HOW TO MAKE A MEAL:
LATE WOODLAND GATHERING AT THE FELTUS MOUNDS SITE, AD 700-1100

Ashley Ann Peles

A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Anthropology.

Chapel Hill
2022

Approved by:

C. Margaret Scarry

Vincas P. Steponaitis

Benjamin Arbuckle

Heather A. Lapham

Brett H. Riggs

ABSTRACT

Ashley Ann Peles: How to Make a Meal:
Late Woodland Gathering at the Feltus Mounds Site, AD 700-1100
(Under the direction of C. Margaret Scarry and Vincas Steponaitis)

This dissertation analyzes botanical and faunal evidence from Feltus, a Late Woodland period mound site used between AD 700 to 1100, in order to understand what plants and animals were gathered, harvested, and hunted for community gatherings. This interpretation is based on data from unrestricted contexts around the plaza and a restricted context on a mound summit.

Data from unrestricted contexts reveal three groupings of taxa brought to Feltus: amassed foods that were stored, those that were brought fresh, and special components. Amassed and stored foods, which involved a large degree of planning, include nuts, starchy grain seeds, and fruits. Amassed and fresh foods, which were prone to spoilage and compiled shortly before or during an event, included deer, rabbits, squirrel, and fish. Plants and animals that did not fit into either category are special components. Special plants were those associated with ritual and medicinal activities, while special animals included dangerous mammals, raptors and owls, and crawfish.

In contrast, the restricted midden deposit on Mound B included specific dishes, labor-intensive ingredients, and conspicuous consumption. Mound-top meals not only incorporated a smaller range of taxa, indicating a focus on more specific dishes, but also highlighted labor-intensive ingredients, including nut oils, possible fish oil, and small grain seeds. Conspicuous

consumption was demonstrated through younger cuts of deer focusing on roasted vertebrae and ribs, roasted squirrel, and bear paws.

Combining data from unrestricted and restricted contexts reveals support for three interrelated activities: feasting featuring amassed stored and fresh taxa, rituals utilizing special plants and animals, and medicinal activities using plants associated with illness and purification. These activities also reveal discontinuities in the current Southeastern framework for delineating communal feasting and other activities; in particular, higher species richness and special taxa are not limited to elite private meals. This reversal of faunal patterns suggests the need for a more flexible set of subsistence expectations for pre-Mississippian communities. In turn, this flexibility may be better suited for identifying subsistence shifts among transforming Late Woodland societies.

ACKNOWLEDGEMENTS

After I decided to attend UNC for my doctoral degree, Steve Mrozowski told me that in his letter of recommendation, he stated I was meant to be at UNC at that point in time. I could not have known just how prophetic a statement that would turn out to be. I have been at UNC longer than I intended, but I have grown much more than I imagined as well. I feel incredibly lucky to have found an amazing support network within this program, without which I could not have made it through this degree. During my time here, my research was supported by the Research Laboratories of Archaeology, the Timothy P. Mooney Fellowship, and a dissertation completion grant from the University of North Carolina, Chapel Hill.

I came into the program under Margie Scarry, for whom I owe an incredible debt of gratitude for taking me on as a student, allowing me to work on botanical contracts, and adeptly encouraging me to expand my archaeological horizons. There were many times when Margie saw more potential in my work than I could see myself, and I am thankful she pushed me to reformulate my ideas and continue working with my data. I am a much better archaeobotanist than I could have hoped to be, but beyond that, Margie always made sure to support me within the program.

A few years after my entry into UNC, Vin Steponaitis asked me if I was interested in working on the faunal material from Feltus. As a historical archaeologist, I knew almost nothing about Southeastern prehistory and certainly did not have a frame of reference for mound building in the Lower Mississippi Valley. I am incredibly thankful for Vin's unending generosity with his time, his data, and his advice, as well as his willingness to share his professional and personal connections. I am a different archaeologist thanks to Vin and my time working in the Natchez Bluffs. He has also offered an incredible amount of support, both within and outside the program, even when contracts were late getting signed. It makes a world of difference to know that you will have a job, regardless of what is happening within the bureaucracy.

I also cannot overstate my appreciation for the other members of my committee. Brett Riggs has an encyclopedic knowledge of Southeastern groups and always has a way of probing the gaps in logic with his questions. I appreciate those pushes, which not only helped me clarify my writing but forced me rethink my approach to various questions. Ben Arbuckle came to UNC with such an incredible positive energy; I could always count on feeling re-energized after our meetings. Ben has always been willing to share his expertise and work through aspects of analysis and interpretation. My analysis certainly would have been much poorer without having had the opportunity to learn from him. Heather Lapham has provided an incalculable amount of guidance, both personally and professionally. I have benefited greatly from the opportunity to puzzle over identifications with Heather and to talk through interpretations with her. Perhaps the largest contribution Heather made was to touch base with me every three weeks this past year. It is not an exaggeration to say that I would not have finished this dissertation without her. Between Heather and Ben, I am a vastly better zooarchaeologist than when I began.

I owe a special thanks to Steve Davis, who has been a source of support throughout my entire time at UNC. I am a better archaeologist for having worked with him over the course of many field schools. More than that, though, he has always represented the generosity of the RLA for me, whether it be lending a truck to pick up a deer carcass, clearing out space to house

collections, or providing a place to stage pig pickings. It is difficult to imagine the RLA without Steve, which is a testament to his hard work and dedication.

One of the benefits of going through the doctoral program at UNC has been the additional support of people who work in other parts of the world or do not do archaeology at all. Colin Thor West teaches perhaps the best GIS course I have ever seen, but beyond that, I have always appreciated his interest and enthusiasm for my work. Rudi Colloredo-Mansfeld, Margaret J. Wiener, and Chris Nelson have all helped smooth the path at various times during my graduate tenure at UNC and deserve thanks for their kindness and support with the paperwork that helped keep me in the program. I also have to thank the administrative staff who have ushered through paperwork, gathered employment information, and fielded questions about deadlines. In particular, Lisa-Jean Michienzi, Jan Scopel, and Katie Poor have dealt with a number of last-minute requests and bureaucratic red tape on my behalf; I appreciate their help in figuring out the correct path and their tact in always treating my requests as a normal part of their day.

I have relied heavily on another set of people for the completion of my research. Fieldwork at Feltus is synonymous with the expertise of John O'Hear. I have been lucky to get to know John, learn from him, and laugh with him. The data that my dissertation is based on are the result of seasons of work at Feltus, specifically the 2012, 2017, and 2018 field seasons. Many field school students never know the outcome of their hard work, but this dissertation could not have been completed without them. Many undergraduates have also worked and volunteered in the labs, cleaning and sorting artifacts; I cannot even count the number of hours of processing time that represents. I especially want to thank Morgan Welch, who helped sort bones during her free time, and Rob Lyerly, who washed artifacts, measured fish vertebrae, and was a dependable source of laughter during his time in the lab.

I also want to acknowledge friends and colleagues who have provided support in ways big and small. I especially want to send thanks to Jess Bowes, Meg Kassabaum, David and Beth Cranford, Erin and David Nelson, Anna Semon, Claire Novotny, Tomas Gallareta Cervera, Maggie Morgan Smith, Caela O'Connell, Julianna Parks, James Nyman, Brooke Kenline-Nyman, Gabby Purcell, Sophie Dent, Anna Graham, and Gracie Reahm. The community down in Natchez was especially important to the success of this dissertation. My project would not have been possible without the support of Sonny Freeman, who provided access to the site and to his excavation equipment. Mimi and Ron Miller, Adam Gwin, Smokye Frank, Robert and Kathy Prospere, Lee and Sherry Jones, Joe and Penny Collins, and Robin Person, among others, have all opened their arms in friendship and support, making Natchez feel like a second home. With a pandemic and an out-of-state move, the last year has been especially hard. Unexpected sources of support came from Tony Boudreaux and Chris Carr. Their words of encouragement during that isolating time meant more to me than they can ever know.

Lastly, I have to thank my family. My parents, Jan and Steve, have always supported my education and believed I could do whatever I set my mind to, and my sister, Brooke, has been rooting me on the whole way. Christine Snair travelled to Chapel Hill multiple times and helped with childcare, including coming down to Natchez during the 2018 field school; she is nothing short of amazing. I did not move down to North Carolina expecting to find a partner, but Dave has been a pillar of support since I met him. He has joined me on digs, helped me set up rotting cages, and provided a sounding board for all of my crazy rantings. Thank you for always supporting me and helping create our little family. And thank you to Galen and Oliver, who are crazy and ridiculous, but have also reminded me to turn off my archaeology brain and focus on what is in front of me every once in a while.

TABLE OF CONTENTS

LIST OF FIGURES

List of Tables

CHAPTER 1

INTRODUCTION

Food plays an enormously important and complex role within societies and among people. Tracing the relations between people therefore relies in part upon close examination of the archaeological residues of past meals. Within the Lower Mississippi Valley (LMV), mound sites are an especially visible indicator of community rituals and feasting events that leave these residues. Utilizing the methods of archaeobotany and zooarchaeology, my dissertation research addresses the role of food in Late Woodland societies of the LMV that were creating and utilizing mound sites. Within the LMV, scholars have focused on the activities taking place at mound sites as important components in shaping relationships within and between communities. However, none of these works have adequately addressed the importance of variability in food procurement and consumption through time and space as a function of the types of deposits sampled. Botanical and floral samples from many different contexts across a site are often combined at a chronological level (e.g. Ryan 2004; Weinstein 2005), bypassing a finer-grained analysis that takes into account the different types of deposits being sampled. Without a finer scale of analysis, subsistence in the LMV during the Late Woodland has been reduced to overly vague statements about hunter-gatherers who primarily took advantage of naturally occurring wild resources. This simplification overemphasizes the importance of maize adoption around AD 1100-1200, underemphasizes the scale of social shifts that may have taken place before the

Mississippian period, and obscures meaningful variation in the use of plants and animals at local and regional levels.

Archaeology in the LMV has deep historical roots, but it is only more recently that botanical and faunal datasets have been incorporated as important components of research agendas. Prior to the 1990s, LMV researchers were primarily interested in constructing culture-historical frameworks in order to organize sites into regional chronologies (Williams and Brain 1983). Dense middens were generally noted and often a focus of excavations for their ceramic potential, but animal or plant remains were not systematically analyzed or methodically collected (Belmont 1967; Cotter 1952; Ford 1951). Compounding this, knowledge of faunal and floral assemblages from earlier excavations (whether analyzed or not) remained hidden in gray literature or inside larger reports that remain largely unknown (Brown 2015; Fuller and Fuller 1987; Mariaca 1985; McGimsey 2004). The larger result of research priorities was therefore to de-emphasize rigorous non-ceramics research and ignore depositional processes that shaped subsistence assemblages from mound sites. While there was recognition that mound sites were sacred community places and that food was connected with these activities (Steponaitis 1986, 1998), granular discussions of subsistence practice were typically reserved for the timing and process of maize adoption (Fritz 1998; Fritz and Kidder 1993). Early exceptions to this provided glimpses into the potential for faunal and botanical assemblages to reveal the ways that social relations were expressed via ritual and feasting events at mound sites (Belmont 1982; Welch and Scarry 1995).

The early lack of analyses related to faunal, floral, and other assemblages helped to obscure connections to ritual and feasting and particularly related research into the tempo, pace, and variability in mound construction and meaning. As archaeologists have become more interested in fine-grained analyses of mound sites, it has become clear that there is important variability within and between specific site and mound chronologies. Rather than being the location of continuous, sustained activity, Late Woodland mound sites in the LMV were periodically visited and constructed on larger seasonal and/or ritual schedules (Kassabaum et al. 2014; Kidder and Fritz 1993; Roe 2010; Steponaitis 1986). Sites transformed over time, beginning with open plazas and ending with space restricted by encircling mounds; each of these components were constructed features and integral components of sites (Kassabaum 2019a; Kidder 2004; Nelson 2014; Sherwood and Kidder 2011). As the physical layouts of sites change, we need to be attentive to the possibility that rituals and feasts may also shift, as they are actively shaped and constructed by the people involved. Tracking such changes requires more granular data, however. As Halstead and Barrett (2004:12) have said for prehistoric Greece, "the evidence must be analysed contextually and, as far as possible, in terms of short-term episodes rather than aggregate periods of consumption." With this in mind, my analysis considers assemblages within Feltus as connected and yet also discrete phenomena, allowing me to explore depositional or chronological shifts in ritual and feasting activities.

I suggest that, in the desire to compile larger datasets for the LMV, we have largely missed shifts in plant and animal use that are only apparent at a fine-grained level. This dissertation presents a case study highlighting changes in food use and consumption that can be seen at the Feltus Mounds site, a multi-mound civic ceremonial center where people were active during the Late Woodland period, primarily between AD 700 to 1200 (Figure 1.1). Through examination of floral and faunal collections from the site, I argue that there is variability between deposits, and that variability is shaped by the food preferences and activities of the people involved.

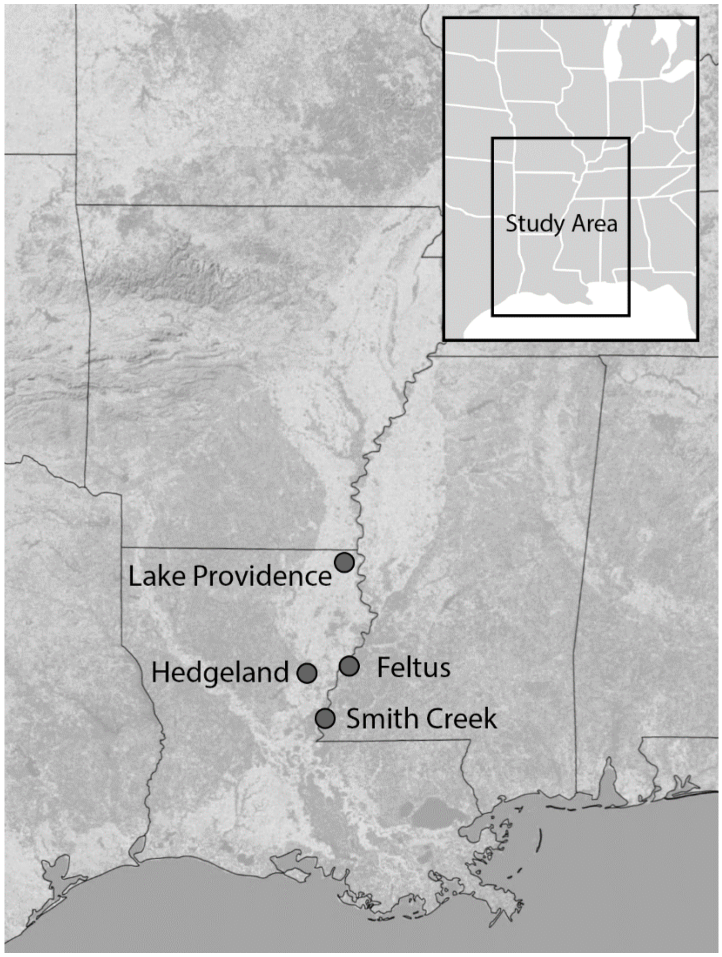

Figure 1.1. Map showing the location of Feltus and other sites mentioned in text.

Late Woodland Archaeology in the Lower Mississippi Valley

According to Brain (1971:2), "The Mississippi drainage system, and especially the Lower Mississippi Valley where it all came together, was truly the cradle of cultural development in eastern North America south of the Arctic." This may be a bit of an overstatement, but it highlights the importance of this area for understanding the development of complex societies. The LMV extends from the mouth of the Arkansas River to the Gulf Coast, including areas of the modern states of Arkansas, Louisiana, and Mississippi. This larger region is typically divided into three (or more) subregions: the Boeuf Basin, the Tensas Basin, and the Natchez Bluffs. The focus of my dissertation is the Late Woodland period in the LMV, dating from c. AD 700 to

1200 AD and correlating regionally to the Coles Creek period (Kidder 1992, 2002). This is a period of time in which the organizational structure of Coles Creek communities shifted to more hierarchical forms later exemplified by Plaquemine culture with chiefly residences and temples atop mounds (Brown 2007).

Our understanding of Coles Creek peoples derives almost exclusively from excavations at mound sites; the ephemeral nature of domestic sites, substantial alluviation, and magnitude of agricultural plowing during the historic and modern periods have obscured much of the non-mound evidence that may have once been available (although see Wells 1998; Wells and Weinstein 2007). Coles Creek mound centers are now understood as civic ceremonial centers and tend to be dominated by two to four flat-topped rectangular mounds surrounding open plazas. More methodical use of carbon-dating and refinement of ceramic chronologies are allowing archaeologists to better understand the pace of construction and uses of Late Woodland mound sites (Kassabaum 2014, 2018; Roe 2010; Steponaitis et al. 2014; Weinstein 2005; Woodiel 1993). For example, Roe (2010) has determined that at Raffman some mounds were constructed very quickly, while others were constructed in stages that involved significant amounts of time between building episodes. Additionally, different mounds functioned in different ways; Roe (2010) posits that some mounds highlighted the act of building itself, while others emphasized ceremonial feasting. Functional differences in mound use are also evident between Mounds A and B at Feltus. Surfaces on the summits of Mound A are clean and lack evidence for structures or substantial midden deposits, while summits on Mound B contain veneers of different colored soil, numerous postholes, votive pits, fire-reddened areas, and on the fourth summit, a dense midden (see Chapter 2 for more detail). Initiation of mound construction also differs between the two mounds; immediately prior to construction of Mound A, people planted and pulled posts and feasted, while Mound B lacks large midden deposits at the base and therefore does not seem to be preceded by the same type of ceremonialism (Steponaitis et al. 2014).

Late Woodland Subsistence in the LMV

The archaeological focus on mound sites means that, in many ways, Late Woodland LMV subsistence is poorly understood. Inadequacies in reporting means that the available subsistence data are generally insufficient to examine nuanced temporal trends (see Jackson and Scott 2002 for a more thorough discussion). Despite this, there are broad patterns that have been noted within regional analyses of faunal and floral data. The botanical data from the LMV are somewhat more robust than the faunal data, but are biased towards the Tensas Basin, making it difficult to tease apart local versus regional patterns. Late Woodland subsistence trends center around analyses from Osceola and Hedgewood in the Tensas Basin, Toltec in southwestern Arkansas, and Rock Levee in Mississippi, though these are of course supplemented from other sites within the larger region (Fritz 2008a). The primary patterns for the LMV seem to be a focus on acorn and thick-shelled hickories, an increase in the use of Eastern Agricultural Complex (EAC) seeds compared to the Middle Woodland, and a lack of any substantial quantities of maize until the transition to the Plaquemine period around AD 1100 to 1200 (Fritz 2008a; Fritz and Kidder 1993). Fritz (2008a) notes that the EAC crops appear earlier and more commonly near the Ozark Highlands, American Bottom, and lower Ohio River Valley, indicating a potential clinal transition, but some of this is also complicated by the fact that the LMV lies within the natural range of all these crops. In the Tensas Basin floodplain side of the Mississippi, there seems to be little evidence of food production based on the lack of evidence for small seeds in flotation samples. Hedgeland currently seems to be an exception with its high percentage of EAC seeds and evidence for both domesticated chenopod and sunflower (Ryan and Roberts 2003). Within these broad patterns there is a wide degree of variation, some of which seems related to local environments and some of which may be related to depositional differences (see Fritz 2008b).

Moreso than botanical analyses, faunal syntheses in the LMV are hindered by different methods of reporting, meaning that comparisons are limited in scope. As a general starting point, the floodplain environment not only supports a great deal of faunal diversity but supports high densities of large animals like deer, as well as providing a high degree of access to fish. This natural variation in animal populations is reflected in LMV faunal assemblages by variable proportions of primarily deer in comparison to fish (Jackson 2008; Jackson and Scott 2002). Jackson and Scott (2002:476) argue that much of this variability is related to seasonal differences in procurement; fish are the primary source of food during the warm seasons, while deer are the primary source during the fall and winter. However, they also point out that there seem to be spatial differences in deposition; higher numbers of fish are found in feature fills (particularly pits), while lower amounts of fish are recovered from sheet middens (Jackson and Scott 2002:477). Tentative chronological patterns include an increase in small and medium mammals, birds, and turtles over the course of the Late Woodland, though as an overall percentage each is still fairly small (Jackson 2008; Jackson and Scott 2002). A closer look at the fish species identified from sites did not highlight any particularly strong temporal or spatial trends. This suggests to Jackson (2008:292) that the patterns and variability of fish targeted at different sites is a function of local fishing habitats. These findings are largely substantiated by researchers that have focused on smaller regions of the LMV. Analysis of faunal assemblages from the Osceola site, in the Tensas Basin, tentatively found a decrease in deer and increase in small mammals (squirrels, rabbits, raccoons primarily) at the end of the Late Woodland (Kidder and Fritz 1993:290). A review of faunal data from the Natchez Bluffs region also found that intersite patterns were quite variable, with patterns that seemed to be more dependent on the local environment than on any broad regional trends (LaDu and Funkhouser 2018).

All of these regional overviews note that some of this variability may be a function of social and ritual activities (Jackson and Scott 2002; Kidder and Fritz 1993). Nearly all of the assemblages examined within these overviews (Fritz 2008a; Jackson 2008; Jackson and Scott 2002; Kidder and Fritz 1993; LaDu and Funkhouser 2018) originate from mound sites, whether from mound contexts specifically or from areas close to mounds. Whether or not these assemblages are the remains of feasts or more akin to daily subsistence, proximity to mound sites means that, as Fritz (2008b:35) notes for analyses from Toltec, "nothing here is totally free of potentially heightened ceremonialism or status connotations." The lack of excavations at domestic sites dating to the Late Woodland period in the LMV means that researchers have no choice but to use mound assemblages to attempt to understand daily subsistence, but more attention needs to be focused on the nuanced ways that depositional context may shape these assemblages.

Within analyses that focus on individual sites in the Southeastern U.S., interpretations of mound-related and mound-adjacent artifact assemblages typically focus on the context of deposition and attempt to determine if assemblages are the result of large gatherings, feasts, and/or ceremonialism, or if contexts may be restricted to specific elite members of societies and involved provisioning (Jackson et al. 2016; Jackson and Scott 2003; Jackson et al. 2012; Kelly 2001; Pauketat et al. 2002; Pluckhahn et al. 2013; Reitz et al. 2020; Scarry et al. 2016;

VanDerwarker 1999; VanDerwarker et al. 2007; Windham 2010; Yerkes 2005). While many analyses have examined feasting and ceremonialism during the Mississippian period (Flosenzier 2010; Jackson et al. 2016; Jackson and Scott 1995, 2003; Nelson et al. 2019; Scarry et al. 2016; Terry 2019; VanDerwarker 1999; Wallis and Blessing 2015; Welch and Scarry 1995), relatively few Late Woodland analyses in the LMV have considered subsistence assemblages through these lenses (Fritz 2008b; Kassabaum 2014, 2018, 2019b; Kassabaum and Peles 2020; Peles and Kassabaum 2020; Terry 2017). The result of these differing research foci is that theoretically better understood feasting and ceremonial expectations for the Mississippi period are applied to the Late Woodland period, despite the fact that differences in social structure may make such comparisons inappropriate.

Feasting Foods and Expectations

The delineation of feasting from other food events is a robust topic of research within archaeology, with a basis in both archaeological samples and ethnographic research (deFrance 2009; Hayden 2014; Hayden and Villeneuve 2011; Kassabaum 2019b; Peres 2017; Twiss 2008). Archaeological evidence for feasts typically comes from deposits that contain stratigraphic evidence of rapid deposition along with large amounts of food refuse (Gero 2003; Pollock 2012; Twiss 2008). In the Southeast U.S., faunal analysts usually attempt to differentiate deposition originating from public feasts versus that from elite consumption (deFrance 2009; Jackson and Scott 1995; VanDerwarker 1999; Windham 2010). Broadly, the main differences between public and elite events relates to the diversity of animals represented, the cuts of animals, the presence of rare or exotic animals, and sometimes the amount of bird remains (see Figure 1.2). In the Southeast, the bulk of faunal remains are represented by deer, which is the most common high.

Communal Feasting	Exclusive, Elite Feasting	Elite Animal Nonfood Use
Low Taxonomic Diversity	Comparatively High Taxonomic Diversity	Rare Taxa
High-Value Cuts of Deer	High-Value Cuts of Deer	Dangerous Taxa
Little Butchering Debris	Little Butchering Debris	Furbearers
Whole Bones	Whole Bones	Colorful Plumage Bearers
Processed Fish and Birds	Significant Use of Birds	High Bone Ornament Production
Variety of Nonfood Luxury Goods	Rare or Exotic Wild Animals	
	Bone Ornament Production	

Figure 1.2. Faunal expectations for different types of use and consumption during the Mississippian period (deFrance 2009; Jackson and Scott 1995; VanDerwarker 1999; Windham 2010).

meat-yielding species in the area. Butchery debris is generally examined through measures of element distributions and completeness, contrasting large amounts of high utility parts that come from areas of the skeleton that contain large amounts of meat and marrow (front and hind quarters) with a paucity of low utility parts, such as the skull and feet (Jackson and Scott 1995, 2003; Kelly 2000, 2001; Madrigal and Holt 2002; Pauketat et al. 2002; Purdue et al. 1989; Scott 1983; VanDerwarker 1999; Welch and Scarry 1995).

There is no such list of potential feasting or elite taxa when it comes to botanical analyses. The way in which plants enter the archaeological record is much more varied and haphazard, making the interpretation of deposits much more complex. The different nature of botanical preservation means that, to some extent, context of deposition and other lines of evidence may override a purely plant-based analysis; i.e., other evidence for public feasting or circumscribed elite contexts is used to determine the circumstances within with botanical assemblages were deposited and how they can be interpreted. In a general sense, however, evidence for feasting assemblages relies upon the same broad patterns as faunal remains: foods that are easily amassed in large quantities, small seeds represented in larger than normal quantities, or unusual taxa sometimes present in large amounts (Fritz 2008b; Kassabaum 2019b; Peres 2017). Fritz (2008b) has suggested that acorn and thick-shelled hickory may be feasting foods, as they tend to dominate assemblages despite access to other nuts like pecan. Maize is also seen as a potential feasting food, though how it is used depends on the timing and context. Sites with early maize tend to produce only low amounts, suggesting that it was primarily utilized as a ritual resource (Fritz 2008a, 2008b; Scarry 1993); once maize becomes a staple crop, it may show up in higher densities because it is easily amassed and/or within contexts where it may represent cleansing associated with green corn ceremonies (VanDerwarker and Idol 2008; VanDerwarker et al. 2007). Small seeds that show up in unusually large amounts at non-domestic sites include maygrass (Blewitt 2012; Fritz 2008b) and barnyard grass (Ryan and Roberts 2003), suggesting that in particular contexts they may be consumed in special ways consistent with feasting or elite use. The last category of unusual taxa, sometimes present in large amounts, can include a wide range of species; those discussed in recent publications include tobacco (Flosenzier 2010; Pauketat et al. 2002), clasping coneflower (Flosenzier 2010), and bearsfoot (VanDerwarker and Stanyard 2009).

While these studies represent a useful starting place, there are some difficulties with their application. Categories that include qualifiers such as "low" and "high" (i.e., low vs high sample richness, larger than average quantities) ideally rely on comparisons to assemblages from domestic contexts (Jackson and Scott 1995; Peres 2017), comparisons that are often unavailable in the LMV. What qualifies as rare taxa can also be rather complex; these categories can be highly localized and difficult to parse depending on the quantity and quality of previous analyses. Perhaps the biggest difficulty, however, is that heuristics in the Southeast typically start from an assumption of elite versus commoner. While there is good evidence for ascribed, hierarchical divisions within Mississippian societies, these social divisions were complex, nuanced, and in need of constant maintenance (Kelly 2001; Schachner 2001). Even within analyses of Mississippian assemblages, the existence of hierarchical divisions does not mean that every gathering emphasized such distinctions (Boudreaux and Armour 2021; Nelson et al. 2019). This complicates the neat divisions in our tables and forces us to consider ways in which "communal" feasting may overlap with "exclusive, elite" feasting, as well as "elite animal products use" (Pollock 2003; Potter 2000). This is not to say that the original authors of many of these studies do not acknowledge the many shades of gray, but more to recognize that these categories are easily carried forward in an overly simplistic manner.

The Contexts of Commensalism

Given that the categories used to distinguish Southeastern feasting are typically based on post-Late Woodland sites, re-envisioning archaeological correlates for the Late Woodland means beginning with what it is that feasts actually accomplish. The dominant feasting framework comes from research by Dietler (1996, 2003) and Hayden (1996, 2014). Although the foci of both researchers are a little different, they divide feasting into essentially the same three broad categories. The first of these consists of economic feasts, where the emphasis is on the amount of food and the people providing food are attempting to acquire power. The second category is redistributive feasts, where the emphasis is also on the amount of food provided, but those providing the food are doing so as an attempt to maintain their power. And the third category is diacritical feasts, which are often restricted events where feast participants are attempting to maintain their power, and in which the focus of the feast is on time consuming and/or elaborate food preparation and presentation. These categories are somewhat limited in that they all assume a society in which unequal distributions of power are already present, whether one group is attempting to maintain their power, or multiple groups are jockeying for power. However, both researchers point out that the division of feasts into three categories is just a heuristic device; realistically most feasts are polysemic and cross these boundaries. This polysemous nature is perhaps one of the most interesting aspects of feasts, because the contradictions present also make them a somewhat dangerous period, in which people can attempt to increase their standing and/or interrupt the status quo.

To this end, a number of researchers have stressed a different component of feasting, connected to mound building, in which feasts provide an opportunity to build a collective identity among participants. Knight's (2001) review of platform mound ceremonialism emphasizes that pre-Mississippian mounds feature open plazas with unrestricted access to mounds, as well as ceramic evidence that points to large feasting events. These features indicate that the function of mounds at this point was geared towards social integration. Howey (2012), whose work looks at monumental structures in the Great Lakes area, also makes a case for the integrative function of large structures in the Late Prehistoric period of her region. Howey delineates two types of monumental structures, the first being ditch and embankment sites that she argues are in neutral areas and represent inter-regional aggregation sites meant to maintain long-distance ties. She argues that the mound sites in this area also function in a dual register; they are in resource-rich areas likely at the edges of territories, meant to claim territory for larger tribal groups, but they also serve as gathering places which emphasize intra-tribal community building. Importantly, Howey (2012) draws her attention to asking why and how groups in this period did not become hierarchical, given obvious opportunities to do so. Her answer lies in liturgy: intentional, communal rituals that "bind" participants to each other and to the social order. Importantly, morality becomes attached to liturgy, thus breaking a social obligation becomes equivalent to immorality.

Many recent interpretations of monumental construction emphasize the integrative aspects of people coming together, sharing food, pooling labor, and later returning to commemorative locations (Henry et al. 2021; Kassabaum 2019b; Knight 2001). Analyzing the motivations that underly activities is difficult, though, as there are many ways people can mask or alternately promote their intentions (Hayden 2014). Large gatherings can certainly emphasize community integration and the creation or maintenance of a shared identity, kinship ties, and alliances (Hayden 1996; Mills 2007; Pollock 2003). However, they can simultaneously be an arena for social negotiation, whereby groups attempt to advance their own cause (Chicoine 2011; Hayden 2014; Twiss 2008). Through avenues such as ritual knowledge and competition, feasts associated with large gatherings can then create and reproduce social inequalities (Chicoine 2011; Schachner 2001; Twiss 2008). As Dietler (2001:65-66) points out, examining feasts is particularly important because they constitute social practices "by which people actually negotiate relationships, pursue economic and political goals, compete for power, and reproduce and contest ideological representations of social order and authority." The remains of gathering events, where people reproduce and recreate their social bonds, is in these feasts and ceremonies (Schachner 2001). This means that understanding feasts requires close attention to shifts in the scale, visibility, and diversity of site activities.

Omnipresent within the reproduction and recreation of social bonds are the plants and animals that constitute feasts and ceremonies. A large gap in our knowledge of foodways during the Late Woodland period are the specific ways that ritual and feasting manifest at different times and how foodways were manipulated within the context of community gatherings. As enumerated above, filling these gaps requires fine-grained site chronologies, separation of various episodes of feasting and ritual, and collection of multiple types of data (Hamilakis 2008). These data must then be contextualized based on evaluation of the activities that could have produced the material remains.

The distinctions described above provide many different categories with which to describe activities and archaeological assemblages related to large gatherings, depending on what factors an individual researcher decides are important. In thinking about how to categorize the deposits at Feltus, I considered many of these: elite/nonelite, public/private, inclusive/exclusive, large/small scale, integrative/status seeking, centripetal/centrifugal, economic/redistributive/diacritical, among others (Chicoine 2011; Dietler 1996; Hayden 2014; Kassabaum 2019b; VanDerwarker 1999). However, the very generalizations that can make these dichotomies useful for comparison simultaneously make them inadequate within this analysis; they are either too broad and do not seem to provide useful distinctions, or they are too narrow and imply greater certainty about the Feltus deposits then currently exists. Rather than attempt to fit assemblage characteristics into the specific categories delineated by other researchers, I decided to focus my initial categories on a more basic level.

Within this dissertation, I focus on two admittedly broad spatial categories: unrestricted and restricted deposits. Unrestricted deposits are those at ground level and for which everyone at the site theoretically had access to, while restricted deposits are those that only a subset of people at Feltus would have been able to access. The use of spatial characteristics to inform archaeological categories is not unique, but they are often used to make assumptions about the nature of deposits; i.e., deposits located adjacent to community areas indicate communal deposits whereas deposits on mound summits are associated with the elite (VanDerwarker 1999:27).

Ethnographic observations of gatherings and feasting in many societies indicate the underlying complexity of deposits, however. Large gatherings typically take place over the course of multiple days to weeks (Hayden 2014; Peres 2017); within this period of time not every meal will constitute a feast nor will it necessarily be shared. Further, even within the context of feasting events, foods are distributed in uneven ways (Hayden 2014; VanDerwarker 1999). The context of a spatially unrestricted deposit, where we may not know who did or did not have access and during which times, means that we have to be careful that the conclusions we draw from assemblages are not overly broad. Similarly, the term restricted deposit is meant to avoid implications of social structure and instead make a more general statement about access. Utilizing more neutral terms for deposits allows me to examine what types of activities are inferred by the botanical and faunal assemblage, without a predetermined set of categories.

Organizational Overview

Feltus is nearly unique among excavated Late Woodland Coles Creek mound centers both for the amount of investigation it has received and for having multiple well-preserved deposits that range across much of the history of the site. It is rare to have good botanical and faunal preservation within the same assemblage; the existence of both within a number of midden assemblages at Feltus provides an opportunity to explore variation in community gatherings within a single site at multiple scales and to create the kinds of fine-scaled chronologies we have so far been lacking.

As a background to the current study, Chapters 2 and 3 provide context to the site itself and to the assemblages under study. In Chapter 2, I provide a summary of the Feltus excavations and our present understanding of the site chronology. This contextual knowledge of the archaeological deposits — the dates when certain assemblages were made by people at the site and our interpretations of how the deposits were formed — underpin my analysis of the botanical and faunal assemblages. Chapter 3 focuses specifically on the methods used in this analysis. I consider taphonomic factors that affect botanical and faunal assemblages, identification decisions that shape my analysis, and the analytical measures I used to aggregate and compare the assemblages.

Chapters 4 and 5 then focus on my analysis of the botanical and faunal assemblages. Chapter 4 details the botanical assemblages, covering multiple deposits within the South Plaza and Mound B. I complement my analyses with additional data from Mound A and a limited number of other Late Woodland LMV sites. While the assemblages differ in terms of the density of deposits, I use the aggregated information to suggest broad patterns in plant use across time at Feltus; I also compare deposits in order to elucidate how plant use varied within and between different areas of the site and between other sites. I suggest that the B.S4 deposit on the top of Mound B reveals important information about the ways in which mound-top gatherings were differentiated during the late Coles Creek period, with an increased focus on specific taxa indicating particular meal preferences. Chapter 5 provides an analysis of the two well-preserved faunal assemblages from the South Plaza and Mound B.S4 middens, also bringing in comparative data from Mound A and other LMV sites. I find a number of indications that people gathering on the top of Mound B differentiated themselves on the basis of skeletal portions, cooking methods, and certain taxa.

Chapter 6 provides a synthesis of the findings from the botanical and faunal analyses. I provide a summary of the shared patterns within amassed resources and special components, followed by a consideration of the differences found within those same categories. I then discuss the inferences we can make about site activities based on the assemblage patterns from unrestricted and restricted deposits. I suggest that unrestricted deposits show a combination of activities, including feasting, ritual, and medicinal activity. Restricted deposits, on the other hand, tell us how smaller groups of people behaved. Within the context of the Mound B.S4 deposit, people were apparently using the same taxa, but in ways that emphasized differences through specific dishes, labor-intensive ingredients, and conspicuous consumption. I finish by critiquing the Southeastern model of archaeological correlates utilized to differentiate between faunal assemblages produced through communal feasting versus elite consumption. I suggest a broader array of botanical and faunal expectations that can be fruitfully applied to Late Woodland gathering in the Southeast. The nature of community gathering, and the associated assemblages, will vary between groups and geographic locations, and a more flexible series of expectations allows for greater interpretive power to tease apart shifts in gathering practices at local and regional levels.

CHAPTER 2

HISTORY OF THE FELTUS MOUNDS

Like many mound sites in the LMV, Feltus has a deep history of interest by antiquarians and archaeologists. This longstanding interest in the site has led to a sustained period of modern excavations, resulting in a wealth of information that is often lacking for other Late Woodland mound sites. The sum total of information about Feltus allows us to construct a reasonably accurate history of how the site was used and built by the people who gathered here, which then helps provide an overarching context for more granular reconstructions at the level of specific deposits. This chapter provides an overview of our current understanding of the Feltus mounds, consisting of a quick summary of the site layout, a chronological overview of the site history, and ending with a detailed description of the contexts that I analyzed for this dissertation. I also provide background information about four other sites in the LMV that I used for regional comparisons.

Feltus Today

Presently, the Feltus site consists of three extant mounds: Mounds A, B, and C (see Figure 2.1). Mound A is the northernmost of the three mounds, and at seven meters is also the tallest mound. Based on geophysical investigation and excavation, it appears that Mound A was built in four stages, three of which added two meters of height each, and one stage that added one

‘

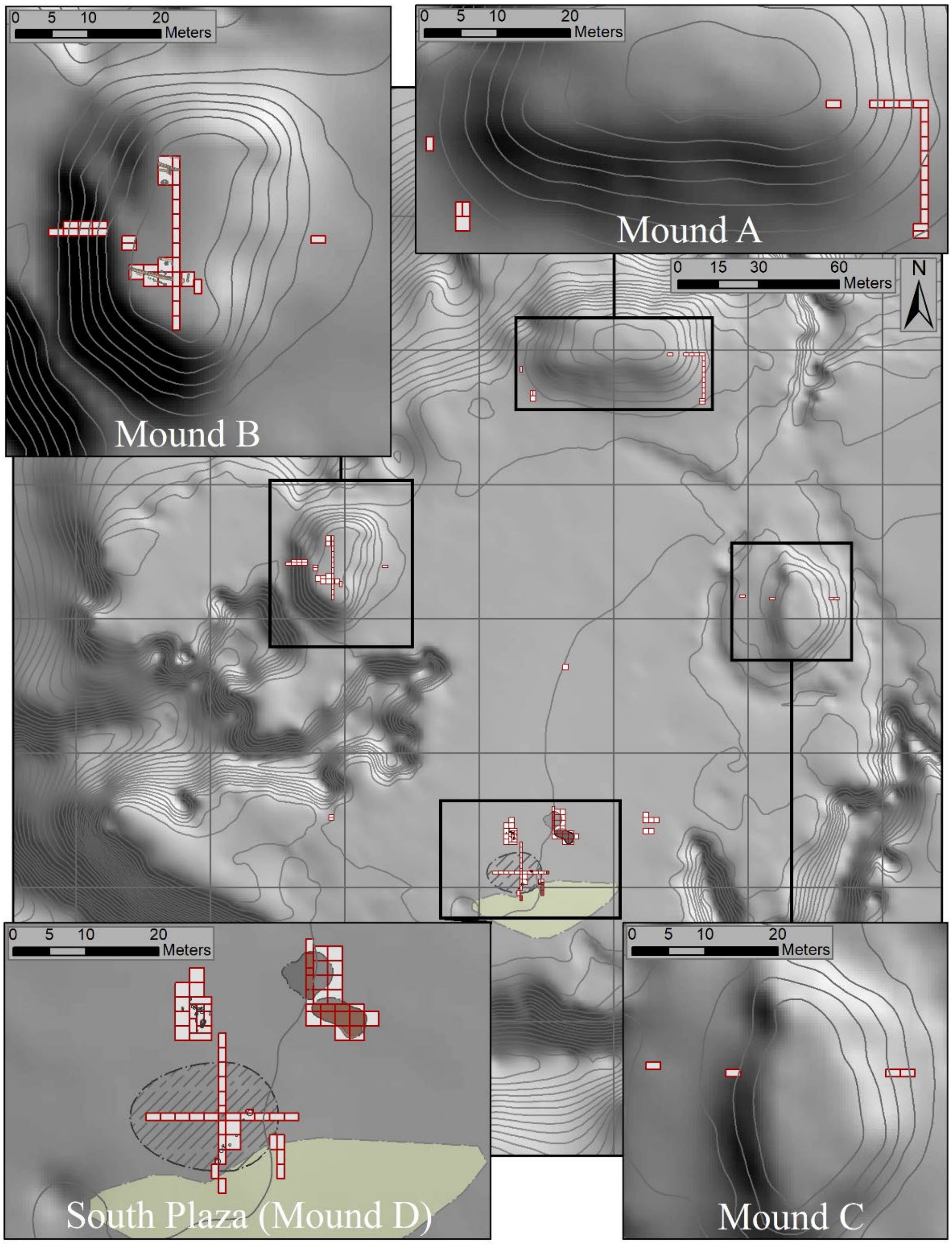

Figure 2.1. Shaded topographical map showing UNC excavations at the Feltus site, 2006-2018. Excavated units are in red.

meter. Mound B is the next tallest mound at six meters and was built in five stages, four of which raised the mound one meter and a last stage that raised the mound an additional two meters. Mound C is the smallest mound, rising four meters above the ground surface (Kassabaum 2014:35-69; Steponaitis et al. 2015). Warren K. Moorehead's 1924 excavations uncovered numerous bundle burials in Mound C; in order to avoid disturbing any other burials excavation in this mound has been extremely limited. Based on those limited excavations, it appears that Mound C was probably built in three stages (Kassabaum 2014:69). Mound D no longer exists, although the location and rough appearance of the mound is known from compass bearings and descriptions by Benjamin C. Wailes (Steponaitis, Kassabaum, et al. 2012). The last historical mention of Mound D is from James A. Ford's visit in 1935 (Ford 1936), while an aerial photograph from 1947 lacks evidence of the mound (Steponaitis, Kassabaum, et al. 2012), meaning that it disappeared sometime in the interim.

Mounds A and B are both in the shape of sub-rectangular platform mounds, meaning they are rectangle in shape with rounded corners and flat tops. Based on stratigraphical evidence from excavations, they were built using two methods: the stacked and mantle methods. The stacked (or pancake) method of construction involved adding height to the summit of the mound, but not increasing the footprint. In contrast, mantle construction involved adding a layer of dirt over the entire mound in a way that increases both the height and the footprint. Kassabaum (2014:58) notes that descriptions from other researchers indicate a potential chronological component to both construction styles, with stacked methods occurring on earlier Coles Creek sites and mantle methods occurring on later Plaquemine sites. On Mound B there is direct evidence for a shift from pancake to mantle style in the fifth construction episode (discussed in more detail below), lending support for the idea that construction methods may be related to a more distinct temporal shift (Kassabaum 2014:58). Both mounds also contain artificial terraces, or low platforms, extending to the east of the mounds.

Unlike Mounds A and B, Mound C has a rounded or domed shape, though it is hard to know if it was shaped like this in each stage of its existence, or if the dome was more specific to its final shape. Mound C also has an artificial terrace extending to the west, probably added on as part of the last stage of construction. Unlike the other mounds, Mound C is surrounded on at least three sides by an artificial ditch or moat. Moorehead's (1924) identification of at least 30 bundle burials in the summit of Mound C, its domed appearance, and the ditch around the mound all indicate that the final function of Mound C was as a burial mound. Kassabaum (2014:69) points out that ditches and/or moats have known uses as "spirit barriers," implying that the ditch surrounding Mound C may have served a similar function.

Because Mound D is no longer extant, we unfortunately do not know anything about its construction history. Based on Wailes' (1852) description, we can say that it likely had a domed top and included an artificial terrace, with a drawing that seems to indicate the terrace was, at minimum, located to the east of the mound. Though Moorehead (1924) did not provide a written description of his excavations into Mound D, he did include a plan drawing in his notes showing eight burials. Based on the shape of Mound D and the recovery of burials, our assumption is that, similarly to Mound C, at least part of its function was as a burial mound. This southern portion of the site also contains a number of other interesting features. Immediately south of Mound D's location is an extremely large borrow pit (shown in olive green on Figure 2.1). The dimensions of the excavated portion of the borrow pit are close to estimates of the total volume of Mound D (Steponaitis et al. 2013), making it was probably used to mine dirt to build the mound. Just north of Mound D is a post-pit complex, containing thirteen large standing posts. While there are many other similar post-pits at the site, this area of the plaza seems to be a specific location where people consistently returned in order to erect freestanding posts. Finally, northeast of Mound D is an area containing three extremely large and deep pits (described in detail below). Each pit was allowed to stay open for a period of time, before being rapidly filled with cultural material.

Chronological History of Activity

Our understanding of the use and modification of the Feltus mounds is furthered by a number of radiocarbon dates, which allow us to place the deposition of various archaeological features into clusters of activity. While we do not currently have a detailed understanding of the scale of individual gathering events, particularly in terms of temporality, the ability to group deposits together chronologically helps to refocus our attention on the plurality of activities that may have occurred as part of a large gathering event, rather than focusing on individual deposits as though they are completely separate phenomena.

Previous work suggests that Feltus' history can be divided into three major periods of activity with a number of secondary clusters within major phases (Kassabaum 2018:13-14). Additional radiocarbon dates since that time substantiate those large divisions and indicate that use of the Feltus site was primarily on a punctuated, rather than continuous, basis. In a practical sense, this means that we do not have evidence for a large population of people living at the site year-round. Instead, the weight of archaeological evidence indicates that people lived elsewhere in the surrounding area and gathered at the site episodically in large numbers, typically leaving extensive midden deposits and completing large construction projects as a testament to their activity.

While the mounds provide much of the obvious evidence for activity at the site, they do not strictly define the temporal boundaries of site use. The earliest radiocarbon date currently obtained from Feltus comes from the original buried A-horizon beneath Mound C and has a range from cal AD 425-565. Earlier ceramic types found in limited amounts around the site (Kassabaum 2014:172-175), along with this radiocarbon date, indicate activity prior to the site's dominant Coles Creek use. Surface collections and shovel tests also indicate the presence of an oval shaped midden that predates the construction of the mounds (Barrier and Kassabaum 2018). This provides a strong indication that the site layout was a planned use of space long before the mounds came to dominate the area. The ring of artifacts around the edge of the plaza then defined the future layout of the site, a pattern common among Woodland mound-and-plaza sites (Kassabaum 2019a). Given the evidence we have for large amounts of people periodically gathering in these spaces, it is clear that great effort was put into keeping central plazas clean (Barrier and Kassabaum 2018; Kassabaum 2019a; Kidder 2004).

With the site layout at Feltus clearly in place, the first phase of major activity at Feltus occurs from roughly AD 700 to 900, a period spanning the Sundown (AD 750-850) and Ballina (AD 850-1000) phases. Within this first Feltus phase we have four radiocarbon dates from: two post pits in the South Plaza; the buried A-horizon at the base of Mound B; and the initial filling of a large pit (Feature 4) also in the South Plaza. The earliest radiocarbon date comes from Feature 1 (cal AD 671-880), a particularly enigmatic post pit excavated in 2006 and 2007. This feature held a freestanding post 40 cm in diameter and was filled with unusual materials including clayey soil from off-site, an ash lining, the remains of four or five children, and a femur and metacarpal from a bear. The unusual material included within this feature lead

Kassabaum and Nelson (2016:149) to suggest that it represents a potent *axis mundi*, gathering worlds together and creating a powerful portal between those worlds.

While not as large as Feature 1 and lacking bear remains, Feature 139 (cal AD 771-892) is a similar post pit containing intentionally curated materials and also likely serving as a type of *axis mundi*. An additional South Plaza date from this first cluster of activity comes from the lowest layer of soil filling a large pit (Feature 4 Zone 3, cal AD 820-978) that may have been utilized as a water feature (see below for more detail). The last date within this cluster originates from the buried A-horizon beneath Mound B (cal AD 772-901). Like the early Mound C date discussed above, the Mound B date indicates that the area that would become Mound B was utilized for activities prior to more specific mound building. Taken as a whole, this first cluster of dates supports the supposition of the purposeful design of the site. All of these features are around the perimeter of the site, leaving the plaza open for gatherings. The intriguing nature of the post pits and large pits in the South Plaza also provide evidence for the importance of ritual activities at the site, with post setting remaining an important activity throughout the active utilization of the site.

The second phase of activity at Feltus runs from roughly AD 870 to 1050 and includes 13 different radiocarbon dates that seem to be arranged in roughly two secondary clusters (see Kassabaum 2018:14-15). Within the first subcluster are six radiocarbon dates, relating to Mounds A and B, and features in the South Plaza. Three dates come from Mound A, providing estimates for the initial construction of Mound A (cal AD 889-1030) as well as the use of the first mound stage (cal AD 870-997 and cal AD 882-996). The initial Mound A date comes from a post beneath the mound that was set with ash (Feature 37); immediately after the post was pulled it was covered over by the first stage of Mound A. This first stage of construction also sealed in a large midden deposit, indicating that food was an integral part of this larger gathering. The subsequent Mound A Stage 1 dates come from black and white veneering placed on the surface of the mound, as well as a small pit dug into the floor. These dates are indicative of people's use of this surface and may not be associated with a larger construction episode. Similarly, another date in this subcluster comes from midden deposits sealed on the second stage of Mound B (cal AD 881-1027), providing evidence of people's activity on the platform but not necessarily evidence of construction. Two more dates originate from the purposeful filling of the previously mentioned large pit in the South Plaza: Zone D at cal AD 887-997 and Zone C at cal AD 876-995. Whatever the use of the large pits may have been, by this point they were apparently no longer in use and were being actively refilled with cultural materials.

The second subcluster consists of seven radiocarbon dates from the same three areas: Mound A, Mound B, and the South Plaza. Three of these dates come from the large pit complex and include dates from a discrete lens of charcoal and fired clay (Feature 4 Zone B/C, cal AD 948-1030), as well as two areas of an overlying dense midden deposit (Feature 4 Zone A, cal AD 949-1035; Feature 148 zone B, cal AD 948-1030). The degree of overlap between these dates makes it likely that they are all part of the same deposition episode. A Mound A date is drawn from deer bone in an extremely well-preserved midden at the base of the southwestern edge of the mound (cal AD 940-1048). This date indicates that the deposit is most likely associated with the first or second stages of the mound and may be connected with construction of the subsequent mound stage. One Mound B date is drawn from a sweetgum pit excavated within the third stage of construction (cal AD 949-1051), providing a date for the actual construction of this mound stage. Two final dates come from the area around the former Mound D. The first of these is a radiocarbon date from midden deposited on the bottom of the large borrow pit presumably mined to construct Mound D; the cal AD 951 to 1041 date provides an estimation for the cessation of borrow pit excavation. The last date originates from another post that may have been at or near the edge of Mound D (Feature 132; cal AD 992-1051). Like the earlier F.1 and F.139, F.132 was also lined with clay and plugged with clean fill, indicating a continuation of freestanding post rituals at the site.

The third phase of activity at Feltus occurs from about AD 1050 to 1150 and consists of six radiocarbon dates from all four areas of the site: Mound A, Mound B, Mound C, and the South Plaza. Two of these dates come from the fourth stage of Mound B; one from the top of a flank midden on the southern edge of the platform (cal AD 1077-1155) and another from a burned post associated with the same mound stage (cal AD 1077-1155). More detail about this flank midden is below, but the excellent preservation of materials makes it likely that the deposition of this midden was part of (and immediately preceding) the next construction episode. Our only radiocarbon date from Mound C is in this last cluster, coming from a midden at the base of the mound, thought to be associated with the first mound stage (cal AD 1016-1158). A second date from a different area of the borrow pit in the South Plaza (cal AD 1022-1159) represents the earliest date at which the borrow pit could have been filled, while a date from another post pit (Feature 131; cal 1025-1160) shows further continuity in the tradition of freestanding posts. The last date in this cluster is from a large rectangular roasting pit associated with the second mound stage (Feature 145; cal AD 1028-1172). Technically this is another date that can only be said to show use of the mound surface, rather than construction. However, given that most of the other extensive midden deposits are quickly covered over by construction episodes, it seems reasonable to hypothesize that the roasting pit is connected with consumption of large amounts of food immediately prior to construction of the third mound stage.

The latest radiocarbon date from Feltus comes from maize recovered in a large wall trench associated with the fifth and final stage of Mound B (Feature 186; cal AD 1204-1276). While there are very few ceramic types to support such a late date, evidence for multiple rectangular structures on this summit does fit with what would be contemporary Plaquemine building practices (Steponaitis et al. 2018). Additionally, given that there are at least three structural iterations on this surface, we know that members of the community returned to Feltus and erected large buildings on this summit multiple times. Perhaps the trench we dated is one of the later or last buildings erected, and material from some of the other trenches would provide an earlier date that is more in line with the majority of ceramics, or perhaps additional samples would indicate this late date is an outlier. Regardless, the shift to a closed building during these later years may be an indication that the nature of ceremonial activities at the site had fundamentally shifted.

If we now step back and take a wider view of the Feltus chronology, it seems clear that there is a large degree of continuity in the community activity at the site. The layout of the site was clearly defined very early in the site's history, with a plaza that was kept clear presumably as the locus of community gathering. We have evidence for freestanding posts throughout the site's history, indicating the use of *axis mundi* was an important ritual component of community activity. Once we have evidence for mounds, mound construction becomes an important part of each phase of activity, with much of our direct evidence for construction episodes drawn from excavation of large midden deposits associated with the construction. While people certainly could have gathered at Feltus and left behind evidence between activity clusters (e.g. the use of the first mound summit of Mound A), it is clear that the largest gatherings were associated with events that included large amounts of food and likely ended with the earth moving that created new mound stages. While we do not know what ended these traditions at Feltus, some of the defining cultural traditions associated with the Plaquemine period around AD 1200 (i.e. large rectangular buildings and maize agriculture) seem to coincide with a decline in the community's interaction with the site and a presumable shift to other sites in the region.

Contexts Analyzed

While there are overarching similarities in the ways that the community interacted with Feltus at a large scale, there are also differences more apparent at a granular level; this dissertation deals with those differences as expressed through botanical and faunal remains. Underlying this analysis is contextual information about the deposits, some of which is integral to interpreting the nature of the material recovered. As shown in Table 2.1, my analysis includes a number of different contexts, only some of which have both faunal and floral remains available. Two previously analyzed contexts from Mound A are also included here as comparative contexts. In order to provide a basis for the analysis in the following chapters, I provide a detailed summary of our current interpretations of these contexts below.

South Plaza Deposits

Extensive excavations in the South Plaza have identified a complicated series of deposits in and around the former location of Mound D. My primary focus in this area of the site was the large pit complex, which contained nearly all of the botanical and faunal samples I analyzed for the South Plaza. The only other analyzed botanical samples came from midden laying at the base of the large borrow pit immediately south of Mound D.

Table 2.1. Botanical and faunal data available for Feltus contexts discussed in this text.

Context	Botanical	Faunal	Analyst
South Plaza			
Feature 4 Midden	Yes	-	Peles
Feature 4 Upper Pit	Yes	-	Peles
Feature 4 Lower Pit	Yes	-	Peles
Feature 148 Midden	Yes	Yes	Peles
Feature 148 Upper Pit	Yes	-	Peles
Feature 148 Lower Pit	Yes	-	Peles
Borrow Pit Midden	Yes	-	Peles
Mound B			
Stage 4 Midden (B.S4)	Yes	Yes	Peles
Stage 5 Features (B.S5)	Yes	-	Peles
Mound A			
Premound Midden (A1.S0)	Yes	Yes	Kassabaum[a] & Jackson[b]
Flank Midden (A2.S0)	Yes	Yes	Kassabaum[a] & Jackson[b]

[a] Botanical.

[b] Faunal.

LARGE PIT COMPLEX. The area to the northeast of Mound D is the location of three extremely large pits, each with a similar depositional history. Feature designations and interpretations have shifted over time, so for description purposes here, pits and their associated strata are referred to as F.4, F.59, and F.148. All three features were initially identified as part of a 2006 gradiometer survey, which showed two large, dark oblong circles (Figure 2.2). That same season, two units were opened at the north end of the feature complex, uncovering F.4. In 2007, a large L-trench was excavated in order to bisect the area identified with the gradiometer. Based on this trench, it was determined that F.4 consisted of a thick, overlying midden (F.4 midden, Zone A) and multiple zones of fill inside a pit extending roughly 1.5 m deep (F.4 upper pit, Zones B-E). Excavations in 2018, which aimed to explore the east half of F.4, discovered that the pit extended another half meter in depth. This lower portion of the pit was visibly different than the previously excavated upper portion of the pit, containing many layers of wash-deposited gleyed laminae (F.4 lower pit, Zones 1-3) (Figure 2.3).

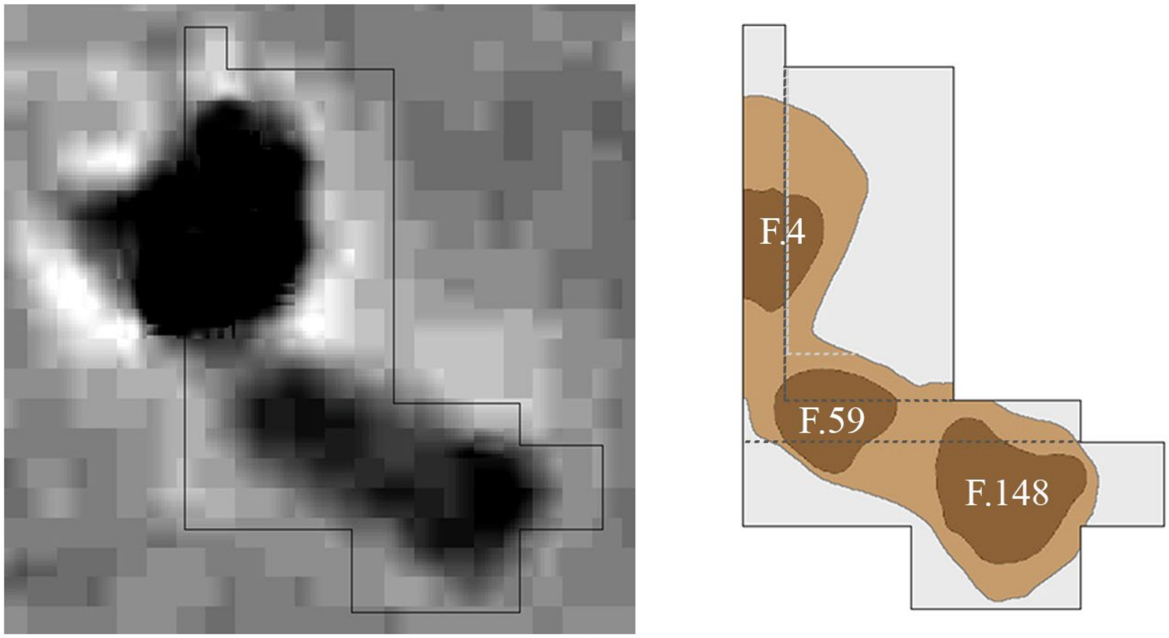

Figure 2.2. Magnetometry results from D2 area (left) compared to excavation boundaries (right). Light brown represents overlying midden, dark brown represents underlying pits. Overlying midden within the dashed dark gray line was designated AU D2.06 (2006/2007); midden south of the dashed dark gray line was designated F.148 Zone B, AU D2.31. Overlying midden within the dashed light gray line was designated F.4 Zone A, AU D2.06 (2018). After Graham et al. 2019.

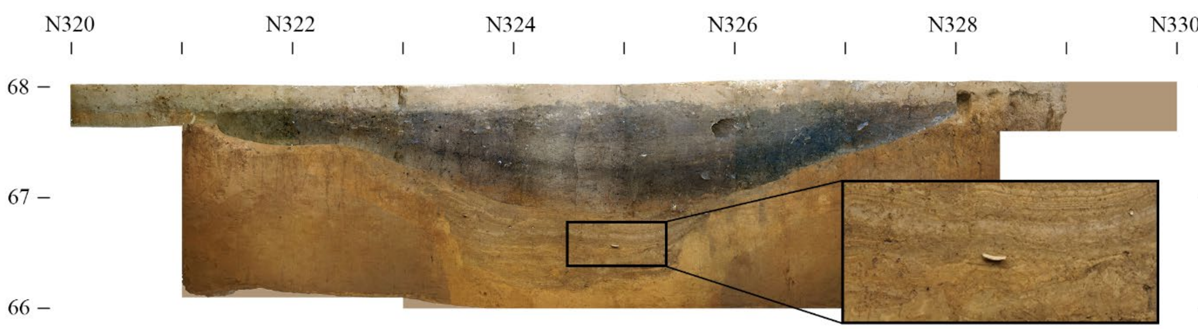

Figure 2.3. Photomosaic of Feature 4 profile, R477 line , with closeup of laminae in the lower portion of the pit. After Graham et al. 2019.

Feature 59 was also identified during the 2007 L-trench excavation. While the excavation of this feature initially proceeded with 10 cm levels through the overlying midden, it became clear in Level 5 that something different was going on, as fill strata continued past what should have been the natural Bt horizon. In order to quickly and efficiently determine the depth and nature of this feature, it was taken down as one subdivided level to the bottom at 190 cmbs. Because the level designations that are potentially and clearly within F.59 (Levels 4 and 5) mix strata together, this feature was excluded from my analysis. However, the stratigraphy revealed in the profile and feature notes transcribed here make clear that the general makeup of Feature 59 is very similar to F.4:

> As these units [320R477 and 320R479) descend there are clear layers of wash that are quite impressive in size, indicating exposure to multiple heavy rains at a time. The soil is sterile for the most part except for sherds (not many, only a couple per dozen buckets) all thus far from the Baytown period indicating the pit was culturally prior to the sheet midden above it.

Though the two units that encountered F.59 in 2007 encompass much of this feature, there are still sections to the south and north that remain unexcavated (see Figure 2.3). Excavations in 2012 removed the overlying midden (designated F.148, Zone B), as well as a small portion of the underlying fill zones in a smaller 1 x 2 m profile cut (F.59, Zones B/C), but the rest of the feature north of this bisect remains intact. Excavations in 2018 removed the plowzone and a small portion of the midden overlying F.59, but beyond this everything remains intact in 321R478. A future excavation that focused on a stratigraphic excavation of either of these intact sections would help clarify the relationships between strata, their associated interpretations, and potentially provide material that could be used for radiocarbon dating.

Feature 148 was first encountered during the 2007 L-trench excavations. That year, the midden overlying the entire pit complex was labeled Zone A and in every excavation unit of the L-trench was designated as the same analysis unit (AU D2.06). Feature 148 was identified and labeled during the end-of-season trench profiling as a potential pit (originally designated F.143). When excavations continued to the south in 2012, it was decided to provide this excavation area with its own feature designation (F.148) (Figure 2.4).[1] After the plowzone was removed from the entire area, it became clear that there was a lighter brown, circular zone in the middle of the excavation, surrounded by the darker midden soil. The lighter brown in the center of excavations was identified as F.148, Zone A (D2.30) and the darker midden soil was labeled F.148, Zone B (D2.31) (Figure 2.4). The lighter F.148 Zone A appeared to be a shallow, 10 cm-deep basin roughly centered over the pit feature below, while the darker F.148 Zone B both surrounded and laid beneath Zone A. Zone A was also artifactually less dense than the surrounding Zone B.

While it is therefore possible that F.148 Zone A was an entirely separate and later deposit, because the artifact content is otherwise so similar, I consider both Zone A and Zone B to be part of the same event; I suspect that a difference in the soil composition of Zone A caused it to leach more organic material and appear lighter in color. Beneath Zone B were a small number of other zones (Zones D-F) that were also designated as part of F.148 (Zone C was initially identified in the field and later combined back with Zone B). Two additional laminated were also identified: Zones G and H. Based on our knowledge of pit strata from 2018 and re-examination of photos from 2012, we believe that there may be additional unexcavated laminae that extend the depth of the F.148 lower pit (Graham et al. 2019). Coles Creek peoples purposefully excavated all three of these features, though given their proximity to each other they may not have been open at exactly the same time. After being dug, we are not sure what the

[1] This sequence of events, the way that feature and analysis units were designated, and the associated visual graphic of Fig. 2.12 are all important because they have affected previous interpretations of this area. Because the 2007 L-trench was considered to be one large midden (reflected in analysis unit designations and field bag designations as F.4), details in various publications combine aspects of both the F.4 and F.148 areas. This is particularly relevant as it regards information about faunal remains detailed in prior publications. If this is one large depositional event, then that conflation may not matter. If they are two or more middens, then some aspects of previous interpretations may need to be updated.

