

Plant Remains, Investment Strategies, and Site Processes: Two Sites Along the
Nolichucky River in Greene County, Tennessee

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Abstract

Sites 40GN228 and 40GN229, located in Greene County, Tennessee, provide a record of subsistence change and variation in landscape management practices spanning from the Late Paleoindian to the Pisgah phase of the Mississippian period. The botanical remains from these sites detail changing plant-human relationships over a 12,000-year time span in the upper Ridge and Valley of eastern Tennessee. The expansive temporal and spatial scale of the two sites presents an opportunity to evaluate the plant assemblages on several levels. The substantial cultural deposits allowed a synchronic and diachronic look into plant use. In addition, the geographic proximity of the two sites, which initially suggested homogenous site use, offered a chance to evaluate the effects of micro-scale differences in environmental and depositional processes on the cultural deposits.

Using complementary datasets, the paleoethnobotanical analysis of 33 features and four column flotation samples is compared to geoarchaeological correlates to determine the relationship between subsistence economy, landscape use, and site formation processes at these two sites situated on adjacent banks of the Nolichucky River. Distinctive land use practices conditional to each landform are identified, with investment in horticulture restricted to the western side of the river. The initial investment in indigenous seed crops at 40GN228 beginning in the Late Archaic transitioned into intensified use in the Early Woodland. Evidence of intentional burning of the lower terrace channel bar illustrates direct investment in a distinctive microhabitat suited for this purpose.

The plant analysis presented in this thesis illustrates the high degree of intra- and intersite variability in cultural assemblages. The geographic proximity of the sites, along with cultural contemporaneity cannot be used to suggest uniformity in plant assemblages. Likewise, even though a site may be subject to frequent floods, significant cultural activities have the potential to be seen in the deposits. Sampling comprehensively and utilizing complementary datasets, such as paleoethnobotanical and geoarchaeological, can allow us to tease apart the small but distinct differences in plant use and better understand prehistoric site use strategies and land management practices.

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Chapter 1. Introduction

Excavation of the Birdwell and Neas sites, 40GN228 and 40GN229 respectively, was undertaken by the Department of Anthropology's Archaeological Research Laboratory (ARL) at the University of Tennessee from August 2009 to January 2010. Contracted by the Tennessee Department of Transportation (TDOT), the excavations succeeded in the recovery and documentation of upper Ridge and Valley Province communities spanning from the Late Paleoindian era to the Pisgah phase of the Mississippian period, or from about 12,000 to 800 years ago. Located in Greene County, Tennessee, along adjacent terraces of the Nolichucky River, these sites are currently overlain by a modern roadway, open fields, and farmland.

Expansive and abundant archaeological deposits point to the advantageous location of these sites along a floodplain deposit characterized by dynamic fluvial activity. The prehistoric record is vast at this location and the associated archaeobotanical assemblages act as a lens to understand persistent foodway traditions, as well as plant, human, and landscape transformations. Using botanical remains from a combination of cultural contexts, this thesis examines plant use over an approximately 11,000 year span in an upper east Tennessee river valley. In addition to reconstructing plant-human relationships at the sites, the patterns of plant use identified at 40GN228 and 40GN229 are evaluated for intrasite, intersite, and regional variability.

Due to the inherent complexity of a depositional sequence that is a product of lengthy, dynamic cultural and natural influences, archaeological interpretations of the patterning within the plant assemblage are contingent upon considering the effects of both natural and cultural processes. Geoarchaeological samples directly correlated to selected botanical floatation columns in this thesis facilitate an understanding of 1) ways in which prehistoric inhabitants chose to develop and utilize areas differently at these locations and 2) how hydrologic and post depositional processes result in variation within the plant assemblages at the two sites.

This thesis contributes to the larger body of paleoethnobotanical work that has been conducted in the upper Ridge and Valley province. It further argues that there is potential for increased clarity and interpretive value in paleoethnobotanical work through the integration of multiple datasets, namely paleoethnobotanical and geoarchaeological. In addition, this thesis stems from the ARL's research plans for the mitigation of the sites, which stated that the recovery of "macrofloral, microfloral, macrofaunal, and microfaunal sample remains from the effected deposits and features, to aid in the interpretation of foodways and related economic issues" was a research priority (Gage 2012:3).

The chapters in this thesis are organized as follows. Chapter 2 provides a background to 40GN228 and 40GN229. This includes an overview of the current location of the sites, previous archaeological work conducted at them, a description of the 2009-2010 field excavations, and the in-process laboratory analysis.

Following the introduction to the excavation details, the natural and cultural history of the project area is outlined. It is important to situate the local patterns of

plant use identified at the site within a larger temporal and geographic context.

Therefore, Chapter 2 provides an overview of the cultural history of the region, from the Late Paleoindian through the Mississippian periods. Considerable attention is directed to the current understandings of the trajectory of plant-human relationships in the region, and how these relationships correlate to significant regional transitions in prehistoric lifeways and traditions.

The local environment is considered highly influential to prehistoric human behavior. Environmental conditions in the project area are considered on a broad scale, in relation to eco-region data, as well as on a finer scale of analysis that includes local climate, geology, hydrology, and ecology. These data are especially important to understand the plant-human relationship, as fluctuations in the environment heavily impact the production and distribution of local flora, consequently modifying subsistence investment strategies, mobility patterns, and reproductive approaches.

Chapter 3 provides detail about the dataset selected for analysis and outlines the guidelines and protocol followed in completion of this project. This includes a review of excavation and laboratory procedures for botanical sampling, the criteria followed for plant identifications, and the succeeding methods chosen for qualitative and quantitative analysis.

Chapter 4 reports the results of the paleoethnobotanical and geoarchaeological analysis of 40GN228 and 40GN229. The results of the soil sediment analysis construct a background for the depositional history of the site areas. In addition, this chapter outlines the patterns of plant use displayed at each individual site, thus

establishing a baseline for plant use synchronically and diachronically. The archaeobotanical assemblage, in combination with soil sediment analysis, is then used to comparatively illuminate intra- and intersite variability.

Chapter 5 integrates the results of the botanical analysis with other lines of data to document changing plant use over time, landscape investment strategies, and the influence of natural variables on plant assemblages. Additionally, suggestions are proposed for future archaeological research projects confronted with similar topographical features and comparable site spatial layouts.

Chapter 2. Background

Site Location

Sites 40GN228 and 40GN229 are located in a rural expanse of land in Greene County, Tennessee. Their positions are marked on opposite shores of the Nolichucky River, within a landscape characterized by adjoining T1 and T2 floodplain valley terraces that ascend into the sloping hillsides typical of the region (Figure 2.1). The site location is subsumed within the Ridge and Valley Province physiographically, but closely borders the Blue Ridge Mountain Province to the east. Archaeologically, the site falls regionally into what is considered the Eastern Woodlands. The Eastern Woodlands is defined as the eastern portion of the United States and a portion of southern Canada, with the Mississippi River serving as a dividing line from western geographic regions. Due to the large geographic extent of the Eastern Woodlands, further subdivisions based on environmental and cultural variations prove useful. For example, Scarry (2003) employs a classification that designates this site location subregionally as the Interior Southeast. This auxiliary classification is particularly important when considering patterns of plant use, as the use of plant resources has a tendency to pattern according to geographic boundaries (Scarry 2003:77).

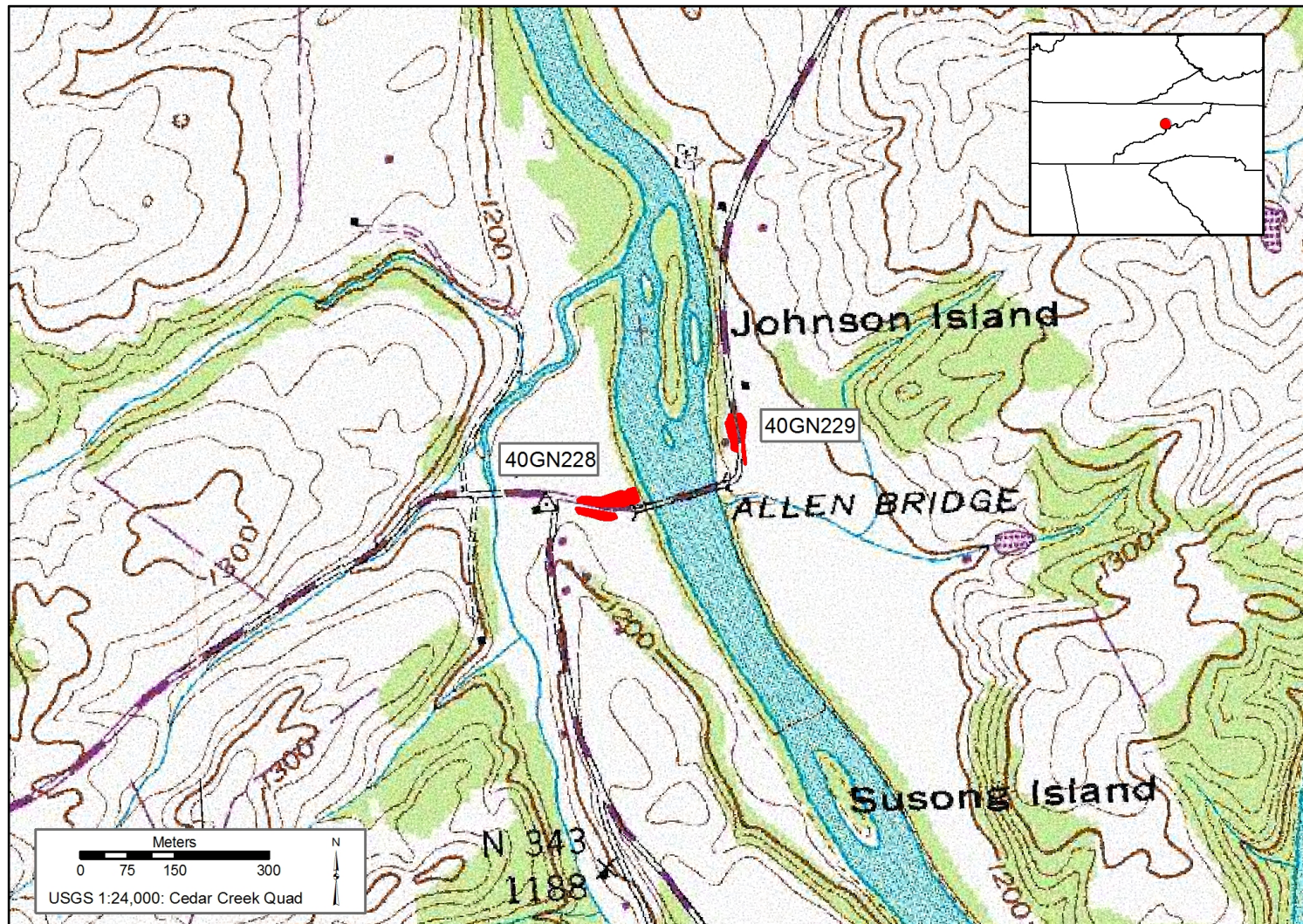


Figure 2.1. 1:24,000 scale topographic map of 40GN228 and 40GN229.

Excavation History

The excavation of 40GN228 and 40GN229 occurred as part of a large-scale environmental mitigation effort that preceded the reconstruction of West Allens Bridge over the Nolichucky River by the Tennessee Department of Transportation (TDOT). Compliance efforts of this nature have been historically and are presently responsible for a substantial portion of our current knowledge of prehistoric lifeways in the Southeast (Steponaitis 1986:365). Indeed, since the inception of TDOT's archaeology division, many sites in the upper Ridge and Valley of east Tennessee that likely would have otherwise been ignored due to their location outside of a major reservoir are receiving attention (Faulkner 2002:179).

Phase I Testing

Site boundaries were established through survey and shovel testing of the area of proposed impact at the site locations in 2002. The presence of both Middle Woodland and Mississippian period ceramic and lithic scatters was identified in a 100 m (N-S) by 40 m (NE-SW) area at 40GN228. 40GN229 was similarly identified by a 95 m (N-S) by 50 m (E-W) artifact concentration dating to the Late Archaic and Middle Woodland period. Due to the widespread artifact scatters and possible buried deposits present at both locations, the sites were considered potentially eligible for inclusion on the National Register of Historic Places (Alexander Archaeological Consultants 2002).

Phase II Excavation

The nature of the cultural deposits found in the Phase I survey warranted Phase II excavations on both sides of the river, which were conducted in 2003. The Phase II testing of 40GN228 included six trenches, four soil core samples, nine features, and three test units resulted in the confirmation of buried archaeological deposits to a depth of 4 m below the surface. Phase II excavations at 40GN229 included six trenches, 16 soil samples, 15 features, and three test units. The results of the Phase II testing called for a mitigation strategy that included either avoidance or Phase III excavation (Oakley et al. 2003).

Phase III Excavation

Phase III mitigation efforts commenced in 2009 and continued through the winter of 2010. The entire assemblage of botanical samples referred to and examined in this thesis are a product of the Phase III excavation conducted by the Archaeological Research Laboratory Department of Anthropology of The University of Tennessee, Knoxville. The bounds of the excavation were restricted to archaeological resources and deposits within a circumscribed area defined by the Area of Potential Effect (APE). These include four areas comprising the east and west shoulders along West Allens Bridge Road on both sides of the river (Figure 2.2) (Gage 2012:2).

Previous delineation of site boundaries and the APE initiated an excavation plan that included mechanical stripping of plowzone within the APE and the hand

excavation of all exposed archaeological features, as well as the strategic placement of trenches and test units throughout the site areas. The subsequent excavation resulted in the identification, mapping, sampling, and excavation of a combined total of 306 features and 18 test units (Figure 2.2).



Figure 2.2. Location of sites 40GN228 and 40GN229 showing excavation blocks, test units, and features.

40GN228 spans the gradually sloping T1 and T2 landforms west of the Nolichucky River (Figure 2.2). Excavations included areas both north and south of the current roadway. Although not unscathed by the effects of road construction, plowing, and collecting, widespread buried archaeological deposits were intact. During the Phase III efforts 187 cultural features and nine test units were excavated, resulting in the collection of artifacts and samples representing an Early Archaic through Mississippian Pisgah phase occupation (Figure 2.3). The prehistoric occupation of this site is represented by components dating to the Early Archaic, Late Archaic, Early Woodland Swannanoa phase, the Middle Woodland Pigeon and Connestee phases, the Late Woodland, and the Mississippian Pisgah phase (Gage 2012). Cultural deposits range from those representative of short-term, seasonal camping/habitation sites to long-term, year-round settlement.

40GN229 occupies the eastern bank and terrace of the river (Figure 2.2). In contrast to the gradually sloping landform present on the western shore, the eastern riverbank more dramatically ascends into the T1 landform, where the site is located. Deposits at this site are dated from the Late Paleoindian to the Pisgah phase of the Mississippian. The APE and the excavations at 40GN229 are likewise dissected by the existing roadway. A total of 119 cultural features and nine test units were excavated at this site (Figure 2.4). The prehistoric occupation of this site includes components dating to the Late Paleoindian, Early Archaic, Late Archaic and Late Archaic Savannah River phase, Terminal Archaic, Early Woodland Swannanoa phase, Middle Woodland Connestee phase, and Mississippian Pisgah phase (Gage 2012). Cultural deposits at this site also exhibit a wide range of variation, but a lack

of posthole features may suggest that this location was not as preferable as 40GN228 for long-term habitation.

Following the field excavation efforts, substantial laboratory analyses were conducted. In addition to the paleoethnobotanical and geoarchaeological analyses outlined in this thesis, the interpretation and reconstruction of the prehistoric occupations of these sites were supported by analysis conducted through the ARL that consisted of ceramic, lithic, and groundstone implements, along with micro- and macro-faunal remains (Gage 2012). The development of a GIS database and the categorization of feature typologies further distinguished the wide range of activity sets and spatial behaviors associated with the site areas. The use of both relative dating techniques and radiocarbon dating established a chronological foundation for the material record and cultural deposits present at the two sites.

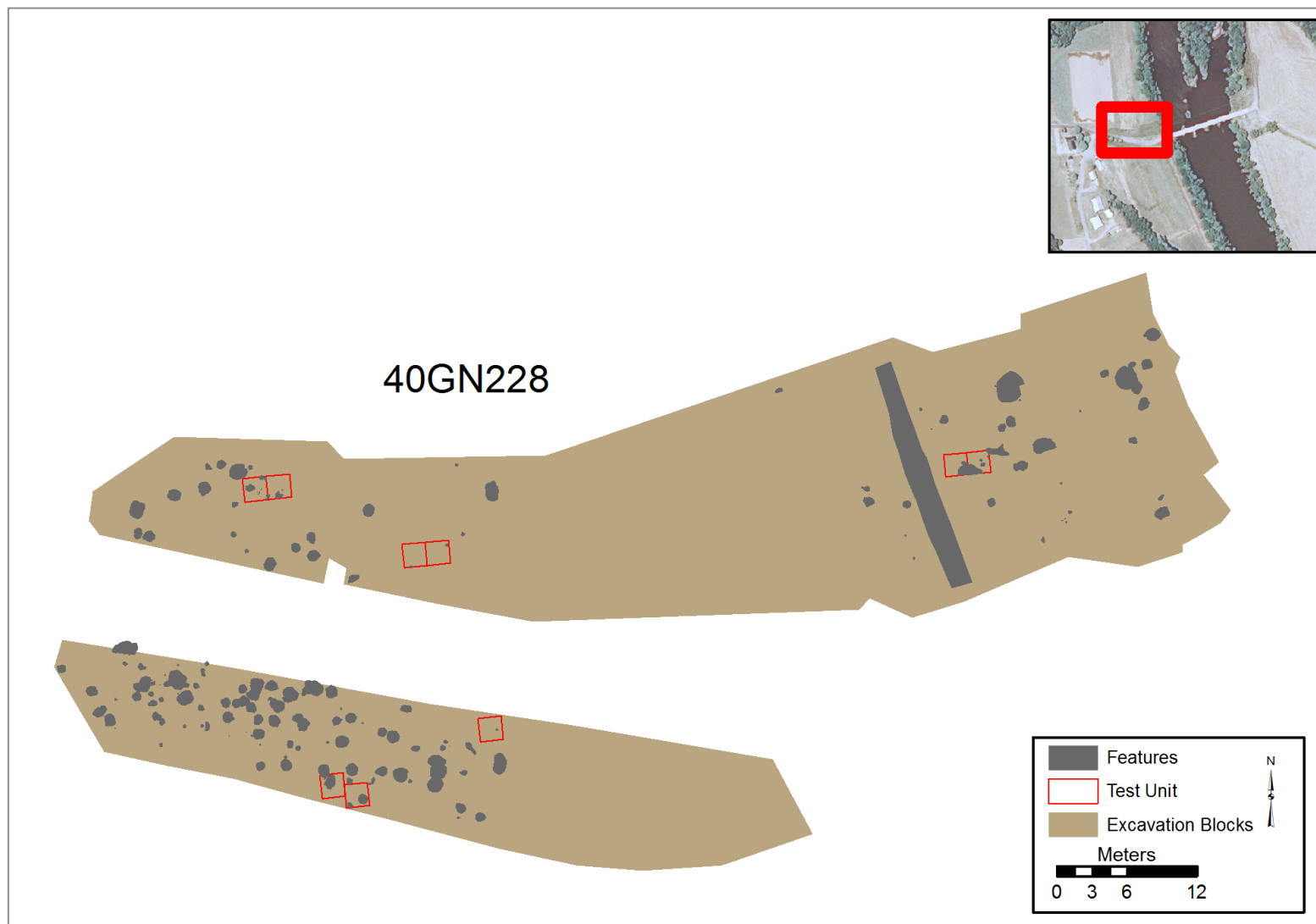


Figure 2.3. Location of excavation blocks, features, and test units excavated during Phase III testing at site 40GN228.

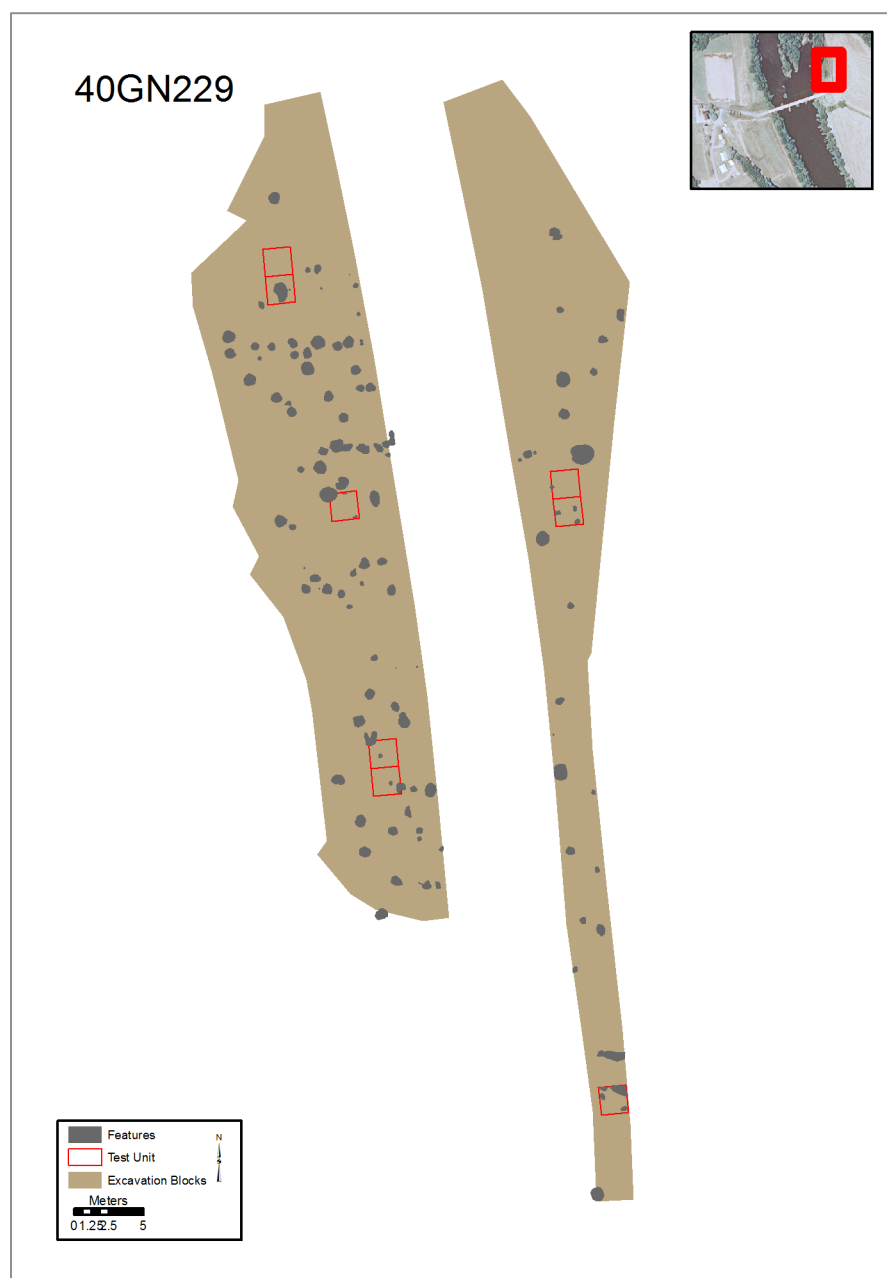


Figure 2.4. Location of excavation blocks, features, and test units excavated during Phase III testing at site 40GN229.

Natural Setting

The cultural remains at 40GN228 and 40GN229 cannot be viewed independently from their natural context. It is important to situate the cultural history of the location within its environmental setting for several reasons. Firstly, humans have a long and complex relationship with their surrounding environment. This interplay is multidirectional: humans are directly affected by fluctuating environmental conditions and thus have frequently adapted through biological and cultural mechanisms to new conditions, but the reverse is true as well.

Anthropogenic influence, both unintentionally and intentionally acted, can alter ecosystems on a micro and macro scale (Delcourt and Delcourt 1988:40; Delcourt et al. 1986). Additionally, and specifically important for this site location, the same physiographic and environmental changes that transformed prehistoric subsistence, site settlement patterns, and site spatial layouts likewise continue to have influence post-depositionally on a local scale. Therefore, the natural environment remains a powerful component of any archaeological interpretations.

Ecoregion Data

Ecoregions are useful units of analysis because they spatially define recognizable patterns of integrated characteristics within an area based on geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology (Griffith et al. 1998). A nested hierarchical organization, along with continuous revisions and increasing refinement in Ecoregion datasets enable a coarse- to fine-grained scale of environmental analysis. Although frequently utilized to aid in contemporary resource

and land management practices, although still variable, the relative stability in environmental conditions that began in the Holocene and continues to endure (Anderson et al. 2007:5), makes it possible to incorporate this dataset to applications extending into prehistory. Due to the local and regional emphasis of this thesis, Ecoregion data will be addressed at Levels III and IV, which detail environmental conditions at a more precise unit of analysis.

Level III

40GN228 and 40GN229 are located in the *Ridge and Valley Province* in upper East Tennessee (Figure 2.5). This province is bordered by the Blue Ridge Mountains to the east and the Cumberland Mountains and Cumberland Plateau to the west. The Ridge and Valley is a narrow northeast-to-southwest trending physiographic ecoregion. It is demarcated from neighboring provinces by a less elevated, alternating pattern of gently rolling parallel ridges and narrow valleys (Friesen and Stier 2011). This incised landscape is the product of an active stream system that works its way from headwaters in the Appalachian Mountains to drainages into the Tennessee River. The Ridge and Valley is a consequence of geologic occurrences of faulting and folding that have resulted in a variable landscape characterized by diversity in both geologic sediments and aquatic biota (Diagle et al. 2006).

Level IV

At the Level IV designation, 40GN228 and 40GN229 are located in the *Southern Limestone/Dolomite Valleys and Low Rolling Hills* ecoregion (Figure 2.6).

This region is characterized by a combination of limestone and cherty dolomite geologic deposits, variable soil productivity, and mixed-forest land cover consisting of white oak, bottomland oak, and sycamore-ash-elm riparian types (Diagle et al. 2006). Approximately seven km to the west occur the Southern Shale Valleys, which consist of a mixed topographic landscape dominated by shale, limited limestone, and strongly acidic soils (Diagle et al. 2006). In contrast, the Southern Sedimentary Ridges, approximately five km to the east, are distinguished by a much more elevated topography, along with diverse geologic types including shale, sandstone, siltstone, quartzite, and conglomerate.

It is important to note the sites' location along the boundary of two Level III and IV ecoregions. While the location is within the Ridge and Valley, the Blue Ridge Mountains Province is within advantageously close proximity, and therefore was likely frequently utilized by inhabitants of this site. Site locations along such corridors of ecological diversity have an abundance of subsistence, lithic, and other raw material resources available for extraction, and therefore have been cited as beneficial and conducive to demographic and economic growth, as well as to the development of social complexity (Hudson et al. 1985:732; Larson 1971b; Muller 1978:373; Swanton 1946:14).

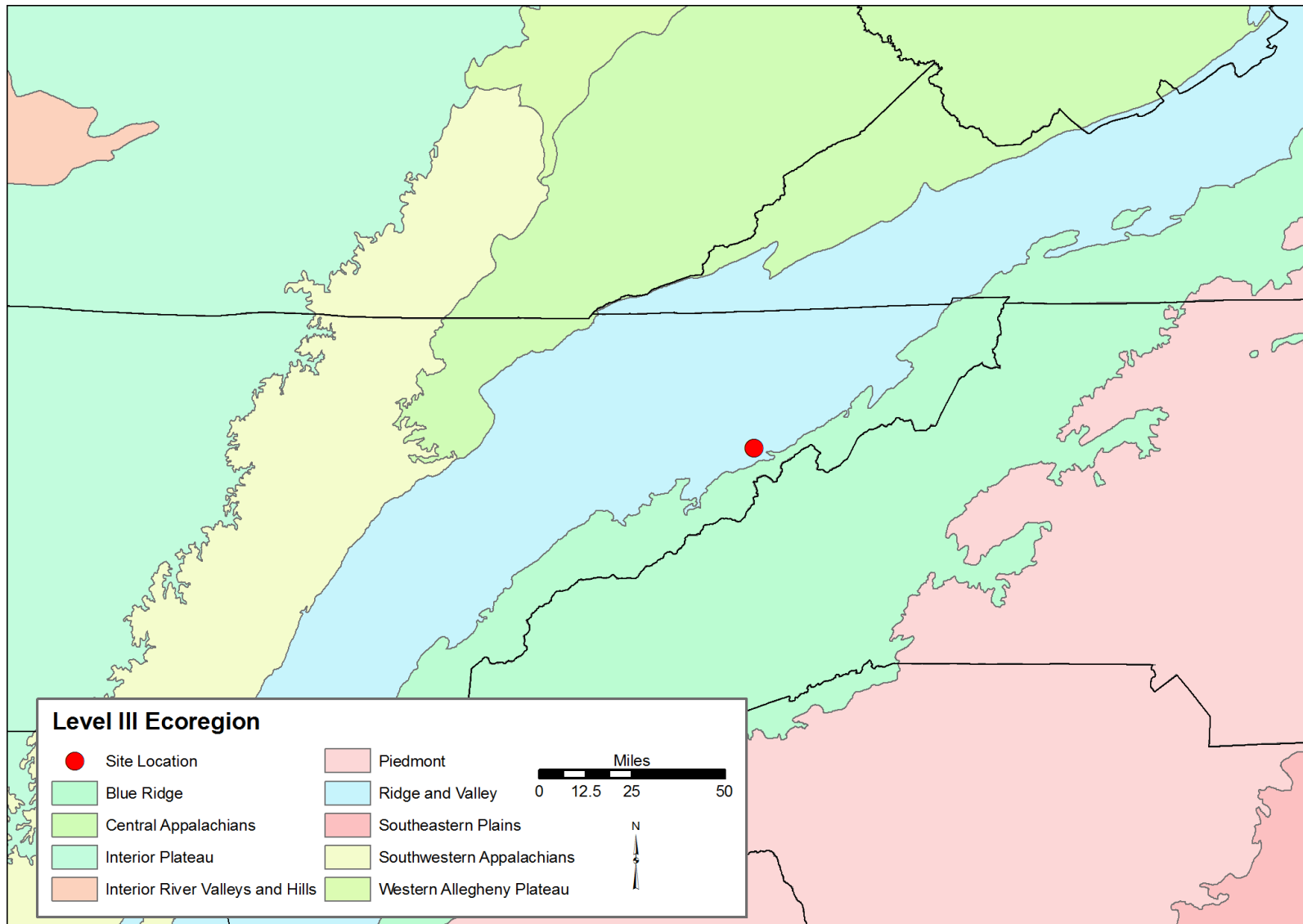


Figure 2.5. Level III Ecoregion Coverage for 40GN228 and 40GN229 (Daigle et al. 2006); US Environmental Protection Agency; GIS data available at <http://www.epa.gov/wed/pages/ecoregions.htm>).

