To the Graduate Council:

I am submitting herewith a thesis written by Edward William Wells III entitled "Soapstone Vessel Chronology and Function in the Southern Appalachians of Eastern Tennessee." I have examined the final paper copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Anthropology.

Sarah C. Sherwood, Major Professor

We have read this thesis and
recommend its acceptance:

Accepted for the Council:

Vice Chancellor
and Dean of Graduate Studies

Thesis
2006
.W47

# SOAPSTONE VESSEL CHRONOLOGY AND FUNCTION IN THE SOUTHERN APPALACHIANS OF EASTERN TENNESSEE

A Thesis
Presented for the
Master of Arts Degree
The University of Tennessee, Knoxville

Edward William Wells III
December 2006

# DEDICATION

This thesis is dedicated to my parents, Ted and Elaine Wells.

# ACKNOWLEDGMENTS

Numerous people helped me through the process of writing this thesis. First, I thank my committee, Dr. Sarah C. Sherwood, Dr. Nicholas Herrmann, and Dr. Jefferson Chapman, for agreeing to be a part of the committee and guiding me with constructive criticism. For their specifc contributions, I thank Dr. Sherwood for leading the challenging effort to produce a contributory work and for urging me to explore new ideas about soapstone. Thank you to Dr. Herrmann for helping me with the statistics and maps. I thank Dr. Chapman for helping me with the Iddins soapstone assemblage and for insight into the Iddins site. Thank you to Dr. Boyce Driskell for bringing the assemblage to my attention and providing the opportunity to analyze the assemblage. Also, thank you to Dr. Kandace D. Hollenbach for providing the paleoethnobotanical analysis in this work and Dr. Linda Cummings for conducting the residue analysis.

Considering this thesis was written as the technical report was being prepared, I owe a debt of gratitude to those people who helped me understand the Apple Barn site (40BT90). Specifically, Brad Creswell and Cameron Howell were always willing to discuss the excavations and provide helpful information about the project. I also thank Jennifer Kirkmeyer for her help with curation and Sherri Turner-Herrmann and Clay Berry for their expertise in artifact photography. Thank you to Tim Smith, Charlie Susano, and Scott Meeks for their friendship and support. Thank you to my wife Suzanne who "inspired" me to finish. Finally, to my parents, Elaine and Ted Wells, I am deeply grateful for the love, encouragement and support they have given me throughout my life.

# ABSTRACT

The role of soapstone along the South Atlantic Slope in Late Archaic societies is well researched; however, information concerning both the chronology and function of soapstone vessel use in the South Appalachian region is limited. Excavations at the Apple Barn site (40BT90) in eastern Tennessee has produced one of the largest assemblages of soapstone artifacts in the region. The results of radiocarbon dating, residue analysis (pollen, starch and phytoliths) (Apple Barn only), and vessel attribute analysis from this assemblage and the Iddins Site (40LD38) are used to reconsider regional soapstone chronology and vessel function. The results suggest that soapstone vessels were used to process cultigens in the Early Woodland.

# TABLE OF CONTENTS

CHAPTER

I. INTRODUCTION ..... 1

II. BACKGROUND ..... 7

III. SITE DESCRIPTIONS ..... 19

IV. NATURE OF THE ASSEMBLAGE ..... 37

V. CHRONOLOGY ..... 57

VI. RESIDUE ANALYSIS ..... 72

VII. CONCLUSION ..... 83

REFERENCES CITED ..... 89

VITA ..... 99

# LIST OF TABLES

Table 1. Categories and Method for Recording Vessel and Non-vessel Attributes..... 39
Table 2. Absolute and Relative Frequency of Soapstone Vessel Fragments and Groundstone Tools from the Apple Barn Site and Iddins Site..... 43
Table 3. Counts of Groundstone Objects by Site*..... 44
Table 4. Counts of Surface Condition on Vessel Fragments..... 44
Table 5. Absolute and Relative Frequencies of Vessel Fragments Exhibiting Attributes Indicative of Recycling and Conservation..... 49
Table 6. Counts of Decoration Types by Location on the Vessel..... 51
Table 7. Absolute and Relative Frequencies of Soot and/or Residue Adhering to Vessel Fragments..... 54
Table 8. Absolute and Relative Frequencies of Soapstone by Weight (kg) Recovered from Specific Contexts..... 54
Table 9. Samples Selected from the Apple Barn Site for AMS Dating..... 58
Table 10.Results of AMS Dates from Soot Adhering to Soapstone Vessels at the Apple Barn Site..... 60
Table 11. AMS Dates from the Apple Barn Site and Dates Associated with Soapstone Vessel Use in Eastern Tennessee and Western North Carolina Listed in Chronological Order..... 63
Table 12. Samples Selected for Residue Analysis from the Apple Barn Site..... 75
Table 13. Results of Residue Analysis for the Apple Barn Site (Cummings and Dexter 2005). Results of Residue Analysis are Coded as Plus (+) Indicates Presence and a Blank Indicates Absence..... 76
Table 14. Plant Remains Recovered from 43 Floatation Samples Representing 31 Features with Soapstone from Sites 40BT89, 40BT90, and 40BT91 (Data Supplied by Kandace Hollenbach)..... 80

# LIST OF FIGURES

Figure 1. Location of the Apple Barn site, Sites in the Vicinity with AMS Soot Dates, and Sites Employed in Chronology. Courtesy of ARL, Townsend Archaeological Project..... 2
Figure 2. Distribution of Soapstone Vessel Fragments in Eastern North America (Modified from Truncer 2004a). ..... 8
Figure 3. Excavation Trench Depicting the Sealed Late Archaic Midden ca. 1 m High in Profile (Indicated by the Black Arrow) at the Iddins Site (40LD38). Photo Courtesy of Frank H. McClung Museum. ..... 21
Figure 4. Plan View of Test Units Exposing Midden and Excavated Rock-filled Pits at the Iddin Site. Photo Courtesy of Frank H. McClung Museum. ..... 22
Figure 5. Plan View of the Iddins Site (Modified from Chapman 1981: Figure 19). ..... 23
Figure 6. Plan of the Apple Barn Site Excavation Depicting Eight Adjacent Sections Indicated in Red, in Order These are Presentes asTerrace A, Office Block (OB), OB1, OB2, OB3, OB4, OB5, and C1. Courtesy of ARL, Townsend Archaeological Project..... 26
Figure 7. Example of a Large Storage Pit Excavated at the Apple Barn Site. Courtesy of ARL, Townsend Archaeological Project. ..... 34
Figure 8. Example of a Large Rock Concentration or "Pavement" Encountered at the Apple Barn Site. Courtesy of ARL, Townsend Archaeological Project. ..... 35
Figure 9. Example of a Soapstone Vessel Fragment from the Apple Barn Site Exhibiting Differences Between the Internal Matrix and External Surface. Courtesy of ARL, Townsend Archaeological Project. ..... 42
Figure 10. Example of Lugs from the Apple Barn Site. Courtesy of ARL, Townsend Archaeological Project. ..... 46
Figure 11. Examples of Ground Stone Objects from the Apple Barn Site. Courtesy of ARL, Townsend Archaeological Project. ..... 47
Figure 12. Examples of Decorated Vessel Fragments with Incised Decorations Highlighted in White. Courtesy of ARL, Townsend Archaeological Project..... 50
Figure 13. Examples of Decorated Vessel Fragments from the Poverty Point Site (Modified from Webb 1944:Figure 31). ..... 52
Figure 14. Probabilities for Calendar Dates at the Apple Barn Site. Graph Generated in Oxcal v3.5 Ramsey (2003) Based on Atmospheric Data from Struiver et al. (1998). ..... 62
Figure 15. Probabilities for Calendar Dates by Site in the Region. Highlighted Items Are AMS Dates from Soot Adhering to the Exterior of Soapstone Vessels. Graph Generated in Oxcal v3.5 Ramsey (2003) Based on Atmospheric Data from Struiver et al. (1998). ..... 64
Figure 16. Distribution of all Dates Considered Reliable by Truncer 2004 that are Associated with Soapstone Vessels at the 2-sigma Level (Modified from Truncer 2004: Figure 6). ..... 67
Figure 17. Distribution of All of the AMS Dates from Soot/residue from Soapstone Vessels in the Southeastern United States (Apple Barn Soot Dates in Black) (Modified from Sassaman 2006:Figure 2). ..... 68

# I. INTRODUCTION

In the southeastern U.S., the recovery of relatively large soapstone artifact assemblages from archaeological sites is rare. Excavations at the Apple Barn site (40BT90) in the Southern Blue Ridge of East Tennessee, however, yielded a large assemblage of soapstone artifacts which provided an opportunity to investigate the nature of the assemblage and compare it to another large soapstone assemblage from the Iddins site (Figure 1). Preliminary observations of the soapstone assemblage at the Apple Barn site indicated that some of the soapstone vessel fragments retained soot on the exterior and residue on the interior, presumably from cooking. This provided the opportunity to address both the dating and function of soapstone vessel use at the Apple Barn site through AMS dates obtained from soot and microscopic analysis of residue. Both the dating of soapstone use and the function of the vessels have been the subject of a recent debate in Southeastern archaeology (Sassaman 2006; Truncer 2004b, 2006).

Soapstone is defined as "a metamorphic rock of massive, schistose, or interlaced fibrous or flaky texture and soft, unctuous feel, composed essentially of talc with varying amounts of micas, chlorite, amphibole, pyroxenes, etc. and derived from the alteration of ferromagnesian silicate materials." (Neuendorf et al. 1997:602). Soapstone has both metamorphic and sedimentary origins with the latter occurring less frequently in eastern North America; in the Southeast, soapstone of sedimentary origin is restricted to Alabama and North Carolina (Greene 1995). Soapstone outcrops occur east of the Appalachian Mountains along a beltway extending from eastern Alabama to northern

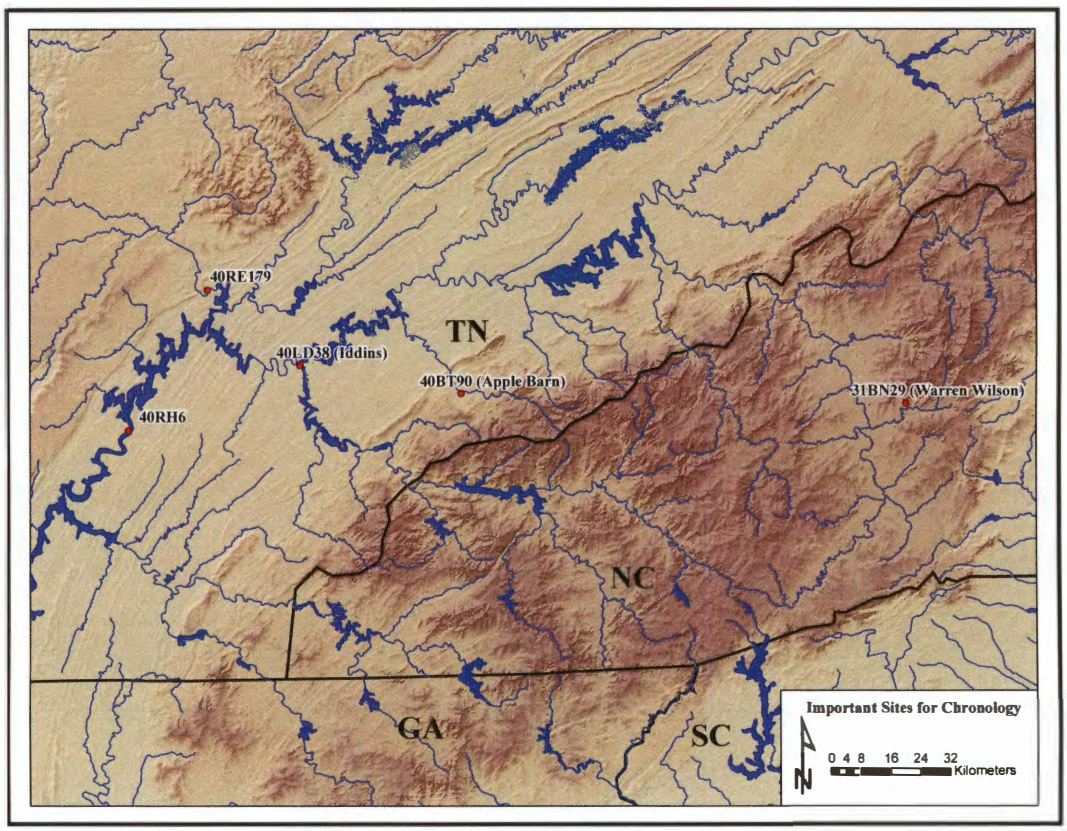



**Figure 1. Location of the Apple Barn site, Sites in the Vicinity with AMS Soot Dates, and Sites Employed in Chronology. Courtesy of ARL, Townsend Archaeological Project.**

mostly in the Piedmont Physiographic Province of Alabama, Georgia, South Carolina, and North Carolina.

Being an easily workable and durable stone, soapstone was manufactured into a variety of different items reflective of the needs of individual cultures around the world. Soapstone occurs and was exploited in Africa, Asia, Europe, the Middle East, South America, Central America, and North America spanning a time frame beginning 10,000 years ago to the present. It was manufactured into many useful items which ranged from small objects for personal adornment (beads, earspools, gorgets, figurines) to large cooking vessels. The manufacture of cooking vessels is spatially restricted to the Middle East, Northern Europe, and North America. Considering its high demand and limited occurrence on the landscape, soapstone was often traded over long distances.

Throughout the prehistory of southeastern North America, soapstone was manufactured into vessels, perforated cooking slabs, gorgets, biconical tubes, earspools, beads, and pipes. With the exception of the southern California coast, intensive exploitation of soapstone for the manufacture of vessels is limited to southeastern North America during the Late Archaic to Early Woodland period (ca. 1800 B.C.-0 A.D.) (Steponaitis 1986:378). Being soft, durable, and resistant to thermal stress, soapstone was a highly suitable source for manufacturing cooking vessels and was probably an important innovation over previous inorganic and organic vessels. The widespread use of soapstone vessels during the Late Archaic/Early Woodland period attests to its importance; however the impetus and duration for this technological innovation is still a matter of debate.

Soapstone vessels were used during a time of great technological and social change in the Southeast. During the Late Archaic period the Poverty Point exchange network existed from ca. 1700 B.C. to 500 B.C. (Webb 1977) and was responsible for the import of soapstone over 500 km from the southern Appalachians to southeastern Louisiana (Smith 1991; Webb 1977). The social hierarchies necessary to organize this exchange and redistribution of resources are considered more complex than the preceding Middle Archaic period (Gibson 1996, 2001), although long-distance exchange networks likely originated from this period (Jeffries 1996).

Because soapstone vessel use covers such a large area and time span, addressing its timing and function is a complex issue. Previous researchers have approached this complexity from both evolutionary and social paradigms. From an evolutionary paradigm, soapstone vessels are viewed as utilitarian items capable of processing food more efficiently than preceding organic and inorganic vessels (Truncer 2004b). From a social paradigm, soapstone vessels are interpreted as an important social mediator in an exchange network dominated by males (Sassaman 1993, 1997). Prior to a recent synthesis of soapstone vessel use in eastern North America (Truncer 2004a), researchers approached the social and technological contexts of soapstone vessel use by sub-regions which include the Middle Atlantic region (Klein 1997), the Savannah River valley of South Carolina (Sassaman 1993, 1995, 1996, 1997), the Piedmont of Georgia (Elliot 1981), and Peninsular Florida (Yates 2000).

As noted above, soapstone vessel use does occur west of the Appalachian summit, but our understanding of the timing, function, and nature of vessel use is obscured by the lack of large vessel assemblages. In order to address these issues, two relatively large

soapstone assemblages were selected from east Tennessee for comparison. The assemblages are the Iddins site (40LD38), a Late Archaic period base camp in the Ridge and Valley Province in east Tennessee, and the Apple Barn site, a recently excavated site in the western portion of the Blue Ridge Province also in east Tennessee. The two sites are in relative proximity to soapstone sources. These two assemblages were analyzed (reanalyzed in the case of the Iddins assemblage) to better understand their composition and variability. In addition, AMS dating of soot adhering to vessel exteriors and residue analysis was conducted on soapstone vessel fragments from the Apple Barn site to better understand the dating and function of soapstone vessels west of the Appalachian summit.

This thesis is presented in seven chapters including the present introductory chapter. Chapter II discusses previous approaches to soapstone use in southeastern North America. The topics addressed include spatial distribution, chronology, manufacturing, sourcing and exchange systems, and function. Chapter III provides the background for the Apple Barn and the Iddins site which are employed in this study for comparison of soapstone assemblages. The descriptions include site background information, excavation methods, summarized results, and interpretations.

Chapter IV presents the results of the analysis of the two assemblages. This chapter consists of the methods for recording the assemblages, the results of the analysis, and a comparison of the two assemblages. Chapter V describes the methods for selecting samples for obtaining AMS dates from soapstone vessels at the Apple Barn site and presents the results. The results are compared to other dates for soapstone vessel use in the Southeast and eastern North America. Soapstone vessels were used at the Apple Barn site from ca. 1400 – 400 cal B.C. and the timing of vessel use at the Apple Barn site is

consistent with the frequency of vessel use during the Late Archaic period and resurgence in use during the Early Woodland period. Chapter VI presents the methods and results of the residue analysis. The results of the residue analysis are discussed in the context of the region and compared to the one other residue analysis on soapstone vessels in eastern North America.

Chapter VII contains a summary of this study emphasizing the inferences derived from soapstone vessel use at the Apple Barn site and the Iddins site. The AMS dates from soot adhering to soapstone vessels and the residue analysis results at the Apple Barn site are addressed in the context of the Late Archaic and Early Woodland periods. The chapter concludes with suggestions for future research.

# II. BACKGROUND

The following sections present previous research on the occurrence of soapstone artifacts in the Southeast. The chapter begins with a description of the spatial and temporal distribution of soapstone in the region. With regards to temporal occurrence, the debate over the chronology of soapstone use is discussed in detail. This is followed by a review of the literature on sourcing, manufacturing, and exchange studies. The chapter concludes with a discussion of the proposed technological (Truncer 2004b) and social function (Sassaman 1995) of soapstone in Late Archaic/Early Woodland societies.

## *Spatial Distribution*

Soapstone vessels occur over the entire Southeast. Their spatial distribution has a nodal quality with concentrations in east Tennessee, western North Carolina, northeastern Louisiana, and southwestern Mississippi (Truncer 2004b:491) (Figure 2). In southwestern West Virginia, Alabama, and Georgia soapstone vessels cluster near major rivers, and in Florida soapstone vessels cluster along both major rivers and coasts (Yates 2000). By far the largest concentration of soapstone vessels and vessel fragments comes from the Poverty Point site where approximately 7000 sherds have been recovered (Truncer 2004a:135) as well as a large cache of whole vessels (Webb 1944). More typically, soapstone vessels are most often recovered from midden contexts and occasionally from caches and burials (Truncer 2004b:495).

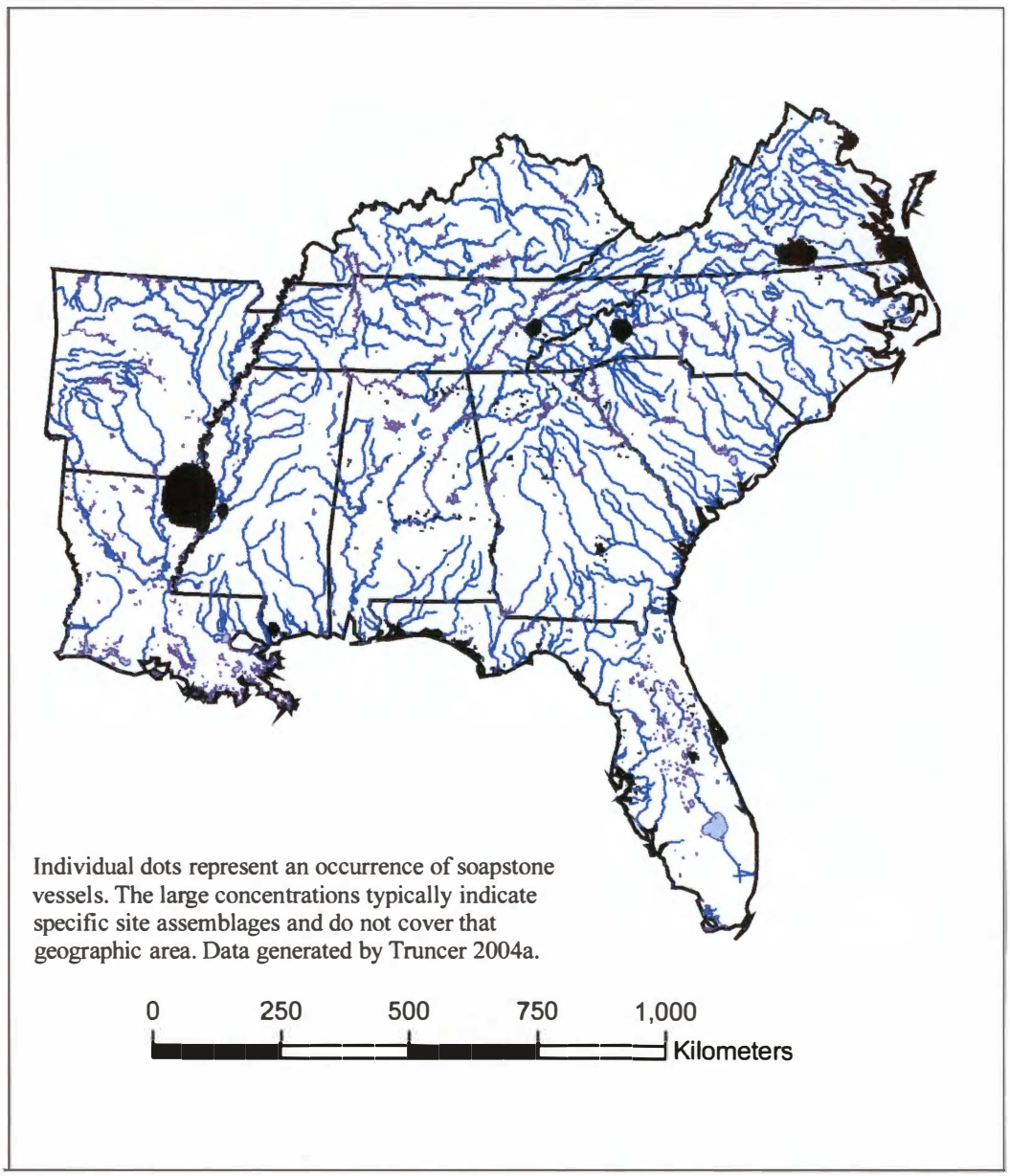



**Figure 2. Distribution of Soapstone Vessel Fragments in Eastern North America (Modified from Truncer 2004a).**

## *Chronology*

Soapstone vessels are traditionally used as a diagnostic artifact of the Late Archaic period in the Southeast (Steponaitis 1986:373). An explanation for this lies in Coe's (1964) *Formative Cultures of the Carolina Piedmont* where soapstone vessels were assigned to the pre-pottery Late Archaic Savannah River phase (see Sassaman 1997:13). Moreover, early evolutionary models inferred soapstone as a natural predecessor to pottery. AMS dates from soot adhering to the exterior of soapstone vessels in the Savannah River valley contradicted this assertion and prompted Sassaman (1993, 1997) to compile AMS dates from soot adhering to soapstone vessels from across the southeastern United States. Results from this study led Sassaman to conclude that, in many cases, soapstone was not the predecessor of pottery. Areas where soapstone postdated the first use of pottery included Peninsular Florida with early Orange series wares and the Savannah River valley with Stallings Island wares. This also prompted Hoffman (1998) to reconsider soapstone chronology in the Northeast. AMS dates from this study indicated that soapstone vessels post-dated early Vignette I pottery which appeared ca. 1000 B.C. (Hoffman 1998).