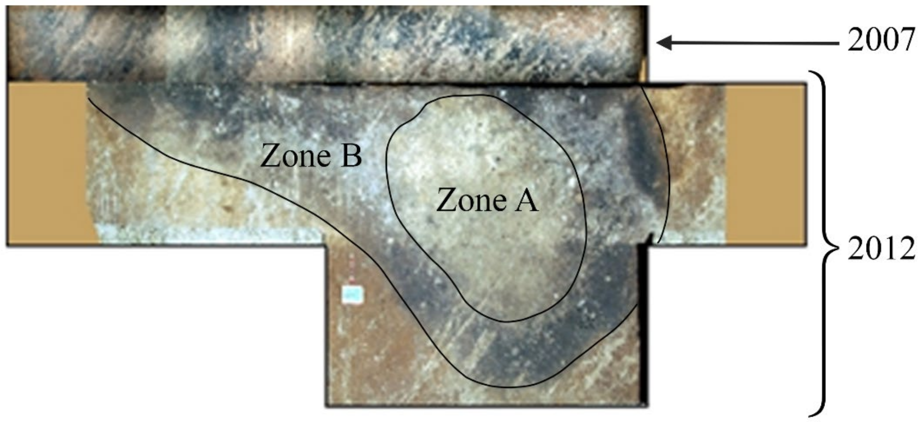

Figure 2.4. Plan view photomosaic of Feature 148, with 2012 zone designations identified. After Graham et al. 2019.

purpose of the pits was, although we believe they may be ritual in nature as their size, shape, and depositional histories are very similar to large pits excavated at the Marksville site that are interpreted as ceremonial in function (McGimsey 2003:59-60). Each pit at Feltus was allowed to stay open for a time, leading to the erosion of soil into the very bottom of the pits and creating a basin shape around the top of the pits. Water sat in the pits for long enough to result in multiple gleyed laminae; artifacts are present but in extremely low amounts. At some point, people decided to deliberately fill the pits in what was probably one or two fairly rapid episodes. We interpret each zone to be a representation of different activities taking place in the plaza, some of which were more focused around meals, others of which focused on activities that left less artifactual evidence (Graham et al. 2019). While fill zones lack any appreciable amount of preserved faunal material, the botanical samples show a number of interesting patterns, described in Chapter 4.

Overlying each feature was a dense midden deposit, roughly 40 cm thick. There was no clear horizontal separation of this midden between features and it is currently unclear if this was multiple separate middens or one extremely large midden, although radiocarbon dates show a great degree of overlap, making it likely the large overlying midden was all related. Analyses of ceramics show that, while the F.4 midden contains a greater density of ceramics, the vessel form patterns are the same for both the F.4 and F.148 middens. In both cases, vessel classes are dominated by bowls, with smaller amounts of jars, restricted bowls, and beakers. More specifically, serving forms predominate, followed by cooking forms, and there are very few storage vessels. Further, the majority of serving vessels are large bowls, greater than 40 cm in diameter. These patterns are consistent with an interpretation of these middens as large-scale communal consumption events (Graham et al. 2019; Kassabaum 2018:18).

During both the 2007 and 2012 excavations, a transitional layer of soil between the plowzone and the unambiguous midden soil was identified as a separate level of excavation and labeled Level 2 on paperwork. Within the grouped analysis units, over Feature 4 these context numbers were described as "plowzone II and midden," or "plowzone II, wash, and midden". Based on consultation with the profile drawings, a matching plowzone II was identified in a 1 m x 1 m controlled-excavation block (324R478) in 2018. Over Feature 148, these context numbers were described as "plowzone and Feature 148". Everywhere this transitional zone was identified, it was darker in color than the overlying plowzone and contained a much greater density of artifacts. While technically this could still be considered plowzone, the characteristics of this layer indicate that it was minimally disturbed by historical plowing. Consequently, field directors decided to waterscreen these contexts through ¼" screen; during the 2018 excavations, one botanical sample was also collected. Based on the minimal disturbance, I included the 2018 botanical sample and 2012 faunal material from this transitional zone in my analyses. The patterns from both sets of material are described in Chapters 4 and 5, respectively.

Borrow Pit. As stated previously, Mound D is no longer standing; based on Ford's notes and an aerial photograph, we know that it disappeared sometime between 1935 and 1947 (Steponaitis, Kassabaum, et al. 2012). Two areas of excavation around the former location of Mound D provided evidence of the same feature — an extremely large borrow pit likely related to the construction of Mound D (Steponaitis, Kassabaum, et al. 2012). Based on soil profiles from augering, this borrow pit appears to be roughly three meters deep, 60 m long and 20 m wide. In one of the excavation units (295R465) there were wash deposits that accumulated in the base of the pit, indicating that the pit laid open for a period of time. Both excavation areas also contained midden deposits that accumulated at the base of the pit, with different radiocarbon dates that provide a *terminus post quem* and *terminus ante quem* for the active use and then filling of the borrow pit (Kassabaum 2014:88). Refilling this pit involved the movement of about 800 cubic meters of dirt; for a sense of scale, this is a total volume almost equal to the estimated volume of Mound D (1100 cubic meters) (Steponaitis et al. 2013). I analyzed three botanical samples from the midden at the base of the borrow pit, described in detail in Chapter 4.

Mound B

The second largest mound at Feltus is Mound B; it rises six meters off the ground surface. The scale of earth moving around Mound B is more extensive than it first appears, however, as much of the area to the west of Mound B has been levelled, removing the natural A horizon along with about a meter of subsoil. Similarly to the Mound D borrow pit, it seems likely that the "missing" soil from this land leveling was used during various constructions stages in Mound B (Kassabaum 2014:57; Steponaitis et al. 2013).

While the construction history of Mound B is interesting and complex, the most extensively sampled archaeological deposits were the fourth (B.S4) and fifth (B.S5) stages of the mound. The fourth mound summit (B.S4) contained alternating zones of burning and veneering that were too intermingled to completely isolate during excavation (Figure 2.5). This floor also contained many features, including a number of large posts, small, potentially dedicatory pits, and the burned remains of a possible screen or complex standing-post deposit. Voids in some of the postholes indicated that the posts were left in place to rot while the next layer of mound fill was added around them (Kassabaum 2014:61-67).

A well-preserved flank midden to the south of the potential screen/standing post complex contained dense deposits of ceramic, botanical, and faunal material. It does appear that there were at least two (and possibly more) depositional zones within this midden, although it was excavated together as one context. Based on the degree of preservation, I interpret this midden as indicative of one larger event, with potential evidence for separate smaller events or meals preserved within. A future excavation that teased out these depositional episodes could analyze them separately; for present purposes and as a result of the excavation method, I analyzed everything together as one context here. There may be another flank midden on the north end of the summit as well, though it was not encountered during excavations (Kassabaum 2014:67).

The Mound B.S4 midden contained a higher proportion of ceramic refits and more complete vessels than any other large deposit at the site, indicating an *in situ* context. Ceramic vessels from the midden have the largest average rim diameter size (25 cm) of any context at Feltus; jars, bowls, and restricted bowls were all larger within this midden than elsewhere (Kassabaum 2014:230; O'Hear et al. 2016). The Mound B.S4 midden also contained the highest proportion of beakers at the site, though conversely, the beakers were below average diameter

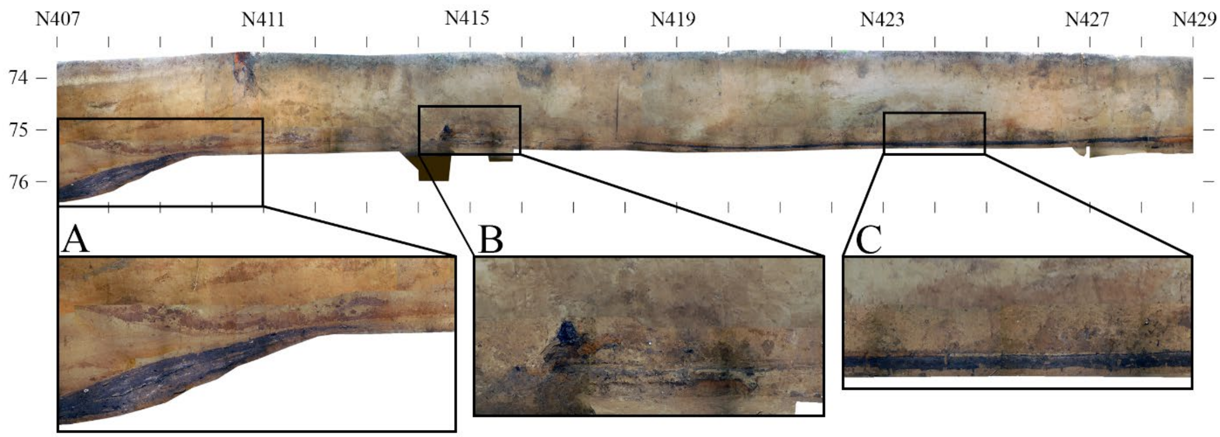

Figure 2.5. Photomosaic profile of B.S4. (A) flank midden, (B) posthole and burned wall fall, (C) red, white, and black veneered surface. After Steponaitis et al. 2012.

(20 cm). Of the four contexts analyzed here, the Mound B.S4 midden contained the highest proportion of cooking vessels, along with the lowest proportion of storage vessels. While serving vessels still predominated, it appears that cooking was a more important activity on this particular mound summit than in other areas (O'Hear et al. 2016). Both the botanical and faunal assemblages from the Mound B.S4 midden are analyzed in Chapters 4 and 5.

The last construction episode (B.F5) represented a shift in methods with fill added as a mantle over the entire mound, increasing the height as well as the footprint of the mound. A berm was added to the summit, helping to stabilize construction; this berm and associated mound fill was likely added almost immediately after the flank midden was deposited, sealing in and helping to preserve the associated artifacts. While the actual mound summit surface of B.S5 has been disturbed by modern activity, excavations in 2017 discovered that extensive architectural features related to the summit were still preserved. Between the 2017 and 2018 field seasons, 34 square meters of the summit were investigated, leading to the identification of five confirmed wall trenches and numerous postholes (Figure 2.6). Two additional wall trenches were considered probable based primarily on posthole alignments; both were backfilled with the same subsoil used in mound construction, making the wall trench fill almost indistinguishable from the mound fill.

Where wall trenches and postholes were both identified, it was clear that the postholes were placed on the inside of the wall trenches, indicating a bent-pole structure. Trenches for the foundations of these buildings were made with extra space along the outside of the trench, allowing for the placement of a horizontal wedge (sill post) that held pressure on the building posts to prevent them from kicking out and getting loose. Based on the alignment of the trenches uncovered in the south blocks of our excavations, we assume that the trenches identified in the northern blocks were their counterparts. The corner of one building was identified, providing a width estimate of 8.5 meters; based on assumed alignments and pairings we estimated a potential length measurement of 14 meters for the same building (Figure 2.6) (Steponaitis et al. 2018). While faunal material was rare and poorly preserved, all of the botanical samples from the 2018 excavation season are detailed in Chapter 4; all but one of these samples came from the excavated wall trenches.

The uppermost levels of the units excavated on this summit also produced unusually large amounts of fired-clay daub, which is otherwise uncommon at Feltus. Many of the fragments recovered still retain impressions of split cane (Figure 2.7), further indicating wattle-and-daub construction. Given the concentration of daub in the areas between the north and south wall trenches, this means that at least one of the summit buildings was burned. When dimensions are compared to similar wall trench structures from Mississippian sites in Alabama and Louisiana, the Mound B structure falls roughly in the middle, meaning that in comparison with other large buildings containing walls more than 10 meters long, its size was fairly typical (Steponaitis et al. 2018).

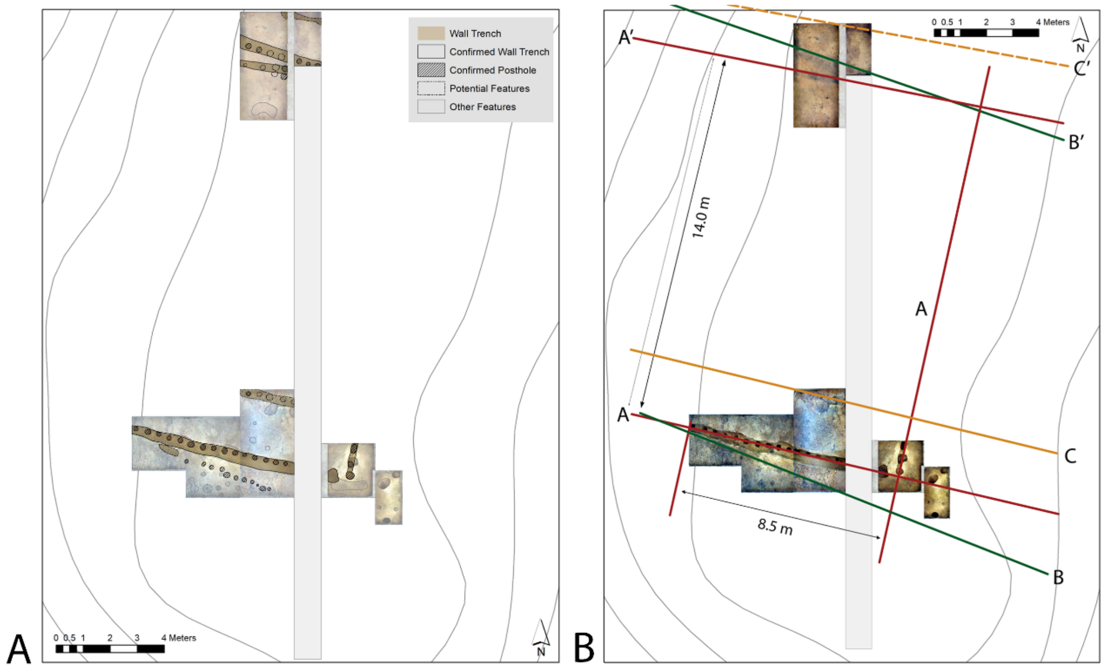

Figure 2.6. Potential buildings located on Stage 5 of Mound B. A) Wall trenches and associated postholes identified on summit, B) proposed architectural delineations. After Steponaitis et al. 2018.

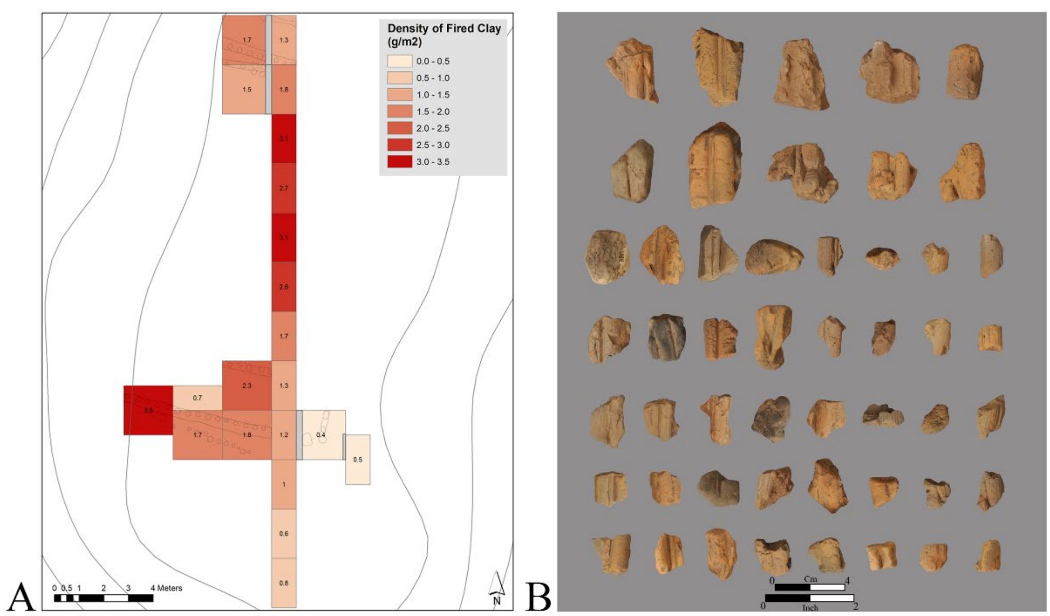

Figure 2.7. Fired clay daub associated with Stage 5 on Mound B. A) Density of fired clay weight from summit units, B) examples of split cane impressions indicating structural daub. After Steponaitis et al. 2018.

As Kassabaum (2014:58) has pointed out, the shift to a mantle-style construction with B.S5 is particularly interesting, as mantle construction is more strongly associated with Plaquemine and Mississippian mound construction methods. The rectangular wall trench buildings discovered on Stage 5 may provide additional substantiation of a shift in construction methods during the late Coles Creek period in the LMV.

Mound A

Mound A is the northernmost of the three extant mounds, and at seven meters is also the tallest mound. It appears that Mound A was built in four stages, three of which added two meters of height each and one stage that added just one meter. The two most pertinent features for the purposes of this analysis are two middens (A1.S0 and A2.S0), both of which provide comparative data for the material that I analyzed. The earliest midden (A1.S0) has often been referred to in publications as a submound midden, though it may be more accurately termed a premound midden, while the later midden is often referred to as a flank midden (A2.S0) due to its location at the base of the mound and the fact that it postdates the first stage of Mound A construction (Kassabaum 2018:15).

The premound midden lays underneath the current mound and consisted of two sequential deposits. The first was a 15-cm thick midden deposit containing numerous postholes and surface burning beneath, within, and on top of the midden, indicating that the area was used extensively both before and in the midst of its deposition. Based on analysis of multiple threads of information, Kassabaum (2018:21) interprets this area as a gradually accumulated midden potentially associated with small structures, though based on faunal preservation this would have occurred within a relatively short period of time. A second deposit consisted of a discrete lens of material sitting on top of the surface of the midden, consisting of fish scales, animal bones, and ceramics. Because this material showed no signs of weathering or trampling and was incredibly well preserved, it was assumed to have been deposited immediately before mound construction began (Kassabaum 2018:15). Ceramics from the A1.S0 midden were slightly smaller on average in comparison to vessels from the rest of the site, and in terms of vessel forms contained a lower proportion of serving vessels than other major contexts. The premound midden also contained an almost even proportion of cooking and storage vessels, another unusual pattern in comparison with the other Feltus contexts analyzed here. This indicates less of a focus on serving food and a comparatively greater focus on storage and cooking (i.e. items brought to and subsequently cooked on site) (Kassabaum 2018:18). The A1.S0 midden was very rich in faunal and botanical remains; there is limited information available about the faunal remains, but the botanical remains were reported on in detail by Kassabaum (2014).

The flank midden on the southwest side of the mound (A2.S0) was originally assumed to be part of the premound midden, but further analysis provided multiple indications that the two deposits were separate. While some areas of surface burning were found at the top of the A2.S0 midden (Kassabaum 2014:50), there did not appear to be any internal differentiation in the stratigraphy. Sherds from the top of the midden and the base refit, indicating the entire midden was deposited as a part of one event. Additionally, the base of the A2.S0 midden lacked any evidence for use in the form of postholes or pits (Kassabaum 2014:50). This combination of evidence indicates a different depositional history for the A2.S0 midden in comparison with the A1.S0 premound midden, suggesting that it is associated with activities related to one of the mound summits (though not necessarily consisting of material from the mound summit itself) (Kassabaum 2018:15). Ceramics from the A2.S0 midden consisted of a very high proportion of serving vessels with a related low proportion of cooking vessels and even lower proportion of storage vessels (Kassabaum 2018:18). The A2.S0 midden also contained a number of vessels of larger-than-average size, including very large bowls up to 53 cm in diameter (Kassabaum 2014:230). Overall, the A2.S0 midden appears to be related to an event which had an increased emphasis on serving food in ways that involved in some particularly large bowls (Kassabaum 2018:18). The A2.S0 midden was also quite rich in botanical and faunal remains, although as with the A1.S0 premound midden, detailed information is available for the botanical analysis while only summary tables are available for the faunal material (Kassabaum 2014).

Lower Mississippi Valley Comparisons

In order to understand if the commensal patterns exhibited at Feltus are unique or if they are shared more broadly, I have chosen a small sample of sites against which to compare data. Here I only utilized robust data that was comparable to the contexts at Feltus, meaning that I did not use subsistence data that is commonly referred to in other syntheses, usually due to either small sample size or incomparable collection techniques (Fritz 2009; Jackson 2008; Jackson and Scott 2002; LaDu and Funkhouser 2018). While this does mean that there are foodways data from a number of sites that are not included here, it also means that in attempting to infer commonalities or differences there were fewer confounding variables. I bring together data from a total of four additional sites (Taylor, Smith Creek, Hedgeland, and Lake Providence), three of which contribute botanical data and three of which contribute faunal data.

Taylor is a multi-mound site located in southeastern Arkansas, excavated from 1990-1991 by the Arkansas Archeological Survey. Although the mounds date to the Coles Creek period, the best-preserved deposits come from pits underneath the mounds that date to the preceding Baytown period (AD 600-700). Botanical material from a number of contexts was analyzed by Brown (1996) as part of her master's thesis. I selected one of the Baytown deposits to include here, Feature 307, which was interpreted as a midden depression underlying Mound 3; ongoing analysis of these features indicates that they are likely the result of short-term events, most likely feasting (Marvin Jeter, personal communication 2021). Technically Brown analyzed two samples from F.307; however, one of the samples came from a potentially mixed stratum at the top of the feature, as illustrated by Brown's identification of 12 maize glumes. Additionally, the heavy fraction from the mixed context was not provided to Brown, therefore identifications from this sample likely underrepresent nutshell. While this means that there is only one other sample from which to draw data (an estimated 130-liter sample from which Brown scanned an estimated 19 liters), the identified material is robust, with a total of 942 plant fragments (Brown 1996).

Smith Creek is a multi-mound site located in southwestern Mississippi about 45 miles south of Feltus. Use of the Smith Creek site is extensive, with evidence ranging from the Early Woodland through the Plaquemine period. The three mounds at the site date to the Late Woodland use of the site; faunal material from a well-preserved midden deposit dating from c. AD 790 to 980 was analyzed by Terry (2017) for her master's thesis. The primary reason this deposit is even accessible is due to historic damage from a road cut, but the resulting damage also means this context is not as well understood as other parts of the site. The size of ceramic sherds and overall preservation of the material argues for very little disturbance, though whether this is *in situ* deposition or material that has been minimally moved in order to provide mound fill is probably impossible to determine. Regardless, it does appear that this midden was probably associated with activity occurring on top of the mound, and therefore may be most analogous to the Feltus Mound B.S4 midden (Megan Kassabaum, personal communication 2022). Lack of comparative material at the University of Pennsylvania meant that certain materials were not identified with as much specificity as other assemblages (specifically relating to rabbit, squirrel, and fish), but overall, this analysis represents good material for comparison.

Hedgeland is a multi-mound site which was excavated as a part of a site mitigation by CEI (Ryan 2004). As a result, there is an extensive amount of data associated with the site. I looked more closely at three well-defined contexts: a Sundown period (AU2) deposit interpreted as a potential feasting pit located in the plaza area of the site and Balmoral/Preston (AU4) and Routh (AU6) phase middens interpreted as residential deposits (Coxe and Kelley 2004; Roberts 2004). Maize was well represented in both the later deposits at the Hedgeland site, which may mean that there are complicating factors in interpreting the breakdown of plant and animal species represented in this deposit. Despite this, Hedgeland represents one of the only sites with well-preserved Late Woodland residential deposits, so I cautiously included it here as a potential foil to feasting deposits. Unfortunately, the Sundown period pit did not contain well-preserved faunal remains, so I only compared the botanical remains from this deposit. I did include both botanical and faunal material from the Balmoral/Preston and Routh phase deposits; however, the faunal tables are presented as aggregations of material from the three most robust analysis units, AUs 2, 4, and 6. While the authors recognize that most of the faunal material for the later AU 4 and AU6 come from the well-preserved residential deposit, this does mean a small amount of less well-preserved material is conflated within their tables.

Lake Providence is the last multi-mound site examined here, a portion of which was excavated as part of another data mitigation by CEI (Weinstein 2005). The vast majority of material came from a well-preserved pit (AUs 7, 7/8, and 8) that, based on ceramic refits between all three analysis units, appeared to have been deposited as part of one event. The identification of unusual ceramics, as well as exotic lithic materials, led investigators to interpret the pit as representing elite waste associated with Mound B at the site, dating to AD 1170 to 1190. Faunal and botanical material from this pit was also well preserved and both assemblages are included here for comparison (Roberts 2005; Scott 2005).

Summary

Many field seasons of archaeological investigation at Feltus have provided an incredible wealth of information about the ways that the site was intensively utilized over the course of more than 400 years. By combining evidence from excavations with radiocarbon dates, we can see specific patterns emerge in terms of the community interaction with this location. Commonalities during these periods of activity include rituals that involve freestanding posts, large gatherings that resulted in extensive midden deposits, and mound construction projects that created and enlarged the mounds over time. Closer examination of specific contexts has indicated more granular differences between areas of the site and over time; these differences extend to specific ways that plants and animals were consumed and used ceremonially (Kassabaum 2018; Kassabaum and Peles 2020). In this analysis, I focus more specifically on faunal and botanical assemblages from the South Plaza and the last two stages of Mound B. Previous analyses of the Mound A middens provide a useful comparison for understanding variation at the site level, while additional comparisons to other LMV sites provide a broader diachronic and regional perspective. By comparing assemblages at multiple scales, the rest of this dissertation attempts to tease apart the question of what traditions were consistently maintained and what things people changed, viewed through the lens of the plants and animals people brought with them to the site.

CHAPTER 3

ARCHAEOBOTANICAL AND ZOOARCHAEOLOGICAL METHODS

This chapter describes the methods used to identify and analyze the faunal and botanical remains from the South Plaza and Mound B at Feltus. I divide this chapter into two parts, first discussing the methods used with the botanical remains and then discussing the methods used with the faunal remains. In each case, identification methods are described first and quantification methods are described second. The methods described here only apply to the material that I analyzed; previous work by other analysts used different methods.

Archaeobotanical Assemblages

The process by which seeds are preserved has important effects on the material ultimately recovered during archaeobotanical analysis. While uncharred seeds may be archaeological, their preservation tends to occur only under unusual circumstances (i.e., arid sites, waterlogged conditions, anaerobic environments). On the other hand, charred seeds are usually assumed to be cultural because they have no food value to animals and are therefore unlikely to be brought to a site without the involvement of people (Miller 1989:50). The pathways by which charred seeds survive in the archaeological record and ultimately make their way under the microscope of an analyst can be divided into two set of factors: taphonomic and recovery-based.

Taphonomic Factors

Archaeological factors affecting seed preservation are those that determine how ancient seeds become incorporated into soil sediments. There are three primary ways that seeds become part of an archaeological deposit: direct resource use, indirect use, and seed rain. Direct resource use involves plants that are brought to a site to be used themselves. This includes accidents in processing when the seeds themselves are used as food, debris burning where plant parts are a component of the waste product of utilized fruits, and the burning of stored materials (Minnis 1981; Pearsall 2016). Indirect resource utilization occurs when seeds become incorporated through the use of the plant, but not the seed. An example of this would be the use of organic roofing material. Seeds may fall from the roof thatch and be burned, or the entire structure could be burned (Minnis 1981). The last way in which seeds may become part of the archaeological record is through seed rain. This is a process by which small, naturally dispersed seeds become preserved after being blown into hearths or burned on middens (Minnis 1981; Pearsall 2016). (Minnis 1981:145) points out that seed rain can also occur through the charring of naturally accumulated seeds in structures after abandonment; weedy annuals grow easily in the disturbed environment and produce increased local seed rain.

Determining the source of seeds in an archaeological deposit is a key factor affecting what types of primary data can be inferred, how secure the cultural deposition may be, and how to then use this information as a part of interpretations (Miller 1989). Studies of modern seeds in soil make clear that there may be a large amount of natural spatial variation in seed density (Minnis 1981), even before considering the fact that different plants and different parts of those plants have varying likelihoods of being preserved via charring. In a general sense, dense plant parts tend to preserve, while more delicate parts are often reduced to unrecognizable ash (Reitz and Scarry 1985:73). Charring both preserves and destroys plant tissue and those effects differ depending on the plant; there is a fairly narrow window of conditions in which charred plants will survive in an identifiable state (Wright 2003). Experimental studies have examined the effects of charring on different types of plants as well as the actual process by which charring may (or may not) produce an archaeologically identifiable piece of material. Sievers and Wadley (2008) found that material thrown directly into a fire did not survive, but that all plant materials buried 5 cm below the actual fire were charred. Goette et al. (1994) and (Dezendorf 2013) have examined how maize processing affects the way that it chars, while in a much older analysis (Wilson 1984) determined that commonly recovered weedy species had very different likelihoods of surviving the effects of fire. Unfortunately, knowing these taphonomic biases does not mean that we can apply some sort of correction factor to our assemblages. However, the accumulated knowledge about plant preservation should make it clear that first, any botanical assemblage under study contains only a small subset of the original plants that may have been used, and even a small subset of the plants that were burned. Secondly, while we can only analyze the assemblage in front of us, knowledge of the pathways of plant preservation also indicates the danger of arguing that absence of evidence is evidence for absence.

Recovery Factors

The other important bias in archaeological assemblages is the process of collecting samples for analysis. The fact that a plant survived charring does not then imply that it will survive a given collection procedure. Collection methods for seeds can include both dry and wet methods, though wet flotation is probably currently better known. Flotation sample strategies have to balance multiple competing issues: time, budget, and the need for appropriate data. How these three issues interact is different for every project.

The process of flotation itself also has important effects on seed recovery. There are two primary methods of flotation: manual and machine-assisted (Pearsall 2016). Mechanical systems generally provide the best recovery rates, although they are affected by the method of agitation and the size of the sieve meshes. Less considered in these biases is the makeup of the sediment being floated. Wright's (2005) experiments showed varying efficacies depending on the soil matrix. While it is unsurprising to anyone who has floated different soils that sandy soils required the least processing time and clay soils required the most, it is noteworthy that increased processing time resulted in greater fragmentation of charred material and ultimately less plant recovery (Wright 2005:22). Longer processing times led to greater saturation of wood and plant materials, which ultimately caused not just damage to the plants themselves but resulted in smaller seeds sinking into the heavy fractions. Given the size difference in fraction meshes, the practical result of this is that smaller seeds will fall through the heavy-fraction cloth. Wright (2005:22-23) reported similar results when samples were pre-soaked, which is a strategy that may be used for soil matrices containing higher levels of silt and clay. A final relevant result of Wright's analysis is that seeds did not have equal probabilities of making it through flotation intact. Chenopod was underrepresented compared to sunflower or sumpweed, and all three were underrepresented compared to maize (Wright 2005:25).

While there are no correction factors that can be used to account for plant loss due to recovery method, it is important to understand that these losses happen and ultimately shape our data. The location of Feltus in the loess bluffs of Mississippi means that nearly all the soil excavated contains high silt contents, placing it in the middle in terms of Wright's (2005) processing experiments. Therefore, we should expect there to be plant loss in archaeological samples as a result of saturation and resulting fragmentation. On the other hand, this makes the richness of the Feltus archaeological samples in the following analysis all the more impressive and emphasizes the importance of analyzing the material available.

Identification Methods

Within the Feltus project, a few general strategies have been used for collecting samples. Flotation samples were collected when primary depositional deposits were suspected; this includes middens and features, but excludes mound fill. For most seasons, when possible, at least one 10-liter sample was taken from each primary deposit. When deposits were excavated by unit, at least one sample was taken per unit, leading to more overall samples. When deposits were excavated as a single context, fewer samples were taken because the deposit was not subdivided. During the 2018 field season, each zone in the South Plaza F.4 midden and pit was excavated as a single context; 15-liter flotation samples were chosen due to convenience because this was the size of the buckets used to remove soil. For smaller features like postholes, typically one half of the deposit was separated as a flotation sample of varying size, while the other half was waterscreened. Using a volume-based, rather than weight based, measurement does potentially introduce variability in soil density as a function of soil sediment characteristics (Wright 2005). Soil deposits at Feltus are all loess (wind-blown silt) deposits, though clay content does increase if deposits originate from weathered subsoils, therefore variations in density should be relatively minimal. Regardless of the potential variation in soil density, all samples were collected in unused trash bags, reducing potential issues of cross contamination. Flotation at Feltus consisted of a machine-assisted method most similar to the commercially available Flote-Tech, though in this case built by project co-director John O'Hear. Light fractions were collected in a very fine-meshed cloth while heavy fractions were collected in 1/16-inch fabric window-screen material.

The botanical assemblage detailed here was analyzed using a standard protocol. Light fractions were sifted through a series of graduated sieves at sizes of 2 mm, 1.4 mm, and 0.71 mm, a process that makes it easier and quicker to scan through samples as everything is of a similar size. Heavy fractions were only sifted through the 2 mm graduated sieve because the mesh used to collect heavy fractions has 1/16-inch openings, meaning any smaller material fell through the mesh during flotation. Samples were scanned with a microscope under 10x magnification, or more when needed. During scanning, all seeds were removed and attempts at identifications were made; however, within this analysis only charred seeds were considered to be archaeological. Seeds were identified using the comparative collection from the Richard A. Yarnell Archaebotany Laboratory at the University of North Carolina at Chapel Hill, as well as from reference books (Martin and Barkley 1961) and the United States Department of Agricultural Plant Database (http://plants.usda.gov). Difficult and unusual identifications were confirmed with Dr. C. Margaret Scarry of UNC-Chapel Hill. Nutshell was identified from the 2 mm and 1.4 mm sieve sizes, while all other seeds were pulled from all size groupings. Botanical material was placed in centrifuge tubes, labels were written on the tubes in permanent ink, and the tubes were then placed back in their respective bags. For all botanical material collected, counts and weights (when heavy enough to register) were recorded. Identifications were made down to the lowest taxonomic level possible; the designation *cf.* was utilized for plant remains that compared well to a given comparative sample but could not be identified with confidence.

Quantification Methods

There are a number of ways to quantify botanical assemblages depending on the contexts under consideration. While there may be multiple flotation samples taken from any deposit on the site, because they come from large analytical contexts, they are aggregated together rather than being treated as though they are independent samples. As a result, the primary comparative method used here is seed density. Absolute counts of seeds are heavily influenced by preservation and sampling (Wright 2010); therefore, a ratio calculation is needed in order to standardize counts and compare contexts to one another. The numerator is normally the number of charred seeds or the weight of charred material. I used counts of charred seeds or nutshell, as seeds less than 0.01 g cannot be effectively weighed with the scale used in the lab, though other analysts sometimes use weights when comparing nutshell. While the unit of measurement used for the denominator in a density ratio is up to the analyst, typically the total volume of material floated is used, which provides a measure of the intensity of activity creating a deposit. Weight of the charred material may be utilized as well, though this provides a measure of taxon density relative to other material. I used total volume floated as a denominator, both for ease of intersite comparisons and because intensity of activity was a measure important to my analysis.

A second way that I quantified remains (both botanical and faunal) was by examining taxa richness and evenness via Kintigh's DIVERS and RAREFY. I find Kintigh's DIVERS particularly useful because it takes assemblage size into account, an issue that can be particularly vexing when trying to compare botanical or faunal assemblages. DIVERS uses raw taxa counts as input, with categories determined by the researcher. As such, it is particularly important to ensure that data are analyzed to the same degree of specificity so that taxa richness is not artificially inflated. One example of this can be provided with fish. Fish bones are particularly hard to identify down to species, requiring not only good preservation, but a robust comparative collection. Many analysts, particularly as they are learning, do not have access to a large enough comparative collection to be able to identify fish bones down to species. An assemblage analyzed by a specialist with access to comparative specimens will almost certainly have more species identified then one analyzed by a researcher who does not have a comparative collection. Comparing two assemblages like this therefore means collapsing down categories into appropriate analytical units to reduce the impact of identification differences. Kintigh's DIVERS takes the provided data and produces a graph showing the sample size on the x-axis and the number of species on the y-axis. The expected number of species is determined by simulating random taxa richness for assemblages of varying sizes and is visualized by a curved line, along with a dotted line to either side representing a chosen confidence interval. Any archaeological assemblage that plots within the dotted lines is considered to be as rich as expected for the sample size; samples outside of the confidence interval are likely influenced by nonrandom factors (Kintigh 1984:45-49).

A further permutation uses rarefaction, in which the sample size of any assemblage is probabilistically reduced down to the sample size of the smallest assemblage. The expected taxa richness for the larger sample (at the smaller size) is then compared to the actual taxa richness identified in the smaller sample; this result is contextualized by a probability value that indicates the likelihood that the expected richness is greater than or equal to the observed richness. Higher values mean a higher likelihood that taxa richness is a function of more than just sample size. While there are some criticisms of rarefaction, particularly in terms of worries about species interdependence, it is a useful way of comparing assemblages of very different sizes because it avoids the larger effect of rare classes in large sample sizes (Baxter 2001; Lyman and Ames 2007).

A final approach I used to analyze both the botanical and faunal datasets was exploratory data analysis (EDA). Because my data consisted of nominal category counts, I used correspondence analysis, which provides a way to analyze two-way tables by measuring the degree of correspondence between columns (cases) and rows (units), and works well for simplifying large tables that have many cases and/or units and would otherwise be too large to easily discern patterns from. Programs that run correspondence analysis take multidimensional data, look for relationships between variables that make them redundant, and in that way reduce the dimensionality of real numeric data (Shennan 1997). Results are reported in a table and in visual form, where close spatial proximity shows a close relationship and greater distance indicates a weaker relationship (VanDerwarker 2010). In a more direct sense, the position of the points in visual form is determined by their chi-squared distance from the overall expected average; the longer the distance from the origin, the more any variable deviates from the amount that is expected. Variables that fall close together are similar in their profile, and variables that behave in similar ways (i.e., their relative counts are high) plot close together. When variables are at 180-degree angles to each other it means they are inversely related (Shennan 1997).

Zooarchaeological Assemblages

The recovery of animal bones at archaeological sites is conditioned by similar overlying taphonomic and recovery factors, though the biases within those factors is somewhat different. I organize this discussion in parallel to the botanical assemblage, discussing taphonomic and recovery factors for animal bones first, and then specifying the procedures used to collect and analyze the Feltus faunal assemblages.

Taphonomic Factors

Faunal analyses also tend to be especially concerned with the taphonomic processes that affect bone, as those processes can limit our ability to interpret assemblage patterning. Animal remains enter the archaeological record through both cultural and natural processes. Archaeologists are typically interested in the cultural factors that condition assemblage patterns, but must be aware of the ways that natural processes affect assemblage composition as well, particularly with regards to bone preservation. Preservation is a function of many factors, but the two most important are the degree of protection at time of deposition and soil conditions. During butchery, food preparation, or after eating, people will put animal remains on the ground, on top of refuse piles, or place them in sealed features (purposeful burial of whole animals also occurs, though this is not currently present at Feltus). Remains in sealed features are usually better preserved than deposits left exposed, as these assemblages are protected from weathering, trampling, and the effects of most scavengers (Reitz and Wing 2008).

Once covered by soil, animal remains are then subject to preservation as a function of soil conditions. Conditions that promote preservation include low bacterial activity and stable environments (Reitz and Wing 2008:143). The ideal soil condition for bones is within a pH of 7.8 to 7.9; deviations from this result in the bone destruction. Additions to deposits can improve or harm those conditions. A well-known example is shell middens, where mollusc shells neutralize acidity (Reitz and Wing 2008:141). Properties inherent to bone, their structural density, further condition the likelihood of their survival. Animal tissues are differentially affected by less-than-ideal conditions in soil; fish and birds have especially delicate bones leading to greater attrition as a result of density-mediated processes (which are not limited to soil conditions). Within species, infant and juvenile bones will be affected first, fused bones are affected next, dense shafts will remain longer, and enamel crowns resist destruction most effectively (Lyman 1994; Reitz and Wing 2008). Quantitative measures utilized by zooarchaeologists attempt to measure the likelihood that assemblages have been affected by density-mediated attrition, results of which are used to inform further interpretation of human activities. Further, many of the categories recorded during analysis are utilized in an attempt to describe the natural and cultural effects on remains, and are utilized as additional methods for understanding the taphonomic conditions shaping the assemblage under question.

Recovery Factors

The effectiveness of recovery methods plays a large part in shaping the quality of faunal assemblages and the ability of assemblages to be compared. Excavation strategies have an effect on the type of deposit encountered and the portion of any deposit that is sampled, which then shapes the nature of the research questions that can be asked. The recovery methods used within excavations further affect the assemblage under study, in particular by altering relative proportions of taxa (Reitz and Wing 2008). Common recovery methods still in use today include hand picking, dry screening, and wet screening. Hand-picking produces the most highly biased assemblages, as they are affected not only by the visibility of bone, but by the biases of excavators who often make choices about which bones are meaningful. Both dry screening and wet screening provide a more complete sample of material, although screen size and choices about which methods are used will depend on soil characteristics. Because wet screening utilizes water to help remove soil, it often includes smaller screen sizes that would be more laborious to use with dry screening (Reitz and Wing 2008). Flotation samples can also be utilized for faunal material; sometimes they are used to assess the presence (or absence) of very small animals (Pluckhahn et al. 2013), other times they can be used to gauge the biases of older, hand-picked collections (Kelley 1990). More complete samples of faunal material take longer to collect and analyze, but also provide more information about the assemblage as a whole. Many studies have documented the loss of information as a result of recovery method (Gordon 1993; Payne 1972; Shaffer and Sanchez 1994; Stahle 1996); understanding how these losses shape faunal assemblages is a key component of interpretation.

Identification Methods

Animal bones are collected in multiple ways at Feltus. In deposits that were not interpreted as primary deposition, dry screening through ½-inch mesh was used. When primary depositional deposits were suspected, all soil was wetscreened through a series of graduated meshes: ½-inch, ¼-inch, 1/8"-inch, and 1/16th-inch window mesh. Material from primary deposits may also be hand-picked (catalogued as visual collections), but this is not done in isolation from waterscreening. Flotation samples, the collection of which is described above, also contain faunal remains. The faunal assemblages analyzed here were well preserved, leading to a greater amount of material to sort through. Based on time constraints, I chose to limit my analysis to ¼-inch screen; I recognize the possibility that my analysis therefore may have missed the very small mammals, birds, and fish that, when present, fall through that screen size. The faunal assemblage presented here was identified using standard faunal methodology as described in Reitz and Wing (2008). All material was identified using the comparative collection at the

Research Laboratories of Archaeology at the University of North Carolina, Chapel Hill or at the University of Southern Mississippi. Difficult and/or unusual identifications were confirmed with Dr. Heather Lapham (UNC) or Dr. H. Edwin Jackson (University of Southern Mississippi). All archaeological specimens were washed prior to analysis, although when needed remains were rewashed in order to provide a cleaner viewing surface or to remove soil from inside long bones. During identification, all information was entered into an Access database. Recorded information included taxonomic classification, count, weight, body part, portion, and symmetry. Where appropriate information was gathered pertaining to fusion, modification, burning, and pathology. For large-mammal long bones with possible green bone fractures (as opposed to post-depositional modern breakage), fragmentation information was recorded; this included percent completeness, shaft circumference, fragment size, fracture angle, fracture outline, and fracture edge (after Villa and Mahieu 1991). When possible, measurements are recorded for white-tailed deer (*Odocoileus virginianus*) bones following von den Driesch (1976).

Individual specimens are identified down to the lowest taxonomic level possible, within reason. Where species or taxa identifications are considered probable but not 100%, they are recorded with the designation *cf*. In some cases, lack of comparative material made identifications more difficult. When this assemblage was initially being analyzed, a complete fox squirrel (*Sciurus niger*) skeleton was unavailable, therefore all squirrel remains from Mound B were categorized as unidentified tree squirrel. Later in the analysis more comparative skeletons became available, so material from the South Plaza could be identified to a lower taxonomic level. This issue is taken into account when comparing the South Plaza and Mound B midden assemblages to each other by aggregating more completely identified material to a higher taxonomic level.

Despite best efforts, some bone fragments cannot be identified down to a genus or species level, often due to lack of diagnostic marks on the specimen. Large animals have bigger bones which can fragment into many pieces, therefore unidentifiable bone fragments tend to be a greater issue at the larger end of the animal size scale. Within this analysis, I attempted to identify all material to at least class and size, though some fragments defy even this level of identification. Assigning otherwise unidentifiable fragments to animal size classes allows for some degree of quantification to be applied and provides for greater inter-site comparability, particularly in assemblages with a high degree of fragmentation (Jackson and Scott 2002). One problem with such groupings, however, is that many analysts do not specify boundaries between their categories. Here, a small mammal is considered anything smaller than a rabbit. Medium mammal consists of fragments that are rabbit-sized or larger but smaller than deer. Large mammals are all deer-sized or bigger specimens. Some analysts also include a size designation of very large mammal. This can include cows, wapiti (elk), moose, or bison. No bone that could have come from a much larger animal was recovered from Feltus, and so this category is not represented.

Very few large mammals other than deer are positively identified within this analysis; the only two include black bear (*Ursus americanus*) and cougar (*Puma concolor*). The skeletons of both animals, although black bear more so, tend to have diagnostic qualities that allow for differentiation with white-tailed deer provided adequate preservation is present. These characteristics include additional surface texture, thicker cortical bone, and different patterns of cancellous bone. Therefore, while unidentified large mammal is a cautious designation that indicates it is not clearly possible to differentiate between deer and other mammals, the patterns in mammal remains make it likely that most, if not all, of the unidentified large mammal are fragments of white-tailed deer bone.

An additional place where a cautious identification was made is with designations of Cervidae (Elk/Moose/Deer). Bones identified as such include long bones otherwise unidentifiable to element, some small vertebrae fragments, and general unidentified bone fragments for which skeletal element could not otherwise be narrowed down (though there are some exceptions here). Moose (*Alces alces*) are very large and are not naturally or prehistorically present in the LMV, therefore it is extremely unlikely that any Cervidae elements are moose. Wapiti (*Cervus canadensis*), more commonly known as elk, was present throughout most of the United States prehistorically. The Southeast in particular was home to the eastern elk (*C. c. canadensis*) until roughly 1867 (Popp et al. 2014). Very little information is available about the potential size of eastern elk populations in Mississippi, therefore given the lack of archaeologically identified specimens within the state, it is assumed that their populations would have been small. Regardless, elk overall are heavier and taller than deer, though there is overlap between juvenile elk and adult deer. Given that no elements of elk were otherwise identified, it is highly likely that all specimens catalogued as Cervidae are white-tailed deer.

Identification of avian fauna is also complicated. Within the Anatidae family in particular (swans, geese, and ducks), it is extremely difficult to differentiate between many species. Some distinctions can be made based on size – large bones can be attributed to geese and swans, for example (Anserini). Duck species are much more difficult to differentiate, as there is large overlap between size ranges and a number of duck species can interbreed. Identifications of ducks were made using a two-step process. First, based on the element identified, known specimens were compared to ascertain at what level taxonomic distinctions could be made.

Second, the archaeological specimen was compared to the known specimens and given an appropriate taxonomic designation. The end result is that there are a number of categories within the bird class based on the bone fragment itself and the potential for identification; categories used here include medium duck, dabbling duck, and diving duck.

Further identification categories relate to various modifications of each bone, when present. These include burning, natural modifications, and cultural modifications. The quantification of these modifications is important for determining what taphonomic processes affected the faunal assemblages before, during, and after deposition. These modifications are particularly important for assessing the likelihood that the analyzed assemblage is actually representative of the original assemblage deposited.

The most common bone modification in most assemblages consists of burning. Burning is an underappreciated aspect of faunal assemblages, but can be an important criterion to assess taphonomy. For example, the amount and degree of burning can allow for some determination of the condition of bone when it was burned (Buikstra and Swegle 1989; Gifford-Gonzalez 1989; Shipman et al. 1984). Such contextual information can in turn be used to examine the cooking process, to determine if burning was deliberate and intentional, or if burning occurred naturally (i.e., brush fire) (Lyman 1994). Typically, analysis of burned bone starts with the location of burning and an examination of bone color. As bone is heated progressively hotter, there are a number of chemical changes that occur and result in changes to the color and internal structure of the bone. The initial stage is the carbonization of collagen, producing a black color. As heating continues, the carbon becomes oxidized, turning the bone white and creating a chalk consistency. Importantly, according to Lyman (1994:385), “the heating of bone is a process because the bone's temperature (or perhaps the duration that it is exposed to heat) must increase for it to progress from 'charred' to 'calcined.'"

While bone color is not an indication of the specific temperature to which bone is heated, it does provide an indication of the range of temperatures bone is exposed to (de Becdelievre et al. 2015; Shipman et al. 1984; Stiner et al. 1995). Calcined bone, which turns white, is generally associated with fires that range in temperature from 600°C to more than 1000°C, and along with yellow-white coloration represents the hottest part of the fire spectrum (Stiner et al. 1995). Factors that affect changes in bone color, however, are not simply the heat of the fire, but also the spatial relationship of bones to that fire. For example, Stiner et al. (1995:230-231) found that bones buried 15 cm away from a 900°C fire (calcination temperatures) were still only slightly burned. This means that bone burned to an intermediate stage could still have been part of a high-temperature fire event, but was not directly exposed to the hottest part of the fire. Concurrently, calcined bone is more likely to be bone that was directly exposed to the hottest area of a fire. Micromorphological changes occur within burned bone as well (Shipman et al. 1984), but these characteristics are not commonly noted in faunal analysis.

Although analyses of burning may go so far as to record coloration down to the Munsell number, a simple visual color schematic provides adequate information for most interpretations. Within the recording scheme used here, categories of heat alteration included: heat-altered, partially carbonized, carbonized, carbonized and calcined, partially calcined, and calcined. The lowest level of burning – heat alteration – can be difficult to identify in comparison with normal bone staining and can only be done with well-preserved assemblages. I was conservative where I recorded heat alteration, therefore this category is likely to be somewhat underrepresented, though it is difficult to know by how much or how little. In cases where bone coloration fell between two categories, whichever category represented more than 50% of the coloration was chosen. I did make a more specific determination when it came to a brownish-gray color in the assemblages. While a darker brown is generally indicative of the lowest level of burning, i.e. heat alteration, this particular brownish-gray appeared to falls between the black of carbonization and the gray-to-white color of calcination. Because I wanted to preserve the calcined category for specimens that were burned to the highest temperatures, brownish-gray color was most often recorded as carbonized.

Natural modifications within the assemblage consist of two types: modifications resulting from exposure to either air or soil, and those resulting from animal damage. Modifications related to exposure include weathering, mineralization, leaching, and erosion/rolling. No evidence of mineralization was found in the Feltus assemblage, and because leaching was recorded too inconsistently, that category was removed from the final analysis. A small number of bones within the assemblage appear to be weathered from exposure to physical elements while exposed above soil. To determine effects produced from weathering, I used Behrensmeyer's (1978) six stage scale, with 0 indicating no evidence of weathering and 5 indicating bone that is splintered and falling apart. While Behrensmeyer's scale does not specifically include color as an attribute, bone color can also be a visual cue of weathering. Bone that sits out in the sun becomes bleached and lightens in color, ultimately to the point that it will appear almost white. The white-ish color that occurs from weathering is usually visually distinct from the white color produced by calcination, but in the case of small fragments other characteristics of weathering and burning can be used to distinguish between the two. Importantly, bones exposed to the same weathering effects will not necessarily weather at the same rate as a result of different compactness. For example, podials and phalanges are more compact than other bones of the skeleton and will weather more slowly as a result (Behrensmeyer 1978). Where weathering is used to determine taphonomic effects on assemblages, natural variability in weathering must also be taken into account.

The last category related to exposure is erosion and rolling. This appears as overall rounding of bone margins and sometimes polish on the bones, depending on the conditions to which they are subject. This type of modification can be due to either the action of soils, water, or both in combination (Fisher 1995). Where I use this category, it is for bones that do not appear to have been purposely shaped or polished, and are clearly distinct from the polishing and rounding that can be a result of carnivore digestion. In cases where the characteristics seem to be from water as opposed to soil, the distinction was noted in comments.

The other kind of natural modification consists of animal damage: gnawing and digestion. Gnawing damage can most simply be divided into categories of rodent and carnivore. Rodents use their incisors to chew on bone, producing distinctive broad, relatively flat grooves located roughly parallel to each other. Significant rodent damage is easily visible to the naked eye, although light damage may require magnification as a means of positive identification. Carnivore gnawing, on the other hand, produces a wider range of marks depending on the type of bone and amount of access. Cancellous tissue is more likely to be destroyed by carnivores than compact bone, typically due to differences in bulk density (Stiner et al. 2012). The products of carnivore gnawing include striations, furrows, pits, and punctures (Fisher 1995). Many toothmarks produced by carnivores are not particularly conspicuous as they can be faint and isolated; obvious carnivore damage tends to be produced in cases of severely gnawed ends of bones.

Damage caused by carnivores can be understood as a process. Initially, damage will appear as shallow pitting and/or punctures where the bone collapses under the weight of the tooth. Which one is seen typically depends on the location of gnawing and bulk density of the bone. Striations and gouging can also occur, generally on the shafts of limb bones. When this occurs on cancellous ends of long bones, it typically presents as furrowing; extreme furrowing becomes scooping/hollowing out, where significant portions of cancellous bone are removed from epiphyseal ends of bones. With more time carnivores may entirely remove the epiphyseal ends of long bones, leaving behind a bone tube with crenulated edges (Lyman 1994).

The last category of recorded modifications was cultural, or alterations to bone caused by people. This excluded burning because it had its own separate category (and burning is not always cultural in origin). Modifications recorded as cultural fall under two primary categories: butchery and tool/use wear. Animal butchery is defined here as the "human reduction and modification of an animal carcass into consumable parts" (Lyman 1994:294). Marks related to the butchery process include chop marks, cut marks, and percussion scars. Percussion scars result from hitting bone with some type of hammerstone, typically to break a bone apart in order to access marrow. The primary difference between chop and cut marks on bone is their size and depth. Chop marks are much deeper and may go all the way through the bone; typically, the origin of chop marks are attempts to either disarticulate skeletal portions or divide bones into smaller sections. Cut marks are much smaller and shallower than chop marks and occur as a result of skinning, disarticulation, or removal of meat from bone. Depending on the size of the mark, butchery vs. modern damage can be determined with the naked eye or underneath a microscope. Butchery marks are distinguished from modern excavation damage by their shape and color. Marks resulting from trowel damage are typically shallow and U-shaped in cross section, whereas butchery marks are deeper and V-shaped in cross section. Modern damage is also typically light in color in comparison to the rest of the bone, though this is not always visually apparent. The purpose of all of these butchery marks is indicated by their anatomical placement and orientation. For example, skinning marks typically occur around the shafts of lower legs and phalanges, and along the lower margins of the mandible or on the skull. In contrast, disarticulation marks will occur on the edges or articular surfaces of the ends of long bones and on surfaces of the vertebrae or pelvic parts (Lyman 1994). Butchery marks are not terribly common within the Feltus assemblage; this does not imply that the butchery process was not occurring but instead that the butcher was not hitting bone. According to Lyman (1994:297) avoidance of bone could very well be related to preserving a sharp tool edge. Stone material available to people in the LMV, typically flint cobbles, is durable enough to hit bone without breaking. However, a sharper working edge makes the process of butchery easier (Dewbury and Russell 2007:356-357), therefore it seems likely that avoiding bone is likely to be at least partially functional in nature.

Tool use and use-wear can be considered separate though at times related categories. Categories recorded include tool, polish, and abrasion/smoothing. These are somewhat sliding categories, as the categories of abrasion/smoothing and polish are most often used when a fragment of bone is too small to determine if it was used as a tool. Some fragments, however, show evidence of some type of use that does not seem to be consistent with other identified tools, but is unknown in origin. When a bone specimen is identified as a tool, it is to denote that it is an "artifact that exhibit[s] use-wear that was created because the artifact was used by humans to perform some function" (Lyman 1994:338-339). How a tool is identified and via which modifications is not a clear-cut process. One on end of scale are easily identified tools that have been intentionally modified to create a specific shape. The more extensively a bone has bee modified, the easier it is to recognize as a tool. Tools can also be expedient in nature; made quickly and easily and used for a limited period of time and then discarded. Rather than overall intentional shaping, a sharp edge from a freshly butchered animal may be used for a specific purpose. Once that purpose has been met, the bone specimen is discarded.

Tool designations can (and should) be determined in conjunction with use-wear. Use-wear is incidental modification as a result of being used, but, depending on the tool, use-wear can be absent or extensive. Evidence for use-wear includes modifications like abrasion, polishing, and flaking. Whether these are related to tool-use depends on where the modifications occur. More specifically, utilized bone-tool edges tend to develop a gloss or polish visible to the naked eye. When viewed underneath a microscope, it is clear that this wear is restricted to the areas that came into contact with other substances. Expedient tools in particular may be difficult to recognize within faunal assemblages. Due to their limited use, they will not accumulate the same amount and degree of modification as a more formal tool. An additional complication to the identification of expedient tools is pot polish, replicated by White (1992) using modern mule deer metapodials boiled in an Anasazi pot. White identified polish on the edges of the metapodial fragments that he attributed to abrasion on the sides of the cooking pot. Typical marks included beveling and rounding of projecting ends of bone as well as striae on the polished surfaces (White 1992:122). White’s (1992) work was done in the context of making an argument for cannibalism and unfortunately, I have yet to find any other examples of this consideration in faunal analyses. Therefore, while I bring up the possible phenomenon here, it is primarily to point out some problems of equifinality that can make determinations of tool use more difficult.

Quantification Methods

All analytical measures used in faunal analyses are complicated by a number of factors outside of the control of analysts. These factors include the number of identifiable elements in each animal, site formation processes, recovery techniques and laboratory procedures (Reitz and Wing 2008). The most that any analyst can do is to recognize how such factors impact an assemblage and then to interpret the assemblage, while taking these factors into account where appropriate. Analytical measures used in my analysis include those that are a sum of the primary data (NISP and weight), and those that are derived from primary data (MNI, biomass, and skeletal portion frequencies).

The two most commonly reported faunal measures are the number of identified specimens (NISP) and weight. Because NISP is a count of all bone fragments present, it can seem like a very straightforward number. Two very practical considerations affect this number, however. The first is post-excavation handling and treatment. All material analyzed for this dissertation was collected via waterscreen. While this can be a gentler procedure than dry screening, the pressure of the water directly on materials in the top section of screen always has the possibility of breaking delicate and/or poorly preserved bone. Similarly, within this initial screening process, soil packed inside bones is likely to get wet, causing it to expand; later when it dries, it will contract again. This contraction-and-expansion can put pressure on bones, resulting in additional post-depositional breakage.

The second issue relates to the way in which samples are collected in the field. During the 2012 field school in which the faunal assemblage was collected, material was divided in many different ways with field sample numbers. Samples collected on different days, even when from the same unit and same level, were given different field sample numbers. Some samples were hand collected; these were given separate field sample numbers and bagged separately. And in many cases, material collected from different screen sizes was given separate field sample numbers. From the perspective of faunal analysis, the practical result is that many different field sample numbers are aggregated within analysis units. As a result of the large numbers of bones and the high degree of divisions, it was impractical to systematically examine the collection for mends and crossmends. Specimens of the same screen size identified with the same field sample number were always examined for within context mends; any time mends were found mended bones were reduced to a count of one specimen. In some cases, specimens that came from the same context but excavated on different days were able to be connected together, but these cases were generally limited to unusual bones for which mends were more obvious (i.e. burned bear bone or large unfused elements and their epiphyses). Overall, this means that the reported NISP somewhat inflates the actual number of specimens present. While mends between field sample numbers are noted, these were not taken into account when compiling larger assemblage statistics. Where more granular discussions occur for specific species, mends are taken into account and noted as such.

Specimen weight is a second descriptive measurement that historically was uncommon, but now is a fairly standard component of faunal analyses. Specimen weight can be useful for quantifying the degree of fragmentation in an assemblage, and may also be used to examine taxa frequency (Reitz and Wing 2008). As Reitz and Wing (2008:212) point out: "Analysts working with collections containing animals other than mammals continue to find that comparisons of relative frequency based on NISP are fraught with interpretive problems because of the variability in numbers of identifiable elements between taxa and differences in preservation." There is no hard and fast rule for when specimen weight is a more appropriate unit of comparison, although a lack of reported or recorded specimen weights actively hamstrings attempts to compare older assemblages in the LMV to more recent analyses (Jackson and Scott 2002).

MNI, or the Minimum Number of Individuals, is a determination of the smallest number of individuals necessary to account for all skeletal elements of a particular species in an assemblage. This number is based on skeletal symmetry and assumes that a right and left side of the same species may come from the same animal. Other recorded factors may also be taken into account, with epiphyseal fusion being the most common. As an example of this, a right and left proximal femur are traditionally considered an MNI of 1, as they can originate from the same animal. If proximal fusion is recorded and taken into account, a fused right proximal femur and an unfused left proximal femur would then indicate an MNI of 2, as the elements are from animals of different ages. An important factor when interpreting MNI is how archaeological samples are aggregated within a site, as that influences estimates of MNI. For the purposes of this dissertation, the South Plaza and Mound B middens are considered to be discrete phenomena, based somewhat on the distance between the two contexts but also based on the fact that both were deposited at different times. Therefore, MNI estimates are determined for each assemblage separately and then summed together when combined at the site level.

MNI estimates are generally done for the lowest taxonomic level within a systematic hierarchy. Here, anytime a species is identified a MNI estimate is associated with it. In a few cases, MNI is estimated for animals at a higher taxonomic level as long as there are no other associated specimens at a lower taxonomic level. I did this for snakes (where a distinction was only made between poisonous and non-poisonous) as well as turtle from Mound B. The lowest taxonomic level to which the small amount of Mound B turtle shell could be identified was one emydid carapace fragment, which just identifies the remain as either box or water turtle. Because no other remains were identified to a lower level, an estimate was provided for the emydid remain. Even though we do not know what type of turtle was deposited on the top of the mound, it is clear that at least one individual was present.

Biomass is a derived measure that represents the "allometrically estimated total weight" of an assemblage (Reitz and Wing 2008:239). This statistic is an estimate of the total weight an archaeological specimen might represent. The development of biomass, and other allometric formulae, arose from attempts to understand intertaxonomic comparison, particularly when comparing terrestrial versus aquatic animals. There are some important drawbacks that have to be recognized when using biomass. There are differences in weight between archaeological samples and fresh bone which will affect the end result, skeletal elements support very different amounts of soft tissue but a biomass calculation assumes all elements are equal, and within species there is variation in the size of animals. Perhaps the biggest issue, however, is that use of biomass for intrasite comparisons can be misleading where differences are actually due to sample size rather than economic patterns (Jackson 1989). Despite all of this, according to Reitz and Wing (2008:239), allometric predications have less inherent error because they do not assume anything about what material is edible or the number of individuals that are represented.

The formula for biomass can be represented in two ways: logarithmically or exponentially. Typically, the exponential form is used in publications, shown below:

$$Y = aX^b$$

In this equation, Y is the estimated biomass or weight (kg) for an individual of the of the taxon, X is the archaeological skeletal weight, and a and b are constants that vary by species.

The last set of derived secondary data are skeletal portion frequencies. When a person kills an animal, they make many complicated decisions that later affect what elements are recovered in a faunal assemblage. Decisions considered include what portions of the animal to bring back, how to butcher the carcass, what dishes will be prepared with the carcass, and how to dispose of the remains, among others (Reitz and Wing 2008:213-216). In our attempts to understand the sequence of decisions made, faunal analysts analyze assemblages based on frequencies of different skeletal portions. Skeletal portions can be based on skeletal elements, anatomical regions, or butchering units. When anatomical regions are used they typically consist of head, axial, forelimb, hindlimb, hindfoot, etc. Exactly how elements are grouped varies between analysts, therefore it is critical to be clear about the division of skeletal elements. Once elements are grouped into portions, those portions are then compared to the percentages found in a complete deer skeleton as a standard. Subtracting the complete deer skeleton percentages from the archaeological assemblage then provides an index of the over- or underrepresentation of each skeletal portion. These results are often presented graphically to provide a useful visual comparison. Some analysts also log-transform the percentages before computing the difference. Most analysts trace the lineage of these diagrams back to Simpson (1941:23-25), who introduced the use of such diagrams in order to visually show similarities and differences between observations on multiples animals at once. The formula used to create those diagrams is shown below (Reitz and Wing 2008:223; Simpson 1941:357):

$$d = \log_e X - \log_e Y$$

In these formulas d is the difference, X is the percentage of each skeletal portion in the archaeological assemblage, and Y is the percentage of each skeletal portion in the complete skeleton.

While the log base itself does not matter, faunal analysists seem to consistently use the natural log as a base (Compton 2009; Pavao-Zuckerman 2001; Reitz and Wing 2008). The values of *d* are then graphed vertically. The standard ratio is represented by zero, overrepresentation falls to the right of the 0-line, and underrepresentation falls to the left. Taxa with the same proportions, regardless of whether they are larger or smaller than the standard, will be represented by similar shapes (Simpson 1941:16-17; Simpson et al. 1960:357).

It is not clear why some analysts simply use an absolute frequency difference and others use a logged frequency difference, but the important point to understand is that a log transformation means comparing *proportional* rather than *absolute* differences (Simpson et al. 1960). In other words, if an observed percentage is double the standard, the value of d will be the same regardless of the absolute value of the standard. An example of food utility from the Feltus collection is included below to provide a clearer example of the difference between absolute and relative quantitative methods (Table 3.1. and Figure 3.1). Using absolute difference values, the medium utility category appears much more overrepresented than the high utility category. However, the medium utility portion of a deer represents almost half the skeleton. When converted to a log scale, the rate of change presents a different result; while the medium utility portion is still overrepresented, it is actually not as overrepresented as the high utility portion.

