Slave Subsistence Strategies at Thomas Jefferson's Monticello Plantation: Paleoethnobotanical Analysis and Interpretation of the Site 8 (44AB442) Macrobotanical Assemblage

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

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August 2016

Acknowledgements

I would first like to express my gratitude to my thesis advisor, Dr. Kandace Hollenbach, whose expertise, encouragement, and patience, have added considerably to my graduate and professional experience. It was under her tutelage that I developed an interest in archaeological studies and without her mentorship, kindness, and direction I would not have considered a graduate career in archaeological research. The paleoethnobotanical analysis training I received from Dr. Hollenbach has undoubtedly made a remarkable impact on my life. It is difficult to convey my gratitude fully, but I owe her my profound appreciation.

A very special thanks goes out to the additional members of my committee, Dr. Barbara J. Heath and Dr. David G. Anderson for the education and assistance they provided during my graduate career and throughout this project. I am appreciative of their time and expertise in which they have always been willing to offer.

I am extraordinarily thankful to the staff of the Archaeological Research Laboratory (ARL) at the University of Tennessee, Knoxville who have always presented me with their patience, encouragement, and incredible opportunities. My experience at the ARL has been invaluable and I will always be grateful for the warmth and guidance I have received from those I have been so fortunate to work with.

Many thanks go out to Dr. Fraser Neiman, the staff of the Monticello Department of Archaeology, and the Thomas Jefferson Foundation, Inc. for the opportunity to work on this project. I am grateful to Dr. Neiman, who has been exceedingly helpful throughout the duration of this project. This research would not have been possible without the funding provided by the Thomas Jefferson Foundation, Inc. and I express my gratitude for their sponsorship.

Of course, I must also acknowledge my wonderful parents for the immeasurable amount of support which they have always provided me. Lastly, I am thankful for Bruno and his incredible companionship.

Abstract

Throughout the seventeenth to nineteenth centuries millions of enslaved Africans and African Americans were crucial to the success of plantations in the American South, but despite their numbers little exists in the written record to provide an accurate history for the African American slave community. However, archaeological and historical research shows that even under the constraints of slavery, enslaved African Americans were active in forming their own families and communities, countering ill-treatment and nutritional deprivation, maintaining their cultural and spiritual identities, and establishing ways to enhance their well-being. The research presented in this study emphasizes the utility of studying carbonized plant remains recovered from slave quarters to draw conclusions that contribute to our understanding of the lifeways of the enslaved in late eighteenth-century Virginia.

The primary focus of this study is Site 8 (44AB442), a late eighteenth-century slave quarter occupied by the field laborers of Thomas Jefferson's Monticello plantation. Jefferson transformed Monticello from a tobacco plantation to a wheat plantation in the early 1790s, resulting in major alterations to both the landscape and the labor system. Agricultural labor systems implemented by planters and overseers largely impacted slaves' free time, and consequently affected their domestic pursuits. Theories borrowed from human behavioral ecology have been applied to this study to interpret the Site 8 macrobotanical assemblage in order to better understand how the agricultural shift from commercial tobacco production to commercial wheat production affected the subsistence behaviors of the Site 8 occupants. Borrowing from Tucker (2006), a model based on future discounting theory is applied to the Site 8 macrobotanical assemblage to explain observable patterns pointing to a mixed foraging/low-

investment horticulture subsistence strategy employed by the Site 8 occupants to balance nutritional stress and add variety to their diets.

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Chapter 1
Introduction

Throughout the seventeenth to nineteenth centuries, millions of enslaved Africans and African Americans were crucial to the success of plantations in the American South. Despite their numbers, little exists in the written record to provide a history for the African American slave community. This lack of information is in part because plantation records kept by slave owners and overseers typically provide only mundane information relating to slave names and ages, work assignments, and the food and materials they were provisioned (Samford 2007:1). Furthermore, existing accounts describing the lifeways of slaves were frequently written from the perspective of a biased recorder (Deetz 1988:363). What further hinders our understanding of African and African American slave communities is the fact that most slaves were prevented from learning to read and write.

Archaeologists and historians alike have turned their attention toward interpreting the histories of enslaved individuals and communities through scrupulous interpretations of historic accounts and material culture. Their research has shown that even under the constraints of slavery, African Americans were active in forming their own families and communities, resisting ill-treatment and nutritional deprivation, maintaining their cultural and spiritual identities, and creating ways to enhance their well-being (Samford 2007:2). The research presented in this study emphasizes the utility of studying carbonized plant remains recovered from slave quarters to draw conclusions that contribute to our understanding of slave life in late eighteenth-century Virginia.

The primary focus of this study is Site 8 (44AB442), a late eighteenth-century slave quarter occupied by the field laborers of Thomas Jefferson’s Monticello plantation. Monticello began as a tobacco plantation in the 1740s under the proprietorship of Thomas Jefferson's father. Thomas Jefferson inherited Monticello after the death of his father in 1757 and moved there in 1769 from his birthplace just two miles west of Monticello (Monticello.org). Jefferson's inheritance included a total property boundary of 5,000 acres as well as the slaves that worked and lived on his father's plantation.

Jefferson transformed Monticello from a tobacco plantation to a wheat plantation in the early 1790s, resulting in major alterations to both the landscape and the labor system. In the context of slavery, labor systems implemented by planters and overseers largely impacted slaves' free time, and undoubtedly affected their domestic activities (Lev-Tov 2004:9). Many researchers (Heath 2012a; Kulikoff 1986; Lev-Tov 2004; Neiman 2008; Stanton 2012) have worked towards advancing our understanding of the ways in which the widespread agricultural shift from tobacco to grain farming in eighteenth century Virginia affected the economic and social lives of Virginia's enslaved population. Consequently, their research has provided a framework for interpretative studies such as the one presented here.

Theories borrowed from human behavioral ecology have been applied to this study to interpret the Site 8 macrobotanical assemblage in order to better understand how the agricultural shift from tobacco to wheat affected the subsistence behaviors of the Site 8 occupants. Optimal foraging theories assume that procurement behaviors are conducted with efficiency relative to energy costs. However, we must consider that in the context of slavery time and decisions revolved around the conventions of the plantation. According to Winterhalder (Winterhalder 1981:16), human behavioral ecology analyses become more complicated when attempting to identify the optimal pattern of behavior in a particular situation, especially when the constraints of a particular situation or historical circumstance hinder one's ability to realize a particular optimum. Borrowing from Tucker (2006), a model based on future discounting theory is applied to the Site 8 macrobotanical assemblage to explain observable patterns pointing to a mixed foraging/low-investment horticulture strategy employed by the Site 8 occupants to balance nutritional stress and add variety to their diets.

To date, there is no known historic documentation of Site 8; however, excavations during the 1997 field season uncovered evidence of four housing structures. Sediment from cultural features, primarily subfloor pits and cellars, was collected for flotation. Botanical assemblages from archaeological sites can communicate the economic and cultural activities of the site's occupants. Plants are regularly used for nutrition and to counteract food insecurities, treat illness, in spiritual and ritual practices, as ornamentals, to create boundaries and as materials for household goods (Heath and Bennett 2004:38). Furthermore, plant remains recovered from slave sites can reveal much about the occupant's circumstances, their relationship with the environment, and their ability to travel across the landscape (Bowes 2011:90-91).

I have analyzed the Site 8 macrobotanical assemblage to address the following objectives: 1) to identify the subsistence strategy exercised by the Site 8 slave community by identifying the plants selected to reduce nutritional deprivation and improve their well-being; 2) to examine the macrobotanical assemblage recovered from cultural features at Site 8 to determine how the agricultural shift from tobacco to wheat production affected the well-being of Monticello's enslaved field laborers; and 3) to contribute to our understanding of everyday life under the constraints of slavery in the American South.

Chapter 2
Background

Once home to Thomas Jefferson, Monticello sits on the Rivanna River in Albemarle County, where the river cuts through the Southwest Mountains at the western edge of the Virginia Piedmont (Neiman 2008:162). Monticello was divided into four quarter farms. The fields on Monticello Mountain were considered the home farm while Shadwell, Tufton, and Lego comprised the outlying farms (Bon-Harper 2006).

Site 8 (44AB442) sits at the ridge of Monticello Mountain as it descends east towards the Rivanna River. Investigations of the Site 8 slave quarters are part of the ongoing archaeological research at Monticello, conducted by the staff of the Monticello Department of Archaeology and students from the Monticello-University of Virginia Archaeological Field School. Site 8 was identified during the 1997 field season of the Monticello Plantation Archaeological Survey (Bon Harper 2006). Site 8 and its sister site, Site 7, are believed to have housed the majority of enslaved field hands that labored the home farm from circa 1770 to circa 1800 (Bon-Harper 2006; Neiman, personal communication 2015).

Based on information derived from historic and archaeological studies, this chapter provides context for the natural and cultural environments experienced by enslaved African and African Americans in eighteenth-century Virginia as a framework for interpreting patterns present within the Site 8 botanical assemblage.

In addition to historical text and archaeological data, I apply testimonies provided by surviving former slaves during the Works Progress Administration's (WPA) 1930s Federal Writers' Project to this study to guide interpretations of African and African American foodways

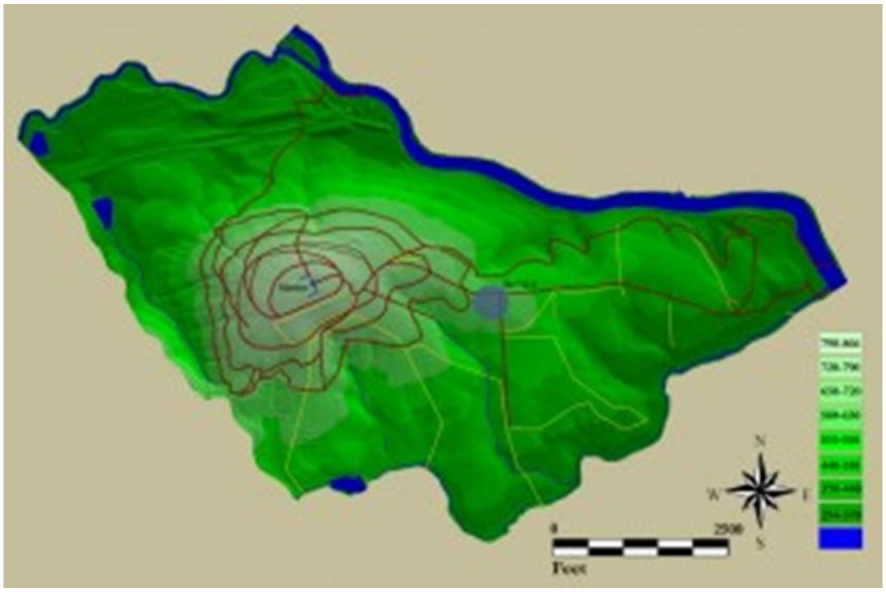

Figure 2.1. Location of Site 8 at the Monticello Home Farm.
Images Courtesy of: http://www.daacs.org/sites/site-8/#home.

during enslavement. The WPA Federal Writers' Project recorded narratives of African Americans who remembered the antebellum period; the narratives often reveal ways in which slaves took control of their lives, to the degree that they could, through aspects of their diets and meals (Covey and Eisnach 2009:72). The WPA narratives indicate that slaves constructed their own cookware and utensils, removed food from the big house without permission, disputed limitations on what and how they could feed their families, and consequently created their own style of cooking and food preparation (Bowes and Trigg 2012:155; Covey and Eisnach 2009:72). Because the WPA records were reported to white interviewers seventy years after the abolition of slavery, there can be obvious biases present within the testimonies; however, they provide useful information about the ways in which slaves processed, prepared and consumed their foods.

Furthermore, to explain the approach exercised by Monticello's enslaved field laborers for managing their well-being and avoiding health related risks through plant use, I apply

Tucker's (2006) mixed foraging/low-investment horticulture strategy, borrowed from behavioral ecology, to the Site 8 botanical assemblage.

Natural Setting

Landscape and Terrestrial Resources

The mostly wooded Piedmont consists of irregular plains, low rounded hills and ridges, shallow valleys, and scattered monadnocks (Omernick and Griffith 2008) that support a variety of wild edible plants available throughout the year. The region's clay-rich, acidic soils and humid temperate climate originally supported an Oak-Hickory-Pine forest dominated by hickory (*Carya* spp.), shortleaf pine (*Pinus echinata*), loblolly pine (*Pinus taeda*), white oak (*Quercus* alba) and post oak (*Quercus stellata*) (Omernick and Griffith 2008). When European settlers first arrived at the beginning of the eighteenth century they found a forested area bisected by numerous broad creeks flowing into large rivers. By the late eighteenth century the region was characterized by dispersed plantations hosting agricultural fields, pastures, and forests of pine and hardwood across a flat to gently rolling terrain (Samford 2007:23). Following settlement, much of the soil eroded as forests were cleared for agricultural lands.

A number of wild animal species were available and exploited for food. African and African American slaves often trapped or hunted fowl, deer, raccoons, opossums, and other wild game to supplement their diets (Covey and Eisnach 2009:113). Nearly every archaeological investigation of southern slave sites has uncovered evidence that the enslaved added wild game to the diet rationed to them by plantation owners (Covey and Eisnach 2009:113). Trapping and netting were common practices that allowed slaves to tend to other chores and collect what they caught when time allowed it.

Hydrology and Aquatic Resources

The Rivanna River originates in the Blue Ridge Mountains of central Virginia, in both Albemarle and Green Counties (Rivanna Conservation Alliance 2016). The primary channel of the river is 50 miles in length and its 766 square miles of watershed are home to a variety of terrestrial and aquatic species (Rivanna Conservation Alliance 2016). Prior to the spread of European settlers, the river was home to the Monacan Indians. As European expansion stretched across the Piedmont, the Rivanna River became an important transportation line for agricultural activities. Thomas Jefferson, like many planters, used the river to facilitate the transportation of crops to larger ports (Stanton 2012:135).

During the colonial period, fish were an essential resource for both household consumption and for export (Hardin 1992:140). The primary fish species native to the Piedmont are comprised of minnows and darters including the Whitemouth Shiner (*Notropis alborus)*, Highfin Shiner (*Notropis altipinnis)*, Speckled Killifish (*Fundulus rathbuni)*, Glassey Darter (*Etheostoma vitreum)*, and the Carolina Darter (*Etheostoma collis)* (Omernick and Griffith 2008). Many plantations switched from tobacco to grain farming in the 1750s. This led to an increase in the production of mills and mill dams that permanently altered the courses of waterways throughout the Piedmont (Hardin 1992:141). By the end of the eighteenth century, Virginia’s fish populations suffered as a result of changes to waterways from dams and agricultural runoff from plantations. Consequently, large-scale exploitation of water resources began to dwindle and most fishing practices were directed towards household consumption (Hardin 1992:141).

Fish were a major source of nutrients for Virginia slaves (Covey and Eisnach 2009:127). Archaeological evidence and testimonies from former slaves during the WPA 1930s Federal Writers' Project indicate that enslaved Africans and African Americans fished often to supplement their diet. Fishing was a fairly undemanding task that could be carried out by elders or children during the hours that other household members were laboring for the plantation or tending to more strenuous tasks. Slaves fished using either nets, traps, or hooks (Covey and Eisnach 2009:127; Lev-Tov 2004:2). Weirs and basket traps could easily be set up in the river near plantation boundaries and fields and checked for fish when time allowed it. The use of fish weirs was evidently unknown in both Europe and West Africa and thus the weirs may have been exclusively rebuilt and re-used by slaves after their original construction by Native Americans (Lev-Tov 2004:8). Archaeologists excavating slave quarters often recover artifacts associated with fishing, such as lead fishing weights and fishhooks (Covey and Eisnach127; Lev-Tov 2004:2). Furthermore, fish and other aquatic resources were commonly provisioned to slaves by plantation owners (Bowen 1996:112). The presence of both saltwater and freshwater fish in the faunal assemblage from slave quarters at Jefferson's Bedford County plantation, Poplar Forest, ninety miles southwest of Monticello, indicates that slaves were provisioned fish from the Atlantic Ocean while also acquiring fish themselves in the river nearby (Klippel et al. 2011:42).

Cultural Setting

When English settlers first established the Chesapeake colonies, their economic plan was to mine precious metals and iron, exchange goods with the native populations, and produce exotic commodities like wine and silk. After over a decade they were unable to find success in these ventures (Russo and Russo 2012:7). They discovered, however, that the region was well suited for tobacco cultivation, equipped with waterways that facilitated exporting the crop back to England (Russo and Russo 2012:7). Successful tobacco cultivation required planters to acquire large plots of land so that fields could be periodically rotated, resulting in a Virginia landscape characterized by dispersed settlements across the regions waterways (Russo and Russo 2012:7). Tobacco cultivation proved prosperous and planters began buying enslaved Africans, and later African Americans, to work their fields after a shift from using indentured servants (Kulikoff 1986:38; Russo and Russo 2012:9, 93). The importation of Africans began slowly in 1619 and increased exponentially by the 1690s. By the end of the seventeenth century Virginia's African and African American population was between 8,000 and 10,000 people and, through a combination of natural increase and importation, their population rose to almost 20,000 by 1710 (Russo and Russo 2012:93). English settlers justified the purchase of enslaved laborers to cultivate their tobacco farms by regarding Africans as different from and inferior to themselves (Russo and Russo 2012:94). This "othering" of Africans and their descendants, coupled with the economic benefits of slave labor experienced by planters, eventually led to the creation of laws from the 1660s to the 1690s that sanctioned slavery as a system of hereditary bondage defined by race (Billings 2007:204; Russo and Russo 2012:95).

The vast majority of slave laborers imported during the late seventeenth century arrived either directly from Africa or spent only a brief time in the West Indies before being taken to the Chesapeake and sold to the owners of tobacco plantations (Russo and Russo 2012:96). Planters' desire to buy slave labor for their Virginia tobacco plantations led to an industry that was so lucrative for slave traders that cargo ships stocked with men, women, and children removed from neighboring areas along the West African coastline were sometimes shipped directly to the Chesapeake market, between the James and Rappahannock rivers (Russo and Russo 2012:96). This trading pattern often inadvertently clustered individuals from the same cultural groups and speaking the same or a related language into common areas, and consequently fostered the preservation of African cultural practices (Russo and Russo 2012:96; Samford 2007:11;Walsh 2001). In fact, many of the African regions most commonly exploited during the slave trade shared with each other many broad-based cultural similarities (Samford 2007:11). At times, a number of people were purchased from the same ship to labor a single or neighboring plantations, further increasing the likelihood of preserving elements of African culture (Russo and Russo 2012:96). Despite being forcibly relocated and introduced to a new environment, a new social community, and altered power structures, enslaved Africans retained various elements of West and West Central African cultures as they formed communities on plantations.

Slave traders leaving Africa stocked their ships with the plants Africans recognized as familiar foods and medicines to maximize the survival of the human "commodities" they forcibly migrated to plantation societies (Carney 2013:26-27). For slave-ship captains, the utility of African crops ended when their captives were disembarked and sold, but for the African captives the familiar foods and medicines that accompanied them on their journey could now delay hunger and treat ailments (Carney 2013:26-27,65-66). Although slave ships regularly arrived in the Americas with depleted food stores and starved human cargo, at times the ships arrived with leftover provisions, providing Africans with the opportunity to access the seeds and roots of African crops and establish them in the New World (Carney and Rosomoff 2009:75-79).

Many Africans brought to America had been expert farmers or herders with the prior knowledge to raise food in the humid and semiarid environments of Africa (Carney and Rosomoff 2009:105). Plants brought to America, already familiar to Africans, not only presented enslaved Africans the ability to nourish their bodies, but also their African identities during desperate and brutal circumstances (Carney and Rosomoff 2009:79). Slave's obligatory self-reliance to generate their own food supply, in many ways, resulted in the preservation of African food staples and traditional food preferences in the New World.

The enslaved not only used plants to supplement their nutrition, but also as an alternative to the lack of adequate or effective medical care provided to them by planters (Covey 2007:2). Slaves not only ingested herbal and plant remedies, they also wore them around their necks or placed them in their pockets as medical treatments. A former slave reported that while the offensive odor of wearing the plant, asafetida, did not treat illness, the strong smell would deter people with colds from coming near (Covey 2007:74). Additionally, because some slaves associated illness with curses or hexes, plants would sometimes be placed in strategic areas around the living quarters as preventatives (Covey 2007:74). At Monticello, Jefferson arranged for physicians to tend to slaves with serious ailments and for midwives to tend to pregnant women, but slaves preferred turning to root doctors and conjurers for help with ailments (Stanton 2012:110, 117).

Many Africans brought to America were healers and herbalists with the knowledge and skills of using plants for medicinal purposes (Carney and Rosomoff 2009:89). In addition to the

African plant species brought to America by way of the slave trade, historic accounts suggest that many enslaved Africans identified and utilized New World plant species closely related to African species (Carney and Rosomoff 2009:90).

Native Americans made significant contributions to American pharmacopoeia (Covey 2007:27) and their remedies were employed by both English settlers and Africans and their descendants. Native Americans maintained extensive social relationships with African Americans with whom they often shared their knowledge of native North American herbal remedies (Covey 2007:27). The medical practices employed by enslaved Africans and African Americans evolved as they merged what they learned from Native American and European medical traditions with traditional African health practices (Covey 2007:27). Because most slaves were unable to read and write, their knowledge of herbal medical practices was typically passed along through oral tradition (Covey 2007:76). It is important to mention that many African medical practices were linked with ritual and religious practices. Although ritual and religion are often exercised to benefit a person or group's well-being, this study emphasizes, and is limited to, the ways in which the enslaved may have used plants to supplement and diversify their diets.