Pre-1800 B.C. dates have been reported at four sites in eastern North America: the Hagerman site (36LY38) in northern Pennsylvania (Truncer 2004b), the Falcon Field site in southern Georgia (9FY36) (Elliot 1989), the Warren Wilson site (31BN29) in western North Carolina (Keel 1976), and the Gaston site (31HX7) in northeastern North Carolina (Coe 1964). These early dates for soapstone vessel use, however, have recently been debated by Truncer (2004b) and Sassaman (2006). Sassaman (1997, 2006) contends that

soapstone vessel use does not predate ca. 1800 B.C. He maintains that these dates were recovered from ambiguous contexts and, without corroborating AMS dates from the vessels themselves, should be considered anomalous. Truncer (2004b, 2006) insists that the pre-1800 B.C. radiocarbon dates are valid based on the possibility that soapstone vessels could have been used in low frequencies before a change in environmental conditions favored their widespread use. Resource use due to changing environmental shifts are inferred from a rise in use of low-preference mast resources such as red acorn and white oak masts (Yarnell and Black 1985) which require extended boiling for consumption by humans.

Another part of this debate is the termination of soapstone vessel use. By Truncer's (2004b:505) account (relying on all radiocarbon dates), soapstone vessel use exhibits a unimodal curve from approximately 4300-0 cal B.C. with a peak around 1500 cal B.C. By Sassaman's (2006:146) account (relying on AMS soot dates exclusively), soapstone vessels have a bimodal curve with a peak during the height of the Poverty Point exchange network (1900-1100 cal B.C.) and another peak during the Early Woodland period (1000-500 cal B.C.) where soapstone appears in mortuary contexts.

This assimilation of dates for soapstone vessel use (Hoffman 1998; Sassaman 1997, 2006; Truncer 2004b) has provided a better understanding of the temporal distribution of its use in eastern North America and consequently sparked this debate. These dates pose a challenge to previously held notions of soapstone as the predecessor of pottery and have inspired new questions concerning the relationship of soapstone vessels with pottery and function of the vessels through time. This issue will be expanded in Chapter V.

## *Soapstone Sourcing and Exchange*

Sourcing artifacts from their original manufacturing point (i.e. quarries) aids in the reconstruction of exchange networks. Sourcing techniques have included macroscopic and microscopic analyses, and instruments which can characterize the composition of the soapstone artifacts and ideally link these composition signatures to their original source. These results are then applied to regional questions concerning social interaction and segregation.

Sourcing soapstone artifacts began with macroscopic differences to differentiate material types (Bushnell 1940) and was employed later by Schambach (1974) to confirm a southern Appalachian source for soapstone recovered from sites in southwest Arkansas. Macroscopic differentiation typically includes grain size, color, and texture.

The use of microscopic analysis, such as petrography, elemental analyses such as X-ray diffraction analysis, X-ray diffraction analysis gained popularity in the 1970's and early 80's. One sourcing study used all of the above mentioned techniques and, although inconclusive, the results suggested that soapstone artifacts recovered in East Tennessee originated from quarries in western North Carolina (Bohanan 1975).

From the 1980's to the present, sourcing techniques became more precise with the aid of instruments which performed analyses such as Instrumental Neutron Activation Analyses (INAA) and Inductively Coupled - Mass Spectrometry (ICP-MS). These types of analyses made characterizing or "fingerprinting" soapstone quarries more accurate and less time consuming by quantifying Rare Earth Element (REE) frequencies.

INAA was employed in the Middle Atlantic region where twenty-one quarries were characterized (Holland, et al. 1981). Results suggested that sociopolitical boundaries existing during the Historic period had prehistoric roots earlier than previously thought (Luckenbach and Holland 1974:187). Subsequent sourcing studies (Moffat and Butler 1986) shed doubt on the possibility of fingerprinting soapstone quarries. This skepticism was based on observations of greater REE variability within a single source than between sources. Truncer (2004a) intensively resampled the same quarries for INAA testing. With the results, differentiating between quarries was more successful with transitional metal frequencies rather than REE frequencies.

In the Southeast, two soapstone quarries in the Russell Reservoir were subjected to INAA by Elliott (n.d.) to test the validity of the technique for discriminating between sources at a local scale. The results were ambiguous leading Elliot to the conclusion that a larger sample size is necessary to adequately discriminate between sources. In addition, two pieces of the same perforated cooking stone subjected to INAA yielded highly variable results which also led Elliot to question the validity of the technique. Elliott (1981) also conducted a study of exchange mechanisms responsible for the distribution patterns of soapstone artifacts in the Wallace Reservoir of northern Georgia. The possible exchange mechanisms included reciprocity, redistribution, and market exchange. Using a gravity model, Elliot concluded that a reciprocal trade model best explained the correlation between the decrease in soapstone volume with increasing distance from the source. Furthermore, spatial distribution across the state indicated that soapstone vessels were more abundant on the Coastal Plain while perforated soapstone slabs were more abundant on the Piedmont of eastern Georgia.

Yates (2000) used ICP-MS to characterize soapstone vessel fragments from Florida for comparison with previously characterized quarries in Georgia and the Middle Atlantic region. INAA and ICP-MS analysis examine the same REE's but a comparison of the sensitivity to those REE's from the two techniques is yet to be conducted. He concluded that the samples originated from quarries in north central Georgia and possibly as far away as South Carolina and Virginia. Clustering of soapstone vessels along navigable waterways, particularly rivers and coasts in the northern portion of the state, suggested that soapstone vessels were transported along these routes from quarries.

### *Manufacturing Studies*

In southeastern North America, manufacturing studies have focused on quarries because traces of manufacture are distinct and well preserved. Soapstone quarries have been reported in North Carolina (Mathis 1982), South Carolina (Kelly 1969; Overton 1969; Lowman and Wheatley 1970; Edens 1971; Peck 1981), Georgia (Dickens and Carnes 1977; Elliott 1981, 1986; Bloom 1990), and Alabama (Mohr 1883; Wright 1974). These quarries typically occur in the Piedmont. Intensive investigations of quarries in Alabama and North Carolina are rare, whereas Georgia and South Carolina quarries have been intensively investigated by universities (Ferguson 1980; Kelly 1969; Overton 1969; Lowman and Wheatley 1970; Edens 1971; Peck 1981) and private CRM firms (Elliott 1986; Bloom 1990). This discrepancy, in part, is attributed to large-scale modern development in soapstone rich areas such as Atlanta, Georgia (Elliott 1986; Bloom 1990).

In the Southeast, protrusions from outcrops or boulders were the focus of vessel shaping and extraction. Extraction was conducted by forming a mushroom-shaped node

on the knob with quartz "picks" or grooved axes. The node was then separated from the outcrop with a quartz wedge and shaped into a preform to be completed at a nearby habitation site (Elliott 1986:103) or temporary camp (Mathis 1982:99). The distribution of soapstone artifacts outside of the Piedmont (Figure 2) indicates that soapstone vessels and groundstone objects were then traded across the Southeast for use at habitation sites.

### *Technological Function*

Technological studies have focused on soapstone's influence on food processing in the Late Archaic/Early Woodland periods. In the prehistoric Southeast, soapstone was manufactured into vessels and perforated slabs for food processing (Sassaman 1995, 1996). Vessels were presumably used for direct heat cooking based on the presence of exterior soot, charred interior residue, and soapstone's resistance to thermal stress (Truncer 2004a:63-67). In contrast, perforated soapstone slabs were used for indirect heat cooking which consisted of heating slabs on a fire, removing them with a stick (placed in the perforation), and placing them into organic and/or inorganic vessels (e.g., textile or wooden baskets, or pottery) (see Sassaman 1993). In thermal stress resistance tests, perforated soapstone slabs proved to be more resistant to thermal stress than their quartz or sandstone counterparts (Sassaman 1995:229).

Initial explanations for the appearance of soapstone vessels did not include the processing of certain foods (Custer 1984). Truncer (2004a) addressed this problem by analyzing the spatial and temporal distributions of soapstone vessels as they occur in different forest compositions in eastern North America. He also conducted residue analysis on soapstone vessels. Residue analysis focusing on phosphorous content, isotope

analysis, and fatty acid indicated that the samples were used for processing plants (Truncer 2004a:97-98, 2004b:507). Analysis of spatial and temporal distribution suggested that soapstone vessels correlated with mast producing forests east of the Appalachian Summit at a time when low preference mast resources, specifically red acorn and hickory (Yarnell and Smith 1985), were most abundant (Truncer 2004b:507). Factoring in the probability that soapstone vessels could withstand the extended exposure to heat required to process tannin rich masts, Truncer (2004a:78) concluded that soapstone vessels were a response to environmental conditions which favored the use of low preference mast resources. This conclusion was recently opposed by Sassaman (2006:151-153) who pointed out multiple instances where mast resources were processed and consumed without the aid of soapstone vessels. Sassaman (2006) agrees that soapstone vessels were likely used for processing masts but he emphasizes the social importance of soapstone.

### *Social Function*

In contrast to soapstone's role in the domestic economy, a few studies have drawn attention to the potential for soapstone's social influence. In particular, researchers have focused on the role of soapstone in prestige based exchange networks and as a form of social resistance to competing pottery technology. The following discussions represent the research of Sassaman (1993, 1995, 1996) in the Savannah River valley and Klein (1997) in the Middle Atlantic region.

Archaeological investigations in the Savannah River valley (see Sassaman and Anderson 1995) provided a framework for addressing the complexity of soapstone use

during the Late Archaic period. A portion of the upper Savannah River valley lies in the soapstone-rich Piedmont Province of Georgia and South Carolina. In the Savannah River valley indirect-heat boiling was employed prior to ca. 3400 cal B.C. during the Late Archaic by heating quartz cobbles and placing them in organic containers made of wood or textile. Around 3400 B.C. perforated soapstone slabs replaced quartz cobbles for indirect-heat boiling. This was an improvement over quartz cobbles as soapstone is more resistant to the thermal stress of reheating. At approximately 2600 B.C. fiber-tempered pottery appears on the interior Coastal Plain for indirect-heat boiling with soapstone slabs. Fiber-tempered pottery was presumably an improvement over preceding organic containers which were more susceptible to damage from heated stones. Following fiber-tempered pottery, innovations in pottery design on the coastal plain allowed for more efficient use in direct-heat cooking around 2100 B.C. Consequently, this reduced the need for soapstone slabs for indirect-heat boiling and therefore may have posed a threat to the prestige and status achieved through stone exchange networks. This idea is supported by the first use of soapstone vessels in the Piedmont region around 1600 B.C. – a fact that contradicts traditional notions of soapstone vessels as the predecessors to pottery (Sassaman 1995:224-229). Soapstone vessel use continues in the Piedmont until approximately 1200 B.C. when pottery use is widespread across the Southeast. The termination of soapstone vessel use in the Savannah River valley correlates with the approximate demise of the Poverty Point exchange network, suggesting that soapstone vessel exchange in the Savannah River valley was influenced, if not driven, by the Poverty Point exchange network.

In the Piedmont of the Middle Atlantic region, soapstone vessels were used from approximately 1000 B.C. to 0 B.C. Soapstone vessels are eventually replaced by Marcey Creek (steatite-tempered) pottery which is used from approximately 0 B.C. to A.D. 200. Marcey Creek pottery is similar to soapstone vessels in the region in that it exhibits both ovoid and rectangular shapes with flat bases and lugs. Ceramic technology studies and ethnographic evidence indicate that the low vessel height to wide orifice ratio of these soapstone and pottery vessels would have been ideal for indirect-heat cooking and serving the contents to individuals. Klein (1997) proposes that the short use of Marcey Creek pottery was an attempt to carry on traditions associated with the symbolic importance of soapstone.

In conclusion, soapstone research focused on the spatial distribution of soapstone vessels indicates that they occur in concentrations in southern Arkansas, western North Carolina, northeastern Louisiana, southern Mississippi, and eastern Tennessee and are evenly distributed along major waterways in Alabama, Georgia, and South Carolina in the Southeast. Due to the size and weight of soapstone vessels, trade may have been confined by navigable waterways. The timing of soapstone vessel use is still a matter of debate although soapstone use appears to have been most intense during the Late Archaic period from ca. 1900 – 1100 cal B.C. Previous assumptions placing soapstone use before pottery use have been proven inaccurate for the Southeast. This is especially true in the Savannah River valley of South Carolina where soapstone vessel use post-dates the use of Stallings Island pottery (Sassaman 1997). The function of soapstone vessels remains a matter of contentious debate. Interpretations of soapstone vessel function have emphasized their role in processing low-preference mast resources in which soapstone

was suitable for extended boiling. Soapstone vessels may also have served as a social mediator between groups involved in the distribution of soapstone.

With regard to sourcing techniques, the validity of soapstone sourcing results is still in question. While REE distribution patterns from Middle Atlantic quarries allowed for differentiation between quarries, other studies using similar techniques yielded ambiguous results. This ambiguity is not the fault of any one technique or sampling protocol but more the nature of the material itself and the significant variations that can occur in one outcropping or formation of soapstone. To begin to define the variability in one formation at least 25 or more samples must be collected and processed (Truncer 2004a). The results could still be ambiguous, and at a significant cost.

# III. SITE DESCRIPTIONS

## *Introduction*

This chapter describes the Iddins site (40LD38), the type-site for the Iddins Phase, and the Apple Barn site (40BT90). Site information for the Iddins site comes from the site report (Chapman 1981) and information for the Apple Barn site comes from the Phase I report of Townsend (Kim, et al. 1999) as well as updated information from the staff at the Archaeological Research Laboratory (ARL), University of Tennessee, Knoxville where the analysis for the data recovery is currently underway. As mentioned in Chapter I, one goal of this study is to better understand the composition and variability of relatively large soapstone assemblages in the region. Both the Apple Barn site and the Iddins site yielded two of the largest soapstone assemblages in the region.

## *The Iddins Site*

The Iddins site (40LD38) is a Late Archaic residential base on the west bank of the Little Tennessee River, 6.11 kilometers upstream from the confluence of the Tennessee River (Figure 1). It is situated on the first terrace approximately 3 meters above the floodplain and is approximately 228 meters downstream of an unnamed branch which flows into the Little Tennessee River. The site lies on the downstream end of Coytee Shoals, now inundated by the TVA's Tellico Reservoir.

The Iddins site lies in the Oak-Chestnut Forest region (Braun 1950:232) of the Ridge and Valley Physiographic Province (Fenneman 1938:265). The landscape in this

province is characterized by northeast to southwest trending elongated ridges and valleys. It is bordered by the Blue Ridge Physiographic Province to the east and the Appalachian Plateau Physiographic Province to the west. The geology of the area consists of Ordovician and Cambrian limestone, shale, and sandstone (Miller 1974:3).

The excavation was part of the larger University of Tennessee Tellico Archaeological Project initiated by the Tennessee Valley Authority (TVA) for the construction of the Tellico Dam. Excavations, directed by Jefferson Chapman, began in the Fall of 1976 and consisted of a series of backhoe trenches to investigate the possibility of deeply buried deposits. Trenches exposed a sealed Late Archaic midden, buried approximately 1 meter below ground surface, which was investigated further when the Tellico Dam completion was delayed (Figure 3).

A total of 236.78 $m^2$ was excavated with the majority of test units in the Late Archaic midden (Stratum III) (Chapman 1981:60). Archaeological features included rock-filled fire pits, burials, shallow pits, netsinker concentrations, and rock concentrations (or rock pavements) (Figure 4). Rock-filled fire pits were most frequent and occurred in a contiguous line along the riverside portion of the terrace (Figure 5). Iddins type projectile point/knives (PPK), netsinkers, and soapstone vessel fragments were common and are key attributes of the Iddins Phase. Plant foods such as walnut, butternut, goosefoot, and grape occurred in high frequencies (Chapman 1981:129,139). Occurring in lower frequencies were *Amaranthus* (pigweed) and *Poaceae* (wild rice) which are noted here for later discussion.

Terry Ferguson's analysis of the soapstone artifacts focused on material type, vessel portions, vessel refitting, and recycled vessel fragments (Chapman 1981:99-102).

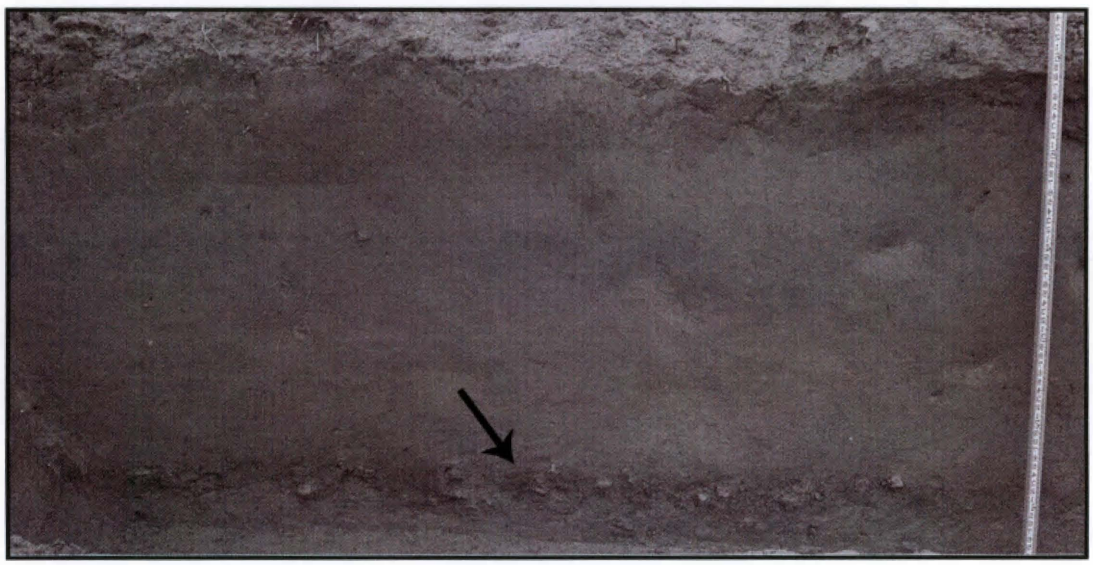


**Figure 3. Excavation Trench Depicting the Sealed Late Archaic Midden ca. 1 m High in Profile (Indicated by the Black Arrow) at the Iddins Site (40LD38). Photo Courtesy of Frank H. McClung Museum.**



**Figure 4. Plan View of Test Units Exposing Midden and Excavated Rock-filled Pits at the Iddin Site. Photo Courtesy of Frank H. McClung Museum.**

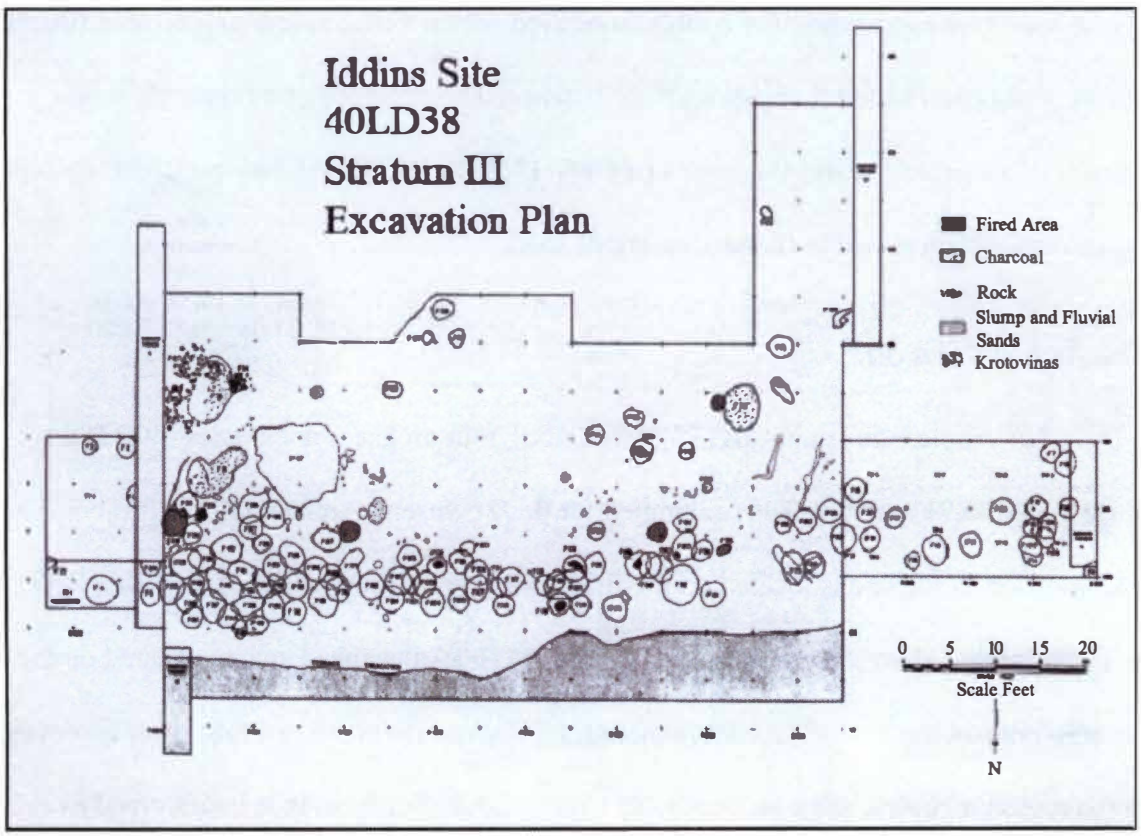



**Figure 5. Plan View of the Iddins Site (Modified from Chapman 1981: Figure 19).**

The majority of the assemblage consisted of vessel fragments with a few reworked vessel fragments and groundstone objects. Refitted vessel fragments from the midden suggest significant vertical displacement of artifacts within the stratum. Partially reconstructed vessels indicate that hemispherical bowls were common at the site.

