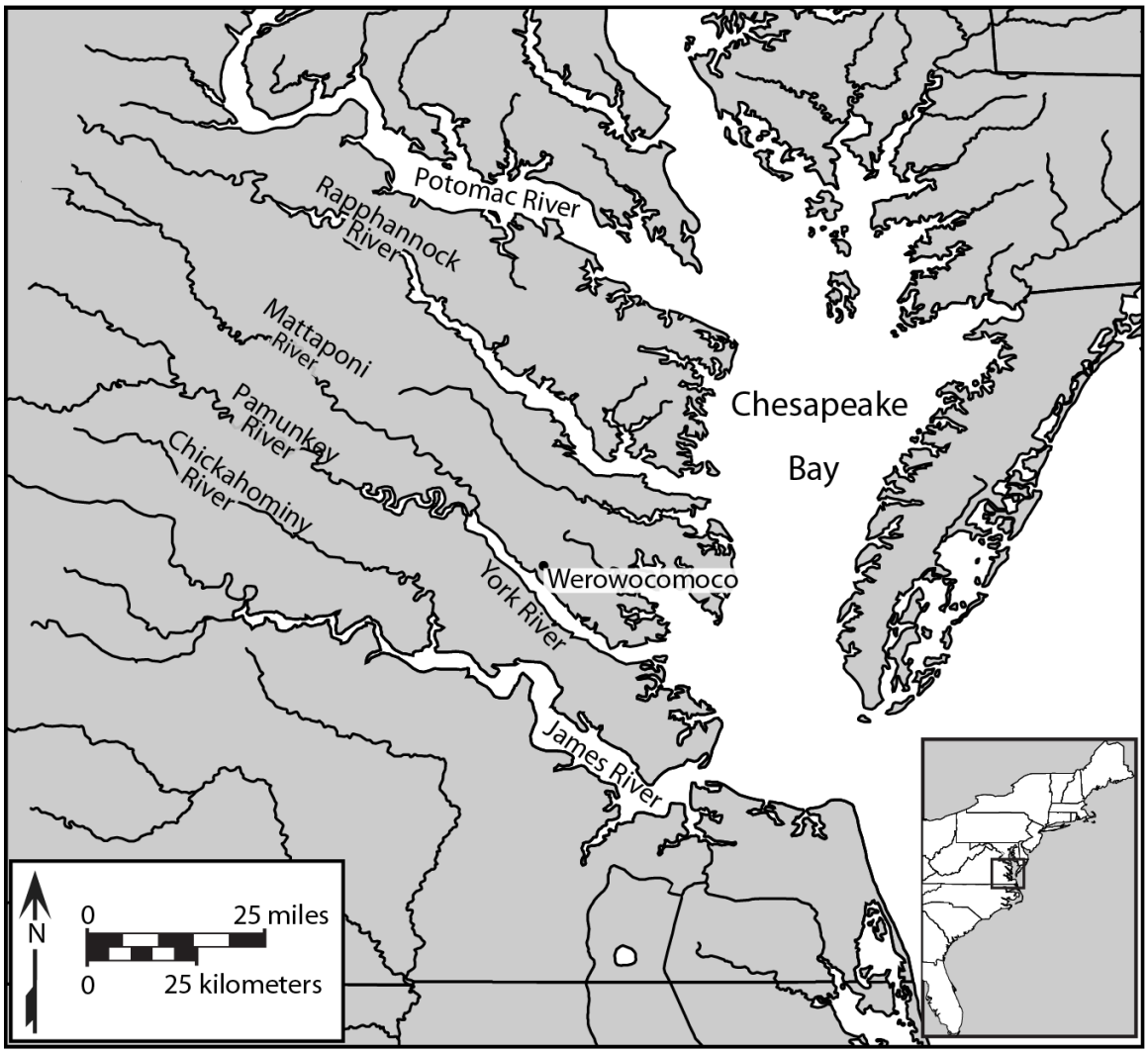
The Werowocomoco Research Project: 2004—2010 Seasons



College of William & Mary
Department of Anthropology
Williamsburg, Virginia
Archaeological Research Report Series
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ACKNOWLEDGEMENTS

Archaeological research at the Werowocomoco site began over a decade ago, spurred on by Lynn Ripley's discovery of American Indian artifacts while walking her property along Purtan Bay. Lynn and Bob Ripley have been instrumental to the success of the archaeological research at Werowocomoco ever since, welcoming into their home the Werowocomoco Research Group, Virginia Indians, William & Mary field school students, and interested visitors by the busload. We are especially grateful for their hospitality and support over the years.

The Virginia Indian community has also played a central role at Werowocomoco from the start, transforming the region's archaeological landscape in the process. The members of the project's Virginia Indian Advisory Board have given generously of their time to meet with the researchers, to serve as liaisons to the Indian community, and to offer thoughtful guidance. Advisory Board members have included Jeff Brown (Pamunkey), Mark Custalow (Mattaponi), Kerry Canaday (Chickahominy), Lee Lockamy (Nansemond), Chief Anne Richardson (Rappahannock), and Reggie Tupponce (Upper Mattaponi), and ex-officio advisors Chief Steve Adkins (Chickahominy) and Chief Ken Adams (Upper Mattaponi). Jeff and Reggie both passed away in recent years, and we miss their advice and friendship greatly. Members of the Virginia Indian community have also joined the Werowocomoco field crew, including Ashley Atkins, Jeff Brown, James Krigsvold, Gloria Custalow, and Ethan Brown. Now a William & Mary PhD student, Ashley has since assumed a leadership role in the nascent Indigenous archaeology of the Chesapeake.

The research reported in this volume represents the efforts of the Werowocomoco Research Group (Randolph Turner, David Brown, Thane Harpole, Danielle Moretti-Langholtz, and Martin Gallivan). Randy Turner, former Director of the Virginia Department of Historic Resources Tidewater Regional Office, was the first to recognize the potential significance of Lynn Ripley's discoveries and to envision what a Werowocomoco project might entail. David Brown and Thane Harpole of the Fairfield Foundation have played a largely unrecognized role as driving forces behind Werowocomoco's archaeology. Both have given tremendously of their time, energy, and expertise to ensure that the fieldwork accords with best practices. Drawing on years of relationship-building and unparalleled diplomatic skills, Danielle Moretti-Langholtz of William & Mary's American Indian Resource Center set the research team on a course of collaborative archaeology that has yielded tremendous rewards.

Institutional support has also been essential. The Virginia Department of Historic Resources has provided indispensable funding and guidance. Much of the logistical support and labor for the project has come from William & Mary. While the College has provided funding and laboratory space, the most important support has come from field school students, graduate teaching assistants, and laboratory volunteers. This report would not be possible without their diligent and enthusiastic efforts.

Justine McKnight's archeobotanical research has been critical to the project. Justine has provided expert guidance in selecting our samples for radiocarbon dating and has analyzed a tremendous volume of botanical evidence from the site. Chapter three of this report summarizes this important work.

Funding for the research has come from a National Endowment for the Humanities Collaborative Research Grant, a National Park Service Save America's Treasures Grant, the Virginia Foundation for the Humanities, the Federal 2007 Jamestown Commemoration Commission, the Virginia Department of Historic Resources, the College of William & Mary, and the Colonial Dames of America. This report was completed with fellowship support for the lead author from the National Endowment for the Humanities. We thank each of these institutions and all of these individuals for helping to make the project a success.

Martin Gallivan
Williamsburg, May 2016

CONTENTS

CHAPTER 1

INTRODUCTION

The following report summarizes the results of archaeological fieldwork at the Werowocomoco site (44GL32) in Gloucester County, Virginia conducted by the Werowocomoco Research Group from June 2004 through June 2010. Detailed background information on the settlement's historical context, the early history of the project, and the results of the initial field season may be found in our previous technical report, The Werowocomoco Research Project: Background and 2003 Archaeological Field Season Results (Gallivan et al. 2006). The following is intended to provide an update on the project through the end of 2010, the final season of fieldwork at Werowocomoco to date.

Werowocomoco was the capital of the Powhatan chiefdom in 1607, the principal residence of paramount chief Wahunsenacawh (i.e. Powhatan), and the scene of early colonial interaction between Tidewater Algonquian leaders and English colonists from Jamestown. The site is located on the northeast bank of the York River along Purtan Bay (Figure 1-1). Though the settlement's name remains unfamiliar to most people, events at Werowocomoco are well known as popular American history, particularly colonist John Smith's reported rescue there by Wahunsenacawh's daughter Pocahontas. Historical accounts—produced solely by English authors—document a series of meetings at Werowocomoco during which Wahunsenacawh negotiated with Jamestown's leaders and exchanged Powhatan corn for English copper, glass beads, and iron implements. As a result of the Werowocomoco Research Group's investigations and subsequent nomination of the site (Turner et al. 2005), Werowocomoco is now listed on both the Virginia Landmarks Register and National Register of Historic Places as having national archaeological and historical significance due to its association with significant historical events (criterion A), people (criterion B), and information (criterion D).

Research Questions and Results

The Werowocomoco research project entails the investigation of Tidewater Algonquian history from the perspective of a Native center of power, particularly during the Late Woodland period (AD 900 – 1600) and during the early seventeenth-century Contact period. This research offers the basis for building narratives counter to those that typically emanate from early colonial studies of the Chesapeake, narratives often focused on European actors, on Jamestown, and on an overarching trajectory of English colonial triumph. More specifically, the research questions we have posed at Werowocomoco are focused on the deep history of a Native settlement central to chiefly political dynamics in the Chesapeake:

- ***Does the history of built environments and land use practices at Werowocomoco contribute to an understanding of the settlement's history as a prominent Native village?***

- ***Do Werowocomoco's subsistence practices or exchange patterns set the village apart from other settlements, highlighting historical processes behind the settlement's status as a chiefly center?***

- ***How do archaeological practices and research results change in the wake of sustained involvement by contemporary Native communities in the research?***

Several of our publications have offered preliminary answers to these questions. Building on an archaeological survey of the site (Harpole et al. 2003), our 2006 technical report (Gallivan et al. 2006) framed the outlines of Werowocomoco's settlement history that included ephemeral Archaic through Early Woodland occupations, a series of small but prominent Middle Woodland activity areas associated with oyster shell concentrations, and the establishment of a dispersed agricultural village circa AD 1200 that contin-

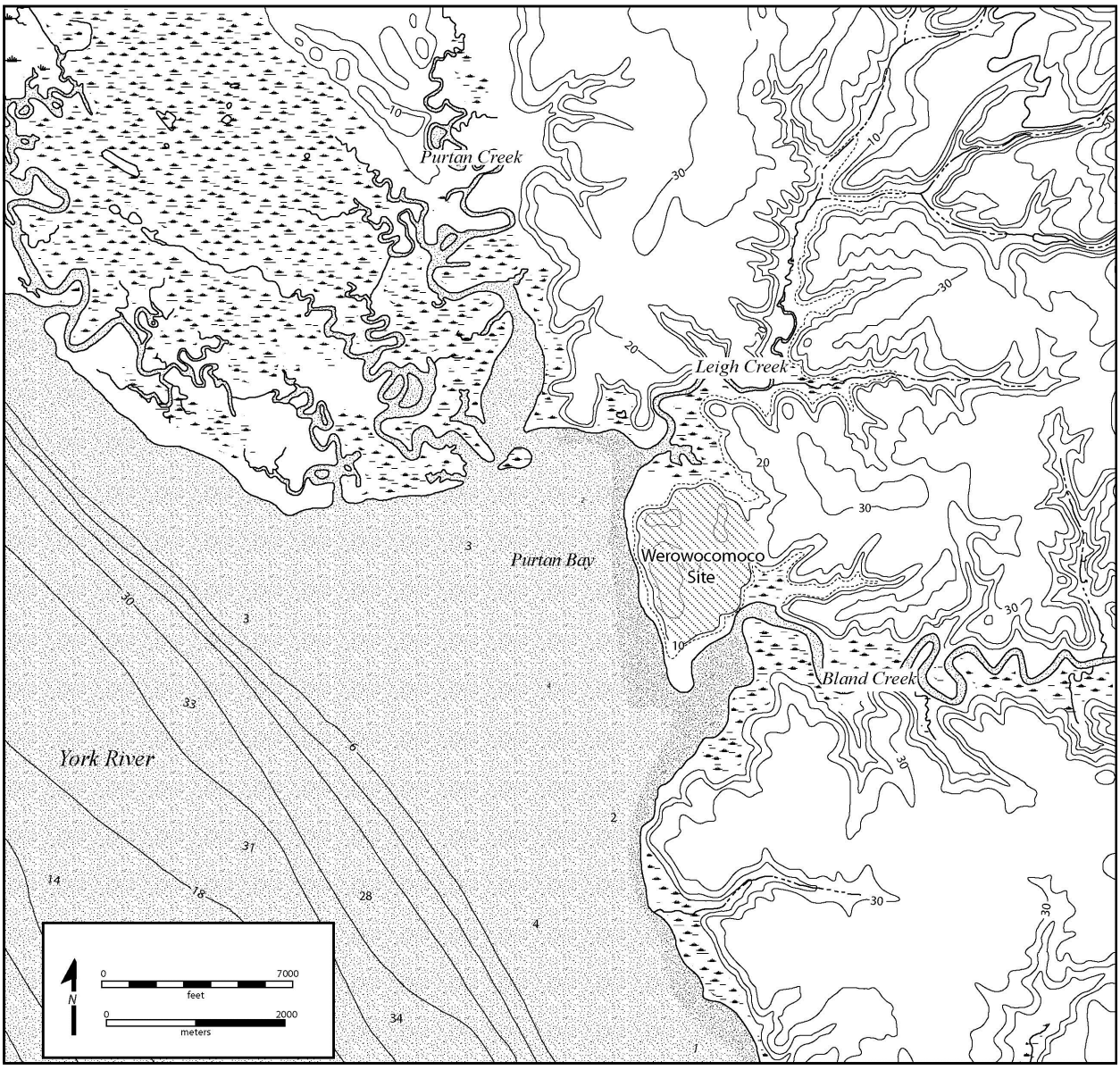

Figure 1-1. Werowocomoco site and environs.

ued to exist through the early seventeenth century. A subsequent *American Anthropologist* article (Gallivan 2007) discussed this history in greater detail, outlining the construction of three concentric trench features in the site interior that run at least 700 linear feet at their greatest extent. The trenches appear to be monumental landscape features that divided the settlement's residential core from a ceremonial zone in the interior.

An additional publication (Gallivan and Moretti-Langholtz 2007) focused on the ways that the Werowocomoco project seeks to incorporate descendant community priorities and indigenous values in the research. We have sought to make Werowocomoco's archaeology the focal point for "civic engagement" that has involved collaboration with Virginia Indians, shared decision making with descendant communities, and public outreach that begin to challenge dominant narratives focused solely on English colonial history. While our efforts have yielded some positive outcomes, the contemporary heritage landscape in the region is still focused on icons of English colonial success, providing only limited opportunities for the voices of Virginia Indians to be heard in discussions of their communities' pasts. A subsequent publication (Gallivan et al. 2011) discussed the prospects and limitations of civically-engaged archaeology at Werowocomoco. Perhaps by the time the next anniversary of

Jamestown's settlement is marked, Werowocomoco will play a central role in the commemorations, as one archaeologist has recently advocated (Hantman 2008). Finally, we have offered a reassessment of the Native archaeology of the Chesapeake in light of the Werowocomoco research (Gallivan 2012).

Collaborative, Public Archaeology at Werowocomoco

From the beginning, the Werowocomoco research has been framed as a collaborative and public project, involving academic researchers, public archaeologists, members of the Virginia Indians community, the general public, and the site's owners, Robert and Lynn Ripley. Lynn Ripley was, in fact, instrumental in the initial identification of the site, calling it to the attention of archaeologists from the Gloucester-based Fairfield Foundation and the Virginia Department of Historic Resources. In March 2002 David Brown and Thane Harpole of the Fairfield Foundation conducted a systematic archaeological survey of the property in consultation with Randolph Turner, director of the Tidewater Regional Office of the Virginia Department of Historic Resources. The survey defined the boundaries of a dispersed, approximately fifty acre site, identified diagnostic artifacts from the Middle Woodland (500 BC – AD 900), Late Woodland (AD 900 – 1600), and Contact (early 1600s) periods, and demonstrated the integrity of cultural deposits from each of these periods.

The next stage of the project involved extensive excavations at Werowocomoco conducted by archaeologists and students from the College of William & Mary after Martin Gallivan and Danielle Moretti-Langholtz of the College's Anthropology Department joined the research team. Moretti-Langholtz has since played a lead role as liaison to the contemporary Virginia Indian community, while Gallivan has directed fieldwork at the site. The Werowocomoco Research Group consists of David Brown, Thane Harpole, Randolph Turner, Danielle Moretti-Langholtz, and Martin Gallivan. Most of the fieldwork at Werowocomoco has been conducted by William & Mary archaeological field methods classes, including field schools during the 2003 through 2007 summers. Fieldwork during the 2009 and 2010 summers was grant-funded. Over the course of the project support has come from the College of William & Mary, the Virginia Department of Historic Resources, the National Endowment for the Humanities, the National Park Service, the Virginia Foundation for the Humanities, the Federal 2007 Jamestown Commemoration Commission, and the Colonial Dames of America.

Descendant community involvement has been an integral part of the Werowocomoco project from its inception. With the results of the 2002 survey that confirmed the site's identity as Werowocomoco, the Werowocomoco Research Group met with the Virginia Council on Indians (VCI) to discuss the possibility of a collaborative project centered on archaeological investigations at the site. At the time, the VCI was the state agency which advised Virginia's Governor on Native affairs. Council members recommended that the research group work closely on the project with the leaders of Virginia's tribes. An all-Native Virginia Indian Advisory Board was established as a result of these conversations, consisting of representatives of six tribes descended from the Powhatans. The advisory board, which includes representatives from the Pamunkey, Mattaponi, Rappahannock, Chickahominy, Nansemond, and Upper Mattaponi tribes has offered advice on the research design and contributed to decisions regarding the representation of the research results.

In addition to the Virginia Indian Advisory Board's role on the project, a number of Virginia Indians have joined the research team as field and laboratory technicians. After Ashley Atkins, a member of the Pamunkey Tribe, completed the William & Mary field school she enrolled in the anthropology PhD program at William & Mary in 2007. Now Ashley Spivey, she has subsequently worked on the project for three additional field seasons and contributed considerably to our understanding of the site. Jeff Brown, a Pamunkey Tribal Council member and a member of the Virginia Indian Advisory Board, worked as a field technician on the Werowocomoco project starting in 2005. Both Jeff and Ashley have subsequently worked on other archaeological sites in Virginia and beyond the region. Ashley is currently completing her doctoral dissertation, focused on an archaeological site within the Pamunkey Reservation. Jeff Brown went on to work on a number of other professional archaeological projects. Other members of Virginia tribes, including James Krigsvold, Ethan Brown, and Gloria Custalow have worked as field technicians at Werowocomoco. The small but growing numbers of Virginia Indian archaeologists have already begun to change archaeological practices within the region, introducing priorities, research questions, and project goals distinct from previous generations of archaeologists.

The strong interest that the broader public has shown in Werowocomoco's past has provided a starting point for a public archaeology of the site that has included various forms of collaboration, outreach, education, and museum exhibition. Attention on the Werowocomoco research has been considerable since

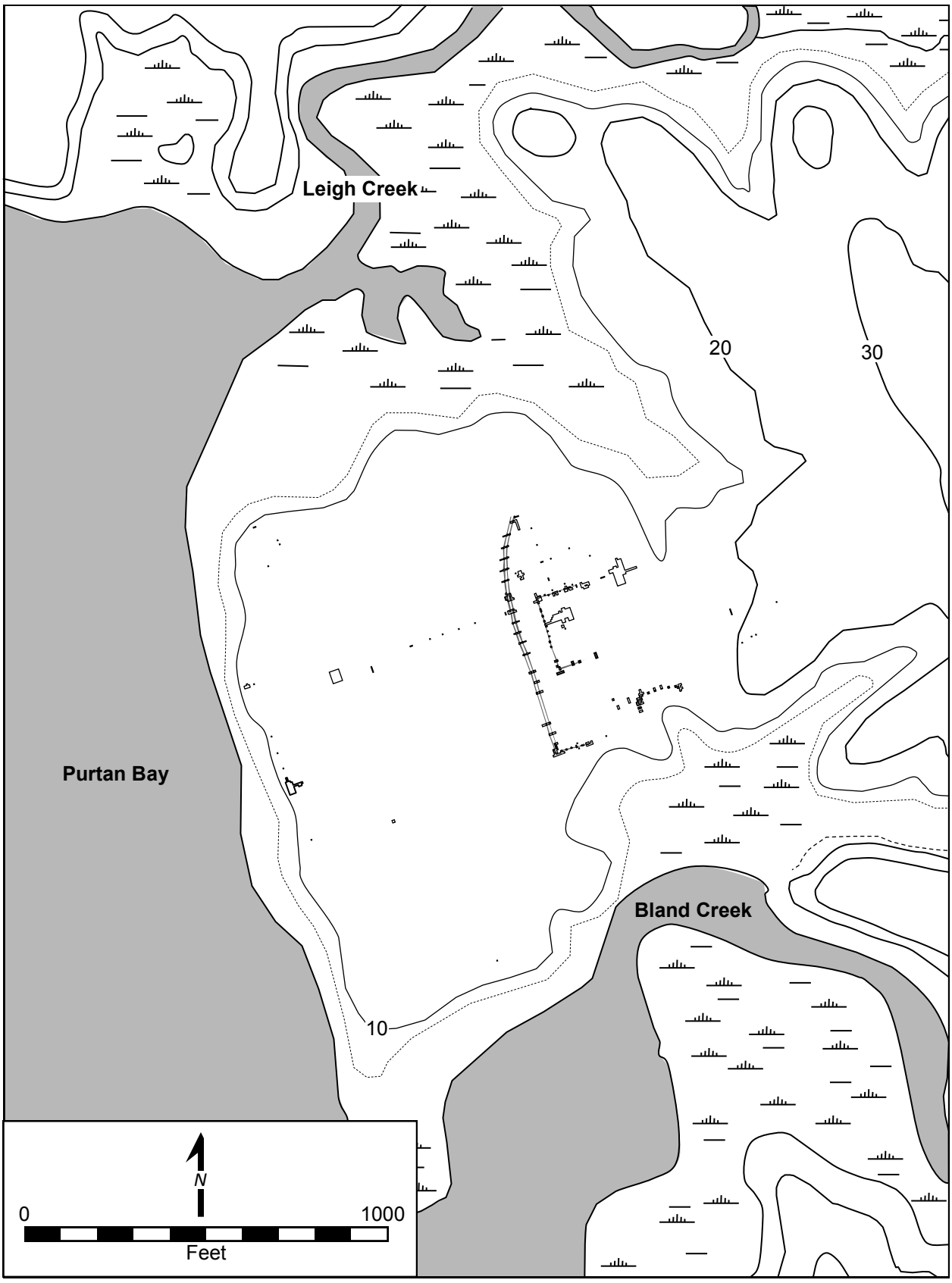

Figure 1-2. Werowocomoco site.

2003, with extensive media coverage such as stories from the New York Times, the Times of London, the Washington Post, CBS News, National Public Radio and a variety of local newspapers, radio, and television news programs. Pocahontas Revealed, a 2007 NOVA documentary about Werowocomoco's history during the early colonial era, prominently featured the archaeological investigations at the site. Also in 2007, National Geographic Magazine devoted an issue to the history and archaeology of Jamestown and Werowocomoco, with a supporting web site featuring details of the Werowocomoco field research and interviews with archaeologists and Powhatan descendants involved in the project.

Especially in the lead-up to the 400th anniversary of Jamestown's 1607 settlement, media attention focused on the James Fort site and on a narrative of English struggle and triumph emanating from research there (e.g., Kelso 2006). The research at the Werowocomoco site offers other historical narratives involving the long-term history of Tidewater Algonquian societies, Native chiefly political dynamics, and Virginia Indians' responses to colonialism. In fact, the Virginia Indian Advisory Board to the Werowocomoco project has emphasized that their priorities include bringing to the fore public discussions of Native communities' histories ***prior to*** Jamestown's settlement and investigations of Native survival and persistence during the centuries ***after*** colonial contact.

In an effort to implement the first of these priorities, the research group has investigated evidence of Werowocomoco's pre-colonial past in considerable detail, and we have presented our findings to the public in a number of ways. This has been challenging at times since, unlike Jamestown, the Werowocomoco site is located on private property, making public access to it difficult. Even so, the property owners have been greatly supportive of the research team's collaborative and public outreach efforts and have opened the site to public visitation on the limited scale that is currently sustainable. In order to bring the site to a broader public we have also worked with curators at the Jamestown Settlement to develop a museum exhibit there entitled "Werowocomoco: Seat of Power" in 2010 - 2011. The exhibit, seen by thousands of visitors, emphasized the history of Werowocomoco's cultural landscape over the long term and discusses contemporary Virginia Indians' reflections on Werowocomoco's significance today.

We have also worked closely with the public school system in Virginia to ensure that the Werowocomoco research is integrated into the regular history curriculum. This process started in our second field season with archaeological workshops for social studies teachers from the local public school system. Subsequently the Virginia public school system consulted with the research group as it made the Werowocomoco site and Powhatan culture required topics in its Standards of Learning at several different grade levels. A discussion of the site is included in the fourth grade curriculum, where students focus on early American history. With this curricular focus in mind, we have sponsored workshops during the field season at Werowocomoco that have brought Gloucester County fourth-graders to the site for a hands-on demonstration of the archaeological research process.

Summary of Field Research Results, 2003 – 2010

As discussed in our earlier technical report (Gallivan et al. 2006), our initial field season at Werowocomoco in 2003 evaluated the site's archaeological integrity and considered its spatial extent and internal organization. Inventory of trade goods recovered from the site, including glass beads, copper alloy objects, and King's Touch tokens, provided additional evidence of Werowocomoco's links to Jamestown.

Excavations in 2004 expanded our understanding of intact features present in the residential core along Purtan Bay and our appreciation of the spatial extent of the parallel trench features 161 and 162 in the site interior (Figure 1-2). A large block excavation adjacent to the modern Ripley's residence identified a scatter of post mold stains and shallow pit features. One intact house pattern in this area measuring 23 by 14 feet surrounded a shallow hearth feature that returned a calibrated radiocarbon date in the fifteenth century AD. A deep feature (feature 428), located in an adjacent excavation block along Purtan Bay containing maize and bean fragments also returned a fifteenth century AD calibrated date. In the site interior, our initial exposure of a 25 foot section of the parallel trenches was expanded to the north and to the south, providing indications of its considerable extent.

Excavations in 2005 identified intact, stratified deposits located within the settlement's residential core along Purtan Bay. The buried horizon located beneath the plow zone extended to a depth of over two feet along the northeastern corner of the site. A detailed paleobotanical assessment of these materials (described in chapter 3) combined with a suite of radiocarbon-dated materials from these deposits offered a richer sense of the settlement's history. The deposits record the sporadic presence of Middle Woodland forager-fishers from AD 200 to AD 900, the establishment of a dispersed horticultural village circa AD

1200, increased settlement intensity through AD 1400, and a population decline during the sixteenth and early seventeenth centuries. Within the site interior, excavations revealed a third trench feature (feature 552) enclosed by the other two trenches.

During the 2006 summer our excavations focused on identifying the overall extent and layout of the trench features and on exposure of a large house pattern in the site interior. A block excavation located approximately 1200 feet from Purtan Bay identified a large architectural feature extending over 70 feet in length and associated with copper originating from Jamestown. The structure is of particular interest given John Smith's (1986-I:69) report that Wahunsenacawh's house was situated "thirty score" from the riverfront, possibly referring 600 feet or paces. This reference suggests a location set apart from most of the houses in the settlement. A radiocarbon assay from one of the structure's posts returned a calibrated median probability of AD 1550, a result that accords with Wahunsenacawh's arrival at Werowocomoco and overlaps with the early seventeenth century time frame described by Smith. The size of the structure, its temporal placement, interior divisions, associated artifacts, and location within the site together support the inference that the structure was indeed Wahunsenacawh's.

