The Rhythm of the Land:
Women's Use of Plants During the Pigeon Phase of Magic Waters (31JK291) in Cherokee, North Carolina

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ABSTRACT

This thesis focuses on the paleoethnobotanical remains of the Pigeon phase village component of the Magic Waters site, 31JK291. The Pigeon phase represented the early Middle Woodland period in the western North Carolina region and spans from approximately 200 BC to AD 200, situated in between the earlier Swannanoa phase (1000 BC to 200 BC) and the later Connestee phase (AD 200 to AD 800; Ward and Davis 1999). The site of Magic Waters is located adjacent to Harrah's Cherokee Casino and Hotel in Cherokee, Jackson County, North Carolina, in the Blue Ridge ecoregion of the Appalachian Summit. The site was excavated in October 2017 through July 2018 by TRC Environmental Corporation, work overseen by the Tribal Historic Preservation Office of the Eastern Band of Cherokee Indians. Sixteen overlapping structures were revealed that suggest at least two occupational periods; these are the first confirmed Pigeon phase structures in western North Carolina. This makes Magic Waters not only the first isolated Pigeon component, but also the first Pigeon village to be excavated. Using paleoethnobotanical and statistical analyses, with comparisons to Swannanoa and Connestee time periods, I find that the contents of the varying pit features reveal a continued reliance on the gathering of nuts, which is a continuation of foraging practices from the Swannanoa phase, with supplementation of wild plants and crops from horticultural practices. Use of crops increasingly intensified into the Connestee phase. Through a historical ecological lens that emphasizes the role of the ancestral Tsalagi women and their relationship to the agentive environment, I interpret the quantitative results using indigenous literature and scholarship as well as Henri Lefebvre's (2004) concept of "rhythmanalysis." By looking at seasonal rhythms of plants we can better understand the affected rhythms of the inhabitants and their daily lived experiences.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE
INTRODUCTION

In the beginning when the Earth was still flat, soft, and wet, the Great Buzzard was sent to prepare the land for the other animals. But as he traveled the Earth he became tired, dipping his wings and creating valleys and mountains within the Cherokee homelands (Mooney 1995:239). These same mountains exist today, and the land and plants continue to be utilized as a part of identity, spiritual connections, food, medicine, and economy (Baumflek et al. 2021). Stories and songs are passed down through generations, revealing the history of the landscape and the interconnectedness of people, plants, and animals. Archaeology can be used as a tool between people and places to further exemplify these emotional and spiritual connections and foster empathy and respect for the cultural concepts they exhibit (Atalay 2020:262; Baxter 2020; Graesch et al. 2020). The scars on the landscape can show us how people lived in the past; pit features and plant remains can be revealing of how people of the past interacted with their immediate environments and provide the ability to reconstruct the landscape within which they lived.

When indigenous literature and ontologies are also centered in archaeological research, the emotions and actions of past peoples who gave to and received from the land can also be reconstructed and imagined. Particular features and their contents can be indicative of activities that required various preparations: gathering, cultivating, harvesting, processing, eating, storing, offering, socializing, trading… all of which take time and are dependent upon seasonality, temporality, and geographical location, creating a rhythm that represents daily routines and the lived experience of the occupants. Paleoethnobotanical documentation not only reveals these processes but provides insight to the occupants' relationship with the land that molded worldviews and ideologies (Minnis 2003). The landscape should not be viewed as a backdrop for human activity, but rather as being influenced by humans and influencing humans as well (Wagner 2003:126).

This thesis focuses on the paleoethnobotanical remains of the Pigeon phase village component of the Magic Waters site, 31JK291, in Jackson County, North Carolina. The Pigeon phase represents the early Middle Woodland period in the western North Carolina region and spans from approximately 200 BC to AD 200, situated in between the earlier Swannanoa phase (1000 BC to 200 BC) and the later Connestee phase (AD 200 to AD 800; Ward and Davis 1999). This period of time is important because it fills in gaps during a transitional period when communities were shifting to farming and more sedentary lifestyles. The plant assemblage can reveal important information about the interactions and rhythms of the inhabitants and the local environment during a time of shifting subsistence practices.

I use paleoethnobotanical and statistical analyses of the plant assemblage at the Magic Waters site to characterize the contents and usage of the varying pit features. I compare the plant and feature data to other Middle Woodland period sites with Pigeon components, as well as Swannanoa and Connestee sites, to situate the site and Pigeon phase within western North Carolina Woodland history. Through a historical ecological lens that emphasizes the role of the ancestral Tsalagi women and their relationship to the agentive environment, I interpret the quantitative results using indigenous literature and scholarship as well as Henri Lefebvre's (2004) concept of "rhythmanalysis." Rhythmanalysis is the concept of using rhythm as a tool to analyze daily and season routines.

THE GEOGRAPHICAL AND ECOLOGICAL SETTING

The Eastern Woodlands' boundaries approximately correlate with the distribution range of deciduous forest; the Interior Southeast of the Eastern Woodlands consists of southern Kentucky, Tennessee, northern Alabama, and western North Carolina (Gremillion 2003; Scarry 2003). Differences in rainfall and temperature due to varying topography, altitude, wind direction, and thermal belts further contribute to resource and overall variability within the region (Wetmore 2002). Within the Interior Southeast lies the Appalachian Summit, where the Magic Waters site is situated in western North Carolina. The term "Appalachian Summit" was originally used by Kroeber (1939:95) to define the highest point in the Appalachian Mountains chain within the Southern Blue Ridge Province, with the Tennessee and North Carolina border following the ridgeline of the mountains.

The Blue Ridge ecoregion is composed of various subdivisions; the Magic Waters site resides in the Southern Metasedimentary Mountains subdivision (Griffith et al. 2002). This subdivision is characterized by Appalachian oak forests, consisting of multiple species of oak (*Quercus* spp.), pine (*Pinus* spp.), and hickory (*Carya* spp.) covering steep, dissected slopes; cove forests that consist of basswood (*Tilia* spp.), beech (*Fagus* spp.), buckeye (*Aesculus* spp.), hemlock (*Tsuga* spp.), northern red oak (*Q.*

rubra), tulip poplar (*Liriodendron tulipifera*), and yellow birch (*Betula alleghaniensis*); and with higher elevations covered by northern hardwood forests including beech, maples (*Acer* spp.), yellow buckeye (*Aesculus flava*), and yellow birch (Griffith et al. 2002). This biodiverse area amongst temperate deciduous forests allowed for the habitation of human populations and larger animals that would not have been supported in a less heterogenous environment (Wetmore 2002).

THEORETICAL APPROACH

In an attempt to imagine the happenings at Magic Waters during the Pigeon phase as the occupants may have, I emphasize the non-human agency of the plants in my writing. Agency will be given to both ancestors and plants, and I highlight the symbiotic relationship between the two. Through a more active and humanizing voice, we can give more power to the non-human relatives of past Indigenous peoples and focus more on a "kinship ecology" and the human-plant interrelatedness that affected their views and daily routines (Carroll 2015:143). Robin Kimmerer (2013) and Sonya Atalay (2020:265) remind us of how "wrong" it is to treat land, water, and plants simply as extractive *things* rather than animate beings and relatives that participate in the reciprocal process of gifting. In the Cherokee language, the term *tsu ye ga*, ᏧᏰᎦ, acknowledges the sentience of plants, meaning "they are awake" (Baumflek et al. 2021:6).

Hodder (2011:155,160) emphasizes human beings' dependence on "things", where things can include plants, animals, and land, and that for the plants to exist in the way humans want them to they must be tended to and/or altered. The co-dependency of these things and humans brings them close together in an entanglement that shapes society and the landscape around them.

Henri Lefebvre's (2004) idea of 'rhythmanalysis' wonderfully exemplifies the agency of plants over humans. Lefebvre used habitus, or repeated daily actions, to show the rhythm of daily and seasonal cycles in societies (Mlekuž 2010:193). Lefebvre (2004:15) defines it as "everywhere where there is an interaction between place, a time and an expenditure of energy, there is a rhythm." van der Veen (2014:804) describes this rhythmic flow of activities as a form of embodiment. As Mlekuž (2010:195) states, this embodiment can create emotions, perceptions, ideas, or actions. The tasks of gathering, cultivating, storing, etc., condition the farmer's view of the landscape and the world. van der Veen (2014:804) notes that through examining these rhythms we can better understand farmers' perspectives of the world around them. Environmental rhythms become woven into social life when the individual becomes aware of changes and conditions and pays attention to the rhythm of the plants and weather, responding and altering their own rhythm to adjust to the world around them. In this way, the plants also respond to human actions as they are tended to (Mlekuž 2010:194).

Relations, daily practices, and the construction of the built environment are all manifestations of habitus that leave marks upon the landscape and can be seen in the archaeological record (Bourdieu 1977; Cobb and Nassaney 2002:529). These marks and remains are representative of not only the agency of the occupants, but also the agency of the land that has allowed for co-domestication (Cobb and Nassaney 2002). Seasonality of the plants within each feature will be highlighted in a table to assist in interpretation of the women's and land's rhythm and routine.

Gender will also play a major role in my interpretations given that women typically gathered, cultivated, processed, stored, and prepared the plants for their communities. Of course, men also assisted in these tasks at times, just as women occasionally assisted in hunting tasks, but unlike modern society where gender division is based on biology, the division of labor and gender amongst the Cherokee is based upon sharing tasks in an equitable manner (Perdue 1998:24). Theda Perdue's (1998) discussion of gender amongst the Cherokees emphasizes the importance of Cherokee women in their matrilocal and matrilineal society, where women are the land-keepers, and all lineage is traced through the mother. This is also highlighted at the Museum of the Cherokee Indian in Cherokee, North Carolina. Women have consistently been documented as the farmers and caretakers of the land and plants in ethnohistoric accounts of Native Americans in the Eastern Woodlands (Fritz 2019). In fact, the return of ancestral seeds from seed banks to tribal communities has been referred to as "rematriation" rather than "repatriation" for this very reason (Prechtel 2012).

Most importantly, there is a great need to incorporate more Indigenous perspectives into archaeological work. I hope that through my own personal research with Indigenous literature and scholarship I can accomplish a research approach that emphasizes a broader worldview, one that centers how Indigenous people may have thought, based on how they continue to think today, to better interpret the botanical remains to imagine how their ancestors would have lived their daily lives entangled with the animate landscape. The thesis proposal was sent to the three federally recognized

Cherokee tribes – The Eastern Band of Cherokee Indians, The Cherokee Nation, and The United Keetoowah Band of Cherokee Indians – for comments and suggestions. Although my timeline did not allow for comments on the final draft of this thesis, I will share it with the three Tribes and incorporate any suggestions prior to additional publication of this research.

MAGIC WATERS SITE (31JK291)

The site of Magic Waters (31JK291), seen in Figure 1 below, is located adjacent to Harrah's Cherokee Casino and Hotel in Cherokee, Jackson County, North Carolina, among the Blue Ridge Mountains of the Appalachian Summit. Positioned north of Soco Creek, Magic Waters resides in one of the only high terrace areas along the creek that is suited for long-term settlement, with the remaining areas being relatively low and flat creekside. Southwest of the site, the Soco Creek empties into the Oconaluftee River (Benyshek et al. 2018).

The site was excavated from October 2017 through July 2018 by TRC Environmental Corporation, work overseen by the Tribal Historic Preservation Office of the Eastern Band of Cherokee Indians. The site was originally identified approximately twenty years earlier when the area was examined prior to casino construction and was then referred to as the "Casino Site" (Riggs et al. 1997). At that time, minimal evidence of Pigeon phase components was found. The Pigeon components excavated in 2017 and 2018 revealed 16 overlapping structures (Figure 2) that suggest at least two occupational periods; these structures are the first confirmed Pigeon phase structures in western North Carolina. This makes Magic Waters not only the first isolated Pigeon component, but

Figure 1. Location of Magic Waters, 31JK291 (yellow star) in Jackson County, Western North Carolina.

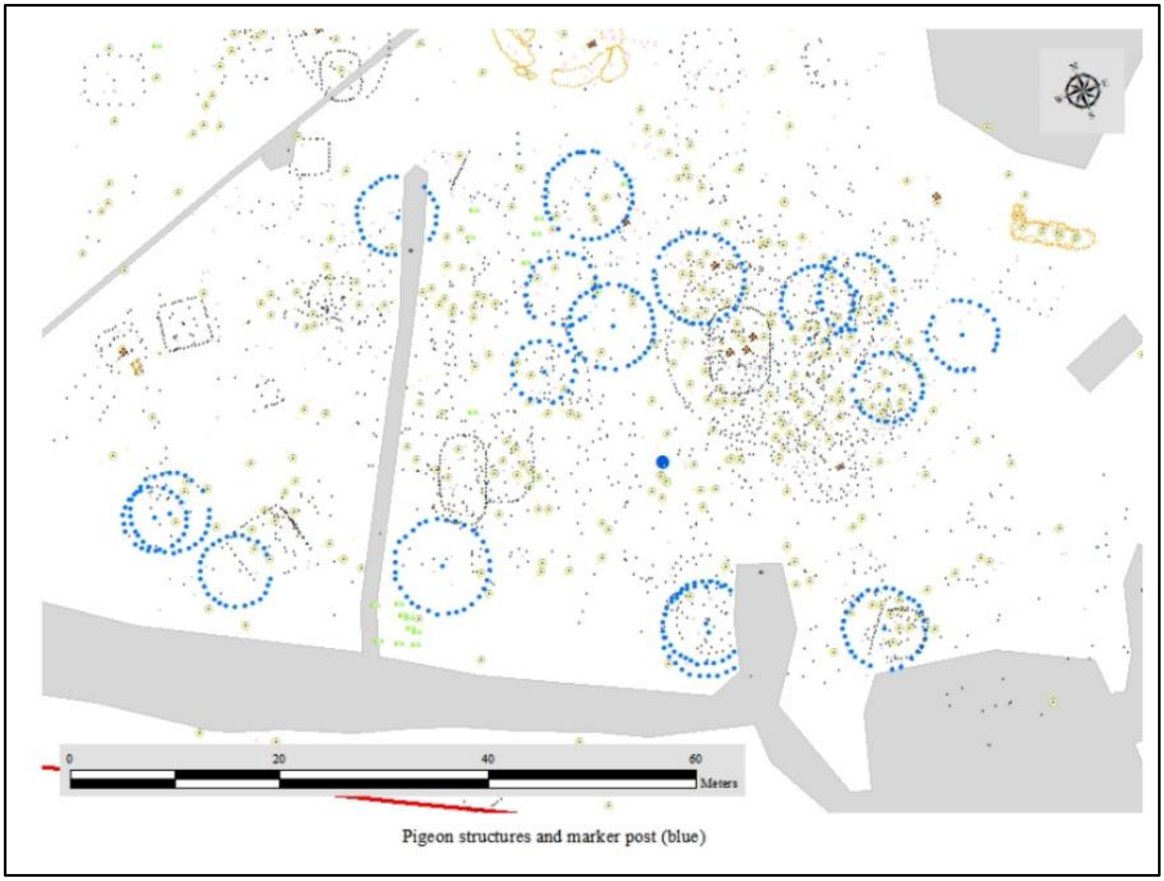

Figure 2. Magic Waters Pigeon structures and marker posts (shown in blue; adapted from Benyshek et al. 2018).

also the first Pigeon village to be excavated. Although the excavations revealed and documented approximately 365 pits from various time periods, my research focuses on sixteen samples taken from thirteen Pigeon pit features. The Pigeon village occupation dates from roughly 200 BC to AD 200 with one pit feature yielding a radiocarbon date of AD 80 (Benyshek et al. 2018).

Proposed research questions include:

- Research Question 1: What plant remains are recovered through paleoethnobotanical analysis? What was the function of the pits during Pigeon phase of Magic Waters (31JK291) and how might they vary intra-site? Are there any underlying associations between pit feature profile and botanical contents?

To address this, I identified plant remains from flotation samples collected from pit features at the site using standard paleoethnobotanical procedures (Pearsall 2000). I group soil samples by pit feature type, comparing botanical taxa and density ratios for similarities and differences. I use correspondence analyses to determine any underlying associations between pit feature types and plant taxa.

- Research Question 2: As the first found and excavated isolated Pigeon phase settlement, what do the plant remains and pit features on the landscape at Magic Waters reveal to us about this “missing” phase in time in the Eastern Woodlands compared to the preceding and succeeding western North Carolina time periods?

I gather botanical taxa and ubiquity values from Southern Appalachian sites in the Swannanoa (Early Woodland), Pigeon (early Middle Woodland), and Connestee (late Middle Woodland) phases to compare for temporal differences. I also perform correspondence analyses to elucidate any statistical underlying associations between time period and particular plant taxa.

- Research Question 3: What environmental and social relationships indicative of daily practices and routines can be inferred based upon botanical, statistical, and "rhythmanalysis" when also considering ethnohistoric/ethnographic and indigenous ontologies that center women as the primary plant and land-keepers?

I use the seasonality of the plant taxa recovered from paleoethnobotanical analysis in tandem with statistical results and the aid of indigenous scholarship and literature to explore the daily and seasonal lives of the women of Pigeon Magic Waters, based upon environmental rhythms.

CHAPTER TWO
BACKGROUND

WOODLAND PERIOD OVERVIEW

Temporal boundaries from region to region vary due to geographical and ecological differences that affect stratigraphy, subsistence practices, material availability and traits, and settlement patterns (Scarry 2003; Wetmore 2002). The term "Woodland" was coined in the 1930's (Griffin 1946) as a time period in the Southeast, dating after the Archaic and before the Mississippian. There has been ample research on the Woodland period in the Southeast within the past few decades, but only a few synthesized volumes have been produced. David Anderson and Robert Mainfort Jr. compiled such a volume in 2002 that brought together knowledge from Early, Middle, and Late Woodland research in the region in a cohesive format. A decade later, Alice Wright and Edward Henry (2013) edited a volume that centered the landscape archaeology of the Early and Middle Woodland periods in the Southeast. Most archaeological work studying the Woodland time period within the past century has aimed to untangle its variability (Anderson and Mainfort Jr. 2002; Anderson and Sassaman 2012:112-151; Broyles 1967; Goad 1979; Stoltman and Snow 1998).

The Woodland period, spanning from approximately 1200 BC to AD 1000 based upon calibrated radiocarbon dates, is characterized by intensification of agriculture, widespread use and trade of pottery, ceremonial interactions at territorial boundaries that often included mound building, as well as an overall increase in population and more sedentary practices. However, the beginnings of many aforementioned Woodland characteristics, once thought diagnostic markers of the transition from Archaic to Woodland, have been found to actually have begun within the Archaic period and only intensified during the Woodland. Even the characteristic of mobility noted in the Archaic period has been questioned in the southeastern temperate climate region, given the abundance of wild resources that would have reduced the need to travel elsewhere (Gremillion 2002; Kidder 2002; Scarry 1993:86; Widmer 2002).

Landscape archaeology and the process of identifying sites and settlement patterns, as presented by Wright and Henry (2013), has played a role in understanding the aforementioned changes and relationships between Woodland peoples and the environment, as well as deciphering economic and social organization. Previously, Rodning (2010) addressed the divide in landscape archaeology in the Southeast that created a false dichotomy: those who studied mobile foragers and the environment but failed to consider cultural significance impressed on the land, and those who studied sedentary communities and their ideational and social organization without considering influence of the environment around them. He argued for a more holistic approach that studied the interrelationship of both physical and social structures, following suit after much of historical ecological research.

Accordingly, Wright and Henry adopt Christopher Fennell's (2010:1) definition of landscape archaeology as "the complex issues of the ways that people have consciously and unconsciously shaped the land around them for a variety of purposes, including subsistence, economic, social, political, and religious undertakings" (Wright and Henry 2013:5). Landscape archaeology also needs to combine the focus of off-site spaces, often through survey, in addition to the excavated anthropological site itself, which cannot be ignored or disentangled from the surrounding land. Although this study will not be comparing off-site landscapes through survey, the concept of using the impression left on the land to better understand social organization and relationships with the environment will be reflected through paleoethnobotanical documentation.

Overall, the Woodland period can be seen as a time of great variability from place to place and people to people. From the end of the Late Archaic to the beginning of the Mississippian time period, the Southeast saw small, banded groups with collective funerary rituals develop into large populous groups with hereditary elites, a reliance on maize agriculture, and a shift from animal and hunting iconography to a more solar and warfare focus, emphasizing subsistence practices and competition with other groups (Anderson and Mainfort Jr. 2002; Brose 1985; Penny 1985:184-89). Thus, the Woodland period depicts these changes over time.

The most diagnostic markers of Woodland sites are pottery artifacts, as well as projectile points with bases that are square and contracting, or triangular. These points are also shown to decrease in size leading up to the use of the bow and arrow by the end of the Woodland period. Presence of nonlocal goods is also indicative, and typically found amongst burial features. The presence of many nonlocal goods at sites are indicative of local trade networks, but there was also an emphasis on trade of inter-regional goods. Nonlocal regional trade goods include copper, galena, mica, and different variations of pipes and earspools (Anderson and Mainfort Jr. 2002; Ward and Davis 1999).

Circular and asymmetrical earthen enclosures are often found at Middle Woodland sites and are associated with funerary features as well. The association of many nonlocal goods with more elaborate funerary features have been referred to as the

Midwestern Hopewell tradition (Kimball, Whyte, and Crites 2013:123). Centered in the Ohio Valley, this tradition is characterized by ritual exotic artifacts in addition to earthwork and mound construction and is associated with the time period spanning 100 BC to AD 400. These exotic items are indicative of long-distance communication and exchange. Such artifacts have been found during investigations of southern mound sites such as Biltmore (31BN174), Garden Creek (31HW2), Tunacunnhee (9DD26) and Crystal River (8CI1) (Chapman and Keel 1979; Jefferies 1976; Keel 1976; Kimball, Whyte, and Crites 2013). These artifacts have included mica and quartz crystal from the Southern Appalachians, marine shell and shark teeth from the Gulf Coast, obsidian and grizzly bear teeth from the Rocky Mountains, and galena from Missouri (Wright and Henry 2013:12). Although Hopewellian influence has been a major topic of research in the past few decades, there are some, such as James A. Brown (2013:237), who warn against allowing the idea of Hopewellian influence to “overtake the imagination” when interpreting Southeastern Woodland sites.

Another intraregional interaction network that mostly developed after Hopewell is referred to as “Swift Creek”, centered in southeastern Georgia and northeastern Florida and associated with the time period after AD 400. While Hopewellian iconography involved primarily avian images, Swift Creek pottery is characterized by complicated stamped pottery with animal and plant motifs and cosmological images (Stephenson et al. 2002). Examination of distributions of the varying pottery, in addition to the previously mentioned exotic goods, can reveal extensive trade networks across the region.

WOODLAND PERIOD SUBSISTENCE

The Eastern Woodlands, rich in biodiversity, has been extensively researched in the past decades and is one of the best places to explore the origins of agriculture and its impact on human societies. Eastern North America has been evidenced to be an independent center of domestication with a long history of crop husbandry (Gremillion 2003; Fritz 1990, 2003; Scarry 2003; Smith 1989). However, evidence of variability has been proven by the lack of uniformity in the adoption of agriculture during the Woodland period (Gremillion 2002). Gayle Fritz (1990) has suggested that the path from hunter-gatherer societies to agricultural societies is not linear and describes the transition between these two subsistence styles as a combination of both styles that varied based on people and place. She refers to these people as “Horticultural Woodland groups” who manipulated the land through both gathering and cultivating (Cobb and Nassaney 2002:527). When considering a society with two subsistence styles, scheduling and organizational conflicts must also be taken into consideration. Additionally, there are major transformations of ideologies, rituals, and ceremony that accompany changes in labor that must also be taken into account.

The plant foods of the Eastern Woodlands generally consist of a variety of nuts, fruits, grains and oily seeds, roots and tubers, as well as legumes and greens, although greens are not found in the archaeological record except for the seeds of the plant from which they came (Scarry 2003). Horticultural practices in the Woodland time period are evidenced not only by the presence of carbonized plant remains of chenopod, sunflower, and sumpweed, but are further supported by pollen and other evidence for land clearing, manufactured hoes, storage pits, and ceramic vessels that would have been used in food processing.

The interdependence of plants and people does not indicate that these groups were ecologically passive; in fact, Native Americans often manipulated the landscape to help promote crops through large-scale burning, altering individual trees, and more (Abrams and Nowacki 2008; Minnis 2003). These human-mediated environmental disturbances played an important role in creating ecological prototypes for gardens and fields (Gremillion 2003:21). The ecological relationships between people and plants helped form the basis for subsistence choices. Wild plants initially gathered helped give rise to indigenous crops that were eventually sown and cultivated in fields and gardens (Scarry 2003:51). It is important to note that even when people cultivated a plant, they still used and gathered the wild forms. Even wild plants can be manipulated and managed through tending and encouragement, and therefore are not completely “wild” and unaffected by people when gathered and used (Scarry 2003).

The significance and economic importance of food production varied widely across the Woodland Southeast. Kristen Gremillion (2002) noted that the pattern most visible during this time is the scarce evidence of native crops in the Southeast prior to maize agriculture as compared to the American Bottom and Midwest. In a compiled list of counts of crops in various Woodland Southeastern sites, Gremillion (2002:487) listed only one site (31CE41) in western North Carolina during the Middle Woodland period, with no evidence of oily seeds, and 110 counts of starchy seeds (including chenopod, little barley, maygrass, and/or knotweed). Compared to the thousands of cultivated seeds recovered from Middle Woodland contexts in the American Bottom and Midwest, this is paltry.

There are many factors that would influence differences in cultivation across the region, including historical, cultural, and environmental. The variations in subsistence practices seen across locales and time periods are at least partly dependent upon the many variations in wild plants in the Eastern Woodlands. These subsistence practices are thus dependent upon the temporal and regional differences in climate, topography, and ecology (Scarry 2003). Some plants may have also simply not been cost effective to cultivate compared to other sources readily available, a consideration Gremillion (2003, 2006) suggests deserves further thought in addition to other future studies such as differences in preservation based upon environmental influences in different regions.