Radiocarbon dates from the sealed stratum assign a Late Archaic occupation to the site from approximately 2000 – 1500 cal B.C. (Chapman 1981:140). A large number of netsinkers, or sandstone river cobbles modified with notched sides, suggest that fishing significantly contributed to the overall subsistence. The presence of a relatively large amount of soapstone vessel fragments (n=346/ 11.71 kg) indicated that soapstone vessels significantly contributed to the processing of food.

### *The Apple Barn Site*

The Apple Barn site (40BT90) was among four archaeological sites (40BT89, 40BT90, 40BT91, and 40BT94) examined for the Townsend Archaeological Project. The main portion of the site is located on the first terrace on the south side of the Little River in Tuckaleechee Cove, Blount County, Tennessee. Tuckaleechee Cove is situated on the western edge of the Blue Ridge Physiographic Province (Fenneman 1938). Similar coves in the region include Cades, Bumpass, and Wear Cove. This province is described as rugged terrain with heavily forested slopes and rushing streams and consists of Precambrian sedimentary and metamorphic sandstone, conglomerate, arkose, and siltstone (Miller 1974:3). It also falls within the Ridge and Valley Section of the Oak-Chestnut Forest region (Braun 1950:201).

The University of Tennessee Transportation Center Archaeology Studies Group conducted excavations at the site in 1999 and 2000. Archaeological testing and mitigation were conducted in unison to expedite the construction of State Routes 73 (U.S. 321) and 337. The analysis of the site is currently underway. This phase of the larger project is being carried out by an interdisciplinary team through the ARL, funded by a grant from the Federal Highways Administration. Analysis and preparation of the final report are ongoing and therefore this description represents information about the site available at this time.

A total of 23,882 $m^2$ was excavated at the Apple Barn site (40BT90). Excavations were divided into Areas A, B, and C (Figure 6). Excavation methods in these areas consisted of removing the plowzone with power machinery and hand excavating sub-plowzone features. Political strife associated with the mitigation of the site limited investigations of burials and, consequently, most of the burials were not removed.

The site consists of occupations from the Early Archaic through Historic Cherokee periods with almost no vertical stratigraphy. Therefore differentiating between features of a certain component in the field was difficult. In the middle of the site, numerous large, deep storage pits associated with the Late Archaic period were encountered in Area B (Figure 7). Many of these pits contained soapstone artifacts. Another small cluster of these large pits was excavated at the eastern end of the site (Area C) and also contained soapstone artifacts. A rock concentration, similar to those encountered at the Warren Wilson (Keel 1976), Iddins (Chapman 1981), and Patrick site (Schroedl 1986), was excavated at the western end of the site (Area A) and also contained soapstone (Figure 8). Like the Iddins site, a relatively large soapstone artifact

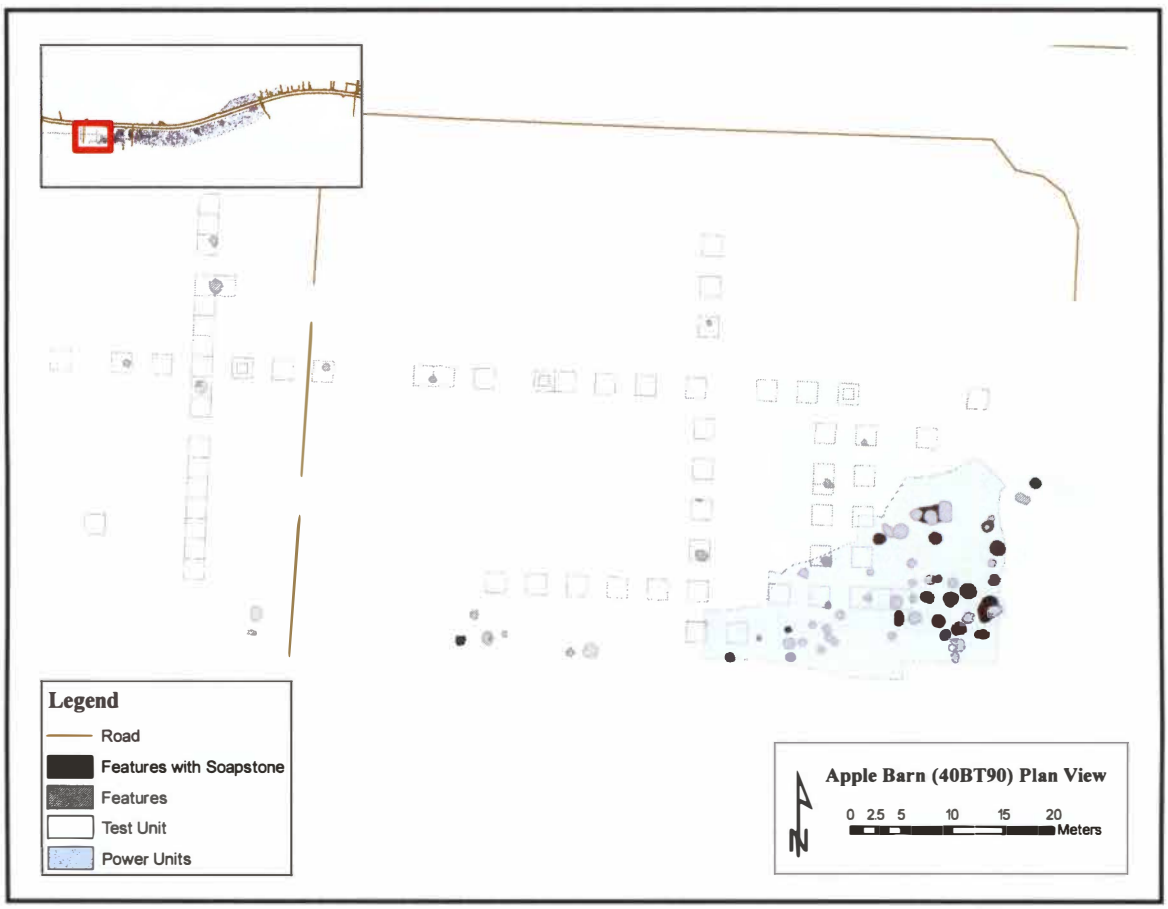



**Figure 6. Plan of the Apple Barn Site Excavation Depicting Eight Adjacent Sections Indicated in Red, in Order These are Presentes asTerrace A, Office Block (OB), OB1, OB2, OB3, OB4, OB5, and C1. Courtesy of ARL, Townsend Archaeological Project.**