A further permutation of skeletal portions is the food utility index. Food utility is a measure that assigns values to different parts of an animal based on the amount of meat, marrow, and grease each element provides (Metcalfe and Jones 1988; Purdue et al. 1989). The concept is based on Binford's (1978) modified general utility index (MGUI), which includes riders like carpals and tarsals that are low utility on their own but are attached to components with higher values. Binford (1978) used this to account for the possible transport of riders to campsites,

Table 3.1. Food utility of deer in the Mound B.S4 midden, showing a comparison between absolute and log difference calculations.

Food Utility Category	% NISP (Mound B.S4)	% NISP (Standard Deer)	Absolute Difference	Log Difference
Low Utility	9.17	41.09	-31.92	-1.50
Medium Utility	70.42	46.51	23.91	0.41
High Utility	20.42	12.04	8.01	0.50

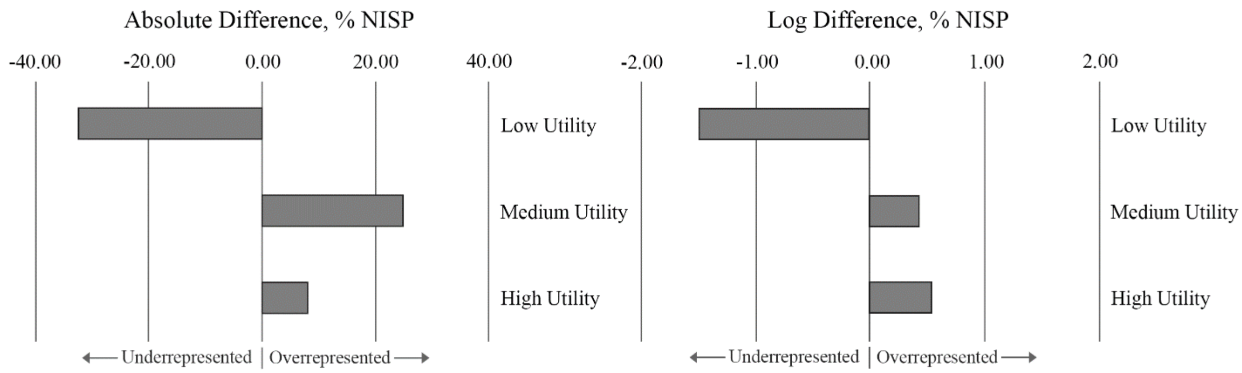

Figure 3.1. Comparison of food utility diagrams using absolute difference and log difference values from Table 3.1.

where otherwise they would be expected to be left at the butchery site. Metcalfe and Jones (1988) proposed the food utility index (FUI) as a replacement for MGUI, which they also modified to incorporate riders, and showed that their index used a simpler formula in order to get nearly the same ranking results as Binford's MGUI. The FUI index was then further transformed by Purdue et al. (1989) who grouped the elements into three categories based on their FUI values: low (<1000), medium (1000-2000), and high (>3000). The authors did not provide a justification for picking those intervals, nor do the intervals seem to follow natural breaks in the data, therefore I assume the numbers were chosen because they were convenient break points at round numbers. Purdue et al. (1989) also shifted by using percent NISP rather than percent minimum anatomical unit (MAU) to compare to their categories. MAU is a measure derived from calculating the minimum number of skeletal elements (MNE) represented by fragmentary bones and diving the observed MNE by the expected MNE in a standard skeleton. Some of the pitfalls of MAU/MNE include vagueness in terminology and variation in how these measures are estimated; NISP avoids these pitfalls while also allowing for intrasite comparisons. The last modification comes from Styles and Purdue (1996), who utilized the previously delineated FUI categories but also categorized all other parts of the skeleton. This has the effect of bringing in fragments traditionally ignored in the previous studies, including shaft fragments, indeterminate phalanges, and indeterminate vertebrae. Styles and Purdue (1996) also calculated the mean value for each FUI category and compared it to a standard deer in order to plot under- and overrepresentation.

I model my food utility categories after Jackson et al. (2016:Figure 10.10), which is also a grouping of low, medium, and high utility elements. Values are based on Metcalfe and Jones (1988) but modified according to butchery techniques associated with Late Woodland and Mississippi-period mound sites (Jackson and Scott 2003; Jackson et al. 2012; Scott and Jackson 1998). Rather than being listed as numerical values, categories are retained as elements which makes visualizing the relationships between elements more apparent, particularly as it is the relationship between categories that ultimately matters rather than the specific numbers themselves. Jackson and Scott's groupings have changed over time. Therefore, based on my own understanding of butchery techniques, I am following the specific categorization listed in Jackson et al. (2016), where fore- and hindquarters are grouped as high utility, vertebrae and associated elements are grouped as medium utility, and all other primary butchery refuse is grouped together as low utility (lower limb and skull elements) (see Table 3.2).

Food utility can be plotted against percent MNE, percent MAU, percent NISP, or percent derived MNE or MAU (see Reitz and Wing 2008:226-229), I use percent weight and percent

Table 3.2. Deer elements belonging to high, medium, and low food utility index categories.

Low Utility	Medium Utility	High Utility
skull	cervical vert	scapula
mandible	thoracic vert	humerus
atlas	lumbar vert	radius
axis	rib	ulna
carpals	sternum	pelvis
tarsals	sacrum	femur
metacarpal		patella
metatarsal		tibia
calcaneus		
astragalus		
phalanges		

NISP here as there is less confusion about how both are defined and calculated. Percent weight was introduced by Scott (1983:352) as a method for comparing deer remains at Lubbub Creek, where deer remains in the village area were much more fragmented than those from mound deposits. Scott (1983:Table 26) weighed skeletal elements from a 14-month-old buck, summed the weights by anatomical part, and then used the results as a baseline for expected proportions. Buchanan (2007) replicated this with three additional deer and confirmed that anatomical weight proportions were consistent across sex and age. While the deer remains from Feltus are not overly fragmented, I used percent weight to avoid any issues with different rates of fragmentation between assemblages. I utilized percent NISP when analyzing any other taxa for which comparative weights were not available.

Summary

The botanical and faunal remains analyzed for this dissertation each have a different set of pathways by which they became part of the archaeological record at Feltus. Understanding the ways that both artifact types become preserved, the biases that may affect their preservation, and how those two factors work in tandem to affect the quality of results is a key component of the ability to effectively analyze assemblages. The various identification and quantification methods described here were used in the following three chapters to analyze and interpret the patterns found within both the botanical and faunal assemblages.

CHAPTER 4

ARCHAEOBOTANICAL REMAINS

Archaeobotanical work in the LMV indicates that the diets of people at mound sites varied, although we lack a nuanced understanding of this variation due to uneven geographical patterning in botanical sampling. The majority of our knowledge of mound-related foodways comes from sites located in the Tensas Basin or on the Louisiana coast of where, with the exception of the Hedgeland site (Roberts 2004), plant remains are typically recovered in low densities (Fritz 2008a, 2009; Fritz and Kidder 1993). We also have more thorough knowledge of Coles Creek/Plum Bayou foodways in the Boeuf Basin in southeast Arkansas (Brown 1996; Fritz 2008b; Smith 1996). Unfortunately, the foodways of Coles Creek people living in the Natchez Bluffs have been more of a mystery. The upland environment is very different than the lowland floodplain side, therefore it stands to reason that even after accounting for the difficulties with plant preservation, diets may be different as well. Previous archaeobotanical work at Feltus suggests it is distinguished from Tensas Basin subsistence on the basis of thick-shelled hickory and starchy seed densities (Kassabaum 2014, 2018; Williams 2008).

The archaeobotanical work discussed here is focused on samples originating from the South Plaza and Mound B. All samples were examined and recorded by me, with difficult identifications confirmed by Dr. C. Margaret Scarry. Some samples from the F.4 area in the South Plaza were originally analyzed by Leah Williams (2008) as part of her honors thesis. I rechecked all of Williams's samples and primarily found that acorn and thick-shelled hickory fragments were under-identified, so the numbers of both have been increased accordingly. I begin this chapter by presenting an overview of the plants identified and their growth, collection, and uses. I then turn to a more detailed discussion of the plant patterns seen in individual deposits.

Feltus Botanical Assemblage

The plants identified from Feltus include 5,281 specimens weighing 16.64 g, arising from a total of 733 liters of floated soil and comprising 42 different species (see Table 4.1). Roughly 17.5% of the material recovered was placed in one of three unknown categories: unidentified seed, unidentifiable seed, or unidentifiable material. When the unknown material is excluded, nearly 60% of the identified plants consist of nutshell or nutmeat. The next 28.5% of material consists of various starchy or oily seeds, a high amount in comparison to most sites in the Tensas Basin (Fritz 2009). While the percentages of fruits vary depending on context, they only make up slightly more than 3% of the assemblage, although it is important to take into account that processing methods for fruits will affect the likelihood of their seeds being preserved in the archaeological record. The last category of miscellaneous seeds makes up close to 9% of the assemblage. Interpreting seeds in this category is complicated, as most are weedy colonizers of disturbed ground and could be accidental inclusions, but many also have recorded medicinal and/or ritual uses and thus could have been deliberately brought to the site.

Nuts

Nuts are one of the most commonly recovered materials in botanical samples, though their likelihood of preservation is uneven across species. Evidence for nut consumption typically

Table 4.1. Provenience of flotation samples from the South Plaza and Mound B.

Context	No. of Samples	Volume (L)	Plant Weight (g)	Wood Weight (g)	Other Weight (g)
South Plaza					
F.4 Midden	4	65	37.97	34.00	3.97
F.4 Upper Pit	19	245	150.66	142.62	8.04
Zone B	2	40	15.59	15.28	0.31
Zone B/C	1	10	5.06	4.31	0.75
Zone C	9	95	102.64	97.89	4.75
Zone D	4	60	26.01	24.05	1.96
Zone D/E	1	10	1.36	1.09	0.27
Zone E	1	15	<0.01	<0.01	<0.01
Zone F	1	15	<0.01	<0.01	<0.01
F.4 Lower Pit	3	75	1.04	1.04	<0.01
Zone 1	1	15	0.05	0.05	<0.01
Zone 2	1	30	0.03	0.03	<0.01
Zone 3	1	30	0.96	0.96	<0.01
F.148 Midden	9	90	7.23	6.28	0.95
F.148 Upper Pit	5	50	18.69	18.33	0.36
Zone D	2	20	15.04	14.69	0.35
Zone E	2	20	3.14	3.13	0.01
Zone F	1	10	0.51	0.51	<0.01
F.148 Lower Pit	3	30	0.98	0.98	<0.01
Zone G	2	20	0.98	0.98	<0.01
Zone H	1	10	0.00	<0.01	0.00
Borrow Pit	3	30	48.75	48.65	0.10
Mound B					
Stage 4 (B.S4)	3	29	25.94	23.30	2.64
Stage 5 (B.S5)	12	119	14.81	14.25	0.56
Total	*61*	*733*	*306.07*	*289.45*	*16.62*

consists of nutshell, although nutmeat may be identified as well. Thinner nutshells, such as chestnut, hazelnut, acorn, and pecan, are delicate and carbonize under more limited conditions. Thicker nutshells, such as certain hickory species and walnut, are more robust and therefore more likely to survive charring conditions. Though it is understood that people collected and consumed nuts from many tree species, it is recognized that the contribution of thin-shelled species is underrepresented in botanical assemblages (Scarry 2003). Processing decisions, such as when and where nuts are deshelled, further affect the likelihood nutshell will be recovered archaeologically. Nuts recovered from Feltus include acorns, hickories, and walnuts.

ACORNS. Acorns are one of the most well-documented resources in the southeastern archaeological record and were a particularly important resource throughout North America across most of the Holocene epoch. Acorn nuts represent more than 60% of the total nut remains recovered, with the vast majority coming from nutshell (97%) rather than nutmeats (almost 3%). Acorn nutshell is thin and delicate, and typically considered to be under-represented in plant assemblages (Fritz 2009; Scarry 2003). Further, many analysts only count nutshell from the larger 2 mm fraction, a decision which tends to systematically underrepresent acorn. Despite this, by the Middle Woodland period acorn often predominates at sites in the LMV (Fritz 2009), a pattern that continues into the Late Woodland, including at Feltus. Within this analysis (and that of Kassabaum 2014 and Williams 2008), fragments of nutshell were pulled from both the 1.44 mm and the 2 mm fraction, meaning that acorn should be well represented, at least as far as it appears in botanical samples.

From a dietary standpoint, acorns are a good source of carbohydrates and relatively high in fat, but are low in protein. Nutritionally they compare well with pre-modern cultivated grains, providing similar returns for the same time and labor investment (Scarry 2003). Based on modern forestry surveys (Stein et al. 2001), the area around Feltus potentially contains about 20 different species of oaks (7 white oaks and 13 red oaks), with the most relevant difference between them resulting from the split between white and red oaks. Red oak acorns contain tannic acid, a feature which has important effects on their attractiveness to wildlife, as well as on how they must be processed in order to be consumed. Red and white oaks also take different amounts of time to produce acorns; red oaks take roughly 15 months to produce acorns (two growing seasons), while white oaks take 3 months (one growing season). From a functional standpoint, this means that red oaks always have two season's worth of acorns on their branches. Mature acorns will be found on the previous year's growth while immature acorns can be seen on the current year's growth. This produces an interesting symbiosis with white acorns, as a late spring freeze will kill the acorn flowers producing the current season's white oak acorns, while red oak acorns will still be maturing (though the next year's crop would then be affected) (Johnson 1994).

Most of the oak species in the vicinity of Feltus drop their acorns between September and October, although a few outliers begin dropping acorns in August or finish dropping acorns November; nutall oak (*Quercus texana*) is an extreme outlier here, dropping acorns from September all the way through February (Filer 1990). A good mast year for oaks generally occurs every three to four years, although there is some variation within that ranging from two to five years, along with willow oak (*Quercus phellos*), which produces a good crop almost every year (Schlaegel 1990). White oaks appear to be more closely synchronized and groves of the same species will therefore produce on a similar schedule. Red oaks are less synchronized and tend to have more individual variation by tree, therefore they tend to have steadier mast harvests though less mast on average than white oaks. Current silviculture efforts are focused around identifying the best producing trees and subsequently thinning the woods immediately around them. The resulting sunlight exposure and crown expansion leads to increased acorn production (Johnson 1994; Self 2018). Prehistoric silviculture efforts presumably would have been focused in the same direction.

The tannin characteristics of white versus red oaks also means that they have somewhat different scheduling concerns. Both species are a mainstay for a wide range of mammals, birds, and insects, but the tannins present in red oaks mean that they are less favored and will last on the ground for longer during the mast season. Because white oak acorns are consumed so much more easily, scheduling concerns are more acute in order for community members to compete for nuts. White oak nuts must be collected quickly after they fall, otherwise much of the harvest can be lost to deer, turkey, squirrels, bears, and other animals. Scheduling concerns additionally must factor in germination, mold, and insect damage. For an experienced collector, heft, texture, and the presence of holes can be used to discern whether acorns are moldy or weevily and should be discarded in the field (Anderson 2005). Another option to reduce the loss of acorns on the ground is to use poles to knock nuts from branches for immediate collection (Mason and Nesbitt 2009; Ortiz 1991). Regardless of which method of collection is used, it is clear that the paramount concern is knowledge of when acorns ripen and when they have fallen to the ground, timing that will be slightly different for each species and grove.

Because the tannins in red oak acorns make them less desirable, they can stay on the ground for longer and therefore do not represent as immediate of a scheduling concern. While red oak species will not tend to produce as many acorns in a good mast year as white oaks (Self 2018), they still may be gathered en masse, though over a longer period of time. The characteristics that allow red oak acorns to stay on the ground for longer also make them an important late fall/early winter crop for animals, after the period when white oak acorns will have disappeared due to either consumption or germination (Scarry 2003:66).

Once acorns are collected, they can be immediately consumed or they can be gathered and stored for a longer period. Drying is a requisite step for long-term storage, although it may still be done for immediate consumption in order to make the shell crack more easily (Anderson 2005). Some archaeologists argue that drying would have occurred at grove sites, as it would reduce the weight and therefore transport costs, though it is also possible that nuts were collected and brought back to villages prior to drying (Bettinger et al. 1997). Ethnographic accounts from California indicate that unshelled nuts were dried in the sun (Ortiz 1991), while historic accounts from the Southeast describe nuts being parched on mats or in shallow baskets over a low fire (Kupperman 1988). Drying nuts has multiple purposes, include reducing and removing moisture, preventing sprouting, killing insects, and reducing mold issues. Parched acorns can technically be stored in or out of their shells, although their shelf life is longer when they are unshelled. After parching, the acorns must be kept dry and protected from animals. Storage pits are a common method of storage and protection in North America (see Sanger 2017), although currently there is little direct archaeological evidence for this in the LMV. Ethnohistoric accounts from the Southeast also discuss storage baskets and probable granaries, either of which would leave little to no trace archaeologically (Lawson 1967; Lederer 1891; Scarry 2003).

The tannins contained in red acorns must be removed before the nutmeat can be considered palatable. There are a few different extraction methods that can be utilized, depending on the intended method of consumption. Based on ethnohistoric accounts, Southeastern Native people added nutmeats to stews, used acorn flour, and extracted acorn oil or butter. A hands-off method of tannin removal for shelled nutmeats is to place them in a bag or basket and simply place the container in flowing water. If nutmeats are to be added to soups or stews, the nutmeat can be boiled for half a day with multiple changes of water as tannins are extracted. An alternative to this longer process is to neutralize the tannins instead, which is done by adding ashes or lye during cooking. When acorn flour is the desired end product (i.e., for bread or porridge), the nutmeats are pulverized first. The resulting flour is then leached by repeated water rinsing; cold water is usually used as hot water will extract oil in addition to tannins (Kupperman 1988; Messner 2011; Ortiz 1991; Scarry 2003).

Information collected from ethnographies about California Native women suggests acorn consumption typically involved small-scale processing on an as-needed basis. This could mean completing all processing steps at once or keeping batches of nuts at various stages of processing (Jackson 1991). Small-scale processing is relatively inefficient, however; bringing large groups of people together to process large amounts of nuts—beyond what would be needed for immediate use—would have allowed people to take advantage of efficiencies of scale. Based on archaeobotanical evidence, it does seem that groups in the Southeast often processed small amounts of acorn, but there is also evidence for features containing amounts of acorn shell and nutmeat that would suggest large-batch processing (Peles and Scarry 2015b).

HICKORIES. Like acorns, hickory nuts can be considered a mainstay of Native subsistence throughout the Holocene. Hickories are divided by archaeobotanists into two primary groups: thick- and thin-shelled hickories. This is a quite literal division of hickories that have thick, dense nutshells in comparison to those that have thin shells, like pecan, bitternut hickory, and pignut hickory. Within these divisions, only some hickories are sweet and palatable enough to be consumed; although historical accounts indicate that bitter hickories may have been occasionally eaten as a famine food (Waugh 1916:122). This discussion will begin with thick-shelled hickories and then move on to thin-shelled.

Thick-shelled hickory use at Feltus seems to have been extensive, with a total count of 836 fragments, representing a standardized count of 1.14 thick-hickory nutshell fragments per liter of soil floated. Within the LMV, thick-shelled hickory tends to share an inverse relationship with pecan, with the predominance of either based on geography (Fritz 2008a, 2009). The location of Feltus, at the intersection of well-drained loess uplands and alluvial bottomlands, meant that people gathering at the site had ready access to both types of environments. This geographic access is an important influence on the higher densities of thick-shelled hickory at Feltus in comparison with sites in the bottomlands (Fritz 2008a).

In the area surrounding the Feltus mounds, community members had access to two varieties of sweet, thick-shelled hickory: mockernut and sand hickory. Mockernut hickory is more common, with nuts that drop between September and December each year. Good mast crops occur every two to three years, with lighter crops in between. Mockernuts produce some of the largest nuts of all the hickory species and their nuts are preferred by wildlife, with squirrels consuming even the green nuts (Smith 1990). Much less information is available about sand hickories, likely because they are much rarer than mockernuts. Given that sand hickory prefers well-drained soils on bluffs, ridges, rolling hills, and dry woods (eFloras 2021), it seems likely that they are and were present in the area around Feltus. While the nuts produced by sand hickories are smaller than mockernut, they are larger than other pignut varieties and are considered to be sweet (Conrad 2012).

Regardless of the species, thick-shelled hickory nuts consist of a relatively smooth-shelled nut encased in a hard husk, with a convoluted nutmeat encased inside. While the interiors of thick-shelled hickories make it difficult to extract nutmeat, hickories are a high energy food with high fat and moderate protein content (Scarry 2003; Talalay et al. 1984). Thick-shelled hickory trees tend to be found in groves where they have cyclical production. While the thick husk protects the nuts from insects and mold (Scarry 2003:60), they must be harvested within a week or two after dropping due to competition with animals, therefore scheduling concerns are similar to white oak acorns discussed above. Experiments by Talalay et al. (1984) show that shagbark hickories produce four times more nuts in open growth areas compared to closed canopy forests. While shagbark hickories are not available at Feltus, if the analogy can be extended to mockernuts then it seems likely that area residents practiced hickory-related silviculture in order to increase nut yields (Fritz et al. 2001:5). Fritz et al. (2001) make the further point that not only are yields larger for trees within open canopies, but nut collection is also much easier and there is less competition with other animals.

The initial steps of processing thick-shelled hickories are much like acorns; drying the nuts first aids with storage and also causes the nutmeats to pull away from the shell, making extraction easier (Talalay et al. 1984:351-352). However, due to the interior convolution, pieces of the nutshell will still remain in the kernel after cracking. Therefore, while sweet hickory nutmeat could have been consumed raw on occasion, methods used for processing the nutmeat into hickory oil or milk would have been much easier and more effective (Talalay et al. 1984). We also have many ethnographic accounts that indicate Native groups primarily processed thick-shelled hickory nuts into oil, rather than consumed hickory directly (Kupperman 1988:39, 50, 152, 238, 243; Lawson 1860 [1714]:24, 100-101; Waselkov and Braund 1995).

Once thick-shelled hickory nuts are dry, processing for consumption starts with a preliminary cracking stage where large fragments of nutshell are sieved out, followed by a second round of crushing and pulverizing the nuts until the fats and oils release. Modern observation by Fritz et al. (2001:13) indicate that, depending on the size of the batch, it can take 30 minutes or more to reach this stage. This hickory meal can be consumed or used immediately, or it can be formed into a ball, which the Cherokees call *kenuche*, though such balls will only keep for a few days to a few weeks without refrigeration, depending on the outside temperature (Fritz et al. 2001:11-13). Regardless of whether the hickory meal is used immediately or temporarily stored as a kenuche ball, there are a couple options for consumption. The first option is to eat the hickory meal as is; the nutmeat will dissolve in the mouth while the nutshell fragments can either be swallowed or spit out (Fritz et al. 2001:5). Another option is to dissolve the hickory meal or kenuche ball in hot water; the nutshells will sink while the nutmeats will float. The resulting mixture can be utilized as is for hickory nut soup or added as a component to another dish, such as a starchy gruel. If the hickory meal is left longer in the water, the nutmeats will dissolve into a milky emulsion. The hickory oil rises to the top and can be decanted, while the unseparated "milk" can be drunk or used as a stock, depending on how much water is added (Fritz et al. 2001:5-7).

The consistent presence of thick-shelled hickory in deposits at Feltus is an indication that at least some hickory nut processing was probably done on site. While hickory shell can be used as a fuel (Fritz et al. 2001:24), it seems unlikely that this would be the sole source of thick-shelled hickory at the site. Instead, a more realistic interpretation is that hickory oil or hickory milk processing was done on site, using the large numbers of gathered people to take advantage of efficiencies of scale. Ethnographic accounts from the Southeast provide an indication that hickory nut soup or stock was used as a component of various dishes that were parts of "feasts" for European explorers (Waselkov and Braund 1995). It seems likely that there would have been a similar use at Feltus: knuche more specifically, or hickory nut stock as a component of stew-like dishes.

Thin-shelled hickory nuts are also found at Feltus, albeit in lower numbers; a total of 75 fragments were identified here. While there are a number of thin-shelled hickory species, the only one that produces sweet nutmeat is pecan (*Carya illinoinensis*), therefore I assume this is the identity of thin-shelled hickory found in the botanical samples (though see Fritz and Connaway 2000 for identification of bitter water hickory). Pecans grow on well-drained loam soils that are not subject to prolonged flooding and also tend to occur in groves that produce on the same cycle (Hall 2000; Scarry 2003). Pecan nuts drop between September through December each year; when the nuts are mature the husks dry and split away from the nut. Good crops are produced roughly every one to three years (Hall 2000). This means that the scheduling concerns for pecan nuts would have been similar to those of acorns and thick-shelled hickory, perhaps even more so as their thin nutshells would have made them a preferred target of wildlife. The interior anatomy of pecans means that they were probably handpicked, as the kernels are easily extracted. Moreover, there is a thin, woody partition between the halves of the nutmeat that precludes processing nutshells and nutmeats in the same crushing manner as thick-shelled hickory. If thick-shelled hickory methods are used, the pecan partition fragments will float to the top amidst the oil, causing the milk to become bitter (Scarry 2003:61).

Like acorns and thick-shelled hickories, pecans store well when dry. Nuts were probably parched in the same manner as acorns and other hickories in order to avoid issues from mold and weevils. Today, certain trees are known to produce larger nuts which consequently provide greater returns, up to 6.2 kg per hour per person. Using a hammerstone and anvil, Hall reports than an inexperienced sheller can extract 66 grams of nutmeat per hour (Hall 2000:109). As with the other hickories, pecans are an excellent source of fat, provide moderate protein, and very low amounts of carbohydrates (Hall 2000; Scarry 2003).

WALNUTS. The last nutshells recovered from Feltus are 30 fragments of black walnut shell. While there are technically two types of Juglandaceae with deeply ridged shells — black walnut (*Juglans nigra*) and butternut (*Juglans cinerea*) — only black walnut is available in the LMV. Black walnut trees are not found in dense stands, as their roots produce juglone, a toxic chemical that inhibits the nearby growth of other plants. Black walnuts produce a good crop every two to three years, but due to the scattered nature of their trees, collection is more labor intensive. The bitter nature of their outer husk does, however, make collection scheduling a bit more flexible. The husk, which adheres to the nut even when it is ripe, discourages attention from other wildlife. Once cracked open the nutmeats reportedly are fairly easy to extract from the shell, however it is nearly impossible to remove *all* fragments of the husk from the ridges of the nutmeat. The remaining pieces of tannin-filled nutshell, if processed like other thick-shelled hickories, would have resulted in a bitter, unpalatable oil. As a result, we assume black walnut meats were hand-picked for consumption (Scarry 2003:64).

Starchy and Oily Seeds

The next large grouping of taxa are starchy and oily seeds, representing almost 24% of the assemblage. Starchy seeds (or grains) are primarily sources of carbohydrates, while oily seeds are primarily sources of proteins and fats (though maygrass is a starchy exception that is high in protein) (Fritz 2014; Scarry 2003). The most commonly recovered starchy and oily seeds were part of the Eastern Agricultural Complex (EAC), including chenopod (*Chenopodium berlandieri*), maygrass (*Phalaris caroliniana*), little barley (*Hordeum pusillum*), erect knotweed (*Polygonum erectum*), sunflower (*Helianthus annuus*), sumpweed (*Iva annua*), and squash (*Cucurbita pepo*) (included here due to its oily seeds). This suite of seeds has a long history in the eastern U.S., with early evidence for domestication and cultivation among squash, sunflower, chenopod, and erect knotweed. The co-occurrence of maygrass and little barley with domesticated EAC seeds, but outside of their natural ranges, is used an argument for their cultivation as well (Scarry 2008). However, the LMV is within the natural range of many of these species and botanical assemblages lack much morphological evidence for domestication until the Late Woodland period. Further, EAC species are typically recovered in very low densities from pre-Mississippian LMV sites, particularly when compared to neighboring regions like the American Bottom, suggesting that most LMV communities remained low-level food producers until the Mississippian period (Fritz 2009). The characterization of LMV communities as low-level food producers should not diminish their interaction with EAC species, however; low-level food production still involves a great deal of active resource management (Fritz 2009; Scarry and Yarnell 2011).

Evidence for the degree of EAC consumption in LMV diets is also hampered by the greater archaeological evidence available for alluvial bottomland sites. At sites like Osceola and Reno Brake, there is very little evidence of starchy or oily seed consumption at all, let alone evidence for domesticated varieties of EAC plants (Fritz and Kidder 1993). Granted, given how plants are preserved in the archaeological record, it is difficult to know if this is due to different dietary preferences or different gathering practices (i.e. potluck feasts wherein already prepared dishes are brought to a gathering, rather than on-site processing). Regardless, prior archaeobotanical evidence from Feltus already indicated different practices occurring on site, with higher recovery of starchy and oily seeds, as well as evidence of domesticated chenopod (Kassabaum 2014; Williams 2008). The evidence for small seeds revealed here adds to the growing evidence that community members of the Natchez Bluffs participated in a similar small-seed-gathering tradition as their Plum Bayou neighbors to the north (Fritz 2008b). For purposes of discussion, I will keep the division of starchy and oily seeds, discussing the starchy seeds first and then the oily seeds.

STARCHY SEEDS. Starchy seeds recovered from Feltus include the full range of EAC grain crops: chenopod, maygrass, erect knotweed, and little barley. There is evidence for domesticated chenopod at Feltus, from a Ballina phase (AD 850-1000) context on Mound B. Unfortunately, most chenopod from Feltus is popped, making it impossible to scan seed coats using scanning electron microscopy (SEM) or to identify other morphological traits of domestication. Chenopod primarily grows in river valley floodplains and prefers open and/or recently disturbed ground. Smith's (1992) field research confirmed that wild *C. berlandieri* is not a particularly abundant species and does not typically appear in large stands (though large stands can occur intermittently after floods), characteristics which helped to suggest its status as a domesticate independent of morphological characteristics. Erect knotweed prefers similar environments and is often seen on newly deposited sediment near creeks, rivers, and lakes that flood seasonally. Though Asch and Asch (1985), found that erect knotweed did not occur in large or dense enough stands for large amounts of harvesting to occur. Mueller (2017b:197) disputes this characterization; while noting that stands of knotweed *are* rare, she also documents that the way in which knotweed drops its seeds results in the formation of dense stands of the plant. Thinning of already existing stands would have been an extremely easy method to drastically increase seed production, though farmers would have had to grow knotweed in areas where it was protected from summer flooding (Mueller 2017b:197, 200). Additionally, Mueller (2017b:195) found that erect knotweed was easy to collect, and because the mature seeds stay on the plant for a few weeks, there is a large window of time for people to come back for harvest . Both chenopod and erect knotweed mature in the fall, with seeds ready to harvest around September and October.

In contrast, little barley and maygrass are spring and summer plants, ripening between May and June. Little barley is a weedy plant common in human disturbed environments. Maygrass differs from the weedy pattern somewhat in that it prefers open but *not* recently disturbed habitats and currently tends to be found in fallow fields and on roadsides (Fritz 2014). Fritz (2014:17) notes that in the LMV, she frequently saw maygrass growing alongside little barley in unplowed roadsides, and Mueller et al. (2021:153) document maygrass and little barley growing alongside sumpweed in bison wallows in eastern Oklahoma. Fritz (2014:18) documents a number of attributes of maygrass that make it attractive for consumption, including the easy harvesting of seed heads or upper stems, the easy removal of florets even prior to maturation, and the thin lemma and palea that meant maygrass did not require processing prior to consumption.

OILY SEEDS. Oily Eastern Agricultural Complex seeds recovered from Feltus include sumpweed and sunflower; examples of both at Feltus appear to be wild based on their small size. Sumpweed occurs naturally in weedy, dense stands in floodplains and grows well in disturbed habitats as long as the dirt is disturbed each year (Wagner and Carrington 2014). Wagner records that sumpweed grows well with maygrass and little barley (mirroring Mueller et al.'s [2021] observations); once the two are established, pulling up the dried maygrass in late spring or the mature sumpweed in late fall is all the disturbance that is required to keep sumpweed happy (Wagner and Carrington 2014:88). As with knotweed, thinning allows for increased harvests, with ripening occurring from mid-September into early October. Sumpweed can be harvested in two ways: either the branches can be stripped, or the whole plant can be uprooted to be stripped or beaten to remove seeds later. The small hairs on sumpweed make stripping an unpleasant task, suggesting that people either wore some type of protection during harvesting or that uprooting of the entire plant may have been preferred (Wagner and Carrington 2014:89). Due to their high oil content, sumpweed cypselae are only preserved under narrow conditions, such as parching of dried (not fresh) fruits (Wagner and Carrington 2014:93). Sunflower has a similar disposition to sumpweed, with wild sunflowers growing well in disturbed ground and seeds ripening in the fall. Mueller et al. (2021:153) note that wild sunflowers (and a close relative to erect knotweed, *Polygonum ramosissimum*) were observed along with maygrass, little barley, and sumpweed in eastern Oklahoma bison wallows, suggesting how easily all these small grains may grow together, with very little to know active effort involved. Experiments burning sunflower show that its achenes are also unlikely to survive charring, as all parts tend to fracture during burning (Wright 2003).

The third oily EAC seed is squash, which I am describing separately as it has a bit more complicated history of use. Broadly, there are two types of squash important from an archaeological perspective: Curcurbita and Lagenaria. *Lagenaria siceraria* is better known as bottle gourd and is typically described as being grown to make utensils, which can be done by harvesting the mature gourd and drying it. However, young fruits of this species can also be harvested and consumed. Based on European ethnographic accounts and archaeological finds, at the time of European contact it appears that three types of curcurbit squash were being grown in North America: *Curcurbita pepo* spp. *pepo* (pumpkins), *C. pepo* spp. *ovifera* (summer squashes), and *C. argyrosperma* (cushaws) (Fritz 1994). Current evidence indicates that *ovifera* was domesticated in the eastern U.S., with a likely predecessor of *C. pepo* ssp. *ovifera* var. *ozarkana* in the Ozark Plateau and the Mississippi River Valley (Simon 2011). Regardless of the species, the initial use of all of these squashes and gourds may have been as utensils, rattles, and possibly net floats (Fritz 1999; Simon 2011). The flesh and seeds of wild gourds contain bitter and toxic cucurbitacins, which must be removed or extremely diluted in order to make the gourds edible. The wild seeds can be processed to remove the cucurbitacins, but it is a labor-intensive process. It seems likely, therefore, that an early direction of domestication could have been selection for nonbitter seeds and flesh (Simon 2011).

Ten fragments of squash rind were recovered in flotation samples analyzed here; low amounts of squash are typical for sites in the LMV. Unfortunately, the small size of the rind fragments from Feltus make it impossible to identify the species without the use of SEM. It is possible that the low number of fragments is an indication that to the degree gourds were used, they were primarily utilized as containers or as net floats. Alternately, there are a number of different ways to preserve squash and squash seeds if the intent is consumption, not all of which would be likely to result in charred accidents. Ethnographically, methods recorded from groups in the northern Plains are likely to be similar to what people gathering at Feltus would have done. For immediate consumption, squashes can be placed directly into the ashes of a fire to roast or they can be boiled in water. In order to preserve the squashes for a later time, they are sliced into rings, the squash slices are strung into a spit, and then the spit is hung to air dry. The dried squash can then be utilized in the same ways as fresh squash: added to soups and stews, boiled or steamed in a pot (either alone or with other ingredients), or roasted in a fire. Squash blossoms are also edible and probably would have been consumed either immediately or dried to be consumed later. Like other starchy and oily seeds, squash seeds can be boiled, parched, or roasted (Wilson 1987[1917]:70-80). Because squash seeds are high in protein and fat, they can also be rendered for oil, although it is a labor-intensive process.

ADDITIONAL GRAIN SEEDS. Three other small grains found at Feltus require discussion here. The first is amaranth, which is often recovered in small quantities in Late Woodland flotation samples but is not discussed in much detail. Fritz's (1984) early work with desiccated remains from northwest Arkansas showed that amaranth was collected en masse by at least some Native people in the same manner as chenopod, and there are a number of Southwestern assemblages with large quantities of amaranth, some clearly domesticated, others suspected (Fritz et al. 2009). Unlike chenopod, however, there is no clear evidence for domestication of native amaranth varieties in sites located in the United States; instead, domesticated varieties appear to have traveled north from Mexico into the Southwest relatively late in prehistory (Fritz et al. 2009). Regardless, given the propensity of amaranth as a weedy colonizer of disturbed ground, it could have readily grown alongside other EAC plants already being tolerated and/or encouraged.

The second small grain is Type X, also sometimes called Toltec Type X (Fritz 2008b). It is unclear what exactly Type X is, besides a grain in the grass (Poaceae) family that is currently extinct. Its comparatively large size makes it rather conspicuous in archaeobotanical assemblages and suggests that it was probably a product of domestication. Fritz (2008b:37) speculates that Type X may have been an accidental hybrid between harvested and wild grass species, in a process with parallels to natural wild grass crosses in the midwestern U.S. Its use appears to be geographically limited to Arkansas, Oklahoma, and Mississippi. The vast majority of Type X seeds have been recovered from the Toltec site in central Arkansas, which seems to be the epicenter of Type X use. In botanical samples from Toltec, Type X is the most numerous of all cultivated seed types, with at least 3,728 seeds identified. Smaller numbers of seeds have been identified from Copple Mound at Spiro in Oklahoma, Late Woodland and Early Mississippian features from four sites in Arkansas, the Hardman sites, Faulkner Lake site, and Taylor site also in Arkansas, and from waterscreen samples at the Oliver site in northern Mississippi (Fritz 2008b). A small number of probable Type X seeds have been identified from the nearby Smith Creek site (personal communication Anna Graham 2020) as well as four fragments from deposits at Feltus. The Feltus and Smith Creek sites represent the farthest south that Type X seeds have been identified. Based on the small number of seeds at Feltus, it is possible that *only* processed seeds were making their way to the area. However, given the similarities in starchy seed resources between Feltus and their northern Plum Bayou neighbors, it seems just as possible that Feltus residents were growing some Type X themselves.

The last starchy seed recovered at Feltus is wild rice. Although typically associated with groups around the Great Lakes, wild rice does occur in smaller amounts throughout the south. Wild rice grows in water and can be found along fresh to brackish river shores and the shallow water of lakes and rivers, preferring a slow-moving current. While present-day reports of wild rice place it only on the Gulf Coast of Mississippi, based on its habitat preferences it is not inconceivable that it could have been present near the site. Descriptions relating to collection and processing of wild rice primarily come from the Ojibwe, but are relevant here as the process would be the same. Wild rice seeds ripen between September and October, at which point the plants can be shaken or tapped, and the falling seeds are typically collected in a canoe. After being harvested, the rice must be quickly dried. One method is to dry the seeds in the sun and later parch them in order to facilitate removal of the hulls. Alternately, rice seeds can be smoked over a smoldering fire, serving to harden the kernel, loosen the hull, scorch off the barbed ends of the chaff, and destroy any other detritus (Moffat and Arzigian 2000). Subsequent to the slow roasting, the friction of the grains rubbing against each other can be used to remove the hulls; in order to do this the Ojibwe would dance, or tread, on the grains wearing leather moccasins (Barton 2018; Moffat and Arzigian 2000). Pounding can also be employed, making use of a wooden pestle and hollowed out log. Winnowing is then done to remove the chaff and lastly the rice is checked by hand to remove any miscellaneous debris or broken seeds (Barton 2018).

After collection, all the other previously mentioned starchy and oily seeds would also have needed to be processed, in ways that are very similar to that mentioned above for wild rice. The first step for each seed is to remove indigestible parts, called dehusking. Depending on the degree to which the husks are attached, multiple methods can be used. One method is milling, where seeds are placed into a deep container along with pebbles and then pounded with a wooden mortar. Another option is to toast seeds, which removes moisture and helps separate the husks from the grains. The grains are then rubbed together, causing the husks to come loose. Separating the husk from the grain is usually done via winnowing, which typically involves blowing air through the grains in order to remove the chaff. This can be done with a basket, tossing the grains up into the air and catching them when they fall – the movement of the air blows the chaff away while the grains are heavy enough to fall back down. This does require skill, however, in terms of tossing in such a way as to remove the chaff without dropping grains on the ground. After winnowing, further processing typically takes place, involving grinding or pounding to create something similar to grits or bulgur. Milled grain can be cooked as is to make a gruel, or it can be ground into a flour to become the basis of bread or another type of baked item (Gremillion 2004:221).

MAIZE. Maize is an introduced crop, originally domesticated in Mexico and arriving to the LMV via routes from the north. Evidence for maize in the LMV has previously been considered late in comparison to adoption of maize elsewhere (Fritz 2008a), though reanalysis of early maize in the American Bottom suggests that conclusions about the timing of maize adoption in different regions needs to be re-evaluated (Simon 2014, 2017). Small amounts of maize show up in botanical samples starting around AD 900, and it does not seem to become a dietary staple until the Plaquemine period, beginning in AD 1200 (Fritz 2008a; VanDerwarker et al. 2017).

With the analysis of samples from the 2018 field season, we now have a total of seven maize kernel and eight maize cupule fragments recovered from flotation. All but one of these fragments originates from Stage 5 on Mound B (additional fragments of maize have been recovered from waterscreen samples of the same features, but are not enumerated here). One fragment of maize kernel from F. 186, a large wall trench, was submitted for radiocarbon dating. The results confirmed that the fragment was maize and returned a date of cal AD 1169-1270. One other maize cupule fragment was recovered from a previously unanalyzed flotation sample originating in Zone C of the F.4 upper pit. Waterscreen samples from the same context were also checked but no additional maize has been found. A fragment of thick-shelled hickory from the layer beneath, Zone D, returned a modelled date of cal AD 892-987. Until and if the maize from Zone C is radiocarbon dated, it is difficult to know if it is early evidence of maize at Feltus (though in line with other early maize from the LMV), or if it is a later intrusion into the deposit.

One of the reasons the advent of maize agriculture is such an enduring topic in archaeology is because it tends to be associated with shifts in societal complexity. However, the timing and context of maize agriculture varies by region, both in terms of when it becomes a staple food and whether it displaces or is grown alongside other small seeds (Scarry 1993; VanDerwarker et al. 2017). While maize gardening among Woodland farmers is often conceptualized as a large shift in horticultural strategy, experiments by Mueller et al. (2019) suggest that cultivation of EAC seeds probably involved more similar strategies than previously been recognized. Many of the tasks involved in growing maize have parallels in successful EAC horticulture, including land clearing, weeding, and thinning (Mueller et al. 2019:558). Differences with maize cultivation would have included creating hills at evenly spaced intervals, placing a number of seeds in each hill, and hoeing soil up maize plants (Scarry 2008:395). Perhaps the largest divergence required to grow maize would have been in the timing of planting and harvesting, particularly once it became a staple crop.

Different varieties of maize mature at different times, and we know that farmers in nearby areas like the American Bottom were growing at least two, if not more, varieties of maize by AD 1050, providing summer and fall harvests (Simon and Parker 2006; VanDerwarker et al. 2017). Beyond the differing maturing dates for varieties, any variety of maize can be harvested at two different points in time. Immature, or green, maize may be gathered in the summer, when it can be roasted or boiled and then ground to produce a sweet juice. Green maize ears may also be half-cooked or roasted, after which the kernels are removed, dried, winnowed, and then stored for winter (Wilson 1987[1917]:36-41). Alternately, mature maize is gathered in the fall, at which point it is dried, threshed to remove the kernels, winnowed, and then stored (Wilson 1987[1917]:45-47, 51-52, 54-55). After harvesting there are many ways that maize can be consumed and used, although a primary use of maize kernels appears to have been as hominy (Briggs 2016; Wilson 1987[1917]:61-65).

Fruits

Fleshy fruits are found in low, though consistent, numbers at Feltus. A total of 143 remains from fruits were identified, primarily consisting of grape, bramble, persimmon, and cabbage palm. These species provide many needed minerals and vitamins; a few species, like persimmon, are also good sources of carbohydrates (Scarry 2003). As with other seeds, recovery of fruit in botanical samples is complicated given that the seeds of many fruits are typically either consumed or purposely discarded during processing, actions that make it unlikely for remains to be consistently charred. Many fruits would have been consumed fresh, but they also would have been preserved through drying and added to breads, gruels, and stews throughout the year.

Even in the LMV, most fruits do not ripen until mid-summer; early-ripening fruits include mayhaw (*Crataegus* sp.) and strawberry (*Fragaria virginiana*), though no seeds from these species have been identified from Feltus. Fruits that ripen in the mid-summer will continue to produce fruits into the fall, including bramble, grape, maypop, and stone fruit (cherry/plum). Bramble is a more generic name for any tangled, thorny shrub, though here it more specifically means raspberry, blackberry, or dewberry. Typically, the fruits are consumed, although there are many ethnohistoric records of eating the young shoots; the leaves could also be cooked with food to impart flavor and the roots and/or leaves could be steeped to make tea. Many of the references from Moerman (2003) involve drying berries for winter use, with some sources specifying that the berries were dried into the form of “cakes.” Additionally, brambles have a number of medicinal and ceremonial uses among different tribes (usually stems and sprouts, although there is one reference to flowers). Grapes are also available during this time period, with seven potential species of grapes available around Feltus. The fruits of all these varieties are consumable, though each would have had a different taste (USDA 2022).

A particularly conspicuous fruit available beginning mid-summer is maypop, with its striking purple flower and large fruit containing many seeds. Beyond consumption of the fruit, most recorded uses of maypop are related to their roots, but the stems, leaves, and flowers may be dried and used in teas as well (Moerman 2003). The seeds of maypop are edible, and can be consumed along with the juices of the interior of the fruit, similarly to how a pomegranate is eaten. Alternately, the seeds can be spit out while the fruit is consumed.

The last mid-summer fleshy fruit recovered at Feltus is a fragment of a stone fruit, indicating that it came from any one of a number of wild plums or cherries. Plums and cherries have been popular for a long time, though primarily the fruits are used as other parts of the plant are toxic (USDA 2006). It is unclear based on ethnographic descriptions if the pits were removed before the fruits were dried. Though consumption of the pits may not have been common, they can generally be consumed whole without issue (they will generally pass through the intestinal system whole). A broken pit will allow the release of amygdalin, which is hydrolized into cyanide in the small intestine. However, most methods of preparation for stone fruits denature the amygdalin, which would then render the pits safe for consumption – relevant preparations include soaking, drying, heating, and fermenting (Bolarinwa et al. 2016). The size of stone fruit pits makes it unlikely they were routinely consumed, though preparation methods may be relevant if pits were accidentally broken and included within food preparations.

As summer turns to fall, the next fruit to ripen is elderberry. The only species of elderberry native to Mississippi is the American black elderberry (*Sambucus nigra* L. ssp. *canadensis*). All parts of elderberry are considered poisonous as they contain cyanogenic glycosides, which become cyanide when consumed by people. As with stone fruits, however, processing methods can functionally reduce or volatilize the cyanide to a low and edible level. Processing methods include significant soaking (24-72 hours), fermenting for multiple days, storage at room temperature (at least a month or more), cooking (particularly using dry heat), and drying (Bolarinwa et al. 2016). This knowledge is reflected in the recorded ethnohistoric uses, which by and large involve drying elderberries or cooking them into jams or jellies. Elderberry also has extensive medicinal uses, along with many references to the use of elderberry wood to make flutes and whistles; among the Seminole, the stems of elderberry are used to make medicine tubes (Moerman 2003).

During the fall, persimmon and cabbage palm begin to ripen. Persimmon seeds are relatively common finds in archaeological samples in the area; early European explorers reported persimmons as part of managed tree groves kept by many Native groups (Abrams and Nowacki 2008; Ross et al. 2014; Waselkov and Braund 1995). Unripe persimmon fruits are extremely astringent; they can cause constipation and induce a temporary dry mouth. Ripe fruit, on the other hand, can be eaten raw or can be dried for winter use, either whole or pulverized and made into cakes or jerky. Persimmon seeds are also edible, and can be roasted and used as a coffee substitute (Nesom 2006).

Cabbage palm seeds are also a common find in archaeological samples in the LMV. There are two relevant species of cabbage palm native to Mississippi – *Sabal palmetto* and *Sabal minor*, though *S. palmetto* is present only along the coast of Mississippi (Wade and Langdon 1990). While *Sabal minor* is present in the same general area, it has a much wider distribution band which puts it within the area around Feltus. The seeds of both species appear to be indistinct from each other, but due to the distribution range, fragments recovered at Feltus are assumed to be *Sabal minor*. Cabbage palm has extensive drupes with sweet fruits, though there are limited accounts of their fresh consumption (Small 1922:161; Sturtevant and Hedrick 1919:515). The palm hearts and leaf buds of cabbage palm can also be eaten, although either of those uses will kill the plant (Anderson et al. 2013; Wade and Langdon 1990). A number of ethnohistoric references also point to the use of cabbage palm for medicine, involving the roots, berries, and seeds (Moerman 2003).

Sumac also ripens late in the fall; people around Feltus may have gathered drupes from fragrant sumac (*Rhus aromatica*), winged sumac (*Rhus copallinum*), smooth sumac (*Rhus glabra*), or staghorn sumac (*Rhus typhina*). While the drupes can be eaten fresh, preparations also included pounding into a flour, crushing and soaking to make a lemonade-like drink, and drying for use as a flavoring. Sumac sprouts were also consumed (Moerman 2003).

The last fruit to ripen in the area around Feltus is hackberry. *Celtis* is a larger genus of trees, although only three are native to Mississippi: dwarf hackberry, common hackberry, and sugarberry. Fruits begin to ripen in early September and can remain on the tree throughout the winter and spring. Many Native groups ate hackberry fruits fresh and dried them for later use. Recorded uses of hackberry by the Dakota include as a flavoring for meat, for which they "pounded them fine, seeds and all" (Gilmore 1919:76).

Interpreting the use of fruits in the archaeological record is complicated because so many of their uses, and associated processing methods, would not have brought fruit seeds or pits into contact with fire. An important aspect of fruit consumption is that while we think of them being eaten fresh, all of the fruits recovered from Feltus could have been, and were recorded ethnohistorically to have been, dried for use later in the winter and spring. The description provided above of Dakota hackberry processing provides an important clue to how all of these fruits were likely preserved and potentially processed. Given the small amount of flesh on many of these fruits, in some cases it may have been easier to dry fruits with the seeds still present and later grind up the seeds with the rest of the fruit, with potential preparation methods (roasting, soaking/sprouting) serving to help “soften” the seed. This may help explain the overall lack of fruit seeds at many sites, as there are many routes to consumption that would not involve the seeds coming near the fire. When eaten fresh, large seeds could have been spit out, not necessarily onto fires (if hearths were even involved). During processing for storage, seeds and pits could have been sieved out (Scarry 2003). When dried fruits were later used, any whole or partial seeds may have been further processed along with the fruit (grinding/pulverizing).

Miscellaneous Taxa

The rest of the seeds recovered from Feltus are labeled as “Miscellaneous,” indicating that they do not fit easily within any of the previously delineated categories. Determining the use of many of these seeds is complicated, as most tend to be weedy colonizers and may therefore be interpreted as background noise in assemblages. Alternately, all of the Miscellaneous species recorded here have some sort of medicinal or ritual use, even if the references are very few in number. Therefore, rather than assume that these plants are found as a result of being accidental weedy inclusions, unless characteristics of the deposits indicate otherwise, I start from the assumption that the identification of these seeds in archaeological deposits may be an indication of their purposeful use for site-related activities.

Purslane seeds are found in almost all samples from Feltus. The plant itself is a semi-succulent that grows well in sunny, open areas. The fleshy leaves of purslane are edible either raw in salads or cooked as a potherb, and it is typically the latter use that is stressed. In addition to fresh consumption, the Tiwa dried purslane greens and stored them for winter (Castetter 1935:43). Though purslane seeds are very small, ethnographic accounts do include their gathering and consumption (Castetter 1935:43; Palmer 1878:602). A method for collecting seeds was provided by Rusby (1906:564), who detailed that "A great pile of plants is accumulated upon a hard and level spot and strongly beaten, after which the seeds are swept up and ground into flour." This method of seed collection sounds similar to the ways that many EAC seeds were collected, and would have provided an easy way to amass large numbers of purslane seeds despite their small size.

Pokeweed is a perennial plant that produces conspicuous dark purple berries and contains phytolaccine, a glycoside that causes stomach upset that varies in severity depending on the person, the part of the plant, and the maturity of the plant when consumed. Roots are the most toxic part of pokeweed, followed by the leaves, stems, and then the berries, and in general toxicity increases as the plant matures, although an exception to this is that ripe berries are less toxic than green berries (Barceloux 2008:801). Despite this fact, the plant is well known for its use as a dark red-to-purple dye or ink, along with having many recorded medicinal uses (Moerman 2003). The seeming contradiction with the plants toxicity and medicinal uses likely has to do with how the plant is prepared; soaking and boiling the plant in multiple changes of water supposedly can lessen or remove the toxins present, depending on the time of season pokeweed is collected. At one time, poke salad was also considered a regional delicacy in the southern United States, although even when the plant is "properly" prepared individuals may experience gastric upset (Barceloux 2008:801).

Vetch, peavine, and wild beans are part of the larger *Fabaceae* family. Three species of vetch are native to Mississippi: deer pea vetch (*Vicia ludoviciana*), pygmy flower vetch (*Vicia* *minutiflora*), and wood vetch (*Vicia caroliniana*). One species of peavine (*Lathyrus pusillus*) and one species of Phaseolus (*Phaseolus polystachios*) are also native to the Feltus area (Lassetter 1984; USDA 2022). The pods, seeds, and greens of these species are edible, and since they are a good source of carbohydrates and protein, they would have made a good addition to people's diets. All three of these plants also have recorded medicinal uses, typically involving the roots or leaves (Moerman 2003). Species within the Fabaceae family will quickly colonize disturbed, sunny ground and all grow as a vine, suggesting one pathway that would have brought the plants in close association with people. Wild beans in particular have been noted in frequent association with crop plants, suggesting that they may have been tolerated or even encouraged within fields and gardens (Scarry 2003:71-72). Both the vetch/peavine and the wild bean seeds were identified in samples from Mound B.S5, and given their garden associations it is tempting to suggest that they were an encouraged component of cropped fields.

Poison ivy is a particularly unusual plant to find, though it has also been identified at two sites in the American Bottom (Williams 2000), the Lake Providence Mound B deposit (Roberts 2005) and at the nearby Smith Creek site (personal communication Anna Graham). While not a seed that would immediately come to mind as being useful, it is unlikely poison ivy would have accidentally been included in a deposit, particularly given that the urushiol which creates the allergic reaction will aerosolize if any parts of the plant are exposed to fire. Various uses of poison ivy are recorded ethnohistorically, including as a tonic, as an emetic, as an inclusion in compounds to poison arrows, to heal sores, as a marking for tattoos or costumes, and within cooking (Moerman 2003; Senchina 2006). Given the toxic nature of poison ivy, researchers have questioned whether or not all of these reported uses are actually true. Researchers have attempted to test some of the reported uses, suggesting that textile production and use as an ink are the most plausible; based on what is known about the non-toxic properties of the plant, other uses of poison ivy are also possible, but may simply have come with health risks (Senchina 2006).

Sumac is technically included in the previous fleshy fruit category, based on the fact that its berries were commonly consumed. However, sumac also has a number of recorded medicinal uses, including as treatment for coughs, fevers, skin rashes, and during childbirth. Further, the plant had multiple ceremonial uses; among many tribes one of these uses was smoking with tobacco (Moerman 2003).

While most of these species described above could have been accidentally charred due to their weedy nature, another possibility is that they were being used for healing ceremonies. Copperleaf is perhaps the seed that is most likely to be weedy in origin, as while it has recorded medicinal usages those uses are fairly minimal (Moerman 2003). Smartweed is also typically ignored as a medicinal plant, but did have a small amount of recorded medicinal uses most often for pain reduction (Moerman 2003). Geranium is a similarly disregarded flowering plant which has numerous medicinal and healing uses, including species that are recorded in use as emetics, laxatives, and antidiarrheals (Moerman 2003). Bedstraw, besides growing well in many different habitats, was potentially used as cushioning, but medicinally was taken as an aid for the skin and kidneys (Moerman 2003; Williams 2000:126). Spurges are also typically seen as weedy additions to assemblage, but had recorded medicinal uses. Williams (2000:122) argues that active compounds present in many spurge species is a further indication they could have been used medicinally. Morning glories (*Ipomoea* sp. and *Convolvulus* sp.) are typically considered weedy plants following field disturbances, but recovery from contexts prior to intensive agriculture have helped provide some more evidence for additional considerations (Peles and Scarry 2015a). Recorded uses of morning glory and bindweed species encompass stimulants, diuretics, and laxatives (Moerman 2003), and Williams (2000:213) notes that some seeds have psychoactive/hallucinogenic compounds. Nightshades, though poisonous, were used for maladies including fever, headaches, toothaches, and snake bites (Moerman 2003).

Prickly poppy is one of the plants most likely to have been utilized medicinally, as it does not appear to have been consumed otherwise. The seeds of prickly poppy were used by multiple tribes as a salve for burns, cuts, and sores, as well as being used as a purgative medicine. The Lakota used dye from prickly poppy for their arrows, while the Comanche used the sap of the plant for sore eyes. Additionally, the Hopi used the plant to whip children during initiation, while the Kiowa used the leaf ash as part of tattooing (Moerman 2003).

All of the miscellaneous seeds identified above and in Table 4.2 have, at minimum, drug-related uses. Ten taxa also have recorded uses as emetics, laxatives, cathartics, or diuretics. These uses may very well have been associated with healing, whether directly or indirectly. From an ethnohistoric perspective, many ceremonies involve ritual purification of participants (Dorland 2017; Hrynick and Betts 2014; Mehta 2007); plants with properties that "cleansed" people may therefore have been an important component of ceremony preparation. A smaller number of plants in the Miscellaneous category have anti-diarrheal, anti-emetic, and stimulating uses, which may have been important to finishing a ritual cleansing. Beyond the use of plants for specific medical illness and purification, spiritual well-being was also an important component of healing, and could have been handled at both an individual and a group level (Hayden 2014). While every community presumably had their own healer(s), one advantage of a large group gathering may have been opportunities for intercessions by higher-level healers. It seems reasonable to then consider that one component of gatherings at Feltus was to seek well-being at multiple levels, meaning that a wide variety of medicinal plants may have been present.

Table 4.2. Drug-related uses of miscellaneous taxa. All references derived from Moermann 2003 and Williams 2000.

Taxon[a]	**Emetic**[b]	**Laxative**[c]	**Cathartic**[d]	**Diuretic**[e]	**Medicinal**[f]	**Notes**
Sumac (*Rhus* sp.)	X	X	X	X	X	smoked with tobacco; ceremonial medicine; antiemetic; antidiarrheal
Pokeweed (*Phytolacca americana*)	X	X	X		X	anti-diarrheal; stimulant
Geranium (*Geranium* sp.)	X	X			X	antidiarrheal
Nightshades (*Solanum* sp.)	X	X			X	anti-emetic, antidiarrheal
Morning Glory (*Ipomoea* sp.)		X		X	X	stimulant
Prickly Poppy (*Argemone* sp.)	X		X		X	tattooing
Spurge (Euphorbiaceae)	X		X		X	
Bedstraw (*Galium* sp.)	X			X	X	
Poison Ivy (*Toxicodendron radicans*)	X				X	
Vetch/Wild Pea (*Vicis* sp./*Lathyrus* sp.)	X				X	stimulant
Bindweed (*Convolvulus* sp.)					X	
Copperleaf (*Acalypha* sp.)					X	
Purslane (*Portulaca* sp.)					X	anti-diarrheal
Smartweed (*Polygonum* sp.)					X	antidiarrheal; hunting medicine

[a] The brassicaceae family has so many species with potential uses that it was not included here; a further limiting factor is that many of the brassica species discussed in ethnohistoric sources are European introductions.

[b] Emetic: causes nausea and vomiting.

[c] Laxative: moves bowels; aids digestion.

[d] Cathartic: accelerates defecation.

[e] Diuretic: removes water and sodium.

[f] Medicinal: any uses for specific illnesses.

The medicinal and ceremonial uses of plants are of course not limited to unusual or rare taxa and the above discussion should not be taken as an implication that previous taxa discussed were only used as food. Most, if not all of them in fact, do have medicinal uses; squash and bramble are two examples that have extensive recorded medicinal uses (Moerman 2003). The lack of food uses for many of the Miscellaneous taxa does make them particularly conspicuous, however. In some cases, suggesting they are part of the archaeological record primarily due to a medicinal or ceremonial use may be a stretch. Understanding if they are more likely to be charred in relation to a specific purpose therefore relies on having a more complete understanding of the contexts from which they were recovered, which is the focus of the next section of this chapter.

Context-Specific Remains

Botanical samples were analyzed from two areas of the site: the South Plaza and Mound B. These areas were subdivided into a number of different contexts for which the botanical analyses are described separately. Samples from the South Plaza are considered unrestricted contexts based on being at ground level and located around the edge of the plaza, where we assume people would have gathered at the site. Material analyzed from Mound B originated from features on two of the mound stages: B.S4 and B.S5. Because these contexts are located on mound summits, where fewer people would have had access, they are considered restricted deposits. Summary tables for deposits provide raw and standardized counts for all taxa, abbreviated as ct and std ct, respectively. All material was standardized using a ratio of count per sample volume; if a ratio of count per gram of plant weight is desired, plant weight is reported in Table 4.1.

South Plaza

The South Plaza deposits analyzed here come from two different areas: a pit complex northeast of the original location of the mound, and a borrow pit, which goes from slightly under to beyond the previous location of Mound D (see Figure 4.1). As described in Chapter 2, the pit complex consists of one or more middens that overlie a number of extremely large pits. Each pit consists of multiple zones of fill; the deepest zones appear to have washed and/or eroded into the pits and are termed lower pit zones here. Above the erosional fill and laminae are a number of zones with higher artifact densities and typically darker, more organic soil which are referred to as upper pit zones. The last, most recent, activity in this area consists of a thick midden extending across the tops of all three pits. The degree of overlap in radiocarbon dates from samples in the middens overlying F.4 and F.148 (see Chapter 2) suggests that, even if they are not the same midden, they were deposited around the same time. These overlying midden(s) generally contain high artifact densities and have been interpreted as rapid deposition from one or more large gatherings in the plaza (Graham et al. 2019; Kassabaum 2018). To the southwest of the pit complex, the other three samples represent material from the borrow pit. The majority of the borrow pit consisted of basketloaded fill, although the very bottom contained the midden that is analyzed here.

FEATURE 4 MIDDEN. I analyzed four samples representing 65 liters of floated soil from the F.4 midden. This included one 15-liter sample from a stratum designated as plowzone II; this stratum was only identified above a section of the F.4 midden. While plowzone II was technically plowed midden soil, it was distinguished from the regular plowzone stratum above it based on the appearance of very minimal disturbance. I chose to include this sample due to a desire avoid losing any potential information about the midden; if there had been any indication of more recent archaeological intrusions, I would have excluded the sample from consideration. *In situ* pot breaks and intact pottery piles observed during excavation indicated material was directly deposited in this area (Graham et al. 2019). The analyzed botanical simples show this midden also has a high density of charred remains (0.58 g/liter) and the highest standardized counts of nut and seed remains from any deposit at the site (24.86 fragments/liter).

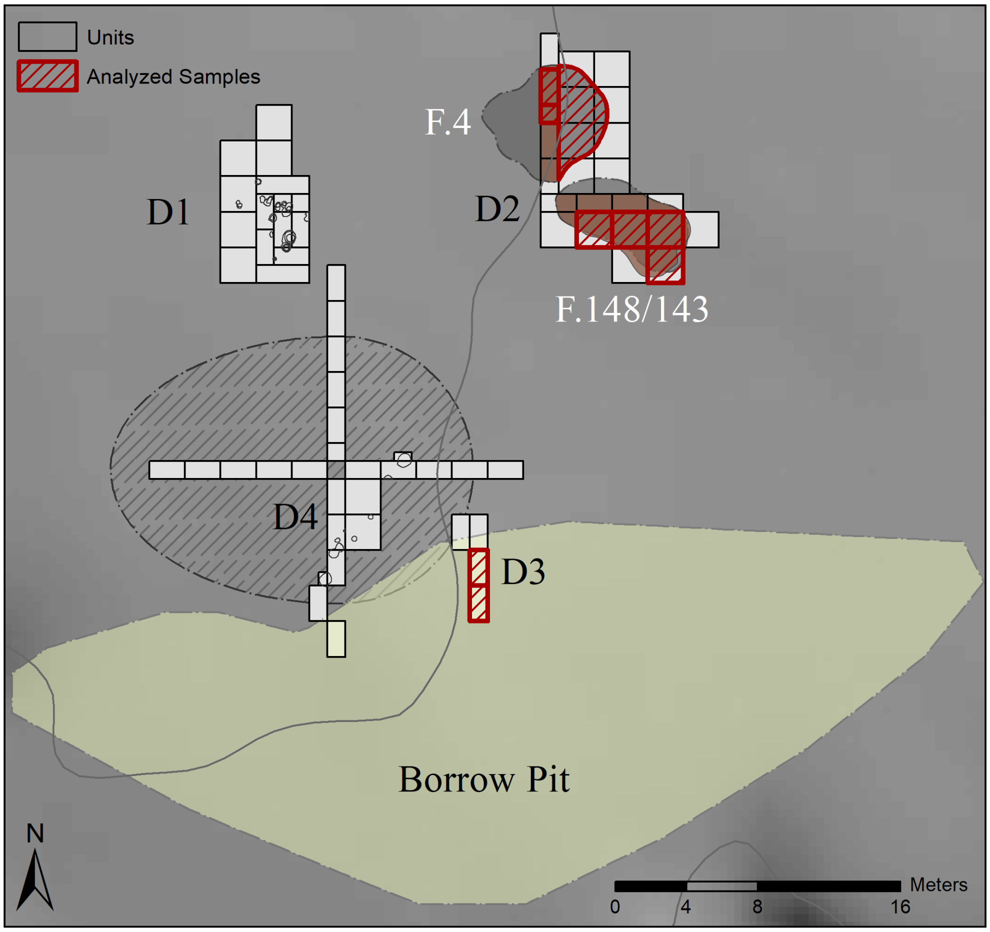

Figure 4.1. Map of South Plaza highlighting locations of analyzed flotation samples.