Subsistence under Enslavement

When slave owners revealed interest in the well-being of slaves, it was primarily because slave's health status could affect plantation productivity (Covey and Eisnach 2009:11). Slave codes were established during the colonial era that regulated the legal rights and treatment of slaves; these regulations stipulated the amount of clothing and food planters were required to issue each slave, and varied over time and between colonies and nations (Covey and Eisnach 2009:20). Jefferson’s record books for Monticello indicate that on average, everyone, regardless of age, received a weekly peck of cornmeal (Kelso 1986:32; Stanton 2012:61). Adults were given four salt herring and half a pound to a pound of salt pork or pickled beef and a gill of molasses each week (Kelso 1986:32; Stanton 2012:61). Children were provisioned smaller amounts of meat and fish, according to age (Stanton 2012:61). This diet was standard across Virginia plantations, although compared to his contemporaries, Jefferson’s provisions of meat were smaller than most (Stanton 2012:114).

In the context of slavery, labor systems implemented by planters and overseers largely impacted slaves’ free time, and undoubtedly affected their domestic activities (Lev-Tov 2004:9). Planters used rations as a method of control over slaves. Although rations were meager, they nonetheless acted as an incentive for slaves to work and comply with the demands of the plantation (Covey and Eisnach 2009:23). Adequate nutrition, whether for reasons of planter indifference or economic efficiency, was contingent upon the efforts of slaves to generate their own food supply (Carney and Rosomoff 2009:127).

For most of Monticello’s slaves a second work shift began in the evening hours. Both men and women pursued activities at night to supplement the standard of living they were provided by Jefferson. Women were known to have spent the hours of darkness tending to the household, preparing meals, repairing clothing, and caring for their children, while men were known to spend their late hours hunting for resources such as wild animals and honey (Stanton 2012:21). At Monticello, like many other southern plantations, slaves were not required to work Sundays.

The ability to forage for wild resources, raise poultry, and grow personal gardens gave slaves a measure of control in their lives. Historic and archaeological evidence indicate that the enslaved were both efficient and resourceful in balancing their well-being (Westmacott 1992:2). In many ways, slaves' need to generate additional food for themselves strengthened their food security, diversified the dietary options otherwise available to them, and reinstated some of their traditional food staples (Carney and Rosomoff 2009:127).

Domesticated Crops

Historians and archaeologists note that slaves often grew their own kitchen gardens within the boundaries of their yards or on plots located along the outskirts of the plantation that they were provided by planters (Heath and Bennett 2000:38). Slaves were often encouraged by planters to grow their own kitchen gardens (Lev-Tov 2004:2) and raise poultry in their yards. Some planters believed that allowing slaves to supplement their diet would reduce food theft and the cost of rationing food (Covey and Eisnach 2009:74). In the context of chronic food shortages, placing slaves in charge of their own subsistence decreased planters' responsibility to provide slaves with food rations (Carney and Rosomoff 2009:127). Planters also sometimes considered that slaves managing their own gardens would form an attachment to the land and therefore be less likely to flee (Covey and Eisnach 2009:74; Sanford 1995:244).

Archaeological evidence indicating the presence of fence enclosures, plant remains, irregular soil disturbances and soils rich in chemicals associated with decaying material support the belief that gardening was practiced often by southern slaves (Heath and Bennett 2000:38; Heath 2010a:171; Mrozowski et al. 2008:711; Samford 2007:127). Gardens offered the enslaved a way to supplement their diets, increase their well-being, and generate an income. Records kept by one of Jefferson's granddaughters reveal that, on Sunday, slaves sold chickens, eggs, and produce they produced in their yards to Jefferson, while some slaves were permitted to travel to the Charlottesville market to sell the goods they produced and procured (Heath 2004:23-26; Heath 2010a:170; Stanton 2012:21).

Enslaved Africans were already acquainted with many of the plant foods of colonial America prior to their arrival (Samford 1996:96). Crops such as corn, yams, and beans that were important staples in the slave diet were cultivated in Africa either before or after European contact. Africans' familiarity with these crops prior to enslavement suggests these crops would have easily been grown in their kitchen gardens, and furthermore, consumption of these plant foods would have fostered the maintenance of traditional culinary practices of West and Central Africa (Samford 1996:96).

Kitchen gardens afforded slaves with the opportunity to grow and consume the foods they preferred (Carney and Rosomoff 2009:63). When the opportunity arose, Africans took the initiative to plant their dietary preferences from the leftover provisions that sometimes inadvertently remained from slave voyages (Carney and Rosomoff 2009:66). In this regard, African crops that made their way into slaves' kitchen gardens were not only a way for the enslaved to generate their own food, but also to maintain their cultural identity and traditions through foodways.

The seasonality of domesticated crops typically begins in the spring, when plots are prepared and seeds are sown, and ends between late summer and early fall, when crops are ready for harvest or the plant is spent. In between planting and harvest, weeding unwanted plants from the garden area would reduce competition for nutrients between plants.

Wild Plants

The term “wild” refers to plants that have not been domesticated and are not typically sown and cultivated deliberately in gardens or fields (Scarry 2003:51). However, foragers who exploit wild plants often engage in a wide range of resource-management activities to enhance the yield and reliability of these resources (Scarry 2003:51). Africans brought to America experimented with plants from their immediate surroundings and incorporated many into their diets and medicinal and religious practices (Carney and Rosomoff 2009:89). The earliest generations of African slaves acquired additional knowledge of New World species in their early and repeated interactions with Native Americans that worked and suffered alongside them (Carney and Rosomoff 2009:89).

Studies show that foraging for wild resources can be rewarding in terms of caloric richness; however, the time slaves had to forage for wild foods was defined by the demands of the plantation. As stated earlier, the time Monticello slaves had available for tending to domestic activities, such as subsistence, was often limited to the hours of darkness. Despite being efficient foragers, searching for resources by moonlight could be a challenging task.

It is also important to note that the availability of resources varies seasonally. Resources are most scarce in the winter months because plants are dormant and offer little, if any, harvestable food (Scarry 2003:74). Most of the spring and early summer plants offer little protein or fat, but several are rich in carbohydrates and others provide important vitamins and minerals (Scarry 2003:75). Roots and tubers can be harvested any time during the year, but most other plants need to be harvested soon after they ripen or could become vulnerable to wildlife or mold (Scarry 2003:74). Plant foods, wild and cultivated, are most abundant in the late summer to early fall. By simply making observations early in the summer, the occupants of Site 8 would have known ahead of time where to find wild edible leafy plants, fruits, and the most abundant nut harvests. Thus, their challenge would have been scheduling time to collect and cultivate resources between their responsibilities to the plantation.

Preserving Resources

Slaves appear to have been efficient in managing their well-being with plants, and they wasted very little. The plant data presented in Chapter 4 suggests corn cobs were used as fuel to light the domestic and economic activities carried out at night. Former slaves reported that the tops of turnips, dandelion greens, pokeweed, and beets were combined with lard to make meals (Covey and Eisnach 2009:78). And the liquid remains from boiled vegetables were saved and used as a broth for flavoring dishes and meats, rather than discarding this rich source of vitamins (Covey and Eisnach 2009:78; Harris 1989: xvi).

In the summer months, heat and humidity meant that food had to be consumed quickly to avoid spoilage. It was unlikely that the inhabitants at Site 8 would have had access to ice for keeping food fresh. Rather, they would have relied on methods such as salting, smoking, pickling, fermenting, and drying to preserve fruits, vegetables, and meats (Covey and Eisnach 2009:52; Samford 2007:124). Slaves also relied on root cellars or subfloor pits to store and to keep perishable foods cool without altering the composition of the food (Samford 2007: 124; Covey and Eisnach 2009:52).

Subfloor Pits

Subfloor pits are present on some Native American and Anglo-American domestic sites, but their use is most commonly associated with the housing structures of eighteenth-century African American slaves from the Chesapeake region (Samford 2007:10). In general, these features vary slightly from 3-feet-by-3-feet to 4-feet-by-6-feet in length and from 1-foot-to-3-feet deep (Neiman 2008:176). Subfloor pits were sometimes lined with wood or brick (Neiman 2008:176; Samford 2007:109) or at times, prefabricated boxes were placed within the pit (Samford 2007:109). Lining the floors and walls of subfloor pits served to stabilize the walls to keep them from collapsing, to keep the contents of the pit clean and dry, and to reduce pests (Samford 2007:109).

Many plantation owners viewed subfloor pits as challenges to their power, and therefore prohibited their construction and use (Lev-Tov 2004:5). Scholars have argued that storage pits, because they conceal whatever is stashed inside them, are a form of resisting social inequalities created by enslavement in which the distribution of goods is controlled by slave owners (Lev-Tov 2004:5).

The presence of subfloor features is considered a response to enslavement, but their purpose is sometimes debated. Historic accounts and evidence from archaeological investigations indicate that subfloor pits were often used to store and preserve food, generally root vegetables. Food storage is one way of coping with or minimizing dietary risks (Lev-Tov 2004:5). Physical evidence associated with the function of subfloor pits is revealed in some cases. The presence of pollen, starch granules, seeds, and phytoliths in soil samples can support the assumption that pits functioned to store foodstuffs. It has also been debated whether the use of subfloor pits was a way for the enslaved to create a private sphere or satisfy a spiritual need (Samford 2007:10). The use and contents of subfloor pits may well have been fluid, but the function of these pits was very likely to increase the security of personal resources (Neiman 2008:176-177). Regardless of their specific function, subfloor pits present in African slave dwellings were likely an adaptation to environmental and/or social circumstances (Neiman 2008:176; Samford 2007).

Slaves regularly used subfloor pits as root cellars (Samford 2007:124). According to Samford, “Root cellars are generally defined as underground pits created for the storage of root vegetables, such as potatoes, carrots, and turnips” (Samford 2007:124). When looking at the diversity of plant foods represented by the Site 8 botanical assemblage, as well as in additional paleoethnobotanical studies of southern slave diets, it is important to consider how well subfloor pits preserved a variety of foodstuffs. Samford stated that temperature and humidity are the most influential variables (Samford 2007:129) in the success of storing perishable foods in subfloor pits. Cold temperatures slow the decomposition of fruits and vegetable, while humidity prevents shriveling. Humidity levels can be manipulated in a number of ways, for instance, by setting pans of water inside the cellars or packing vegetables in moist sawdust or peat moss (Samford 2007:129). Proper placement and construction methods can help assure that temperature levels remain constant. Lastly, the deeper the hole is excavated, the more stable the temperature will be (Samford 2007:129-130). By storing and sharing self-produced and -procured foods, slaves were able to decrease their risk of food shortages and malnutrition (Lev-Tov 2004:3).

Slave Yards

Enslaved Africans and their descendants used the space around their dwellings for subsistence, social activities, spiritual practices, and even the mundane functional needs of households (Heath and Bennett 2000:38; Heath 2010a:170; Westmacott 1992:9). Communities were shaped and maintained in the yard as domestic chores blended with social activities. Between the hours spent laboring for the plantation, men and women socialized in their often shared yards while laundering, cooking, butchering and raising animals, as children played (Heath and Bennett 2000:42). Over the span of several decades scholars have recognized the value of studying the yards around slave housing to uncover the economic, social, and spiritual practices of their former occupants (Heath and Bennett 2000:38; Heath 2010a:170). The houses and yards of slave communities are rich in meanings associated with their inhabitants, as places not just for leisure, but where well-being was asserted with extraordinary resourcefulness (Westmacott 1992:2).

The yards around slave dwellings often contained kitchen gardens made up of vegetables and herbs. Kitchen gardens were a valuable source of nutrition and could be managed by adults when time allowed, or by elders and children while others labored on the plantation. Slaves are known to have grown a number of plant species in their gardens, including both West African and New World cultigens (Samford 2007:127).

The Agricultural Shift

Many researchers have turned their attention toward developing a better understanding of how the widespread agricultural shift from tobacco to grain farming in eighteenth-century Virginia affected the economic and social lives of Virginia's slaves. The shift from tobacco to wheat farming occurred at Monticello plantation in 1793 (Neiman 2008:174), generating major alterations to both the landscape and the labor force.

Labor systems depended on the types of crops produced (Lev-Tov 2004:1). Growing tobacco was a simple albeit strenuous task that required careful timing and attention throughout most of the year. Wheat farming, on the other hand, required less labor and time between planting and harvesting, but required the organization of a specialized labor force to oversee a variety of tasks.

In the eighteenth century, tobacco cultivation set the framework for much of daily life. The tasks necessary to produce a marketable tobacco crop required little skill but the timing of each step required judgment and year-round attention (Russo and Russo 2012:55-56). Tobacco was cultivated by gangs clearing fields using a slash-and-burn technique, whereby trees were killed to expose the areas shaded by their foliage, but trunks were left and worked around (Kulikoff 1986:28; Neiman 2008:181; Russo and Russo 2012:56). When soil fertility declined after five to seven years, the tobacco fields were abandoned and the work gangs cleared new ones (Kulikoff 1986:47). At times, attempts were made to replenish the depleted soils with manure, but the resulting tobacco crops were considered lower quality. To replenish the soil, tobacco plots were often left to fallow for 10-15 years (Henderson 2013:12).

The enslaved laborers used hoes to prepare fields and create the loose soils necessary for proper root development. It was crucial that plants were checked daily for pests or signs of disease, as an infestation could completely destroy an entire crop in less than a week. To promote the growth of leaves, the only marketable portion of the crop, tobacco plants were regularly pruned (Russo and Russo 2012:56). The period between planting and harvesting tobacco spanned from January to early autumn. It has been estimated that one worker cultivating tobacco annually labored, on average, 125 days and although no one task was particularly difficult, by the mid-seventeenth century planters expected each worker to cultivate roughly six thousand plants per year (Russo and Russo 2012:56).

The shift from tobacco to wheat farming generated major alterations to both the landscape and the labor force. Wheat farming required much larger fields be cleared. Instead of the slash-and-burn technique employed for growing tobacco, wheat demanded the removal of tree stumps and the use of plows. The monotony associated with tobacco monoculture was replaced by varied, specialized tasks necessary for cultivating grains and preparing them for market (Neiman 2008:181). As Virginia tobacco plantations shifted to grain farming, the tasks assigned to enslaved laborers began to diverge significantly. Russo and Russo described the changes as follows:

> Growing and processing grain created a larger market for craft workers, particularly woodworkers, blacksmiths, and coopers. Unlike the rough-hewn barns used to house tobacco, a mill required skilled carpenters for construction and maintenance, as well as trained millers to turn grains into marketable grades of flour. Wheelwrights produced carts and wagons that carried harvested grain to barns for threshing and to mills for grinding into flour, while coopers made barrels for shipping milled flour to overseas markets. The metalwork of cart wheels and traces, mill gears, and barrel hoops all called for blacksmithing skills (Russo and Russo 2012:182).

The execution of more diversified tasks took place in either large wheat fields or specialized work sites that were dispersed across the plantation, and thus a single overseer could no longer closely monitor all the laborers under his supervision (Neiman 2008:181; Stanton 2012:63). As a result the cost of monitoring labor processes rose drastically because the size of work groups declined and the complexity of many tasks increased (Neiman 2008:182). Furthermore, "The investment in training or purchasing a skilled laborer made that person a more expensive, valued, piece of property" (Monticello.org).

Not only did the shift from tobacco to wheat farming alter the landscape, it also greatly altered the power structures between overseers and slaves. After the shift to wheat farming, plantation owners and overseers had to direct their focus toward the products of their workers rather than the labor process (Neiman 2008:182; Stanton 2012:84). Slave owners were forced to rely on the efficiency and products produced by slaves, creating conditions under which slave owners who offered positive rewards benefited from more efficient laborers (Neiman 2008:180-182; Stanton 2012:62-63). According to Neiman, "It was this development that gave enslaved people the additional leverage required to achieve marginal improvements in their lives at the end of the eighteenth century" (Neiman 2008:182). Some slaves equipped with the knowledge for carrying out specialized tasks increased their power to negotiate with plantation owners and overseers for better working and living conditions while inadvertently improving their autonomy (Heath 2012a:108; Neiman 2008:182) as a result of the requirements to work significantly larger fields and dispersed task sites.

Changing trends in the treatment and management of slaves may be visible in how owners provisioned slaves and the ways in which slaves met their subsistence needs (Bowes and Trigg 2012:156). The impact labor systems had on slaves' free time undoubtedly affected slaves' abilities to produce and procure additional foods (Lev-Tov 2004:9). It has been theorized that slaves organized into labor gangs associated with tobacco farming, were generally provisioned most of their food rations, while slaves organized by task groups, associated with wheat farming, were often expected to generate much of their own food (Klippel et al. 2011:28). The shift to wheat farming and tasked labor may have inadvertently improved slaves' conditions if, in fact, the practices associated with wheat farming increased slaves' autonomy and time available during daylight hours to conduct activities for improving their well-being.

The Agricultural Shift at Monticello

Jefferson converted Monticello plantation to a wheat farm in the early 1790s and became personally involved in the day-to-day operations. At this time, Jefferson also dedicated his efforts toward reforming the institution of slavery by exploring ways to improve the conditions of the enslaved people he owned (Stanton 2012:60). His records, however, indicate that the food and clothing he rationed to slaves did not differ greatly from that of other plantations in the region, and the meat rations he provided were rather meager. Most of Jefferson's efforts toward improving slave's conditions focused on the conditions of labor (Stanton 2012:61). Jefferson wanted laborers to be well-treated and attempted to avoid hiring overseers with the reputation of severity; despite his instructions to minimize cruelty, the whip was never banished from his fields (Stanton 2012:61). To improve the lives of his slaves, Jefferson tested new management methods that afforded unaccustomed autonomy and unsupervised work environments to some tradesmen (Stanton 2012:63, 67).

In this study I analyze macrobotanical remains from Site 8 to examine whether the agricultural shift from tobacco to wheat in the early 1790s affected the foodways of Monticello's enslaved field laborers. A distinguishable presence of more or less domesticated or wild plants during the era of wheat farming, in which some slaves are believed to have had more time and autonomy to carry out tasks for improving their well-being, can serve to indicate their preferences and day-to-day choices. By comparing the recovery of wild useful plants present in the subfloor pits associated with the period of tobacco production to the wild plants present in the subfloor pits associated with the period of wheat production, the floral assemblage may speak to the degree in which time and autonomy granted to slaves increased from the tobacco era to the wheat era at Monticello. There are number of ways in which Monticello's enslaved field laborers could have used plants to improve their well-being, such as supplementing their diets to improve their nutritional status, implementing religious and medicinal practices, or generating an income by selling edible plants to Jefferson or, with permission, at the Charlottesville market.

Based on historical references, the following discussion presents a comparison between the tobacco and wheat labor systems with regards to the cultural and environmental factors presumed to affect the ways in which slaves might have improved their well-being through the use of plants. To interpret the subsistence strategy employed by Monticello's enslaved field laborers, it is important to consider which resources they might select and why. The distance between Site 8 and wild resources, the length of a person's work day, the likelihood that a slave would be sold or moved to another plantation, and the degree to which slaves could bargain for improved conditions are each significant factors that would ultimately affect a slave's time and ability to produce and procure plants. The following is a discussion of how each of these factors, when examined independently from one another, might have shaped the choices and constraints relating to the subsistence strategies of Monticello's enslaved field laborers.

1) Distance to Wild Resources. During the time in which Monticello was a tobacco plantation, small plots of land were developed and abandoned for more fertile soil about every seven years. This process would presumably create disturbed areas near Site 8 in which many wild plant species thrive. Slaves might have collected wild resources as they traveled to and from work sites, or encouraged wild plants to grow in abandoned tobacco plots near their homes. As large, permanent fields were cleared for wheat cultivation, it is possible that the number of wild plant resources near Site 8 would have decreased and been pushed further from Site 8. Based solely on the fact that wild resources would be in closer proximity to the Site 8 domestic quarters during the tobacco era, we might expect to see a higher recovery of wild plant taxa at this time.

2) Length of the Work Day. Jefferson's record books indicate that an enslaved person's work day spanned from nine hours in the darkest winter months to fourteen hours in the longest days of the summer (Stanton 2012:20-21). The period between planting and harvesting tobacco spanned from January to early autumn, and the high demands of the tobacco labor system would have left very few, if any, daylight hours for slaves to tend to their own affairs, such as hunting or fishing for wild game or searching for wild plant resources. Historic documents reveal that Monticello's enslaved laborers spent the hours of darkness tending to their own affairs and procuring wild resources (Stanton 2012:21), however, during the tobacco era we may expect to see evidence of a heavy reliance on domesticated plant taxa as slaves combined domestic activities such as cooking or caring for children with tending to kitchen gardens adjacent to their homes.

As Monticello switched to a tasked labor system whereby some slaves were occasionally granted early release during daylight hours, wild resources would have become easier to locate. Therefore the exploitation of wild resources may have increased during Monticello's wheat era.

3) Chances of Being Moved or Sold to Another Plantation. Albeit strenuous, the labor practices associated with tobacco farming were simple and did not require specialized training. Consequently, during the era of tobacco farming, slaves that labored in the fields may have been vulnerable to being sold or moved to another plantation. Because of the delay between planting and harvesting domesticated crops, slaves deprived of stability might have spent more time procuring wild resources than investing time in kitchen gardens.

Alternatively, slaves that were trained or purchased as skilled laborers were considered a more expensive and valued asset to the plantation (Monticello.org). Jefferson's desire to improve the lives and the treatment of the enslaved occurred just after the shift to wheat farming in the early 1790s. In 1824, a visitor reported that the slaves at Monticello told him they were, "perfectly happy…that they cultivated the lands of Monticello with the greater pleasure, because they were almost sure of not being torn away from them, to be transported elsewhere, so long as Mr. Jefferson lived" (Stanton 2012:69). Because the specialized labor force trained for wheat farming were less likely to be moved or sold to another plantation we may expect an increased investment in kitchen gardens after the agricultural shift.

4) Bargaining Power. Tobacco farming was carried out on small plots of land by small groups of laborers conducting simple tasks easily supervised by an overseer. The

diversity of tasks and the expansion of fields necessary to farm wheat resulted in a labor force that was dispersed across the plantation. After the shift to wheat farming, plantation owners and overseers had to direct their focus toward monitoring the products of their workers rather than the labor process (Neiman 2008:180-182; Stanton 2012:84), creating an environment in which slave owners who offered positive rewards would have benefited from more efficient laborers (Neiman 2008:182). The labor system associated with wheat farming would have increased some slaves' power to negotiate with plantation owners for better circumstances (Neiman 2008:182). An increase in bargaining power might be the most influential factor examined here because substantial, observable modifications to slaves' behavior or circumstances may be a reflection of what slaves most valued.