Fieldwork in 2007 focused on tracing the extent of the three trench features in the site interior. A geophysical survey designed to locate these features using soil resistivity provided guidance for this effort. Excavations to "ground truth" the geophysical survey produced mixed results. Some of the remote sensing anomalies corresponded with the trench features while others did not. A series of radiocarbon dates from the three trenches indicate that the interior trench (feature 552) produces the earliest results, with median calibrated dates ranging from AD 1200 - 1350, while the outer trenches (features 161 and 162) produce calibrated median dates ranging from AD 1350 to 1560.

No fieldwork was conducted at Werowocomoco during the 2008 summer. Short field seasons in 2009 and 2010 were designed primarily as public archaeology, allowing visitors to learn of the site and its history while excavations were in progress. Our excavations both seasons focused on sampling the area enclosed by the three trench features.

The report that follows offers a more detailed, technical discussion of the evidence upon which this narrative is based. Chapter two covers the results of the archaeological fieldwork by excavation block, starting with the residential core area located along Purtan Bay and proceeding to the settlement interior to the East. Chapter three summarizes the paleoethnobotanical evidence recovered at Werowocomoco and analyzed by archeobotanist Justine McKnight. Chapter four synthesizes and interprets the results of the excavations, returning to the questions posed above.

CHAPTER 2

EXCAVATION METHODS AND RESULTS

Excavation methods at the Werowocomoco site have followed best practices in the region. All plow zone soil from excavation units was screened through quarter-inch mesh for uniform artifact recovery. A 250 milliliter soil sample was drawn from each plow zone context for chemical analysis. At the plow zone base, excavation units were trowel-scraped to identify features and intact sub-plow zone deposits. Excavation units were then photographed and all soil anomalies drawn in plan. Representative profiles of excavation units were recorded with scale drawings and photographs. Soil descriptions relied on standard Munsell color charts and USDA textural terminology.

Within each excavation block a sample of the identified features was excavated, with priority placed on those that appeared to date to the precontact or Contact periods rather than those from later historic periods. Features chosen for excavation were drawn and photographed in plan prior to excavation. One half of each feature was excavated to reveal a cross-section profile, which was also drawn and photographed. Feature fill was excavated according to natural strata if present. All feature soils were processed through a flotation tank for ethnobotanical and small artifact recovery. In those locations where stratified cultural deposits continued beneath the plow zone, excavation proceeded according to artificial levels and then by natural strata. Flotation samples were also drawn from these deposits.

Artifact classification relied on an attribute-based approach. The Native ceramic analysis included ware-type identifications (Egloff and Potter 1982) and characterization of vessel portion (i.e. rim, shoulder, body, base), rim form, sherd size, mean sherd thickness, surface treatment (i.e. fabric-impressed, simple-stamped, cord-marked, check-stamped, plain), temper (i.e. shell, crushed lithic, sand), and decoration. When present, decoration (e.g., incising, punctation, cord-wrapped dowel impression) was identified according to location, implement, and motif.

Lithic artifact classification included characterization of raw material and artifact form. Similar to other sites dating to the Late Woodland through Contact period transition, the site produced relatively low numbers of lithic artifacts. The vast majority of these fell under the category of debitage. Categories of debitage used in the classification included decortation flakes, secondary and tertiary flakes, shatter, and tested cobbles. Decortation flakes, the product of the initial step in the stone tool production process, exhibit a striking platform, bulb of percussion, and cortex. Secondary flakes are flat flakes lacking cortex that exhibit scars on the dorsal surface. Tertiary flakes are small flakes, less than one centimeter in maximal length, that generally result from pressure flaking tool edges. The category of shatter includes angular pieces that are part of stone tool production, but lack the formal attributes of flakes due to uneven fracture patterns. Tested cobbles exhibit a few flake scars.

Stone tools identified at the site include bifaces, utilized flakes, abraders, fire-cracked rock, and projectile points. Bifaces are defined here as generalized stone tools or more formal tools abandoned during the reduction process with flake scars on opposite surfaces. Utilized flakes exhibit retouched edges and use marks. Abraders in the Chesapeake region are typically sandstone and were used to smooth or sharpen antler, bone, wood, and stone, a use reflected in grooves or abrasions on the artifact's surface. Projectile points are formal, hafted bifaces.

Historic artifact classification followed methods that are standard in the Chesapeake. Ceramics, glass, bone, nails, and other metals were categorized using descriptive typologies, recording characteristics such as ware type, vessel portion and form, decoration, and function. All fragments of brick, mortar, oyster and clam shell, and coal were collected and then weighed in order to plot distributions within the various excavation areas.

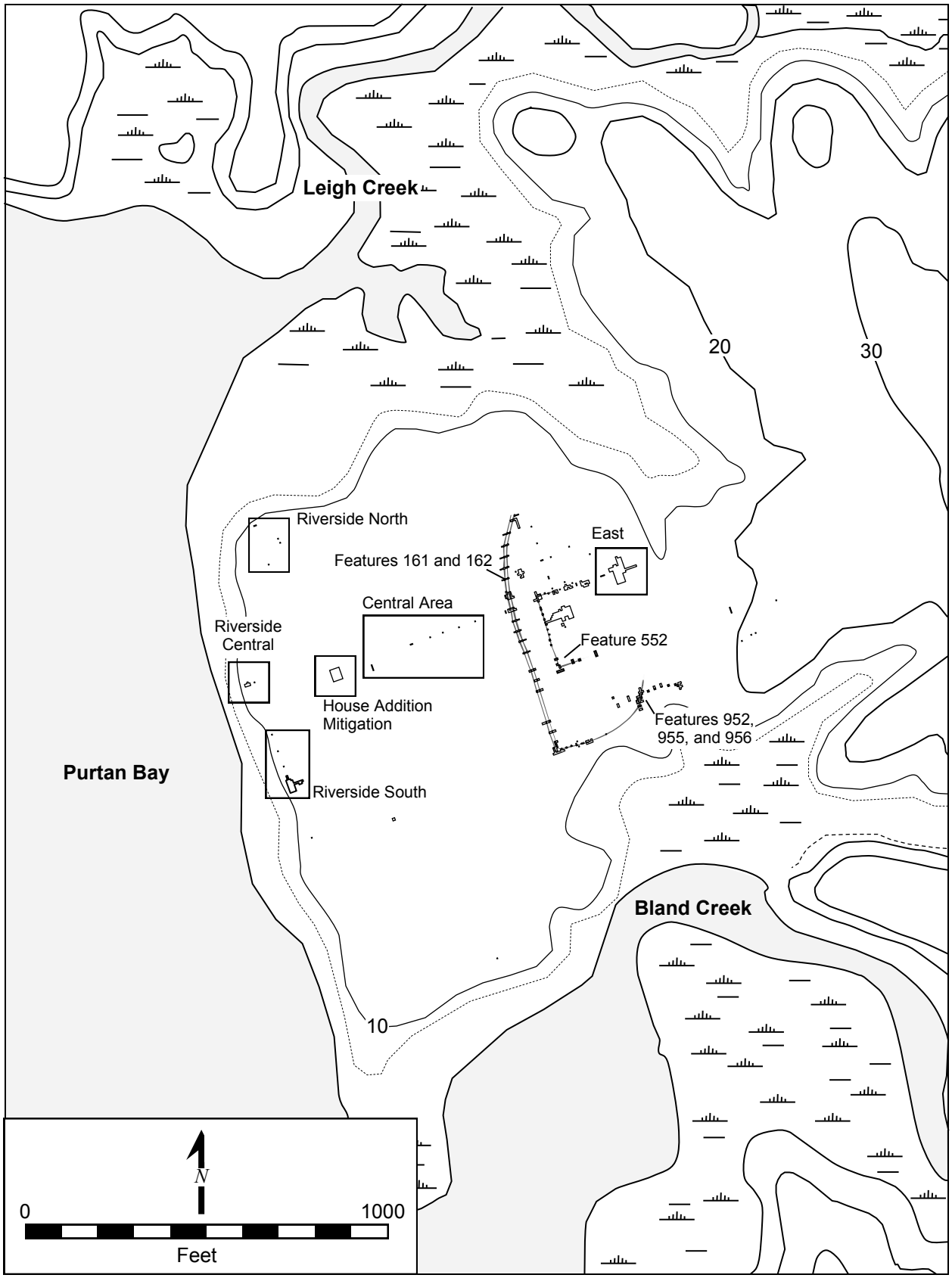

Figure 2-1. Werowocomoco site excavation blocks, 2004-2010.

Riverside South Block

Located along Purtan Bay, the Riverside South block examined an area containing the highest concentrations of Native materials recovered during the survey. As detailed previously (Gallivan et al. 2006:74-82), the excavations exposed a number of Native post mold stains and several historic-era features post-dating the Native occupation. In an effort to broaden exposure of this area so as to identify Native pit features and post mold patterns, excavations during 2004 added 19 five-by-five foot units to this block.

Native artifacts recovered from the 1.1 foot deep plow zone are summarized in the tables below. These materials record occupations focused on the Middle and Late Woodland periods, with fabric-impressed/shell-tempered Rappahannock ceramics (43% of identifiable sherds), plain/shell-tempered ceramics (23%), and cord-marked/shell-tempered Mockley ceramics (15%) making up the majority of the assemblage. Lithic artifacts were predominantly quartzite, with 5 small to medium-sized triangular points datable to the Middle and Late Woodland periods.

Beyond the scatter of post mold stains within the block, feature 428 was the only Native feature identified in the Riverfront South block. Containing Native artifacts, oyster shell fragments, and a rich array of charred plant material, the feature measured 3.7 feet in maximal diameter with a depth extending 2.9 feet beneath the plow zone base. Feature 428 was excavated in three levels, each approximately 1 foot deep, as noted on the profile drawing. Artifacts included primarily Rappahannock ceramics and quartzite lithics.

Three radiocarbon dates from the feature returned one-sigma calibrated ranges from AD 1260 to 1460. These dates bracket the heaviest occupations of Werowocomoco as a whole. A bean fragment returned the earliest date for this cultigen in the Virginia Coastal Plain, suggesting the addition of beans to horticultural practices during the fifteenth century AD.

Temper	Surface Treatment	Count
Shell	Fabric Impressed	338
	Plain	182
	Cord Marked	116
	Simple stamped	15
	Net Impressed	3
	Unknown	1517
Sand	Plain	64
	Fabric Impressed	31
	Cord Marked	20
	Simple stamped	4
	Unknown	229
Crushed Lithic	Fabric Impressed	8
	Plain	2
	Cord Marked	1
	Simple stamped	1
	Unknown	35
Rounded Lithic	Unknown	5
Unknown	Fabric Impressed	16
	Plain	13
	Cord Marked	5
	Scraped	1
	Unknown	147
	TOTAL:	**2753**

Table 2-1. Native Ceramics, Riverfront South plow zone.

Raw Material	Type	Count
Quartzite	Primary decoration flake	52
	Secondary flake	329
	Tertiary flake	322
	Retouched flake	2
	Biface	10
	Shatter	138
	Core	2
	Fire-cracked rock	66 (3899 g)
	Abrader	1
	Hammerstone	2
	Triangular point	4
	Projectile point tip	1
Quartz	Shatter	197
	Primary decoration flake	53
	Secondary flake	91
	Tertiary flake	101
	Shatter	2
	Biface	4
	Core	1
	Fire-cracked rock	7 (181 g)
	Triangular projectile point	1
	Tested Cobble	2
Chert	Primary decoration flake	5
	Secondary flake	6
	Tertiary flake	22
	Shatter	15
	Utilized flake	1
Jasper	Primary decoration flake	2
	Secondary flake	1
	Triangular projectile point	1
	Total	**1441**

Table 2-2. Native Lithics, Riverfront South plow zone.

Like most Coastal Plain sites occupied during the Late Woodland period, Werowocomoco has few pit features. Feature 428, possibly representing the filled root hole of an ancient tree, is thus particularly important as a source of evidence on village life. Chapter 3 draws in part on evidence from feature 428 to sketch the ethnobotanical patterning at Werowocomoco. Artifacts recovered from the feature, including 49 ceramic sherds and 4 lithic artifacts, suggest deposition of materials associated within a dispersed community. The density of charcoal in the feature points to the deposition of midden materials. The amorphous shape of the feature makes it difficult to assign the feature a specific function, though it may represent a storage pit impacted by tree root disturbance.

The scatter of post molds in the Riverside South block indicates that the area saw residential occupa-

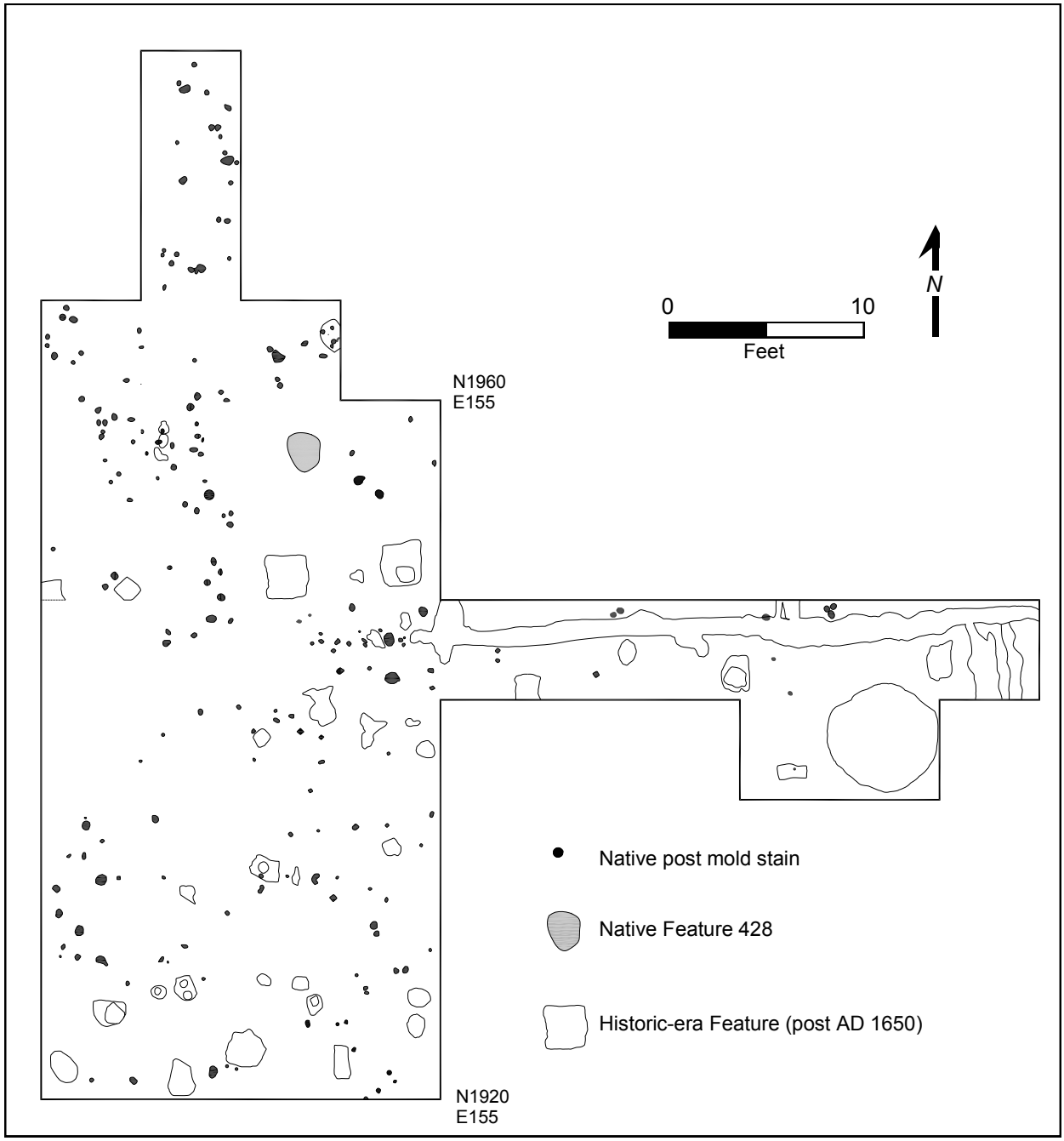

Figure 2-2. All features identified in the Riverfront South block.

Context	Dated Material	Conventional Age	1 Sigma Calibrated Range	2 Sigma Calibrated Range
F428 Ib	Wood charcoal	730 +/- 60 BP	AD 1260 - 1300	AD 1200 - 1390
F428 Ic	Bean fragment	440 +/- 40 BP	AD 1430 - 1460	AD 1420 - 1490
F428 Ic	Maize cupule	430 +/- 40 BP	AD 1440 - 1460	AD 1420 - 1610

Table 2-3. Riverfront South radiocarbon dates.

tions between AD 1200 and the early seventeenth century. The overlapping construction of houses and the uneven preservation of post stains make it difficult to isolate house patterns. A possible elliptical pattern measuring 15 feet by 8 feet is detectible in the southern portion of the block, as indicated in the plan drawing below.

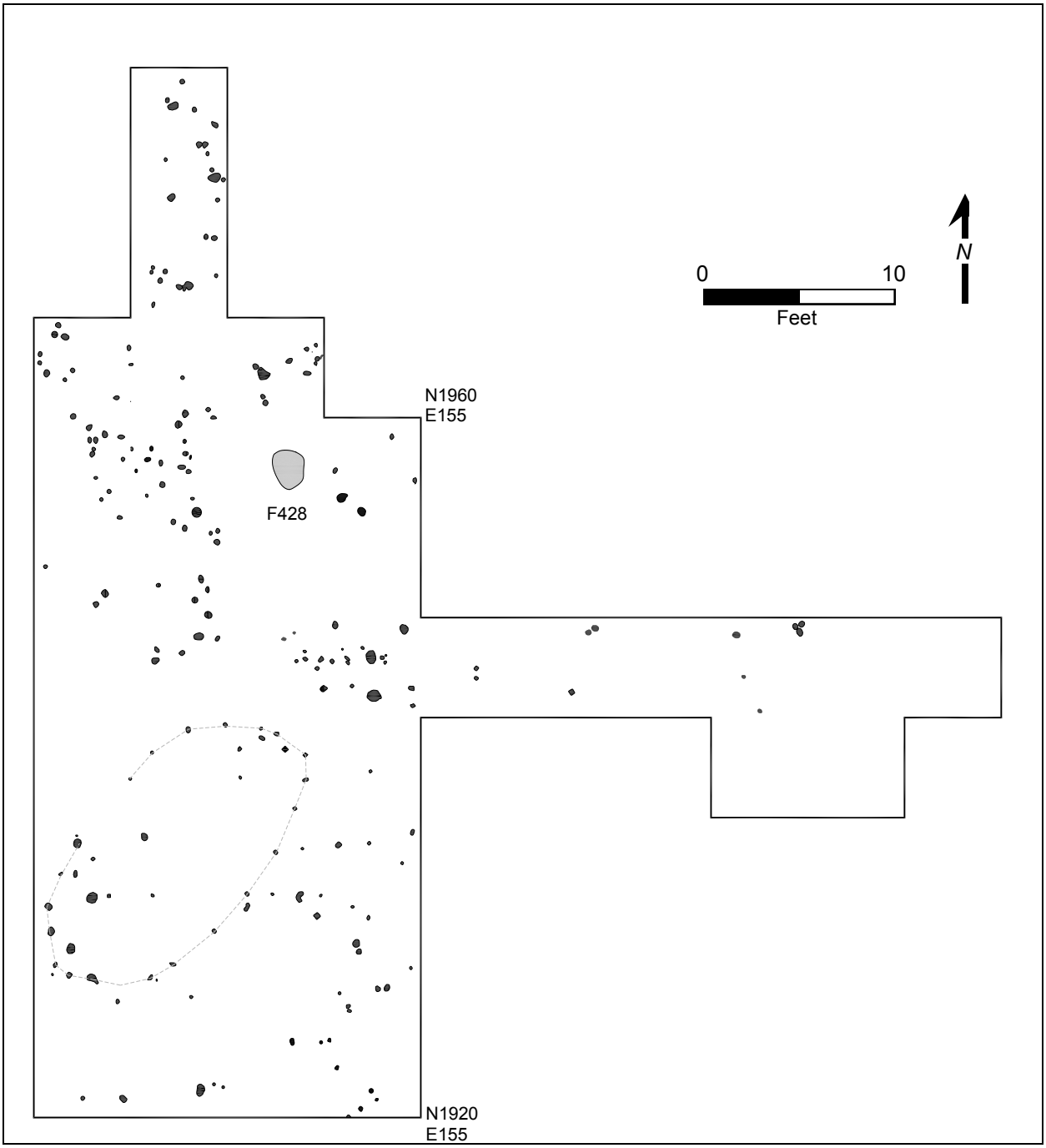

Figure 2-3. Native features identified in the Riverfront South block with projected house pattern.

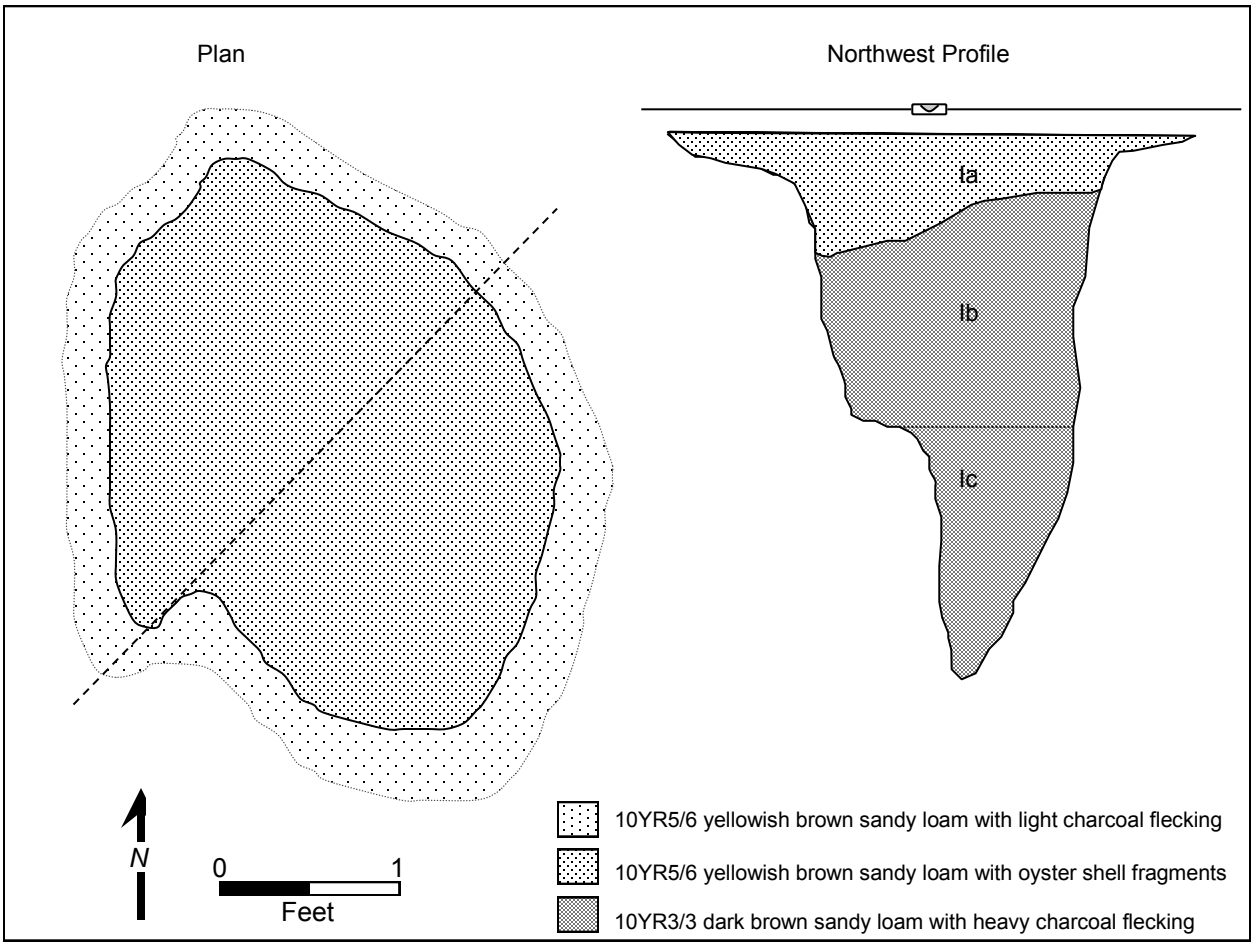

Figure 2-4. Feature 428 plan and profile.

Context	Temper	Surface	Incised	Count
Ia	Shell	Fabric	-	4
	Unidentified	-	-	13
Ib	Shell	Fabric	-	12
	Shell	Fabric	X	1
	Shell	Cord	-	1
	Shell	-	-	5
Ic	Shell	Fabric	-	7
	Shell	Fabric	X	1
	Shell	-	-	4
	Shell	Cord	-	1

Table 2-4. Ceramics recovered from Feature 428.

Level	Raw material	Type	Count
a	Quartzite	Secondary Flake	1
b	Quartzite	Primary Flake	1
c	Quartzite	Fire-cracked Rock	2 (176g)

Table 2-5. Lithics recovered from Feature 428.

House Addition Mitigation Block

Located northeast of the Riverfront South block and immediately adjacent to the Ripley residence, the House Addition Mitigation block was excavated in 2004 and 2005 in preparation for the construction of an addition on the south side of the existing residence. The block, measuring 50 by 30 feet, covered the footprint of the planned addition. The excavation uncovered Native post mold stains, several shallow Native features, and a series of historic-era features that postdate Native occupation of Werowocomoco.

Native artifacts recovered from the plow zone and recent fill associated with a gravel driveway are summarized in the tables below. Late Woodland wares, including Rappahannock fabric-impressed and Roanoke simple-stamped, predominate with Middle Woodland ceramics including Mockley cord-marked making up just 6% of the identifiable sherds. Lithic artifacts were predominantly quartzite, with 12 small triangular points datable to the Late Woodland period.

An elliptical pattern of Native post molds was discernible in the northern portion of the block. The pattern, measured approximately 23 feet by 14 feet and enclosed an area with a shallow, charcoal-rich lens and three, shallow charcoal-rich pit features. One of these, feature 184, returned a radiocarbon date (table 2-9) which calibrates to the first half of the fifteenth century AD. The charcoal-rich lens and the shallow pits in the southeastern portion of the house pattern likely represent household debris. The relatively low artifact counts from these deposits suggest that the interior of the structure was kept relatively clean.

The House Addition Mitigation block represents residential space within the settlement when occupation was at its most intensive. Since the block was located a considerable distance (275 feet) from the shoreline, it contains less evidence of the many reoccupations that were focused on the riverfront. As a result, the construction and use of domestic space is clearer in this area than it is in the Riverfront South block. Assuming that the proposed architectural patterns are correctly identified, house sizes varied considerably at Werowocomoco. The 23-foot long structure in this excavation block is considerably longer than the 15-foot long house pattern in the Riverfront South block and significantly smaller than the 72-foot long structure in the site interior.