The density of plant remains in the F.4 midden is driven by the recovery of an incredibly high amount of acorn (Table 4.3). The 888 fragments recovered represent a standardized count that is almost seven times higher than that of the associated thick-shelled hickory remains (2.05 fragments/liter), despite the much higher likelihood of thick-shelled hickory carbonizing and surviving. This very strongly suggests that acorns were shelled on site, with shells thrown into the fire after the nutmeats were extracted. The F.4 midden also contains the highest standardized counts of amaranth on site, along with correspondingly high standardized counts of maygrass and little barley. Three seeds of well-preserved Type X were identified (one complete and two fragmentary seeds), indicating that this probable domesticate made its way down to southeastern

Table 4.3. Plants identified in overlying midden in the South Plaza.

	F.4		F.148	
Taxon	**Ct**	**Std Ct**	**Ct**	**Std Ct**
Nuts				
Acorn (*Quercus* sp.)	888	13.66	31	0.34
Acorn Nutmeat (*Quercus* sp.)	6	0.09	3	0.03
Thick Hickory (*Carya* sp.)	133	2.05	30	0.33
Thin Hickory (*Carya* sp.)	12	0.18	4	0.04
Walnut (*Juglans nigra*)	1	0.02	1	0.01
Starchy and Oily Seeds				
Amaranth (*Amaranthus* sp.)	46	0.71	-	-
Amaranth/Chenopod (*Amaranthus/Chenopodium* sp.)	9	0.14	-	-
Chenopod (*Chenopodium* sp.)	38	0.58	24	0.27
Maygrass (*Phalaris caroliniana*)	79	1.22	24	0.27
Knotweed (*Polygonum* sp.)	8	0.12	8	0.09
Little Barley (*Hordeum pusillum*)	66	1.02	2	0.02
Type X	3	0.05	-	-
Squash Rind cf. (*Cucurbita/Lagenaria* sp.)	-	-	1	0.01
Fleshy Fruits				
Bramble (*Rubus* sp.)	16	0.25	3	0.03
Grape (*Vitis* sp.)	5	0.08	2	0.02
Maypop (*Passiflora incarnata*)	2	0.03	-	-
Hackberry (*Celtis* sp.)		-	1	0.01
Persimmon (*Diospyros virginiana*)	3	0.05	-	-
Cabbage Palm (*Sabal minor*)	9	0.14	-	-
Stone Fruit (*Prunus* sp.)	1	0.02	1	0.01
Other				
Smartweed (*Polygonum* sp.)	1	0.02	-	-
Pokeweed (*Phytolacca americana*)	1	0.02	2	0.02
Purslane (*Portulaca* sp.)	19	0.29	21	0.23
Bedstraw (*Galium* sp.)	3	0.05	-	-
Geranium (*Geranium* sp.)	21	0.32	-	-
Mustard (*Brassica* sp.)	5	0.08	-	-
Bindweed family (*Convulvus* sp.)	1	0.02	-	-
Grass Family (Poaceae)	5	0.08	-	-
Unidentified Seed	1	0.02	11	0.12
Unidentifiable Seed	233	3.58	47	0.52
Total Samples Analyzed	*4*		*9*	
Total Liters Floated	*65*		*90*	

Mississippi by AD 900 (Figure 4.2). Six different species of fleshy fruits were identified, including bramble, grape, persimmon, cabbage palm, maypop, and stone fruit.

Lastly, miscellaneous species recovered include smartweed, pokeweed, mustard, purslane, bedstraw, bindweed, and geranium. Many of these taxa could be weedy inclusions in this deposit. However, the fact that nearly all of these plants have medicinal uses makes this aggregation of taxa rather conspicuous and suggests that they were incorporated as a result of intentional activities.

FEATURE 148 MIDDEN. While the midden overlying F.148 is also a primary deposit, despite the flotation and analysis of 90 liters of soil, the plant remains are quite sparse (see Table 4.3). The total density of charcoal is only 0.07 g/liter, while the nut and seed density is only 2.4 fragments/liter, meaning that very little charcoal or other charred plant material was deposited here (Figure 4.3). As a result, plants from this area of the midden are not easily compared to other contexts, though they are representative of plant use at Feltus in a broad sense.
Identified nuts included acorn, thick- and thin-shelled hickory, and walnut. All of the starchy EAC crops were present, with chenopod and maygrass predominating and smaller amounts of knotweed and little barley also represented. One fragment of possible squash rind was recovered, which could represent the use of squash as an oily seed, consumption of the rind, or use of the plant as a utensil. Small numbers of fruit were identified (bramble, grape, hackberry and a stone fruit), as well as some pokeweed and purslane. With 31 seeds, purslane was the most conspicuous of the miscellaneous taxa, with a standardized count similar to that of chenopod and maygrass. Given the comparatively high seed density and likely fall seasonality of this deposit

Figure 4.2. Type X seeds recovered from the midden overlying Feature 4.

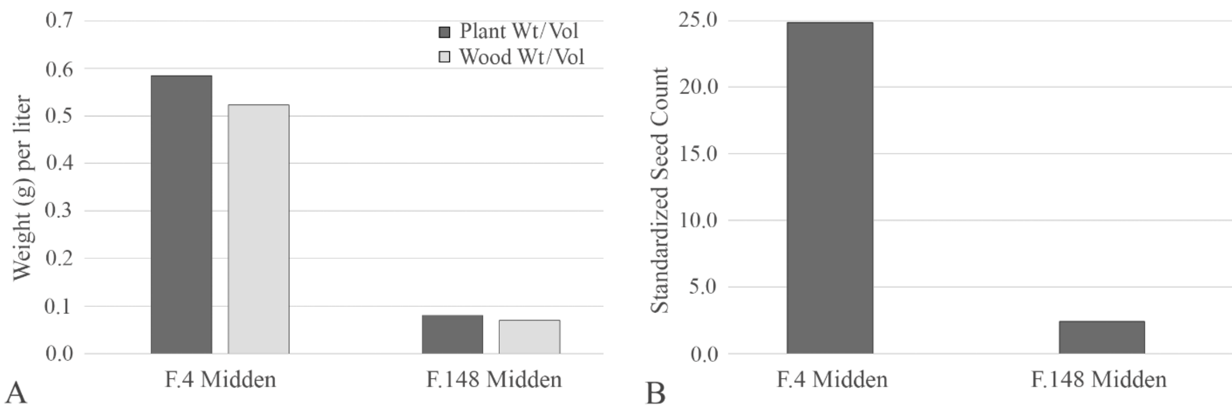

Figure 4.3. Density of plant remains recovered from both areas of the South Plaza midden. (A) Comparison of plant and wood charcoal density. (B) Comparison of standardized seed counts.

(see Chapter 5), the purslane most likely represents stored seeds that were included as a starchy addition to a meal.

With such low overall plant densities, it is difficult to make any specific interpretations about the plant remains recovered from the F.148 midden. However, the fact that EAC grains appear is good evidence that their use at the site was consistent. While the standardized counts of acorn and thick-shelled hickory are similar, the fact that acorn is still higher, despite its fragility, may also suggest that there was a slight preference for starchy dishes over hickory oil/butter in the plaza.

FEATURE 4 UPPER PIT ZONES. The Feature 4 upper pit, described in Chapter 2, consists of multiple zones of intentionally-deposited cultural material. Identified zones that correspond to the upper pit include Zones B, B/C, C, D, and E. The boundary between zones D and E were difficult to discern during excavation, leading to an ambiguous Zone D/E designation; while one botanical sample was processed and analyzed, because it combines two zones it is not singled out in discussion here. Zone F was another cautious designation that related to discerning the edges of the pit; after excavation it was determined that this zone consisted of intense insect activity around the outer edges of the pit that made the edges more difficult to discern (mottled pit fill and subsoil). Extremely low plant recovery from this sample helps confirm that interpretation. A combined nineteen flotation samples representing 245 liters of soil from the upper pit zones are described here (Table 4.4). Artifact content varies by zone, but overall is increased in comparison to the lower pit zones (Zones 1, 2, and 3) (Figure 4.4). This cultural activity is reflected in the density of plant material, with higher amounts focused around Zones B/C, C, and D. Plant densities in Zone E are so low that it is excluded from further discussion here.

The density of plant remains from Zone B is not particularly high, but it nevertheless contains a good range of taxa. All of the typical nuts were recovered, including acorn, thick- and thin-shelled hickory and walnut, with acorn present in much higher numbers than thick-shelled hickory. The primary EAC grains were present (chenopod, maygrass, knotweed, and little barley), with chenopod and maygrass exhibiting the highest densities. I identified one fragment of squash rind, as well as seeds from bramble and grape. A number of miscellaneous taxa were present, including morning glory, pokeweed, and geranium. Taken together, while this zone is not distinguished by high densities of plant remains, the overall makeup of taxa appears similar to that of the overlying midden.

Table 4.4. Plants identified in upper pit fill zones in the South Plaza.

	F.4								F.148					
	Zone B		Zone B/C		Zone C		Zone D		Zone D		Zone E		Zone F	
Taxon	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**
Nuts														
Acorn (*Quercus* sp.)	51	1.28	10	1.00	344	3.62	67	1.12	-	-	1	0.10	-	-
Acorn Nutmeat (*Quercus* sp.)	-	-	23	2.30	2	0.02	3	0.05	-	-	-	-	-	-
Thick Hickory (*Carya* sp.)	12	0.30	-	-	376	3.96	122	2.03	5	0.25	-	-	-	-
Thin Hickory (*Carya* sp.)	4	0.10	-	-	33	0.35	17	0.28	-	-	-	-	-	-
Walnut (*Juglans nigra*)	1	0.03	-	-	7	0.07	16	0.27	2	0.10	-	-	-	-
Starchy and Oily Seeds														
Maize cupule *(Zea mays)*	-	-	-	-	1	0.01	-	-	-	-	-	-	-	-
Amaranth (*Amaranthus* sp.)	-	-	1	0.10	19	0.20	4	0.07	-	-	-	-	-	-
Amaranth/Chenopod (*Amaranthus*/*Chenopodium* sp.)	-	-	-	-	6	0.06	7	0.12	-	-	-	-	-	-
Chenopod (*Chenopodium* sp.)	10	0.25	2	0.20	13	0.14	62	1.03	12	0.60	4	0.40	1	0.05
Maygrass (*Phalaris caroliniana*)	26	0.65	4	0.40	82	0.86	45	0.75	3	0.15	4	0.40	1	0.05
Knotweed (*Polygonum* sp.)	3	0.08	4	0.40	18	0.19	8	0.13	97	4.85	26	2.60	7	0.35
Knotweed Family (Polygonaceae)	-	-	-	-	-	-	-	-	1	0.05	-	-	-	-
Little Barley (*Hordeum pusillum*)	5	0.13	-	-	3	0.03	-	-	-	-	-	-	-	-
Sumpweed *(Iva annua)*	-	-	-	-	8	0.08	2	0.03	-	-	-	-	-	-
Sunflower *(Helianthus annuus)*	-	-	-	-	1	0.01	-	-	-	-	-	-	-	-
Squash Rind (*Cucurbita*/*Lagenaria* sp.)	1	0.03	-	-	5	0.05	-	-	-	-	-	-	-	-
Fleshy Fruits														
Bramble (*Rubus* sp.)	2	0.05	-	-	4	0.04	-	-	-	-	-	-	-	-
Grape (*Vitis* sp.)	1	0.03	-	-	33	0.35	7	0.12	1	0.05	-	-	-	-
Hackberry *(Celtis* sp).	-	-	-	-	3	0.03	-	-	-	-	-	-	-	-
Elderberry *(Sambucus* sp).	-	-	3	0.30	-	-	1	0.02	2	0.10	-	-	-	-
Persimmon (*Diospyros virginiana*)	-	-	-	-	6	0.06	10	0.17	-	-	-	-	-	-
Cabbage Palm (*Sabal minor*)	-	-	-	-	7	0.07	1	0.02	-	-	-	-	-	-

Table 4.4. Continued.

	F.4								F.148					
	Zone B		Zone B/C		Zone C		Zone D		Zone D		Zone E		Zone F	
Taxon	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**
Other														
Morning Glory (*Ipomoea* sp.)	2	0.05	-	-	1	0.01	-	-	-	-	-	-	-	-
Knotweed/Smartweed (*Polygonum* sp.)	-	-	-	-	2	0.02	-	-	-	-	-	-	-	-
Pokeweed (*Phytolacca americana*)	1	0.03	1	0.10	16	0.17	4	0.07	-	-	-	-	-	-
Purslane (*Portulaca* sp.)	4	0.10	14	1.40	71	0.75	115	1.92	1	0.05	9	0.90	1	0.05
Nightshade (*Solanum* sp.)	1	0.03	-	-	4	0.04	-	-	1	0.05	-	-	-	-
Poison Ivy (*Toxicodendron radicans*)	-	-	-	-	-	-	1	0.02	-	-	-	-	-	-
Bedstraw (*Galium* sp.)	5	0.13	-	-	1	0.01	-	-	-	-	-	-	-	-
Copperleaf (*Acalypha* sp.)	-	-	-	-	2	0.02	-	-	-	-	-	-	-	-
Geranium (*Geranium* sp.)	2	0.05	-	-	2	0.02	-	-	-	-	-	-	-	-
Spurge (Euphorbiaceae)	-	-	-	-	1	0.01	-	-	-	-	-	-	-	-
Grass Family (Poaceae)	2	0.05	-	-	1	0.01	-	-	-	-	-	-	-	-
Unidentified Seed	1	0.03	3	0.30	6	0.06	3	0.05	-	-	3	0.30	-	-
Unidentifiable Seed	49	1.23	24	2.40	101	1.06	46	0.77	71	3.55	23	2.30	11	0.55
Total Samples Analyzed	*2*		*1*		*9*		*4*		*2*		*2*		*1*	
Total Liters Floated	*40*		*10*		*95*		*60*		*20*		*20*		*10*	

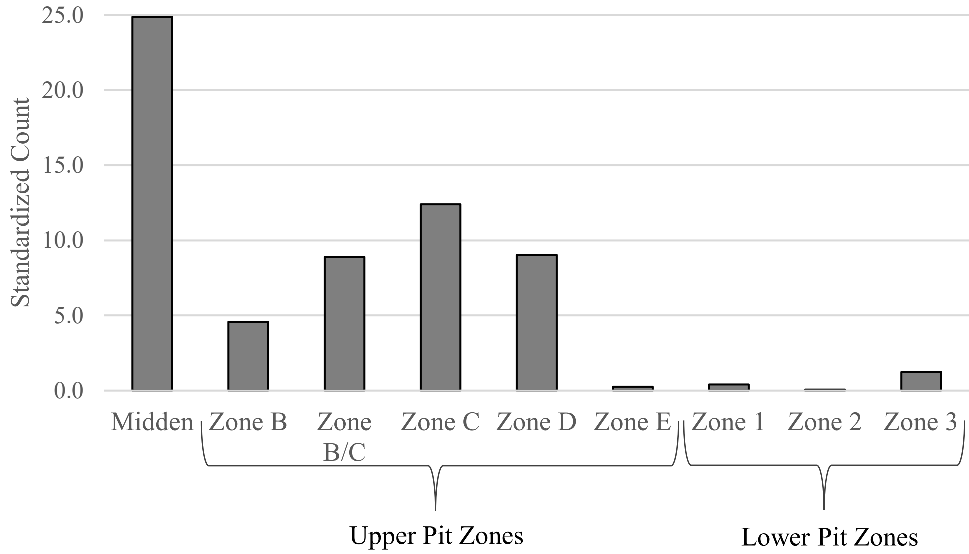

Figure 4.4. Comparison of standardized seed counts for all F.4 contexts: midden, upper pit zones, and lower pit zones.

The subsequent Zone B/C was identified in the field as a discrete lens of fired clay and charcoal at the intersection of Zones B and C. The flotation sample taken from this lens stands out due to the unusual presence of acorn nutmeats; while the absolute numbers are small (23 specimens), the remains consist of mostly intact nutmeat halves. Small amounts of other seeds are also present, including chenopod, maygrass, erect knotweed, elderberry, pokeweed, and purslane. Despite being a small deposit and only being a 10-liter float sample, standardized counts of nuts and seeds total a high 8.90 fragments per liter.

The highest standardized counts of plants in the F.4 upper pit zones were from Zone C (12.41 fragments/liter). Overall, this zone is taxonomically rich (29 species), which may be a function of both the high amount of charred material (1 g/liter) and the increased volume of material floated (95 liters). Zone C was characterized by a roughly even split and high density of acorn and thick-shelled hickory (Figure 4.5), and comparatively high densities of maygrass, grape, sumpweed, pokeweed, and purslane. This zone also stood out because it contained a number of potentially medicinal or ritual plants, including a morning glory seed (*Ipomoea* sp.),

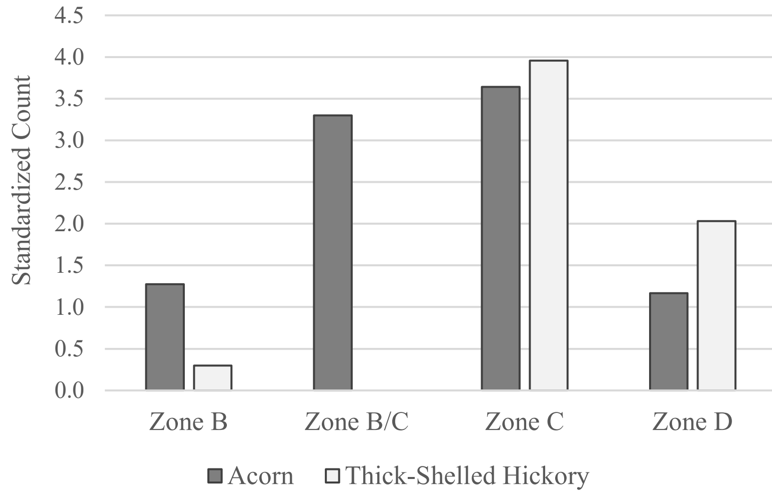

Figure 4.5. Comparison of nutshell identified from F.4 upper pit zones.

four seeds from the nightshade family (Solanaceae), bedstraw, copperleaf, geranium, and spurge. The identification of multiple plants with potential medicinal and ceremonial uses may support the idea that some of the other seeds like pokeweed and purslane were also being used medicinally or ceremonially.

Zone D is the only other zone that had a particularly high density of plant remains, at 9.03 fragments per liter. Nut remains in this zone are reversed, with thick-shelled hickory present in nearly twice the numbers of acorn (see Figure 4.5). Zone D contains the highest standardized counts of chenopod in the upper pit zones (Figure 4.6, 1.03 seeds/liter), while also containing nearly the entire suite of other EAC seeds (maygrass, erect knotweed, and sumpweed). Of the miscellaneous plant remains present, the two that stood out were purslane and poison ivy. Zone D contained the highest density of purslane seeds at the site (1.92 seeds/liter). Without knowing the seasonality of this deposit, it is possible that the seeds managed to blow their way into the ashes of a hearth. However, given the large number of seeds, it seems much more likely that the seeds were being parched and/or they had been brought to the site and were in the process of being included as part of a dish. The other particularly interesting seed in Zone D is poison ivy.

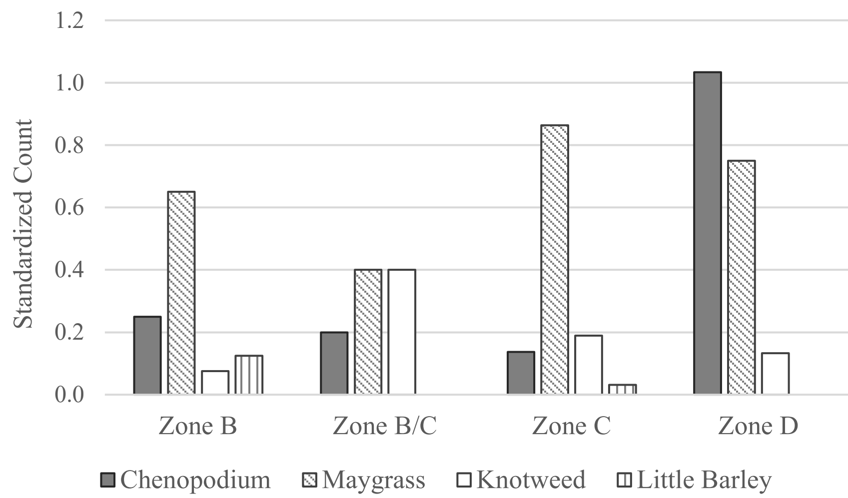

Figure 4.6. Comparison of starchy seed counts from F.4 upper pit fill zones.

While not a seed that would immediately come to mind as being useful, it is unlikely poison ivy would have accidentally been included in a deposit. Based on the uses described above, it was most likely utilized ritually and/or medicinally. Given that some people are immune to urushiol (though they may develop an allergy over time), the ceremonial consumption or use of poison ivy may have been a special event in and of itself.

To reiterate, the deposits that make up the F.4 upper pit show variable plant patterns between each zone (Figure 4.7). Zones B and B/C indicate meals or activities prioritizing starchy acorn, Zone C has an almost even density of starchy acorn and oily thick-shelled hickory, and Zone D is the only deposit for which thick-shelled hickory predominates over acorn. Similarly, grain seeds remain and increase in predominance as we go back in time, to the point that in Zone D there is a slightly higher density of grain seeds than either acorn or thick-shelled hickory. Within each zone, there is also variability in which grain seed predominates. Maygrass is consistently present across all samples, predominating in Zones B and C, and still remains comparatively high in Zone D. Chenopod is also consistently present, though at lower levels in all but Zone D, in which it is the dominant grain seed. Knotweed is present to varying degrees in

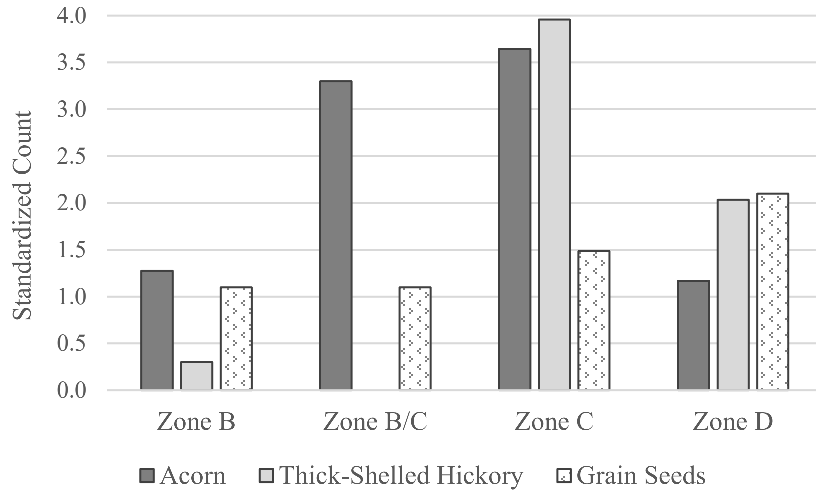

Figure 4.7. Standardized counts of acorn, thick-shelled hickory, and small grain seeds within F.4 upper pit fill zones.

each sample, though in the interesting B/C lens it peaks in the same density as maygrass. Little barley is the only EAC grain that does not appear in all the samples, and instead only shows up in small numbers in Zones B and C.

Lastly, there is variation in the numbers and types of taxa grouped under miscellaneous seeds. Zones B and C contain the widest variety of miscellaneous taxa, while Zones B/C and D contain only a few miscellaneous taxa each, though both show increased densities of purslane. Taken together, the upper levels of pit fill (Zones B, B/C, C, and D) show the kinds of variability that might be expected if each deposit represents a different set of activities with their associated dishes and potential ceremonial rites. Within all these activities, however, there is a consistency to the reliance on nuts and EAC seeds as components of dishes and/or ceremonies.

FEATURE 148 UPPER PIT ZONES. The upper pit zones in F.148 mirror those of F.4, with organically enriched soil and increased artifact density. The designation of upper pit zones is applied to Zones D, E, and F; Zones G and H appear to be part of the lower fill zones. As expected for a feature that has multiple fill zones, the plant content of each zone is variable. If all three upper fill zones are combined, they contain a total of 5.74 fragments/liter, ranging from 9.8 fragments/liter in Zone D to 2.10 fragments/liter in Zone F (Figure 4.8). In aggregate, there is a limited range of taxa present in the upper fill zones, which may mean they are related to smaller groups of people and/or a smaller set of activities. The identified plants are typical based on what has already been seen from other deposits at Feltus: small amounts of nutshell, starchy EAC seeds (chenopod, maygrass, and knotweed), and fleshy fruits, and a small number of other plants including purslane and a seed in the nightshade family. What stands out from this deposit are the extremely high standardized counts of knotweed (Figure 4.9). Of the 130 knotweed seeds identified, nearly 75% come from Zone D (97 specimens), while another 20% come from Zone E (26 specimens); these two zones contain the densest remains of knotweed at Feltus. Nearly all of the seeds appear to be erect knotweed; seeds from one sample in Zone D were well enough preserved to determine that a majority are smooth morph, potentially indicating that the seeds were harvested in late fall (Mueller 2017a). Additional work measuring the size of these achenes may indicate if they are from the extinct domesticated variety of erect knotweed, *Polygonum erectum* ssp. *watsoniae*. Given the high numbers of knotweed and low numbers of other material, it seems likely that a large proportion of the unidentifiable seeds are also knotweed fragments.

FEATURE 4 AND FEATURE 148 LOWER PITS. As described above, the F. 4 and F. 148 pits share many characteristics, one of which is a series of lower pit fill zones that appear to be erosional in origin. This impression is confirmed not only by the very small number of artifacts recovered from the lower zones, but also by the limited plant remains. Because both the F. 4 and F. 148 lower pits have such sparse plant recovery and appear to be the result of similar events, I

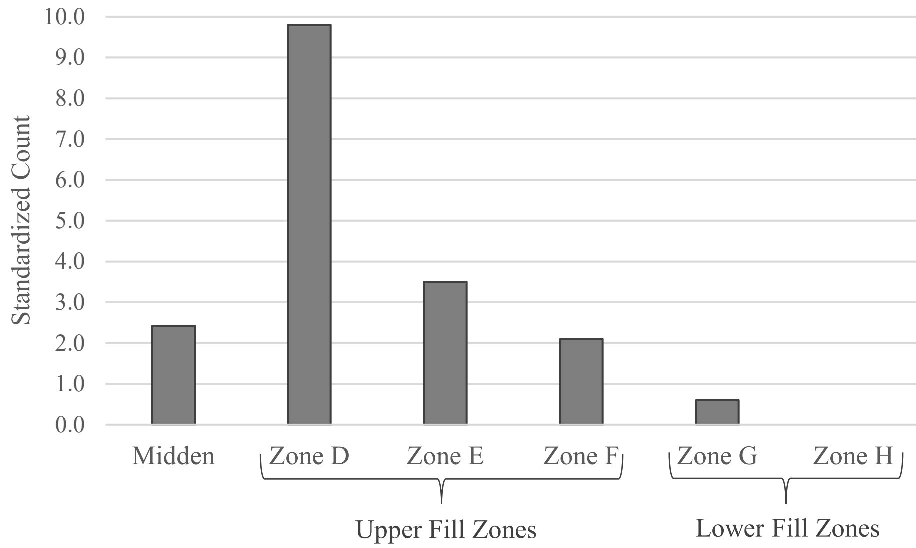

Figure 4.8. Comparison of standardized seed counts for all F.148 contexts: midden, upper pit zones, and lower pit zones.

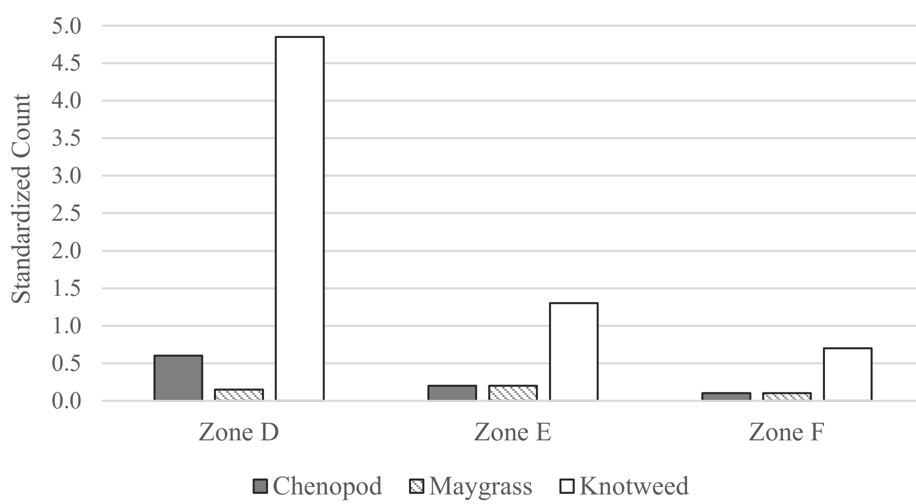

Figure 4.9. Comparison of starchy seed counts from F.148 upper pit fill zones.

combine them here for purposes of discussion; in total, six samples representing 105 liters of soil were analyzed (Table 4.5).

Very little charcoal or other material was recovered from either lower pit and based on the information above, it seems likely these remains were simply part of other deposits in the surrounding soils that eroded into the pits. The plants that do make an appearance include thin-shelled hickory, chenopod, maygrass, knotweed, and purslane. Because these are secondary deposits, the plant remains cannot be interpreted to any wider degree. However, the recovery of small numbers of starchy seeds even within these zones deposits does speak to the continuity of their use at Feltus.

BORROW PIT MIDDEN. Described in detail in Chapter 2, the borrow pit was excavated in two different areas; plant remains from the 2012 excavations were examined here (see Figure 4.1). Three samples consisting of 30 liters of fill were analyzed, representing 48.75 g of plant material. Although not analyzed here, a 20-liter sample was taken from another area of the midden in 295R465. This sample would provide an interesting counterpoint to the material presented here, particularly given the differing radiocarbon dates from each area of the borrow pit (see Chapter 2).

The plant remains recovered from the borrow pit are intriguing (Table 4.6), as they contain a high density of wood charcoal remains (1.62 g/liter) along with a low density of nut and seed remains (.003 g/liter and 3.73 fragments/liter). Small amounts of acorn nutshell were consistently identified in all three samples, though no thick-shelled hickory was present. Small starchy and oily seeds included chenopod, maygrass, knotweed, and sumpweed, while fruits

Table 4.5. Plants identified in lower pit zones in the South Plaza.

	F.4						F.148			
	Zone 1		Zone 2		Zone 3		Zone G		Zone H	
Taxon	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**	**Ct**	**Std Ct**
Nuts										
Thin Hickory (*Carya* sp.)	-	-	-	-	-	-	1	0.03	-	-
Starchy and Oily Seeds										
Chenopod (*Chenopodium* sp.)	1	0.07	1	0.03	3	0.10	-	-	-	-
Maygrass (*Phalaris caroliniana*)	-	-	-	-	16	0.53	4	0.13	-	-
Knotweed (*Polygonum* sp.)	-	-	-	-	1	0.03	2	0.07	-	-
Other										
Purslane (*Portulaca* sp.)	-	-	-	-	6	0.20	2	0.07	-	-
Unidentified	4	0.27	-	-	-	-	-	-	-	-
Unidentifiable Seed	1	0.07	1	0.03	11	0.37	3	0.10	-	-
Total Samples Analyzed	*1*		*1*		*1*		*2*		*1*	
Total Liters Floated	*15*		*30*		*30*		*20*		*10*	

Table 4.6. Plants identified in the South Plaza borrow pit midden.

Taxon	**Ct**	**Std Ct**
Nuts		
Acorn (*Quercus* sp.)	46	1.53
Starchy and Oily Seeds		
Chenopod (*Chenopodium* sp.)	11	0.37
Maygrass (*Phalaris caroliniana*)	4	0.13
Knotweed (*Polygonum* sp.)	11	0.37
Sumpweed *(Iva annua)*	3	0.10
Fleshy Fruits		
Bramble (*Rubus* sp.)	2	0.07
Other		
Prickly Poppy (*Argemone* sp.)	1	0.03
Purslane (*Portulaca* sp.)	1	0.03
Composite Family (Compositae)	2	0.07
Unidentified seed	3	0.10
Unidentifiable seed	28	0.93
Total Samples Analyzed	*3*	
Total Liters Floated	*30*	

were represented by a small number of bramble seeds. Seeds in the Miscellaneous category include two seeds that could only be identified to the Compositae family (flowering plants that include asters, daisies, and sunflowers), one purslane seed, and one prickly poppy seed. Prickly poppy seed is particularly notable it has multiple medicinal and ritual uses, but is not otherwise recorded as a component of daily consumption (Moerman 2003).

Though it is difficult to interpret the activities that introduced these remains to the archaeological record, the acorn nutshell and EAC seeds indicate a consistent tradition of consumption as part of all site activities, while the prickly poppy and extremely high densities of charcoal may be an indication that the activities involved in depositing this basal borrow pit midden were somewhat different than other contexts at the site. The fact that there may be different activities occurring as part of the filling of the borrow pit makes this deposit an interesting location for future excavations.

Mound B

Excavation of the last two episodes of mound construction on Mound B have provided a number of flotation samples for analysis. As described in Chapter 2, evidence for multiple buildings was uncovered below the fifth mound stage (B.S5). Twelve flotation samples were taken from the excavated wall trenches and one posthole; all of these were analyzed and are treated together as one assemblage. Excavations of the next-to-last mound stage (B.S4) revealed a thick midden on the southern end of the mound; three samples taken from this deposit are also analyzed here.

STAGE 5 (B.S5). Flotation samples taken from B.S5 during the 2018 field season included one sample from what turned out to be two posts (F.236), and eleven samples from wall-trench fills (F.186, F.203, F.209, F.216, and F.217) (see Figure 4.10). These 12 flotation samples represent a combined 119 liters of soil with 14.81 g of plant material. The low wood density (0.12 g/liter) and nutshell/seed density (2.80 fragments/liter) provide useful confirmation of the fact that the feature fill consists of secondary material initially deposited elsewhere.

The specific plant components of the feature fill, however, include some unusual material which may indicate that the origins of the fill are from special meals (Table 4.7). Two conspicuous grain seeds include a probable fragment of Type X grass and three fragments of wild rice. As stated previously in this chapter, Type X is an unusual find this far south in the LMV and it is difficult to know if only the seeds were making their way to the area (via movement of people or down-the-line trade) or if the plants were being grown in local gardens. Wild rice is also extremely unusual; while it grows in the southeastern U.S., nearby archaeological finds have been limited to Graveline, an early Late Woodland mound site on the coast of Mississippi; Bottle Creek, a Mississippian mound site in coastal Alabama; and Moundville, another extensive Mississippian mound site in central Alabama (Peles and Scarry 2015a). Jackson et al. (2016:228) suggest that recovery of wild rice at such limited locations and in low densities indicates that it was a plant restricted to ritual or elite meals. This supports the idea that the wild rice found as part of the feature fill on B.S5 may have originated as part of special meals consumed on top of the mound.

Seven maize kernels and seven cupules were also identified in wall trench fills. With the Gordon/Anna phase radiocarbon date and the rectangular structures, maize is an expected find because this is a period of time when maize becomes a staple crop in LMV diets (Fritz 2008a).

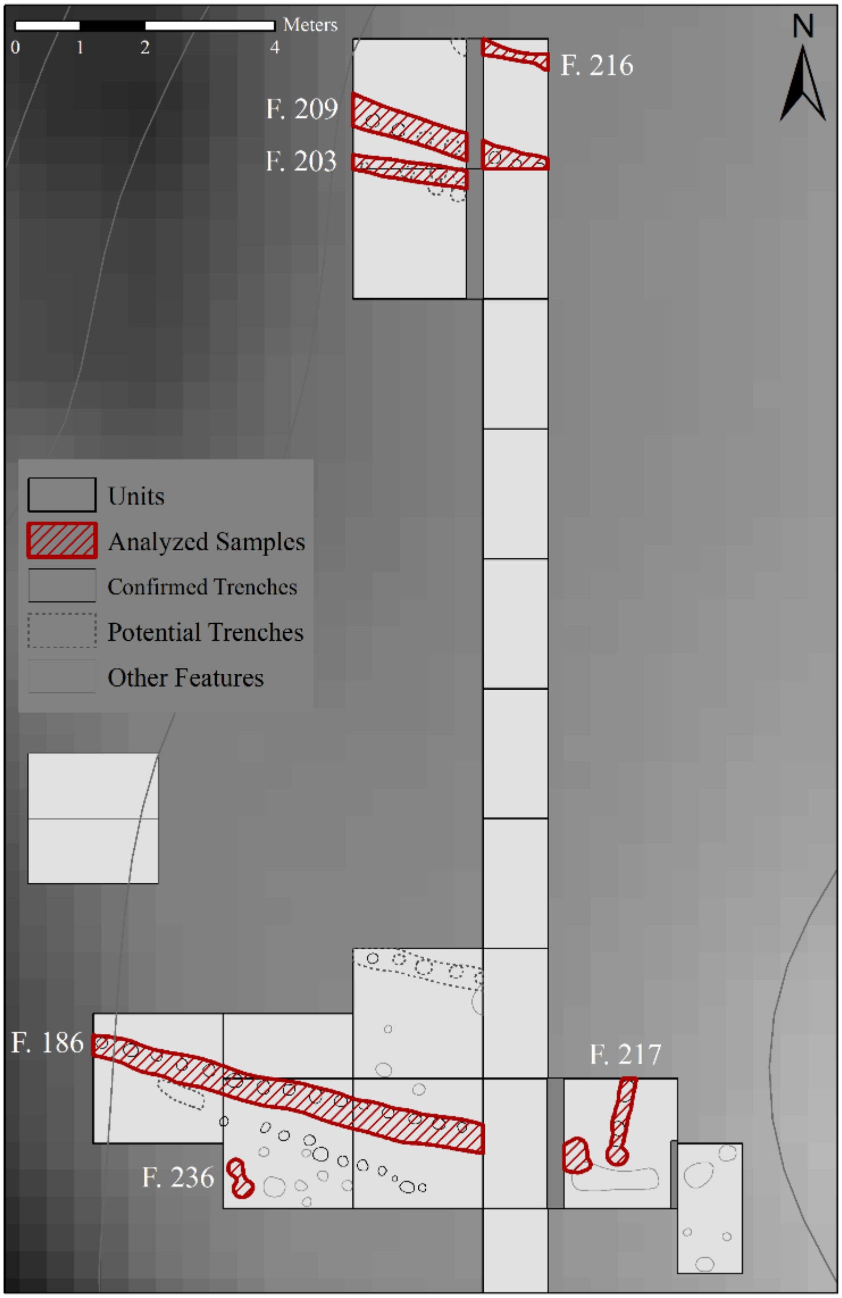

Figure 4.10. Map of Mound B Stage 5, highlighting locations of analyzed flotation samples.

Table 4.7. Plants identified in the Mound B summit features.

	B.S5		B.S4	
Taxon	**Ct**	**Std Ct**	**Ct**	**Std Ct**
Nuts				
Acorn (*Quercus* sp.)	101	0.85	61	2.10
Acorn Nutmeat (*Quercus* sp.)	1	0.01	9	0.31
Thick Hickory (*Carya* sp.)	23	0.19	116	4.00
Thin Hickory (*Carya* sp.)	3	0.03	1	0.03
Walnut (*Juglans nigra*)	1	0.01	1	0.03
Starchy and Oily Seeds				
Maize kernel *(Zea mays)*	7	0.06	-	-
Maize cupule *(Zea mays)*	7	0.06	-	-
Amaranth (*Amaranthus* sp.)	1	0.01	-	-
Amaranth/Chenopod (*Amaranthus*/*Chenopodium* sp.)	2	0.02	-	-
Chenopod (*Chenopodium* sp.)	7	0.06	183	6.31
Maygrass (*Phalaris caroliniana*)	71	0.60	71	2.45
Knotweed (*Polygonum* sp.)	3	0.03	16	0.55
Little Barley (*Hordeum pusillum*)	1	0.01	-	-
Wild Rice cf. (*Zizania aquatica*)	3	0.03	-	-
Type X cf.	1	0.01	-	-
Sumpweed (*Iva annua*)	-	-	4	0.14
Squash Rind (*Cucurbita*/*Lagenaria* sp.)	3	0.03	-	-
Fleshy Fruits				
Bramble (*Rubus* sp.)	2	0.02	-	-
Grape (*Vitis* sp.)	7	0.06	7	0.24
Cabbage Palm (*Sabal minor*)	1	0.01	-	-
cf. Sumac (*Rhus* sp.)	-	-	1	0.03
Other				
Pokeweed (*Phytolacca americana*)	1	0.01	-	-
Purslane (*Portulaca* sp.)	4	0.03	2	0.07
Vetch (*Vicis* sp.)	1	0.01	-	-
Legume (*Phaseolus* sp.)	1	0.01	-	-
Nightshade *(Solanum* sp.)	1	0.01	-	-
Bedstraw (*Galium* sp.)	-	-	1	0.03
Barnyard grass (*Echinochloa* sp.)	1	0.01	-	-
Spurge (Euphorbiaceae)	1	0.01	-	-
Grass Family (Poaceae)	3	0.03	1	0.03
Unidentified Seed	8	0.07	2	0.07
Unidentifiable Seed	67	0.56	160	5.52
Total Samples Analyzed	*12*		*3*	
Total Liters Floated	*119*		*29*	

However, a number of researchers have suggested that the initial introduction of maize into certain regions of the Southeast may have been as a ritual food (Fritz 1995, 2000; Scarry 1993; VanDerwarker et al. 2017). While we would expect maize to be a regular component of LMV botanical assemblages by AD 1200 (Fritz 1995, 2008a, 2009), that would not necessarily preclude continued use as a ritual or feasting food in contexts like mound-top gatherings.

Three additional plants within the miscellaneous category were nightshade, spurge, and barnyard grass. While the nightshade recovered from Feltus is not identified further, it could have been from a plant commonly consumed as food (i.e., ground cherry) or used medicinally/ritually (i.e., black nightshade). Many plants within the Solanaceae family are pharmacologically active, making it a strong possibility that this could represent a ceremonial plant (Williams 2000). One seed from the spurge family was also identified; while spurge is typically seen as a weedy, accidental inclusion, Williams (2000:122) argues it should be considered a possible medicinal plant. Barnyard grass does not have any known medicinal uses, but is an interesting plant in this context as it is a starchy seed that is suspected of being at least managed, if not ultimately domesticated. While only one seed is identified here, the recovery of numerous seeds at the Hedgeland site, for example, provides more evidence for its possible inclusion as a consumed resource (Ryan and Roberts 2003).

STAGE 4 FLANK MIDDEN (B.S4). The Mound B midden associated with the fourth stage (B.S4) represents a primary deposit located at the southern edge of the summit (roughly one meter below Stage 5). As shown in Figure 2.6 (Chapter 2), the midden appears to have at least two zones, although this was not apparent during excavation so material was collected together as one zone.

Despite a small amount of floated material (29 liters of soil), the B.S4 midden contains the highest overall density of plant remains at the site (21.93 fragments/liter). While the absolute numbers shown may seem small in comparison with other deposits discussed (636 total seed and nut remains), the patterns from this midden are quite strong (Table 4.7). Nut remains in this deposit reverse the pattern seen previously in the F.4 midden; here, thick-shelled hickory is roughly 1.6 times as prevalent as acorn nutshell. Starchy and oily seeds include chenopod, maygrass, knotweed, and sumpweed (Figure 4.11). Both chenopod and maygrass are represented by a very large number of seeds, representing the highest densities of both at the site (6.31 seeds/liter and 2.45 seed/liter respectively). The remaining fruit and miscellaneous-category seeds (12 seeds) are present in only small numbers, although this is the only deposit other than the Mound A middens that contains remains of sumac (Kassabaum 2014). Sumac can be consumed fresh, or dried and used as a flavoring, but also has many medicinal and ceremonial uses (Moerman 2003; Yanovksy 1936:40-41).

From an overall perspective, the remains of acorn nutshell in the Mound B.S4 midden indicate that at least some nut processing probably occurred on the mound summit. The higher densities of thick-shelled hickory indicate that oil-based dishes were preferred over starchy acorn nutmeats. The remains of other seeds could have two potential origins: either as purposely burned offerings or as cooking accidents. Given their inclusion within the overall midden deposits, cooking accidents seem a more likely possibility, although analysis of potential dedicatory deposits from the related B.S4 stage might shed more light on this interpretation. The restricted area available on the top of mound indicates that food brought up to the summit was for a smaller group of people. If this is the case, then it may help explain why the plant remains, while numerous, are not taxonomically rich. Rather than representing a broad array of consumed

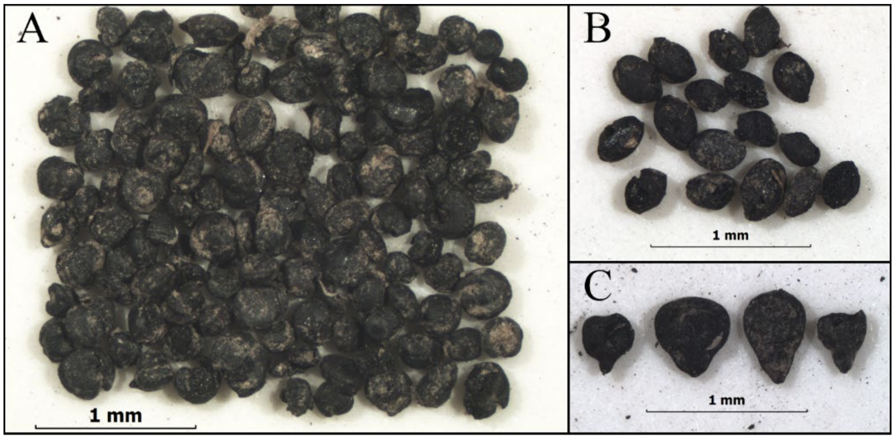

Figure 4.11. Plant remains from the Mound B.S4 midden. (A) chenopod, (B) maygrass, and (C) sumpweed.

plants, this midden may represent charred material from cooking a smaller number of specific dishes. Absent finding an upturned pottery bowl with intact charred remains, the plants identified here may be one of the closest contexts we have at Feltus to the remains of a select one or a few dishes. While there do not appear to be any exclusively medicinal or ceremonial plants, maygrass has been highlighted by Fritz (2014) as a potential ceremonial plant and there is no reason chenopod could not have potent ceremonial connections as well.

Botanical Remains from Mound A

Two additional contexts at Feltus are available for botanical comparison: the Mound A premound midden (A1.S0) and the Mound A flank midden (A2.S0) (see Chapter 2). The Mound A1.S0 midden was formed immediately prior to and sealed over by the first mound stage of Mound A. Based on evidence for extensive use of the premound surface and surfaces within the midden, (Kassabaum 2014:44, 47) interprets this deposit as a comparatively gradual accumulation, though still compatible with feasting. The Mound A2.S0 midden is located at the southwest base of the mound and appears to be associated with the first or second stages of the mound. Lack of internal differentiation and refits of sherds from the top and bottom of the midden indicate that it accumulated rapidly, likely as a part of one single event (Kassabaum 2014:50). Because both Mound A middens are located at ground level, they can both be considered unrestricted deposits; we cannot determine who did or did not have access to them as disposal areas. The full botanical analysis for both contexts was completed by Meg Kassabaum (2014); I used the raw data compiled by Kassabaum here.

At a broad level, taxa richness from the South Plaza, Mound A, and Mound B middens can be compared using Kintigh's DIVERS to account for sample size (Figure 4.12). The results of this analysis indicate that the Mound A1.S0 midden is the only one that contains expected taxa richness. The South Plaza and Mound A2.S0 middens contain increasing fewer taxa than expected, while the Mound B.S4 midden exhibits the least taxa richness. I also compared all three unrestricted deposits to the Mound B.S4 midden using Kintigh's rarefaction routine in order to account for differing sample sizes. When the South Plaza midden was downsampled to Mound BS.4's sample size of 474 specimens and richness of 14 taxa, the former still had greater taxa richness than the latter, with an expected richness of 19 taxa and p value of ≥ 1.000. When the Mound A1.S0 assemblage was downsampled, it had a similar result; it had an expected richness of 22 taxa and p value of ≥ 1.000. Finally, when the Mound A2.S0 assemblage was downsampled, the result was an expected richness of 17 taxa and p value of ≥ 1.000. All of these results indicate that the greater number of taxa in the unrestricted deposits are unlikely to be a function of only greater sample size.

As an unrestricted deposit, the fact that the Mound A1.S0 midden is the only deposit with expected taxa richness supports Kassabaum's (2018) interpretation of the unusual nature of this midden. If this deposit did accumulate over a longer period of time than the other large middens, then perhaps the taxa richness is more reflective of a combination of daily and special meals. An

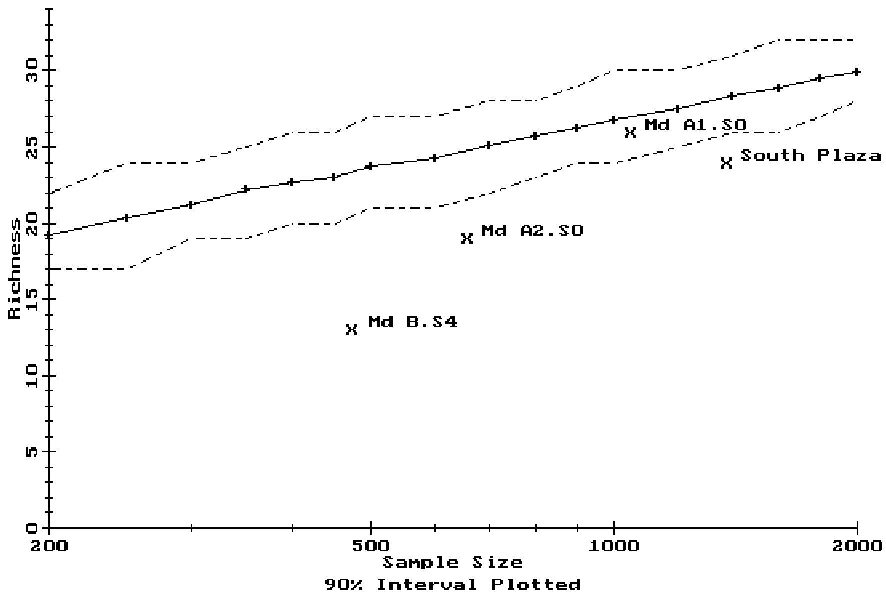

Figure 4.12. Comparison of taxa richness between the South Plaza, Mound A, and Mound B middens.

alternative explanation might be a series of potluck-style contributions that involved less directed organization of dishes, freeing people to contribute a wider array of taxa. The somewhat fewer taxa present in the unrestricted South Plaza and Mound A2.S0 middens may be a result of the rapidity of deposition (Kassabaum 2018); associated reasons may include differing activities and group sizes, or an increase in the level of organization represented in each deposit (organizers requesting particular dishes). The extremely low richness of the Mound B.S4 midden is probably a reflection of the smaller group of people on the mound and a smaller number of consumed dishes.

To more directly compare the Mound A deposits to the South Plaza and Mound B deposits, I focused on similar groupings of plant species: nuts and starchy grains. Though I did not compare them here, it is notable that the Mound A middens contain the highest densities of squash at the site, while the A1.S0 midden has the highest density of fruits. That fruit density is driven by persimmon and cabbage palm, both of which ripen in the fall. Until we know more about the seasonality of this deposit, it is hard to know if this is a fluke of preservation, an indication of different consumption methods, or the preparation of different dishes.

In the Mound A middens, acorn and thick-shelled hickory continue to be the primary nutshell identified. The A1.S0 midden contains a higher proportion of acorn, while the A2.S0 midden contains a higher proportion of thick-shelled hickory (Figure 4.13). This variation is similar to that seen in the South Plaza F.4 upper pit zones, where acorn-to-thick-shelled-hickory ratios were not consistent, and show that different gatherings and activities emphasized different dishes. This indicates that the densities of either nuts go beyond unrestricted/restricted deposits and small/large eating events (as a function of assemblage density), such that the preference for starchy or oily meals crosscuts many axes of comparison.

Grain seeds also provide a useful comparison between the four deposits. I chose to compare the starchy seeds (amaranth, chenopod, maygrass, knotweed, and little barley) rather than the oily seeds because sumpweed and sunflower carbonize under such limited conditions that comparisons did not seem useful. Amaranth only shows increased densities in the A1.S0 and South Plaza middens (Figure 4.14). While this could be a temporal pattern (amaranth utilized earlier in the site's history rather than later), the fact that the South Plaza and A2.S0 middens share so much temporal overlap argues against a temporal dimension. This suggests that amaranth is connected to meal consumption within large public gatherings. Chenopod and maygrass are present to some degree in all of the deposits, though in the highest densities in relation to feasting deposits. The densities of both plants are most exaggerated in the Mound B.S4 midden, suggesting that the dishes they were used in became more closely associated with restricted contexts during the Late Balmoral period.

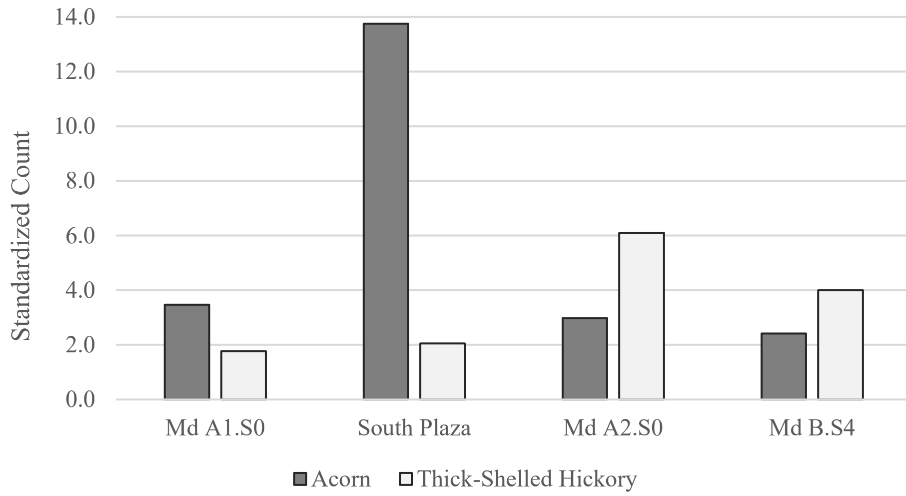

Figure 4.13. Comparison of acorn and thick-shelled hickory densities between deposits in the South Plaza, Mound A, and Mound B.

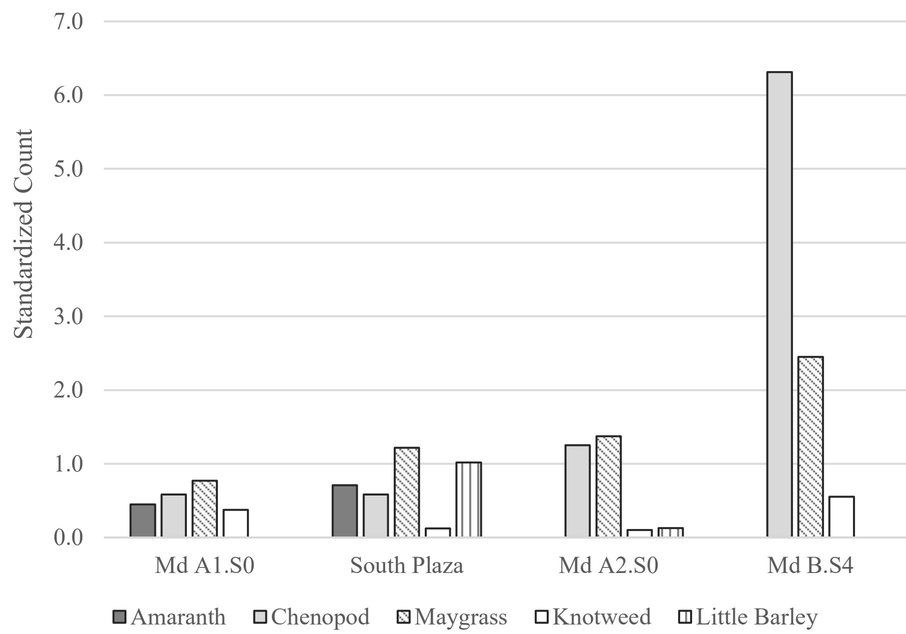

Figure 4.14. Comparison of small starchy seeds from comparable deposits at Feltus.

Plant Use in the Lower Mississippi Valley

Larger regional patterns are visible by examining at contexts from three other sites: Taylor, Hedgeland, and Lake Providence. I focus on three comparisons: broad class categories, nuts, and starchy seeds, all of which are compared using standardized counts (plant count/liters). Beginning with the broad classes, I compared nuts, starchy seeds, and fruits. Focusing more on the general trend rather than the absolute numbers, there was a common pattern within most contexts where nuts contributed the highest densities, starchy seeds came second, and fruits were last (Figure 4.15). Given the previously discussed uses of these plants and their likelihoods of being preserved in the archaeobotanical record, this is not surprising. The contexts that stood out from this pattern were Taylor and the Mound B.S4 midden. Within F.307 at Taylor, the density of starchy seeds was almost equal to that of nuts, while in the Mound B.S4 midden starchy seeds are present in a density 50% greater than that of nutshell. Given the temporal difference between these two deposits (Late Baytown versus Balmoral period, respectively), this is most likely to be a similarity in the activities that produced both deposits. Without information about other artifacts within F.307 at Taylor, it is difficult to speculate about the reasons for this, though the pattern is consistent with trends enumerated by Fritz (2008b), where EAC seeds rise to greater prominence earlier in the temporal sequence in the Bayou-Beouf Basin.

For a more similar temporal comparison, the Mound B.S4 midden pattern *is* very different than Lake Providence, despite the fact that both deposits arose from the activities of a limited group of people. The simplest explanation may be that expressions of difference during the Late to Terminal Woodland are localized; meals related to Mound B at Lake Providence have a different ratio of components, i.e., recipes, than meals consumed on the Mound B summit.

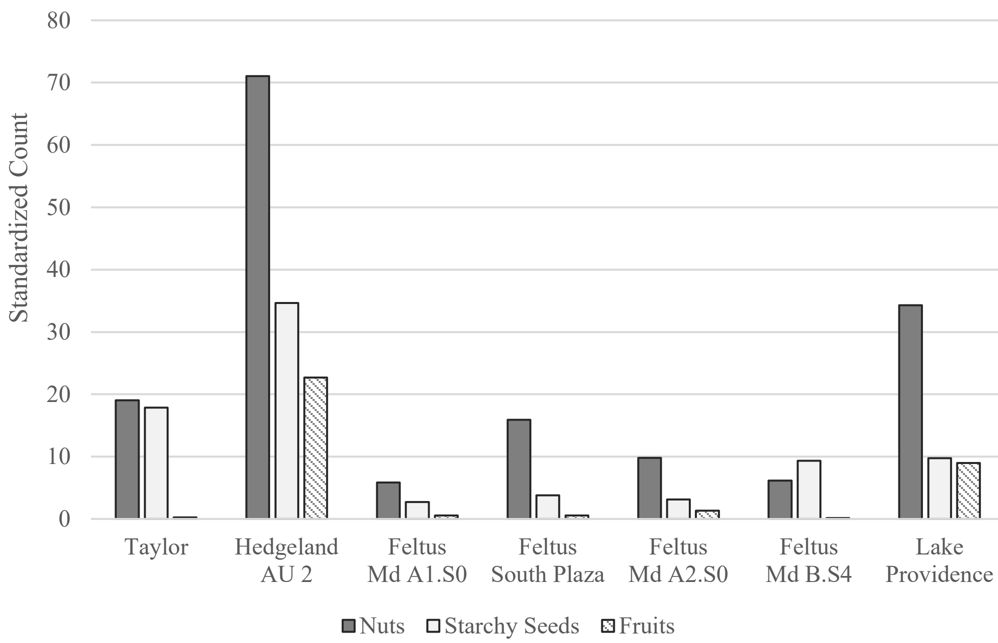

Figure 4.15. Comparison of primary botanical classes at LMV sites, arranged chronologically. Starchy seed counts at Lake Providence includes maize cupules.

In order to understand the variability between and among nut and EAC species, I utilized correspondence analysis (Figure 4.16). Variability in plant assemblages is reflected in the distribution of deposits on the plot, which are not particularly clustered. Most of the variance within the analysis was the result of thick-shelled hickory and chenopod, though a smaller amount came from acorn and maygrass. All of the unrestricted deposits at Feltus fell in the lower half of the biplot, showing their association with either nut and maygrass. The Feltus deposits also fell on a continuum between acorn and thick-shelled hickory, illustrating the increasing preference for hickory oil or milk. At sites in the bottomlands (Hedgeland and Lake Providence), pecans were utilized but never in the densities approached by acorn. It is not clear why this might be the case, although it is possible that at special events the communal labor of acorn processing was highlighted. Another explanation is that pecans were brought to gatherings deshelled, in which case they would not end up in the same deposits.

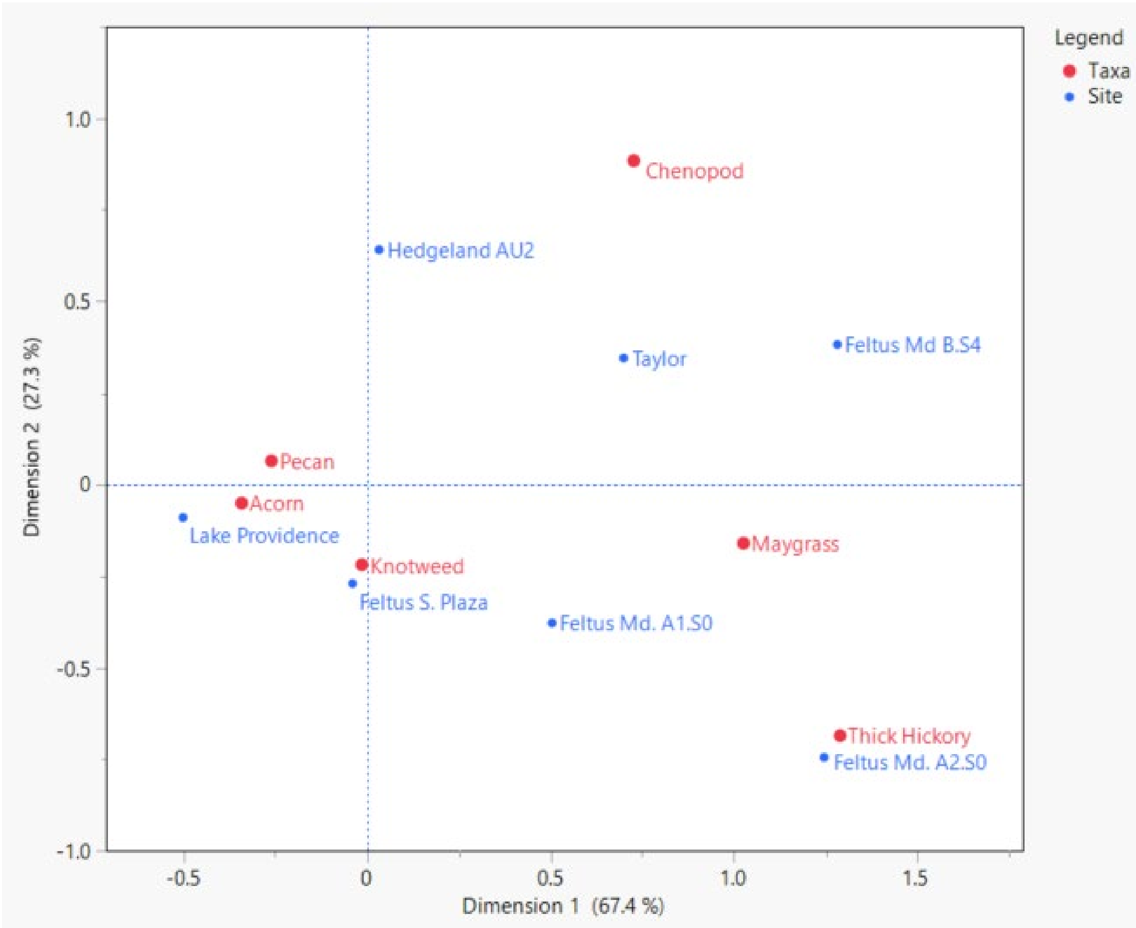

Figure 4.16. Correspondence biplot comparing plant taxa among LMV sites.

While there was also a great deal of variability in chenopod, maygrass, and knotweed, between the three seeds, chenopod had greatest variance and greatest influence on the results. Knotweed was present in all of the gathering assemblages, but due to its low densities and small variance it did not influence the correspondence results much. Though the South Plaza upper pit assemblages are not included here, I mention them to note that there were specific times when knotweed came into focus; the increased knotweed densities associated with the F.148 upper pit zones and at Lake Providence suggest that knotweed may have had important, context-specific ritual uses. Deposits more strongly associated with chenopod include Hedgeland, Taylor, and Feltus Mound B.S4. Both the Taylor and Hedgeland deposits are much earlier than the Mound

B.S4 deposit; each site is also located in a different region of the LMV (Bayou-Beouf Basin, Tensas Basin, and Natchez Bluffs). This may indicate that chenopod was utilized in many ways, and that use needs to be examined on a more regional basis. Between the Feltus contexts, all of the unrestricted deposits plot on the lower half of the biplot with maygrass, while the restricted Mound B.S4 deposit is pulled to the upper right quadrant by chenopod. The position of Mound B.S4 helps provide additional confirmation of how different the Mound B.S4 deposit is from those that come before it, with a greater emphasis on chenopod than other contexts that came before it.