DECIPHERING THE EARLY MIDDLE WOODLAND PIGEON PHASE

Within western North Carolina there are two mountain regions: the Appalachian Summit, homeland of the Tsalagi/Cherokee people, and the Western Foothills, homeland of the Catawba peoples (Ward and Davis 1999:24). The Western Foothills are composed of the upper region of the Yadkin, Catawba, and Broad River drainages, and are not included within the study area for this research. As previously stated, the Magic Waters site resides within the Appalachian Summit, home to the ancestral Tsalagi people. The isolated Pigeon village component, without a directly preceding Early Woodland Swannanoa phase or succeeding later Middle Woodland Connestee phase time period component at the site, makes deciphering the characteristics of the Pigeon components more easily ascertainable. Through comparison of previous paleoethnobotanical research at other Appalachian Summit sites during the corresponding Pigeon phase, as well as regional sites dating to the preceding Swannanoa phase and succeeding Connestee phase, interpretation of the Magic Waters Pigeon plant assemblage and pit features in question will become clear. The locations of sites selected for comparison are shown in Figure 3 below.

Early Woodland - Swannanoa Phase

The Swannanoa phase is the singular Early Woodland phase within the Appalachian Summit mountain region in western North Carolina. This phase spans from the end of the Late Archaic, approximately 1000 BC, until the beginning of the Middle Woodland, approximately 200 BC. Patricia Holden (1966) found a series of cordmarked and fabric-impressed ceramic pieces among her study of potsherds across Transylvania County, which she attributed to the Early Woodland time period and referred to as "Early Series" pottery sherds (Ward and Davis 1999:141). These later became known as Swannanoa pottery, named after the Swannanoa River that ran alongside the Warren Wilson site that Holden had once studied and that Bennie Keel (1976:230-231) used for his dissertation work. Keel further added check-stamped, simple-stamped, and plain surfaces to this pottery series and defined them as having a tempering agent of either crushed quartz or coarse sand, with a notable thickness in the vessel walls (Keel 1976:115-16). A few Late Archaic steatite sherds have also been found at the Warren Wilson site and claimed as Swannanoa pieces. Similarly, the check-stamped, simple-stamped, and plain surface pottery were associated with the latter part of the Swannanoa

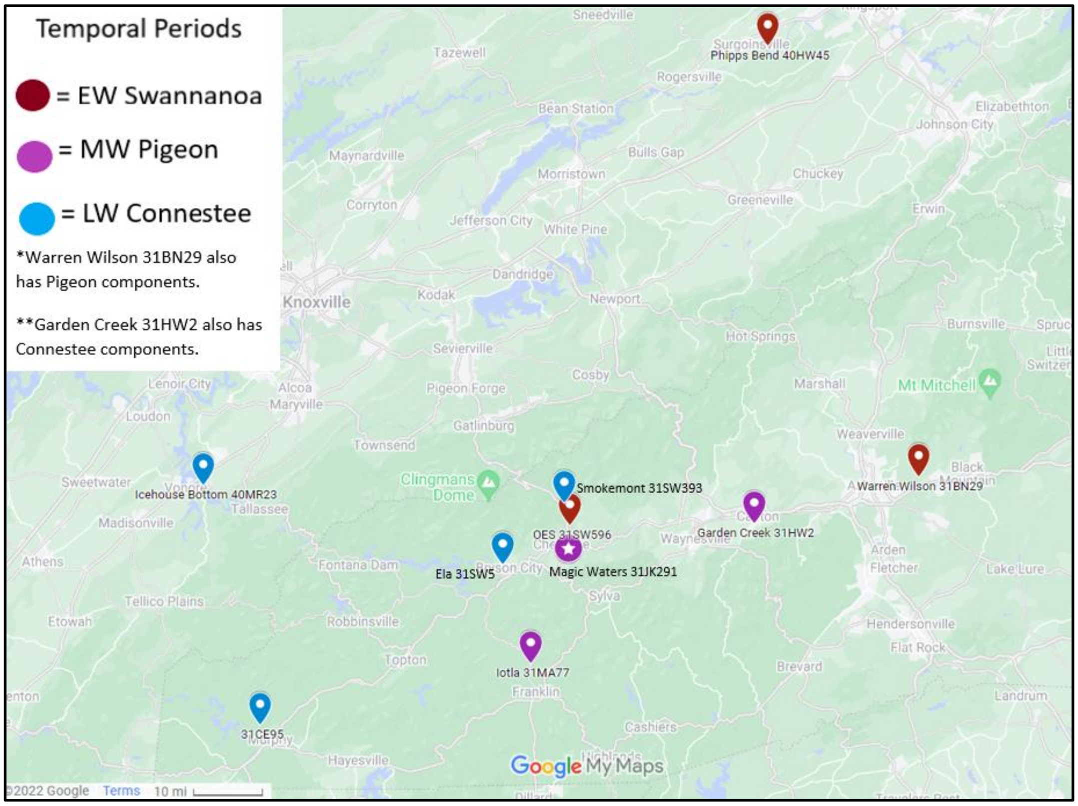

Figure 3. Locations of sites used for comparison by temporal period.

time period and therefore use of these types could also have continued into the succeeding Pigeon phase (Ward and Davis 1999:147). The projectile points associated with the Swannanoa Early Woodland phase are termed small "Swannanoa Stemmed" and "Plott Stemmed", named by Keel (1976:194-97), and "Gypsy points" named by Billy Oliver (1985:207), although these different points could simply be modifications of one another (Ward and Davis 1999:143). The "Transylvania Triangular" large triangular point type has also been found associated with these Swannanoa projectile points (Keel 1976:211; Ward and Davis 1999:143). Western North Carolina and eastern Tennessee sites with comparable Early Woodland Swannanoa components and plant analyses include the following.

Warren Wilson (31BN29, Buncombe County, North Carolina)

Although primary components date to the Mississippian Pisgah phase, Swannanoa components were found at all areas across the Warren Wilson site. The most common Swannanoa features were large hearths, some over five feet across, with clusters of fire-cracked rock (Simpkins 1984:57). Large boat-shaped pits and postholes were also common Swannanoa features, but house structures did not appear to be present (Ward and Davis 1999:141). A small carbonized plant sample of nine grams analyzed by Dan Simpkins included hickory, walnut, and acorn shells, but failed to find any presence of native cultigens (Simpkins 1984:211-12). The nut dominance is consistent with other Late Archaic and Early Woodland subsistence patterns in the Appalachian Summit (Herring 2022), although a larger sample could have produced a greater variety of seed-producing plants and evidence of horticultural practices (Ward and Davis 1999:145). In general, Early Woodland subsistence is sparse but it is evident that people had begun seed collecting and horticultural practices. The Swannanoa tools recovered also infer the importance of hunting within the people's diets, although animal bones were not preserved (Ward and Davis 1999:145).

OES, EBCI Cherokee Elementary School (31SW596, Swain County, North Carolina)

The OES, or Eastern Band of Cherokee Indians Elementary School site, is multi-component site located along the Qualla Boundary. The site was excavated starting in 2012 by the TRC Environmental Corporation, contracted by EBCI (Benyshek 2016). The Swannanoa components were concluded to be a residential camp based upon lack of Swannanoa structures or storage pits. Catherine Herring analyzed the Swannanoa pit feature botanical assemblage as a part of her 2022 Master's thesis. Seven different feature were analyzed, totaling 19.3 g of plant material that included a dominance of hickory, significant amount of acorn and pine cone, and minimal amounts of black walnut, hazelnut, blackberry/raspberry, grape, mulberry, chenopod, sumpweed, and wild bean. Various weedy taxa were also recovered (Herring 2022).

Phipps Bend (40HW45, Hawkins County, Tennessee)

The Phipps Bend site contained various Swannanoa phase storage pits that were large, straight-sided and bell-shaped (Lafferty 1981:350-351). The subsistence remains recovered were dominated by arboreal nut crops, as was also seen by Simpkins (1984:211-212) at the Warren Wilson site's Swannanoa components, and other Late

Archaic and Early Woodland sites along the lower Little Tennessee River (Chapman and Shea 1981; Lafferty 1981:524).

Early Middle Woodland - Pigeon Phase

The Pigeon phase of the Middle Woodland period in western North Carolina spans approximately 200 BC to AD 200. Cultural periods in eastern Tennessee comparable to the Pigeon phase include Woodland II, Patrick I and II, Candy Creek, and Long Branch. These range from 200 BC to AD 350, with Candy Creek and Long Branch being most comparable based upon ceramics (Wetmore 2002). Pure and isolated Pigeon components at sites have rarely been identified until now (Benyshek et al. 2018; Ward and Davis 1999:146). Many artifacts are assumed to have been used by Pigeon groups based upon their presence in the preceding and succeeding time periods.

Pigeon pottery is characterized by crushed quartz temper, check stamping surface treatment, iridescent interior surface sheen, large tetrapodal supports, and vessels in the form of bowls and subconical and necked jars. Keel (1976:49) regarded the iridescent sheen on the interior surface particularly as unique to Pigeon series pottery in the Southern Appalachians. Simple-stamped and plain surface treatments are also associated with the Pigeon phase, according to Ruth Wetmore (2002). Patricia Holden (Ward and Davis 1999:150) noticed that there were similarities and connections between the Pigeon ceramics and the Deptford tradition in Georgia, and that later Connestee phase ceramics were more closely related to Candy Creek ceramics in eastern Tennessee. However, a few Candy Creek sherds have been found at Pigeon sites (Wetmore 2002). Pigeon sidenotched, Garden Creek triangular, and Copena triangular projectiles points are also typical of this phase (Ward and Davis 1999:147).

Pigeon components have been located in a variety of ecological areas including floodplains, upland valleys, coves, and ridgetops. Additionally, the increase in plant cultivation and horticultural practices that define the Middle Woodland is indicated by a shift towards more use of fertile bottomlands in the Pigeon phase (Purrington 1983). As evidenced by the sites listed below containing Pigeon components, data are very limited and mostly limited to pottery with botanical remains lacking.

Casino/Magic Waters (31JK291, Jackson Count, North Carolina)

Magic Waters, previously referred to as the “Casino Site” when uncovered twenty years ago, revealed the presence of many Pigeon phase pit features containing cultigens and wild plants that indicate people used the site more permanently than a temporary camp. Excavations at the site twenty years ago were minimal, limited to ascertaining whether or not archaeological materials and intact deposits were present (Riggs et al. 1997). However, the Wright Check Stamped ceramics and nonlocal lithic raw materials found at the time was enough to be indicative of interactions with Ridge and Valley provinces (Wetmore 2002).

Garden Creek (31HW2, Haywood County, North Carolina)

The artifacts at the Garden Creek site that were identified as dating to Pigeon phase, mostly the easy to identify pottery, were found in the plowzone or in deposits mixed with later components (Ward and Davis 1999:146). The Garden Creek Mound also revealed a Pigeon pit lined in mica that was exposed during a later excavation (Wright 2013).

Iotla (31MA77, Macon County, North Carolina)

Two Pigeon phase features were recovered during the excavation of Iotla in Macon County in 2009 by TRC Environmental Corporation, directed by Tasha Benyshek. Nutshell was recovered in significant quantities that included hickory, hazelnut, black walnut, and dominated by the presence of acorn, although densities were very low and the component was not fully exposed (Benyshek 2020; VanDerwarker and Alvarado 2020).

Warren Wilson (31BN29, Buncombe County, North Carolina)

At the Warren Wilson site, one stratum of Feature 141 contained chenopod, knotweed, sedge, and nut fragments in an undisturbed Pigeon-Connestee context (Yarnell 1976:219). Most other artifacts identified as Pigeon phase were found in the plowzone or in deposits mixed with later components (Ward and Davis 1999:146).

Late Middle Woodland - Connestee Phase

The Connestee phase is the latter phase of the Middle Woodland within the Appalachian Summit region. This phase spans from the end of the Pigeon phase, approximately AD 200, until the beginning of the Late Woodland, approximately AD 800 (Ward and Davis 1999:150). The Connestee phase is well documented throughout western North Carolina, with most sites reflecting development in size and occupational intensity compared to the preceding earlier Woodland Appalachian Summit sites. Many more Connestee components have been minimally exposed from numerous cultural resource management projects (Ward and Davis 1999:154).

Patricia Holden in her studies of pottery sherds in Transylvania County found that Connestee pottery was closely related to pottery from eastern Tennessee such as Candy Creek (Holden 1966:84-85). Excavation of Garden Creek Mound No. 2 in Haywood County (Keel 1972, 1976) and Icehouse Bottom site (40MR23) in eastern Tennessee (Chapman 1973) have provided the greatest amount of information on the Connestee phase. The Connestee pottery demonstrates a progression from Pigeon pottery (Keel 1976:247-55). Plain, brushed, and simple stamped exterior surface treatments, as well as cordmarking and fabric marking, characterize this time period. Thin vessel walls with fine sand or crushed quartz temper are also typical. Flat-bottomed jars often have small tetrapodal supports, although hemispherical bowls and conical jars without supports are also common (Ward and Davis 1999:151).

Connestee sites have been typically located in floodplains of major streams, and many small-grain seed plants have been found to be cultivated at these sites. Smaller temporary camps have also been recovered, as hunting, gathering, and fishing remained of importance in Connestee foodways (Ward and Davis 1999:153).

With the exception of Garden Creek, mounds are not common in the Connestee phase in western North Carolina. However, mounds are associated with other Middle Woodland sites in the Southeast, particularly in northern Georgia, usually accompanied by exotic goods traced to Illinois and Ohio River Valley Hopewell cultures (Anderson and Sassaman 2012; Ward and Davis 1999:153). Ward and Davis (1999:156) hypothesized that northern Hopewell influence is more typical of the first half of the Connestee phase, whereas southern Swift Creek influence, originating in northern Georgia, is more typical of the latter half of the Connestee phase. They have supported this hypothesis with evidence of both types of ceramic vessels at the Harshaw Bottom site (31CE41) in Cherokee County, radiocarbon dated to approximately AD 600 (Robinson 1989; Robinson et al. 1994).

31CE95 (Cherokee County, North Carolina)

31CE95 is one of several Connestee sites in western North Carolina to contain significant amounts of Swift Creek complicated stamped pottery and plain sherds (Ward 1977a). The presence of these Swift Creek sherds indicates involvement between the Appalachian Summit Middle Woodland groups with southern Middle Woodland groups in southern and central Georgia. Swift Creek and Napier complicated stamp pottery has also been recovered at eastern Tennessee Middle Woodland sites along the lower Little Tennessee River (Chapman 1973, 1980; Cridlebaugh 1981; Schroedl 1978).

Ela (31SW5, Swain County, North Carolina)

Dating to the latter part of the seventh century AD, the Ela site is located on the Tuckasegee River in Swain County and was found to contain several Connestee components. These features and structures included possible domestic dwellings in the form of circular structures, possible public buildings or town houses in the form of two larger circular posthole configurations, and large rock-filled pit hearths nearby to the domestic structures, similar to Garden Creek. Internal hearths within the domestic structures were absent (Robinson et al. 1994; Wetmore 1990).

Garden Creek Mound No. 2 (31HW2, Haywood County, North Carolina)

Similar to the Warren Wilson site dating to the Late Archaic and Early Woodland, the Garden Creek site revealed many rock-filled pit hearths dating to the Connestee phase, with several pit hearths and fire-cracked rock clusters also recovered from the pre-mound surface (Ward and Davis 1999:151). Mound burials at Garden Creek were dated to the later Pisgah phase (Keel 1976:78-101), but the mound itself was constructed and used during Connestee as low platforms for public buildings (Ward and Davis 1999:150, 151).

Connections to other Middle Woodland peoples in eastern Tennessee and the Hopewell region of Ohio are exemplified by the presence of non-local exotic goods found in the upper portion of the pre-mound midden and fill from the two stages of mound construction (Keel 1976:117-49). These goods included both chert and chalcedony prismatic stone blades, human and animal form clay figures, beads, copper sheets, and a copper pin, as well as pot sherds indicative of the Ohio Hopewell region (Ward and Davis 1999:151). The connections between the Connestee people at Garden Creek and the Ohio Hopewell people are thought to have been prompted by the Hopewell peoples' desire for the mica sourced in the western North Carolina mountains. The Ohio Hopewell traders would have journeyed down to North Carolina to exchange for the highly valued material and given their own wares and goods in return (Chapman and

Keel 1979:161). Blades at Garden Creek examined by Larry Kimball (1992) were used to cut soft stone like the desired mica.

Icehouse Bottom (40MR23, Monroe County, Tennessee)

The Icehouse Bottom site in eastern Tennessee, about 75 miles west of Garden Creek, contains a rich midden that was created about the same time as Garden Creek in the fifth century AD, although Icehouse Bottom lacks a mound (Ward and Davis 1999:153). Connestee pottery was recovered alongside, and shared many similarities with, the Candy Creek phase pottery formed locally using limestone temper. Both Connestee and Candy Creek vessels exhibit simple stamping, smoothing, cordmarking, and check stamping surface treatments. This information in addition to the support of radiocarbon dates places Icehouse Bottom as a Connestee-Candy Creek component (Chapman and Keel 1979:159-160).

Smokemont (31SW393, Swain County, North Carolina)

A multi-component site, Smokemont was found to contain Connestee pit features beneath the excavated Pisgah house. Two of these pit features were analyzed by Gabrielle Purcell (2013) for paleoethnobotanical remains. In Feature 122, Purcell recovered bark, black walnut, cane, chenopod, chestnut meat, chestnut shell, cucurbit rind, hazelnut, hickory, node/stems, nutshell, pine cone, sumpweed, and walnut family nutshell. Chestnut meat dominated the assemblage with a count of 194, more than double that of any other plant taxa. In the second Connestee pit feature analyzed, Purcell recovered acorn, black walnut, cane, chestnut meat, chestnut shell, hazelnut, hickory, honey locust, node, pine cone, stem, and walnut family nutshell. Within this feature, chestnut shell dominated with 727 fragments, followed by chestnut meat with 369 fragments (Purcell 2013). Although there are preservation biases to consider that result in a higher recovery of nuts, it is important to highlight that within these Middle Woodland Connestee pits at Smokemont, native cultigens such as chenopod, cucurbit rind, and sumpweed were recovered, in addition to a large amount of nuts that emphasizes their continued importance.

CHAPTER THREE
MATERIALS AND METHODS

The documentation of plant remains provides glimpses into a group's foodways – food availability, procurement, and processing, as well as inferred social interactions and group organization that are revealing of cultural traditions (Johannessen 1993). Paleoethnobotanical documentation has provided evidence for Native Americans' use of plants both before and after cultivation, as well as manipulation and use of gathered wild foods (Scarry 2003). Plant analyses can reveal the environment within and beyond a site and the relationships that the people had with the plants and land.

Macrobotanical remains include all plant remains that are able to be identified under a low-powered microscope or with the naked eye (Ford 1979:301; Pearsall 2000:11). Paleoethnobotanical research of macrobotanical remains has largely focused on wood and seeds due to their durability to preserve, especially during carbonization. Additionally, wood and seeds are both relatively easy to identify. Seeds often possessing unique anatomy and often preserving as complete specimens due to their small size, and even small wood fragments allow for identification due to their structure. However, all parts of the plant have the potential to be preserved in the archaeological record, including roots, stems, fibers, sap, leaves, spines, flowers, and fruits, in addition to the most commonly preserved nuts, seeds, and wood (Gallagher 2014:19-20).

Analyses of plant remains can also inform our understandings of the contexts in which they are found. Pit features can demonstrate cooking, storage, and waste in primary and secondary contexts. With an abundance of pit features of varying shape (basin, small basin, silo, bell-shaped), I explore how the contents may differ and what this could possibly mean for why and how each pit feature was used. These contents may also be indicative of time period, especially when used in comparison to other dated sites.

ASSEMBLAGE FORMATION, PRESERVATION, AND POST-DEPOSITION

To best interpret paleoethnobotanical remains, we must consider the formation of assemblages, preservation methods, and post-depositional processes. Assemblages can be formed from direct and indirect anthropogenic, as well as non-anthropogenic, processes. These cultural and non-cultural processes also affect preservation (Gallagher 2014).

Direct anthropogenic processes include humans agentively choosing to manipulate, cultivate, gather, and harvest plants for uses such as food, fuel, fodder, construction material, basketry, medicine, ritual objects, dyes, fiber and cordage, tools, and toys, with some eventually becoming waste (Gallagher 2014:29). In this way, the plants also respond in the cycle of reciprocity, and routines are created that reflect social practices and identity (Atalay and Hastorf 2006; van der Veen 2007). In the Southeastern United States, where carbonization is the most common preservation method, whether or not a plant could have been intentionally exposed to heat is also necessary to consider.

Indirect anthropogenic processes include plants that could have been brought to the site accidentally. These often include weeds and wild plants gathered unintentionally along with desired plants. Weeds and wild plants are often utilized purposefully as well, and therefore context and quantity of these plant remains are important in interpretation. Gallagher (2014:31) notes that just because a wild plant has edible, medicinal, or other useful qualities, does not necessarily mean that it was brought to the site for that purpose or even intentionally.

Lastly, non-anthropogenic processes that form an assemblage can include seed dispersal by wind, water, insects, animals, and attachment to clothing and hair of humans; the processes that disperse seeds widely independent of human activity are often referred to as “seed rain” (Cappers 1993, 1995; Gallagher 2014:32; Minnis 1981). Fortunately, most plants brought to a site through these processes are uncarbonized and will not be considered in analysis; however, occasionally these plants will be carbonized, especially if brought to a site prior to or during an anthropogenic fire or wildfire (Miller 1989). Such plants can still have meaningful value in interpretation, allowing the researcher to glimpse into surrounding vegetation that could have been influenced by humans through land-clearing or encouragement of particular wild plants for gathering (Gallagher 2014:32; Smith 2011, 2014).

The preservation of macrobotanical remains is affected by biological, chemical, geochemical weathering, and anthropogenic processes (Beck 1989; Ford 1979). Although desiccation (dry preservation), waterlogging (wet preservation), and plant impressions produce the best preserved samples and representations, carbonization (preservation by fire) is the most commonly method of preservation, particularly in the Southeastern United States (Gallagher 2014). The attributes of a plant itself affect its preservation, but foremost, the environmental conditions of the area in which the plant resides and the processes by which it is preserved improve the chances of preservation most. These processes, such as carbonization, make the plants resistant to decomposition. Anthropogenic processes also play into whether a plant is preserved (Gallagher 2014).

Some human activities damage plants, such as grinding, cutting, pounding, eating, and trampling, and thus the likelihood of a plant surviving and preserving in the archaeological record lessens (Beck 1989; Holliday 2004).

Carbonization, the method by which the Magic Waters botanical remains were preserved, is the process of altering an organic substance into an inorganic substance by means of exposure to heat (Bryant 1989; Markle and Rosch 2008). These altered plants are composed mostly of carbon. Although any part of the plant can be carbonized, typically only more durable parts of the plant such as the seed achenes and caryopses, nutshells, and wood charcoals are preserved in an identifiable form using a low-powered microscope (Gallagher 2014:26-27). Depending upon the plant species and plant part, the moisture content and specimen condition, as well as the temperature, oxygen, and time at which a specimen was introduced to fire, whether a plant part becomes carbonized and does so in a recognizable form varies widely (Wright 2003:577). Boardman and Jones (1990) and Wright (2003) have suggested that lower oxygen levels, lower fire temperatures, and burning for shorter amounts of time result in more intact carbonized macrobotanicals. However, there is still a great deal of variability based upon plants species, plant part, and overall size.

Therefore, there are biases that must be considered in interpreting the context and value of the carbonized botanical remains recovered. These include the overrepresentation of nutshell and hardier plants, and the underrepresentation of more fragile (unable to withstand fire or vulnerable to mechanical damage) and entirely edible plants that do not leave behind a byproduct (nutshells, for example, are a byproduct). This often leads to nutshell dominating assemblages, with some seeds preserved, minimal fruits, and rarely any greens, roots, or tubers present in identifiable form. Ethnohistoric and modern comparisons of plants uses, in addition to knowledge of a region's typical plant taxa, are thus important in considering interpretive value of macrobotanical remains at a site.

Finally, post-depositional processes should also be considered. When an archaeological site has been abandoned, various processes can occur that alter the condition in which the archaeological record was left by the occupants. Environmental impacts such as sediment shifting, cracking, trampling, bioturbation, and erosion can all impact remains. Additionally, animals that burrow, along with insects such as earthworms and ants, can move seeds and sediment and mix contexts. Fortunately, these shifts can typically be seen in soil stratigraphy, but some small seeds can be moved without obvious shift (Borojevic 2011; Fowler et al. 2004; Miksicek 1987). Also important to consider is the ability of some animals, such as squirrels, to collect seeds and create caches that can mimic those created by humans (Borojevic 2011; Gasser and Adams 1981; Miller 1989; Minnis 1981).

MAGIC WATERS PLANT DOCUMENTATION

The Magic Waters' features were excavated by TRC Environmental Corporation as well as the archaeologists with the Eastern Band of Cherokee Indians' Tribal Historic Preservation Office during the field seasons between October 2017 and July 2018. The EBCI's Tribal Construction also assisted in restripping of areas with intact soil (Benyshek et al. 2018). The locations of the Pigeon features are shown in Figure 4 below, provided by TRC (Cox 2022, personal communications).The samples were processed using water floatation prior to being sent to the Department of Anthropology at the University of Tennessee-Knoxville for further documentation.

From 2020 to 2021, I analyzed 16 samples from 13 different Pigeon pit features with the assistance of Catherine Herring, Caroline Pope, and Eva Kiser under the supervision of Dr. Kandi Hollenbach. The samples and features analyzed are listed in Table 1, showing pit feature size and shape.