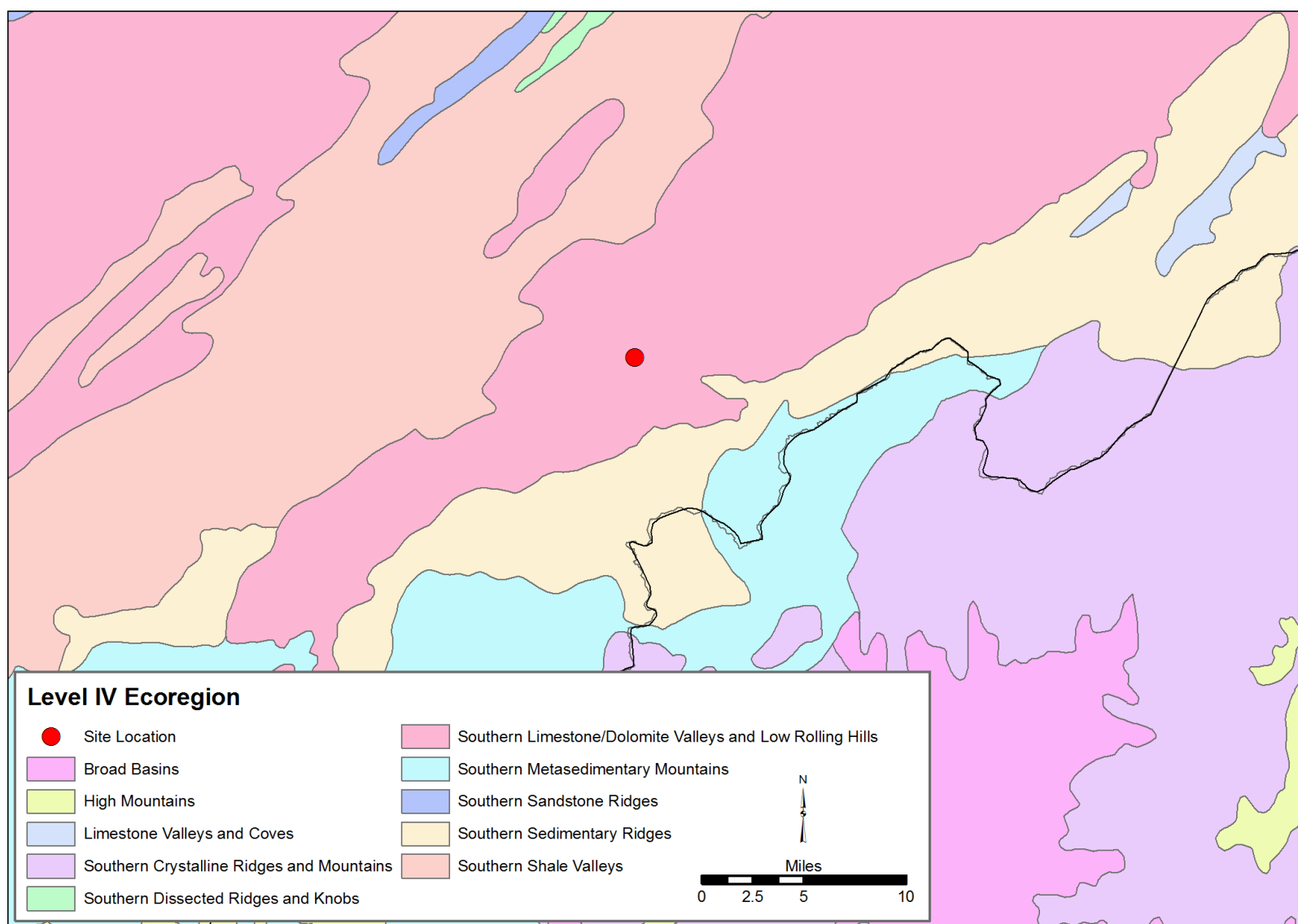


Figure 2.6. Level IV Ecoregion Coverage for 40GN228 and 40GN229 (Daigle et al. 2006); US Environmental Protection Agency; GIS data available at <http://www.epa.gov/wed/pages/ecoregions.htm>)

In particular, the rise of large chiefdoms in the Southeast seems to substantiate this inference. Geographic and environmental factors associated with this trend consist of the plentiful distribution of resources across the landscape, as well as beneficial positioning relative to the coast and riverine systems and to the rich soils of the interior valleys (Chapman 1985b:76-77). The occupational land of the Cherokees for example, which comprised areas in the southern Appalachian highlands, serves as an example of the kind of environment that has been described as most agreeable to demographic expansion and political and social aggrandizement (Marcoux 2012; Swanton 1946:14). The highlands not only existed at the intersection of several diverse geographic provinces that could be exploited for plants, animals, minerals, and quarries, but this land was further amenable to agricultural development.

Hydrology

The hydrology and underlying geology of this region is responsible for producing the geographic variation that characterizes the Ridge and Valley Province. The Nolichucky River is a mostly fast-moving water system that has incised the underlying bedrock. From headwaters in the mountainous regions of North Carolina, the Nolichucky River flows along 36 miles of shoreline, where it ultimately merges with the French Broad River and empties into the Tennessee River. In addition to being responsible for supplying large sediment loads that have been favorable to farming for centuries (Tennessee Valley Authority 2010), the Nolichucky River also provides vital habitat for a variety of weedy plant species, as well as a diverse assemblage of aquatic and terrestrial animal species.

Climate

Climactically, 40GN228 and 40GN229 are located within the Ecoregion I *Eastern Temperate Forests*. A moderate to mildly humid climate characterizes this designation (Griffith et al.1998). Greene County has a mild climate, with average temperatures in the winter of 37° F and summer temperatures averaging 73° F. The growing season is generally restricted to May through October, a seasonal period defined by the majority 584 mm) of the annual precipitation (1118 mm) and milder temperatures. The first freeze generally occurs in mid October and most often ceases by the end of April (Natural Resources Conservation Service 2000).

Biotic Resources

The dominant forest type consists of Appalachian oak forest, southeastern spruce-fir forest, and northern hardwoods (McNab and Avers 1994). The flora and fauna of the region will be discussed in-depth within the *Cultural Background* section of this chapter. This is done in order to emphasize the reciprocal relationships between human communities and their surrounding biota. In doing so, I point to the more active, intentional shaping of the flora and fauna by the inhabitants of this region, while also addressing the increasing levels of co-dependence across these communities.

Cultural Background

The culture history of the southeastern United States is geographically and temporally complex. The record of prehistoric subsistence in the Eastern Woodlands

is vast and the archaeological literature expansively covers the transition from hunting-and-gathering to intensive farming. The Eastern Woodlands is a primary region of interest to paleoethnobotanists due to broad temporal trends consisting of the early and independent development of an agricultural complex based on indigenous crop husbandry in the Late Archaic, the early introduction of corn in the Middle Woodland, and the transition to a farming economy based on corn agriculture in the Late Woodland and Mississippian (Smith and Cowan 2003).

In outlining the cultural background of the region, particular emphasis will be given to identifying the defining characteristics of each temporal cultural period, but additionally weighted will be the changing relationships between plant and human communities. While it is particularly difficult to determine cause and effect relationships, changing plant-human relationships are highly influential to transitions in large-scale behavioral patterns.

Large databases based on the plant recovery from archaeological sites throughout the Southeast have provided an extensively detailed temporal and spatial timeline of plant use (Scarry 2003:87). In addition, historical and contemporary ethnographic studies have added knowledge of the temporal trends in plant use at the time of European Contact and are as well responsible for much of our current knowledge of the gathering, processing, and methods of plant consumption (see Fritz et al. 2001; Hamel and Chiltoskey 1975; Hammet 1992). The resulting timeline establishes a comparative foundation to compare the temporal and spatial patterns of plant use identified at 40GN228 and 40GN229. Since the manner and patterns in which plant resources in the Southeast were utilized are not homogenous, but display

variation in accordance with dietary necessity, cultural order, and individual and communal preference, it is important to approach these patterns discriminatively to tease apart local differences.

Paleoindian Period (12,000-10,000 ¹⁴C B.P.)

The Paleoindian period begins with the first colonization of North America approximately between 30,000 and 15,000 years B.P. Genetic and archaeological evidence point more strongly to the colonization of the Americas around 15,000 years ago (Goebel et al. 2008). Traditional models of the peopling of North America have designated the first inhabitants of the continent as the Clovis culture. This culture has been defined primarily on the basis of archaeological sites found throughout the continent consisting of associated Clovis fluted points and large game. Dated approximately to 11,500 B.P., the Clovis culture has traditionally been viewed as nearly monolithic in technology and subsistence. The record of the expansion of people across North and South America is changing rapidly as pre-Clovis-aged sites are now accepted and other models of movement are becoming considered more plausible.

Although the conventional image of Paleoindian hunters is still considered predominantly representative of this period, the degree by which Paleoindian peoples' were megafauna specialist and thus, the amount that large megafauna contributed to the overall subsistence in the Paleoindian diet remains in question (Waguespack and Surovell 2003; Yesner 1996). There is confirmation of Paleoindian megafaunal hunting in the Southeast (see Anderson et al. 1996; Claassen et al. 1979; Dunbar

1991; Webb et al. 1984), but changes in vegetation (to a mature homogenous northern hardwood forest dominated by oak-hickory) (Delcourt and Delcourt 1985; Pianka 1978) and climate (to a more seasonal summer and winter with increased precipitation) (Watts 1980a, 1980b) from 12,000 to 10,000 B.P. suggest that in this region, adaptations from a collecting to a more generalized foraging subsistence strategy occurred much earlier than in other portions of eastern North America (Anderson et al. 1996:7). This implies that at least in the Southeast, as more generalized foragers, inhabitants were conceivably organizing to a greater extent around local resource extraction.

A general lack of recovery of plant remains from Paleoindian period archaeological deposits has limited paleoethnobotanical estimates of plant use, but it is reasonable to suggest that the same biases towards stone tools, hunting activities, and other male-based activities that have traditionally caused archaeological disregard for the importance of plant-based subsistence have also led to an underrepresentation of plant-based subsistence in the Paleoindian (Conkey and Gero 1997:425; Gero 1995). In fact, Hollenbach (2009) argues that based on plant remains from four rockshelter sites located in the northwestern Alabama, Late Paleoindian and Early Archaic settlement patterns may be attributable more to the distribution of predictable plant resources than to an exclusive concentration on animal movements or stone resource deposits. Thus, gathered plant remains may not have been a secondary resource, but instead may have had a much stronger influence on early prehistoric communities.

Archaic Period (10,000-3,000 ¹⁴C B.P.)

The Archaic period is distinguished from the preceding Paleoindian by increasing specialization in subsistence and technology, as well as increasing population growth and sedentism. While the earlier occupants of this period share many of the same characteristics with their predecessors, by the Late Archaic, although still mobile hunter-gatherers, indigenous crop husbandry and increasing anthropogenic influence on the environment becomes a distinguishable feature.

Early Archaic (10,000-8,000 ¹⁴C B.P.)

The Early Archaic Period has been defined on the basis of an increasingly regional toolkit that is believed to imply reduced long-range mobility and trade. Characteristics associated with the Early Archaic, as mentioned previously, may have occurred in the Southeast earlier in the chronological sequence than once accepted. Thus, Early Archaic inhabitants used the boreal and mixed vegetation of the Eastern Woodlands to their advantage, giving rise to a generalized foraging subsistence strategy (Sassaman 2010; Scarry 2003:78). The diversified toolkit of the Early Archaic stands as evidence of the increasing dependence on a broad-based subsistence that included both a variety of local woodland animals and uncultivated plant communities (Chapman 1985b:43-46).

Middle Archaic (8,000-5,000 ¹⁴C B.P.)

The Middle Archaic chronologically occurs during a period of mid Holocene warming (Anderson 2001). Evidence of the routine contribution of wild plants to

dietary intake is present in the Middle Archaic in the form of stone plant-processing tools found from a series of sites across the Southeast (Anderson 1995:154). Hickory nuts and acorns comprise a large portion of the plant remains recovered from archaeobotanical assemblages in the Interior Southeast (Scarry 2003:83). Regional traditions continue to develop in this period, and as a result, the Middle Archaic toolkit continued to diversify to accommodate localized conditions (Anderson and Sassaman 1996). The Middle Archaic toolkit expands to include not only plant and animal processing tools, but also fishing implements and the atlatl. While these prehistoric populations undoubtedly still practiced mobility, it appears that by this period, permanently disturbed open habitat settings suggestive of more long-term habitation did exist in riverine habitats (Smith 1992:27). In addition, sites along and near the coast throughout the Southeast begin to exhibit evidence of early aggregation and social complexity, exemplified in the archaeological record by increasingly visible midden deposits and organized mound-building efforts (Gibson 1994; Russo 1996).

Late Archaic (5,000-3,000 ¹⁴C B.P.)

Notable differences in settlement patterning, social organization, and subsistence are visible beginning in the Late Archaic. Whereas there is some evidence of semi-permanent structures in the Middle Archaic, postmolds and pithouses are well documented in the Late Archaic in the Southeast (Anderson 1995:157; Sassaman 2010). Increasing sedentism is further indicated by the elevated density of sites within this period, as well as a high density of archaeological features

and middens in the Tennessee Valley (Chapman 1985a:150, 1985b:51-53). Russo (1994:93) argues that the extensive shell rings that occur during the Late Archaic along the eastern and southern coasts of the United States, while still treated by a portion of the scientific community as strictly domestic trash deposits, are more accurately representative of Late Archaic peoples' active ceremonial culture. Perhaps tied to the organization and sentiments associated with increasing sedentism, Late Archaic burial patterns also indicate greater ritual activity and status differentiation (Muller 1978:381).

Profound changes did occur in the plant-human relationship within the Late Archaic. Indeed, while "experimental plots for plant manipulation" may have been established in the preceding Middle Archaic period, by the Late Archaic there is clear evidence of the domestication of several indigenous plant species (Smith 1992:27). The domestication of maize is no longer seen as the exclusive agricultural development in the Americas, as recent archaeological focus on food production economies in the Late Archaic highlight the domestication of squash, chenopod, marshelder, and sunflower in eastern North America between 5,000 and 3,500 B.P. (Smith and Cowan 2003:106). Larger seeds and thinner seed coats stand as direct archaeological evidence of the intentional storage and sowing of seeds leading to domestication. Sometime around 3,500 B.P. an additional suite of indigenous crops were cultivated, which included maygrass, knotweed, little barley, and giant ragweed (Smith and Cowan 2003:111). Although it is unclear to what extent Late Archaic inhabitants were consuming these edible seeds, consistent presence in paleofecal

remains and archaeological features implies that these early domesticates served as a steady and important food source (Smith and Cowan 2003:111-112).

Woodland (3,000-1,000 ¹⁴C B.P.)

The Woodland period is characterized by increasing social complexity, technological innovation, and agricultural intensification. Although many of the traits that were once used to define Woodland culture (e.g. ceramic technology, agriculture, sedentism, and complexity) were most likely initiated earlier, these attributes become predominant across Woodland period communities (Anderson and Mainfort 2002:1). Limestone-tempered pottery is characteristic of this time frame within this region. Woodland period divisions are primarily divided into Early, Middle, and Late.

Early Woodland (3,000-2,150 ¹⁴C B.P.)

Many of the cultural attributes associated with the Early Woodland remain consistent with that of the Late Archaic. Populations are still considered relatively small, seasonally mobile, and regionally distinctive (Anderson and Mainfort 2002:5). However, ceramic technology continues to intensify, as evidenced by its widespread use and stylistic diversification. Characteristic pottery of the Ridge and Valley Province include both Swannanoa and Long Branch Fabric types.

Subsistence practices appear to remain relatively stable in this period. People continued to exploit woodland mammals and aquatic resources. Plant utilization remained concentrated on the gathering of a range of nuts, tubers, and berries, as well as the harvesting of indigenous crops. In the Interior Southeast, the cultivation of

weedy seeds may have played a secondary role to that of mast harvest, and from a database of plant assemblages from this region, Scarry (2003:88) points out that acorns rather than seed crops may have fulfilled starch necessities.

Middle Woodland (2,150-1,350 ¹⁴C B.P.)

Middle Woodland period sites and assemblages are not entirely different from these outlined in the Early Woodland. Despite continuance of general patterns in technology, settlement distribution, and subsistence, several significant developments occurred that deserve special attention. First of all, while the extent of influence was not absolute, the formation of a regional tradition associated with the Hopewell complex altered communities across the Midwest and Southeast (Anderson and Mainfort 2002:14). While the degree of influence of this large ceremonial complex varied, the presence of Hopewellian artifacts and mound complexes suggests that even in upland sites, inhabitants may have been aware of and affected by the Hopewellian interaction sphere. What appears to be an increasing domestication of the local landscape applies not only to the intentional and controlled management of ecological surroundings, but most assuredly also applies to ceremonial changes that were occurring in the communal layout (Dillehay 1990:226). As centers of visibility, congregation, and repetition, the mound complexes throughout the Eastern Woodlands would have provided communities a forum by which to display and reinforce traditions and social institutions. Local traditions as defined in this period based on Keel's (1976) ceramic typology for the Appalachians include the early Middle Woodland Pigeon and the late Middle Woodland Connestee phases.

Associated with the social changes occurring throughout the Middle Woodland is the initial appearance of corn in eastern North America. Firmly dated at three sites, Holding near St. Louis, Missouri, Icehouse Bottom in Monroe County, Tennessee, and Edwin Harness Mound in Ross County, Ohio (Riley et. Al 1994:490), early corn appears in small amounts archaeologically and was not widely consumed until the Late Woodland-Emergent Mississippian period. This said, the prehistoric importance of corn is no longer solely identified by its dietary contribution alone, and subsequent research indicates that corn may in fact have had significant cultural meaning expressed both ritually and in the formation of community identity and social maintenance that could have impacted its adoption and movement among prehistoric communities (Hastorf and Johannessen 1994:427).

Late Woodland (1,350-1,050 ¹⁴C B.P.)

The Late Woodland Period is marked by the widespread adoption of the bow and arrow, and increasing population levels, warfare, and reliance on corn-based agriculture. Hopewellian influence subsided and although mound construction was depressed in some areas, it thrived further south (Anderson and Mainfort 2002:16). Corn agriculture continued to intensify from that practiced in the Middle Woodland and began to develop as a primary crop. As a result of sedentism and farming, there is evidence of increased land clearing, which had a large impact on local forest composition (Cridlebaugh 1984). Archaeologically, the increasing appearance of maize in plant assemblages after 1,150 B.P., along with an increased presence of $\delta^{13}\text{C}$

in human bone collagen samples, suggest that the dietary contribution of maize is much greater towards the end of this period (Smith 1992:275).

Mississippian (950-250 ¹⁴C B.P.)

The Mississippian Period is viewed as the apex of social complexity in the region. It is often associated with sites distinguished by year-round habitation, well-developed hierarchies that formed polities at the chiefdom level, increased fortification and territorialism, mound building around a central plaza, and substantial reliance on three sisters agriculture (corn, beans, and squash) (Chapman 1985b:74). Pottery stylistically blossomed, with shell becoming the favored tempering agent in many regions (Steponaitis 1986:388).

The Mississippian is divided into several regionally recognized phases. These phases include the Mississippian I (Martin Farm phase) dating to 1150-950 B.P., the Mississippian II (Hiwassee Island phase) at 950-650 B.P., the Mississippian III (Dallas phase) from 650-350 B.P., and the Mississippian IV (Overhill Cherokee phase), which dates from 350 B.P. to sustained European contact (Chapman 1985:76-77; Davis 1990; Lewis and Kneberg 1946; Marcoux 2012). Distinct differences in cultural traits such as housing construction, defensive architecture, diagnostic projectile point types, and ceramic assemblages separate the subdivisions within the greater Mississippian period.

Substantial changes in subsistence in the Mississippian can be considered as intensifications rather than transformations. However, the level of intensification was indeed dramatic. Inhabitants continued to rely on the hunting of common woodland

mammals and the acquisition of aquatic resources (Bogan and Bogan 1985:390-399; Chapman and Shea 1981; Larson 1980; Smith 1975). They further continued to gather wild plants and make use of indigenous crop plants, but greatly intensified their use of corn.

Evidence for this transition is apparent in both archaeobotanical assemblages and biological markers. Chapman and Shea (1981:72) found that while nut remains found in the Middle Woodland made up 95 percent of assemblages, Mississippian era sites show a decrease to 82 percent. Fritz (1993), while noting that variability in crop production within the Mississippian was a product of chronological and geographical differences, additionally documents the thematic reoccurrence of a general reliance on corn rather than native seed crops in the paleoethnobotanical record. The increasing reliance on corn as a primary crop is further seen in an amplification of the carbon isotope marker of corn from human bone collagen samples from the Mississippian as compared to values found from earlier periods (Buikstra and Milner 1991; Smith 1989:1570). Crop production had a significant effect on social complexity, providing a surplus revenue that could support a class of ruling elite. This expansion and intensification continued in East Tennessee until the arrival of the Spanish, when local populations were decimated by disease and conflict (Chapman 1985b:98).

Significant Mississippian Pisgah phase deposits at 40GN228 and 40GN229 make it pertinent to discuss this temporal designation further. The Pisgah phase dates to 950-450 B.P. in the Appalachian Summit. It occurs primarily contemporaneous with the Mississippian III Hiwassee Island and Dallas phases. It was defined at sites

excavated in the Southern Appalachians of western North Carolina, and is characterized by a distinct ceramic expression (Keel 1976). This Pisgah ceramic expression is defined by thickened and collared rims that are believed to be an unprecedented south Appalachian tradition. This tradition was influential to later Cherokee Qualla phase ceramic traditions that developed in the region (Dickens 1976).

Summary

The chronological sequence and the associated typological classifications provided in this chapter outline broad changes in prehistoric cultures, as they are currently understood. These patterns, although useful as a comparative tool, tend to diminish the variability and complexity of prehistoric populations. Nonetheless, widespread changes occurred from the Paleoindian to the Mississippian periods in human settlement, cultural relationships, and human-environment relationships that ultimately transformed the prehistoric landscape and created very unique archaeological records. The plant materials from 40GN228 and 40GN229 are evaluated in light of the larger patterns that have been established for the prehistoric Southeast.

Chapter 3. Methodology

Introduction

The extensive excavations at sites 40GN228 and 40GN229 presented an opportunity to spatially and diachronically investigate patterns of plant use over an approximately 11,000-year span in the upper Ridge and Valley in eastern Tennessee. In consultation with the Tennessee Department of Transportation, the Archaeological Research Laboratory documented, collected, and curated the archaeological remains of both sites. For a more detailed report of site excavation history and site excavation protocol, refer to Chapter 2 of this thesis or to the primary field report (Gage 2012).

The selected goals for this thesis relied upon both systematic field and laboratory methods, and a subsequent analysis that allowed for the archaeobotanical assemblages of 40GN228 and 40GN229 to be comparatively examined through a temporal and spatial lens. Carbonized plant remains were analyzed from a variety of contexts from both sites to 1) reconstruct plant use throughout the prehistoric occupation and 2) to discern localized patterns of plant use on the landscape. The results of the plant analysis are then compared to complementary sediment analyses to increase an understanding of the effects that a dynamic and heterogeneous landscape produces on the observed paleoethnobotanical record.

Theoretical Considerations

Only carbonized plant remains were considered to be representative of past plant-human relationships for the purpose of this thesis. Although plant preservation

can occur in a variety of natural environments without carbonization (e.g. arid, frozen, or waterlogged) (Miksicek 1987:212), the open-air nature and moist condition of the deposits at 40GN228 and 40GN229 precluded processes of preservation other than carbonization. Carbonization occurs when a plant's organic material is converted into elemental carbon. This takes place exclusively upon exposure to fire and lends the plant remains insusceptible to microbiologically induced decay (Dimbleby 1967:100). Plants can often become a stable and interpretable component of the cultural record, vulnerable primarily to mechanical damage (Miksicek 1987:219). Natural carbonization has been discussed as a source of interpretive error, particularly in the case of small seed inclusions in an archaeological context, but there is no valid evidence to support any significant presence of naturally charred seeds in archaeological contexts (Keepax1977:226; Minnis 1981:147).

Whether by the result of routine and purposeful activity (e.g. the burning of hickory or wood for fuel), or accident (e.g. the occasional spill during meal preparation or consumption), carbonized plants are introduced into the archaeological record as a result of cultural processes. Therefore, plant assemblages can act as an entrée to past human behavioral practice. Estimations of the importance of particular taxa are contingent upon the plant's likelihood of exposure to fire, the plant's internal properties, the associated processing techniques, and the properties of the thermal exposure itself (Minnis 1981:149; Wright 2005:577). Well recognized are the biases introduced into archaeobotanical assemblages by the aforementioned qualities and therefore, macrobotanical remains are rarely considered representative of total plant use or consumption at an archaeological site (Fritz 1994:22-23; Pearsall 2000:245).

Rather, because plant foods are habitually prepared and consumed, they display patterning, coherence, and variation that can illuminate changing plant-human relationships across time and space (van der Veen 2007:986).

Botanical Field Sampling Strategies

A comprehensive sampling strategy was initiated by the ARL in consultation with the TDOT to enable the consistent and unbiased field recovery of botanical material. Representative bulk flotation samples measuring approximately 10 liters were collected from all cultural features identified at the two sites. In addition, flotation samples were collected from the southwest 30-cm-by-30-cm corner of every test unit in 10-cm levels, yielding approximately 15 liters of fill. The exact volume of each flotation sample was recorded initially in the field and subsequently in the laboratory with necessary adjustments. A large sample size was established in recognition of the moist and acidic soil characteristics of the Eastern Woodlands, which can reduce botanical preservation (Wagner 1988:26). The effort made to collect comparable amounts from each context was expected to bolster opportunities to conduct statistical analysis (Hastorf 1999:58-59).

The systematic collection of flotation samples from all excavated contexts enabled a more complete understanding of individual components of each site and allowed for multiple intra- and intersite comparisons. This kind of systematic blanket sampling strategy has been argued to enable both more meaningful and more credible archaeological interpretations (Lennstrom and Hastorf 1995:701; Pearsall 2000:95).

Data Selection

The selection of feature and column sample flotation samples for paleoethnobotanical analysis depended on 1) temporal cultural affiliation and 2) geographic location on the landscape. Column flotation samples were additionally selected for botanical analysis on the basis of their direct correlation with geoarchaeological analyses.

It was important to incorporate both feature and column flotation samples for the following analysis due to the opportunities that each present. Features are unique anomalies on the landscape. Distinguished on the basis of soil morphology and compositional characteristics that isolate them from the surrounding matrix, they are among the most visible traces of past human behavior at archaeological sites. Features are frequently principal contexts utilized for paleoethnobotanical analysis because they often contain very visible and abundant plant remains, which can be directly associated with specific activities that occurred over a relatively short period of time.

The expansive archaeological deposits present at 40GN228 and 40GN229 required a selective process for the feature botanical analysis that took into consideration both temporal-cultural affiliation and feature type. The goals of the analysis included examining a wide swath of botanical materials that represented the daily activities that occurred at the sites and that utilized the tightly controlled contextual data to identify changing subsistence practices and land use through time. The widely recognized variability in deposition rates and preservation conditions in features lends caution to extensive quantitative comparisons. Despite this, the

changing presence and/or absence of taxa in feature contexts, along with the spatial structuring of archaeological features, are considered the visible traces of prehistoric social expression (Palmer and van der Veen 2002). Although the factors leading to this expression are multifaceted, the record that was produced is deemed to be representative of consistent patterns of prehistoric behavior.

As opposed to the feature samples in this analysis, column samples were useful for providing quantitative measurements of plant use over time. Additionally, as they represent gradual accumulation and are not bound as strictly to specific activity sets, column samples can be used as a point of reference by which to evaluate the botanical materials from other contexts (e.g. features). Incorporating an unbiased selection of contexts for sampling has been emphasized as a key to the construction of valid botanical interpretations (Lenstrom and Hastorf 1995:702; Pearsall 2000:95; Spector 1970:172).

The column samples from 40GN228 and 40GN229 will be used to: 1) to distinguish patterns of plant use sensitive to context through comparisons with feature samples; 2) to evaluate spatial variability of plant use, both within and between the two sites; and 3) to detect changing patterns in plant use over time. Each column sample will be evaluated individually and then compared to highlight differences in plant distribution across the study area.

Laboratory Methods

The flotation samples were collected in the field and processed in the laboratory by the ARL staff. A modified SMAP machine fitted with 1/16-in (1.6-

mm) or 1/20-in (1.3-mm) window screen was used to capture the heavy fraction and a fine mesh with openings approximately 0.05 mm wide was used to collect the light fraction (Johanson and Hollenbach 2012). Using the process of flotation, which takes advantage of the gravitational separation of matter by suspension in water, ensured the unbiased recovery of all organic matter (Wagner 1988:19).