Summary of Archaeobotanical Results

The deposits sampled from Feltus paint a picture of the variety of plants consumed and used by people gathering at the site. Compared to many other Late Woodland sites in the LMV (see Fritz 2009), the botanical record at Feltus is particularly rich, making it important for the information it can provide about diachronic and intrasite patterning. Most of the contexts at Feltus can be considered unrestricted deposits; while some of them may have been the result of activities of smaller groups of people (i.e., upper pit fill zones), it is difficult to say more about who those people may have been.

The earliest unrestricted deposits analyzed here, spanning the Sundown and Ballina phases, come from the South Plaza lower pit zones. The presence of EAC seeds indicates that people consistently tended and consumed these plants from the earliest times Feltus was intensively utilized, and that these plants were cooked at Feltus as part of site-related activities.

The next cluster of dates is from the Ballina phase and includes a subcluster of the Mound A1.S0 premound midden and the upper pit zones from F.4 (Zones C, D, and E); I also include the F.148 upper pit zones here (Zones D, E, and F), though this reflects my own assumptions rather than radiocarbon evidence. All of these can be considered unrestricted deposits, although based on artifact densities the pit deposits may result from the activities of comparatively smaller groups of people. There is a lot of botanical variability in these contexts, both in the predominance of nut species and in starchy seeds. This suggests activities that focused on different meals, though it is difficult to know exactly what those activities might be. The high densities of erect knotweed in the F.148 upper pit zones are especially unusual and suggest a possible ritual use for the plant. Other unusual plants from the pit zones include poison ivy, nightshade, morning glory, and geranium; the prominent medicinal uses of these plants indicate that healing and purification may have been important activities as well.

A second subcluster of dates in the Ballina phase includes the South Plaza midden, the remaining F.4 upper pit zones (Zones B and B/C), the borrow pit, and the Mound A2.S0 midden. All of these contexts can be considered unrestricted deposits, two of which result from large feasts (the South Plaza and Mound A2.S0 middens). Activities in the South Plaza focused on starchy dishes, while hickory oil- or milk-based dishes were more concentrated by Mound A. Steponaitis et al. (2014) have suggested that different mounds at Feltus functioned in different ways; while we cannot say that oil extraction was a focus of Mound A across all periods, it may represent a focus of mound-related feasting and ceremonialism during the late Ballina phase. Chenopod and maygrass continue as the primary EAC seeds represented, with maygrass typically predominating over chenopod. Little barley is an outlier in this period of activity; while it is evident in both the South Plaza and Mound A2.S0 middens, its density is much higher in the South Plaza midden. This suggests another functional difference between the two areas of the site, with little barley connected to activities associated with the large-scale feasting in the South

Plaza. Evidence for ritual and medicinal plants continues across all deposits in this period of site activity, which provides further support for the inclusion of plants within the repertoire of ritual activities at the site (Kassabaum 2018). Finally, while botanical evidence from the borrow pit midden is broadly similar to that described for the South Plaza (prevalence of acorn, use of EAC seeds, medicinal plants), in comparison to other middens it is unique in its extremely high density of wood charcoal. Something about the activities represented in this context resulted in much more burned wood; analysis of the species represented might help reveal if the borrow pit midden represents land clearing or something more specific.

Botanical evidence for the third phase of activity at Feltus, during the Balmoral period, comes from the Mound B.S4 midden. This can be considered a restricted context, because it is related to the comparatively smaller group of people who gathered on the summit of Mound B. While the density of remains is high, fewer plant taxa are represented. I compared both the Mound A1.S0 and South Plaza middens to the Mound B.S4 midden using Kintigh's rarefaction routine; the results strongly suggests that the differences in taxa richness on the mound summit are not a function of sample size. When the Mound A1.S0 middenThe botanical patterns therefore indicate that activities occurring on the summit were focused around very specific plants and/or dishes. People on the top of the mound focused on consuming thick-shelled hickory products, whether as kenuche, a flavoring component, or a drink. They also spent a lot of labor processing chenopod and maygrass. While an obvious preparation would have been ground up in gruel, one or both could have been components of ritual drinks as well (Fritz 2014). Another option is that the seeds were ground and made into unleavened bread (see Arranz-Otaegui et al. 2018 for a similar example from a Neolithic hunter-gatherer site in northeastern Jordan).

The last phase of activity at Feltus is represented by the wall trenches on the fifth stage of Mound B. Whether or not the Anna-phase maize date turns out to be accurate, the rectangular buildings constructed on Mound B's platform were probably one of the last activities at the site and correspond with a shift in mound-building methods. Botanical evidence from this stage comes from secondary fill in the wall trenches, but the species present do indicate a potential shift in consumption. The people who constructed the buildings and gathered on this summit ate maize; findings of kernels and cupules tentatively suggest that whole ears were brought to the site. Activity on the summit also included Type X and wild rice, two more starchy grains. These unusual finds suggest that the meals people ate on top of Mound B continued to contain special and unusual components.

While all of the deposits summarized here provide important information about the types of plants people brought to and consumed at Feltus, the high density of plant remains from the South Plaza and Mound B.S4 middens provide the strongest evidence of such patterning. These contexts suggest that there may have been very real differences between the activities associated with unrestricted and restricted contexts. Luckily, the patterns in these two deposits can be combined with zooarchaeological data, as the faunal remains from both areas are very well preserved. The focus of the next chapter is therefore to elucidate what faunal patterns are associated with unrestricted and restricted contexts, and if those patterns help outline a broader set of site activities.

CHAPTER 5

ZOOARCHAEOLOGICAL REMAINS

This chapter describes the results of the faunal analyses for the South Plaza and the Mound B.S4 middens. I begin by discussing the Feltus faunal assemblage as a whole, providing summary information about the animals identified and the modifications present. I then discuss the results for the South Plaza and Mound B.S4 middens separately, in each case highlighting specific animals and the results of quantitative analysis. Additional context for these results is provided in Chapter 6, which brings together the faunal and botanical analyses into a more complete picture.

Feltus Faunal Assemblage

Faunal material analyzed for this dissertation consists of 14,307 specimens weighing a 13,906.1 g and representing 151.57 kg of biomass. These statistics include a small number of probable commensal species, such as mouse and/or rat remains, as well as amphibian and snake remains. The combined collection includes 42 different taxa, many of which have been identified in other areas of the site as a part of previous faunal analyses (Funkhouser 2013; Jackson 2016).

Breaking the current assemblage down further, mammals represent the majority of identified specimens (Table 5.1). Fish represent the next largest category, followed by bird and reptile. Amphibians and crustaceans represent such a small portion of overall NISP (6 specimens) that they are not included in these numbers. The large representation of mammals is

Table 5.1. Percentages of each animal class in the combined Feltus faunal assemblages, compared by NISP, bone weight, and biomass.

Class	% NISP	% Bone Weight (g)	% Biomass (kg)
Mammal	58.8	88.5	87.4
Bird	3.3	1.7	0.7
Reptile	3.3	1.4	2.0
Fish	34.7	8.4	9.9

typical for an upland setting in the LMV (Jackson and Scott 2002; Kelley 1990; LaDu and Funkhouser 2018; Smith 1974). The high representation of fish, at more than a third of NISP and close to 10% of weight, is a more unusual finding. However, the generally delicate bones of fish decay quickly in suboptimal environments, therefore any comparison to other sites needs to seriously take into account the possibility that fish may be underrepresented as a result of taphonomic issues. Mammals continue to dominate the other classes when quantified according to weight, representing 88.5% of included remains, with fish representing 8.4% and bird and reptile representing 1.7% and 1.4% respectively. Forgoing the important criticisms of biomass (see Chapter 3), transforming weight values into kg of soft tissue mass does not substantially change any of the class patterns, other than dropping bird below reptile. Mammals still represent the vast majority of soft tissue, fish represent less than 10%, and bird and reptile represent the remainder.

Mammals

More than 50% of the specimens found in the Feltus analysis come from mammals, with roughly 20% of the mammalian assemblage identified to family or below, including 12 separate taxa. Material identified to at least family also represents a little more than 80% of the assemblage by weight. This accords well with the overall observation that both assemblages contain very good preservation and generally low amounts of fragmentation. All contexts at Feltus are dominated by deer, which are the largest readily available mammal in the LMV. When combining specimens identified as Cervidae with white-tailed deer, deer represents over half of the identified, non-commensal mammalian NISP; by weight this balloons to 88%. The use of deer as a primary meat source is typical for upland sites in the southeastern U.S., whereas coastal and floodplain sites tend to have much higher proportions of aquatic species (Coxe and Kelley 2004; Jackson and Scott 2002; LaDu and Funkhouser 2018; Smith 1974).

Based on NISP, the next most abundant mammal is squirrel (269 specimens). Mississippi is home to three squirrels: the gray squirrel (*Sciurus carolinensis*), the fox squirrel (*Sciurus niger*), and the southern flying squirrel (*Glaucomys volans*). No specimens are positively identified as southern flying squirrel, although they are a nocturnal species and thus may have been targeted less than other squirrel species or not at all. While gray squirrels and fox squirrels live in a range of forest types and can co-exist within the same area, they do tend to have environmental preferences. Generally, fox squirrels prefer mature, upland forests that contain little understory, while gray squirrels prefer mature hardwood forests with dense understory (Edwards et al. 2003). In the southeast U.S., fox squirrels tend to prefer forests with longleaf pines, sandhills, and clay hills (Means 2006), and also tend to be found in edge habitats (Conner et al. 1999). Conversely, gray squirrels are found in higher proportions in forests made primarily of hardwoods, particularly mixed hardwood-pine and bottomland hardwood forests (Fischer and Holler 1991; Warren and Hurst 1980). These habitat preferences can then be useful for inferring local environmental conditions and diachronic changes in those conditions. Broadly, faunal analysts have considered high ratios of fox to gray squirrels as indicative of disturbances associated with agriculture, assuming that fox squirrels would better tolerate the open conditions resulting from forest clearance for agricultural fields (Scott 1983:362). In the case of Feltus, the same interpretive pattern would imply that the high ratios of gray squirrels mean a woodland forested environment. Consistent findings of maize at Feltus are limited to the last summit of Mound B, which indicates the more forested Late Woodland environment favorable for gray squirrels. However, the bluff hills ecoregion where Feltus is located is also primarily oak-hickory forest (Chapman et al. 2004), which may tend to attract gray squirrels regardless.

Following squirrels, rabbits occur in the next highest numbers in the Feltus assemblage (117 specimens). Two species of rabbits occur in the area: the swamp rabbit (*Sylvilagus aquaticus*) and the eastern cottontail (*Sylvilagus floridanus*). As with squirrels, rabbit species can also be useful environmental indicators. Swamp rabbits tend to live in drier floodplain habitats with open tree canopy providing for plant growth, while eastern cottontails prefer forest edge environments that provide brushy-open areas. These preferences parallel the environmental changes seen with a shift to agricultural fields; in some cases, increases in eastern cottontails have been interpreted as garden hunting within and on the edges of cropped areas (Speth and Scott 1989). Within the Feltus assemblage, swamp rabbits outnumber eastern cottontails, a ratio that would indicate hunting in forested environments rather than open field edges.

According to NISP, the next highest number of remains comes from bear (*Ursus americanus*) (56 specimens). Bear remains are unevenly distributed across the LMV, with Late Woodland assemblages from the Natchez Bluffs region containing greater amounts (Peles and Kassabaum 2020). It seems likely that during this period, bear had special significance to people living in the uplands, resulting in increased activities and disposal of bear related to both ceremony and consumption, though some of this patterning is also attributable to naturally higher densities of bear. Ethnographic accounts indicate widespread consumption of bear meat, particularly at feasts, and rendering of bear fat into oil, which had myriad uses including within dishes, as medicine, and even within funeral rites (Peles and Kassabaum 2020; Waselkov 2020). Bears were considered other-than-human kin by many Southeastern tribes and played important roles in communicating between worlds, such that shamans were thought to transform into bears during trances (Kassabaum and Peles 2020). The importance of bears as a component of both subsistence and ceremony is reflected in the high numbers of bear identified from Feltus, where remains are found in every major feasting deposit and in the F.1 post pit.

The remaining mammals identified in the assemblage comprise a small number of specimens. Opossum (*Didelphis virginiana*) is represented by 27 bones in the assemblage; most of the specimens are vertebrae or skull fragments, although four long bones were identified as well. Eight raccoon (*Procyon lotor*) remains were identified, including a range of elements. Gray fox (*Urocyon cinereoargenteus*) is represented in the assemblage by three bones, with an additional bone that could not be identified to either gray or red fox (*Vulpes vulpes*) more specifically (a right proximal tibia). The three gray fox bones are all paw bones: a left third and fifth metacarpal and a left metatarsal. While fox certainly can be consumed, there has been some suggestion they may play a more specialized role in assemblages (Jackson et al. 2016; Jackson and Scott 2003). Two cougar (*Puma concolor*) bones (a distal shaft of a carbonized right femur and a complete right radial-intermediate carpal) and one bobcat (*Lynx rufus*) third phalanx (claw) were also identified. Neither animal is a common component of archaeological assemblages, though they have been identified in low numbers at other mound sites in the LMV (Brown 2015; Coxe and Kelley 2004; Futch 1980; Jackson 2016; Kelley 1990; Mariaca 1985; Springer 1980; Terry 2017). Jackson and Scott (2003) group cougar and bobcat (as well as bear) within the category of dangerous taxa, and suggest their identification in elite Mississippian contexts indicates symbolic connotations with power. While this specific symbolism may have been a later association, the presence of both animals at Feltus is certainly special.

Commensal Mammals

Commensal mammals are those that would have been attracted to food sources at a site but are not likely to have been specifically targeted for hunting. Commensal mammals in the Feltus assemblage include a left maxilla from a hispid cotton rat (*Sigmodon hispidus*), and bones from both a rat-sized and mouse-sized members of the rodent family. While hispid cotton rats are not typically interpreted as environmental indicators within faunal assemblages, they are strongly associated with particular habitats. In the Southeast this includes grassy areas and early successional habitats, with a preference for the types of disturbed areas that are particularly common with overgrown fields (Martin et al. 1951). More importantly, hispid cotton rats are relatively sedentary, with home ranges estimated at less than an acre (Slade and Swihart 1983; Spencer et al. 1990). The identified hispid cotton rat may therefore provide some evidence of the microhabitat at the site; an area cleared of trees but with grasses growing would have provided an ideal habitat.

High numbers of commensal mammals have been interpreted as indirect evidence of large storage structures (Scott and Jackson 1998), and may also be associated with semi-permanent to permanent villages (Compton 2009; Whyte 1991). While the numbers of commensal mammals at Feltus is low, an important consideration is that rodent bones are very small and likely to fall through quarter inch screen (see Compton 2009). While all midden deposits from Feltus are waterscreened, I only analyzed material larger than ¼-inch. Analyses by Compton (2009) and Scott (2005) indicate that, in a well-preserved assemblage, analysis of 2 mm components can greatly increase identification of fishes, small birds, and small mammals—including commensal mammals in particular. Analysis of 2 mm material at Feltus is therefore needed to make a final determination concerning the numbers of commensal mammals potentially present at the site, though the low amount of rodent damage on bones makes it unlikely that significant numbers of commensal mammals will be identified.

Unidentified mammals

The unidentified mammals category consists of a total of 5,718 bone specimens weighing 2001.4 g. These bones primarily consist of fragments too small to positively identify beyond class, and/or lacking identifiable morphological attributes. As an illustration of this, the average weight of unidentified large mammal fragments is 0.42 g, whereas the average weight of identified deer bone is 8.9 g; the smaller the bone, the more likely it is to be unidentifiable. When possible, fragments were grouped according to mammalian size; only 635 fragments could not be given a size estimate. The majority of unidentified animal remains are fragments originating from large mammal bones. Given that most of the *identified* large mammal bone comes from deer, and that many other large mammals tend to have additional identifying cortical surface attributes, it is highly likely that most of these unidentified large mammal specimens are fragments of deer bone. Unidentified medium mammals make up the smallest amount of remains (62 specimens), while small mammals consist of a much larger 389 specimens. There are also a number of remains recorded as in-between categories of medium/large mammal and small/medium mammal. The relatively small number of unidentified medium mammals is likely a function of their low representation within the assemblage, whereas small mammals (i.e.

squirrel and rabbit) make up a larger proportion of the identified mammal assemblage and thus contribute more to the unidentified small mammal assemblage.

Birds

Birds are present in the Feltus assemblage in small numbers, though most of the remains are unidentifiable past size. Of a total of 405 specimens weighing 212.9 g, 100 bones were identifiable further. Of the bones identified beyond size, 70% were turkey bones (70 specimens, 151.0 g). Early chroniclers took note of the abundance of turkey (and other animals) in the LMV (Le Page du Pratz 1758:238, 287; Tonty 1898:29); Le Page du Pratz (1758:220-221) even recounted a turkey chase with one of his Natchez companions. Turkeys can adapt to a wide variety of habitats as long as the environment provides some sort of cover interspersed with open, grassy areas. Although the optimal time for turkey hunting is in the winter and early spring, they are available throughout the year.

A small number of migratory waterfowl and duck elements were identified from the assemblage (28 specimens, 8.6 g). Although ducks are notoriously difficult to identify to species, their numbers in the Feltus assemblage are still small given the location of the site on the Mississippi Flyway. If gatherings at Feltus did not occur during peak migration periods, then perhaps only small numbers of migratory bird species were available. Most of the identified waterfowl are represented by one specimen, although six bones were identified as Canada goose (*Branta canadensis*). Canada geese are one of the larger migratory species in North America, migrating southwards in the winter and present in Mississippi from roughly early October to early April. Canada geese are not considered year-long residents of Mississippi, though there are currently members of the giant and interior subspecies present as resident birds, likely as a result of drastic habitat changes and greater availability of waste grain in the state (Turcotte and Watts 1999:119-120). One complete rib from a goose or swan was recovered; although it is likely to be from a Canada goose, there are also three other species of geese that winter in Mississippi: snow goose (*Anser caerulescens*), Ross's goose (*Anser rossii*), and greater white-fronted goose (*Anser albifrons*). Twelve fragments of bone weighing 2.8 g come from ducks. This includes six fragments from an unidentified medium-sized duck, a left proximal carpometacarpus from a dabbling duck, the distal shaft of a left ulna from a diving duck, and one fragment each from a wood duck (*Aix sponsa*), a lesser scaup (*Aythya affinis*), a mallard/black duck (*Anas platyrhynchos*/*Anas rubripes*) and a common goldeneye (*Bucephala clangula*). The wood duck is the only one of these species that is a year-round resident of Mississippi. Represented by a manubrium fragment, wood ducks reside in wooded swamps where they nest inside trees (Turcotte and Watts 1999:121-123). The other ducks are migratory, however, and along with Canada goose can provide seasonality information.

Lesser scaup, also known as bluebills, are small diving ducks that migrate south primarily via the Central and Mississippi Flyways. They tend to winter on lakes, rivers, and sheltered bays in freshwater or somewhat brackish areas (Turcotte and Watts 1999:134-135). Lesser scaup are one of the most common diving ducks and are represented in the Feltus assemblage by a complete left quadrate – a bone that is a part of the jaw and feeding mechanism in ducks. Mallard/Black ducks are represented by the distal shaft of a right femur. While many analyses list mallard separately, mallards and black ducks are closely related and known to commonly interbreed (Turcotte and Watts 1999:124). Although it is hypothesized that habitat differences previously kept the species more separate, the extent of this separation is unknown, therefore this analysis did not attempt to differentiate between the two species. The wintering range of both mallards and black ducks includes Mississippi, although black ducks are considered uncommon winter residents and the Natchez area represents the southern boundary of their winter range in Mississippi. Black ducks prefer wooded areas and in the Natchez Bluffs area may be found on inland lakes and wooded swamps (Turcotte and Watts 1999:124). In contrast, mallards are a common winter visitor in Mississippi and can be found in swamps and lakes in the LMV (Turcotte and Watts 1999:126). Combining the wintering periods of both birds, mallard/black duck are present in Mississippi from roughly mid-September through the end of May. The last migratory duck species in the Feltus assemblage is the Common Goldeneye, represented by a manubrium fragment. Common goldeneyes are also currently considered an uncommon winter resident in Mississippi, residing primarily in protected bays and estuaries but on rivers and lakes as well. These birds are available from mid-November through the end of April (Turcotte and Watts 1999:138-139).

The last two birds in the assemblage are particularly uncommon in faunal assemblages and likely represent special or ritualized activities. One shaft fragment of a right radius comes from a member of the Accipitriformes order. The fragment of radius is too large for any hawk species, but could not be identified to a specific eagle, vulture, or osprey. Two species of eagles are present in the Southeast: bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*). Bald eagles would have been more common in the area around Feltus, living year-round along the Mississippi River, while golden eagles would have been a rarer sight due to their more restricted ranges and low population sizes. Eagles in general were particularly symbolic, with connections to chiefly authority, power, peace, ceremonies, and healing pain (Krech 2009:111-113, 126, 161). Eagles were also associated with Woodland and Plains Indian narratives about the journey to reach the afterlife (Carr and Caseldine 2021:274, 283, 285, 290, 315; Caseldine et al. 2021:239, 241-242, 252-253), and eagle parts were used in Huron medicine rites and within medicine bags and bundles used by historic Minnesota Ojibwa (Carr 2021b:458, 484). Two species of vultures are present in the Southeast: turkey vultures (*Cathartes aura*) and black vultures (*Coragyps atratus*). It is not uncommon for a flock of black vultures to be seen with a typically solitary turkey vulture, as black vultures take advantage of the turkey vultures' superior sense of smell. Like eagles, vultures also play an important role in many Native groups and have a common connection with death and mortuaries, particularly in their association with the men and women who defleshed the bones of the deceased ("buzzard pickers") (Carr 2021b:481-482; Krech 2009:136-137). In his review of US ethnohistoric accounts, Carr (2021b:475) notes that there was more emphasis on turkey vultures within historic southeastern tribes than among Native groups elsewhere. Like eagles, great importance was placed on the power of vulture feathers, which played key roles in warfare, hunting, healing, and protection. In many stories the vulture was a doctor and was thought to be immune from sickness; this made vulture parts especially connected to medicine and healing (Carr 2021b:475, 480; Krech 2009:138-139). Osprey (*Pandion haliaetus*) would have been a relatively common sight near Feltus, as the site is within this bird's breeding range. Osprey are mentioned only rarely within Woodland or Plains Indians' ethnohistorical accounts, but they are associated with healing and eliminating pain (Krech 2009:161). If we take the commonalities within all of the possible species, regardless of which animal the radius fragment came from, it seems likely that the bone was connected to healing, protection, and potentially the afterlife. Despite being unable to say more about this bone, any large bird of prey would not be easy to catch or have been a normal part of the diet.

The other unusual bird is a barred owl (*Strix varia*), represented by a terminal phalanx – more commonly known as a talon. Barred owls are widespread and reside in wooded areas, favoring dense and thick woods with scattered clearings, particularly in low-lying or swampy areas. These large owls roost in trees during the day and most often nest in natural tree hollows. Among Southeastern groups, owls are particularly associated with death; they were seen as ambivalent animals, harboring both good and ill qualities (Carr 2021b:464-473; Krech 2009:145-146). Among the bad qualities, owls were seen as ill omens, witches, and spirits bent on malevolence and were often linked with impending death or dire misfortune. However, the nighttime quality that connected them to witches, ghosts, and souls, also made them powerful sources of wisdom and divination for priests with the ability to marshal their powers (Carr 2021b:464-469, 472; Krech 2009:147-148). Carr (2021c:1420) points out that among the Scioto Hopewell, the talon of a raptor was understood to represent the whole raptor and its relationship to humans; perhaps Coles Creek peoples held similar ideas about the connection of animal power parts to the animal itself and/or to clan affiliation (Carr 2021c:1490).

Reptiles

Reptiles are present in the Feltus assemblage in small numbers, with a total of 396 specimens weighing 183.3 g. Over 80% of the identified reptile remains are turtle, while the other nearly 20% are snakes. Three separate species of turtle were identified: snapping turtle (Chelydridae), box turtle (*Terrapene carolina*), and eastern mud turtle (*Kinosternon subrubrum*). Two hundred and ninety-two turtle bones are fragments from the shell, either carapace or plastron; this represents 90% of the identified turtle remains. Turtle shell is dense and due to fragmentation (whether due to unfused juvenile shells separating or fused shells cracking) can be found in amounts that somewhat overrepresent the actual number of turtles present. The overall good preservation in the assemblage makes it unlikely that potential non-shell bones were lost due to due to soil conditions. While it is technically possible that smaller bones may have fallen through the ¼"-inch screen and are present in smaller fractions, it is unlikely that analysis of the other waterscreened material will increase the number of non-shell bones substantially. One possible explanation for the overall lack of appendicular bones is that whatever method of cooking was used, turtle shells were discarded in the midden while the rest of the bones were either butchered and discarded elsewhere, or they were included in the meal. Another possibility is that turtle shells in the assemblage are primarily the end result of turtle shell bowls, cups, or rattles. While a number of carapace bones contained evidence of grinding and polishing on their margins, such as would be seen with a bowl or cup, it is difficult to differentiate between the various possibilities mentioned in the absence of any other evidence for shell modification.

The majority of identified turtle in the assemblage consists of snapping turtles (154 specimens, 78.3 g). Two species of snapping turtles are present in the Natchez Bluffs area: the common snapping turtle (*Chelydra serpentina*) and the alligator snapping turtle (*Machrochelys temminckii*). Although identification was conservative, given differences in carapace characteristics it is very likely that all or most of the specimens identified as Chelydridae are from the common snapping turtle. Both alligator and common snapping turtles can grow to be quite large and can live in nearly any permanent water body, but prefer those with soft bottoms and a high degree of aquatic vegetation. Because shells can fragment into so many pieces, it is not inconceivable that the snapping turtle carapace fragments all could have come from one large individual.

The next most prevalent turtle in the assemblage is box turtle, a primarily terrestrial turtle that is common across North America. Box turtle accounts for almost 17% of the reptilian assemblage (67 specimens, 69.5 g), with all but two specimens coming from either the carapace or plastron. Live box turtles are easily collected by hand, although the remains in the assemblage could also include empty shells that were gathered for other purposes (cups, bowls, rattles, etc.). The presence of a complete left humerus and proximal right femur imply that at least one of the box turtles was complete at the time it came to the site.

Eastern mud turtle is the last identified turtle species, based on a large fragment of partially burned carapace that included the pygal. A heat-altered left ischium, a fragment of a right plastron, and a calcined carapace peripheral identified as mud or musk turtle may also originate from the same eastern mud turtle. Eastern mud turtles are freshwater turtles that prefer sandy and muddy areas for burrowing and shallow, well-vegetated areas for feeding. Given the small size of mud and musk turtles, as well as the foul smell released by musk turtles in particular, many analysts think it is unlikely these turtles were targeted for hunting. Instead, they may have been caught up in nets during the process of capturing fish.

The other reptile identified in the assemblage is snake, with a total of 72 vertebrae weighing 10.7 g. Although no vertebrae were identified to species, the presence of a hypapophysis — or a projection on the underside of the vertebral column — indicates a poisonous species. Poisonous snakes in Mississippi come from two families: Viperidae and Elapidae. The only snake from the Elapidae family present in Mississippi is the eastern coral snake (*Micrurus fulvius*), but its natural range does not put it in the Feltus area. On this basis, the poisonous snake vertebrae recovered are assumed to be from one of the Viperidae family snakes in Mississippi, including copperhead (*Agkistrodon contortrix*), cottonmouth (*Agkistrodon* *piscivorus*), and canebreak rattlesnake (*Crotalus horridus*). Snakes may be considered commensal animals in some analyses, though it is generally difficult to determine whether they were attracted to the site in search of small animals or they were brought to the site as a result of hunting. All identified snake specimens are vertebrae, and one vertebra is carbonized, suggesting that at least one snake was specifically caught and/or hunted.

Amphibians

Three amphibian bones were identified in the Feltus collection: a left ilium fragment from a bullfrog (*Lithibates catesbeianus*), the shaft of a tibiofibula from an unidentified toad, and the shaft of an indeterminate long bone from a frog or toad. Amphibian bones are rather fragile and easily decay under most soil conditions. While the simplest explanation for these bones is that they come from amphibians that were accidentally included in the assemblage, there are examples of other sites in the Southeast where toads were consumed and/or used for ritual purposes (Whyte and Compton 2020).

Fish

Fish remains are the most numerous specimens identified in the combined assemblages, consisting of 4,224 fragments weighing 1,076.8 g and representing a minimum of 45 individuals. This number does not include 465 gar scales (126.6 g) and 38 unidentified fish scales (0.6 g). The most common species represented are bowfin (*Amia calva*), gars, and catfish. These species tend to be overrepresented in most analyses due to the surface texture of their bones, which make even small fragments of otherwise nonspecific bones identifiable; bowfin and gars also have unusually-shaped and easily identifiable vertebrae. Bowfin are the most common species in the assemblage, with 1,291 remains weighing 186.6 g and representing a minimum of 15 fish. Bowfin prefer vegetated waterways, which can include lowland rivers and lakes, oxbow lakes, swamps, and backwater areas.

Gars are the next most numerous species, with 581 specimens weighing 405.0 g and 465 scales weighing 126.6 g. Alligator gars (*Atractosteus spatula*) are represented within this by 117 specimens, while the slender gars were not identified to species, primarily due to a lack of comparative skeletal material at the time of analysis. Despite the large NISP, gar only have an MNI of 4; while MNI is an estimate of the lower bounds, the large size that gar can grow to mean that it is entirely possible that only a small number of gar contribute to the high NISP. Alligator gar are the largest of the gar family fishes and typically prefer slow-moving rivers, but are also found in oxbow lakes, bayous, and estuaries. Although slender gar (Lepisosteidae) are not identified more specifically here, three species may be found in the area around Feltus: longnose gar (*Lepisosteus osseus*), shortnose gar (*Lepisosteus platostomus*), and spotted gar (*Lepisosteus oculatus*). While each species has its own habitat preference, those habitats are broadly similar. Longnose gar are similar to alligator gar and prefer medium to large rivers, but are also found in oxbow lakes and estuaries. Shortnose gar are found in the quiet backwater areas of large rivers and oxbow lakes; spotted gars also prefer the slow waters of rivers and are also found in lakes (MDWFP:26-29, 31).

Beyond bowfin and gars, catfish make up the next highest proportion of fishes, with a total of 252 fragments weighing 83.2 g and representing a minimum of five fish. All five of the catfish species found in the area around Feltus are represented in the collection: blue catfish (*Ictalurus furcatus*), channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictis olivaris*), yellow bullhead (*Ameiurus natalis*), and black bullhead (*Ameiurus melas*). Blue, channel, and flathead catfish all prefer similar habitats; they are found primarily in larger river channels but are also commonly found in oxbows and backwater lakes. Yellow and black bullheads are smaller in size and tend to prefer oxbows and backwater lakes with clear and heavily vegetated water, although they can be found in river channels and streams as well. Even with well-preserved assemblages, catfish are difficult to identify to species; out of the 252 fragments, only 38 could be confidently identified to genus or species. Blue, channel, and flathead are the most consistently identified (10, 11, and 9 specimens respectively), while seven specimens are identified as bullhead. This could imply fishing in main river channels, or oxbow lakes, or both (MDWFP:21-25).

Perciform and sucker fish are identified in almost equal numbers in the assemblage, although many of the unidentified fish specimens likely come from either category. Perciformes comprise a slightly larger total of 108 specimens weighing 15.6 g. Identified species include redear sunfish (*Lepomis microlophus*) and white crappie (*Pomoxis annularis*). Redear sunfish, represented by four pharyngeal plates, prefer clear, quiet waters with abundant vegetation and are found in shallow lakes and ponds. Three specimens are identified as white crappie, which are found in large numbers in oxbow lakes and rivers, and prefer deep water near drop-offs and areas of cover. Another seven specimens could only be identified to genus and could be either white or black crappie. Additionally, 26 specimens are identified as bass genus and could be either largemouth (*Micropterus salmoides*) or spotted bass (*Micropterus punctulatus*). Largemouth bass prefer slow moving water but can survive in a variety of habitats, while spotted bass prefer faster waters than largemouth bass and are often found in oxbow lakes, streams, and rivers (MDWFP:4, 7, 9-10).

The sucker family (Catostomidae) in the Feltus assemblage is represented by almost the same number of specimens as Perciformes (104 specimens), but consists of a much heavier 66.1 g of bone. The majority of identified specimens come from buffalo, including 19 bigmouth buffalo (*Ictiobus cyrpinellus*), 8 smallmouth buffalo (*Ictiobus bubalus*), and 22 specimens that could only be identified to genus. Bigmouth and smallmouth buffalo prefer similar environments of oxbow lakes, large streams, and rivers (MDWFP:34-35). One specimen in the assemblage was identified as spotted sucker (*Minytrema melanops*), a species that is found in similar habitats as buffalo and prefers the deep pools of small to medium rivers but can also be found in oxbow lakes, creeks, and large rivers. Within these habitats spotted sucker prefer clean, clear water with no silt (Hendrickson and Cohen 2020). The last fish identified in the assemblage is freshwater drum (*Aplodinotus grunniens*), with 19 specimens weighing 3.3 g. Drum can be found in a wide variety of habitats, although they prefer oxbow lakes and rivers with slow to moderate current over the top of sand or mud bottoms (MDWFP:32).

Crustaceans

The last class of animal identified from the assemblage is crustaceans, with three fragments of calcined crayfish shell. Mississippi is home to 63 different species of crayfish and it is likely that they are underrepresented in most assemblages as their delicate shells quickly decay under most conditions. About nine of the crayfish species in the state are currently recorded in the area around Feltus (Adams 2019). Crayfish live in a wide variety of habitats and are important prey species for fish like largemouth bass; there are multiple methods that can be used to capture them, although fishing strategies that employed fish traps may have been an effective, hands-off method. The only reason the fragments exist in the Feltus assemblage is due to their heat alteration.

Bone Modifications

Bone modifications occur on almost 25% of the Feltus assemblage and include categories of burning, butchery marks, tools, carnivore and rodent damage, weathering, and other (Table 5.2). The vast majority of the modifications consist of burning. Burning within the Feltus assemblage follows what can be considered a normal pattern: a small percentage are only heat altered (8.5%), the largest proportion are carbonized (57.7%), a small amount are mixed carbonized-and-calcined (13.1%), and the last twenty percent of the assemblage is fully calcined. The largest class category, mammals, mirrored this overall patterning, which is unsurprising given that burned mammal bones make up more than 60% of the burned assemblage (1,952 specimens). Fish comprise the next largest group, with a total of 1,021 burned specimens. In comparison to other class categories, fish have the highest proportion of heat altered specimens and somewhat lower amounts of calcined bones (Figure 5.1). Reptiles constitute the next largest category, with a total of 64 burned specimens; one of these is a snake vertebra while the remainder are turtle bones. Roughly one third of the burned turtle bones are non-shell, including a number of unfused vertebrae as well as a burned scapula, ilium, and ischium. Thirty-two of the burned turtle shell specimens are from the carapace and plastron of box turtle, a number of which have had the peripheral edge smoothed and polished. It is highly likely that most of this burned and worked box turtle shell originally comes from the same specimen that has since broken apart. The last category is bird, which follows a different pattern by having a high proportion of

Table 5.2. Bone modifications in the Feltus assemblages.

Type of Modification	NISP	%NISP assemblage	%NISP modifications
Burning[a]	3172	22.98	96.2
Butchery	31	0.22	0.9
Tools/Worked	55	0.40	1.7
Carnivore/Rodent Damage	36	0.26	1.1
Weathering	3	0.02	0.1
Other (Hunting)[b]	1	0.01	0.0
Total	**3298**	**23.89**	**100.0**

[a] Does not include burned gar scales.

[b] Arrowpoint embedded in deer vertebra.

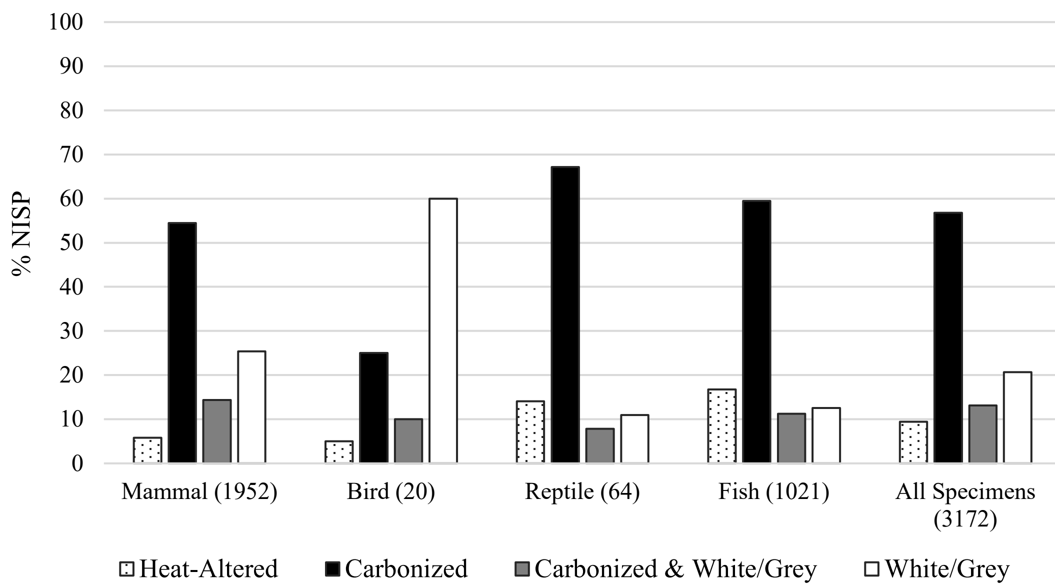

Figure 5.1 Type of burning within each class of animals; NISP for each category in parentheses.

calcined bones (60.0%). However, the amount of burned bird bone is very small (20 specimens) so it is possible these percentages are skewed — in this case 12 bones weighing a total of 3.19 g are fully calcined. Considered together, these patterns indicate that burning occurred primarily as a result of cooking; exposed portions of bones and turtle shell turn a darker shade of brown or become carbonized due to contact with fire, whether via flames or being placed in a hearth. Calcined bones may have been a result of accidental disposal in a hearth, or they may have been purposely calcined for ritual reasons, though this patterning was not extensive at Feltus either way.

All butchery-related marks in the Feltus assemblage occur on mammal bones, including two specimens with chop marks, 16 specimens with cut marks, 12 specimens with percussion scars, and one piece of bone debitage. Butchery-related marks represent 0.23% of the entire assemblage; this small number of butchery modifications is typical of faunal assemblages in the LMV and in the Southeast prehistorically. Clear chop marks are rare in the Feltus assemblage and depending on the location can represent disarticulation of elements from the main carcass, portioning of large elements into smaller pieces, or access to marrow (Landon 1996). Chop marks occur on two deer specimens: a distal tibia and a metapodial shaft. The chop marks on the distal tibia are probably from attempting to separate the tibia from the tarsals. The chop marks on the fragmentary metapodial are harder to interpret, but because the fragment comes from the shaft, it is likely either portioning of the metapodial or accessing marrow.

Activities resulting in cut marks on bone include skinning of carcasses, cutting through meat and tendons as part of the disarticulation process, and taking meat off the bone (Landon 1996; Lyman 1994). All cut marks in the assemblage occur on mammal bones, with all but one appearing on large mammal bones. That exception is a cut mark on a partially carbonized juvenile opossum right distal tibia. Three black bear specimens contain cut marks, including a right ischium, a right 2nd metatarsal, and a right 3rd metatarsal. The rest of the cut marks occur on deer specimens, including five femurs, two humeri, one metacarpal, two lumbar vertebrae, one rib, and a 1st phalanx. The locations of a number of cut marks on the proximal or distal portions of elements indicate that they resulted from attempts to disarticulate bones. For example, cut marks on the base of a femoral head and on an ischium both would have been from cutting the femur free of the innominate as part of removal of the hindlegs. Similarly, cut marks on the distal end of a humerus are probably a result of disarticulating the humerus from the radio-ulna. Cut marks present on the shafts of bones, the proximal end of a rib, and the centrum and transverse processes of lumbar vertebrae, all would have resulted from the removal of meat from the bone. A cut mark on a first phalanx is the only direct evidence in the assemblage for hide skinning.

Percussion marks provide evidence for another type of consumption – that of marrow. Identifiable percussion marks occur on 12 specimens: 10 deer and two unidentified large mammal bones that are probably also deer remains. This type of butchery mark is most often indicated by spiral fractures with percussion notches along fracture edges (Pickering and Egeland 2006). The one fragment of long bone shaft debitage identified is most likely also a result of a percussion impact. All of the specimens associated with percussion blows are long bones, an additional piece of evidence that points to accessing bone marrow as the primary driver of these marks.

Within the Feltus assemblage, specimens recognized as more formalized tools as well as specimens showing polishing or working (abrasions and smoothing) are grouped together. Combined this category consists of 55 specimens, making up 0.4% of the entire bone assemblage and 1.7% of the modified bones. Twenty-one specimens are categorized as tools, 19 show evidence of polishing, and 15 are abraded or smoothed. Fourteen of the recognized tools come from deer or other unidentified large mammals; one of these is an antler tine, while the rest are various long bones, identified to element or otherwise (see Table 5.3). Four long-bone shaft tools come from unidentified medium or small/medium mammals, two are tarsometatarsals from turkeys, and one long-bone shaft tool comes from an undetermined small mammal or bird. While the overall number of tools identified in the Feltus assemblage is small, it is worth nothing that many specimens seem to be more expedient in nature. These are cases where the broken shafts from long bones were subsequently used for some activity (i.e., an awl for punching), resulting in polishing/wear along the exposed fracture and some of the exposed cortical surfaces. However, the bone itself was not otherwise shaped in order to create a more formal tool.

Of the polished and worked specimens, two-thirds are box turtle shell. Some of the polished and worked box turtle shell fragments are also heat altered or carbonized; the ones that are not burned are likely to have come from the same modified shell. All of these modifications consist of abrading and/or polishing along the margin of the shell, such as would occur on a turtle shell bowl. Of the remaining specimens, four come from deer or unidentified large mammal, two are unidentified mammal, two are bones that were unidentifiable to class, and one is part of the right maxilla from a bear (further discussion of the bear specimen is below).

One specimen in the Feltus assemblage did not fit into any of the other cultural modification categories; this is a first thoracic vertebra of a deer with a piece of stone point embedded beneath the spine (Figure 5.2). The bone around the point fragment has healed and there is evidence of some bone modification at the base of the spine and on the posterior zygapophyses, indicating that the deer survived this particular brush with death, albeit not a subsequent one.

Table 5.3. Modified bone specimens in the Feltus assemblage.

Description	Taxon	Weight (g)	Area	Bag
Antler tine	White-Tailed Deer (*Odocoileus virginiana*)	8.52	South Plaza	2827
Right distal femur	White-Tailed Deer (*Odocoileus virginiana*)	43.28	South Plaza	2679
Right distal femur	White-Tailed Deer (*Odocoileus virginiana*)	41.53	South Plaza	2679
Femur shaft	White-Tailed Deer (*Odocoileus virginiana*)	2.09	South Plaza	2582
Left distal humerus	White-Tailed Deer (*Odocoileus virginiana*)	66.81	South Plaza	2830
Right humerus shaft	White-Tailed Deer (*Odocoileus virginiana*)	5.00	South Plaza	2830
Right proximal humerus	White-Tailed Deer (*Odocoileus virginiana*)	37.92	South Plaza	2830
Long bone shaft	White-Tailed Deer (*Odocoileus virginiana*)	3.94	South Plaza	2583
Right distal metatarsal	White-Tailed Deer (*Odocoileus virginiana*)	25.81	South Plaza	2830
Right distal tibia shaft	White-Tailed Deer (*Odocoileus virginiana*)	5.44	South Plaza	2830
Right proximal tibia	White-Tailed Deer (*Odocoileus virginiana*)	66.95	South Plaza	2830
Long bone shaft	Elk/Moose/Deer (Cervidae)	6.59	South Plaza	2583
Long bone shaft	Unidentified Large Mammal	1.14	South Plaza	2830
Long bone shaft	Unidentified Large Mammal	6.91	South Plaza	2709
Long bone shaft	Unidentified Medium Mammal	0.18	South Plaza	2583
Long bone shaft	Unidentified Medium Mammal	0.25	South Plaza	2578
Long bone shaft	Unidentified Medium Mammal	0.61	South Plaza	2593
Long bone shaft	Unidentified Small/Medium Mammal	0.32	South Plaza	2578
Right proximal tarsometatarsus	Turkey (*Meleagris gallopavo*)	9.00	Mound B	3086
Distal tarsometatarsus	Turkey (*Meleagris gallopavo*)	2.31	South Plaza	2725
Long bone shaft	Unidentified Small Mammal/Bird	0.26	South Plaza	2583

Damage from erosion and rolling can result from either movement within the soil or from water; a total of 32 specimens in the assemblage show this type of natural modification, though it is hard to ascertain the original cause and how the specimens came to be within the otherwise undamaged assemblage. The eroded and rolled bones could be considered material from secondary contexts, for example, transported along with other fill dirt to cover over primary midden deposition. Only one specimen showed evidence of weathering—damage that occurs when a bone is exposed to the elements for an extended period of time. The fact that only one bone is weathered provides evidence that neither of the assemblages were exposed to the air for any length of time and were instead covered over relatively quickly.

Figure 5.2. Reference adult and juvenile deer vertebrae compared to archaeological specimen. Archaeological specimen is in the middle, closeup of embedded point on the right.

The second category of natural modifications—animal damage—consists of rodent gnawing, carnivore gnawing, and digested bone. In total, 34 bones show evidence of animal damage. Fifteen bones contain evidence of rodent gnawing, though even where gnawing is present the damage is minimal, which indicates a few different things. Rodents are thought to be more numerous in village locations, where they are attracted to and thrive on access to food, and stored food in particular (Compton 2009; Whyte 1991). Compton (2009) argues that high rates of rodent damage and numerous rodent bones in the 15th-to-16th century Upper Nodena village Block C assemblage indicate that rodents lived among people in the village. Out of the entire ¼-inch assemblage, 0.85% of bones were rodent damaged, despite the fact that the overall preservation of the assemblage suggested it was not left uncovered for an extended time (Compton 2009:102). He contrasts the Upper Nodena assemblage with the low occurrence of rodent damage in the Baytown-period component of the Meador village site (0.11% of the assemblage), interpreting Meador as a more ephemeral settlement that contained limited foods and refuse accumulation (Compton 2009:232). The rate of rodent damage (0.11% of the assemblage) and small number of rodent bones at Feltus is similar to that of the Baytown Meador component, providing a line of evidence that confirms the site was home to periodic aggregations of people, rather than a permanently or even consistently settled locale (Kassabaum 2018). Rodent damage also provides a second line of evidence pertaining to the deposition of the assemblage; lack of rodent damage is another indication that the assemblages were quickly covered by soil.

Carnivore damage occurs on 15 bones and is similarly a very small proportion of the overall assemblage. Carnivore damage can result from the chewing action of many animals, including domestic dogs, coyotes, wolves, bears, bobcats, cougars, etc. Four specimens in the assemblage are identified as digested, most likely via a carnivore. While any carnivore could have contributed these bones, given the number of people who were probably present at the site it is likely that digested bones come from domestic dogs. While wild animals may have had some access to the discarded bones, it is unlikely they would have had the type of unimpeded access necessary to consume and then defecate on site. Domestic dogs, on the other hand, may have been provided with scraps and could have been tolerated on site in such a way as to have felt comfortable defecating amongst the assemblage. The Upper Nodena and Meador village sites assemblages, discussed above, provide rates of carnivore damage that can also be used for comparison with Feltus. At the extensively occupied Upper Nodena village, carnivore gnawing was identified on 1.52% of the Block C assemblage, and carnivore digestion was identified on 0.32% of the assemblage (Compton 2009:102). At the lightly occupied Meador site, 0.99% of the Baytown assemblage contained evidence of carnivore gnawing, with no evidence for carnivore digestion (Compton 2009:232). The rates of both types of damage at Feltus were even lower; 0.12% of the assemblages were gnawed by carnivores and 0.03% of bone specimens were digested. The small proportion of carnivore damage and digestion could mean two things. First is that there may have been only a small number of dogs with the people congregating at Feltus; fewer dogs would mean less evidence of chewing and digestion. The second conclusion would be limited access, and given that all the available evidence seems to indicate the faunal assemblages were covered over very quickly, domestic dogs or other carnivores would not have had much time to alter the Feltus deposits.

Context-Specific Remains

Animal remains were analyzed from two areas of the site: the South Plaza pit complex and Mound B. The only component of the pit complex that contained good bone preservation was the midden overlying F.148 (referred to as the South Plaza midden hereafter), while the only component of the Mound B excavations with appropriate bone preservation was the B.S4 midden. Both of these contexts contain numerous remains of small mammals, birds, and fish, which indicates good preservation within the soil. The very low amounts of weathering and carnivore or rodent damage further indicate rapid disposal and covering of the faunal assemblages, along with little post-depositional damage; this suggests that the patterns identified in the assemblages can be primarily attributed to the decisions of the Coles Creek people creating the deposits. *In situ* pot breaks, as well as articulated faunal remains, further indicate that both contexts are primary deposition, unlikely to have been deposited elsewhere and later moved. The location of the South Plaza midden, at the southeast edge of the plaza, makes it an unrestricted deposit; the density of artifacts and high percentage of serving vessels indicates large-scale feasting (see Chapter 2). The Mound B.S4 midden, on the other hand, is considered a restricted deposit due to its location on the mound summit. The ceramic assemblage has a different composition from the other deposits at the site, with a high proportion of cooking vessels, but the deposit is also interpreted as the result of feasting.

South Plaza Midden

The South Plaza faunal assemblage represents the majority of the faunal remains analyzed for this dissertation. A total of 11,072 fragments of bone were analyzed weighing 10,604.9 g (see Table 5.4). This represents 122.9 kg of biomass and a minimum of 78 individuals. Thirty-eight different taxa are present in the assemblage, primarily composed of mammals and fish. In order to understand the relative contribution of different animals to the assemblage, animals are ranked according to biomass. To make categories comparable between contexts, and to account for differences in identification, a few quantification choices require explanation. Due to the previously mentioned issues relating to identification of rabbit and squirrel species, all Sylvilagus and Sciurinae remains are grouped together as general rabbit and general squirrel. A similar decision was made for ducks; given difficulties in identifying duck species, all duck remains are grouped together. Rather than consider turtle as one group, remains are split into two categories: box turtles and water turtles. Water turtles consist of snapping turtles and mud/musk turtles; these types of turtles are likely to be targeted and caught in similar ways, whereas box turtles are easily hand harvested on the ground. Lastly, fish identified to order or below are aggregated as one group to similarly account for identification difficulties. The unidentified fish category is excluded in order to mirror categories above. Including unidentified fish but excluding other unidentified animals (such as large mammals, which are most likely to

Table 5.4. Animals identified in the South Plaza midden.

Taxon	NISP	MNI	Weight (g)	Biomass (kg)
Mammal				
White-Tailed Deer (*Odocoileus virginianus*)	586	10	6687.0	72.882
Bear (*Ursus americanus*)	66	3	993.1	13.098
Cougar (*Puma concolor*)	2	1	7.7	0.165
Bobcat (*Lynx rufus*)	1	1	0.4	0.010
Raccoon (*Procyon lotor*)	7	1	5.8	0.129
Gray Fox (*Urocyon cinereoargenteus*)	3	1	2.0	0.050
Unidentified Fox (*Urocyon*/*Vulpes*)	1		1.2	0.032
Opossum (*Didelphis virginiana*)	19	1	9.0	0.190
Cottontail Rabbit (*Sylvilagus floridanus*)	19	2	10.5	0.218
Swamp Rabbit (*Sylvilagus aquaticus*)	65	4	31.4	0.586
Unidentified Rabbit (*Sylvilagus* sp.)	30		5.2	0.116
Gray Squirrel (*Sciurus carolinensus*)	11	2	2.4	0.057
Fox Squirrel (*Sciurus niger*)	3	1	0.7	0.019
Tree Squirrel (*Sciurus* sp.)	9		2.7	0.063
Unidentified Squirrel (Sciurinae)	8		1.0	0.025
Unidentified Large Mammal	3465		1257.9	16.202
Unidentified Medium Mammal	59		18.9	0.370
Unidentified Small/Medium Mammal	408		71.8	1.232
Unidentified Small Mammal	74		10.6	0.220
Unidentified Mammal	324		30.8	0.575
Mammal Total	*5160*	*27*	*9149.9*	*106.238*
Bird				
Turkey (*Meleagris gallapavo*)	50	3	61.2	0.862
Eagle/Vulture/Osprey, cf. (Large Accipitriformes)	1	1	0.3	0.007
Barred Owl (*Strix varia*)	1	1	0.1	0.003
Canada Goose (*Branta canadensis*)	3	1	1.4	0.027
Mallard/Black Duck (*Anas platyrhynchos*/*rubripes*)	1	1	0.2	0.004
Dabbling Duck (*Anas* sp.)	1		0.1	0.003
Wood Duck (*Aix sponsa*)	1	1	0.3	0.006
Diving Duck (Aythyini)	1		0.2	0.006
Common Goldeneye (*Bucephala clangula*)	1	1	0.2	0.004
Medium Duck	6		1.8	0.034
Unidentified Large Bird	88		17.0	0.268
Unidentified Medium/Large Bird	2		0.3	0.007
Unidentified Medium Bird	11		2.1	0.039
Unidentified Small/Medium Bird	1		0.2	0.004
Unidentified Small Bird	1		0.2	0.005
Unidentified Bird	3		0.1	0.003
Bird Total	*172*	*9*	*85.5*	*1.281*

Table 5.4. Continued.

Taxon	NISP	MNI	Weight (g)	Biomass (kg)
Reptile				
Snapping Turtle (*Chelydra serpentina*)	61	1	54.3	0.460
Unidentified Snapping Turtle (Chelydridae)	93		24.0	0.409
Box Turtle (*Terrapene carolina*)	67	2	69.5	1.122
Box/Water Turtle (Emydidae)	1		0.6	0.013
Eastern Mud Turtle (*Kinosternon subrubrum*)	1	1	4.1	0.077
Mud/Musk Turtle (Kinosternidae)	3		1.1	0.021
Unidentified Turtle (Testudines)	94		18.3	0.222
Non-Poisonous Snake (Colubridae)	48	1	6.3	0.115
Poisonous Snake (Viperidae)	15	1	2.9	0.041
Unidentified Snake (Serpentes)	9		1.5	0.029
Reptile Total	*392*	*6*	*182.6*	*2.508*
Fish				
Black Bullhead (*Ameiurus melas*)	1	1	0.1	0.002
Yellow Bullhead (*Ameiurus natalis*)	2	1	0.2	0.004
Bullhead (*Ameiurus* sp.)	2		0.4	0.009
Blue Catfish (*Ictalurus furcatus*)	8	2	3.2	0.061
Channel Catfish (*Ictalurus punctatus*)	11	2	2.1	0.041
Blue/Channel Catfish (*Ictalurus furcatus*/*punctatus*)	1		0.2	0.005
Flathead Catfish (*Pylodictis olivaris*)	9	1	3.5	0.066
Catfish Family (Ictaluridae)	188		65.8	1.065
Bowfin (*Amia calva*)	1274	14	184.1	1.957
Smallmouth Buffalo (*Ictiobus bubalus*)	2	1	0.7	0.023
Largemouth Buffalo (*Ictiobus cyprinellus*)	13	2	3.6	0.083
Buffalo (*Ictiobus* sp.)	10		36.4	0.517
Spotted Sucker (*Minytrema melanops*)	1	1	0.1	0.005
Sucker (Catostomidae)	40		8.6	0.165
Redear Sunfish (*Lepomis microlophus*)	4	2	0.8	0.015
Sunfish (*Lepomis* sp.)	5		0.3	0.007
Crappie (*Pomoxis* sp.)	5		0.6	0.011
Sunfish/Crappie (*Lepomis*/*Pomoxis*)	1		0.1	0.001
Bass (*Micropterus* sp.)	19	3	3.0	0.043
Sunfish Family (Centrarchidae)	2		0.1	0.002
Perciformes (Perciformes)	48		6.5	0.129
Freshwater Drum (*Aplodinotus grunniens*)	19	2	3.3	0.094
Alligator Gar (*Atractosteus spatula*)	114	1	173.7	2.941
Slender Gars (*Lepisosteus* sp.)	14	1	30.3	0.645
Gars (Lepisosteidae)	419		156.5	2.687
Unidentified Fishes (Osteichthyes)	1852		295.3	2.956
Fish Total	*4064*	*34*	*979.3*	*13.532*

Table 5.4. Continued.

Taxon	**NISP**	**MNI**	**Weight (g)**	**Biomass (kg)**
Amphibian				
Toad (Bufonidae)	1	1	0.3	
Bullfrog (*Rana catesbeiana*)	1	1	0.2	
Frog/Toad (Anura)	1		0.1	
Amphibian Total	*3*	*2*	*0.7*	
Unidentified				
Unidentified Small Mammal/Bird	1		0.3	
Unidentified Bone	815		81.5	
Unidentified Total	*816*		*81.8*	
Gar Scales	461		125.2	
Unidentified Fish Scales	4		0.0	
Grand Total	*11072*	*78*	*10604.9*	*123.558*

be deer) would unfairly bias calculations toward fish; I recognize that this is not a perfect solution, but it is consistent. I chose biomass as a comparative statistic because NISP tends to overrepresent easily identifiable species and weight tends to underrepresent species with light bones – particularly fish and birds. Biomass, while based on weights, comes closer to representing relative contributions to diet. While large animals will of course still have large biomasses, it can better represent animals like fish that are relatively light in weight but provide more protein than might be expected for that weight.

A variety of animals are present in the South Plaza midden, but white-tailed deer is by far the dominant taxon, consisting of 585 specimens weighing 6,617.7 g and representing at least 10 individuals and a little more than 72 kg of biomass (see Table 5.5). Deer are followed by bear and fish, which contribute 13.0 kg and 10.6 kg of biomass, respectively. The next cluster of animals consist of box turtles, water turtles, rabbit, and turkey, each contributing roughly 1 kg of biomass. After this, each taxon contributes less than 0.2 kg of biomass as a result of low numbers of specimens.

WHITE-TAILED DEER. Given the environment of the Natchez Bluffs and the resulting availability of deer, it is unsurprising that deer are solidly ranked first according to biomass. In order to better understand the deer consumption represented by the 72 kg of biomass, element distribution data are analyzed according to the food utility model. Low utility elements consist of the skull, atlas and axis, foot and associated wrist/ankle elements, and metapodials. These skeletal parts are associated with the initial processing of a carcass and are used to determine if primary butchery occurred on-site or elsewhere. In the South Plaza midden assemblage, low utility elements are very underrepresented (Figure 5.3). Skull elements are extremely

Table 5.5. Animals in the South Plaza midden, ranked according to biomass.

Rank	Taxon	NISP	Weight (g)	Biomass (kg)
1	White-Tailed Deer (*Odocoileus virginianus*)	586	6687.0	72.882
2	Bear (*Ursus americanus*)	66	993.1	13.098
3	Fish, general (Osteichthyes)	2212	684.0	10.575
4	Box Turtle (*Terrapene carolina*)	67	69.5	1.122
5	Water Turtles (Chelydridae/Kinosternidae)	158	83.5	0.967
6	Rabbit, general (*Sylvilagus* sp.)	114	47.1	0.920
7	Turkey (*Meleagris gallapavo*)	50	61.2	0.862
8	Opossum (*Didelphis virginiana*)	19	9.0	0.190
9	Snake, general (Serpentes)	72	10.7	0.184
10	Cougar (*Puma concolor*)	2	7.7	0.165
11	Squirrel, general (*Sciurus* sp.)	23	5.7	0.139
12	Raccoon (*Procyon lotor*)	7	5.8	0.129
13	Duck, general (Anatidae)	11	2.7	0.056
14	Gray Fox (*Urocyon cinereoargenteus*)	3	2.0	0.050
15	Canada Goose (*Branta canadensis*)	3	1.4	0.027
16	Bobcat (*Lynx rufus*)	1	0.4	0.010
17	Large Raptor (Accipitriformes)	1	0.3	0.007
18	Barred Owl (*Strix varia*)	1	0.1	0.003

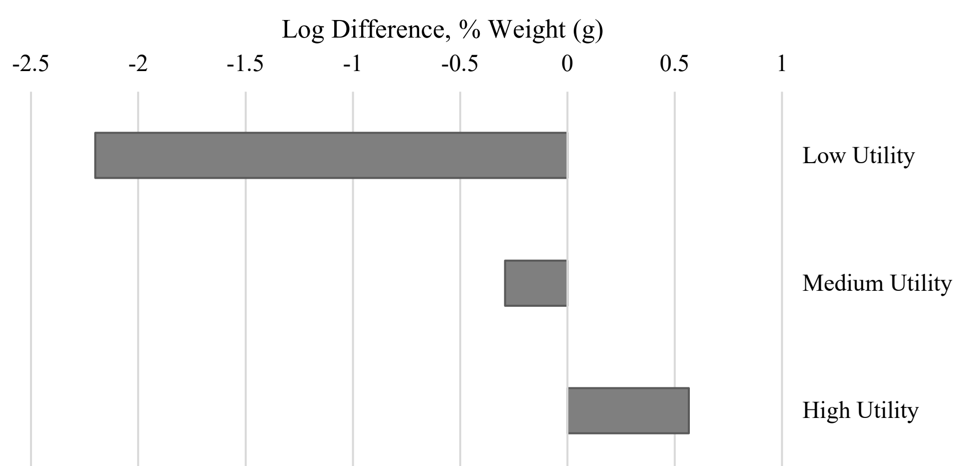

Figure 5.3. Log difference scale showing relative under- and overrepresentation of deer food utility from the South Plaza midden, in comparison to a standard deer skeleton.

fragmented, with numbers boosted by seven fragments of maxillary teeth. The low number of even fragmentary teeth is a good indication that elements of the skull were never present in the excavated portions of the midden, as the dense enamel of teeth allows them to survive in otherwise poor environments and also means that they are easily identifiable amongst even heavily fragmented assemblages. All of the maxillary teeth identified are fragmented; similarly, besides one large left occipital fragment, all of the cranial elements are also heavily fragmented. Only one mandibular fragment was recovered, containing both a second and third molar that provide the only dental age in the entire collection—in this case a deer that was about 2.5 years old. The atlas and axis tend to be removed along with the skull as a part of primary butchery. Due to their unique morphology, both vertebrae can often be identified on the basis of fairly small fragments; despite this, only two small axis fragments (a fragment of the posterior end and a fragment of the transverse process) were identified. Ten carpals and eleven tarsals are present in the assemblage; while small, these elements are also easily identified. The larger astragalus and calcaneus are only represented by a total of three fragments. Again, the unique morphology of these elements means that even small fragments can often be positively identified, therefore it is unlikely any large number of fragments are "missing" amongst the unidentified large mammal bone. The last low-utility elements are phalanges, represented in the south plaza by seven complete phalanges and seven fragments. The small number of low-utility parts indicates that, at Feltus, most primary butchery occurred elsewhere. This could mean that low-utility parts were discarded at the site of kills (reducing transport costs), or that primary butchery was done on-site but in a different area.

Medium-utility elements consist of cervical, thoracic, and lumbar vertebrae, ribs, the bones of the sternum, and the sacrum. Functionally, this is the middle section of the deer and is primarily the vertebral column and connected elements. The elements in the medium utility category are less dense than many other parts of the skeleton, making interpretation complicated as preservation can play a heavy role in their presence or absence. Conversely, all of these elements can also be identified on the basis of otherwise small fragments, therefore where preservation is decent they are unlikely to be lost within analysis. The high amounts of fish in the assemblage and presence of bones from fawns is a clear indication that preservation in the midden is good overall, therefore it is very unlikely that the presence or absence of bones in this category is skewed as a result of soil conditions. To further underscore this, of a total 133 vertebrae specimens only 32 were unable to be identified, representing 25% of the vertebral assemblage. Seven of the unidentified specimens are actually somewhat identified; they come from the lower lumbar or upper thoracic section of the vertebral column. The last two thoracic vertebrae are morphologically very similar to the first couple lumbar vertebrae, therefore if an even nearly complete vertebra is missing key markers it cannot technically be identified as one or the other. If the lumbar/thoracic vertebrae are excluded, then only 18.8% of the vertebral assemblage could not otherwise be identified—an extremely low percentage. Compared to a standard deer then, medium-utility elements are somewhat underrepresented within this assemblage. While the middle section of a deer is not devoid of nutrition, there is certainly less available meat, fat, and marrow, and what is present in this section of deer requires additional effort to remove and/or cook. In the case of the South Plaza midden assemblage, it is clear that while medium utility elements were utilized at the event, it was not to the same degree as would be present from the disposal of an entire skeleton.