Standard paleoethnobotanical techniques were used for documentation (Pearsall 2000). Heavy and light fractions were analyzed separately, although results for the entire sample were combined in the final records. A few of the samples were subsampled due to the large quantity of material, and this was noted in the results. Fractions were weighed in grams and then placed through geological sieves to further separate for documentation; these included the largest sieve of 2 mm, 1.4 mm, 0.71 mm, and the smallest being the pan. The contents of the 2-mm sieve were sorted entirely with any remains not identified as plant, bone, lithic, or ceramic being categorized as contaminants. From the 1.4-mm sieve and below, the remains were only scanned for seeds, and the rest placed into residue. Acorn, however, was also collected from the 1.4-mm sieve to mitigate against preservation biases from its fragility; additionally, any other taxon found in 1.4 mm thathad not previously been identified in the 2-mm portion was also collected. All materials were then counted, weighed, and recorded. Any amount of mica or red clay found was recorded in the “other” category in the final tables. Identification of plant material was made with reference to Martin and Barkley’s (1961) *Seed Identification Manual* and the PLANTS Database (U.S. Department of Agriculture – Natural Resources

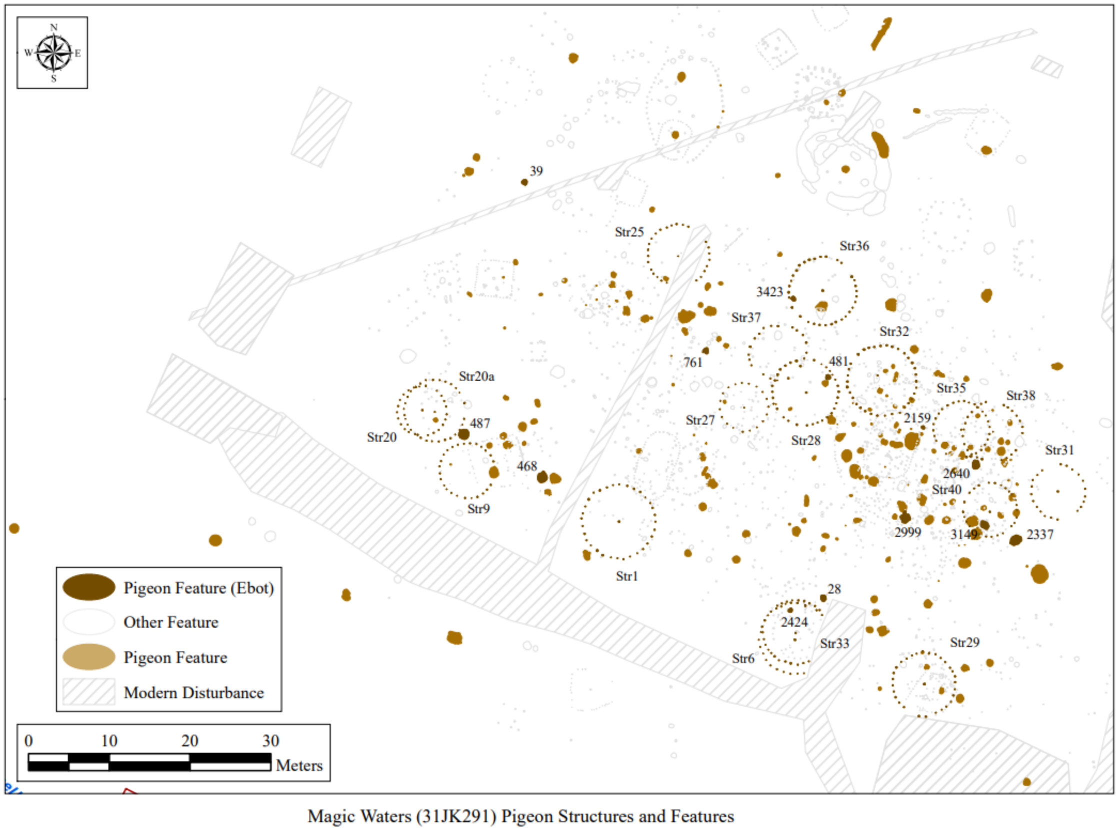

Figure 4. Location of Pigeon Features at 31JK291 (Cox 2022).

Table 1. Floatation Samples Analyzed from Pigeon Phase Pits at 31JK291 (weights are given in grams).

Bag#	Fea#	Feature Type/ Context	Zone	Sample Volume (L)	Sample Weight	Contaminant Weight	Residue Weight
441 (1of2)	28	Bell-shaped	B	11[a]	294.79	95.02	15.85
441 (2of2)	28	Bell-shaped	B	11[a]	172.64	107.77	45.14
444	39	Silo	A	13	109.42	74.26	31.04
445	39	Silo	B	10	536.69[c]	35.46	48.04
453	468	Bell-shaped	A	11	131.27	106.09	23.62
134	481	Basin, small		12	48.89	31.97	15.97
463 (1of2)	487	Silo		14[b]	285.84	234.80	48.59
130	761	Basin		12	83.05	52.20	28.07
1435	2159	Basin, small		7	116.10	141.60	15.88
837 (3of4)	2337	Basin		56[b]	233.85	163.53	60.62
841	2424	Bell-shaped, small; below sherds		6	58.61	28.21	24.44
840	2424	Bell-shaped, small; above sherds		7	58.07	27.28	26.01
1442	2640	Basin		10	90.98	61.37	22.92
1456	2999	Bell-shaped	A	10	120.55	83.99	26.14
1460	3149	Silo	A	10	191.94	131.36	56.60
1480	3423	Basin, small		12	296.30	234.33	59.32

[a]Volume was recorded for the whole sample; for comparative purposes, plant weights and wood weights are combined and divided by the total volume.
[b]Volume was recorded for the whole sample, but only a portion of the sample was analyzed; for comparative purposes, plant weights and wood weights are divided by either half or one-quarter of the total volume.
[c]A 1/4 subsample (156.88 g) of this sample was analyzed.

Conservation Service [USDA-NRCS] 2022), as well as modern comparative specimens housed at the Department of Anthropology and McClung Museum of Natural History and Culture at the University of Tennessee, Knoxville. Any uncarbonized plant material was considered to be modern contaminant and was not included in plant weight, counts, nor in overall interpretation. Uncarbonized material is rare and unlikely in archaeological sites in the Eastern Woodlands and therefore unreliable to consider in plant documentation; therefore, all plant materials mentioned in this report are carbonized materials only (Reitz and Scarry 1985:10). Similarly, any plant remain that is identified as "cf.," or "considered favorably to" is noted and explicitly stated if included in interpretation. All plant materials and feature information were recorded into an Access Database to assist in generating statistical analyses.

I then use the documentation of the plants recovered and identified from the 13 Pigeon features to answer the aforementioned research questions. Methods of statistical analysis and interpretation, in addition to the botanical analysis, are listed below for each question presented.

RESEARCH QUESTION 1

What plant remains are recovered through paleoethnobotanical analysis? What was the function of the pits during Pigeon phase of Magic Waters (31JK291) and how might they vary intra-site? Are there any underlying associations between pit feature types and botanical contents?

After successfully identifying and recording the plant remains found within the samples, I performed statistical analyses to better understand underlying associations with feature type (basin, silo, and bell-shaped). These statistical analyses consisted of correspondence analyses.

Correspondence analysis (CA) analyzes the similarities of correspondences in data made up of counts or frequencies using a multidimensional reduction technique. CA takes into account the distribution of counts across each variable (such as individual plant taxa) as well as the distribution of values across each row (each sample), effectively achieved through the chi-squared distance (Carlson 2017:279). Unlike other statistical methods that only allow for the analysis of one plant taxon at a time, multivariate statistics such as CA can determine relationships among multiple taxa, which then can be plotted by context (VanDerwarker et al. 2014:210).

To perform CA, the data table is sliced to the desired variables (for example, leaving out tentatively identified remains and collapsing rarer taxa into categories like "weedy plants"); the chi-square matrix is then weighted by sample size. Using the statistical program of R (R Core Team 2020), the data collected are entered into a table showing pit types against counts of plant taxa per type. The results of the correspondence are then graphed onto a biplot. Should all of the points plot at the origin of the two axes (0,0), then the null hypothesis of the chi-squared statistic would be realized, with no significant differences among the samples. Otherwise, points plotted away from the origin are those that deviate from their expected values, with the farthest points away being most differentiated. The greatest variation is plotted on the first axis and the second greatest variation is plotted on the second axis. The total inertia/variance of the contingency table is essentially represented by the chi-squared statistic divided by the total count of samples in the data set. Although when looking at the biplot, it is not the variance worth noting but the relationship and position of the points on the biplot (Carlson 2017:279-295).

Immediately, correspondences will be noticeable between plant taxa that are plotted closest to each other on the biplot, as well as contexts that are close to each other. These proximities show similarities and relations within and between the samples, with samples mapping nearest to the plant taxa that characterize the sample. Once correspondence analysis is conducted, meaningful associations (or lack thereof) can be drawn between the pit feature profiles and their carbonized plant contents.

These results are then compared to a comparative analysis of each individual feature to determine possible use. Analysis of wood weight to plant weight ratios will help determine the pit usage for processing, cooking, storage, or trash. Tables for each pit feature type will detail the density ratios within each sample, including plant density, wood density, and plant taxa density of definitively identified taxa. Plant density in each sample is calculated by total sample plant weight (g) / sample volume (L). Wood density within the plant weight is calculated by wood weight (g) / total plant weight (g). Individual plant taxa density is calculated by plant taxa count / total plant weight (g). Ratios with higher wood weights can be indicative of cooking pits, whereas lower wood weights in comparison to plant weights can be indicative of storage or trash pits. By comparing these densities to other samples analyzed with the same pit shape, conclusions may be formed in addition to those seen on the correspondence analysis biplots.

Finally, box plots will also be utilized to make overall density comparisons between feature types and sizes. Box plots display distributions of data by representing 50 percent of the data within the box, the median value of the distribution along the central line, the extending line (or whisker) on either end of the box representing 25 percent of the distribution each, and outliers within the data displayed as asterisks beyond the whiskers (VanDerwarker et al. 2014:211). Individual feature studies can use box plots to identify outliers. Placing distributions of plant density data, wood density data, and particular plant taxa such as cultigens against one another, as well as analyzing pit rock density and bark density, will assist in possible associations and uses of pit feature types. Significant similarities and differences will aid in the interpretation of Pigeon phase Magic Waters pit features on the landscape.

RESEARCH QUESTION 2

What environmental and social relationships indicative of daily practices and routines can be inferred based upon botanical, statistical, and "rhythmanalysis" when also considering ethnohistoric/ethnographic and indigenous ontologies that center women as the primary plant and land-keepers?

Once intra-site botanical and statistical analyses were completed, I interpreted these findings through the lens of historical ecology, with attention to entanglement and rhythmanalysis of the landscape and how these processes affected the routines and actions of the Pigeon phase inhabitants. These daily and seasonal routines and actions can be inferred using rhythms as a tool (Lefebvre 2004).

Determining rhythms is achieved by paying close attention to the seasonality of the plants recovered from the pit features and beginning to sort them accordingly into a table divided by calendar months. Using ethnohistoric, ethnographic, and indigenous literature, potential uses of the plant along with when they are grown— with or without human assistance, can help provide a timeline and indications of activities that would have occurred for the plant to end up in the pit it was analyzed from. Linking these activities together and acknowledging who would have performed them gives greater agency to the inhabitants and the environment and helps tease out social relationships possibly not seen otherwise.

RESEARCH QUESTION 3

As the first found and excavated isolated Pigeon phase settlement, what do the plant remains and pit features on the landscape reveal to us about this "missing" phase in time in the Eastern Woodlands compared to the preceding and succeeding western North Carolina time periods?

Lastly, to best interpret the Pigeon phase settlement at Magic Waters within western North Carolina Woodland history, I compiled all of the methods and interpretations used in answering Research Questions 1 and 2 to paint a clearer picture of the time period at Magic Waters in comparison to other sites within the region. After determining pit feature usages, possible associations between profiles and botanical contents, as well as an imagined rhythm of the local environment that impacted the routine of the women at Magic Waters, I compared the Magic Water data to other regional sites with Pigeon features, as well as regional Swannanoa and Connestee sites with significant botanical data.

Comparisons to other regional sites are made using ubiquity values and correspondence analyses to look for similarities and differences that help situate the Pigeon time period in western North Carolina and Southern Appalachia. Ubiquity values are percentages calculated by dividing the number of samples in which a plant taxon is present, by the total number of samples. A comparison table, similar to that formed for pit feature types, will compare sites temporally.

Out of the sites researched in the Southern Appalachian region for Swannanoa, Pigeon, and Connestee components, two sites were selected from each time period (including Magic Waters) that had significant comparable botanical data. Swannanoa sites used include Phipps Bend (40HW45) and OES Cherokee Elementary School (31SW596) with botanical data pulled from the Phipps Bend Archaeological Project report (Lafferty 1981) analyzed by Laura L. Knott, and from Catherine Herring's (2022) Master's thesis. The Pigeon phase, as previously mentioned, has relatively no significant comparable data. However, Iotla (31MA77) included two Pigeon features with botanical data, and they are listed for comparison to Magic Waters. The Iotla botanical data was pulled from the Iotla site report (Benyshek 2020; VanDerwarker and Alvarado 2020). Lastly, Smokemont (31SW393) and Icehouse Bottom (40MR23) were selected for Connestee comparison. The botanical data were collected from Gabrielle Purcell's Master's thesis (Purcell 2013) and from the Icehouse Bottom site report (Cridlebaugh 1977). Each site's interpretation and comparison to other sites considers preservation, excavation, and identification differences, as well as the ecoregion and local environment which includes the topography, proximity to river and water sources, and plant taxa typical of the area.

Using correspondence analyses to plot the aforementioned sites against plant taxa can reveal associations, or lack thereof, between the sites of Swannanoa, Pigeon, and the succeeding Connestee phase. These possible associations can help create a clearer picture for Pigeon phase subsistence within the region, and any changes that gradually or drastically occurred from the Early Woodland to the late Middle Woodland.

CHAPTER FOUR
BOTANICAL AND STATISTICAL ANALYSIS

THE PLANT ASSEMBLAGE

The 16 analyzed samples overall yielded 163.07 g of carbonized plant remains (Table 2). Of this amount, 76.06 g recovered is wood. The remaining 87.01 g of carbonized botanical remains recovered are documented in sum in Table 3, as well as in greater detail by bag and feature number in the Appendix Table A1. Table 3 provides both the common and scientific name of the plants, as well as seasonality and the overall counts and weights in grams from all pits analyzed. The discussion following highlights the botanical taxa recovered and the ethnohistoric and ethnographic uses that have been documented for each.

Nuts

The nut taxa recovered from the site include acorn, black walnut, hazelnut, hickory, and walnut family, totaling 2,441 counts. All of the nuts recovered have fall seasonality; although they would have been gathered during this time, they would likely have been stored for use throughout the year. Hickory dominates the nuts recovered with a count of 1,034 and a weight of 10.73 g, excluding those identified as "Hickory cf." It is not unusual for hickory to comprise the majority of a plant assemblage given its thick and hard shell for withstanding fire and thereby its high preservation potential, especially in comparison to more fragile nuts such as acorns with much thinner shells.

Table 2. Pigeon Phase Floatation Samples Analyzed from 31JK291 (weights are given in grams).

Pit Feature Type	Bag#	Fea#	Zone	Sample Volume (L)	Plant Weight	Wood Weight	Plant Density	Wood Density
Basin, small:								
	134	481		12	0.82	0.48	0.068	0.585
	1435	2159		7	3.38	2.34	0.483	0.692
	1480	3423		12	1.71	1.07	0.143	0.623
Basin, large:								
	130	761		12	1.62	0.59	0.135	0.364
	837 (3of4)	2337		56[b]	8.73	2.69	0.514	0.308
	1442	2640		10	6.28	1.76	0.628	0.280
Bell, small:								
	840	2424		7	4.39	3.96	0.627	0.902
	841	2424		6	5.69	5.29	0.948	0.930
Bell, large:								
	441 (1of2)	28	B	11[a]	23.56	20.17	3.613	0.843
	441 (2of2)	28	B	11[a]	16.18	13.35		
	453	468	A	11	0.92	0.54	0.084	0.587
	1456	2999	A	10	9.47	2.08	0.947	0.220
Silo, large:								
	444	39	A	13	3.18	2.81	0.245	0.884
	445	39	B	10	71.53	16.60	7.153	0.232
	463 (1of2)	487		14[c]	1.67	0.58	0.239	0.347
	1460	3149	A	10	3.95	1.75	0.395	0.443

[a] Volume was recorded for the whole sample; for comparative purposes, plant weights and wood weights are combined and divided by the total volume.
[b] Volume was recorded for the whole sample, but only a portion of the sample was analyzed; for comparative purposes, plant weights and wood weights are divided by one-quarter of the total volume.
[c] Volume was recorded for the whole sample, but only a portion of the sample was analyzed; for comparative purposes, plant weights and wood weights are divided by half of the total volume.

Table 2. Continued**.**

Pit Feature Type	Bag#	Fea#	Zone	Sample Volume (L)	Bone Count	Bone Weight	Lithic Count	Lithic Weight	Ceramic Count	Ceramic Weight	Mica Count	Mica Weight
Basin, small:												
	134	481		12							3	0.001
	1435	2159		7	7	0.09						
	1480	3423		12	4	0.14	1	0.01				0.26
Basin, large:												
	130	761		12	25	0.37					5	0.00
	837 (3of4)	2337		56[b]	38	0.56	3	0.09			2	0.05
	1442	2640		10	46	0.35			1	0.00		
Bell, small:												
	840	2424		7	8	0.03					8	0.14
	841	2424		6	27	0.18			1	0.02	19	0.009
Bell, large:												
	441 (1of2)	28	B	11[a]	1	0.00			1	0.00		1.01
	441 (2of2)	28	B	11[a]	3	0.00						0.28
	453	468	A	11	1	0.00	9	0.21	3	0.19	5	0.019
	1456	2999	A	10	36	0.52	6	0.08			10	0.146
Silo, large:												
	444	39	A	13			5	0.10	4	0.77	3	0.00
	445	39	B	10	1	0.00	2	5.81				0.041
	463 (1of2)	487		14[c]	3	0.01	2	0.07	6	0.28	3	0.073
	1460	3149	A	10	3	0.03	1	0.00				

[a] Volume was recorded for the whole sample; for comparative purposes, plant weights and wood weights are combined and divided by the total volume.
[b] Volume was recorded for the whole sample, but only a portion of the sample was analyzed; for comparative purposes, plant weights and wood weights are divided by one-quarter of the total volume.
[c] Volume was recorded for the whole sample, but only a portion of the sample was analyzed; for comparative purposes, plant weights and wood weights are divided by half of the total volum

Table 3. Plant Taxa Recovered from 31JK291 Pigeon Phase Pits (weight given in grams).

Common Name	Scientific Name	Seasonality	Count	Weight
Nuts:				
Acorn	*Quercus* sp.	Fall	748	1.62
Acorn cap	*Quercus* sp.	Fall	3	0.01
Acorn cf.	*Quercus* sp.cf.	Fall	40	0.05
Acorn meat	*Quercus* sp.	Fall	8	0.30
Acorn meat cf.	*Quercus* sp.cf.	Fall	20	0.10
Acorn/chestnut cf.	*Quercus*/*Castanea*	Fall	1	0.00
Black walnut	*Juglans nigra*	Fall	223	5.66
Hazelnut	*Corylus* sp.	Fall	107	0.72
Hazelnut cf.	*Corylus* sp.cf.	Fall	1	0.00
Hickory	*Carya* sp.	Fall	1034	10.73
Hickory cf.	*Carya* sp.cf.	Fall	4	0.01
Hickory hull cf.	*Carya* sp.cf.	Fall	2	0.02
Nutshell			4	0.02
Nutshell/fruit pit			4	0.01
Walnut family	Juglandaceae	Fall	314	2.43
Fruits:				
Blackberry/raspberry	*Rubus* sp.	Summer	2	0.00
Fruit cf.			2	0.00
Fruit/tuber			6	0.06
Grape	*Vitis* sp.	Summer	9	0.01
Honey locust	*Gleditsia triacanthos*	Late Summer/Fall	5	0.01
Honey locust cf.	*Gleditsia triacanthos* cf.	Late Summer/Fall	4	0.01
Pawpaw cf.	*Asimina triloba* cf.	Late Summer/Fall	6	0.04
Persimmon	*Diospyros virginiana*	Fall	4	0.01
Persimmon cf.	*Diospyros virginiana* cf.	Fall	11	0.01
Plum/cherry	*Prunus* sp.	Summer	9	0.11
Plum/cherry cf.	*Prunus* sp.cf.	Summer	7	0.03
Sumac	*Rhus* sp.	Fall	2	0.00
Edible Seeds:				
Cheno/am	*Chenopodium/Amaranthus*	Late Summer/Fall	3	0.00
Chenopod	*Chenopodium* sp.	Late Summer/Fall	118	0.02
Chenopod cf.	*Chenopodium* sp.cf.	Late Summer/Fall	7	0.00
Corn cupule cf.	*Zea mays* cf.	Late Summer/Fall	1	0.00
Corn kernel cf.	*Zea mays* cf.	Late Summer/Fall	2	0.01
Cucurbit rind	Cucurbitaceae	Late Summer/Fall	10	0.01
Cucurbit rind cf.	Cucurbitaceae cf.	Late Summer/Fall	3	0.00
Maygrass	*Phalaris caroliniana*	Spring/Early Summer	222	0.06

Table 3 Continued.

Common Name	Scitentific Name	Seasonality	Count	Weight
Maygrass cf.	*Phalaris caroliniana* cf.	Spring/Early Summer	66	0.01
Sumpweed	*Iva annua*	Late Summer/Fall	1	0.00
Sumpweed cf.	*Iva annua* cf.	Late Summer/Fall	2	0.00
Wild bean	*Strophostyles/Phaseolus polystachios*	Late Summer/Fall	5	0.04
Wild bean cf.	*Strophostyles/Phaseolus polystachios* cf.	Late Summer/Fall	5	0.02
Miscellaneous:				
Bark			2945	59.59
Bark cf.			12	0.10
Bedstraw	*Galium* sp.		1	0.00
Bud			2	0.00
Cane	*Arundinaria* sp.		11	0.05
Carpetweed	*Mollugo* sp.		1	0.00
Grass family	Poaceae		5	0.00
Grass family cf.	Poaceae cf.		1	0.00
Groundcherry	*Physalis* sp.		1	0.02
Morning-glory	*Convolvulus/Ipomoea* sp.		3	0.00
Pine cone	*Pinus* sp.		17	0.03
Pine cone cf.	*Pinus* sp.cf.		2	0.01
Pitch			390	3.23
Pokeweed	*Phytolacca americana*	Summer/Fall	3	0.00
Purslane	*Portulaca* sp.	Summer/Fall	60	0.00
Ragweed cf.	*Ambrosia* sp. cf.		1	0.00
Receptacle			2	0.00
Smartweed	*Polygonum penslyvanicum*		2	0.00
Smartweed cf.	*Polygonum penslyvanicum* cf.		1	0.00
Stem/twig			2	0.04
Tuber cf.			14	0.15
Unidentifiable			334	1.58
Unidentifiable seed			181	0.07
Unidentifiable fruit/starchy			2	0.00
Unidentified			3	0.00
Unidentified seed			7	0.00
Wood				76.06
Total			7028	163.07

Hickory nuts are a reliable food resource carrying significant dietary value high in fat and protein (U.S. Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory [USDA NDL] 2004). Modern ethnoarchaeological studies (Fritz et al. 2001) have shown the use of hickory nuts among Native American peoples, such as the Cherokees, in dishes such as “ku-nu-che.” Kanuchi is still a favorite dish amongst Cherokee members today and has been demonstrated being made by Cherokee elder, Edith Knight through *Osiyo, Voices of the Cherokee* People, a documentary series exhibiting Cherokee traditions (Osiyo 2022). The hickory nuts are processed by crushing the entire nut, shell included, and forming balls from the pulverized nutmeats and shell. These balls can then be placed into boiling water to separate the shells from the nutmeats; the nutmeats float to the top and can be skimmed off the top or continue to melt to make a milky beverage while the shells sink to the bottom (Fritz et al. 2001; Gardner 1997; Talalay et al. 1984). Ancestral native peoples also appear to have used hickory nuts as an abundant fuel source given its high oil content, which further justifies its high recovery rate (Gardner 1997; Scarry 2003).

Despite the fragility of acorn shell and its less likelihood for preservation and recovery, acorn is the second-most recovered nutshell within Pigeon phase at the Magic Waters site with nearly 751 acorn shell and cap fragments, including 8 pieces of acorn meat. The acorns recovered totaled a weight of 1.93 g. However, to account for poor preservation and recovery, Yarnell and Black (1985:97-98) recommended multiplying the recovered weight of acorn shell by 50 to achieve a more accurate picture of acorn use. This adjustment would give an approximate weight of 96.5 g, suggesting that acorns could have been predominate over hickory nuts, or at least used in similar quantities.

Although this calculation is useful for considering the higher importance for acorn, it cannot be used in statistical comparisons and interpretation. Noteworthy are the 8 fragments of acorn meat recovered, along with the 20 additional possible acorn meats. Acorn meat, as well as any edible nutmeat, is rarely recovered at archaeological sites. Acorns, alongside hickory, make an important food source that is high in carbohydrates (USDA NDL 2004).

Unlike hickory nuts, acorns contain toxic tannins that are not only bitter and less palatable but can also prevent proper absorption of nutrients. An extra processing step to remove these tannins must be taken before consuming acorns. The tannins can be removed by leaching with water or can also be denatured by toasting (Bettinger et al. 1997; Petruso and Wickens 1984; Scarry 2003:66). With the Magic Water's site in such close proximity to Soco Creek, that also emptied into the Oconaluftee River nearby, acorns were most likely leached by placing the acorns in a basket into a fast-flowing stream. After leaching, the large acorn nutmeats can then be ground into meal that can then be made into breads or into a mush (Carr 1895:172; Densmore 1974:320; Palmer 1871:409-410; Peterson 1977:204). Unlike hickory nuts, which can be stored in the shell, acorns have the risk of sprouting or attracting mold or worms and therefore must be parched (toasted dry) in advance (Petruso and Wickens 1984:362; Scarry 2003:66).

The 314 pieces indicated as "Walnut family" were in fact pieces too small to properly identify as hickory or black walnut. Black walnut shells were thereby the next most prevalent nut taxa throughout the samples, with over 200 fragments recovered. Gathering black walnuts is more time-consuming than gathering hickory and acorn nuts because black walnut trees are solitary and do not grow in stands like hickory and oak trees. Additionally, hickory and oak trees grown in a range of environments while black walnut trees generally only grow in rich woods (Radford et al. 1964). Moreover, black walnuts cannot be crushed and boiled like hickory nuts because the bitter hull remains attached to the deep ridges of the walnut shell. Although these high costs of gathering and processing may have deterred greater use of black walnuts (Gardner 1997; Talalay et al. 1984), occupants of the site clearly enjoyed the flavor and high oil content of these nuts.

A significant number of hazelnut shell pieces were also recovered from the samples with a total count of 107. Similar to black walnuts, hazelnuts are also time-consuming to gather because they must be picked from shrubs like berries, and do not grow in stands but rather in thickets along forest edges (Gardner 1997; Talalay et al. 1984, Radford et al. 1964).

