5-2014

THE WESTERN TENNESSEE SHELL MOUND ARCHAIC: PREHISTORIC OCCUPATION IN THE LOWER TENNESSEE RIVER VALLEY BETWEEN 9000 AND 2500 CAL YR BP

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To the Graduate Council:

I am submitting herewith a dissertation written by Thaddeus Geoffrey Bissett entitled "THE WESTERN TENNESSEE SHELL MOUND ARCHAIC: PREHISTORIC OCCUPATION IN THE LOWER TENNESSEE RIVER VALLEY BETWEEN 9000 AND 2500 CAL YR BP." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Anthropology.

David G. Anderson, Major Professor

We have read this dissertation and recommend its acceptance:

Jefferson Chapman, Benjamin M. Auerbach, Russell Zaretzki

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(Original signatures are on file with official student records.)

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A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Thaddeus Geoffrey Bissett
May 2014

Acknowledgements

There are number of people, organizations, and institutions without whom this study would not have been possible. First and foremost, I thank my committee—Dr. David G. Anderson, Dr. Jefferson Chapman, Dr. Benjamin M. Auerbach, and Dr. Russell Zaretzki—for their involvement and support. Dr. David Anderson has been a true mentor, advocate, and friend, and I count myself fortunate to have benefited from his immense experience, his encyclopedic knowledge of Southeastern prehistory, and his generosity during my years at the University of Tennessee. Evening barbeques and trips to the Sunspot have been a highlight of my time in Knoxville. His willingness to allow me to divert field time and students to the exploration of Archaic shell middens along the Cumberland River during the 2010 and 2012 field seasons at Bells Bend in Nashville, and to use project money for radiocarbon dates from those sites, helped to solidify my interest in Tennessee's Shell Mound Archaic. Finally, his invitation to me to participate in a grant writing workshop in 2011 was directly responsible for my success in obtaining National Science Foundation funding for the research presented in this dissertation.

I owe Dr. Jefferson Chapman my thanks for his willingness to serve on my committee in addition to his not inconsiderable responsibilities as the director of the McClung Museum. When I approached him in 2009 and asked if the museum would consider sponsoring one new radiocarbon date from the Eva site if I could obtain funding for a second, he unhesitatingly agreed. Not only did that project give me a more solid understanding of the types of methodological problems I would face in my dissertation, but it also served to significantly strengthen my case when I later applied for further grant funding. I also wish to thank Dr.

Chapman for the annual invitations to the fantastic crawfish boils he puts on each year at his home.

Dr. Benjamin Auerbach has offered considerable advice and provided much-needed feedback during this project. When he invited me to work with him on (and present) a paper at the 2010 Society for American Archaeology meetings in St. Louis, I am not certain he realized at the time that would be my first presentation at an SAA meeting. Nevertheless, he was interested in my ideas and the collaboration was both interesting and rewarding. Dr. Auerbach's constructive criticism of my ideas has proved enormously helpful.

On several occasions, I have intruded upon Dr. Russell Zaretzki's otherwise normal schedule to ask questions about statistical methods that I was perhaps not entirely familiar with, but thought might be useful. Despite these question and answer sessions, ultimately the statistics in this dissertation did not need to be elaborate. Nevertheless, Dr. Zaretzki's efforts have been much appreciated; particularly his willingness to plow through this document.

I would be remiss if I did not also acknowledge Dr. Lynne Sullivan, the former curator of archaeological collections at the McClung Museum, whose gracious offer of a first-year assistantship provided my first exposure to the Depression-era collections with which I would eventually work.

I wish to express my sincere thanks to two of my fellow graduate students specifically. At the University of Tennessee, Stephen B. Carmody has been a sounding board, a frequent collaborator, and a great friend, and many of the ideas that became this dissertation project grew directly from late-night discussions with him. D. Shane Miller, formerly a University of Tennessee undergraduate and master's student, took me on my first tour of the Department of Anthropology at the University of Tennessee before beginning his own doctoral program at the

University of Arizona the same year I entered UT. Despite the distance between Tucson and Knoxville, Shane has been a continual source of ideas, feedback, and excitement about Southeastern archaeology, and I particularly thank him for his pointed question to me in 2010 – "Why aren't you doing Archaic-period research for your dissertation again?" An excellent question.

I also include here my thanks to the University of Tennessee undergraduate work study students who spent many hours entering data from field specimen logs and other site forms into Microsoft Access, and transcribing unpublished UTDoA field reports and Douglas Osborne's unpublished master's thesis. Without their work, I might still be entering data from the Eva site's F.S. log.

The Frank H. McClung Museum of Natural History and Culture at the University of Tennessee is an irreplaceable resource for archaeology in the Southeast and in Tennessee specifically. In addition to Drs. Chapman and Sullivan, I owe my sincere thanks to the staff and student workers at the museum for their assistance and patience during the months and years over which this project was conducted.

The majority of research funding for this project was provided by a National Science Foundation Doctoral Dissertation Improvement Grant (Award #1202960). Initial funding for a pilot study, conducted in 2009 and 2010, derived from a 2010 grant from the Tennessee Council for Professional Archaeologists (TCPA) and matched funding from the McClung Museum. Additional money has been provided by a University of Tennessee Department of Anthropology grant, the Kneberg-Lewis Scholarship.