High utility elements are those which contain the largest proportions of meat, marrow, and fat, taking into account the distribution of those materials on the skeleton and the way in which carcasses are dismembered. High utility elements come from the fore- and hindlegs, and include the scapula, humerus, radius, ulna, pelvis, femur, and tibia. In the South Plaza midden assemblage, high utility elements are strongly overrepresented, suggesting that there was a preferential focus on these elements over other skeletal elements. This preference also suggests that one focus of the event was on meat procurement, as the front and hindlegs contain most of the easily available meat and fat on a deer skeleton. Breaking this pattern down further, forelegs and hindlegs are overrepresented to almost the same degree, though there are relevant differences between the respective cuts of venison (Figure 5.4). Hindlegs contain more meat than forelegs and that meat is more tender, lending to potentially different cooking methods. Hindlegs also contain more marrow than forelegs; given that a number of long bones contain direct evidence of percussion blows and heat alteration for the purpose of marrow extraction, it seems that both meat and marrow played a role in consumption decisions.

With the analysis of element composition in mind, another relevant factor is age at death. This can be estimated through two methods—tooth eruption and wear, and epiphyseal fusion data. Tooth rows provide more granular data because a more specific age can be applied to the mandible, but also rely on a robust assemblage of mandibles. As illustrated by the previously described element distribution, very few low utility elements were recovered from the South Plaza midden; in fact, only one mandible fragment with partially intact tooth row was identified. Due to the lack of mandibles, epiphyseal fusion represents the only option for examining hunting patterns.

The survivorship curve for deer elements in the South Plaza, shown below in Figure 5.5, does not appear to exactly mirror either the catastrophic or the prime-dominated mortality profiles outlined by (Stiner 1990); instead, it seems to be a blend of the two. In a catastrophic

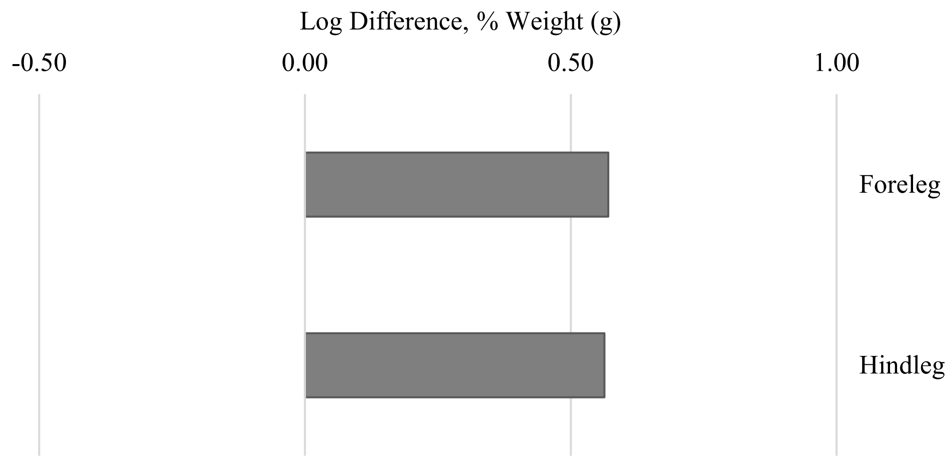

Figure 5.4. Log difference scale showing relative under- and overrepresentation of deer fore- and hindlegs from the South Plaza midden.

assemblage, mortality is highest in the youngest age groups and decreases steadily with age, while a prime-dominated deer assemblage should be characterized by a high frequency of animals from about three to five years (Stiner 1990:314-316). Catastrophic curves can result in two ways: first, through random hunting over time; and second, through killing most or all of a herd (Stiner 1990:314); the common factor is that hunters target almost any animal they find, as opposed to selecting animals with a specific set of attributes (usually related to size). Prime-age curves result from hunters targeting animals selectively, usually via stalking (Stiner 1990:317).

Most of the elements in the South Plaza assemblage represent deer taken between the ages of two to three years, after which survivorship increases slightly, if fusion at 35 and 38 months are combined (Table 5.6, Figure 5.5). Deer that are younger than two (fawns and yearlings) are not a large component of the South Plaza assemblage, but they are still present. This combination of deer ages suggests a mix of random (taking the prey you encounter) and selective hunting, although both are typically interpreted as a result of individual stalking. Given the large number of deer remains and the rapidity with which deer needed to be hunted for a

Table 5.6. Survivorship data for white-tailed deer from the South Plaza midden.

Fusion Stage	Age of Fusion (months)	Fused	Fusing	Unfused	Total	Survivorship (% fused)
1	5	33	-	-	33	100.00
2	11	5	1	6	12	41.67
3	12	15	-	-	15	100.00
4	17	-	-	1	1	0.00
5	20	7	1	1	9	77.78
6	29	20	4	32	56	35.71
7	32	4	2	7	13	30.77
8	35	12	1	6	19	63.16
9	38	6	3	11	20	30.00

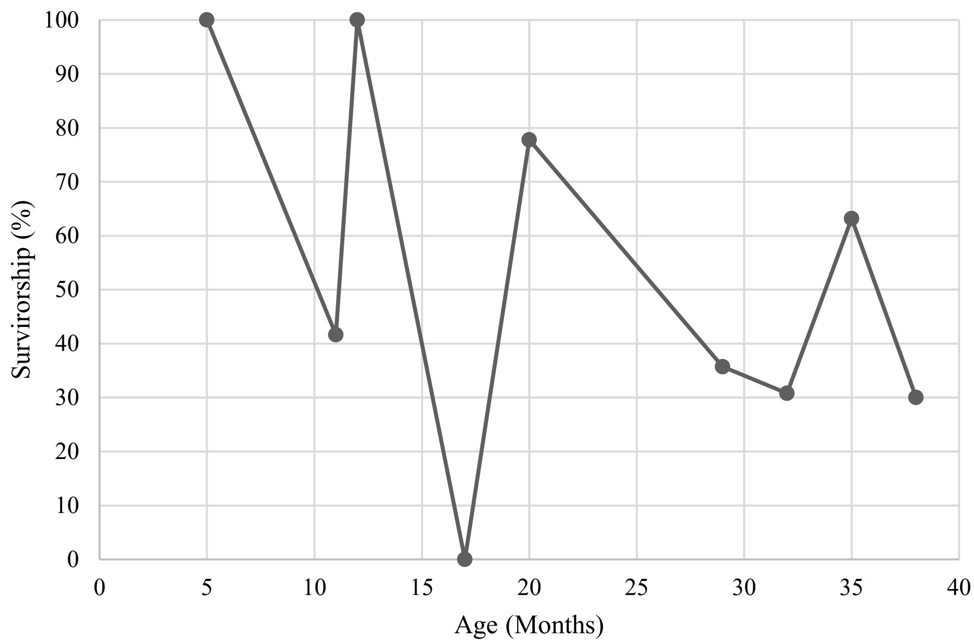

Figure 5.5. Deer survivorship curve based on epiphyseal fusion for the South Plaza midden.

large gathering, I suggest a better model would be communal drives, analogous to ethnohistoric descriptions in the eastern Woodlands that involve driving deer towards water or using fire (Waselkov 1978). A similar method of hunting is described by Le Page du Pratz (1758:71-73) among the Natchez; this well-known account involves a group of hunters that bring back a live deer, slowly surround it, and ultimately exhaust the animal until it lays down on the ground and is dispatched. While du Pratz's account is quite specific, use of a similar method would have greatly increased the odds of hunting success and also allowed greater selectivity in choosing which animals to kill.

Two sets of remains from fawns provide an opportunity to narrow down the seasonality of the South Plaza midden. Determining age for these remains takes into account normal fusion data, as well as comparisons to fawns of known age from the comparative collection at the Research Laboratories of Archaeology at UNC. One fragment of an unfused right ilium matches the size range of a two- to three-month-old fawn, while the proximal end of an unfused left ischium and the proximal end of an unfused left femur compared well with a one- to two-month-old fawn. In addition, the cortical characteristics of a long-bone shaft also compared well to the archaeological specimens from the one- to two-month-old fawn. The specificity of these age ranges means that they can be used along with typical birth months to determine when the fawns were most likely killed. The Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) collects detailed information pertaining to deer biology, including data for breeding dates of mature does (MDWFP 2022). These types of data are important as breeding dates for white-tailed deer differ based on their geographic location, with breeding occurring later in the year in the southern portion of their range. Significantly, the MDWFP has found that average breeding dates vary widely within the state; assuming that their information aligns well with prehistoric breeding rates, I use these data to determine what I hope is a more accurate birth range for Mississippi deer. In the area around Feltus, the average breeding date occurs during the first week of January. If a doe does not get pregnant, it will cycle again with a second estrus roughly 28 days later. The gestation period for white-tailed deer averages 200 days; based on the two estrus periods and the average breeding date from the MDWFP, this means that fawns in the Feltus area are predominately born between the end of July and the end of August. The fawns recovered from the South Plaza midden, aged roughly one- to two-months old and two- to three-months old, were therefore probably killed between the end of August/end of September and end of September/end of October respectively. These estimates provide a fall date for the timing of the gathering that produced the South Plaza midden.

BEAR. The South Plaza midden also contains an unusually large amount of bear remains, consisting of 66 bone specimens weighing 993.1 g and representing a minimum of three bears. Two bones are heat altered, including a large portion of the shaft from a left radius that is fully carbonized inside and out with a small amount of calcining, as well as a calcined complete right scapholunar (a wrist bone). Two bones in the assemblage have evidence of rodent gnawing: a large portion of an occipital bone and a complete, fused right calcaneum. Another three bones contain evidence of carnivore gnawing: a right proximal scapula, complete left femur, and complete lumbar vertebra. The only butchery related marks are multiple cut marks on a right ischium, related to disarticulation/defleshing (Costamagno et al. 2019). The other cultural modification of note is in relation to a fragment of the right maxilla extending to just in front of the posterior end of the zygomatic arch (Figure 5.6). This section of bone appears to have been cut/chopped and then abraded and smoothed. The location of the break is inconsistent with

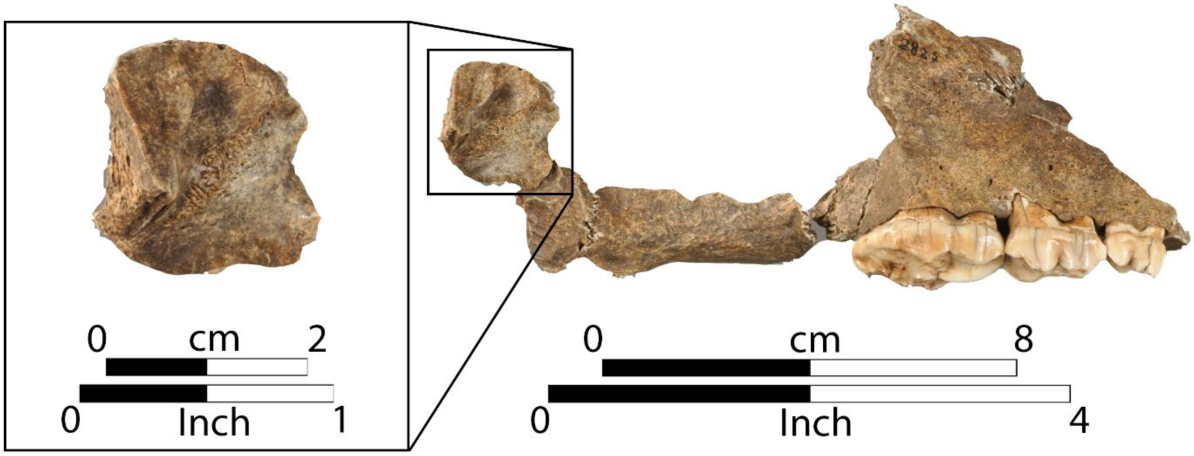

Figure 5.6. Right bear maxilla with close-up of fragment showing cut and smoothed surface.

recorded information relating to brain consumption, in which case a hole was made in the parietal/temporal area of the skull (Berres et al. 2014). Based on the location of the break and smoothing of the bone, it seems possible that the skull may have been used as some sort of headdress or other type of ritual object and purposely disposed of within the South Plaza deposit.

The MNI of bear for this assemblage, as mentioned before, is three. This is based on three femurs: two complete and fused left femurs and an unfused proximal right epiphysis, assumed to be a different animal based on the fusion state. The relatively large amount of skeletal material also allows for some information to be compiled, although this information does not change the minimum number of individuals. Unfortunately, we lack robust data pertaining to tooth wear in black bears. Instead, I utilized Stiner's (1998) methodology, although that data relates to cave and brown bears rather than black bears. In place of assigning specific ages to molar wear, Stiner groups wear into nine different stages, with the youngest stage correlating to cubs and the oldest stage concluding at the point that a bear can no longer effectively eat. Those individual stages are then grouped into three age cohorts: juvenile, prime adult, and old adult (Stiner 1998). The complete right mandible in the South Plaza midden provides the most specific ageing information; based on the first molar the bear appears to be a prime adult within Stiner's Stage 4 cohort (Stiner 1998:313). Although clinal variation in bear sizes is likely, on the basis of sexual dimorphism tooth width can also be used to estimate sex. Based on the canine width and an estimation of the second molar width from the empty crypt, the right mandible may be from a female bear (Gordon and Morejohn 1975).

Five unfused skeletal parts are likely from the same bear; an unfused squamous temporal fragment, unfused right and left occipital fragments, an unfused right proximal femur epiphysis, and an unfused distal calcaneum fragment. Fusion of the squamous temporal is somewhat variable, but appears to begin around 2 years, while the occipital seems to be completely fused by 2 years of age (Marks and Erickson 1966:398-399). Fusion of the femur happens later in life, between 6 to 8 years, therefore minimally the unfused femur is from a bear less than 8 years old, while the fusing and fused specimens are from bears at least 6 years old (McGee et al. 2007). Unfortunately, fusion data was not found for black bear calcanei; brown bear calcanei fuse between 5 and 6 years, although it is not clear how analogous this may be to black bears (Weinstock 2009:419). Based on these rough data, it would appear that the South Plaza midden contains one juvenile bear less than two years old and two adult bears, one potentially between 6 to 8 years old and another at least older than 6 years.

Similarly to deer, skeletal part information was also compiled for bear. Anecdotally, bear paw bones have been discussed as overrepresented among archaeological assemblages, while the rest of the skeleton tends to be underrepresented. However, comparisons are often made using raw NISP (see LaDu and Funkhouser 2016 for an example); given the number of bones in a paw, simple counts are a skewed method for understanding this phenomenon. In order to examine ratios for the Feltus assemblage, skeletal elements are grouped into categories and then compared to the expected number of bones for the same skeletal category in a bear. Because the rest of the skeleton is often relatively underrepresented, data are aggregated into two main components: paw bones and other skeletal parts. Paw bones consist of phalanges, metapodials, carpals, and tarsals; sesamoids were removed from consideration due to their high number and potential for skewing of data. The number of bones considered for the rest of the skeleton is altered by changing the number of sternebrae to one, due to the fact they are rarely recovered, and not counting individual teeth within skull or mandible totals. Based on these adjustments, the full number of bones considered is 171, with 104 paw elements and 67 other skeletal elements. Adjustments were also made specific to the South Plaza midden assemblage. In order to reduce NISP inflation, bone fragments that are thought to be from the same element are grouped together. For example, eight right maxilla fragments from bag #2821 did not mend together, but visually appear to be from the same maxilla element, so their number was reduced to one. Similarly, a right pubis fragment, right fused ischium fragment, and three other fragments of bone found together, all appear to be from the same innominate and therefore are also grouped together as one element. This reduced the overall number of bear remains under consideration from 66 to 46.

Grouped as paw and other elements (Figure 5.7), paw remains are underrepresented while other skeletal parts are overrepresented. Compared to most other sites in the LMV this is an unusual pattern (Peles and Kassabaum 2020), suggesting that entire bear skeletons were consumed and or used for ritual purposes and disposed of in this midden. It also suggests that bear paws were removed and used or disposed of elsewhere, either in a different part of the midden or outside the midden entirely.

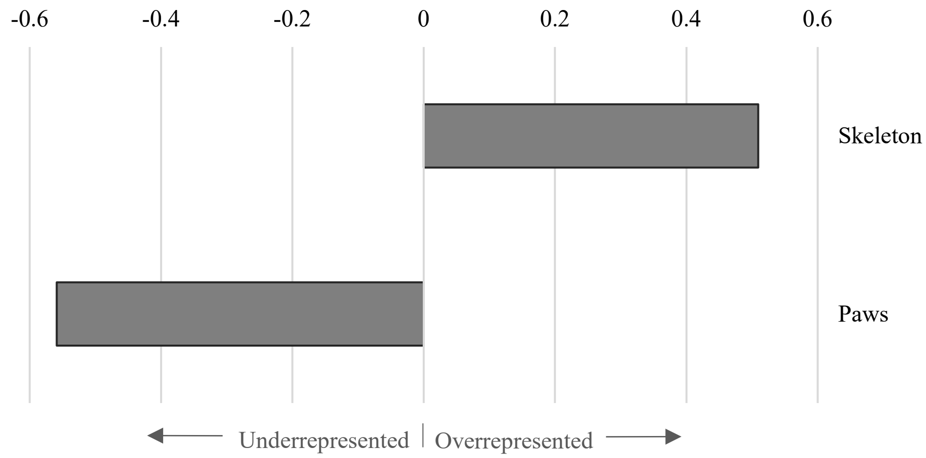

Figure 5.7. Log difference scale showing relative under- and over-representation of bear skeletal elements in the South Plaza midden.

OTHER MAMMALS. Beyond deer and bear, the next most abundant mammal based on NISP is rabbit (114 specimens), particularly swamp rabbit (65 specimens). Swamp and cottontail rabbit are represented by a minimum of four and two individuals respectively, and it may be their method of consumption led to the relatively high number of skeletal elements. Broadly, all parts of the skeleton are represented except for those that are too small to be caught in ¼" screen (e.g., phalanges, carpals, tarsals), indicating that rabbits may have been cooked whole or nearly whole. Very few elements are heat altered, which could suggest either roasting whole or a wet cooking method such as stewing. Additional small mammals are present in the assemblage, though in much smaller numbers, including squirrel, opossum, raccoon, and gray fox. Of particular note are remains from cougar and bobcat; one distal phalanx from bobcat is present, while a large portion of the distal shaft of a burned right femur and a complete right scapholunar carpal from a cougar are also present. Like bear, these remains are very unusual; while both animals could have provided meat, their status as predators and their relatively small populations make it much more likely they were utilized and/or consumed within a ritual context.

FISH. Following mammals, fish were the next most numerous class of vertebrates recovered, ranking third in biomass. At least fifteen different species of fish were represented in the South Plaza midden; the most numerous were gar, bowfin, and catfish. Most of the identified fish either prefer or secondarily are found in backwater habitats, such as oxbows and backwater lakes. Experiments by Limp and Reidhead (1979) suggest that numerous fish could have been gathered via collection in such oxbow lakes and bayous, far beyond what could have been gathered through fishing in main channels. Seasonal flooding of the Mississippi River would have continually replenished low lying areas with fish; oxbows for example could be targeted after the floods receded and water levels lowered. As seasonal oxbows and low-lying areas shrank, fish would have been confined to increasingly small areas; by fall, some of these would have completely evaporated, but areas with deeper waters would still remain. Shallow oxbows would have provided particularly easy areas for fishing, where nets or baskets could be set up on one side and fish driven into traps. Limp and Reidhead (1979:71) focused on a bayou, blocking off escape through the use of a large log and simply driving fish into the shallow section, whereby they then collected fish by hand.

Within the South Plaza midden collection there are also some extremely large alligator gar remains, although they are less well preserved and more fragmented than smaller slender gar, making it difficult to determine size in a more specific way. One complete left post-temporal was sized based on the comparative assemblage at the USM and came from a gar that was more than 120 cm, or about 4 ft, in length. Alligator gar prefer the back pools of larger riverways, so it is possible the large skeletal elements in the assemblage came from one or more alligator gar caught in the Mississippi River. Doing so would have required specific knowledge of the best hunting techniques and possibly bait fish. However, it is also possible that some particularly large gar were caught up in the broader backwater strategy probably used to capture the other fish in the assemblage.

REPTILES. Reptiles were represented in the South Plaza midden primarily by turtle, which consisted of 320 specimens weighing 171.9 g and a minimum of four turtles. As noted previously, nearly all of these specimens were shell remains, either carapace or plastron. I subdivided turtles in the biomass ranking into terrestrial and aquatic species to reflect different collection patterns. Two of the identified turtle species — snapping turtle and eastern mud turtle — are aquatic species. It seems very likely that these turtles could have been caught up in nets along with fish, in the context of mass collection of oxbow and/or bayou areas (Limp and Reidhead 1979).

The other taxon in the South Plaza midden was box turtle, which is extremely common in the Southeast. A femur and humerus indicate that at least one turtle was brought whole to the site and could have easily been picked up by hand. While turtle can be consumed, empty shells also would have been conspicuous on the landscape and easily gathered for other uses, such as rattles, bowls, or cups. This is particularly relevant for the South Plaza midden as a number of shell fragments were polished and/or ground down, including peripheral fragments from the edge of the turtle shell (25 specimens, including two unidentified turtle shell fragments which were too small to positively identify but are highly likely to be box turtle, see Figure 5.8). Ten of these culturally modified shell fragments were also heat-altered, ranging from browning through full carbonization. Based on this, it seems likely that most or all of the 21 other heat-altered box turtle elements came from the same shell.

In addition to the modified carapace fragments, two smoothed box turtle plastron

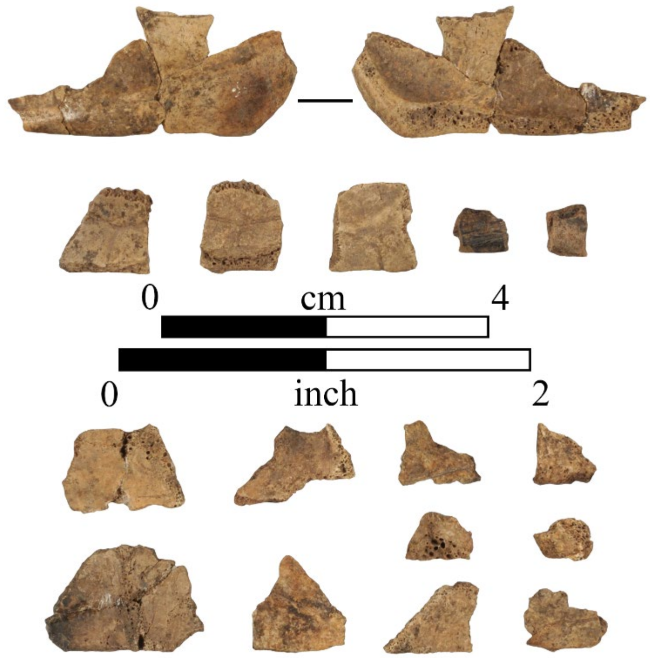

Figure 5.8. Modified box turtle carapace fragments. Peripheral fragments are above the scale, neural and costal fragments below the scale.

fragments were also identified; one fragment comes from the axial notch of a right hyoplastron, while the other fragment comes from a fragment of left epiplastron. The placement of these plastron modifications does not match any known descriptions that I have been able to find, therefore it is difficult to know whether they are related to some sort of food consumption (similar to turtle shell bowls) or ritual use (similar to turtle shell rattles).

BIRDS. The primary bird identified in the South Plaza midden was turkey, with 50 specimens weighing 61.2 g and representing at least three birds. Another 88 specimens were categorized as unidentified large bird; given the assemblage characteristics the majority of these remains are also likely to be turkey. Turkeys are one of the larger bird species available in the Feltus area and would have been relatively numerous given the upland setting of the Natchez Bluffs. Ethnohistorically, turkey feathers were also important components of clothing and ritual regalia (Krech 2009:66, 70, 74-75, 121-122), so it is important to recognize that they may have served multiple functions within this context.

Other identified birds in the South Plaza midden assemblage are primarily seasonal migrators, including Canada goose, mallard/black duck, and common goldeneye. The LMV is a part of the Mississippi Flyway migration route, so the area around Feltus would have had access to a large population of migratory ducks and geese. Given the preservation in the South Plaza midden, it may be surprising that there are not *more* duck and geese species in the assemblage. This may be an indication that geese and duck were sought less for consumption and more for their feathers, particularly within the context of a large gathering, though it could also be a reflection of reduced availability during the beginning of the migration season. The presence of seasonal migrators also provides another set of data pertaining to seasonality. When the wintering dates of Canada geese, mallards and black ducks, and common goldeneyes are compared to the dates obtained from the young fawns, a fall gathering seems overwhelmingly likely, with a more specific date probably falling in the October range.

Two additional specimens in the assemblage represent rare and unusual birds. The first was a radius fragment that comes from either an eagle, vulture, or osprey. While this bone fragment unfortunately did not contain any other morphological characteristics allowing for more specific identification, any of the possible large raptors it represents would be unusual and meaningful. The second unusual bone was a barred owl talon. Given the ambivalent reputation of owls within southeastern Native cosmology and their ability to communicate with other worlds, this is also most likely a special object. The presence of bones from two birds that not only had numerous ritual, ceremonial, and healing properties, but were also connected with journeys to the afterlife, suggests that they are indicative of specific activities associated with the large gathering that created the South Plaza midden.

Mound B, Stage 4 Flank Midden

The faunal collection from the midden at the southern edge of the Mound B summit (hereafter referred to as the Mound B.S4 midden) is a comparatively smaller assemblage consisting of 3,235 fragments of bone weighing 2,560.6 g. This represents a minimum of 34 individuals and nearly 35 kg of biomass (Table 5.7). Within this assemblage, 20 separate taxa were identified consisting primarily of mammals and fish. I also ranked taxa according to biomass here in order quantify the relative contributions of animals brought to the mound top by participants (Table 5.8). As with the South Plaza midden, deer are the predominant animal in the Mound B.S4 midden assemblage according to any measure, though particularly in terms of biomass. The next cluster of animals consists of bear, fish, turkey, and squirrel, which all contribute between 1 and 2 kg of biomass. The remaining animals contribute about 0.5 kg of biomass combined; these animals include rabbit, opossum, duck, Canada goose, and raccoon.

WHITE-TAILED DEER. A total of 328 fragments of bone are identified as deer, weighing 1,476.5 g and representing at least four deer. Grouping together white-tailed deer based on element distribution, low utility elements are very underrepresented (Figure 5.9). Skull fragments in the Mound B.S4 midden were large in size and easy to identify, and consisted of three cranial fragments (bulla, frontal, and zygomatic), a fragment of a mandible, and four fragments from mandibular teeth. One complete axis is in the assemblage, as well as one radial carpal, two ulnar carpals, and one lateral malleolus. No metatarsals, calcanei, or astragali were recovered, although

Table 5.7. Animals identified in the Mound B.S4 midden.

Taxon	NISP	MNI	Weight (g)	Biomass (kg)
Mammal				
White-Tailed Deer (*Odocoileus virginianus*)	328	4	1476.5	18.716
Bear (*Ursus americanus*)	25	1	99.6	1.654
Raccoon (*Procyon lotor*)	1	1	0.5	0.014
Opossum (*Didelphis virginiana*)	8	1	7.2	0.155
Cottontail Rabbit (*Sylvilagus floridanus*)	2	1	0.6	0.015
Swamp Rabbit (*Sylvilagus aquaticus*)	3	1	12.7	0.259
Gray Squirrel (*Sciurus carolinensus*)	240	8	64.1	1.112
Tree Squirrel (*Sciurus* sp.)	2		0.7	0.019
Unidentified Squirrel (Sciurinae)	1		0.1	0.004
Hispid Cotton Rat (*Sigmodon hispidus)*	1	1	0.1	0.004
Mouse-sized Rodent (Cricetidae)	3		0.2	0.006
Rat-sized Rodent (Cricetidae)	1		0.3	0.009
Unidentified Large Mammal	736		507.7	7.161
Unidentified Medium/Large Mammal	19		2.9	0.069
Unidentified Medium Mammal	3		1.0	0.026
Unidentified Small/Medium Mammal	4		1.9	0.046
Unidentified Small Mammal	312		50.4	0.895
Unidentified Mammal	311		47.0	0.840
Mammal Total	*2000*		*2273.4*	*31.004*
Bird				
Canada Goose (*Branta canadensis*)	3	1	2.1	0.039
Goose/Swan (Anserini)	1		0.1	0.003
Lesser Scaup, cf. (*Aythya affinis*)	1	1	0.1	0.003
Duck/Goose/Swan (Anatidae)	9		2.3	0.044
Turkey (*Meleagris gallapavo*)	20	2	90	1.223
Unidentified Large Bird	47		15.6	0.248
Unidentified Medium/Large Bird	29		3.3	0.061
Unidentified Medium Bird	31		5.7	0.099
Unidentified Bird	93		8.9	0.149
Bird Total	*234*		*127.9*	*1.869*
Reptile				
Box/Water Turtle (Emydidae)	1	1	0.1	0.002
Unidentified Turtle (Testudines)	3		0.6	0.012
Reptile Total	*4*		*0.7*	*0.014*

Table 5.7. Continued.

Taxon	**NISP**	**MNI**	**Weight (g)**	**Biomass (kg)**
Fish				
Yellow Bullhead (*Ameiurus natalis*)	2	1	0.1	0.002
Blue Catfish (*Ictalurus furcatus*)	2	1	0.4	0.009
Catfish Family (Ictaluridae)	26		7.2	0.129
Bowfin (*Amia calva*)	17	1	2.5	0.017
Smallmouth Buffalo (*Ictiobus bubalus*)	6	1	1.4	0.039
Largemouth Buffalo (*Ictiobus cyprinellus*)	6	2	8.0	0.156
Buffalo (*Ictiobus* sp.)	12		4.2	0.093
Sucker (Catostomidae)	14		3.2	0.076
White Crappie (*Pomoxis annularis*)	3	1	0.4	0.007
Crappie (*Pomoxis* sp.)	2		0.2	0.004
Bass (*Micropterus* sp.)	7	2	2.4	0.036
Sunfish Family (Centrarchidae)	6		0.6	0.011
Perciformes (Perciformes)	6		0.8	0.022
Alligator Gar (*Atractosteus spatula*)	3	1	18.4	0.417
Slender Gars (*Lepisosteus* sp.)	4	1	8.2	0.207
Gars (Lepisosteidae)	27		17.9	0.408
Unidentified Fishes (Osteichthyes)	17		21.8	0.358
Fish Total	*160*		*97.5*	*1.992*
Crustacean				
Crayfish (*Procambarus* sp.)	3	1	0.1	
Crustacean Total	*3*		*0.1*	
Unidentified				
Unidentified Bone	800		59.5	
Unidentified Total	*800*		*59.5*	
Gar Scales	4		1.4	
Unidentified Fish Scales	34		0.56	
Total	*3239*		*2561.0*	*34.878*

Table 5.8. Animals in the Mound B.S4 midden, ranked according to biomass.

Rank	**Taxon**	**NISP**	**Weight (g)**	**Biomass (kg)**
1	White-Tailed Deer (*Odocoileus virginianus*)	328	1476.5	18.716
2	Bear (*Ursus americanus*)	25	99.6	1.654
3	Fish, general (Osteichthyes)	143	75.8	1.634
4	Turkey (*Meleagris gallapavo*)	20	90	1.223
5	Squirrel, general (*Sciurus* sp.)	243	65.0	1.135
6	Rabbit, general (*Sylvilagus* sp.)	5	13.2	0.274
7	Opossum (*Didelphis virginiana*)	8	7.2	0.155
8	Duck, general (Anatidae)	10	2.4	0.046
9	Canada Goose (*Branta canadensis*)	3	2.1	0.039
10	Raccoon (*Procyon lotor*)	1	0.5	0.014

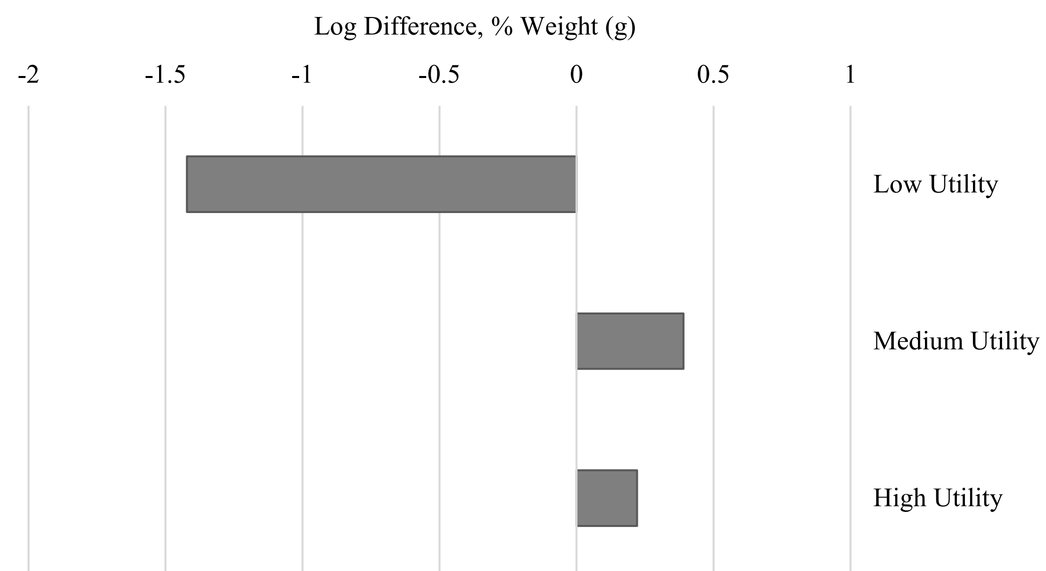

Figure 5.9. Log difference scale showing relative under- and over-representation of deer food utility from the Mound B.S4 midden at Feltus, in comparison to a standard deer skeleton.

four metacarpal fragments are identified. A total of five phalanges are in the assemblage: one complete first phalanx, a complete and distal end of two second phalanges, and a complete and proximal end of two third phalanges. The first phalanx contains cut marks along the shaft, likely related to skinning for hide removal. The medium utility portion of the deer, or the midsection, is represented by thoracic and lumbar vertebrae, ribs, sternebrae, and the sacrum. No fragments of cervical vertebrae were recovered. Some analyses group cervical vertebrae with the skull based on presumed butchery discard patterns, therefore the lack of skull remains may go hand in hand with the lack of cervical vertebrae. Almost a third of the thoracic and lumbar vertebrae are nearly complete specimens, while another third are unfused epiphyses that may ultimately mend with the previous vertebrae. Roughly 45% of all vertebrae are categorized as unidentified vertebrae, although this amount includes 19 epiphysis fragments, all but one of which are burned to some degree. Overall, this indicates extremely low fragmentation of vertebral remains – vertebral columns were not utilized extensively for grease or otherwise broken during cooking and were not otherwise damaged after being discarded. Both lumbar and thoracic vertebrae contain evidence of burning, with most of the evidence consisting of small amounts of partial carbonization such as would occur if meat were still attached to the bone. One thoracic spine contains evidence of carnivore gnawing; based on the context this is most likely to be dog and implies that at least one dog was included in the mound-top activities.

In addition to the vertebrae, a large number of rib fragments were recovered, totaling 137 fragments weighing 255.35 g. Ribs fragment easily due to their fragile nature, but even if rib heads are used to obtain a minimum number of ribs, there are still at least 36 ribs present. Despite the much larger area and number of remains in the South Plaza midden, it only contains 42 rib fragments weighing 54.28 g and representing a minimum of 21 ribs. Ribs from the Mound

B.S4 midden are also broken into larger fragments, with each fragment weighing an average of 1.86 g (compared to 1.29 g in the South Plaza midden). Due to the way that ribs tend to splinter when they break it is difficult to determine green bone fractures vs. post-depositional fractures, but the evidence for little disturbance of vertebrae suggests the lower fragmentation of ribs may be a real phenomenon rather than preservational in nature. Two complete and articulating sternebrae were also recovered, suggesting that the rib cage of at least one deer may have been whole when it made its way up the mound. Finally, one sacrum was identified, consisting of the unfused first and second sacral vertebrae and indicating a deer less than 11 months of age.
The high-utility portion of a deer includes the foreleg and hindleg and is also overrepresented in the Mound B.S4 midden collection, though the ratio of forelegs to hindlegs is much more skewed than the South Plaza midden (Figure 5.10). There are a number of relatively complete elements within these designations, including two complete scapulae, a nearly complete humerus only missing epiphyses due to carnivore gnawing, another humerus between 50-75% complete, a radius and an ulna between 50-75% complete, and two tibiae between 50-75% complete. Interestingly, there are no innominate fragments identified in the assemblage, suggesting that hindlegs were completely disarticulated from the acetabulum before being brought up to the mound top. The inclusion of two complete scapulae likewise suggests that the foreleg was removed at the shoulder joint and potentially brought to the top of the mound as an intact unit.

Burning patterns reveal additional information about the nature of fore- and hindleg consumption on the top of the mound. Nine specimens show evidence of either heat alteration or partial carbonization; six of these are noted to be only small amounts of burning on shafts, sometimes specifically located by breakage points. Heat alteration and partial carbonization can indicate two things, not necessarily mutually exclusive. The first would be that elements were

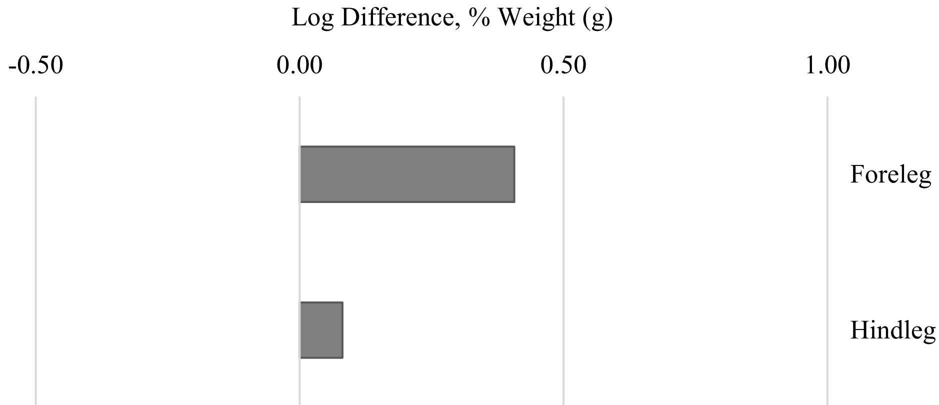

Figure 5.10. Relative over- and underrepresentation of deer fore- and hindlegs from the Mound B.S4 midden.

roasted with the meat on the bone, leaving only exposed portions of the bone to be altered by heat. The second option is localized heat, such as would be used to liquify marrow before cracking open a long bone for consumption. Specimen fragments lacking heat alteration could have been either roasted or stewed, but the presence of some heat altered and carbonized bones suggests that roasting was at least one cooking method utilized.

The smaller assemblage of the Mound B.S4 midden means that there are also fewer elements from which to analyze age at death, but they provide some interesting information regardless. Of 31 elements included in analysis, there are no completely fused late-age elements, which would indicate deer older than 38 months of age, or about 3 years (Table 5.9). Two fusing elements provide more specific aging information: one fusing proximal humerus indicates age at death between 29 and c.38 months and a fusing proximal femur indicates death between 23 and 29 months (Purdue 1983). The oldest completely fused element in the assemblage is from the distal tibia, which fuses at 20 months. A fused first phalanx represents the fourth fusion stage (17 months), a distal humerus represents the third stage (12 months), and a fused second phalanx represents the second fusion stage (11 months). The first fusion stage (5 months) is represented in the Mound B.S4 midden by thoracic and lumbar vertebrae, all of which have fused centra. If the fourteen complete vertebrae are ignored, this leaves a total of six fused, two fusing, and nine unfused elements. In an assemblage with large amounts of density-mediated destruction (either due to poor preservation or the actions of carnivores), unfused elements tend to be underrepresented because they contain large amounts of grease and are more porous. This means that they tend to be targeted by carnivores and that they are more affected by soil pH. Although the totals are small, the fact that unfused elements are better represented than fused elements in the Mound B.S4 midden assemblage is an unusual pattern. Based on the survivorship data (Table 5.9), it appears that deer between the ages of 1 and 3 were selectively deposited in this context. The survivorship curve for the B.S4 midden (Figure 5.11) is most similar to the curve for a prime-dominated survivorship assemblage *except* for the fact that the ages skew too young. Prime age in deer, relative to weight at least, begins at roughly 3.5 years of age; a prime-dominated assemblage should therefore consist primarily of late-fusing elements.

There are two potential explanations for the deer hunting pattern seen in the Mound B.S4 midden assemblage. The first is that hunters were indeed targeting younger deer. This could have been because they were easier to hunt or because their meat was more tender; these explanations are not mutually exclusive, though being so selective would have been much riskier, particularly within the context of the amount of deer meat needed for a large gathering. Hunting in this manner would have relied on stalking, allowing hunters to focus their energy on a specific animal; this is suggested by Le Page du Pratz's (1758:69-71) description of solitary deer hunting by the Natchez. A second explanation is suggested by Waselkov (1978:20), who points out that bison drive sites — which *should* be representative of a nonselective hunting method — tend to show underrepresentation of juvenile bison. Given the frequency with which this

Table 5.9. Survivorship data for white-tailed deer from the Mound B.S4 midden.

Fusion Stage	Age of Fusion (months)	Fused	Fusing	Unfused	Total	Survivorship (% fused)
1	5	14	-	-	14	100.00
2	11	1	-	-	1	100.00
3	12	1	-	1	2	50.00
4	17	1	-	-	1	100.00
5	20	3	-	-	3	100.00
6	29	-	-	3	3	0.00
7	32	-	1	3	4	0.00
8	35	-	-	2	2	0.00
9	38	-	1	-	1	0.00

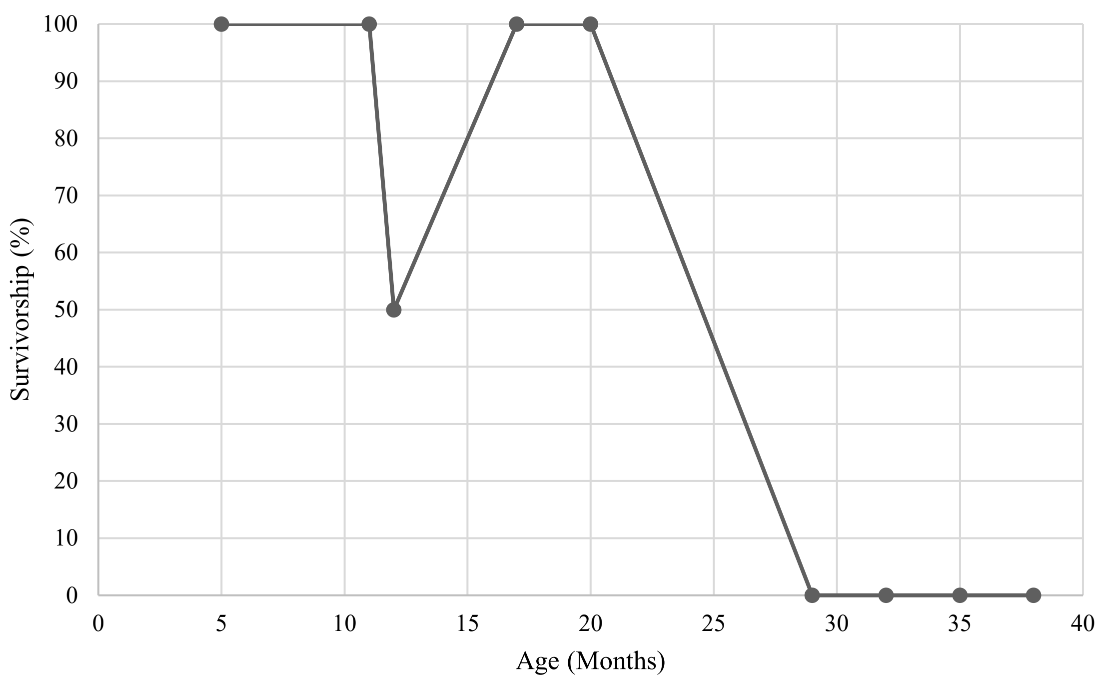

Figure 5.11. Deer survivorship curve based on epiphyseal fusion for the Mound B.S4 midden.

underrepresentation is seen, he believes this must be due to different treatment of juvenile carcasses, rather than problems with the archaeological samples themselves; this could mean things like different processing areas or immediate consumption, but all resulting in removing the remains from the kill site (Waselkov 1978:20-21). Waselkov (1978) extends this analogy to deer assemblages that contain abundant numbers of two-to-three-year-old deer; these deer represent the animals removed from the hunting location. Within the context of a communal drive, these deer would have been preferentially selected and brought back to sites. Applied to the Mound B.S4 midden, this would mean that hunters ventured out to hunt deer in the same way they did for the South Plaza deposit; they would have worked together using communal drives. Rather than *only* bringing back 1-to-3-year-olds, however, I suggest that all age classes were still brought back to the site; younger venison was then provisioned to the mound summit, while the remaining deer were utilized for meals in the plaza.

BEAR. Despite the smaller size of the B.S4 midden assemblage it still contains a number of bear remains, though the composition of bear elements is very different compared to the South Plaza midden. The Mound B.S4 bear assemblage consists of 25 specimens weighing 99.6 g and representing a minimum of one bear (though an unfused distal metapodial epiphysis may be an indication that at least two bears are present). Five bones in the assemblage show evidence of burning: one heat-altered unfused distal metapodial epiphysis, an almost completely carbonized left calcaneum, a carbonized distal second phalanx, two calcined first phalanges, and a calcined proximal rib shaft. A second and third right metatarsal both contain butchery marks, with both requiring magnification to see. The second metatarsal cut mark is on the distal end of the element, while the third metatarsal cut mark runs perpendicular to the shaft of the bone. A fifth metatarsal shows evidence of extosis near the joint, indicating some possible arthritis. The Mound B.S4 bear assemblage was also analyzed from the standpoint of skeletal parts; all bones except the rib shaft fragment are paw bones, so even when skeletal parts are adjusted in comparison with a normal bear skeleton, paw parts truly are overrepresented (Figure 5.12). Given the overall high number of paw parts, and particularly the second, third, fourth, and fifth metatarsals that all come from the right back paw, the most likely explanation is that whole paws were brought to the top of the mound.

OTHER MAMMALS. Beyond deer and bear, very few other mammals are present in the Mound B.S4 midden assemblage; these include raccoon, opossum, rabbit, squirrel, and hispid cotton rat. The most conspicuous of these other mammals in the midden is gray squirrel, numbering 238 specimens that weighed 63.4 g and represented at least eight individuals (see Figure 5.13). In order to better understand squirrel consumption and disposal, squirrel remains were grouped into skeletal portions, albeit with some modifications. The most significant modification was my decision to eliminate foot parts. While a common method of squirrel butchery is to pull the hide down to the feet and then cut the feet off, squirrel foot components (metapodials, phalanges, carpals, tarsals) are also quite small and likely to fall through ¼-inch screen. Because material smaller than ¼ inch was not analyzed for this dissertation, it is unknown if those parts are actually missing or if they are simply in the unanalyzed eighth inch material. Cranial elements are identified down to the portion of the skull they represent (i.e., frontal, squamosal, bulla, etc.). To account for fragments of skull portions and/or unfused cranial elements, all identified cranial portions were considered separately. This means that rather than considering the cranium to be one element, based on elements identified it was considered to be 17 (one occipital, two

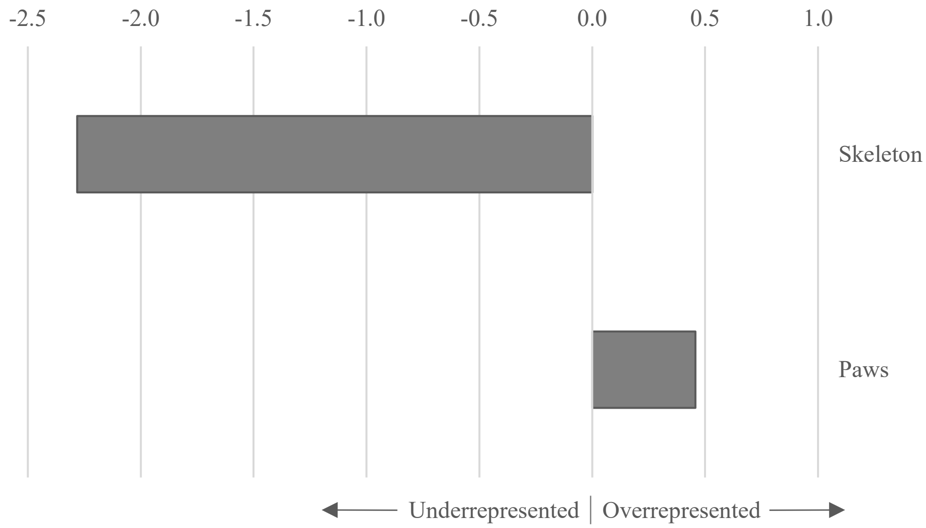

Figure 5.12. Log difference scale showing relative under- and over-representation of bear skeletal elements in the Mound B.S4 midden.

Figure 5.13. Sample of squirrel remains from the Mound B.S4 midden.

parietals, two zygomatics, two squamosals, two bulla, two frontals, two mandibles, two maxillae, and two premaxillae). Loose teeth were eliminated from analysis as they most likely originate from mandibles and maxillae already in the assemblage, otherwise they should have fallen through the quarter inch screen.

For the axial portion of the skeleton, the ribs and sternum were eliminated from analysis as they generally cannot be positively identified as squirrel. When analyzing deer, the sacrum and innominate are often included as part of the hindquarter; however, this is in opposition to the way that squirrel are usually butchered. Generally, the femur is popped out of the hip socket so that the hindquarter can be removed, therefore we would not expect the sacrum or innominate to be included as a portion of the hindleg "package." The patella was also eliminated from analysis since it would be expected to fall through the quarter inch screen. This means that the hindquarter consisted of the femur, tibia, and fibula, while the axial portion consisted of cervical, thoracic, and lumbar vertebrae, the sacrum, and the innominate. Caudal vertebrae were removed due to their small size and small likelihood of being positively identified as squirrel. This left a total of 60 elements as part of the standard squirrel skeleton.

When compared against the identified elements in the Mound B.S4 midden, the skull, forequarter, and hindquarter were all overrepresented, while axial components were underrepresented. Vertebrae, sacrums, and innominates all should be large enough to be represented in the quarter inch screen; while innominate fragments make up almost half of the axial assemblage (16 specimens), there are relatively few vertebrae (16 specimens) and sacrums (2 specimens). This is especially interesting considering that 26 vertebrae are present in a standard squirrel vertebral column alone; based on the MNI of eight, we should expect closer to 208 vertebrae if all skeletal parts are accounted for. Only three vertebrae were included as part of the otherwise unidentified small mammal category, meaning that the "missing" vertebrae were not simply identified differently. Conversely, despite controlling for the multiple cranial parts identified, skulls remain somewhat overrepresented in the assemblage, suggesting that their inclusion may be related to a specific purpose or dish. Although not well studied academically, squirrel brains are consumed as part of a rural Appalachian dish (Berger et al. 1997); it is entirely possible that squirrel brains were also consumed during Coles Creek times. The overrepresentation of fore- and hindlegs is not particularly surprising given that they are easy to separate from the rest of the skeleton during butchery and contain the most meat.

Forty-five squirrel specimens include some type of heat alteration, indicating that at least one method of cooking was roasting or smoking. This total includes four partially carbonized premaxilla with heat alteration limited to a small portion of the incisor. The location of this scorching raises the possibility that either squirrel heads were roasted, or that a few squirrels were roasted whole, in either case with the hide attached. The conspicuous lack of axial components may have a few causes. One possibility is that squirrel was butchered prior to being brought up to the top of the mound and axial components were mostly not included in this bundle. A second explanation may be different cooking methods. Today, hunters generally prefer to separate the axial components and use them in stocks or stews, as they have relatively little meat that is more difficult to strip off the bone (Costello 2018). Given the survival of very delicate fragments of skull, attrition as a result of different cooking methods at the top of the mound seems like an unlikely possibility. A third possibility is that vertebral columns made it up to the top of the mound with the rest of the squirrel but were disposed of elsewhere.

FISH. A total of 160 fish specimens are present in the Mound B.S4 midden, weighing 97.5 g and representing a minimum of 11 fish. As a proportion of NISP, this represents roughly 5% of the overall assemblage. This is significantly less than the South Plaza midden, where fish represents about 38% of the assemblage. However, NISP can be misleading due to the number of skeletal elements in fish and their propensity for fragmenting; in this case biomass is probably a better representation of dietary importance. When biomass is considered, fish represent 6% of the Mound B.S4 midden assemblage and 11% of the South Plaza midden assemblage, indicating a less drastic difference between the two contexts. In order to explore these numbers further, I also analyzed the number of postcranial elements in both assemblages. Postcranial elements include vertebrae, terminal vertebrae, atlases, spines, ribs, unidentified fish bones[2], and scales. As a percentage of NISP, postcranial elements represent 34% of the Mound B.S4 assemblage and 68% of the South Plaza assemblage. When viewed with respect to weight, postcranial elements are 39% and 52% of the respective midden assemblages. Although these numbers are not standardized to a full fish skeleton, they do represent an interesting difference given that collection environments seem to be the same (see below), and suggest that fish heads are more prevalent in the Mound B.S4 midden assemblage.

I identified a total of nine species of fish in the Mound B.S4 midden assemblage, with the different orders of fish (Siluriformes, Perciformes, Cypriniformes, etc.) roughly equal in count. Most of the species in the assemblage are present in oxbows and backwater lakes as either their preferred or secondary environments, making it likely that these were the habitats utilized for fishing. Unfortunately, very few vertebrae are in this assemblage (19 specimens), making it

[2] Although more specific identifications may be impossible, there is a distinct difference between fish skull bones and the bones that make up the rest of their body. In this analysis, I distinguished between unidentified skull bones and unidentified bones from the rest of the skeleton, meaning that in my schema unidentified fish bones most likely represent fragmentary postcranial elements.

difficult to assess the size of fish being targeted. There are a few elements from gar noted as being very large, but due to the degree of fragmentation they could not be accurately sized.

BIRDS. Three species of birds are present in the Mound B.S4 midden assemblage: turkey, Canada goose, and lesser scaup. While the number of turkey bones was relatively small (20 specimens), it included a number of complete or nearly complete elements. Vertebrae were conspicuously absent in the assemblage, even considering parts identified only as large bird, and this may be another case where either choice components of turkey were brought up to the mound summit, or whole turkey traveled up the mound but vertebrae were disposed of elsewhere.

Canada goose and lesser scaup are migratory species that provide seasonality information for the midden. Canada goose were represented by three elements (a left acetabulum, a right femur shaft, and a left ulna shaft) and would have been available from early October through early April (Turcotte and Watts 1999:119-120). Lesser scaup was represented by a complete left quadrate and is present in Mississippi from late November through the end of April (Turcotte and Watts 1999:134-135). While this technically provides a long amount of time during which both birds can be hunted, given the prominent number of deer it seems likely that the Mound B.S4 midden was formed in late fall or early winter.

REPTILES. The only reptile represented in the Mound B.S4 midden is turtle; four carapace fragments were present, three of which were from an unidentified turtle and one of which was from an otherwise unidentified emydid (box or water turtle). Given the ease with which carapace and plastron fragments are identified, the small number of turtle remains in the Mound B.S4 midden is surprising and seems to be an indication that turtles were not a large part of the activities occurring on top of the mound.

CRUSTACEANS. Crustaceans were represented in the Mound B.S4 midden by three fragments of calcined crayfish exoskeleton. As detailed above, there are numerous species of crayfish in Mississippi and in the area around the Feltus mounds. Based on their availability and the ease with which they can be gathered, we would expect them to play a larger role in the diet then we see represented in the archaeological record. Crayfish decay rapidly, however, therefore they are probably extremely underrepresented in the archaeological record, making it difficult to understand how prominent of a role they may or may not have played within diet more generally or in special activities. It is also possible that crayfish were not considered a preferred source of food, or they may have generally been subject to restricted consumption.

Faunal Remains from Mound A

In terms of faunal remains, supporting data are available from both of the Mound A middens; the Mound A1.S0 midden represents a Ballina-period premound feasting deposit, while the Mound A2.S0 midden is a slightly later Ballina/Balmoral-period feasting deposit located at the southwestern flank of the mound. Both analyses were performed by Dr. H. Edwin Jackson (USM) and consist of summary tables with NISP and weights for each taxon. Mammals dominate both middens in the same way they dominate the South Plaza and Mound B.S4 middens, representing more than 80% of the total biomass of both deposits. In order to better understand the patterns in fauna composition, I therefore divide my analysis into two parts. The first is a comparison of animal classes that includes birds, reptiles, and fish (Figure 5.14);

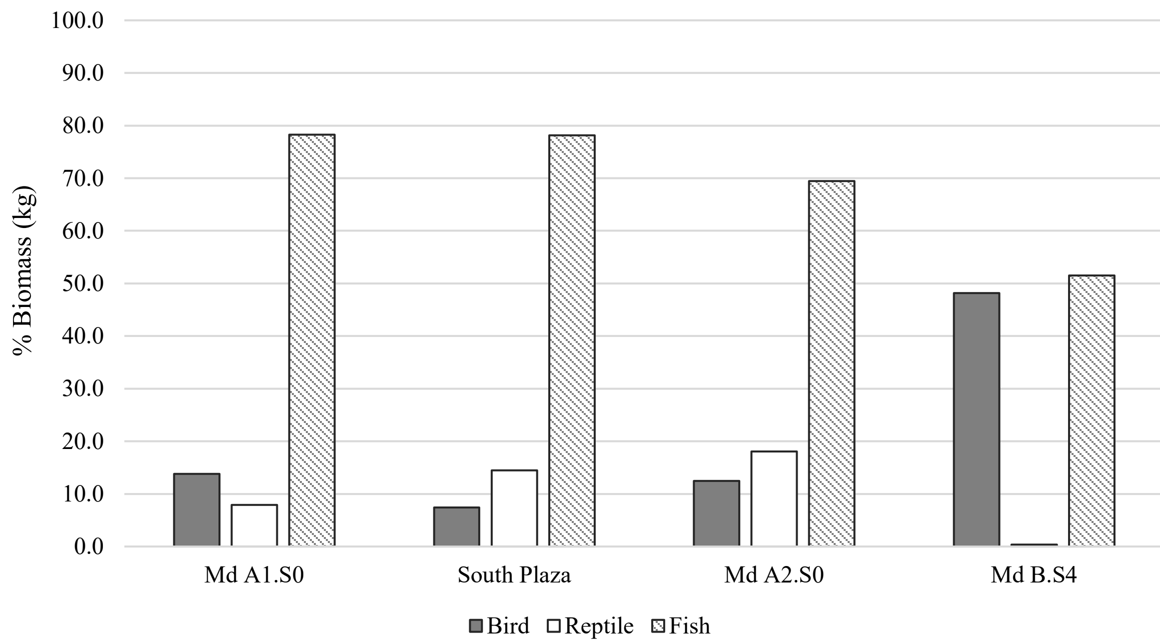

Figure 5.14. Comparison of biomass proportions among the South Plaza, Mound A, and Mound B middens, arranged chronologically.

mammals are omitted because they distract from the patterns in the other classes. This comparison shows that the compositions of both Mound A middens are broadly similar to the South Plaza midden. The Mound A1.S0 midden contains higher proportions of fish and bird and a lower proportion of reptiles than the Mound A2.S0 and South Plaza middens. The Mound B.S4 midden, on the other hand, looks extremely anomalous, with almost no reptiles and a nearly even proportion of birds and fish.

The second comparison I examined was within the mammal category. Deer were again left out of this analysis in order to better focus on other patterns; categories are compared on the basis of biomass, with the assumption that these represent consumed taxa. Based on the patterns previously identified from the South Plaza and Mound B.S4 middens, I chose to concentrate on bear, rabbit, and squirrel (Figure 5.15). This does leave out one conspicuous mammal from the Mound A1.S0 midden assemblage: raccoon. Twenty-eight raccoon specimens weighing 56.24 g

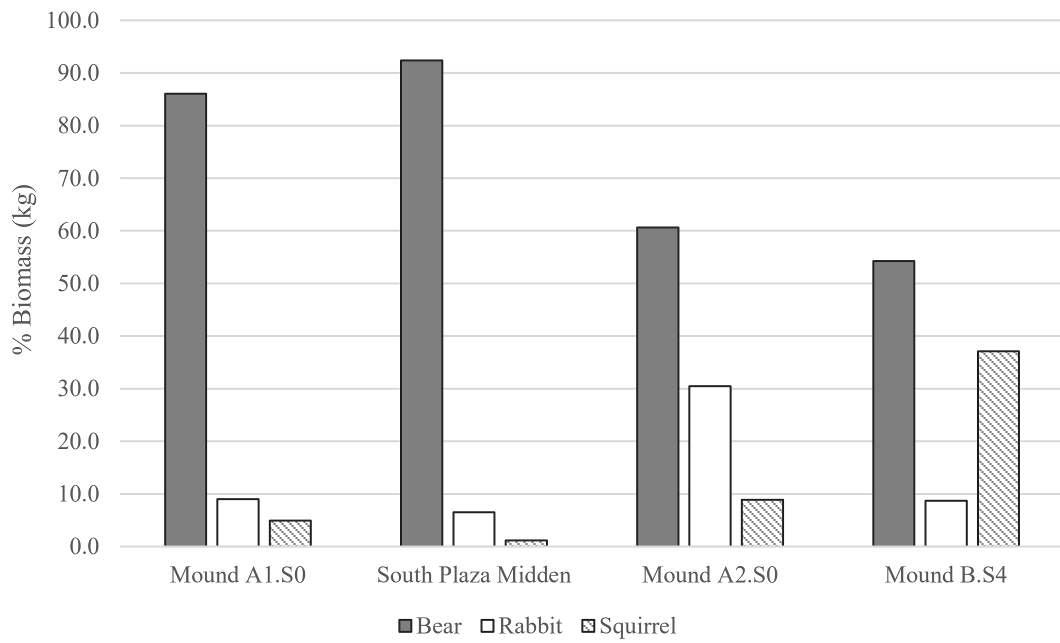

Figure 5.15. Comparison of bear, rabbit, and squirrel biomass proportions among the South Plaza, Mound A, and Mound B middens, arranged chronologically.

were identified from this deposit, which is much higher any of the other midden assemblages. Information about the representation of skeletal elements would help determine if raccoons were primarily consumed, or if they may have been utilized for other activities. The raccoon question aside, the comparison of rabbit, squirrel, and bear also indicates some interesting consumption patterns. While the proportion of rabbit to squirrel is most skewed for the South Plaza midden, the three unrestricted deposits share the same pattern of rabbit over squirrel. In a stark contrast, the Mound B.S4 deposit reverses this pattern, with four times as much squirrel than rabbit. The proportion of bear remains identified from the Mound A1.S0 and South Plaza middens are roughly similar, while those from the Mound A2.S0 and Mound B.S4 middens are also comparable.

While working on bear specific remains, I examined and quantified the bear specimens from both of the Mound A middens. Grouping the specimens into the same categories used above (paws and other parts) shows some additional patterns (Figure 5.16). Both the Mound A1.S0 and South Plaza middens contain an overrepresentation of non-paw elements, while the Mound A2.S0 and Mound B.S4 middens contain an overrepresentation of paw components. This indicates that there is not a simple division of bear use between unrestricted and restricted contexts. However, the overlap in radiocarbon dates between the South Plaza and A2.S0 middens does suggest that various components of bear tend to be spatially distributed; if we think of these deposits as related, then bear paws primarily went to the people near Mound A, while other bear components mostly stayed in the South Plaza. This also helps explain the difference seen above in bear biomass. Other components of the skeleton weigh more, which will equate to greater biomass; paw components weigh less, so assemblages with many paw parts will tend to have less biomass.

The last analysis I performed was a comparison of taxa richness, utilizing Kintigh's DIVERS. Because of the difficulties in identifying fish, I decided it was better to leave fish taxa out of this analysis to reduce bias from inter-analyst differences. The complexities in determining what activities are represented within deposits are apparent here, as the three unrestricted deposits all show different results, despite the fact that all three are associated with large-scale feasting (Figure 5.17). The Mound A1.S0 assemblage is richer than expected for its sample size, which may support Kassabaum's assertion that the character of the activities represented is different than other contexts at the site. The South Plaza midden is as rich as would be expected, while the Mound A2.S0 midden is less rich than expected. The Mound A2.S0 midden is interpreted as rapid deposition from one event; perhaps the more discrete nature of this deposit means fewer activities or people shaping the assemblage, leading to fewer overall taxa. The Mound B.S4 midden is also less rich than expected, though this difference is even greater than

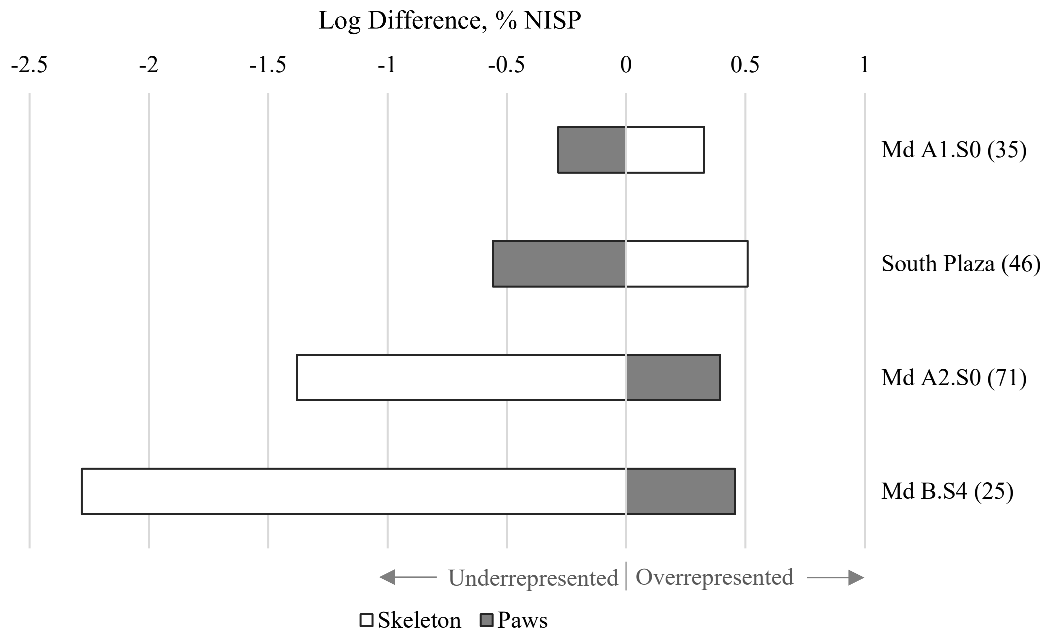

Figure 5.16. Comparison of under- and overrepresentation of bear elements among the South Plaza, Mound A, and Mound B middens, arranged chronologically ; NISP for each context in parentheses.