Hazelnuts ripen in late summer, while black walnut, hickory, and acorn have peak availability around the month of October. However, the gathering window can be limited by competition with local wildlife such as squirrels, turkeys, deer, and birds, as well as molds and insects (Gardner 1997; Radford et al. 1964; Schopmeyer 1974; Talalay et al. 1984). Sizeable crops are also only produced every two to five years, depending on the species of oak, hickory, or walnut (Schopmeyer 1974). In between bumper crops, competition from wildlife is even keener, as trees within as much as a 400-km radius produce relatively few nuts (Koenig and Knops 2000, 2005).

It should also be noted that although chestnuts (*Castanea dentata*) were not identified in the samples, evidence of these nuts is notoriously difficult to recover. Their thin, papery shell readily burns to ash, giving them a low preservation potential. However, early peoples of the Southern Appalachians certainly used chestnuts (Purcell

2013), and chestnuts are continued to be used as a major staple today in foods such as in Chestnut Bread (Cherokee Tribal Food Distribution Program 2022). This is possible thanks to modern efforts between the Eastern Band of Cherokee Indians Natural Resource Department and The American Chestnut Foundation to hybridize chestnut trees with the Chinese Chestnut that is resistant to the fungal blight, *Cryphonectria parasitica*, that previously eliminated so many Chestnut trees since the early 1900's (Van Leuven 2021). These nuts are similar to acorns in their high carbohydrate content, but they lack tannins and produce sizeable crops on a yearly basis, making them a valuable food resource (Scarry 2003).

Fruits

The fruit taxa recovered from the site includes blackberry/raspberry, grape, honey locust, persimmon, plum/cherry, and sumac. Grape and plum/cherry were recovered most frequently with nine identified each, followed by five counts of honey locust, four persimmon, two blackberry/raspberry, and two sumac fruits. Fruits are less frequently recovered from sites because they can be eaten fresh or in their entirety, and therefore are less likely to be introduced to fire and carbonized. Fruits also were used as supplements, adding flavor to foods and supplying important vitamins and nutrient to diets, rather than being dietary staples.

The various fruits may be eaten fresh or dried (Havard 1896; Moerman 2004; Swanton 1946; Yanovsky 1936). Persimmons were kept for winter use by fashioning the pulp into cakes and drying them (Swanton 1946:265, 285, 288, 291, 363, 373), or making them into preserves, with some historic native groups consuming ripe persimmons in "large quantities" (Palmer 1871:471). Dried cakes and/or preserves were also made from grapes, blackberries, raspberries, plums, and cherries (Angier 1974; Fernald and Kinsey 1943; Medsger 1972; Moerman 2004; Peterson 1977; Yanovsky 1936). As a flavoring agent, many fruits would be mixed into breads, cornmeal, and with legumes/wild beans (Angier 1974; Fernald and Kinsey 1943; Kindscher 1987; Kurz 1997; Medsger 1972; Peterson 1977; Swanton 1946). Sumac berries were used to make a beverage similar to lemonade. To make the drink, the berries were crushed, bruised, or roasted (Havard 1896:44-5; Peterson 1977:186; Yanovsky 1936:40-1), in part to help abate tannins in the berries (Kindscher 1987:191-3). Similarly, the pods of honey locust have a sweet pulp that was used to make a beverage (Moerman 2004; Ulmer and Beck 1951:58; Yanovsky 1936:36), but also can be eaten raw (Moerman 2004; Yanovsky 1936:36) or used to sweeten medicines or children's dispositions (Moerman 2004). Leaves and bark of fruit trees were also used; for example, leaves of grapes were cooked as vegetables, and leaves of persimmon were concocted into a tea (Kindscher 1987; Peterson 1977). Bark of persimmon trees were also used for tea infusions or poultices. (Moerman 2004).

Grape vines typically are found in wooded habitats, the seeds having been scattered by bird and animals. Women would tie large amounts of grapes into bunches and dry them on roofs, then boil them in the winter through a cane sieve to use with cornmeal (Hill 1997:14). Persimmon and honey locust trees thrive in disturbed areas like agricultural fields, or edges of habitats. Ethnohistoric accounts describe a cold soup prepared by Cherokee women of honey locust pods in a sour corn broth (Perdue 1998:21). Sumac, blackberry, and raspberry shrubs grow in thickets in similar edge habitats (Radford et al. 1964; Sullivan 1994). Sumac berries were gathered by women to dye baskets and have also been used as a powder to preserve blackness of hair (Hill

1997:15). With the exception of persimmon, which typically falls to the ground when ripe, all of the fruits recovered must be picked which can take a longer time to gather.

Although the fruits can be dried and stored for later use, their seasonality is revealing of the timing of collection. Blackberries, raspberries, plums, cherries, and grapes are summer fruits. Honey locust, sumac, and persimmons ripen in the fall months, with persimmons only palatable after the first frost. Gatherers would have competed with local wildlife for many of these fruits but would have also needed to schedule time spent gathering fall fruits so as not to compete with the gathering of nut staples, particularly during years of bumper nut crops.

Edible Seeds/Cultigens

The edible seed and cultigen taxa recovered from the site include cheno/am, chenopod, cucurbit rind, maygrass, sumpweed, and wild bean. Although only ten cucurbit rinds, five wild beans and one definitive sumpweed seed were recovered from the samples, a significant amount of both chenopod and maygrass were identified. In total, 118 chenopod and 222 maygrass seeds were recovered, suggesting that the occupants did indeed practice horticulture at Magic Waters. These findings also support the presence of stone hoes that were uncovered during excavation in 2018 (Benyshek et al. 2018). There are also too great a number of chenopod and maygrass to be recovered incidentally. Given that the Southern Appalachians are well out of the natural range of maygrass (Smith and Cowan 2003), all evidence presented suggests a relationship deeper than tolerance of useful disturbance taxa.

Both cucurbit seeds and rinds are eaten by boiling, roasting, or drying (Moorman 2004; Ulmer and Beck 1951; Yanovsky 1936). The starchy and oily seeds can be eaten raw, boiled into porridge, toasted, or made into a flour that can be used in breads and mush (Kindscher 1987; Moerman 2004; Niethammer 1974; Palmer 1871; Peterson 1977; Yanovsky 1936). Chenopod leaves and shoots can also be cooked and used as vegetable greens (Kindscher 1987; Niethammer 1974; Palmer 1871; Peterson 1977; Yanovsky 1936).

All cultivated taxa thrive in disturbed areas such as agricultural fields, suggesting that they were in fact cultivated, or at the very least tolerated. Again, given the evidence presented, it appears that the Middle Woodland occupants cultivated chenopod, maygrass, and cucurbits at Magic Waters. Chenopod, sumpweed, wild beans, and cucurbits are ready for harvest in late summer and early autumn (Radford et al. 1964), while maygrass ripens in May or June (Cowan 1994:267). However, it is also possible that horticulturalists planted maygrass along with chenopod and the oily seeds in the spring so that the two would ripen in the same season (Smith and Cowan 2003:111-112). Regardless of when they were planted, the seed crops would have been planted by broadcasting seeds over prepared beds, in contrast to the planting of individual seeds, as is the practice for cucurbits (Smith and Cowan 2003:119).

Weedy Seeds/Miscellaneous

The miscellaneous taxa recovered from the site provide a glimpse into the local habitat of the site. These include bark, bedstraw, cane, carpetweed, grass family, groundcherry, morning-glory, pine cone, pitch, pokeweed, purslane, and smartweed. Most impressive is the amount of bark recovered, particularly from Feature 39. Bark was often used for lining pits and most likely served this purpose for Feature 39, a large silo.

Eleven pieces of cane were identified, which is not surprising given the site's proximity to the river, although cane can also grow in settings outside of riverbanks (Radford et al. 1964). Cane was often used as a fuel source, in the form of torches, in weaving baskets, in wattle and daub construction and webbing between posts, whittled into flutes, as well as to create shafts for arrows and blow guns (Moerman 2004; Watson and Yarnell 1966). Women directly and indirectly enhanced the growing conditions through selection for cane to replenish their resources for basket material and other uses (Hill 1997:60).

Weedy taxa such as bedstraw, purslane, carpetweed, smartweed, and members of the Grass family are generally indicative of human-disturbed areas such as domestic settings, garden plots, or agricultural fields (Radford et al. 1964). Ethnohistoric accounts describe Cherokee women's use of sharpened sticks or stone mattocks that allowed them to be tolerant of weeds while hoeing their gardens (Perdue 1998:19).

Many of these weedy plants also have useful properties. For example, bedstraw has a variety of medicinal uses and its spring leaves can be eaten as greens (Gilmore 1932; Moerman 2004; Powers 1873-74). The spring leaves and shoots of purslane, morning-glory, and poke can also be eaten as greens, and knotweed and smartweed seeds may also be eaten (Moerman 2004; Niethammer 1974; Palmer 1871; Yanovsky 1936). In present day, many foraged items such as greens like poke, ramps, creases, sochan, as well as mushrooms like the wishi, are still gathered, prepared, and eaten. In fact, the Eastern Band of Cherokee Indians Natural Resource Department in recent years has created the Culturally Significant Plant Species Initiative (CSPSI) to help preserve traditional ecological knowledge and the continued practice of gathering and consuming these plants

(Baumflek et al. 2021). Permits were recently granted to EBCI tribal members, with cooperation of the U.S. Park Service to collect sochan and ramps in traditional gathering areas (McKie B.P. 2019). Groundcherry fruits are also edible, and still eaten today (Moerman 2004). The leaves, bark, stems, and branches of many of the weedy seed plants also have medicinal uses. Pokeweed was also encouraged for use of its fall berries as a pale red dye (Hill 1997:62). Given their various useful properties, many of these weedy plants may have been encouraged rather than pulled from gardens. The exception is carpetweed, for which no known ethnohistoric uses are given (Moerman 2004).

Fourteen fragments were tentatively identified as tubers. Historically, Native American groups used a wide range of starchy roots and tubers, particularly in winter and early spring, when other fresh plant resources are lacking (Scarry 2003). Tubers and roots are notoriously difficult to identify in archaeobotanical assemblages because their high starch and high water content produces carbonized specimens that lack readily recognizable structure. However, roots and tubers likely were important foodstuffs, readily available at when other food resources were unavailable and stores were depleting. Tubers and roots can have a long storage life if kept in a dark and dry place (Scarry 2003).

There was also a great deal of mica recovered from the samples (Table 2), which is not surprising given the cut mica recovered from Pigeon contexts during excavation and that mica was traded by groups in the Southern Appalachians throughout the Middle Woodland period. The fragments of mica could have possibly been from working material and making cut-outs on the site or lost through abrasion as stored locally during transport. More information would be required to determine the reason for the presence of mica definitively.

BASIN SHAPED PITS

Small Basin Pits

Feature 481 is a small basin pit with a depth of 22 cm, clear boundaries, and a plow scar running from east to west. A 12-L soil sample, bag number 134, was taken from the western half of the feature and floated to collect the heavy and light fraction for paleoethnobotanical analysis.

Feature 2159 is a small basin pit with a depth of 13 cm and many rocks at the bottom of the pit. The eastern half contained three rocks totaling 0.5 kg (1 lb.) and the western half contained 15 rocks totaling 3.6 kg (8 lb.). The pit has clear, circular boundaries and is located outside of Structure 10. Seven liters from the western half of the feature were taken as a float sample, bag number 1435.

Feature 3423 is a small basin pit with a depth of 17 cm and clear boundaries that are oval-circular. The feature is located in the area of Structure 35 and was filled with rocks, a small amount of charcoal, one flake, and a possible post discovered at the center base. Twelve liters of soil were taken as a float sample, bag number 1480, from the northern half of the feature.

As a group, the small basin pits produced a wide range of plant taxa (Table 4), including acorn, black walnut, hazelnut, hickory, walnut family, grape, plum, cucurbit, maygrass, wild bean, bark, grass family, pine cone, and pitch.

Table 4. Basin Small Pit Features Plant Taxa.

	Feature 481 (plant wt = 0.82 g)		Feature 2159 (plant wt = 3.38 g)		Feature 3423 (plant wt = 1.71 g)	
Plant Taxa	Count	Density	Count	Density	Count	Density
Nuts:						
Acorn	5	6.098	5	1.480	5	2.924
Black walnut					7	4.094
Hazelnut	3	3.659	3	0.888		
Hickory	13	15.854	20	5.917	18	10.526
Walnut family	9	10.976	9	2.662		
Total Nuts	30	36.585	35	10.335	30	17.544
Fruits:						
Grape			1	0.296		
Plum pit					8	4.678
Edible Seeds:						
Cucurbit rind					4	2.339
Maygrass	5	6.098	5	1.479		
Wild bean			1	0.296		
Total Edible Seeds			6	1.775		
Miscellaneous:						
Bark	5	6.098	59	17.456	8	4.678
Bud			1	0.296		
Grass family	1	1.220				
Pine cone					2	1.170
Pitch	20	24.390	14	4.142	7	4.094

Large Basin Pits

Feature 761 is a large basin pit with a depth of 24 cm, circular and diffuse edges except for the southwest edge. Possible mendable vessel fragments were recovered along with 25 rocks totaling 2.3 kg (5 lb.). Charcoal was found at approximately 12 cm below surface level. A 12-L float sample, bag number 130, was taken from the eastern half of the feature. Feature 2337 is a large basin pit with a depth of 32 cm and irregular oval and diffuse boundaries. The western edge of the pit held a higher a higher concentration of charcoal and some burnt/oxidized clay on the wall, unlike the rest of the fill. Rocks of various sizes were recovered with the southern half containing 36 rocks totaling 6.8 kg (15 lb.) and the northern half containing 70 rocks totaling 13.2 kg (29 lb.). Although 56 L of soil were removed from the northern half of the feature for flotation, yielding four bags of number 837, only bag 837 (3 of 4) was subsampled for analysis.

Feature 2640 is a large basin pit with a depth of 14 cm and clear, circular boundaries. A good amount of flakes, rocks, charcoal, and a projectile point/knife tip was recovered from the fill. Ten rocks totaling 1.4 kg (3 lb.) were found in the southern half, while 13 rocks totaling 1.8 kg (4 lb.) were recovered from the northern half. A 10-L float sample was taken from the northern half of the feature, bag number 1442.

As a group, the large basin pits produced a wide range of plant taxa (Table 5), including acorn, acorn meat, black walnut, hazelnut, hickory, walnut family, blackberry/raspberry, grape, persimmon, chenopod, cucurbit, maygrass, bark, bedstraw, cane, carpetweed, grass family, morning-glory, pine cone, pitch, pokeweed, and purslane.

Table 5. Basin Large Pit Features Plant Taxa Density.

	Feature 761 (plant weight = 1.62 grams)		Feature 2337 (plant weight = 8.73 grams)		Feature 2640 (plant weight = 6.28 grams)	
Plant Taxa	Count	Density	Count	Density	Count	Density
Nuts:						
Acorn	262	161.728	182	20.848	13	2.070
Acorn meat			7	0.802		
Black walnut	2	1.235	57	6.529	10	1.592
Hazelnut	1	0.617	9	1.031	18	2.866
Hickory	8	4.938	96	10.997	286	45.541
Walnut family	4	2.469	85	9.737	51	8.121
Total Nuts	307	189.506	438	50.172	378	60.191
Fruits:						
Blackberry/raspberry					2	0.318
Grape					1	0.159
Persimmon					1	0.159
Persimmon fruit			1	0.115		
Persimmon seed coat			1	0.115		
Edible Seeds:						
Chenopod	27	16.667	52	5.956	5	0.796
Cucurbit rind			1	0.115	3	0.478
Maygrass	2	1.235	39	4.467	58	9.236
Total Edible Seeds	29	17.901	92	10.538	66	10.510
Miscellaneous:						
Bark	12	7.407	14	1.604	11	1.752
Bedstraw			1	0.115		
Cane			1	0.115		
Carpetweed					1	0.159
Fruit/tuber	1	0.617				
Grass family			2	0.229	1	0.159
Morning glory			3	0.344		
Pine cone	2	1.235	2	0.229		
Pitch	22	13.580	61	6.987	29	4.618
Pokeweed			2	0.229	1	0.159
Purslane	5	3.086			10	1.592
Receptacle					2	0.318
Stem/twig			2	0.229		

Basin Discussion

All three small basins revealed wood weight that was either half or slightly more than half of the total plant weight of the sample (Table 3). The three samples also had in common dominance of a variety of nut taxa, and at least one taxa of edible seed/cultigen. Feature 2159 and Feature 3423 also produced fruit taxa. Bark was also found in all three samples, with Feature 2159 recovering the most.

Similar to the small basins, the large basins also share commonalities. All three large basins were calculated to have wood density values of approximately 0.3 (Table 3). They all also held a wide variety of plant taxa within the samples collected and analyzed. While all three large basins are dominated by nut taxa, acorn taxa dominate Feature 761 and Feature 2337, and hickory is the most commonly recovered nut taxa from Feature 2640. Notable also are the 7 counts of acorn meat recovered from Feature 2337, possibly hinting at processing or cooking or acorns within the pit. Charcoal flecks were also found in all three and Feature 761 recovered potentially mendable vessel fragments.

Overall, there appear to be differentiation between the small and large basins excavated and analyzed. While small basins have wood weights that make up half of their plant density and taxa dominated by nuts with some cultigens and minimal fruit taxa in two of three of the small basins, large basins have lower wood densities and a much wider variety of plant taxa, although still dominated by nuts of either acorn or hickory. Overlapping plant taxa of the small basins include acorn, hickory, bark, and pitch. Feature 481 and Feature 2159 further have similar taxa of hazelnut, walnut family, and maygrass, although Feature 2159 also has the addition of wild bean and grape. Feature 3423 instead recovered additional taxa of black walnut, cucurbit, and 8 counts of plum pit. Overlapping plant taxa of the large basins include acorn, black walnut, hazelnut, hickory, walnut family, chenopod, maygrass, bark, and pitch.

BELL-SHAPED PITS

Small Bell-Shaped Pits

Feature 2424 is a small bell-shaped pit with a depth of 30 cm and oval boundaries located inside Structure 6. Large vessel fragments were recovered from this feature and samples were taken from above and below the vessel fragments in the western half of the feature as shown in Figures 11A and 11B. The eastern half contained 1.8 kg (4 lb.) of rock, while the western half contained 2.3 kg (5 lb.) of rock. Six liters of soil were taken from below the sherds, bag number 841, and 7 liters of soil were taken from above the sherds, bag number 840. Nut taxa and bark are present in greatest quantities in the sample (Table 6).

Large Bell-Shaped Pits

Feature 28 is a large bell-shaped pit with a depth of 14 cm and clear, circular boundaries. A large check-stamped vessel fragment was recovered from this pit, along with 32 rocks totaling 6.4 kg (14 lb.) in the southern half of the pit, and 23 rocks totaling 2.3 kg (5 lb.) in the northern half. An 11-L sample, bags number 441 (1 of 2) and 441 (2 of 2), was taken from the northern half of Zone B. For comparative purposes, all count and weights were combined for Table 7 and the total volume of 11 L was used to determine plant density. Feature 468 is a large bell-shaped pit with a depth of 37 cm and oval boundaries that are clear edges in the north and diffuse edges in the south, as well as a slightly concave base. Possible reconstructable large vessel fragments were recovered along with a great amount of charcoal in Zone B. The northeast section of the feature contained a rodent burrow, and the northern half contained 10.9 g (24 lb.) of rocks while

Table 6. Density Ratios of Small Bell Feature Plant Taxa.

		Feature 2424 (plant wt above sherds = 4.39g; plant wt below sherds = 5.69g)	
Above or Below Sherds	Plant Taxa	Count	Density
Above Sherds	**Nuts:**		
	Acorn	7	1.59
	Black walnut	1	0.23
	Hazelnut	2	0.46
	Hickory	29	6.61
	Walnut family	5	1.14
	Total Nuts	44	10.02
	Edible Seeds:		
	Cheno/am	1	0.23
	Chenopod	3	0.68
	Cucurbit rind	1	0.23
	Maygrass	3	0.68
	Total Edible Seeds	8	1.82
	Miscellaneous:		
	Bark	43	9.79
	Pitch	7	1.59
	Purslane	21	4.78
Below Sherds	**Nuts:**		
	Acorn	3	0.53
	Hickory	14	2.46
	Walnut Family	4	0.70
	Total Nuts	21	3.69
	Edible Seeds:		
	Cucurbit rind	1	0.18
	Maygrass	2	0.35
	Sumpweed	1	0.18
	Total Edible Seeds	4	0.70
	Miscellaneous:		
	Bark	28	4.92
	Cane	1	0.18
	Grass Family	1	0.18
	Pitch	7	1.23
	Purslane	1	0.18

Table 7. Density Ratios of Bell Large Feature Plant Taxa.

	Feature 28, Zone B (plant wt = 39.74 g)		Feature 468, Zone A (plant wt = 0.92 g)		Feature 2999, Zone A (plant wt = 9.47 g)	
Plant Taxa	Count	Density	Count	Density	Count	Density
Nuts:						
Acorn	5	0.126	2	2.174	31	3.273
Acorn meat					1	0.106
Black walnut	6	0.151			114	12.038
Hazelnut			6	6.522	31	3.273
Hickory			14	15.217	342	36.114
Walnut family	16	0.403			87	9.187
Total Nuts	69	1.736	22	23.913	606	63.992
Fruits:						
Grape	1	0.025				
Honey locust	1	0.025			4	0.422
Persimmon	1	0.025			2	0.211
Total Fruit	3	0.075			6	0.634
Edible Seeds:						
Cheno/am					2	0.211
Chenopod	1	0.025	1	1.087	26	2.746
Maygrass	2	0.050	6	6.466	86	9.081
Total Edible Seeds	3	0.075	7	7.609	4	0.422
Miscellaneous:						
Bark	578	14.545	8	8.696	7	0.739
Bud					1	0.106
Cane					8	0.845
Nutshell/fruit pit					3	0.317
Pitch	90	2.265	20	21.739	13	1.373
Purslane			1	1.087	22	2.323
Smartweed	2	0.050				

the southern half contained 5.4 kg (12 lb.) of rocks. An 11-L sample, bag number 453, was taken from the northern half of Zone A. Feature 2999 is a large bell-shaped pit with a depth of 61 cm and an irregular circular shape with extensions and clear boundaries. Three zones were identified in Feature 2999: Zone A contained darker fill with an abundance of charcoal and the base mottled with red, burned earth; Zone B is lighter and more mottled than Zone A; and Zone C is much darker with charcoal found throughout. The northern half of Zone A contained 42 rocks totaling 3.2 kg (7 lb.), and the southern half contained 48 rocks totaling 5.9 kg (13 lb.). A 10-L soil sample, bag number 1456, was taken from the northern half of Zone A.

As a group, the large bell pits produced a wide range of plant taxa (Table 7), including acorn, acorn meat, black walnut, hazelnut, hickory, walnut family, grape, honey locust, persimmon, cheno/am, chenopod, maygrass, bark, cane, pitch, purslane, and smartweed.

Bell-Shaped Pit Discussion

Feature 2424 is particularly interesting, not only because it is the only small bell-shaped pit, but because it was located inside of Structure 6 with large fragments of a broken vessel. This feature has a very high wood density, making up the majority of the plant weight (Table 3). In addition to the dominance of rocks, vessel fragments, and wood, hickory, walnut, and bark are most frequent with additional edible seed taxa also found (Table 6).

Although wood density and plant taxa recovered appear to vary across the three large bell pits (Tables 3 and 7), there are still similarities to consider. Feature 28, Feature 468, and Feature 2999 all were found to hold multiple zones, despite that only one zone was analyzed by myself from each. Additionally, all four bell pits (including the small bell pit in Structure 6) recovered a large amount of rocks. All bell pits, with the exception of Feature 2999, also recovered large vessel fragments while excavating. Bark is recovered across all bell pits, presumably due to its use as a liner for pits. Feature 28, a large bell pit, included the highest amount of bark compared to the others; however, the soil sample from Feature 28 was collected from Zone B, whereas the other two large bell pits collected soil samples from Zone A. It is possible that an analysis of Zone B (or Zone C for Feature 2999) may have revealed equally high amounts of bark. Also, Feature 28 is noteworthy in that it included the greatest amount of mica out of all pit features with 1.01 g (Table 3). Also, all bell shaped pits recovered some amount of mica in the samples analyzed, which is not the case for basin and silo features, which both had a feature that did not contain mica.

Overall, bell-shaped pits, both small and large, appear to have characteristics of bark lining, large amounts of rocks, possible vessels used in association, and some amount of mica, as well as a wide range of plant taxa within the recovered assemblages. A significantly higher wood density was recovered from Zone B of Feature 28 and the smaller bell pit, Feature 2424, than Zone A of the other two large bells, Feature 468 and Feature 2999. Given that the large bell pits all had multiple zones, a more in-depth analysis comparing all zones could provide further clarity to pit usage. Overlapping plant taxa of the bell features include acorn, hickory, chenopod, maygrass, bark, and pitch.

SILO-SHAPED PITS

Feature 39 is a large silo-shaped pit with a depth of 53 cm, circular clear boundaries, and a semi-flat base. This pit has two zones: Zone A and Zone B. Zone A recovered 46 rocks totaling 16.3 kg (36 lb.) in the southern half, and 36 rocks totaling 12.7 kg (28 lb.) in the northern half. Zone B recovered 19 rocks totaling 5.9 kg (13 lb.) in the southern half, and 34 rocks totaling 12.7 kg (28 lb.) in the northern half. A 13-L soil sample, bag 444, was taken from the northern half of Zone A, and a 10-L soil sample, bag number 445, was taken from the northern half of Zone B.

Feature 487 is a large silo-shaped pit with a depth of 58 cm, circular clear boundaries, and a semi-flat base. The edges of the pit appeared to be fired all the way around, and mendable pot fragments were uncovered at approximately 20 cm below surface level. Underneath, a very large amount of rocks were recovered. In the northern half, 155.1 kg (342 lb.) of rocks were found, and in the southern half 224.1 kg (494 lb.) of rocks were found. A 14-L sample, bag number 463, was taken from the southern half of the feature. Two bags (463 (1 of 2) and 463 (2 of 2)) were collected from this soil sample, but only bag number 463 (1 of 2) was analyzed.