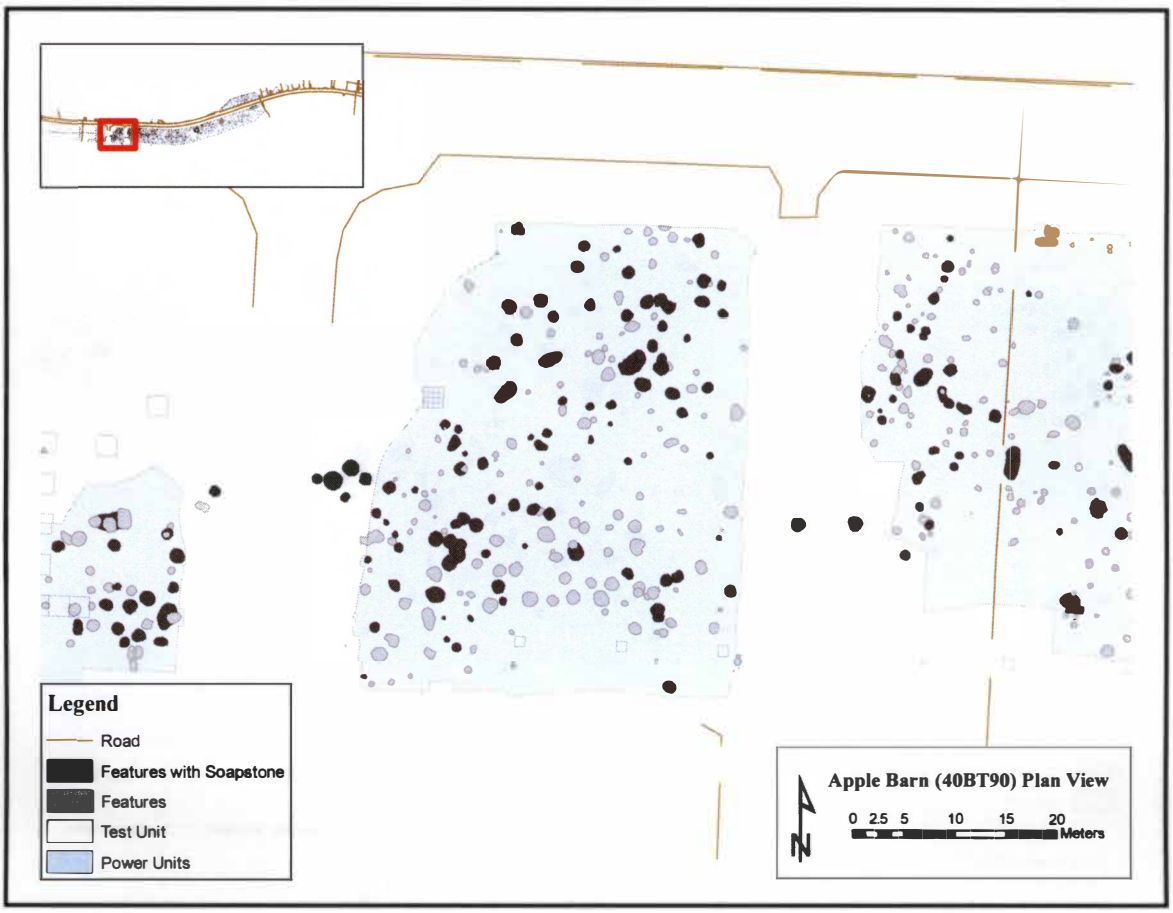



**Figure 6. Continued.**

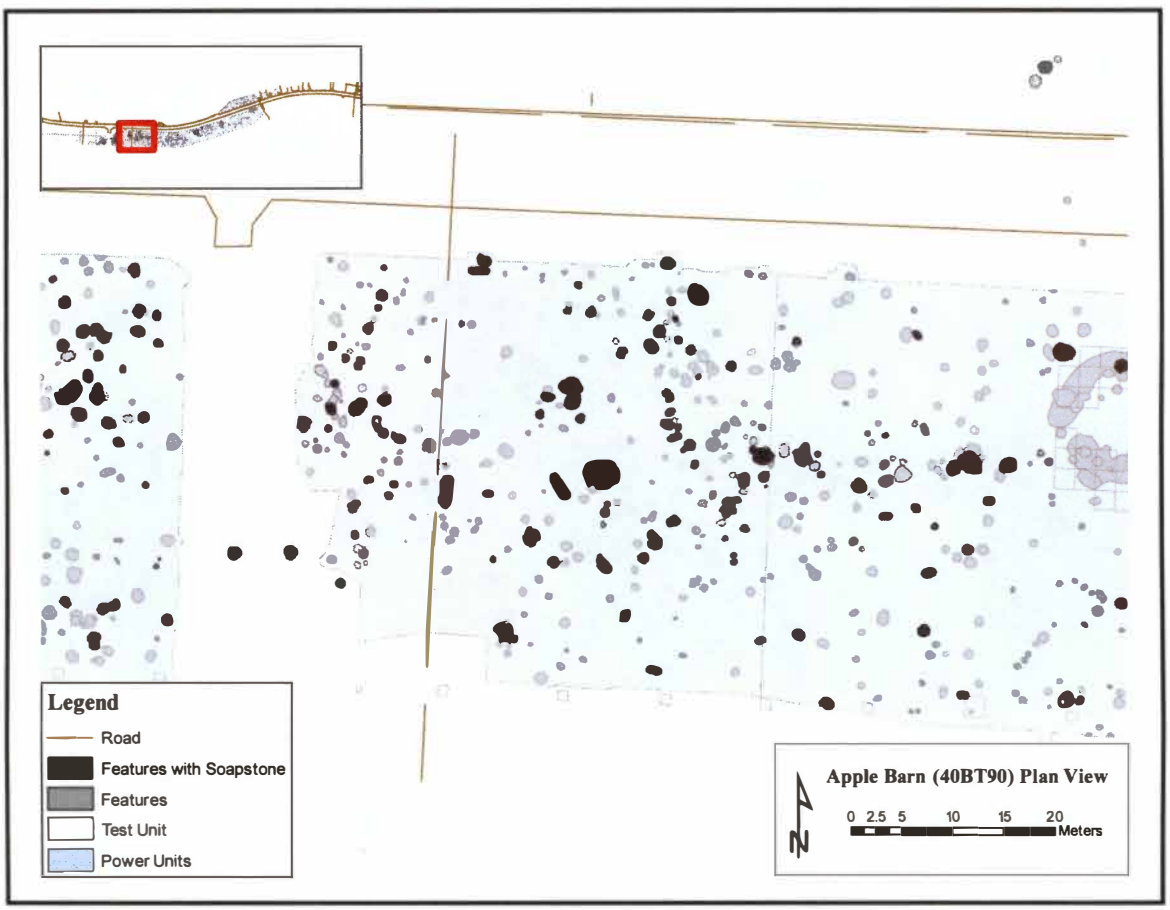



**Figure 6. Continued.**

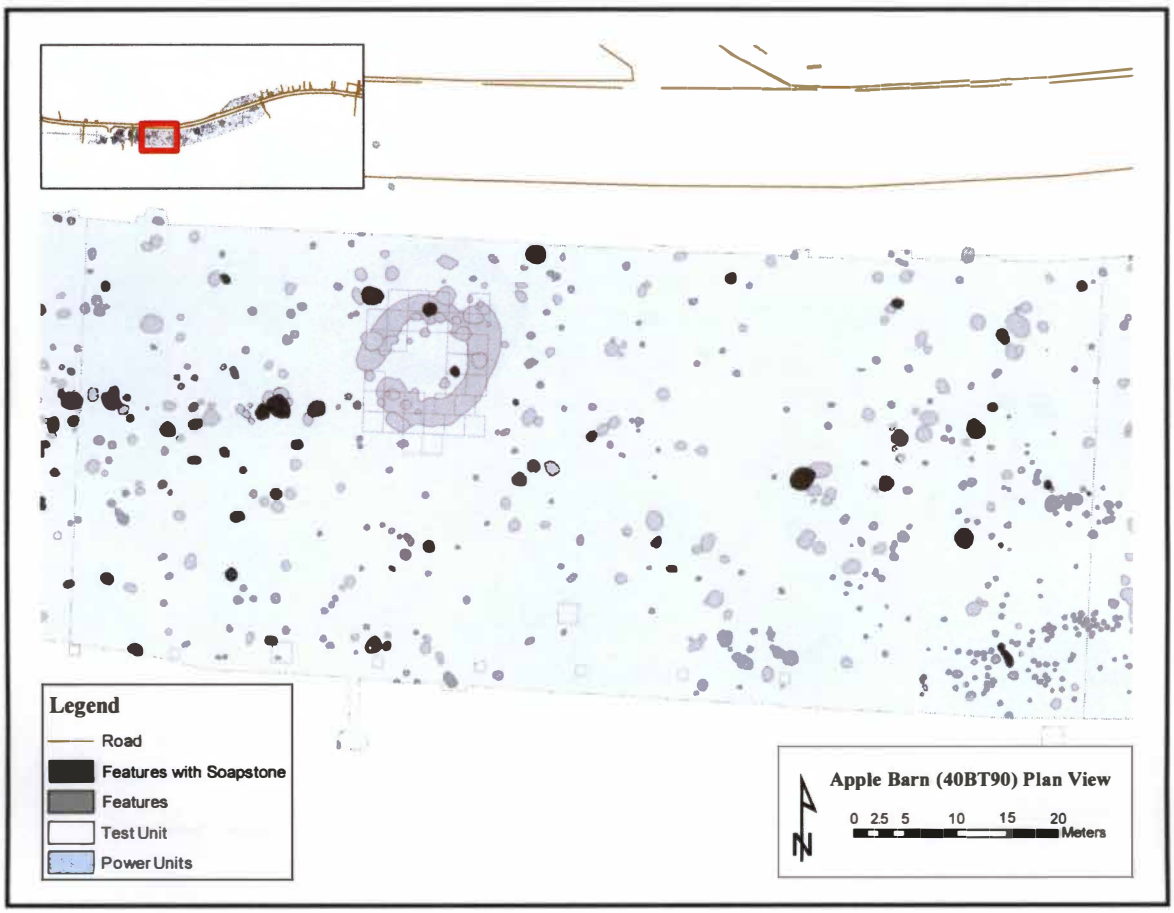



**Figure 6. Continued.**

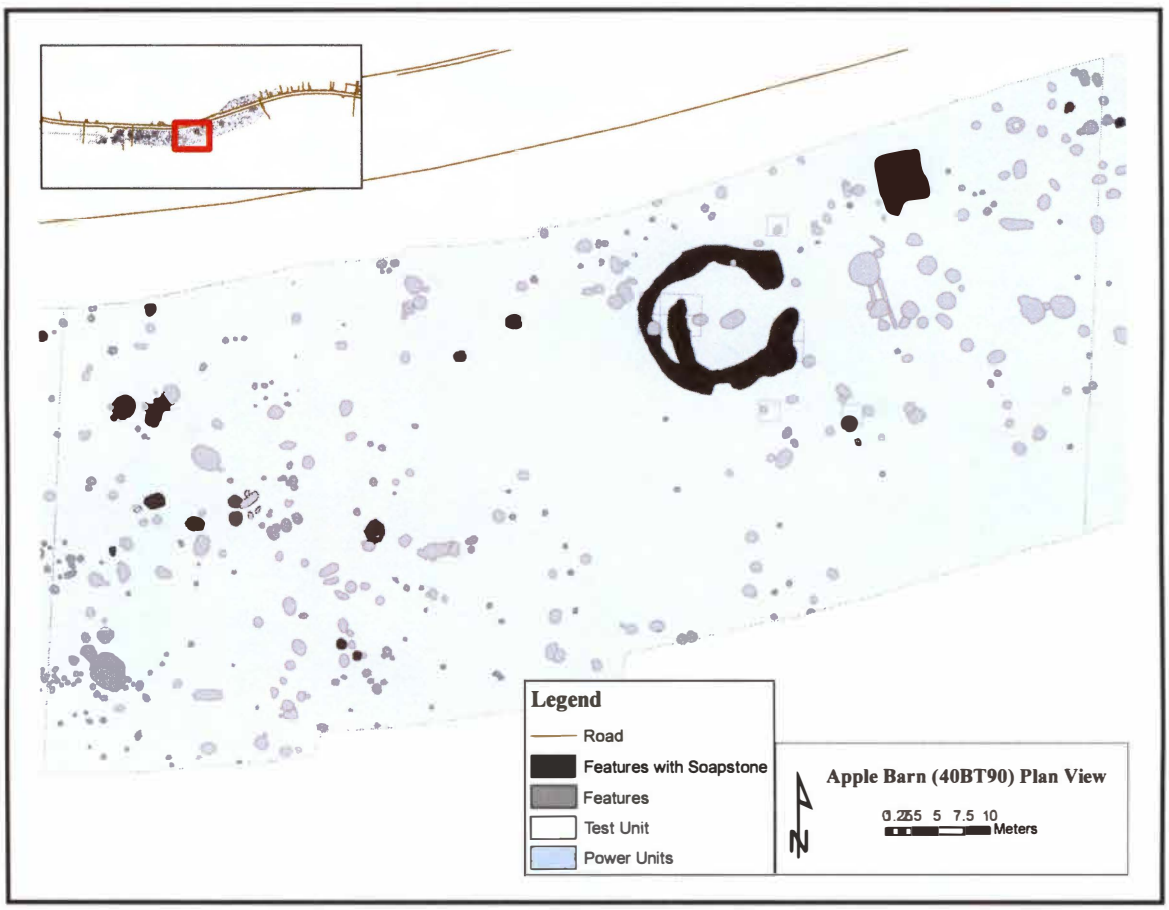



**Figure 6. Continued.**

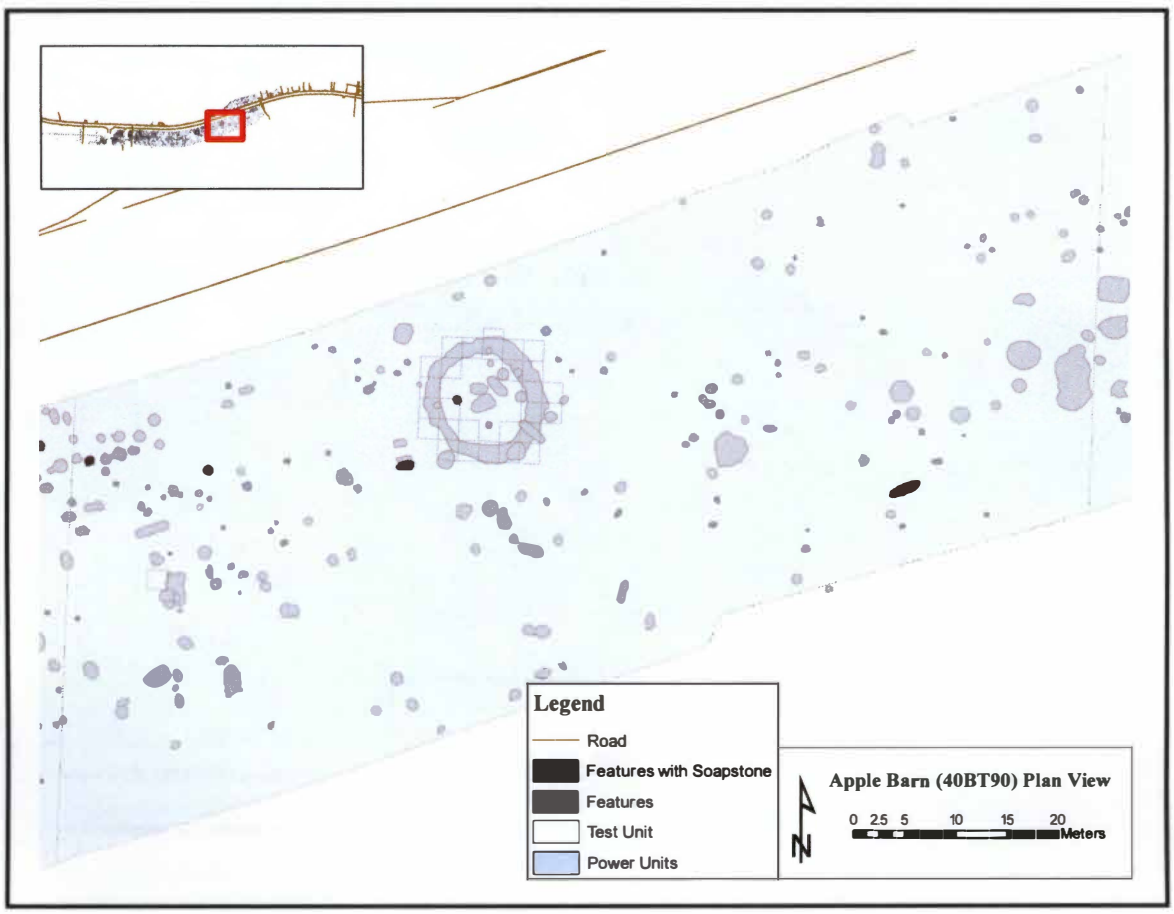



**Figure 6. Continued.**

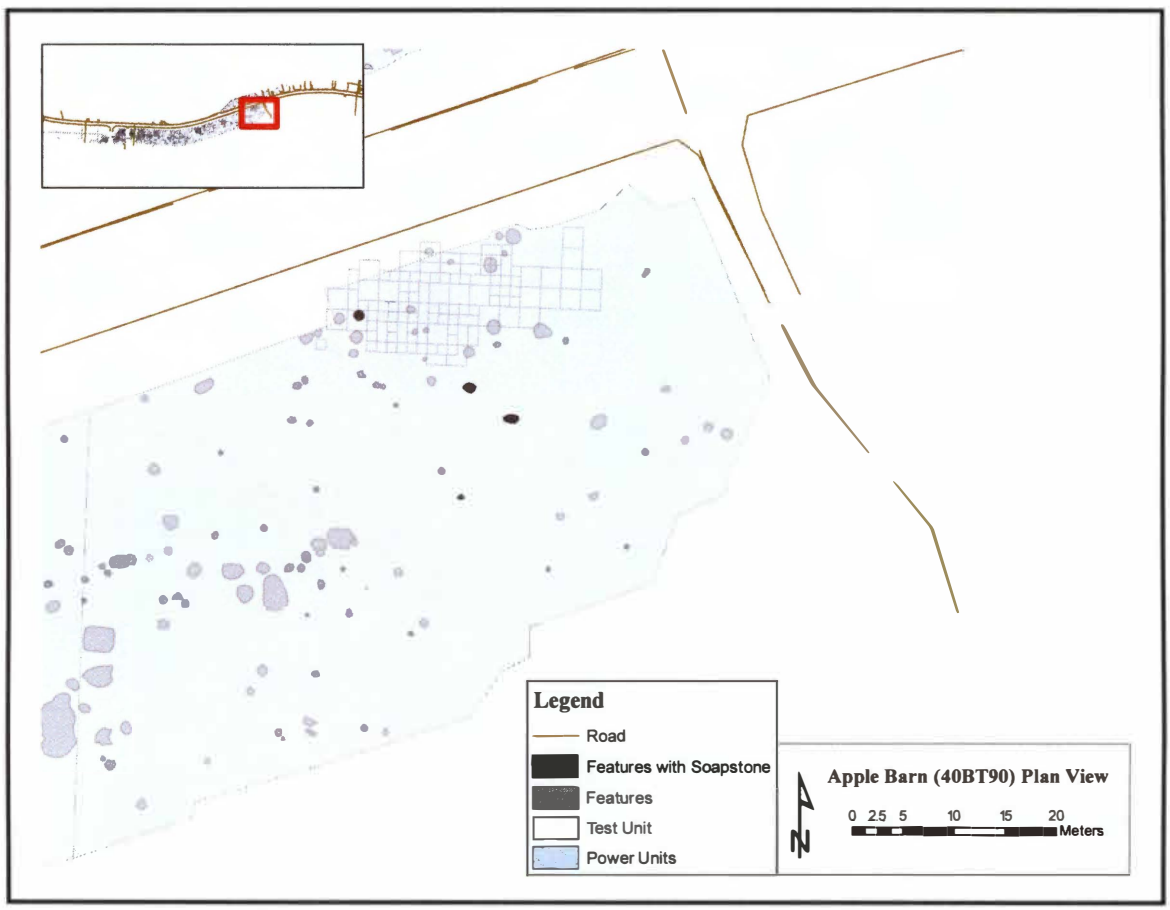



**Figure 6. Continued.**

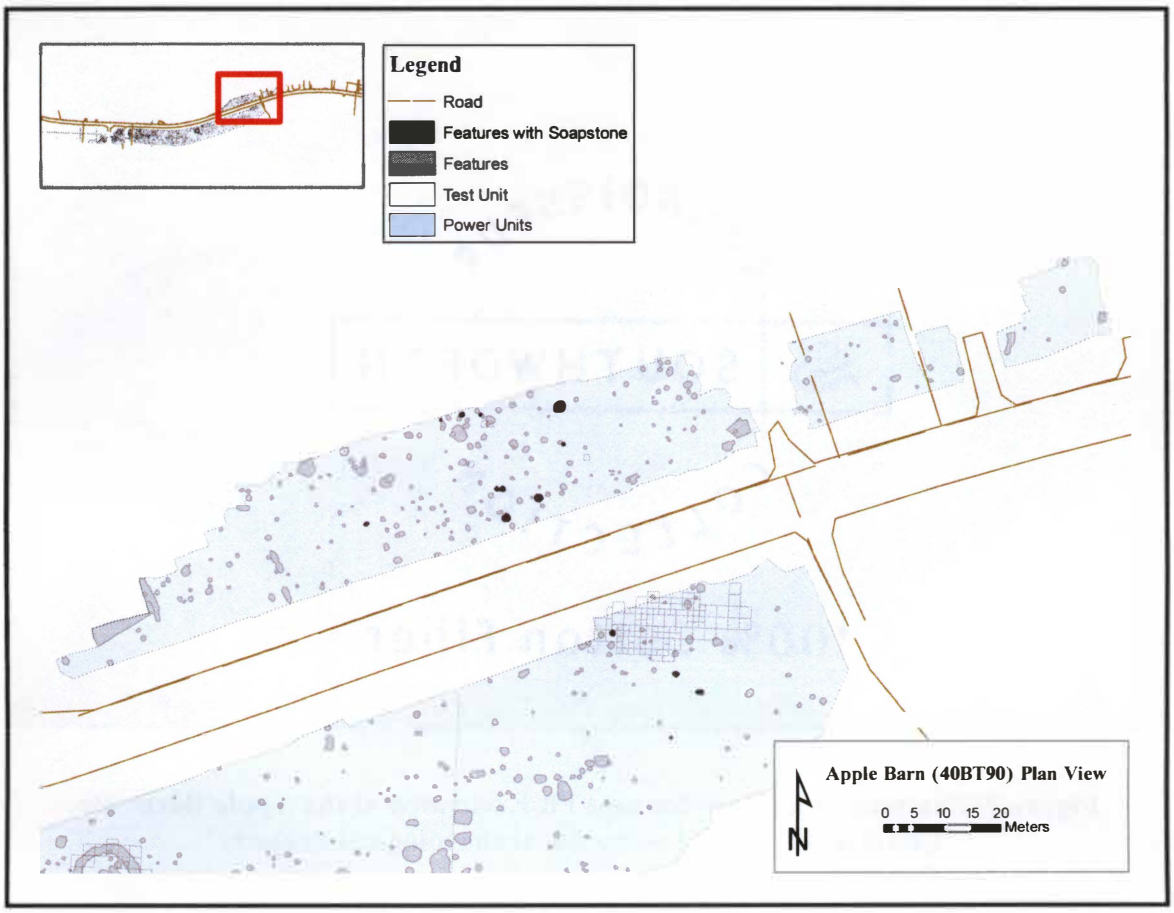



**Figure 6. Continued.**



**Figure 7. Example of a Large Storage Pit Excavated at the Apple Barn Site. Courtesy of ARL, Townsend Archaeological Project.**

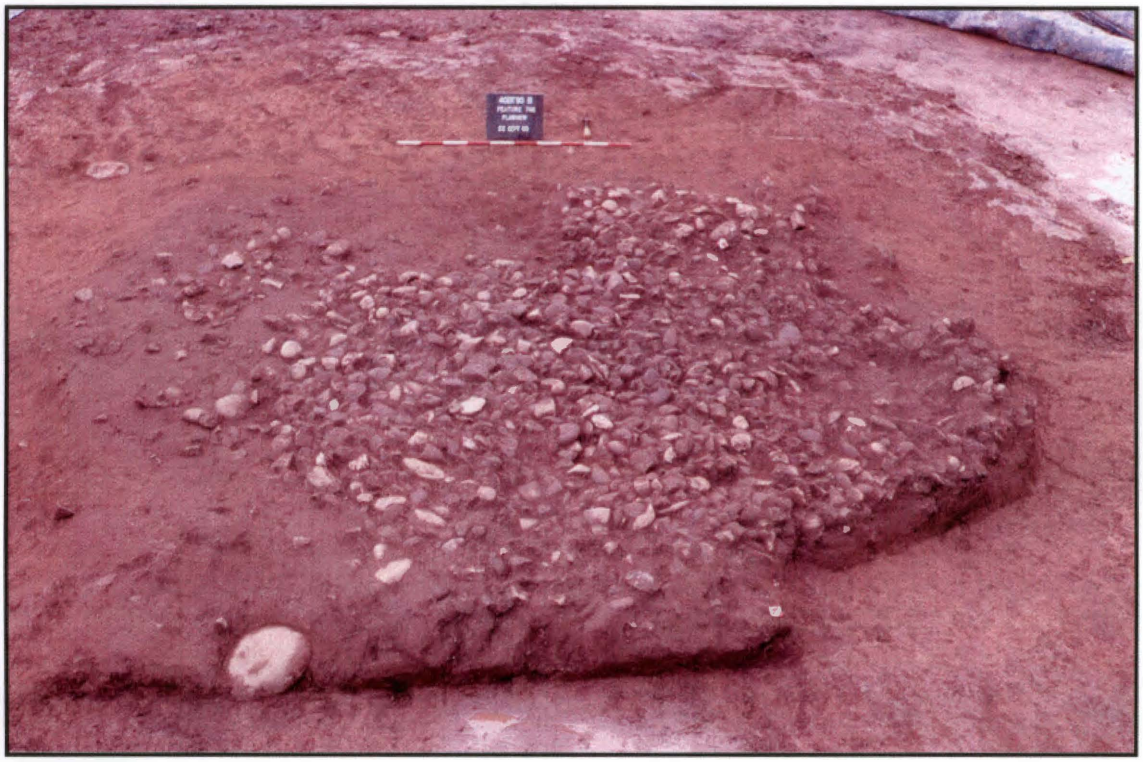


**Figure 8. Example of a Large Rock Concentration or "Pavement" Encountered at the Apple Barn Site. Courtesy of ARL, Townsend Archaeological Project.**

assemblage (n=1379/ 21.11 kg) was recovered from Late Archaic/Early Woodland (or Terminal Archaic) features. Although the majority of soapstone artifacts were recovered from Late Archaic/Early Woodland features, soapstone from all contexts is used in the analysis.

# IV. NATURE OF THE ASSEMBLAGE

Soapstone assemblages have been recovered from archaeological sites across the Southeast but have never been systematically compared. In order to gain a better understanding of the variability that exists within and between soapstone assemblages, two relatively large assemblages, one from the Iddins site (40LD38) and the other from the Apple Barn site (40BT90), are compared. This chapter presents the results of the attribute analysis and the comparison of the soapstone assemblages from those sites. The methods for this analysis are first provided followed by the results. The results consist of tables of absolute and relative frequencies of attributes which provide the basis for comparison.

## *Assemblage Descriptions*

From the Iddins site a total of 346 soapstone artifacts (11.71 kg) were analyzed for this study. Five were groundstone tools and the remaining 341 were vessel fragments. Sixteen reworked vessel fragments and one ovoid object could not be relocated for this study and they are included in the result tables numerically only.

The Apple Barn site yielded an assemblage of 1379 soapstone artifacts with a total weight of 21.11 kg. The assemblage consisted of 1359 vessel fragment and 20 groundstone objects, four of which were likely reworked from vessel fragments. Ten of the vessel fragments showed evidence of reworking but were not completely reworked into groundstone objects.

## *Methods for Describing the Assemblages*

Because soapstone artifacts typically occur on sites in low numbers, previous analyses of soapstone assemblages are usually limited to counts, weights, and measurements by type, and occasionally the vessel fragments are reported by material type and the portion of the vessel represented (e.g. rim, body, etc.). In order to address the nature of the assemblages in this study, the analysis focused on both metric and non-metric attributes (Table 1). The attributes were recorded in an IBM DB2 relational database designed and maintained at the Archaeological Research Laboratory at the University of Tennessee (ARL). Metric attributes were recorded to 1/100 of a millimeter with digital calipers and to a 1/100 of a gram on digital scales. Artifacts were size graded into greater than 5.00 cm, greater than ½", and less than ½" categories to maintain consistency with size classifications developed for pottery fragments at ARL. Artifacts were first separated with a ½" mesh screen and then those artifacts >½" were further separated into the >½" or >5cm grade with digital calipers. Non-metric vessel attributes were analyzed both macroscopically and microscopically using a Zeiss Stemi 2000 stereoscopic microscope. The majority of the observations to assess the presence of soot were made with magnifications up to 225x.

## *Methods for Determining the Archaeological Contexts*

Since the analysis of the Townsend Archaeological Project is ongoing, broad categories of feature function are necessary to analyze correlations between the artifacts and their context of recovery. All features containing soapstone were placed into one of

**Table 1. Categories and Method for Recording Vessel and Non-vessel Attributes.**

| Category | Variable |
|---|---|
| Non-vessel | Nominal |
| Reworked | Presence/Absence |
| Lip Type | Nominal |
| Rim Type | Nominal |
| Base Type | Nominal |
| Interior Surface Condition | Nominal |
| Exterior Surface Condition | Nominal |
| Indeterminate Fragment Surface Condition | Nominal |
| Lip Decoration | Nominal |
| Rim Decoration | Nominal |
| Lug | Presence/Absence |
| Use Wear Groove | Presence/Absence |
| Perforation | Nominal |
| Perforation Type | Nominal |
| Perforation Count | Numeric |
| Interior Sooting | Presence/Absence |
| Exterior Sooting | Presence/Absence |
| Undetermined Sooting | Presence/Absence |
| Max. Rim Thickness | Numeric |
| Min. Rim Thickness | Numeric |
| Max. Lip Thickness | Numeric |
| Min. Lip Thickness | Numeric |
| Max. Body Thickness | Numeric |
| Min. Body Thickness | Numeric |
| Max. Base Thickness | Numeric |
| Min. Base Thickness | Numeric |
| Max. Indeterminate Thickness | Numeric |
| Min. Indeterminate Thickness | Numeric |
| Weight | Numeric |
| Size | Nominal |
| Count | Numeric |
| Feature Function | Nominal |

six feature categories. The context of recovery for soapstone artifacts at the Iddins site is derived from the final site report (Chapman 1981). These categories consist of storage features, non-storage features, burials, rock concentrations, cooking features, and non-functional contexts.

Features with soapstone at the Apple Barn site were first divided into storage and non-storage features by using a depth: diameter ratio of 0.5 or greater for storage features and a less than 0.5 ratio for non-storage features. This method was developed by Schroedl (1986:90-97) at the Chota-Tanasee site in East Tennessee and also employed at the Bailey site (Bentz, et al. 1996) in southern Middle Tennessee.

From the non-storage pits, descriptions from field notes were used to identify burials, rock concentrations, cooking features, and non-functional contexts. Rock concentrations included rock pavements, rock-filled pits, and rock-lined pits. Cooking features include hearths, earth ovens, and rock-filled fire pits. Since these two classes of features are similar, cooking features were based on the presence of in situ charred earth and/or charcoal. Non-functional contexts included General Surface Collections (GSC), Test Units (TU), and Post Molds (PM). GSC's represent artifacts collected after the plow zone that had been stripped and therefore were out of context. It should be noted that artifacts recovered from GSC's could have been plowed out of features and were not necessarily from middens or buried surfaces. TU's represent traditional Phase II 1 x 1m test units excavated in 10cm levels. PM's are features related to the structural elements of buildings.

*Discussion*

Although systematic characterization of vessel types was not conducted in this study, I did get a general impression of vessel shape while analyzing the assemblages. The Iddins site vessels are mostly large, hemispherical and with unrestricted orifices. Vessels from the Apple Barn site are more variable. Vessels were both small ( ≤20cm) and large (>20 cm) (in orifice diameter) (see Truncer 2004a:61, 63) and exhibited oval, hemispherical, and rectangular shapes; the dominant vessel shape appears to be hemispherical. All portions of the vessel are represented although vessel bases are almost all but absent. The paucity of vessel base fragments may be due to three reasons. One, basal fragments were mistaken for body fragments; two, basal fragments were reworked into groundstone objects more frequently than other vessel fragments; and three, vessel bases were "burned through" by repeated heating as suggested by Werner (1972:87) and were difficult to recognize.

Systematic characterization of the material properties of soapstone at both sites was difficult because the material properties were likely altered by manufacture and use wear. In one instance, a fresh fracture plane exhibited vastly different material properties compared to the exterior and interior surface conditions (Figure 9). This leads me to question the usefulness of previous macroscopic characterizations of soapstone. It is worthy to note, however, that the Apple Barn assemblage exhibited a wide range of material likely originating from multiple sources.

The total weight of soapstone artifacts at the Iddins site is 11.71 kg with 11.56 kg (99%) of this total being soapstone vessel fragments and the remaining 0.15 kg (1%) being groundstone objects (Table 2). The total weight of soapstone artifacts at the Apple




**Figure 9. Example of a Soapstone Vessel Fragment from the Apple Barn Site Exhibiting Differences Between the Internal Matrix and External Surface. Courtesy of ARL, Townsend Archaeological Project.**

**Table 2. Absolute and Relative Frequency of Soapstone Vessel Fragments and Groundstone Tools from the Apple Barn Site and Iddins Site.**

| Site | Total Weight of Vessel Fragments (kg) | Total Weight of Groundstone Objects (kg) | Total Weight (kg) |
|---|---|---|---|
| Apple Barn | 20.65 (98%) | 0.46 (2%) | 21.11 |
| Iddins | 11.56 (99%) | 0.15 (1%) | 11.71 |

Barn site is 21.11 kg with 20.65 kg (98%) of this total being soapstone vessel fragments and the remaining 0.46 kg (2%) being groundstone objects (Table 3). In weight, the Apple Barn site contained twice as many soapstone artifacts as the Iddins site. The relative weight ratio of groundstone objects to vessel fragments was approximately equal at 1g of groundstone objects to every 99g of vessel fragments at both sites.

The relative frequency of artifact size grades by weight: count ratio at both sites are approximately equal as well. Both sites contain a greatest weight: count ratio of soapstone artifacts in the >5cm size grade, the second greatest ratio in the >½" size grade, and the least in the <½" size grade. A high weight: count ratio in the <½" size grade might indicate that unfinished vessels were traded in and completed at the site. This however is not the case. The low weight: count ratio at the Iddins site (2%) and the Apple Barn site (1%) suggest that soapstone vessels reached the sites in finished form. This is consistent with suggestions that soapstone vessels were finished at habitation sites in close proximity to quarries or in the source area (Elliott 1986:107).

The majority of soapstone vessel fragments at the Iddins site were smoothed on the interior and exterior of the vessel (Table 4). In contrast, the surface conditions of vessel fragments at the Apple Barn site showed greater variation. The assemblage was dominated by exterior surface conditions which were different from the interior. These

**Table 3. Counts of Groundstone Objects by Site*.**

| Groundstone Tool | Apple Barn | Iddins |
|---|---|---|
| Bead | 1 | |
| Gorget | 3 | |
| Ovoid-shaped Object | 5 | 4 |
| Palette-shaped Object | 3 | |
| Earspool | 1 | |
| Triangular, Trapezoidal-shaped Object | 5 | 1 |
| Atlatl Weight | 1 | |
| Elbow Pipe | 1 | |
| Total | 20 | 5 |

* Counts also reflect artifacts that were reworked from vessel fragments.

**Table 4. Counts of Surface Condition on Vessel Fragments.**

| Site | Surface Condition | Interior | Exterior |
|---|---|---|---|
| Apple Barn | | | |
| | Smoothed | 295 | 84 |
| | Irregular | 36 | 203 |
| | Chiselled | 32 | 55 |
| | Eroded | 13 | 23 |
| | Polished | 3 | 3 |
| | Gouged | 1 | 8 |
| | Total Observed | 380 | 376 |
| Iddins | | | |
| | Smoothed | 192 | 171 |
| | Irregular | 12 | 34 |
| | Chiselled | 10 | 23 |
| | Eroded | - | 2 |
| | Polished | - | - |
| | Gouged | - | 1 |
| | Total Observed | 214 | 231 |

surface conditions included smoothed, gouged, chiseled, irregular, polished, and eroded. Of those fragments with similar surface conditions on the interior and exterior, smoothed conditions were most frequent (19%).

The presence of lugs (n=13) and use wear grooves (n=5) on vessel fragments at the Apple Barn indicates that suspension was an important technique for cooking whereas the absence of these attributes at the Iddins site suggests that soapstone vessels were placed directly on top of fires or heated stones. Lugs and use wear grooves, where present, are typically located near the rim of vessels (Figure 10). The results mentioned above would be biased by a greater frequency of vessel/rim fragments at one site over another, however the relative frequency of vessel rim/body fragments at the Iddins site (5%) and at the Apple Barn site (6%) are approximately equal.