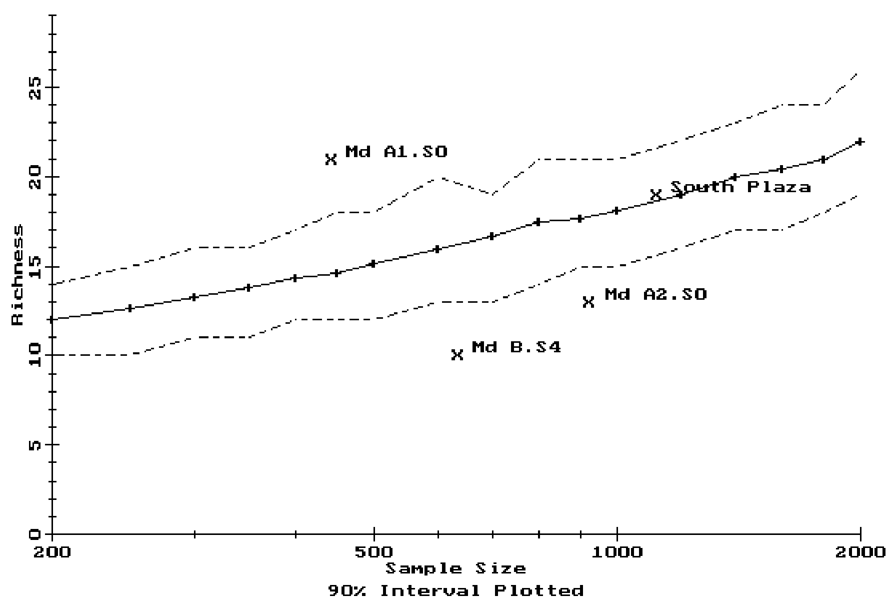

Figure 5.17. Sample richness of faunal assemblages from Feltus, excluding fish.

with the Mound A2.S0 midden. I compared both the South Plaza and Mound A2.S0 middens with the Mound B.S4 midden using Kintigh's rarefaction routine. When the South Plaza midden is downsampled to the same assemblage size as Mound B.S4, the former still has greater taxa richness than the latter, with an expected richness of 16 taxa and p value of ≥ 1.000. Similarly, when the Mound A2.S0 midden is downsampled to the Mound B.S4 assemblage size of 632, it also still has greater taxa richness, with an expected richness of 12 taxa and a p value of ≥ 0.999. These results suggest that the low taxa richness of the Mound B.S4 midden is not the result of smaller sample size. Comparisons of evenness confirm the unique pattern in the Mound B.S4 midden. All three unrestricted deposits are within or very close to the expected evenness, suggesting that despite taxa differences, counts within taxa categories are spread in a roughly similar manner. Mound B.S4 is an outlier, with taxa counts skewed to a much larger degree than would be expected. With the restricted nature of this mound-top deposit, it appears that Balmoral-period summit activities not only utilized more specific taxa, but within those taxa certain animals dominated the consumed dishes.

Animal Use in the Lower Mississippi Valley

Putting the Feltus faunal remains in a larger regional context, I compared data to Smith Creek and Lake Providence. First, I examined higher level class comparison and then I analyzed more specific species comparisons. Comparing animals by class, it is clear that mammals consistently contribute a majority of food within deposits, primarily driven by deer due to their large size and abundance in the LMV (Figure 5.18). Fish is typically second, and bird and reptile come last, with their proportions varying. Smith Creek clearly has more fish than is typical of other sites; this could be a function of environmental availability or a difference in the seasonality of the

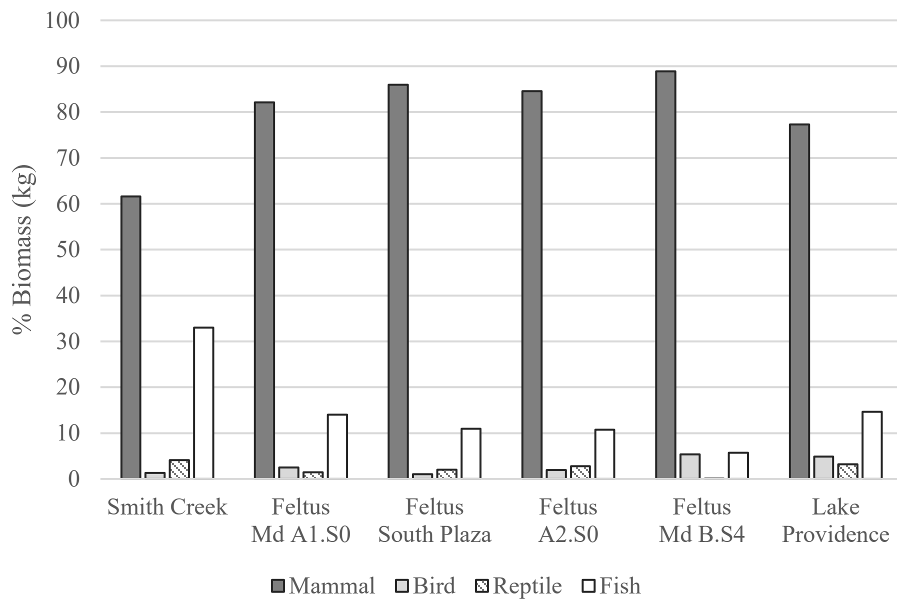

Figure 5.18. Comparison of animal classes at LMV sites, arranged chronologically.

deposit. All three unrestricted deposits at Feltus (A1.S0, South Plaza, and A2.S0) have similar proportions of fish, which may be an indication of the importance of aquatic resources for large-scale meals. In contrast, the proportion of fish is lower for the restricted Mound B.S4 midden, suggesting decreased importance of fish in comparison to mammal and bird. Based on the location of Lake Providence, we would expect the mound-top elite to consume much more fish and proportionally less mammal (Scott 2005). The fact that Lake Providence looks similar to the upland pattern of Feltus is rather unusual and indicates a pattern more akin to the Mound B.S4 midden. This similarity extends to birds as well, with both assemblages containing about 5% NISP of birds, primarily driven primarily by large amounts of turkey and unidentified large bird remains (which are also likely to be primarily turkey). It is unclear what the reason is for this shift although both deposits are interpreted as the result of a specific group of people, meaning that the proportion of birds may be an expression of status differences.

In order to examine taxa associations, I utilized correspondence analysis. Based on the patterns elucidated above for Feltus, I focused on deer, bear, rabbit, squirrel, turtle, and fish.

Representing this information within a correspondence biplot highlights some of these associations nicely (Figure 5.19). Fish, deer, and squirrel exert the most influence on the biplot, with squirrel exhibiting the greatest inertia. Rabbit and bear exert the least influence and show the least variation; this is explained by the fact that all of the Feltus assemblages and Smith Creek exhibit relatively high numbers of bear remains; Smith Creek and all the unrestricted deposits from Feltus also have high numbers of rabbit remains. All three of the unrestricted Feltus deposits plot close together, indicating their assemblages are very similar to each other. Smith Creek, also located in the uplands, plots close by, though it is drawn away by its higher proportion of fish. The Mound B.S4 and Lake Providence middens plot far away from both the previous assemblages and from each other. This helps provide an indication of how different the Mound B.S4 midden is from other midden assemblages at Feltus. It also indicates that, while Mound B.S4 and Lake Providence share high proportions of squirrel, they do not share much else. If birds were included in this analysis, it is possible the two sites would plot somewhat closer together.

While dimensions 1 and 2 on the biplot account for 97.5% of the inertia, rabbit is poorly described and its position is distorted. To get a better sense of the relationship between rabbit and squirrel, I examined data from just those two species in bar chart form (Figure 5.20). I also included data from two terminal Woodland-period residential deposits at the Hedgeland site, which provides a comparison more akin to domestic consumption. The unrestricted deposits at Feltus, Smith Creek, and Hedgeland all share high proportions of rabbit. In contrast, the Mound B.S4 and Lake Providence deposits share high proportions of squirrel. If the shift from rabbit to squirrel was a regional temporal pattern, we would expect to see it at Hedgeland as well. Instead, Hedgeland has high proportions of rabbit, indicating that on a daily level, rabbit was still hunted

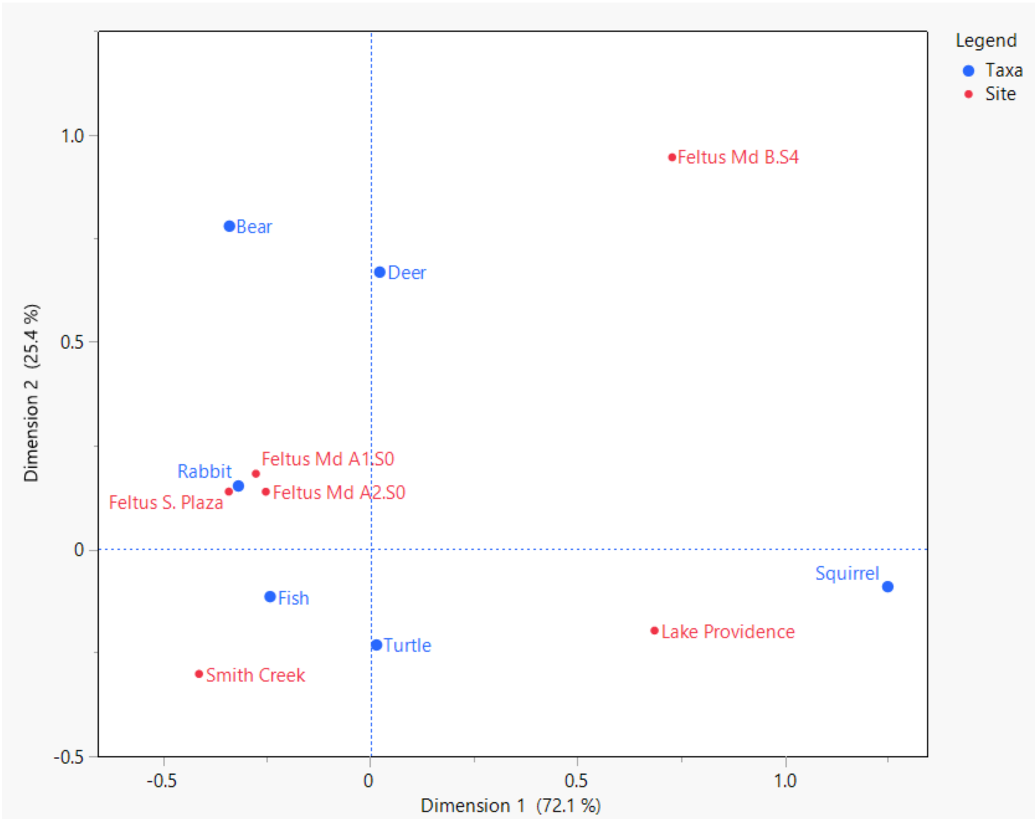

Figure 5.19. Correspondence biplot comparing animal taxa among LMV sites.

more consistently than squirrel. Taken together, this seems to indicate a lack of evidence for a broad, LMV-wide shift in small mammal resources. The increase in squirrel within the Feltus Mound B.S4 and Lake Providence middens therefore currently suggests that squirrels were specifically sought by a smaller, potentially elite, group of people (Scott 2005).

Summary of Zooarchaeological Results

Faunal remains from the South Plaza and the Mound B.S4 middens provide an opportunity to closely analyze how the context of deposition may affect the composition of assemblages. The assemblage from the unrestricted South Plaza midden indicates that hunters focused their efforts on procuring deer, provisioning mainly the meaty fore- and hindlegs for a

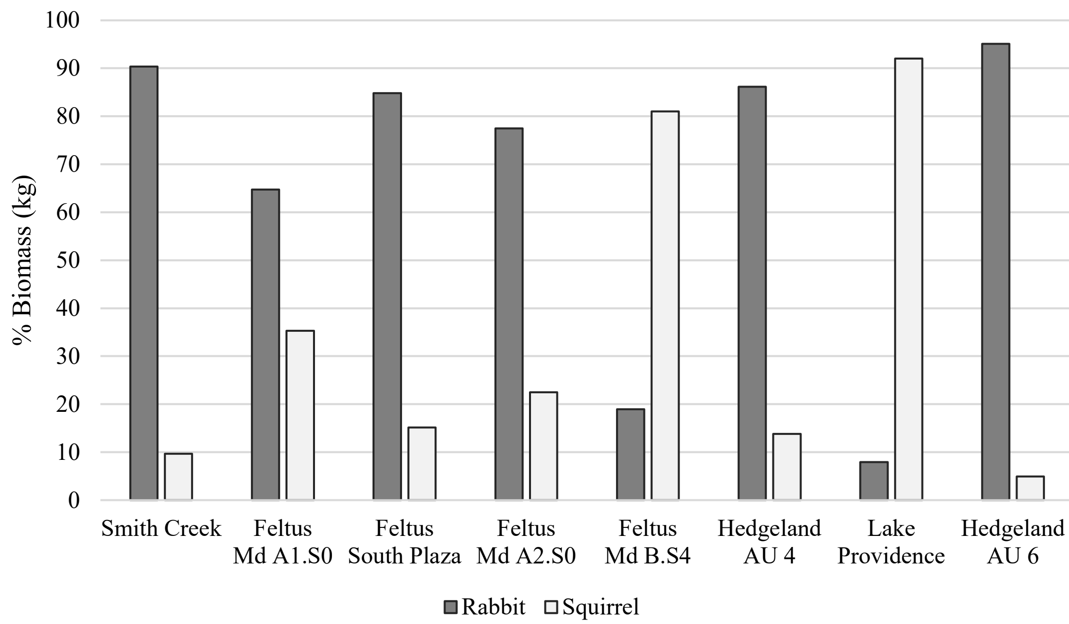

Figure 5.20. Comparison of rabbit and squirrel biomass at LMV sites, arranged chronologically.

large feast(s). Hunters also brought back at least three bears, one of which was a juvenile and two that were adults. Many of the bear bones were included in the midden deposit, implying that people consumed bear, perhaps as both bear fat/oil and bear meat. Although deer were the main focus of consumption, large amounts of fish were gathered, as well as smaller amounts of turtle, turkey, rabbit, and squirrel. Two fawns and migratory bird species indicate that this large gathering took place in the fall, probably around October. Rare and unusual species in the deposit indicate there were more activities taking place than just consumption; ceremony and ritual also played an important part. Bear, cougar, bobcat, gray fox, a large raptor, and barred owl were probably all special inclusions, implying that ritual specialists (priests or shamans) played an important role in the activities during large gatherings.

While the Mound B.S4 midden assemblage is smaller in size, it presents an interesting comparison as a restricted deposit. Although there are no remains in the Mound B.S4 midden that can date it as specifically as the South Plaza midden, two migratory birds and the focus on deer make a fall date seem likely. The group of people on the mound summit not only consumed younger deer, but ate more cuts of venison associated with the vertebrae and ribs. Burning patterns indicate this meat was roasted on the bone, suggesting a degree of conspicuous consumption. The use of fish was much more limited on top of the mound, though it does seem that to the degree they were used, fish heads were more prevalent. Mound-top meals also focused on squirrels that were either roasted or smoked as a cooking method, and bear paws, which were probably eaten as a delicacy. This seems to indicate that there was a specific suite of dishes for the people who were privileged enough to gather on top of Mound B, elevated above the rest of the plaza.

Intra- and intersite comparisons help confirm the nature of the patterns seen in the unrestricted South Plaza and the restricted Mound B.S4 middens. Within unrestricted deposits, dietary contributions from each animal class were broadly similar, whereas the restricted Mound B deposit showed increases in mammals and birds, and concurrent reductions in fish and reptiles. All three unrestricted deposits also contain close to or more than the expected richness for their sample size, while the Mound B.S4 deposit is much less rich than expected, supporting the inference that mound-top meals were focused around certain taxa and a more specific set of dishes. Intersite comparisons further confirm the differences between unrestricted and restricted deposits. While the three unrestricted deposits at Feltus plot closely together in the lower left quadrant of the correspondence biplot, the restricted Mound B.S4 deposit plots in the upper right. There are important differences between deposits in relation to local environmental conditions, but as a whole, the Mound B.S4 midden looks more similar to the Lake Providence elite deposit. Both middens contain higher proportions of deer forelegs and axial components, birds, and squirrels. This suggests that during the Late-to-Terminal Coles Creek period, the smaller groups of people gathering on mound summits had the ability to provision themselves with animals in ways that highlighted a different social status.

The findings presented above, that rare animals and increased taxa richness were a component of unrestricted, large gatherings, contradicts many of our current assumptions pertaining to public versus private gatherings, primarily based on analysis of Mississippian faunal assemblages. This suggests that we need to reassess how we define different deposits, the types of activities represented, and how animals were utilized therein. In the next chapter, I combine my findings from the faunal analysis with the results from the botanical analysis, and provide a more holistic interpretation of the activities at Feltus. Using the patterns from Feltus, I also suggest a new rubric of expectations that provides more flexibility for interpreting the activities and shifts in consumption taking place at Late Woodland sites.

CHAPTER 6

THE NATURE OF COMMUNITY GATHERING AT FELTUS

The presence of well-preserved botanical and faunal remains in many contexts at Feltus facilitates fine-grained analyses of contextual and temporal differences in subsistence. In this chapter, I focus on the two contexts that have the best representation of both datasets: the South Plaza and Mound B.S4 middens. Combining datasets, I explore how people's use of plants and animals at site gatherings is reflected in unrestricted and restricted deposits. I compare and contrast data from the Mound A middens, and other sites in the LMV as well, when they provide useful comparisons. Finally, drawing on these perspectives, I propose we broaden our interpretations of mound-related subsistence remains and adopt a more flexible approach when trying to understand Late Woodland societies that lacked rigid hierarchies.

Patterns in Subsistence Remains

Subsistence-related data from Feltus, considered together, can be divided into two broad categories: foods that were amassed and stored versus those that were amassed and consumed immediately. From the perspective of large gatherings, foods that can be amassed and stored in large quantities were extremely important, as they provided dependable food that could be gathered, harvested, or hunted at predictable times of the year. Storability in this case does not *have* to mean long term, although based on seasonality data from Feltus, many of these items must have been processed in ways that kept them from spoiling between the period in which they were obtained and when they were actually consumed (see Smith 2014; Spielmann 2002). Foods that were amassed and eaten immediately were obtained in season and would have spoiled quickly if not either consumed or processed further in some manner. Additionally, some plants and animals fall into neither category of amassed items; these special species are medicinal plants and animals likely to be utilized for reasons other than sustenance.

Amassed and Stored Resources

The ability to process foods in ways that allows them to be stored provides opportunities to produce large surpluses over relatively short amounts of time. Animals *can* represent storable resources, to the degree that they can be preserved in the form of jerky and stored for long periods of time; however, this process typically involves removing flesh from bone, meaning that we cannot always "see" these products archaeologically. Therefore, while it is important to acknowledge that preserved animal products were likely part of the events happening at Feltus, the remainder of this particular discussion focuses on plant species that have a direct archaeological correlate with amassed and stored resources. At Feltus, such plants included nuts, small grain seeds, and fruits. The predominant nuts in the South Plaza and Mound B.S4 middens were acorns and thick-shelled hickories. Both of these resources would have been in season during the proposed fall seasonality of the deposits, so to some degree they may have been collected and consumed fresh. However, given the length of the collection season for nuts and the planning required for procuring foods for a large gathering, community members may have begun collecting nuts as soon as they were available and processing them (via parching) to preclude significant spoilage. People also may have purposely over-collected nuts in the years leading up to a large gathering as another method of producing surplus (see Spielmann 2002).

While a wide range of starchy and oily seeds were recovered in botanical samples from Feltus, the most common species included chenopod, knotweed, and maygrass. Maygrass ripened in the spring, meaning that people would have collected and stored seeds with the knowledge that at least a portion of them would be needed for a large gathering(s) later in the year. Chenopod and knotweed ripened in the late summer to fall, so their collection would have been timed in closer proximity to Feltus gatherings, which I proposed took place in the fall, but with the knowledge that a surplus needed to be incorporated into normal growing and collecting patterns. High quantities of seeds could be collected with minimal effort; however, the overall amount of food produced may have been relatively small, and both storage and preparation involved a relatively large amount of labor. Fruits also represented an easily amassed and storable resource, although they made up only a small portion of the assemblages analyzed here. Based on growing season, many of the identified fruits (brambles, elderberries, grapes, maypops, stone fruits) must have been gathered earlier in the growing season, during the summer months, and dried for consumption at a later date.

Easily amassed and storable resources were important to the overall success of large gatherings. These foods provided a fairly predictable and staple base of many dishes, and knowledge about the current level of surplus would have been known or easily communicated to event organizers. In her discussion of the accumulation of food for the purposes of feasting, Spielmann (2002:197) emphasizes that “the food consumed in feasts is not simply surplus left over after domestic consumption needs are met.” Instead, overproduction was a specific goal of subsistence strategies targeted towards the knowledge of an impending event. Intensification in this sense can occur in a few ways; one method would be to encourage existing production, for example, silviculture that allows fruit and nut trees to produce maximum harvests, or thinning existing stands of starchy and oily seed plants to increase seed production. Another strategy is to make specific areas off limits to everyday gathering so that the entire harvest of an area is put towards the food needs of a large event (Spielmann 2002:197). Even in the case of a restricted area, however, active management of plant stands and trees still has to occur in order to encourage maximum production. These two strategies are not mutually exclusive; individualized intensification and restricted community areas can occur at the same time. Regardless, perhaps the most important point here is that we can infer that people knew about upcoming events, knew they would be expected to help provision such community gatherings, and prepared appropriately (Smith 2014).

Amassed and Fresh Resources

Gathering, harvesting, or hunting food resources to be consumed fresh could have occurred days or even weeks before an event (Smith 2014:1220), but without additional processing, these components would spoil relatively quickly. For a fall gathering at Feltus the plants most likely to be eaten fresh were certain fruits (such as persimmon, cabbage palm, and hackberry) and some of the nuts and small seeds. Most resources that would have been consumed fresh were animal products. Animals that fell into the amassable, fresh category within the Feltus assemblages included deer, rabbit, squirrel, and fish. Other animal resources were also brought to large gatherings, but their numbers were consistently low and they seemed to have been ad hoc additions representing the potluck nature of particular feasts or non-communal meals that also must have taken place during a multi-day event.

Deer represent, by far, the largest meat component of the South Plaza and B.S4 middens, providing more protein than any other animal available in the fall, based on size and population density. Deer would have been hunted either shortly before a community gathering, or the hunt may have taken place as part of the community gathering (Jackson and Scott 1995:116). Successful hunting was never guaranteed, though the chances for success could have been increased by utilizing group hunting methods (Emerson 1980; Muir and Driver 2002; Waselkov 1978), as well as declaring certain territory off limits in advance of an event so the deer population remained at peak density (Spielmann 2002). The survivorship curves for deer from the South Plaza and B.S4 middens, discussed in Chapter 5, suggested that group hunting was used to procure deer for large gatherings at Feltus. Food utility analyses also showed an additional focus on meaty parts of the skeleton. Low utility parts (skulls and lower leg bones) were recovered in only small numbers in either deposit. Skulls and metapodials did have utilitarian uses for tanning hides (deer brains) and making tools (metapodials), though we do not know if hunters were leaving these parts at their kill sites, simply using and/or disposing of them in other areas of the site, or otherwise keeping certain skeletal parts for display purposes (Hayden 2014:193). The predominance of high utility, meaty and marrowy skeletal elements within both deposits suggested that a prime focus of feasting was on consumption, and perhaps display, of copious amounts of venison.

Rabbits and squirrels also represented amassable resources, even if the amount of meat they offered was a fraction of that of deer. In comparison to other medium and small mammals around Feltus, rabbit and squirrel were present in the highest densities and from a functional standpoint may have represented “easy” additions to meals. The inclusion of either species is consistent with their numbers in other LMV mound site assemblages, though patterns of use were variable and described in more detail below. Squirrels would have been particularly visible during the fall when they were gathering and hiding nuts; ethnographic accounts indicate they were easily hunted using arrows and blow darts (LaDu and Funkhouser 2018).

The other primary category of amassable and fresh animals was fish. Fish were conspicuous in the faunal record at Feltus, though as described in Chapter 5, from a regional perspective they were a variable resource based primarily on local environment. The overall makeup of fish species at Feltus indicated a consistent focus on backwater habitats like oxbows; utilizing the same habitats over time would have made fish predictable components of large gatherings. Seasonal flooding of the Mississippi River would have provided an easy resource for large gatherings. With advance knowledge of a large event, community members could have used temporary weirs to block off parts of fishing areas, providing a rich and ready resource for later in the season (see Limp and Reidhead 1979; Spielmann 2002). As with deer, accessing this resource would have required the work of a large group of people, immediately prior to or during a gathering. Not only would groups of people have been needed to capture fish in nets or baskets, but to bring the fish to the site and to quickly and efficiently process and cook them. Although less discussed, processing and cooking of fish also would have benefitted from the efficiencies of scale a large gathering would have provided, as fish needs to be eaten or otherwise processed within about a day of being captured (Tushingham and Bettinger 2013).

Special Components of Gatherings

While the bulk of the food available at a large gathering was in the form of amassable items, whether stored or fresh, there were many species identified that did not neatly fit into either of these two categories. As mentioned above, some plants and animals were probably included either as ad hoc individualized contributions to potluck style meals, or they may have been a component of non-communal meals that took place over the course of a multi-day event. A small number of plants and animals had additional qualities that implied they were brought for non-sustenance reasons. I place these items under a category of special components; they include plants that were likely utilized for medicinal and ritual purposes and animals that are thought to have significant religious connotations.

The plant assemblages from the South Plaza and B.S4 middens both contained a small number of seeds that fell outside of the typical categories of nuts, small grain seeds, and fruits. While more typical sustenance foods also had medicinal and ritual uses, many of the miscellaneous seeds stood out because they were not typically associated with meals. In Chapter 4, I examined all of these species as one unit, without singling out any particular deposit. I highlighted that beyond having recorded medicinal uses for specific illnesses, a majority of the seeds identified, such as sumac, pokeweed, and prickly poppy, had uses as emetics, laxatives, cathartics, or diuretics (and some as antidiarrheals and antiemetics). While these uses would have been appropriate for many specific ailments, or even for helping stomach upset related to consumption of large amounts of food, it is also possible that their consumption was related to ritual purification.

As an analogue involving a similar suite of activities, sweat-lodge ceremonies among the 17th century Wendat and Iroquois involved purification within the context of healing ceremonies and communicating with the ancestors (Dorland 2017). The discussion of sweat lodges among Northeast Algonquians by Hrynick and Betts (2014:97) also indicates that many different plants were associated with sweat rituals. While we do not know if events at Feltus involved a sweat lodge in a specific sense, we know that the same types of activities were carried out in the Southeast (Mehta 2007), and we can infer the possibility that plants with cleansing and healing properties may have been used towards a similar purpose. Every major area excavated at Feltus showed evidence for some of these plants; while the South Plaza pit complex contained a majority of these species, the extensive excavation and sampling strategy in this area may bias these numbers. Importantly, however, the combination of medicinal, cleansing, and anti-diarrheal properties suggests that healing activities and perhaps ritual purification were an important component of many gatherings at the site.

In addition to conspicuous plants, there were a number of unusual animals identified within the South Plaza and B.S4 middens, including mammals, birds, and crayfish. While my focus was on the animals that I identified myself, unusual animals occured in many of the deposits at Feltus; the most conspicuous of these was bear. When viewed across the expanse of the Southeast, bears are only rarely recovered in archaeological assemblages; however, in particular regions within the Southeast and at particular times, bear remains are much more visible archaeologically (Lapham 2020; Peles and Kassabaum 2020). A broad swath of ethnographic literature attests to the fact that bears seem to hold a particularly prominent position within the worldview of many Native groups (see Lapham and Waselkov 2020). Bears are one of a number of animals understood to blur boundaries between worlds, appearing in a range of roles including as healers and spirit guides (Kassabaum and Peles 2020). While this makes the recovery of bear remains from any archaeological site particularly meaningful, it also appears there was heightened bear ceremonialism in the Natchez Bluffs area surrounding Feltus (Peles and Kassabaum 2020). Feltus in particular is home to far greater numbers of bear remains than we see in nearby geographical areas (Peles and Kassabaum 2020), with bear remains recovered from all major middens, from the post pit of the F.1 freestanding post, and even from some mound fill.

Remains of two other mammals also staood out as particularly special: cougar and bobcat. One of the cougar remains – the shaft of a femur – was completely heat altered, with mottled blackening and graying on the exterior and blackening throughout the interior. While it is difficult to say exactly how this burning pattern originated, it is different from the more typical roasting patterns seen at Feltus where burning is often limited to articular or broken ends of elements. The unusual burning pattern of this cougar femur suggests that it may have been intentionally exposed to fire for some reason, perhaps ritually related. The second cougar bone in the collection was a carpal bone, which would have come from a front paw and may have represented a particularly potent part of the animal. Similarly, the identified bobcat element is from a third phalanx, or the claw. As a claw, or as a part of a paw, this may have represented a power part and been particularly symbolically potent (Carr 2021c).

Unfortunately, there is little information about more specific meanings that cougars and bobcats may have held for Native people, although there is wide agreement that both animals *were* important ritually and cosmologically, and were not typically consumed within daily diets (Carr 2021c; Jackson 2014; Jackson and Scott 1995; Kuehn 2016; Reitz et al. 2020). In his review of important animals within the worldviews of North American native groups, Carr (2021c:1425) points out Adena use of cougar maxilla masks to indicate a connection between cougars and shamans, specifically suggesting the addition of cougars to the repertoire of species involved in shamanic merging of humans and animals during the Early Woodland. Components of many animals were also cross-culturally important in medicine bundles and within healing, and both ethnographic and potential archaeological examples of medicine bundles include cougar and bobcat body parts (Carr 2021c; Kuehn 2016).

Yet another unusual mammal was gray fox. Though gray fox is not necessarily an odd component of Southeastern faunal assemblages, at Feltus it was only represented by a small number of elements — two metacarpals and a metatarsal (one tibia fragment was also recovered, although it could not be identified to either gray or red fox). If the Mound A assemblages are included, this only adds two more fox elements. While sampling issues are always a concern within archaeological assemblages, with the large amount of excavation in the South Plaza we would expect to see more fox elements if they were regularly consumed and deposited as a part of gatherings. Jackson and Scott (2003:565) note that fox may be ritually important in Southeastern assemblages due to their potential supernatural connotations; the inclusion of two gray fox paws within the South Plaza midden assemblage may therefore represent ritually potent parts of the animal (Wallis and Blessing 2015).

The more unusual birds identified here, the large raptor and the barred owl, would have been more restricted in terms of their capture and utilization. Both birds are extremely important within the worldviews of groups in North America and any body part present would have been extremely symbolic. As detailed in Chapter 5, eagles, vultures, and barred owls all played important cosmological roles — helpful and harmful — in Woodland and Plains Indians narratives about the journey to reach the afterlife (Carr and Caseldine 2021; Caseldine et al. 2021). Large raptors and owls were primarily associated with shamans and had connections to healing, whether of present people or of the deceased (Carr 2021b; Krech 2009). The barred owl talon would have been particularly symbolic, as raptor talons were a common motif in Woodland and Mississippian art, whether on their own or as a component of composite creatures. The nighttime association of owls and their connection with death meant that they could easily cause misfortune in the wrong hands, but marshalled by ritual experts, they could also be utilized within important divination and healing rites (Carr 2021b; Krech 2009). Two additional species of unusual birds were also recovered from the A1.S0 midden: a bird from the heron and bittern family (Ardeidae) and an American crow (*Corvus brachyrhynchos*). Without going into an extended description of these two species, neither are typically considered food items (Kelly 2010) and both have ethnohistoric connections to religion and ritual among Southeastern tribes (Jackson et al. 2016; Krech 2009; Scarry et al. 2016).

The last potentially special animal identified in my faunal analysis was crawfish. Because crawfish shells decompose so readily, it is difficult to know how large or small of a component these animals may have played within domestic diets. In my own experience with Mississippi Valley faunal assemblages, crawfish components are only preserved when they are burned; all the examples I have identified are calcined. Their ready availability in the area around Feltus makes it seem like they certainly could have been a normal component of both every-day subsistence as well as special meals. The reason I include them here, therefore, is not because of their rarity within faunal assemblages, but instead due to their possible connections with Southeastern Indian creation stories. Among such stories is that of the Earth-Diver, an animal that dives into the water and brings up a ball of wet soil from which the earth is then formed (Cummings 2008; Lankford 2007b). While the animal that actually dives beneath the water is not always specified, summaries of literature by Swanton (1946:781) and Mooney (1902:430) detail Chitimacha, Creek, and Yuchi creation stories that all specify crawfish as the animal that was ultimately successful in securing a piece of earth. While the crawfish fragments identified here could simply be an accident of preservation, it is also possible they were part of something much more symbolic. Interpretations of crawfish remains as a part of gathering subsistence and as representative of creation and renewal symbolism are not necessarily mutually exclusive.

As with the medicinal plants discussed above, it is important to note that animals often categorized by faunal analysts as food could have ritual connotations. Dividing “special” from mundane species does not necessarily reflect how Coles Creek peoples approached plants and animals in their own lives, particularly within the context of a large gathering where everything brought to the site may have attained heightened meaning (Fritz 2008b) (for an example related to deer, see Peres and Altman 2018). A number of the animals identified from the South Plaza and B.S4 middens, as well as from the Mound A middens, were also almost certainly important for their hides and feathers. The color of feathers from ducks, turkeys, and Canada geese, along with cosmological connotations related to the specific animal they came from, all would have had important ceremonial functions, particularly if one activity at large events was the construction of ceremonial regalia (Krech 2009). The animals singled out above, however, all had especially symbolic connections to Southeastern cosmology, both within creation stories and the paths that souls took after death (Lankford 2007a, 2011). Bears, cougars, bobcats, large raptors, and barred owls were also commonly associated with divination and healing, particularly in the context of shamanic rituals. It seems very likely that these animals are indicative of rituals that occurred as a part of gatherings at Feltus, particularly as components of world gathering and renewal that involved potent moments in time when portals were opened between worlds (Kassabaum and Nelson 2016; Nelson and Kassabaum 2014).

Differences Among Deposits

While there were many similarities in the plants and animals utilized for large gatherings at Feltus, there is also smaller-scale variability that indicated differences in the types of dishes that were consumed. The restricted Mound B.S4 midden provides the strongest signals of these differences, likely because it represented the activities of a smaller group of people. These differences may exist within the unrestricted deposits, but particularly for deposits resulting from large-scale feasting, their signals may be subsumed within larger patterns. While I therefore focus on the axes of differentiation in the restricted Mound B.S4 midden, I also note when those same patterns are found in other deposits, potentially indicating similarities in the activities or groups of people contributing to the assemblages. I divide the assemblage patterns into three interrelated categories: specific dishes, labor-intensive ingredients, and conspicuous consumption.

Specific Dishes

Analyses of taxa richness, explored in Chapters 4 and 5 via statistical modeling, indicate differences in the overall suite of plants and animals utilized in different deposits at the site. Although the botanical assemblages should be compared cautiously due to the complicated effects of carbonization, only the A1.S0 midden was as taxonomically rich as expected. The South Plaza midden was slightly less rich than expected, the A2.S0 midden more so, and the B.S4 midden was much less rich than expected. While a smaller suite of plants therefore seems typical of feasting deposits, within the history of Feltus, the Mound B.S4 midden took this pattern to an extreme. Combined, the low faunal and botanical taxa richness supports the idea that mound-summit meals were focused on a smaller number of species and potentially incorporated specific dishes that involved large amounts of only a few particular components.

Both the unrestricted Mound A2.S0 and restricted Mound B.S4 middens also contained fewer animal taxa than expected for their sample size, while the unrestricted Mound A1.S0 and South Plaza middens contained greater than or expected animal taxa richness. Based on the mound-top context, we know that the Mound B.S4 midden represented the activities of a smaller group of people; we may infer that fewer people with a more focused set of activities resulted in fewer taxa. The smaller animal taxa richness of the Mound A2.S0 midden, combined with its extremely rapid accumulation, may therefore indicate that it also represented the activities of a smaller group of people. If the other three LMV sites are added to this analysis (Smith Creek, Lake Providence, and Hedgeland), it is apparent that only the Lake Providence elite-associated deposit shared a similar pattern of low faunal taxa richness (Figure 6.1). This pattern is repeated in an analysis of taxa evenness between the faunal assemblages at the same LMV sites, where the Mound B.S4 and Lake Providence middens were also much less even than expected (Figure 6.2). This supports the hypothesis that smaller groups of people focused on specific dishes in an effort to emphasize their status.

Labor-Intensive Ingredients

In his comprehensive review of feasting, Hayden (2014:75) argues foods that are highly valued for feasts include those which are labor-intensive to produce; such foods include nut oils, fish oil, and small grain seeds. All three of these were definitively or potentially present at Feltus, suggesting that Coles Creek peoples placed value on the labor invested in ingredients. Nut oils are most clearly present in the form of thick-shelled hickory waste, which was present in nearly all deposits at the site. Thick-shelled hickories were probably processed into hickory milk or oil, which could have been drunk on its own, made into hickory-nut soup (*kenuche*), or used as a component of a larger meal. Feltus s the only site analyzed here with deposits that contained a higher proportion of hickory (thick-shelled hickory or pecan) than acorn. This not only

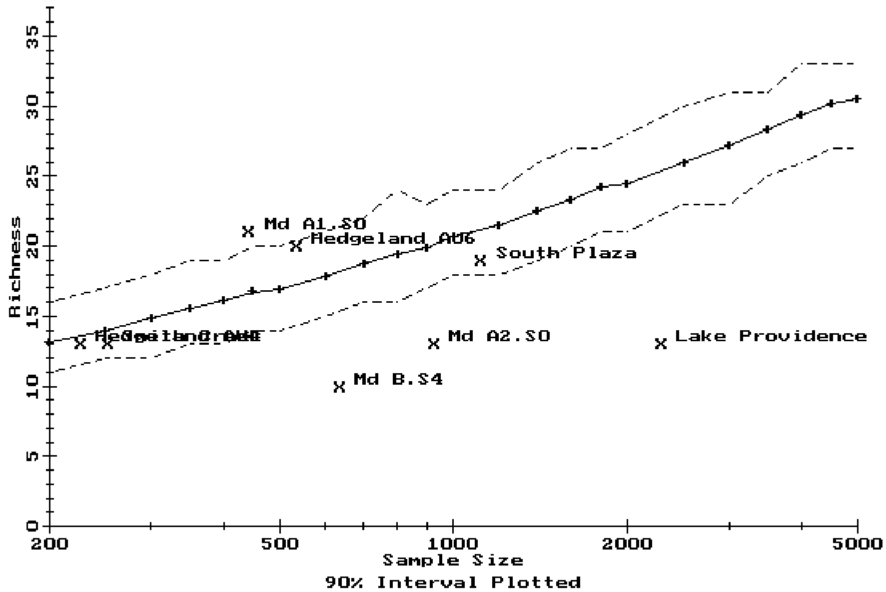

Figure 6.1. Comparison of taxa richness in faunal assemblages from LMV contexts.

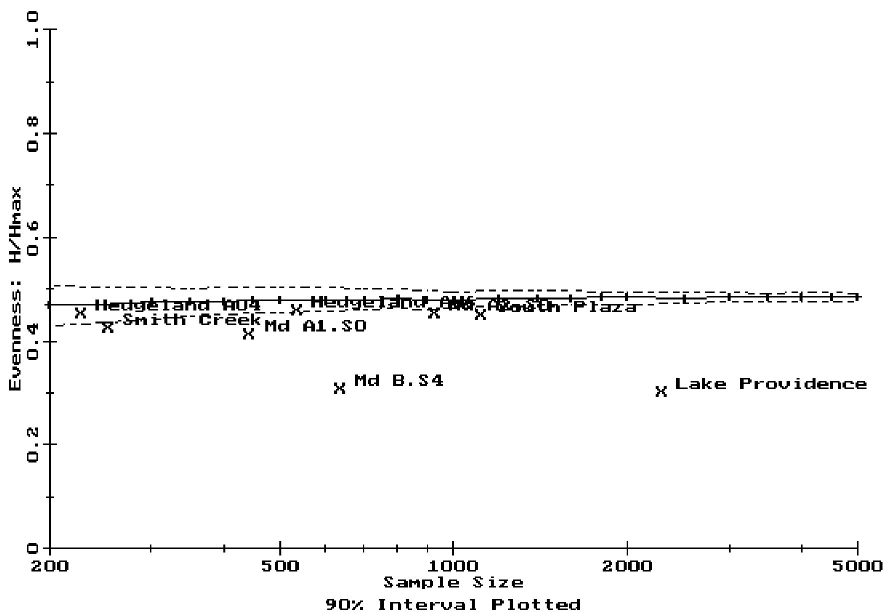

Figure 6.2. Comparison of taxa evenness in faunal assemblages from LMV contexts.

suggests the importance of having several contexts to analyze, but indicates that meals or drinks with oily components were particularly important within certain contexts. All three of the contexts where thick-shelled hickory predominated were either certainly or possibly associated with smaller groups of people and a more limited set of activities (South Plaza F.4 Zone D, B.S4, and A2.S0). While I have not emphasized it here, acorn meat can also be processed into oil; while acorns produce much less oil than thick-shelled hickories, ethnohistoric accounts do record the extraction of this “sweet” oil (Waselkov and Braund 1995). Though it is not possible to distinguish the extraction of acorn oil on the basis of botanical remains, it would certainly constitute a labor-intensive ingredient similar to hickory oil.

Evidence for the extraction of fish oil at Feltus is ambiguous, though it may be difficult to determine even at the best of times. Taché and Craig (2015) found evidence of fish oil in pottery from sites in the northeastern U.S. dating between c. 3100 and 2300 cal BP; they suggest that extraction and consumption of fish oil occurred within the context of small-scale celebratory feasts. Both Taché and Craig (2015) and Hayden (2014) also cite evidence from northwest coast communities, where fish oil was considered a prestigious commodity. While we cannot say for certain if fish oil was among the food products produced at Feltus, the greater proportion of fish head elements in the B.S4 midden provide a tentative link to the different use of fish on the mound summit. Current research relating to fish oil centers around extraction from fish heads, as they are a consistent by-product of processing (Abiona et al. 2021). This suggests that use of fish for fish oil does not need to be an either/or proposition; perhaps fish heads were removed and used for oil while the rest of the body was cooked in more typical ways. Regardless, the connection of fish oil to feasting and its use as a prestige item in later times indicate that we should at least consider fish oil extraction as a possible food product and status signal.

The last labor-intensive ingredient at Feltus was small EAC seeds, especially chenopod, maygrass, and knotweed. Chenopod and maygrass typically predominate across deposits at Feltus; however, high densities of both in the B.S4 midden may also indicate a focus on very specific dishes or drinks. While all of the small EAC seeds could have been amassed relatively easily, they were still rather labor-intensive to process and cook (Gremillion 2004), suggesting that they may have been considered high value in all contexts within which they were used (Hayden 2014:135). The consumption of specific dishes or drinks that utilized higher densities of these seeds and extended this labor may have therefore increased their value. Flatbreads would have been one preparation that required high densities of seeds and additional labor (Arranz-Otaegui et al. 2018); fermented drinks could be another possibility (Fritz 2014).

Knotweed is a third starchy seed that was consistently identified across deposits at Feltus, though generally in low numbers. Deposits that contained atypically high densities of knotweed included two depositional zones of the South Plaza F.148 upper pit (Zones D and E); another four contexts contained slightly elevated densities (Mound A1.S0, South Plaza F.148 Zone E and F.4 Zone B/C, and Mound B.S4). While it was not always possible to identify which species of knotweed was present, when species level identifications were possible the vast majority of charred seeds appeared to be erect knotweed. Based on contexts where domesticated erect knotweed has been identified, Mueller (2018:46-47) suggests that it may have been considered a prestige item. Whether or not the erect knotweed at Feltus constituted a domesticated variety, the effort involved in collecting and especially processing knotweed suggests that at Feltus it was also a highly regarded plant with potential ritual or ceremonial connotations, though its use may have been more constrained than chenopod or maygrass.

Conspicuous Consumption

The last category of difference is conspicuous consumption, where differences in preparation or access to certain ingredients appears to be an indication of social status. At Feltus, conspicuous consumption is reflected in patterns associated with deer, squirrel, and bear. Discussed in detail in Chapter 5, deer patterns from the Mound B.S4 midden suggested some very specific methods of consumption. Mound-summit gatherings consisted of tender venison from deer mostly younger than 3 years old, with a focus on forelegs and axial components (vertebrae and ribs). The fascia associated with forelegs and the less accessible (though more tender) meat of the axial components would have required the use of specific cooking methods. Generally complete and articulated thoracic and lumbar vertebrae with evidence for heat alteration indicate that axial components were roasted on the bone. Together this suggests that mound-summit venison meals involved more specific components and somewhat different cooking methods in comparison with the South Plaza midden. The provisioning of forelegs and axial components on the Mound B summit was extremely similar to the patterns Scott (2005) identified within the Lake Providence assemblage, which was interpreted as the feasting remains associated with a small, perhaps elite, group of people (see Figure 6.3). The similarities in deer remains between the two sites suggests that components of status signaling during the Late Woodland may have occurred more broadly across areas of the LMV.

The Mound B.S4 midden also showed a clear preference for squirrel consumption on the mound summit. Eighty-eight percent of squirrel elements identified were from B.S4, with only 11% of elements coming from the South Plaza midden. With the greater horizontal area excavated in the South Plaza, as well as the much larger assemblage, the abundance of squirrel on the Mound B summit is particularly striking. Analysis of the skeletal components also

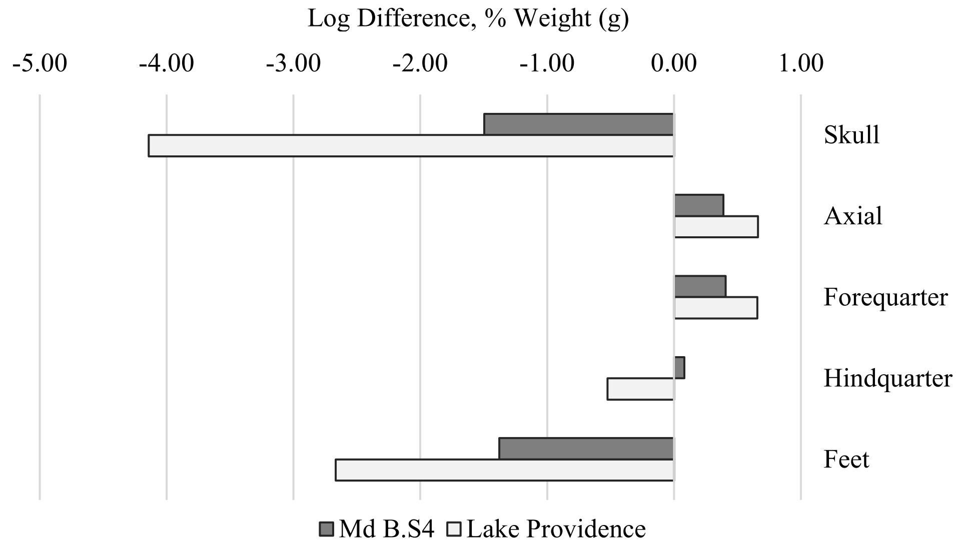

Figure 6.3. Comparison of anatomical proportions of deer Feltus Mound B.S4 and Lake Providence.

indicated the use of particular cooking methods for squirrels. Axial elements were largely missing, while legs and cranial elements showed some evidence of partial heat alteration, suggesting that roasting or smoking was used as a cooking method. This pattern was very similar to Lake Providence, where more than 1,500 squirrel remains were recovered from the ¼-inch-screen assemblage (Scott 2005). Scott (2005:428) also examined evidence for burning and concluded that one method of cooking was roasting squirrels over an open fire. The patterning in squirrel remains constitutes a second striking pattern of similarity between the Mound B.S4 and Lake Providence assemblages, providing further evidence that certain indications of status may have been shared across a wider area.

The last indication of conspicuous consumption at Feltus is spatial patterning in bear remains. In Chapter 5, I argued the combined bear data indicated multiple types of utilization; bears fattened up on acorns in the fall would have provided an abundant source of fat for oil, while ethnohistoric evidence indicates that paws were considered delicacies (Kassabaum and

Peles 2020:122-123; Lapham 2020:165, 186; Waselkov 2020:27-29). Bear remains data were not spread evenly across the site, however. The Mound A1.S0 and South Plaza middens share an overabundance of body components, while the Mound A2.S0 and B.S4 middens share an overabundance of paw elements. This suggests that bear paws were used within particular contexts and went to specific groups of people. The division of bear parts between areas of the site is seen even more clearly by the South Plaza and A2.S0 middens, which share almost the same overlap in radiocarbon dates. If we think of these two deposits as part of the same overall event, then most of the bear paws may have been provisioned to the people at Mound A, while the rest of the skeleton was utilized in meals and activities happening in the South Plaza. The ethnohistoric evidence that bear paws were considered a delicacy, along with their abundance in specific contexts at Feltus, indicates that they became another signal of social status among gatherings at the site, with their consumption mostly limited to a smaller group of people.

The Nature of Gathering at Feltus

Through the combination of botanical and faunal analysis, as well as insights drawn from other artifact classes, it is possible to draw some inferences about the nature of community gatherings at Feltus. Dense midden deposits at Feltus can generally be divided according to their spatial characteristics: unrestricted and restricted. Unrestricted deposits are those that were spatially accessible to everyone and at Feltus involved deposition around the edges of the plaza. In terms of the contexts discussed here, this would include the South Plaza midden and pits, the borrow pit, and both the Mound A1.S0 and A2.S0 middens. This does not mean that everyone had equal access to each of these areas, but simply that the ground-level location of these deposits meant that anyone in or near the plaza would have theoretically been able to deposit material in these spaces. Restricted deposits are related to a smaller group of people because they were located in areas with restricted access. While there are many ways to restrict access to locations, at Feltus restriction was most clearly accomplished via mound construction. While the platforms on both Mound A and Mound B are still relatively large, they would have held a much smaller number of people in comparison to the full group of community members that may have come together at the site. Restricted deposits discussed in Chapters 4 and 5 included the Mound B.S4 midden and the B.S5 wall trenches; we assume that these deposits are specifically representative of the activities of a smaller group people on mound summits.

Evidence from unrestricted and restricted contexts allow us to make inferences about the types of activities that people were involved in at the site. Based on the density of deposition, and in some cases the evidence for related mound building, we know that one of the main activities was large gatherings (Kassabaum 2018). From ethnographic examples, we can assume that these gatherings involved a number of different components and took place over multiple days or weeks. Combining the botanical, faunal, and ceramic assemblages, there seem to be at least three interrelated activities occurring at Feltus gatherings: feasting involving amassed stored and fresh resources, religious/ritual activities, and healing. Mound building can be considered an additional category, but because it is not directly related to botanical and faunal assemblages (besides sealing them in), I do not focus on mound building episodes here. While individual deposits at Feltus may only involve one or two of the previous activities, evidence for all three is particularly clear in the South Plaza midden. High densities of ceramics and faunal material indicate a feast (or multiple feasts) was an important component of gatherings. Some finished dishes may have been brought to the site, though the charred botanicals and faunal material provide evidence for food processing and cooking that happened on site. Once prepared, dishes were then shared amongst people gathered at the site. The focus on distribution of food is reflected in proportions of ceramic vessels; while the specific numbers vary, serving vessels dominate all of the large middens at Feltus, with smaller proportions of cooking and storage vessels present (Graham et al. 2019; Kassabaum 2018). Both the botanical and faunal assemblages highlight foods that were amassed in large numbers by community members: nuts, small seeds, fruits, mammals, and fish.

Multiple lines of evidence also point to ritual activities during gatherings (Kassabaum 2018). Some of this evidence is in the form of freestanding posts constructed with purposefully chosen materials (ash, clean loess, etc.) (Kassabaum and Nelson 2016), as well as ceramic pipe fragments that contain tobacco residue (Carmody et al. 2018). However, we can also see evidence of ritual activities in the form of unusual animals within the faunal assemblages. Bears are particularly visible at Feltus (Kassabaum 2018; Kassabaum and Peles 2020; Peles and Kassabaum 2020), with a modified bear maxilla providing an especially direct link to ritual activity. Other identified animals were probably also featured in ritual contexts, including barred owl, bobcat, cougars, and a large raptor. All of these objects — animals, smoking pipes, freestanding posts — are associated with shamanism, omens, and connections with other worlds. Large gatherings are often structured around religious events (Hayden 2014) and mound construction itself has been connected with world renewal ceremonies (Knight 2001), therefore it seems unsurprising that all of these activities could be gathered together during times when the Coles Creek community came together at Feltus.

The third activity at Feltus is medicinal, which is both a broad and yet ephemeral category at the same time. Medicine, and the associated healing, can mean both mind and body and can involve specific diseases as well as more general ailments. Healing is also not limited to people in the present, but can involve the recently deceased (Carr 2021a). Within worldviews that do not necessarily make clearcut divisions between mind and body, other worlds, and even humans and animals, medicines can crosscut many different categories. In addition, many medicinal ceremonies involve shamans, purification, and smoking, meaning that there is opportunity for significant overlap with religious and ritual activities. Specific evidence for medicinal activity can be difficult to discern, however, because of this overlap. Within the assemblages at Feltus, the clearest evidence for medicinal activity is the miscellaneous taxa within the botanical assemblages. Though other botanical and faunal taxa have a slew of medicinal properties, it is the absence of food uses that make many of the miscellaneous taxa so conspicuous as a part of medicinal activities. Examining these taxa as a whole also shows that many have additional uses relevant to purification, furthering the argument that they may have been used within the context of medicinal ceremonies.

Because unrestricted contexts can originate from multiple activities, multiple groups of people, and a combination of private vs. communal meals, they can be subject to a great deal of variation dependent on which combination of events result in their deposition. While it can be difficult (if not impossible) to pull apart these different threads to try and analyze the constituent parts of each activity, unrestricted deposits have great value in providing evidence for the broader patterns occurring at a site. Where unrestricted deposits are associated with feasting, they also reveal how social relationships and labor were deployed in the service of large groups of people. Restricted deposits, by their nature, tell a more specific story about a smaller group of people. Because the associated deposits are often smaller in size, assemblage biases mean that we have to be very careful about the inferences we draw from them. However, the fact that restricted deposits are related to a more limited group of people means that, where differences occur, they may be more apparent. In the case of the B.S4 midden, patterning in the botanical and faunal assemblages does seem to show strong signals of difference related to mound summit deposition.

Examining the botanical and faunal assemblage as whole, statistical analyses using DIVERS showed that both assemblages contained fewer taxa than expected for their sample sizes, validated through Kintigh's rarefaction routine. While we cannot say which specific species may be "lacking," we can say that overall, plant and animal use on the mound summit was focused around a smaller suite of species. Within the botanical assemblage, the B.S4 midden was strongly associated with particular plants: thick-shelled hickory, chenopod, and maygrass. In Late Woodland LMV assemblages, acorn tends to be the predominant nut (Fritz 2008a:338), meaning that the higher densities of thick-shelled hickory in the Mound B.S4 midden (and other contexts) at Feltus is noteworthy and was probably a result of different dishes or drinks served at the associated gatherings. Fritz (2014:37) also suggests that maygrass was an important component of ceremonial activities, perhaps as a fermented drink; the association of chenopod with maygrass could indicate that it was utilized in a similar manner. Alternately, either or both seeds could have been processed into dough and made into a flatbread (see Arranz-Otaegui et al. 2018).

The faunal assemblage from the B.S4 midden also showed differences in composition that indicated a focus on specific dishes and/or cooking methods. People consuming food on the mound summit appear to have had the ability to commandeer younger, more tender venison. While they ate more components considered medium utility, they seem to have roasted those elements in articulated portions. Potter and Ortman (2004:179) emphasize that portioning roasted meat is a political act in and of itself due to the difficulty in distributing it equally. Scott

(2005:426) also notes that the waste of drippings falling off roasted meat can be considered a form of conspicuous consumption. Further, mound-top meals contained a higher proportion of fish heads, which may have been boiled to extract oil. The shift in age for venison, the conspicuous roasting of tender meat, and the potential extraction of fish oil therefore may all be indicative of attempts to highlight differences in consumption on the mound summit. The B.S4 deposit also involved an unusually large amount of squirrel which shows evidence for roasting or smoking. The overabundance of squirrel at the slightly later Lake Providence site was associated specifically with a feature that has been linked to elite members of the site (Weinstein 2005:515); while Feltus lacks the exotic artifacts found in the Lake Providence context, large proportions of squirrel may have also been a status signal. Finally, mound summit activities focused on bear paws, which were probably considered a delicacy.

Analysis of ceramics from the B.S4 midden provide additional context and support for an interpretation of status signaling. The mound summit displayed the highest proportion of cooking vessels along with the lowest proportion of storage vessels. Within the cooking category, the B.S4 midden also contained the highest number of beakers, though the beakers were below average size in comparison to other Feltus contexts (O'Hear et al. 2016). The high proportion of cooking vessels indicated that more cooking was done on top of Mound B. This could be related to an emphasis on fresh foods that needed to be cooked immediately, but it may also suggest there was something important about cooking certain dishes in a restricted context. The use of more, but smaller, beakers on the Mound B summit indicates preparation of certain liquid dishes meant for smaller groups of people, which aligns with the reduced number of people present on the mound summit. While it may seem contradictory that the B.S4 midden also contained some of the largest vessels at Feltus, this may be explainable by the focus on specific dishes as well as the importance of public presentation. Certain food items recovered from the B.S4 midden were amassed and stored before being brought to Feltus; large storage vessels may indicate communal storage of certain items like small seeds or nuts. Extracting oil from thick-shelled hickories and fish would have benefitted from economies of scale; perhaps the greater focus on this type of preparation on the mound top also led to the use of larger pots. Within the context of certain dishes, perhaps it was also important to serve everyone on the mound summit from the same large pots. Finally, large serving vessels may also be related to large, intact cuts of meat and a visual emphasis on abundance.

Combined together, the botanical and faunal assemblages from the B.S4 midden suggest that the people gathering on the mound summit were utilizing similar ingredients to those in unrestricted contexts, but in ways that emphasized their differing status (see LeCount 2001). This was accomplished through increased densities of specific ingredients (chenopod, maygrass, squirrel), consumption of delicacies (bear paws), different cooking methods (roasting), and a concomitant focus on labor-intensive preparations. In examining how people differentiated themselves we tend to focus on prestige items, which are often exotic items with uses that are typically restricted to a subset of people. However, when examining subsistence foods at feasts, Hayden (2014:159) points out that "the most highly valued foods are the most labor intensive to procure or prepare." While it is often difficult to see food preparation archaeologically, the subsistence patterns from the B.S4 midden suggest that axes of value or prestige during this period of time were at least partly associated with conspicuous cooking methods and labor-intensive preparations.

Gathering in the Late Woodland Southeast

The patterns revealed by comparing both the botanical and faunal assemblages from unrestricted and restricted contexts at Feltus show just how important it is to examine multiple contexts within a site. The granular analyses of species density, animal ages, skeletal portions, and burning patterns are where many of the differences between deposits become more apparent; without this level of detail, it is easy to misinterpret the nuanced patterns at the site.

However, while the patterns found at Feltus are interesting on their own, they do not easily fit within our current framework for delineating communal feasting and other activities. This framework tends to rest on Jackson and Scott's (1995) work, which presents a series of expectations for the faunal refuse generated by elite consumption and communal feasting activities specific to Mississippi-period communities. Importantly, (Jackson and Scott) based their expectations on contexts at the Crenshaw and Lubbub Creek sites, where a great deal of contextual analysis supports the delineation of "elites" and "commoners." While the text of the article is nuanced, their simplified table is what typically makes its way into discussions of faunal expectations for different deposits (Jackson and Scott 1995:Table 1). Elite deposits are expected to include better cuts of meat from primarily the fore- and hindlegs, greater diversity and variety of animals, exclusive use of rare and exotic animals, little butchery waste, ornamental bone object manufacture, and greater use of birds. While communal feasting is also expected to contain high-value cuts of deer, little butchery debris, and whole bones, it is further expected to contain low taxonomic diversity, few birds, and few rare animals (deFrance 2009; Jackson and Scott 1995; Windham 2010). Recent research shows that even within Mississippian communities, specific events give rise to archaeological signatures that blend these expected signatures (Nelson et al. 2019). Within their discussion, Jackson and Scott (1995:108) also contrast earlier feasting, which was the "communal responsibility of corporate groups or the community at large," with manipulation by the rising Mississippian elite, whereby "hosting feasts became the responsibility of the elite." This suggests that expectations created for Mississippian communities have been overextended to other periods.

Rather than projecting Mississippian consumption expectations onto the Late Woodland-period Coles Creek communities of the LMV, we need to understand these earlier groups on their own terms and track how different practices were eventually captured and transformed by a small group of people for their own benefit. The large depositional events at Feltus provide an opportunity to do just that, allowing us to examine how Late Woodland foodways were both maintained and transformed within the history of the community that gathered at the site. While the practices at Feltus may be somewhat specific to that area, the comparisons to other LMV sites help indicate how the patterns found at Feltus can be broadened out to provide a more inclusive set of archaeological correlates.

A Late Woodland suite of floral and faunal expectations, at least within the LMV, would still emphasize animals and plants that can be amassed in large quantities, which would include acorns, hickories, deer, and fish. Small seeds would also fit within this category, as it is relatively easy to encourage increased seed production and seed collection is comparatively easy. Given the many contexts within which rare animals can be utilized, they would not necessarily be limited to elite private consumption, particularly for periods where provisioning of elites does not appear to occur. Instead, we might consider them an appropriate component of many types of gatherings, with their specific use tied to contextual analysis of deposits. This serves a second function of opening up expectations of taxa richness. There is no particular reason to assume a priori that taxa richness is a function of elite status and private consumption across all time periods. Instead, assessments of the kinds of activities that result in greater taxa richness may help us understand how the use of certain taxa moved from unrestricted to restricted contexts over time. Finally, detailed comparisons among taxa should allow for the identification of contexts that differ in terms of taxa density and consumption methods. The idea that labor-intensive products (whether that labor is a function of rarity, method of production, or both) can be an indication of prestige is an important one; it may be that elaboration of staple foods occurs prior to taxa proscription in the LMV, but we will need more detailed analyses of multiple contexts at sites to determine if this is the case more broadly. Perhaps most importantly, though, identifying a broad set of pre-Mississippian botanical and faunal expectations provides more flexibility for identifying the traces of multiple types of site activity. This flexibility may also be better suited for identifying shifts in animal and plant use that provide clues surrounding the ultimate transformation of Late Woodland societies.

References Cited

Abiona, Oluseye Oladapo, Shola Hezekiah Awojide, Adebanjo Jacob Anifowose, Abiodun Odunlami Adegunwa, Wasiu Bolade Agbaje, and Adeniyi Solomon Tayo
2021 Quality Characteristics of Extracted Oil from the Head and Gills of Catfish and Titus Fish. *Bulletin of the National Research Centre* 45(1):101.

Abrams, Marc D., and Gregory J. Nowacki
2008 Native Americans as Active and Passive Promoters of Mast and Fruit Trees in the Eastern USA. *The Holocene* 18(7):1123-1137.

Adams, Susan B.
2019 Crayfishes of Mississippi. US Forest Service, Southern Research Station.

Anderson, M. Kat
2005 *Tending the Wild: Native American Knowledge and The Management of California's Natural Resources*. University of California Press, Berkeley.

Anderson, M. Kat, Diana L. Immel, and T. W. Oakes
2013 Dwarf Palmetto. National Plants Team, USDA, NRCS.

Arranz-Otaegui, A., L. Gonzalez Carretero, M. N. Ramsey, D. Q. Fuller, and T. Richter
2018 Archaeobotanical Evidence Reveals the Origins of Bread 14,400 Years Ago in Northeastern Jordan. *PNAS* 115(31):7925-7930.

Asch, David L., and Nancey B. Asch
1985 Prehistoric Plant Cultivation in West-Central Illinois. In *Prehistoric Food Production in North America*, edited by Richard I. Ford, pp. 149-203. Anthropological Papers No. 75. Museum of Anthropology, Universty of Michigan, Ann Arbor.

Barceloux, Donald G.
2008 *Medical Toxicology of Natural Substances: Foods, Fungi, Medicinal Herbs, Plants, and Venomous Animals*. John Wiley & Sons, Hoboken, New Jersy.

Barrier, Casey R., and Megan C. Kassabaum
2018 Gathering in the Late Woodland: A Look at Plazas and Gathering Spaces at Two Sites from the Greater Southeastern US, A.D. 750-1000. In *Investigating the Ordinary: Everyday Matters in Southeast Archaeology*, edited by Sarah E. Price and Philip J. Carr, pp. 168-184. University Press of Florida, Gainesville.