Material	Type	Count
Quartzite	Triangular projectile point	9
	Projectile point tip	2
	Biface	5
	Retouched flake	2
	Primary decoration flake	57
	Decondary flake	201
	Tertiary flake	337
	Shatter	204
	Fire-cracked rock	149
	Hammer stone	1
Quartz	Triangular projectile point	3
	Projectile point tip	1
	Side-notched projectile point	1
	Biface	4
	Primary decoration flake	59
	Secondary flake	72
	Shatter	178
	Tertiary flake	101
	Hammer stone	1
	Tested cobble	5
Chert	Biface	2
	Tested cobble	1
	Core	2
	Primary decoration flake	8
	Secondary flake	4
	Tertiary flake	12
	Shatter	31
Jasper	Shatter	1
	Tertiary flake	2
Rhyolite	Shatter	1
	TOTAL:	1456

Table 2-6. Native lithics from the House Addition Mitigation block plow zone.

Temper	Surface treatment	Count
Shell	Fabric	327
	Plain	113
	Cord	34
	Simple Stamped	18
	Unident.	592
Sand	Fabric	80
	Plain	72
	Simple Stamped	12
	Cord	7
	Unident.	188
Crushed Lithic	Fabric	9
	Plain	5
	Cord	3
	Unident.	24
Rounded Lithic	Unident.	15
Unident.	Fabric	11
	Plain	8
	Simple stamped	8
	Cord	2
	Unident.	91
	TOTAL:	1619

Table 2-7. Native ceramics from the House Addition Mitigation block plow zone.

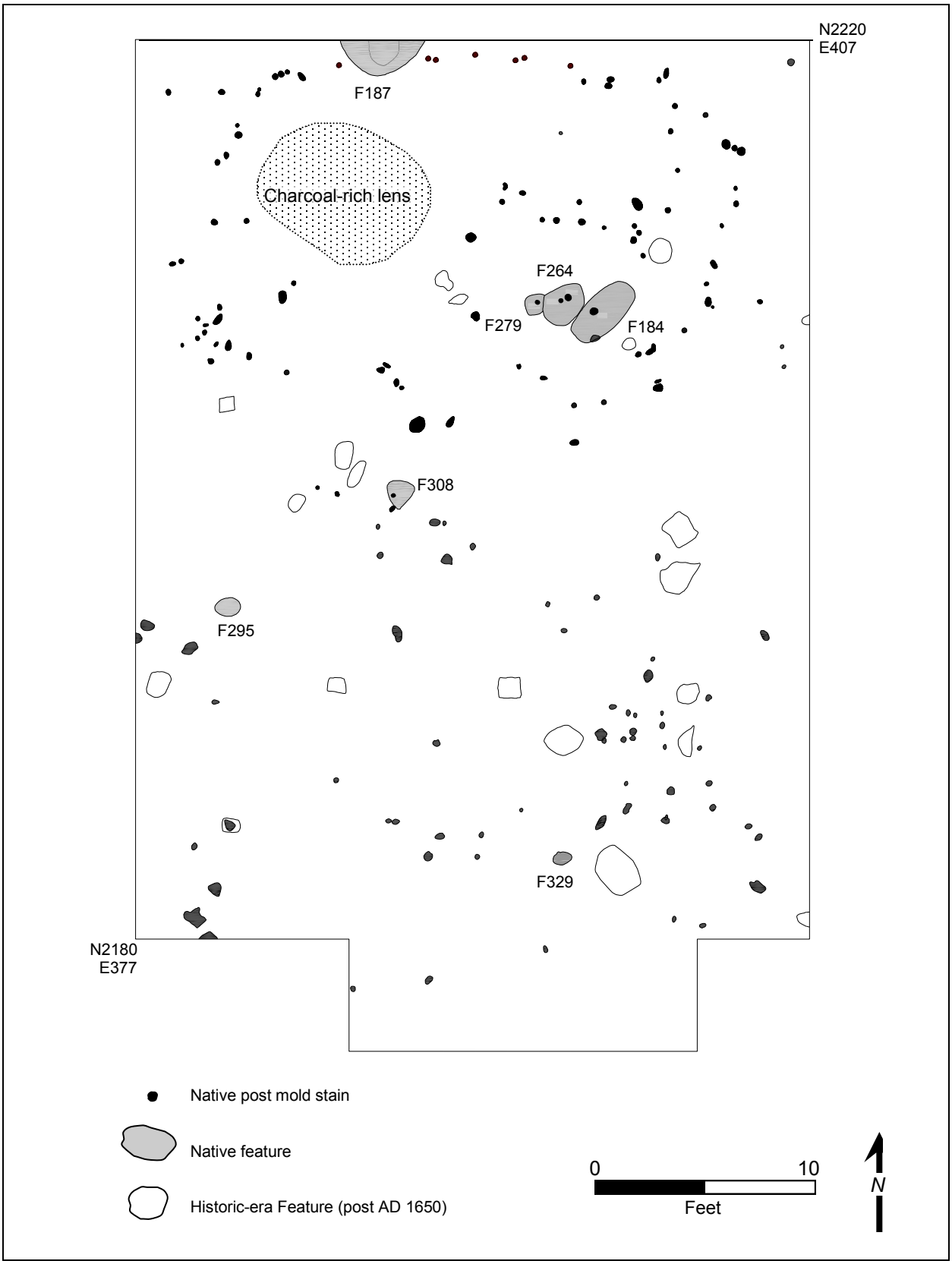

Figure 2-5. House Addition Mitigation block.

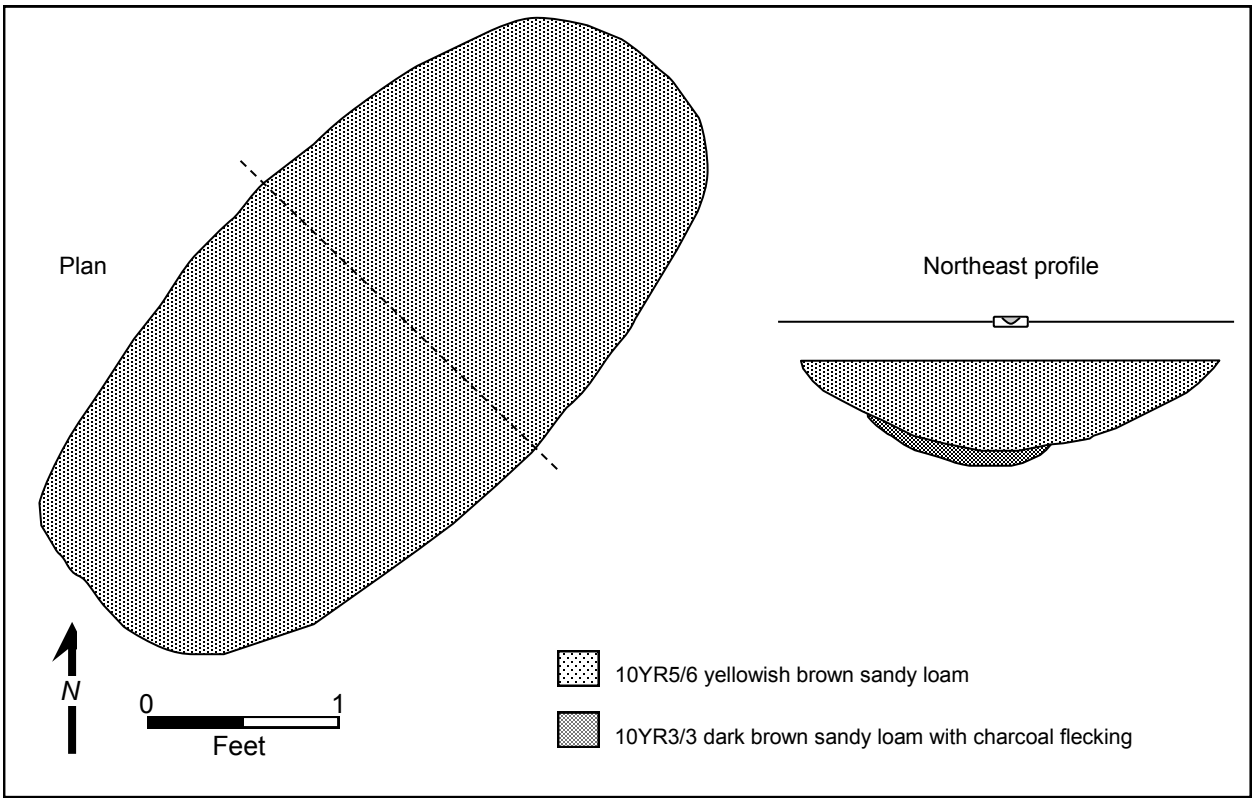

Figure 2-6. Feature 184 plan and profile.

Feature	Ceramics			Lithics		
	Temper	Surface	Count	Material	Type	Count
184	Shell	Fabric	4	Quartzite	Secondary flake	1
	Shell	Plain	2			
	Unident.	-	5			
187	Shell	Fabric	1	-	-	-
	Shell	Unident.	2			
264	Shell	Fabric	1	-	-	-
279	Shell	Fabric	1	-	-	-
295	Shell	Fabric	2	Quartzite	Secondary flake	1
	Shell	Plain	3	Quartzite	Tertiary Flake	1
	Shell	Cord	1	Quartzite	Shatter	1
	Shell	Unident.	8			
	Sand	Fabric	1			
	Sand	Unident.	3			
	Sand	Plain	2			
	Unident.	Unident.	79			
308	Shell	Fabric	1	-	-	-

Table 2-8. Ceramics and lithics recovered from Feature 184 .

Context	Material	Conventional Age	1 Sigma Calibrated Range	2 Sigma Calibrated Range
F.184	Wood charcoal	510 +/- 40 BP	AD 1410 - 1430	AD 1400 - 1450

Table 2-9. Feature 184 radiocarbon results.

Riverside Central Block

Located west of the House Mitigation block and along the edge of the bluff overlooking Purtan Bay, the Riverfront Central block was excavated during the 2005 summer to identify architectural patterns and stratified midden deposits. We also excavated this area to gauge the potential loss of cultural deposits due to erosion along the western edge of the site. The block included 10 five-by-five foot excavation units as depicted in figures 2-8 and 2-9.

With the benefit of four radiocarbon dates from these deposits it becomes clear that the excavations uncovered a buried, intact 'A' horizon beneath the plow zone containing evidence dating from the first century BC through the thirteenth century AD. These deposits abut the bluff overlooking Purtan Bay, indicating that erosion is indeed impacting intact archaeological deposits. Included in these deposits were botanical remains, shell-tempered ceramics, quartz, quartzite, and jasper lithics, Native post mold stains, and shallow Native features, several with concentrations of oyster shell. These deposits represent midden materials that accumulated in a residential area containing dense and overlapping post mold patterns from building episodes that occurred over generations. The Mockley and Rappahannock ceramics recovered from this area, in concert with the radiocarbon assays, include evidence of the site during the Middle Woodland II through Late Woodland centuries.

The stratigraphic sequence includes a shallow 10YR5/4 fine sandy loam plow zone containing post-eighteenth century artifacts underlain by an older 10YR4/4 sandy loam plow zone with eighteenth-century diagnostics. Beneath these two stacked plow zones (labeled stratum I in the profile) we identified several unplowed horizons containing Native artifacts. The buried 'A' horizon included stratum II, a 10YR5/3 brown sandy loam deposit, and stratum III, a 10YR3/6 yellowish brown sandy loam deposit. Strata II and III contained a relatively dense concentration of post molds, ceramics, lithic artifacts, and oyster shell fragments. As summarized in the tables below, the materials from stratum II are associated primarily with the Late Woodland period and the materials from stratum III were associated primarily with the terminal Middle Woodland period. Stratum IV, a 10YR5/6 yellowish brown fine sandy loam contained few artifacts and appears to be a 'B' horizon containing materials leached from stratum III above.

Five shallow pit features also were identified amidst the buried A horizon. Features 605 and 606, which appeared at the top of stratum II, both extended for a depth of 0.3 feet and contained charcoal, shell fragments, and Rappahannock fabric-impressed pottery. Bowl-shaped feature 608 extended for a depth of 1.0 feet and contained a dense deposit of charcoal, shell and Native artifacts. Located on the eastern edge of the excavation block, partially-excavated feature 662 measured 0.5 feet in depth and contained oyster shell and wood charcoal. Feature 607, bowl-shaped and 0.7 feet deep, appeared at the top of stratum III and contained a dense deposit of oyster shell along with a single Mockley cord-marked sherd.

Taken together, the evidence suggests repeated seasonal settlement associated with oyster harvesting and processing along the bluff overlooking Purtan bay during the centuries between 100 BC and AD 1300. The radiocarbon dates and artifact densities point toward usage of the site throughout the Mockley phase (AD 200—900), with increased intensity of activity during the thirteenth century.

Jasper debitage occurs in unusually large amounts

Beta No.	Context	Context note	Material	Conventional Age	1 Sigma Cal.	2 Sigma Cal.	Median Prob.
206166	TU402IIA	Top of buried 'A' horizon	Wood charcoal	750 +/- 40 BP	AD 1230-1280	AD 1200-380	AD 1260
207435	F606	Mockley sherd from F606	Carbonates in sherd	1330 +/- 40 BP	AD 650-770	AD 650-770	AD 690
208956	F608	Small, shell-filled pit	Wood charcoal	1490 +/- 40 BP	AD 540-620	AD 440-490	AD 580
207437	TU403 IIIB	Bottom of buried 'A' horizon	Wood charcoal	2020 +/- 100 BP	170 BC-AD 70	360 BC - AD 220	40 BC

Table 2-10. Radiocarbon results, Riverside Central block.

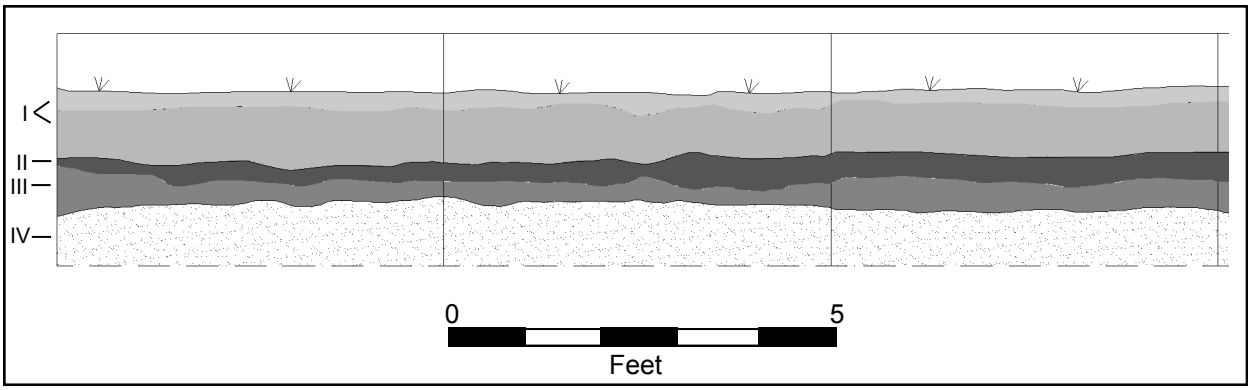

Figure 2-7. Riverside Central block, South profile of excavation units 403, 407, and 404.

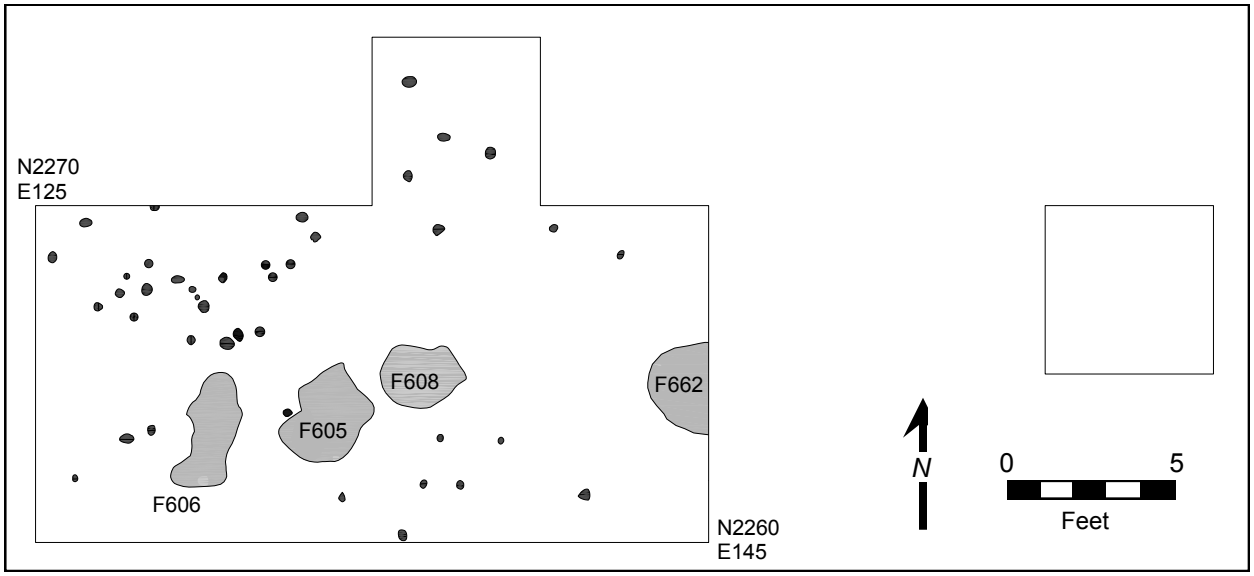

Figure 2-8. Riverside Central block, Base of stratum II.

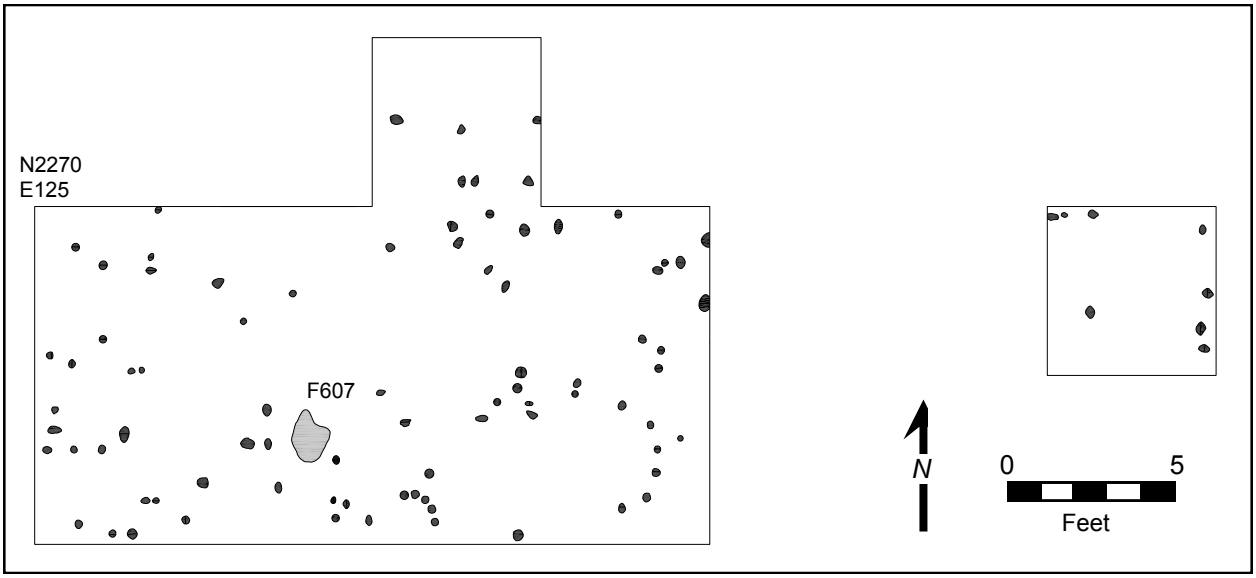

Figure 2-9. Riverside Central block, Base of stratum III.

Stratum	Temper	Surface	Count
I (Plow Zone)	Shell	Fabric	10
		Plain	1
		Unident.	14
	Sand	Fabric	6
		Plain	4
		Unident.	9
	Rounded Lithic	Unident.	1
	Unident.	Unident.	58
II	Shell	Fabric	177
		Plain	37
		Simple Stamped	3
		Cord	4
		Unident.	59
	Sand	Fabric	9
		Plain	3
		Unident.	3
	Crushed Lithic	Unident.	1
	Unident.	Unident.	638
III	Shell	Fabric	20
		Cord	24
		Plain	5
		Unident.	35
	Sand	Fabric	1
		Unident.	5
	Unident.	Unident.	351
IV	Shell	Cord	3
	Unident.	Unident.	1

Table 2-11. Non-feature ceramics, Riverside Central block.

in the stratum III deposits, which date to the Mockley phase. Over half of the lithic artifacts in this deposit (65%, n=439) were jasper. A fine-grained, cryptocrystalline stone ideal for stone tool production, jasper is common in isolated outcrops along the fall line in central Virginia. The high densities of these artifacts imply that the residents at the site were linked to jasper sources through either exchange relations or direct access.

The relatively high density of ceramics in stratum II suggests changes in the nature of settlement at the location circa AD 1200 - 1300. Stratum II, dominated by Rappahannock fabric-impressed pottery, contains more than twice the number of ceramic sherds present in stratum III. This pattern parallels others at the site which suggest the creation of a large, permanent settlement at Werowocomoco during the thirteenth century AD in a location that had seen seasonal settlement during the Mockley phase.

The densities of artifacts, post molds and shallow pits in this relatively small excavation block also highlight the likelihood that a substantial amount of archaeological deposits have been lost at Werowocomoco.

Stratum	Material	Type	Count
I	Quartzite	Primary decoration flake	1
		Secondary flake	3
		Tertiary flake	2
		Shatter	6
		Fire-cracked rock	2
	Quartz	Tertiary flake	1
		Shatter	2
	Jasper	Tertiary flake	4
		Shatter	3
	Chert	Primary decoration flake	1
II	Quartzite	Primary decoration flake	3
		Secondary flake	10
		Tertiary flake	43
		Shatter	19
		Fire-cracked rock	7
	Quartz	Primary decoration flake	14
		Secondary flake	4
		Tertiary flake	35
		Shatter	62
		Fire-cracked rock	3
		Tested cobble	2
		Core	1
	Jasper	Secondary flake	15
		Tertiary flake	73
		Shatter	2
	Chert	Tertiary flake	4
		Shatter	2
III	Quartzite	Primary decoration flake	6
		Secondary flake	2
		Tertiary flake	48
		Shatter	17
		Fire-cracked rock	15
	Quartz	Primary decoration flake	4
		Tertiary flake	22
		Shatter	27
	Jasper	Primary decoration flake	2
		Secondary flake	19
		Tertiary flake	230
		Shatter	47
	Chert	Tertiary flake	6
		Shatter	1
IV	Quartzite	Tertiary flake	3
	Quartz	Shatter	13
	Jasper	Tertiary flake	8
	Chert	Tertiary flake	2
		Shatter	1

Table 2-12. Non-feature lithics, Riverside Central block.

The Riverside Central block is located 5 to 6 meters from the bluff edge overlooking Purtan Bay. Erosion of the bluff edge has occurred in recent years, though recent efforts at shoreline stabilization have slowed this process.

Stratum	Munsell	Soil texture	Geological stratum	Period	Features	Ceramics (n)	Lithics (n)
I	10YR5/4	Sandy loam	Plow zone	Mixed	-	103	25
II	10YR5/3	Sandy loam	Buried A hosizon	Late Woodland	605, 606, 608, 662	934	299
III	10YR3/6	Sandy loam	Buried A horizon	Middle Woodland	606	441	446
IV	10TY5/6	Fine sandy loam	B horizon	Middle Woodland	-	4	27

Table 2-13. Riverside Central block stratigraphy..

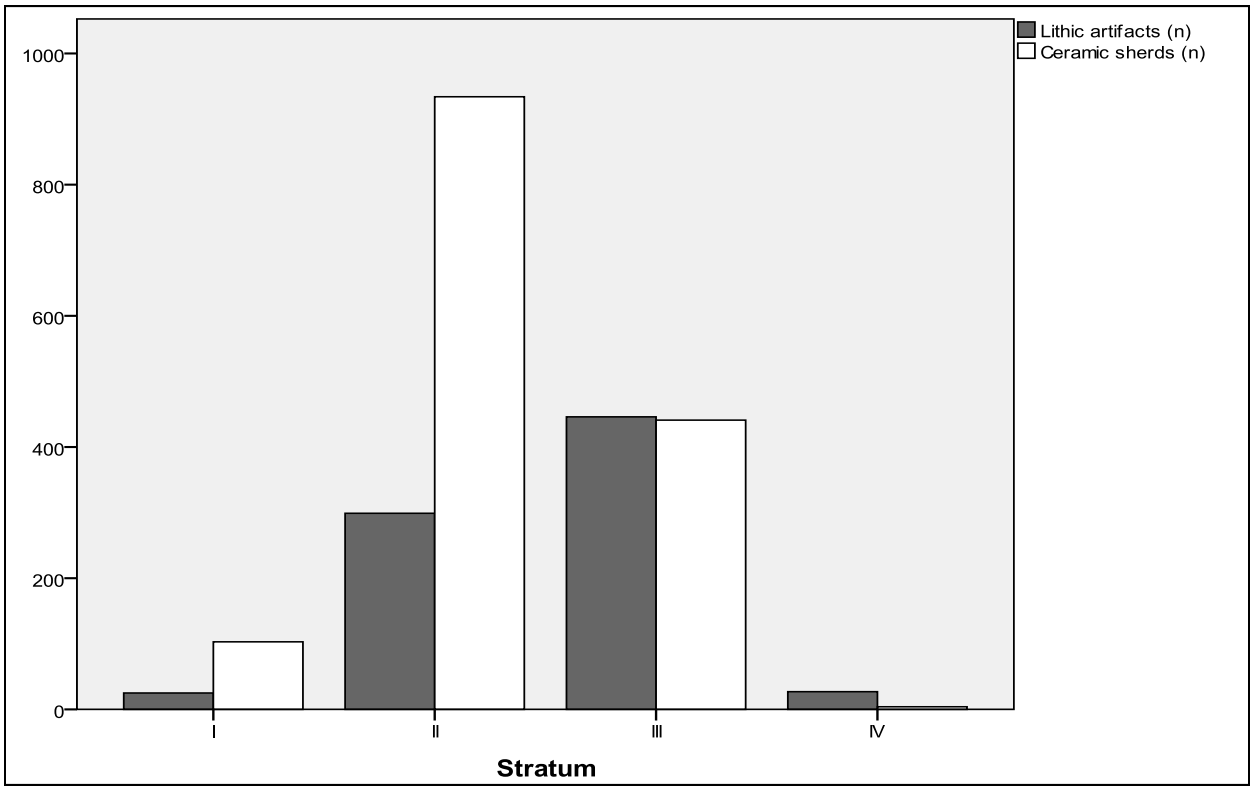

Figure 2-10. Distribution of artifacts, Riverside Central block.

	Ceramics			Lithics		
Feature	Temper	Surface	Count	Material	Type	Count
605	Shell	Fabric	2	Quartz	Hammerstone	1
	Shell	Plain	1	Jasper	Tertiary	2
	Crushed Lithic	Fabric	1	Jasper	Shatter	1
	Unident.	Unident.	14	-	-	-
606	Shell	Fabric	2	Jasper	Secondary	1
	Shell	Plain	1	-	-	-
	Shell	Unident.	5	-	-	-
	Sand	Unknown	1	-	-	-
	Unident.	Unident.	3	-	-	-
607	Shell	Cord	1	-	-	-
	Unident.	Unident.	16	-	-	-
608	Shell	Fabric	7	Quartz	Decortation	1
	Shell	Unknown	5	Quartz	Shatter	1
	Sand	Unident.	1	Quartz	Tertiary	1
	Unident.	Unident.	23	Quartzite	shatter	3
	-	-	-	Quartzite	Tertiary	1
	-	-	-	Jasper	Secondary	1
	-	-	-	Jasper	Shatter	8
	-	-	-	Jasper	Tertiary	5
662	Unident.	Unident.	1	-	-	-

Table 2-14. Feature artifacts, Riverside Central block.