Finally, I wish to thank my family for their unwavering and unconditional support not only in this endeavor, but in all preceding (and future) pursuits as well. My parents, Jack and

Connie, have never questioned my choice to become an archaeologist, despite my childhood aversion to getting dirty that my mother reminded me of when I first told her I wanted to do archaeology. I also wish to thank both parents for the editing they have provided for conference papers and early drafts of this dissertation! My brothers, Mason and Spencer (also soon-to-be Dr. Bissett) are the best friends anyone could hope for.

I could never have accomplished this without any of the people named above, and I reiterate my sincerest thanks and appreciation to all of the people, institutions, and organizations mentioned here.

Abstract

Data from seven Middle and Late Archaic sites in western Tennessee dating to ca. 8900 – 3200 cal BP are used explore how shell middens and mounds were created and used. The study sites – Eva (40BN12), Big Sandy (40HY18), Kays Landing (40HY13), Cherry (40BN74), Ledbetter Landing (40BN25), McDaniel (40BN77), and Oak View (40DR1) – were excavated during the Great Depression prior to the construction of the Kentucky Dam by the Tennessee Valley Authority.

A high-resolution chronology of site use was developed, based on existing older radiocarbon assays and 50 new AMS determinations. These chronological data were used in conjunction with analyses of curated collections at the Frank H. McClung Museum to produce a synthesis of human occupation, including shell fish use, in this part of the Tennessee River Valley. The temporal data also formed the basis for in-depth examination of the composition of, and variation in, artifact assemblages, cultural features, and burial populations through time to assess changes in the intensity and manner of site use.

Results indicate that shellfishing appeared in western Tennessee by the mid-9th millennium cal BP, and continued sporadically throughout the Middle and Late Archaic periods until at least the mid-3rd millennium cal BP. Shell-bearing sites accumulated over many centuries. Although raw numbers of artifacts and human burials recovered from them are impressive, when contextualized within a temporal span of many centuries, they suggest periodic, or even sporadic, occupation rather than continuous use. It has been suggested, based on burial numbers, that freshwater shell-bearing sites resulted from feasting and other activities associated with funerary rituals. However, average annual burial rates for the study sites, when

compared with modern and historic ethnographic data on hunter-gatherer mortality rates, suggest that these burial populations represent only a tiny fraction of the total number of deaths that would have occurred during the time the sites formed, and may be better interpreted as the long-term aggregated result of occasional deaths among groups who periodically occupied these sites.

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CHAPTER 1. INTRODUCTION

What are shell mounds and middens? How were the locations where such sites would eventually develop first used, and how did that use translate into the often substantial accumulations of cultural material, mollusc shell, and human remains that Southeastern archaeologists and, before them, amateur prehistorians, naturalists, zoologists, and geologists have been investigating for over one hundred fifty years? What did shell-bearing sites mean to the people whose actions and decisions produced them?

This dissertation uses previously excavated archaeological materials and archival records from seven Middle (8900 – 5700 cal BP) and Late (5700 – 3200 cal BP) Archaic sites formerly located along the lower Tennessee River to reconstruct the occupational histories of that region's freshwater shell middens and mounds in order to address these long-standing questions. The study sites – Eva (40BN12), Big Sandy (40HY18), Kays Landing (40HY13), Cherry (40BN74), Ledbetter Landing (40BN25), McDaniel (40BN77), and Oak View (40DR1) (Figure 1.1) – were excavated from 1939 to 1941 as salvage projects prior to the construction of the Kentucky Dam by the Tennessee Valley Authority (TVA). Since the late 1950s, they have received relatively little attention as primary sources of data (Lewis and Kneberg 1959).

Funding was obtained[1] for a series of fifty radiocarbon dates, which are used to develop a secure and high-resolution chronological framework for Archaic occupations and shell midden use in the lower Tennessee Valley. These chronological data are used in combination with extensive reanalyses of collections and relevant site documentation housed at the Frank H.

[1] Funding for 48 radiocarbon dates was provided by a National Science Foundation Doctoral Dissertation Improvement Grant, Award #1202960. Additional funding for two dates was provided by a 2010 grant from the Tennessee Council for Professional Archaeology and the Frank H. McClung Museum of Natural History and Culture.