The flotation samples were analyzed using standard paleoethnobotanical procedures (Pearsall 2000). Once weighed, the samples were size-graded using nested geologic sieves. Plant remains were sorted from the portions greater than 2.00 mm in size and identified to the lowest possible taxonomic level using a stereoscopic microscope at 10 to 40 power magnification. Materials less than 2.00 mm in size were scanned for seeds and plant remains not represented in the larger size fraction. If present, acorn remains were pulled from the 1.40-mm sieve to mitigate biases against their preservation and recovery. All plant materials were then counted and weighed.

Samples were analyzed in totality, with the exception of BCL 09-245 from Feature 68, 40GN228. Due to the exceptional quantity of acorn shell present in this sample only, a subsample was pulled from the 1.40-mm sieve. The acorn shell in this sample greatly exceeded that present in any other sample from either site, resulting in its outlier position. Therefore, taking a subsample did not significantly affect quantitative comparisons.

Identifications were made with reference to Martin and Barkley's (1961) *Seed Identification Manual* and the PLANTS database (US Department of Agriculture – Natural Resources Conservation Service 2011), as well as modern comparative

specimens housed at the ARL. Using a Microsoft Access database, all sample provenience information, quantitative measures, and plant identifications were recorded.

Quantification of the Dataset

To address the goals of the thesis, both qualitative and quantitative analyses were employed. Qualitative measurements refer exclusively to the presence/absence of a taxon in a sample. Although a rudimentary level of analysis, this qualitative measurement is a powerful analytical tool for paleoethnobotanists. Pearsall (2000:242) notes that qualitative analysis can become a requirement in the absence of standardized datasets, in complex depositional environments, and in poor preservational environments, in which quantitative measurements can be inappropriate.

However, presence/absence data are not strictly a secondary dataset to quantitative analysis. Presence/absence data can singularly contribute to interpretations of an individual site (e.g. delineation of seasonality, temporal/cultural affiliations, and feature classifications), as well as detail the trajectory of plant-human relationships over time and across regions [e.g. by documenting the spread of agriculture or the amount of anthropogenic change on the landscape (Pearsall 2000:191)]. In addition, qualitative data can act comparatively to indicate instances of differential preservation within and among similar sites.

Several quantitative measurements were employed to interpret patterning in the archaeobotanical assemblages collected from 40GN228 and 40GN229. Ubiquity

measures were used to estimate the importance of plant taxa. Ubiquity (U) is a measure of frequency expressed as the simple equation:

$$U = \frac{\textit{number of samples in which a taxon is present}}{\textit{total number of samples}}$$

Thus, ubiquity works on the assumption that the more often a plant taxon was used, the more often it should be present across archaeobotanical assemblages. Ubiquity measures do not take into account abundance by count or weight, but estimate importance of taxa solely on how often or frequently they are represented at a site.

Density and relative density measurements were additionally used to identify patterns in the plant assemblages. Both rely on the conversion of counts and weights into ratios. Ratios are important because, through standardization, they allow for intra- and intersite comparisons of unequal datasets (Miller 1988:72). Unevenness in datasets can occur due to differential sample size and differences in the amount of samples analyzed (Pearsall 2000:194).

Density measurements were used primarily to parse changes in the deposition or preservation of plant taxa over time at each site. Density can often signify an increase or decrease in site use by tracking how heavily an item is deposited (Pearsall 1983:129). Density was exclusively used on the column flotation samples in this thesis, because the features, which represented multiple functions, inherently displayed considerable variation in deposition. For instance, the amount of plant material collected from a hearth compared to that found within a storage pit does not necessarily say anything about the overall intensity of use of the features, but rather is

more reflective of the residue created by very different activities. Density (D) is derived by the formula:

$$D = \frac{\text{plant weight or the taxon count for a sample}}{\text{total volume of sediment floated for a sample}}$$

The y-axis was expressed logarithmically on the density graphs, with 0.001 added to zero values so that they would plot. The logarithmic function was used to increase the visibility of small fluctuations in the dataset.

Relative density (RD), which is expressed by the equation:

$$RD = \frac{\text{plant weight or the taxon count for a sample}}{\text{total volume of plant material recovered for a sample}}$$

was used to examine changes in the importance of particular taxa relative to other plant material. This measurement can be used to track the trajectory of a specific taxon over time. Particularly, relative density can highlight the degree to which a plant was utilized, as well as how that utilization corresponds to other taxa's use synchronically or diachronically.

Quantified data were visually explored through the use of line graphs and boxplots. Line graphs are used to display both the changing density and relative density of plant taxa over time as observed within the column samples. These graphs are useful because they quickly reveal patterns of deposition, as well as patterns of

plant use over time. In addition, they can act as a comparative tool, to identify correlations or incongruities between datasets.

Boxplots, likewise, are an effective way to explore the temporal changes in plant use (Hollenbach 2009:141). Boxplots allow a quick examination of several descriptive statistics within a dataset (e.g. range, median, 25th and 75th percentiles, and outliers). They can also assist in comparative analysis by delineating situations of statistically significant differences. This is done through the display of notches on individual boxplots that when overlapping, denote no statistical difference between the compared boxplots, but when clearly separate indicate statistically significant differences at the 0.05 confidence level.

Summary

The carbonized plant remains used in this analysis were selected to take advantage of the unique accretional and cultural deposits present at 40GN228 and 40GN229. Using select flotation samples from both sites, this thesis takes advantage of systematic field and laboratory strategies, along with qualitative and quantitative analyses, to comparatively identify and interpret changing plant-human relationships over time. The meticulous collection of samples additionally allowed for the comparison of complementary datasets, specifically the archaeobotanical and geoarchaeological data, that when taken together provide clues to the dynamic interplay between the natural and cultural record.

Chapter 4. Results and Analysis

Introduction

In this chapter, the results of the plant analyses are presented, looking at differences within each site depending on contexts, as well as the differences between sites. However, in order to do this effectively, the depositional history of the two sites must be well understood. So first the geoarchaeological data is discussed for the sites, followed by a presentation of the plant data from feature and column contexts for the two sites.

The nature of the deposits at 40GN228 and 40GN229, along with the multi-scalar scope of this thesis, necessitates the division of the analysis of the botanical data. I employ the use of two scales of analysis: 1) a broader scale looking at similarities across the sites to establish a baseline of data for the regional area; and 2) a smaller scale used to reveal the influence of the local depositional histories at each site. Therefore, the general patterns of subsistence occurring over time at this location will be considered and held up as an assessment of the current model of subsistence change in the geographic region of the Interior Southeast of the United States. Although frequent attention has been given to the paleoethnobotanical deposits present in the large fluvial bottomlands of the Tennessee Valley, considerably less is known of the potentially more isolated local histories of peoples living in the upper Ridge and Valley province. The plant assemblage from the extensive open-air deposits present at 40GN228 and 40GN229 is used to identify geographic and cultural variation in plant use practices.

While the geographic and temporal proximity of these sites is considered, the similarities must not be taken as an indicator that these sites can act as a proxy for one another. The physiographic and cultural variation that was taken into account during excavation and that warranted the careful separation of site contexts are also considered as primary components contributing to the variation visible in the paleoethnobotanical analysis. The botanical remains from 40GN228 and 40GN229 were analyzed and are evaluated separately in order to highlight the unique depositional histories of each of these sites. A comparative analysis of the two sites, based on the qualitative and quantitative assessment of feature floatation samples and column floatation samples, enables a glimpse into the daily practices and activities of inhabitants in short duration, as well as the broad patterns of change over time. The data facilitate an understanding of the distinctive choices and strategies prehistoric inhabitants employed at each location concerning foodways and land use.

Geoarchaeological Analysis

The geoarchaeological analysis of these sites consists of complementary soil samples derived from test unit walls, two of which are directly correlated to the botanical column floatation samples described in this thesis. The results from Cyr's (2012) geoarchaeological particle size analysis are critical in assessing the natural context of the sites, and particularly the role river and landform stabilization played in the decision-making processes of the prehistoric inhabitants of these sites. The inseparability of the botanical and particle size analysis is further argued in this chapter, as the physiological processes that influenced the land use practices for over

12,000 years at these sites are the same processes that contributed to the currently observed archaeological record. The nature of plant recovery from archaeological sites is complex and influenced by factors including plant preservation, post-depositional processes, and archaeological sampling and sieving techniques (van der Veen 2007:968). Therefore, the particle size analysis can assist in parsing out natural and cultural influences that contributed to the current plant record.

Cyr (2012) conducted particle size and organic matter analyses on bulk sediment samples collected from test units located at both 40GN228 and 40GN229. Only those test units that directly correlate to the botanical column floatation analysis are discussed comprehensively in this chapter as 1) they can irrefutably be associated with the plant analysis at a precise level and 2) they provide a very detailed history of the natural site formation processes occurring on both sides of the Nolichucky River, thus resulting in a temporal and spatial comparative tool.

Particle size analysis is a useful indicator of the level of intensity of fluvial activity. Fast-moving water systems are capable of moving not only large sediment loads downstream, but due to their intensive energy, they are also capable of moving larger-sized particles (Waters 1992:120-121). Thus, a stratigraphic level dominated by very coarse sediments can be associated with a high-intensity stream environment, while fine-sized particles are indicative of a reduced-energy environment. Similarly useful, organic matter analysis is also used to denote levels of deposition and stream activity. As landforms stabilize and soils have a chance to develop, organic matter is likewise more cumulative (Waters 1992:120). Consequentially, a stratigraphic

sequence heavy laden with organic material is presumably evidence of a more stable landform.

Geoarchaeological Analysis from 40GN228

Particle size and organic matter analysis were conducted on samples collected from a stratigraphic wall sequence from Test Unit N1003 E5055, which had components that dated from the Early Woodland to Middle Woodland period (Figure 4.1). Located on the lower terrace (T1) of site 40GN228, this is an area of the site presumably within a very dynamic environment, but that did contain substantial cultural deposits dating from the Early Woodland to the Mississippian. Additionally, a sequence obtained during Phase II testing of Trench M was also analyzed to evaluate landform stability on the upper terrace (T2) of the site (Figure 4.2) (Sherwood and Kocis 2003).

Cyr's (2012) particle size analysis results classify the lower terrace of 40GN228 as a relatively unstable landform throughout the majority of its existence. Alternating coarse-grained and rich sand deposits dominate the lower Strata IV through VIII of the test unit column, only to be replaced in Strata III by gradually fining sediments that are eventually capped by weakly developed soils (Figure 4.3). In addition, rapidly accumulated flood deposits are present from Strata IV-VIII. The lower 1.2 meters of deposition represented by these strata accumulated in just 200 years time (Figure 4.3). In contrast, the upper strata (I-III) took approximately 1,000 years to develop (Cyr 2012). This suggests that intensive flooding indeed took place throughout most of the Early Woodland sequence, followed by a gradually reduced-

intensity stream environment during the Middle Woodland. Organic matter analysis corroborates the particle size analysis results. Organic matter percentages increase over time, mimicking the trends of upward-fining sediments (Figure 4.3). The lower terrace of 40GN228, therefore, transitioned from a high intensity, very unstable landform characteristic of a channel bar, to a moderately intensive channel point, and finally to a seasonally inundated floodplain (Cyr 2012).



Figure 4.1. Location of Test Unit N1003 E5055 at site 40GN228.

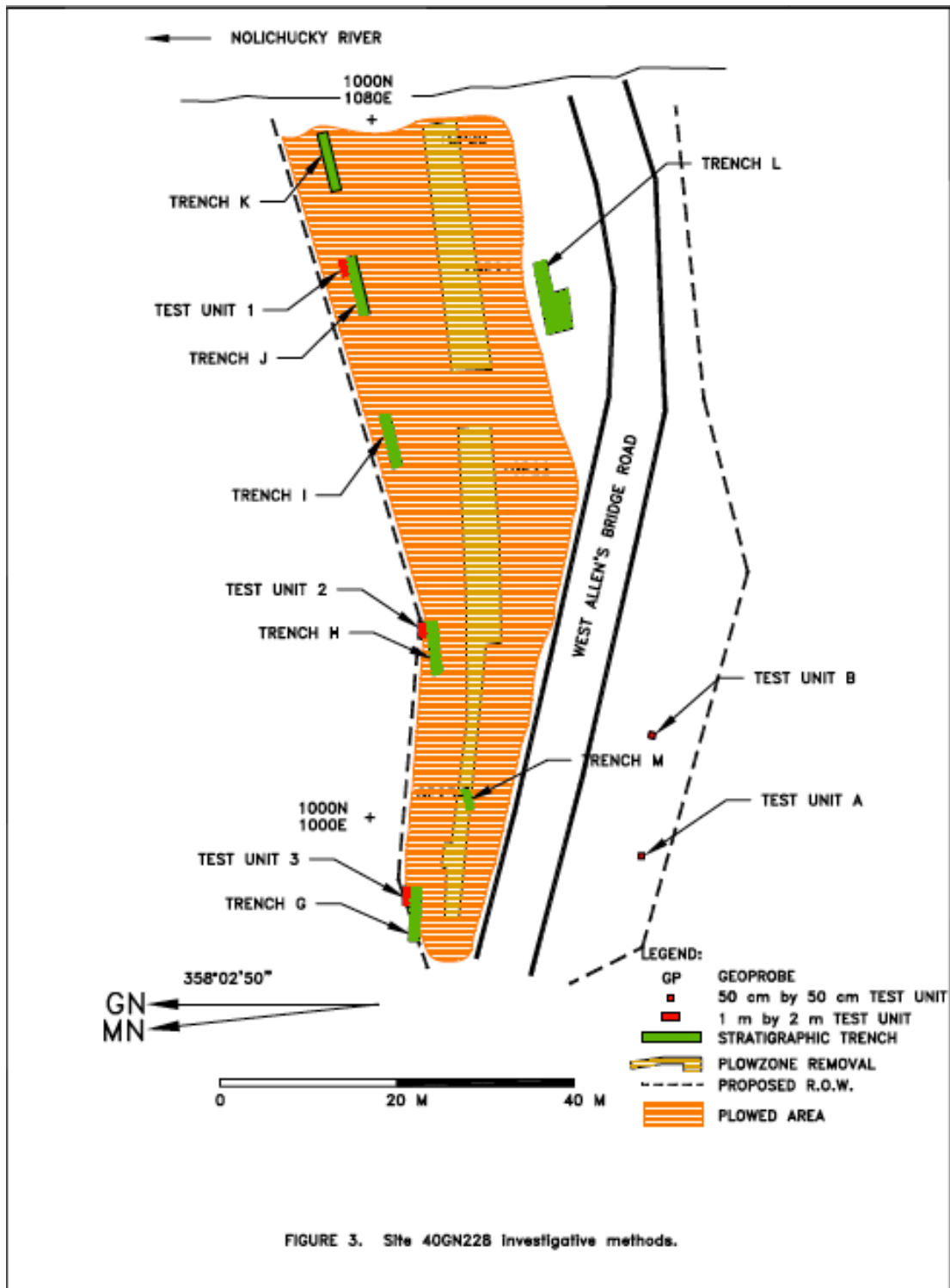


Figure 4.2. Location of Trench M north of West Allens Bridge Road at site 40GN228 from Phase II testing (Oakley et al. 2003).

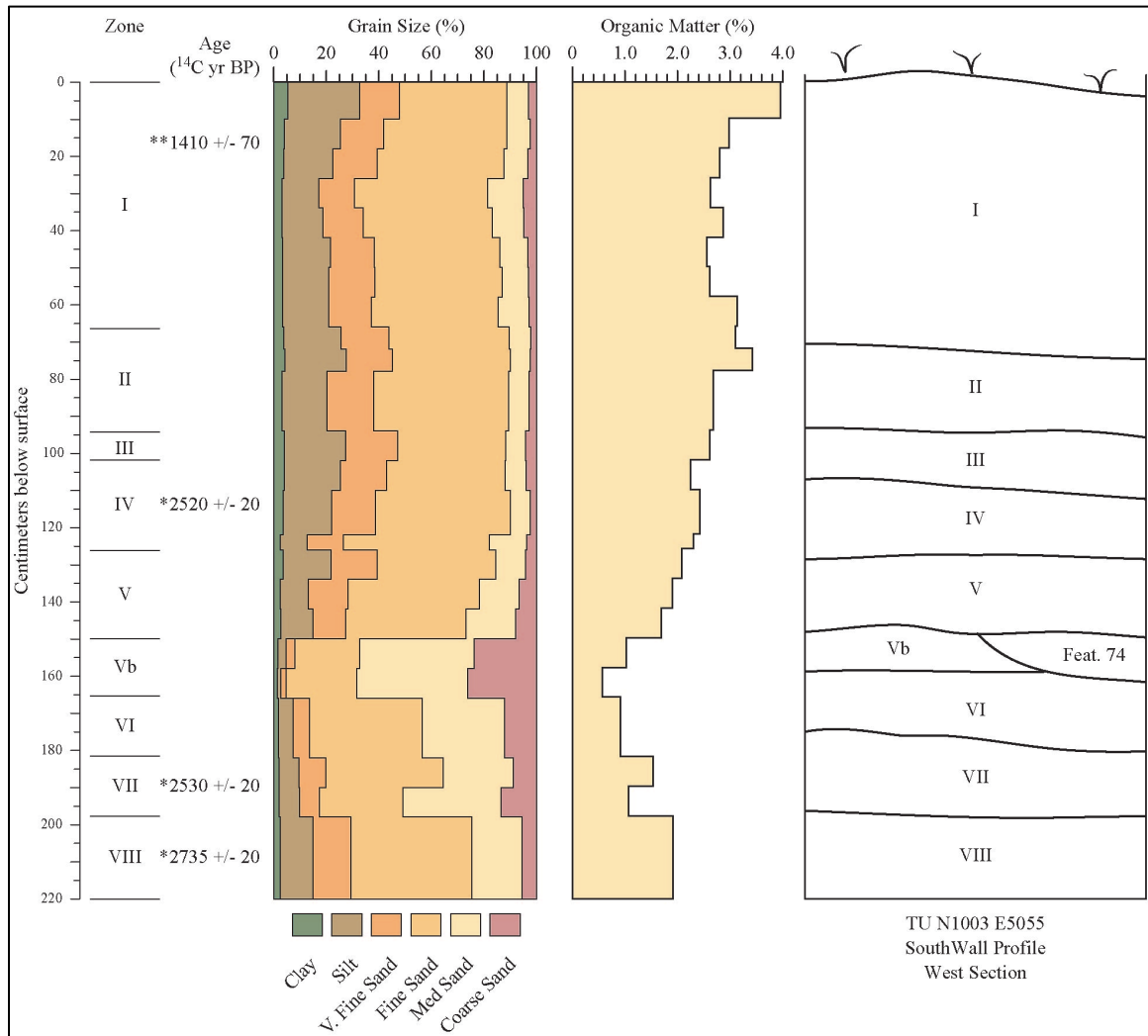


Figure 4.3. Comparison of the results of particle size analysis and organic matter analysis, as well as the stratigraphic profile of the lower terrace of 40GN228 as represented in Test Unit N1003 E5055 (Cyr 2012).

Particle size and organic matter analyses from Trench M of the upper terrace of 40GN228, while not directly correlated to plant floatation samples, do suggest that sometime around 3,580 B.P., just as the lower terrace (T1) was beginning to form, the upper terrace had completely stabilized with minimal to no impact from seasonal flooding episodes (Cyr 2012). So, while the lower strata of the upper terrace reflect modest stream intensity associated with the proposed westward migration of the Nolichucky River, a trend towards stability is evidenced in the upper strata by increasing levels of fine sediments (Figure 4.4). Also displayed in Figure 4.4, the percentages of organic matter remain relatively consistent with only slight increases, suggesting that energy levels were not as dramatic as those found in the lower terrace of 40GN228. Alternative to the patterns displayed in the lower terrace, the upper terrace represented a much more stable landform over a longer period of time.

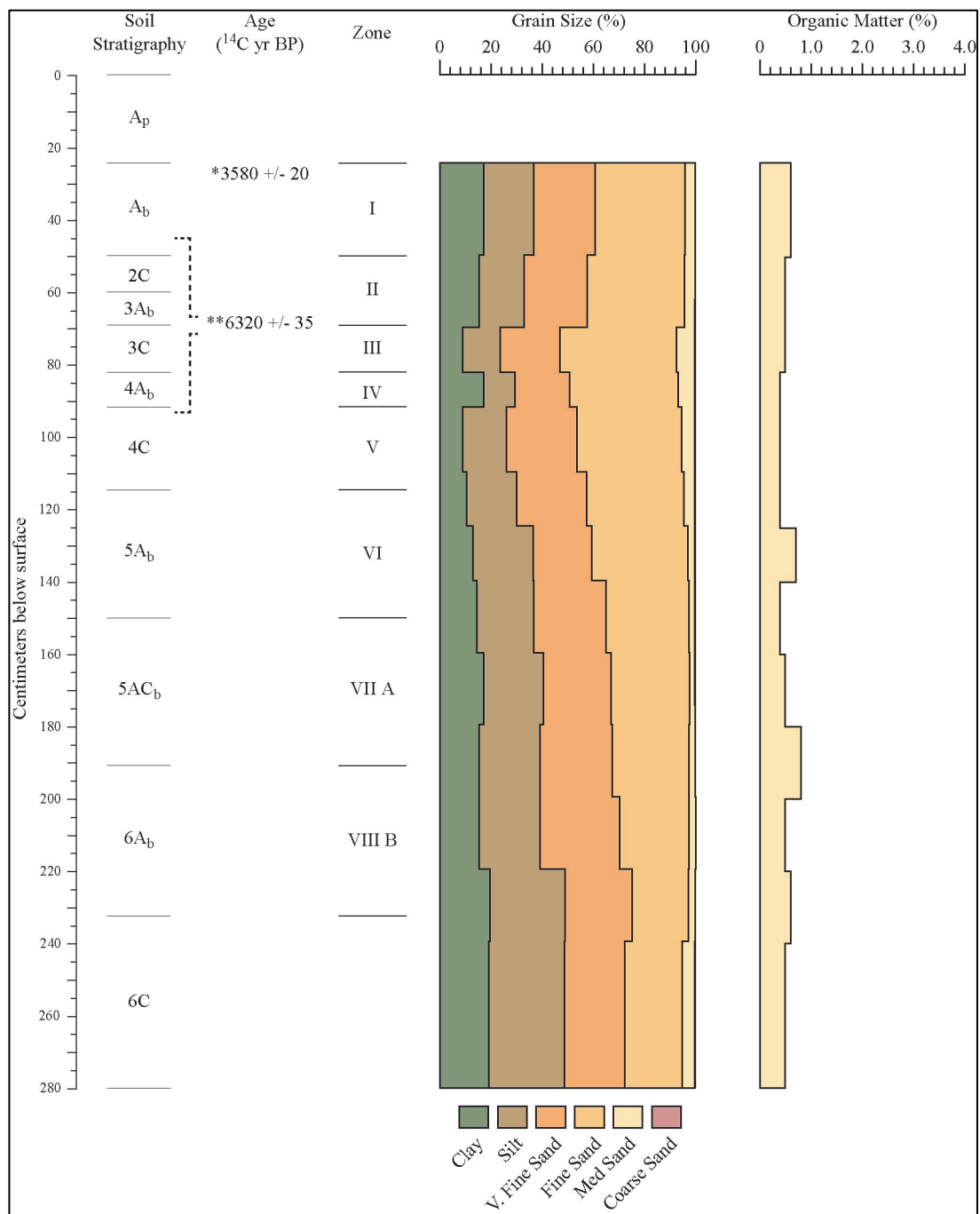


Figure 4.4. Comparison of the results of particle size analysis, organic matter analysis, and stratigraphic profile of the upper terrace of 40GN228 as represented in Trench M (Cyr 2012).

Geoarchaeological Analysis from 40GN229

Particle size and organic matter analyses from 40GN229 consisted of samples collected from two stratigraphic wall sequences (Figure 4.5). Only Test Unit N1105 E5232 will be explained in detail, as the 40GN229 landform is a homogenous T1 landform and the results of Test Unit N1069 E5236 closely resemble that found in N1105 E5232.

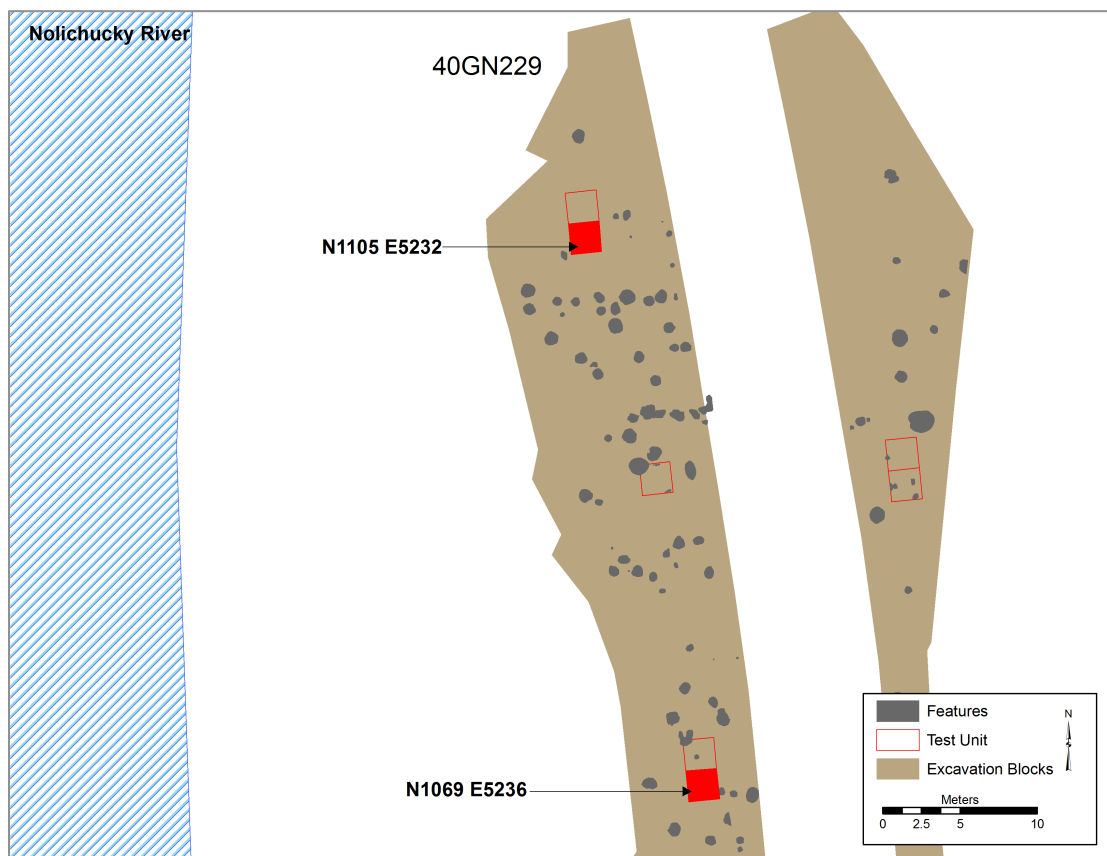


Figure 4.5. Location of Test Unit N1105 E5232 and N1069 E5236 at site 40GN229.

The picture of landform stability presented at 40GN229 suggests that in contrast to 40GN228, especially in regards to 40GN228's lower terrace, this site displays a high degree of landform stability as early as 7,400 B.P., which lies within the Early Archaic period (Cyr 2012). The grain size of both 40GN229 test units suggest moderate- to weak-intensity flooding, with plentiful stability that was suitable for soil formation (Figure 4.6). Likewise, as depicted in Figure 4.6, organic matter successfully accumulated on these secure soil deposits, which indicates that vegetation was in fact more stable.

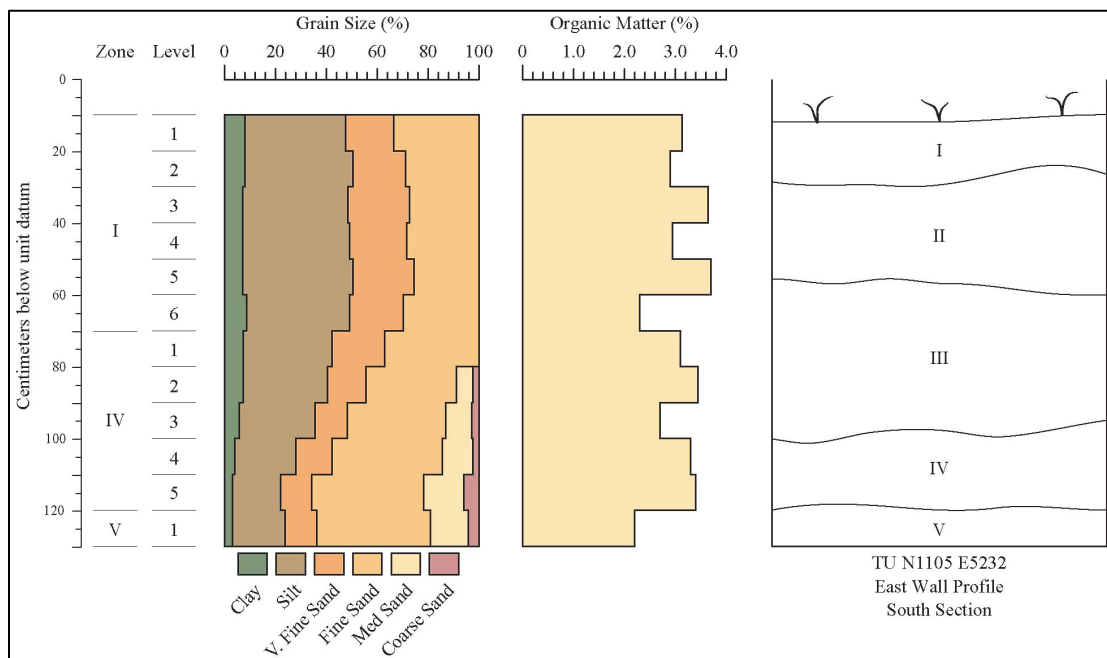


Figure 4.6. Comparison of the results of particle size analysis, organic matter analysis, and stratigraphic profile of 40GN229 as represented in Test Unit N1105 E5232 (Cyr 2012).