Barton, Barbara J.
2018 *Manoomin: The Story of Wild Rice in Michigan*. Michigan State University Press, East Lansing.

Baxter, M. J.

2001 Methodological Issues in the Study of Assemblage Diversity. *American Antiquity* 66(4):715-725.

Behrensmeyer, Anna K.
1978 Taphonomic and Ecologic Information from Bone Weathering. *Paleobiology* 4(2):150-162.

Belmont, John S.
1967 The Culture Sequence at the Greenhouse Site, Louisiana. *Southeastern Archaeological Conference Bulletin* 6:27-34.

1982 The Troyville Concept and the Belmont Site. *Louisiana Archaeology* 9:65-98.

Berger, Joseph R., Erick Weisman, and Beverly Weisman
1997 Creutzfeldt-Jakob Disease and Eating Squirrel Brains. *The Lancet* 350(9078):642.

Berres, Thomas E., David M. Stothers, and David Mather
2014 Bear Imagery and Ritual in Northeast North America: An Update and Assessment of A. Irving Hallowell's Work. *Midcontinental Journal of Archaeology* 29(1):5-42.

Bettinger, Robert L., Ripan Malhi, and Helen McCarthy
1997 Central Place Models of Acorn and Mussel Processing. *Journal of Archaeological Science* 24:887-899.

Binford, Lewis R.
1978 *Nunamiut Ethnoarchaeology*. Academic Press, New York.

Blewitt, Rosemarie
2012 Ceremonial Plant Use at a Caddo Site in Southwest Arkansas. Honor's thesis, Department of Anthropology, Washington University, St. Louis.

Bolarinwa, I. F., M. O. Olaniyan, and A.S. Ajala
2016 A Review of Cyanogenic Glycosides in Edible Plants. In *Toxicology: New Aspects to this Scientific Conunundrum*, edited by S. Soloneski and M. L. Larramendy. IntechOpen.

Boudreaux, Edmond A., and Daryl W. Armour
2021 Artifacts and Activities Associated with Mound-Area Public Contexts at the Town Creek Site, North Carolina. *Southeastern Archaeology* 40(2):79-99.

Brain, Jeffrey P.
1971 *The Lower Mississippi Valley in North American Prehistory*. Submitted to Arkansas Archeological Survey, Contract No. 9911T00049.

Briggs, Rachel V.
2016 The Civil Cooking Pot: Hominy and the Mississippian Standard Jar in the Black Warrior Valley, Alabama. *American Antiquity* 81(2):316-332.

Brown, Ian W.
2007 Plaquemine Culture in the Natchez Bluffs Region of Mississippi. In *Plquemine Archaeology*, edited by Patrick C. Livingood and Mark A. Rees, pp. 145-160. University of Alabama Press, Tuscaloosa.

2015 *The Petite Anse Project: Archaeological Investigations along the West-central Coast of Louisiana 1978-1979*. Borgo Publishing, Tuscaloosa, AL.

Brown, Malaina L.
1996 Plant Remains from the Taylor Mounds (3DR2) Site, Southeastern Arkansas. Master's Thesis, Department of Anthropology, Washington University, St. Louis.

Buchanan, Meghan E.
2007 Patterns of Faunal Utilization at Kincaid Mounds, Massac County, Illinois Master's thesis, Department of Anthropology, Southern Illinois University, Carbondale.

Buikstra, Jane, and Mark Swegle
1989 Bone Modification due to Burning: Experimental Evidence. In *Bone Modification*, edited by R. Bonnichsen and M. H. Sorg, pp. 247-258. Center for the Study of the First Americans, Orono.

Carmody, Stephen B., Megan C. Kassabaum, Ryan K. Hunt, Natalie Prodanovich, Hope Elliott, and Jon Russ
2018 Residue Analysis of Smoking Pipe Fragments from the Feltus Archaeological Site, Southeastern North America. *Journal of Archaeological Science: Reports* 17:640-649.

Carr, Christopher
2021a The Family and Community in Three Scioto Hopewell Ritual Dramas of Death Journeys. In *Being Scioto Hopewell: Ritual Drama and PErsonhood in Cross-Cultural Perspective*, Vol 2, edited by Christopher Carr, pp. 699-782. 2 vols. Springer, Cham, Switzerland.

2021b The Ferocious Dog, Brain-Taker, the Keen-Eyed Owl, and Other Persons in the Cosmologies of Postcontact Eastern Woodland and Plains Indians as Told in Oral Narratives. In *Being Scioto Hopewell: Ritual Drama and Personhood in Cross-Cultural Perspective*, Vol 1, edited by Christopher Carr, pp. 451-490. 2 vols. Springer, Cham, Switzerland.

2021c Nested Personhood, Masking, and the Question of Personnages in Scioto Hopewell, Adena, and Glacial Kame Societies. In *Being Scioto Hopewell: Ritual Drama and Personhood in Cross-Cultural Perspective*, Vol 2, edited by Christopher Carr, pp. 1409-1512. 2 vols. Springer, Cham, Switzerland.

Carr, Christopher, and Christopher R. Caseldine

2021 Journeys to Afterlives in the Cosmologies of Postcontact Eastern Woodland and Plains Indians: Interwoven Elements, Their Regional Distinctions, and Meta-Narratives. In *Being Scioto Hopewell: Ritual Drama and Personhood in Cross-Cultural Perspective*, Vol 1, edited by Christopher Carr, pp. 267-332. 2 vols. Springer, Cham, Switzerland.

Caseldine, Christopher R., Christopher Carr, and Samantha R. Feinberg
2021 Journeys to Afterlives in the Cosmologies of Postcontact Eastern Woodland and Plains Indians: Inventory, Frequencies, and Geographic Distributions of Elements in Oral Narratives. In *Being Scioto Hopewell: Ritual Drama and Personhood in Cross-Cultural Perspective*, Vol 1, edited by Christopher Carr, pp. 195-266. 2 vols. Springer, Cham, Switzerland.

Castetter, Edward F.
1935 Uncultivated Native Plants Used as Sources of Food. *The University of New Mexico Bulletin, No. 266* 4(1):1-62.

Chapman, S. S., G. E. Griffith, J. M. Omernik, J. A. Comstock, M. C. Beiser, and D. Johnson
2004 Ecoregions of Mississippi (color poster with map, descriptive text, summary tables, and photographs), U.S. Geological Survey, Reston, Virginia.

Chicoine, David
2011 Feasting Landscapes and Political Economy at the Early Horizon Center of Huambacho, Nepeña Valley, Peru. *Journal of Anthropological Archaeology* 30(3):432-453.

Compton, J. Matthew
2009 Regional Patterns of Animal Use during the Woodland and Mississppian Periods in the Central Mississippi Valley. Ph.D. dissertation, Department of Anthropology, University of Georgia, Athens.

Conner, L. Mike, J. Larry Landers, and William K. Michener
1999 Fox Squirrel and Gray Squirrel Associations within Minimally Disturbed Longleaf Pine Forests. *Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies* 53:364-374.

Conrad, Jim
2012 Jim Conrad's Naturalist Newsletter, July 1, 2012. Electronic document. https://www.backyardnature.net/n/12/120701.htm, accessed April 2, 2021.

Costamagno, Sandrine, Marie-Cécile Soulier, Aurore Val, and Sébastian Chong
2019 The Reference Collection of Cutmarks. *Palethnologie* 10.

Costello, Mike
2018 Edible History: A Field Guide to Dressing a Squirrel. Electronic document, https://explorepartsunknown.com/west-virginia/a-field-guide-to-dressing-a-squirrel, accessed November 14, 2021.

Cotter, John L.
1952 The Gordon Site in Southern Mississippi. *American Antiquity* 18(2):110-126.

Coxe, Carey, and David B. Kelley
2004 Vertebrate Fauna and Freshwater Mussels. In *Data Recovery Excavations at the Hedgeland Site (16CT19), Catahoula Parish, Louisiana*, edited by Joanne Ryan, pp. 227-239. Submitted to the U.S. Army Corps of Engineers, Vicksburg District, Contract No. DACW38-91-D-0014. Copies available from Coastal Environments, Inc.

Cummings, Garrett B.
2008 Gumbo Balls and Earth Divers: Contagious Magic in Mound Construction at a Coles Creek Site. Paper presented at the Southeastern Archaeological Conference, Charlotte, North Carolina.

de Becdelievre, Camille, Sandrine Thiol, Frédéric Santos, and Stéphane Rottier
2015 From Fire-Induced Alterations on Human Bones to the Original Circumstances of the Fire: An Integrated Approach of Human Cremains Drawn from a Neolithic Collective Burial. *Journal of Archaeological Science: Reports* 4:210-225.

deFrance, Susan D.
2009 Zooarchaeology in Complex Societies: Political Economy, Status, and Ideology. *Journal of Archaeological Research* 17(2):105-168.

Dewbury, Adam G., and Nerissa Russell
2007 Relative Frequency of Butchering Cutmarks Produced by Obsidian and Flint: An Experimental Approach. *Journal of Archaeological Science* 34:354-357.

Dezendorf, Caroline
2013 The Effects of Food Processing on the Archaeological Visibility of Maize: An Experimental Study of Carbonization of Lime-Treated Maize Kernels. *Ethnobiology Letters* 4:12-20.

Dietler, Michael
1996 Feasts and Commensal Politics in the Political Economy: Food, Power, and Status in Prehistoric Europe. In *Food and the Status Quest: An Interdisciplinary Perspective*, edited by Polly Wiessner and Wulf Schiefenhovel, pp. 87-125. Berghahn Books, Providence, Rhode Island.

2001 Theorizing the Feast: Rituals of Consumption, Commensal Politics, and Power in African Contexts. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by Michael Dietler and Brian Hayden, pp. 65-114. University of Alabama Press, Tuscaloosa.

2003 Clearing the Table: Some Concluding Reflections on Commensal Politics and Imperial States. In *The Archaeology and Politics of Food and Feasting in Early States and Empires*, edited by Tamara L. Bray, pp. 271-282. Kluwer Academic/Plenum Publishers, New York.

Dorland, Steven
2017 Sensoriality and Wendat Steams: The Analysis of Fifteenth- to Seventeenth-Century Wendat Steam Lodge Rituals in Southern Ontario. *The American Indian Quarterly* 41(1):1-30.

Edwards, John, Mark Ford, and David Guynn
2003 Fox and Gray Squirrels (*Sciurus niger* and *S. carolinensis*). In *Wild Mammals of North America: Biology, Management, and Conservation*, edited by George A. Feldhamer, Bruce C. Thompson, and Joseph A. Chapman, pp. 248-267. 2nd ed. Johns Hopkins University Press, Baltimore, Maryland.

eFloras
2021 Sand Hickory. Missouri Botanical Garden, St. Louis, MO & Harvard University Herbaria. Electronic document, http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=233500323, accessed April 2, 2021.

Emerson, Thomas E.
1980 A Stable White-Tailed Deer Population Model and Its Implications for Interpreting Prehistoric Hunting Patterns. *Midcontinental Journal of Archaeology* 5(1):117-132.

Filer, T.H., Jr
1990 Nutall Oak. In *Silvics of North America: Volume 2. Hardwoods*, edited by Russell M. Burns and Barbara H. Honkala, pp. 704-708. Agriculture Handbook 654, United States Department of Agriculture (USDA), Forest Service.

Fischer, Richard A., and Nicholas R. Holler
1991 Habitat Use and Relative Abundance of Gray Squirrels in Southern Alabama. *Journal of Wildlife Management* 55:52-60.

Fisher, John W., Jr.
1995 Bone Surface Modifications in Zooarchaeology. *Journal of Archaeological Method and Theory* 2(1):7-68.

Flosenzier, Diana Boney
2010 Mississippian Feasting Strategies in the Lower Mississippi Valley: Archaeobotanical Analysis of Two Features from Winterville Mounds (22WS500). Master's thesis, Department of Anthropology, University of Southern Mississippi, Hattiesburg.

Ford, James A.

1936 *Analysis of Indian Village Site Collections from Louisiana and Mississippi*. Anthropological Study No. 2. Department of Conservation, Louisiana Geological Survey, New Orleans.

1951 *Greenhouse: A Troyville-Coles Creek Period Site in Avoyelles Parish, Louisiana*. Anthropological Papers of the American Museum of Natural History, Vol. 1. American Museum of Natural History, New York.

Fritz, Gayle J.

1984 Identification of Cultigen Amaranth and Chenopod from Rockshelter Sites in Northwest Arkansas. *American Antiquity* 49(3):558-572.

1994 Precolumbian *Cucurbita argyrosperma* ssp. *argyrosperma* (Cucurbitaceae) in the Eastern Woodlands of North America. *Economic Botany* 48(3):280-292.

1995 New Dates and Data on Early Agriculture: The Legacy of Complex Hunter-Gatherers. *Annals of the Missouri Botanical Garden* 82:3-15.

1998 The Development of Native Agricultural Economies in the Lower Mississippi Valley. In *The Natchez District in the Old, Old South*, edited by Vincas P. Steponaitis, pp. 23-47. Southern Research Report #11. Academic Affairs Library, Center for the Study of the American South, Research Laboratories of Archaeology, Chapel Hill, NC.

1999 Gender and the Early Cultivation of Gourds in Eastern North America. *American Antiquity* 64(3):417-429.

2000 Native Farming Systems and Ecosystems in the Mississippi River Valley. In *Imperfect Balance: Landscape Transformations in the Precolumbian Americas*, edited by David L. Lentz, pp. 225-249. Columbia University Press, New York.

2008a Paleoethnobotanical Information and Issues Relevant to the I-69 Overview Process, Northwest Mississippi. In *Time's River: Archaeological Syntheses from the Lower Mississippi River Valley*, edited by Janet Rafferty and Evan Peacock, pp. 299-343. University of Alabama Press, Tuscaloosa.

2008b Plum Bayou Foodways: Distinctive Aspects of the Paleoethnobotanical Record. *Arkansas Archeologist* 47-48:31-41.

2009 Keepers of Louisiana's Levees: Early Mound Builders and Forest Managers. In *Rethinking Agriculture: Archaeological and Ethnoarchaeological Perspectives*, edited by Timothy P. Denham, José Iriarte, and Luc Vrydaghs, pp. 189-209. Left Coast Press, Walnut Creek, CA.

2014 Maygrass (*Phalaris caroliniana* Walt.). In *New Lives for Ancient and Extinct Crops*, edited by Paul E. Minnis, pp. 12-43. University of Arizona Press, Tucson.

Fritz, Gayle J., Karen R. Adams, Glen E. Rice, and John L. Czarzasty
2009 Evidence for Domesticated Amaranth From a Sedentary Period Hohokam House Floor at Las Canopas. *KIVA* 74(4):393-419.

Fritz, Gayle J., and John H. Connaway
2000 Please, Sir, I Want Some More Acorn Soup: Plant Remains from the Oliver Site presented at the Southeastern Archaeological Conference, Chatanooga, Tennessee.

Fritz, Gayle J., and Tristram R. Kidder
1993 Recent Investigations into Prehistoric Agriculture in the Lower Mississippi Valley. *Southeastern Archaeology* 12(1):1-14.

Fritz, Gayle J., Virginia Drywater Whitekiller, and James W. McIntosh
2001 Ethnobotany of Ku-Nu-Che: Cherokee Hickory Nut Soup. *Journal of Ethnobiology* 21(2):1-27.

Fuller, Richard S., and Diane Silvia Fuller
1987 *Excavations at Morgan: A Coles Creek Mound Complex in Coastal Louisiana*. Lower Mississippi Survey Bulletin, Vol. 11. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, MA.

Funkhouser, J. Lynn
2013 Feltus Faunal Report, University of North Carolina-Chapel Hill, Copies available from the Research Laboratories of Archaeology, UNC-Chapel Hill.

Futch, Robin S.
1980 Human Ecology at the Morton Shell Mound Site (16IB3), Iberia Parish, Louisiana. *Louisiana Archaeology* 7:31-51.

Gero, Joan M.
2003 Feasting and the Practice of Stately Manners. In *The Archaeology and Politics of Food and Feasting in Early States and Empires*, edited by Tamara L. Bray, pp. 285-288. Kluwer Academic/Plenum Publishers, New York.

Gifford-Gonzalez
1989 Ethnographic Analogues for Interpreting Modified Bones: Some Cases from East Africa. In *Bone Modification*, edited by R. Bonnichsen and M. H. Sorg, pp. 179-246. Center for the Study of the First Americans, Orono.

Gilmore, Melvin Randolph
1919 Uses of Plants by the Indians of the Missouri River Region. In *Thirty-Third Annual Report of the Bureau of American Ethnology, 1911-1912*, pp. 43-154. Bureau of American Ethnology, Washington, D.C.

Goette, Susan, Michele Williams, Sissel Johannessen, and Christine A. Hastorf

1994 Toward Reconstructing Ancient Maize: Experiments in Processing and Charring. *Journal of Ethnobiology* 14(1):1-21.

Gordon, Elizabeth A.
1993 Screen Size and Differential Faunal Recovery: A Hawaiian Example. *Journal of Field Archaeology* 20(4):453-460.

Gordon, Kenneth R., and G. Victor Morejohn
1975 Sexing Black Bear Skulls using Lower Canine and Lower Molar Measurements. *The Journal of Wildlife Management* 39(1):40-44.

Graham, Anna F., Ashley A. Peles, Vincas P. Steponaitis, and John W. O'Hear
2019 Exploring Coles Creek Mound Site Activities Through Pit and Midden Features. Paper presented at the Southeastern Archaeological Conference, Jackson, Mississippi.

Gremillion, Kristen J.
2004 Seed Processing and the Origins of Food Production in Eastern North America. *American Antiquity* 69(2):215-233.

Hall, Grant D.
2000 Pecan Food Potential in Prehistoric North America. *Economic Botany* 54(1):103-112.

Halstead, Paul, and John C. Barrett
2004 Introduction: Food, Drink, and Society in Prehistoric Greece. In *Food, Cuisine, and Society in Prehistoric Greece*, edited by Paul Halstead and John C. Barrett, pp. 1-15. Sheffield Studies in Aegean Archaeology. Oxford Books, Oxford.

Hamilakis, Yannis
2008 Time, Performance, and the Production of a Mnemonic Record: From Feasting to an Archaeology of Eating and Drinking. In *DAIS: The Aegean Feast*, edited by Louise A. Hitchcock, Robert Laffineur, and Janice Crowley, pp. 3-19, Vol. Aegaeum 29. Université de Liège, Liège.

Hayden, Brian
1996 Feasting in Prehistoric and Traditional Societies. In *Food and the Status Quest: An Interdisciplinary Perspective*, edited by Polly Wiessner and Wulf Schiefenhövel, pp. 127-147. Berghahn Books, Providence, RI.

2014 *The Power of Feasts: From Prehistory to the Present*. Cambridge University Press.

Hayden, Brian, and Suzanne Villeneuve
2011 A Century of Feasting Studies. *Annual Review of Anthropology* 40:443-449.

Hendrickson, Dean A., and Adam E. Cohen
2020 Fishes of Texas Project Database (Version 3.0). Electronic document, http://www.fishesoftexas.org/home/, accessed December, 10, 2021.

Henry, Edward R., Natalie G. Mueller, and Mica B. Jones
2021 Ritual Dispositions, Enclosures, and the Passing of Time: A Biographical Perspective on the Winchester Farm Earthwork in Central Kentucky, USA. *Journal of Anthropological Archaeology* 62.

Howey, Meghan C. L.
2012 *Mound Builders and Monument Makers of the Northern Great Lakes, 1200-1600*. University of Oklahoma Press, Norman.

Hrynick, M. Gabriel, and Matthew W. Betts
2014 Identifying Ritual Structures in the Archaeological Record: A Maritime Woodland Period Sweathouse from Nova Scotia, Canada. *Journal of Anthropological Archaeology* 35:92-105.

Jackson, H. Edwin
1989 The Trouble with Transformations: Effects of Sample Size and Sample Composition on Meat Weight Estimates Based on Skeletal Mass Allometry. *Journal of Archaeological Science* 16(6):601-610.

2008 Faunal Research in the Yazoo Basin and Lower Mississippi Valley: Setting Parameters for Future Research in the I-69 Corridor, Mississippi. In *Time's River: Archaeological Syntheses from the Lower Mississippi River Valley*, edited by Janet Rafferty and Evan Peacock, pp. 274-298. University of Alabama Press, Tuscaloosa.

2014 Animals as Symbols, Animals as Resources: The Elite Faunal Record in the Mississippian World. In *Animals and Inequality in the Ancient World*, pp. 107-123.

2016 Faunal Remains from Feltus and Aden: New Evidence for Coles Creek Animal Use presented at the Southeastern Archaeological Conference, Athens, Georgia.

Jackson, H. Edwin, C. Margaret Scarry, and Susan Scott
2016 Domestic and Ritual Meals in the Moundville Chiefdom. In *Rethinking Moundville and Its Hinterland*, edited by Vincas P. Steponaitis and C. Margaret Scarry, pp. 187-233. University Press of Florida, Gainesville.

Jackson, H. Edwin, and Susan L. Scott
1995 The Faunal Record of the Southeastern Elite: The Implications of Economy, Social Relations, and Ideology. *Southeastern Archaeology* 14(2):103-119.

2002 Woodland Faunal Exploitation in the Midsouth. In *The Woodland Southeast*, edited by David G. Anderson, pp. 461-482. University of Alabama Press, Tuscaloosa.

2003 Patterns of Elite Faunal Utilization at Moundville, Alabama. *American Antiquity* 68(3):552-572.

Jackson, H. Edwin, Susan L. Scott, and Frank F. Schambach
2012 At the House of the Priest: Faunal Remains from the Crenshaw Site (3MI6), Southwest Arkansaw. In *The Archaeology of the Caddo*, edited by Timothy K. Perttula and Chester P. Walker, pp. 47-85. University of Nebraska Press, Lincoln.

Jackson, Thomas L.
1991 Pounding Acorn: Women's Production as Social and Economic Focus. In *Engendering Archaeology: Women and Prehistory*, edited by Joan M. Gero and Margaret W. Conkey, pp. 301-325. Blackwell, Cambridge, Massachusetts.

Johnson, Paul S.
1994 How to Manage Oak Forests for Acorn Production. United States Department of Agriculture, TB-NC-1 from the Silviculture and Ecology Upland Central Hardwood Forests Research Unit, North Central Forest Experiment Station.

Kassabaum, Megan C.
2014 Feasting and Communal Ritual in the Lower Mississippi Valley, AD 700-1000. Ph.D. dissertation, Department of Anthropology, University of North Carolina, Chapel Hill.

2018 Social Subsistence: Integrating Analyses of Ceramic, Plant, and Animal Remains from Feltus. In *Baking, Bourbon, and Black Drink: Foodways Archaeology in the American Southeast*, edited by Tanya M. Peres and Aaron Deter-Wolf, pp. 11-29. The University of Alabama Press, Tuscaloosa.

2019a Early Platforms, Early Plazas: Exploring the Precursors to Mississippian Mound-and-Plaza Centers. *Journal of Archaeological Research* 27(2):187-247.

2019b A Method for Conceptualizing and Classifying Feasting: Interpreting Communal Consumption in the Archaeological Record. *American Antiquity* 84(4):610-631.

Kassabaum, Megan C., Edward R. Henry, Vincas P. Steponaitis, and John W. O'Hear
2014 Between Surface and Summit: the Process of Mound Construction at Feltus. *Archaeological Prospection* 21(1):27-37.

Kassabaum, Megan C., and Erin Stevens Nelson
2016 Standing Posts and Special Substances: Gathering and Ritual Deposition at Feltus (22Je500), Jefferson County, Mississippi. *Southeastern Archaeology* 35(2):134-154.

Kassabaum, Megan C., and Ashley A. Peles
2020 Bears as Both Family and Food: Tracing the Changing Contexts of Bear Ceremonialism at the Feltus Mounds. In *Shaman, Priest, Practice, Belief: Materials of Ritual and Religion in Eastern North America*, edited by Stephen B. Carmody and Casey R. Barrier, pp. 108-126. The University of Alabama Press, Tuscaloosa.

Kelley, David B.

1990 Coles Creek Period Faunal Exploitation in the Ouachita River Valley of Southern Arkansas: The Evidence from the Paw Paw Site. PhD dissertation, Department of Anthropology, Tulane University, New Orleans, Louisiana.

Kelly, Lucretia S.
2000 Social Implications of Faunal Provisioning for the Cahokia Site: Initial Mississippian Lohmann Phase. PhD dissertation, Department of Anthropology, Washington University, St. Louis.

2001 A Case of Ritual Feasting at the Cahokia Site. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by Michael Dietler and Brian Hayden, pp. 334-367. University of Alabama Press, Tuscaloose.

2010 A Bird's Eye View of Ritual at the Cahokia Site. In *Anthropological Approaches to Zooarchaeology: Complexity, Colonialism, and Animal Transformations*, edited by Douglas V. Campana, Pamela Crabtree, Susan D. deFrance, Justin Lev-Tov, and Alice M. Choyke, pp. 1-11. Oxbow Books, Oakville, CT.

Kidder, Tristram R.
1992 Coles Creek Period Social Organization and Evolution in Northeast Louisiana. In *Lords of the Southeast: Social Inequality and the Native Elites of Southeastern North America*, edited by Alex W. Barker and Timothy R. Pauketat, pp. 145-162. Archeological Papers of the American Anthropological Association, Number 3. American Anthropological Association, Washington, D.C.

2002 Woodland Period Archaeology of the Lower Mississippi Valley. In *The Woodland Southeast*, edited by David G. Anderson and Robert C. J. Mainfort, pp. 66-90. University of Alabama Press, Tuscaloosa.

2004 Plazas as Architecture: An Example from the Raffman Site, Northeast Louisiana. *American Antiquity* 69(3):514-532.

Kidder, Tristram R., and Gayle J. Fritz
1993 Subsistence and Social Change in the Lower Mississippi Valley: The Reno Brake and Osceola Sites, Louisiana. *Journal of Field Archaeology* 20:281-297.

Kintigh, Keith W.
1984 Measuring Archaeological Diversity by Comparison with Simulated Assemblages. *American Antiquity* 49(1):44-54.

Knight, Vernon James
2001 Feasting and the Emergence of Platform Mound Ceremonialism in Eastern North America. In *Feasts: Archaeological and Ethnographic Perspectives on Food, Politics, and Power*, edited by Michael Dietler and Brian Hayden, pp. 311-333. Smithsonian Institution Press, Washington, D.C.

Krech, Shepard, III
2009 *Spirits of the Air: Birds and American Indians in the South*. University of Georgia Press, Athens.

Kuehn, Steven R.
2016 Beyond Diet: Faunal Remains and Ritual During the Late Woodland Through Mississippian Periods in the American Bottom Region. *Illinois Archaeology* 28:533-566.

Kupperman, Karen Ordahl
1988 *Captain John Smith: A Select Edition of His Writings*. University of North Carolina Press, Chapel Hill.

LaDu, Daniel A., and J. Lynn Funkhouser
2016 The Faunal Record at Mazique (22AD502): Everyday Subsistence at a Late Prehistoric Mound and Plaza Center in the Natchez Bluffs Region. *Mississippi Archaeology* 51(1 & 2):1-28.

2018 Coles Creek Fauna Procurement Strategies: Subsistence Diversity Among Late Prehistoric Hunter-Gatherer-Horticulturalists in the Lower Mississippi Valley. *Southeastern Archaeology* 38(1):54-73.

Landon, David B.
1996 Feeding Colonial Boston: A Zooarchaeological Study. *Historical Archaeology* 30(1):1-153.

Lankford, George E.
2007a The "Path of Souls": Some Death Imagery in the Southeastern Ceremonial Complex. In *Ancient Objects and Sacred Realms: Interpretations of Mississippian Iconography*, edited by F. Kent Reilly, III and James F. Garber, pp. 174-212. University of Texas Press, Austin.

2007b Some Cosmological Motifs in the Southeastern Ceremonial Complex. In *Ancient Objects and Sacred Realms: Interpretations of Mississippian Iconography*, edited by F. Kent Reilly, III and James F. Garber, pp. 8-38. University of Texas Press, Austin.

2011 The Raptor on the Path. In *Visualizing the Sacred: Cosmic Visions, Regionalism, and the Art of the Mississippian World*, edited by George E. Lankford, F. Kent Reilly, III, and James F. Garber, pp. 240-250. University of Texas Press, Austin.

Lapham, Heather A.
2020 In Feast and Famine: New Perspectives on Black Bear in the Southern Appalachians and Piedmont, AD 1000-1800. In *Bears: Archaeological and Ethnohistorical Perspectives in Native Eastern North America*, edited by Heather A. Lapham and Gregory A. Waselkov, pp. 160-192. University Press of Florida, Gainesville.

Lapham, Heather A., and Gregory A. Waselkov (editors)

2020 *Bears: Archaeological and Ethnohistorical Perspectives in Native Eastern North America*. University Press of Florida, Gainesville.

Lassetter, J. Stuart
1984 Taxonomy of the *Vicia ludoviciana* Complex (Leguminosae). *Rhodera* 86(848):475-505.

Lawson, John
1860 [1714] *The History of Carolina*. Strother and Marcom, Raleigh.

1967 *A New Voyage to Carolina*. Hugh Talmage Lefler. University of North Carolina Press, Chapel Hill.

Le Page du Pratz, Antoine Simone
1758 *Histoire de la Louisiane : contenant la découverte de ce vaste pays, sa description géographique, un voyage dans les terres, l'histoire naturelle, les moeurs, coutumes & religion des naturels, avec leurs origines : deux voyages dans le nord du nouveau Méxique, dont un jusqu'à la mer du Sud*. 3 vols. Chez De Bure, l'aîné [et al.], Paris.

LeCount, Lisa J.
2001 Like Water for Chocolate: Feasting and Political Ritual among the Late Classic Maya at Zunantunich, Belize. *American Anthropologist* 103(4):935-953.

Lederer, John
1891 *The Discoveries of John Lederer*. Sir William Talbot. Walker, Evans & Cogswell Co., Charleston, South Carolina.

Limp, W. Frederick, and Van A. Reidhead
1979 An Economic Evaluation of the Potential of Fish Utilization in Riverine Environments. *American Antiquity* 44(1):70-78.

Lyman, R. Lee
1994 *Vertebrate Taphonomy*. Cambridge University Press, New York.

Lyman, R. Lee, and Kenneth M. Ames
2007 On the Use of Species-Area Curves to Detect the Effects of Sample Size. *Journal of Archaeological Science* 34:1985-1990.

Madrigal, T. Cregg, and Julie Zimmermann Holt
2002 White-Tailed Deer Meat and Marrow Return Rates and Their Application to Eastern Woodlands Archaeology. *American Antiquity* 67(4):745-759.

Mariaca, Maria Teresa
1985 Late Marksville/Early Baytown Period Subsistence Economy: Analysis of Three Faunal Assemblages from Northeastern Louisiana. Master's thesis, Department of Anthropology, Boston University, Boston.

Marks, Stuart A., and Albert W. Erickson
1966 Age Determination in the Black Bear. *The Journal of Wildlife Management* 30(2):389-410.

Martin, Alexander C., and William D. Barkley
1961 *Seed Identification Manual*. University of California Press, Berkeley.

Mason, Sarah, and Mark Nesbitt
2009 Acorns as Food in Southeast Turkey: Implications for Prehistoric Subsistence in Southwest Asia. In *From Foragers to Farmers: Gordon C. Hillman Festschrift*, edited by Andrew S. Fairbairn and Ehud Weiss, pp. 71-85. Oxbow Books, Oxford.

McGee, Meghan E., Danielle L. Miller, Janene Auger, Hal L. Black, and Seth W. Donahue
2007 Black Bear Femoral Geometry and Cortical Porosity are Not Adversely Affected by Ageing Despite Annual Periods of Disuse (Hibernation). *Journal of Anatomy* 210(2):160-169.

McGimsey, Chip
2003 The Rings of Marksville. *Southeastern Archaeology* 22(1):47-62.

2004 *The Gold Mine Site (16RI13): An AD 825 Ossuary in Northeast Louisiana*. Regional Archaeology Program, Management Unit III, 2003/2004 Annual Report, Washington, D.C.

MDWFP
Freshwater Fishes Common to Mississippi: A Fish Identification Guide, edited by Fisheries Mississippi Department of Wildlife, and Parks. Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP), Jackson.

2022 Mississippi White-Tailed Deer Simulated Mean Conception Date Map. Mississippi Department of Wildlife, Fisheries, and Parks (MDWFP) https://www.mdwfp.com/wildlife-hunting/deer-program/deer-breeding-date-map, accessed November 12, 2021.

Means, D. Bruce
2006 Vertebrate Faunal Diversity of Longleaf Pine Ecosystems. In *The Longleaf Pine Ecosystem: Ecology, Silviculture, and Restoration*, edited by Shibu Jose, Eric J. Jokela, and Deborah L. Miller, pp. 157-213. Springer, New York.

Mehta, Jayur M.
2007 A Study of Sweat Lodges in the Southeastern United States. Master's thesis, Department of Anthropology, University of Alabama, Tuscaloosa.

Messner, Timothy C.
2011 *Acorns and Bitter Roots: Starch Grain Research in the Prehistoric Eastern Woodlands*. University of Alabama Press, Tuscaloosa.

Metcalfe, Duncan, and Kevin T. Jones
1988 A Reconsideration of Animal Body-Part Utility Indices. *American Antiquity* 53(3):486-504.

Miller, Naomi F.
1989 What Mean These Seeds: A Comparative Approach to Archaeological Seed Analysis. *Historical Archaeology* 23(2):50-59.

Mills, Barbara J.
2007 Performing the Feast: Visual Display and Suprahousehold Commensalism in the Puebloan Southwest. *American Antiquity* 72(2):210-239.

Minnis, Paul E.
1981 Seeds in Archaeologial Sites. *American Antiquity* 48(1):143-152.

Moerman, Daniel
2003 Native American Ethnobotany Database: BRIT. Electronic document, http://naeb.brit.org/, accessed April 8, 2021.

Moffat, Charles R., and Constance M. Arzigian
2000 New Data on the Late Woodland Use of Wild Rice in Northern Wisconsin. *Midcontinental Journal of Archaeology* 25(1):49-81.

Mooney, James
1902 *Myths of the Cherokee*. Smithsonian Institution, Washington, D.C.

Moorehead, Warren K.
1924 Field Notes. Natchez, Mississippi Mounds and Village Sites. Typescript. Robert S. Peabody Foundation, Phillips Academy, Andover, MA.

Mueller, Natalie G.
2017a Documenting Domestication in a Lost Crop (*Polygonum erectum* L.): Evolutionary Bet-Hedgers under Cultivation. *Vegetation History and Archaeobotany* 26(3):313-327.

2017b Evolutionary "Bet-Hedgers" under Cultivation: Investigating the Domestication of Erect Knotweed (*Polygonum erectum* L.) using Growth Experiments. *Human Ecology* 45(2):189-203.

2018 The Earliest Occurrence of a Newly Described Domesticate in Eastern North America: Adena/Hopewell Communities and Agricultural Innovation. *Journal of Anthropological Archaeology* 49:39-50.

Mueller, Natalie G., Robert N. Spengler, III, Ashley Glenn, and Kunsang Lama
2021 Bison, Anthropogenic Fire, and the Origins of Agriculture in Eastern North America. *The Anthropocene Review* 8(2):141-158.

Mueller, Natalie G., Andrea White, and Peter Szilagyi
2019 Experimental Cultivation of Eastern North America's Lost Crops: Insights into Agricultural Practice and Yield Potential. *Journal of Ethnobiology* 39(4).

Muir, Robert J., and Jonathan C. Driver
2002 Identifying Ritual Use of Animals in the Northern American Southwest. In *Behavior Behind Bones: The Zooarchaeology of Ritual, Religion, Status, and Identity*, edited by Sharyn Jones O'Day, Wim Van Neer, and Anton Ervynck, pp. 128-143. Proceedings of the 9th Conference of the International Council of Archaeozoology, Durham, August 2002, Peter Rowley-Conwy, Umberto Albarella, and Keith Dobney, general editor. Oxbow Books, Oxford.

Nelson, Erin S., Ashley Peles, and Mallory A. Melton
2019 Foodways and Community at the Late Mississippian Site of Parchman Place. *Southeastern Archaeology* 39(1):29-50.

Nelson, Erin Stevens
2014 Intimate Landscapes: the Social Nature of the Spaces Between. *Archaeological Prospection* 21:49-57.

Nelson, Erin Stevens, and Megan C. Kassabaum
2014 Expanding Social Networks through Ritual Deposition: A Case Study from the Lower Mississippi Valley. *Archaeological Review from Cambridge* 29(1):103-128.

Nesom, Guy
2006 Common Persimmon. National Plant Database, USDA, NRCS.

O'Hear, John W., Megan C. Kassabaum, Ashley A. Peles, and Vincas P. Steponaitis
2016 Coles Creek Mound Summits and Their Uses. Paper presented at the Southeastern Archaeological Conference, Athens, Georgia.

Ortiz, Beverly R.
1991 *It Will Live Forever: Traditional Yosemite Indian Acorn Preparation*. Heyday Books, Berkeley, California.

Palmer, Edward
1878 Plants Used by the Indians of the United States. *The American Naturalist* 12(9):593-606.

Pauketat, Timothy R., Lucretia S. Kelly, Gayle J. Fritz, Neal H. Lopinot, Scott Elias, and Eve Hargrave
2002 The Residues of Feasting and Public Ritual at Early Cahokia. *American Antiquity* 67(2):257-279.

Pavao-Zuckerman, Barnet

2001 Culture Contact and Subsistence Change at Fusihatchee (1EE191). Ph.D. dissertation, Department of Anthropology, University of Georgia, Athens.

Payne, Sebastian
1972 Partial Recovery and Sample Bias: The Results of Some Sieving Experiments. In *Papers in Economic Prehistory*, edited by E. S. Higgs, pp. 49-63. Cambridge University Press, Cambridge.

Pearsall, Deborah M.
2016 *Paleoethnobotany: A Handbook of Procedures*. 3rd ed. Routledge, New York.

Peles, Ashley A., and Megan C. Kassabaum
2020 Reexamining the Evidence for Bear Ceremonialism in the Lower Mississippi Valley. In *Bears: Archaeological and Ethnohistorical Perspectives in Native Eastern North America*, edited by Heather A. Lapham and Gregory A. Waselkov, pp. 235-255. University Press of Florida, Gainesville.

Peles, Ashley, and C. Margaret Scarry
2015a Plant Remains. In *Graveline: A Late Woodland Platform Mound on the Mississippi Gulf Coast*, edited by John H. Blitz and Lauren E. Downs, pp. 75-84. Archaeological Report 34. Mississippi Department of Archives and History, Jackson.

2015b Subsistence Remains. In *Archaeology at Ashe Ferry: Late Woodland and Middle Mississippian Period Occupations in the Lower Catawba River Valley, York County, South Carolina*, edited by Brett H. Riggs, R. P. Stephen Davis, Jr., and Mary Elizabeth Fitts. Research Report 36. Research Laboratories of Archaeology, University of North Carolina, Chapel Hill.

Peres, Tanya M.
2017 Foodways Archaeology: A Decade of Research from the Southeastern United States. *Journal of Archaeological Research* 25(4):421-460.

Peres, Tanya M., and Heidi Altman
2018 The Magic of Improbable Appendages: Deer Antler Objects in the Archaeological Record of the American South. *Journal of Archaeological Science: Reports* 20:888-895.

Pickering, Travis Rayne, and Charles P. Egeland
2006 Experimental Patterns of Hammerstone Percussion Damage on Bones: Implications for Inferences of Carcass Processing by Humans. *Journal of Archaeological Science* 33:459-469.

Pluckhahn, Thomas J., J. Matthew Compton, and Mary Theresa Bonhage-Freund
2013 Evidence of Small-Scale Feasting from the Woodland Period Site of Kolomoki, Georgia. *Journal of Field Archaeology* 31(3):263-284.

Pollock, Susan

2003 Feasts, Funerals, and Fast Food in Early Mesopotamian States. In *The Archaeology and Politics of Food and Feasting in Early States and Empires*, edited by Tamara L. Bray, pp. 17-38. Kluwer Academic/Plenum Publishers, New York.

2012 Towards an Archaeology of Commensal Spaces. An Introduction. *eTopoi Journal for Ancient Studies* 2(1):1-20.

Popp, Jesse N., Tom Toman, Frank F. Mallory, and Josef Hamr
2014 A Century of Elk Restoration in Eastern North America. *Restoration Ecology* 22(6):723-730.

Potter, James M.
2000 Pots, Parties, and Politics: Communal Feasting in the American Southwest. *American Antiquity* 65(3):471-492.

Potter, James M., and Scott G. Ortman
2004 Community and Cuisine in the Prehispanic American Southwest. In *Identity, Feasting, and the Archaeology of the Greater Southwest*, edited by Barbara J. Mills, pp. 173-191. University Press of Colorado, Boulder.

Purdue, James R.
1983 Epiphyseal Closure in White-Tailed Deer. *The Journal of Wildlife Management* 47(4):1207-1213.

Purdue, James R., Bonnie W. Styles, and Mary Carol Masulis
1989 Faunal Remains and White-Tailed Deer Exploitation from a Late Woodland Encampment: The Boschert Site (23SC609), St. Charles County, Missouri. *Midcontinental Journal of Archaeology* 14(2):146-163.

Reitz, Elizabeth J., and C. Margaret Scarry
1985 *Reconstructing Historic Subsistence with an Example from Sixteenth-Century Spanish Florida*. Special Publication Series No. 3. Society for Historical Archaeology.

Reitz, Elizabeth J., Mark Williams, and Katie B. Dalton
2020 Rare Animals at a Mississippian Chiefly Compound: The Irene Mound Site (9CH1), Georgia, USA. *Southeastern Archaeology* 39(2):89-108.

Reitz, Elizabeth J., and Elizabeth S. Wing
2008 *Zooarchaeology*. 2nd ed. Cambridge, New York.

Roberts, Katherine M.
2004 Plant Remains. In *Data Recovery Excavations at the Hedgeland Site (16CT19), Catahoula Parish, Louisiana*, edited by Joanne Ryan, pp. 207-224. Submitted to the U.S. Army Corps of Engineers, Vicksburg District, Contract No. DACW38-91-D-0014. Copies available from Coastal Environments, Inc.

2005 Plant Remains. In *Lake Providence: A Terminal Coles Creek Culture Mound Center, East Carroll Parish, Louisiana*, Vol II, edited by Richard A. Weinstein, pp. 431-489. 2 vols. Submitted to the U.S. Army Corps of Engineers, Vicksburg District, Contract No. DACW38-91-D-0014, Contract No. DACW38-96-D-0005, Contract No. DACW38-98-D-0004. Copies available from Coastal Environments, Inc.

Roe, Lori M.
2010 Social Complexity and Mound Ceremony in the Coles Creek Culture: Research at the Raffman Mound Center in Madison Parish, Louisiana. PhD dissertation, Department of Anthropology, Tulane University, New Orleans.

Ross, N. J., M. H. Stevens, A. W. Rupiper, I. Harkreader, and L. A. Leben
2014 The Ecological Side of an Ethnobotanical Coin: Legacies in Historically Managed Trees. *American Journal of Botany* 101(10):1-13.

Rusby, H. H.
1906 Wild Foods of the United States in September. *Country Life in America* 10:533-566.

Ryan, Joanne
2004 *Data Recovery Excavations at the Hedgeland Site (16CT19), Catahoula Parish, Louisiana*, Submitted to the U.S. Army Corps of Engineers, Vicksburg District, Contract No. DACW38-91-D-0014, Contract No. DACW38-96-D-0005, Contract No. DACW38-98-D-0004. Copies available from Coastal Environments, Inc.

Ryan, Joanne, and Katherine M. Roberts
2003 Coles Creek Period Native Seed Use in the Tensas Basin, Louisiana. In *Proceedings of the 19th Mid-South Archaeological Conference: Papers in Honor of Charles H. McNutt, Sr.*, edited by David H. Dye and C. Andrew Buchner, pp. 83-94. University of Memphis, Anthropological Research Center, Occasional Paper No. 22, Memphis, TN.

Sanger, Matthew C.
2017 Evidence for Significant Subterranean Storage at Two Hunter-Gatherer Sites: The Presence of a Mast-Based Economy in the Late Archaic Coastal American Southeast. *American Antiquity* 82(1):50-70.

Scarry, C. Margaret
1993 Variability in Mississippian Crop Production Strategies. In *Foraging and Farming in the Eastern Woodlands*, edited by C. Margaret Scarry, pp. 78-90. University Press of Florida, Gainesville.

2003 Patterns of Wild Plant Utilization in the Prehistoric Eastern Woodlands. In *People and Plants in Ancient Eastern North America*, edited by Paul E. Minnis, pp. 50-104. Smithsonian Books, Washington, D.C.

2008 Crop Husbandry Practices in North America's Eastern Woodlands. In *Case Studies in Environmental Archaeology*, edited by Elizabeth J. Reitz, C. Margaret Scarry, and Sylvia J. Scudder, pp. 391-404. 2nd ed. Springer, New York.

Scarry, C. Margaret, and Richard A. Yarnell
2011 Native American Domestication and Husbandry of Plants in Eastern North America. In *The Subsistence Economices of Indigenous North American Societies*, edited by Bruce D. Smith, pp. 483-501. Smithsonian Institution Scholarly Press, Washington, D.C.

Scarry, John F., H. Edwin Jackson, and Mintcy D. Maxham
2016 Late Prehistoric Social Practice in the Rural Black Warrior River Valley. In *Rethinking Moundville and Its Hinerland*, edited by Vincas P. Steponaitis and C. Margaret Scarry, pp. 162-186. University Press of Florida, Gainesville.

Schachner, Gregson
2001 Ritual Control and Transformation in Middle-Range Societies: An Example from the American Southwest. *Journal of Anthropological Archaeology* 20(2):168-194.

Schlaegel, Bryce E.
1990 Willow Oak. In *Silvics of North America: Volume 2. Hardwoods*, edited by Russell M. Burns and Barbara H. Honkala, pp. 715-720. Agriculture Handbook 654, United States Department of Agriculture (USDA), Forest Service.

Scott, Susan L.
1983 Analysis, Synthesis, and Interpretation of Faunal Remains from the Lubbub Creek Archaeological Locality. In *Prehistoric Agricultural Communities in West-Central Alabama: Studies of Material Remains from the Lubbub Creek Archaeological Locality*, Vol 2, edited by Christopher S. Peebles, pp. 272-390. University of Michigan, Submitted to the Army Corps of Engineers, Mobile District.

2005 Vertebrate Fauna. In *Lake Providence: A Terminal Coles Creek Culture Mound Center, East Carroll Parish, Louisiana*, Vol II, edited by Richard A. Weinstein, pp. 411-429. 2 vols. Submitted to the U.S. Army Corps of Engineers, Vicksburg District, Contract No. DACW38-91-D-0014, Contract No. DACW38-96-D-0005, Contract No. DACW38-98-D-0004. Copies available from Coastal Environments, Inc.

Scott, Susan L., and H. Edwin Jackson
1998 Early Caddo Ritual and Patterns of Animal Use: An Analysis of Faunal Remains from the Crenshaw Site (3MI6), Southwestern Arkansas. *Arkansas Archeologist* 37:1-38.

Self, Brady
2018 Managing Hardwood Stands for Acorn Production. Publication 2904. Mississippi State University Extension Service.

Senchina, David S.

2006 Ethnobotany of Poison Ivy, Poison Oak, and Relatives (*Toxicodendron* spp., Anacardiaceae) in America: Veracity of Historical Accounts. *Rhodora* 108(935):203-227.

Shaffer, Brian S., and Julia L. Sanchez
1994 Comparison of 1/8"- and 1/4"-Mesh Recovery of Controlled Samples of Small-to-Medium-Sized Mammals. *American Antiquity* 59(3):525-530.

Shennan, Stephen
1997 *Quantifying Archaeology*. 2nd ed. Edinburgh University Press, Edinburgh.

Sherwood, Sarah C., and Tristram R. Kidder
2011 The Davincis of Dirt: Geoarchaeological Perspectives on Native American Mound Building in the Mississippi River Basin. *Journal of Anthropological Archaeology* 30(1):69-87.

Shipman, Pat, Giraud Foster, and Margaret Schoeninger
1984 Burnt Bones and Teeth: An Experimental Study of Color, Morphology, Crystal Structure and Shrinkage. *Journal of Archaeological Science* 11(4):307-325.

Simon, Mary L.
2011 Evidence for Variability Among Squash Seeds from the Hoxie Site (11CK4), Illinois. *Journal of Archaeological Science* 38:2079-2093.

2014 Reevaluating the Introduction of Maize into the American Bottom and Western Illinois. In *Reassessing the TIming, Rate, and Adoption Trajectories of Domesticate Use in the Midwest and Great Lakes*, edited by Maria E. Raviele and William A. Lovis, pp. 97-134. Midwest Archaeological Conference Occasional Papers No. 1, Champaign, Illinois.

2017 Reevaluating the Evidence for Middle Woodland Maize from the Holding Site. *American Antiquity* 82(1):140-150.

Simon, Mary L., and Kathryn E. Parker
2006 Prehistoric Plant Use in the American Bottom: New Thoughts and Interpretations. *Southeastern Archaeology* 25(2):212-257.

Simpson, George Gaylord
1941 Large Pleistocene Felines of North America. *American Museum Novitates* 1136:1-27.

Simpson, George Gaylord, Anne Roe, and Richard C. Lewontin
1960 *Quantitative Zoology*. Revised ed. Harcourt, Brace, and Company, New York.

Slade, Norman A., and Robert K. Swihart
1983 Home Range Indices for the Hispid Cotton Rat (*Sigmodon hispidus*) in Northeastern Kansas. *Journal of Mammalogy* 64(4):580-590.

Small, John K.

1922 The Blue-Stem — Sabal Minor. *Journal of the New York Botanical Garden* 23(275):161-168.

Smith, Bruce D.

1974 Middle Mississippi Exploitation of Animal Populations: A Predictive Model. *American Antiquity* 39(2):274-291.

1992 The Economic Potential of *Chenopodium berlandieri* in Prehistoric Eastern North America. In *Rivers of Change: Essays on Early Agriculture in Eastern North America*, edited by Bruce D. Smith, pp. 163-183. University of Alabama Press, Tuscaloosa.

Smith, Christopher

1996 Analysis of Plant Remains from Mound S at the Toltec Mounds Site. *The Arkansas Archeologist* 35(51-76).

Smith, H. Clay

1990 Mockernut Hickory. In *Silvics of North America: Volume 2. Hardwoods*, edited by Russell M. Burns and Barbara H. Honkala, pp. 226-233. Agriculture Handbook 654, United States Department of Agriculture (USDA), Forest Service, Washington, D.C.

Smith, Monica L.

2014 Feasts and Their Failures. *Journal of Archaeological Method and Theory* 22(4):1215-1237.

Spencer, Stephen R., Guy N. Cameron, and Robert K. Swihart

1990 Operationally Defining Home Range: Temporal Dependence Exhibited by Hispid Cotton Rats. *Ecology* 71(5):1817-1822.

Speth, John D., and Susan L. Scott

1989 Horticulture and Large-Mammal Hunting: the Role of Resource Depletion and the Constraints of Time and Labor. In *Farmers as Hunters: The Implications of Sedentism*, edited by Susan Kent, pp. 71-79. Cambridge University Press, New York.

Spielmann, Katherine A.

2002 Feasting, Craft Specialization, and the Ritual Mode of Production in Small-Scale Societies. *American Anthropologist* 104(1):195-207.

Springer, James Warren

1980 An Analysis of Prehistoric Food Remains from the Bruly St. Martin Site, Louisiana, with a Comparative DIscussion of Mississippi Valley Faunal Studies. *Midcontinental Journal of Archaeology* 5(2):193-223.

Stahle, Peter W.

1996 The Recovery and Interpretation of Microvertebrate Bone Assemblages from Archaeological Contexts. *Journal of Archaeological Method and Theory* 3(1):31-75.

Stein, John, Denise Binion, and Robert Acciavetti
2001 Field Guide to Native Oak Species of Eastern North America, edited by Forest Health Technology Enterprise Team. USDA Forest Service, Morgantown, West Virginia.

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

1998 Native American Cultures in the Precolonial South. In *The Natchez District in the Old, Old South*, edited by Vincas P. Steponaitis, pp. 1-22, Vol. Southern Research Report #11. Academic Affairs Library, Center for the Study of the American South, Research Laboratories of Archaeology, Chapel Hill, NC.

Steponaitis, Vincas P., Edward R. Henry, Megan C. Kassabaum, John W. O'Hear, Alexander Craib, and Sara Wyatt
2012 Between Surface and Summit: The Process of Mound Construction at Feltus. Paper presented at the Southeastern Archaeological Conference, Baton Rouge, Louisiana.

Steponaitis, Vincas P., Megan C. Kassabaum, and John W. O'Hear
2012 Coles Creek Earthworks and Ritual at the Feltus Mounds in Southwest Mississippi, AD 700-1100. Poster presented at the Society for American Archaeology, Memphis, Tennessee.

2013 The Scale and Complexity of Earthmoving at Feltus (And Beyond!). Poster presented at the Annual Meeting of the Southeastern Archaeological Conference, Tampa, Florida.

2014 Cahokia's Coles Creek Predecessors. In *Medieval Mississippians: The Cahokian World*, edited by Timothy R. Pauketat and Susan M. Alt, pp. 13-19. School for Advanced Research Press, Santa Fe, New Mexico.

2015 The Uses of Platform-Mound Summits at a Coles Creek Site in Southwest Mississippi. Poster presented at the Society for American Archaeology, San Francisco, California.

Steponaitis, Vincas P., Ashley A. Peles, and John W. O'Hear
2018 Coles Creek Summit Architecture at the Feltus Mounds. Poster presented at the Southeastern Archaeological Conference, Augusta, Georgia.

Stiner, Mary C.
1990 The Use of Mortality Patterns in Archaeological Studies of Hominid Predatory Adaptations. *Journal of Anthropological Archaeology* 9:305-351.

1998 Mortality Analysis of Pleistocene Bears and Its Paleoanthropological Relevance. *Journal of Human Evolution* 34:303-326.

Stiner, Mary C., Steven L. Kuhn, and Ofer Bar-Yosef

1995 Differential Burning, Recrystallization, and Fragmentation of Archaeological Bone. *Journal of Archaeological Science* 22:223-237.

Stiner, Mary C., Natalie D. Munro, and Montserrat Sanz
2012 Carcass Damage and Digested Bone from Mountain Lions (*Felis concolor*): Implications for Carcass Persistence on Landscapes as a Function of Prey Age. *Journal of Archaeological Science* 39(4):896-907.

Sturtevant, E. Lewis, and U. P. Hedrick
1919 *Sturtevant's Notes on Edible Plants*. J. B. Lyon Company, Albany, New York.

Styles, Bonnie W., and James R. Purdue
1996 Animal Exploitation. In *Middle and Late Woodland Subsistence and Ceramic Technology in the Central Mississippi River Valley*, edited by Michael J. O'Brien, pp. 145-242. Reports of Investigations, No. 52. Illinois State Museum, Springfield, Illinois.

Swanton, John R.
1946 *The Indians of the Southeastern United States*. Bureau of American Ethnology Bulletin No.137. Smithsonian Institution, Washington, D.C.

Taché, Karine, and Oliver E. Craig
2015 Cooperative Harvesting of Aquatic Resources and the Beginning of Pottery Production in North-Eastern North America. *Antiquity* 89(343):177-190.

Talalay, Laurie, Donald R. Keller, and Patrick J. Munson
1984 Hickory Nuts, Walnuts, Butternuts, and Hazelnuts: Observations and Experiments Relevant to their Aboriginal Exploitation in Eastern North America. In *Experiments and Observations on Aboriginal Wild Plant Food Utilization in Eastern North America*, edited by Patrick J. Munson, pp. 338-359. Prehistory Research Series VI, No. 2. Indiana Historical Society, Indianapolis.

Terry, Ashley L.
2017 Zooarchaeological Analysis of a Coles Creek Flank Midden at Smith Creek, Wilkinson County, Mississippi (22Wk526). Master's Thesis, Department of Anthropology, University of Pennsylvania, Philadelphia.

Terry, Samantha
2019 An Examination of Faunal Resource Use and Feasting Activity at Shields Mound (8DU12), Jacksonville, Florida. Master's thesis, Anthropology Department, Florida State University, Tallahassee.

Tonty, Henri de
1898 *Relation of Henri de Tonty Concerning the Explorations of La Salle from 1678 to 1683*. The Caxton Club, Chicago.

Turcotte, William H., and David L. Watts

1999 *Birds of Mississippi*. University Press of Mississippi, Jackson.

Tushingham, Shannon, and Robert L. Bettinger
2013 Why Foragers Choose Acorns before Salmon: Storage, Mobility, and Risk in Aboriginal California. *Journal of Anthropological Archaeology* 32(4):527-537.

Twiss, Katheryn C.
2008 Transformations in an Early Agricultural Society: Feasting in the Southern Levantine Pre-Pottery Neolithic. *Journal of Anthropological Archaeology* 27(4):418-442.

USDA, NRCS
2006 Wild Cherries. Illinois Grazing Manual Fact Sheet.

2022 The PLANTS Database. National Plant Data Team http://plants.usda.gov, accessed May 18, 2021.

VanDerwarker, Amber M.
1999 Feasting and Status at the Toqua Site. *Southeastern Archaeology* 18(1):24-34.

2010 Correspondence Analysis and Principal Components Analysis as Methods for Integrating Archaeological Plant and Animal Remains. In *Integrating Zooarchaeology and Paleoethnobotany: A Consideration of Issues, Methods, and Cases*, edited by Amber M. VanDerwarker and Tanya M. Peres, pp. 75-95. Springer, New York.

VanDerwarker, Amber M., Dana N. Bardolph, and C. Margaret Scarry
2017 Maize and Mississippian Beginnings. In *Mississippian Beginnings*, edited by Gregory D. Wilson, pp. 29-70. University Press of Florida, Gainesville.

VanDerwarker, Amber M., and Bruce Idol
2008 Rotten Food and Ritual Behavior: Late Woodland Plant Foodways and Special Purpose Features at Buzzard Rock II, Virginia (44RN2/70). *Southeastern Archaeology* 27(1):61-77.

VanDerwarker, Amber M., C. Margaret Scarry, and Jane M. Eastman
2007 Menus for Families and Feasts: Household and Community Consumption of Plants at Upper Saratown, North Carolina. In *The Archaeology of Food and Identity*, edited by Katheryn C. Twiss. Center for Archaeological Investigations, Occasional Paper No. 34, Southern Illinois University, Carbondale.

VanDerwarker, Amber M., and Bill Stanyard
2009 Bearsfoot and Deer Legs: Archaeobotanical and Zooarchaeological Evidence of a Special-Purpose Encampment at the Sandy Site, Roanoke, Virginia. *Journal of Ethnobiology* 29(1):129-148.

Villa, Paola, and Eric Mahieu
1991 Breakage Patterns of Human Long Bones. *Journal of Human Evolution* 21:27-48.

von den Driesch, Angela
1976 *A Guide to the Measurement of Animal Bones from Archaeological Sites*. Peabody Museum Bulletin 1. Peabody Museum of Archaeology and Ethnology, Cambridge, Mass.

Wade, Dale D., and O. Gordon Langdon
1990 Cabbage Palmetto. In *Silvics of North America: Volume 2. Hardwoods*, edited by Russell M. Burns and Barbara H. Honkala, pp. 762-767. Agriculture Handbook 654, United States Department of Agriculture (USDA), Forest Service.

Wagner, Gail E., and Peter H. Carrington
2014 Sumpweed or Marshelder (*Iva Annua*). In *New Lives for Ancient and Extinct Crops*, edited by Paul E. Minnis, pp. 65-101. University of Arizona Press, Tuscon.

Wailes, Benjamin L.C.
1852 Notes on the Aboriginal Monuments and Remains of Mississippi. Manuscript (field notebook), Mississippi Department of Archives and History, Archives and Library, Wailes papers, Z/0076.000/S, Box 3, Folder 2.

Wallis, Neill J., and Meggan E. Blessing
2015 Ritualized Deposition and Feasting Pits: Bundling of Animal Remains in Mississippi Period Florida. *Cambridge Archaeological Journal* 25(1):79-98.

Warren, Randy C., and George A. Hurst
1980 Squirrel Densities in Pine-Hardwood Forests and Streamside Management Zones. *Proceedings of the Annual Conference Southeastern Association of Fish and Wildlife Agencies* 34:492-498.

Waselkov, Gregory A.
1978 Evolution of Deer Hunting in the Eastern Woodlands. *Midcontinental Journal of Archaeology* 3(1):15-34.

2020 Ethnohistorical and Ethnographic Sources on Bear-Human Relationships in Native Eastern North America. In *Bears: Archaeological and Ethnohistorical Perspectives in Native Eastern North America*, edited by Heather A. Lapham and Gregory A. Waselkov, pp. 16-47. University Press of Florida, Gainesville.

Waselkov, Gregory A., and Kathryn E. Holland Braund
1995 *William Bartram on the Southeastern Indians*. University of Nebraska Press, Lincoln.

Waugh, Frank W.
1916 *Iroquois Foods and Food Preparation*. Government Printing Bureau, Ottawa.

Weinstein, Richard A.
2005 *Lake Providence: A Terminal Coles Creek Culture Mound Center, East Carroll Parish, Louisiana*. Submitted to Submitted to the U.S. Army Corps of Engineers,

Vicksburg District, Contract No. DACW38-91-D-0014, Contract No. DACW38-96-D-0005, Contract No. DACW38-98-D-0004. Copies available from Coastal Environments, Inc.

Weinstock, J.
2009 Epiphyseal Fusion in Brown Bears: A Population Study of Grizzlies (*Ursus arctos horribilis*) from Montana and Wyoming. *International Journal of Osteoarchaeology* 19(3):416-423.

Welch, Paul D., and C. Margaret Scarry
1995 Status-Related Variation in Foodways in the Moundville Chiefdom. *American Antiquity* 60(3):397-419.

Wells, Douglas C.
1998 The Early Coles Creek Period and the Evolution of Social Inequality in the Lower Mississippi Valley. Ph.D. dissertation, Department of Anthropology, Tulane University, New Orleans, Louisiana.

Wells, Douglas C., and Richard A. Weinstein
2007 Extraregional Contact and Cultural Interaction at the Coles Creek-Plaquemine Transition: Recent Data from the Lake Providence Mounds, East Carroll Parish, Louisiana. In *Plaquemine Archaeology*, edited by Mark A. Rees and Patrick C. Livingood, pp. 38-65. University of Alabama Press, Tuscaloosa.

White, Tim D.
1992 *Prehistoric Cannibalism at Mancos 5MTUMR-2346*. Princeton University Press, Oxford.

Whyte, Thomas R.
1991 Small-Animal Remains in Archaeological Pit Features. In *Beamers, Bobwhites, and Blue-Points: Tributes to the Career of Paul W. Parmalee*, edited by James R. Purdue, Walter E. Klippel, and Bonnie W. Styles, pp. 163-176. Illinois State Museum, Springfield.

Whyte, Thomas R., and J. Matthew Compton
2020 Explaining Toad Bones in Southern Appalachian Archaeological Deposits. *American Antiquity* 85(2):305-330.

Williams, Leah
2008 The Paleoethnobotany of the Feltus Mounds Site Honors Thesis, Department of Anthropology, University of North Carolina, Chapel Hill.

Williams, Michele
2000 Evidence for Medicinal Plants in the Paleoethnobotanical Record of the Eastern United States During the Late Woodland through Mississippian Periods. Ph.D., Anthropology, Washington University, St. Louis.

Williams, Stephen, and Jeffrey P. Brain
1983 *Excavations at the Lake George Site, Yazoo Country, Mississippi, 1958–1960*. Papers of the Peabody Museum of Archaeology and Ethnology. Harvard University Press, Cambridge, Massachusetts.

Wilson, D. G.
1984 The Carbonisation of Weed Seeds and their Representation in Macrofossil Assemblages. In *Plants and Ancient Man: Studies in Palaoethnobotany; Proceedings of the 6th Symposium of the International Work Group, Groningen, Netherlands, May 30-June 3, 1983*, edited by W. Van Zeist and W. A. Casparie, pp. 201-206. A. A. Balkema, Boston.

Wilson, Gilbert L.
1987[1917] *Buffalo Bird Woman's Garden: The Classic Account of Hidatsa American Indian Gardening Techniques*. Minnesota Historical Society Press, St. Paul.

Windham, R. Jeannine
2010 Exploitation and Feasting at the Glass Site (9TF145). *Journal of Global Initiatives* 5(1):19-34.

Woodiel, Deborah Kay
1993 The St. Gabriel Site: Prehistoric Life on the Mississippi. *Louisiana Archaeology* 20:1-136.

Wright, Patti J.
2003 Preservation or Destruction of Plant Remains by Carbonization? *Journal of Archaeological Science* 30:577-583.

2005 Flotation Samples and Some Paleoethnobotanical Implications. *Journal of Archaeological Science* 32:19-26.

2010 Methodological Issues in Paleoethnobotany: A Consideration of Issues, Methods, and Cases. In *Integrating Zooarchaeology and Paleoethnobotany*, edited by Amber M. VanDerwarker and Tanya M. Peres, pp. 37-64. Springer, New York.

Yanovksy, Elias
1936 *Food Plants of the North American Indians*. Miscellaneous Publication No. 237. United States Department of Agriculture, Washington, D.C.

Yerkes, Richard W.
2005 Bone Chemistry, Body Parts, and Growth Marks: Evaluating Ohio Hopewell and Cahokia Mississippian Seasonality, Subsistence, Ritual, and Feasting. *American Antiquity* 70(2):241-265.