Feature 3149 is a large silo-shaped pit with a depth of 39 cm and circular diffuse boundaries. Two zones were identified in the pit with charcoal flecks and small rocks apparent throughout. The eastern half contained 9 rocks totaling 0.7 kg (1.5 lb.), and the western half contained 20 rocks totaling 3.2 kg (7 lb.). A 10-L soil sample, bag number 1460, was taken from the western half of the feature in Zone A.

Silo Discussion

Of the three large silo-shaped pits, Feature 39 silo stands out with the greatest amount of plant weight at 71.53 g, even though only a subsample was analyzed (Table 3 and Table 8). Zone B of the feature recovered the most bark from any sample, with an approximation of 2,150 pieces identified (due to the large quantity and tendency to fragment, the count was estimated). Acorn was also dominant in Zone A as well as Zone B with 213 counts total. With minimal amounts of other few taxa recovered and such a great amount of bark possibly used as a lining matting, this feature may have been used to store acorns.

Feature 487 and Feature 3149 are not quite as straightforward as Feature 39. Feature 487 was unique in that it recovered an enormous amount of rocks, totaling 370 kg (836 lb.), along with vessel fragments, and fired edges all the way around the feature. Plant and wood weight were both relatively low in Feature 487, and although 69 counts of hickory and 6 counts of grape were recovered, the other nut taxa and maygrass were recovered in minimal amounts. It is noteworthy, however, that only one of the two sample bags was analyzed for this feature, and that analysis of the second bag could further prove revealing.

Feature 3149 had a much smaller quantity of rocks totaling only 3.9 kg (8.5 lb.), but had charcoal flecks throughout and wood comprising half of the plant weight. Significant amounts of hickory, walnut, hazelnut, and black walnut, in addition to some chenopod and maygrass were recovered from this sample. However, this feature also contained two zones, and because only Zone A was analyzed, further analysis of Zone B could be helpful in interpretation.

Table 8. Density Ratios of Silo Large Pit Features Plant Taxa by Zone.

	Feature 39, Zone A (plant wt = 3.18 g)		Feature 39, Zone B (plant wt = 71.53 g)		Feature 487 (plant wt = 1.67 g)		Feature 3149, Zone A (plant wt = 3.95 g)	
Plant Taxa	Count	Density	Count	Density	Count	Density	Count	Density
Nuts:								
Acorn	44	13.836	169	2.363	7	4.192	9	2.278
Black walnut					1	0.599	22	5.570
Hazelnut							34	8.608
Hickory	3	0.943	3	0.042	69	41.317	77	19.494
Nutshell			2	0.028				
Total Nuts	43	13.522	174	2.433	9	5.389	142	35.949
Fruits:								
Grape					6	3.593		
Plum/cherry			1	0.014				
Edible Seeds:								
Chenopod							3	0.759
Maygrass	1	0.314			3	1.796	10	2.532
Total Edible Seeds							13	3.291
Miscellaneous:								
Bark	10	3.145	2150	30.057	2	1.198	10	2.532
Cane			1	0.014				
Groundcherry			1	0.014				
Nutshell/fruit pit							1	0.253
Pine cone			3	0.042	1	0.599	7	1.772
Pitch	14	4.403	18	0.252	23	13.772	45	11.392

Overall, the large silo pits do not appear to have as many similarities as the basin and bell-shaped pits. Acorn storage use is most likely for Feature 39 given the high recovery of acorns and bark possibly used for matting; however, the fired edges of Feature 487 along with the charcoal flecks throughout Feature 3149 suggest other uses than storage, especially with more diverse plant taxa. The exponentially larger amount of rocks along with pot fragments in Feature 487 is also worth considering. Overlapping taxa of the silo features include acorn, hickory, maygrass, bark, and pitch.

BOX PLOT ANALYSIS BY FEATURE TYPE

I used box plots to make statistical comparisons to further build upon feature type conclusions. Figure 5 displays the overall plant densities (plant weight in grams/sample volume in liters) by feature types. This box plot was log transformed to better show the data distribution between feature types. Basins tend to have a lower plant density. There also appears to be overlap in bell and silo pit plant densities, demonstrating there is similarities that are not statistically different. Silos also show a wide range in plant densities.

Figure 6 shows the wood density (wood weight in grams/overall plant weight in grams) by feature type and size. The plot reveals an overlap in the small basin, large bell, and silo-shaped pits, showing that their wood densities are not statistically different. However, there is a clear statistically significant difference between basin small and basin large, as well as between bell small and bell large. This difference reveals that despite similar morphologies, size does appear to mean something in terms of what people were doing in these pits. Larger basins could have possibly been used for tertiary refuse given

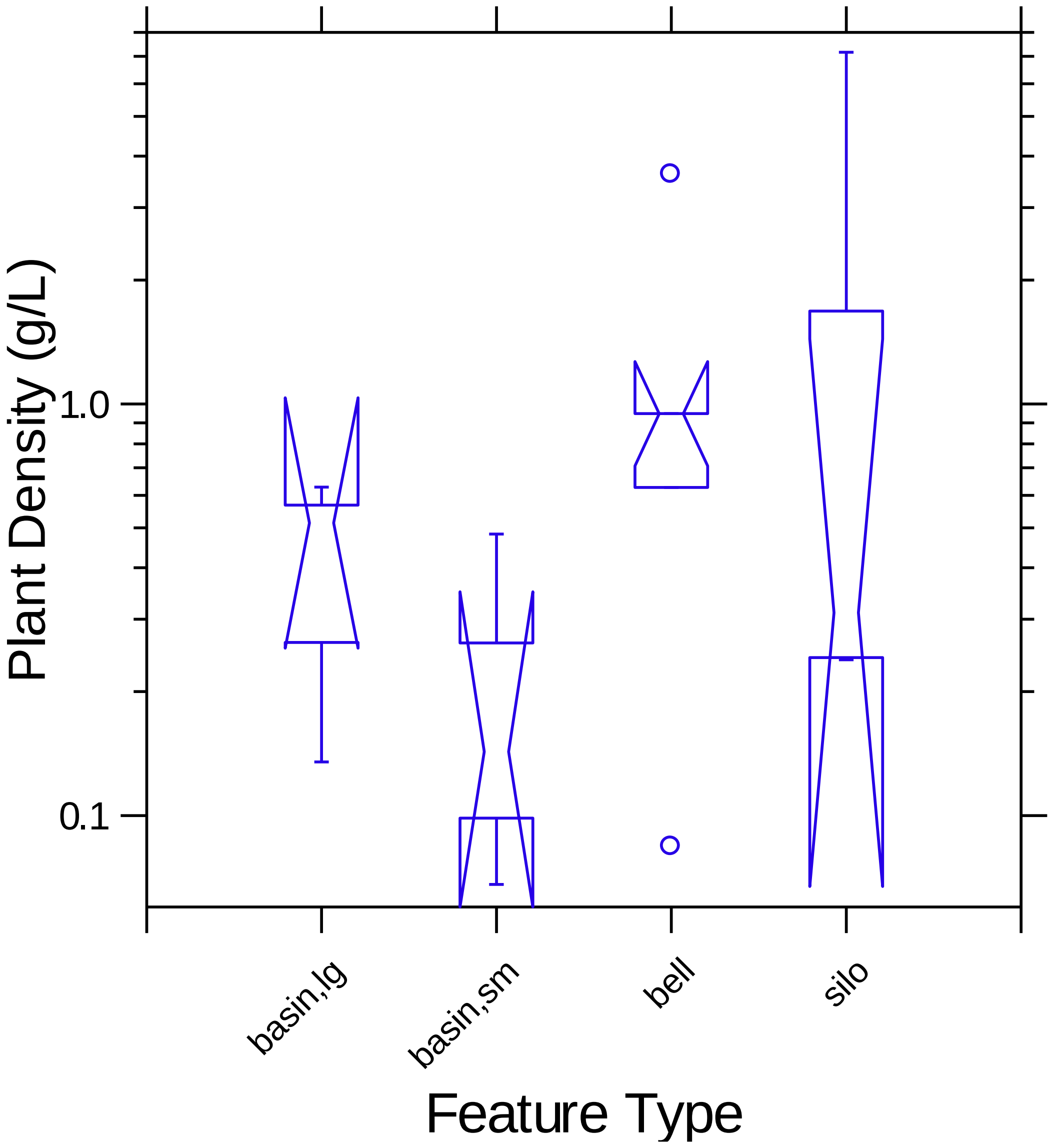

Figure 5. Box plot of plant density (g/L) by feature type.

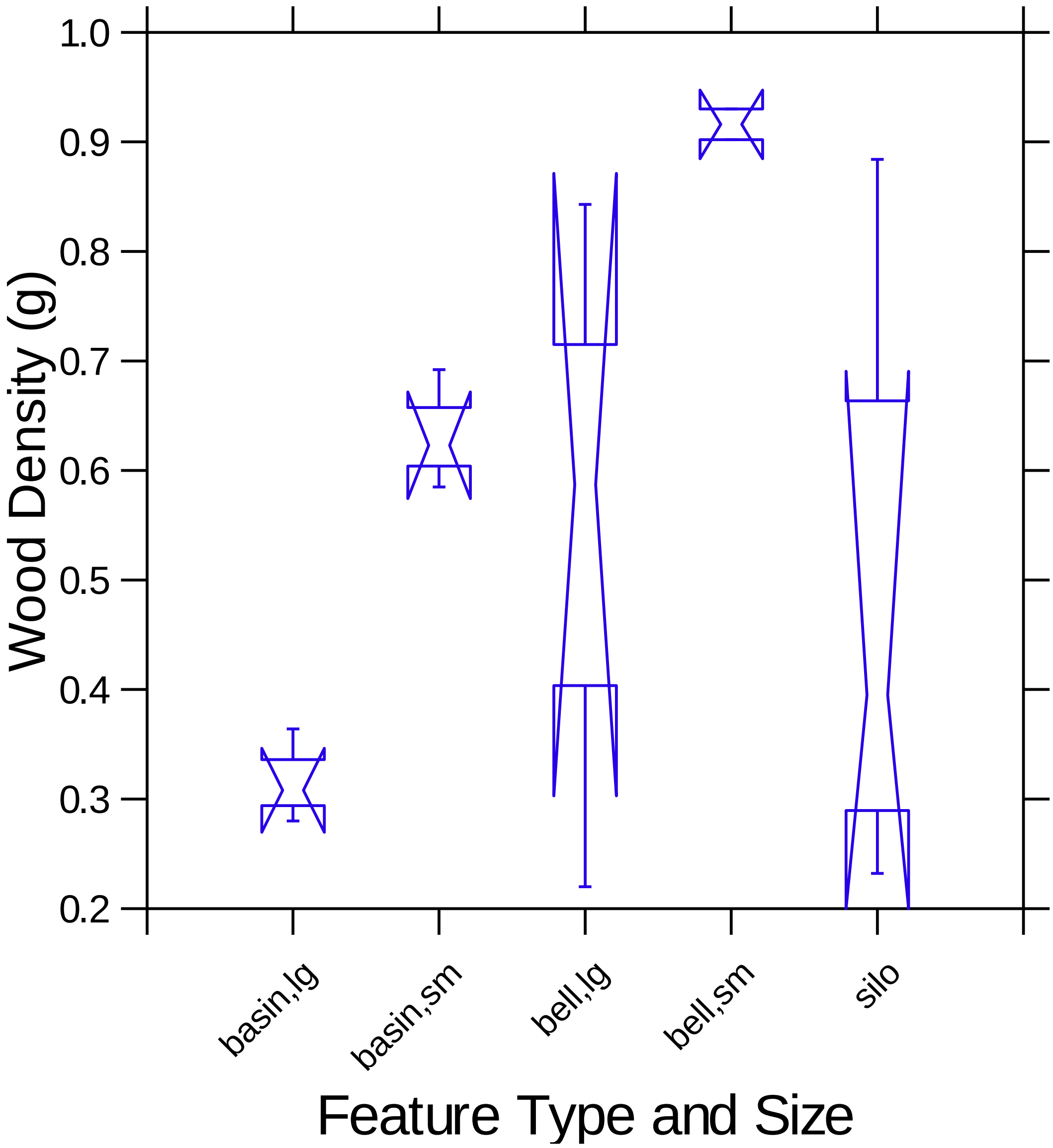

Figure 6. Box plot of wood density (g) by feature type and size.

the higher amounts of plant weight to wood weight, whereas small basins possibly could be more likely to contain fuel from original use given the higher wood density. However, there is also the possibility that the larger basins were simply used multiple times to the extent that the wood has been broken down and preserved poorly.

Given the high counts of bark in various features, comparison of bark density among feature types seemed interesting to consider. Bark has been found to have been used to line pits (Purcell 2013), and could have been used in these features as well. Figure 7 however, reveals no statistically significant difference between the feature types. Basin small, bell large, bell small, and silos all have overlapping notches. Silos also overlap notches with basin large. The only difference between quantities of bark between the features is a much smaller range of values for large basins and a much wider range for silos.

Tasha Benyshek, along with TRC and EBCI THPO, also recorded the varying rock weight among features (Benyshek 2020, personal communications). The densities displayed in Figure 8 are based upon approximate calculations using the width, length, depth, and weight of total rocks recorded (Table A.2). Given that bell-shaped pits are fairly cylindrical and could be silos that were dug out (forming the bell shape), both bell and silo volume was calculated using the formula for cylindrical volume. The radius was calculated by averaging the length and width provided (an estimated diameter) and dividing by two. Basins were calculated using the volume formula for ellipsoids, and diving in half. The radii 'A' and 'B' were calculated by dividing the length measurement and width measurement in half, and the height 'C' was equivalent to the value provided for depth. The figure displays a dominance of rock density in the feature types basin

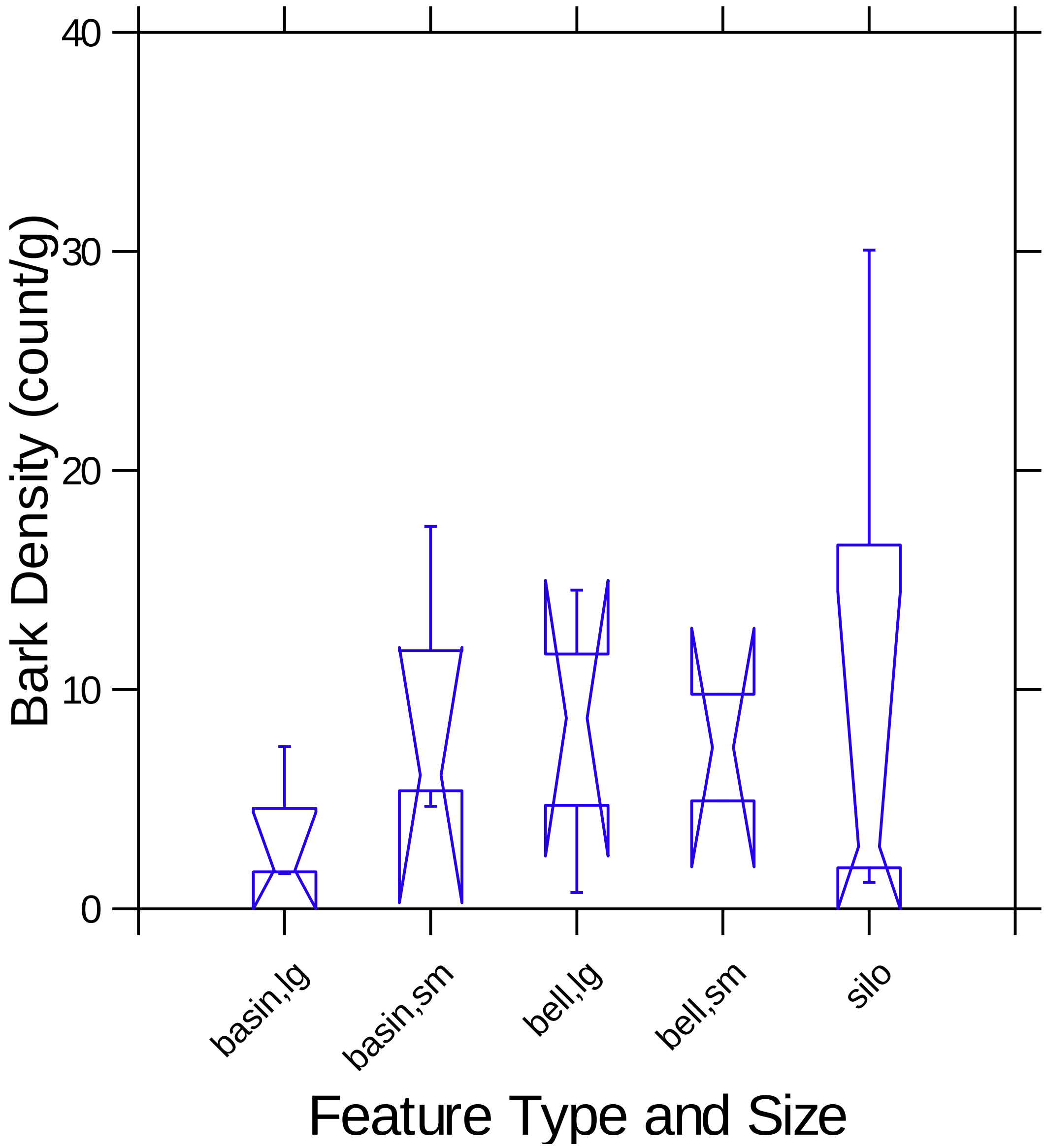

Figure 7. Box plot of bark density by feature type and size.

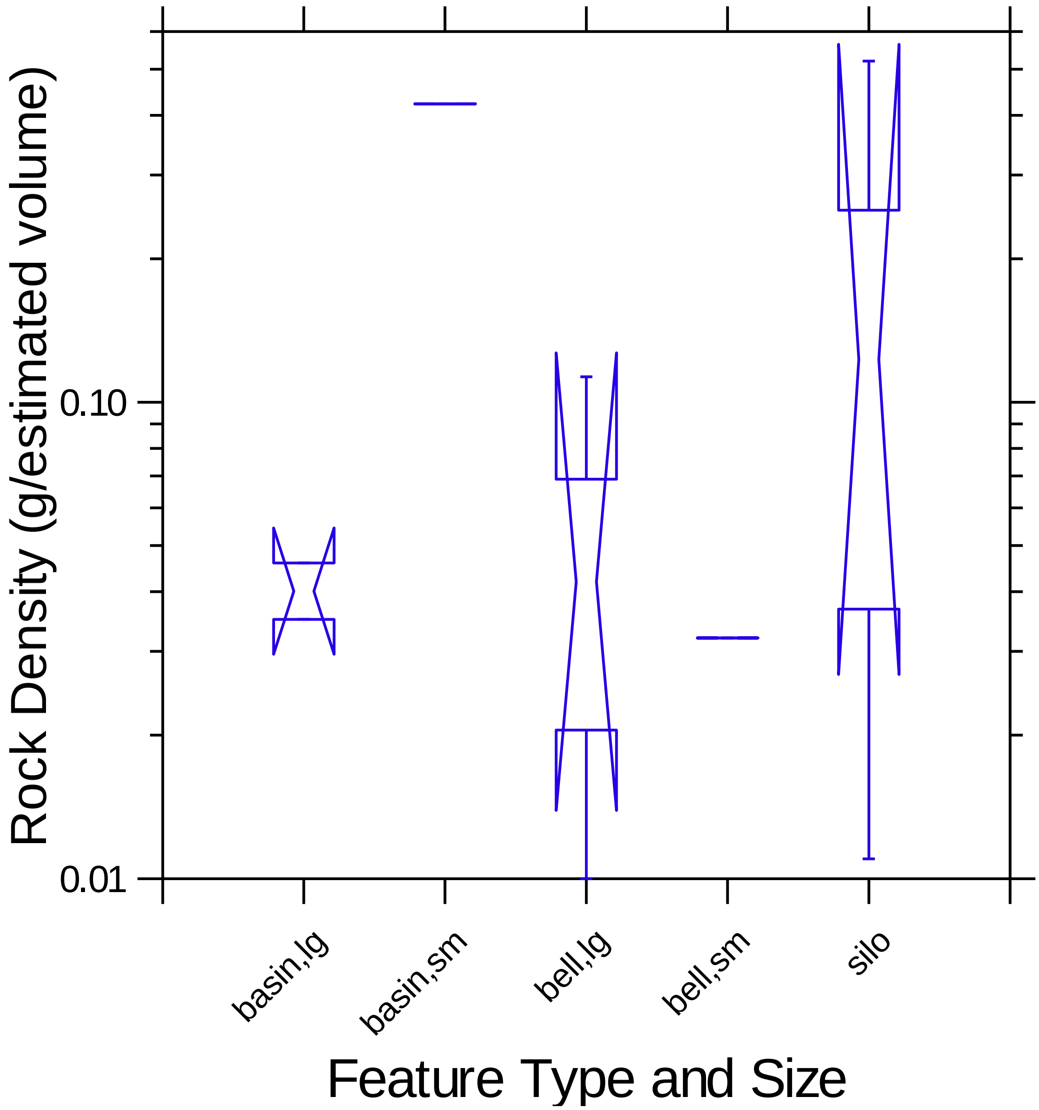

Figure 8. Box plot of rock density by feature type and size.

large, bell large, and silo; however, because the notches overlap there does not appear to be a statistically significant difference. Bell large and silos do appear, however, to have a greater range of rock density data, possibly supporting the idea of a few of these pit feature types being used as earth ovens, or containing the refuse of them. In particular, the rock weight for silo feature 487 was exponentially greater than any other feature, signaling the most likely use as an earth oven.

Figure 9 displays a side-by-side comparison of box plots for acorn and hickory densities, given that they were the most dominant nut taxa throughout the Pigeon samples. Basin small and large appear to have a statistically significant difference in terms of acorn density; however, there is no statistically significant difference between the bell sizes, nor between basin small and silo. Acorns also seem to have a wider range of data in the large basin features. Hickory density, in comparison, shows a large data spread for silo features, showing overlap with all other feature types as well, revealing no statistically significant difference.

Figure 10 displays the dominance of total nut taxa throughout all feature types. However, basin large pit features appear to be statistically significant in terms of overall nut taxa density compared to the others.

Fruit counts were minimal throughout the samples, mostly due to preservation biases. Figure 11 displays the differences in feature types and summer or fall fruits. Blackberry/raspberry, grape, and plum/cherry counts were classified as “summer fruits”, whereas honey locust, persimmon, and sumac counts were classified as “fall fruits”. Interestingly, summer and fall fruits appear to dominate in opposite feature types,

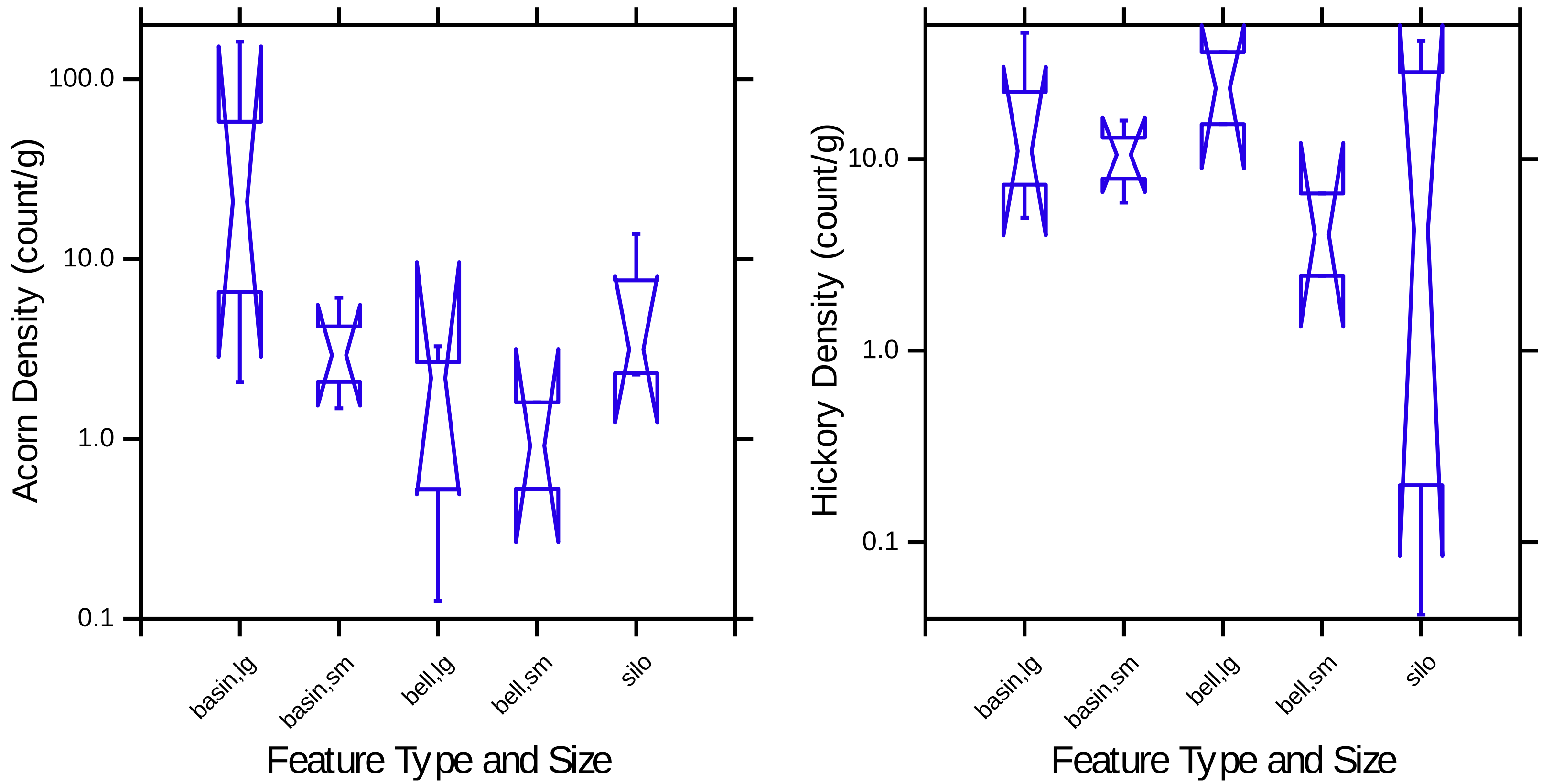

Figure 9. Comparative box plots of acorn and hickory densities (counts/total plant weight in grams) by feature type and size with y-axis log-transformed.