The environmental and cultural factors examined in Table 2.1 introduce a framework in which we can interpret the opportunities and constraints that may have shaped the subsistence behaviors of Monticello's field laborers. When examined individually, we are presented with conflicting expectations for how the Site 8 macrobotanical assemblage might reflect the subsistence strategy employed by enslaved field laborers during each of the agricultural regimes at Monticello. Nevertheless, the factors presented here are important to our understanding of how Monticello's field laborers actively improved their conditions over time.

Behavioral Ecology

Archaeologists have borrowed models from behavioral ecology to understand decisions linked to subsistence behavior, including how diet choice and resource procurement change over time.

Table 2.1. Comparison of Factors Affecting Slaves' Time and Autonomy.

	Tobacco Era	Wheat Era	Expected Plant Use
Distance to Wild Resources	Tobacco requires smaller plots of land that are rotated about every 7 years, therefore wild resources may have been close to slave's domestic quarters. The rotation of plots creates disturbed areas conducive to the growth of many of the wild useful species recovered from Site 8.	Wheat cultivation required large, permanent plots of land, pushing wild plant resources further from slave's domestic quarters.	During the Tobacco Era we might expect more wild plant taxa are procured because they are available near Site 8. During the Wheat Era we might expect more domesticated plants are produced as wild taxa are pushed further from Site 8.
Length of Work Day	Tobacco cultivation required considerable attention each day and therefore, laborers had few to no daylight hours to collect resources and tend to domestic activities.	Laborers may have been assigned tasks that once completed allowed early release and therefore, an increase in daylight hours to collect wild resources or tend to domestic activities.	During the Tobacco Era we might expect more domesticated plant taxa are produced than wild plants procured because of the difficulty of foraging for resources at night. During the Wheat Era we might expect that slaves could more easily procure wild plants if granted increased time during daylight hours to forage.
Chances of Being Moved or Sold	Cultivating tobacco involves strenuous, yet simple labor practices that could be carried out by any healthy worker. Therefore labor practices during the tobacco era did not offer the enslaved any additional stability from being sold or traded.	Training a worker in one of the skills required for cultivating wheat was costly to the plantation, thus making trained slaves a more valuable asset and less likely to be sold or traded to another plantation.	During the Tobacco Era we might expect more wild plant taxa are procured because domesticated crops require several months to produce. During the Wheat Era we might expect more domesticated plants are produced because slaves had more stability and time to invest in gardens.
Bargaining Power	Tobacco cultivation was carried out by small work gangs that could easily be monitored by an overseer or plantation owner.	Wheat cultivation required a number of tasks be carried out across the plantation. The divergence of laborers meant planters and overseers could only monitor the results of a laborers work. Diligent workers gained greater leverage and bargaining power because the plantation relied on worker productivity.	During the tobacco era slaves did not have much bargaining power and would have been forced to make subsistence-based choices within constraints set by the plantation. During the wheat era the actions of slaves that acquired leverage to bargain for more desirable circumstances may reflect slaves preferred subsistence strategies.

Optimal foraging theory models predict that subsistence strategies will reflect patterns of behavior for optimizing an outcome (Smith and Winterhalder 1992:52; Winterhalder 1981:13) with regards to time, calories, or preferences. Optimal foraging theory, as an archaeological approach, is valuable in that it emphasizes the context of diet-choice decisions, focusing on individual actions within particular cultural and environmental settings (Smith 2006:291). This contextual approach appropriately considers that elements of societies and environments change over time, creating reasons for adaptive shifts in human behavior.

Archaeologists most commonly apply models derived from optimal foraging theory to predict the behavior of hunter-gatherer societies, whereby a value is assigned to resources by calculating their net acquisition rates in kcal/hr, factoring in processing costs and handling times (Carmody 2009:2; Smith and Winterhalder 1992:55; Tucker 2006:25; Winterhalder 1986:369). This model is used to predict a forager's preference in food choice, such as the items that will be included or excluded from a forager's diet upon encounter, the breadth of items included in a forager's diet, and how choices change as environmental conditions change (Carmody 2009:2). Optimal foraging theories assume behaviors relating to resource procurement are aimed towards maximizing an outcome (Smith and Winterhalder 1992:52). However, Winterhalder demonstrated that if we build the same model asserting that a person's goal is to avoid the risk of starvation or serious food shortages the, "risk-minimizing diet choices are not too different from those that maximize efficiency" (Winterhalder 1986:371-377).

Furthermore, Smith and Winterhalder defined "rational" as the relationship between ends and means, whereby the actors pursue their ends as effectively as possible (Smith and Winterhalder 1992:45). Likewise, rational-choice theory divides the factors that determine outcomes into two categories: choices and constraints (Smith and Winterhalder 1992:45).

"Where preferences are known or presumed, rational-choice theory is tested by observing situations where constraints change in a certain manner, then comparing changes in actual choices to those predicted from the theory (given the specified shift in constraints and the original preferences)" (Smith and Winterhalder 1992:45).

Theories derived from behavioral ecology stress the relationship between choice and constraints, in which constraints are frequently defined by the environment. The application of behavioral ecology to this study is unique because the enslaved were constrained not only by their environment, to which many were abruptly and forcibly placed no less, but also by the brutality of enslavement. Slaves were expected to operate between the hours they labored for the plantation and within the dietary constraints of meager rations controlled by plantation owners.

Models derived from optimal foraging theory predict that subsistence activities, in a variety of social and environmental contexts, will reflect patterns of adaptive behaviors (Winterhalder 1981:13). Therefore, I turn to the future-discounting model presented in Tucker's (2006) ethnographic study of the mixed foraging/low-investment horticulture strategy employed by the Mikea of Madagascar, to assess the subsistence strategies used by Monticello's field laborers over time. Tucker described foraging as an "immediate return" economic system and horticulture as a "delayed return" economic system (Tucker 2006:24). The future-discounting model assumes that when offered a choice between a small, immediate award and a larger, delayed award, the immediate award is often preferred because, despite being larger, the delayed reward is less valuable in the present (Tucker 2006:26). In Madagascar the Mikea cultivate small plots of untamed land because the return rate is high compared to foraging, but they refrain from intensified agriculture because immediate needs limit their capacity for future investment (Tucker 2006:24). Taking into consideration the context of slavery, in which rations were monotonous, meager, and dictated by the plantation owner, and the threat of sale discounted a slave's stability, I propose that Monticello's field laborers practiced a mixed foraging/low-investment horticulture subsistence strategy within the time they were able to avoid nutritional deprivation and add variety to their diet throughout the year. Because the free time allotted to slaves was regularly controlled by the demands of the plantation, this subsistence strategy would have been an advantageous approach to food security.

When comparing the impact of labor systems on slaves' ability to produce and procure plant resources we assume that changes to labor practices would consequently affect their subsistence strategies. Theories borrowed from behavioral ecology are valuable when applied to this study because they consider that elements of societies and environments change over time, creating cause for adaptive shifts in human behavior, and because they stress the relationship between choice and constraints. In the context of slavery, the constraints that dictate choice extend far beyond environmental factors. By applying models of optimal foraging theory and rational-choice theory we can interpret the Site 8 macrobotanical assemblage as a reflection of choices made by Monticello's enslaved field laborers to reach a particular optimum. Tucker's future-discounting model, which assumes a smaller immediate reward will be chosen over a larger delayed award, is a practical method for interpreting the subsistence strategy of the enslaved when we consider the likelihood that they were regularly confronted by circumstances of food scarcity. This model is applied to the factors listed in Table 2.1 and the plants recovered from the Site 8 soil samples to compare how the tobacco and wheat labor systems impacted slave's subsistence-based decisions.

Jefferson's Slaves

Thomas Jefferson became a slave-owner by inheritance (Stanton 2000:17-18; Stanton 2012:56). He inherited 52 slaves from his father in 1757 and acquired 135 more slaves after the death of his father-in-law in 1774 (Heath 1999; Heath 2012a:109). The number of slaves Jefferson owned in his lifetime fluctuated above and below the number of 200, depending on births and periodic sales (Stanton 2012:4). Between 1774 and 1794, Jefferson was forced to sell both land and slaves in an effort to pay his enormous debts to several British mercantile firms, despite his reluctance to sell human beings (Stanton 2012:59). At times Jefferson bought and sold slaves to unite families. He did not separate spouses or young children from their parents, but between the designated working ages of around 10 and 12, boys and girls were no longer guaranteed family stability (Stanton 2012:6). Jefferson recognized that slaves became attached to the landscape and the social networks they formed. Acknowledging this, he would sometimes either foster family ties or exploit them as a method for controlling behavior in favor of plantation productivity (Stanton 2012:5).

To date, there is no known demographic record for the enslaved inhabitants that formed the Site 8 quarter community. Researchers believe Site 8 and its sister site, Site 7, housed the majority of enslaved field hands on the Monticello home farm, while most of the slaves assigned to tasks in Jefferson's domestic quarters and industrial shops lived along the thousand-foot-road known as Mulberry Row (Fraser Neiman, personal communication, 2015).

Site 8 Paleoethnobotanical Study

Soil samples were collected for flotation from subfloor pits and cellars where housing units once stood at Site 8 (Figure 2.2). The pits from Houses 2-4 appear to have been emptied prior to the destruction of the houses (Bon-Harper 2006); nonetheless they each contain a number of plant taxa. The following discussion denotes the size and characteristics of each of the cultural features from which soil samples were excavated for flotation and analyzed for this study.

Feature 3 is associated with House 1, the earliest building occupied at Site 8. It is a small subfloor pit measuring about 3.3 feet by 2.3 feet (Fraser Neiman 2016, personal communication). One notable characteristic of its fill was the large number of greenstone cobbles, which are believed to be the remains of the hearth that heated this building (Fraser Neiman, personal communication 2016). Soil samples derived from Feature 6 and Feature 7 are representative of House 2, which once stood in the northeast region of Site 8 (Bon-Harper 2006). Feature 6 is estimated to have been 8 feet by 8 feet and was lined with brick; Feature 7 sits to the southeast of Feature 6 and appears to have been a small subfloor pit (Bon-Harper 2006). House 3 sat at the center of Site 8 and is represented by Feature 8, a subfloor pit which appears to have been lined with wooden boards and is estimated to be about 7 feet by 4 feet (Bon-Harper 2006). Features 9 and 15 are small, roughly square-shaped pits with rounded corners; these pits are adjacent to one another and represent House 4 (Bon-Harper 2006). Feature 9 contained large amounts of charcoal and was flat-bottomed (Bon-Harper 2006). Directly south of Feature 9 sits Feature 15, a pit characterized by cobbles that may once have been a stone lining (Bon-Harper 2006). Soil

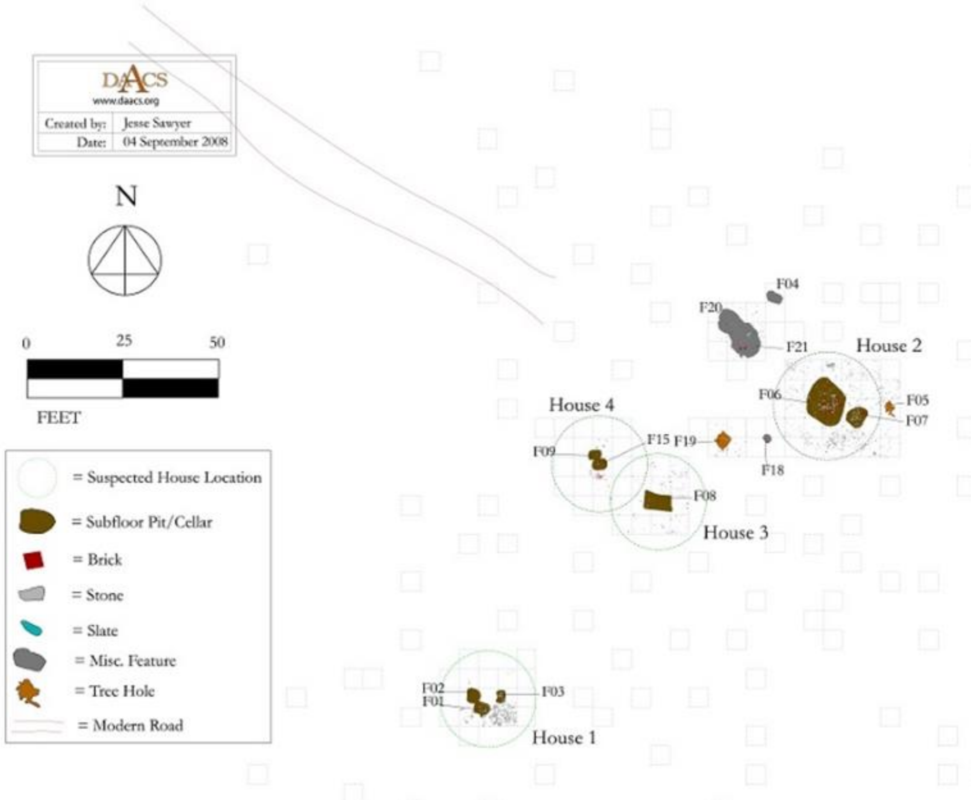

Figure 2.2. Locations of the houses and subfloor pits excavated at 44AB442.
Images Courtesy of: http://www.daacs.org/sites/site-8/#home.

samples were floated and analyzed from Features 18, 20, and 21. These features have been characterized as unidentified subfloor pits (Bon-Harper 2006). Feature 18 is southwest of House 2, and Feature 6 is between House 2 and House 3. Features 20 and 21 are adjacent to one another and are located in the northwest portion of Site 8. A time frame for their use is unclear at this time; however, they are located closest to the northwest of House 2. Table 2.2 provides a complete list of the soil samples analyzed for this study, including their size and weight and corresponding context.

It is important to note that over time the Site 8 housing structures were destroyed and the subfloor pits were likely filled in with debris largely unrelated to their function. According to

Table 2.2. Site 8 Sample Contexts.

Site 8 Location	Feature Number	Stratigraphic Group	Sample Number	Sample Volume (liters)	Sample Weight (grams)
House 1	3	SG 12	191C S07	10	71.59
House 1	3	SG 12	191D S12	10	149.16
House 1	3	SG 12	191E S18	4	39.32
House 1	3	SG 12	191F S31	10	177.61
House 1	3	SG 12	191F S32	9	116.69
House 1	3	SG 12	191G S33	10	184.14
House 1	3	SG 12	191G S34	10	127.75
House 1	3	NO SG	191H S38	10	111.71
House 2	6	SG 47	220C S08	6	337.44
House 2	6	SG 19	220H S43	10	277.29
House 2	6	SG 20	220I S49	10	473.15
House 2	6	NO SG	220N S77	9	472.59
House 2	6	SG 20	220Q S93	10	580.26
House 2	6	SG 21	220R S95	10	422.20
House 2	7	SG 22	237E S02	10	168.06
House 2	7	SG 22	237H S11	11	143.16
House 2	7	SG 23	237K S14	10	227.84
House 2	7	SG 23	237N S26	8	207.26
House 3	8	SG 40	236G S05	10	326.65
House 3	8	SG 43	236J S14	10	318.31
House 3	8	SG 36	241AAA S63	3	354.05
House 3	8	SG 36	241C S01	12	436.38
House 3	8	SG 44	241DD S75	10	203.52
House 3	8	SG 44	241EE S81	3	134.52
House 3	8	SG 41	241EEE S90	12	366.47
House 3	8	NO SG	241FFF S95	10	255.11
House 3	8	NO SG	241LLLS109	10	223.10
House 3	8	SG 44	241R S28	10	293.45
House 3	8	SG 44	241V S44	10	142.72
House 3	8	SG 40	241X S54	10	287.98
House 3	8	SG 41	241Y S57	12	226.80
House 3	8	SG 42	241Z S64	10	323.26
House 4	15	SG 31	273F S12	10	97.47
House 4	15	SG 32	273G S14	10	97.47
House 4	15	SG 33	273H S16	10	93.94
House 4	15	SG 34	273J S21	8	73.04
House 4	15	SG 29	277D S07	8	127.85
House 4	15	SG 30	277E S08	10	174.63
House 4	15	SG 35	277J S16	10	116.89

Table 2.2. Continued.

Site 8 Location	Feature Number	Stratigraphic Group	Sample Number	Sample Volume (liters)	Sample Weight (grams)
House 4	15	SG 35	281BB S69	10	98.32
House 4	9/15	SG 28	281G S18	10	71.14
House 4	15	NO SG	281P S46	10	251.43
House 4	15	NO SG	281Q S48	8	106.75
House 4	15	SG 31	281X S64	5	35.69
House 4	15	SG 32	281Y S66	14	28.07
Borrow Pit	20	NO SG	347E S19	12	319.09
Borrow Pit	20	NO SG	356E S15	14	255.34
Borrow Pit	20	NO SG	356F S21	10	191.61
Borrow Pit	20	NO SG	356G S24	10	216.07
Borrow Pit	20	NO SG	356I S31	10	54.71
Borrow Pit	18	NO SG	357G S09	12	161.88
Borrow Pit	21	NO SG	359C S02	12	315.46
Borrow Pit	21	NO SG	359D S09	12	242.75
Borrow Pit	21	NO SG	359E S12	12	227.10
Borrow Pit	21	NO SG	359F S16	12	194.29
Borrow Pit	21	SG 27	366F S13	12	247.42
Borrow Pit	21	SG 27	366F S15	12	310.53
Borrow Pit	21	NO SG	366G S18	12	254.06
Borrow Pit	21	NO SG	366H S33	12	215.88

Samford, “Architectural debris from a building’s destruction, such as nails and brick fragments, can be considered primary refuse, that is, debris deposited at the location of its use” (Samford 2007:118). Soil strata containing debris from daily life, such as pottery and foodstuffs, were created by the deposition of organic matter and trash swept up from the yards or floors of the quarters; this debris associated with a place away from the feature is defined as secondary refuse (Samford 2007:118).

The habitual sweeping of yard space between dwellings was once a tradition in West and Central Africa as well as the southern United States (Heath and Bennett 2000:43; Westmacott

Westmacott 1992:102). Swept yards have been associated with both spiritual and social customs of Africans and their descendants (Heath and Bennett 2000:43). This activity may have had a significant effect on the presence of secondary refuse within the subfloor pits of houses that were demolished prior to the end of the site's occupation. The subfloor features at Site 8 were empty of stored goods when they were backfilled, suggesting that the inhabitants were allowed to remove their contents before the houses were demolished (Bon-Harper 2006).

Biases affecting both the quantity and variety of plant taxa recovered at archaeological sites hinder our ability to account in detail for all subsistence-based behaviors that once occurred; however, as stated by Yarnell, "In general and over the long run, the quantities of different plant food remains in any particular category of size, durability, and processing should be approximately representative of their relative use by the site inhabitants when good collections are recovered" (Yarnell 1982:3). Therefore, I have based my interpretations of the Site 8 macrobotanical assemblage on the presumption that the secondary refuse, from the housing structures and yards of Site 8, is representative of the conditions of daily life and the behavioral practices carried out by Site 8's inhabitants in response to their enslavement.

Chapter 3
Materials and Methods

During the excavations of Site 8 (44AB442) sediment samples were collected for paleoethnobotanical analysis. Samples recovered from the yards and housing areas of Site 8 provide the opportunity to investigate patterns of plant use at the site during approximately the last 30 years of the eighteenth century. Following is a discussion of the analytical and interpretive approaches I employed for the purpose of investigating the Site 8 macrobotanical assemblage.

Preservation and Representation of Plant Materials

The plant remains recovered from archaeological sites are typically a reflection of their use by the site's inhabitants. These plant remains that survived the time between the site's occupation and the site's excavation generally have not undergone the process of degradation; whether they become degraded later, by soil or fauna, depends on the nature of the site (Dimbleby 1967:95-96). There are several factors that can lead to the degradation of plant remains and affect their presence or absence in the archaeological record. For example, insects, fungi, and bacteria often consume or decay plant materials. Additional factors, generally resting on either extremes of the spectrum, include temperature, moisture, and soil type (Dimbleby 1967:96; Popper 1988:57). The plant remains that tend to withstand the process of degradation are most often carbonized and tend to be the focus of paleoethnobotanical recovery.

Most of our knowledge about early plant use comes from plant remains that were exposed to fire, altering them from their natural chemical state to elemental carbon. Elemental carbon is practically indestructible chemically (except by burning), and it offers no source of sustenance to micro-organisms (Dimbleby 1967:100). However, erosion, root growth and plowing can still threaten the destruction of carbonized remains (Popper 1988:57). The carbonization of plants at archaeological sites often provides archaeologists with well-preserved identifiable plant remains, including seeds or other plant parts, which contribute to our knowledge of the site's inhabitants. These plant parts can either be intentionally introduced to fire because of the way they are processed for food or disposed, or introduced to fire by accident during the cooking process. The preservation and representation of plant remains in archaeological contexts is largely affected by the cause of charring, the frequency of each plant's use, and the method of disposal employed by the site's inhabitants (Popper and Hastorf 1988:5). Beyond the environmental and cultural influences that impact the preservation of plant remains are factors associated with data recovery that can affect the representation of plant remains from archaeological sites.

Sample Biases

Both preservation and recovery methods at archaeological sites can affect the variety and quantities of plant remains represented and consequently cause sample biases. During the recovery, transportation, processing, and handling of plant remains from archaeological sites, parts of the assemblage can be lost or destroyed (Yarnell 1982:1). Moreover, while excavation and recovery procedures lead to loss and destruction of carbonized plant remains, differential attrition is the greatest cause of the misrepresentation of plant remains in the archaeological record (Yarnell 1982:2). This process begins with the activities associated with site occupation and continues with decay, soil movement, other natural causes, and anthropogenic destruction during the long interval between deposition and excavation (Yarnell 1982:2).