Riverside North Block

The Riverside North block included 5 five-by-five foot excavation units located in the northwestern portion of the site overlooking the mouth of Leigh Creek. These units were opened to identify residential deposits associated with the flat, elevated terrace in this portion of the site.

Excavation units 504, 505, and 506 exhibited a 1.2 foot deep plow zone with a light density of Native artifacts. Several post mold stains and one shallow lens

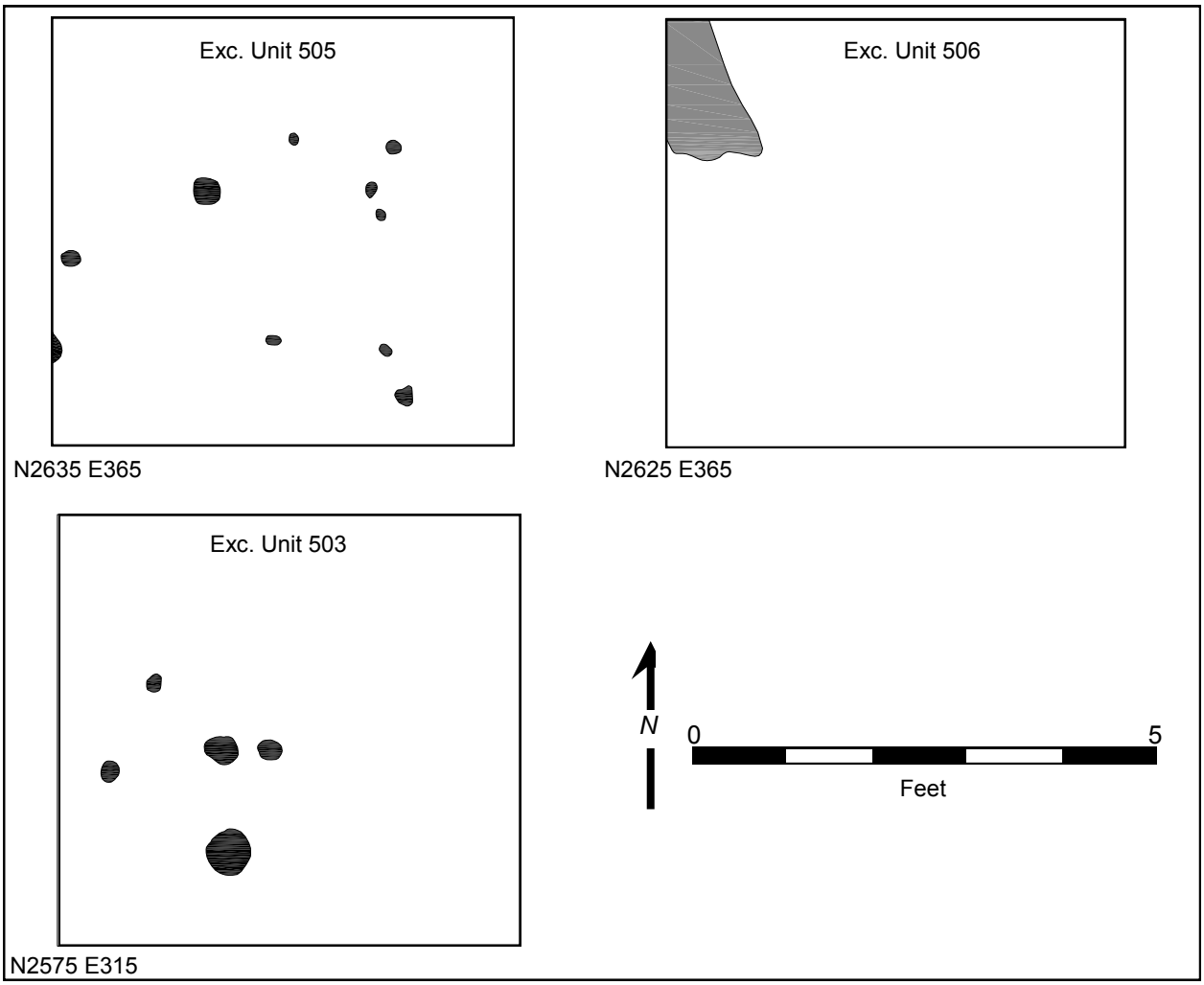

Figure 2-11. Riverside North block, plans of excavation units 503, 505, and 505, plow zone base..

Beta No.	Context	Context note	Material	Conventional Age	1 Sigma Cal. Range	2 Sigma Cal. Range	Median Prob.
207438	TU 500 IIA	Top of buried 'A' horizon	Wood charcoal	270 +/- 70 BP	AD 1490-1940	AD 1450-1950	1620
208957	TU 500IIIA	Buried 'A' horizon	Wood Charcoal	640 +/- 70 BP	AD 1290-1390	AD 1260-1420	1340
211101	TU 500IIIA	Buried 'A' horizon	Maize cupule	610 +/- 40 BP	AD 1300-1400	AD 1290-1410	1350
211102	TU 500IIIC	Bottom of buried 'A' horizon	Maize cupule	570 +/- 40 BP	AD 1300-1400	AD 1300-1370	1350

Table 2-15. Radiocarbon dates, Riverside North block.

Stratum	Temper	Surface	Count
I	Shell	Simple Stamped	3
	Shell	Fabric	62
	Shell	Plain	19
	Shell	Unidentified	24
	Sand	Fabric	2
	Sand	Plain	1
	Crushed lithic	Fabric	1
	Unidentified	Unidentified	177
II	Shell	Simple Stamped	2
	Shell	Fabric	17
	Shell	Unidentified	12
	Shell	Plain	6
	Sand	Plain	2
	Unidentified	Unidentified	218
III	Shell	Fabric	14
	Shell	Plain	4
	Shell	Unidentified	6
	Unidentified	Unidentified	263

Table 2-16. Ceramics from excavation units 500 and 501.

Stratum	Raw Material	Type	Count
I	Quartzite	Primary flake	4
		Secondary flake	9
		Tertiary flake	54
		Shatter	21
		Projectile point fragments	2
	Quartz	Sm. triangular projectile point	1
		Primary flake	23
		Secondary flake	4
		Tertiary flake	23
		Core	1
		Shatter	16
	Chert	Tertiary flake	2
	Jasper	Tertiary flake	1
II	Quartzite	Primary flake	1
		Secondary flake	13
		Tertiary flake	164
		Shatter	31
		Projectile point fragments	2
		Fire-cracked rock	1
	Quartz	Primary flake	5
		Secondary flake	4
		Tertiary flake	28
		Shatter	40
	Chert	Shatter	1
	Jasper	Primary flake	1
		Secondary flake	1
		Shatter	1
		Tertiary flake	2
III	Quartzite	Primary flake	5
		Secondary flake	17
		Tertiary flake	203
		Shatter	12
		Fire-cracked rock	1
		Projectile point fragments	2
	Quartz	Primary flake	3
		Secondary flake	3
		shatter	14
		Tertiary flake	23
		Fire-cracked rock	2
		Tested cobble	1
		Projectile point fragment	1
	Chert	Primary flake	4
		Secondary flake	1
		Tertiary flake	2
		Shatter	2
	Jasper	Core	1

Table 2-17. Lithics from excavation units 500 and 501.

appeared at the plow zone base (see figure 2-11). None of these features contained artifacts.

While no clear residential patterns were identified in this portion of the site, stratified deposits were identified in units 500 and 501. The two adjacent units were located along the edge of a sloping bluff that continues downward north and west toward Leigh Creek. The deposits consisted of a 10YR4/3 brown sandy loam plow zone underlain by two intact, artifact-bearing deposits (strata II and III) and a sterile subsoil (stratum IV). Stratum II contained 10YR3/4 dark yellowish brown sandy loam, and stratum III contained 10YR3/1 very dark gray sandy loam. Stratum IV, which contained no artifacts, consisted of a 10YR6/2 light brown gray loamy sand.

Diagnostic artifacts coming from the two intact strata included predominantly fabric-impressed, shell tempered ceramics dating to the Late Woodland period. None of the ceramics from this portion of the site pointed toward a Middle Woodland occupation.

Perhaps the most significant results to come from the Riverside North excavation block relate to the radiocarbon dates and botanical remains recovered from these stratified deposits. The top of the buried 'A' horizon immediately below the plow zone returned a radiocarbon date with a median probability in the Contact period (see table 2-15). Stratum III contained several maize fragments, two of which calibrate to the fourteenth century AD. Moreover, dates at the top and bottom of stratum II date to a tight interval, suggesting that these charcoal-rich deposits formed over a relatively short period of time. Further discussion of ethnobotanical patterning can be found in chapter 3.

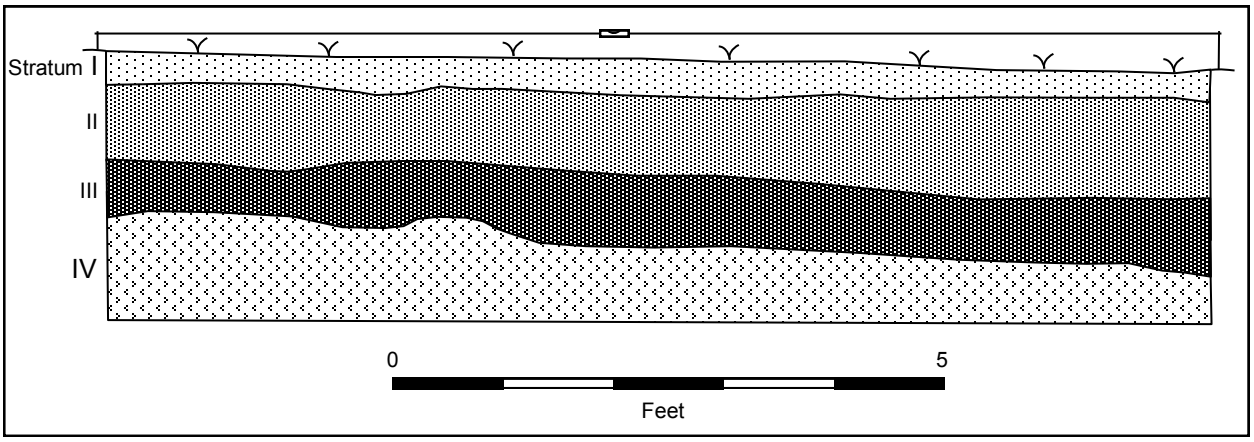

Figure 2-12. Riverside North block, South profile of excavation units 500 and 501.

Central Area

The Central Area block consisted of 10 five-by-five foot excavation units in the central area of the site. These units were opened during the 2005 and 2006 seasons to assess the use of space in this portion of the site. Excavation units 349 through 352, located immediately east of a garage, were opened to mitigate the impact of the planned burial of a tank in this area.

Excavations in test units 349 to 352 encountered a 0.5 foot thick layer of 5YR4/4 reddish brown sandy loam containing twentieth-century materials underlain by a 0.5 foot thick 10YR4/6 dark grayish brown sandy loam plow zone with nineteenth-century diagnostics. The Native artifacts recovered in small numbers from these deposits consisted of materials dating to the terminal Late Woodland.

Excavations in test units 313 and 347 contained an intact horizon beneath the plow zone containing Late Woodland materials. The plow zone in these units consisted of a 0.9 foot thick 10YR3/6 dark yellowish

Ceramics			Lithics		
Temper	Surface	Count	Material	Type	Count
Shell	Simple stamped	2	Quartzite	Primary flake	4
	Fabric	8		Secondary flake	13
	Plain	1		Tertiary Flake	8
	Cord	3		Shatter	1
	Unident.	56		Fire-cracked rock	9
Sand	Fabric	3	Quartz	Primary flake	4
	Unident.	9		Secondary flake	2
	Plain	7		Tertiary Flake	1
Crushed lithic	Unident.	3		Tested cobble	1
Unident.	Unident.	235	Jasper	Triangular proj. pt.	1

Table 2-19. Plow zone artifacts from the Central Area block.

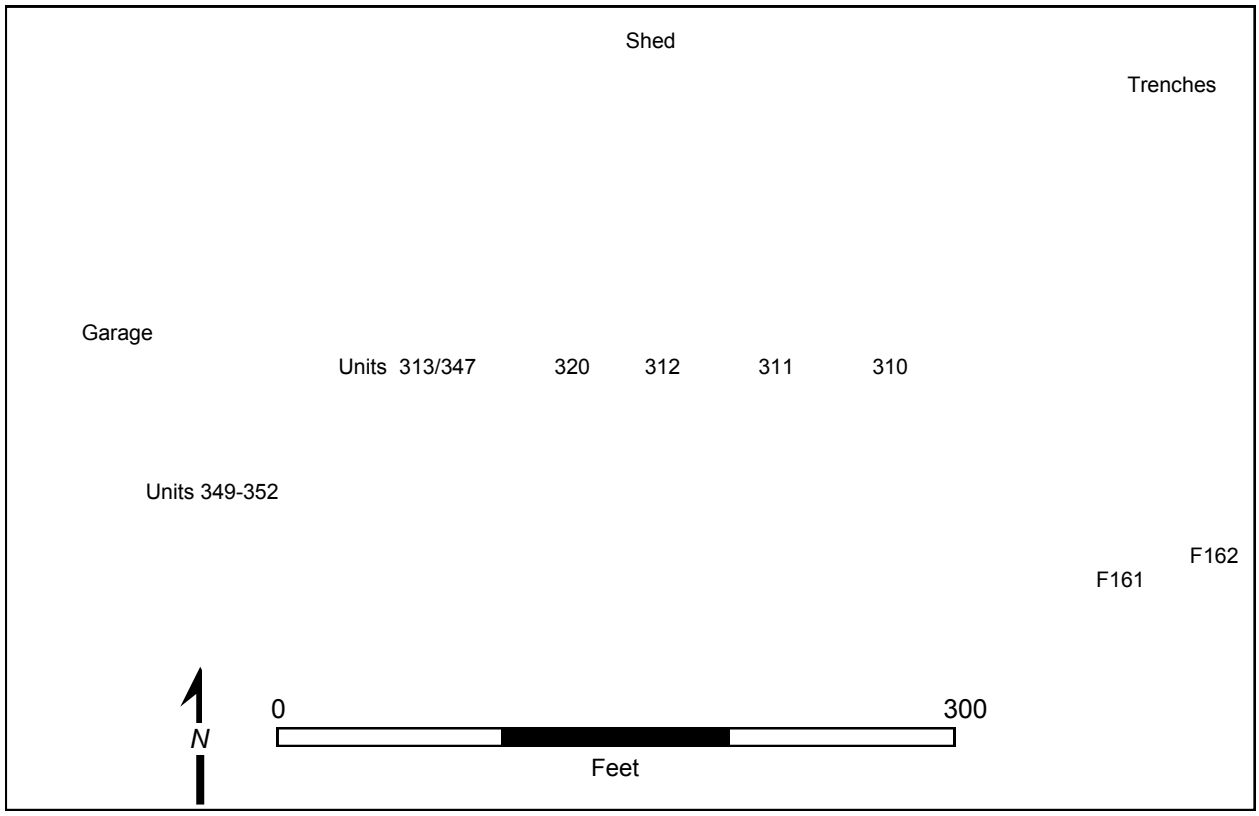

Figure 2-13. Central Area block..

Stratum	Raw Material	Type	Count
I	Quartzite	Tertiary flake	7
		Shatter	8
		Fire cracked rock	1
		Projectile pt fragment	1
	Quartz	Shatter	1
		Shatter	1
		Tertiary flake	1
II	Quartzite	Tertiary flake	2
	Quartz	Shatter	8
	Jasper	Shatter	2
III	Quartz	Shatter	1

Table 2-20. Lithics from stratified deposits, Excavation units 313 and 347.

Stratum	Temper	Surface	Count
I	Shell	Fabric	18
		Plain	4
		Unident.	13
	Sand	Fabric	13
		Plain	5
		Unident.	12
	Unident.	Unident.	115
II	Shell	Fabric	40
		Cord	2
		Plain	1
		Unident.	29
	Sand	Simple stamped	1
		Fabric	5
		Unident.	3
	Unident.	Unident.	234
III	Shell	Fabric	3
		Unident.	6
	Unident.	Unident.	18

Table 2-21. Ceramics from stratified deposits, Excavation units 313 and 347.

brown sandy loam. Stratum II, a 10YR3/3 dark brown sandy loam, marked a buried 'A' horizon dating to the Late Woodland period containing primarily Rappahannock fabric-impressed pottery. Stratum III, a 'B' horizon of materials leached from stratum II, consisted of a 10YR5/6 yellowish brown sandy clay and contained a light scatter of Native materials.

Perhaps the most striking results of this testing was the paucity of artifacts and the absence of intact Native features in this area. Where excavations closer to the riverfront (i.e. to the west) recovered dense artifact deposits and overlapping post mold patterns, the Central Area yielded few artifacts and no intact features or post molds.

Placed in the context of Werowocomoco's occupation history and spatial organization it is striking that the Central Area is largely devoid of residential features and artifacts. Ethnobotanical assessment of the stratified deposits in this portion of the site included a single maize cupule in the buried 'A' horizon. The presence of maize in this area raises the possibility that this portion of the site contained garden plots for maize and other domesticates.

Trench Features

A series of Native-constructed trench features at Werowocomoco sets the site apart from others in the Chesapeake region. Features 161 and 162 were first uncovered in the eastern interior of the site during the 2003 field season beneath a 10YR4/6 dark yellowish brown sandy loam plow zone measuring 1.1 feet in depth. Approximately 2.5 to 5 feet across and 1 to 3 feet in depth below the plow zone, features 161 and 162 run parallel, separated by a distance of 4 to 7 feet. During subsequent field seasons, our excavations in this portion of the site indicated that features 161 and 162 maintain similar dimensions while extending more than 690 feet north to south. The two features turn gently to the northeast on the north side and sharply to the east on the south side (figures 2-15 and 2-16). Radiocarbon dating of the trenches indicates that they were constructed and filled over a three to four century period stretching from the thirteenth through early seventeenth centuries AD (table 2-22).

While we have not exposed these features in their entirety, there are indications that the trenches roughly accord with a D-shaped pattern found on the earliest known map of Werowocomoco—the Zuñiga map discussed in the final chapter of this report. Our excavations of these features on the north side did not proceed into a densely forested area. Soil deflation and erosion have impacted the southern portion of the features. Here, feature 161 was difficult to identify and the remnants of feature 162 were narrow and shallow. A gap in the trench features is apparent in this area of the site, which slopes southward to the nearby creek.

Adjacent to this gap, excavations in the southeastern portion of the site revealed a complicated series of intersecting features labeled 952, 955, and 956. These features have sizes, shapes, and contents that generally match features 161 and 162. Nonetheless, the relationship between these trenches is difficult to determine due to the erosion. We have postulated that features 162, 952, and 955 may be connected based on their orientations (see figure 2-16).

Materials recovered from the fill of feature 161 and 162 were primarily Native ceramics and lithics, including a light scatter of shell-tempered, simple

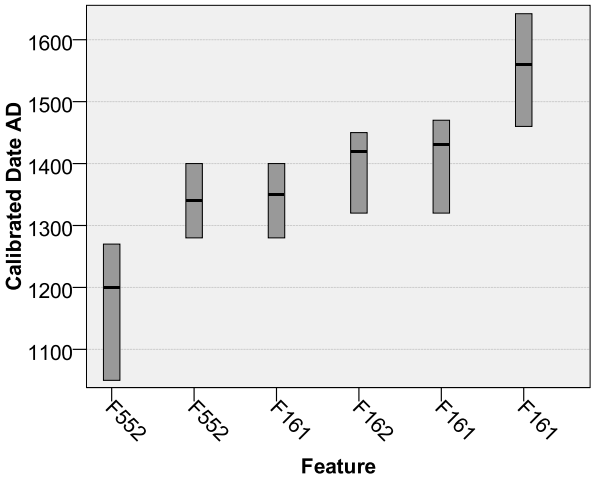

Figure 2-14. Radiocarbon dating results. Calibrated one-sigma range and median probabilities.

Beta No.	Context	Context note	Material	Conventional Age	1 Sigma Cal. Range	2 Sigma Cal. Range	Median Prob.
230508	F552 IIa	Stratum II near top of F552 I	Maize cupule	840 +/- 40 BP	AD 1160 - 1250	AD 1050 - 1270	AD 1200
230509	F552 IIIa	Stratum III in F552 trench fill	Maize cupule	650 +/- 40 BP	AD 1290 - 1390	AD 1280 - 1400	AD 1340
239507	F161 Vb (trench)	Maize near base of F161	Maize cupule	630 +/- 40 BP	AD 1290 - 1390	AD 1280 - 1400	AD 1350
186840	F182 (in F162)	Taproot at trench F162 base	Wood charcoal	500 +/- 40 BP	AD 1410 - 1440	AD 1320 - 1450	AD 1420
186839	F65 (in F161)	Lens near base of trench F161	Wood charcoal	490 +/- 40 BP	AD 1410 - 1440	AD 1320 - 1470	AD 1430
198731	F161 Ic	Near top of trench F161	Wood charcoal	340 +/- 40 BP	AD 1490 - 1633	AD 1460 - 1642	AD 1560

Table 2-22. Radiocarbon dating, features 161, 162, and 552. Calibration with Calib 6.0.1.

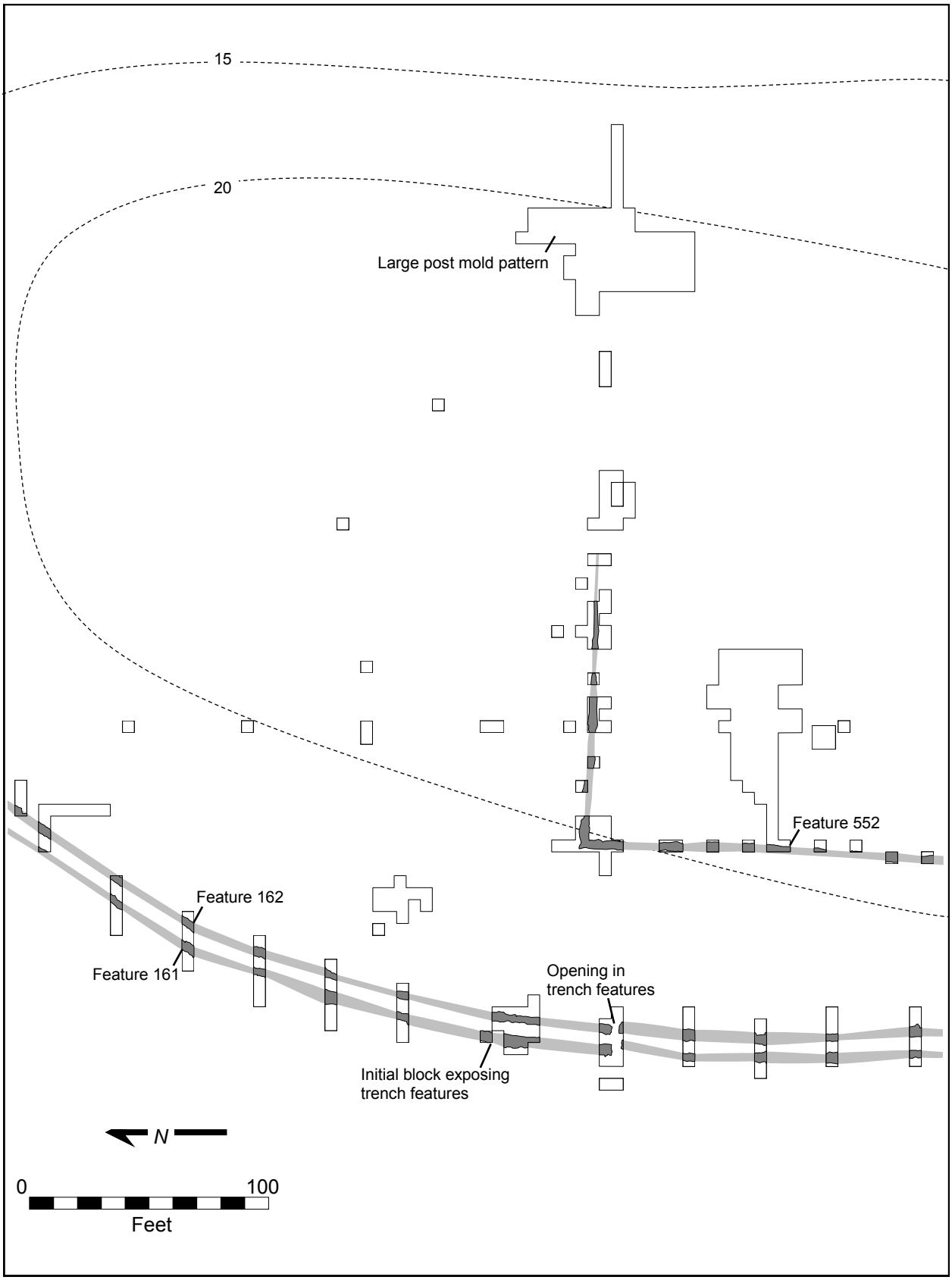

Figure 2-15. Trench features

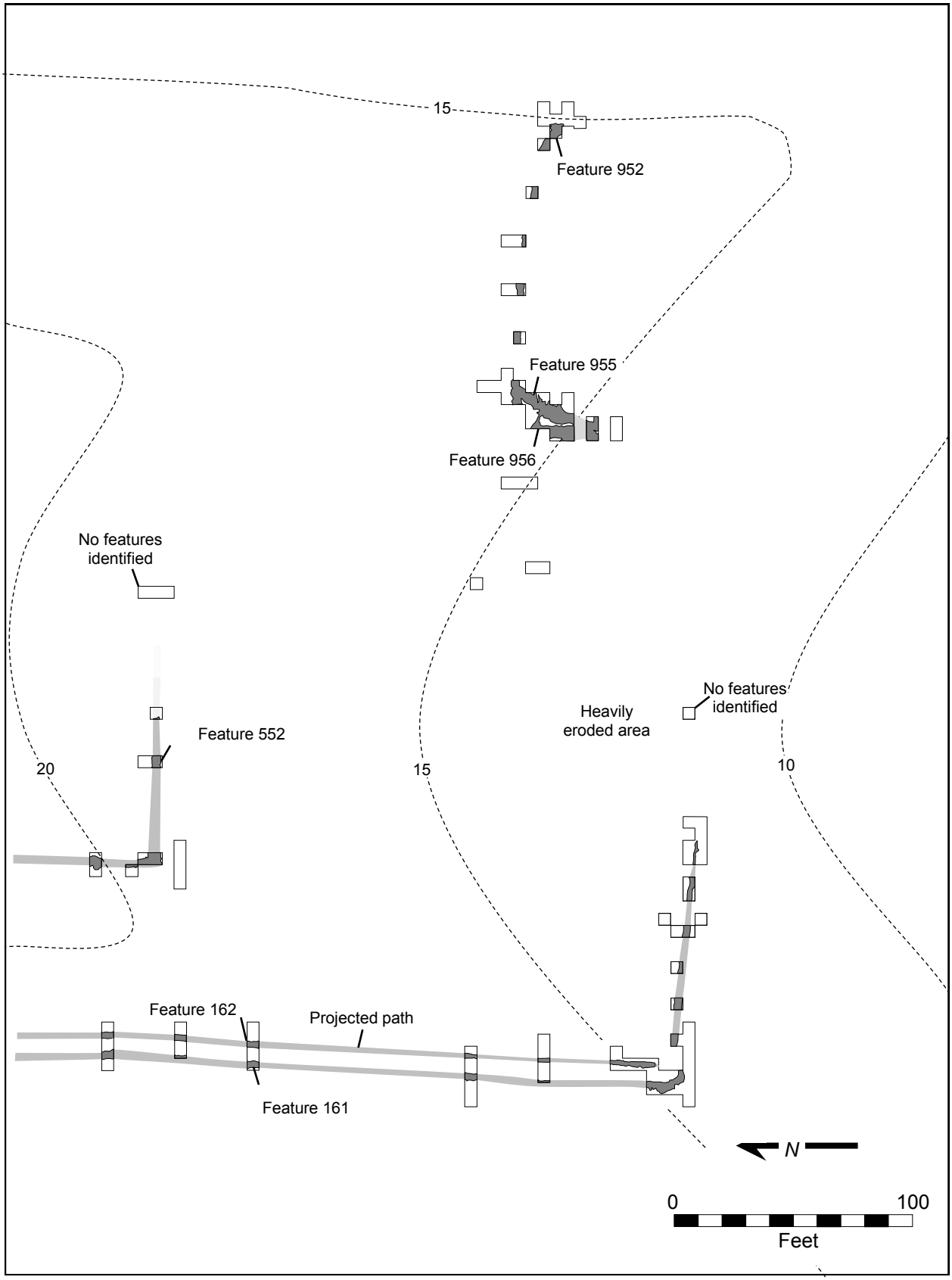

Figure 2-16. Trench features

stamped Roanoke ceramics diagnostic of the terminal Late Woodland and Contact period in coastal Virginia (see the tables below for details). Botanical remains recovered from the trench features, including cultigens and other comestibles are discussed in chapter 3.