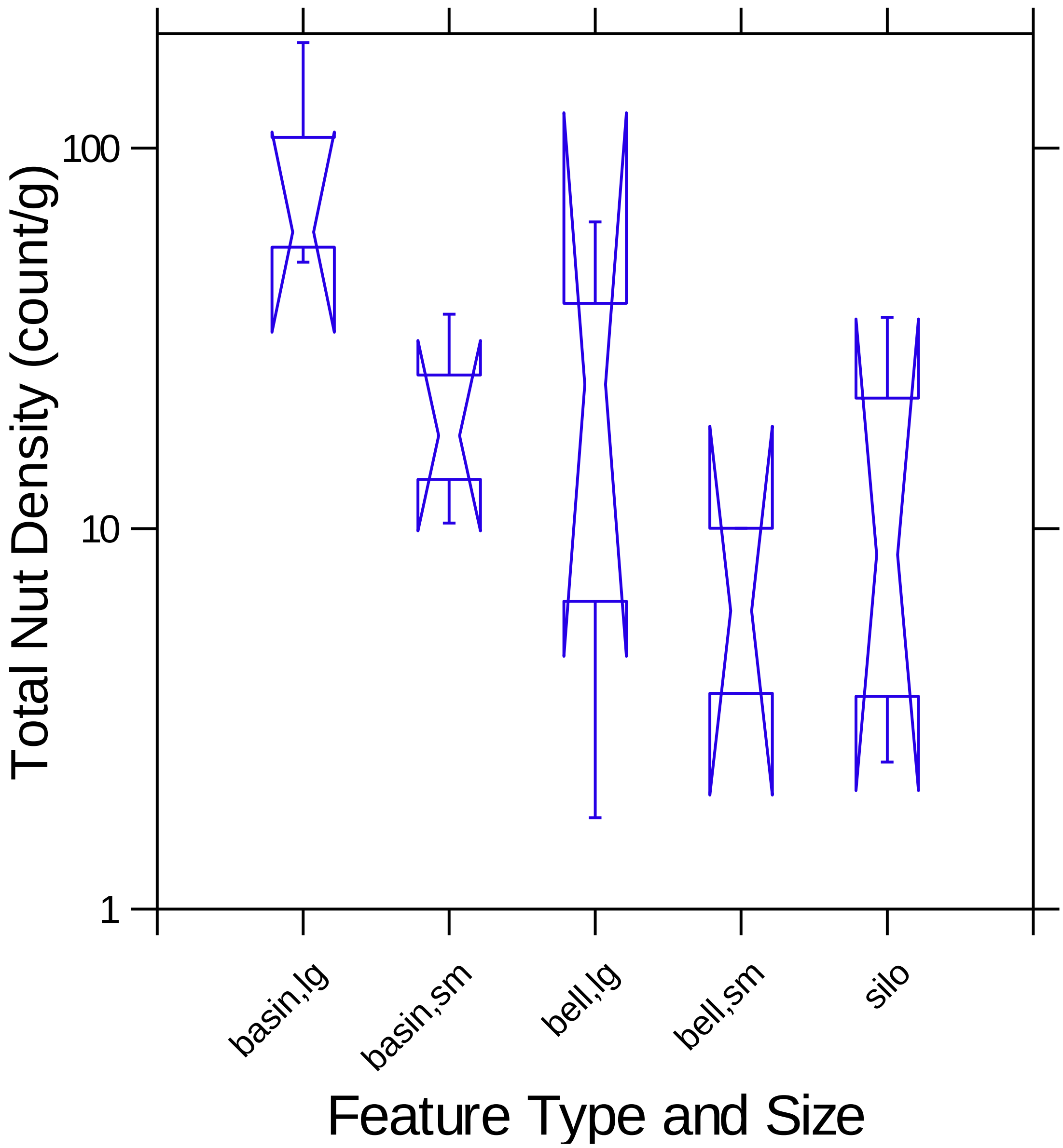

Figure 10. Box plot of total nut density by feature type and size.

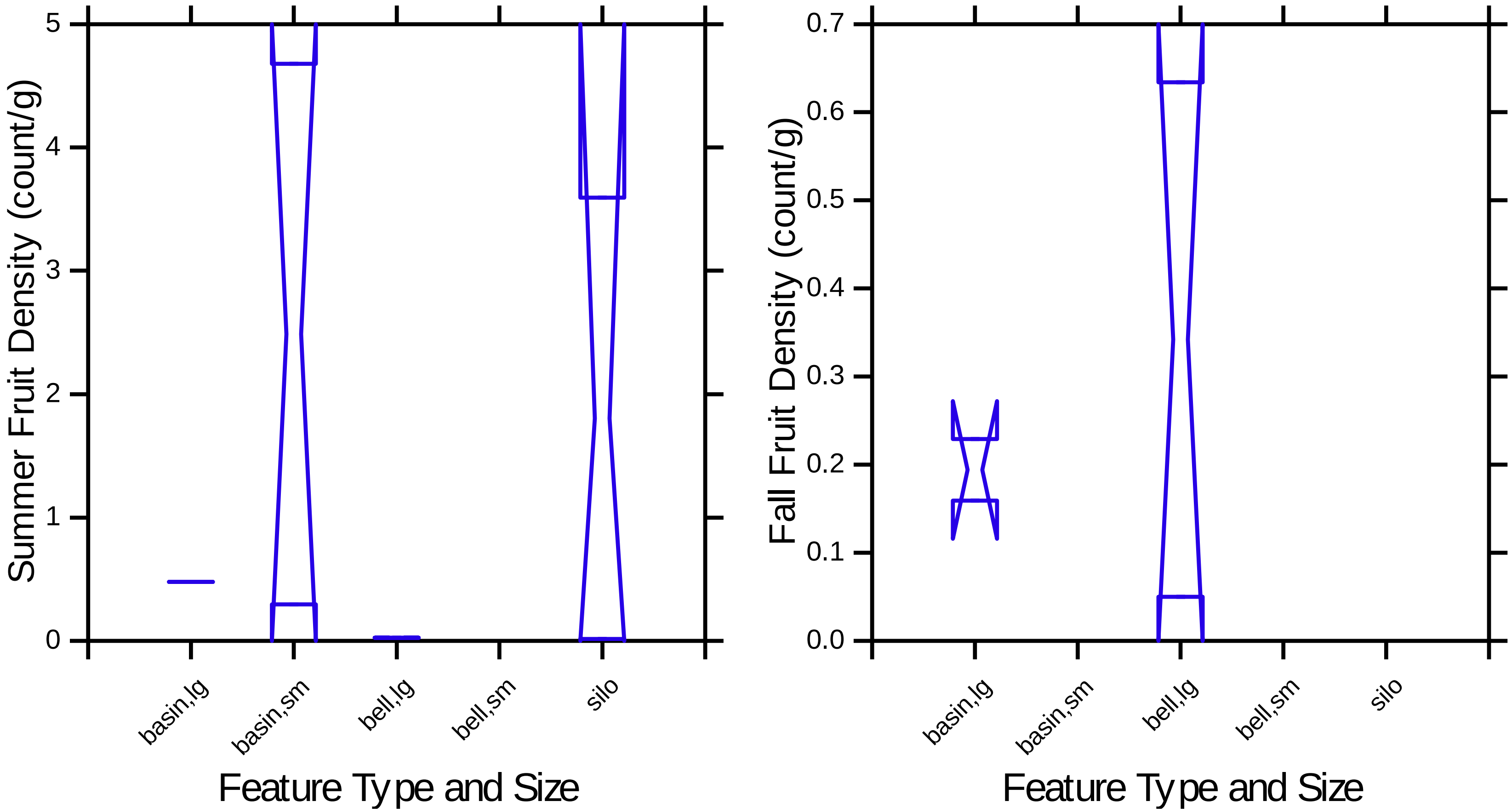

Figure 11. Comparative box plots of summer and fall fruit densities (counts/total plant weight in grams) by feature type and size.

possibly indicative of the time of year each were used. Summer fruits are associated with small basins and silos, whereas fall fruits are associated with large basins and large bells.

Lastly, cultigens were compared in Figures 12 and 13. The largest range of data for maygrass was shown in small and large basins, as well as large bells, with silo notches overlapping slightly with small basins (Figure 12). Bell small appears to be statistically different from all other features in terms of maygrass, with a much narrower spread. Chenopod appears to be strongly associated with the large basin pit features, showing a statistically significant difference from all other features types containing chenopod. Large bells also contained a fair range of chenopod compared to the other feature types, but not nearly as wide of a range as large basins. Interestingly, chenopod densities are highest in those features that have high densities of fall fruits, which corresponds with its season of harvest. Maygrass, on the other hand, was recovered more broadly across feature types.

Cucurbits, another possible cultigen, although recovered in minimal quantities at Pigeon Magic Waters, are displayed in Figure 13. The graph reveals a dominance of cucurbit associated with large basin and small bell, appearing to not be statistically significantly different from one another because the notches overlap.

CORRESPONDENCE ANALYSIS BY FEATURE TYPE

The correspondence analysis (Figure 14) shows the association between particular plant taxa (in red) and feature profile types (in blue). Essentially, the graph allows for the comparison of categorical data within reduced dimensions by adjusting the data matrix of

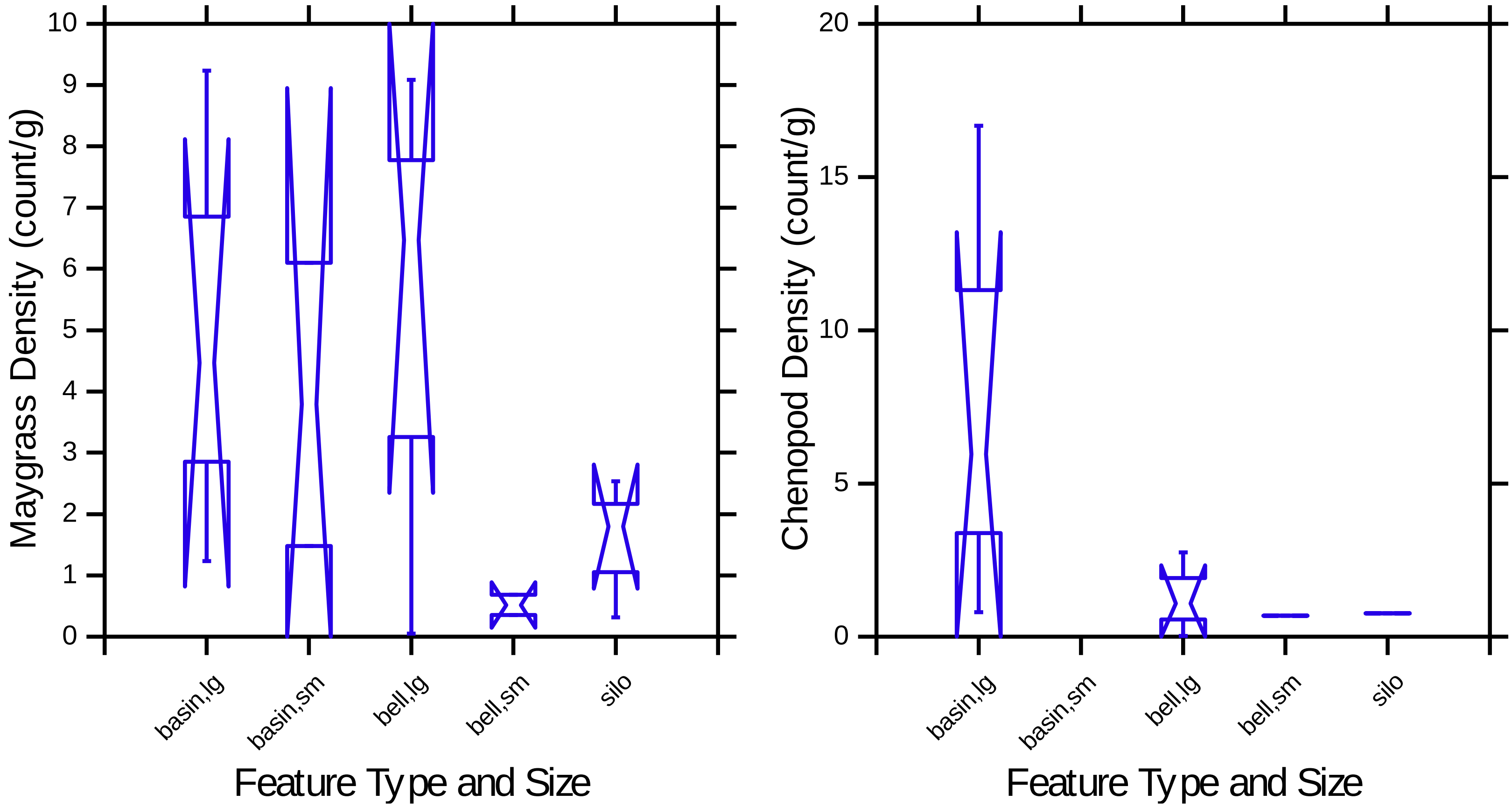

Figure 12. Comparative box plots of maygrass and chenopod densities (counts/total plant weight in grams) by feature type and size.

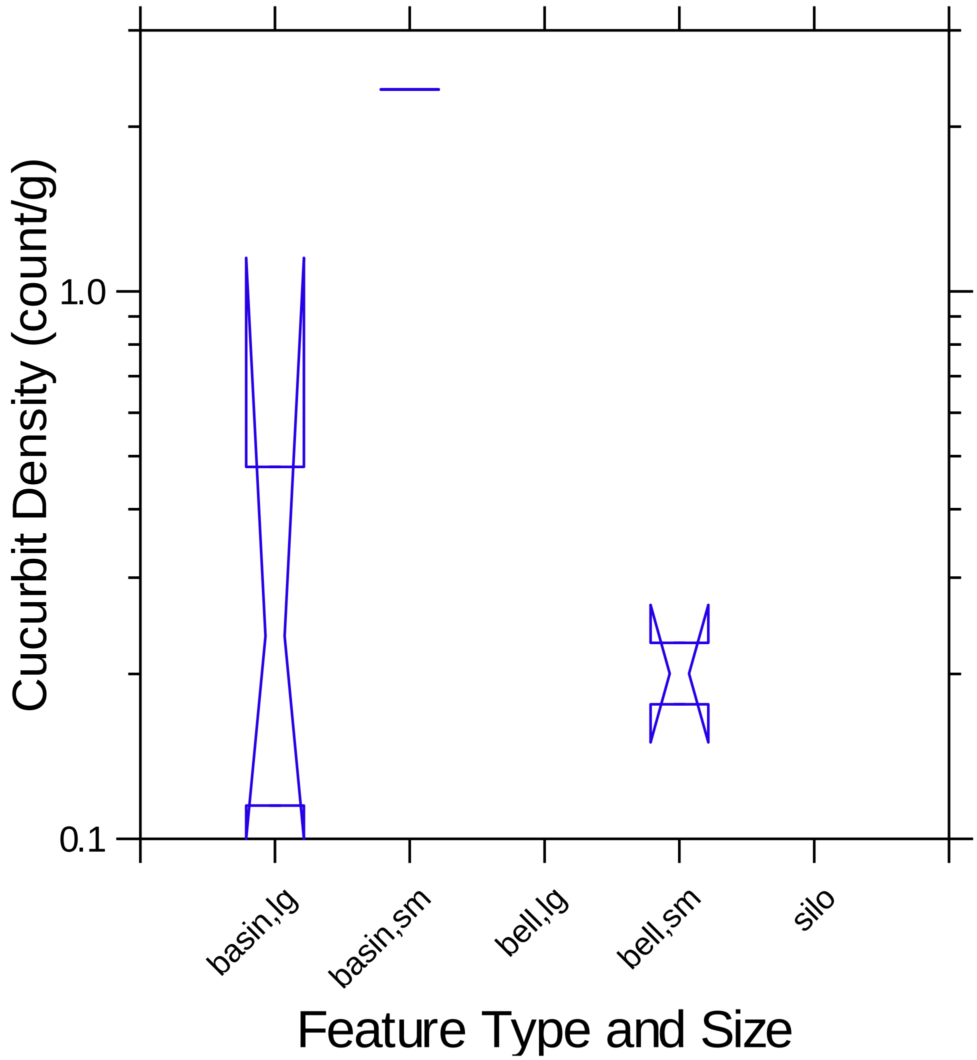

Figure 13. Box plot of cucurbit density (count/total plant weight in grams) by feature type and size.

observations and variables before analysis. The adjustment made is a modification of the chi-squared test, allowing the observations and variables to be projected onto a space in a symmetrical analysis (Carlson 2013:279). Plant taxa associated with particular feature types are clustered near the feature type in the graph. Figure 13 shows underlying associations between the silo large feature type and the plant taxa grape, bark, pine cone, and groundcherry. It also shows a relationship between the basin large feature type and the plant taxa chenopod, persimmon, acorn, acorn meat, morning-glory, and blackberry/raspberry. Interestingly, feature types basin small, bell large, and bell small are clustered close together near the origin, implying that they may not differentiate or be distinct. The plant taxa that are farthest from the origin are best at discriminating between the profile types. For example, sumpweed is strongly associated with bell small, blackberry/raspberry is strongly associated with basin large, and ground cherry is strongly associated with silo large. Those variables across the origin from one another have negative or opposite associations. This is also exemplified when examining the residuals calculated in Table 9. The feature type basin large and the plant taxon bark appear to have the strongest negative association; however, basin large has a high residual value and strongly positive association with the plant taxon acorn. On the contrary, the feature type silo large has a strongly positive association with the plant taxon bark.

Correspondence analysis focuses on relativities rather than highest quantities. These associations do not mean that certain plant taxa are exclusive to certain feature types but are relative and/or differentiated. Therefore, in interpreting the Pigeon.

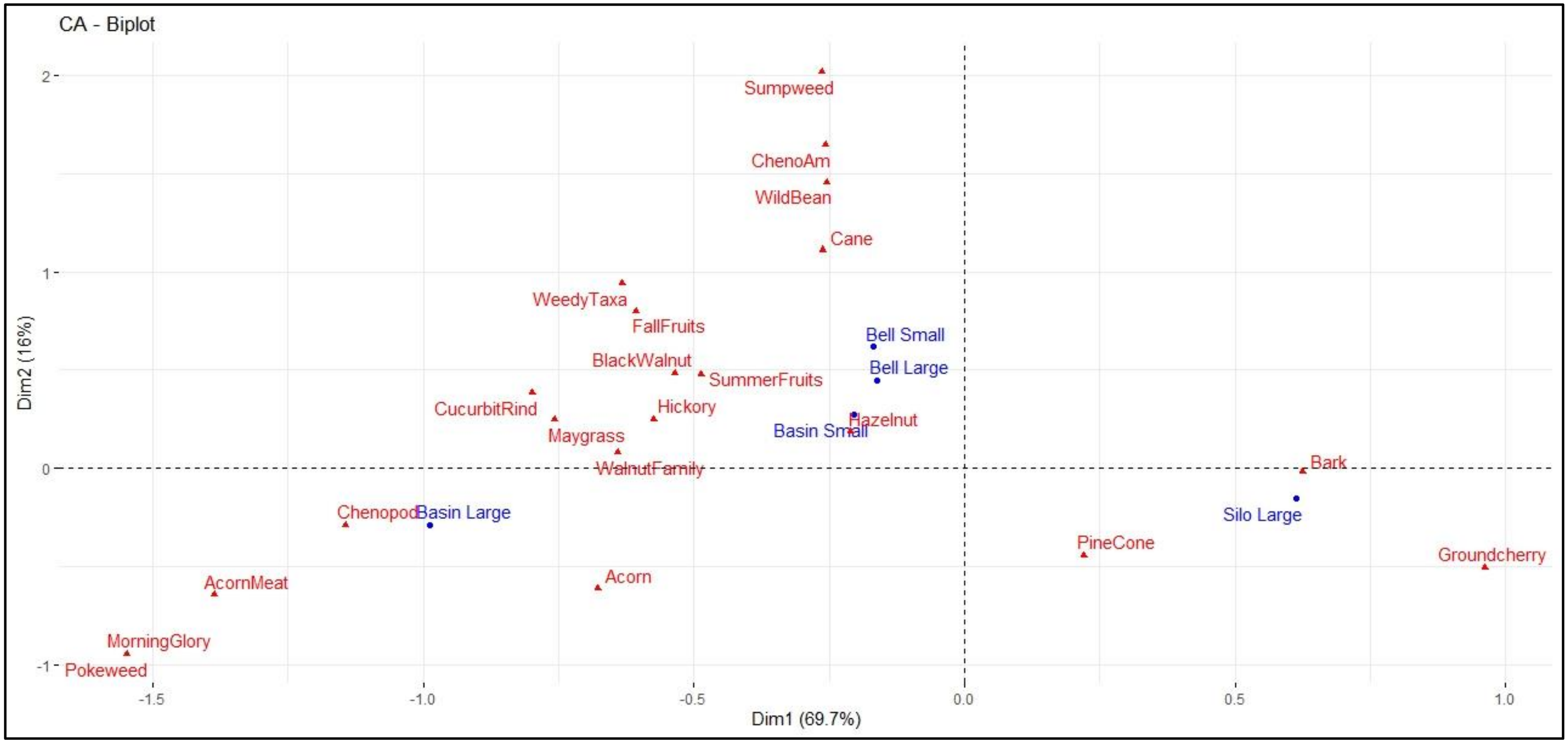

Figure 14. Correspondence Analysis (CA) of pit profiles and plant taxa contents of 31JK291 Pigeon Phase pits.

Table 9. Calculated Residuals of 31JK291 Pigeon Pit Profile Types and Plant Taxa.

Pit Profile Type	Plant Taxa	Frequency
Basin Large	Bark	-24.69684
Silo Large	Bark	22.39570
Basin Large	Acorn	21.65199
Bell Small	Purslane	15.28449
Silo Large	Hickory	-14.89343
Basin Small	Plum/Cherry	14.17810

components of Magic Waters, individual features were analyzed by feature type in addition to overall correspondence

SOUTHERN APPALACHIA TEMPORAL COMPARISONS

A comparison of the plant remains from Swannanoa, Pigeon, and Connestee sites by ubiquity value is useful to properly situate Pigeon phase within Woodland history (Table 10). As noted in Chapter 2, these sites were chosen based upon significant available botanical data for comparison. Pigeon phase Iotla (31MA77) data was very limited with only two features. However, as mentioned in previous chapters, aside from Magic Waters, limited data of Pigeon components has been recovered. This will be taken into account during interpretation of the results. The reports from two sites, Phipps Bend (40HW45) and Icehouse Bottom (40MR23), did not provide counts of nut taxa, and therefore only weights of the taxa are provided for these sites in Table 10 as noted. Based solely upon the ubiquity values across site features shown in Table 10, certain associations and values immediately stand out. Looking at the data for Phipps Bend and OES, the Early Woodland Swannanoa features appear to be dominated by acorn and chenopod. Hickory and walnut family nut taxa also seem to supplement and make up a large majority of the feature samples. Other edible seed taxa recovered includes counts of cheno/am and wild beans. The only fruit taxa recovered from the Swannanoa features is grape from both Phipps Bend and OES, and blackberry/raspberry and mulberry from OES. There are also a good amount of weedy taxa represented with 49 counts of grass family seeds at Phipps Bend and one count of pokeweed at both sites. Pigeon taxa represented by Magic Waters and Iotla show a more diverse assemblage of nut taxa,

Table 10. Ubiquity of Plant Taxa from Southern Appalachian Swannanoa, Pigeon, and Connestee Sites.

	Swannanoa Sites (Early Woodland)				Pigeon Sites (Early Middle Woodland)				Connestee Sites (Late Middle Woodland)			
Taxon	Phipps Bend (40HW45) n = 11		OES (31SW596) n = 7		Magic Waters (31JK291) n = 16		Iotla (31MA77) n = 2		Smokemont (31SW393) n = 8		Icehouse Bottom (40MR23) n = 17	
Nuts:	Count	Ubiquity	Counts	Ubiquity	Count	Ubiquity	Count	Ubiquity	Count	Ubiquity	Count	Ubiquity
Acorn	*23.4g	100%	108 (0.16g)	100%	759 (1.97g)	100%	61 (0.19g)	100%	1 (0.001g)	12.5%	*8.74g	82.4%
Black walnut	---	---	19 (0.39g)	85.7%	230 (5.66g)	62.5%	3 (0.07g)	50%	304 (7.28g)	62.5%	*13.99g	70.6%
Chestnut	---	---	---	---	---	---	---	---	1361 (24.72g)	87.5%	---	---
Hazelnut	---	---	1 (0.001g)	14.3%	111 (0.72g)	56.3%	8 (0.07g)	50%	13 (0.06g)	25%	*0.01g	5.9%
Hickory	*17.9g	100%	935 (14.42g)	100%	3438 (10.73g)	100%	89 (0.74g)	100%	132 (2.08g)	37.5%	*223.72g	100%
Walnut family	*3.4g	81.8%	19 (0.17g)	57.1%	369 (2.43g)	75%	---	---	146 (1.14g)	25%	*2.84g	76.5%
Fruits:												
Blackberry/raspberry	---	---	1	14.3%	2	6.25%	---	---	---	---	1	5.9%
Grape	6	9.1%	3	28.6%	9	25%	1	50%	---	---	43	70.6%
Honey locust	---	---	---	---	5	12.5%	---	---	1	12.5%	10	41.2%
Maypop	---	---	---	---	---	---	2	50%	---	---	---	---
Mulberry	---	---	1	14.3%	---	---	---	---	---	---	---	---
Persimmon	---	---	---	---	6	18.8%	---	---	---	---	1	5.9%
Plum/cherry	---	---	---	---	9	12.5%	---	---	---	---	3	5.9%
Sumac	---	---	---	---	2	6.25%	---	---	---	---	1	5.9%
Edible Seeds:												
Bearsfoot	---	---	---	---	---	---	---	---	---	---	1	5.9%
Cheno/am	3	9.1%	---	---	4	12.5%	1	50%	---	---	9	23.5%
Chenopod	111	45.5%	4	42.9%	118	50%	12	50%	2	12.5%	60	76.5%

Table 10. continued.