Further biases associated with the representation of plant remains recovered from archaeological sites relate to the chemical composition and structure of particular plants. In general there is a major underrepresentation and often a near absence of some varieties of plants and plant parts, including tubers, rhizomes, corms, stems, leafy greens, flowers, lichens, and fungi (Yarnell 1982:2). These plant parts, when exposed to fire, tend to completely burn to ash or transform to the degree that it is difficult to identify them.

The presence of plant remains can vary depending on how people consumed, processed, stored, and prepared the plant and disposed of its by-products (Popper 1988:54). Fleshy fruits with small seeds, for example, are poorly represented because the seeds are ingested with the pulp (Yarnell 1982:2). Plants with seeds that are pulverized prior to being processed near fires are unlikely to be recovered from archaeological sites, while the parching of whole seeds of some grains such as maize, chenopod/amaranth, and knotweed result in a higher rate of recovery (Yarnell 1982:2). There is little macrobotanical evidence of plants consumed for their leafy greens that also lack a useful or durable seed. Although corn cobs and nutshell are fairly durable plant parts, tending to survive their exposure to fire, they are often used for fuel so that the quantities of these plant types may be over-representative of their relative use by the site's inhabitants. At historical sites it is important to consider that many foodstuffs, such as preserves, were purchased or provisioned and processed for consumption elsewhere, making it unlikely that they would be detected using standard paleoethnobotanical methods. Lastly, foodstuffs fed to dogs and livestock rather than burned and/or deposited in trash pits are less likely to be preserved and recovered (Hollenbach 2009b:11).

While there are factors that affect the varieties and quantity of plants represented archaeologically, the information to be gained from paleoethnobotanical analysis is still quite useful. Plants from archaeological sites are a by-product of specific human cognitive patterns of behavior and are selected according to the rules and beliefs of each culture (Ford 1979:286). In some instances the only evidence of past activities comes from the preservation of carbonized plants.

Collecting and Processing Plant Remains

The recovery of plant remains was greatly improved in the 1960s when Stewart Struever developed the flotation method where sediment samples collected from cultural features are slowly added to a basin of water and gently agitated. At the bottom of the basin is a one-millimeter mesh screen. Fine-grained silts and sand escape through the mesh while the larger inclusions remain; this may include small artifacts, bone, and plant materials (Struever 1968:354). As the sample is being agitated the heavier inclusions, termed the "heavy fraction" are caught by the mesh while the lighter inclusions, termed the "light fraction" float and can be collected by gently scooping them from the surface or allowing them to overflow into a separate container designed for their collection. After the samples are dried, paleoethnobotanists trained in the identification of plant remains systematically inspect both the heavy and light fractions for carbonized plant materials.

The Site 8 Macrobotanical Assemblage

Site 8 was excavated during the 1998-2006 field seasons by the Monticello Department of Archaeology and students in the Monticello-University of Virginia Archaeological Field School (Bon Harper 2006). Excavations were conducted using a sampling strategy of randomly chosen 5-foot-by-5-foot quadrats within each 20-foot grid unit on the site area defined by artifact distribution, with additional quadrats excavated in areas of interest (Bon-Harper 2006). This sampling strategy provided excavation data from areas with both high-and low-density artifact scatters and allowed for the examination of the house and yard areas (Bon-Harper 2006). Sediment was collected for flotation from the subfloor pits and cellars of four housing structures and a borrow pit and processed at the Monticello Department of Archaeology using a Flotetech Machine. A one-millimeter mesh fabric was used to collect the heavy fraction and window sheers were used to collect the light fraction. The dried samples were sent to the Archaeological Research Lab (ARL) at the University of Tennessee, Knoxville, where I analyzed a total of 58 samples from nine features. Each sample ranged from an average of 10-12 liters.

All samples were analyzed using standard paleoethnobotanical techniques. Each sample was weighed and sifted through 2.0 mm, 1.4 mm, and 0.5 mm nested geologic sieves. All materials greater than 2.0 mm in size were identified to the lowest taxonomic level, and counted and weighed. The sample portions caught in the 1.4 mm and 0.5 mm sieves were scanned for seeds not present in the greater than 2.00 mm portion of the sample and counted and weighed. Acorn shell is more likely to fragment and turn to ash than a denser nutshell, like hickory, and would therefore be underrepresented in a botanical assemblage (Miller 1988:77). To balance this bias, acorn shell and acorn meat were weighed and counted from both the 2.00 mm and 1.4 mm sieves. All identifications of plant remains were made by referencing Martin and Barkley's

(1961) *Seed Identification Manual*, and the PLANTS database provided by the U.S. Department of Agriculture-Natural Resources Conservation Service (2016), and using the modern comparative specimens collection housed at the Archaeological Research Laboratory at the University of Tennessee, Knoxville.

Basic Methods for Reporting Botanical Assemblages

Paleoethnobotanists use different quantifying methods to present data depending on the research question(s) being addressed. Following is a discussion of the basic methods employed in this study for reporting the Site 8 dataset.

Ubiquity

The method of ubiquity, or presence analysis, takes into account the biases in preservation and recovery techniques that can affect the representation of any particular taxon (Popper 1988:60-61, 64). Rather than focusing on the absolute count or weight of a taxon, ubiquity analysis is a measure of its frequency (Popper 1988:60-61). "The taxon is considered present whether the sample contains 1 remain of the taxon or 100, thereby giving the same weight to 1 or 100" (Popper 1988:61). Ubiquity is represented as a percentage and is calculated by dividing the number of samples in which each taxon is present by the total number of samples (Popper 1988:61). However, ubiquity is based on two assumptions: (1) that preservation is similar between all samples and (2) that the samples contained similar volumes of sediment (Hollenbach 2009a:140; Kadane 1988:206).

Ratios

Paleoethnobotanists use ratios to standardize data for intra- and inter-site comparisons. Ratios are particularly valuable when comparing samples of unequal size, samples differing in circumstances of deposition or preservation, and quantities of divergent categories of material that are equivalent in some respect (Miller 1988:72). Density measurements, one type of ratio, are commonly used to compare samples that differ in size due to discrepancies from deposition, preservation, and recovery rates (Miller 1988:73). Density is calculated by dividing the number or weight of plant remains derived from a sediment sample by the total volume of the sample. Another ratio type commonly used, percentages, standardize a sample so that the importance of one taxon can be compared to others from sample to sample (Miller 2988:74). To calculate percentages, the numerator is a subset of the denominator, but unlike density measurements, both parts of the equation are expressed in the same unit of measurement (Miller 1988:74).

Boxplots

Boxplots provide an approach to exploring patterns within data through a visual representation of compared datasets. Boxplots represent several descriptive statistics including range, median, 25^{th} and 75^{th} percentiles, and outliers. The interpretation of boxplots is clearly described by Hollenbach:

> The range of the data is depicted in the form of a notched box, the 'waist' of which is the median; the ends of the box mark the 25^{th} and 75^{th} percentiles of the data. The notch itself denotes the 95 percent confidence interval around the median. If the notches of two boxes do not overlap, then their differences are statistically significant at the 95 percent confidence level. 'Whiskers' extend from the ends of the boxes to the lowest values within 1.5 times the hinge spread, where the hinge spread

> is the distance between the 25th and 75th percentiles. Outliers are shown as asterisks, and defined as values beyond 1.5 times the hinge spread. Extreme outliers, defined as values beyond three times the hinge spread, are displayed as open circles (Hollenbach 2009a:141-142).

To interpret the quantitative data from Site 8, I use boxplots to compare changes in plant use over time. The visual utility provided by boxplots demonstrates whether there were significant changes in the types of plants most frequently produced and procured by the occupants of Site 8.

Chapter 4
Results

The samples analyzed from Site 8 (44AB442) yielded 860.24 grams of plant material, of which 756.54 grams are represented by carbonized wood. The remainder is represented by a broad range of carbonized plant materials that have been separated into categories of nuts, fruits, crops, and miscellaneous taxa. Uncarbonized blackberry/raspberry seeds were also pulled from the samples and included in the fruit category, as their dense composition facilitates their preservation.

In this chapter I discuss the Site 8 botanical assemblage in two ways. First, I examine the entirety of the plant data, providing a discussion of seasonal availability, nutritional contributions, processing procedures, and culinary uses of the recovered plant taxa. At times this discussion is limited to taxa that are culturally significant and/or appear in large numbers within the botanical assemblage. I begin with a discussion of the domesticated crops recovered from the flotation samples followed by a discussion of the wild plants recovered. Second, I examine the presence of plant taxa by depositional location within Site 8, with regards to the timeline of the former housing structures, to investigate whether Monticello's agricultural shift from tobacco to wheat cultivation altered the subsistence strategies of its enslaved field labors.

One of the primary objectives of this study was to determine the ways in which Monticello's enslaved field laborers countered nutritional deprivation through the use of plants they produced and procured themselves. Therefore, I place an emphasis on the processing and culinary uses of plants represented in the Site 8 macrobotanical assemblage. However, it is important to recognize that many of the plant taxa discussed in this chapter could have served a number of purposes in slave communities. To name a few, enslaved people increased their well-being by using plants for fuel, medicine, household goods, in rituals and religious ceremonies, to mark boundaries, and as ornamentals (Heath and Bennett 2000:38-42).

Domesticated Crops

Crop taxa recovered from Site 8 represent domesticated foodstuffs that were provisioned by Jefferson, acquired as waste from Jefferson's domestic quarters, and/or grown in personal kitchen gardens. Crop taxa include bean, buckwheat, corn, English pea, grains, and squash (Table 4.1). Corn and wheat have the greatest representation within the domesticated crop foods category.

Corn is a hardy plant that is cultivated with relative ease, while its stalks can serve as stability for plants that grow on vines, such as beans and peas. The work of archaeologists and historians alike supports the fact that within the slave diet there was a heavy reliance on corn since it was plentiful, hardy, and easy to produce (Covey and Eisnach 2009:3). Slaves used corn in a variety of dishes that were both simple and easy to prepare (Covey and Eisnach 2009:80). Corn plants are known to have been used for medicinal purposes as well. Native Americans used corn oil in poultices to treat boils, burns, and inflammations (Covey 2007:92). Reports derived from the WPA narratives indicate that slaves used corn husks to treat aches and flu (Covey 2007:93). In addition to corn kernels, the edible portion of the plant, a high number of corn cupules were recovered from the Site 8 soil samples. The presence of this inedible by-product suggests that corn was not only an important food source, but that the cobs were burned as a means of disposal and as well could have served as a fuel source. The recovery of both corn kernels and cupules in high numbers is consistent with the production of maize at the site

Table 4.1. Domesticated Crops Recovered from the 44AB442 Flotation Samples.

Taxa	Count	Weight in Grams	Seasonality
Bean	3	0.05	late summer/fall
Bean cf.	8	0.04	
Bean embryo cf.	1	0.00	
Bean family	2	0.00	
Buckwheat cf.	1	0.01	
Buckwheat family	1	0.00	
Buckwheat/dock family	1	0.00	
Corn cupule	431	4.57	late summer/fall
Corn cupule cf.	7	0.05	
Corn kernel	45	0.78	
Corn kernel cf.	37	0.30	
Cucurbit rind	3	0.02	late summer/fall
English pea	1	0.01	
Grain	1	0.01	
Grain cf.	2	0.02	
Oat	1	0.01	
Wheat	29	0.26	
Wheat cf.	8	0.08	
Total	582	6.21	

(Henderson 2013:49). It is possible that corn, as well as wheat, oat, and buckwheat were ground with a mortar and pestle for use in breads and gruels.

Twenty-nine wheat grains were recovered from the Site 8 flotation samples. Wheat grains can be boiled into a gruel, ground into flour and baked into a variety of dishes, or serve as a coffee substitute. Slaves were rarely provisioned wheat flour, but considered it a delicacy (Covey and Eisnach 2009:153). When slaves were provisioned wheat flour they typically received the coarsest type of flour, called “seconds” (Henderson 2013:50). The wheat grains recovered may represent poorly ground provisioned flour, with whole seeds still present (Henderson 2013:50). It is also possible that the wheat seeds were trapped on the clothes of laborers coming home from the fields. However, wheat seeds present in features not associated with the era of Monticello’s large-scale wheat cultivation suggest the inhabitants of Site 8 may have grown wheat in their kitchen gardens and cooked wheat kernels as a kind of gruel, similar to bulgur wheat.

Biases relating to the chemical composition and structure of plants greatly affect the representation of taxa such as beans, peas, and squash in the archaeological record. In general there is a major underrepresentation and often a near absence of these taxa because the edible portion of the plant is either consumed completely or, when exposed to fire, frequently burns to ash or becomes altered to the degree that identification is challenging. Additionally, these plants lack a durable inedible byproduct to be found in the archaeological record. Despite their low representation within the Site 8 botanical assemblage, it is likely that beans and squash were grown in gardens near the houses at Site 8.

With the slave trade, black-eyed peas, pigeon peas, lentils, and chickpeas were brought to America where varieties of red, black, and white beans were already grown. Beans were a common food source for slaves and were often dried for storage and preserved (Covey and Eisnach 2009:78). Squash was useful to slaves because it served as both a food source and a material for constructing utensils and storage containers. The frequency with which gourds were used for utilitarian needs rather than a food source would consequently affect the recovery of this plant archaeologically.

Wild Plants

The term “wild” refers to plants that have not been domesticated and are not typically sown and cultivated deliberately in gardens or fields (Scarry 2003:51). Nonetheless, foragers who exploit wild plants often engage in a wide range of resource-management activities to enhance the yield and reliability of the plants on which they depend (Scarry 2003:51). The occupants of Site 8 may have encouraged useful wild plants to grow near their homes and gardens for easier access to a reliable food source. However, foraging for wild resources in forested areas, and along forest edges and the bank of the Rivanna River would offer a greater variety of resources.

Nuts

Nut taxa recovered from the Site 8 assemblage include acorn, black walnut, hazelnut, and walnut family, with the highest abundance of wild edible nuts being black walnut and hickory (Table 4.2). Hickory nuts are a high-energy food and compared to other nuts in the region, walnuts are the best source of protein (Scarry 2003:60). Several plant remains were categorized as black walnut/peach or peach/nutshell due to the morphological similarities between nutshell and peach pit when they become highly fragmented.

Although a positive identification could not be made, the possibility exists that twelve plant fragments labeled “acorn cf.” could be chestnut. These nut types are members of the same family, Fagaceae. Chestnuts were available in the region and share characteristics with acorn, but chestnut shells are more fragile and tend to burn to ash more frequently than other nuts. Therefore, chestnuts are seldom represented in archaeobotanical assemblages.

Hazelnuts ripen as early as late summer, while the remaining nuts recovered from the samples become available in the fall. Nuts are a valuable food source because they can be collected with relative ease (with the exception of hazelnuts which take some effort to collect) and stored until needed in times of food scarcity (Scarry 2003:65).

Table 4.2. Nut Taxa Recovered from the 44AB442 Flotation Samples.

Taxa	Count	Weight in Grams	Seasonality
Acorn	6	0.01	Fall
Acorn cf.	15	0.01	Fall
Black walnut	25	1.85	Fall
Black walnut cf.	1	0.00	
Black walnut/peach	204	2.75	
Black walnut/peach cf.	2	0.01	
Hazelnut cf.	1	0.00	Fall
Hickory	66	0.48	Fall
Hickory cf.	7	0.07	
Taxa	Count	Weight in Grams	Seasonality
Nutshell	30	0.21	
Nutshell cf.	3	0.02	
Nutshell/peach	21	0.16	
Walnut family	23	0.11	Fall
Total	404	5.68	

Informants for the WPA slave narratives indicated that slaves regularly consumed hickory nuts, walnuts, and chestnuts (Covey and Eisnach 2009:179). Nuts were gathered when time allowed or gathering them was tasked to young children not yet laboring for the plantation. Nuts in the walnut family, including black walnuts and hickory nuts, can be consumed fresh or dried or used for breads, gravies, soups, butter, syrup, and sugar (Fernald and Kinsey 1943:147; Peterson 1977:188-190). In preparation of gravies, soups, and butter, hickory nuts – shells and all – are pounded and boiled so that the oil can be skimmed from the surface, seasoned with salt, and used like a butter or saved for future use. When the nuts are boiled the shells tend to sink while the nutmeats float to the surface (Fernald and Kinsey 1943:148). Native Americans would season the nutmeats before mixing them with potatoes or meal; mashed nutmeats were also often dried in cakes and preserved for winter use (Fernald and Kinsey 1943:148). Both black walnut and hickory nuts can be eaten out of hand, dipped in sugar syrup and eaten as candy, or ground into a meal-like flour (Fernald and Kinsey 1943:149; Peterson 1977:188-190). Former slaves recall simmering tree saps to make brown sugar or adding walnuts to ash cakes (Covey and Eisnach 2007:180). Black walnut bark, the kernel, and the green hull have been known to expel various kinds of worms, and the fruit, leaves, and bark offer many other medicinal benefits. Taken internally, black walnut can be used to relieve constipation, and against fungal and parasitic infections (Covey 2007:115). When applied to the skin, black walnut extract is beneficial for treating eczema, herpes, psoriasis, and skin parasites (Covey 2007:115).

Fruits

A large number of fruit remains were recovered from the Site 8 botanical assemblage, including blackberry/raspberry, blueberry, grape, peach, persimmon, and members of the genus *Prunus*. A complete list of each taxon, including the count and weight, represented at Site 8 can be found in Table 4.3. Most of these fruits are ready for collection between late summer and early fall and could have been collected by children or elders while family members were working the fields. Plants that produce fleshy fruit are most often found in forest clearings, along forests and stream borders, and in anthropogenic habitats (Scarry 2003:68). Narratives from former slaves indicate that wild fruits were gathered for personal consumption or for sale (Covey and Eisnach 2009:168; Lev-Tov 2004:10).

Blackberries and raspberries can be collected during summer months and not only can the fruit be eaten from the shrub without any processing, they can also be served as a cold drink or used in a pie, jam, or salad (Peterson 1992:184). The young tender sprouts of the blackberry/raspberry plant can also be eaten as greens (Fernald and Kinsey 1943:238).

Table 4.3. Fruit Taxa Recovered from 44AB442 Flotation Samples.

Taxa	Count	Weight in grams	Seasonality
Blackberry/raspberry	58	0.04	summer
Blackberry/raspberry (uncarbonized)	102	0.08	
Blueberry	1	0.00	summer
Cherry	33	0.15	summer
Cherry cf.	2	0.01	
Grape	8	0.13	summer-fall
Grape cf.	2	0.03	
Peach	329	10.40	summer
Peach cf.	1	0.00	
Persimmon	18	0.33	summer-fall
Persimmon cf.	10	0.07	
Persimmon/legume	3	0.04	
Plum	1	0.14	summer
Prunus	51	0.32	summer
Prunus cf.	19	0.01	
Total	638	11.75	
Black walnut/peach	204	2.75	
Black walnut/peach cf.	2	0.01	
Nutshell/peach	21	0.16	
Total	227	2.92	
Total (fruits + nut/peach)	865	14.67	

Blackberry root or bark can be used to treat old sores, kidney and stomach problems (Covey 2007:83). Because blackberries and raspberries are commonly consumed at the resource patch, the large number of blackberry/raspberry seeds recovered from the botanical assemblage suggests these fruits were a significant resource for the site’s inhabitants. Uncarbonized blackberry/raspberry seeds are included here because their hardy structure facilitates their preservation, even when the seeds are not carbonized. Blackberry/raspberry plants prefer open and disturbed environments, such as the forest edge and abandoned fields (Radford et al.

1964:97; Scarry 2003:68); the growth of these plants was likely encouraged by the inhabitants of Site 8 (Hollenbach 2009b:7).

Although there is no record that these fruits were distributed to the Site 8 inhabitants, fruit from the genus *Prunus*, including peach, plum, and cherry, were grown on the Monticello plantation (Hatch 1992:55) and may have been provisioned or acquired from Jefferson's orchards, while grapes may have come from the vineyard. Fruits in the genus *Prunus* ripen between late summer and early fall. Cherry trees grow wild in the South and slaves regularly incorporated cherry tree bark into their folk remedies (Covey and Eisnach 2009:173). Wild plums were also common in the region and thrive in areas where forests have been cleared (Covey and Eisnach 2009:178). Cherries and plums can be eaten fresh although the quality of the fruit varies from tree to tree, making some better suited for pies, jams, and jellies (Peterson 1977:218). It should be noted that preservation by canning was uncommon in the eighteenth century because earthenware was not reliable for this practice (Covey and Eisnach 2009:169). Narratives from the WPA Federal Writer's Project suggest that slaves typically consumed fruits immediately or dried and preserved them for the winter (Covey and Eisnach 2009:169).

The peach was introduced to Florida in the sixteenth century by Spanish settlers and brought north by American Indians (Covey and Eisnach 2009:176; Hatch 1992:57). Peach trees are well suited to the Southeast climate and spread so abundantly that they have been described as one of North America's first weeds (Hatch 1992:57). The leaves of peach trees were often boiled with other ingredients and used as an effective cold medicine or to treat fevers (Covey and Eisnach 2009:176). The fruit could be eaten fresh, cooked in pies and jams, or used to make peach brandy.

Grapes were grown on Monticello plantation and also grew wild in thickets and at the forest edge throughout the Southeast (Peterson 1977:198). The young leaves can be collected in the early summer and boiled and served with butter or lightly boiled and used to wrap rice or meat for baking (Peterson 1977:198). The fruit ripens in the fall and can be eaten fresh or used in a jelly or cold drink; before fully ripe, the fruit is an excellent source of pectin (Peterson 1977:198).

Persimmons are typically found in abandoned fields and dry, deciduous woods and the fruit are easily collected from the ground or when shaken from the tree (Covey and Eisnach 2009:177; Peterson 1977:194). Persimmons were often used to make a wine or beer, but can be eaten fresh or made into a jam, nut bread, or pudding (Covey and Eisnach 2009:177; Peterson 1977:194). The leaves of the persimmon tree can be gathered in the summer and dried to make a tea rich in vitamin C, while the fruit ripens between late fall and mid-winter (Peterson 1977:194).