Summary of Geoarchaeological Results

The results of the geoarchaeological analysis of 40GN228 and 40GN229 demonstrate the important influence that river and landform stabilization had on site

formation processes and consequently on site settlement patterning and use, as will be suggested by the following plant analysis. Generally speaking, the landform at 40GN229 stabilized much earlier and experienced the effects of the high-intensity flow of the Nolichucky River much less than the landform at 40GN228. As a result of this secure environment, soil and vegetation were permitted to accumulate, providing a predictable and suitable site for human occupation. In contrast, although much more exposed to the effects of high-intensity flooding and the shifting course of the Nolichucky until late in its history, the landform at 40GN228 provided a wide floodplain with several microhabitats. In combination, these two shores of the Nolichucky presented challenges and opportunities that prompted both the repeated short-term habitation of the two sites and their eventual year-round occupation.

Plant Analysis: Botanical Remains from 40GN228

The botanical analysis of 40GN228 consists of carbonized plant remains analyzed from 39 flotation samples collected from two test unit columns and 15 flotation samples from 12 features excavated during the Phase III investigations (Table 4.1). The flotation samples from 40GN228 yielded 89.90 g of carbonized plant remains, of which 56.81 g (63 percent) is wood (Appendix A.1). Associated with archaeological remains that date from the Early Archaic to the Pisgah phase of the Mississippian period, the botanical record documents changing subsistence practices over time.

A wide range of taxa was identified at 4GN228, representing at least 32 definitive species (Table 4.2). See Appendix A.1 for a detailed list of taxa recovered

by context. The plant taxa and the changing distributions of the taxa identified at 40GN228 are consistent with general patterns outlined in plant use chronologies of the interior southeastern region of the Eastern Woodlands (see discussion in Chapter 2; see also Scarry 2003:87; Smith and Cowan 2003:106). In spite of a lack of a grand divergence from the current understandings of foodway traditions in the region, the plant remains do exhibit a high degree of diversity and intra- and inter-site variability that highlight the significance of microhabitats.

The quantity and distribution of edible seeds are of particular importance at this site and suggest that 1) the acquisition of edible seeds played an important and consistent role in the occupants' diets beginning in the Late Archaic, and 2) that the collection and use of these seeds was restricted locally on the landscape.

Table 4.1. Plant Samples Analyzed from 40GN228 (Weights listed are in grams).

Context	Bag	TCA	Stratum/Type	Depth (m below datum)	Volume (L)	Sample Wt	Contaminant Wt	Residue Wt	Plant Wt	Wood Wt
Feature Samples:										
4	09-34	Pigeon (late E. Wood.)	hearth/pit		9	33.38	9.02	23.26	1.10	0.34
41	09-104	Patrick I (M. Wood.)	circular pit		14	26.51	11.48	14.39	0.64	0.26
	09-105	Patrick I (M. Wood.)	circular pit		14	29.55	14.37	12.56	2.62	2.29
42A	09-129	Connestee	circular pit		14	815.7	468.79	286.52	60.63	44.42
43	09-181	Pigeon (late E. Wood.)	pit		15	36.14	26.62	8.26	1.26	0.45
63	09-255	Savannah River	FCR concentration		15.5	26.13	14.93	10.97	0.23	0.14
67	09-216	Middle Archaic	smudge pit		7	3.77	0.80	2.94	0.03	0.01
68	09-245	Pisgah	house floor?		12	193.30	102.04	81.69	9.58	2.35
	09-300	Pisgah	house floor?		2	14.91	7.87	6.48	0.57	0.12
78	09-463	Pisgah	earth oven		15	245.7	167.58	77.51	0.61	0.24
	09-699	Pisgah	earth oven		15	25.14	12.12	13.01	0.01	0.00
133	09-536	Terminal Archaic	earth oven/pit		15	21.24	13.29	7.88	0.07	0.02
134	09-531	Late Archaic	earth oven/pit		16.5	26.89	15.02	11.73	0.14	0.08
159	09-610	Swannanoa	pit		15	47.49	32.99	13.17	1.33	0.59

Table 4.1 (continued). Plant Samples Analyzed from 40GN228 (Weights listed are in grams).

Context	Bag	TCA	Stratum/Type	Depth (m below datum)	Volume (L)	Sample Wt	Contaminant Wt	Residue Wt	Plant Wt	Wood Wt
161	09-598	Early Archaic	hearth		15	31.01	21.72	8.38	0.91	0.41
Column Samples (N1000 E5008):										
	09-133		I	499.33-499.23	18	7.82	3.93	3.66	0.23	0.02
	09-202		II	499.23-499.13	9.5	18.89	4.47	13.70	0.72	0.11
	09-210		II	499.13-499.03	11.5	14.41	3.15	10.37	0.89	0.00
	09-232		II	499.03-498.93	24	10.82	2.33	8.09	0.4	0.02
	09-257		III	498.93-498.83	9.5	5.82	1.56	4.17	0.09	0.00
	09-266		III	498.83-498.73	21	9.18	1.53	7.65	0.00	0.00
	09-355		III	498.73-498.63	11	7.77	0.92	6.85	0.00	0.00
	09-416		III	498.65-498.55	19	7.88	1.79	6.09	0.00	0.00
	09-425		III	498.55-498.45	23	7.59	1.62	5.95	0.02	0.02
	09-447		III	498.45-498.35	21	13.70	2.31	11.39	0.00	0.00
	09-457		IV	498.35-498.25	12	5.54	2.86	2.67	0.01	0.00
	09-487		IV	498.25-498.15	24	18.68	0.31	18.37	0.00	0.00
	09-500		IV	498.15-498.05	31	27.68	5.05	22.60	0.03	0.01
	09-520		IV	498.05-497.95	10	8.11	3.54	4.57	0.00	0.00
	09-551		IV	497.95-497.91	20	11.26	0.82	10.40	0.04	0.02
	09-561		V	497.91-497.81	0	13.43	6.18	7.23	0.02	0.02
	09-593		V	497.81-497.71	26	4.78	0.72	4.06	0.00	0.00
	09-602		V	497.71-497.61	24	7.92	1.45	6.47	0.00	0.00

Table 4.1 (continued). Plant Samples Analyzed from 40GN228 (Weights listed are in grams).

Context	Bag	TCA	Stratum/Type	Depth (m below datum)	Volume (L)	Sample Wt	Contaminant Wt	Residue Wt	Plant Wt	Wood Wt
Column Samples (N1003 E5055):										
	09-117		I	497.34-497.24	7	7.89	2.68	4.72	0.49	0.36
	09-131		I	497.24-497.14	16	32.22	4.72	26.79	0.71	0.37
	09-141		I	497.14-497.04	16	11.56	3.22	6.97	1.37	0.43
	09-146		I	497.04-496.94	10	9.42	1.04	7.63	0.75	0.33
	09-152		I	496.94-496.84	16	3.74	0.49	3.23	0.02	0.01
	09-157		I	496.84-496.74	20	5.37	0.60	4.64	0.13	0.05
	09-166		I	496.74-496.64	22	9.19	1.21	7.92	0.06	0.02
	09-175		I	496.64-496.54	20	9.64	1.90	7.49	0.25	0.09
	09-185		II	496.54-496.44	17	20.98	2.05	18.33	0.60	0.48
	09-195		III	496.44-496.34	16	10.75	3.08	7.50	0.17	0.09
	09-214		III	496.34-496.24	20	9.37	4.91	4.34	0.12	0.06
	09-224		III	496.24-496.14	19	10.71	0.84	9.69	0.18	0.05
	09-237		IV	496.14-496.04	22	20.75	0.61	19.98	0.16	0.05
	09-244		V	496.04-495.94	18	18.54	0.28	18.22	0.04	0.03
	09-253		V	495.94-495.84	20	34.78	1.39	32.85	0.54	0.54
	09-264		V	495.84-495.74	10	126.1	6.49	118.94	0.64	0.59
	09-369		V	495.74-495.64	20.5	73.25	0.84	71.40	1.01	0.97
	09-390		VI	495.64-495.54	20	22.7	1.49	21.09	0.12	0.09
	09-405		VII	495.54-495.44	17.5	45.42	0.51	44.82	0.09	0.03
	09-409		VII	495.44-495.34	18	2.24	0.15	2.03	0.06	0.04
	09-413		VIII	495.37-495.28	0	7.05	0.29	6.55	0.21	0.19

Table 4.2. Plant Taxa Recovered from 40GN228.

Common Name	Taxonomic Name	Seasonality	Count (g)	Weight (g)
<u>Nuts:</u>				
Acorn	<i>Quercus</i> sp.	fall	1553	5.58
Acorn cap	<i>Quercus</i> sp.	fall	23	0.08
Acorn cap cf.	<i>Quercus</i> sp. cf.	fall	1	0.00
Acorn cf.	<i>Quercus</i> sp. cf.	fall	13	0.01
Acorn meat	<i>Quercus</i> sp.	fall	1	0.00
Acorn meat cf.	<i>Quercus</i> sp. cf.	fall	2	0.02
Black walnut	<i>Juglans nigra</i>	fall	196	3.84
Black walnut cf.	<i>Juglans nigra</i> cf.	fall	2	0.01
Chestnut	<i>Castanea dentata</i>	fall	28	0.07
Hazelnut	<i>Corylus</i> sp.	fall	1	0.01
Hazelnut cf.	<i>Corylus</i> sp. cf.	fall	1	0.01
Hickory	<i>Carya</i> sp.	fall	904	10.63
Hickory cf.	<i>Carya</i> sp. cf.	fall	32	0.16
Unidentifiable nutmeat		fall	8	0.13
Unidentifiable nutshell		fall	6	0.02
Walnut family	Juglandaceae	fall	193	1.27
<u>Fruits:</u>				
Blackberry/raspberry	<i>Rubus</i> sp.	summer	3	0.00
Elderberry	<i>Sambucus</i> sp.		1	0.00
Grape	<i>Vitis</i> sp.	summer	15	0.02
Grape cf.	<i>Vitis</i> sp. cf.	summer	1	0.00
Mulberry	<i>Morus</i> sp.	summer	15	0.00
Mulberry cf.	<i>Morus</i> sp. cf.	summer	9	0.00
Persimmon seed cf.	<i>Diospyros virginiana</i> cf.	fall	8	0.03
Persimmon seed coat	<i>Diospyros virginiana</i>	fall	1	0.01
Sumac	<i>Rhus</i> sp.	fall	2	0.01
Sumac cf.	<i>Rhus</i> sp. cf.	fall	1	0.00
<u>Edible Seeds:</u>				
Bearsfoot	<i>Polymnia uvedalia</i>	late summer/fall	119	0.12
Chenopod	<i>Chenopodium berlandieri</i>	late summer/fall	292	0.05
Chenopod embryo	<i>Chenopodium berlandieri</i>	late summer/fall	2	0.00
		spring/early		
Little barley	<i>Hordeum pusillum</i>	summer	19	0.02
		spring/early		
Little barley cf.	<i>Hordeum pusillum</i> cf.	summer	8	0.01
		spring/early		
Maygrass	<i>Phalaris caroliniana</i>	summer	138	0.03
		spring/early		
Maygrass cf.	<i>Phalaris caroliniana</i> cf.	summer	22	0.00
Sumpweed cf.	<i>Iva annua</i> cf.	late summer/fall	1	0.00
Sunflower cf.	<i>Helianthus annuus</i> cf.	late summer/fall	2	0.00
Wild bean	<i>Strophostyles</i> sp.	late summer/fall	2	0.00
<u>Crops:</u>				
Corn cupule	<i>Zea mays</i>	late summer/fall	121	0.77
Corn cupule cf.	<i>Zea mays</i> cf.	late summer/fall	9	0.04
Corn glume	<i>Zea mays</i>	late summer/fall	2	0.00

Table 4.2 (continued). Plant Taxa Recovered from 40GN228.

Common Name	Taxonomic Name	Seasonality	Count (g)	Weight (g)
Corn glume cf.	<i>Zea mays</i> cf.	late summer/fall	1	0.00
Corn kernel	<i>Zea mays</i>	late summer/fall	4	0.02
Corn kernel cf.	<i>Zea mays</i> cf.	late summer/fall	6	0.01
Cucurbit rind	Cucurbitaceae	late summer/fall	21	0.03
Cucurbit rind cf.	Cucurbitaceae cf.	late summer/fall	2	0.00
Miscellaneous:				
Ash seed	<i>Fraxinus</i> sp.		1	0.02
Aster family cf.	<i>Asteraceae</i> cf.		2	0.00
Bark			79	0.44
Bark cf.			3	0.00
Bean/Persimmon cf.			1	0.01
Bedstraw	<i>Galium</i> sp.		11	0.01
Bedstraw cf.	<i>Galium</i> sp. cf.		12	0.01
Bud			2	0.01
Cane	<i>Arundinaria</i> sp.		147	0.84
Cane cf.	<i>Arundinaria</i> sp. cf.		1	0.00
Carpetweed	<i>Mollugo</i> sp.		5	0.00
Clover	<i>Trifolium</i> sp.		1	0.00
Gall			5	0.09
Goosegrass	<i>Eleusine indica</i>		13	0.00
Grass family	Poaceae		18	0.00
Grass family cf.	Poaceae cf.		3	0.01
Knotweed	<i>Polygonum</i> sp.		7	0.00
Knotweed cf.	<i>Polygonum</i> sp. cf.		6	0.00
Morning glory/grass cf.	<i>Ipomoea/Convolvulus</i> cf.		3	0.01
Nightshade	<i>Solanaceae</i> sp.		1	0.00
Nightshade family cf.	<i>Solanaceae</i> sp.cf.		1	0.00
Pine cone	<i>Pinus</i> sp.		297	0.18
Pine cone cf.	<i>Pinus</i> sp. cf.		3	0.00
Pine needle	<i>Pinus</i> sp.		1	0.00
Pine seed	<i>Pinus</i> sp.		1	0.00
Pitch			926	6.81
Pitch cf.			3	0.00
Pitch/Unidentifiable			43	0.40
Pokeberry	<i>Phytolacca americana</i>		1	0.00
Pokeberry cf.	<i>Phytolacca americana</i> cf.		7	0.00
Purslane	<i>Portulaca</i> sp.	summer/fall	3	0.00
Spore clump			7	0.03
Spurge family	Euphorbiaceae		10	0.00
Stem			6	0.00
Unidentifiable			179	1.03
Unidentifiable seed			439	0.18
Unidentified			1	0.00
Unidentified seed			1	0.00
Unidentified seed coat			4	0.00
Violet	<i>Violeta</i>		2	0.00

Feature Dataset

The feature floatation samples were bulk samples taken from a subset of excavated features that represent a diverse set of activities spanning the roughly 10,000-year occupation of this site (Figure 4.7). Fifteen floatation samples were analyzed from 12 features at 40GN228, representing Early Archaic through Mississippian temporal-cultural affiliations. The features comprise a variety of cultural deposits, including one hearth (Feature 161), one hearth/pit (Feature 4), four pits (Features 41, 42, 181, and 159), one fire-cracked rock concentration (Feature 63), one smudge pit (Feature 67), one earth oven (Feature 78), two earth oven/pits (Features 133 and 134), and a possible house floor (Feature 68). The features analyzed are represented by one Early Archaic feature, one Middle Archaic feature, one Late Archaic feature, one Late Archaic Savannah River feature, one Terminal Archaic feature, one Early Woodland Swannanoa feature, two Pigeon phase/Late Early Woodland features, one Middle Woodland Connestee feature, one Middle Woodland/Patrick I feature, and two Pisgah features (Table 4.1).

Feature Results

The feature botanical analysis of 40GN228 resulted in 79.73 g of carbonized plant remains (of which 51.72 g or 65 percent is wood). Refer to Appendix A.1 for a detailed list of taxa recovered by context at 40GN228. The wide diversity of plants present within the feature samples includes nuts, fruits, edible seeds, crops, and miscellaneous categories. The feature samples suggest that although nut taxa were a

particularly valuable component of the prehistoric diet, a variety of foodstuffs consistently contributed to a diversified menu.

Among the feature samples, the importance of nuts is evidenced by both their frequent and numerous presence. Of all the taxa recovered, hickory is dominant with a 100 percent ubiquity value. Hickory would be foremost in both count (n=608) and weight (7.58 g) if not for the disproportionate presence of acorn shell collected from Feature 68. Two floatation samples from Feature 68, a possible Mississippian house floor, contain 1,432 of the 1,546 total acorn shell fragments identified from 40GN228 features. While the two samples from this feature inflate the quantitative presence of acorn, the 87 percent ubiquity value confirms its eminent position in the local diet. Black walnut (n=150), although not as abundant as hickory or acorn, is still a frequently occurring nut and is represented in ten of the 12 features. It appears that although black walnuts were advantageous for their high nutritional value, the isolated distribution and high processing cost associated with the taxon precluded a larger contribution of these nuts to the diet (Scarry 2003:64). Chestnut was the only other nut taxa identified in the 40GN228 feature samples. It was recovered exclusively from Feature 42, a Connestee pit, and is represented by 28 fragments.

Fruits, while diverse, are sparsely present and occur in low numbers compared to other categories in the feature samples of 40GN228. The fruit taxa identified includes seven grape seed fragments, six possible persimmon seeds, one possible

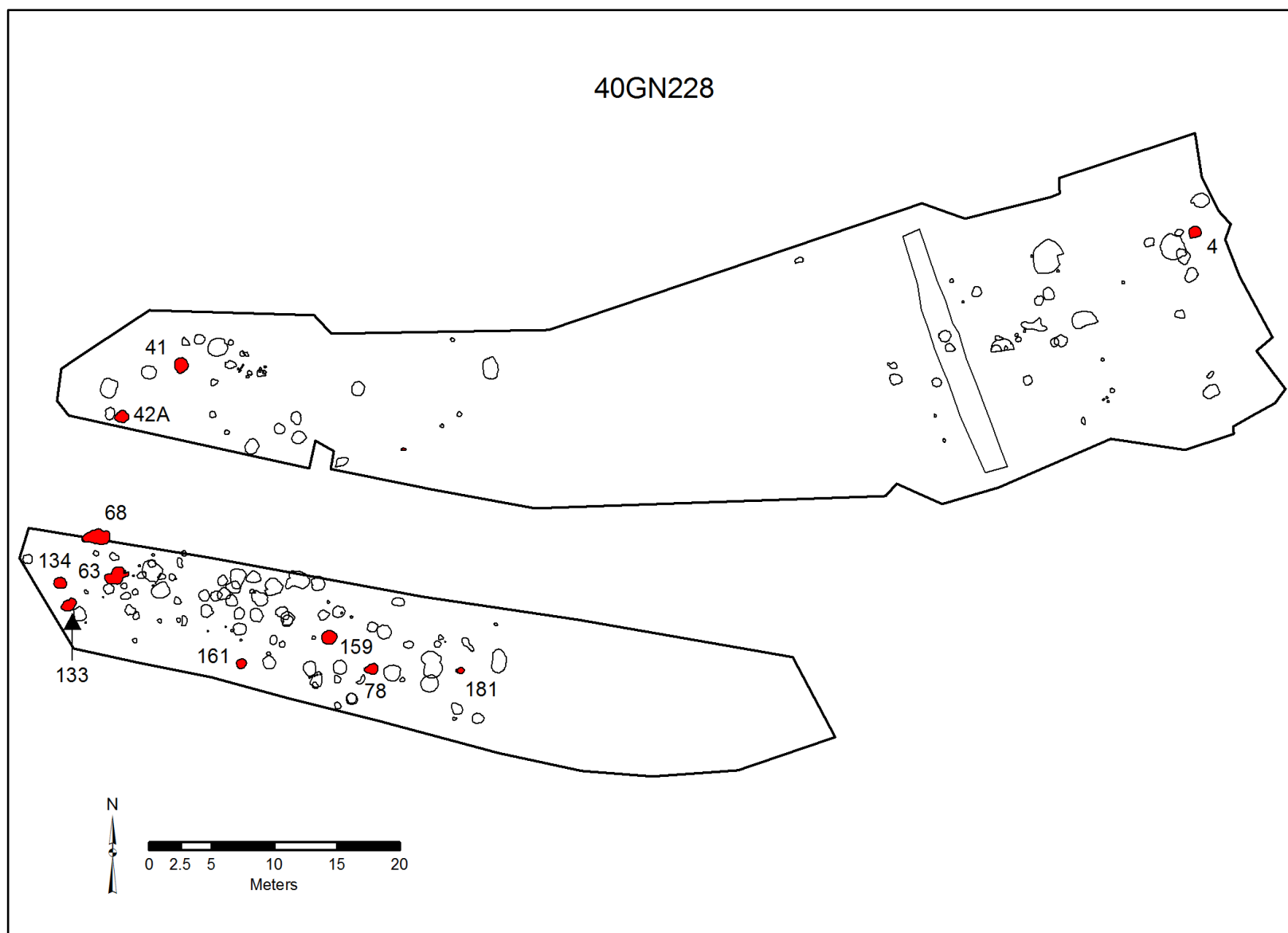


Figure 4.7. Location of feature samples analyzed at site 40GN228.

Mulberry seed, one elderberry seed, and one possible and two definitive sumac seeds. Fruit was only definitively identified in three of the 12 features. Feature 42, a Connestee circular pit, displays the greatest diversity in fruit taxa, with inclusions of sumac, elderberry, blackberry/raspberry, and grape. The overall low quantity of fruit taxa recovered is most likely due to the nature of the consumption of these items rather than being a true reflection of their overall importance. Frequently eaten whole and uncooked, the seeds of fruits are less likely to be exposed to the process of carbonization.

Ethnographic documentation of prehistoric plant use in the Southeast frequently emphasizes the central role that fruits played in cultural constructs (Swanton 1946:259). By the time of European contact, ethnographic accounts detail a variety of southeastern tribes using the harvesting of fruits and other wild plants to establish cultural concepts of time, division of labor, and ritual. For example, as the exploitation of food resources determined seasonal movements and labor practices, the Siouan tribes are noted as having described seasons in terms such as the “strawberry or mulberry month” (Swanton 1946:259). Hollenbach (2010:18-19) notes that when comparing the return rates of plant and animal resources, mulberry actually ranks higher than any other resource. According to central place foraging hypothesis, she posits that due to the low handling cost of some fruits, they rank comparably, if not higher than other animals and many staple plant items such as nuts. Therefore, in spite of the low recovery of fruits within 40GN228 features, it is likely that they were in fact a stable and significant component of the diet.

Edible seeds occurred with a 58 percent ubiquity value in the features of 40GN228. These starchy/oily seeds appear in feature contexts as early as the Late Archaic in the form of bearsfoot and occur with increasing diversity into the Pisgah phase of the Mississippian. Edible seeds recovered from feature contexts include 14 fragments of bearsfoot, 277 chenopod, 2 possible little barley seeds, 29 definitive and 1 possible maygrass, 1 possible sumpweed, and 2 possible sunflower seed fragments. Feature 42, a Connestee pit previously noted for its diversity of fruit taxa, has a combination of edible seeds in abundance as well. One hundred sixty-nine chenopod, 25 maygrass, and 2 bearsfoot fragments were recovered from this feature. Similarly, Feature 78, a Pisgah pit, contains 104 chenopod seeds. Although bearsfoot is the earliest occurring edible seed, by the Middle Woodland occupation, as evidenced by Feature 42 and 78, it appears that maygrass and chenopod were more frequently and intensively utilized.

Crops are present in six of the 12 features. This category is represented by 14 cucurbit rind fragments and 1 possible bean fragment, as well as 121 definitive and 8 possible corn cupules, 2 glumes, and 3 definitive and 6 possible kernels. The earliest cucurbit fragment was identified in Feature 133 (a Terminal Archaic earth oven/pit), 3 fragments were recovered from Feature 41 (a Middle Woodland circular pit), 8 fragments were recovered from Feature 42 (a Connestee circular pit) and the 2 remaining fragments are from Feature 68 (a possible Pisgah house floor). Although corn was tentatively identified in Features 4, 133, and 42, the Terminal Archaic, Pigeon, and Connestee dates associated with these contexts makes it more plausible that these fragments may be attributed to alternative taxa or may be intrusive. The

high recovery of corn exclusively from Feature 68 speaks to the overarching significance of this crop to Mississippian subsistence. In addition, the greater diversity of crops present in this Mississippian context further distinguishes this period as a farming economy.

The miscellaneous category refers to a variety of taxa that are often associated with either natural or anthropogenic disturbances on the landscape. Although not representative of subsistence, these plants are evidence of local habitat and ecology. Pine cone fragments were identified and appear in the 40GN228 samples with 100 percent ubiquity from the Early Archaic to the Mississippian period. Perhaps of more importance is the presence/absence of weedy seeds, which are affiliated with the transition from a mobile hunting-and-gathering lifestyle to one of increasing sedentism and horticultural development (Smith 1992:50, 58). These miscellaneous weedy seeds were recovered almost entirely from two features. Feature 42, a Middle Woodland period Connestee pit, which complementarily contains a high diversity and abundance of edible seeds, contained a wide array of weedy seeds represented by clover, bedstraw, goosegrass, and species belonging to the Grass and Spurge families. Feature 68, a Pisgah context, includes possible knotweed and possible bedstraw. Taken comprehensively, the combination and increasing abundance of edible and weedy seeds beginning in the Middle Woodland are an indication that the local habitat was responding to the effects of amplified human investment in the landscape.

Column Floatation Dataset

Carbonized plant remains were analyzed from 39 floatation samples collected from two test unit columns at 40GN228 (Table 4.1). The two floatation columns occur on separate areas of the site (Figure 4.8). The first column derives from Test Unit N1003 E5055, which is located on the lower T1 terrace closest to the river. This test unit dates from the Early Woodland to the Middle Woodland period. The second column sample was collected from Test Unit N1000 E5008, which was placed on top of the rising T2 landform that ascends westward from the river. Deposits from the T2 terrace date much earlier than the lower terrace, and represent a period of time spanning from the Early Archaic to the Mississippian Pisgah Phase. Out of the nine test units excavated during the Phase III excavation, these two test unit columns were selected for 1) their differential geographic locations that indicate variant habitats and past environmental conditions and 2) their correlation to geoarchaeological soil samples. The floatation samples were collected from the southwest 30-cm-by-30-cm corner of units in 10-cm levels.

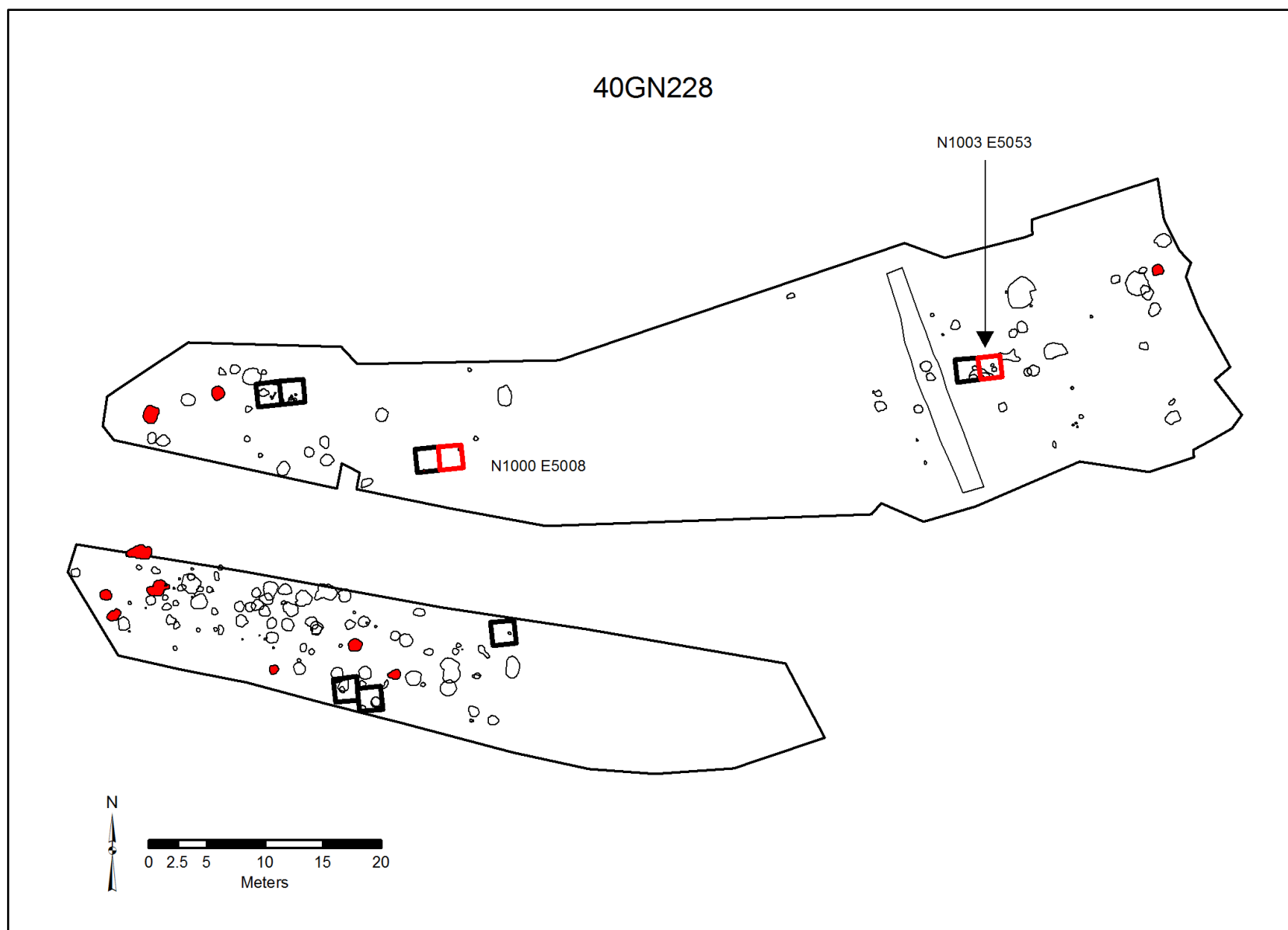


Figure 4.8. Location of Test Unit N1000 E5008 and Test Unit N1003 E5055 at site 40GN228.