One piece of scrap copper, likely a trade good obtained from the Jamestown colonists early in the seventeenth century, was recovered from the top of feature 161 near its northern limit. Of the 12 pieces of seventeenth-century scrap copper recovered during our excavations, 11 were recovered in the site interior. An additional 20 pieces of scrap copper collected from the site interior prior to our excavations match the chemical signature of Jamestown copper (Hudgins 2005). These materials, which are discussed again in the East block section of this report, highlight the link between Werowocomoco's interior spaces and trade relations with Jamestown colonists.

Curvilinear trench feature 952 contained additional materials dating to the early historic period, including several shards of green case bottle glass and kaolin pipe fragments (see table 2-25). These artifacts indicate that at least some portions of the trench features were open during the late sixteenth and early seventeenth centuries when European materials began to appear in the area. The single kaolin pipe stem recovered from this context has bore diameter 3.3 mm, or between 8/64ths and 9/64th of an inch.

Since the size of kaolin pipe bore diameters recovered from sites in the Chesapeake decreased over time, assemblages of pipe stems provide reasonably accurate indications of deposition periods from the sixteenth through the eighteenth centuries. Studies of kaolin pipes from historic sites have linked stem bore diameters to the following date ranges (Deetz 1996:28):

Bore diameter	Date range
9/64	1590-1620
8/64	1620-1650
7/64	1650-1680
6/64	1680-1720
5/64	1720-1750
4/64	1750-1800

While it is not possible to date an archaeological context from a **single** pipe stem with any confidence, the pipe stem recovered from feature 952 is consistent with an early seventeenth-century date.

A third trench, feature 552, was identified during the 2005 season running north-south approximately 75 feet east of feature 162. Feature 552 turns to the east on its north and south ends before disappearing in an area of heavy plow disturbance.

Excavations from 2004 to 2010 in this area focused on identifying the overall configuration of these features, their contents, and chronology. Our excavation strategy initially centered on an effort to "ground-truth" the results of a remote sensing survey. The fluxgate gradiometer survey (Clay 2005) indicated that the trenches extended southward, across the gravel road for a considerable distance before turning to the east.

While not all of the anomalies identified on the remote sensing survey were, in fact, cultural features, the survey did orient our subsequent efforts to expose the trench features. Working north and south of the original excavation block, we excavated a series of excavation units perpendicular to the orientation of the trenches in order to trace their extent. This approach allowed us to expose the extensive trench features efficiently. As summarized in the tables below and the profile drawings, we have tested the trench features in a number of areas in order to address our research questions. In keeping with archaeology's conservation ethic, though, we have left most of these features unexcavated for future researchers.

The considerable size of these trenches and their association with a political center mark the features as particularly significant in Tidewater Algonquian culture history and in the emergence of the Powhatan chiefdom. Prior to the excavation of these features, no monumental-scale architecture had been identified in Tidewater Virginia. We have argued that the Werowocomoco trenches played a role in defining Werowocomoco as a place of power and of deep history.

A series of radiocarbon dates from the three trenches indicate that the interior trench (feature 552) produces the earliest results, with median calibrated dates ranging from AD 1200 to 1350, while the outer trench features 161 and 162 produce calibrated median dates ranging from AD 1350 to 1560. These dates suggest the initial construction of a small trench enclosure circa AD 1200, and a larger pair of trenches beginning AD 1350. Radiocarbon dates from the interior trench (feature 552) indicate that the feature filled during the period from AD 1200 to 1350. The outer trenches apparently filled between AD 1350 and the early colonial era.

Looking more broadly, it is clear that the incorporation of earthworks into monumental spaces occurs with some frequency in other portions of the Eastern Woodlands, particularly in the interior areas influenced by the mound-building Adena, Hopewell, and Mississippian traditions. Nevertheless, trenches are rare in

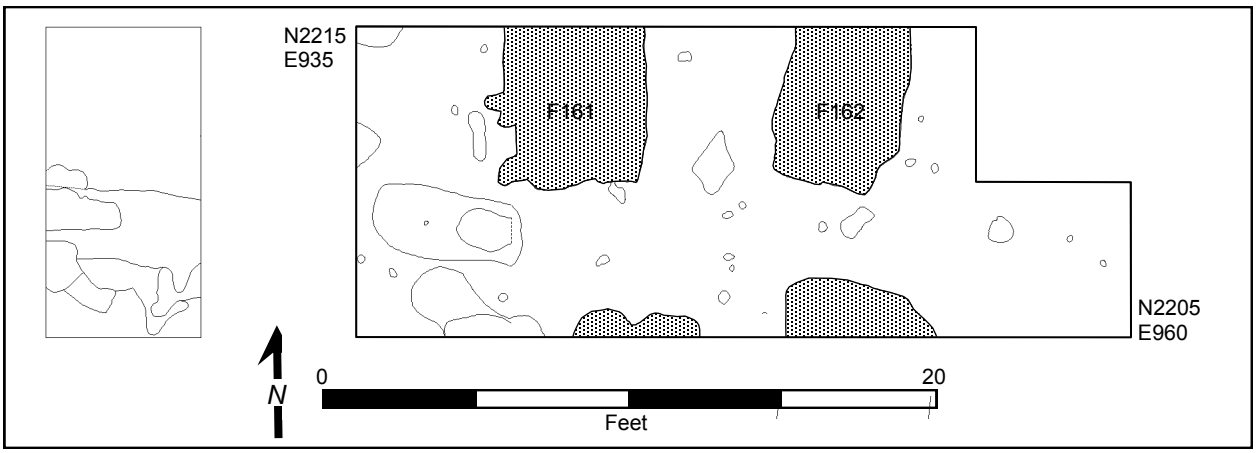

Figure 2-17. Partial plan view of features 161 and 162.

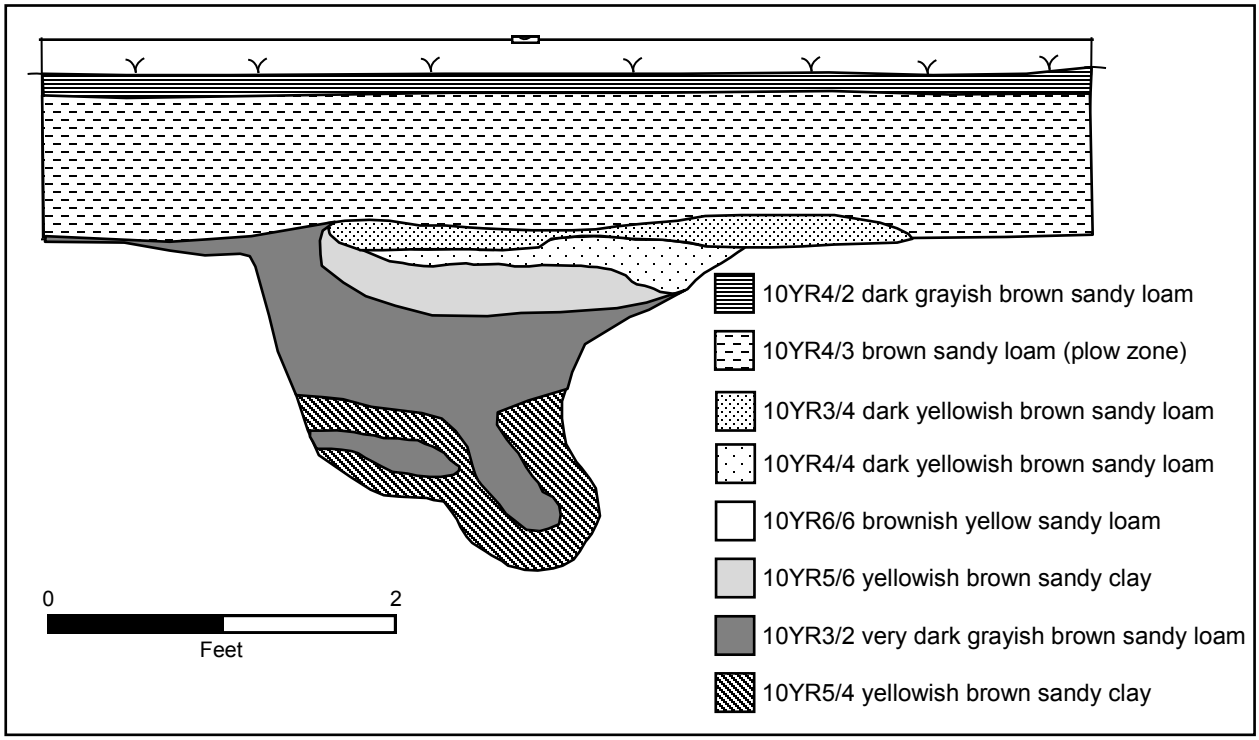

Figure 2-18. South profile of feature 161 in excavation units 103 and 104.

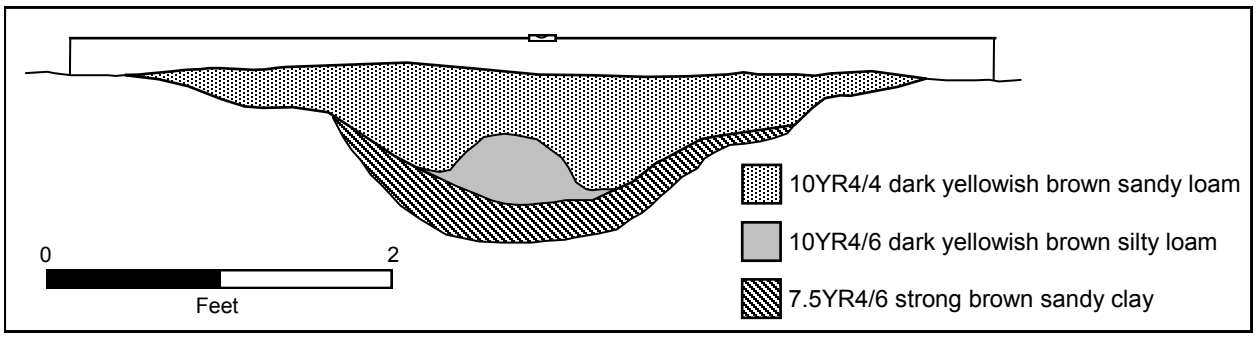

Figure 2-19. North profile of feature 162 in excavation units 106 and 107.

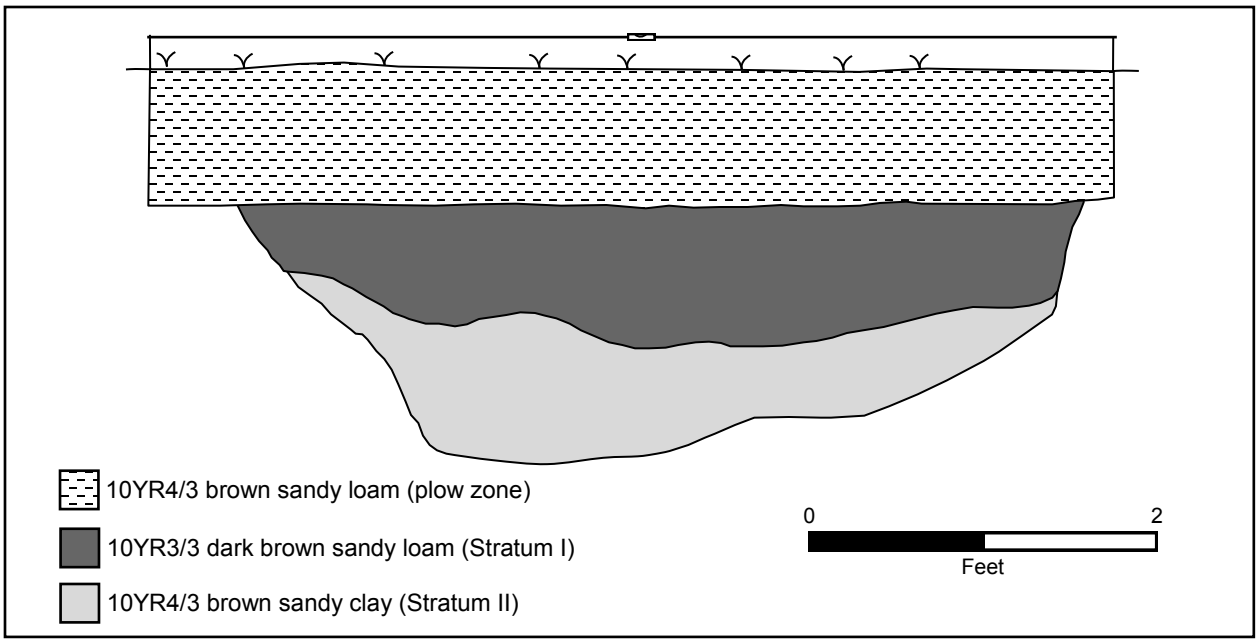

Figure 2-20. North profile of feature 956 in excavation unit 696.

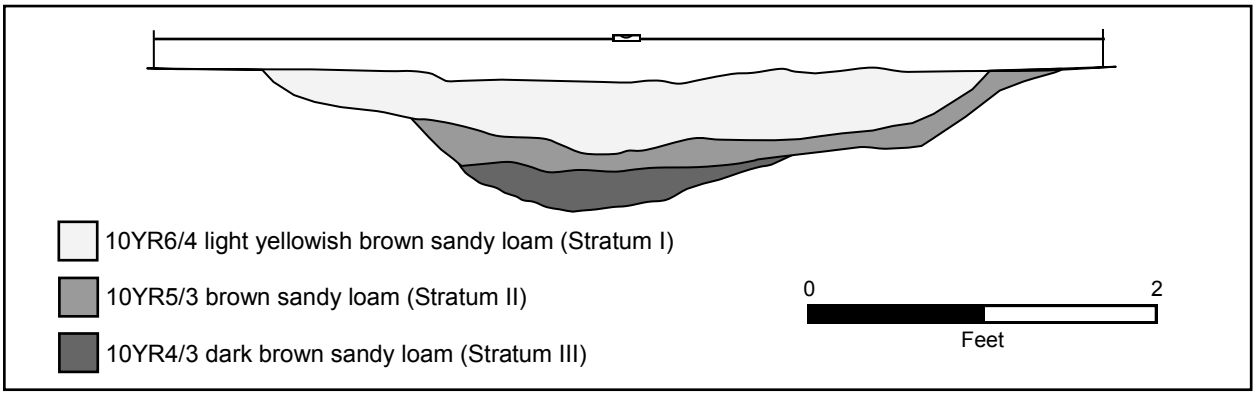

Figure 2-21. Southwest profile of feature 955 in excavation unit 663.

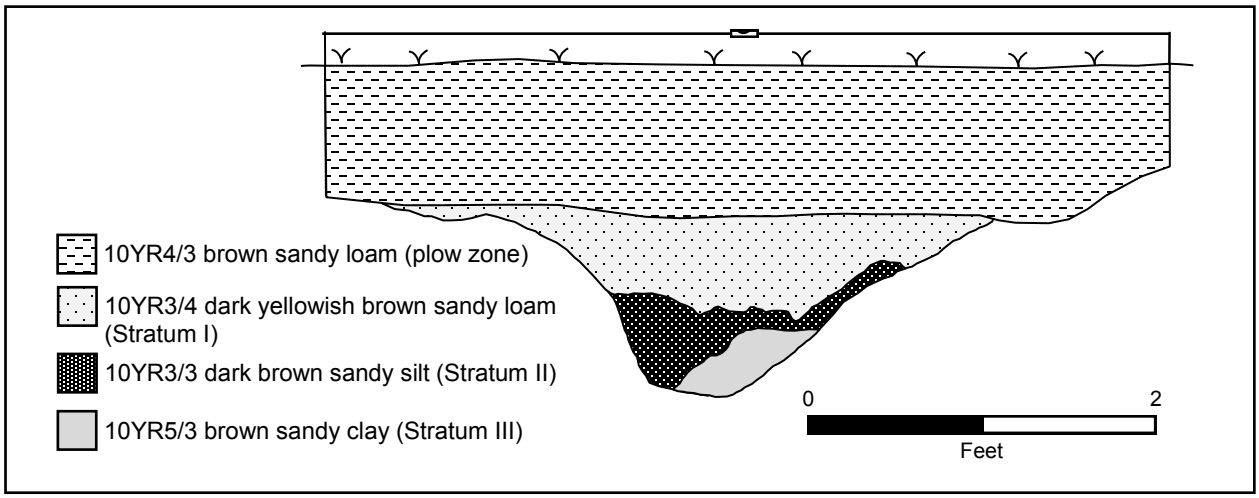

Figure 2-22. West profile of feature 952 in excavation unit 691.

Feature	Context identified within	Stratum	Level	Ceramics	Lithics
65	Feat 161	I		Plain shell-tempered sherds (14)	
65	Feat 161	I		Roanoke sherd	
65	Feat 161	I		Crushed lithic tempered Native sherd	
65	Feat 161	I			Fire-cracked rock (quartzite)
161	Unit 17	I	a	Roanoke sherds (3)	
161	Unit 17	I	b	Roanoke sherd	
161	Unit 17	III	a	Unidentified Native sherds (2)	
161	Unit 5	I	a	Imported tobacco pipe fragment	
161	Unit 5	II	a		Quartz secondary flake
161	Units 86-87	I	a	Unidentified Native sherds (6)	
161	Units 86-87	I	b	Fired clay fragments (11)	
161	Units 86-87	I	b	Shell-tempered sherds (unident. surface) (2)	
161	Units 86-87	I	c	Shell-tempered sherds (unident.surface) (4)	
161	Units 86-87	I	c	Crushed-lithic tempered (unident surface) (4)	
161	Units 86-87	I	c	Fired clay fragments (4)	
161	Units 103-104	I	a	Shell-tempered, plain-surfaced sherd	
161	Units 103-104	IV	a	Shell-tempered, plain-surfaced sherds (2)	
161	Units 103-104	V	b		Quartz tertiary flake
161	Units 103-104	V	c	Shell-tempered, plain-surfaced sherd	
161	Unit 261	I	a	Rappahannock incised sherd	
161	Unit 261	I	b	Roanoke sherd	Quartzite secondary flake
161	Unit 261	I	c	Shell-tempered, plain-surfaced sherd,	
161	Unit 261	I	d	Shell-tempered, plain-surfaced sherd	Quartzite secondary flake
161	Unit 261	II	a		Quartz tertiary flake

Table 2-23. Artifacts from trench feature 161 (including features identified within the trenches).

Feature	Context identified within	Stratum	Level	Ceramics	Lithics
123	Feat 162	I		Sand-tempered, fabric-impressed sherd	
162	Unit 14	I	b	Roanoke sherds (2)	
162	Unit 14	I	c	Roanoke sherd	
162	Unit 4	I	c	Roanoke sherd	
162	Units 106-107	I	a	Roanoke sherds (2)	
162	Units 106-107	I	a	Shell-tempered, plain-surfaced sherds (5)	
162	Units 106-107	I	b	Shell-tempered sherds (unident. surface) (2)	
162	Units 106-107	I	c	Shell-tempered sherd (unidentified surface)	
162	Units 106-107	I	d	Shell-tempered sherds (unidentified surface)	Chert shatter
162	Units 106-107	II	a	Unidentified Native sherds (2)	Chert shatter
182	Feat 162	I	a	Unidentified Native sherd	
182	Feat 162	I	a	Fired clay fragments (2)	

Table 2-24. Artifacts from trench feature 162 (including features identified within the trenches).

Feature	Context identified within	Stratum	Level	Historical artifacts	Ceramics	Lithics
952	Unit 691	I	a	-	Plain shell-tempered sherd	-
		I	b	-	Roanoke sherd	Quartzite secondary flake
		II	a	Green case bottle base	Shell-tempered sherd (unident. surface)	-
		III	a	Green case bottle shards (10)	Roanoke sherds (2)	-
	Unit 704	I	a	Kaolin pipe stem (9/64 diameter) and bowl fragments (2)	Plain shell-tempered sherds (2)	-
		II	a	-	Roanoke sherd	Quartz shatter
955	Units 663, 664	I	a	-	Roanoke sherds (2)	Quartzite secondary flakes (2), Quartzite fire-cracked rock (2)
		II	a	-	Plain shell-tempered sherds (2)	-
		III	a	-	-	Jasper cobble
956	Unit 697, 698	I	a	-	Shell-tempered sherd (unident. surface)	-
		II	b	-	Roanoke sherds (2)	

Table 2-25. Artifacts from trench features 952, 955, and 956.

the Algonquian Chesapeake, and nowhere on the scale as seen at Werowocomoco. There are some indications that trench construction was associated with other central places, including the Patawomeke center located at the Potomac Creek site (44ST2) (Blanton et al. 1999) and at the Kiskiak chiefly center located on the current Naval Weapons Station (44YO2) (Blanton et al. 2005).

East Block

The 2100 square foot East block was located approximately 1300 feet (about 400 meters) from the riverfront. Our excavation goals in this portion of the site, currently in pasture, centered on locating intact deposits that shed light on activities occurring east of the trenches. A systematic-random sample of five-by-five foot test units in the pasture east of the trenches located generally light densities of Native artifacts in the plow zone and few intact features. The highest density of Native post molds were uncovered in excavation units located along the pasture's eastern edge.

Plow disturbance in the East block was considerable, especially on the east side. Nonetheless, this area contained intact features including an array of Native post molds and 21 large post stains, some with post hole / mold patterning. These features appeared beneath a 1.1 foot 10YR4/6 dark grayish brown sandy loam plow zone.

Excavation of one of the large posthole/post mold features recovered eighteenth-century ceramics (tin-glazed earthenware and white salt-glazed stoneware), brick fragments and a nail, suggesting that these features post-date the Native occupation. These postholes represent at least one historic building, possibly a barn, and likely several fence posts, all dating to the eighteenth century Most of the sampled Native posts contained no artifacts, though four did include Rappahannock fabric-impressed pottery and one included a Roanoke simple-stamped sherd. A radiocarbon date from charcoal in one post mold (Feature 587) returned a one -sigma calibrated result of AD 1475 - 1631, indicating that the structure may have been occupied during the years when Wahunsenacawh was present at the settlement.

We recovered a light density of Native artifacts from the plow zone (tables 2-27 and 2-28), including predominantly shell-tempered, fabric-impressed or plain ceramics and four small triangular projectile points, all of which point toward a Late Woodland / Contact period occupation.

As discussed in detail in our 2003 report, 20 pieces of copper matching the chemical signature of scrap metal traded from Jamestown were collected by property owner Lynn Ripley from the area surrounding the East block prior to our systematic excavations. Since then we have recovered an additional 12 pieces of copper with similar characteristics. All but one of these artifacts was recovered from the interior portion of the site east of the trench features.

Figure 2-23. Jamestown copper from Werowocomoco.

Identifying the post mold patterns of Native architecture in the East block proved to be difficult due to disturbance from the colonial occupation and modern

Beta No.	Context	Context note	Material	Conventional Age	1 Sigma Cal. Range	2 Sigma Cal. Range	Median Prob.
208955	F587	Post, within architectural pattern	Charcoal	350 +/- 40 BP	AD 1475 - 1631	AD 1455 - 1637	AD 1552

Table 2-26. Radiocarbon date results, post mold Feature 587.

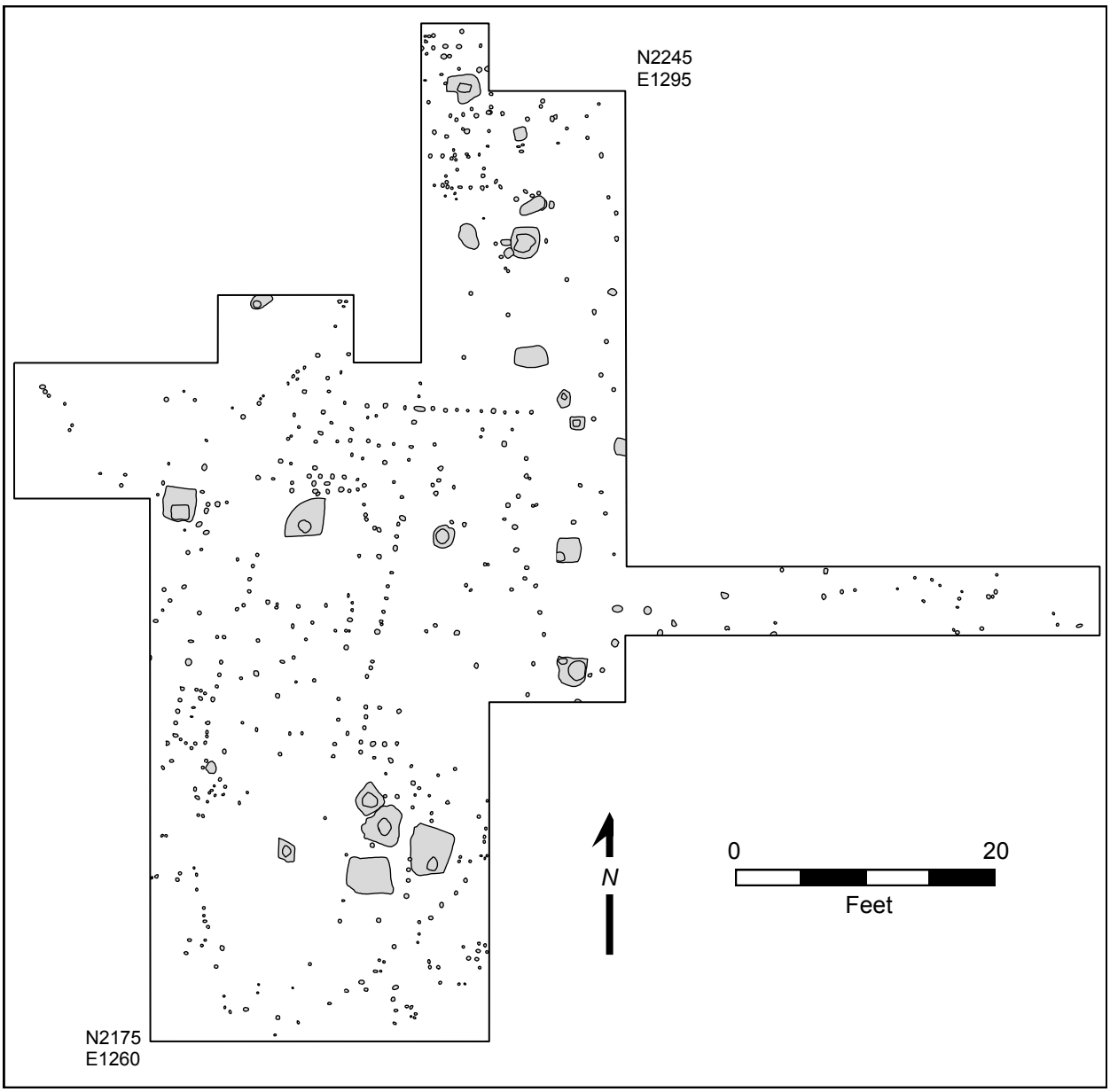

Figure 2-24. Plan of East block features. Shaded features are historic.

plowing. The abundance of small Native post mold stains ranging from 0.2—0.3 feet in diameter further complicated the effort. Nonetheless, the excavators noted in the field a line of post molds running north/northeast to south/southwest and a second line roughly perpendicular to this one near the center of the block. Arcing lines of posts near the northern and southern edges of the block were also apparent to the excavators. Figure 2-25 combines these lines in an interpretation of a possible structural pattern measuring approximately 72 feet (22 m) in length and 20 feet (6 m) in width. Since the plow disturbance was greatest on the east side of the excavation block, the postulated line of posts there is not as clear in this portion of the structure. With an area of approximately 1130 square feet (or 103 square meters), this structure represents the largest Native house pattern identified in the Chesapeake (Gallivan 2003:116).