Miscellaneous

A number of miscellaneous taxa, indicative of the local habitat, were recovered from the Site 8 samples (Table 4.4). Fragments of pine cone were present in the samples, indicating that pine trees grew in the area. More significant is the presence of a variety of useful weedy plants that offer edible leafy greens that can be eaten as a salad green or boiled, as well as nutritious seeds that can be consumed as a gruel or pounded into a flour. Chenopod and amaranth seeds appear frequently in the Site 8 macrobotanical assemblage and were grouped together because of the difficulty of differentiating the two in these samples. Some Native Americans used amaranth

Table 4.4. Miscellaneous Taxa Recovered from the 44AB442 Flotation Samples.

Taxa	Count	Weight in Grams	Seasonality
Bark	348	2.16	
Bedstraw	1	0.02	
Bedstraw cf.	1	0.02	
Bud	5	0.03	
Hairy bud/seed	1	0.10	
Chenopod/amaranth	1280	0.24	Summer-Winter
Chenopod/amaranth cf.	1	0.00	
Chickweed	112	0.06	
Copperleaf	3	0.01	
Dock	16	0.02	
Dock cf.	1	0.00	
Dock/buckwheat family	1	0.00	
Goosegrass	710	0.13	Spring
Grass family	84	0.00	
Knotweed	2	0.00	
Monocot stem	4	0.07	
Monocot stem cf.	1	0.00	
Oxalis	21	0.01	
Pine cone	161	0.44	
Pine cone cf.	1	0.01	
Pink family	86	0.03	
Pitch	6993	63.54	
Pokeweed	198	0.40	Early Spring
Pokeweed cf.	70	0.04	
Purslane	90	0.02	
Purslane cf.	1	0.00	
Receptacle	2	0.01	
Smartweed	13	0.02	
Spikerush	1	0.00	
Spurge family	1	0.00	
Unidentifiable	238	1.63	
Unidentifiable seed	40	0.11	
Unidentified	153	1.03	
Unidentified seed	39	0.06	
Weedy legume	388	0.13	
Total	11067	80.24	

leaves to treat profuse menstruation, while chenopod was used as an emetic and to treat headaches (Moerman 1998:66,156). The seeds of some chenopod varieties can be crushed to create a red dye (Moerman 1998:156). The leaves of chenopod and amaranth can be collected in the summer and boiled and eaten while the highly nutritious seeds can be collected in the fall and early winter and ground into a flour. This is true of purslane as well. Chenopod, amaranth, and knotweed contain low levels of carbohydrates but are good sources of protein and fat and the seeds of these plants are hardy and could have been stored for winter use (Scarry 2003:69).

There is a large number of goosegrass seeds in the assemblage. This weedy plant is native to Africa and was used by slaves as a tea to treat a number of illnesses (Covey 2007:118). The shoots of goosegrass can be collected in the spring and eaten as a salad or boiled, while the fruit ripens in the early summer and can be used as a coffee substitute. Additionally, the leaves of dock, members of the pink family (which includes chickweed), and oxalis can be boiled or eaten as a salad. These wild leafy greens, high in vitamins and minerals, become available in the early spring and could have improved the nutritional condition of the site's occupants after relying mostly on stored foods for much of the winter (Scarry 2003:73). Bedstraw emits a sweet smell and was often used for bedding, but can also be a substitute for rennet to make cheese (Fernald and Kinsey 1943:343).

Pokeweed is one of the first plants to sprout greens in the early spring and was a common and preferred vegetable plant in the antebellum South. Slaves ate pokeweed in a salad, boiled it, or fried it in hot grease (Covey and Eisnach 2009:87). Former slaves frequently reported consuming pokeweed and using it for medical treatments during enslavement; the large number of pokeweed seeds recovered from the Site 8 flotation samples suggests that slaves likely encouraged this plant to grow nearby or cultivated it in the private kitchen gardens adjacent to their homes. Folk practitioners have used pokeweed as a sedative as well as to treat gout, pneumonia, rheumatism, and typhoid fever, while Native Americans were known to use pokeweed to make a poultice for treating skin disease, sores, ulcers and tumors (Covey 2007:106).

The large number of plant remains labeled as “pitch” can sometimes be resin from pine, but can also represent carbonized sugar- or starch-based plants that tend to burn to the degree that identification is not possible, thus limiting our knowledge of how frequently these plants were consumed (Scarry 2003:68). Roots and tubers are assumed to often fall into this category. Tubers (such as yams), introduced to the New World from Africa were ideal for slave subsistence because they require little attention to produce, are high yielding, and are readily prepared as food (Carney and Rosomoff 2009:112). Unless the ground is frozen or covered by ice, these plant foods are available throughout the year and considered valuable resources (Scarry 2003:69).

The seeds identified as “wild legume” may likely be clover and were recovered in the samples as both carbonized and uncarbonized specimens. At times, grasses were used as a lining or packing material for food stored in subterranean pits (Samford 2007:135); this may explain the presence of this taxa.

Most of the wild plants categorized as miscellaneous taxa are found in disturbed anthropogenic areas. What makes them noteworthy is that their seasonality ranges from early spring to early winter, providing the inhabitants of Site 8 with a means to supplement their nutrition throughout most of the year.

Summary of Findings

The 58 flotation samples analyzed from Site 8 were comprised of a wide variety of useful plant species, suggesting that during the late eighteenth century the enslaved occupants actively participated in gardening and foraging to supplement their diets and maintain their well-being. Undoubtedly the availability of foods would have varied annually, depending on weather conditions and the production cycles of perennial resources. However, by making observations early in the summer, the inhabitants of Site 8 would have known the best areas to find wild grains and seeds and where the nut masts and wild fruits would be most plentiful at harvest time (Scarry 2003:74). Meanwhile, vegetables and herbs grown in kitchen gardens adjacent to their quarters would further ease periods of food scarcity. The ways in which plants were used and useful to the occupants of Site 8 can illustrate how the enslaved population negotiated the various natural and manipulated spaces surrounding them (Henderson 2013:28).

Plant Use through Time: A Temporal Perspective

The primary objectives of this study include the identification of plants selected by the occupants of Site 8 to reduce nutritional deprivation and improve their well-being and furthermore, to examine the plant remains recovered from cultural features excavated at Site 8 to determine how Monticello's agricultural shift from tobacco to wheat production affected the well-being and altered the subsistence strategies of its enslaved field laborers over time.

A seriation-based chronology using ceramic sherds recovered from cultural features provides an estimated ten year occupation for each of the houses, from the time they were built to when they were demolished, and more importantly it creates a means for tracing the effect of changes experienced by the site's occupants over a thirty year period (DAACS.org; Fraser Neiman, personal communication 2015). Furthermore, this chronology allows for comparisons between the periods of tobacco and wheat farming and how changes in labor practices impacted the circumstances of Site 8's occupants.

As stated, the seriation-based chronology using ceramic sherds recovered from cultural features established a temporal context for each of the housing structures at Site 8. Houses 1, 3, and 4 are believed to have been occupied during the era of tobacco cultivation and gang labor at Monticello. House 1 has been interpreted as the earliest residence at Site 8, occupied from circa 1770 to circa 1780. House 3 and House 4 were likely occupied simultaneously from circa 1780 to circa 1790. House 2 is estimated to have been occupied from circa 1790 to circa 1800, during the era of wheat cultivation and tasked labor (Fraser Neiman, personal communication 2015). Table A-2 illustrates the number and weight of each of the useful plant taxa recovered from subfloor features associated with each of the houses for comparison.

The number and variety of plant remains recovered at archaeological sites are often linked to a number of factors relating to the occupants' choices and activities; the morphology of plants and the methods in which they are prepared or utilized greatly affects their recovery. Despite sample bias, the botanical assemblage is useful in determining the status, restraints, choices, and practices of the Site 8 community over the thirty year occupation of the site. The following discussion is an assessment of patterns present within the Site 8 macrobotanical assemblage.

Ubiquity

Comparing ubiquity values of plant taxa present in soil samples recovered from each of the Site 8 housing structures can illustrate how frequently the site's inhabitants used particular plants over time (Table 4.5). The ubiquity values of taxa representing each of the plant categories (defined in this chapter) are compared over the site's thirty-year occupation to examine whether the exploitation of particular types of plant foods increased or decreased as labor practices changed. Because the analysis of the soil samples excavated at Site 8 presents a macrobotanical assemblage comprised of an extensive variety of plants, two to three taxa have been chosen to represent each of the plant categories. These taxa, in particular, were chosen for examination due to their cultural significance and because they were recovered from multiple Site 8 soil samples.

Table 4.5. Ubiquity Results by Housing Structure.

	House 1	House 3	House 4	House 2	Borrow Pit
	c. 1770-1780	c. 1780-1790	c. 1780-1790	c. 1790-1800	
n=	8	14	13	10	13
Taxa					
Bean*	0%	7%	15%	0%	31%
Black Walnut	25%	0%	8%	10%	38%
Chenopod/Amaranth*	38%	71%	31%	90%	100%
Corn Cupule*	50%	36%	38%	40%	85%
Corn Kernel*	75%	29%	23%	50%	62%
Grape	25%	0%	0%	30%	8%
Hickory	38%	21%	0%	30%	38%
Peach	38%	14%	15%	60%	85%
Wheat*	38%	36%	8%	10%	23%

**Includes Bean, Bean cf. and Bean Family*
**Includes Chenopod/Amaranth cf.*
**Includes Corn Kernel cf.*
**Includes Wheat cf.*

The ubiquity rate of chenopod/amaranth rises from 38% in House 1, during the era of tobacco farming, to 90% in House 2, during the era of wheat farming. House 4 had a remarkably low ubiquity of chenopod/amaranth, but House 3, which was occupied simultaneously, bears a 71% ubiquity, supporting a pattern of increased use of chenopod/amaranth at the site. The relationship between House 3 and House 4 are unclear, but House 4 appears to be an outlier, nonetheless. Factors which might affect the recovery of plant remains from cultural features include, but are not limited to, the size of subfloor features from which soil samples were excavated as well as the designated use of the plant.

We see a continuous use of corn, with fairly high ubiquity rates of both kernels and cupules throughout the site's occupation. Historic documents reveal that Jefferson rationed cornmeal to slaves, but based on the high recovery of both corn kernels and cupules it is quite likely that slaves were growing corn in their private gardens.

The relatively high ubiquity rates of chenopod/amaranth, corn, peach, and wheat is fairly consistent over time, suggesting that these plants served as staple foods over the course of Site 8's thirty year occupation. Soil samples derived from the borrow pit exhibit high ubiquity rates for most of the taxa studied here, suggesting that this area of Site 8 may have hosted domestic activities such as cultivating, processing and preparing foods or that these taxa are a product of maintained yards. The ubiquity rates of the taxa examined here reveal no clear pattern depicting a significant rise or fall of the utilization of any particular plant category. However, they do imply that a variety of plants, including both domestic and wild, were exploited throughout the site's thirty-year occupation.

Boxplots and Ratios

A change in the presence of wild plants over Site 8's thirty-year occupation can reveal how the agricultural shift affected the time, autonomy, and decisions of Site 8's occupants. Slaves' likely encouraged useful wild plants to grow near their quarters, however the wide variety of wild plant taxa recovered from Site 8 suggest the site's occupants would have been foraging for wild resources across the landscape when able. The box plots in Figure 4.1 illustrate the ratio of wild plants to domesticated crops recovered from features associated with the borrow pit and each of the housing structures that stood at Site 8 at the end of the eighteenth century. There is a significantly higher number of wild plants present in the subterranean features associated with House 2 compared to the number of wild taxa recovered from samples associated with House 1, House 3, and House 4. This difference is statistically significant at the 95% confidence interval, as the notches of the boxplots do not overlap.

The results of this study support the idea that many plantation owners began expecting slaves to source much of their own food after the switch from tobacco to wheat farming (Klippel et al. 2011:28). The significant increase of wild plants present in the feature samples associated with the period of wheat farming is notable and suggests that after the shift to wheat farming the enslaved were granted increased time and autonomy to travel across the Monticello landscape to gather resources.

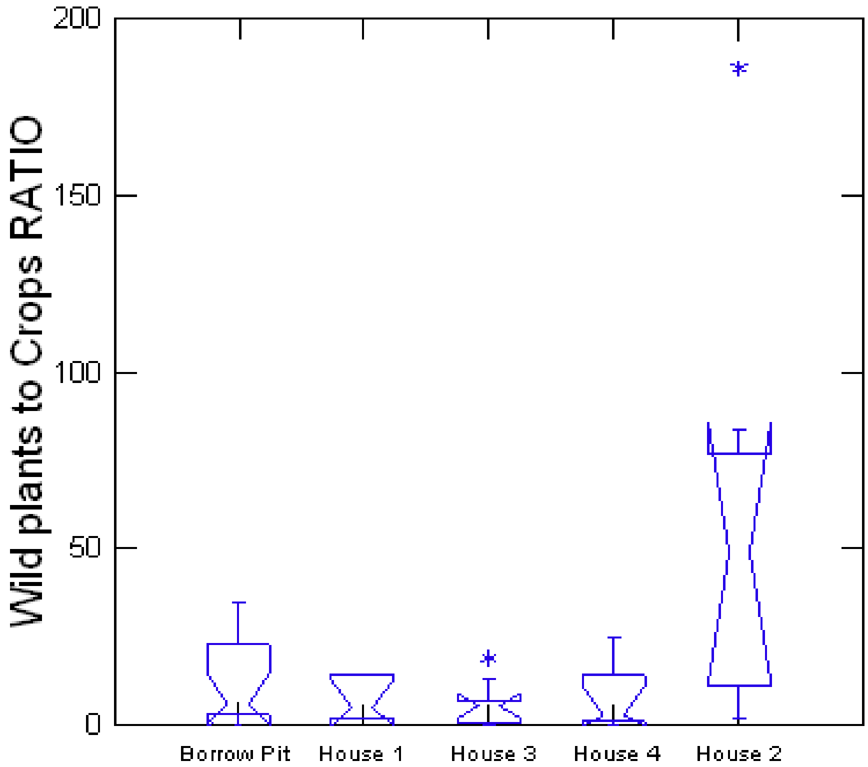

Figure 4.1. Ratio of Wild to Domesticated Plants Recovered from the 44AB442 Macrobotanical Assemblage.

Chapter 5
Discussion

Records kept by slave owners provide a foundation for the minimum amounts and varieties of foods consumed by slaves, but are inadequate representations of the entire slave diet. Slaves' nutritional status often depended considerably on the extra effort they dedicated to supplementing the rations provided to them by slave owners (Carney and Rosomoff 2009:126). Whether to add variety to their diet, maintain their health, or generate an income, the rate and recovery of macrobotanical data from Site 8 indicates that enslaved field laborers actively increased their weekly rations with plants.

In this chapter I investigate whether the weekly food rations Jefferson provisioned to slaves provided them with the adequate calories required to keep a person alive and produce enough energy for muscular work. To estimate the calories required of an enslaved field laborer on an eighteenth-century plantation I turn to modern health studies presented by the World Health Organization (WHO) and the Office of Disease Prevention and Health Promotion (ODPHP), which calculate the nutritional requirements of a healthy person. The caloric estimations drawn from these studies are then compared to the expected number of calories, or amount of energy, obtained from the weekly rations Jefferson provided to slaves. I limit this study to an examination of the number of calories required; however, further studies could also determine whether slaves' rations provided them with the proper amount of protein, vitamins, and minerals required to maintain one's health.

By calculating the estimated calories required to sustain an enslaved field worker, based on their workload and the calories provided to them, we can begin to measure the degree to which the supplementary foods produced and procured by the enslaved were essential to maintain their health and counter nutritional deprivation. To better understand the subsistence strategies employed by the occupants of Site 8 models borrowed from behavioral ecology, including the future-discounting model described by Tucker (2006), are used to explain subsistence behaviors, taking into consideration a person's choices under risk in which the immediacy of resource requirements (Tucker 2006:29) greatly affect subsistence behaviors.

Caloric Requirements

Slave codes established during the colonial era regulated the legal rights and treatment of slaves. Most codes stipulated that slaves were restricted to a weekly ration of a peck of cornmeal and three to four pounds of salt pork per family (Covey and Eisnach 2009:20). For planters this diet established a necessary investment, one calculated to maintain laborers at a minimum level while maximizing plantation profits (Sanford 1995:245). Usually once a week, planters rationed food to the head of households or unmarried slaves. The amount each individual was rationed depended on factors such as the size of the plantation, the perceived value, age, and work role of a slave, and the time of year (Covey and Eisnach 2009:20). The adequacy of the slave diet has been a topic of controversy among historians and social scientists; however, it is well established that the degree to which slave owners were willing to invest in the care and provision of food to slaves varied (Covey and Eisnach 2009: xi). Planters viewed slaves as an economic investment and often only provided slaves with enough food to maintain their productivity (Covey and Eisnach 2009:11). Slave owners put to work men, women, and children as young as ten to work as agricultural laborers (Kulikoff 1986:64). Plantation owners and overseers needed to ensure that slaves were provided adequate food, meaning minimally sufficient to sustain life, particularly that of a productive laborer (Covey and Eisnach 2009:20; Sanford 1995:245).

Research studies pertaining to human nutritional requirements have been conducted by the World Health Organization (WHO) and the Office of Disease Prevention and Health Promotion (ODPHP) and applied to this study to estimate the caloric intake required of an eighteenth-century enslaved plantation worker to maintain a healthy status.

In 1974 the World Health Organization published a report, *Handbook on Human Nutritional Requirements*, indicating the nutritional requirements of a healthy human. Data from the WHO report have been applied to this study because the caloric requirements presented are representative of the expected energy expended contingent on a person's occupation. The estimations provided in this study are based on men and women age 25 and weighing 65 kg (143 pounds) and 55kg (121 pounds). Table 5.1 illustrates the estimated calories required of a person per hour depending on their workload. Because historic records indicate that Monticello's enslaved work force regularly worked between nine and fourteen hours each day (Stanton 2012:21), the caloric requirements per hour have been multiplied by nine and fourteen to project the estimated calories a field laborer would require throughout an average work day. Note that the 1974 WHO report places women in less strenuous roles than men at each of the designated activity levels; therefore we should expect that the caloric requirements assigned to women in the WHO study are likely fewer on average than what would have been necessary to sustain an enslaved female laboring the fields of an eighteenth-century plantation. In Table 5.1 all numeric data remain consistent with the original study; however, the exemplary tasks assigned to represent women's activities in the 1974 WHO publication have been merged with those designated to men to establish a more accurate representation of the physical exertion demanded

Table 5.1. Estimated Caloric Necessities Based on Energy Expenditure

	Examples of Tasks	Energy Expended per Hour by Men	Energy Expended per Hour by Women	Energy Expended by Men during a 9-14 Hour Work Day	Energy Expended by Women during a 9-14 Hour Work Day
Moderately Active	Light industry, construction workers (excluding heavy laborers), farm workers	175 kcal	125 kcal	1,575-2,450 kcal	1,125-1,750 kcal
Very Active	Some agricultural workers, steel workers, unskilled laborers,	240 kcal	175 kcal	2,160-3,360 kcal	1,575-2,450 kcal
Exceptionally Active	Lumberjacks, blacksmiths, construction workers	300 kcal	225 kcal	2,700-4,200 kcal	2,025-3,150 kcal

**The WHO estimated an additional 700-1,500 kcal are expended by males in an eight-hour period spent outside of work-related tasks and an additional 580-980 kcal are expended by women during these periods.*
**Table 5.1 is based on men and women age 25 and weighing 65 kg and 55kg. Data reported by the 1974 World Health Organization's, Handbook on Human Nutritional Requirements (WHO 1974:8-9).*
**The caloric needs of pregnant women are not included in this illustration.*

of eighteenth-century slaves, assuming that enslaved women regularly carried out tasks equal to men.

Table 5.1 does not account for the additional expenditure of energy during periods of recreational or non-occupational activities throughout the day. The WHO estimated an additional 700-1,500 kcal are expended by males in an eight-hour period spent outside of work-related tasks and an additional 580-980 kcal are expended by women during these periods. In addition to physical activity and the nature of non-occupational activities, the number of calories required of individuals depend also on the following: the need to lose, maintain, or gain weight, body size and composition, age, climate and other ecological factors (Covey and Eisnach 2009:19; ODPHP 2015; WHO 1974:10).

The 2015-2020 report published by the ODPHP designates the average daily caloric requirements for American men and women based on their ages and activity levels. The ODPHP estimates that an active woman between the ages of 21-25 (standing 5’4” tall and weighing 125 pounds) requires 2,400 calories daily, and an active man between the ages of 21-25 (standing 5’10” tall and weighing 154 pounds) requires an estimated 3,000 calories per day (ODPHP 2015). Based on these studies an active woman around the age of 25 years would require an estimated average of 2,400 calories daily and an active 25 year old man would require an estimated average of 3,000 calories daily.

It is important to note that the studies referenced here are based on the customs of modern society and can only serve to loosely guide interpretations. For instance, the production and consumption of foods have altered considerably since the eighteenth century. Furthermore, the physical intensity of tasks and the hours plantation slaves spent working each day far exceed what is termed an “active” lifestyle by modern standards. The ODPHP defines an “active” person as someone with a lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour, in addition to the activities of independent living (health.gov). The activity level of an enslaved field worker would have depended on the labor system implemented by the plantation. All plantation labor required strenuous work although some tasks would have been more labor intensive than others; therefore slaves working the more arduous tasks would have required a higher energy intake than others. Nonetheless, the estimated caloric requirements presented by the WHO and ODPHP can establish a framework for understanding risks relating to slaves’ nutritional status.

Calories Provided from Weekly Rations

The studies published by the World Health Organization and the Office of Disease Prevention and Health Promotion present the necessary data to make comparisons between the number of calories required of a healthy person, depending on their age, sex, and activity level, and the number of calories that could be obtained from the weekly food rations Jefferson supplied to slaves. It is noteworthy that these estimations are limited to caloric requirements and do not account for the vitamins and minerals also vital to maintain a person's health.