Refitted pieces of vessel fragments were three times as great in number at the Iddins site (n=33) in comparison to the Apple Barn site (n=13). It is likely that the sealed Late Archaic stratum at the Iddins site prevented subsequent groups inhabiting the site from finding and reworking vessel fragments. This might account for the higher number of refitted pieces at the Iddins site. Conversely, the portion of the Apple Barn site yielding the majority of soapstone vessel fragments was frequently occupied after the Late Archaic period. The repeated occupations of the site into the Protohistoric period increased the chance of disturbance or discovery and use of vessel fragments by later groups. Moreover the presence of groundstone objects such as beads and earspools, and from the Apple Barn site are associated with the later Woodland and Mississippian periods (Figure 11).




**Figure 10. Example of Lugs from the Apple Barn Site. Courtesy of ARL, Townsend Archaeological Project.**




**Figure 11. Examples of Ground Stone Objects from the Apple Barn Site. Courtesy of ARL, Townsend Archaeological Project.**

The term conservation, as used by archaeologists, is defined as a "process that brings about a change in the function (but not form) of an object such that (often permanent) preservation is intended" (Schiffer 1976:40). In like manner, recycling, in archaeological terms, is defined as "an activity whereby a secondary material is introduced into an industrial process in which it is transformed into a new product in such a manner that its original identity is lost" (see Schiffer 1976:38). Conservation of soapstone vessels is evident through the presence of perforations which were used to prevent cracks from lengthening or to mend cracks by placing perforations on either side of the crack and binding it with twine. Recycling is evident through reworking of vessel fragments into groundstone objects. Occasionally vessel fragments are reworked generally, or tested, and discarded or cached. The degree of conservation and recycling at both sites appears to be equal (Table 5). While the Apple Barn site is in closer proximity in straight line to known sources of soapstone (ca. 25 miles), acquiring these resources probably required over land transport because the Little Tennessee River and Little River, while adjacent, exist in separate watersheds (see Kimball 1985, Figure 14). Conversely, the Iddins site is located twice the distance from known sources (ca. 50 miles), but the sources are located in close proximity to tributaries that feed into the headwaters of the Little Tennessee River; therefore facilitating transport of soapstone downstream to the Iddins site. The lack of vertical stratigraphy at the Apple Barn site complicates the comparison because the frequencies may be biased by the possibility of reuse by post Late Archaic/Early Woodland people inhabiting the site.

**Table 5. Absolute and Relative Frequencies of Vessel Fragments Exhibiting Attributes Indicative of Recycling and Conservation.**

| Site | Recycled | Perforations | Total Possible |
|---|---|---|---|
| Apple Barn | 14 (3%) | 9 (2%) | 530 |
| Iddins | 14 (6%) | 7 (3%) | 222 |

Decorative motifs on soapstone vessels are primarily restricted to vessel lips and rims and occasionally extend from the rim to the body. Specifically, decorations on soapstone vessels are primarily tick marks or grooves along the lip and/or rim, and occasionally successive grooves are paired to form a chevron pattern (Figure 12). In the Southeast similar decorative motifs have been observed in Alabama (Newman 2002), Florida (Yates 200), Kentucky (Dougherty 1970), northeastern Louisiana (Webb 1944), South Carolina (Bushnell 1925), and eastern Tennessee (Harrington 1922; Chapman 1981). The frequency of decorated vessel fragments at the Apple Barn site and the Iddins site is approximately equal, however the variation in decorative motifs at Apple Barn site is much greater than the Iddins site (Table 6).

Both sites share similar decorative motifs with soapstone vessels at the Poverty Point site (Figure 13). The use of decorated soapstone vessels at the Apple Barn and Iddins sites suggest that these motifs originated in the Southern Appalachians and the Poverty Point people were the recipients of soapstone vessels with these motifs. Moreover, the similarity and contemporaneity (see Chapter VI) of these motifs suggest that the Tennessee River and its tributaries played an important role in the distribution of soapstone to non-source areas, such as Poverty Point, as previously suggested by Webb (1977) and Smith (1991).




**Figure 12. Examples of Decorated Vessel Fragments with Incised Decorations Highlighted in White. Courtesy of ARL, Townsend Archaeological Project.**

**Table 6. Counts of Decoration Types by Location on the Vessel.**

| Site | Decor | Lip | Rim | Lug |
|---|---|---|---|---|
| Apple Barn | | | | |
| | Double Channel Groove | 3 | 5 | - |
| | Double Line Chevron | 1 | 1 | - |
| | Notched | 5 | 1 | 1 |
| | Polished | 1 | - | - |
| | Single Channel Groove | 7 | 3 | - |
| | Transverse Lines | 4 | - | - |
| | Single Channel Groove | 1 | - | - |
| | Red Film | - | - | 1 |
| Iddins | | | | |
| | Double Channel Groove | - | 3 | - |
| | Double Line Chevron | - | - | - |
| | Notched | 17 | 2 | - |
| | Polished | - | - | - |
| | Single Channel Groove | - | - | - |
| | Transverse Lines | 2 | - | - |
| | Single Channel Groove | 2 | - | - |
| | Red Film | - | - | - |

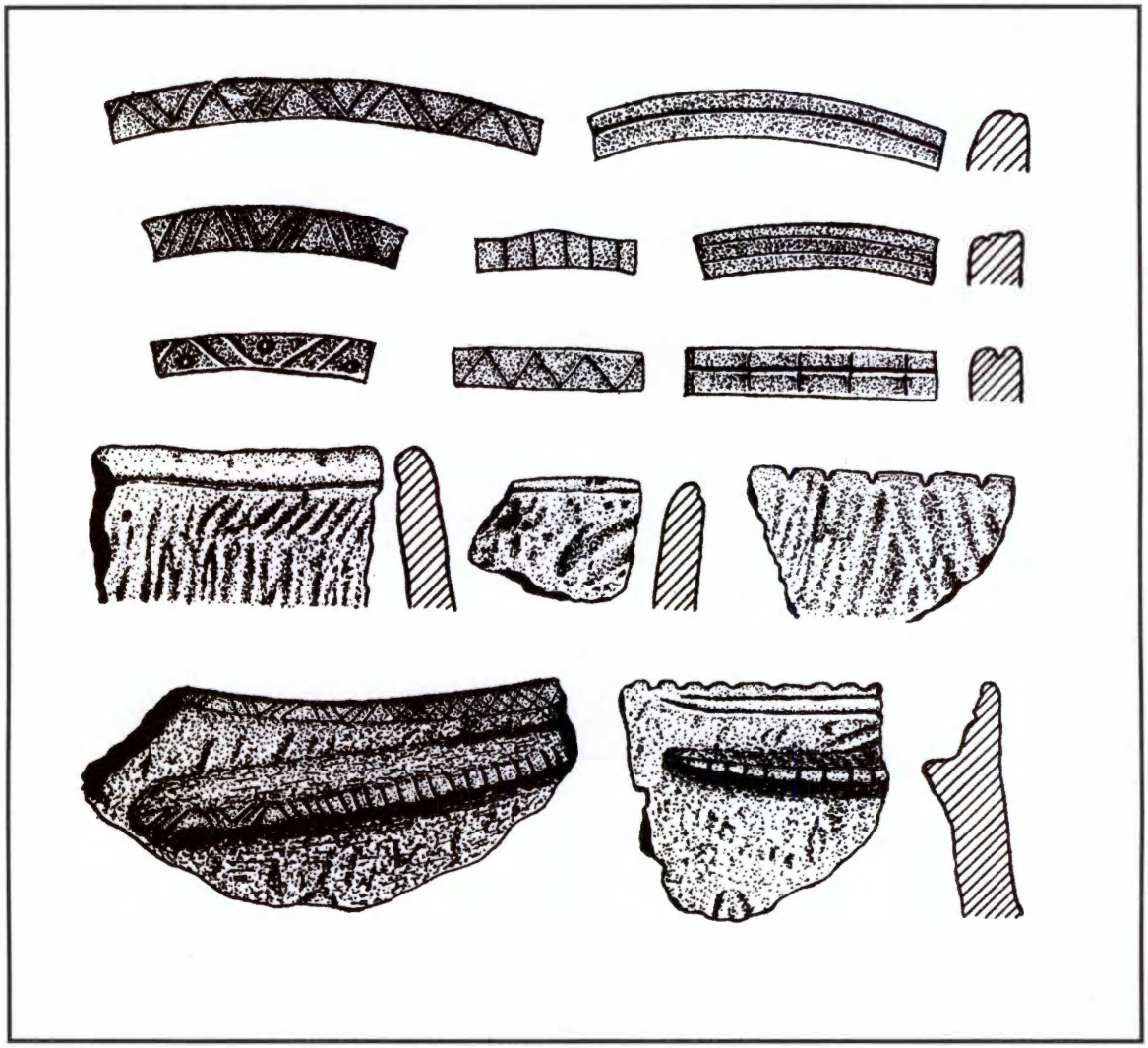


**Figure 13. Examples of Decorated Vessel Fragments from the Poverty Point Site (Modified from Webb 1944:Figure 31).**

The Apple Barn site and Iddins site had different frequencies of soot on the exterior and residue on the interior. The frequency of sooted vessel fragments at the Iddins site was approximately three times (33%) more than the Apple Barn Site (12%) (Table 7). Soot, a by-product of wood combustion, typically occurs in patches across vessel exteriors and more frequently near the rim (Hally 1983; Skibo 1992). Soot may go undetected after being washed in the lab (Sassaman 1997:3). Sassaman (1997:3) estimated that approximately a quarter of the sherds he analyzed exhibited soot. Although his analysis included a variety of sites from the Savannah River valley (Sassaman 1997), this frequency is consistent with the frequency observed at the Iddins site. As mentioned above, the absence of vessel fragments exhibiting lugs at the Iddins site suggests that soaptone vessels were placed directly on top of a heat source. Consequently, soot may have been deposited over a larger area of the vessel, which would account for the higher frequency of sooted vessel fragments at the Iddins site. At the Apple Barn site approximately 25% of the vessel fragments exhibited soot and/or residue whereas at the Iddins site it was almost 50%. The frequency of soot and residue at both of the sites also may be related to the tendency of soot and residue to collect only on certain portions of the vessel (Hally 1983; Skibo 1992).

At the Apple Barn site the majority of soapstone vessel fragments were recovered from storage features (40%) and the remaining fragments were recovered in low, but relatively equal frequencies in cooking features (15%), non-functional contexts (18%), and non-storage pits (21%) (Table 8). Vessel fragments occurred in lowest frequency in rock concentrations (5%) and one burial (2%). Considering whole soapstone vessels are

**Table 7. Absolute and Relative Frequencies of Soot and/or Residue Adhering to Vessel Fragments.**

| Site | Residue | Soot | Both Soot and Residue | Neither Soot nor Residue | Total |
|---|---|---|---|---|---|
| Apple Barn | 20 (4%) | 61 (12%) | 54 (11%) | 358 (73%) | 493 |
| Iddins | 5 (2%) | 74 (33%) | 22 (10%) | 121 (55%) | 222 |

**Table 8. Absolute and Relative Frequencies of Soapstone by Weight (kg) Recovered from Specific Contexts.**

| | Site | |
|---|---|---|
| Feature Type | Apple Barn | Iddins |
| Mortuary | 0.003 (0%) | - |
| Cooking | 3.19 (15%) | 0.42 (4%) |
| Non-functional Context | 3.87 (18%) | 11.24 (96%) |
| Non-storage pit | 4.48 (21%) | 0.05 (0%) |
| Rock Concentration | 1.03 (5%) | - |
| Storage Pit | 8.54 (40%) | - |
| Total | 21.11 kg | 11.71 kg |

typically recorded in burials, the vessel fragment in one burial was likely part of the fill. It should also be noted that burials were not removed from the Apple Barn site (see Chapter III). In comparison, soapstone vessel fragments at the Iddins site occurred primarily in the Late Archaic midden (96%) and in Cooking Features (4%). A single fragment was recovered from a non-storage pit. As mentioned in Chapter II, a significant amount of bioturbation and human disturbance probably occurred within the Late Archaic midden, and therefore this may account for the high frequency of soapstone artifacts outside of feature contexts.

In sum, twice as much soapstone (by weight) was recovered from the Apple Barn site than the Iddins site, but 100 times more area was excavated at the Apple Barn site. Both assemblages consisted mostly of soapstone vessel fragments with groundstone objects occurring in low frequency. The weight: count ratio of soapstone vessel fragments to groundstone objects was equal. Of the soapstone vessel fragments, the weight: count ratio indicates that large fragments (>5 cm) made up the majority of both assemblages. Soapstone vessels at the Apple Barn site exhibited more variation in form, surface conditions, and decorative motifs than the Iddins site, however smoothed interiors large and small vessels in varying shapes while the Iddins site contained mostly large hemispherical vessels. Similar variation in decorative motifs on soapstone vessels at the Apple Barn site and the Poverty Point site suggests that the Apple Barn site participated in the distribution of soapstone within the Poverty Point exchange network. Groundstone objects recoveredfrom the Apple Barn site exhibited more variation than the Iddins site as well. Vessel lugs and use wear grooves associated with vessel suspension were absent at the Iddins site but were present at the Apple Barn site which suggests slightly different

strategies of food preparation. Along the same lines, approximately a quarter of the vessels at the Apple Barn site, a similar frequency observed by Sassaman (1997), exhibited soot presumably from cooking. Sooted vessels at the Iddins site were three times more frequent. Conservation and recycling of soapstone was roughly equal at both sites which is expected because these sites are in relative proximity to the source area. In terms of context, soapstone vessels were recovered from features at the Apple Barn site more often than the Iddins site although the Apple Barn site contained more features and lacked a comparable midden to the Iddins site. Soapstone occurred mostly in storage features at the Apple Barn site whereas at the Iddins site they were mostly dispersed within the midden.

# V. CHRONOLOGY

This chapter presents the results of AMS dates from sooted soapstone vessels in order to identify the time range of soapstone vessel use at the Apple Barn site. These dates are presented and discussed at the level of the site and then the region, specifically eastern Tennessee and western North Carolina. Next the results are compared to existing dates for soapstone vessel use in the Southeast (Sassaman 2006) and eastern North America (Truncer 2004b) in order to address the larger debate over the timing and function of soapstone vessels in eastern North America.

## *Methods*

Seven samples were selected for AMS dating to determine the temporal span of soapstone use at the Apple Barn site (Table 9). Sample selection was based on the size of the artifact, the portion of the vessel represented, and the amount of soot on the exterior. The samples chosen were larger artifacts (>5cm) with a rim, body, lip, and significant (>0.05 g) amount of soot (see Sassaman (1997:3) for the justification of this criteria).

Samples were inspected under a stereoscopic microscope to confirm the presence/absence of soot on fracture planes. Soot was then scraped onto aluminum foil using a clean metal dental pick and shipped to the Illinois Geological Survey Laboratory (ISGS) for AMS dating. Sample 99-257 was obtained from residue adhering to the interior of the vessel to acquire an AMS date for the residue analysis. Results were calibrated using the Oxcal 3.5 program (Ramsey 2000).

**Table 9. Samples Selected from the Apple Barn Site for AMS Dating.**

| Block | Sample | Feature | Portion | Zone | Depth (cmbed) | Sample Type | S-1 Wt. | ISGS # |
|---|---|---|---|---|---|---|---|---|
| B-1 | 99-257 | 7 | N½ | A | 0-72 | soot | 1.02 g | A0562 |
| B-1 | 99-3222 | 748 | SW½ | B&C | 15-34 | soot | .31 g | A0563 |
| B | 99-1549 | 202 | W½ | B&C | 5-47 | soot | .25 g | A0564 |
| B-1 | 00-1019 | 656 | S½ | A | 80 | soot | .06 g | A0565 |
| B | 99-1407 | 198 | W½ | A | 9-28 | soot | .15 g | A0566 |
| A | 99-6164 | 1880 | SE½ | B&C | 24-36 | soot | .09 g | A0567 |
| B | 99-2180a | 307 | W½ | A | 10-29 | soot | .39 g | A0568 |

## *Context of Recovery for AMS Samples*

Sample 99-257 was recovered from Feature 7, a pit feature with in-slanting sides and round base and a maximum depth of 70 cmbs. The soapstone bowl fragment was recovered at 25 cm below surface in a fill described as very dark grayish brown texture. Concentrations of Fire Cracked Rock (FCR) and river cobbles were noted in the north half and at the base of the feature.

Sample 1407 came from Feature 198, a shallow basin shaped pit with a maximum depth at 20 cmbs. The soil was described as a dark brown silt loam. The soapstone bowl fragment was recovered from the center of the feature at 10 cmbs, and above this was found a stemmed projectile point.

Sample 99-1549 came from Feature 202 which was conjoined with two other features to form three contiguous, large storage pits. The feature had slightly expanding sides and a flat base. The maximum depth is 100 cmbs and contains 3 zones. The soapstone bowl fragment was recovered from Zone B which is described as dark yellowish brown silty clay mottled with dark yellowish brown silty clay. Charcoal was noted in this zone and an FCR concentration was observed near the base of this zone.

Sample 99-2180a came from Feature 307, a small basin shaped pit with a maximum depth of approximately 20 cmbs. The soil was described as dark yellowish brown silt loam. The soapstone vessel fragment was located near the base of the feature. Small amounts of FCR and charcoal were noted throughout the fill.

Sample 00-1019 came from Feature 656 which had slightly expanding sides, a flat bottom, and a maximum depth of approximately 70 cmbs. The soapstone vessel fragment came from the south half of the feature which also contained concentrations of FCR. The single soil zone in the feature is described as very dark grayish brown silty clay.

Sample 99-3222 came from Feature 748, a rock pavement with stratified soils beneath. The two strata beneath the rock pavement were excavated together, and the soapstone vessel fragment came from one of these two strata. These strata extend to a maximum depth of approximately 30 cmbs and approximately 20 cm below the rock pavement. The soils beneath the rock pavement are described as dark brown silt loam in Zone B and brown silty clay loam in Zone C.

Sample 99-6164 came from Feature 1880, a large shallow pit with insloping sides and a flat bottom. The soapstone vessel fragment came from Zone B (14 to 25 cmbs), and the soil in this zone is described as dark brown silt loam with charcoal and burnt clay.

### *Discussion*

Results of seven AMS dates from the Apple Barn site (Table 10) indicate that soapstone vessel use at the site began as early as 1700 cal B.C. AMS dates also indicate that the latest known use of soapstone vessels at the site occurred as late as 820 cal B.C. which indicates an approximate 900 year span of soapstone vessel use. Three of the dates

**Table 10.Results of AMS Dates from Soot Adhering to Soapstone Vessels at the Apple Barn Site.**

| Site | Lab Number | Material Dated | Uncalibrated $^{14}C$ Age (B.P) | $\delta^{13}C$ | Calender Age (2σ)* |
|---|---|---|---|---|---|
| Apple Barn | A0562 | Residue | 2755 ± 35 | -27.5 | 1000-820 (95.4%) |
| Apple Barn | A0563 | Soot | 2760 ± 30 | -25.2 | 1000-820 (95.4%) |
| Apple Barn | A0564 | Soot | 3350 ± 30 | -25.9 | 1740-1710 (4.9%)<br>1700-1520 (90.5%) |
| Apple Barn | A0565 | Soot | 3115 ± 30 | -25.2 | 1440-1290 (94.2%)<br>1280-1260 (1.2%) |
| Apple Barn | A0566 | Soot | 2960 ± 40 | -25.5 | 1320-1020 (95.4%) |
| Apple Barn | A0567 | Soot | 2825 ± 30 | -25.1 | 1080-890 (95.4%) |
| Apple Barn | A0568 | Soot | 2995 ± 30 | -27.8 | 1380-1330 (6.2%)<br>1320-1120 (89.2%) |

* $^{14}C$ calibrated with 2-sigma error terms and associated probilities using Oxcal v3.5 Bronk Ramsey (2003) with Atmospheric data from Struiver et al. (1998).

cluster tightly between ca. 1100 – 800 cal B.C. suggesting that soapstone vessel use was most intense during this time span (Figure 14). The four dates that precede this cluster in time suggest that soapstone use occurred in lower frequency from ca. 1700 – 1100 cal B.C.

As noted in Chapter IV, similar decorative motifs on soapstone vessels at both the Apple Barn site and the Poverty Point site suggest that people at the Apple Barn site participated in the Poverty Point exchange network existing between ca. 1800 – 1100 cal B.C. This point is further supported by the correlation between the time range of the Poverty Point exchange network and time range for soapstone vessel use at the Apple Barns site.

Table 11 lists dates attributed to soapstone vessel use in eastern Tennessee and western North Carolina. These dates are based on Truncer's (2004b) assessment of the reliability of the dated organic material for soapstone vessel use, in this case soot adhering to soapstone vessels and carbon in depositional association with soapstone vessels. Sassaman (2006) has relied on AMS soot dates exclusively whereas Truncer (2004b) incorporates radiocarbon dates from organic material in depositional association with soapstone vessels. The resulting temporal distribution of soapstone vessel use in the region is different depending on whether AMS dates from soot are used exclusively or if both AMS soot dates and associated radiocarbon dates are combined. The earliest known AMS soot dates from soapstone vessel use in the region occurs at 3360 ± 70 B.P., 1600 cal B.C. (1780-1490 cal B.C., 90.0%, Ramsey 2000) (Sassaman 2006) (Table 11, Figure 15). The Apple Barn site yielded the latest known dates of soapstone use in the region, although it should be noted that half of the AMS soot dates are from the Apple Barn site.