Column Floatation Sample Results

Test Unit N1000 E5008

The 18 analyzed column floatation samples from Test Unit N1000 E5008 resulted in only 2.45 g of carbonized plant material, of which 0.22 g (9 percent) is wood (Table 4.1). With the exception of four samples, from Stratum I through Stratum III, that contained large quantities of hickory shell (09-133, 09-202, 09-210, and 09-232), minute amounts of plant material were recovered (Appendix A.1). Hickory nutshell was by far the most numerous (n=197) and ubiquitous (56 percent) taxon in this column. Although common in the feature samples, only one definitive acorn fragment was identified in Stratum IV and black walnut was absent. The only other edible taxa recovered was fruit, which was represented by one possible persimmon seed fragment from Stratum I and one definitive persimmon seed fragment from Stratum II. The lower Strata, IV through V, are dominated by taxa belonging to the miscellaneous category, namely pitch and pine cone.

As a result of the low recovery of plant materials from the Test Unit N1000 E5008 samples, extensive quantitative comparisons are unwarranted. However, the limited remains from Strata IV through V, coupled with the large increase in hickory from Strata III to I, suggests Strata III may be associated with the period of stabilization that occurred on the upper terrace around 3,580 B.P. Figure 4.9 demonstrates the changing densities in plant and wood use over time. The large peaks at levels 498.93-498.83, 499.23-499.13, as well as the slight peak at 497.95-499.13, represent periods of increased landscape use, most likely associated with

relatively low-intensity flooding. Hickory accounts primarily for the peak in plant use that is represented in Figure 4.9.

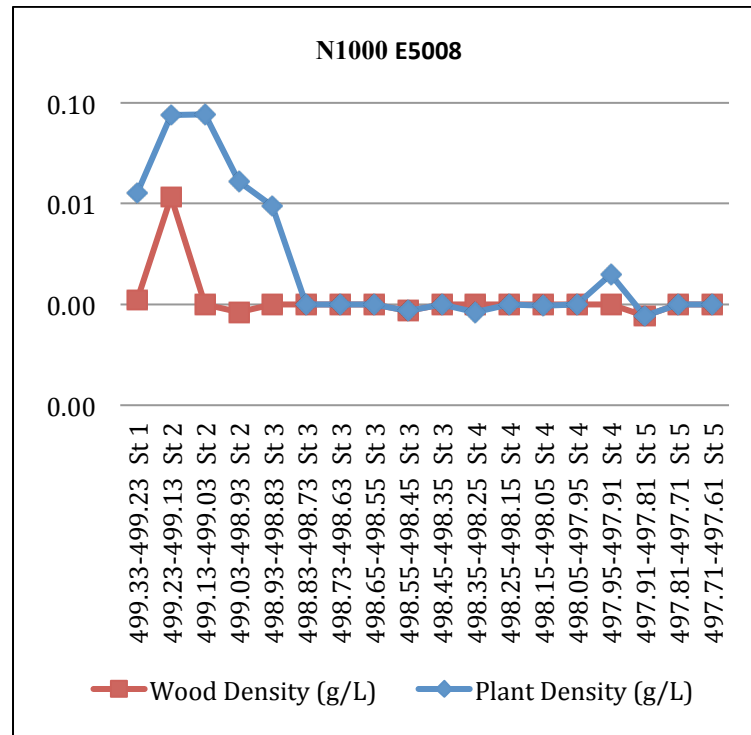


Figure 4.9. Site 40GN228: Comparison of density of plant and wood over time from Test Unit N1000 E5008.

Test Unit N1003 E5055

The column flotation samples from Test Unit N1003 E5055 are notably different from the previous column sample both qualitatively and quantitatively. The 21 analyzed column flotation samples from N1003 E5055 resulted in 7.72 g of carbonized plant remains, of which 4.87 g (63 percent) is wood (Table 4.1). The botanical samples from this test unit are impressive when compared to the column flotation samples of N1000 E5008 due to 1) the volume of carbonized botanical remains, 2) the diversity of plant taxa, and 3) the counts and combinations of edible seeds.

Plant remains recovered from Test Unit N1003 E5055 encompass a diverse assemblage of botanical material represented by nuts, fruits, edible seeds, crops, and miscellaneous taxa. Excavated to a depth of 2.6 m and including eight distinct strata representative of an Early Woodland Swannanoa phase through Middle Woodland occupation, the plant remains from this test unit highlight the intensive use of the floodplain habitat of the Nolichucky River (Figure 4.10). Unlike the column floatation samples from Test Unit N1000 E5008, in which only five taxa were identified, the floatation samples from Test Unit N1003 E5055 contain 27 definitive taxa. This amount is comparable to that represented in the 40GN228 feature samples (n=32) and is highly uncharacteristic from samples located outside of a midden context.

Taxa belonging to the nut category were ubiquitous in the column samples from this test unit. Of these taxa, hickory was the most frequently occurring, with a ubiquity value of 95 percent. Acorn and black walnut both have a ubiquity value of 55 percent, but are distributed more frequently in the more recent deposits (Stratum I through IV). Their occurrence is sparse with descending depth. Hickory is not only more prevalent in the deposits, but is also the most numerous in the samples, with a count of 95 compared to 45 for black walnut and 30 for acorn. Only one definitive and one possible fragment of hazelnut were recovered from Stratum I of the samples, suggestive of the taxon's more recent utilization and more limited exploitation. Fifty-two fragments of nut could only be classified to the Walnut family due to material erosion and fragmentation.

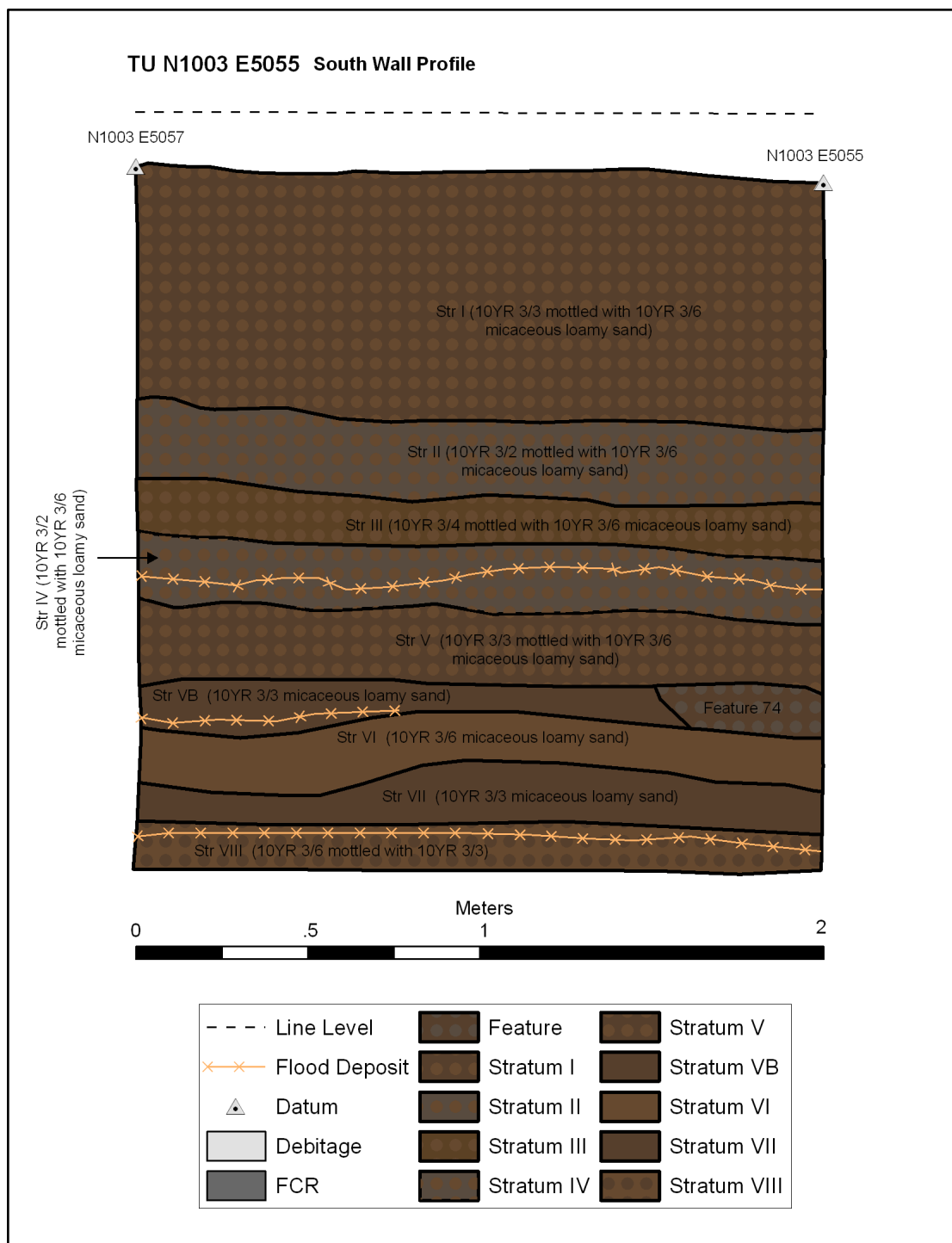


Figure 4.10. 40GN228: Test Unit N1003 E5055 stratigraphy showing extensive sequence of deposits.

The distribution of fruits throughout the column sample is minimal when compared to several of the other categories of plant taxa. Fruits are present in only six of the 20 samples and are represented by only three definitive taxa. Fruits recovered include one possible and eight definitive grape seed fragments, one blackberry/raspberry seed, one nightshade, two possible persimmon seeds, and eight possible and 15 definitively identified mulberry seeds. Interestingly, the pattern of fruit distribution appears to be split between the upper and lower deposits, with grape and blackberry/raspberry occurring in the upper two strata and persimmon and mulberry restricted to Strata IV through VIII. This pattern is reflective of the utilization of several habitats, where grape is associated with wooded areas, blackberry/raspberry and persimmon are associated with transitional areas, and mulberry is associated with rich bottomlands.

The pattern of fruits appearing in this test unit column is interesting, as it alludes to a changing habitat for this location over time. While it does not provide a direct relationship, as plant materials can be brought in from extensive distances, it does tentatively suggest that during the Early Woodland occupation the location was more characterized by marshy, wet conditions, while by the Middle Woodland the landscape in this area transitioned to a drier, more wooded locale. This does in fact coincide with geoarchaeological analysis of this test unit. The lower Strata VIII through IV were characterized by unstable, mostly wet conditions, while the upper Strata III through I represent a period of gradual stabilization marked by generally drier conditions and soil formation (Cyr 2012) (Figure 4.3).

Edible seeds occur with uncharacteristic diversity and abundance throughout the full extent of Test Unit N1003 E5055. While nut taxa, under normal conditions, commonly overshadow other categories of plant taxa, edible seeds act as an anomaly in this particular context. Edible seeds occur in 19 of the 20 samples from this test unit column. They are found in Stratum I through Stratum VIII, without exception. Edible seeds identified include 101 bearsfoot fragments, 17 chenopod, 21 possible and 107 definitive maygrass, and 6 possible and 19 definitive little barley. Maygrass occurs in 13 of the 20 column samples and is the most numerous of the edible seeds. Second to maygrass, bearsfoot is also abundant in the samples and has a ubiquity of 55 percent. Little barley and chenopod occur less frequently, in only 6 and 7 of the 20 samples respectively, but this number is still elevated considering the non-midden context of the samples. While the quantities of edible seeds are staggering, the combination of these seeds also importantly point to the cultural nature of these deposits. The recovery of edible seeds from Stratum VIII, with an associated radiocarbon date of 2,735 B.P. $\pm$ 20, is significant and contributes to our understanding of the horticultural practices of Early Woodland people in the Ridge and Valley and western slopes of the Blue Ridge. While many plant assemblages from sites in the Ridge and Valley during this period display very little to no evidence of horticulture this period (Schroedl 1990:90-91), the deep floodplain deposits of 40GN228 suggest an early and intensive investment in local cultigens.

In contrast to the high diversity and quantity of edible seeds recovered from N1003 E5055, the lower terrace location of this test unit contained minimal taxa belonging to the crop category. Two possible and seven definitive cucurbit rind

fragments, as well as one possible cupule and glume and one definitive corn kernel complete the identified crops. As Stratum I of this test unit appears to date to the Middle Woodland (the stratum is dated by association with nearby Feature 117, which had a radiocarbon date of 1410 B.P. $\pm$ 70), the presence of definitively identified corn in Strata III, which is also therefore presumably Middle Woodland, is tantalizing evidence of the possibility of early corn in this upland site. As no other definitive evidence of Middle Woodland corn was identified at either 40GN228 or 40GN229, the early presence of corn is being presented with caution. However, early appearances in this region are not inconceivable: one of the earliest occurrences of the taxon appears along the Tennessee River Valley at the Icehouse Bottom Site dating to 1,825 cal B.P. (Chapman and Crites 1987:352). This site, along with several others in the Eastern Woodlands (e.g. the Holding Site in Illinois [Parker 1989], the Edwin Harness Mound Site in Ohio [Riley et al. 1994], and tentatively at the nearby Townsend Site in Tennessee [Hollenbach et al. 2012]), appear to exist as scattered and isolated occurrences of experimenting communities, involved and participating to varying degrees in what is recognized in the Middle Woodland as a “thin veneer of Hopewellian exchange, iconography, and ritual” (Anderson and Mainfort 2002:9) (Figure 4.11). This limited and sporadic appearance of corn is very suggestive of its ritualized rather than strictly subsistence related use (Hastorf and Johannessen 1994).

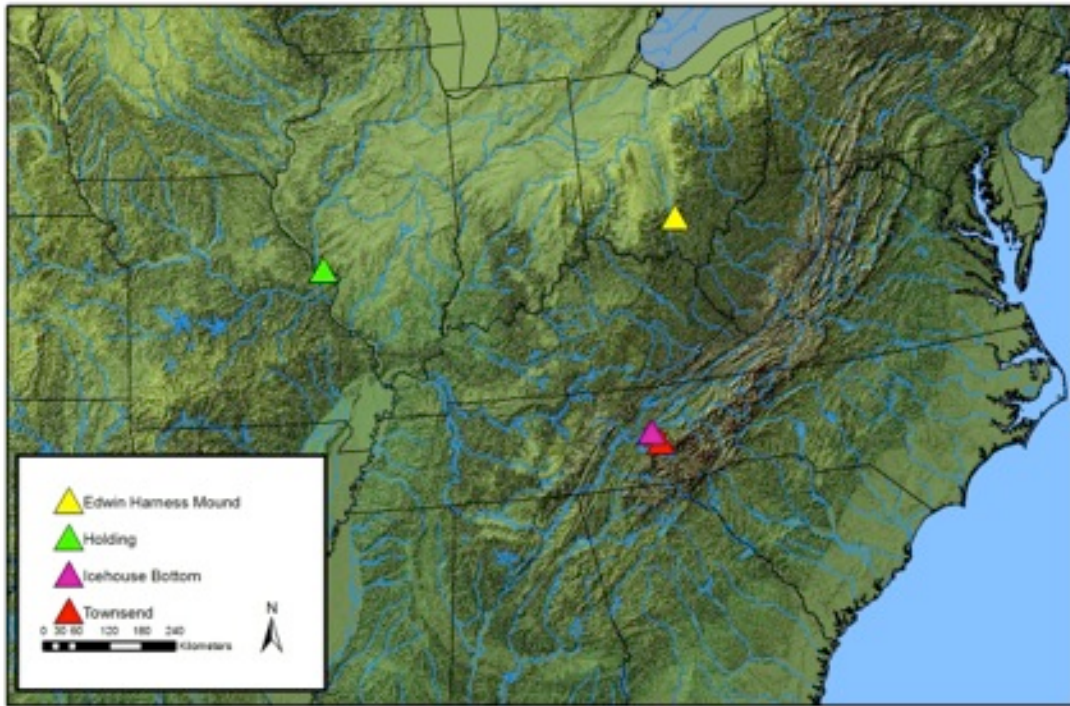


Figure 4.11. Location of sites in the Eastern Woodlands with evidence of early corn.

Crop taxa in this test unit were otherwise confined to the Middle Woodland occupation, with the definitive corn kernel's recovery from Stratum III, and cucurbit rind fragments occurring throughout Stratum I through Stratum III. Crops have the lowest ubiquity within the plant categories in this column, only appearing definitively in five of the 20 samples. While the marshy habitat of the Nolichucky floodplain may have proved beneficial for horticultural investment in a suite of weedy edible seeds during the Early Woodland, the methods of field preparation, which may have required frequent burning to encourage fertility and soil development, appear to not have been as suitable for the growth of other common cultigens. In addition, the risks associated with such an active and unpredictable habitat may have proved too large to

invest in labor-intensive crop production in this period. By the Middle Woodland, as landform stability increased, investment in additional crop taxa may have been more reasonable.

This column sample does display a wide diversity of plants belonging to the miscellaneous category. In addition to the anticipated inclusion of pine cone and pitch, these samples contain a large assemblage of miscellaneous weedy seeds, suggestive of localized disturbance to the environment. Seeds belonging to this category include both taxa that are more widely attributed as non-cultural intrusions and those that have been clearly identified with a variety of non-subsistence-based human activities. Seven taxa of miscellaneous seeds are identified in this test unit, including bedstraw, goosegrass, species belonging to the Grass and Spurge families, carpetweed, purslane, and a possible pokeberry seed. There is a distinct divide between the upper and lower strata concerning the presence of these miscellaneous seeds. With the exception of seeds identified to the Grass family, these seeds are wholly restricted to the upper strata (I-IV). Bedstraw occurs in low numbers (n=7) but relatively consistently in the upper strata of the column (I-IV). Likewise, spurge (n=3), goosegrass (n=1), carpetweed (n=5), purslane (n=3), and possibly pokeberry (n=6) are restricted to the upper strata of the column.

This pattern is indicative of a greater degree of human-produced impact on the local environment and a broader set of plant taxa over time during the latter half of the occupation. This parallels what is seen in the 40GN228 feature samples and appears to indicate that although horticulture, as evidenced by edible seeds, was being practiced in the Early Woodland period, the impacts of this activity on the landscape

may have been relatively minimal until the Middle Woodland. The lack of these seeds from the lower strata cannot be explained by preservation differences, as the presence of edible seeds, which are likewise small and fragile, is stable throughout the full extent of the column samples.

Change through Time

In addition to the changing patterns of plant use indicated by the presence/absence of plant taxa over time in the column samples, density measures are useful to quantify changing distributions of taxa and to delineate the intensity of occupational deposition. Figures 4.12, 4.13, 4.14, and 4.15 use density and relative density measurements to depict the changing patterns in use of plant categories over time on the lower terrace of 40GN228.

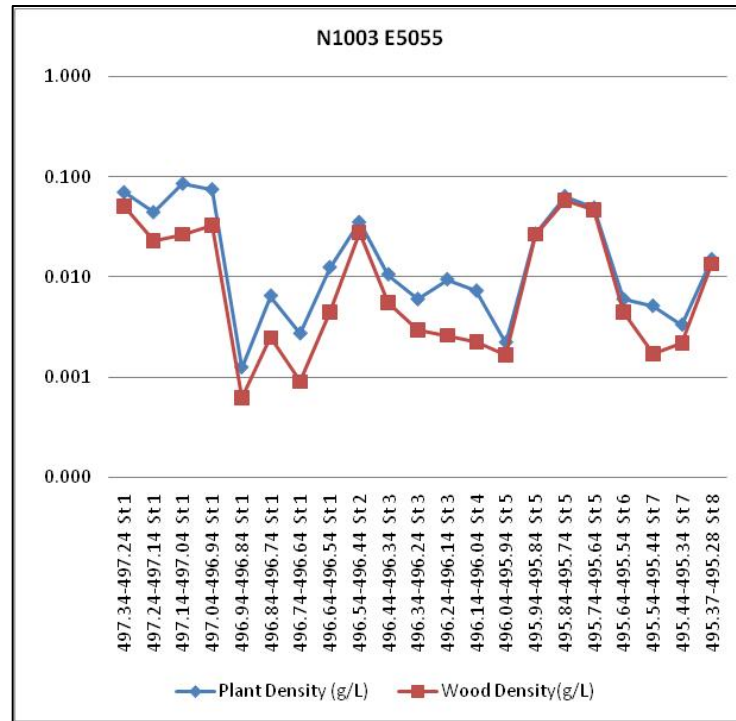


Figure 4.12. Site 40GN228: Changing density of plant and wood use over time from Test Unit N1003 E5055.

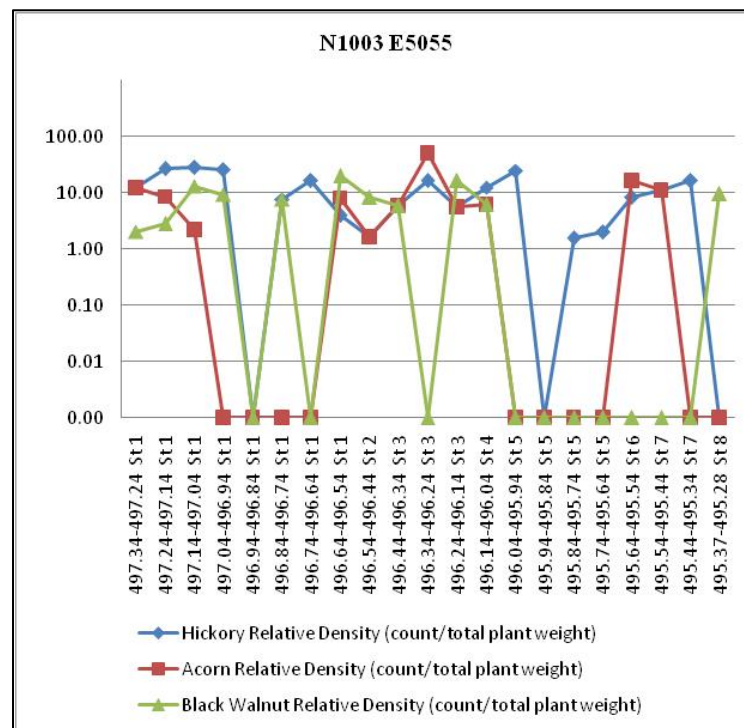


Figure 4.13. Site 40GN228: Changing relative density of nut use over time from Test Unit N1003 E5055.

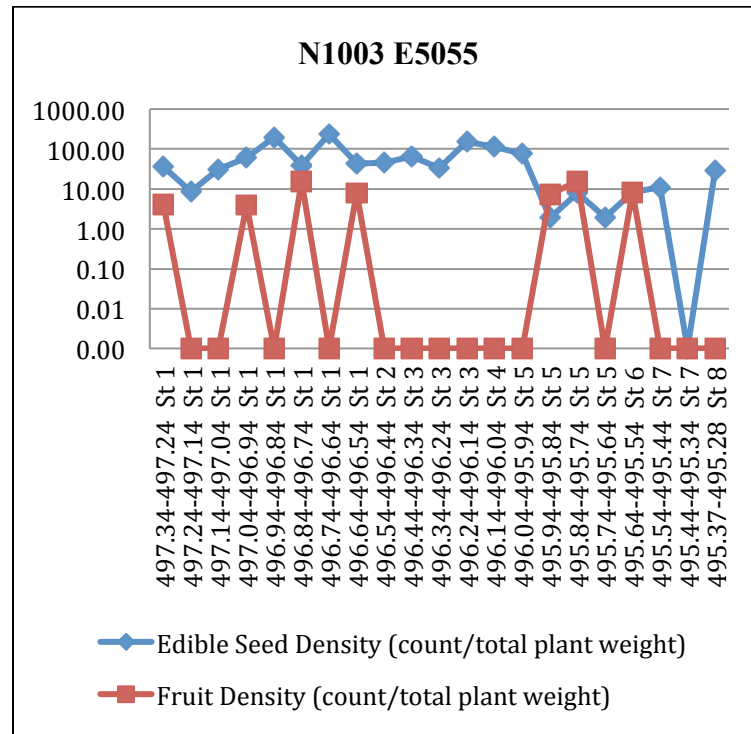


Figure 4.14. Site 40GN228: Relative density of edible seed and fruit use over time from Test Unit N1003 E5055.

Note that Strata I-III represent Middle Woodland occupations and Strata IV-VIII represent Early Woodland occupations.

Figure 4.12, which depicts the changes in total plant and wood density (g/L) over time, points to several periods of intensive site use followed by relative declines in use that occur during the lower levels of Stratum I and the upper level of Stratum V. The peaks, therefore, are interesting periods of site use that likely represent more intensive cultural occupation and deposition. It is notable that several peaks in plant use exist, some that date as early as Stratum V, considering the intensity of the stream environment and the instability of the landform until late in the stratigraphic

sequence. This indicates that occupants were in fact utilizing this landform, in spite of the wet and frequently disturbed nature of the location.

Comparisons of the relative densities of taxa also display several noteworthy trends in plant use. Hickory nuts and edible seeds are both the most intensively utilized and the most consistently depended upon plant resources recovered from Test Unit N1003 E5055. Although acorn, black walnuts, and fruit taxa are used frequently, their appearance is sporadic in comparison to hickory and edible seeds (Figures 4.13 and 4.14).

Another trend that is particularly important is the contrasting patterns of the heavily exploited resources, hickory nuts and edible seeds. As displayed in Figure 4.13, hickory nut use rapidly declines at a depth of 496.94-496.84, 495.94-495.84, and again at 495.37-495.28. Edible seed use stands in direct opposition to the displayed pattern of hickory use. Figure 4.15 shows that periods of time displaying the greatest decline in hickory nut use are points that represent elevated levels in comparison to hickory, and in two instances peaks in edible seed use. It may be that inhabitants were not only consistently taking advantage of the fertile habitat of the Nolichucky floodplain by investing in local cultigens, but that in periods of poor mast production they were especially reliant on these resources.

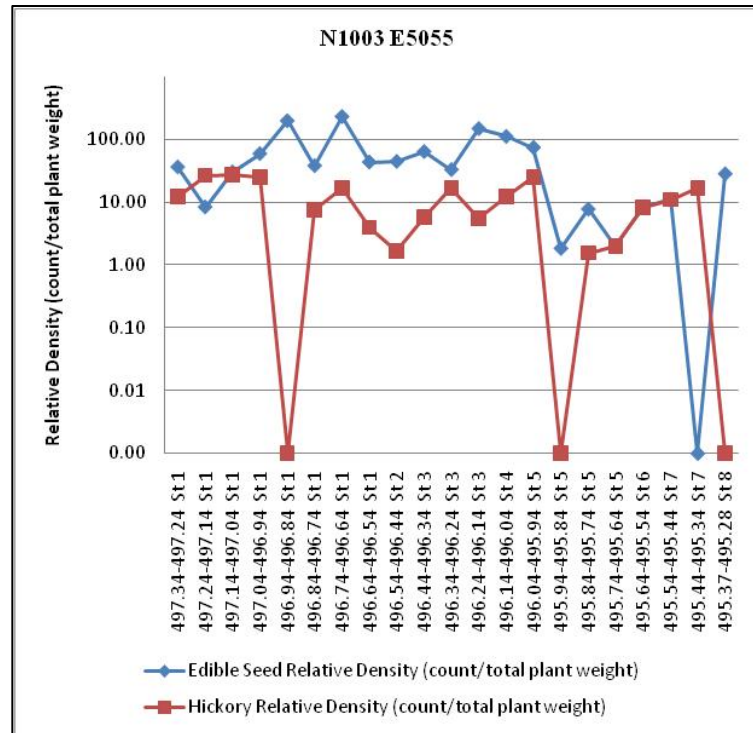


Figure 4.15. Site 40GN228: Comparison of relative density of hickory and edible seed use over time from Test Unit N1003 E5055.

Broader changes in plant use can be identified by comparing the Early Woodland/Swannanoa component represented by Stratum VIII through Stratum IV, and the Middle Woodland component represented by Stratum III through Stratum I in Test Unit N003 E5055. The boxplot in Figure 4.16 shows the density of plant remains (g/volume) recovered from the column floatation sample of N1003 E5055. There appears to be a slight increase in total plant use in the Middle Woodland suggestive of increased site use, but the changes are not statistically significant.

While the total density of wood (g/volume) displays little variation across time (Figure 4.17), the relative density of wood (g/plant weight) decreases with statistical significance in the Middle Woodland (Figure 4.18). This decrease in wood,

coupled with the slight increase in hickory nut use in the Middle Woodland, as displayed in Figure 4.19, may indicate that hickory nut was being utilized more intensively as a fuel source over time at this location (Hollenbach 2009:180). However, this pattern taken in concert with the high recovery of edible seeds beginning in the earliest levels of the test unit and the geoarchaeological analysis of this landform elude to the early prehistoric management and use of this microhabitat for indigenous crop husbandry.

Indigenous crop husbandry can be traced to the Late Archaic in the Eastern Woodlands (see Chapter 2). There is little doubt that the open, wet habitats created by fluvial activity along river banks created a suitable habitat for a suite of floodplain weeds that were capable of yielding substantial seed harvests (Smith 1992:30). As Woodland communities practiced greater sedentism, there was increased opportunity to not only harvest these crops, but furthermore to aid in their enhancement. The initial (Early Woodland) channel bar habitat of Test Unit N1003 E5055, while not suitable for habitation, would have provided a perfect location for the growing of these edible seed crops. This is corroborated by the early elevated and consistent presence of a combination of edible seeds throughout the prehistoric occupation of this lower terrace.