On average, the slaves at Monticello, regardless of age, received a weekly peck of cornmeal (Kelso 1986:32; Stanton 2012:61). Adults were given four salt herring and half a pound to a pound of salt pork or pickled beef and a gill of molasses each week (Kelso 1986:32; Stanton 2012:61). Children were provisioned smaller amounts of meat and fish, according to age (Stanton 2012:61). Using data provided by the United States Department of Agriculture (USDA) and the Food and Agriculture Organization of the United Nations, Table 5.2 represents the estimated calories attainable from the rations provisioned to slaves at Monticello. The data presented here indicates that the specified rations would have provided slaves with an estimated average of between 2,569 and 2,983 calories per day. When compared to the estimated 2,400-3,000 calorie requirements quantified by the WHO and the ODPHP, the rations appear to be adequate. However, the caloric requirements designated in these studies are representative of people that work far fewer hours and exert far less energy than what was expected of an eighteenth-century slave. Furthermore, the monotony of the rationed diet would not provide the essential vitamins and minerals required of a healthy person. Based on the studies presented here,

Table 5.2. The Estimated Caloric Value per Weekly Rations Jefferson Provided to Slaves

Weekly Ration	Caloric Value per Week	Caloric Value per Day
1 peck of cornmeal	16,208	2,315
4 Atlantic herring	816	117
½-1 pound of pork or beef	1,699-3,393 or 496-992	243-485 or 71-142
1 gill of molasses	464	66
Total	19,187-20,881 or 17,984-18,480	2,741-2,983 or 2,569-2,640

**Estimated calories provided from cornmeal, pork, beef, and molasses based on information provided by United States Department of Agriculture*

**Salt herring estimated calories derived from the Food and Agriculture Organization of the United Nations Fisheries and Aquaculture Department.*

the weekly rations Jefferson supplied slaves would have been inadequate to sustain an enslaved field laborer unless supplemented with additional foods.

The Effect of Labor Systems on Subsistence Behavior

Based on the work of archaeologists and historians, we know that labor systems affected slaves' abilities to produce and procure additional foods (Lev-Tov 2004:9). After Monticello switched from a tobacco plantation to a wheat plantation, the labor system changed and along with it several circumstances believed to have altered the subsistence behaviors of Monticello's enslaved field laborers (Table 2.1). The factors addressed in this study include: 1) the distance between the Site 8 housing quarters and wild resources, 2) the length of a person's work day, 3) the likelihood that a slave would be sold or moved to another plantation, and 4) the degree to which slaves could bargain for improved conditions. It is important to note that the factors presented here, among others, would have functioned collectively to drive subsistence-based decisions. The following discussion presents an interpretation, based on the Site 8 macrobotanical assemblage and theories derived from behavioral ecology, of the subsistence behaviors of Monticello's enslaved field laborers.

First, it is important to address the ways in which Monticello's agricultural shift from tobacco farming to wheat farming might have impacted slaves' subsistence behavior. As noted in Chapter 2, when examined separately, the factors can convey contradicting expectations.

Despite the likelihood that wild plant resources would have been closer to the Site 8 domestic quarters when Monticello was a commercial tobacco plantation, it is also recognized that during this period slaves likely had less time and less freedom to travel the landscape to collect them.

After Monticello began producing grains for commercial sale, the labor system changed drastically to accommodate the demands of wheat and grain farming. Slaves were trained in diverse, specialized tasks necessary for cultivating grains and preparing them for market. Plantation owners viewed slaves trained in carrying out a specialized task as an economic investment, subsequently decreasing the chances that a skilled slave would be sold to another plantation. If slaves felt less threatened by the risk of being sold, we might expect an increased investment in kitchen gardens during this time.

The execution of more diversified tasks took place in either large wheat fields or specialized work sites that were dispersed across the plantation, and thus a single overseer could no longer closely monitor all the laborers under his supervision (Neiman 2008:182; Stanton 2012:63). Instead, overseers had to evaluate the products of workers rather than the labor process (Neiman 2008:180-182; Stanton 2012:84). Planters benefited from efficient workers, creating conditions "…that gave enslaved people the additional leverage required to achieve marginal improvements in their lives at the end of the eighteenth century" (Neiman 2008:182). An increase in bargaining power might be the most influential factor examined here because substantial, observable modifications to slave's behavior or circumstances may reveal what slaves most valued.

After Monticello's agricultural shift to commercial wheat and grain farming, enslaved tradesmen are believed to have had increased time, autonomy, and bargaining power and subsequently fewer constraints. Therefore, the era of wheat farming may more accurately reflect slaves' subsistence-based preferences.

Behavioral Ecology as a Theoretical Approach to Slave Subsistence

Models of optimal foraging theory assume that decision-makers calculate time and energy as a net rate for maximizing an outcome (Tucker 2006:25; Winterhalder 1981:13). "This maximization assumption has proven sufficiently general to explain a wide range of subsistence behavior, including choices under risk" (Tucker 2006:25). Nonetheless, foraging behavior is complex and multi-causal (Winterhalder 1986:371). According to Winterhalder,

> "Early foraging models set aside questions of uncertainty (How do foragers get and maintain information about their environment?); unpredictability (How does risk from environmental stochasticity affect foraging choices?); the interacting demands of behaviors other than foraging (What are the opportunity costs of choices among different types of behaviors?); complex resource benefits (Are diet choices based on complex nutritional needs in addition to energy?); resource renewal (How does resource selectivity interact with resource depletion?); and issues of group behavior (How does food sharing affect foraging societies?)" (Winterhalder 1986:371).

These questions are important factors working together to shape a decision-maker's subsistence strategy, but our ability to answer these questions is limited. Fortunately, historical records, ethnographic studies of subsistence behavior, and testimonies from former slaves help guide interpretations and allow us to begin answering questions concerning the subsistence strategies employed by the enslaved field laborers that occupied Site 8 in the late eighteenth century.

Based on the data derived from the Site 8 botanical assemblage it appears that the enslaved occupants of Site 8 depended on both foraged wild plants and domesticated crops grown in their kitchen gardens to supplement the food rations they were provisioned. If optimal foraging models predict that subsistence activities reflect patterns of behavior for yielding the optimal net rate of calories or a preferred outcome, then the botanical assemblage examined here suggests that within the social and environmental contexts experienced by Monticello's enslaved field laborers, the best strategy for reaching their caloric needs and ensuring food security was to exploit both domesticated and wild plant resources. To examine the utility of a subsistence strategy in which both domesticated crops are produced and wild taxa are procured, Tucker's ethnographic study of the mixed foraging/horticulture strategy exercised by the Mikea of Madagascar is applied to this study.

A Mixed Foraging/Low-Investment Horticulture Subsistence Strategy

To assess the subsistence strategies implemented by Monticello's field laborers, I turn to the future-discounting model defined in Tucker's (2006) study of the mixed foraging/low-investment horticulture strategy employed by the Mikea. Tucker proposed that both foraging and farming practices can be compared with the logic of foraging theory whereby rewards are calculated as a net rate of energy gain (Tucker 2006:23). As stated in Chapter 2, the future-discounting model assumes that when offered a choice between a small, immediate award and a larger, delayed award, the immediate award is often preferred (Tucker 2006:26). Under circumstances in which a person is suffering from inadequate nutrition or nutritional deprivation the immediate gratification associated with choosing a smaller, immediate reward over a larger, delayed reward may be related to the immediacy of resource requirements (Tucker 2006:29).

Successfully cultivating crops results in high returns, but requires invested time and attention. While foraging for wild plant species can present an immediate reward, the availability and abundance of wild foods varies annually, depending on weather conditions. The recognized instability and nutritional deficiency suffered by slaves suggests that in the context of slavery an immediate award would be chosen over a larger, delayed award. However, slaves were not always afforded the opportunity or ample time to forage for wild resources during the day; consequently, managing small kitchen gardens near their living quarters might have provided a more feasible method for supplementing their rations because this activity could be combined with additional domestic chores such as looking after children, repairing clothing, and preparing and cooking meals.

A mixed foraging/low-investment horticulture strategy requires less investment, effort, and risk than if a person or group relied solely on the success of cultivating crops or foraging for wild species. This subsistence strategy is advantageous because in the event that an endeavor was unsuccessful, there is an alternative food supply. Taking into consideration the context of slavery, in which the threat of sale reduced stability, a mixed-foraging/low-investment horticulture strategy would be an effective strategy for increasing one’s nutritional status and adding variety to their diet throughout the year.

The presence of high numbers of both domesticated crops and wild plants recovered from the Site 8 macrobotanical assemblage support the theory that the enslaved inhabitants of Site 8 exercised a mixed foraging/low-investment horticulture approach to supplement their food rations and consequently reduce the risk of nutritional deprivation and maintain their well-being. Despite the agricultural shift to wheat farming, which resulted in major changes to the landscape and the labor system, this subsistence strategy persisted among the Site 8 occupants throughout the 30 year occupation. However, the results of this study indicate that after the shift from tobacco to wheat agriculture the site occupant's placed a greater emphasis on their use of wild edible plants compared to domesticated crops.

Shifts in Subsistence Behaviors

Analyses of the Site 8 macrobotanical assemblage reveal a significantly higher recovery of wild plants to domesticated crops in soil samples from cultural features associated with the period after Monticello's shift to commercial wheat farming. According to models derived from optimal foraging theory, the higher recovery rates of wild plant taxa should reflect slaves' choice to exploit wild resources as a method for reaching a desired optimum. Foraging for wild plant resources not only would have provided the enslaved an immediate reward, but the time slaves spent foraging rather than tending to garden plots could further maximize their return rates because floral and faunal resources could be exploited simultaneously.

Although fewer domesticated crops were recovered from the subfloor pits associated with the period of wheat production at Monticello, domesticated crops were still represented. Regardless of whether slaves preferred wild resources, it appears they continued practicing horticulture throughout the site's occupation. It should be noted that if a slave's primary motivation was to generate an income, one might expect the recovery of domesticated crops from the Site 8 macrobotanical assemblage would be lower than the recovery of wild plant resources as slaves sold the crops they cultivated to Jefferson, or at the Charlottesville market. However, it is recognized that slaves collected and sold wild taxa, such as blackberries, as well.

Of course, the actions of the decision-maker can be affected by a number of personal factors that lie beyond the scope of theoretical models. The interpretations presented here do not account for the individual, but rather focus on the site occupants as a group. Individual decisions undoubtedly vary for a multitude of reasons; therefore it is only practical to conduct interpretations through a broad lens.

If we determine that the agricultural shift to grain farming increased slaves' time, autonomy, and bargaining power, then the outcome of these changes should have broadened slaves' opportunities to make diet-based choices. Following models of optimal foraging theory, the macrobotanical assemblage presented here suggests that when afforded the opportunity, slaves chose to forage for wild resources to supplement the rations they received from Jefferson. Nonetheless, the macrobotanical assemblage reveals that both wild and domesticated plant taxa were present in subfloor pits throughout the thirty-year occupation of Site 8. Based on historical and archaeological references, optimal foraging theories, and the analysis of the macrobotanical assemblage, I conclude that slaves were resourceful when supplementing their diets by exploiting wild resources when they were able and managing kitchen gardens as an alternative food supply.

Chapter 6
Conclusion

The macrobotanical data presented in this study expands our understanding of the ways in which the occupants of Site 8 actively improved their lives with plants they produced and procured as a means for supplementing the food rations provided to them. Consistent with the conclusions of others, the WPA narratives, and results of botanical studies from contemporaneous sites in the region, the results of this study indicate that enslaved African Americans adapted to their conditions and actively and efficiently enhanced their well-being, managed health-related risks, and maintained control in their lives.

A Comparison between Site 8 and Contemporary Sites in the Region

The study presented here is representative of only a small population of Virginia slaves. More comprehensive and accurate conclusions pertaining to the foodways of Virginia's enslaved African American community can be drawn from comparisons between the Site 8 macrobotanical assemblage and the results of contemporaneous botanical studies from the region.

A number of macrobotanical studies have been conducted at slave quarters from Thomas Jefferson's Poplar Forest Plantation in Bedford County, 90 miles southwest of Monticello. A 2008 study published by Mrozowski et al. compare the macrobotanical data recovered from slave quarters on five Virginia plantations including the North Hill and Quarter sites at Poplar Forest Plantation, the Rich Neck Plantation in Williamsburg, the Wilton Plantation quarter site in Henrico County and the Southall's Quarter in James City County (Table A-4) (Mrozowski et al.

2008:717). Similar to Site 8, the macrobotanical assemblages from the North Hill and Quarter sites represent high recoveries of both corn cupule, corn kernel, and peach.

In 2013 Henderson published her macrobotanical analysis of the Wingos site, a slave quarter occupied at Thomas Jefferson's Poplar Forest plantation between 1770 and 1790 (Table A-5) (Heath and Breen 2009:11; Henderson 2013:2). The Wingos macrobotanical assemblage is consistent with the high recovery of corn cupules, corn kernels, walnut family, a number of useful weedy wild taxa, and taxa from the genus, *Prunus*, at Site 8. Conversely, the recovery of blackberry/raspberry seeds at Wingos are notably low compared to Site 8.

Avenues for Future Research

A more comprehensive comparison of the macrobotanical data from contemporaneous sites, particularly those that include a transition from tobacco to wheat farming, can serve to increase our knowledge of enslaved African American lifeways in eighteenth-century Virginia. Furthermore, the analysis of the Site 8 macrobotanical assemblage presented here has been largely aimed towards improving our understanding of enslaved African American foodways in the late eighteenth century; however, future studies comparing the presence of medicinally valuable plant taxa in macrobotanical assemblages, such as those presented by Mrozoswki et al. (2008) and Henderson (2013), would serve to increase our understanding of the methods exercised by eighteenth-century African American slaves to actively manage their well-being.

There is great value in studying plants recovered from archaeological sites; however, a multi-faceted approach to foodways can benefit and support our understanding of the relationship between a site's inhabitants, their environment, and their conditions. The conclusions inferred in this study are supported by historical accounts and archaeological research; however, results from phytolith, starch, faunal and pollen analyses from subfloor pits can further support and shape our knowledge of enslaved African American foodways at the end of the eighteenth century.

Although this study is limited to the recovery and analysis of the macrobotanical remains from Site 8, a pollen analysis has also been conducted by Dr. John Jones. In conjunction with the macrobotanical data presented in this study, similarities between the results of plant taxa recovered from the pollen analysis and the Site 8 macrobotanical assemblage can further support the conclusions drawn from this study and increase our ability to interpret the conditions and actions of the Site 8 community. Additionally, faunal remains recovered from Site 8 have been analyzed by Dr. Joanne Bowen. If the rate at which wild faunal taxa were recovered from Site 8 are consistent with the recovery rate of wild plant taxa, the combined results could support the implications relating to food choices and procurement presented here.

Final Conclusions

Macrobotanical data recovered from slave quarters can serve to improve our understanding of the occupants' behaviors and choices under social constraints. In this study the paleoethnobotanical analysis of plant remains recovered from Site 8 presents useful information relating to the lifeways of the enslaved people that occupied the site at the end of the eighteenth century. The Site 8 macrobotanical data reveals that the site's enslaved occupants were active in improving their circumstances by producing and procuring plants and furthermore, it reflects their changing relationships with, and their ability to travel across the Monticello landscape. Although the study presented here highlights the ways in which plants were likely exploited for nutrition, plants can serve to enhance well-being a number of ways. Many of the plants recovered from the cultural features excavated at Site 8 were also likely used to enhance the flavor of dishes, for medicine, for religious and spiritual purposes, to manufacture household goods, to create borders around personal boundaries, and displayed as ornamentals in the yards surrounding housing structures.

The implications drawn from the results of the Site 8 macrobotanical analysis are consistent with those established by historians, accounts provided by formers slaves during the Works Progress Administration's (WPA) 1930s Federal Writers' Project, and archaeological evidence from contemporaneous slave quarters from the region, showing that over time, slaves transformed their experience – through, among other things, their resourcefulness and resilience – into a culture that joined them together.

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Appendix

Table A-1. Scientific Names of Taxa Recovered from 44AB442

Common Name	Taxonomic Name	Item Type	Category
Acorn	*Quercus sp.*	nutshell	nut
Acorn cf.	*Quercus sp.*	nutshell	nut
Acorn meat	*Quercus sp.*	nutmeat	nut
Acorn meat cf.	*Quercus sp.*	nutmeat	nut
Amaranth	*Amaranthus sp.*	seed	miscellaneous
Bark		bark	miscellaneous
Bean	*Phaseolus vulgaris*	seed	crop
Bean cf.	*Phaseolus vulgaris*	seed	crop
Bean family	*Fabaceae*	seed	miscellaneous
Bean family cf.	*Fabaceae*	seed	miscellaneous
Bedstraw	*Galium sp.*	seed	miscellaneous
Bedstraw cf.	*Galium sp.*	seed	miscellaneous
Black walnut	*Juglans nigra*	nutshell	nut
Blackberry/raspberry	*Rubus sp.*	seed	fruit
Blueberry	*Vaccinium sp.*	seed	fruit
Bud		not applicable	miscellaneous
Bulrush	*Scirpus sp.*	seed	miscellaneous
Chenopod/amaranth	*Chenopodium/Amaranthus*	seed	miscellaneous
Chenopod	*Chenopodium berlandieri*	seed	starch/oil seed
Chickweed	*Stellaria*	seed	miscellaneous
Copperleaf	*Acalypha virginica*	seed	miscellaneous
Corn cupule	*Zea mays*	cupule	crop
Corn kernel	*Zea mays*	kernel	crop
Cucurbit rind	*Cucurbitaceae*	rind	crop
Dock	*Rumex sp.*	seed	miscellaneous
Goosegrass	*Eleusine indica*	seed	miscellaneous
Grape	*Vitis sp.*	seed	fruit
Grape cf.	*Vitis sp.*	seed	fruit
Grass family	*Poaceae*	seed	miscellaneous
Hazelnut	*Corylus sp.*	nutshell	nut
Hickory	*Carya sp.*	nutshell	nut
Knotweed	*Polygonum sp.*	seed	miscellaneous
Monocot stem	*Poaceae*	non-woody stem	miscellaneous
Nutshell		nutshell	nut
Pea	*Pisum sativum*	seed	crop
Peach	*Prunus persica*	seed	fruit
Persimmon	*Diospyros virginiana*	seed	fruit

Table A-1. Continued.

Common Name	Taxonomic Name	Item Type	Category
Pine cone	*Pinus sp.*	other fruit	miscellaneous
Pink family	*Caryophyllaceae*	seed	miscellaneous
Pitch		amorphous plant tissue	miscellaneous
Plum	*Prunus americana*	seed	fruit
Pokeweed	*Phytolacca americana*	seed	miscellaneous
Purslane	*Portulaca sp.*	seed	miscellaneous
Smartweed	*Polygonum cf. pennslyvan*	seed	miscellaneous
Squash	*Cucurbita pepo*	seed	crop
Unidentifiable		amorphous plant tissue	miscellaneous
Unidentifiable seed		seed	miscellaneous
Unidentified		seed	miscellaneous
Walnut	*Juglans sp.*	nutshell	nut
Walnut family	*Juglandaceae*	nutshell	nut
Weedy legume	*Fabaceae*	seed	miscellaneous
Wheat	*Triticum sp.*	seed	crop
Wheat cf.	*Triticum sp.*	seed	crop
Wood		wood	miscellaneous

Table A-2. List of Useful Taxa Recovered from Each of the Site 8 Houses.

	House 1		House 3		House 4		House 2	
Taxa	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)
Fruit								
Blackberry/raspberry	3	0.00	20	0.00	1	0.00	72	0.07
Blackberry/raspberry uncarbonized	31	0.01	10	0.01	4	0.00	5	0.01
Blueberry	1	0.00						
Cherry							33	0.15
Cherry cf.							2	0.01
Grape	4	0.04					4	0.09
Grape cf.							1	0.01
Peach	23	2.08	4	0.08	14	0.21	54	2.89
Peach cf.							1	0.00
Persimmon	13	0.23			3	0.07	3	0.04
Persimmon cf.					3	0.02		
Plum							1	0.14
Prunus							32	0.18
Prunus cf.	2	0.00			10	0.00		
Nuts								
Acorn	5	0.00			1	0.01		
Acorn cf.	13	0.01						
Black walnut	3	0.05			7	0.10	1	0.02
Black walnut cf.	1	0.00						
Black walnut/peach	8	0.04	38	0.42	16	0.22	51	0.52
Black walnut/peach cf.								
Hazelnut cf.			1	0.00				
Hickory	5	0.03	23	0.07			16	0.16
Hickory cf.	7	0.07						

Table A-2. Continued.

	House 1		House 3		House 4		House 2	
Taxa	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)
Nutshell	1	0.02	1	0.01	2	0.02		
Nutshell cf.	3	0.02						
Peach/nutshell			6	0.05	1	0.01	14	0.10
Walnut family	16	0.06					7	0.05
Miscellaneous								
Bedstraw								
Bedstraw cf.					1	0.02		
Buckwheat family								
Cheno/am	2	0.01	936	0.16	7	0.03	178	0.04
Cheno/am cf.	1	0.00						
Copperleaf					1	0.01		
Dock	1	0.00	2	0.00	5	0.00	6	0.02
Dock cf.							1	0.00
Dock/buckwheat family								
Goosegrass	1	0.01	192	0.05	1	0.00	91	0.01
Knotweed							1	0.00
Oxalis			3	0.00	12	0.01	1	0.00
Pink family	41	0.01			4	0.00	28	0.02
Pink family part carbonized	86	0.04						
Pitch	787	6.81	509	4.39	929	6.75	1343	9.47
Pokeweed	17	0.08	23	0.04	1	0.00	130	0.24
Pokeweed cf.	2	0	29	0.00	2	0.00	32	0.03
Purslane	1	0	2	0.00	42	0.01	8	0.00
Purslane cf.			2	0.00				
Smartweed			4	0.01	1	0.00	8	0.01

Table A-2. Continued.