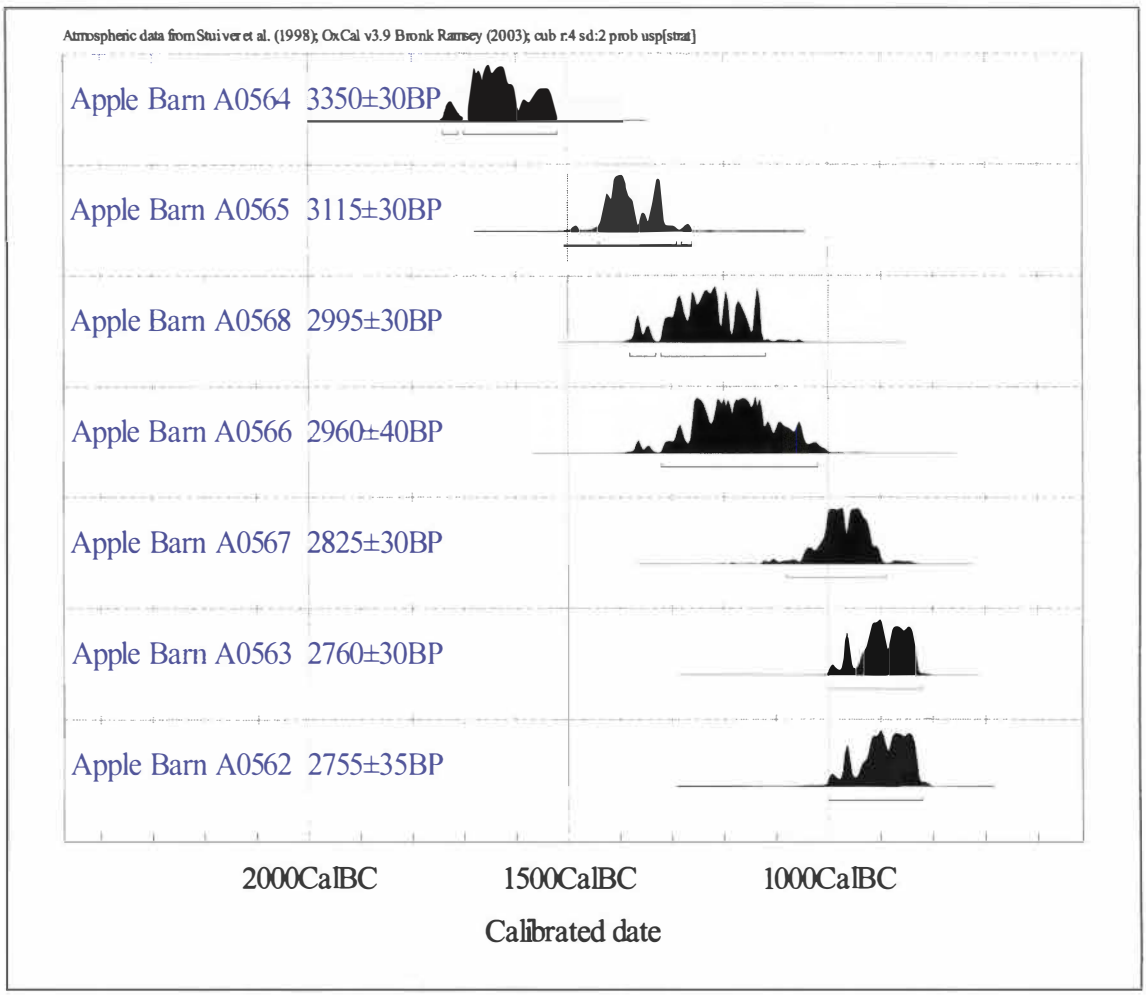



**Figure 14. Probabilities for Calendar Dates at the Apple Barn Site. Graph Generated in Oxcal v3.5 Ramsey (2003) Based on Atmospheric Data from Struiver et al. (1998).**

**Table 11. AMS Dates from the Apple Barn Site and Dates Associated with Soapstone Vessel Use in Eastern Tennessee and Western North Carolina Listed in Chronological Order.**

| Type of Date[a] | Site | Lab Number | Uncalibrated $^{14}C$ Age (B.P) | $\delta^{13}C$[c] | Calender Age (2σ)[d] | Reference |
|---|---|---|---|---|---|---|
| Assoc. | Iddins | GX4705 | 3655 ± 135 | - | 2500-1650 (95.4%) | Chapman 1981:140 |
| Assoc. | Iddins | UGa1883 | 3470 ± 75 | - | 1980-1600 (95.4%) | Chapman 1981:140 |
| Soot | 40RE179 | Beta-126946 | 3360 ± 70 | - 25.3 | 1880-1840 (3.8%)<br>1830-1790 (1.7%)<br>1780-1490 (90.0%) | Sassaman 2004:144 |
| Assoc. | Iddins | GX4706 | 3205 ± 145 | - | 1900-1050 (95.4%) | Chapman 1981:140 |
| Assoc. | 40RH6 | Unreferenced | 3280 ± 190 | - | 2200-1000 (95.4%) | Calabrese 1976 |
| Assoc. | 40RH6 | Unreferenced | 3020 ± 260 | - | 2000-500 (95.4%) | Calabrese 1976 |
| Soot | Apple Barn | A0562 | 2755 ± 35 | -27.5 | 1000-820 (95.4%) | This thesis |
| Soot | Apple Barn | A0563 | 2760 ± 30 | -25.2 | 1000-820 (95.4%) | This thesis |
| Soot | Apple Barn | A0564 | 3350 ± 30 | -25.9 | 1740-1710 (4.9%)<br>1700-1520 (90.5%) | This thesis |
| Soot | Apple Barn | A0565 | 3115 ± 30 | -25.2 | 1440-1290 (94.2%)<br>1280-1260 (1.2%) | This thesis |
| Soot | Apple Barn | A0566 | 2960 ± 40 | -25.5 | 1320-1020 (95.4%) | This thesis |
| Soot | Apple Barn | A0567 | 2825 ± 30 | -25.1 | 1080-890 (95.4%) | This thesis |
| Soot | Apple Barn | A0568 | 2995 ± 30 | -27.8 | 1380-1330 (6.2%)<br>1320-1120 (89.2%) | This thesis |
| Assoc. | Warren Wilson | GX2274 | 4865 ± 280 | - | 4400-2900 (95.4%) | Keel 1976:175 |
| Assoc. | Warren Wilson | Unreferenced | 3515 ± 140 | - | 2300-1500 (95.4%) | Keel 1976:175 |

[a] The material dated and its depositional context is coded as follows: soot = AMS from soot adhering to the exterior of the soapstone vessel fragment and assoc. = radiocarbon date from charcoal in stratum with soapstone artifact.
[b] Noted only for dates first reported in this thesis.
[c] Dates are corrected for isotopic fractionation where noted.
[d] All dates are listed in calibrated B.C. with 2-sigma error terms and associated probabilites. Calibrated $^{14}C$ dates were derived from Oxcal v3.5 Ramsey (2003) based on atmospheric data from Struiver et al. (1998).

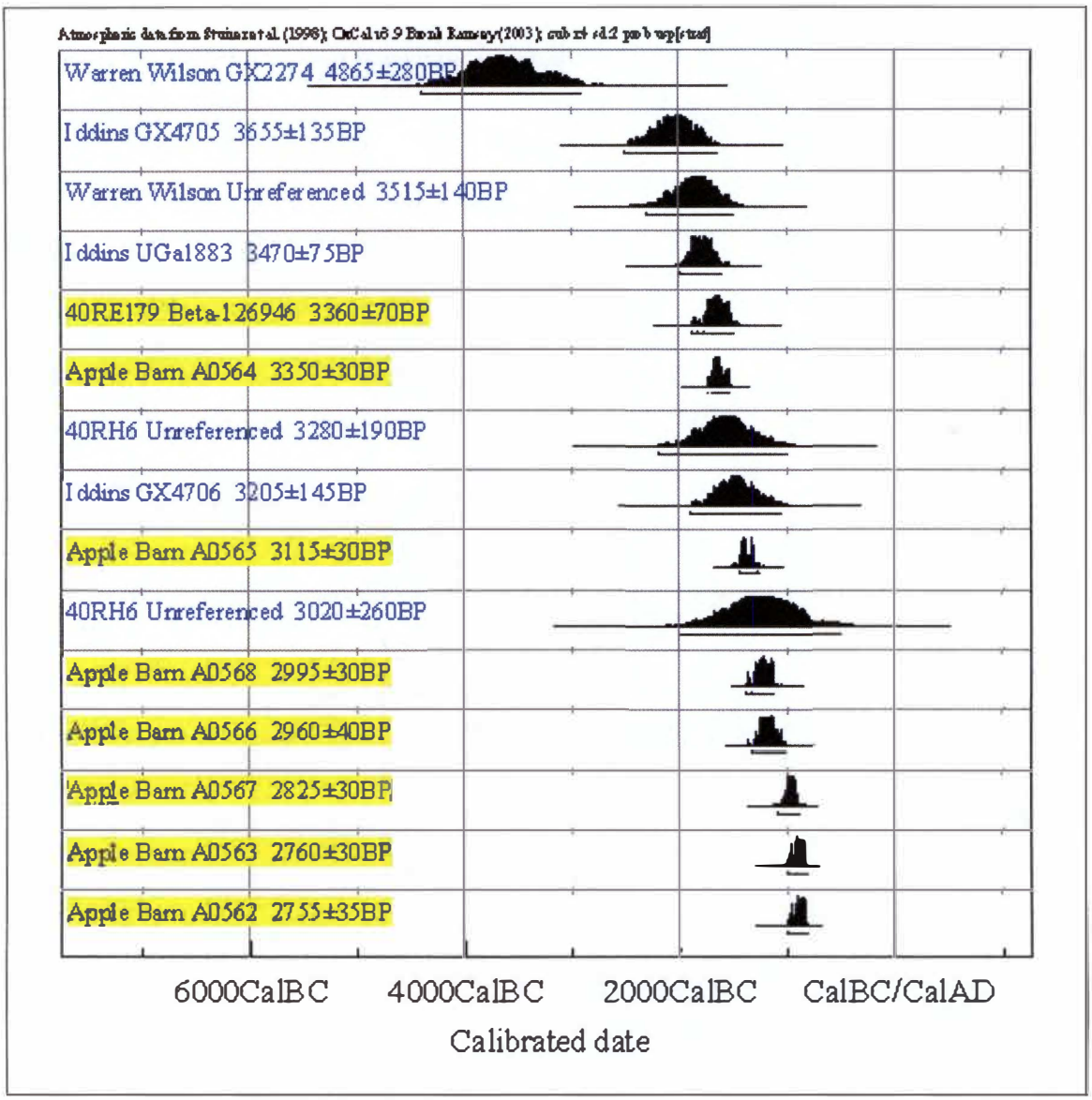



**Figure 15. Probabilities for Calendar Dates by Site in the Region. Highlighted Items Are AMS Dates from Soot Adhering to the Exterior of Soapstone Vessels. Graph Generated in Oxcal v3.5 Ramsey (2003) Based on Atmospheric Data from Struiver et al. (1998).**

The early date of 4865 ± 280 BP (Keel 1976:151), 3600 cal B.C. (4400-2900 cal B.C., 95.4%, Ramsey 2000) came from the Warren Wilson site and has sparked a recent debate concerning the earliest soapstone vessel use in eastern North America (see Sassaman 2006; Truncer 2004b, 2006).

The Warren Wilson site (Figure 1) is approximately 120 km east of the Apple Barn site and is located on the Swannanoa River in the Appalachian Mountains of western North Carolina. The Swannanoa River flows east into the French Broad River which then flows into the Tennessee River. In terms of site characteristics, the Warren Wilson site is more similar to the Iddins site than the Apple Barn site; the Apple Barn site has significantly large, storage features which were absent from the Iddins site and Warren Wilson site. Although the Late Archaic component at the Apple Barn site is contemporaneous with these sites, the presence of the large storage features indicates that food storage played a significant role in the subsistence economy. The Late Archaic stratum (Zone C) of the Warren Wilson site contained numerous rock-filled hearths, rectilinear rock concentrations, soapstone vessels, and Otarre Stemmed PPK's similar in form to the Iddins PPK's (Ward 1999:71). Two radiocarbon dates were obtained from the Late Archaic stratum. One assay dates to 3600 cal. B.C. (4400-2900 cal B.C., 95.4% Ramsey) and the other to 1900 cal B.C. (2300-1500 cal B.C., Ramsey 95.4%) (Table 11).

Truncer (2004b) bases his argument on the earlier of the two dates and Sassaman's (2006) counter-argument centers on the latter of the two dates. Based on the 3600 cal B.C. date and three other early dates (Chapter III), Truncer (2004b) purports that soapstone vessels were used in low frequency at this time. Sassaman (2006) counters this assertion by emphasizing that the early "tail" in Truncer's graph is misleading because it

consists of only four assays (Figure 16). Sassaman (2006) also refutes the 3600 cal B.C. date by pointing out that this is too early and the majority of soapstone vessels at the site originated from the Early Woodland Swannanoa phase stratum (2006:148) and therefore the 1900 cal B.C. date likely represents the earliest use of soapstone at the site.

When compared to the dates for soapstone vessel use at the Warren Wilson site, the Apple Barn dates do not support the argument for the earlier date at the Warren Wilson site. Three of the Apple Barn site AMS dates occur at the Late Archaic to Early Woodland transition when early pottery such as Watts Bar (quartz tempered) and Swannanoa (quartz or coarse sand tempered) appear. With the exception of the early date from the Warren Wilson site, dates in Table 11 indicate that soapstone vessel use occurred between 2500 cal B.C. to 800 cal B.C. in the region. Of the seven AMS assays from soot on soapstone vessels from the Apple Barn site, not one yielded a date earlier than 1700 cal B.C. Moreover, three of the dates suggest that soapstone vessel use was most intense when the first known use of pottery appears in the region ca. 1000 cal B.C. (Lafferty 1981:501). The results from this study, therefore, indirectly help support Sassaman's (2006) argument for soapstone vessel use during the Swannanoa phase at the Warren Wilson site.

With regards to the Southeast as a whole, in previous studies of soapstone vessel chronology (Sassaman 1997, 2006; Truncer 2004b), specific sites from across eastern North America were employed based on dates associated with soapstone vessel use. The temporal distribution of soapstone vessel use is different depending on the use of AMS soot dates exclusively (Figure 17) or the use of both AMS dates from soot and radiocarbon dates from charred material in depositional association (e.g. feature or

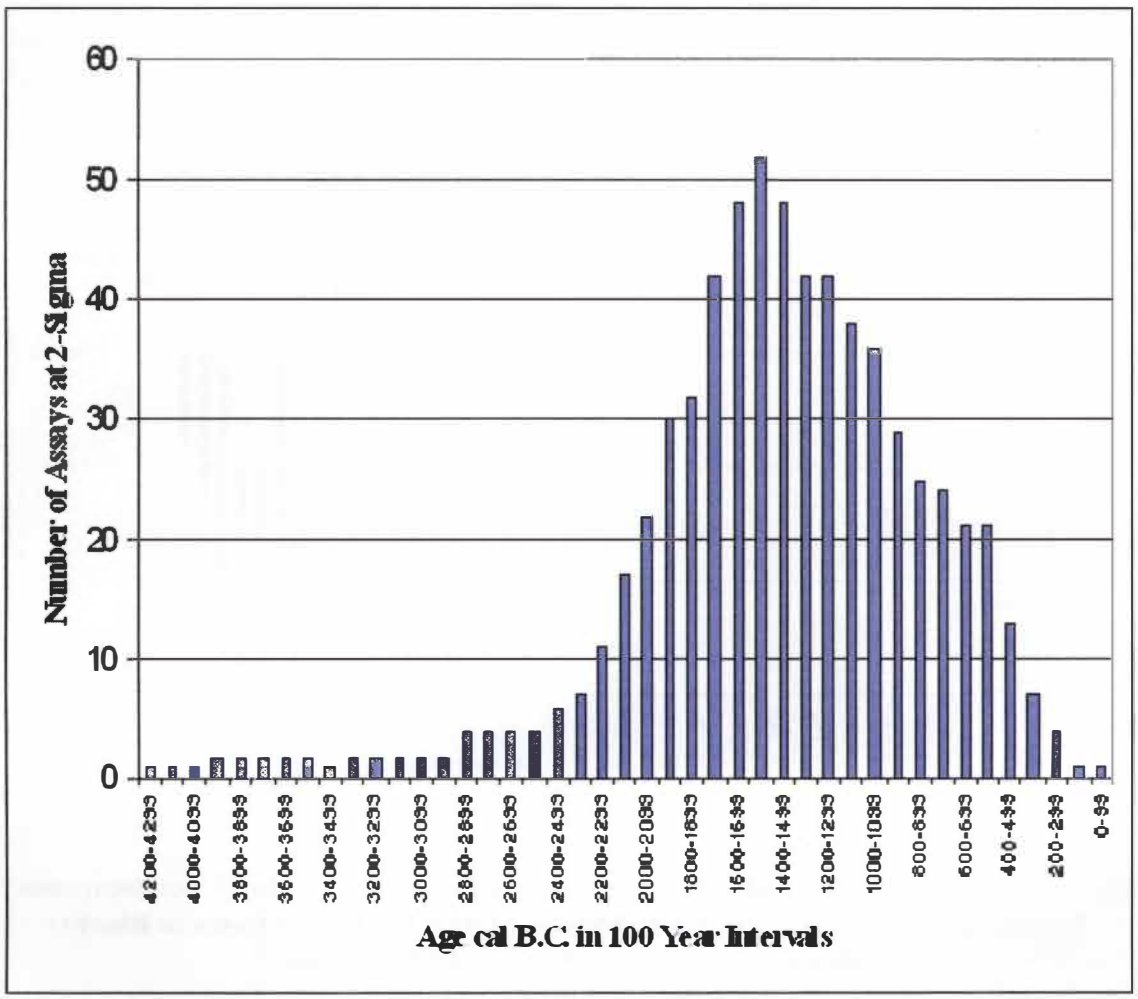



**Figure 16. Distribution of all Dates Considered Reliable by Truncer 2004 that are Associated with Soapstone Vessels at the 2-sigma Level (Modified from Truncer 2004: Figure 6).**

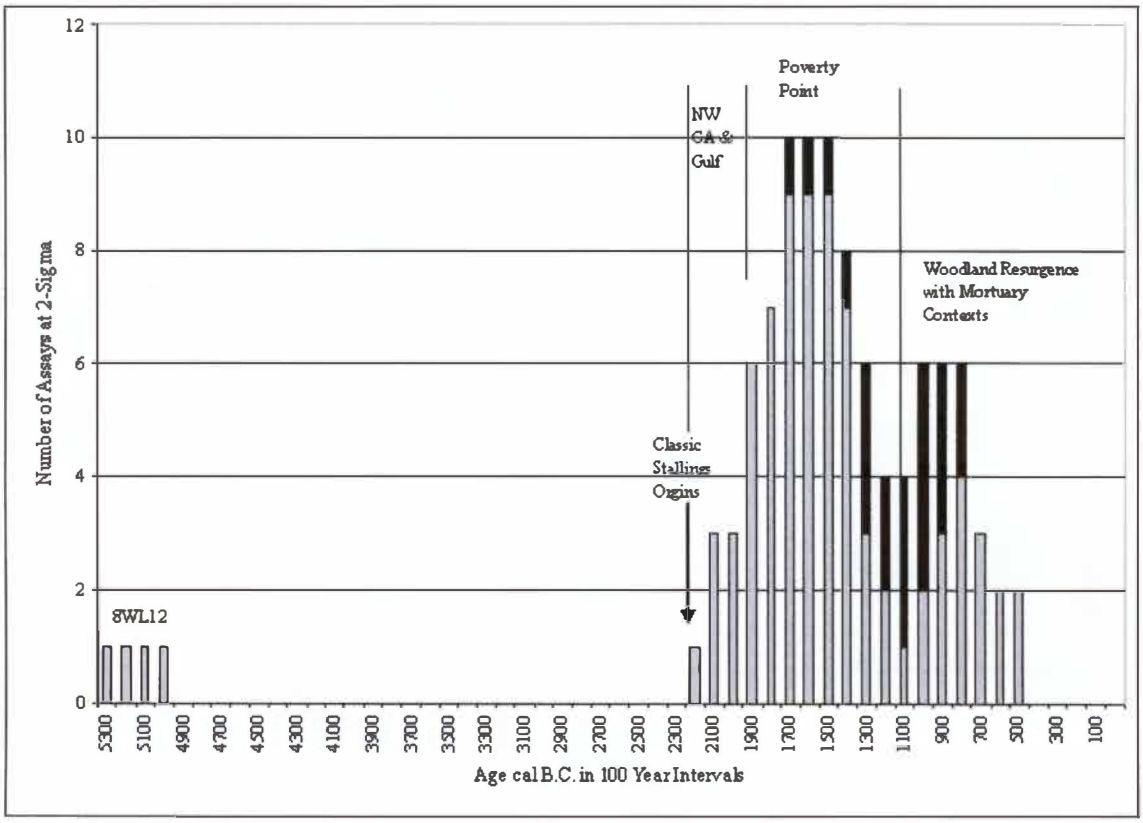



**Figure 17. Distribution of All of the AMS Dates from Soot/residue from Soapstone Vessels in the Southeastern United States (Apple Barn Soot Dates in Black) (Modified from Sassaman 2006:Figure 2).**

stratum) with soapstone vessels (Figure 16). In Figure 17, the temporal distribution of soapstone vessel use in the Southeast is bimodal with the greatest peak that correlates with the Late Archaic Poverty Point exchange network (ca. 1800-1100 cal B.C.). The second, later peak correlates with a resurgence of soapstone vessel use that Sassaman (1997, 2006) associates with Early Woodland mortuary contexts (ca. 1100 – 800 cal B.C.). In Figure 16, the temporal distribution of soapstone vessel use in eastern North America is unimodal with soapstone vessels occurring in low frequency beginning ca. 4300 cal B.C., then a rise in frequency around ca. 2500 cal B.C., with a peak in soapstone vessel use at ca. 1500 cal B.C., and then ending ca. 0 A.D.

When the Apple Barn AMS soot dates are assessed in the context of Figure 17, the distribution of the dates are consistent with soapstone vessel use from the Late Archaic to Early Woodland period. Four of the dates correspond with the first peak in soapstone vessel use correlating with the Poverty Point exchange network (ca. 1800-1100 cal B.C.). They also correspond with Figure 16 which depicts a single peak at ca. 1800-900 cal B.C.). Three Apple Barn AMS dates from ca. 1100 – 800 cal B.C. correlate with a "Woodland Resurgence with Mortuary Contexts" noted by Sassaman (2006:146). This resurgence is characterized by stone vessels, soapstone or sandstone, placed in burials and occasionally over the heads of interred individuals. This has been documented in the Middle Tennessee River valley (see Sassaman 1997:13) and in the Middle Duck River valley (Amick et al. 1986). Sassaman (1997, 2006) bases this idea on an AMS date from one burial containing a soapstone vessel and his assertion that Early Woodland burials with soapstone vessels have been misassigned to the Late Archaic component at sites in the Middle Tennessee River valley, such as the Perry site (see Sassaman 1997:13,

2004:153). It should be noted that Sassaman (1997) does indicate that the reconstruction of the exact contexts of vessel fragments from other portions of the site is difficult due to incomplete records. In light of the AMS soot dates from the Apple Barn site and the contexts from which the vessel fragments were recovered, I find it difficult to attribute the use of soapstone vessels at the Apple Barn site to a resurgence of use in mortuary contexts. Unfortunately, mortuary contexts were not investigated at the Apple Barn site (see Chapter III) therefore a comparison cannot be made, however, the fact that the dated vessels from the Apple Barn site were recovered from non-mortuary contexts and were used to process food (see Chapter V) does suggest that soapstone vessels served a variety of different purposes during the Early Woodland period including food preparation and mortuary offerings.