Although edible floodplain vegetation communities are suited to an intense and unstable riverine habitat, the particle size analysis of this landform, particularly in the early strata, documents fast-moving stream conditions, frequent flooding, and very little evidence of the stability needed for cumulative soil development (Cyr 2012). These conditions transition beginning in Stratum III, when the landform

stabilized and intense flooding was less frequent. The high relative density of wood compared to other plant remains in the Early Woodland sequence of this test unit (Figure 4.18), coupled with the abundance and combination of edible seeds found throughout the sequence, is very suggestive of human-induced burning of this landform. The statistically significant decline in the relative density of wood (Figure 4.18) and the associated increase in hickory nuts (Figure 4.19) beginning in the Middle Woodland sequence of this test unit coincide with the physiographic drying out of this landform. It is possible that as the landform stabilized and conditions for soil formation improved, burning episodes that utilized wood for fuel became less necessary, and thus less frequent. Alternatively the decline in the relative density of wood over time compared to that present in the lower strata may be the result of a diminished amount of trees on the landform after the initial clearing. It is possible that the trees never grew back in Strata I-III or that they were kept clear to enhance the habitation living platform.

Although the presence of edible seeds is consistently elevated throughout the extent of the column, Figure 4.20 depicts an increase in their use over time. This is not surprising as investment in horticulture likely intensified across the region in the Middle Woodland (Scarry 2003:62-63). Likewise, the use of black walnut increases in the Middle Woodland period (Figure 4.21). While fruits are the only taxa to slightly decrease in use over time (Figure 4.22), this decrease is not statistically significant and the low numbers of fruit recovered across the column sample may be responsible for the lack of clear patterning or statistically significant differences.

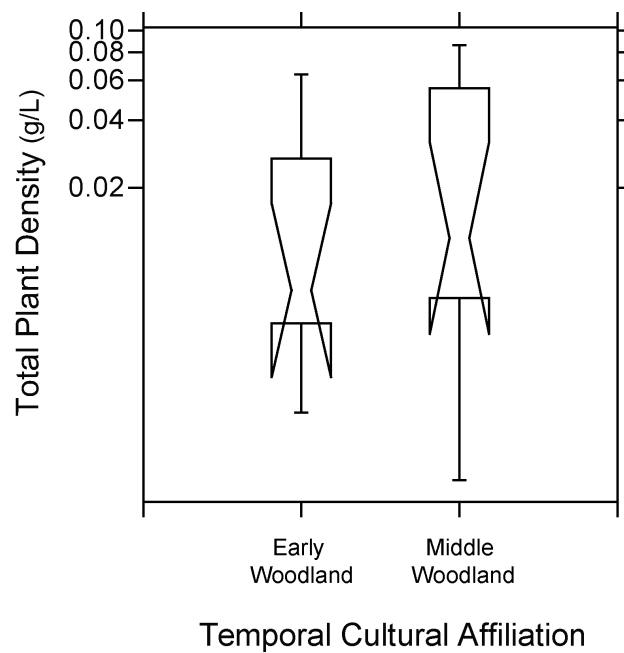


Figure 4.16. Comparison of the density of plant materials over time at site 40GN228, Test Unit N1003 E5055. A - Early Woodland period, B – Middle Woodland period.

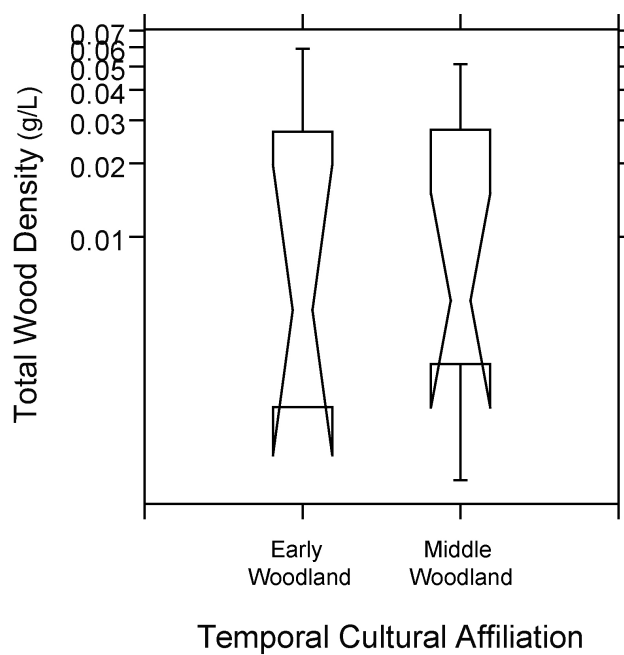


Figure 4.17. Comparison of the density of wood over time at site 40GN228, Test Unit N1003 E5055. A – Early Woodland period, B – Middle Woodland period.

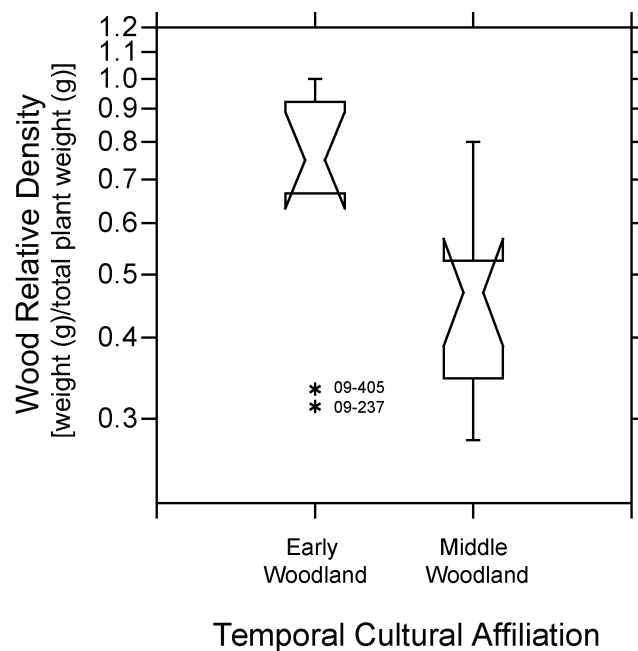


Figure 4.18. Comparison of the relative density of wood over time at site 40GN228, Test Unit N1003 E5055. A – Early Woodland period, B – Middle Woodland period.

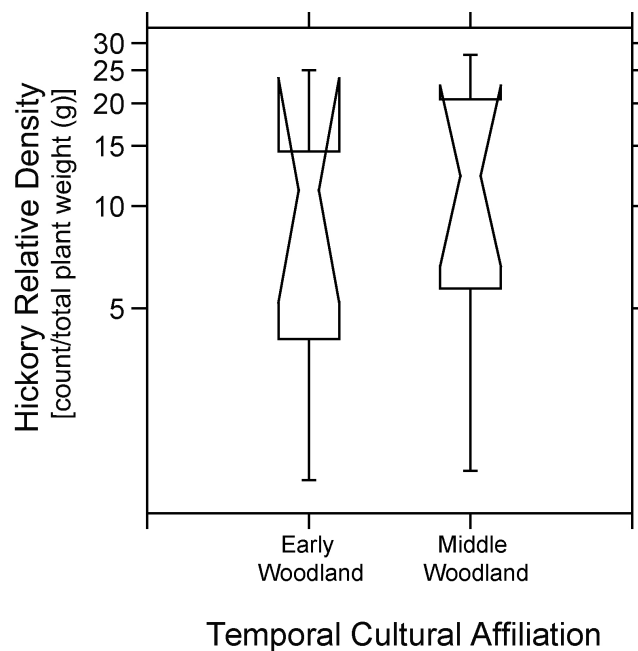


Figure 4.19. Comparison of the relative density of hickory over time at site 40GN228, Test Unit N1003 E5055. A – Early Woodland period, B – Middle Woodland period.

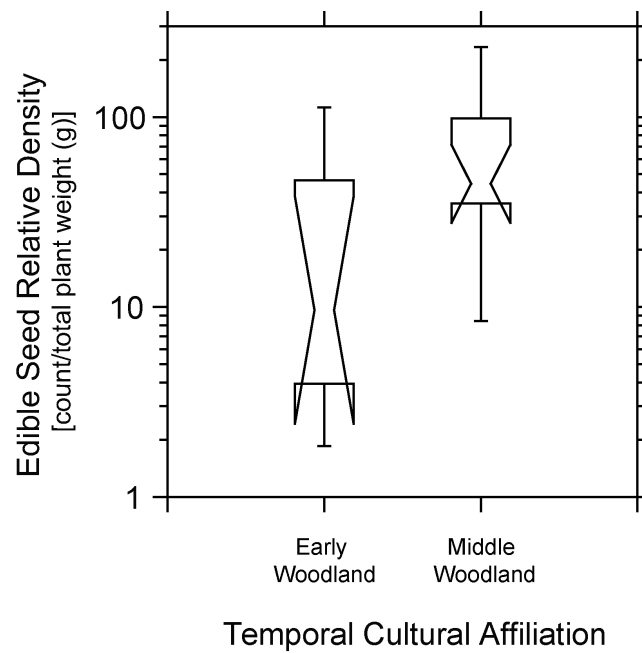


Figure 4.20. Comparison of the relative density of edible seeds over time at site 40GN228, Test Unit N1003 E5055. A – Early Woodland period, B – Middle Woodland period.

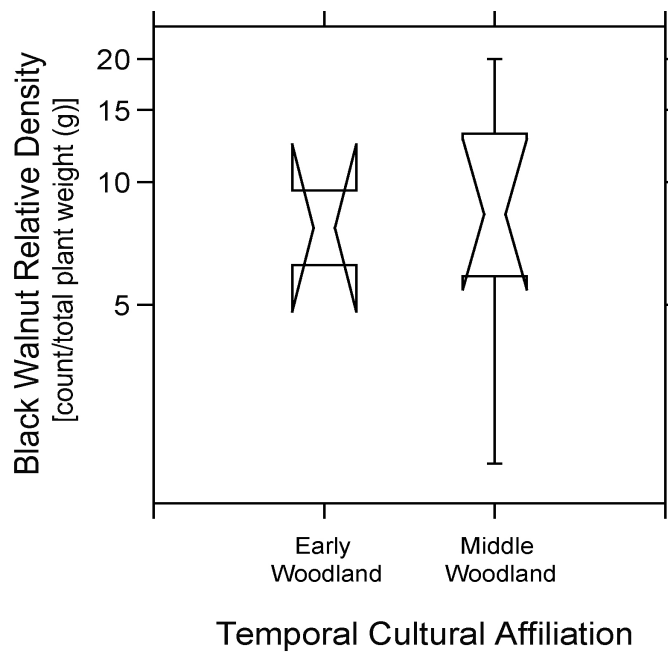


Figure 4.21. Comparison of the relative density of black walnut over time at site 40GN228, Test Unit N1003 E5055. A – Early Woodland period, B – Middle Woodland period.

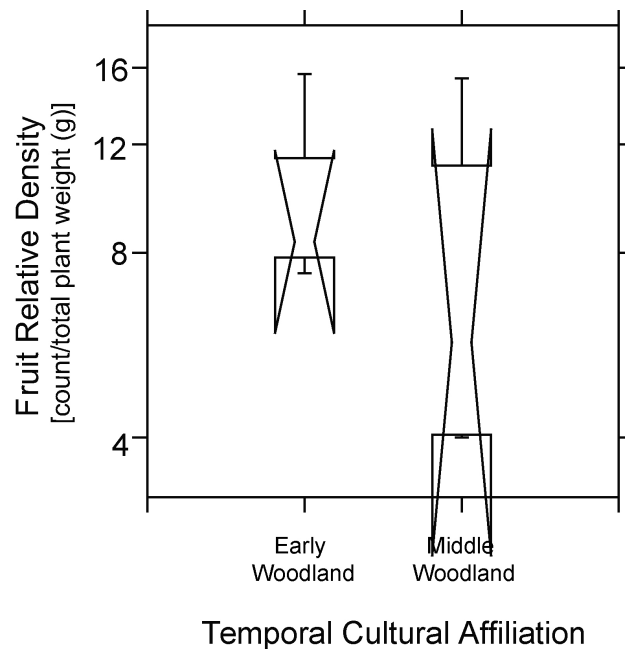


Figure 4.22. Comparison of the relative density of fruits over time at site 40GN228, Test Unit N1003 E5055. A – Early Woodland period, B – Middle Woodland period.

Botanical Remains from 40GN229

The botanical remains collected from deposits located at site 40GN229 are strikingly different from those previously discussed in site 40GN228. These differences exist in spite of relative geographic and temporal-cultural similarity. They therefore stand as a relevant unit to compare distinctive land management strategies and prehistoric spatial patterning, as well as depositional and post-depositional site formation processes.

The botanical assemblage from 40GN229 consists of carbonized plant remains analyzed from 21 samples collected from selected features and 27 floatation samples collected from two test unit columns (Table 4.3, Figure 4.23 and 4.24). In addition to feature samples and a column of samples from Test Unit N1071 E5236

identified and analyzed by Hollenbach (2012) at the Archaeological Research Laboratory, I analyzed an additional column of floatation samples collected from Test Unit N1105 E5232 to complete the 40GN229 botanical analysis. Located approximately 32 m to the north of Test Unit N1071 E5236, Test Unit N1105 E5232 was added to the analysis in order to procure a more comprehensive understanding of the plant practices and depositional processes across the site.

The 40GN229 floatation samples contain 85.86 g of carbonized plant remains, 44 percent of which is wood. The occupation at 40GN229 spans the Late Paleoindian through Pisgah phase. The botanical analysis from 40GN229, when interpreted solely, provides a view of subsistence practices over time at this location. Taken in concert with the botanical analysis of 40GN228, the plant remains from 40GN229 stand in direct contrast to those from the other side of the river, particularly in consideration of the distinctive lack of edible seeds recovered from both features and column floatation samples. The samples from 40GN229 display limited taxa diversity and a lack of horticultural investment (Table 4.4).

Table 4.3. Plant Samples Analyzed from 40GN229 (Weights listed are in grams).

Context	Bag	TCA	Stratum/Type	Depth (m below datum)	Volume (L)	Sample Wt	Contaminant Wt	Residue Wt	Plant Wt	Wood Wt
Feature Samples:										
2	09-13	Swannanoa	earth oven		12	90.26	48.26	40.39	0.86	0.70
5	09-35	Savannah River	pit		14	59.01	33.53	22.10	0.85	0.38
9	09-76	Savannah River	cooking pit		17	50.77	32.71	14.99	2.74	2.66
10	09-86	Swannanoa	cooking pit/earth oven		15	43.63	27.21	15.99	0.23	0.18
15	09-55		smudge pit		18	17.73	6.06	8.98	2.03	1.80
16	09-151	Connestee	hearth		15	27.89	11.92	15.05	0.64	0.40
22	09-17	Late Archaic (Likely)	hearth		14	26.12	17.65	8.21	0.11	0.05
26	09-58	Connestee	pit, bell shaped		15	29.68	13.27	12.15	3.74	2.36
30	09-62	Connestee	earth oven		14	3.61	1.59	1.88	0.09	0.07
64	09-235	Terminal Archaic	earth oven		15	165.86	76.56	53.98	32.82	13.27
85	09-294	Late Archaic	pit		15	45.79	21.56	22.22	1.56	0.82
97	09-337	Late Archaic (Likely)	earth oven		14	141.42	91.96	37.56	2.21	1.02
99	09-424	Late Archaic (Likely)	FCR concentration		20	146.25	84.30	51.01	10.09	7.39

Table 4.3 (continued). Plant Samples Analyzed from 40GN229 (Weights listed are in grams).

Context	Bag	TCA	Stratum/Type	Depth (m below datum)	Volume (L)	Sample Wt	Contaminant Wt	Residue Wt	Plant Wt	Wood Wt
02	09-393	Terminal Archaic	earth oven		14	140.81	89.92	49.71	2.64	1.93
108	09-379	Pisgah (likely)	post mold		3	1.71	0.71	0.93	0.05	0.05
109	09-386	Pisgah	pit		13	15.40	8.28	6.27	0.64	0.46
110	09-385	Late Archaic (Likely)	smudge pit/hearth		17	7.02	2.95	3.80	0.16	0.11
119	09-434	Pisgah	pit, basin shaped		14	74.09	25.05	25.00	23.25	3.63
122	09-474	Late Paleoindian	rock cluster/hearth		10	4.12	0.89	3.21	0.00	0.00
123	09-478	Late Paleoindian	rock cluster/hearth		5	2.56	1.16	1.39	0.00	0.00
124	09-490	Early Archaic	hearth		10	22.43	1.98	20.19	0.22	0.02
Column Samples (N1071 E5236):										
	09-104		I	500.02-499.92	13	21.33	11.38	9.31	0.09	0.08
	09-133		I	499.92-499.82	26	46.37	26.78	17.84	0.71	0.67
	09-202		I	499.82-499.72	15	3.49	1.60	1.88	0.01	0.00
	09-219		I	499.72-499.62	26	17.57	5.22	12.30	0.01	0.01
	09-239		II	499.62-499.52	23.5	34.66	3.47	31.19	0.01	0.01
	09-249		II	499.52-499.42	26	17.69	9.25	8.23	0.01	0.00
	09-262		II/III	499.42-499.32	24	10.30	3.44	6.63	0.01	0.01
	09-278		III	499.30-499.20	26	11.06	2.61	7.97	0.00	0.00

Table 4.3 (continued). Plant Samples Analyzed from 40GN229 (Weights listed are in grams).

Context	Bag	TCA	Stratum/Type	Depth (m below datum)	Volume (L)	Sample Wt	Contaminant Wt	Residue Wt	Plant Wt	Wood Wt
	09-296		III/IV	499.20-499.10	25	24.24	3.99	18.40	0.01	0.01
	09-335		IV/V	499.10-499.00	26.5	21.84	6.73	12.43	0.03	0.00
	09-349		V	499.00-498.90	23	49.17	5.93	42.61	0.03	0.01
	09-377		V	498.90-498.80	23	29.74	8.30	21.30	0.01	0.01
	09-437		V	498.80-498.70	24.5	27.74	4.61	23.14	0.00	0.00
	09-447		V/VI	498.70-498.60	24	77.20	12.50	64.61	0.00	0.00
	09-460		VI	498.60-498.50	27	23.43	0.35	23.08	0.00	0.00
Column Samples (N1105 E5232):										
	09-68		I	499.67-499.57	17	22.98	5.36	17.60	0.02	0.00
	09-73		I	499.57-499.47	15	13.54	2.15	11.34	0.05	0.04
	09-80		I	499.47-499.37	17.5	8.72	1.60	7.10	0.02	0.02
	09-95		I	499.37-499.27	19	2.69	0.66	2.03	0.00	0.00
	09-102		I	499.27-499.17	20	4.85	0.99	3.86	0.00	0.00
	09-120		I	499.17-499.07	0	9.07	2.16	6.91	0.00	0.00
	09-162		IV	499.07-498.97	20	19.29	12.52	6.71	0.06	0.04
	09-170		IV	498.97-498.87	20	55.28	4.47	50.74	0.07	0.06
	09-188		IV	498.87-498.77	0	19.77	4.89	14.82	0.06	0.06
	09-208		IV	498.77-498.67	21	128.75	12.45	116.28	0.02	0.02
	09-230		IV	498.67-498.57	20	27.63	1.97	25.64	0.02	0.02
	09-245		V	498.57-498.47	20	8.31	0.15	8.16	0.00	0.00

Table 4.4. Plant Taxa Recovered at Site 40GN229.

Common Name	Taxonomic Name	Seasonality	Count (g)	Weight (g)
<u>Nuts:</u>				
Acorn	<i>Quercus</i> sp.	fall	144	0.23
Acorn cap	<i>Quercus</i> sp.	fall	8	0.00
Acorn cf.	<i>Quercus</i> sp.	fall	4	0.00
Acorn meat	<i>Quercus</i> sp.	fall	1	0.01
Acorn meat cf.	<i>Quercus</i> sp.	fall	1	0.00
Beech family	<i>Fagus</i>	fall	14	0.06
Black walnut	<i>Juglansnigra</i>	fall	42	1.74
Chestnut	<i>Castaneadentata</i>	fall	37	0.07
Hickory	<i>Carya</i> sp.	fall	724	16.93
Hickory cf.	<i>Carya</i> sp.	fall	4	0.00
Nutmeat		fall	8	0.04
Nutshell cf.		fall	12	0.02
Thin hickory	<i>Carya</i> sp.	fall	3	0.00
Walnut family	<i>Juglandaceae</i>	fall	83	0.83
Walnut family cf.	<i>Juglandaceae</i>	fall	3	0.01
<u>cFruits:</u>				
Blackberry/raspberry	<i>Rubus</i> sp.	summer	1	0.00
Grape	<i>Vitis</i> sp.	summer	9	0.02
Grape cf.	<i>Vitis</i> sp.	summer	3	0.00
Grape family		summer	1	0.00
Persimmon seed cf.	<i>Diospyrosvirginiana</i>	fall	4	0.03
Persimmon seed coat	<i>Diospyrosvirginiana</i>	fall	1	0.00
<u>Edible Seeds:</u>				
Bearsfoot	<i>Polymniauvedalia</i>		1	0.00
Chenopod	<i>Chenopodiumberlandieri</i>	late summer/fall	1	0.00
Chenopod cf.	<i>Chenopodiumberlandieri</i>	late summer/fall	1	0.00
Little Barley cf.	<i>Hordeumpusillum</i>	spring/early summer	1	0.00
Maygrass cf.	<i>Phalariscaroliniana</i>	spring/early summer	3	0.00
<u>Crops:</u>				
Corn cupule cf.	<i>Zea mays</i>	late summer/fall	3	0.02
Corn cupule/glume	<i>Zea mays</i>	late summer/fall	348	1.47
Corn embryo	<i>Zea mays</i>	late summer/fall	1	0.00
Corn kernel	<i>Zea mays</i>	late summer/fall	16	0.06
Corn kernel cf.	<i>Zea mays</i>	late summer/fall	3	0.03
Cucurbit rind	<i>Cucurbitaceae</i>	late summer/fall	1	0.00
<u>Miscellaneous:</u>				
Bark			148	1.24
Beech family	<i>Fagus</i>			
Cane	<i>Arundinaria</i> sp.		46	0.32
Chestnut/acorn meat/persimmon cf.			25	0.04
Fruit seed/thin hickory cf.			1	0.00
Gall			6	0.03
Grass family cf.	<i>Poaceae</i>		3	0.00

Table 4.4 (continued). Plant Taxa Recovered at Site 40GN229.

Common Name	Taxonomic Name	Seasonality	Count (g)	Weight (g)
Monocot stem	<i>Poaceae</i>		2	0.08
Pine cone	<i>Pinus</i> sp.		122	1.28
Pine cone cf.	<i>Pinus</i> sp.		2	0.00
Pitch			1459	18.65
Ragweed	<i>Ambrosia</i> sp.		1	0.00
Spore clump			1	0.00
Spurge family	<i>Euphorbiaceae</i>		1	0.00
Stem			3	0.03
Stem/peduncle			1	0.02
Stem/wood			1	0.00
Twig			2	0.02
Unidentifiable	Unidentifiable		100	0.54
Unidentifiable seed	Unidentifiable		43	0.03
Unidentified seed	Unidentifiable		1	0.00
Unidentified seed/nutmeat	Unidentifiable		2	0.04
Wood part carbonized			20	3.92

Feature Dataset

The botanical analysis from 40GN229 consisted of bulk samples collected from a subset of features spanning the geographic extent of the site area (Figure 4.23). All feature plant identifications from 40GN229 and the feature analysis are adapted from Johanson and Hollenbach (2012). Twenty-one feature samples were analyzed, representing Late Paleoindian to Piskaway occupations (Table 4.3). The feature samples comprise a variety of cultural deposits, including three hearths (Features 16, 22, and 124), five pits (Features 5, 26, 85, 109, and 119), one FCR concentration (Feature 99), one smudge pit (Feature 15), one smudge pit/hearth (Feature 110), seven earth oven and/or cooking pits (Features 2, 9, 10, 30, 64, 97, and 102), one rock cluster (Feature 123), one rock cluster/hearth (Feature 122), and one post mold (Feature 108). Temporal-cultural affiliations include two Late Paleoindian features, one Early Archaic feature, five Late Archaic features, two Late Archaic Savannah River

features, two Terminal Archaic features, two Early Woodland Swannanoa features, three Middle Woodland Connestee features, three Mississippian Pisgah phase features, and one of unknown affiliation.

Feature Results

The feature samples from 40GN229 resulted in 84.93 g of carbonized material, of which 44 percent is wood. Although the features are represented by 19 definitive taxa and contain nuts, fruits, edible seeds, crops, and miscellaneous plant material (Table 4.4), the presence/absence of the majority of these taxa and the quantities in which they appear are more narrowly confined to the deposits affiliated with the Connestee and Pisgah components. Refer to Appendix A.2 for a detailed list of taxa by context recovered at 40GN229.

This restriction in occurrence of taxa does not apply to taxa in the nut category. Nut taxa are present in all of the feature samples, with the exception of the Late Paleoindian and Early Archaic. Scant botanical material was present in these early deposits, likely a result of poor preservation. Nut taxa identified within the feature samples include hickory and thin hickory, acorn, black walnut, Walnut family, Beech family, and chestnut. Hickory is the most numerous and ubiquitous nut taxon, occurring in 18 of the 21 features. Quantitatively ranging from 1 to 19 in the majority of the samples, its count is inflated by its elevated presence in Features 99 (a likely Late Archaic FCR concentration) and 119 (a Pisgah pit). Acorn is secondary to hickory in both count (n=150) and ubiquity (57 percent).

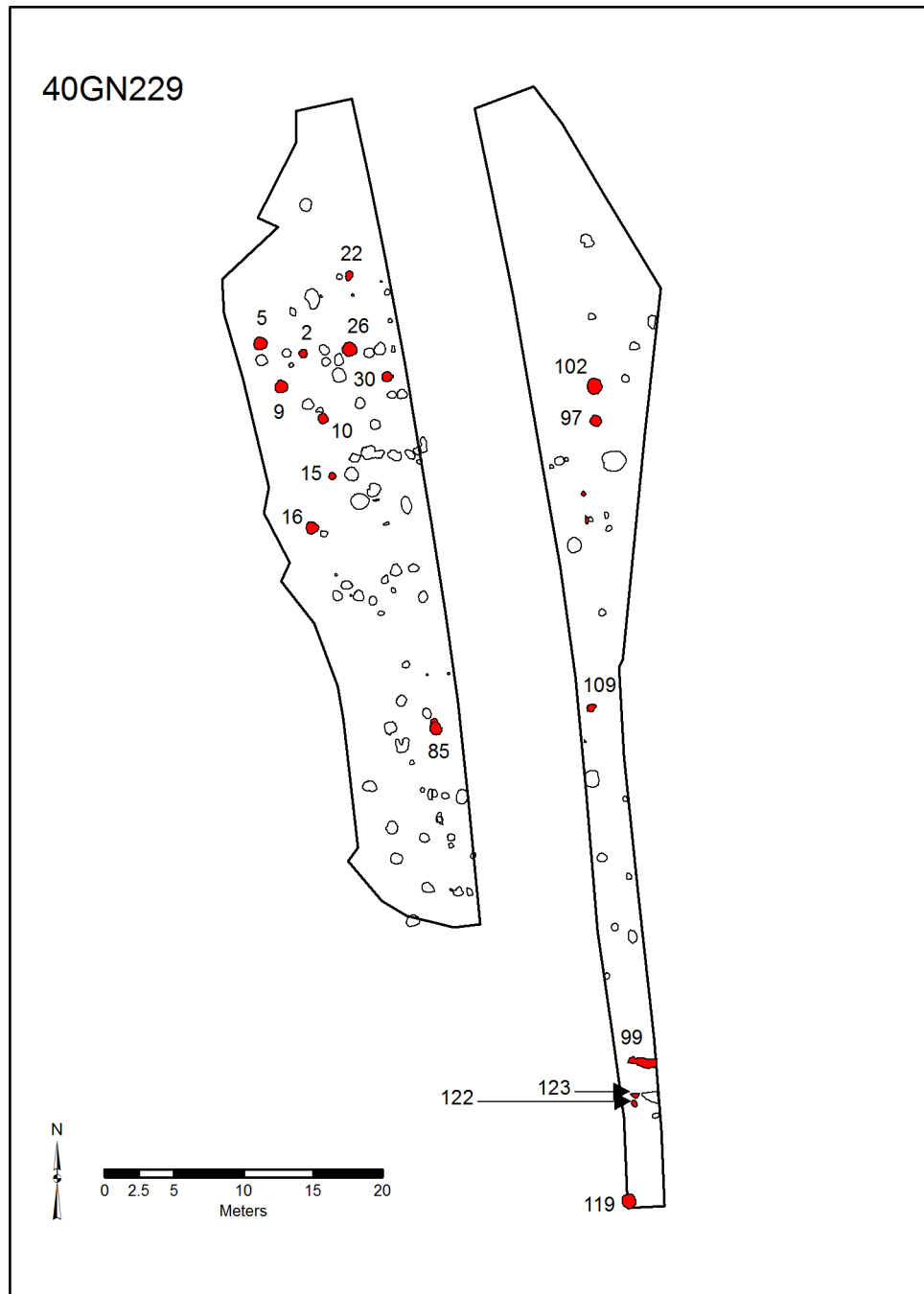


Figure 4.23. Location of feature samples analyzed at site 40GN229.

In addition to acorn's absence in the earliest deposits, it is also notably absent from the two Late Archaic Savannah River deposits. Black walnut appears much less consistently (with a 33 percent ubiquity) and in lower numbers ($n=42$) than hickory or

acorn. Feature 119, a Pisgah pit, displays the highest diversity in nut taxa, with additional inclusions of both chestnut and Beech family (either acorn or chestnut).

Evidence of fruit consumption is limited from the feature samples at 40GN229. Grape was definitively identified in five of the 21 samples, with evidenced use spanning the Late Archaic to the Pisgah. Only one fragment of persimmon seed was recovered. A single blackberry/raspberry seed was recovered from Feature 64, a Terminal Archaic earth oven.