	Swannanoa Sites (Early Woodland)				Pigeon Sites (Early Middle Woodland)				Connestee Sites (Late Middle Woodland)			
	Phipps Bend (40HW45) n = 11		OES (31SW596) n = 7		Magic Waters (31JK291) n = 16		Iotla (31MA77) n = 2		Smokemont (31SW393) n = 8		Icehouse Bottom (40MR23) n = 17	
Taxon	Count	Ubiquity	Count	Ubiquity	Count	Ubiquity	Count	Ubiquity	Count	Ubiquity	Count	Ubiquity
Cucurbit rind	---	---	---	---	11	31.3%	7	50%	21	12.5%	---	---
Maygrass	---	---	---	---	236	81.3%	1	50%	---	---	125	76.5%
Sumpweed	---	---	2	28.6%	1	6.25%	---	---	2	12.5%	1	5.9%
Wild bean	7	9.1%	1	14.3%	6	12.5%	---	---	---	---	11	17.6%
Weedy Seeds:												
Bedstraw	---	---	1	14.3%	1	6.25%	---	---	---	---	83	82.3%
Carpetweed	---	---	---	---	1	6.25%	---	---	---	---	---	---
Grass family	49	27.3%	---	---	5	25%	3	50%	---	---	27	47.1%
Knotweed	---	---	---	---	---	---	---	---	---	---	8	23.5%
Pokeweed	1	9.1%	1	14.3%	3	12.5%	---	---	---	---	7	23.5%
Purslane	---	---	---	---	60	37.5%	---	---	---	---	---	---

*Count not provided, only weight recorded.

moving from acorn, hickory, and walnut family, to include other nuts such black walnut and hazelnut. While acorn counts are extremely high, hickory still appears to dominate during this time according to the samples represented in Table 10. However, considerations for the fragility of acorn and the hardiness of hickory should be accounted for in interpretation of importance. A varied amount of fruit also are represented in the Pigeon samples with grape found in both Magic Waters (with 25% ubiquity) and one of the two features at Iotla. Other fruits recovered from Pigeon phase contexts include blackberry/raspberry, honey locust, maypop, persimmon, plum/cherry, and sumac.

Edible seed taxa also increased from the Swannanoa period, although chenopod has remained of importance, as well as cheno/am. Other cultigens recovered that were not found in earlier features include cucurbit, maygrass, sumpweed, and wild bean. At Magic Waters, maygrass has an even higher count frequency and ubiquity than chenopod with 236 counts in 83.6% of the samples. At Iotla, 12 chenopod seeds and only one maygrass seed were recovered from its two features, but the overall sample count and plants recovered were very low. As is typical with an increase in cultigens causing disturbed soil, weedy taxa also greatly increased during Pigeon phase. While Swannanoa samples included grass family and one pokeweed seed, Pigeon samples recovered bedstraw, carpetweed, grass family, pokeweed, and purslane.

The Connestee phase, represented by Smokemont and Icehouse Bottom sites, continues to see the importance of acorn, black walnut, hazelnut, hickory, walnut family, grape, chenopod, and maygrass represented in their samples. However, there are a few changes and/or additions in Connestee. Although not recovered at Icehouse Bottom, chestnut dominated the nut taxa of the Connestee Smokemont features with a count of

1,361 and a ubiquity of 87.5%. A wide variety of fruits continue to be represented during Connestee as well, including blackberry/raspberry, grape, honey locust, persimmon, plum/cherry, and sumac. Chenopod, maygrass, and cucurbit continue to be of importance. It should be mentioned that there was also a high recovery of 85 counts of corn in 64.7% of the samples at Icehouse Bottom (Cridlebaugh 1977); however, in 2021, several "corn" specimens were reanalyzed and found to be intrusive from later Mississippian contexts, making the presence of early corn at the site highly doubtful (Simon et al. 2021). Therefore, corn was not added to the table for Icehouse Bottom. Although only chenopod, cucurbit, and sumpweed were recovered at Smokemont, common bean, bearsfoot, cheno/am, chenopod, corn, legumes, maygrass, and sumpweed are represented at Icehouse Bottom. Accordingly, a wide variety of weedy taxa are also represented with 82.3% of Icehouse Bottom features containing bedstraw, with grass family, knotweed, and pokeweed also present.

Figure 15 displays the correspondence analysis of all the nut taxa across sites. Interestingly, not all sites clustered near the site of the same time period, nor did there appear to be a geographical association between eastern Tennessee nor western North Carolina sites. Acorn appears to be strongest associated with Phipps Bend, a Swannanoa Early Woodland site, whereas hickory is clustered close to the Swannanoa OES site, as well as the Connestee Icehouse Bottom. The other Connestee site, Smokemont, is highly differentiated from the others and very strongly associated with chestnut. Even with a small sample, the nut taxa of Pigeon Iotla and Pigeon Magic Waters appear to be closely related due to their plotted proximity. Hazelnut seems to be associated with the Magic Waters site particularly. Black walnut also appears to have an opposite, or

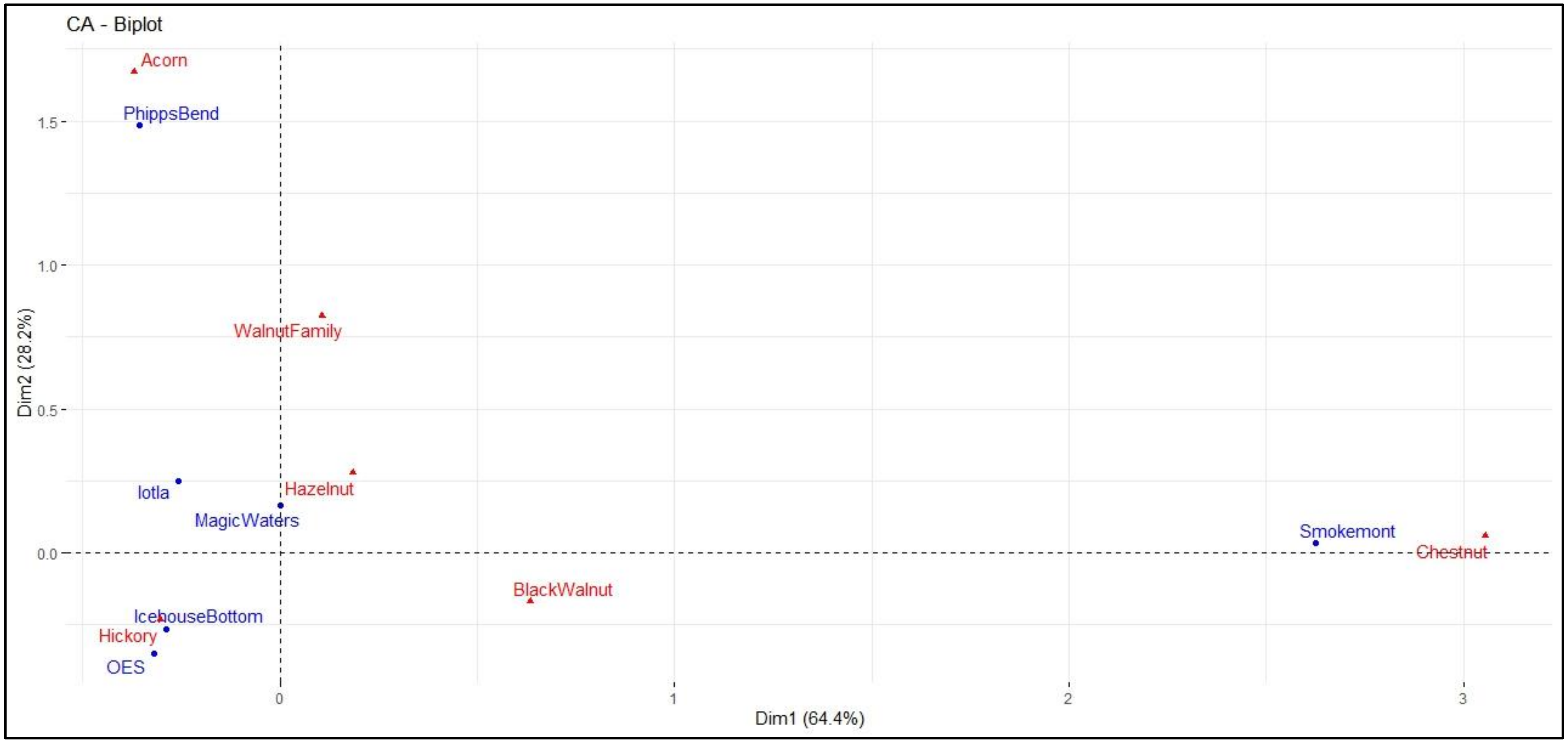

Figure 15. Correspondence Analysis of the nut taxa of Swannanoa, Pigeon, and Connestee sites.

negative, association with Swannanoa Phipps Bend and Pigeon Iotla. Of course, this is not entirely conclusive given the limited sites and feature data of some time periods used; however, it is important to consider in interpretation along with the previously discussed ubiquity values.

Figure 16 displays the correspondence analysis of all sites against fruits, edible seed/cultigens, and weedy taxa. For this analysis, any rare taxa that were singular and only found at one particular site were excluded to reduce noise when plotting. A large majority of the sites and taxa clustered near the origin, which is why the graph was elongated to show the various taxa, especially the highly differentiated. Maygrass, plum/cherry, persimmon, and purslane are all clustered close to Magic Waters, revealing association with the site; Phipps Bend shows a strong differentiation with grass family; Icehouse Bottom is associated with bedstraw; and Smokemont is associated with cucurbit.

Unlike the nut taxa that did not seem to have a geographical difference, there does seem to be some connection in Figure 16. Both eastern Tennessee sites, Swannanoa Phipps Bend and Connestee Icehouse Bottom show some association with the taxa of chenopod, wild bean, grape, pokeweed, and bedstraw. Also interesting, is what appears to be an opposite association between Magic Waters and its fellow Pigeon site Iotla, as well as the earlier Swannanoa OES site that is located very close to Magic Waters. However, as originally stated, this graph is elongated because of so many taxa and sites so close to the origin with just a few differentiated. Therefore, these opposite associations cannot be taken too seriously. Furthermore, as stated with the nut correspondence, there is

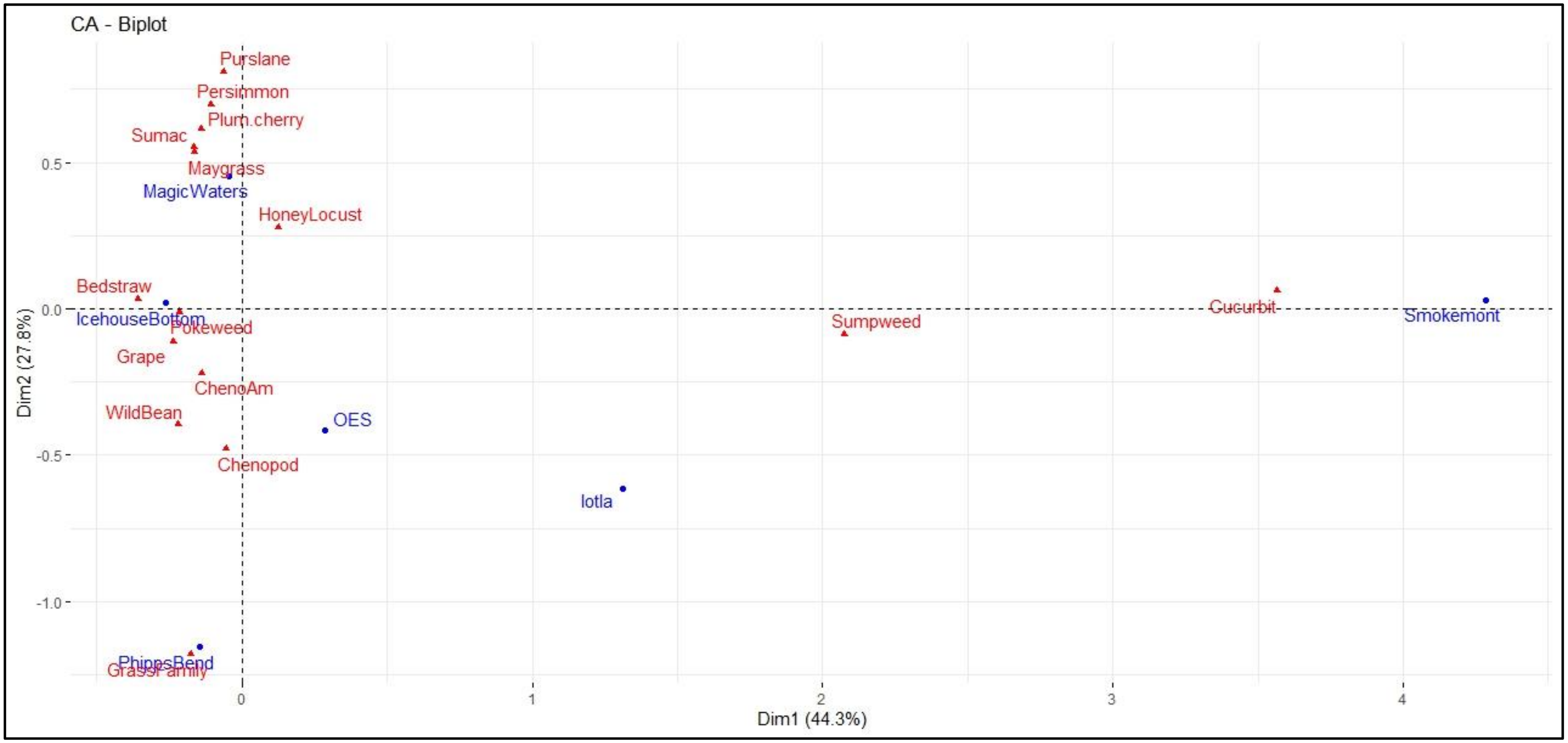

Figure 16. Correspondence Analysis of the fruit and edible seed taxa of Swannanoa, Pigeon, and Connestee sites.

differentiation of sample sizes and excavation methods that could also reveal positive and negative associations between sites and plant taxa that are not suitable for definitive statements for the overall time period.

CHAPTER FIVE
RHYTHMANALYSIS

An analysis of social rhythms shows the understandings of space and time in the comprehension of everyday life (Lefebvre 2004:1). There is a need to look at time as not linear, but as cyclical and lived. To view time in this way, especially in archaeology, is to fully give agency to those whom we are studying. In paleoethnobotany, this includes not only the ancestral human beings, but the plants analyzed and the land from which they came.

Lefebvre (2004:94) referred the use of rhythmnalaysis as "a study that can listen to a house or town just as one would to a piece of music." Biological and social rhythms revolve around the body, and any bodily needs such as sleep or hunger are responses to the conditioning of our working lives and social environment. Lefebvre uses the body not as a subject but as a point of analysis, thereby producing a rhythmanalysis rather than an analysis of rhythms (Lefebvre 2004:6). And where are these rhythms created? Anywhere and everywhere that there is an interaction between place, time, and some sort of expenditure of energy, there is a rhythm (Lefebvre 2004:6). It is not the beats of rhythm, but the gaps between those beats where time exists.

From an archaeological standpoint, it is not simply the actions that are inferred by the artifacts and ecofacts that remain thousands of years later, it is the life that happened in between their use connecting them: the everyday life, and the beautiful mundane. The flow of activities carries on life and *creates* time (Mlekuz 2010). Life is not moments of beads slowly collected on a string, but music notes that respond and anticipate to the world and moments that came before them, surround them, and those yet to arrive that give it purpose (Lefebvre 2004).

To view the rhythm of a village such as Magic Waters, the conditioning of the natural world on the human, and vice versa, must also be understood. Every seed and nut recovered and studied was an agentive being with its own rhythm in the world that effected the rhythm and life of the human relatives that agentively used it for a particular purpose. Gardens are an example of non-human agency, providing a space for plants to grow and develop as well as providing humans with a connection to the past through the ancestors that originally prepared them and planted seeds in them (Mlekuž 2010:197). A garden creates a rhythm throughout the seasons with a flow of substances intertwining human beings and non-human beings and their movement (Mlekuž 2010:201). The proximity of garden plots to domestic spaces and their constant need for tending is not unlike the rearing of children, further speaking to the idea of plants as relatives. If they are not tended to, they will grow where they are unwanted, worrying only about their own agenda of reproduction (van der Veen 2014:808). Plants' agency stems from their need to reproduce and copy themselves, which is why plant domestication is mutually beneficial to both the agency of humans and plants. Plants will use wind, insects, animals, or any other being necessary to assist with their reproduction goals (van der Veen 2014:802).

The subsistence way of life is guided by knowledge and practices past down from elders that focus on respect and reciprocity (Carroll 2015:120,141). Kimmerer (2013:382) describes the agency of berries and their teachings of reciprocity explaining that the berries offer themselves to the birds, bears, and people, knowing and trusting that they will then disperse their seeds to grow in new places; they are mutually responsible for one another. Every tree, every flower, every fruit, and every nut and seed all have their own rhythm; a time for flowering; a time for providing fruits to human and animal relatives, a time for each leaf to slowly fall from the tree, and so on (Lefebvre 2004:89). There is a rhythm to almost all things in life.

The rhythm of the land is primarily dependent on geography, topography, climate, seasons, and external influence of humans and animals. The earth's rhythm varies across time and space, ebb and flow based upon giving and receiving to and from the other beings around it. Not only the growth and seasonality of trees, shrubs, crops, herbs, weeds, mushrooms, tubers, but also the lunar cycles, the flow of the nearby stream and river; the animals hunted for game or competed with for food; and so on. Water was collected by Cherokee women everyday filling gourds and pitchers with which to aid in preparing food, medicines, dyes, and other domestic goods (Hill 1997:4). In this way, the rhythm of the water, with its magical and spiritual properties, brings a repetitive routine that the women respond to. The phrase, *amo-hi atsv-sdi*, means "going to the water", for purification and rebirth, and occurred after every event and each new moon.

The Middle Woodland Pigeon phase at Magic Waters is suggested to be a semi-permanent settlement based upon the sixteen structures indicated by posthole patterns (Benyshek 2018), but also, as seen in this thesis, based upon the numerous pits of varying shape and size and their botanical contents with differing seasonality, some pit shapes corresponding to particular seasonal foods. Because of this, rhythmanalysis is an appropriate framework for an interpretation of the botanical activities of the site's occupants, their connections with the land around them, and connections with one another, highlighting the "woman's world" (Perdue 1998). However, when discussing and highlighting Tsalagi "women" and the "woman's world" it is important to address that this binary division of labor did not mean that there were not non-binary individuals, such as two-spirits or berdaches, who would have identified with and/or assisted with this work. Also, as is exemplified in my rhythmanalysis, there were many times when the work of "men" and "women" overlapped. Yet, it is important to highlight these individuals and their work that have not always been given attention in previous research, but have been so important in these matriarchal societies.

After analysis and identification of botanical remains and statistical associations are calculated, there is still the heart to consider: the relationship between the plants and the ancestors and the life that they created together (Atalay 2020). More specifically, "the rhythmic temporality of the yearly course woven into life" (Mlkeuz 2010:193) must be addressed. The best way to imagine the rhythm of Magic Waters during Pigeon phase is to look at what would be happening at and near the site by season. A seasonality chart of plant taxa recovered from the Pigeon pit features is displayed in Table 11.

Spring

Every morning, the women take gourds and vessels to the creek to retrieve water for the day and prepare food for the other villagers. The women also collect the wood to

Table 11. Seasonality (ripening/harvesting time) of plant taxa definitively identified from Magic Water Pigeon pits.

	Spring	Summer	Fall	Winter
Maygrass	X	X		
Blackberry/raspberry		X		
Grape		X		
Plum/cherry		X		
Cheno/am		X	X	
Chenopod		X	X	
Cucurbit		X	X	
Sumpweed		X	X	
Wild bean		X	X	
Honey locust		X	X	
Pokeweed		X	X	
Purslane		X	X	
Hazelnut		X	X	
Acorn			X	
Black walnut			X	
Hickory			X	
Walnut family			X	
Persimmon			X	
Cane			X	X

prepare the fires for cooking and warmth (Hill 1997:4,13). A meal is made over a cooking pit at the start of each day, created from any leftover stores of nuts, dried bread, dried fruits, or recently foraged items. The meal is placed in a communal area over a fire for others to retrieve when they are hungry. Then the day is spent gardening and preparing the land, or if it is too early in spring and it is yet too cold, time will mostly be spent foraging for roots, tubers, and early greens for potherbs, roots for dyes, medicine, and food; and indoor activities creating domestic necessities continue as they did in the winter.

While the women work the children trail at their feet, playing and assisting, but also observing and learning skills passed down from generation to generation, the way to speak and listen to the land; to receive and give in a reciprocal manner. Elders may join the women in their work, sharing their wisdom and knowledge, and helping where able.

The women, the land-keepers, listen and watch for the weather to warm and soil to be ready for clearing and planting. When all signs of winter have disappeared, the ground is prepared with slate hoes. Although the women are responsible for the plants, many in the village assist with preparation; men not needed elsewhere assist in the clearing of the fields.

The seeds kept from the previous year's harvest of maygrass and chenopod, originally gathered wild or gifted in an act of reciprocity with village neighbors, are broadcast over the prepared beds. As the crops grow, so do the weeds who thrive in the freshly disturbed soil. The women encourage the weeds, allowing them space in exchange for their use for medicinal or food purposes. Leaves and young shoots are prepared for eating, not able to be stored like other foods.

They continue to till and clear the land and cucurbits are ready to be planted. More time is spent planting the cucurbits, who demand the attention of individual planting, rather than broadcasting seeds. By the very end of spring, the maygrass is ready for harvesting, unless planted alongside chenopod and cucurbit, in which case, the harvest will not occur until later summer.

Summer

Summer at Magic Waters is not necessarily spent in the village. This is a time for dispersing into smaller summer camps: gathering, hunting, fishing, or even visiting others in nearby villages. Some tilling of the fields occur, but the cucurbit leaves provide aid by protecting the soil from weeds and sun. Outside of the fields, and perhaps farther away from the village, the women and those who are a part of their gathering groups, listen and respond to the ripening of the fruit trees and shrubs, presenting bounty to their animal and human relatives. The gathering of fruit must be prioritized to avoid competition with nearby animals.

The women are knowledgeable on the location of the foods they gather. Into the woods they walk to find the grape vines, children underfoot and assisting in picking as large an amount as they are able. Along the edges of the forest, thickets of blackberry and raspberry shrubs reside, waiting to be picked so that they may grow again. A great deal of time is spent picking the fruits by hand, and the women must allow for this in their daily schedule. The fruit trees even offer their bark and leaves for purposes, the bark often used in medicinal teas, or matting for pit lining, and the leaves, especially that of grapes, to be cooked and eaten.

Blackberries, raspberries, plums, cherries, and grapes, all of these summer fruits are eaten raw, dried for later consumption, formed into preserves, and used for flavor in breads. The process of drying for storage is also knowledge passed down from generations. Time spent communally gathering, tilling, planting, harvesting, processing, cooking, or eating, is also a time for learning from elders and socializing with other women.

In late summer, the land-keepers also anticipate the time-consuming activity of gathering hazelnuts. Along the edges of the forest, the hazelnut thickets must be picked like berries. Once they have been gathered and returned home, the hazelnuts are stored, processed, or cooked. This busy time is also when chenopod, sumpweed, wild beans, and cucurbits are starting to be ready for harvest. Thankfully, harvesting is also a time in which the entire village assists and the men help reap what has been sown.

Once the harvest is collected, the crops are processed for storing or eating. Cucurbit rinds are eaten by boiling, roasting, or drying. The seeds of the cucurbits are eaten raw, boiled into porridge, toasted, or formed into flour for breads and mush. Chenopod leaves and shoots are also used as greens.

Fall

September is appropriately named "*Dulu-stinee"* in Cherokee, or "Nut Month"/"Month of the Nut Moon" (Hill 1998). With all nuts ripening in the fall months, with the exception of hazelnut that can ripen as early as late summer, the women's, children's, and elder's activities and schedules during this time are largely centered around nut gathering. Men too are heavily involved in harvesting during peak season to assist in accomplishing all that must be done in the time allotted. With sizeable crops only produced every two to five years the time to collect and the labor to do so would vary. However, even bumper crops with minimal producing nuts would invoke urgency for collection with an even greater competition with wildlife.

Acorn, black walnut, and hickory all peak in availability around the month of October. The women must also make time in their schedules for the extra time it takes to gather or process particular nuts. Hickory, growing in stands and not requiring processing prior to storage, with the exception of the large quantity desired for both fuel and food, would not take as long to gather and process as acorn and black walnut. Acorn is also found commonly in oak stands, however, soon after collection the acorn must be parched prior to storage to avoid mold and sprouting. The acorn is also toasted or walked down to the creek or river in a basket and placed in the water to leach and remove tannins. Finally, black walnuts, growing solitary in rich woods, would take a greater deal of time to gather, and perhaps would only be gathered as an addition when foraging for other plants in the same area as the black walnut tree. The women would decide based upon the growth of the nuts that year and their own taste preferences and needs which nuts to spend the most time on, in addition to their daily work and other seasonal activities. The time to process the nuts before eating would also be anticipated and considered.

The women then gather in a communal area for processing, using groundstones formed purposefully for grounding the nuts. While the women and elders converse, the children are also playing nearby or helping and learning where they can. Acorn meats are ground into meal for bread or mush; hickory is crushed, formed into balls, and placed into boiling water that separates meat and shell, where nut meat can be collected or continue to melt to create nut milk. Black walnut can take a greater deal of time to process, as the bitter hull attached to the deep ridges of the shell cannot be crushed and boiled so easily as hickory or acorn. All of the plant material not used, especially the shells, are placed into a trash pit, creating a rhythm even in an activity of the undesired.

In between nut gathering, processing, and preparing, the women also find time for collecting fall fruits when they ripen. Among the edge of the woods the women locate the honey locust trees and the sumac thickets. Although persimmon are also amongst the honey locust in the edge of the forest or along the fields, the women must wait until after the first frost when the persimmon will ripen and fall to the ground, signaling they are ready to be gathered. The bark and the leaves of the persimmon trees are collected simultaneously to later use for creating medicines and teas.

Sumac berries are taken home, crushed, bruised, or roasted and formed into a drink. The women also use the pulp of the honey locust to make a drink, although they are also eaten raw, or saved to sweeten medicines. The pulp of the persimmon is dried and formed into cakes, made into preserves, and eaten raw.

Rivercane is also collected during the fall or winter, after waiting for the spring and summer periods of rapid growth. Until they have time to work with the cane, the women immerse the stalks in the streams to keep them fresh (Hill 1997:41).