In conclusion, soapstone vessels were used at the Apple Barn site for approximately 900 years between ca. 1700 cal B.C. and ca. 800 cal B.C. Both the AMS soot dates of soapstone vessel use and the decorative motifs (Chapter IV) at the Apple Barn site suggest that the Poverty Point exchange network, with its demand for soapstone, possibly stimulated the use of soapstone vessels at the Apple Barn site.

Three Early Woodland Apple Barn dates in non-mortuary contexts suggest that soapstone vessel use was more diverse in the Upper Tennessee River valley in comparison to the Middle Tennessee River valley and Middle Duck River valley. The AMS soot dates from the Apple Barn site do correspond with the Early Woodland resurgence suggested by Sassaman (1997, 2006), however, the soapstone vessels at the Apple Barn functioned beyond simply mortuary items - they also functioned as containers for food processing. With such a small sample of AMS dates (n=4) from the

Early Woodland period for a region as large as the Southeast, I question whether a resurgence in mortuary contexts accurately characterizes soapstone vessel use during this period.

# VI. RESIDUE ANALYSIS

This chapter presents the residue analysis of soapstone vessel fragments from the Apple Barn site to assist in the identification of function. Archaeologists have traditionally studied the shape and material properties of vessels to determine their function. Considering vessels were typically used for cooking food, vessel residues can contain important information about the food types processed in vessels. The contexts from which these samples were recovered are first described and then the methods for the residue analysis are explained. The results are presented and a literature review of previous residue analyses is provided with particular focus on an analysis conducted on soapstone vessels (Truncer 2004a). The results of the Apple Barn residue analysis are then compared to this analysis.

## *Residue Analysis*

Beginning in the 1970's archaeologists began investigating organic residues adhering to the interior of ceramic vessels (Duma 1972; Condamin et al. 1976). Archaeologists have traditionally employed three types of residue analysis: phosphorous content, isotope analysis, and fatty acid analysis. Phosphorous content only indicates that the vessel came in contact with organic material (Duma 1972). Even this determination may be unreliable because environmental conditions can render the phosphorous profiles ambiguous (Dunnell and Hunt 1990). Isotope analysis and fatty acid analysis, however, have the potential to identify individual plant and animal species. Using isotope analysis,

individual types of plants identified are based on distinct carbon and nitrogen ratios (DeNiro 1987; Hastdorf and DeNiro 1985) and strontium ratios (Burton 1990; Price 1985; Runia 1987). Fatty acid analysis (Deal and Silk 1988; Rottlander 1990; Skibo 1992) is conducted using gas chromatography and mass spectrometry (GC/MS) to identify varying concentrations of fatty acids indicative of specific types of plants or animal species. The preservation state of fatty acids affects the ability to detect specific species and results are often restricted to simple categories such as plant versus animal (Eerkens 2005).

Microscopic examination of residues in vessels has exhibited success in identifying specific plant species through the identification of pollen and phytoliths. Dean and Heath (1990) examined the carbonized residues of 12 ceramic sherds from western Utah using low-powered microscopy. Identified plant materials included charred and uncharred seeds, *Chenopodium*, *Poa* (grass), juniper, ricegrass and *Allenrolfea* (pickleweed). Touhy (1990) also examined the carbonized residues of two ceramic vessels from north-central Nevada. Using significantly higher microscopy, he focused on pollen and phytoliths but did not include the examination of starches. Touhy (1990) identified a significant amount of festucoid grass phytoliths in one vessel and a significant amount of pine pollen and pine seeds in the other. Results from both studies suggest the importance of ceramic vessels in seed processing (Dean and Heath 1990) and nut processing (Touhy 1990) in the southwest. Although post-depositional accumulation of material on vessel walls must be carefully considered, microscopic identification of carbonized residues has been successful in identifying specific species of plants processed in vessels.

*Samples*

Four samples were selected from the Apple Barn site for residue analysis based on the presence of residue adhering to the interior of the vessel fragment, the amount of residue adhering to the interior, and the absence of residue or soot in the fracture plane (see Sassaman (1997:3) for further justification of these criteria) (Table 12). Soapstone vessel fragments greater than 5 cm were selected, the interior of the vessel was determined by the curvature of the vessel, and the fracture plane was examined under a stereoscopic microscope to confirm the presence of residue and the absence of residue on fracture planes. All four samples were separated in the field prior to waterscreening to preserve the interior residue.

Sample 99-1819-26 was recovered from Feature 258, a roughly round shaped non-storage pit 1m wide by 40 cm deep. The soapstone fragment was recovered from the south half which was excavated as one zone. Feature fill was described as a dark yellowish brown silt loam.

Sample 99-257-258 was recovered from Feature 7, a round non-storage pit, with straight walls 1m wide by 70 cm deep. A concentration of rocks was recorded at the base of the north half. Feature fill was described a very dark grayish brown.

Sample 99-2055-253 was recovered from Feature 320, a straight walled, flat-bottomed storage pit 1.1m wide by 70 cm deep. The soapstone artifact was recovered from Zone A in the southwest half. The feature fill is described as dark yellowish brown silt loam.

Sample 99-1596-15 was recovered from Feature 201, a storage pit 1.3 m wide by 75 cm deep. This feature is one of three large overlapping features. Feature fill was

**Table 12. Samples Selected for Residue Analysis from the Apple Barn Site.**

| Block | Sample | Feature | Zone | Depth (cmbed) |
|---|---|---|---|---|
| B-Office | 99-1819-26 | 258 S½ | A | 0-40 |
| B-1 | 99-257-258 | 7 N½ | A | 0-82 |
| B-Office | 99-2055-253 | 320 SW½ | A | 7-82 |
| B-Office | 99-1596-15 | 201 E½ | A | 9-77 |

## *Methods*

Samples were selected for residue analysis at the ARL and shipped to Linda Scott Cummings of PaleoResearch Institute in Golden Colorado (Contract No. 05-34) where they were processed and analyzed. Analysis focused on the presence of starch, pollen, and phytoliths. Samples were first cleaned with pressurized air and a bath of reverse osmosis water to remove contaminants and sediment. A dental pick was then used to remove the residue sample from the vessel fragment. The residue sample was then sieved and placed in a centrifuge tube to isolate the pollen, phytoliths, and starches. Microscope slides were then created for examination under a light microscope at a magnification of 500x. Pollen, phytoliths, and starches were identified and recorded by presence/absence. The following results and discussion are based on the report prepared by PaleoResearch Institute (Cummings and Dexter 2005).

## *Results*

Results of the residue analysis indicate that all four of the samples retained the residue of plant materials in varying frequencies (Table 13). Arboreal pollen included *Acer* (Maple), *Pinus*, (Pine), and *Quercus* (Oak). Non-arboreal pollens included

**Table 13. Results of Residue Analysis for the Apple Barn Site (Cummings and Dexter 2005). Results of Residue Analysis are Coded as Plus (+) Indicates Presence and a Blank Indicates Absence.**

| | | Feature 7 Sample No.258 | Feature 201 Sample No.15 | Feature 258 Sample No. 26 | Feature 320 Sample No. 253 |
|---|---|---|---|---|---|
| Phytolith | Oblong long w/ platform | | + | | |
| | Trapezoid sinuate (Crenate) | | + | | |
| | Chloridoid | + | + | + | |
| | Bilobate | | + | + | |
| | Buliform | + | + | + | |
| | Buliform rectangular | + | + | + | |
| | Trichome | + | + | | |
| | Elongate Smooth | + | + | + | |
| | Elongate Spiny | + | + | | |
| | Phytolith sum | 27 | 26 | 14 | 0 |
| Pollen | *Acer* pollen | + | + | + | |
| | *Pinus* pollen | | + | + | + |
| | *Quercus* pollen | | + | + | |
| | *Artemisia* pollen | + | + | | |
| | Cheno-am pollen | | + | | + |
| | Pollen sum | 2 | 9 | 3 | 2 |
| Starch | *Hordeum/Elymus*-type starch | | + | | + |
| Fiber | Fiber | | + | + | |
| | Human hair fragment | | + | | |
| | Rat/cat hair | | + | | |
| Other | Unidentified aggregate | + | | | |

*Artemisia* (Wormwood), Cheno-am (Goosefoot and/or Amaranth), and Poaceae (unidentified grass). Starches included *Hordeum/Elymus*-stype starch (Little Barley grass and/or Wild Rye seed). In addition, one sample also retained a human hair fragment and a rat/cat hair. A summary of the results by sample is provided in the following section.

Residue from Sample 258 (Feature 7) included phytoliths and pollen but no starches. Phytoliths and pollen represent local grasses and trees which may have adhered to the vessel wall from the surrounding matrix. On the other hand, it is also possible that these phytoliths and pollen grains were incorporated into the residue because they were processed in the vessel for consumption.

From Sample 26 (Feature 258) phytoliths and pollen were present but starches were absent. Phytoliths included Chloridoid, Buliform, Buliform rectangular, Trichome, Elongate smooth, and Elongate Spiny. The majority of these phytoliths represent grasses that could have originated from the surrounding matrix however the presence of trichomes is important because their presence is expected if they were cooked in the vessel. Trichomes are diagnostic plant appendages which can originate from any part of the plant. Pollen included *Acer* and *Artemisia* which originate from maple and wormwood respectively. *Artemisia*, or wormwood, has medicinal properties which help rid the body of intestinal parasites and its' presence is expected if it was cooked in the vessel.

Sample 15 (Feature 201) exhibited the largest variation among the phytoliths, pollen, and starches identified. Of the phytoliths, the presence of trichomes suggests that grass seeds were ground and cooked in the vessel. Pollen observed included *Acer*, *Pinus*, *Quercus*, *Artemisia*, Cheno-am (represents *Chenopodium*), and Poaceae (represents

*Amaranthus*). Cheno-am and Poaceae pollen are introduced into food by cooking *Chenopodium* and *Amaranthus*. Furthermore *Hordeum/Elymus*-type starch, which originates from Little Barley grass and/or Wild Rye seeds, was present and was likely processed in the vessel for consumption. A rat/cat hair and human hair in poor condition were also present but is unclear if they were cooked.

Sample 253 (Feature 320) included pollen and starches but no phytoliths. Poaceae pollen was present suggesting this vessel was used to process *Amaranthus*. Furthermore, *Hordeum/Elymus* was present suggesting that this vessel was also used to process Little Barley grass and/or Wild Rye seeds.

## *Discussion*

In a recent article, Truncer (2004b) argues for a direct correlation between the spatial distribution of soapstone vessels and mast producing forests in the eastern United States. As part of this research he conducted GC/MS analysis on residues from four soapstone vessel fragments recovered from archaeological sites in New England and with a wide date range of ca. 3900 cal B.C. to ca. 1650 cal A.D. This research (Truncer 2004a) is the first residue analysis on soapstone vessels in eastern North America. The results confirmed that soapstone vessels were used for processing plants although specific types of plants could not be identified (Truncer 2004a:97-98, 2004b:507). This technique is limited to the identification of plants, therefore the potential for fauna is not accounted for in the analyses. Truncer (2004b:68-74) emphasizes the correlations between the superior resistance of soapstone to thermal stress with an increase in the use of low preference mast resources such as red acorns and hickory nuts (Yarnell and Black 1985)

and interprets soapstone vessel use as a response to changing selective conditions. Soapstone vessels, according to Truncer (2004b), represent a more efficient technology for processing masts which required extended cooking for consumption by humans.

Results from the Apple Barn site suggest that people processed a variety of plants in soapstone vessels. Specifically, *Chenopodium* and Little Barley grass and/or Wild Rye seeds were likely processed in soapstone vessels at the site. *Chenopodium*, a weedy annual plant, was cultivated and domesticated after ca. 1200 cal B.C. and *Amaranthus* was stored and consumed out of season after ca. 1200 cal B.C. in the Upper Cumberland Plateau of Kentucky (Gremillion 2004:216-217). It is likely that these plants were being harvested and possibly cultivated at the Apple Barn site at this time as the AMS results correspond with these dates (see Chapter VI). The use of soapstone vessels for processing nut meat cannot be discounted, however. Dr. Kandace Hollenbach analyzed paleoethnobotanical samples from 43 features containing soapstone as part of the larger analysis for the Townsend Archaeological Project (report in progress) (Table 14). The results show mast resources in high frequency compared to other edible flora. Nut meat was not accounted for in this residue analysis and are not likely survive taphonomic processes.

Artemisia (Wormwood) pollen was also observed in two samples (Sample 15 and 258) from the Apple Barn site. Artemisia are perennial herbs and shrubs occurring in the temperate regions of Asia, Europe, and North America, and the more than 400 species in North America include edible and medicinal species which help prevent gastric lesions and fight cancer (Wright 2002:3). Artemisia pollen is dispersed by wind pollination (Wright 2002:3), and the pollen was observed in the Holocene (ca. 8,000 cal. B.C. to

**Table 14. Plant Remains Recovered from 43 Floatation Samples Representing 31 Features with Soapstone from Sites 40BT89, 40BT90, and 40BT91 (Data Supplied by Kandace Hollenbach).**

| Common Name | Scientific Name | Count | Weight (g) |
|---|---|---|---|
| **Nuts** | | | |
| Acorn cap | *Quercus* spp. | 11 | 0.01 |
| Acorn meat | *Quercus* spp. | 18 | 0.67 |
| Acorn meat cf. | *Quercus* spp. cf. | 6 | 0.06 |
| Acorn shell | *Quercus* spp. | 332 | 0.70 |
| Acorn shell cf. | *Quercus* spp. cf. | 2 | 0.00 |
| Beechnut cf. | *Fagus* sp. | 2 | 0.01 |
| Black walnut | *Juglans nigra* | 251 | 4.68 |
| Black walnut/hickory | Juglandaceae | 325 | 2.57 |
| Hazelnut | *Corylus* sp. | 4 | 0.05 |
| Hickory | *Carya* spp. | 2807 | 27.81 |
| Hickory, thin shell | *Carya* spp. | 3 | 0.01 |
| Hickory cf. | *Carya* spp. cf. | 11 | 0.08 |
| **Edible Seeds** | | | |
| Bearsfoot | *Polymnia uvedalia* | 9 | 0.00 |
| Bearsfoot cf. | *Polymnia uvedalia* cf. | 4 | 0.00 |
| Chenopod | *Chenopodium* sp. | 1 | 0.00 |
| Chenopod cf. | *Chenopodium* sp. cf. | 4 | 0.00 |
| Little barley | *Hordeum pusillum* | 120 | 0.19 |
| Little barley cf. | *Hordeum pusillum* cf. | 118 | 0.09 |
| Maygrass | *Phalaris caroliniana* | 15 | 0.00 |
| Maygrass cf. | *Phalaris caroliniana* cf. | 4 | 0.00 |
| Sunflower (wild) | *Helianthus annuus* | 1 | 0.00 |
| Sumpweed cf. | *Iva annua* cf. | 1 | 0.00 |
| **Fruits** | | | |
| Maypop | *Passiflora incarnata* | 1 | 0.00 |
| Persimmon seed | *Diospyros virginiana* | 1 | 0.00 |
| Persimmon seed cf. | *Diospyros virginiana* cf. | 2 | 0.01 |
| Persimmon seed coat cf. | *Diospyros virginiana* cf. | 3 | 0.00 |
| Squash rind cf. | *Cucurbita* sp. cf. | 4 | 0.01 |
| **Weedy Seeds** | | | |
| Bedstraw | *Galium* sp. | 26 | 0.01 |
| Bedstraw cf. | *Galium* sp. cf. | 1 | 0.00 |
| Carpetweed | *Mollugo* sp. | 4 | 0.00 |
| Purslane | *Portulaca* sp. | 5 | 0.00 |
| **Miscellaneous** | | | |
| Bark | | 1 | 0.00 |
| Bark cf. | | 14 | 0.10 |
| Cane | *Arundinaria gigantea* | 9 | 0.08 |
| Monocot node/stem | Poaceae | 44 | 0.05 |
| Monocot stem | Poaceae | 3 | 0.00 |
| Peduncle/stem | | 1 | 0.01 |

present) pollen profile at Lake Louise in Southern Georgia (Watts 1969). The pollen could have been introduced from the surrounding soil matrix although it is not a likely part of the "limited ambient pollen record expected from the area" (Cummings and Dexter 2005:5)

The use of *Artemisia* in folk medicine is well documented in western North America. Among the Blackfoot (Hellson 1999), Hopi (Whiting 1939), Pomo (Barrett 1952), and Yuki (Curtin 1957), *Artemisia* was commonly used to remedy stomach pains, reduce skin irritation, relieve rheumatism, and more edible species were occasionally consumed as food. People used the leaves of *Artemisia* mostly and occasionally they used the stems and flowers. Ethnographic accounts of the Yuki of Northern California describe a hot drink prepared with dried or green leaves of wormwood to aid individuals with dysentery (Curtin 1957:8). Gastrointestinal diseases also existed during the Early Woodland period in Tennessee. At Big Bone cave in central Tennessee, Faulkner (1991) observed harmful *Giardia* parasites which cause intestinal diseases (Adam 2001) in desiccated paleofeces dating to the Early Woodland period. Although individual species were not identified in this study, *Artemisia* may have been processed in soapstone vessels for consumption as food, or species with volatile oils may have been processed to remedy gastrointestinal diseases.

In conclusion, Truncer's (2004b) suggestion that soapstone vessels functioned primarily to process low-ranked mast resources east of the Appalachian Mountains is a valid hypothesis but needs to be reassessed in light of the results from the Apple Barn site. Although nut masts occurred in high frequency in features from the Apple Barn site, at least one vessel at the Apple Barn site was probably used to process edible grasses

such as *Chenopodium* and *Amaranthus* and it is highly probable that little barley grass and/or wild rye seeds (*Hordeum/Elymus*) were processed in two separate vessels. Furthermore, soapstone vessels at the Apple Barn site may have been used to process *Artemisia* for consumption as food or for medicinal purposes.

# VII. CONCLUSION

This study represents several firsts in the study of soapstone in the Appalachian Mountains. It is the first systematic comparison of two large soapstone assemblages in the region. The AMS dates of soot from vessel fragments are the first to be reported and examined in the Blue Ridge Province and the first large sample from a single site. Finally, residue analysis has only been carried out thus far in the New England and Middle Atlantic region, this being the first such analysis in the Southern Appalachians.

The comparison of the Apple Barn site and the Iddins site assemblages yielded valuable information about the variability existing between the two sites. The Apple Barn assemblage was twice as large in weight as the Iddins site and exhibited more diversity in both soapstone vessels and groundstone objects. The shape of soapstone vessels at the Apple Barn site exhibited more variation than the Iddins site. Iddins vessels appear to be hemispherical while Apple Barn vessels appear to be both large and small in size and oval, hemispherical, and rectangular in shape. Vessel fragments at both sites were large (>5 cm) and all portions of vessels are equally represented except for vessel bases. The absence of bases may be due to the fact that they were indiscernible from body fragments, they were frequently recycled, and/or they were eroded from use wear. The majority of vessels at both sites were smoothed on the interior and exterior of the vessel but the Apple Barn site exhibited greater variability in surface treatments including polished, chiseled, and gouged surface conditions.

Food processing strategies at the sites may have been different. This possibility is supported by both the variability in features and site structure between the two sites, as wells as differences in the soapstone vessel assemblages. The presence of vessels lugs and use wear grooves at the Apple Barn site suggests that vessels were suspended over fires. The absence of vessel lugs and use wear grooves at the Iddins site suggests that vessels were mostly used directly over fires. Vessels refitted into individual pieces at the Iddins site are three times more frequent than the Apple Barn site. This is logical because the assemblage from the Iddins site was recovered from a sealed context whereas the Apple Barn site lacked deep vertical stratigraphy and therefore was probably subject to disturbance and discovery by post-Terminal Archaic period groups inhabiting the site. Conservation and recycling was practiced in equal frequencies at both sites but the frequency at the Apple Barn site may be biased by the lack of vertical stratigraphy. In terms of context, soapstone was recovered from a variety of different features at the Apple Barn site including (listed from greatest to least frequency) storage pits, non-storage pits, non-functional contexts, cooking features, and rock concentrations. This is significant because soapstone vessels are generally attributed to middens, caches, and burials. The Apple Barn site indicates that soapstone can occur in a greater variety of depositional contexts.

Perhaps the most interesting discovery from the two assemblages is the similarity in decorative motifs shared with the Poverty Point site vessels. Both the Apple Barn and Iddins assemblages exhibited decorative motifs similar to decorated soapstone vessels at the Poverty Point site over 500 km away. The similarity in motifs, the contemporaneity of the vessels, and previous sourcing studies (Smith 1991) suggest that the Tennessee River

and its' tributaries were an important route for transporting soapstone vessels to southeastern Louisiana.

In regards to the Apple Barn site and Iddins site, the differences are subtle. It is possible that the absence of lugs and use wear grooves on vessels at the Apple Barn site is a result of different fauna and/or flora being exploited and therefore different processing techniques. Furthermore, smoothed vessels were observed at both sites but the Apple Barn site exhibited greater variation in surface conditions. Coupled with a larger diversity in material composition, the Apple Barn soapstone suggests that people occupying the site participated in an exchange network with access to more quarries. In terms of similarity, the presence of decorative motifs at the Apple Barn and Iddins site suggests that the site was part of a unique Southern Appalachian culture, stimulated by the demand for stone by the Poverty Point exchange network.