	House 1		House 3		House 4		House 2	
Taxa	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)
Spikerush							1	0.00
Spurge family					1	0.00		
Weedy legume			1	0.00	4	0.01	385	0.13
Domesticated Crops								
Bean cf.								
Bean embryo cf.					1	0.00		
Bean family			2	0.00				
Buckwheat cf.							1	0.01
Corn cupule	12	0.07	66	1.02	17	0.21	15	0.10
Corn cupule cf.			5	0.02	2	0.03		
Corn kernel	11	0.15	2	0.01	4	0.12	5	0.17
Corn kernel cf.	8	0.09	3	0.02	8	0.06	2	0.01
Cucurbit rind					1	0.01		
English pea					1	0.01		
Grain kernel								
Grain kernel cf.					2	0.02		
Oat							1	0.01
Wheat	3	0.05	23	0.19	2	0.01		
Wheat cf.	2	0.02	2	0.02			1	0.01
Total	1114	10	1909	6.57	1111	7.97	2535	14.72

Table A-3. Taxa Count and Weight by House and Sample Number.

	Sample Number	Common Name	Count	Weight
House 1				
	191C S07	Acorn	5	0.0
	191C S07	Blackberry/raspberry	3	0.0
	191C S07	Blackberry/raspberry uncarbonized	2	0.0
	191C S07	Blueberry	1	0.0
	191C S07	Corn kernel	2	0.03
	191C S07	Grape	2	0.02
	191C S07	Nutshell cf.	3	0.02
	191C S07	Persimmon	3	0.08
	191C S07	Pine cone	2	0.01
	191C S07	Pinecone cf.	1	0.01
	191C S07	Pink family	50	0.02
	191C S07	Pitch	86	0.86
	191C S07	Pokeweed	3	0.03
	191C S07	Unidentifiable seed	4	0.01
	191C S07	Unidentified seed	1	0.0
	191C S07	Wheat	2	0.03
	191C S07	Wheat cf.	1	0.01
Total			171	1.13
	191D S12	Bark	1	0.02
	191D S12	Black walnut/peach	1	0.0
	191D S12	Blackberry/raspberry uncarbonized	3	0.01
	191D S12	Chenopod/amaranth	1	0.01
	191D S12	Chickweed	41	0.01
	191D S12	Nutshell	1	0.02
	191D S12	Persimmon	3	0.06
	191D S12	Peach	11	1.90
	191D S12	Pitch	113	1.32
	191D S12	Pokeweed	1	0.01
	191D S12	Pokeweed cf.	1	0.0
	191D S12	Unidentifiable	3	0.01
Total			180	3.37
	191E S18	Bark	2	0.0
	191E S18	Blackberry/raspberry uncarbonized	21	0.0
	191E S18	Pitch	24	0.16
	191E S18	Pokeweed	6	0.02
Total			53	0.18
	191F S31	Acorn cf.	1	0.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	191F S31	Bark	2	0.01
	191F S31	Black walnut cf.	1	0.0
	191F S31	Black walnut/peach	5	0.04
	191F S31	Blackberry/raspberry uncarbonized	1	0.0
	191F S31	Chenopod/amaranth cf.	1	0.0
	191F S31	Chickweed	1	0.0
	191F S31	Corn cupule	2	0.02
	191F S31	Corn kernel	5	0.06
	191F S31	Corn kernel cf.	4	0.04
	191F S31	Hickory	3	0.01
	191F S31	Hickory cf.	2	0.05
	191F S31	Persimmon	3	0.03
	191F S31	Pitch	101	0.73
	191F S31	Pokeweed	2	0.02
	191F S31	Unidentifiable seed	1	0.0
	191F S31	Unidentified	15	0.08
	191F S31	Wheat cf.	1	0.01
	191F S31	Wood part carbonized	1	0.01
Total			151	1.11
	191F S32	Bark	5	0.08
	191F S32	Blackberry/raspberry uncarbonized	1	0.0
	191F S32	Corn cupule	1	0.0
	191F S32	Corn kernel cf.	1	0.0
	191F S32	Peach	9	0.15
	191F S32	Pitch	134	1.27
	191F S32	Pokeweed	3	0.0
	191F S32	*Prunus* cf.	1	0.0
	191F S32	Purslane	1	0.0
	191F S32	Unidentified seeds	3	0.0
	191F S32	Unidentifiable Seeds	1	0.01
	191F S32	Walnut family	14	0.05
Total			174	1.56
	191G S33	Acorn	5	0.01
	191G S33	Acorn cf.	2	0.0
	191G S33	Bark	4	0.03
	191G S33	Black walnut	3	0.05
	191G S33	Blackberry/raspberry uncarbonized	2	0.0
	191G S33	Chenopod/amaranth	1	0.0
	191G S33	Chickweed	21	0.01

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	191G S33	Corn cupule	6	0.02
	191G S33	Corn kernel	3	0.03
	191G S33	Corn kernel cf.	2	0.04
	191G S33	Dock	1	0.0
	191G S33	Goosegrass	1	0.01
	191G S33	Grape	2	0.02
	191G S33	Hickory	1	0.01
	191G S33	Hickory cf	1	0.01
	191G S33	Peach	3	0.03
	191G S33	Persimmon	3	0.04
	191G S33	Pine cone	3	0.03
	191G S33	Pitch	127	1.03
	191G S33	Pokeweed	2	0.0
	191G S33	Unidentifiable	22	0.08
	191G S33	Unidentified	2	0.04
	191G S33	Unidentified seed	1	0.0
	191G S33	Walnut family	2	0.01
Total			211	1.48
	191G S34	Acorn cf.	9	0.0
	191G S34	Bark	37	0.22
	191G S34	Blackberry/raspberry uncarbonized	1	0.0
	191G S34	Corn cupule	3	0.03
	191G S34	Corn kernel cf.	1	0.01
	191G S34	Grass family	1	0.0
	191G S34	Hickory	1	0.01
	191G S34	Hickory cf.	4	0.01
	191G S34	Pine cone	11	0.03
	191G S34	Pink family	14	0.01
	191G S34	Pitch	150	0.84
	191G S34	Pokeweed cf.	1	0.0
	191G S34	*Prunus* cf.	1	0.0
Total			234	1.16
	191H S38	Acorn cf.	1	0.0
	191H S38	Bark	4	0.02
	191H S38	Black walnut/peach	2	0.0
	191H S38	Corn kernel	1	0.03
	191H S38	Monocot stem cf.	1	0.0
	191H S38	Persimmon	1	0.02
	191H S38	Pitch	52	0.60

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	191H S38	Unidentified	5	0.02
	191H S38	Wheat	1	0.02
	191H S38`	Unidentifiable seeds	2	0.0
Total			70	0.71
House 2				
	220C S08	Bark	2	0.0
	220C S08	Black walnut	1	0.02
	220C S08	Black walnut/peach	4	0.03
	220C S08	Blackberry/raspberry	1	0.0
	220C S08	Blackberry/raspberry uncarbonized	12	0.01
	220C S08	Chenopod/amaranth	41	0.0
	220C S08	Chickweed	9	0.01
	220C S08	Dock	2	0.02
	220C S08	Goosegrass	1	0.0
	220C S08	Peach	1	0.01
	220C S08	Peach/nutshell	9	0.04
	220C S08	Persimmon cf.	1	0.01
	220C S08	Pitch	19	0.13
	220C S08	Pokeweed	74	0.15
	220C S08	*Prunus*	5	0.02
	220C S08	Purslane	3	0.0
	220C S08	Unidentified	4	0.0
	220C S08	Unidentified seed	1	0.01
	220C S08	Weedy legume	5	0.0
Total			195	0.46
	220H S43	Blackberry/raspberry uncarbonized	10	0.0
	220H S43	Chenopod/amaranth	2	0.0
	220H S43	Chickweed	1	0.0
	220H S43	Corn cupule	2	0.0
	220H S43	Goosegrass	1	0.0
	220H S43	Grass family	3	0.0
	220H S43	Peach	9	0.19
	220H S43	Peach/nutshell	5	0.06
	220H S43	Pitch	55	0.43
	220H S43	Pokeweed	17	0.02
	220H S43	*Prunus*	1	0.0
	220H S43	Unidentifiable seed	2	0.0
	220H S43	Unidentified seed	4	0.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	220H S43	Walnut family	7	0.05
	220H S43	Weedy legume	330	0.12
Total			449	0.87
	220I S49	Black walnut/peach	5	0.18
	220I S49	Blackberry/raspberry uncarbonized	9	0.0
	220I S49	Chenopod/amaranth	6	0.0
	220I S49	Chickweed	5	0.01
	220I S49	Grass family	7	0.0
	220I S49	Hickory	2	0.05
	220I S49	Peach cf.	1	0.0
	220I S49	Pitch	53	0.40
	220I S49	Pokeweed	5	0.02
	220I S49	Pokeweed cf.	28	0.02
	220I S49	*Prunus*	3	0.02
	220I S49	Unidentifiable seed	1	0.0
	220I S49	Weedy legume	9	0.0
Total			134	0.70
	220N S77	Bark	1	0.0
	220N S77	Black walnut/peach	8	0.01
	220N S77	Blackberry/raspberry uncarbonized	13	0.0
	220N S77	Buckwheat family	1	0.01
	220N S77	Chenopod/amaranth	2	0.0
	220N S77	Goosegrass	11	0.0
	220N S77	Grass family	1	0.0
	220N S77	Peach	5	0.06
	220N S77	Pink family	1	0.0
	220N S77	Pitch	76	0.68
	220N S77	Pokeweed	13	0.0
	220N S77	*Prunus*	1	0.01
	220N S77	*Prunus* cf.	1	0.0
	220N S77	Smartweed	1	0.0
	220N S77	Unidentified	10	0.02
	220N S77	Unidentified seed	3	0.01
	220N S77	Weedy legume	8	0.0
Total			156	0.80
	220Q S93	Bark	10	0.07
	220Q S93	Black walnut/peach	19	0.17
	220Q S93	Blackberry/raspberry	3	0.0
	220Q S93	Blackberry/raspberry uncarbonized	6	0.02

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	220Q S93	Chenopod/amaranth	2	0.0
	220Q S93	Cherry	1	0.0
	220Q S93	Dock cf	1	0.0
	220Q S93	Goosegrass	32	0.0
	220Q S93	Grass family	5	0.0
	220Q S93	Hickory	1	0.02
	220Q S93	Peach	1	0.02
	220Q S93	Persimmon	1	0.02
	220Q S93	Pine cone	7	0.05
	220Q S93	Pink family	9	0.0
	220Q S93	Pitch	113	0.56
	220Q S93	Pokeweed	1	0.01
	220Q S93	Pokeweed cf.	3	0.01
	220Q S93	*Prunus*	15	0.10
	220Q S93	*Prunus* cf.	4	0.01
	220Q S93	Purslane	2	0.0
	220Q S93	Unidentifiable seed	1	0.01
	220Q S93	Weedy legume	28	0.0
Total			265	1.07
	220R S95	Bark	16	0.04
	220R S95	Blackberry/raspberry	23	0.01
	220R S95	Chenopod/amaranth	58	0.01
	220R S95	Cherry	32	0.15
	220R S95	Cherry cf.	2	0.01
	220R S95	Chickweed	2	0.0
	220R S95	Corn cupule	8	0.07
	220R S95	Corn kernel	1	0.06
	220R S95	Dock	4	0.0
	220R S95	Goosegrass	41	0.01
	220R S95	Grass family	28	0.0
	220R S95	Hickory	13	0.09
	220R S95	Knotweed	1	0.0
	220R S95	Monocot stem	2	0.01
	220R S95	Oat	1	0.01
	220R S95	Oxalis	1	0.0
	220R S95	Peach	37	2.61
	220R S95	Persimmon	1	0.01
	220R S95	Pine cone	57	0.12
	220R S95	Pitch	733	5.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	220R S95	Plum	1	0.14
	220R S95	*Prunus*	2	0.02
	220R S95	Purslane	1	0.0
	220R S95	Smartweed	7	0.01
	220R S95	Unidentifiable	44	0.40
	220R S95	Unidentifiable seed	1	0.01
	220R S95	Unidentified seed	7	0.03
	220R S95	Weedy legume	4	0.01
	220R S95	Wheat cf.	1	0.01
Total			1129	8.84
	237E S02	Bark	1	0.01
	237E S02	Black walnut/peach	4	0.03
	237E S02	Blackberry/raspberry uncarbonized	3	0.01
	237E S02	Chenopod/amaranth	10	0.01
	237E S02	Corn kernel	1	0.01
	237E S02	Grape	1	0.01
	237E S02	Grape cf.	1	0.01
	237E S02	Pitch	36	0.30
	237E S02	Pokeweed	16	0.03
	237E S02	Unidentifiable seed	1	0.0
Total			74	0.42
	237H S11	Bark	16	0.05
	237H S11	Black walnut/peach	4	0.03
	237H S11	Blackberry/raspberry uncarbonized	2	0.0
	237H S11	Chenopod/amaranth	56	0.01
	237H S11	Corn kernel	1	0.01
	237H S11	Goosegrass	4	0.0
	237H S11	Grass family	1	0.0
	237H S11	Pitch	54	0.40
	237H S11	Pokeweed	2	0.0
	237H S11	Purslane	1	0.0
	237H S11	Unidentifiable seed	1	0.03
	237H S11	Unidentified	1	0.01
Total			144	0.54
	237K S14	Bark	9	0.0
	237K S14	Black walnut/peach	4	0.04
	237K S14	Chickweed	1	0.0
	237K S14	Corn cupule	2	0.01

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	237K S14	Corn kernel cf.	2	0.01
	237K S14	Goosegrass	1	0.0
	237K S14	Grape	1	0.02
	237K S14	Pine cone	2	0.0
	237K S14	Pitch	92	0.51
	237K S14	Pokeweed cf.	1	0.0
	237K S14	Purslane	1	0.0
	237K S14	Unidentified	5	0.01
	237K S14	Unidentified seed	1	0.0
Total			122	0.60
	237N S26	Bark	5	0.05
	237N S26	Black walnut/peach	3	0.03
	237N S26	Blackberry/raspberry	5	0.03
	237N S26	Chenopod/amaranth	1	0.01
	237N S26	Corn cupule	3	0.02
	237N S26	Corn kernel	2	0.09
	237N S26	Grape	2	0.06
	237N S26	Pitch	112	1.06
	237N S26	Pokeweed	2	0.01
	237N S26	Spikerush	1	0.0
	237N S26	Unidentifiable	10	0.10
	237N S26	Unidentified seeds	5	0.01
	237N S26	Unidentified	1	0.01
Total			152	1.48
House 3				
	236G S05	Blackberry/raspberry	1	0.0
	236G S05	Blackberry/raspberry uncarbonized	1	0.0
	236G S05	Chenopod/amaranth	14	0.0
	236G S05	Corn kernel cf.	2	0.01
	236G S05	Goosegrass	7	0.0
	236G S05	Grass family	1	0.0
	236G S05	Hickory	3	0.02
	236G S05	Peach	1	0.04
	236G S05	Pitch	8	0.03
	236G S05	Pokeweed cf.	10	0.0
	236G S05	Smartweed	1	0.0
	236G S05	Unidentifiable seed	4	0.02
	236G S05	Unidentified	3	0.01

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	236G S05	Unidentified seed	3	0.01
Total			59	0.14
	236J S14	Blackberry/raspberry	1	0.0
	236J S14	Chenopod/amaranth	2	0.01
	236J S14	Corn kernel	1	0.01
	236J S14	Hickory	19	0.05
	236J S14	Pine cone	1	0.01
	236J S14	Pitch	28	0.22
	236J S14	Unidentifiable	2	0.01
	236J S14	Wheat	3	0.03
Total			57	0.34
	241AAA S63	Black walnut/peach	5	0.04
	241AAA S63	Blackberry/raspberry uncarbonized	4	0.0
	241AAA S63	Chenopod/amaranth	231	0.04
	241AAA S63	Goosegrass	15	0.0
	241AAA S63	Oxalis	1	0.0
	241AAA S63	Pitch	16	0.37
	241AAA S63	Pokeweed	5	0.01
	241AAA S63	Unidentifiable seed	1	0.0
Total			278	0.46
	241C S01	Black walnut/peach	3	0.04
	241C S01	Blackberry/raspberry	16	0.0
	241C S01	Blackberry/raspberry uncarbonized	5	0.01
	241C S01	Chenopod/amaranth	677	0.11
	241C S01	Dock	1	0.0
	241C S01	Goosegrass	148	0.04
	241C S01	Peach/nutshell	5	0.04
	241C S01	Pitch	41	0.45
	241C S01	Pokeweed	18	0.03
	241C S01	Pokeweed cf.	19	0.0
	241C S01	Purslane	1	0.0
	241C S01	Receptacle	1	0.01
	241C S01	Unidentified	9	0.01
	241C S01	Unidentified seed	7	0.01
Total			951	0.75
	241DD S75	Bark	1	0.0
	241DD S75	Black walnut/peach	2	0.08
	241DD S75	Corn cupule	24	0.25
	241DD S75	Goosegrass	1	0.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	241DD S75	Hickory	1	0.0
	241DD S75	Pitch	50	0.54
	241DD S75	Receptacle	1	0.0
	241DD S75	Smartweed	3	0.01
	241DD S75	Unidentified seed	1	0.0
	241DD S75	Unidentifiable	6	0.03
	241DD S75	Wheat	2	0.02
Total			92	0.93
	241EE S81	Black walnut/peach	14	0.03
	241EE S81	Chenopod/amaranth	2	0.0
	241EE S81	Dock	1	0.0
	241EE S81	Goosegrass	4	0.0
	241EE S81	Peach	3	0.04
	241EE S81	Pine cone	2	0.01
	241EE S81	Pitch	9	0.05
	241EE S81	Unidentified	2	0.0
Total			37	0.13
	241EEE S90	Bark	7	0.02
	241EEE S90	Bean family	1	0.0
	241EEE S90	Chenopod/amaranth	1	0.0
	241EEE S90	Goosegrass	2	0.0
	241EEE S90	Hazelnut cf.	1	0.0
	241EEE S90	Oxalis	2	0.0
	241EEE S90	Peach/nutshell	1	0.01
	241EEE S90	Pitch	12	0.05
	241EEE S90	Unidentifiable	3	0.0
Total			30	0.08
	241FFF S95	Bark	8	0.08
	241FFF S95	Bud	3	0.01
	241FFF S95	Corn cupule	40	0.76
	241FFF S95	Corn kernel	1	0.0
	241FFF S95	Goosegrass	3	0.0
	241FFF S95	Pitch	30	0.19
	241FFF S95	Unidentifiable	9	0.06
	241FFF S95	Wheat	1	0.01
Total			95	1.11
	241LLLS109	Goosegrass	1	0.01
	241LLLS109	Pitch	26	0.33
Total			27	0.34

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	241R S28	Bark	11	0.06
	241R S28	Black walnut/peach	6	0.17
	241R S28	Chenopod/amaranth	2	0.0
	241R S28	Corn cupule	1	0.01
	241R S28	Corn cupule cf.	4	0.02
	241R S28	Pine cone	6	0.02
	241R S28	Pitch	155	1.13
	241R S28	Unidentifiable	2	0.01
	241R S28	Unidentified	15	0.08
	241R S28	Unidentified seed	1	0.0
	241R S28	Weedy legume	1	0.0
	241R S28	Wheat	16	0.11
	241R S28	Wheat cf.	2	0.02
Total			222	1.63
	241V S44	Bud	1	0.01
	241V S44	Nutshell	1	0.01
	241V S44	Pitch	44	0.45
	241V S44	Unidentifiable seed	2	0.01
Total			48	0.48
	241X S54	Bark	33	0.16
	241X S54	Black walnut/peach	2	0.03
	241X S54	Chenopod/amaranth	4	0.0
	241X S54	Corn cupule cf.	1	0.0
	241X S54	Goosegrass	3	0.0
	241X S54	Monocot stem	1	0.04
	241X S54	Pine cone	3	0.0
	241X S54	Pitch	25	0.21
	241X S54	Purslane cf.	2	0.0
	241X S54	Unidentifiable	2	0.0
	241X S54	Wheat	1	0.02
Total			77	0.46
	241Y S57	Bark	5	0.0
	241Y S57	Black walnut/peach	1	0.0
	241Y S57	Chenopod/amaranth	2	0.0
	241Y S57	Corn cupule	1	0.0
	241Y S57	Goosegrass	4	0.0
	241Y S57	Pitch	39	0.19
Total			52	0.19
	241Z S64	Black walnut/peach	5	0.03

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	241Z S64	Blackberry/raspberry	2	0.0
	241Z S64	Chenopod/amaranth	1	0.0
	241Z S64	Corn kernel cf.	1	0.01
	241Z S64	Goosegrass	4	0.0
	241Z S64	Pitch	26	0.18
	241Z S64	Purslane	1	0.0
	241Z S64	Unidentifiable	8	0.08
	241Z S64	Unidentified	5	0.06
Total			53	0.36
	273F S12	Black walnut/peach	3	0.01
	273F S12	Blackberry/raspberry uncarbonized	1	0.0
	273F S12	Chickweed	3	0.0
	273F S12	Corn cupule cf.	1	0.01
	273F S12	Dock	2	0.0
	273F S12	Oxalis	3	0.0
	273F S12	Pine cone	1	0.0
	273F S12	Pitch	10	0.11
	273F S12	Pokeweed cf.	2	0.0
	273F S12	*Prunus* cf.	10	0.0
	273F S12	Purslane	1	0.0
	273F S12	Unidentifiable	1	0.0
	273F S12	Unidentified	2	0.21
	273F S12	Unidentified seeds	4	0.0
Total			46	0.34
House 4				
	273G S14	Nutshell	2	0.02
	273G S14	Pitch	19	0.12
Total			21	0.14
	273H S16	Black walnut/peach	1	0.01
	273H S16	Chenopod/amaranth	3	0.03
	273H S16	Corn cupule	8	0.15
	273H S16	Grass family	1	0.0
	273H S16	Oxalis	4	0.01
	273H S16	Pitch	27	0.16
	273H S16	Purslane	5	0.01
	273H S16	Unidentified	1	0.01
	273H S16	Unidentified seed	1	0.0
Total			51	0.38

