipping along one edge; Platform prep present; Ocala Group

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
253.011	EU 21, LV 1, natural LV	0-23	Flake, Utilized	1	1.7		Chipping along two edges; Thermally Altered; Ocala Group
253.012	EU 21, LV 1, natural LV	0-23	Biface	2	2.4		Possible base of PP/K; Thermally Altered; Ocala Group
255.005	EU 28, clean-up		Flake, Utilized	1	5.4		Thermally Altered; Chipping along one edge; Ocala Group
267.005	EU 17, Clean-up Storm wash		Biface	1	1.0		Flakes removed from both sides; Ocala Group
273.012	EU 19, LV 5, natural LV	13-39	Flake, Utilized	1	1.6		Chipping along one edge; Ocala Group
273.013	EU 19, LV 5, natural LV	13-39	Flake, Utilized	1	0.2		Chipping along one edge; Ocala Group
273.014	EU 19, LV 5	13-39	Scraper	1	0.8		Unifacial scraper; Utilized three edges
277.013	S. wall baulk of EU 21, EU 33	0-37	Flake, Utilized	1	2.3		Chipping along one edge; Ocala Group
280.012	EU 21, LV 2	10-20	Flake, Utilized	1	0.3		Thermally Altered; Chipping along one edge; Ocala Group
280.013	EU 21, LV 2	10-20	Flake, Utilized	1	2.5		Very fine chipping; Ocala Group
292.008	EU 29, LV 3	20-30	Scraper	1	0.2		Chipping and retouch along both sides; Thermally Altered; Ocala Group
293.001	EU 38, LV 2	15-21	PP/K, Clay	1	18.1	5.35 L; 4.35 W; 2.06 Stem W; 0.85 Thick	Ocala Group; Fracture caused by material
293.012	EU 38, LV 2	15-21	Scraper	1	0.8		Chipping along two edges; Retouch; Thermally Altered; Ocala Group

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
303.012	EU 28, 3/4 of unit	Zone 4	Flake, Utilized	1	0.9		Hawthorne Formation
303.013	EU 28, 3/4 of unit	Zone 4	Biface	1	11.0		Utilization along alternating edges; Possible knife; Ocala Group
305.005	EU 28, 3/4 of unit	Zone 6	Flake, Utilized	1	0.8		Thermally Altered; Ocala Group; Chipping along two edges
306.008	EU 28, 3/4 of unit	Zone 7	Biface	1	0.8		Thermally Altered; Ocala Group
310.007	EU 32, LV 2	10-20	Flake, Utilized	1	2.0		Ocala Group; Chipping one edge
312.010	EU 31, LV 1	0-16	Flake, Utilized	1	4.4		Chipping along two edges; Thermally Altered; Ocala Group
313.009	EU 31, LV 1	0-10	Flake, Utilized	1	5.2		Chipping along one edge; Ocala Group
314.007	EU 28, 3/4 of unit	Zone 2	Flake, Utilized	1	0.3		Chipping along edge; Thermally Altered; Ocala Group
316.010	EU 32, LV 3	20-30	Flake, Utilized	1	6.5		Thermally Altered; Chipping along one edge; Ocala Group
318.010	EU 31, LV 2	16-29	Flake, Utilized	1	1.9		Chipping along one edge; Platform prep present; Ocala Group
322.001	EU 12, LV 4	30-40	PP/K	1	5.2	3.12 L; 2.33 W; 0.82 Thick	Only tip remains; Hawthorne Formation
323.008	EU 29, LV 4	30-40	Flake, Utilized	1	2.2		Chipping along one edge; Ocala Group
327.002	EU 26, LV 4	30-40	Awl/Perforator	1	2.1		Thermally Altered; Ocala Group; Double ended drill

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
330.001	EU 30, LV 3	20-33	PP/K, Marion	1	18.9	6.05 L; 4.42 W; 0.93 Thick; 1.61 Stem W	Ocala Group
330.011	EU 30, LV 3	20-33	Flake, Utilized	1	2.8		Thermally Altered; Ocala Group
339.001	EU 30, LV 5	40-50	PP/K, Middle Archaic	1	5.9	4.24 L; 3.52 W; 0.98 Stem W; 0.70 Thick	Thermally Altered; Retouched several times
343.002	EU 17, LV 4	20-35	PP/K, Marion	1	19.4	5.33 L; 4.93 W; 0.79 Thick; 1.65 Stem W	Thermally Altered; Ocala Group
343.003	EU 17, LV 4	20-35	Flake, Utilized	1	13.6		Chipping along one; Thermally Altered; Ocala Group
346.002	EU 28, LV 9	80-90	Flake, Utilized	1	6.0		Chipping along one edge; Thermally Altered; Ocala Group
347.003	EU 15, LV 6	50-60	Flake, Utilized	1	4.0		Chipping along two edges; Ocala Group
349.011	EU 42, LV 3	20-30	Awl/Perforator	1	7.3		Chipping along two edges
351.001	EU 16, LV 5	40-50	Flake, Utilized	1	8.9		Chipping along all edges; Thermally Altered; Ocala Group
354.008	EU 39, LV 3	20-30	Scraper	1	1.1		Chipping along edges; Ocala Group
358.006	EU 19, LV 6	30-40	PP/K, Putnam	1	10.6	6.09 L; 2.80 W; 0.90 Thick; 1.20 Stem Thick	Part of tang and stem missing; Thermally Altered; Ocala Group
363.011	EU 38, LV 3	20-30	Biface	1	1.7		Thermally Altered; Ocala Group; Part of larger biface
365.007	EU 17, LV 6	39-55	Flake, Utilized	1	12.8		Chipping along one edge; Thermally Altered; Ocala Group
365.008	EU 17, LV 6	39-55	Biface	1	1.9		Basal thining; Ocala Group