Prior to this study, residue analysis focusing on the presence of pollens, starches, and phytoliths on soapstone vessels had not been attempted in the Southeast. The analysis focusing on these residue types from the Apple Barn site yielded some intriguing results. Residues observed in soapstone vessels included pollen from *Acer* (Maple), *Pinus*, (Pine), *Quercus* (Oak), *Artemisia* (Wormwood), Cheno-am (Goosefoot and/or Amaranth), and Poaceae (unidentified grass), and *Hordeum/Elymus*-type starch (Little Barley grass and/or Wild Rye seed) (Cummings and Dexter 2005). Of these plants, grass seeds from *Chenopodium*, Poaceae, and Little Barley and/or Wild Rye were probably processed in soapstone vessels. Possibly, wormwood may have been processed in vessels and consumed for medicinal purposes. The residue analysis results from the Apple Barn site indicate that people used soapstone vessels for processing a much larger suite of plants

available along the western portion of the Appalachian Mountains, beyond that of just mast crops. One can propose that the primary function of soapstone vessels east of the Appalachian Mountains may have been for processing nut masts as Truncer (2004b) has suggested, but, other flora may have been processed in the vessels as well.

Investigations of the chronology of soapstone vessel use at the Apple Barn site have important ramifications for the regional prehistory. The Apple Barn dates suggest a much later peak in soapstone vessel use during the Late Archaic/Early Woodland period in the Southern Appalachians. The dates from the Apple Barn are also consistent with Sassaman's (1997; 2006) assertion of an Early Woodland resurgence of soapstone vessel use. Sassaman, however, restricts this resurgence to mortuary use based on an AMS soot date from one burial and originally misidentified Early Woodland period burials with soapstone vessels. The Apple Barn assemblage, however, based on soot dates, residue analysis, and the contexts from which they were recovered, suggests that the utilitarian function of soapstone vessels continues during this period and use is not confined or focused on mortuary contexts.

The Apple Barn dates span the gap between the Late Archaic and Early Woodland resurgence. With such a small sample size of AMS soot dates for the Southeast, the addition of a few dates may change the distribution of soapstone vessel use from bimodal to unimodal suggesting that there is no resurgence at all. A unimodal curve would thus suggest that soapstone use declines as the Poverty Point exchange network also declines, and in the case of the Apple Barn site, is eventually replaced with pottery.

## *Suggestions for Future Research*

This study provided some necessary first steps for addressing relatively large soapstone assemblages in the Southeast. The data in this study were not only collected to address basic questions about the nature, function, and timing of soapstone use in the study area but to also prepare a foundation for future research. I offer some future research topics in the following section that I believe are worth investigating.

The effects of manufacturing and use wear on the material properties of soapstone vessels needs to be investigated. I observed vast differences between the material properties exhibited on vessel surfaces and a fresh fracture plane of the same fragment (Chapter IV). A study focused on changes in material properties has the potential to challenge the validity of macroscopic characterizations of soapstone material composition.

In this study, residue analysis focusing on the presence of starches, phytoliths, and pollen was limited to identification of plant species. Thus, processing of fauna in soapstone vessels at the Apple Barn site cannot be ruled out. Since a small fraction of the Apple Barn vessel fragments retained residue visible to the naked eye, vessel fragments without obvious residue should be subjected to other types of residue analysis to expand the results of this study. Fatty acid analysis, for example see Eerkens (2005) and Deal and Silk (1988) for ceramic residue, has the potential to identify the full range of flora and fauna processed in soapstone vessels.

Soapstone vessels are often recovered in middens and occasionally caches or burials. The Apple Barn site may be biased because burials were not excavated, but soapstone vessel fragments were recovered from a variety of different depositional contexts including rock concentrations, cooking features, storage pits, and non-storage pits. A further examination of the primary artifact deposits may illuminate functional relationships (e.g., caching or discard) between artifacts and features. Furthermore, closer examination of Early Woodland sites may indicate that soapstone vessels occur in a broader range of contexts outside of mortuary offerings.

In conclusion, this thesis has contributed to a complex topic. While the debate over the chronology and function of soapstone vessels spanning such a large time range is likely to continue, this research provides new data towards the understanding of early cultigen processing during the Early Woodland and the overall timing of soapstone vessel use in the Blue Ridge Province. More AMS soot dates and studies focused on the context of soapstone vessel use will further refine interpretations concerning the timing and function of soapstone vessel use.

# REFERENCES CITED

# REFERENCES CITED


Adam, Rodney A.
2001 Biology of *Giardia lamblia. Clinical Microbiology Reviews* 14:447-475

Barrett, Samuel A.
1952 *Material Aspects of Pomo Culture.* Published by the order of the Board of Trustees, Milwaukee, Wisconsin. As seen in the eHRAF Collection of Ethnography on the Web, (05/11/2006).

Bentz, Charles
1996 *The Bailey Site (40GL26): Late Archaic, Late Woodland, and Historic Settlement and Subsistence in the Lower Elk River Drainage of Tennessee.* Miscellaneous publication. Division of Archaeology, Tennessee Department of Transportation, Nashville, TN.

Bloom, Johnathan A.
1990 *Archaeological Data Recovery at the Charlotte Woods Soapstone Quarry (9DA248), Dekalb County, Georgia.* Ms. on File, Garrow & Associates, Atlanta.

Bohanan, Earl R.
1975 A Petrographic and Spectrographic Analysis of Several Soapstone Artifacts from Tennessee and Soapstone Deposits in North Carolina and South Carolina in an Attempt to Determine the Source Area of the Artifacts. Unpublished M.S. Thesis, Department of Geology, University of Tennessee, Knoxville, Tennessee.

Braun, Lucy E.
1950 *Deciduous Forests of Eastern North America.* Blakiston, Philadelphia.

Burton, J.H.
1990 Ratio of Barium to Strontium as a Paleodietary Indicator of Consumption of Marine Resources. *Journal of Archaeological Science.* 17:547-557

Bushnell, D.I., Jr.
1940 The Use of Soapstone by the Indians of the Eastern United States. *Annual Report of the Smithsonian Institution* 1939:471-490. Washington

Calabrese, Francis A.
1976 *Excavations at 40RH6, Watts Bar Area Rhea County, Tennessee.* Department of Sociology and Anthropology, University of Tennessee at Chattanooga. Tennessee Valley Authority.

Chapman, Jefferson
1981 *The Bacon Bend and Iddins Site: The Late Archaic Period in the Lower Little Tennessee River Valley*. Report of Investigations No. 25. Department of Anthropology, The University of Tennessee, Knoxville.

Chidester, Alfred Herman, A.E.J. Engel, and L.A. Wright
1964 Talc Resources of the United States. *United States Geological Survey Bulletin 1167*. United States Government Printing Office, Washington, D.C.

Coe, Joffre L.
1964 The Formative Cultures of the Carolina Piedmont. *Transactions of the American Philosophical Society* 54(5). Philadelphia.

Condamin, J, F. Formenti, M.O. Metais, M. Michel, and P. Blond
1976 The Application of Gas Chromatography to the Tracing of Oil in Ancient Amphorae. Archaeometry 18:195-201

Cummings, Linda S. and Jaime Dexter
2005 *Steatite Residue Analysis of Samples from Site 40BT90, Tennessee.* Paleo Research Institute Technical Report 05-34, Paleo Research Institute, Colorado.

Curtin, Leonora S. M.
1957 *Some Plants Used by the Yuki Indians of Round Valley, Northern California.* Southwest Museum, Los Angeles. As seen in the eHRAF Collection of Ethnography on the Web, (05/11/2006).

Custer, J.F.
1984 The Paleoecology of the Late Archaic: Exchange and Adaptation. *Pennsylvania Archaeologist* 54:32-47.

Deal, M., and P. Silk
1988 Absorption Residues and Vessel Function: A Case Study from the Maine-Maritimes Region. In *A Pot for All Reasons: Ceramic Ecology Revisited*, edited by C.C. Kolb and L.M. Lackey, pp. 105-125. Laboratory of Anthropology, Temple University, Philadelphia.

Dean and Heath
1990 Form and Function: Understanding Gray Pottery in the Northeastern Great Basin, in *Hunter-Gatherer Pottery from the Far West*, edited by J. Mack, pp. 19-28. Nevada State Museum Anthropological Papers No. 23, Carson City, NV.

Deniro, M.J.
1987 Stable Isotope and Archaeology. *American Scientist* 75: 182-191.

Dickens, Roy S., Jr., and Linda R. Carnes
1983 Preliminary Investigations at Soapstone Ridge, Dekalb County, Georgia. *Southeastern Archaeological Conference Bulletin* 20/21:81-97.

Dougherty, Irvin S.
1970 A Steatite Bowl from Kentucky. *The Redskin* 5:108-109.

Duma, G.
1972 Phosphate Content of Ancient Pots as Indication of Use. *Current Anthropology* 13:127-130.

Dunnell, R.C. and T.L. Hunt
1990 Elemental Composition and Inference of Ceramic Vessel Function. *Current Anthropology* 31:330-336.

Edens, Rick
1971 A Further Report on Archaic Soapstone Quarries in Upper South Carolina. Institute of Archaeology and Anthropology, University of South Carolina, *Notebook* 4(2):91-92.

Eerkens, J.W.
2005 GC-MS Analysis and Fatty Acid Analysis Ratios of Archaeological Potsherds from the Western Great Basin of North America. *Archaeometry* 47:83-102.

Elliot, Daniel T.
1981 *Soapstone Use in the Wallace Reservoir.* Wallace Reservoir Project Contribution 5, Department of Anthropology, University of Georgia, Athens, Georgia.
1986 *The Live Oak Soapstone Quarry, Dekalb County, Georgia.* Garrow and Associates, Inc., Atlanta, Georgia.
1989 *Falcon Field and Line Creek: Two Archaic Period Sites in West Central Georgia.* Southeastern Archaeological Services, Athens, Georgia.
n.d. *Late Archaic Use of Soapstone: A View from the Source.* Technical Report, Southeastern Wildlife Services, Inc.

Faulkner, Charles T.
1991 Prehistoric Diet and Parasitic Infection in Tennessee: Evidence from the Analysis of Desiccated Human Paleofeces. *American Antiquity* 56(4):687-700.

Fenneman, Nevin M.
1938 *Physiography of Eastern United States*. McGraw-Hill Book Company Inc., New York.

Ferguson, Terry Andrew
1980 *Prehistoric Soapstone Procurement in the Northwestern South Carolina*. Unpublished M.A. Thesis, The University of Tennessee, Knoxville.

Gibson, Jon L.
1996 Poverty Point and Greater Southeastern Prehistory: The Culture that Did Not Fit. In *Archaeology of the Mid-Holocene Southeast*, edited by Kenneth E. Sassaman and David G. Anderson, pp. 288-305. University Press of Florida, Gainesville, Florida.
2001 *The Ancient Mound of Poverty Point: Place of Rings*. University Press of Florida, Gainesville, Florida.

Greene, Robert C.
1995 *Talc Resources of the Conterminous United States*. U.S. Geological Survey. Open-File Report, OF 95-586. Menlo Park, California.

Gremillion, Kristen J.
2004 Seed Processing and the Origins of Food Production in Eastern North America. *American Antiquity* 69(2):215-234.

Hally, David J.
1983 Use Alteration of Pottery Vessel Surfaces: An Important Source of Evidence for the Identification of Vessel Function. *North American Archaeologist* 4:3-26.

Harrington, M.R.
1922 *Cherokee and Earlier Remains on Upper Tennessee River*. Indian Notes and Monographs, No. 24, Museum of the American Indian, Heye Foundation, New York.

Hastorf, C.A., and M.J. DeNiro
1985 Reconstruction of Prehistoric Plant Production and Cooking Practices by a New Isotopic Method. *Nature* 315:489-491.

Hellson, John C.
1999 *Ethnobotany of the Blackfoot Indians*. National Museums of Canada, Ottawa. As seen in the eHRAF Collection of Ethnography on the Web, (05/11/2006).

Hoffman, Curtiss
1998 Pottery and Steatite in the Northeast: A Reconsideration of Origins. *Northeast Anthropology* 56:43-68.

Holland, C.G., S.E. Pennell, and R.O. Allen
1981 Geographic Distribution of Soapstone Artifacts from 21 Aboriginal Quarries in the Eastern U.S. *Quarterly Bulletin of the Archaeological Society of Virginia* 35:200-208.

Jeffries, Richard W.
1996 The Emergence of Long-Distance Exchange Networks in the Southeastern United States. In *Archaeology of the Mid-Holocene Southeast*, edited by Kenneth E. Sassaman and David G. Anderson, pp. 222-234. University Press of Florida, Gainesville, Florida.

Keel, Bennie C.
1976 *Cherokee Archaeology: A Study of the Appalachian Summit*. University of Tennessee Press, Knoxville, Tennessee.

Kelly, Arthur Randolph
1969 An Archaic Steatite Quarry near Greenville, South Carolina. *Eastern States Archaeological Federation Bulletin* 26:12.

Kim, Yong W., Bradley A. Creswell, Charles Bentz, Dan Marcel, and Tracy Hoose
1999 *A Final Report on Intensive Phase I Survey and Phase II Testing of Sites 40BT89, 40BT93, and 40BT94 in the Proposed State Route 73 (U.S. 321) and State Route 337 Corridor from Kinzel Springs to the Great Smoky Mountains National Park Boundary, Blount County, Tennesse.* Transportation Center, The University of Tennessee, Knoxville. Submitted to the Tennessee Department of Transportation, Environmental Planning and Permits Office, Nashville. Tennessee Department of Transportation Project Number 05006-1238-04.

Kimball, Larry R.
1985 *An Overall Assessment of the Archaeological Resources of Tellico Reservoir.* Report of Investigations No. 40, Department of Anthropology, University of Tennessee. Knoxville, Tennessee.

Klein, Michael J.
1997 The Transition from Soapstone Bowls to Marcey Creek Ceramics in the Middle Atlantic Region: Vessel Technology, Ethnographic Data, and Regional Exchange. *Archaeology of Eastern North America* 25:143-158.

Lafferty, R. H., III
1981 *The Phipps Bend Archaeological Project*. Research Series 4, Office of Archaeological Research, University of Alabama, and TVA Publications in Anthropology 26, Knoxville.

Lowman, D. W., and S. L. Wheatley
1970 Archaic Soapstone Quarries in Upper South Carolina. Institute of Archaeology and Anthropology, University of South Carolina, *Notebook* 2(6/7):6-12.

Luckenbach, Alvin H. and C.G. Holland
1974 Soapstone Artifacts: Tracing Prehistoric Trade Patterns in Virginia. *Science*. 187 (4171): 57-58.

Mathis, M.A.
1982 The Blue Rock Soapstone Quarry (31YC7), Yancey County, North Carolina. In *Collected Papers on the Archaeology of North Carolina*, edited by J.B. Mountjoy, pp. 83-103. North Carolina Archaeological Council Publication No. 19, North Carolina Archaeological Council and the Archaeological Branch, Division of Archives and History, North Carolina Department of Cultural Resources, Raleigh.

Miller, Robert A.
1974 *The Geologic History of Tennessee*. Nashville: State of Tennessee, Department of Conservation, Division of Geology.

Moffat, D., and S.J. Butler
1986 Rare Earth Element Distribution Patterns in Shetland Steatite – Consequences for Artifact Provenancing Studies. *Archaeometry* 28:101-115.

Mohr, Charles H.
1883 Aboriginal soapstone quarry and shell-heaps in Alabama. *Annual Report of the Smithsonian Institution for 1881*. 91-93.

Neuendorf, Klaus K.E., James P. Mehl, Jr. and Julia A. Jackson
1997 *Glossary of Geology*. Edited by Neuendorf, Klaus K.E., James P. Mehl, Jr., Julia A. Jackson. Fourth Edition ed. American Geological Institute, Alexandria, Virginia.

Newman, John B.
2002 A Steatite Bowl from the Flint River Site: 1Ma48. *Journal of Alabama Archaeology* 48:1-22

Overton, James M.
1969 A Survey of Soapstone Quarry Sites. Institute of Archaeology and Anthropology, University of South Carolina, *Notebook* 1(4):6-7.

Peck, R.M.
1981 The Pacolet River Site: A South Carolina Soapstone Quarry. *The Chesopiean* 19(3-4):39-44.

Price, D.T.
1985 Bone Chemistry and the Reconstruction of Diet: Strontium Discrimination in White-Tailed Deer. *Journal of Archaeological Science.* 12:419-442.

Ramsey, B. C.
2000 Oxcal 3.5. http://units.ox.ac.uk/departments/rlaha/orau/

Rottländer, Rolf C.A.
1990 Lipid Analysis in the Identification of Vessel Contents. *MASCA Research Papers in Science and Archaeology* 7:37-40.

Runia, L.T.
1987 Strontium and Calcium Distribution in Plants: Effect on Paleodietary Studies. *Journal of Archaeological Science.* 14:599-608.

Sassaman, Kenneth E.
1993 *Early Pottery in the Southeast: Tradition and Innovation in Cooking Technology*. The University of Alabama Press, Tuscaloosa, Alabama.
1995 The Social Contradictions of Traditional and Innovative Cooking Technology in the American Southeast. In *The Emergence of Pottery*, W.K. Barnett and J. Hoopes (eds.), pp. 223-240. Smithsonian Institution Press, Washington.
1996 Technological Innovations in Economic and Social Contexts. In *Archaeology of the Mid-Holocene Southeast*, K.E. Sassaman and D.G. Anderson (eds.), pp. 57-74, University Press of Florida, Gainesville.
1997 Refining Soapstone Vessel Chronology in the Southeast. *Early Georgia* 25 (1):1-20.
2006 Dating and Explaining Soapstone Vessels: A Comment on Truncer. *American Antiquity*, 71(1):141-156.

Sassaman, Kenneth E., and David G. Anderson
1995 *Middle and Late Archaic Archaeological Records of South Carolina* (revised edition). Savannah River Archaeological Research Papers 6, South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Schambach, F.F.
1974 A Unique Engraved Steaite Bowl from Southwest Arkansas. *The Arkansas Archaeologist* (15):40-44

Schiffer, Michael B.
1976 *Behavioral Archaeology.* Academic Press, New York.

Schroedl, Gerald F. and J. F. Bates
1986 *Overhill Cherokee Archaeology at Chota-Tanasee.* Report of Investigations No. 38, Department of Anthropology, University of Tennessee, Knoxville, Tennessee.

Skibo, James M.
1992 *Pottery Function: A Use Alteration Perspective.* Plenum Press, New York.

Smith, Brent W.
1991 The Late Archaic-Poverty Point Trade Network. *Geoscience & Man* 29:173-180.

Steponaitis, Vincas P.
1986 Prehistoric Archaeology in the Southeastern United States, 1970-1985. *Annual Reviews in Anthropology* 15:363-404.

Stuiver, M., Reiner, P.J., Bard, E., Beck, J.W., Burr, G.S., Hughen, K.A., Kromer, B., McCormac, F.G., v.d. Plicht, J., and Spurk, M.
1998 INTCAL98 Radiocarbon Age Calibration 24,000-0 cal B.P. *Radiocarbon* 40:1041-1083.

Touhy, D.R.
1990 Second Thoughts on Shoshoni Pots from Nevada and Elsewhere, in *Hunter-Gatherer Pottery from the Far West*, edited by J.Mack, pp. 84-105. Nevada State Museum Anthropological Papers No. 23, Carson City, NV.

Truncer, James
2004a *Steatite Vessel Manufacture in Eastern North America.* BAR International Series. Archaeopress, Oxford, in press.
2004b Steatite Vessel Age and Occurrence in Temperate Eastern North America. *American Antiquity* 69 (3):487-513.
2006 Taking Variation Seriously: The Case of Steatite Vessel Manufacture. *American Antiquity* 71 (1):157-163.

Ward, Trawick H.
1999 *Time Before History: The Archaeology of North Carolina.* The University of North Carolina Press, Chapel Hill, North Carolina.

Watts, William A.
1969 The Late Quaternary Vegetation History of the Southeastern United States. *Annual Review of Ecological Systems* 11:387-409.

Webb, Clarence H.
1944 Stone Vessels from a Northeastern Louisiana Site. *American Antiquity* 9:386-394.
1977 The Poverty Point Culture. *Geoscience & Man* 17.

Werner, David
1987 The Zimmerman Site. In *Archeology in the Upper Delaware Valley; A Study of the Cultural Chronology of the Tocks Island Reservoir*, edited by W. Fred Kinsley III, pp.55-130. Pennsylvania Historical and Museum Commission Anthropological Series, No. 2. Harrisburg.

Whiting, Alfred F.
1939 *Ethnobotany of the Hopi*. Northern Arizona Society of Science and Art, Flagstaff. As seen in the eHRAF Collection of Ethnography on the Web, (05/11/2006).

Wright, Collin W.
2002 *Artemisia.* Taylor and Francis Inc., London.

Wright, Amos J., Jr.
1974 An Aboriginal Quarry in Tallapoosa County. *Journal of the Alabama Academy of Science* 45:17-22

Yarnell, Richard A., and M. Jean Black
1985 Temporal Trends Indicated by a Survey of Archaic and Woodland Plant Food Remains from Southeastern North America. *Southeastern Archaeologist* 4:93-106.

Yates, Brian
2000 Implications to Late Archaic Exchange Networks in the Southeast as Indicated by the Archaeological Evidence of Prehistoric Soapstone Vessels Throughout Florida. Unpublished M.S. Thesis, Department of Anthropology, Florida State University, Tallahassee, Florida.

# VITA

Ted Wells began his career in Archaeology in 1999 when he participated in a field school offered by Middle Tennessee State University (MTSU) at Pinson Mounds Archaeological Park outside of Jackson, Tennessee. He received his B.S. in Anthropology from Middle Tennessee State University in 2000. After graduation he worked as an archaeological technician for 1 ½ years with Panamerican Consultants, Inc. on projects in Tennessee and Kentucky. Before returning to graduate school, Ted was a teaching assistant for the MTSU Department of Sociology and Anthropology at Bledsoe's Lick Archaeological Project in Castilian Springs, Tennessee. Ted began graduate school at the University of Tennessee, Knoxville in the Anthropology Department in 2002. While in graduate school, Ted was a contract archaeologist for the Tennessee Valley Authority (TVA) and gained experience in Cultural Resource Management and Public Archaeology. In the summer of 2003, Ted joined the Southeastern Archaeological Center (SEAC) briefly as an archaeological technician as the Shiloh Mounds Archaeological Project entered its third field season. After returning to the University of Tennessee he began work on his Master's thesis at the Archaeological Research Laboratory where he was a graduate research assistant. Ted is employed at TVA and is working on publishing his research.

5873 8921 ۸ 5
84/84/87 US
Group