Several lines of evidence support the interpretation that this pattern does indeed represent a large Native structure and one most likely associated with Wahunsenacawh. First, the roughly elliptical shape of the pattern matches most other Native structures identified in Tidewater Virginia. Second, while the structure at Werowocomoco appears to be remarkably long, a handful of other unusually large structures in the region have widths and center support posts closely

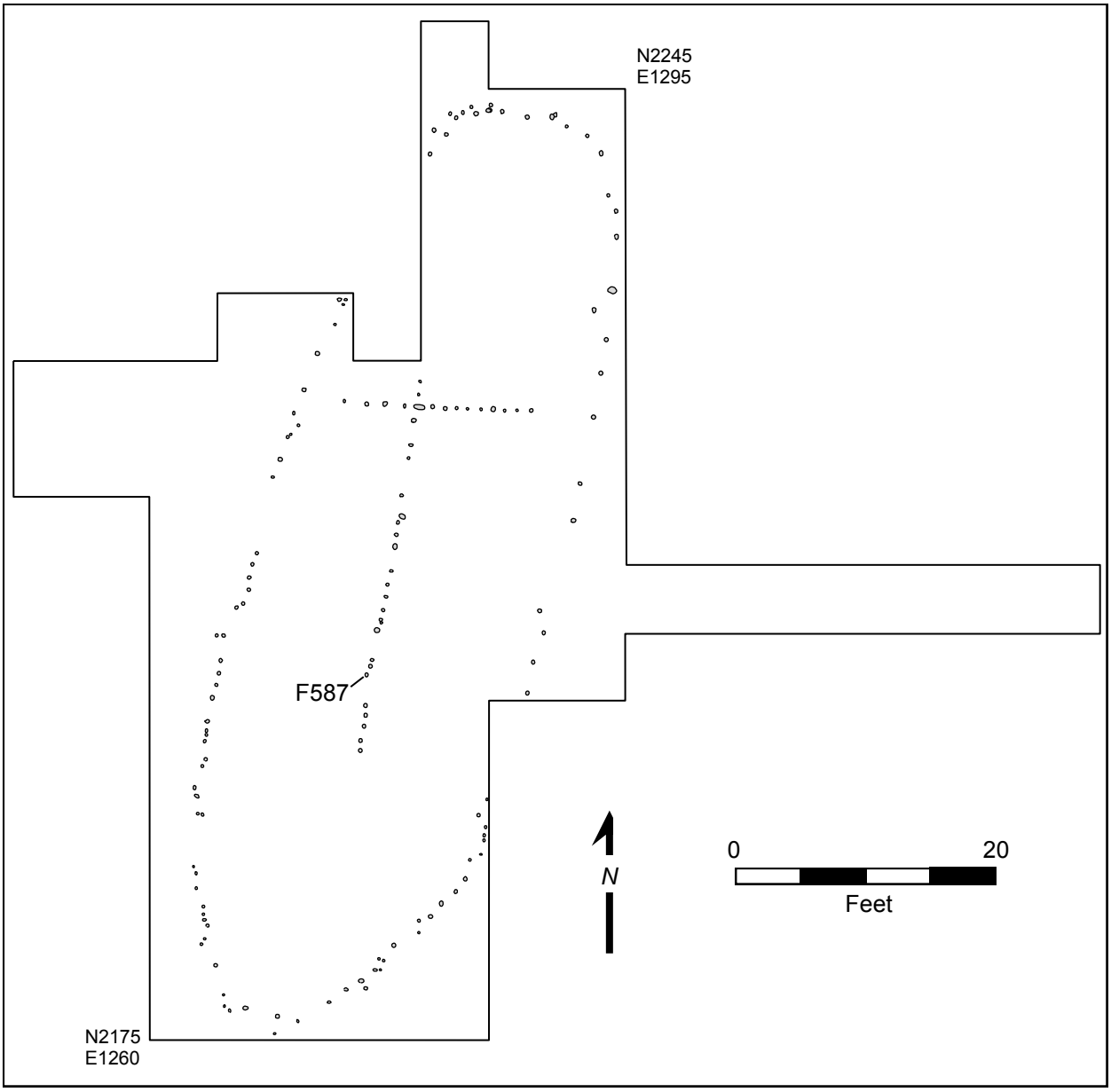

Figure 2-25. Interpretation of possible house pattern in East block.

matching the dimensions found at the Werowocomoco site (Turner 1992:110-112; Gallivan 2003:116). Third, the generally modest counts of Native artifacts recovered from the East block—with the exception of fire-cracked rock—accord well with relatively clean domestic space marked by a series of hearths.

In addition, English colonists' references to Native architecture echo elements of the archaeological patterns at Werowocomoco. In his *Relation of Virginia* Henry Spelman (1998:487) wrote:

> Their building are made like an oven with a little hole to come in at, but more spacious within, having a hole in the midst of the house for smoke to go out at. The king's houses are both broader and longer then the rest having many dark windings and turnings before any come where the king is.

John Smith's (1986:I-51) *A True Relation* offers this early account of Wahunsenacawh's houses:

> By this great King hath foure or five houses, each containing fourscore or an hundred foot in length, pleasantly seated upon an high sandy hill.

Temper	Surface	Count
Shell	Simple-stamped	13
	Plain	76
	Fabric	79
	Cord	9
	Net	4
	Unidentified	196
Sand	Simple-stamped	3
	Plain	49
	Fabric	15
	Cord	2
	Unknown	56
Crushed lithic	Simple-stamped	3
	Plain	6
	Fabric	4
	Cord	2
Unidentified	Unidentified	76

Table 2-27. Ceramics from East block plow zone.

Material	Type	Count
Quartzite	Triangular projectile point	3
	Hammerstone	1
	Fire-cracked rock	114
	Core	6
	Tested cobble	1
	Primary decortation flake	14
	Secondary flake	25
	Tertiary flake	60
	Shatter	122
Quartz	Triangular projectile point	1
	Fire-cracked rock	1
	Core	5
	Primary decortation flake	24
	Secondary flake	14
	Tertiary flake	47
	Shatter	144
Chert	Core	1
	Primary decortation flake	4
	Secondary flake	5
	Tertiary flake	11
	Shatter	37
Jasper	Primary decortation flake	3
	Secondary flake	5
	Tertiary flake	5
	Shatter	11

Table 2-28. Lithics from East block plow zone.

Of the archaeologically-identified examples in the region, only the structure identified in the East block at Werowocomoco comes close to Smith's estimate that Wahunsenacawh's houses measured 100 feet or more in length. The East block structure also appears to have a screen in the northern end and a center line of support posts, creating internal divisions that echo Spelman's account of a chief's house.

Moreover, Smith also offers some indications of Werowocomoco's layout in his account of a visit there. He describes Wahunsenacawh's house as located "thirty score" from the waterside:

> The next day coming a shore in like order, the King having kindly entertained us with a breakfast, questioned us in this manner. Why we came armed in that sort, seeing hee was our friend, and had neither bowes nor arrows, what did wee doubt? I told him it was the custome of our Country, not doubting of his kindnes any waies. Wherewith, though hee seemed satisfied, yet Captaine Nuport caused all our men to retire to the water side, which was some thirtie score from thence. (Smith 1986-I:69)

Whether thirty score (or 600) refers to a distance of 600 feet, 600 paces (roughly 1500 feet), or 600 yards (1800 feet) is left unclear in the text, yet the implication is that Wahunsenacawh met Smith and Newport in a structure located a considerable distance from the riverfront. Measured on a straight line, the East block is about 1300 feet from Purtan Bay. Due to riverfront erosion at the site in recent years, this distance would have been greater during the seventeenth century. Given that it is unclear precisely where Smith and his party landed at the site, his reference to the distance between Wahunsenacawh's residence and the waterside matches the East block's location rather well.

Finally, the association of Jamestown copper plus the Protohistoric/Contact period radiocarbon date offer additional evidence that the structure in the East block was indeed Wahunsenacawh's. Due to its importance as a highly-valued material, during the early days of the Jamestown colony Wahunsenacawh effectively monopolized the flow of copper from the colonists (Potter 2006, Hantman 1990).

The broader significance of the excavations in the East block relate to the Powhatan use of space in a powerful political center. The evidence uncovered in our excavations suggests that the structure was indeed Wahunsenacawh's, possibly the one described by John Smith in his written accounts.

CHAPTER 3

PALEOETHNOBOTANICAL ANALYSIS

Archeobotanical materials were collected and analyzed from the 2003, 2004, and 2005 field seasons at the Werowocomoco site. Current understanding of the Powhatans' subsistence economy emphasizes a mixture of foraging and horticulture which enabled increased sedentism in these villages, with winter dispersal into the interior for hunting. The Powhatans of the early seventeenth century were, of course, organized in a complex chiefdom which relied upon an efficient horticultural system.

The archeobotanical data from Werowocomoco reflect the role of wild and cultivated plant foods in the subsistence economy, document local landscape conditions, and record the composition of local forest cover during the periods of site occupation. The archeobotanical information from Werowocomoco constitutes the largest such assemblage collected from a Virginia Tidewater site. The materials offer a rich data set that can be compared with emerging regional patterns of Woodland and Contact-era ethnobotany in the region and beyond. The archeobotanical data also provide an opportunity to explore the intersection of the Colonial and Powhatan worlds.

Archeobotanical data have been drawn from pit, post and hearth features, stratified midden contexts, and a set of large landscape features. The archeobotanical dataset derives from three sample types (see table 3-1): flotation, hand-collected carbon, and water-screened samples. One hundred percent of all feature fill excavated—a total of over 4,000 liters—has been flotation-processed. Archeobotanical analysis has been conducted on material from almost half of this total (69 flotation samples totaling over 1,870 liters has been processed and analyzed to date). Six water-screen-recovered samples (all from the extensive river-front midden) and three small hand-collected carbon concentrations (from hearth and trench features) have also been analyzed.

Sample type	N of samples	Total volume (liters)	Weight of recovered carbon (grams)
Flotation	69	1870.03	541.915
Hand-collected carbon	3	NA	0.05
Water screen	6	~375.50	34.415
TOTAL	78 samples	~2245.53 liters	576.38 grams

Table 3-1: Summary of analyzed archeobotanical samples.

Sampling Strategies and Analytical Methods

Flotation Samples

Samples of unscreened soil were secured from each excavated feature and packaged in vinyl bags for a brief period of storage. Soil processing was conducted at William and Mary's Department of Anthropology Archaeology Laboratory. Soil flotation relied on a Flote-Tech flotation system equipped with 0.325 mm fine fraction and 1.0 mm coarse fraction screens. The Flote-Tech system is a multi-modal flotation system which allows for the separation and recovery of plant materials from the soil matrix via agitation in water. Thoroughly dry soil samples were individually processed. Two fractions of material (heavy [sinkable] and light [floatable]) were collected. These floated

portions were air-dried. Entire heavy and light fractions were delivered to archeobotanist Justine McKnight's Severna Park, Maryland laboratory for analysis.

Across the site, processed flotation sample matrices were generally composed of fine sediment and root fibers with quartzitic gravel. Many samples also contained abundant crushed shell. A variety of other ecofacts were noted, including clayey conglomerate, oyster shell, mussel shell, periwinkle shell, small gastropods, bone fragments (some burned), fish scales, copious insect egg cases, rodent or insect excrement, grass fibers, and coniferous needles (non-carbonized).

The processed flotation samples yielded both carbonized and non-carbonized remains. Non-carbonized plant remains observed in the flotation-derived botanical assemblage included root fibers, coniferous needles, and grass fragments (noted and not further categorized) as well as non-carbonized seeds. The seeds occurred in 42% of the flotation samples analyzed. Non-carbonized seeds were identified, but were not picked from the sample matrices or quantified. It is highly unlikely that the non-carbonized plant specimens were interred concurrent with period artifacts and the carbonized macro-botanical remains. Although the persistence of non-carbonized plant remains from rare contexts such as consistently xeric or water-saturated environments does occur (Hastorf and Popper 1988; Minnis 1981; Pearsall 2000), such soil conditions do not characterize the Werowocomoco site. Non-carbonized plant remains occurring within archaeological soil samples from similar open-site environments are usually considered to be intrusive modern specimens (Minnis 1981; Keepax 1977).

All flotation-recovered plant remains were combined and passed through a 2 mm geological sieve, yielding fractions of 2 different sizes for analysis. Weights and sample descriptions of the resulting greater-than or equal-to 2 mm and less-than 2 mm fractions were recorded. The greater-than or equal-to 2 mm botanical specimens were examined under low magnification (10X to 40X) and sorted into general categories of material (i.e. wood, nutshell, carbonized seeds, cultigens, etc.). Descriptions were recorded for each category of the greater-than or equal-to 2 mm material. The less-than 2 mm size fractions were examined under low magnification, their general composition recorded, and any seed or cultivated plant remains encountered were removed for identification.

Identifications were routinely attempted on all seed, nut, cultigen, and miscellaneous plant remains, and on a sub-sample of twenty randomly selected wood fragments from each sample containing *more* than twenty specimens, in accordance with standard practice (Pearsall 2000). Identifications of all classes of botanical remains were made to the genus level when possible, to the family level when limited diagnostic information was available, and to the species level only when the assignment could be made with absolute certainty. When botanical specimens were found to be in such eroded or fragmentary condition as to prevent their complete examination or recognition, a variety of general categories were used to reflect the degree of identification possible: General wood categories within the analyzed assemblage include *'ring porous'*, where specimens exhibited differences between early and late wood growth; *'diffuse porous'*, where specimens exhibited homogenous growth within annual rings; *'deciduous taxa'* where a porous arrangement was apparent; *'coniferous taxa'* where a non-porous structure was evident; and *'unidentifiable'*, where specimens were so fragmentary or minute that no clear section could be obtained upon which to base identification. The category *'amorphous carbon'* was used in this report to classify burned plant remains which lacked any identifiable characteristics.

All identifications were made under low magnification (10X to 40X) with the aid of standard texts (Edlin 1969; Kozlowski 1972; Martin and Barkely 1961; Panshin and deZeeuw 1980; Schopmeyer 1974), and checked against plant specimens from a modern reference collection representative of the Coastal Plain region of Virginia. Specimen weights were recorded using an electronic balance accurate to 0.01 grams.

Waterscreen-recovered Samples

Six archeobotanical samples were waterscreen-recovered from the midden located within the Riverfront North area of the site. A total of 375.5 liters of soil were waterscreened through 1/16th inch window mesh. Recovered artifacts were air-dried, and carbonized plant macro-remains were isolated from non-botanical artifacts and submitted for study. Waterscreen-recovered samples were processed and analyzed using the same methods applied to flotation-recovered materials.

Hand-recovered Carbon Samples

Three small hand-collected carbon samples were submitted for taxonomic identification prior to submittal for radiocarbon dating. The samples contained carbonized plant remains, sediment, and fine carbon dust. Each sample was passed through a 2 mm geologic

sieve to separate size fractions and clean carbonized remains from the sediment. The greater-than-or-equal-to 2 mm fractions were examined with a binocular microscope under low magnification (10X to 40X), and all plant materials were identified. The less-than 2 millimeter fractions were scanned for the remains of seeds and cultivated plants. Hand-recovered samples were processed and analyzed using the same methods applied to flotation-recovered materials.

Analysis Results

Flotation Samples

Flotation of over 1,870 liters of feature sediment produced 541.915 grams of carbonized archeobotanical material (a mean average of 0.2898 grams of material per liter of feature fill). A variety of economically important wild and cultivated plant taxa were represented in the analyzed assemblage. These include a predominance of wood charcoal (dominated by hickory, pine and oaks); nuts (hickory, black walnut and acorn shells were identified); carbonized seeds (including wild fruits and small starchy grains); cultivated crops (maize, beans, and bread wheat); and miscellaneous plant materials (including galls, monocot stem fragments, rind material, fungi, coniferous twigs, leaf stem, and amorphous carbon). An overview of flotation-recovered plant remains from Werowocomoco is presented in table 3-2. A discussion of each class of carbonized plant material encountered within the assemblage is provided below.

Wood Charcoal

Wood charcoal occurred within 97% of the flotation samples analyzed. A total of approximately 37,575 fragments of carbonized wood (>2 mm in diameter) weighing 494.06 grams was recovered (accounting for 91% of the entire flotation-recovered plant carbon, by weight). Of the total wood charcoal, a sub-sample of 1,274 fragments (a maximum of 20 fragments per sample) was randomly selected for identification.

This sub-sample revealed a predominance of hickory *(Carya spp.)* (30% of the selected sub-sample, by fragment count), pines of the southern group (*Pinus taeda [loblolly pine] or P. virginiana [Virginia pine]* in the vicinity of the project area) (24%) and oak species. These include white oak *(Quercus spp. LEUCOBALANUS group)* (17%), red oak *(Quercus spp. ERYTHROBALANUS group)* (4%), and unspecified oak *(Quercus sp.)* (< 1%). Present in lesser amounts were maple *(Acer spp.)* (1%), American chestnut *(Castanea dentata)* (1%), walnut *(Juglans sp.),* Eastern red cedar *(Juniperus virginiana)*, yellow poplar *(Liriodendron tulipifera),* and black locust *(Robinia pseudoacacia)* (all <1%). Wood specimens which were too minute or which exhibited incomplete morphology were assigned to the categories *'diffuse porous'* (<1%), *'ring porous'* (2%), *'coniferous'* (<1%), *'deciduous'* (4%), and *'unidentifiable'* (13%).

Nutshell

1,697 fragments of carbonized nutshell weighing 37.42 grams were recovered from the flotation samples. Nut remains were present in 65% of the samples, and account for 7% of the flotation-recovered carbonized plant macro-remains (by weight). Thick-walled hickory nutshell *(Carya spp.)* (1,603 fragments), black walnut *(Juglans nigra)* (91 fragments), acorn *(Quercus spp.)* (1 fragment), and walnut family *(JUGLANDACEAE)* (2 fragments) were identified.

Cultivated Plant Remains

The class of cultivated plants was well-represented within the Werowocomoco flotation assemblage. A total of 178 specimens weighing 1.315 grams were recovered from 42% of the analyzed flotation samples. Maize (*Zea mays*) remains total 174 specimens and include a variety of morphological elements: kernel (1), kernel fragment (4), cupule segment (7), cupule (23), extruded embryo (1), and cupule fragment (138). The common bean (*Phaseolus vulgaris*) is represented by 2 cotyledons present in 2 separate samples from Feature 428 (a possible storage pit) and a single tentatively identified cotyledon from the Riverfront North midden. A single wheat kernel (*Triticum aestivum*) was recovered from contact-era deposits within the trench Feature 162 that were also impacted by modern plowing.

Carbonized Seeds

A site total of 121 carbonized seed/seed fragments weighing 0.26 grams were encountered within the flo-

Context number		total
Feature		69 samples
Soil sample volume (liters)		1870.03
Total weight carbonized plant remains (grams)		541.915
WOOD CHARCOAL (carbonized)	(number of fragments)	37575
total weight (grams)		494.06
Acer spp. (maple)		10
Carya spp. (hickory)		386
Castanea dentata (American chestnut)		12
Juglans sp. (walnut)		1
Juniperus virginiana (Eastern red cedar)		3
Liriodendron tulipifera (yellow poplar)		4
Pinus spp. (southern pine group)		309
Quercus spp. (white oak)		212
Quercus spp. (red oak)		52
Quercus spp. (oak)		26
Robinia pseudoacacia (black locust)		1
diffuse porous		2
ring porous		29
coniferous		4
deciduous		53
unidentifiable		170
total identified fragments		1274
NUT REMAINS (carbonized)	(number of fragments)	1697
total weight (grams)		37.42
Carya spp. (hickory) nutshell fragment		1603
Quercus spp. (oak acorn) nutshell fragment		1
Juglans nigra (black walnut) nutshell fragment		91
JUGLANDACEAE (walnut family) nutshell fragment		2
SEED REMAINS (carbonized)	(total count)	121
total weight (grams)		0.26
Acalypha spp. (copperleaf) seed		1
Amaranthus sp. (pigweed)		2
Chenopodium spp. (goosefoot) seed		4
Liriodendron tulipifera (yellow poplar) seed		1
Panicum sp. (panic grass) seed		2
Passiflora incarnata (maypop) seed fragment		7
Phytolacca americana (poke) seed		8
Pinus spp. (pine) seed		1
Polygonum spp. (knotweed) seed		12
Prunus spp. (cherry) pit		1
Rhus spp. (sumac) seed		23
Vitis spp. (grape) seed		4
seed fragment		9
FABACEAE (bean family) seed		2
POACEAE (grass) seed		11
SOLANACEAE (nightshade family) seed		1
terminal seed end		4
possible small eroded seed		6
striated seed coat fragment		1
unidentifiable seed coat fragment		5
unidentifiable seed		5
unidentifiable small seed fragment		11
CULTIVATED PLANT REMAINS (carbonized) (total count)		178
total weight (grams)		1.315
Phaseolus vulgaris (common bean) cotyledon		2
possible Phaseolus vulgaris (common bean) cotyledon, eroded		1
Triticum aestivum (wheat) kernel		1
Zea mays (corn)	*total specimens*	174
kernel		1
kernel fragment		4
extruded embryo		1
cupule segment		7
cupule		23
cupule fragment		138
MISC PLANT REMAINS (carbonized) (total count)		1027
total weight (grams)		8.86
leaf stem basal fragment		6
gall		28
fungal fructification		19
coniferous twig fragment		2
monocot stem fragment		1
rind fragment		134
amorphous carbon		837

Table 3-2. Summary of flotation samples.

tation samples. Seeds occurred in 38% of the samples analyzed. Fifteen taxa were identified, along with various categories of unidentifiable specimens. Sumac *(Rhus spp.)* was the most common seed encountered (23 seeds or 19% of the total seed assemblage, by specimen count), followed by grape *(Vitis spp.)* (13 seeds or seed fragments or 11%), knotweed *(Polygonum spp.)* (12 seeds or 10%), grass family *(POACEAE)* (11 seeds or 9%), poke *(Phytolacca americana)* (8 seeds or 7%), maypop *(Passiflora incarnata)* (7 seeds or 6%), goosefoot *(Chenopodium spp.)* (4 seeds or 3%), panic grass *(Panicum sp.)* (2 seeds or 1%), pigweed *(Amaranthus sp.)* (2 seeds or 1%), bean family *(FABACEAE)* (2 seeds or 1%). Single specimens of copperleaf *(Acalypha spp.)*, yellow poplar *(Liriodendron tulipifera)*, cherry *(Prunus spp.)*, pine *(Pinus spp.)*, and nightshade family *(SOLANACEAE)* collectively account for 4% of the seed assemblage. Twenty-six percent of the seeds were inconclusively identified.

Miscellaneous Plant Remains

Miscellaneous archeobotanical materials total 1,027 specimens weighing 8.86 grams (1.6% of the total flotation-recovered remains, by weight). Twenty-eight galls, 19 fungal fructification fragments, 6 leaf stem basal fragments, 1 fragment of monocot stem, 1 coniferous twig fragment, 134 rind fragments, and 837 fragments of amorphous carbon were identified.

Non-carbonized Seeds

Non-carbonized seed remains were present in 42% of the flotation analyzed samples. Twenty taxa were represented: copperleaf *(Acalypha spp.)*, sedge *(Carex*

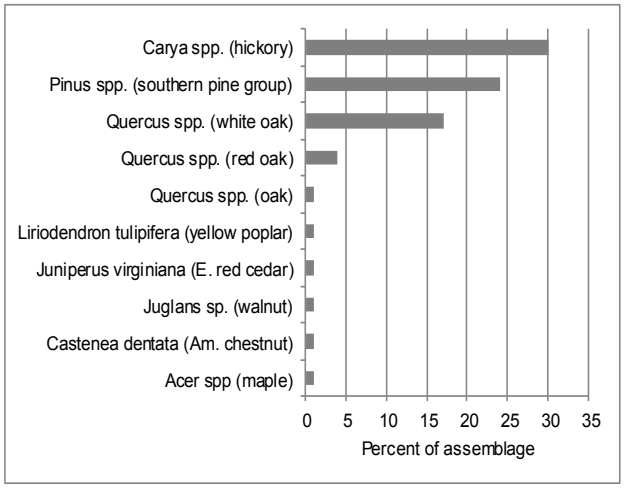

Figure 3-1. Taxonomic composition of woods recovered through flotation.

sp.), goosefoot/pigweed *(Chenopodium/Amaranthus spp.)*, carpetweed *(Mollugo verticillata)*, goosegrass *(Eleusine indica),* woodsorrel *(Oxalis stricta),* panic grass *(Panicum spp.),* panic/foxtail grass *(Panicum/ Setaria spp.),* poke *(Phytolacca americana)*, pine *(Pinus spp.),* raspberry or blackberry *(Rubus sp.),* elder *(Sambucus canadensis),* rush *(Scirpus sp.)*, buffalobur *(Solanum rostratum)*, chickweed *(Stellaria media),* germander *(Teucrium spp.),* vetch *(Vicia spp*.), nightshade *(SOLANACEAE),* and grass *(POACEAE)*. Non -carbonized hickory *(Carya spp.)* (thick-walled) nutshell was present in Feature 403.

Waterscreen-recovered Samples

Waterscreening of over 375 liters of midden soil from the Riverfront North area of the site produced 35.415 grams of carbonized archeobotanical material (a mean average of 0.0943 grams of carbonized plant material per liter of cultural fill). A variety of economically important wild and cultivated plant taxa were represented in the analyzed assemblage. These include a predominance of wood charcoal (especially pine, white oak, and hickory), nuts (black walnut and hickory), carbonized seeds (including wild fruits and small starchy grains), maize, and miscellaneous plant materials including rind material, fungi, leaf stem, a bud, and amorphous carbon. A summary of the waterscreen-recovered assemblage is offered in table 3-6. A discussion of each class of carbonized plant material encountered within the assemblage is provided below.