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
365.009	EU 17, LV 6	39-55	Scraper	1	6.1		Chipping along two edges; Thermally Altered; Agatized Coral
368.006	EU 18, LV 6	50-60	Flake, Utilized	2	3.7		Chipping along two edges; Cross-mend; Ocala Group
369.009	EU 38, LV 4	30-40	Flake, Utilized	1	6.5		Chipping along two edges; Ocala Group
369.010	EU 38, LV 4	30-40	Flake, Utilized	1	4.5		Chipping along two edges; Ocala Group
369.011	EU 38, LV 4	30-40	Biface	1	1.6		Thermally Altered; Ocala Group
371.002	EU 20, LV 4	30-40	Core	1	31.4		Thermally Altered; Small amount of cortex remaining; Ocala Group
371.011	EU 20, LV 4	30-40	Flake, Utilized	1	1.5		Chipping along one edge; Thermally Altered; Ocala Group
376.004	EU 18, LV 7	60-70	Flake, Utilized	1	2.1		Chipping along one edge; Ocala Group
378.004	EU 42, LV 4	30-40	PP/K, Marion	1	19.4	5.28 L; 3.91 W; 0.94 Thick; 1.44 Stem W	Discoloration present; Impact fracture; Ocala Group
382.002	EU 39, LV 4	30-40	Biface	1	46.8		Thermally Altered; Ocala Group
383.005	EU 21, LV 5	40-50	Flake, Utilized	1	0.4		Ocala Group
397.007	EU 42, LV 5	40-50	PP/K, Newnan	1	12.1	5.70 L; 3.66 W; 0.57 Thick; 1.74 Stem W	Thermally Altered; Ocala Group; Stem broken
398.006	EU 43, LV 6	50-60	Scraper	1	0.3		Thermally Altered; Chipping along both edges; Ocala Group
399.004	North Wall Profile Clean-up		Flake, Utilized	1	49.9		Thermally Altered; Ocala Group

FS.Lot	Provenience	Depth (cmbd)	Name/ Type	Count	Weight (g)	Measurement (cm)	Comments & Notes
411.003	Zone 7, disturbed trench shell above black soil		PP/K, Clay	1	25.1	8.20 L; 4.19 W; 0.85 Thick; 2.4 Stem W	Thermally Altered; Large over shot flake caused point to be unusable; Ocala Group
416.013	Zone 7 Trench disturbed just above zone 8		PP/K	1	3.4	2.6 L; 2.4 W; 5.6 Thick; 1.45 Stem W	Thermally Altered; Ocala Group; Beveled base; Irregular flaking
418.003	Trench Zone 7 above Zone 8		Flake, Utilized	1	19.1		Chipping along two edges; Thermally Altered; Ocala Group
418.004	Trench Zone 7 above Zone 8		PP/K	1	17.0	4.74 L; 3.28 W; 1.51 Thick; 1.36 Stem W	Stemmed; Thermally Altered; Part of stem broken; Rough flaking
418.005	Trench Zone 7 above Zone 8		Biface	1	3.0		Thermally Altered; Small regular flakes along two edges; Quartzite
421.003	Zone 7 disturbed		Biface	1	25.2		Thermally Altered; Ocala Group
421.004	Zone 7 disturbed		Biface	1	1.2		Thermally Altered; Ocala Group; Piece of shoulder
421.005	Zone 7 disturbed		Flake, Utilized	1	2.9		Thermally Altered
423.006	Zone 7, disturbed trench		Biface	1	2.0		Thermally Altered; Ocala Group
426.003	Disturbed midden, wall replacement		Flake, Utilized	1	3.2		Chipping along two edges; Ocala Group

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BIOGRAPHICAL SKETCH

Born in California in 1975 to a Navy submariner and a “Domestic Engineer” (as my mom likes to refer to her occupation), I moved around frequently as a Navy Kid. When I was eight years old, we moved to Charleston, S.C. It was there I visited my first archaeological site and went home and announced to my mother, “I want to be an archaeologist.” She patted me on the head and said, “That’s nice dear.” After a few years of restating the same goal, my parents realized I was serious. My parents always encouraged me to study hard and to set a goal of going to college to pursue archaeology.

I came to Tallahassee in 1993 to attend Florida State University’s Department of Anthropology. I received my B.A. in 1997. Shortly afterwards, I went to work for the Florida Master Site File, where I met my future husband who is also an archaeologist. We married in 2000, and in 2003 we welcomed our first daughter Emma and our second daughter Charlotte in 2010.

Along the way, I conducted excavations both on land and in the water. I have excavated underwater Paleoindian sites, Shipwrecks, and have had many underwater adventures. On land, I excavated in Florida, Georgia, the U.S. Virgin Islands, and Tuscany, Italy. Since 2007, I have worked for the National Park Service’s Southeast Archeological Center in Tallahassee, Florida.

I enjoy spending time with my family and friends, traveling, going to the beach and watching movies.