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	273J S21	Bark	3	0.01
	273J S21	Black walnut/peach	3	0.04
	273J S21	Corn cupule	2	0.02
	273J S21	Pitch	204	1.68
	273J S21	Purslane	6	0.0
	273J S21	Unidentified	1	0.02
	273J S21	Unidentified seed	1	0.01
Total			220	1.78
	277D S07	Black walnut/peach	3	0.02
	277D S07	Pitch	24	0.20
	277D S07	Purslane	1	0.0
	277D S07	Unidentifiable	1	0.0
Total			29	0.22
	277E S08	Black walnut/peach	5	0.04
	277E S08	Chenopod/amaranth	1	0.0
	277E S08	Corn kernel cf.	1	0.02
	277E S08	Dock	2	0.0
	277E S08	Oxalis	1	0.0
	277E S08	Pitch	20	0.13
	277E S08	Purslane	2	0.0
Total			32	0.19
	277J S16	Chenopod/amaranth	1	0.0
	277J S16	Oxalis	1	0.0
	277J S16	Pitch	139	1.02
	277J S16	Purslane	7	0.0
	277J S16	Spurge family	1	0.0
	277J S16	Unidentifiable	2	0.01
Total			151	1.03
	281BB S69	Blackberry/raspberry	1	0.0
	281BB S69	Oxalis	1	0.0
	281BB S69	Peach	11	0.07
	281BB S69	Pitch	136	1.12
	281BB S69	Purslane	15	0.0
Total			164	1.19
	281G S18	Blackberry/raspberry uncarbonized	1	0.0
	281G S18	Black walnut/peach	1	0.0
	281G S18	Chickweed	1	0.0
	281G S18	Copperleaf	1	0.01
	281G S18	Dock	1	0.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	281G S18	Goosegrass	1	0.0
	281G S18	Pitch	25	0.20
	281G S18	Purslane	1	0.0
	281G S18	Unidentifiable	1	0.01
Total			32	0.22
	281P S46	Acorn	1	0.01
	281P S46	Bark	14	0.06
	281P S46	Black walnut	7	0.10
	281P S46	Blackberry/raspberry uncarbonized	1	0.0
	281P S46	Bean embryo cf.	1	0.0
	281P S46	Bedstraw cf.	1	0.0
	281P S46	California poppy	1	0.0
	281P S46	Chenopod/amaranth	1	0.0
	281P S46	Corn cupule	4	0.04
	281P S46	Corn cupule cf.	1	0.02
	281P S46	Corn kernel	4	0.10
	281P S46	Corn kernel cf.	3	0.02
	281P S46	Cucurbit rind	1	0.01
	281P S46	English pea	1	0.01
	281P S46	Grain kernel	2	0.02
	281P S46	Grass family	1	0.0
	281P S46	Peach	4	0.14
	281P S46	Persimmon	3	0.07
	281P S46	Persimmon cf.	3	0.02
	281P S46	Persimmon/legume	3	0.04
	281P S46	Pine cone	5	0.01
	281P S46	Pitch	296	1.82
	281P S46	Unidentifiable	30	0.22
	281P S46	Unidentifiable seed	10	0.01
	281P S46	Wheat	2	0.01
Total			400	2.73
	281Q S48	Bark	4	0.0
	281Q S48	Blackberry/Raspberry uncarbonized	1	0.0
	281Q S48	Black locust	1	0.02
	281Q S48	Black walnut/Peach	1	0.0
	281Q S48	Corn cupule	3	0.0
	281Q S48	Corn kernel	1	0.02
	281Q S48	Corn kernel cf.	4	0.02
	281Q S48	Grass family	18	0.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	281Q S48	Pitch	20	0.13
	281Q S48	Pokeweed	1	0.0
	281Q S48	Smartweed	1	0.0
	281Q S48	Unidentifiable	5	0.06
	281Q S48	Unidentifiable seed	2	0.01
Total			29	0.20
	281X S64	Grass family	3	0.0
	281X S64	Oxalis	2	0.0
	281X S64	Pitch	2	0.0
	281X S64	Purslane	1	0.0
	281X S64	Unidentified seed	2	0.0
Total			10	0.0
	281Y S66	Bean family	1	0.0
	281Y S66	Peach/nutshell	1	0.01
	281Y S66	Pitch	7	0.06
	281Y S66	Purslane	3	0.0
	281Y S66	Weedy legume	1	0.0
Total			13	0.07
Borrow Pit				
	347E S19	Bark	68	0.72
	347E S19	Bean	2	0.02
	347E S19	Bean cf.	5	0.03
	347E S19	Black walnut	3	0.27
	347E S19	Black walnut/peach	57	0.90
	347E S19	Blackberry/raspberry uncarbonized	1	0.0
	347E S19	Buckwheat family	1	0.0
	347E S19	Chenopod/amaranth	2	0.0
	347E S19	Corn cupule	6	0.05
	347E S19	Dock/buckwheat family	1	0.0
	347E S19	Goosegrass	11	0.01
	347E S19	Grass family	2	0.0
	347E S19	Hairy bud/seed	1	0.0
	347E S19	Hickory	9	0.10
	347E S19	Oxalis	1	0.0
	347E S19	Peach	2	0.18
	347E S19	Persimmon cf.	1	0.01
	347E S19	Pine cone	8	0.03
	347E S19	Pink family	1	0.0

Table A-3.Continued.

	Sample Number	Common Name	Count	Weight
	347E S19	Pitch	565	4.37
	347E S19	Pokeweed cf.	1	0.0
	347E S19	*Prunus*	9	0.11
	347E S19	Purslane	3	0.0
	347E S19	Unidentifiable seed	1	0.0
	347E S19	Unidentifiable	32	0.27
Total			793	7.07
	356E S15	Bark	11	0.04
	356E S15	Blackberry/raspberry	1	0.0
	356E S15	Blackberry/raspberry uncarbonized	1	0.0
	356E S15	Chenopod/amaranth	14	0.0
	356E S15	Chickweed	3	0.01
	356E S15	Bean	1	0.04
	356E S15	Corn cupule	2	0.02
	356E S15	Corn kernel	2	0.04
	356E S15	Goosegrass	13	0.0
	356E S15	Grain	1	0.01
	356E S15	Grass family	4	0.0
	356E S15	Hickory	1	0.02
	356E S15	Nutshell	4	0.03
	356E S15	Peach	53	1.02
	356E S15	Pine cone	1	0.01
	356E S15	Pitch	134	1.15
	356E S15	Pokeweed	6	0.0
	356E S15	*Prunus*	5	0.02
	356E S15	Purslane	14	0.0
	356E S15	Unidentifiable	6	0.04
Total			277	2.45
	356F S21	Bark	39	0.17
	356F S21	Bean cf.	1	0.0
	356F S21	Black walnut	3	0.49
	356F S21	Black walnut/peach	16	0.25
	356F S21	Black walnut/peach cf.	2	0.01
	356F S21	Blackberry/raspberry uncarbonized	1	0.0
	356F S21	Chenopod/amaranth	2	0.0
	356F S21	Copperleaf	1	0.0
	356F S21	Corn cupule	1	0.0
	356F S21	Dock	1	0.0
	356F S21	Goosegrass	3	0.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	356F S21	Peach	1	0.11
	356F S21	Pine cone	6	0.0
	356F S21	Pitch	177	2.40
	356F S21	Pokeweed	1	0.0
	356F S21	Poppy	1	0.0
	356F S21	*Prunus*	7	0.0
	356F S21	Unidentifiable seed	1	0.0
	356F S21	Unidentified	4	0.04
	356F S21	Wheat	1	0.01
	356F S21	Wheat cf.	1	0.01
Total			270	3.49
	356G S24	Bark	17	0.17
	356G S24	Black walnut/peach	18	0.50
	356G S24	Bud	1	0.01
	356G S24	Chenopod/amaranth	6	0.0
	356G S24	Corn cupule	1	0.01
	356G S24	Goosegrass	5	0.01
	356G S24	Pine cone	1	0.0
	356G S24	Pitch	189	2.87
	356G S24	Pokeweed cf.	1	0.01
	356G S24	*Prunus*	2	0.02
	356G S24	Purslane	2	0.0
Total			243	3.60
	357G S09	Black walnut	2	0.09
	357G S09	Blackberry/raspberry uncarbonized	1	0.0
	357G S09	Chenopod/amaranth	1	0.0
	357G S09	Chickweed	2	0.0
	357G S09	Goosegrass	23	0.0
	357G S09	Grass family	2	0.0
	357G S09	Oxalis	1	0.0
	357G S09	Pitch	48	0.50
Total			80	0.59
	359C S02	Bark	4	0.01
	359C S02	Black walnut	1	0.02
	359C S02	Blackberry/raspberry uncarbonized	2	0.01
	359C S02	Chenopod/amaranth	8	0.0
	359C S02	Chickweed	4	0.01
	359C S02	Corn cupule	82	0.94
	359C S02	Corn kernel cf.	3	0.02

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	359C S02	Dock	1	0.0
	359C S02	Goosegrass	33	0.0
	359C S02	Hickory	6	0.07
	359C S02	Nutshell	6	0.04
	359C S02	Peach	14	0.18
	359C S02	Pitch	365	3.46
	359C S02	Pokeweed	12	0.01
	359C S02	*Prunus* cf.	2	0.0
	359C S02	Unidentifiable seed	1	0.0
	359C S02	Unidentified	13	0.13
	359C S02	Wheat cf.	1	0.01
Total			558	4.91
	359D S09	Bark	2	0.03
	359D S09	Chenopod/amaranth	7	0.0
	359D S09	Corn cupule	96	0.86
	359D S09	Corn kernel	7	0.10
	359D S09	Goosegrass	5	0.0
	359D S09	Oxalis	1	0.0
	359D S09	Peach	15	0.40
	359D S09	Pine cone	2	0.0
	359D S09	Pink family	6	0.0
	359D S09	Pitch	377	7.04
	359D S09	Pokeweed cf.	2	0.0
	359D S09	Unidentifiable seed	1	0.0
	359D S09	Unidentified	14	0.06
Total			535	8.49
	359E S12	Bark	1	0.01
	359E S12	Blackberry/raspberry uncarbonized	2	0.01
	359E S12	Chenopod/amaranth	2	0.0
	359E S12	Corn cupule	35	0.47
	359E S12	Corn kernel	4	0.06
	359E S12	Goosegrass	66	0.01
	359E S12	Knotweed	1	0.0
	359E S12	Peach	41	0.93
	359E S12	Pine cone	6	0.01
	359E S12	Pink family	5	0.0
	359E S12	Pitch	297	3.67
	359E S12	Pokeweed	1	0.01
	359E S12	*Prunus*	1	0.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	359E S12	Unidentifiable	5	0.04
	359E S12	Unidentifiable seed	1	0.0
	359E S12	Unidentified	2	0.02
	359E S12	Weedy legume	1	0.0
Total			471	5.24
	359F S16	Bark	2	0.0
	359F S16	Bedstraw	1	0.02
	359F S16	Black walnut	5	0.81
	359F S16	Chenopod/amaranth	1	0.0
	359F S16	Corn cupule	3	0.01
	359F S16	Goosegrass	59	0.0
	359F S16	Grass family	2	0.0
	359F S16	Nutshell	13	0.09
	359F S16	Peach	20	0.41
	359F S16	Pine cone	9	0.04
	359F S16	Pitch	303	2.23
	359F S16	Purslane	1	0.0
	359F S16	Wheat cf.	1	0.01
Total			420	3.62
	366F S13	Acorn cf.	2	0.0
	366F S13	Bean cf.	2	0.01
	366F S13	Blackberry/raspberry uncarbonized	1	0.0
	366F S13	Chenopod/amaranth	33	0.0
	366F S13	Chickweed	6	0.0
	366F S13	Corn cupule	8	0.08
	366F S13	Corn kernel	4	0.03
	366F S13	Corn kernel cf.	4	0.04
	366F S13	Grape cf.	1	0.02
	366F S13	Hickory	2	0.02
	366F S13	Nutshell	1	0.0
	366F S13	Oxalis	1	0.0
	366F S13	Peach	5	0.04
	366F S13	Persimmon cf.	5	0.03
	366F S13	Pine cone	12	0.02
	366F S13	Pitch	203	1.58
	366F S13	Pokeweed cf.	1	0.0
	366F S13	Purslane	2	0.0
	366F S13	Squash rind	2	0.01
	366F S13	Unidentifiable	16	0.07

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	366F S13	Unidentifiable seed	3	0.0
	366F S13	Unidentified	38	0.19
	366F S13	Weedy legume	1	0.0
Total			353	2.14
	366F S15	Bark	1	0.01
	366F S15	Blackberry/raspberry uncarbonized	3	0.0
	366F S15	Chenopod/amaranth	53	0.0
	366F S15	Chickweed	6	0.0
	366F S15	Copperleaf	1	0.0
	366F S15	Corn cupule	49	0.47
	366F S15	Corn kernel	3	0.07
	366F S15	Corn kernel cf.	3	0.02
	366F S15	Goosegrass	90	0.01
	366F S15	Nutshell	1	0.0
	366F S15	Oxalis	1	0.0
	366F S15	Peach	40	0.75
	366F S15	Pine cone	2	0.01
	366F S15	Pitch	280	2.96
	366F S15	Pokeweed	3	0.0
	366F S15	Purslane	2	0.0
	366F S15	Unidentified	1	0.0
Total			538	4.29
	366G S18	Blackberry/raspberry	1	0.0
	366G S18	Chenopod/amaranth	21	0.0
	366G S18	Chickweed	6	0.0
	366G S18	Corn kernel cf.	5	0.04
	366G S18	Goosegrass	87	0.02
	366G S18	Monocot stem	1	0.01
	366G S18	Peach	21	0.31
	366G S18	Pine cone	3	0.01
	366G S18	Pitch	178	1.40
	366G S18	Pokeweed	2	0.01
	366G S18	Unidentifiable	19	0.08
Total			344	1.88
	366H S33	Bark	1	0.01
	366H S33	Chenopod/amaranth	8	0.0
	366H S33	Corn cupule	38	0.26
	366H S33	Corn kernel	2	0.03
	366H S33	Corn kernel cf.	1	0.0

Table A-3. Continued.

	Sample Number	Common Name	Count	Weight
	366H S33	Goosegrass	24	0.0
	366H S33	Grass family	3	0.0
	366H S33	Hickory	7	0.02
	366H S33	Peach	21	0.81
	366H S33	Pine cone	10	0.02
	366H S33	Pitch	309	2.49
	366H S33	Pokeweed	2	0.01
	366H S33	Purslane	5	0.01
	366H S33	Unidentifiable	2	0.01
Total			433	3.67

Table A-4. Estimated Caloric Needs per Day based on Age, Sex, and Activity Level.

Males				Females			
Age	Sedentary	Moderately active	Active	Age	Sedentary	Moderately active	Active
2	1,000	1,000	1,000	2	1,000	1,000	1,000
3	1,000	1,400	1,400	3	1,000	1,200	1,400
4	1,200	1,400	1,600	4	1,200	1,400	1,400
5	1,200	1,400	1,600	5	1,200	1,400	1,600
6	1,400	1,600	1,800	6	1,200	1,400	1,600
7	1,400	1,600	1,800	7	1,200	1,600	1,800
8	1,400	1,600	2,000	8	1,400	1,600	1,800
9	1,600	1,800	2,000	9	1,400	1,600	1,800
10	1,600	1,800	2,200	10	1,400	1,800	2,000
11	1,800	2,000	2,200	11	1,600	1,800	2,000
12	1,800	2,200	2,400	12	1,600	2,000	2,200
13	2,000	2,200	2,600	13	1,600	2,000	2,200
14	2,000	2,400	2,800	14	1,800	2,000	2,400
15	2,200	2,600	3,000	15	1,800	2,000	2,400
16	2,400	2,800	3,200	16	1,800	2,000	2,400
17	2,400	2,800	3,200	17	1,800	2,000	2,400
18	2,400	2,800	3,200	18	1,800	2,000	2,400
19-20	2,600	2,800	3,000	19-20	2,000	2,200	2,400
21-25	2,400	2,800	3,000	21-25	2,000	2,200	2,400
26-30	2,400	2,600	3,000	26-30	1,800	2,000	2,400
31-35	2,400	2,600	3,000	31-35	1,800	2,000	2,200
36-40	2,400	2,600	2,800	36-40	1,800	2,000	2,200
41-45	2,200	2,600	2,800	41-45	1,800	2,000	2,200
46-50	2,200	2,400	2,800	46-50	1,800	2,000	2,200
51-55	2,200	2,400	2,800	51-55	1,600	1,800	2,200
56-60	2,200	2,400	2,600	56-60	1,600	1,800	2,200
61-65	2,000	2,400	2,600	61-65	1,600	1,800	2,000
66-70	2,000	2,200	2,600	66-70	1,600	1,800	2,000
71-75	2,000	2,200	2,600	71-75	1,600	1,800	2,000
76+	2,000	2,200	2,400	76+	1,600	1,800	2,000

Table provided by the Office of Disease Prevention and Health Promotion.

*Sedentary: a lifestyle that includes only the physical activity of independent living.
*Moderately Active: a lifestyle that includes physical activity equivalent to walking about 1.5 to 3 miles per day at 3 to 4 miles per hour, in addition to the activities of independent living.
*Active: a lifestyle that includes physical activity equivalent to walking more than 3 miles per day at 3 to 4 miles per hour, in addition to the activities of independent living.
*Estimates for females do not include women who are pregnant or breastfeeding.
Source: Institute of Medicine. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington (DC): The National Academies Press; 2002.

Table A-5. Comparison of Botanical Specimens Recovered from Five Slave Sites Occupied During the Second Half of the Eighteenth Century. (Mrozowski et.al 2008:718).

Common Name			Count by Site		
	Rich Neck	North Hill	Quarter	Southall's Quarter	Wilton Period
Garden/ Orchard					
Bean	23	-	-	-	-
Blackberry/raspberry	3	26	3	-	3
Cherry	6	-	2	-	3
Common bean	3	6	1	1	4
Cowpea	187	-	-	-	-
Elderberry	-	1	-	-	-
Grape	-	3	2	-	-
Huckleberry	-	-	2	-	-
Lima bean	1	-	-	-	-
Melon	2	-	-	-	-
Peach	-	158	38	-	-
Peanut	1	-	-	-	-
Poppy	-	1	-	-	-
Strawberry	-	4	-	-	-
Squash	1	-	-	-	-
Sunflower	-	1	2	1	-
Sweet potato	-	-	-	-	244
Violet	-	1	-	-	-
Crops					
Corn	30	273	45	53	6
Little barley	18	-	-	-	-
Oats	-	1	-	-	3
Rye	4	4	-	-	-
Sorghum	-	5	-	-	-

Table A-5. Continued.

	Common Name	Scientific Name	Count by Site				
			Rich Neck	North Hill	Quarter	Southall's Quarter	Wilton Period
	Wheat		6	134	3	12	8
	Wheat or Oat		-	-	-	2	-
	Cultivated Grain		-	0.3	1.6	-	-
Wild Plants							
	Acorn		11	2	-	-	-
	Bedstraw		1	4	2	-	-
	Carpetweed		-	1	-	-	-
	Goosefoot		-	34	2	-	1
	Hickory		-	12	3	13	2
	Hickory/walnut		-	4.5	-	-	-
	Honey locust		250	-	-	-	-
	Knotweed		-	41	-	-	7
	Pennsylvania smartweed		-	14	2	-	-
	Persimmon		-	1	3	1	-
	Pigweed		-	2	-	-	-
	Purslane		-	1	-	-	-
	Sheep sorrel		1	-	-	-	-
	Sorrel/dock		-	20	-	-	-
	Sumac		-	16	-	-	-
	Vervain		-	2	-	-	-
	Walnut family		-	-	-	10	-
	Walnut		-	-	-	2	-
	Black walnut		113	-	11	31	3
Weed							
	Copperleaf		-	1	-	-	-

Table A-5. Continued.

	Common Name	Scientific Name	Count by Site				
			Rich Neck	North Hill	Quarter	Southall's Quarter	Wilton Period
	Jimsonweed		-	8	1	-	-
	Nightshade		-	2	-	-	-
	Prickly mallow		-	2	-	-	-
	Ragweed		-	23	-	-	-
	Sedge		3	-	-	-	-
Weed-Grass							
	Agropyron		-	4	-	-	-
	Goosegrass		-	1	1	-	-
	Grass family		-	17	4	-	-
Unknown							
	Bean family		-	1	-	-	-
	Composite family		-	1	-	-	-
Total			664	870	129	126	281

Table A-6. Macrobotanical Data from the Wingo's Site of Thomas Jefferson's Poplar Forest Plantation, Bedford County (Henderson 2013).

	Scientific Name	Common Name	Count
Crops			
	Nicotiana tabacum	Tobacco	1
	Linum	Flax	2
Edible Crops			
	Zea Mays	Corn cupule	137
	Zea Mays	Corn kernel	29
	Triticum sp.	Wheat	35
	Secale sp.	Barley, rye, wheat	6
	Cerealia		1
	Prunus		244
	Pyrus sp.	Pear	1
Gardened Crops			
	Cucurbita maxima	Squash	1
	Cucurbitaceae rind	Squash rind	8
	Phaseolus sp.	bean, wild bean	4
	Vigna sp.	legume	3
Wild Fruit			
	Rubus sp.	Blackberry/raspberry	2
	Vaccinium sp.	Blueberry	6
	Vitis sp.	Grape	1
	Rhus sp.	Sumac	13
	Gleditsia triancanthos	Honey locust	1
Wild Edible Weeds/Grasses			
	Rumex crispus	Dock	4
	Rumex sp.	Dock family	7
	Polygonum	Knotweed/Smartweed	101
	Chenopodium sp.	Chenopod	95
	Portulaca sp.	Purslane	17
	Salvia c.f.	Salvia family	1
	Mentha sp.	Spearmint family	1
	Panicum sp.	Switchgrass	78
Nutshell			
	Quercus sp.	Acorn	2
	Castanea sp.	Chestnut	1
	Carya sp.	Hickory	1
	Juglans nigra	Black walnut	8
	Juglandaceae	Walnut family	160

Vita

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