Wood Charcoal

Wood charcoal occurred within all six of the waterscreen-recovered samples analyzed. A total of approximately 3,068 fragments of carbonized wood (>2 mm in diameter) weighing 30.74 grams was recovered (accounting for 87% of the entire waterscreen-recovered plant carbon, by weight). Of the total wood charcoal, a sub-sample of 120 fragments (a maximum of 20 fragments per sample) was randomly selected for

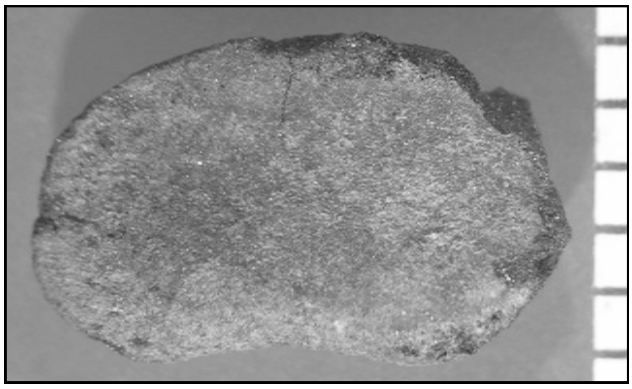

Figure 3-2: Bean (Phaseolus vulgaris) cotyledon recovered from Feature 428. Scale = 1 mm increments

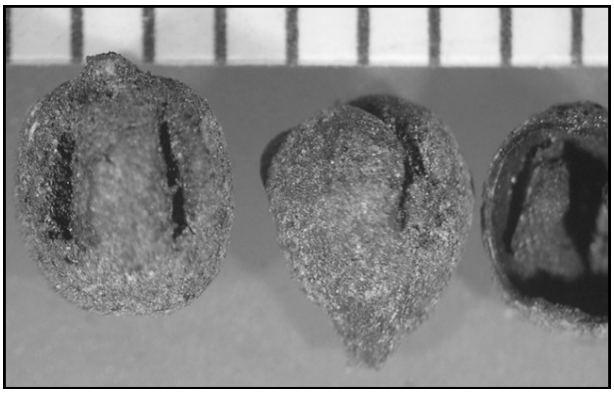

Figure 3-4: Grape (Vitis spp.) seed from Feature 428. Scale = 1 mm increments

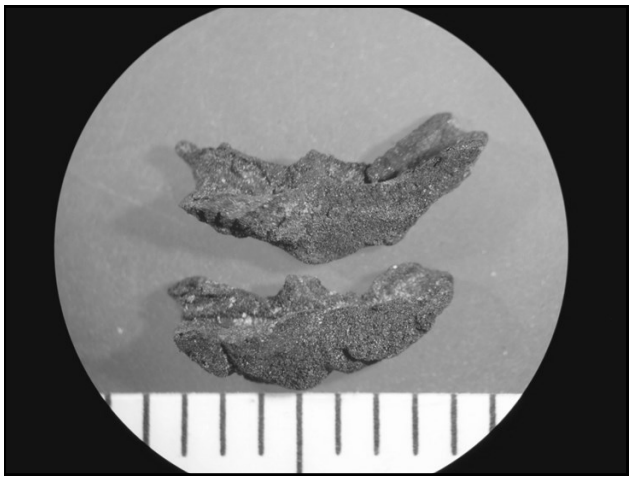

Figure 3-3. Maize (zea mays) cupules from Feature 428.

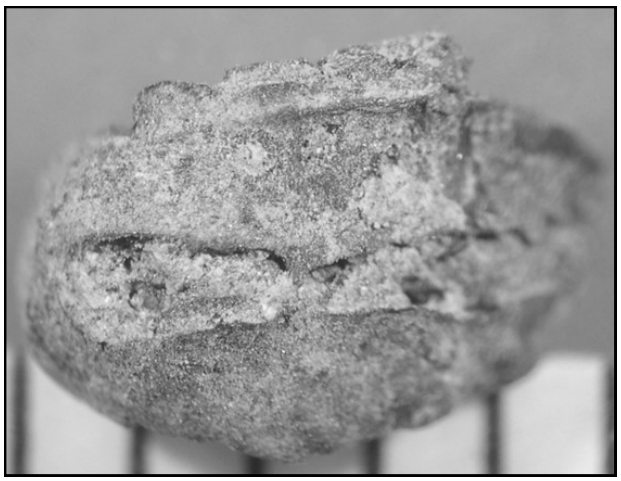

Figure 3-5: Maize (Zea mays) embryo from Feature 428.

WOOD CHARCOAL (carbonized)	(number of fragments)	3068
	total weight (grams)	30.74
Carya spp. (hickory)		14
Castanea dentata (American chestnut)		5
Juniperus virginiana (Eastern red cedar)		2
Pinus spp. (southern pine group)		57
Quercus spp. (white oak)		23
Quercus spp. (oak)		2
ring, deciduous, unidentifiable		17
total identified fragments		120
NUT REMAINS (carbonized)	(number of fragments)	47
	total weight (grams)	0.77
Carya spp. (hickory) nutshell fragment		3
Juglans nigra (black walnut) nutshell fragment		44
SEED REMAINS (carbonized)	(total count)	64
	total weight (grams)	0.26
Phytolacca americana (poke) seed	*entire*	8
	fragments	1
Polygonum pensylvanicum (knotweed) seed		1
Rhus spp. (sumac) seed		8
Vitis spp. (grape) seed		5
	fragment	7
POACEAE (grass) seed		3
unidentifiable small ovoid		6
unidentifiable seed		22
CULTIVATED PLANT REMAINS (carbonized)	(total count)	111
	total weight (grams)	0.325
Zea mays (maize)	*kernel fragment*	3
	extruded embryo	1
	nearly complete cupule	6
	cupule	13
	cupule fragment	89
MISCELLANEOUS PLANT REMAINS (carbonized)	(total count)	344
	total weight (grams)	3.4
leaf stem basal fragment		13
bud fragment		3
fungal fructification		25
rind fragment		1
amorphous carbon		302
Total soil sample volume (liters)		~375.5
Total weight carbonized plant remains (grams)		35.415

Table 3-3: Summary of 6 waterscreened samples.

identification. This sub-sample revealed a predominance of pines of the southern group (*Pinus taeda [loblolly pine] or P. virginiana [Virginia pine]* in the vicinity of the project area) (57 fragments of 48% of the selected sub-sample, by fragment count), oak species (white oak *[Quercus spp. LEUCOBALANUS group])* (23 fragments or 19%),and unspecified oak *(Quercus sp.)* (2 fragments or 2%), and hickory *(Carya spp.)* (14 fragments or 12%). Present in lesser amounts were American chestnut *(Castanea dentata)* (5 fragments or 4%), and Eastern red cedar *(Juniperus virginiana)* (2 fragments or 2%). Wood specimens which were too minute or which exhibited incomplete morphology were assigned to the categories, *'ring porous'* (2%), *'deciduous'* (7%) and *'unidentifiable'* (3%).

Nutshell

Forty-seven fragments of carbonized nutshell weighing 0.77 grams were recovered from the water-screen-recovered floral samples. Nut remains were present in 83% of the samples, and account for 2% of the waterscreen-recovered carbonized plant macro-remains (by weight). Black walnut *(Juglans nigra)* (44 fragments) and thick-walled hickory nutshell *(Carya spp.)* (3 fragments) were identified.

Cultivated Plant Remains

Cultivated plant remains recovered through water-screening included 111 fragments of maize (0.325 grams). Maize remains were present in all 6 of the waterscreen-recovered samples analyzed. Kernel fragments (3), extruded embryo (1), cupule (19), and cupule fragment (89) elements were identified.

Carbonized Seeds

Sixty-four carbonized seed/seed fragments weighing 0.26 grams were encountered within the flotation samples. Seeds occurred in each of the 6 samples analyzed. Five taxa were identified, along with 28 unidentifiable specimens. Grape *(Vitis spp.)* (12 seeds or seed fragments or 19% of the total waterscreen-recovered seeds) was the most common seed encountered, followed by poke *(Phytolacca americana)* (9 specimens or 14%), sumac *(Rhus spp.)* (8 seeds or 13%), grass family *(POACEAE)* (3 seeds or 5%), and knotweed *(Polygonum pensylvanicum)* (1 seed or 2%).

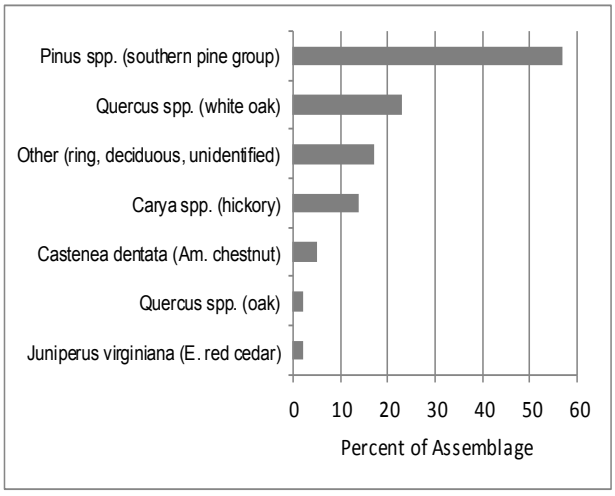

Figure 3-6: Taxonomic composition of woods recovered through water screening.

Miscellaneous Plant Remains

Miscellaneous archeobotanical materials total 344 specimens weighing 3.4 grams (almost 10% of the total flotation-recovered remains, by weight). Three buds, 25 fungal fructification fragments, 13 leaf stem basal fragments, 1 rind fragment, and 302 fragments of amorphous carbon were identified.

Non-carbonized Seeds

Non-carbonized seed remains were present in 50% of the waterscreen-recovered samples analyzed. Poke *(Phytolacca americana)*, pine *(Pinus spp.)*, raspberry or blackberry *(Rubus sp.),* and grape *(Vitis spp.)* comprise the four taxa represented.

Hand-recovered Carbon Samples

Three hand-collected carbon concentrations weighing a total of 0.05 grams were submitted for taxonomic identification. The carbon samples were comprised of burned wood fibers, nutshell fragments, maize, an unidentified bud fragment, and amorphous carbon. Wood charcoal dominated the samples. A total of 3 fragments weighing 0.02 grams were unidentifiable. Nutshell included 3 fragments of thick-walled hickory *(Carya spp.)* weighing 0.01 grams. A single maize *(Zea mays)* kernel fragment, a bud fragment, and 5 pieces of amorphous carbon were also identified.

Context number	**291**	**417**	**428**	**total**
Feature type	**hearth**	**trench**	**trench**	
Temporal association	**LW2**	**Proto / Contact**	**LW2**	
Total weight carbonized plant remains (g)	**0.02**	**0.01**	**0.02**	**0.05**
WOOD CHARCOAL (carbonized frags)	0	2	1	3
total weight (grams)	0	0.01	0.01	0.02
unidentifiable		2	1	3
total identified fragments		2	1	3
NUT REMAINS (carbonized fragments)	3	0	0	3
total weight (grams)	0.01	0	0	0.01
Carya spp. (hickory) nutshell fragment	3			3
CULTIVATED PLANT REMAINS (carbonized) (total count)	0	0	1	1
total weight (grams)	0	0	0.005	0
Zea mays (maize) total specimens			1	1
kernel fragment			1	1
MISCELLANEOUS PLANT REMAINS (carbonized count)	3	0	3	6
total weight (grams)	0.01	0	0.01	0.02
bud fragment			1	1
amorphous carbon	3		2	5

Table 3-4. Inventory of hand-recovered carbon samples.

Discussion

Archeobotanical remains represent largely biodegradable artifacts, with the majority of plant remains decomposing quickly and leaving only a limited and prejudiced sample of the original material. Therefore, there are tremendous biases inherent in interpreting archeobotanical data. These biases are due both to the cultural factors involved in deposition of organic remains and to the physical factors governing the differential preservation of deposited plant artifacts. Despite these biases, carbonized plant macro-remains are preserved in archaeological contexts, even in open-site environments, and they provide us with critical information about human-plant relationships.

Economically Important Plant Foods

The comestible plant remains recovered from Werowocomoco suggest a plant food economy focused on the gathering of a seasonally predictable wild nut harvest, the collection of wild starchy seeds and fleshy fruits, and the cultivation of maize and beans. Different plant food pathways were utilized through time, and the floral assemblage from the site allow us to examine the changing contribution of different plant resources to the subsistence economy.

Mast

Hickories (Carya spp.)

The true (or thick-walled) hickories *(Carya spp.)* include a variety of native species which occupy a variety of ecological zones, and produce a heavy nut crop which ripens during September and October (Radford et al 1964:263-266). Five species of hickory are native to the project area: Pignut *(Carya glabra),* Shagbark *(Carya ovata),* Mockernut *(Carya tomentosa)*, Bitternut *(Carya cordiformis),* and sand hickory *(Carya pallida)*. The true hickories bear oily, edible nuts which ripen in the autumn. Each hickory tree produces a nut crop annually, yielding an average of 1.5-3 bushels per tree (USDA 1948). The hickory nut is covered in a thick husk, which dries and falls away in 4 sections.

The shagbark and mockernut hickory produce the sweetest nuts, while the pignut and bitternut hickories have notoriously bitter flesh. The prevalence of hickory remains from prehistoric archaeological contexts attests to the importance of the species to human subsistence, and the accessibility of the resource to local populations. Nut collection by Native peoples probably focused on gathering fallen nuts from beneath trees. Hickory nuts (referred to as *'walnuts'*) are mentioned in early historic accounts of Algonquian diets (Lorant 1946:250; Quinn 1955:351), and the prevalence of hickory trees in the native forests of the eastern United States is noted by Hariot (Lorant 1946:256).

Black Walnut (Juglans nigra)

The black walnut *(Juglans nigra)* is a medium to large-sized tree which sometimes attains a height of 100 feet and a diameter at breast height (DBH) of 36 inches. The species prefers deep, well-drained, neutral soils and commonly occupies valley slopes and rich (not wet) bottomlands. Black walnut is shade intolerant and often grows along forest margins and in clearings. Black walnuts rarely occur in pure stands, owing to their production of juglone, a substance toxic to other walnut trees. The black walnut fruit is a large, corrugated nut with a thick, durable wall enclosed in a fleshy hull. Black walnut trees produce an annual crop measuring 1 to several bushels which fall from the trees in September through November (USDA 1948).

Black walnut nutmeats were heavily relied upon and favored by historic Indian tribes throughout the range of the species (Gilmore 1919:74; Yanovsky 1936:17). Hariot comments on the use of black walnuts in his accounts of Virginia:

> The kernels of the fruit are very oily and sweet. The inhabitants either eat them or make a milk of them by breaking the nuts with stones and grinding the powder in a mortar with water. This they add to their spoonmeat, their boiled wheat, pease, beans, and pumpkins, thus giving the food a far more pleasant taste (Lorant 1946:250).

Acorns (Quercus spp.)

The oaks indigenous to the Eastern Woodlands of North America are numerous, and together they formed a dominant component in native forests. The oaks grow as trees or shrubs. The fruit of all oak species is a single-seeded, hard coated nut (the acorn) which matures in the fall, reaching peak availability from September through November. Some species bear fruit every year, others (the red and black oaks, specifically), require 2 years to mature such that only one half the trees produce in any given year. On average, oaks produce a yield of 1/4 bushel per tree (USDA 1948).

The most common oaks occurring in Tidewater Virginia include the following species, which occupy diverse habitats defined by soil conditions, microclimate and moisture: White oak *(Quercus alba)*, Southern red oak *(Q. falcata)*, Northern red oak *(Q. rubra)*; Pin oak *(Q. palustris)*, Willow oak *(Q. phellos)*, Post oak *(Q. stellata)*, Black oak *(Q. velutina)*, Water oak *(Q. nigra), S*wamp chestnut oak *(Q. Michauxii), a*nd blackjack oak *(Q. marilandica)*.

Historic accounts of Native Americans preparing and consuming acorns are many (e.g., Smith 1986:I:151). Accounts of acorn caching attest to the practice of storing the fruits for winter use. Lawson, travelling among North Carolina groups of the early eighteenth century, mentions obtaining baskets of acorns to use as food (1952:69,71). The Pilgrims exploring Cape Cod in 1620 observed caches of parched acorns stored in subterranean pits, and hung inside of homes (Cheever 1848:39)

Wild Fruits, Grains and Herbs

A wide range of wild edible plants are represented within the analyzed floral samples from Werowocomoco. An array of fleshy fruits and berries were identified, including cherry, sumac, maypop, and grape. Knotweed, pigweed, goosefoot, and grass produce edible seeds which undoubtedly contributed to the diet. Poke, woodsorrel, and goosefoot provide tender greens/shoots in the spring months. Most of the wild seeds recovered represent plant species pre-adapted to flourish in anthropogenic, open habitats such as habitation sites, garbage middens, and floodplain landscapes. Most of the food-bearing wild plants recovered are common 'edge' species which would thrive in the local forest ecotone, the borders of streams and rivers, and the margins of cultivated land. These taxon are common to such disturbed settings and are often emblematic of human habitation and agricultural areas.

Native Cultigens

The comestible plant remains from Werowocomoco document a subsistence economy focused on maize agriculture and the collection of predictable wild-gathered foods. Squash, gourd, and sunflower are conspicuously absent from the horticultural assemblage. And while wild knotweed and goosefoot seeds are evidenced, none of the recovered specimens exhibit the characteristics of the cultivated forms belonging to the Eastern Agricultural Complex (Smith 1992).

Although maize was introduced to some areas of North America by AD 200 (Ford 1987; Chapman and Crites 1987), it appeared to have been a minor cultigen (perhaps serving a ceremonial role) until after AD 800. Evidence for a shift to maize-centered agriculture in the East comes from a marked increase in archaeological maize remains from AD 800 to AD 900 and changing human bone isotope values which indicate a substantial increase in maize consumption from this period through about AD 1100. This transition to maize-centered agriculture (with the tropical cultigens beans and squash) was associated with increased sedentism and the development of more complex sociopolitical formations. The Late Woodland in Tidewater Virginia is characterized by intermediate-sized farming villages located in floodplain locations.

Direct dates on maize in Virginia point toward a west to east process through which maize appears in the region (Gallivan and McKnight 2010). East of the Blue Ridge, maize appeared episodically in a few locations during the eleventh century AD. All of the earliest maize documented on Virginia's Coastal Plain occurs within sites that represent socially-significant locations within Late Woodland landscapes. These early maize sites functioned as persistent places, locations of ceremony, and political centers.

Maize features prominently in John Smith's accounts of his experiences at Werowocomoco and Jamestown. Smith describes the ceremonial use of cornmeal and maize seed by Powhatan priests prior to his entry into Werowocomoco, provides details of maize cultivation and harvest, and focuses on maize as a valued trade item. While it is absent entirely from Middle Woodland deposits at Werowocomoco, maize increased in frequency during the Late Woodland period until maize remains occurred in roughly half of the sampled feature contexts. Maize remains from six contexts provided direct radiocarbon assays. The two-sigma calibrated dates range from AD 1060 to 1610 (table 3-6).

Werowocomoco's maize is similar to the Eastern Eight-Row type which was more common in the southeast (Wagner 1986, 1987). This type of maize is characterized by 8-row cobs (85-90%) and tapered ears that frequently have enlarged butts. The kernels are wide and thick but not deep and are borne in shallow cupules. The maize kernel recovered from Werowocomoco is broad and crescent shaped, and the embryo is absent. A dislodged embryo was also recovered. The kernel conforms to King's (1994:37) hypothesis that such specimens may have been cooked or soaked (as in the preparation of hominy) prior to carbonization.

Common bean *(Phaseolus vulgaris)* was introduced to some regions of the Eastern Woodlands by AD 1000 to 1200, but was not well-established in the east until the 13th century AD (Hart et al. 2002; Hart and Scarry 1999). Beans were not abundant within the assemblage (n=3), but their presence documents a cultural reliance on maize/bean intercropping.

Comparison of Sampled Contexts

Patterns of plant use are evident when we scrutinize the archeobotanical data by feature type and temporal association. The following analysis is confined to carbonized, flotation-recovered remains.

By Feature Type

The 69 flotation samples analyzed from Werowocomoco conform to five general types (trench, hearth, pit, post, and storage) as well as midden. Patterns are evident in the density of carbonized plant remains recovered from different types of features, as well as in the kinds of plant products represented. These differences shed light on the varied activity areas uses of space within Werowocomoco.

Nine samples from a possible storage pit (feature 428, a deep pit on the riverfront) produced the greatest density of carbonized plant remains (nearly 3 grams per liter), followed by post features (n=9) which averaged 1.5 grams per liter. The trench features (n=22) exhibited the lowest charcoal densities.

The density of different plant remains by feature type speaks to the concentration of food preparation within riverfront areas of the site associated with domestic space. The trench features in the site interior held little by way of food remains.

By Temporal Association

Werowocomoco's archeobotanical data come from contexts associated with a long history, offering the opportunity to examine ethnobotanical changes over time. Archeobotanical materials were recovered from Middle Woodland (500 BC-AD 200), Late Woodland I (AD 900-1200), Late Woodland II (AD 1200-1500), Protohistoric/Contact (AD 1500-1646), and eighteenth-century contexts.

Features associated with Late Woodland II and Protohistoric/Contact period occupations were most heavily sampled (32 samples totaling over 676 liters and 17 samples totaling 580 liters, respectively). The Late Woodland II features were significantly more productive than those from any other period, yielding 0.675 grams of charcoal per liter of floated soil.

BETA	Site	Measured Age	Conventional Age	2 Sigma Calibration
216846	44PG40 Maycock's Point	690 +/- 40 BP	930 +/- 40 BP	Cal AD 1020 to 1200
216847	44PG40 Maycock's Point	670 +/- 40 BP	910 +/- 40 BP	Cal AD 1020 to 1220
227090	44VB7 Great Neck	680 +/- 40 BP	910 +/- 40 BP	Cal AD 1030 to 1220

Table 3-5. Earliest directly-dated maize, Virginia Coastal Plain.

BETA	Measured Age	Conventional Age	2 Sigma Calibration
230507	190 +/- 40 BP	430 +/- 40 BP	Cal AD 1420 to 1500, Cal AD 1600 to 1610
211102	330 +/- 40 BP	570 +/- 40 BP	Cal AD 1300 to 1430
211101	370 +/- 40 BP	610 +/- 40 BP	Cal AD 1290 to 1420
239507	380 +/- 40 BP	630 +/- 40 BP	Cal AD 1280 to 1410
230509	420 +/- 40 BP	650 +/- 40 BP	Cal AD 1280 to 1400
230508	600 +/- 40 BP	840 +/- 40 BP	Cal AD 1060 to 1080, Cal AD 1150 to 1270

Table 3-6. Direct dates on Werowocomoco maize.

	Late Woodland II (AD 1200—1500)	Protohistoric/Contact (AD 1500—1644)
Samples	32	20
Volume (liters)	831	802
Number of features	11	3
Carbonized grams per liter	0.55	0.07

Table 3-7. Summary of Archeobotanical Samples from Late Woodland II through Contact.

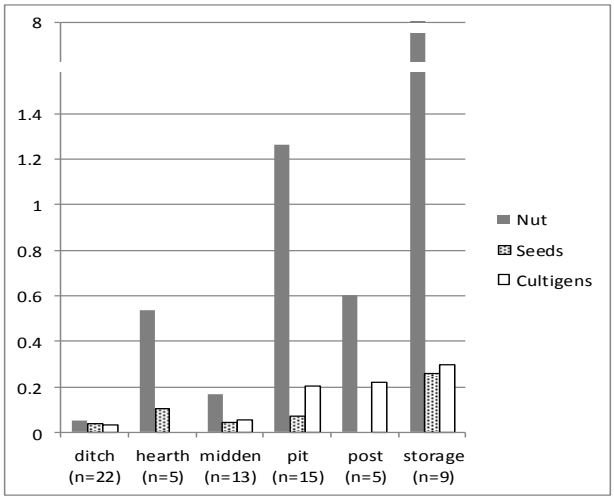

Figure 3-7. Abundance of carbonized plant remains by feature type (fragments per liter of soil).

The densities of wood charcoal (measured using grams per liter of processed soil) are highest in Late Woodland II contexts. Similarly, food plant remains (especially seeds and cultigens) are more abundant and more ubiquitous during the Late Woodland II centuries. The ubiquity of cultivated plant remains and seed remains peaks during the Late Woodland II, corresponding to similarly high wood densities. These patterns document the development of plant-rich features during the years from AD 1200 to AD 1500.

Focusing on Werowocomoco's archeobotanical record from the Late Woodland II through the early seventeenth century, very different patterns are apparent on either side of Wahunsenacawh's move to the site. As noted in table 3-7, Late Woodland II data hail from a greater number of features and more samples, though roughly equal quantities of soil were processed from each period. We see an eight-fold ***decrease*** in carbon densities in the Protohistoric/Contact contexts site wide. This decrease in carbonized plant materials is accompanied by a visible ***decline*** in the ubiquity of all classes of food plant remains based on percentage presence. It should be noted that the relative contribution of different classes of plant foods to the diet (more nuts than cultigens and more cultigens than seeds) remains consistent through both periods.

Comparing the Late Woodland II and Contact era assemblages, we see a measurable decline in the presence of maize during the Protohistoric/Contact period measured according to its presence in features and according to the density of maize per feature volume. Various factors may contribute to this decline in maize's presence: 1) the archaeobotanical maize remains may relate most directly to localized changes in maize *consumption*, rather than in maize *production*—the remains were charred and recovered from feature contexts**,** 2) the apparent decline may be a result of plow disturbance that disproportionately affected Contact-period deposits, and 3) severe droughts recorded during this period (Blanton 2000) may have impacted horticultural productivity. Even considering the possible influence of these factors, the available evidence is particularly clear in that it does **not** support the notion that an increase in maize production occurred at Werowocomoco during the period when the Powhatan chiefdom was centered there. Nor do the data suggest that maize production increased at Contact in response to demand from colonists.

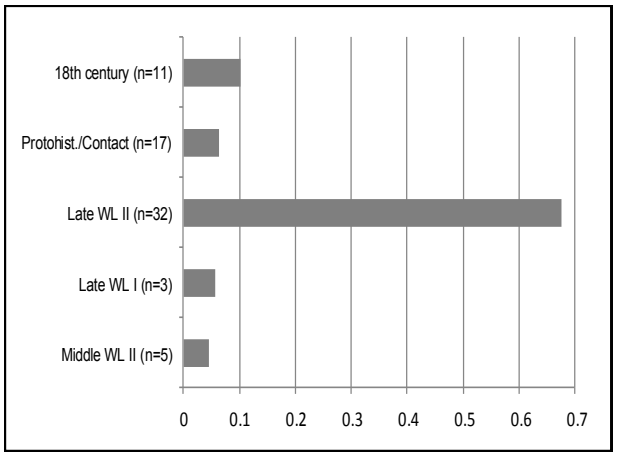

Figure 3-8. Density of carbonized plant remains by period (grams of carbonized material per liter of soil).

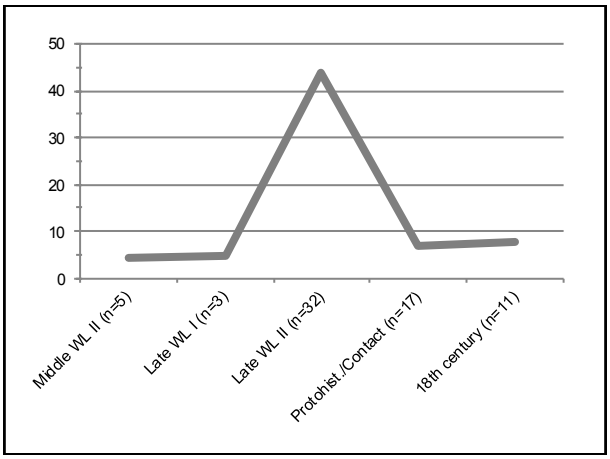

Figure 3-9. Density of wood charcoal through time (fragments per liter of soil).