Aside from the daily routine of collecting water and wood, preparing communal food, working the fields, collecting nuts and fruits, processing gathered plants, and the always ongoing rearing of children, the drier fall and winter months are also a time for setting fire to underbrush to help clear vegetation and drive game. Setting fire to the grass in the woods is specifically the duty of the women (Hill 1997:61).

Winter

After filling storage pits with the harvests of the fall, the villagers leave Magic Waters for hunting camps in the hills, where storage pits have previously been filled for future returns. Even away from the village the rhythm of work does not cease- water and wood are still collected, fires are kept going for cooking and warmth, food is prepared for the villagers, and roots and tubers are foraged for supplemental nutrients. The stores of nuts, grain, and dried fruits, anticipated in the earlier seasons for need during the winter and early spring, are now utilized by the women for preparing meals. These stores are the property of the women, and they delegate when and how much will be used. The entire year the women use what they know to be available and how to grow, process, store, and/or prepare it, in anticipation of the next season. Whether the next season brings a time of harvest, or a time of limited resources, the women have scheduled and prepared accordingly, responding with a rhythm that that echoes the land.

CHAPTER SIX
CONCLUSIONS

Overall, sixteen samples from Pigeon phase pits were analyzed from Magic Waters (31JK291). These samples were taken from thirteen different features of varying profile shape and size, including three small basins, three large basins, one small bell within a structure, three large bells, and three large silos. Ultimately, 163.07 grams of carbonized plant material were recovered across all analyzed features.

RESEARCH QUESTION 1

What plant remains are recovered through paleoethnobotanical analysis? What was the function of the pits during Pigeon phase of Magic Waters (31JK291) and how might they vary intra-site? Are there any underlying associations between pit feature profile and botanical contents?

As displayed in Table 4 of Chapter Four, the Pigeon phase pit features at Magic Waters produced a great variety of plant taxa, many in significant quantities. Nuts dominate the assemblage with the highest frequency of hickory recovered, followed by acorn, and black walnut. Although nuts most certainly were a primary food and fuel source, as discussed in Chapter Three, because nuts produce a byproduct and are the most likely of the plant taxa to withstand contact with fire, they are almost always overrepresented in macrobotanical assemblages. Fruits, often underrepresented, were recovered throughout the samples, even if only in minimal quantities. Blackberry/raspberry, grape, honey locust, persimmon, plum/cherry, and sumac were all successfully identified from the samples.

The edible seeds and cultigens were most anxiously anticipated prior to botanical analysis, as the recovery of slate hoes in the 2018 excavation at Magic Water already hinted at horticultural practices. Paleoethnobotanical analyses did not disappoint. Many plant taxa known to be included the Eastern Agricultural Complex (EAC) were recovered in significant quantities, including cultigens that may not have been domesticated at Magic Waters but were most certainly encouraged and gathered from nearby the site, if not cultivated. These include cheno/am, chenopod, cucurbits, maygrass, sumpweed, and wild bean, with 118 chenopod seeds recovered and 222 maygrass seeds.

Maygrass, chenopod, and cucurbits (both squash [*Cucurbita pepo*] and bottle gourd [*Lagenaria siceraria*]) are among native cultigens that were cultivated by Native peoples in the Eastern Woodlands approximately 3500 years ago (Smith and Cowan 2003; Yarnell 1993). Cucurbits were grown even earlier, by at least 4,500 years ago (Smith and Cowan 2003:106; Yarnell 1993:23), but indigenous groups had utilized wild "squashes" for at least two millennia prior (Cowan 1997).

Domestication can be difficult to determine, with definitive morphological evidence only present in a few cultivated plant taxa. Domesticated chenopod (*Chenopodium berlandieri* ssp. *jonesianum*) displays a thinner seed coat. Given that at least one chenopod seed lacking a seed coat was recovered from Feature 28, we can assume that it had a seed coat thin enough to be easily burnt off, suggesting that it was the domesticated subspecies. Sumpweed (*Iva annua* var. *macrocarpa*) has an overall increased seed size when domesticated. The single sumpweed seed recovered at Pigeon phase Magic Waters measured 3.6 mm, within the range of wild sumpweed seeds.

Unfortunately, maygrass seeds do not display any morphological evidence of domestication. Yet, as previously discussed and demonstrated in the Pigeon component at Magic Waters, and other Connestee sites such as Icehouse Bottom, maygrass seeds are often recovered regularly and in significant amounts, suggesting a reliance that corresponds with harvesting of other native cultigens. Reliance upon sumpweed and wild bean at Magic Waters cannot be deduced on the few specimens recovered. Although only a handful of wild beans and cucurbit rinds were identified, it is important to note that unlike other plant foods such as nuts and corn that have inedible byproducts, cucurbits and beans do not and therefore are less likely to be recovered. Thus these minimal amounts cannot be statistically compared for importance in diet or assumed to not be included in horticultural practices.

These horticultural practices are further evidenced by the variety of weedy taxa found throughout the assemblage, including bedstraw, carpetweed, grass family, pokeweed, purslane, and smartweed. All of these weedy taxa thrive in disturbed agricultural soil. The remaining miscellaneous taxa recovered also included significant amounts of bark, most likely used as matting to line pits, especially in the large silo Feature 39, as well as minimal amounts of cane, used for various crafting purposes and most likely acquire alongside the nearby creek and/or river.

Pit functions can be difficult to tease out; however, the results of density value comparisons of plant taxa as well as overall feature descriptions and correspondence analysis (Figure 4) displayed in Chapter Four, do show underlying associations between particular taxa and pit types. As seen in Table 11, all of the nut taxa, chenopod, and maygrass have high ubiquity levels across all analyzed pits. Acorn and hickory have 100% ubiquity, and black walnut, hazelnut, and walnut family are in over half of the pits. Chenopod has a ubiquity of exactly 50% and maygrass has an incredibly high ubiquity at 81.3%, with only acorn and hickory being higher.

Both small and large basins have taxa including nuts and at least one cultigen, although the quantity and variety of plant taxa in the large basins versus the small basins is much greater. All three small basins were calculated to have higher wood densities, comprising half of the plant weight, while all three large basins' wood density hovered around a value of 0.3. The large amount of either acorn or hickory, along with 7 counts of acorn meat found in Feature 2337, hint at processing or cooking uses. Charcoal flecks found throughout all three large basins as well as possibly mendable vessel fragments in Feature 761 further support this claim. Worth considering as well is that basin-shaped pits were the most common and almost exclusive shape of pits in earlier time periods in western North Carolina, especially for the Late Archaic component at Magic Waters (Herring 2022; Santana et al. 2022). The uses of these basin feature types during less sedentary times possibly were continued during the more sedentary Pigeon phase.

All four bell-shaped pits yielded large quantities of rocks, and with the exception of Feature 2999 (large), all bell pits also recovered vessel fragments. Bark, often used for lining pits, was also recovered from all bell-shaped pits. Bell pit 2424 was unique in that it was the only small bell-shaped pit and was located inside of Structure 6, with the majority of the plant weight recovered being wood. There did not appear to be a significant difference in botanical contents recovered from the sample collected above the sherds in Feature 2424 compared to those recovered below the sherds. All three large bell-shaped pits contained multiple zones, although I was only able to analyze one zone of each. More definitive conclusions on the use of bell pits could be inferred after botanical analysis of all additional zones. This is further suggested by the large amount of bark recovered from Zone B of Feature 28 (the only zone analyzed) compared to Zone A from Feature 468 and Feature 2999 (the only zone analyzed), suggesting that samples from deeper zones may have recovered the most bark, if lining in fact had been used.

Lastly, the uses and characteristics of the silo-shaped pits seemed to vary more so than the basin and bell-shaped pits. Feature 39 was unique in that it recovered the greatest amount of plant weight out of all samples, even though it was subsampled. Approximately 2,150 pieces of bark were recovered from Zone B, the highest indication out of any Pigeon pit for use of bark as a liner. Acorn was also significantly recovered with 213 counts between both zones. It is highly likely based upon the identification of Feature 39's botanical contents that it was used to store acorns. Feature 487, without zones, was also unique in that it yielded an incredible weight of 379.2 kg (836 lb.) of rocks, was fired around all edges, and contained vessel fragments, possibly indicative of an earth oven. Feature 3149, with multiple zones, also contained more diverse plant taxa and charcoal flecks throughout. With a diverse plant assemblage, suggesting usage other than storage, it is also possible that this pit was refilled with refuse from other activities.

It is also important to consider that pit shape could have been a preference of whoever made and used it, or that varying shape changed from the basin of the Late Archaic, to bell with extensions and silo shapes based upon experimentation, which was made possible with a more sedentary existence. However, it has also been thought that bell-shaped pits were simply storage pits, possibly starting as silos, that were dug out. Each pit could also have had varying uses during a short span of time – for processing, cooking, or a fire made just for warmth. The most important takeaway is the very obvious expansion of number of pits, and varying pit shape that occurred parallel to the horticultural practices and the more permanent village settlement during the Pigeon occupation of Magic Waters.

RESEARCH QUESTION 2

What environmental and social relationships indicative of daily practices and routines can be inferred based upon botanical, statistical, and "rhythmanalysis" when also considering ethnohistoric/ethnographic and indigenous ontologies that center women as the primary plant and land-keepers?

As seen in Chapter Five, life during the Pigeon phase at Magic Waters revolved around environmental rhythms. The local landscape that included a creek, a river, forest, shrubs, fertile soil, and other wild plants, all impacted and influenced the inhabitants of Magic Waters, and gave reason to return to a site previously used in the Late Archaic period to create a permanent/semi-permanent settlement. The horticultural practices that developed and intensified at Magic Waters made it possible to have sustainable food sources year-round, or nearly so. The plants recovered and their seasonality reflect the way in which Magic Waters women would have lived by the routines created out of these environmental rhythms. In turn, these rhythms also reflect the social relationships that women would have held with children, elders, and men.

The creation of vessels that would be carried to the creek to collect water for the day, the gathering, processing, preparing, cooking, storing, sharing, conversing, planting, harvesting… all of these actions throughout the seasons of an annual year create rhythms. Kimmerer (2013:53, 55) notes that seventy percent of the Potawatomi language are verbs which give life to the non-human world. Phrases with meaning such as "to be a hill" rather than "it is a hill" demonstrate how the land and the non-human beings upon and within it are viewed as kin. Environmental rhythm is not possible without acknowledging the agency of plants and land.

Agricultural fields, gardens, places of foraging, places of processing, places of eating, all are the sites of where people and plants interact with one another, skills and knowledge are shared and controlled, and societal roles and identities are formed (Johnston 2005:212). Because children were often amongst these groups of women, learning from elders, these sites are not only sites of production for food and plant based items, but also sites of production for the next generation to continue ecological knowledge and practices. In this sense, these rhythms and activities reproduce both the human inhabitants of Magic Waters as well as the plant inhabitants.

Rhythmanalysis provides a way of viewing life not merely as a succession of isolated seasonal tasks; it is a flow of tasks meaningfully related to one another and connected even if separated in time and space (Mlekuz 2010). Analyzing the seasonal rhythm of plants recovered from the Pigeon assemblage, as well as comparisons to indigenous ethnohistoric and modern uses, allows us to paint a picture that more fully captures how, why, and what it may have been like performing labor as a woman during the Pigeon phase at Magic Waters in a more permanent settlement. Even as these tasks were gendered, there is no doubt that these women held power amongst their village and a meaningful and reciprocal relationship with the natural world around them.

RESEARCH QUESTION 3

As the first identified and excavated isolated Pigeon phase settlement, what do the plant remains and pit features on the landscape reveal to us about this "missing" phase in time in the Eastern Woodlands compared to the preceding and succeeding western North Carolina time periods?

Looking at Table 10 and the correspondence analyses that follow in Chapter Four, we can see a trend through time from Swannanoa to Pigeon to Connestee. Prior to this analysis, without significant plant data for Pigeon phase, there was a large jump from Early Woodland nut-based subsistence with some evidence of cultigens, to the late Middle Woodland with diverse nut taxa, various cultigens recovered in significant quantities, and diverse fruit and weed assemblages. The Pigeon data at Magic Waters help fill in the gap and show the increase in diversity of plant taxa, particularly with cultigens and associated weeds, as settlements became more permanent and sedentary.

While acorn and hickory remain consistent with Early Woodland sites, hazelnut and black walnut appear to become of greater importance in Pigeon diets. Interestingly, despite its high cost of gathering and processing, black walnut seems to continue to grow in importance in the late Middle Woodland. Hazelnut does not, however, and appears to be statistically associated with the Pigeon phase. In addition, chestnut, which is not positively identified in any Early Woodland or early Middle Woodland samples, dominates the Connestee assemblage at Smokemont. This may be related to fortuitous circumstances for preservation, but further consideration of whether storage of chestnuts, which were a significant food source for historical Cherokee groups, may be related to increased sedentism.

Although grape is found across all time periods, diversity of fruit taxa recovered greatly increased in Pigeon phase, continuing into Connestee. Both chenopod and wild bean are prevalent in Early Woodland samples and continue throughout the Middle Woodland. Maygrass and cucurbit are not recovered until the Pigeon phase, when they, maygrass in particular, begin to dominate the plant assemblage along with nuts. Various and numerous cultigens continue to be recovered throughout the late Middle Woodland. Lastly, parallel to the cultigens recovered, weedy taxa are found in similar amounts, increasing in recovery as more cultigens are simultaneously produced.

The Pigeon phase at Magic Waters can be defined by the rhythmic activities that intertwined with the land. The women, including the non-binary, with the help of the children, elders, and men, relied on the gathering and processing of nuts, supplementing with wild plants and horticultural practices. Even the plants not cultivated were manipulated or encouraged through fire, selection, and simply not exploited to complete depletion. Ultimately, the increase in horticultural practices shaped the way they viewed and responded to the world.

Because of these entanglements, we see an increase in pit features that were used for storage, processing, cooking, and refuse from these activities that were not as prevalent prior to the Middle Woodland Pigeon phase at other sites in the region. Because of the diverse seasonality of the plants recovered, we can also use rhythmanalysis to better understand the daily routines and life of the women at Magic Waters, and thereby their social relations with children, men, and elders in their community, as well as their relations with the environment around them.

RELEVANCE TO WESTERN NORTH CAROLINA HISTORY

As stated previously, within published literature of the early Middle Woodland in western North Carolina, the Pigeon phase has received little attention due to lack of data and isolated components. Ward and Davis (1999:141) in their overview of North Carolina archaeology stated in particular that little knowledge had been produced about the Pigeon phase outside of a few components layered with other time periods at sites that often contained the well-known “Pigeon pottery.” In comparison to other western North Carolina sites that have held only one or a handful of pit features dating to the Pigeon phase, the Magic Waters site has revealed an entire Pigeon village settlement with numerous pit features and circular structures.

Previously, because the Pigeon phase is intermediate to the Swannanoa and Connestee phases, assigning artifacts to this period could be difficult to tease out at multi-component sites; however, given that Magic Waters lacks these preceding and succeeding contexts, the Pigeon phase at Magic Waters is more “isolated” and thus revealing. The data compiled from the pit feature samples, compared to that of the surrounding earlier and later contexts, shows some consistency with the idea of an “in-between” period. Cultivation was beginning to intensify and affecting worldviews, yet the gathering of wild plants and nuts was most likely still the basis of diets. However, as seen in the correspondence analysis, Magic Waters Pigeon settlement does stand out compared to the other Pigeon sites excavated previously, although the sample size from Iotla was small. Rather than a handful of pit features with minimal botanical contents, or one possibly associated structure (Benyshek 2018), Magic Waters recovered an entire village. It is interesting to think of whether there could be other unexcavated Pigeon villages or if Magic Waters is truly unique for this time in Woodland history, although it is very unlikely this would be the case.

RELEVANCE TO THE FIELD OF ARCHAEOLOGY

Additionally, this thesis is relevant to the entire field of archaeology in that it contributes to the shift towards including indigenous worldviews into archaeological practice and interpretation. I have aimed to uncover routine domestic practices performed by the female occupants of Magic Waters during the Pigeon phase through botanical, statistical, and rhythmanalysis, with the aid of indigenous ethnohistories and ontologies. Through extensive pit documentation, I not only demonstrate women's impact on the landscape and economy, but also the land's and the plants' impact on the daily routines of women. Employing interpretations such as rhythmanalysis is important for understanding early farming groups in their transition to more agricultural and sedentary lifeways. Using paleoethnobotany to analyze the relationships with the environment in an unprecedented and isolated Pigeon context, my thesis will not only help archaeologists learn more about this “missing” period of time in western North Carolina, but will bring easily accessible statistical results to life for the public that highlight indigenous thinking and the important role of women that is often overlooked.

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APPENDIX

Table A.1. Plant Taxa Recovered from 31JK291 by Floatation Sample.

Bag#	Feature	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
130	761	1.62	0.59	Acorn	262	0.81
				Bark	12	0.01
				Black walnut	2	0.00
				Chenopod	27	0.01
				Fruit/tuber	1	0.00
				Hazelnut	1	0.00
				Hickory	8	0.01
				Maygrass	2	0.00
				Pine cone	2	0.00
				Pitch	22	0.19
				Purslane	5	0.00
				Unidentifiable	4	0.00
				Unidentifiable seed	8	0.00
				Walnut family	4	0.00
134	481	0.82	0.48	Acorn	5	0.00
				Acorn/chestnut cf.	1	0.00
				Bark	5	0.03
				Chenopod cf.	1	0.00
				Corn kernel cf.	2	0.01
				Grass family	1	0.00
				Hazelnut	3	0.02
				Hickory	13	0.08
				Maygrass	5	0.00
				Pitch	20	0.13
				Tuber cf.	3	0.02
				Unidentifiable	1	0.00
				Unidentifiable seed	5	0.01
				Walnut family	9	0.04
441(1of2)	28	23.56	20.17	Acorn	1	0.00
				Bark	337	2.43
				Black walnut	2	0.12
				Grape	1	0.00
				Hickory	19	0.19
				Persimmon	1	0.00
				Pitch	28	0.27

Table A.1 Continued.

				Smartweed	2	0.00
				Unidentifiable	72	0.34
				Unidentifiable seed coat	1	0.00
				Walnut Family	6	0.04
441(2of2)	28	16.18	13.35	Acorn	4	0.00
				Bark	241	1.89
				Black walnut	4	0.07
				Chenopod	1	0.00
				Hickory	23	0.26
				Honey locust	1	0.00
				Maygrass	2	0.01
				Pitch	62	0.39
				Plum/cherry cf.	2	0.00
				Unidentifiable	31	0.16
				Unidentifiable (pocket gall cf.)	2	0.00
				Unidentifiable seed	6	0.00
				Walnut family	10	0.05
444	39	3.17	2.81	Acorn	44	0.09
				Bark	10	0.09
				Cucurbit rind cf.	2	0.00
				Hickory	3	0.02
				Maygrass	1	0.00
				Pitch	14	0.06
				Unidentifiable	16	0.11
				Unidentifiable seed	4	0.00
445	39	71.53	16.60	Acorn	168	0.33
				Acorn cap	1	0.00
				Acorn cf.	10	0.01
				Bark	2150	54.06
				Bark cf.	12	0.10
				Cane	1	0.00
				Groundcherry	1	0.02
				Hickory	3	0.01
				Nutshell	2	0.01
				Pine cone	3	0.00
				Pitch	18	0.10
				Plum/cherry	1	0.00
				Unidentifiable	67	0.29
				Unidentifiable seed	1	0.00

Table A.1 Continued.

				Unidentifiable seed coat	1	0.00
453	468	0.92	0.54	Acorn	2	0.00
				Acorn cf.	1	0.00
				Bark	8	0.02
				Chenopod	1	0.00
				Hazelnut	6	0.03
				Hickory	14	0.10
				Hickory cf.	1	0.00
				Maygrass	6	0.00
				Maygrass cf.	2	0.00
				Pawpaw cf.	3	0.01
				Pitch	20	0.17
				Purslane	1	0.00
				Unidentifiable	12	0.05
				Unidentifiable seed	1	0.00
463(1of2)	487	1.68	0.58	Acorn	7	0.01
				Bark	2	0.02
				Black walnut	1	0.02
				Grape	6	0.00
				Grass family cf.	1	0.00
				Hickory	69	0.88
				Maygrass	3	0.00
				Pine cone	1	0.00
				Pitch	23	0.10
				Unidentifiable seed	2	0.00
				Unidentified seed	1	0.00
				Walnut family	9	0.06
837(3of4)	2337	6.03	2.69	Acorn	182	0.28
				Acorn cf.	1	0.00
				Acorn embryo cf.	1	0.00
				Acorn meat	7	0.26
				Acorn meat cf.	14	0.08
				Bark	14	0.06
				Bedstraw	1	0.00
				Black walnut	57	2.31
				Cane	1	0.00
				Chenopod	52	0.01
				Corn cupule cf.	1	0.00
				Cucurbit rind	1	0.00
				Fruit/tuber cf.	5	0.06

Table A.1. Continued.

				Walnut family	5	0.00
841	2424	5.69	5.29	Acorn	3	0.00
				Bark	28	0.12
				Cane	1	0.00
				Cucurbit rind	1	0.00
				Grass family	1	0.00
				Hickory	14	0.18
				Maygrass	2	0.00
				Persimmon cf.	1	0.00
				Pitch	7	0.00
				Purslane	1	0.00
				Sumpweed	1	0.00
				Unidentifiable	25	0.10
				Unidentifiable seed	2	0.00
				Walnut family	4	0.00
1435	2159	3.38	2.35	Acorn	5	0.00
				Acorn cf.	1	0.00
				Acorn meat cf.	3	0.01
				Bark	59	0.41
				Bud	1	0.00
				Grape	1	0.01
				Hazelnut	3	0.01
				Hickory	20	0.12
				Hickory cf.	1	0.00
				Hickory hull cf.	2	0.02
				Maygrass	5	0.00
				Pitch	14	0.11
				Unidentifiable	24	0.23
				Unidentifiable seed	8	0.01
				Walnut	3	0.06
				Walnut family	4	0.03
				Wild bean	1	0.01
1442	2640	6.28	1.76	Acorn	13	0.02
				Acorn cap	2	0.01
				Acorn cf.	2	0.00
				Acorn meat cf.	2	0.01
				Bark	11	0.10
				Black walnut	10	0.14
				Blackberry/raspberry	2	0.00
				Carpetweed	1	0.00

Table A.1. Continued

				Chenopod	5	0.00
				Chenopod cf.	5	0.00
				Cucurbit rind	3	0.00
				Grape	1	0.00
				Grass family	1	0.00
				Hazelnut	18	0.23
				Hickory	286	3.30
				Maygrass	58	0.02
				Maygrass cf.	10	0.00
				Persimmon	1	0.00
				Persimmon cf.	4	0.01
				Pitch	29	0.19
				Plum/cherry cf.	3	0.02
				Pokeweed	1	0.00
				Purslane	10	0.00
				Receptacle	2	0.00
				Smartweed c.f.	1	0.00
				Sumpweed cf.	2	0.00
				Unidentifiable	11	0.04
				Unidentifiable seed	17	0.01
				Walnut family	51	0.42
1456	2999	9.46	2.08	Acorn	31	0.07
				Acorn cf.	16	0.03
				Acorn meat	1	0.04
				Bark	7	0.04
				Black walnut	114	2.31
				Bud	1	0.00
				Cane	8	0.05
				Cheno/am	2	0.00
				Chenopod	26	0.00
				Hazelnut	31	0.19
				Hickory	342	3.59
				Honey locust	4	0.01
				Honey locust cf.	4	0.01
				Maygrass	86	0.02
				Maygrass cf.	47	0.01
				Nutshell/fruit pit	3	0.01
				Pine cone cf.	2	0.01
				Pitch	13	0.12
				Purslane	22	0.00

Table A.1. Continued

				Sumac	2	0.00
				Tuber cf.	1	0.01
				Unidentifiable	14	0.09
				Unidentifiable seed	54	0.02
				Unidentified	3	0.00
				Unidentified seed	1	0.00
				Walnut family	87	0.71
				Wild bean	4	0.03
				Wild bean cf.	4	0.02
1460	3149	3.95	1.75	Acorn	9	0.00
				Bark	10	0.06
				Black walnut	22	0.41
				Chenopod	3	0.00
				Hazelnut	34	0.20
				Hazelnut cf.	1	0.00
				Hickory	77	0.70
				Hickory cf.	1	0.00
				Maygrass	10	0.00
				Maygrass cf.	3	0.00
				Nutshell/fruit pit	1	0.00
				Persimmon cf.	1	0.00
				Pine cone	7	0.03
				Pitch	45	0.34
				Tuber cf.	10	0.12
				Unidentifiable	8	0.02
				Unidentifiable seed	2	0.00
				Walnut family	40	0.32
1480	3423	1.71	1.07	Acorn	5	0.01
				Acorn cf.	4	0.01
				Acorn meat cf.	1	0.00
				Bark	8	0.05
				Black walnut	7	0.22
				Cucurbit rind	4	0.01
				Hickory	18	0.17
				Hickory cf.	1	0.01
				Pine cone	2	0.00
				Pitch	7	0.03
				Plum pit	8	0.11
				Plum seed meat cf.	2	0.01
				Unidentifiable	4	0.01

Table A.1. Continued

Unidentifiable seed	1	0.00
Unidentifiable seed coat	2	0.00
Unidentifiable seed, oily	1	0.00
Unidentified seed, starchy	1	0.00
Wild bean cf.	1	0.00

Table A.2. Feature Measurements with Rocks Recovered from 31JK291.

Feature	Profile	Feature Width (cm)	Feature Length (cm)	Depth (cm)	Rock Count	Rock Weight (kg)
28	bell-shaped	75	68	14	55	8.62
39	silo	73	75	53	135	52.16
468	bell-shaped	142	118	37		16.33
487	silo	128	125	58		383.74
2424	bell-shaped small	53	51	30		4.08
2999	bell-shaped	130	146	61	90	9.07
3149	silo	124	93	39	29	3.86

VITA

Kelly Dean Santana was born in Phoenixville, Pennsylvania, but has lived most of her life in North Carolina and calls it home. She currently lives in Knoxville, Tennessee, with her husband, Brandon and daughter, Andie. Kelly is studying paleoethnobotany in the southeastern United States and is interested in performing archaeology through a feminist and indigenous framework.