Edible seeds were virtually absent from the 40GN229 feature samples. These seeds are represented solely by one fragment of chenopod in Feature 16 (a Middle Woodland Connestee hearth) and one fragment of bearsfoot in Feature 119 (a Pisgah pit). This absence is perplexing due to 1) the sites favorable location for horticulture along the bank of the Nolichucky River, 2) particle size analysis that evidences a stable landform suitable to habitation beginning in the Early Archaic, and 3) the high quantity and diversity of edible seeds located in both the 40GN228 feature and column floatation samples. A more detailed discussion of the results of the comparative analysis of edible seeds from 40GN228 and 40GN229 is presented in the Chapter 5 discussion.

Crops were definitively identified in two features. *Cucurbita* does not appear until late in the temporal-cultural sequence. Feature 30, a Connestee earth oven, contained one curcurbit rind fragment. In conformity with a majority of sites in the Southeast, corn is not definitively identified until the Pisgah phase. A large amount of corn was identified in Feature 119, a Pisgah pit, in the form of 348 cupules/glumes, one embryo, and 16 kernels. Due to the very early contexts from which they were

procured (Late Archaic), tentative identifications of both kernels and cupules in Features 97 and 110 are more likely better attributed to another taxon or are the result of intrusion.

Miscellaneous seeds do not appear in the feature samples until the Middle Woodland Connestee occupation. Several seeds in this category indicative of a disturbed landscape in both the Connestee and the Pisgah include one Spurge family, one ragweed, and a possible Grass family seed. The appearance of the miscellaneous seeds coincides with the timing of their appearance at 40GN228, further supporting the increased anthropogenic influence on the environment in the Middle Woodland period. Cane was present in five of the samples, appearing in a variety of contexts and temporal cultural affiliations. Pine cone was identified in nine of the 21 samples and pitch is nearly ubiquitous.

Several general trends over time can be proposed according to the 40GN229 feature data. While preservation bias does appear to be a major factor influencing the recovery of botanical material from the Late Paleoindian and Early Archaic feature samples, it does not seem to fully explain the absence of edible seeds or the increase in diversity over time that is evident from the Late Archaic through the Pisgah periods. Table 4.5 shows the ratio of wood recovery to total plant recovery from each of the 40GN229 feature samples. Although fluctuations occur in preservation over time, the percentage of wood to plant weight remains relatively stable, with the exception of the earliest three features. This ratio indicates that the lack of expected taxa in the feature samples is not exclusively representative of preservation biases, as wood, which is fragile in comparison to other taxa, does not greatly diminish with

increasing age beginning with the Late Archaic deposits. In addition, small seeds represented by grape, possible maygrass, and several unidentifiable seeds are present in low numbers as early as the Late Archaic. Acorn is present beginning in the Late Archaic samples, suggesting that the recovery of fragile plant remains is not extremely poor.

The geoarchaeological particle size analysis complements the plant data, and while there are differences in clay percentages among the test units sampled, as the lower terrace of 40GN228 has a 1-2 percent content, the upper terrace has a 12-16 percent content, and the 40GN229 samples range from 4-8 percent, they are not drastic differences. Therefore, although mechanical damage to plant remains during floatation may be more of a concern within these areas of higher clay concentration (e.g. samples with higher a clay content usually take longer to float and therefore provide a higher chance of mechanical disturbance), it does not appear to fully explain the high degree of variation in plant assemblages between the two sites.

Table 4.5. Wood to Plant Ratio Over Time in 40GN229 Feature Samples.

Context	Bag	Temporal Cultural Affiliation	Plant Weight	Wood Weight	Wood/Plant Ratio
Feature Samples:					
15	09-55	Unknown	2.03	1.80	0.89
119	09-434	Pisgah	23.25	3.63	0.16
109	09-386	Pisgah	0.64	0.46	0.72
108	09-379	Pisgah (likely)	0.05	0.05	1.00
16	09-151	Connestee	0.64	0.40	0.63
26	09-58	Connestee	3.74	2.36	0.63
30	09-62	Connestee	0.09	0.07	0.78
2	09-13	Swannanoa	0.86	0.70	0.81
10	09-86	Swannanoa	0.23	0.18	0.78
102	09-393	Terminal Archaic	2.64	1.93	0.73
64	09-235	Terminal Archaic	32.82	13.27	0.40

Table 4.5 (continued). Wood to Plant Ratio Over Time in 40GN229 Feature Samples.

Context	Bag	Temporal Cultural Affiliation	Plant Weight	Wood Weight	Wood/Plant Ratio
5	09-35	Savannah River	0.85	0.38	0.45
9	09-76	Savannah River	2.74	2.66	0.97
85	09-294	Late Archaic	1.56	0.82	0.53
22	09-17	Late Archaic (Likely)	0.11	0.05	0.45
97	09-337	Late Archaic (Likely)	2.21	1.02	0.46
99	09-424	Late Archaic (Likely)	10.09	7.39	0.73
110	09-385	Late Archaic (Likely)	0.16	0.11	0.69
124	09-490	Early Archaic	0.22	0.02	0.09
122	09-474	Late Paleoindian	0.00	0.00	0.00
123	09-478	Late Paleoindian	0.00	0.00	0.00

The large temporal scale of the botanical data at 40GN229 permits an examination of changing patterns in plant use over time. The presence/absence of taxa allows an interpretation of site use and subsistence practices. The high ubiquity and count of nuts, hickory in particular, proves the importance of the taxa to prehistoric inhabitants. Fruit consumption is evident early in the temporal sequence, but edible seeds are barely visible. The paucity of edible seeds throughout the sequences at 40GN229 is suggestive of little investment in horticulture along the eastern bank of the Nolichucky. This is despite the early formation of a stable landform. Diversity in plant taxa increases over time, apparent both in the addition of crop taxa and the elevated presence of weedy seeds in the Connestee and Pisgah components. While *Cucurbita* is present in a Connestee feature, corn quickly emerges as the dominant crop, as evidenced in Feature 119, a Pisgah pit containing over 364 cupules/glumes and kernels. Weedy seeds do not appear until the Connestee phase, suggesting that beginning in the Middle Woodland the local inhabitants began to increase their impact on the habitat in the immediate area.

Column Floatation Dataset

Carbonized plant remains from 27 samples collected from two columns of floatation samples were analyzed from 40GN229 (Table 4.3). Located near the southern extent of the western portion of the site boundary, Test Unit N1071 E5236 is in an area heavily populated with a variety of features (Figure 4.24). The column samples range over Strata I through VI and represent 1.52 m of fill. Dates by association were extrapolated for Test Unit N1069 E5236 (which shares the same stratigraphic wall as this test unit), using nearby corresponding radiocarbon dated features (119 and 120) (Cyr 2012). These dates suggest that Stratum I, Level 1 is a Pisgah phase occupation and Stratum III is Middle Archaic. The following analysis of the column sample collected from N1071 E5236 is based on identifications made by Johanson and Hollenbach (2012).

In order to cover a larger geographic extent and to obtain a more representative sample of botanical material, a column of samples from Test Unit N1105 E5232 was added to the analysis. Test Unit N1105 E5232 is located approximately 32 m to the north of Test Unit N1071 E5236, but is just north of a cluster of features. The column floatation samples from this test unit represent five distinct strata and cover 1.2 m of deposits. Similar to Test Unit 1071 E5236, no absolute dates were available for this test unit. However, Stratum IV, Level I appears to correspond well with Stratum III of Test Unit N1071 E5236, suggesting that Stratum IV, Level I of this test unit dates to the Middle Archaic (Cyr 2012).

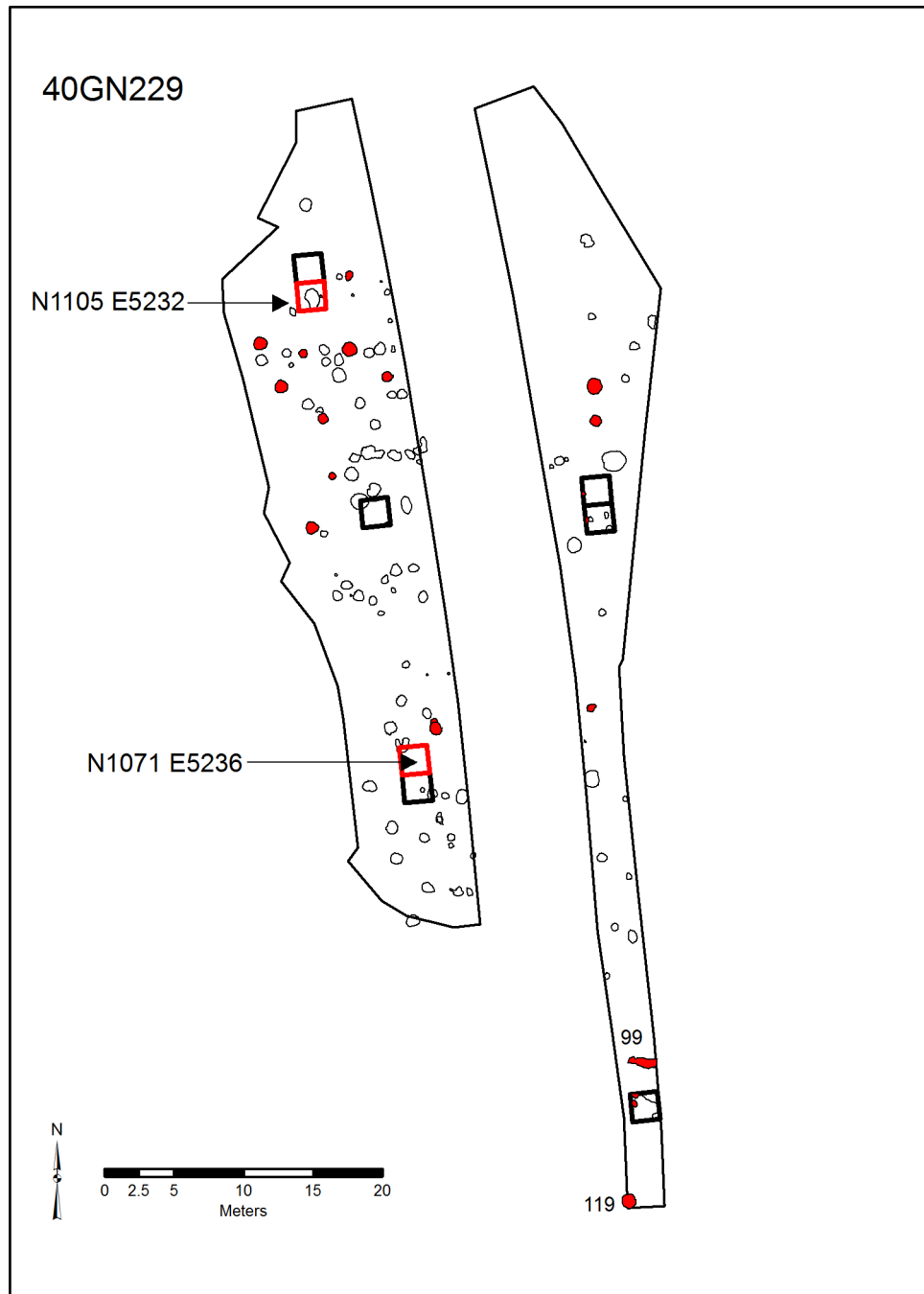


Figure 4.24. Location of Test Unit N1105 E5232 and N1071 E5236 at site 40GN229.

Column Floatation Sample Results

Test Unit N1071 E5236

The 15 analyzed column floatation samples from Test Unit N1071 E5236 resulted in 0.93 g of carbonized plant remains, of which 87 percent is wood (Table 4.3). The plant taxa recovered from these samples other than wood are extremely limited. Only two taxa were definitively identified, hickory and acorn. Although both occur in low numbers, hickory is present through all of the strata, while acorn is restricted to the upper three strata of the column. Interestingly, one tentatively identified Grass family seed and two unidentifiable seeds were recovered from the lower depths of the test unit (Stratum V).

The limited recovery of carbonized plant remains from this test unit column discourages extensive quantitative comparisons. Figure 4.25 and 4.26 depict the extremely minimal quantities of both plant and wood from Test Unit N1071 E5236. Likewise, a review of botanical material recovered by context confirms the absence of diversity in these samples (Appendix A.2). Although still minute in recovery, plant density does peak in Stratum I at 499.92-499.82 and to a lesser extent in Stratum V at 499.00-498.90, suggesting that the highest occupation intensity of this location occurred during or before the Middle Archaic, and again during the Pisgah occupation (Figure 4.25).

Test Unit N1105 E5232

The 12 analyzed column flotation samples from Test Unit N1105 E5232 are very similar in appearance to the column of flotation samples derived from Test Unit N1071 E5236 in quantity and diversity. A total of only 0.32 g of carbonized plant remains was recovered, of which 81 percent is wood (Table 4.3). The only plant material recovered other than wood was hickory and its presence was extremely low (Figure 4.28). Similar to Test Unit N1105 E5232, due to the very low recovery of plant material recovered from Test Unit N1071 E5236, limited quantitative comparisons are possible.

Likewise, similar to the patterns displayed in Test Unit N1071 E5236, there are two distinctive peaks in plant recovery from Test Unit N1105 E5232 (Figure 4.27). These peaks occur first at a depth of 498.97-498.77 and again during the later dating occupation at a depth of 499.57-499.47. The high intensity of occupation suggested by the lower peak in plant use that occurs during Stratum IV coincides with the lower peak that occurs in Stratum V of Test Unit N1071 E5236. The peak that occurs during Stratum I of this test unit appears to coincide with the peak represented in Stratum I of Test Unit N1071 E5236. This may indicate that Stratum I of this test unit dates to the Pisgah occupation as well. If so, it appears that the highest intensity of occupation at this location likewise occurs during the Middle Archaic and the Pisgah phase.

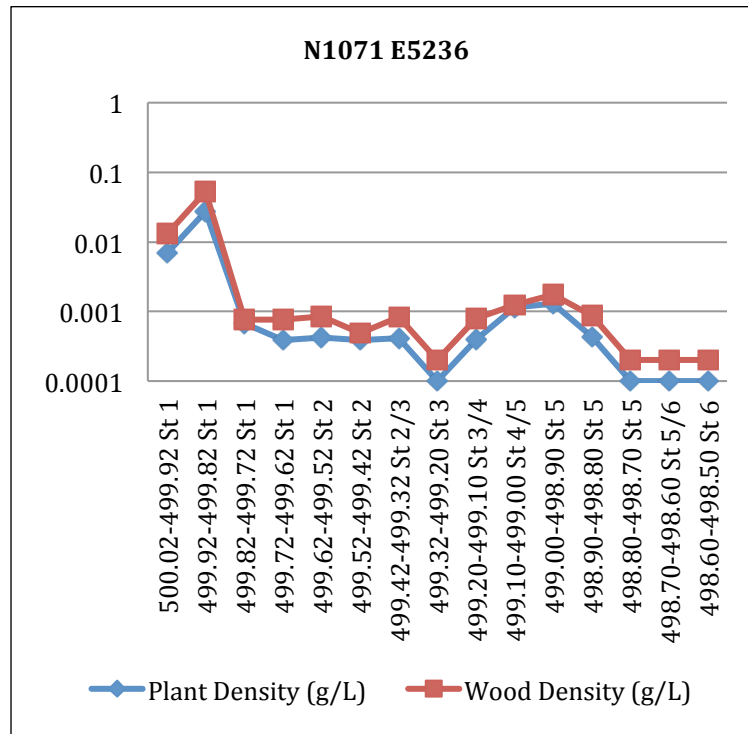


Figure 4.25. Site 40GN229: Changing density of plant and wood use over time from Test Unit N1071 E5236..

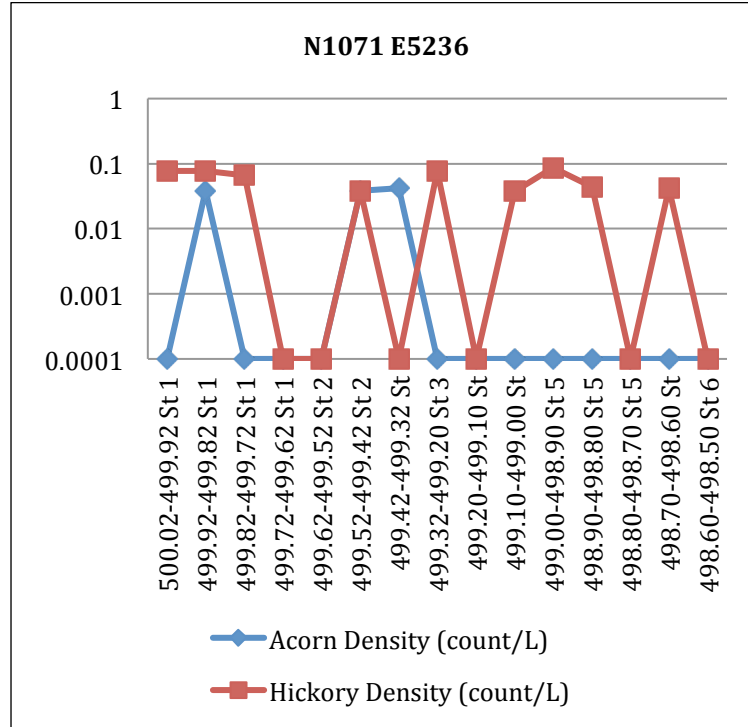


Figure 4.26. Site 40GN229: Changing relative density of acorn and hickory use over time from Test Unit N1071 E5236.

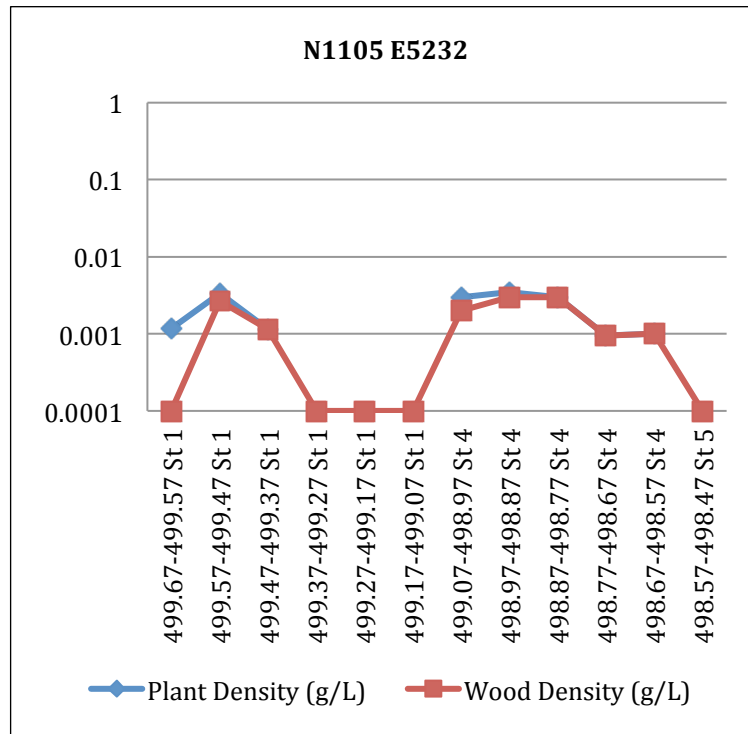


Figure 4.27. Site 40GN229: Changing density of plant and wood use over time from Test Unit N1105 E5236.

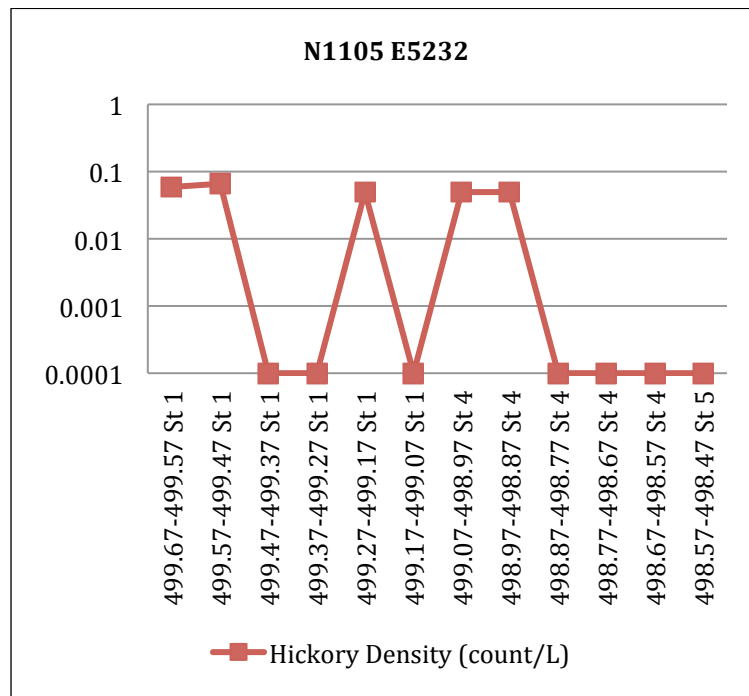


Figure 4.28. Site 40GN229: Changing relative density of hickory use over time from Test Unit N1105 E5232.

Summary

Taken comprehensively, the patterns of plant use at both 40GN228 and 40GN229 point to broad changes over time. The botanical record at these sites evidences a transitioning culture, moving from a subsistence economy centered on gathered wild resources, to one that included indigenous crop husbandry, and ultimately to a diverse, but agriculturally based farming economy. Tables 4.6 and 4.7 depict the changing importance of plants over time at these locations through ubiquity measures. Feature samples were divided according to temporal cultural affiliation, with those features representing periods earlier than the Late Archaic excluded. Even though sample numbers are low, these tables illustrate the changes in plant use from the early stages of sedentism and horticulture (Late Archaic/Early Woodland), to the intensification of both sedentism and agriculture (Middle Woodland), and finally to the apex of sedentism and agricultural intensification (Mississippian).

Table 4.6. Ubiquity Results from Feature Samples Over Time at 40GN228.

	Late Archaic/Early Woodland (n=5)	Middle Woodland (n=4)	Late Woodland/Mississippian (n=4)
Hickory	100%	100%	100%
Acorn	80%	100%	100%
Black Walnut	40%	100%	80%
Edible Seeds	60%	75%	50%
Fruit	20%	75%	25%
Miscellaneous Weedy Seeds	20%	25%	25%
Crops	20%	75%	50%

Table 4.7. Ubiquity Results from Feature Samples Over Time at 40GN229.

	Late Archaic/Early Woodland (n=11)	Middle Woodland (n=3)	Late Woodland/Mississippian (n=3)
Hickory	100%	100%	67%
Acorn	45%	100%	67%
Black Walnut	36%	67%	0%
Edible Seeds	0%	33%	0%
Fruit	18%	67%	0%
Miscellaneous Weedy Seeds	0%	33%	0%
Crops	0%	33%	33%

Table 4.6 shows several trends among the 40GN228 feature samples. Hickory and acorn appear are not only the most ubiquitous taxa, but their use appears relatively stable over time. Edibles seeds are also have a high ubiquity, suggesting they were used not only early in the occupation, but also frequently. A number of plant taxa and categories peak in the Middle Woodland and this period displays a high degree of diversity. Crop taxa (squash and corn) do not appear until the Middle Woodland, but likewise peak in use during this period.

Table 4.7 shows the changing ubiquity of plant taxa and categories over time at 40GN229. In contrast to 40GN228, there is much less diversity and frequency of the plants being utilized. Similar to 40GN228, the Middle Woodland does appear to be the most heterogeneous in subsistence choices. Edible seeds, miscellaneous weedy seeds, and crops all appear for the first time in this period. Although corn's presence is minimized by its identification in only one of the three Pisgah phase features, the large quantity recovered within this feature is firm evidence of its increasing significance.

Although there is a clear cultural and geographic similarity between the sites, distinct differences in plant use are apparent upon an examination of the feature and column floatation samples, as well as the geoarchaeological data. The extreme paucity of edible seeds from the feature and column samples at site 40GN229 suggests that horticultural investment was minimal on the eastern flank of the river. This is in spite of a landform that stabilized early and was favorable for human habitation. Oppositely, indigenous crops appear to have been a consistent and at times an intensively utilized component of the diet at 40GN228. The absence of plant material, specifically edible seeds, from Test Units N1000 E5008, N1071 E5236, and N1105 E5232 when compared to the heavily edible-seed-laden deposits of N1003 E5055 confirms the unique position that the lower terrace of 40GN228 held for prehistoric inhabitants. In fact, despite the unpredictable and dynamic nature of the lower terrace environment, plant remains taken in light of geoarchaeological data suggest that by the Early Woodland, inhabitants were fostering and enhancing this channel bar environment through intentional burning.

Chapter 5: Conclusions

The botanical remains from sites 40GN228 and 40GN229 detail changing plant-human relationships over a 12,000-year time span in the upper Ridge and Valley province of eastern Tennessee. They are an important component of broader scale changes occurring at the sites, and therefore help us understand transitions in subsistence, settlement patterning, and cultural practice. As the relationship between human and plant communities is intimate and reciprocal, the observed patterns of plant assemblages at these two sites give insight into the challenges and opportunities that prehistoric inhabitants were presented with at these locations, as well as the strategies employed to maneuver within them.

The expansive temporal and spatial scale of the two sites presented an opportunity to evaluate the plant assemblages from 40GN228 and 40GN229 on several levels. The substantial cultural deposits allowed a synchronic and diachronic look into plant use. In addition, the geographic proximity of the two sites, which initially suggested homogenous site use, offered a chance to evaluate the effects of micro-scale differences in environment and depositional processes on the cultural deposits. The interpretation of such a complex data set was permitted by the systematic, unbiased, and comprehensive field recovery of botanical floatation samples from all contexts across both sites. Choosing a variety of features and floatation column samples from diverse cultural and geographic contexts from the sites created a very representative sample. Corresponding geoarchaeological analysis provides the advantage of understanding the depositional history of the site, therefore furthering an understanding of how the changing landform affected both natural and

cultural depositional processes. This was particularly important as the cultural deposits at these site locations experienced both a wide range of environmental change and dynamic fluvial activity over time.

The results of the plant analysis from this thesis do not alter but in fact reinforce temporal patterns of plant use that have been documented on a regional scale. The cultural deposits at both sites point to widely cited large-scale transitions in site use and subsistence. The Late Paleoindian to Middle Archaic is characterized by short-term habitation and gathered plant resources. In the Late Archaic and Early Woodland, inhabitants experimented with indigenous crop husbandry and likely used the site locations for more than temporary camps. The Middle Woodland cultural remains suggest an intensification of indigenous crop production, perhaps experimentation with maize, and long-term habitation. By the Mississippian period both agricultural production and sedentism climaxed. These patterns point to the development of a habitation that was not isolated, but connected to a broader community and the cultural traditions that accompany these ties.

Despite the broad scale similarity of the plant assemblages from these sites to regional patterns of plant use, the plant remains do reveal several important behaviors that illustrate site use, land management strategies, and cultural integration. Of particular importance to the interpretation of these sites is the occurrence and location of edible seeds. While the botanical data clearly denote a separation of activity occurring between the two site locations, with 228 representing more intensive horticultural investment and more intensive occupation than 229, it becomes pertinent to address why each location displays such distinct contrasts.

It remains unclear why the recovery of edible seeds is limited almost exclusively to 40GN228. In fact, the geoarchaeological analysis points to 40GN229 as representing a more stable and perhaps more suitable location for habitation than 40GN228. While the recovery of plant remains from 40GN229 may have been affected by soil composition with a higher level of clay content, the increase in clay was not excessive. The consumption and disposal of edible seeds seemingly did not take place at 40GN229.

The reasons for this difference between the sites are complex. The repeated visitation and eventual habitation of these riverine locations point to the importance of the river itself to the occupations of the two sites. During non-flood times, the river was not an impediment to human movement or a barrier to food procurement, but rather prehistoric groups were most assuredly exploiting beneficial aspects of both sides of the river to their advantage at any given point of time. The lack of edible seeds on the east side of the river appears to directly reflect the differential use of the landscape by prehistoric occupants. While the stability of the landform at 40GN229 initially suggests increased suitability for habitation, the lack of a frequent flood regiment may have created an appreciably more dense forest canopy that would have inhibited easy land clearance. In effect, the challenges presented by tree removal may have decreased the suitability of the east side of the river for habitation or for the creation of garden plots. Likewise, the increased canopy may have inhibited the growth of weedy seeds, which prefer a more open, sunlit habitat. While not conclusive, perhaps the large, open floodplain across the river at 40GN228 was

more appropriate to the needs of prehistoric inhabitants than the dense, protected landform at 40GN229.

The early and exclusive recovery of indigenous seed crops from the 40GN228 feature samples, and more notably from column samples from the lower terrace of the site, suggest that although unstable, the wet conditions created by an active flood regiment throughout the history of this landform encouraged investment in weedy seed crops. Beginning in the Late Archaic, they appear to have been a consistent and important component of the prehistoric diet at this location. Additionally, as evidenced in the lower terrace, in times of low mast production their use is elevated suggesting that these seeds may have also been used to buffer periods of economic stress. Using a behavioral ecology framework, Cowan (1985a, 1985b) and others have argued that groups may have initially invested in edible seeds as a fallback for poor nut harvests. Alternatively, the low recovery of nuts in the lower levels may simply reflect the preference of hickory and oak trees for more dry and stable habitats.

The picture of early indigenous crop husbandry in the Eastern Woodlands is often presented as mutualistic, and therefore a plant-human relationship initiated fortuitously and developed with minimal effort (e.g. Crites 1987). It is clear that the Early Woodland occupants of the site were using this frequently flooded lower terrace to their advantage, growing native seed crops in these highly disturbed soils, where weedy plants thrive and have little competition. These plants in some locations may have required little investment in terms of bed preparation, weeding, etc., and because

of other resources such as nut stores, inhabitants may not have been overly concerned with the risk of losing their crop to seasonal floods.