Landscape

These archeobotanical data contribute to a better understanding of precontact landscape conditions during the Middle Woodland through Contact periods in Tidewater Virginia. The site lies within the Atlantic Slope Section of the Oak-Pine Forest Region (Braun 1950:268-269). Native forest development within the Coastal Plain or Embayed district of this region has been largely influenced by topography and the permanence of abundant water. Native forest cover over the project area was probably characterized by a medium tall to tall forest of broadleaf deciduous and needleleaf evergreen trees. The forest overstory would have been dominated by loblolly and Virginia pines and a variety

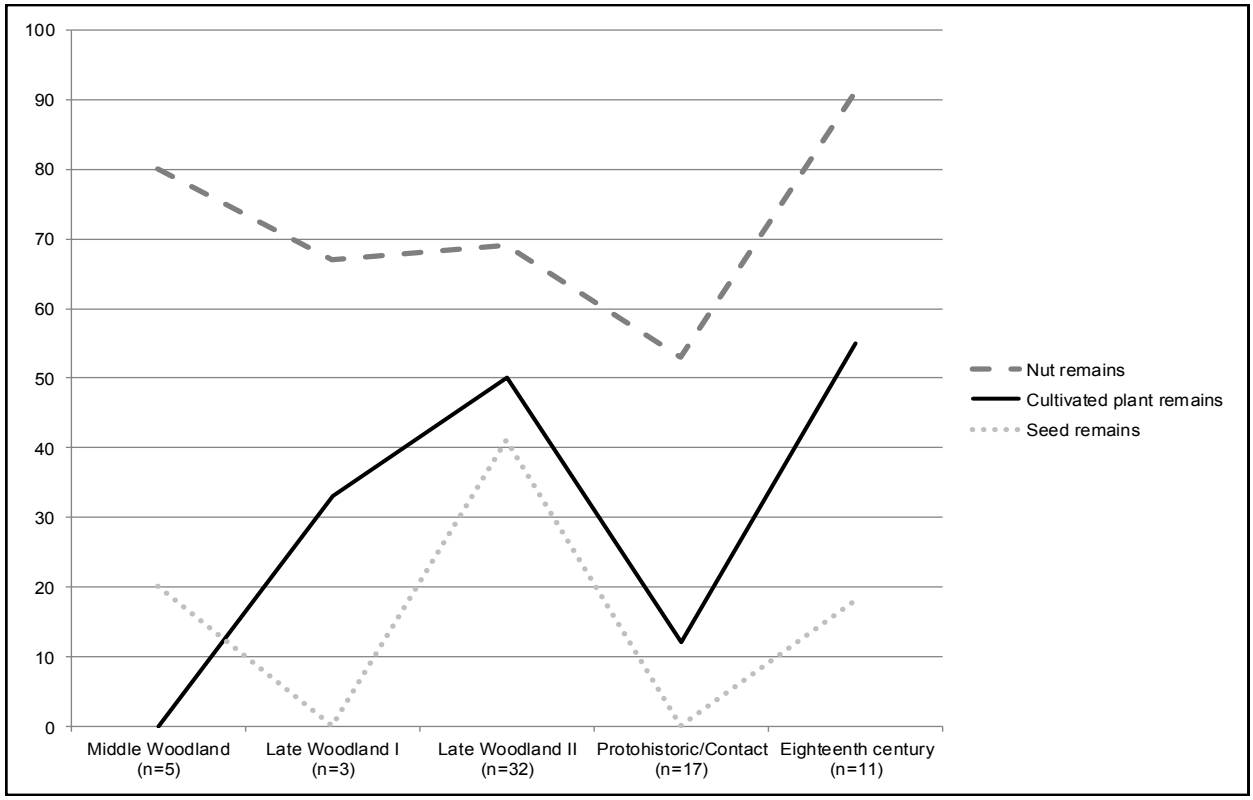

Figure 3-10. Percentage presence of nuts, seeds, and cultivated plants through time.

of hickory and oak species. The wood assemblage from Werowocomoco is composed of taxa characteristic of this native forest association (Kartesz 1999; Little 1971; Harvill et al. 1992).

The site is close to a variety of micro-environmental zones which would have provided an abundance of wild foods throughout much of the seasonal cycle. The archeobotanical data, narrative descriptions and the site setting suggest that the floodplain and lower river terrace were likely characterized by garden plots surrounded by weedy growth and young successional forest. Margins of these areas would have given way to more stable bottomland hardwood forests, and local uplands would have been characterized by the forest association described above.

Seasonality

While plant remains can be strong markers for seasonality, the data are often skewed by the presence of storable foods which can enter the archaeological record at almost any time of the year. While the recovery of a variety of late-summer and fall ripening nuts, seeds, and crop plants at Werowocomoco suggest that the sampled deposits were developed during this period of the year, almost all of the edible plant remains identified constitute readily storable food resources. The ubiquity of nutshell, seeds, and cultigen remains across the site reveals that the village was occupied throughout the growing season for the sowing, tending, and harvesting of crops, and that predictable wild plant foods played a substantial role in subsistence. The presence of maize and beans within the assemblage evidences the saving of seed stock for future planting. In fact, all plant foods recovered archaeologically represent storable plant foods (nuts, maize, beans, starchy seeds and wild fruits) which would have significantly extended the consumption of these plant products into the winter months.

Werowocomoco Ethnobotany

English colonial narratives and art contain vivid descriptions of Tidewater Virginia's flora and the Native food systems in place at the time of European contact. In his *History of Travell into Virginia Britania,* William Strachey (1953:79-80) offered a detailed account of Powhatan Indian foodways:

> About their houses they have commonly square plots of cleared ground which serve them for gardens, some 100, some 200 foot square, wherein they sow their tobacco, pumpkins, and a fruit like into a muskmillion . . . They plant also the field apple—a wild fruit like a kind of pomegranate which increases infinitely and ripens in August, continuing unto the end of October when all other fruits be gathered….In March they live much upon their weirs and feed on fish, turkeys, squirrels, and then, as also in May they plant their fields and set their corn, and live after those months most off acorns, walnuts, chestnuts, chinquapin, and fish. In June, July, and August they feed upon the roots of tuckohoe, groundnuts, fish, and green wheat.

Observations made by Captain John Smith during the years 1607-1609 of York River communities, including Werowocomoco, have given us a view of the ethnobotany of the Virginia Indians at the time of the colonial encounter (Smith 1986). Such accounts have served as the basis for ethnobotanical interpretations of Virginia Algonquian life, and their presumed veracity has heavily influenced the emphasis that archaeologists have placed on doing large-scale flotation and archeobotanical analysis. But the accuracy of these accounts has largely remained untested. The archaeological research at Werowocomoco allows us to see how the archaeological data stand up against some of the most vivid descriptions of early Contact-period Native plant use in North America. These data offer a unique and exciting opportunity to consider material evidence alongside a detailed and geographically-specific ethnohistoric record.

Preceding and following the emergence of the Powhatan chiefdom at Werowocomoco, we see measurable changes in plant use in the archeobotanical record. The data corroborate John Smith's descriptions of a settlement of Late Woodland horticulturalists who cleared forests, managed a diverse natural resource base, and relied upon seasonally-predictable wild foods to fill many of their dietary needs. Discrepancies between Smith's accounts and the floral record at Werowocomoco arise when we try to reconcile both the relative contributions of plant food types to the economy of the site, and the quantity of horticultural products produced at one of the principal Native villages of the day. Smith's descriptions of food and farming practices of the Powhatan people are strongly maize-focused, yet the archeobotancial record suggests

that Mesoamerican cultigens made a relatively small dietary contribution. The presence of maize declined significantly at Werowocomoco during the Protohistoric/Contact period, precisely the moment when John Smith expounded on its abundance. The most striking thing about the Werowocomoco archeobotanical assemblage is the overall scarcity of maize. Site-wide, for all periods combined (over 2200 liters of floated feature fill), we recovered only 286 maize elements (cupules, kernels, or their fragments) - less than would constitute a single ear of common field maize. Beans total only 3 specimens site-wide.

The recovered remains comprise a class of material culture which can be used to address large issues well beyond merely documenting food and landscape – such as how plants (especially maize) relate to the concentration of social power at Werowocomoco, and the wielding of power from it at the time of the colonial encounter.

Summary

The archeobotanical data from Werowocomoco offer valuable information about Virginia Coastal Plain ethnobotany from the Middle Woodland through Contact periods. Archeobotanical remains collected from excavations at Werowocomoco comprises the largest systematically-collected and studied dataset from the Tidewater Chesapeake, providing important baseline data regarding the changing and variable nature of human-plant relationships.

The plant remains reveal a diverse subsistence base involving the propagation, stewardship, gathering, and harvest of storable seasonal resources. A firm reliance on maize characterizes site agriculture after AD 1200, with beans introduced by the mid-fifteenth century. Utilization of the products of a diverse forest ecotone for food and fuel and a cultural reliance on opportunistic weedy plants which flourish in anthropogenic settings is evidenced through all periods.

Importantly, the comprehensive data set both corroborates and diverges from the colonial accounts. Information drawn from these two sources builds a clearer picture of the cultural traditions associated with plant use at Werowocomoco. At the same time, the collective evidence draws into focus questions regarding the role of food—specifically maize—in the exercise of social relationships at the time of contact.

CHAPTER 4

CONCLUSION

A Biography of Place at Werowocomoco

Viewed as a whole, the evidence from Werowocomoco offers a record of settlement history across roughly 1500 years. The radiocarbon dates point toward light settlement during the Middle Woodland centuries of 500 BC – AD 900, no detectible settlement during the centuries from AD 800 to 1100, and intensive occupation from AD 1200 through the Contact period.

Middle Woodland settlement at Werowocomoco is limited to small concentrations of Mockley ceramics, lithic artifacts, and oyster shell along Purtan Bay and the creeks bordering the site. Circa AD 1200,

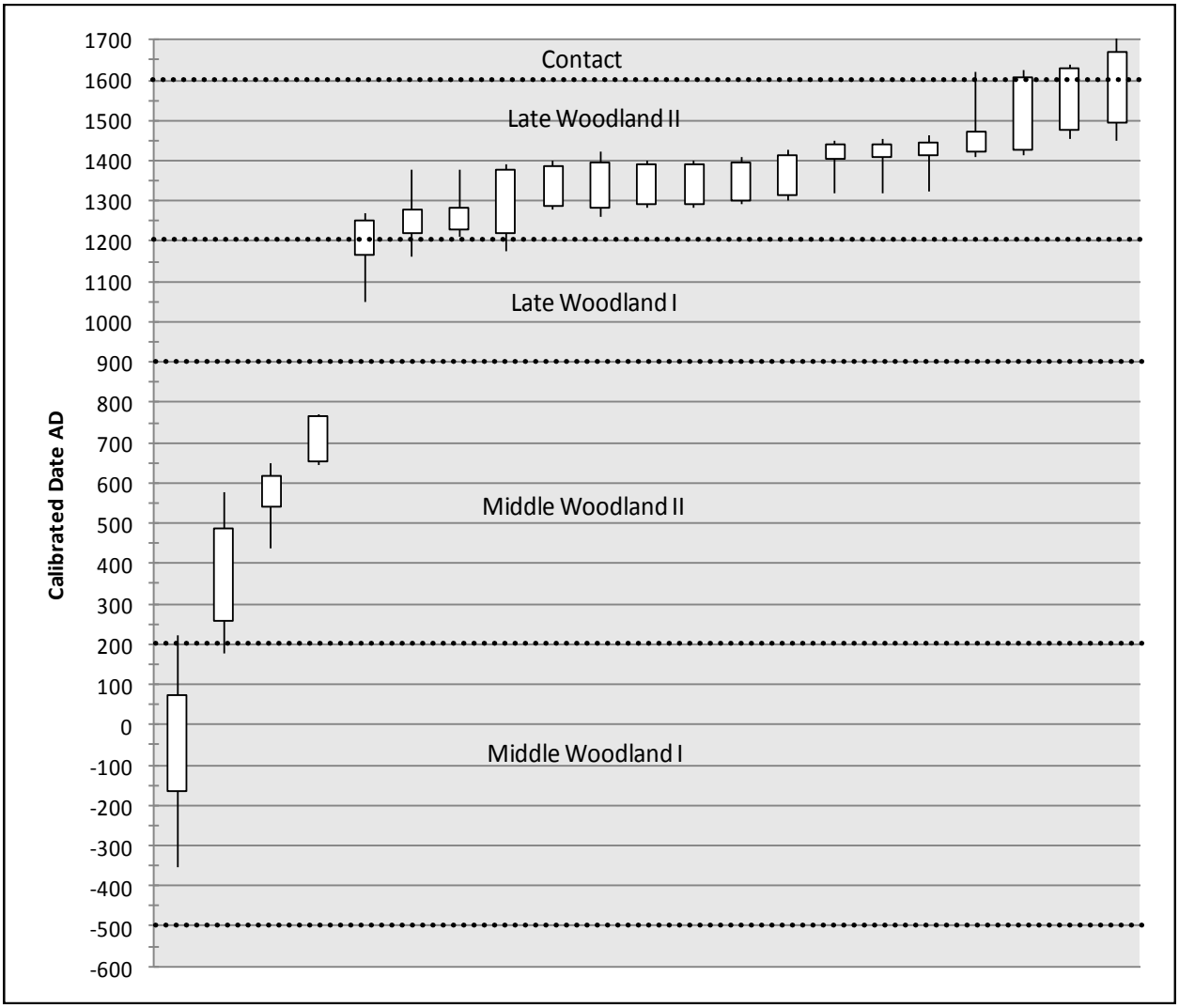

Figure 4-1. Radiocarbon dates, Werowocomoco. Calibrated one-sigma range (box) and two-sigma range (whiskers) depicted.

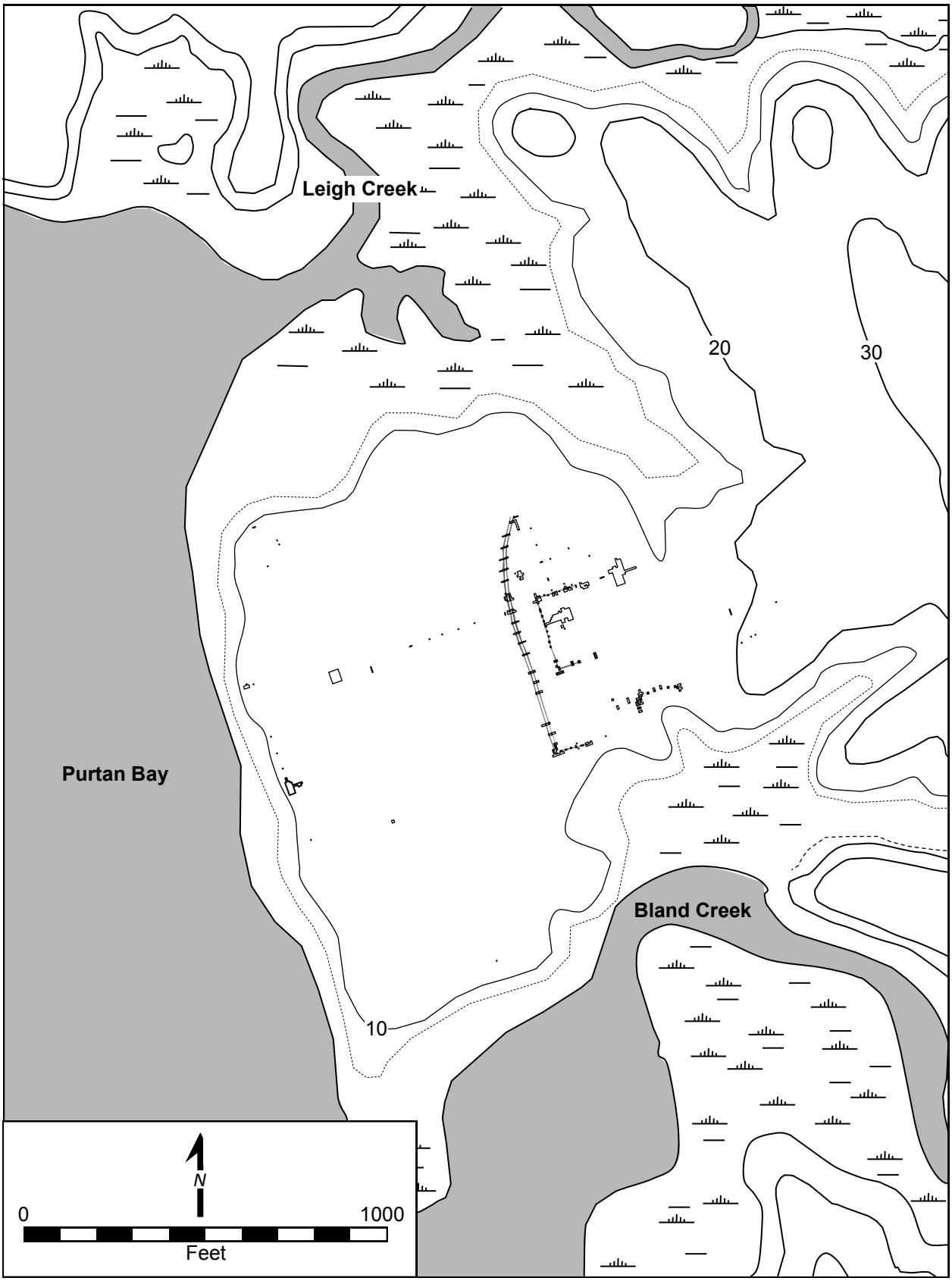

Figure 4-2. Werowocomoco site.

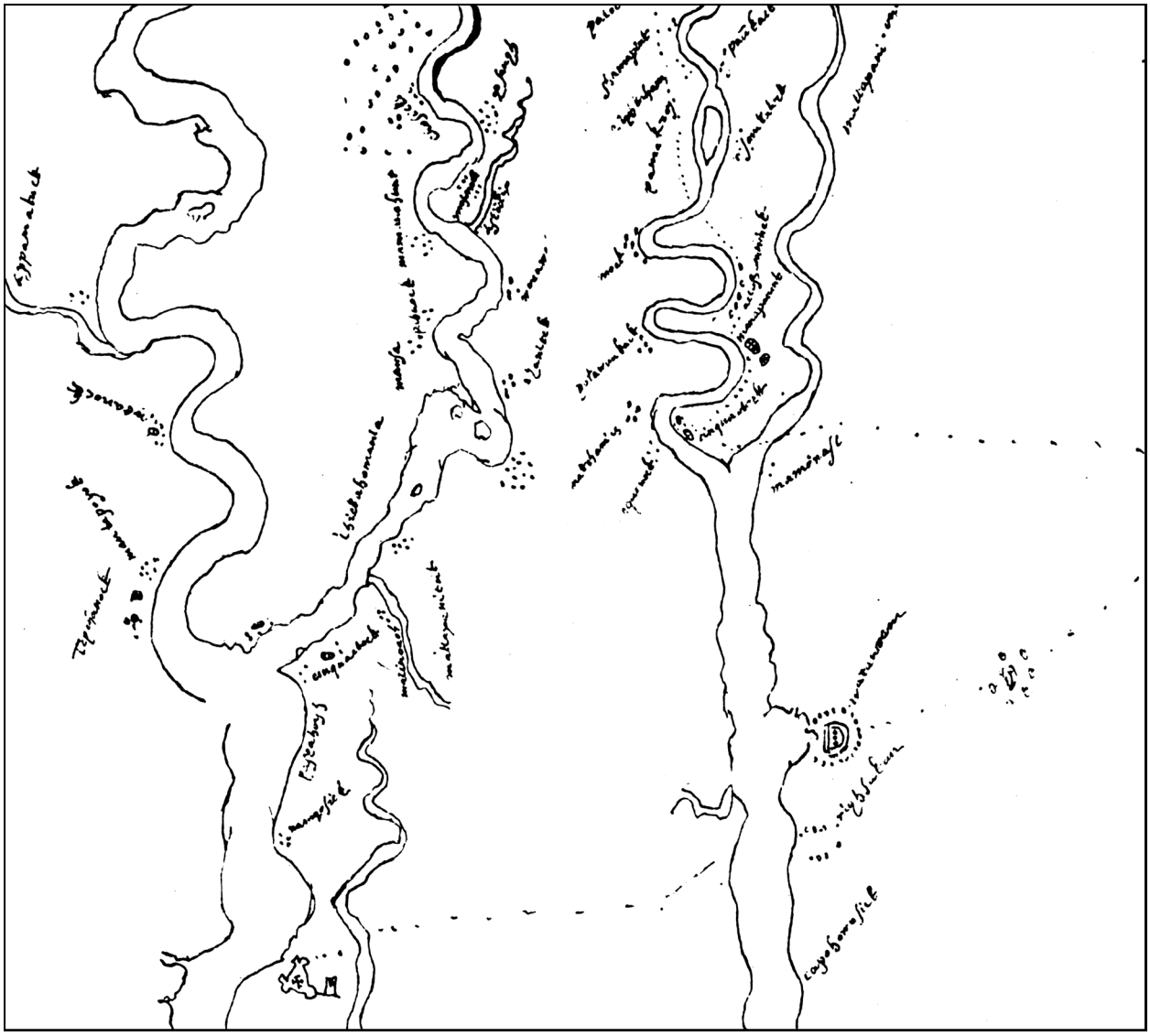

Figure 4-3. Zuñiga Map inset..

trench construction began in the interior at the same time that residential architecture, scattered middens, and Rappahannock ceramics appeared along the riverfront. The earliest maize recovered from riverfront features and from the interior trenches has been dated to the thirteenth century AD, indicating the establishment of a large, dispersed, horticultural village at that time. The dearth of radiocarbon dates from the 300 year period prior to the thirteenth century is surprising. The thirteenth-century community of Werowocomoco was established in a remarkably short period of time which saw both the construction of unusual landscape features in the interior and dramatically increased use of residential spaces along the York.

The botanical evidence from Werowocomoco records the deforestation of large areas within the site and the presence of modest amounts of maize horticulture during the thirteenth century AD. By the fifteenth century AD, beans were also part of Werowocomoco's subsistence repertoire, as recorded in the presence of a single specimen with a median calibrated date of AD 1450. A striking decline in the abundance of plant remains during the Protohistoric and Contact periods complicates our understanding of Werowocomoco and, particularly, of maize during the era when Wahunsenacawh lived at Werowocomoco.

The trench features in the site interior inscribed

Werowocomoco with a unique landscape that remained in use from AD 1200 through the early colonial era when Wahunsenacawh was in residence. Like the botanical evidence, the radiocarbon dates and artifact densities point to a modest decline in Werowocomoco's population during the sixteenth century, the period when Wahunsenacawh moved to Werowocomoco. During the sixteenth and early seventeenth centuries non-local ceramics and copper objects were concentrated in the site interior, within the trench enclosure, pointing to colonial exchange relations and diplomatic events focused on this area of the site.

During the early colonial era, documentary sources shed additional light on Werowocomoco's significance in the Powhatan world, evidence assessed in detail in our previous report (Gallivan et al. 2006). The early seventeenth century Zuñiga map of the Chesapeake may, in fact, depict Werowocomoco's trenches and John Smith's awareness of them (Figure 4-2). A large structure in the site interior, possibly Wahunsenacawh's residence or a colonial-era temple, was associated with trade items from Jamestown.

The concentric trench enclosure at Werowocomoco contained evidence of special architecture and long-distance exchange. A suite of radiocarbon dates from across the site demonstrates that the monumental landscape at Werowocomoco preceded Wahunsenacawh's rise to power as the Powhatan paramount chief by three centuries. Radiocarbon dates for the inner-most feature begin circa AD 1200. Born elsewhere, at the village of Powhatan on the James River, Wahunsenacawh moved to Werowocomoco as he consolidated regional authority through warfare, intimidation, strategic marriages, and regional alliances (Rountree and Turner 2002). Given this history of the Powhatan chiefdom and the history of the Werowocomoco settlement, we suggest that it was not the paramount chief Wahunsenacawh who made Werowocomoco a powerful place; rather it was Werowocomoco and its unique landscape of power that made Wahunsenacawh the Powhatan paramount.

Research Question #1

Does the history of built environments and land use practices at Werowocomoco contribute to an understanding of the settlement's history as a prominent Native village?

Perhaps the most striking aspect of Werowocomoco's archaeology is its built environment. The concentric trench features and the massive longhouse structure in the interior index key moments in Werowocomoco's history: its abrupt establishment as a town circa AD 1200. the expansion of monumental trench features in the interior circa AD 1350, and the sixteenth century arrival of Wahunsenacawh. These pre-colonial events established and transformed Werowocomoco's importance as a prominent location in the Tidewater Algonquian world.

The history of "place making" behind these events becomes clearer as we approach the colonial era. Wahunsenacawh emerged as a central political, spiritual, and economic figure in the Powhatan world during the sixteenth century. This process appears to have culminated in his relocation to Werowocomoco.

A process of "un-making" is also indexed in Werowocomoco's history as an Algonquian place. While visiting the town in 1609, colonist John Smith learned that Wahunsenacawh had abandoned the village, apparently out of concern for the increasingly hostile relations with the Jamestown colonists. Subsequently Wahunsenacawh moved westward to Orapax, located on the upper reaches of the Chickahominy River.

From 1609 until his death in 1618, Wahunsenacawh's centrality to Powhatan politics and interaction with the English declined with his move west. As described in detail in our previous report (Gallivan et al. 2006:39-44), a single burial dating to this period was identified at Werowocomoco prior to the Werowocomoco Research Group's excavations. Apparently interred ***after*** Werowocomoco's residents had departed the town, the burial of a young Algonquian, possibly from an elite lineage, contained a rich assemblage of trade goods. No subsequent evidence of a Native presence is apparent in Werowocomoco's archaeological record after this burial.

Research Question #2

Do Werowocomoco's subsistence practices or exchange patterns set the village apart from other settlements, highlighting historical processes behind the settlement's status as a chiefly center?

While the preservation of faunal remains at Werowocomoco is not good, the site does contains some of the best-documented archeobotanical evidence of subsistence practices from a Native site in the Chesapeake region. As outlined in chapter 3, the assemblage contains maize and beans, documenting horticultural production at Werowocomoco. The available evidence, though, does not point toward large volumes of maize production or of increased horticultural production during the colonial era. In fact, Werowocomoco appears to have ***fewer*** residents and ***less*** horticultural productivity during the sixteenth and seventeenth centuries than in the period between AD 1200 and AD 1500.

Evidence of regional-scale relations during the pre-colonial era appears in the form of an increased diversity of pottery types at the site after AD 1200. The area within the trenches contains not only the Rappahannock fabric-impressed pottery common across the site but also Roanoke simple-stamped pottery (common to the south) in significant numbers. Other ceramic types, including Gaston simple-stamped pottery (n=6) from the West and Potomac Creek pottery (n=2) from the North, were present in small numbers. Colonial-era trade at the site is more prominent, as reflected in the sheet copper recovered from the site interior.

So, while trade in highly-valued copper clearly played a prominent role in Werowocomoco's political economy during the early colonial era, the evidence for pre-colonial trade at the site is more modest. Almost all of this material was deposited in the area of the site enclosed by the trenches.

Research Question #3

How do archaeological practices and research results change in the wake of sustained involvement by contemporary Native communities in the research?

Our Native partners on the Werowocomoco project have encouraged a research focus on the long-term, precontact history of the site, thereby shifting attention away from the post-1607 colonial narrative that centers on Jamestown. In order to operationalize this perspective, our research design has prioritized investigation of Werowocomoco's Late Woodland archaeology along with its Contact period deposits. This report has offered the outline of a long-term "biography of place" that resulted from this approach. Our methods have included an extensive regimen of radiocarbon dating and archaeobotanical analyses allowing the research team to unpack Werowocomoco's deep history. Our related efforts to broaden the region's historical narratives have included public outreach resulting in changes to Virginia's public school curricula. By foregrounding the precontact history, the Native partners working on the project have influenced the Werowocomoco research process and resituated themselves and their communities against an overwhelmingly colonialist narrative.

The results of collaborative archaeology at Werowocomoco suggest that shifting the overall focus away from English colonial narratives will be challenging to accomplish in Tidewater Virginia, at least in the short run. Nonetheless, the expanding involvement of Native scholars in archaeological research and the growing importance of various forms of Indigenous archaeology represent critical developments toward this end. Fostering such community-building around Werowocomoco will require a sustained effort to provide Native descendants ready access to the site and to its history.

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