However, the plant analysis from 40GN228 also suggests repeated burning during the Early Woodland occupation of the lower terrace channel bar, indicating that occupants at this site invested some time and energy into the enhancement of a location that, as the soil sediment analysis shows, was not particularly amenable to soil formation or organic growth. Since the marshy and unstable habitat of the lower terrace would have been unsuitable for use as a living surface, it appears that prehistoric occupants designated this area for other purposes. The opportunities that this microhabitat presented were not neglected throughout the occupation of this site, suggesting the contribution of edible seeds to the diet may have been substantial. I argue, therefore, that this direct evidence of investment in a suite of small edible seed crops is not an example of a relationship characterized by coincidence and effortlessness, but rather is representative of a very systematic and intentional human act aimed at shaping the local environment to community necessities.

The plant analysis presented in this thesis further illustrates the high degree of intra- and intersite variability in cultural assemblages. The geographic proximity of the sites, along with cultural contemporaneity, cannot be used to suggest uniformity in plant assemblages. Likewise, even though a site may be subject to frequent floods, significant cultural activities have the potential to be seen in the deposits. For example, while inhabitants may not have been building long-term structures in the wet portion of 40GN228 during the Early Woodland period, this thesis suggests that they were performing a range of other activities. Only by sampling comprehensively

and utilizing complementary datasets such as the plant remains and soil data, can we tease apart the small but distinct differences in plant use and continue to better understand prehistoric site use strategies and land management practices.

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Appendix

Table A.1. Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
Feature 4						
09-34	north half	1.10	0.34	Acorn	8	0.03
				Acorn cap cf.	1	0.00
				Bearsfoot	10	0.00
				Black walnut	3	0.09
				Cane	2	0.00
				Chenopod	1	0.00
				Corn cupule cf.	1	0.00
				Corn kernel cf.	1	0.00
				Hickory	39	0.43
				Insect Gall	1	0.01
				Mulberry cf.	1	0.00
				Persimmon seed cf.	3	0.02
				Pine cone	5	0.01
				Pitch	9	0.10
				Pokeberry	1	0.00
				Sumac cf.	1	0.00
				Unidentifiable	1	0.00
				Unidentifiable seed	2	0.00
				Walnut family	11	0.07
Feature 41						
09-104	north half	0.64	0.26	Acorn	1	0.00
				Bark	2	0.01
				Black walnut	6	0.13
				Cane	1	0.01
				Cucurbit rind	2	0.01
				Grass family cf.	1	0.00
				Hickory	5	0.04
				Little barley cf.	2	0.01
				Maygrass	3	0.00
				Pine cone	2	0.00
				Pitch	25	0.13

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-105		2.62	2.29	Unidentifiable seed	4	0.00
				Walnut family	4	0.04
				Acorn	2	0.00
				Bark	8	0.02
				Black walnut	3	0.11
				Cucurbit rind	1	0.00
				Hickory	11	0.07
				Pine cone	1	0.00
				Pitch	23	0.10
				Unidentifiable	2	0.00
Feature 42	north half	60.63	44.42	Walnut family	3	0.03
09-129				Acorn	58	0.21
				Acorn cap	3	0.01
				Acorn cf.	10	0.01
				Acorn meat cf.	2	0.02
				Bark	50	0.34
				Bearsfoot	2	0.00
				Bedstraw	4	0.00
				Bedstraw cf.	2	0.00
				Black walnut	116	2.51
				Blackberry/raspberry	2	0.00
				Cane	3	0.02
				Chenopod	169	0.03
				Chestnut shell	28	0.07
				Clover	1	0.00
				Corn cupule cf.	2	0.01
				Cucurbit rind	8	0.02
				Elderberry	1	0.00
				Gall	1	0.00
				Goosegrass	12	0.00
				Grape	4	0.01
				Grass family	4	0.00

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Hickory	411	5.60
				Hickory cf.	19	0.14
				Maygrass	25	0.00
				Pine cone	22	0.03
				Pine seed	1	0.00
				Pitch	601	5.00
				Pitch/Unidentifiable	43	0.40
				Spore clump	3	0.01
				Spurge family	7	0.00
				Sumac	2	0.01
				Unidentifiable	121	0.86
				Unidentifiable nut meat	8	0.13
				Unidentifiable nutshell	6	0.02
				Unidentifiable seed	118	0.09
				Violet	2	0.00
				Walnut family	93	0.66
Feature 43						
09-181	north half	1.26	0.45	Acorn	1	0.00
				Bark	2	0.01
				Black walnut	5	0.05
				Hickory	15	0.11
				Hickory cf.	2	0.00
				Persimmon seed cf.	1	0.00
				Pine cone	3	0.00
				Pitch	52	0.63
				Unidentifiable	5	0.01
				Unidentified	1	0.00
Feature 63						
09-255	north half	0.23	0.14	Hickory	5	0.07
				Pitch	1	0.01
				Walnut family	1	0.01
Feature 67						

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-216	north half	0.03	0.01	Bark	1	0.00
				Hickory	2	0.01
				Pine cone	11	0.00
				Pitch	1	0.01
Feature 68						
09-245	north half	9.58	2.35	Acorn	1332	4.93
				Acorn cap	18	0.06
				Acorn meat	1	0.00
				Aster family cf.	2	0.00
				Bark	5	0.02
				Bean/Persimmon cf.	1	0.01
				Bedstraw cf.	9	0.01
				Black walnut	11	0.10
				Cane	89	0.67
				Corn cupule	121	0.77
				Corn cupule cf.	5	0.02
				Corn glume	1	0.00
				Corn kernel	3	0.02
				Corn kernel cf.	4	0.01
				Cucurbit rind	2	0.01
				Hickory	32	0.21
				Insect gall	2	0.05
				Knotweed	7	0.00
				Knotweed cf.	4	0.00
				Morning glory/grass	3	0.01
				Persimmon seed cf.	1	0.00
				Pine cone	106	0.10
				Pine needle	1	0.00
				Pitch	29	0.12
				Sumpweed cf.	1	0.00
				Sunflower cf.	2	0.00
				Unidentifiable	19	0.09

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Table A11 (continued). Plant Remains Recovered from 75GN226 by 1 Provenience.						
Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-300	north half	0.57	0.12	Unidentifiable seed	10	0.00
				Walnut family	9	0.02
				Acorn	100	0.34
				Bark	2	0.00
				Black walnut	1	0.01
				Corn glume	1	0.00
				Hickory	3	0.04
				Pine cone	6	0.01
				Pitch	5	0.02
				Uncarbonized wood	1	0.00
				Unidentifiable seed	4	0.01
				Walnut family	5	0.02
Feature 78						
09-463	north half	0.61	0.24	Acorn	2	0.00
				Acorn cf.	1	0.00
				Black walnut	2	0.01
				Chenopod	104	0.02
				Grape	2	0.00
				Grass family cf.	1	0.00
				Hickory	16	0.19
				Maygrass cf.	1	0.00
				Pine cone	14	0.00
				Pitch	20	0.14
				Unidentifiable seed	2	0.00
				Walnut family	4	0.01
09-699	north half	0.01	0.00	Acorn cap	1	0.00
				Hickory	1	0.01
				Pine cone	4	0.00
				Pitch	1	0.00
				Feature 133		
09-536	north half	0.07	0.02	Acorn	12	0.00
				Black walnut	1	0.00

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Table A1 (continued). Plant Remains Recovered from 18GN228 by F. P. McPherson.						
Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
Feature 134 09-531	north half	0.14	0.08	Chenopod embryo	1	0.00
				Corn kernel cf.	1	0.00
				Cucurbit rind	1	0.00
				Grape	1	0.01
				Hickory	1	0.00
				Pine cone	3	0.01
				Pitch	9	0.02
				Unidentifiable	1	0.01
				Walnut family	2	0.00
Feature 159 09-610	north half	1.33	0.59	Acorn	1	0.00
				Bearsfoot	1	0.00
				Hickory	1	0.01
				Pine cone	11	0.01
				Pitch	12	0.03
				Spore clump	3	0.01
				Walnut family	1	0.00
Feature 161 09-598	north half	0.91	0.41	Acorn	3	0.00
				Acorn cap	1	0.01
				Bark cf.	1	0.00
				Black walnut	2	0.09
				Chenopod	2	0.00
				Hickory	34	0.44
				Maygrass	1	0.01
				Pine cone	26	0.01
				Pitch	25	0.16
				Unidentifiable seed	2	0.00
				Walnut family	4	0.02
Feature 161 09-598	north half	0.91	0.41	Acorn	2	0.01
				Hickory	32	0.35

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
N1000 E5008				Hickory cf.	2	0.01
				Pine cone	2	0.00
				Pitch	8	0.12
				Unidentifiable	1	0.01
				Unidentifiable Seed Coat	1	0.00
09-133	I	0.23	0.02	Acorn cf.	1	0.00
				Hickory	25	0.21
				Persimmon seed cf.	1	0.00
				Pitch	1	0.00
				Walnut family	1	0.00
09-202	II	0.72	0.11	Hickory	70	0.61
				Persimmon	1	0.00
				Pine cone	1	0.00
				Pitch	2	0.00
				Stem	1	0.00
				Unidentifiable seed coat	4	0.00
09-210	II	0.89	0	Hickory	59	0.89
				Walnut family	1	0.00
09-232	II	0.40	0.02	Hickory	29	0.38
09-257	III	0.09	0	Hickory	7	0.08
				Pine cone	2	0.00
				Pitch	2	0.01
09-266	III	0.00	0	Pitch	1	0.00
				Unidentifiable seed	1	0.00
				Walnut family	1	0.00
09-355	III	0.00	0	Hickory	1	0.00
				Pitch	2	0.00
				Unidentifiable	1	0.00
09-416	III	0.00	0	Hickory	1	0.00
				Hickory cf.	1	0.00
				Pine cone	1	0.00

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-425	III	0.02	0.02	Pitch	2	0.00
				Hickory cf.	1	0.00
				Pitch	2	0.00
09-447	III	0.00	0	Unidentifiable seed	1	0.00
				Hickory	3	0.00
				Walnut family	1	0.00
09-457	IV	0.01	0	Acorn	1	0.00
				Hickory	2	0.01
				Pitch	2	0.00
09-500	IV	0.03	0.01	Pitch	5	0.02
09-520	IV	0.00	0	Unidentifiable seed	2	0.00
09-551	IV	0.04	0.02	Pitch	4	0.02
09-593	V	0.00	0	Pine cone	1	0.00
				Pitch	1	0.00
09-602	V	0.00	0	Pitch	1	0.00
N1003 E5055						
09-117	I	0.49	0.36	Acorn	6	0.01
				Bark	2	0.01
				Bearsfoot	18	0.01
				Bedstraw	1	0.00
				Black walnut	1	0.01
				Goosegrass	1	0.00
				Grape	2	0.00
				Grass family cf.	1	0.01
				Hickory	6	0.06
				Pine cone	2	0.00
				Pitch	4	0.02
				Spurge family	1	0.00
				Unidentifiable	1	0.00
				Unidentifiable seed	6	0.00
				Walnut family	1	0.00
09-131	I	0.71	0.37	Acorn	6	0.01

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-141	I	1.37	0.43	Bearsfoot	3	0.00
				Bedstraw cf.	1	0.00
				Black walnut	2	0.03
				Chenopod	1	0.00
				Cucurbit rind cf.	1	0.00
				Hazelnut	1	0.01
				Hickory	19	0.20
				Maygrass	2	0.00
				Maygrass cf.	1	0.00
				Pine cone	12	0.00
				Pitch	5	0.03
				Unidentifiable seed	7	0.00
				Walnut family	10	0.06
				Acorn	3	0.01
				Bedstraw	1	0.01
				Black walnut	18	0.31
				Carpetweed	3	0.00
				Chenopod	9	0.00
				Corn cupule cf.	1	0.01
				Corn glume cf.	1	0.00
				Cucurbit rind cf.	1	0.00
				Hazelnut cf.	1	0.01
				Hickory	38	0.33
				Little barley cf.	1	0.00
				Maygrass	33	0.01
				Maygrass cf.	3	0.00
				Pine cone	1	0.00
				Pitch	1	0.00
				Unidentifiable	1	0.00
				Unidentifiable seed	22	0.01
				Walnut family	28	0.24
09-146	1	0.75	0.33	Bearsfoot	3	0.01

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-152	I	0.02	0.01	Bedstraw	1	0.00
				Black walnut	7	0.14
				Blackberry/raspberry	1	0.00
				Cane	3	0.01
				Carpetweed	2	0.00
				Grape	2	0.00
				Grass family	3	0.00
				Hickory	19	0.18
				Hickory cf.	4	0.00
				Little barley cf.	1	0.00
				Maygrass	42	0.01
				Maygrass cf.	6	0.00
				Pine cone	10	0.00
				Pitch	2	0.01
				Unidentifiable	2	0.01
				Unidentifiable seed	33	0.01
				Walnut family	7	0.04
				Bearsfoot	1	0.00
				Cane	5	0.01
				Hickory cf.	1	0.00
?09-157	I	0.13	0.05	Knotweed cf.	1	0.00
				Maygrass	3	0.00
				Nightshade	1	0.00
				Unidentifiable seed	3	0.00
				Bark	1	0.00
				Bearsfoot	5	0.01
				Black walnut	1	0.02
				Cane	9	0.02
				Grape	2	0.00
				Hickory	1	0.00
				Insect gall	1	0.03
				Pine cone	1	0.00

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-166	I	0.06	0.02	Pitch	1	0.00
				Unidentifiable seed	4	0.00
				Bark cf.	1	0.00
				Bearsfoot	13	0.03
				Cane	2	0.00
				Hickory	1	0.01
				Little Barley cf.	1	0.00
				Maygrass	1	0.00
				Persimmon seed cf.	1	0.00
				Pine cone	5	0.00
				Pitch	2	0.00
				Unidentifiable seed	11	0.00
				Wild bean	2	0.00
09-175	I	0.25	0.09	Acorn	2	0.00
				Bearsfoot	10	0.01
				Black walnut	5	0.10
				Cane	5	0.02
				Cucurbit rind	1	0.00
				Grape	2	0.00
				Grass family	2	0.00
				Hickory	1	0.01
				Maygrass	1	0.00
				Pine cone	2	0.00
				Pitch	5	0.02
				Unidentifiable seed	10	0.00
				Unidentifiable seed coat	1	0.00
				Acorn	1	0.00
				Bearsfoot	20	0.01
09-185	II	0.60	0.48	Bedstraw	1	0.00
				Black walnut	5	0.05
				Cane	6	0.02
				Chenopod	1	0.00

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-195	III	0.17	0.09	Cucurbit rind	3	0.00
				Grape cf.	1	0.00
				Hickory	1	0.01
				Little barley	4	0.00
				Maygrass	2	0.00
				Pine cone	4	0.00
				Pitch	3	0.02
				Pitch cf.	3	0.00
				Spurge family	1	0.00
				Unidentifiable	4	0.00
				Unidentifiable seed	32	0.01
				Acorn	1	0.00
				Bark	1	0.00
				Bearsfoot	7	0.01
				Bedstraw	1	0.00
				Black walnut	1	0.01
				Bud	2	0.01
				Cane	7	0.02
				Chenopod	1	0.00
				Cucurbit rind	1	0.00
				Grass family	1	0.00
				Hickory	1	0.00
				Little barley	2	0.00
				Maygrass	1	0.00
				Pine cone	5	0.00
				Pitch	5	0.01
				Spore	1	0.01
				Unidentifiable	1	0.01
				Unidentifiable seed	9	0.00
				Unidentifiable seed coat	4	0.00
09-214	III	0.12	0.06	Acorn	6	0.02
				Bearsfoot	1	0.01

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-224	III	0.18	0.05	Black walnut cf.	2	0.01
				Cane	7	0.00
				Corn kernel	1	0.00
				Cucurbit rind	2	0.00
				Hickory	2	0.01
				Little barley	3	0.00
				Little Barley cf.	3	0.00
				Maygrass cf.	1	0.00
				Pine cone cf.	1	0.00
				Pitch	3	0.00
				Purslane	1	0.00
				Unidentifiable	1	0.00
				Unidentifiable seed	12	0.01
				Acorn	1	0.00
				Bark	2	0.01
				Bearsfoot	12	0.01
				Bedstraw	1	0.00
				Black walnut	3	0.04
				Hickory	1	0.01
				Hickory cf.	1	0.00
				Little barley	6	0.00
				Maygrass	9	0.00
				Pine cone	2	0.00
				Pitch	3	0.00
				Unidentifiable seed	35	0.01
				Walnut family	6	0.05
09-237	IV	0.16	0.05	Acorn	1	0.00
				Bearsfoot	13	0.01
				Bedstraw	1	0.00
				Black walnut	1	0.02
				Cane	1	0.01
				Cane cf.	1	0.00

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-244	V	0.04	0.03	Chenopod	2	0.00
				Grass family	3	0.00
				Hickory	2	0.03
				Knotweed cf.	1	0.00
				Maygrass	3	0.00
				Maygrass cf.	6	0.00
				Mulberry cf.	1	0.00
				Pine cone cf.	1	0.00
				Purslane	2	0.00
				Spurge family	1	0.00
				Unidentifiable	4	0.03
				Unidentifiable seed	36	0.01
				Unidentified seed	1	0.00
				Cane	1	0.00
				Hickory	1	0.01
09-253	V	0.54	0.54	Maygrass	3	0.00
				Maygrass cf.	3	0.00
				Pine cone	1	0.00
				Pokeberry cf.	1	0.00
				Unidentifiable seed	9	0.00
				Grass family	2	0.00
				Maygrass	1	0.00
				Maygrass cf.	1	0.00
				Mulberry	4	0.00
				Pine cone	1	0.00
09-264	V	0.64	0.59	Pitch	6	0.00
				Unidentifiable	1	0.00
				Unidentifiable seed	7	0.00
				Bark	1	0.00
				Hickory	1	0.00
				Little barley	3	0.02
				Maygrass	2	0.00

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-369	VI	1.01	0.97	Mulberry	10	0.00
				Mulberry cf.	7	0.00
				Nightshade family cf.	1	0.00
				Pine cone	3	0.00
				Pitch	21	0.02
				Stem	4	0.00
				Unidentifiable seed	10	0.01
				Acorn cf.	1	0.00
				Bark	1	0.00
				Cane	1	0.01
				Chenopod	2	0.00
				Grass family	1	0.00
				Hickory	2	0.00
				Pine cone	6	0.00
				Pitch	5	0.02
				Pokeberry cf.	6	0.00
				Unidentifiable	1	0.00
				Unidentifiable seed	7	0.00
09-390	VI	0.12	0.09	Unidentifiable seed coat	1	0.01
				Acorn	2	0.00
				Hickory	1	0.01
				Little barley	1	0.00
				Mulberry	1	0.00
				Pine cone	4	0.00
				Pitch	9	0.02
				Unidentifiable	4	0.00
				Unidentifiable seed	11	0.00
09-405	VII	0.09	0.03	Acorn	1	0.01
				Bark	1	0.02
				Cane	5	0.02
				Chenopod embryo	1	0.00
				Grass family	1	0.00

Table A.1 (continued). Plant Remains Recovered from 40GN228 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-409	VII	0.06	0.04	Hickory	1	0.00
				Hickory cf.	1	0.01
				Pine cone	17	0.00
				Pitch	3	0.00
				Unidentifiable	3	0.00
				Unidentifiable seed	8	0.00
				Ash seed	1	0.02
				Hickory	1	0.00
				Pitch	1	0.00
				Stem	1	0.00
				Unidentifiable	5	0.00
				Unidentifiable seed fragment	1	0.00
09-413	VIII	0.21	0.19	Bark cf.	1	0.00
				Black walnut	2	0.01
				Grass family	1	0.00
				Maygrass	6	0.00
				Persimmon seed cf.	1	0.01
				Pine cone cf.	1	0.00
				Pitch	1	0.00
				Unidentifiable seed	9	0.00

Table A.2. Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
Feature 2						
09-13	north half	0.86	0.70	Acorn	2	0.00
				Acorn cap	1	0.00
				Chenopod cf.	1	0.00
				Hickory	4	0.04
				Pine cone	3	0.01
				Pitch	5	0.04
				Stem/peduncle	1	0.02
				Unidentifiable	6	0.03
				Unidentifiable seed	2	0.00
				Walnut family	2	0.02
Feature 5						
09-35	north half	0.85	0.38	Bark	4	0.03
				Black walnut	2	0.04
				Gall	1	0.02
				Hickory	2	0.03
				Pine cone	2	0.01
				Pitch	18	0.24
				Unidentifiable	8	0.06
				Walnut family	3	0.04
Feature 9						
09-76	north half	2.74	2.66	Bark	2	0.01
				Hickory	2	0.03
				Pitch	2	0.01
				Unidentifiable	5	0.03
Feature 10						
09-86	north half	0.23	0.18	Black walnut	1	0.01
				Hickory	2	0.01
				Hickory cf.	1	0.00

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
Feature 15 09-55	north half	2.03	1.80	Pitch	7	0.03
				Unidentifiable seed	3	0.00
				Acorn	3	0.00
				Bark	1	0.01
				Cane	4	0.03
				Hickory	3	0.03
				Pine cone	1	0.00
				Pitch	26	0.14
				Unidentifiable	3	0.01
				Walnut family	1	0.01
				Acorn	4	0.00
				Acorn cap	1	0.00
				Bark	2	0.02
				Black walnut	4	0.03
Feature 16 09-151	north half	0.64	0.40	Cane	1	0.00
				Chenopod	1	0.00
				Grape	7	0.02
				Hickory	5	0.05
				Pine cone	2	0.01
				Pitch	6	0.04
				Spurge family	1	0.00
				Unidentifiable	4	0.03
				Unidentifiable seed	2	0.00
				Walnut family	4	0.04
				Hickory	1	0.03
				Hickory cf.	1	0.00
Feature 22 09-17	north half	0.11	0.05			

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
Feature 26 09-58	north half	3.74	2.36	Maygrass cf.	1	0.00
				Pitch	1	0.00
				Unidentifiable seed	1	0.00
				Walnut family	3	0.03
				Acorn	55	0.13
				Acorn cap	2	0.00
				Bark	1	0.00
				Black walnut	17	0.84
				Grape family	1	0.00
				Hickory	19	0.25
				Little barley cf.	1	0.00
				Persimmon seed coat	1	0.00
				Pitch	15	0.13
				Unidentifiable	1	0.01
				Unidentifiable seed	5	0.00
				Walnut family	4	0.02
Feature 30 09-62	north half	0.09	0.07	Acorn	1	0.00
				Cucurbit rind	1	0.00
				Hickory	2	0.01
				Pitch	2	0.01
Feature 64 09-235	north half	32.82	13.27	Acorn	40	0.05
				Acorn cap	2	0.00
				Bark	10	0.06
				Blackberry/raspberry	1	0.00
				Cane	5	0.08
				Fruit seed? Thin hickory?	1	0.00

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)				
Feature 85 09-294	north half	1.56	0.82	Gall	3	0.01				
				Hickory	3	0.09				
				Pine cone	3	0.02				
				Pitch	1111	15.52				
				Unidentifiable	18	0.07				
				Unidentifiable seed	3	0.00				
				Wood, part carbonized	0	3.65				
				Acorn	12	0.01				
				Black walnut	2	0.03				
				Gall	1	0.00				
				Grape	1	0.00				
				Hickory	11	0.09				
				Pine cone	3	0.02				
				Pitch	44	0.56				
Feature 97 09-337	north half	2.21	1.02	Unidentifiable	3	0.01				
				Unidentifiable seed	2	0.01				
				Walnut family	2	0.01				
				Acorn	1	0.00				
				Bark	2	0.01				
				Corn kernel cf.	1	0.00				
				Grape	1	0.00				
				Hickory	5	0.05				
				Pine cone	92	1.10				
				Thin hickory	1	0.00				
				Unidentifiable	5	0.03				
				Unidentifiable seed	2	0.00				
				Feature 99	north half					

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-424		10.09	7.39	Acorn	1	0.00
				Acorn cf.	1	0.00
				Acorn meat cf.	1	0.00
				Bark	1	0.00
				Black walnut	9	0.23
				Hickory	142	1.57
				Pine cone cf.	1	0.00
				Pitch	81	0.75
				Thin hickory	1	0.00
				Unidentifiable	2	0.02
				Unidentifiable seed	1	0.00
				Walnut family	15	0.12
				Walnut family cf.	3	0.01
Feature 102	north half					
09-393		2.64	1.93	Acorn cf.	1	0.00
				Hickory	4	0.04
				Maygrass cf.	1	0.00
				Pitch	41	0.63
				Thin hickory	1	0.00
				Unidentifiable	2	0.01
				Unidentifiable seed	3	0.00
				Walnut family	2	0.03
Feature 108	entire					
09-379		0.05	0.05	Acorn	1	0.00
				Hickory	1	0.00
				Maygrass cf.	1	0.00
				Pitch	1	0.00
				Unidentifiable seed	1	0.00
Feature 109	north half					

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-386		0.64	0.46	Acorn	6	0.01
				Cane	1	0.00
				Corn cupule cf.	1	0.00
				Gall	1	0.00
				Grape cf.	3	0.00
				Hickory	3	0.01
				Hickory cf.	1	0.00
				Pine cone	3	0.01
				Pitch	7	0.03
				Stem	1	0.03
				Unidentifiable	3	0.02
				Walnut family	4	0.07
Feature 110	north half					
09-385		0.16	0.11	Acorn cf.	1	0.00
				Corn kernel cf.	2	0.03
				Hickory	1	0.00
				Pitch	5	0.02
				Unidentifiable	1	0.00
Feature 119	north half					
09-434		23.25	3.63	Acorn	16	0.03
				Acorn cap	2	0.00
				Bark	125	1.10
				Bearsfoot	1	0.00
				Beech family	14	0.06
				Black walnut	7	0.56
				Cane	35	0.21
				Chestnut	37	0.07
				Chestnut/acorn meat/persimmon cf.	25	0.04
				Corn cupule cf.	1	0.00

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Corn cupule/glume	348	1.47
				Corn embryo	1	0.00
				Corn kernel	16	0.06
				Grass family cf.	2	0.00
				Hickory	496	14.53
				Monocot stem	2	0.08
				Nutmeat	8	0.04
				Nutshell cf.	12	0.02
				Persimmon seed cf.	4	0.03
				Pine cone	12	0.10
				Pitch	27	0.24
				Ragweed	1	0.00
				Spore clump	1	0.00
				Unidentifiable	36	0.21
				Unidentifiable seed	17	0.02
				Unidentified seed/nutmeat	2	0.04
				Walnut family	43	0.44
				Wood, part carbonized	20	0.27
Feature 122	entire					
09-474		0.00	0.00	Wood	2	0.00
Feature 123	entire					
09-478		0.00	0.00	Pitch	1	0.00
				Wood	2	0.00
Feature 124						
09-490		0.22	0.02	Pitch	21	0.18
				Stem/wood	1	0.00
				Twig	2	0.02
N1071 E5236						
09-104	I	0.09	0.08	Hickory	1	0.01

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
09-133	I	0.71	0.67	Pitch	2	0.00
				Acorn	1	0.00
				Hickory	2	0.02
09-202	I	0.01	0.00	Pitch	3	0.02
				Hickory	1	0.01
				Pitch	2	0.00
09-219	I	0.01	0.01	Wood	3	0.00
				Hickory cf.	1	0.00
				Pitch	1	0.00
09-239	II	0.01	0.01	Stem	1	0.00
				Acorn cf.	1	0.00
				Unidentifiable	1	0.00
09-249	II	0.01	0.00	Acorn meat	1	0.01
				Hickory	1	0.00
				pine cone cf.	1	0.00
09-262	II/III	0.01	0.01	Pitch	1	0.00
				Acorn	1	0.00
				Pitch	1	0.00
09-278	III	0.00	0.00	Hickory	2	0.00
				Pitch	2	0.00
				Unidentifiable	1	0.00
09-296	III/IV	0.01	0.01	Wood	2	0.00
				Pitch	2	0.00
				Unidentifiable	1	0.00
09-335	IV/V	0.03	0.00	Hickory	1	0.01
				Pitch	3	0.02
				Wood	2	0.00
09-349	V	0.03	0.01	Hickory	2	0.01
				Pitch	2	0.01

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Unidentifiable - seed?	1	0.00
09-377	V	0.01	0.01	Hickory	1	0.00
09-437	V	0.00	0.00	Grass family cf.	1	0.00
				Pitch	2	0.00
				Wood	2	0.00
09-447	V/VI	0.00	0.00	Hickory	1	0.00
				Pitch	2	0.00
				Unidentified seed	1	0.00
				Wood	2	0.00
09-460	VI	0.00	0.00	Pitch	2	0.00
				Wood	2	0.00
N1105 E5232						
09-68	N1105E5232	0.02	0.00	Hickory	1	0.00
				Pitch	1	0.02
09-73	N1105E5232	0.05	0.04	Hickory	1	0.00
				Pitch	1	0.01
09-102	N1105E5232	0.00	0.00	Hickory	1	0.00
				Pitch	2	0.00
				Unidentifiable seed	1	0.00
09-120	N1105E5232	0.00	0.00	Pine cone	1	0.00
				Pitch	1	0.00
09-162	N1105E5232	0.06	0.04	Corn cupule cf.	1	0.02
				Hickory	1	0.00
				Pitch	4	0.00
09-170	N1105E5232	0.07	0.06	Hickory	1	0.01
				Pitch	1	0.00
09-208	N1105E5232	0.02	0.02	Pitch	1	0.00
09-230	N1105E5232	0.02	0.02	Pitch	1	0.00
				Stem	1	0.00

Table A.2 (continued). Plant Remains Recovered from 40GN229 by Provenience.

Bag	Level	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Unidentifiable seed	0	0.00

Vita

Jessie L. Johanson was born in Knoxville, Tennessee on September 27, 1982. In 2004 she received a B.A. in Anthropology from the University of Tennessee, Knoxville. She entered the graduate program at the University of Tennessee, Knoxville in the fall of 2010 where she received her M.A. in Anthropology. She is currently pursuing her doctorate in Anthropology.