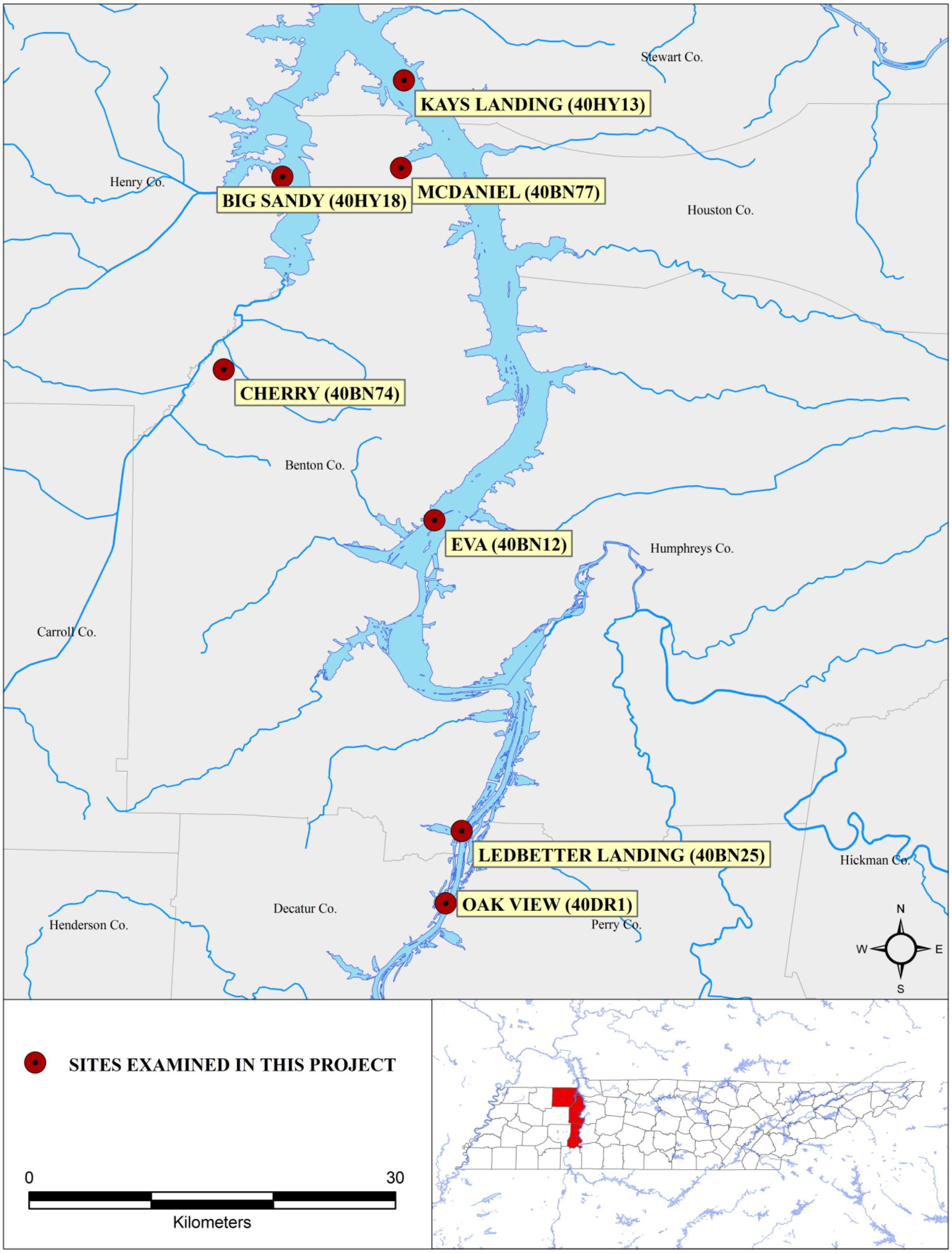

Figure 1.1. Locations of the seven sites examined in this dissertation project: Eva (40BN12), Big Sandy (40HY18), Kays Landing (40HY13), Cherry (40BN74), Ledbetter Landing (40BN25), McDaniel (40BN77), and Oak View (40DR1).

McClung Museum at the University of Tennessee, Knoxville to construct individual occupational histories for each of the seven study sites, which are then combined to produce a region-wide synthesis. The new temporal data provide a basis for in-depth analyses of the composition of each site's artifact assemblage, cultural features, and burial population by time period. They are then used to assess changes in occupational intensity at each site during its history, and over the period when shell-bearing sites in western Tennessee accumulated.

The archaeological sites examined in this dissertation are among a number of shell-bearing sites in the midcontinental United States that were excavated during the Great Depression under a series of programs initiated by the Roosevelt administration as part of the New Deal, intended in part to provide employment to unemployed Americans. Large-scale investigations were conducted at a number of Archaic shell-bearing sites in northern Alabama (Webb 1939; Webb and DeJarnette 1942), Kentucky (e.g., Webb 1974; Webb and Haag 1939, 1940), and in western Tennessee (Lewis and Kneberg 1947, 1959; Lewis and Lewis 1961) (Figure 1.2). These projects continued through much of the 1930s and into the early 1940s before the federal programs were terminated at the start of World War II.

The results of these excavations helped to provide the initial definition of the cultural expression known as the "Shell Mound Archaic" (SMA), which appears to have extended across much of the midcontinental United States between 8,900 and 3,200 cal years BP (Anderson and Sassaman 2004, 2012; Claassen 2010; Jefferies 2008; Kidder and Sassaman 2009; Marquardt and Watson [eds.] 2005; Sassaman 2010; Sassaman and Anderson 2004).

The Depression-era projects produced enormous amounts of information on the freshwater shell-bearing sites in Tennessee, Alabama, and Kentucky. But because the archaeology in Tennessee and Alabama was conducted in advance of the construction of dams

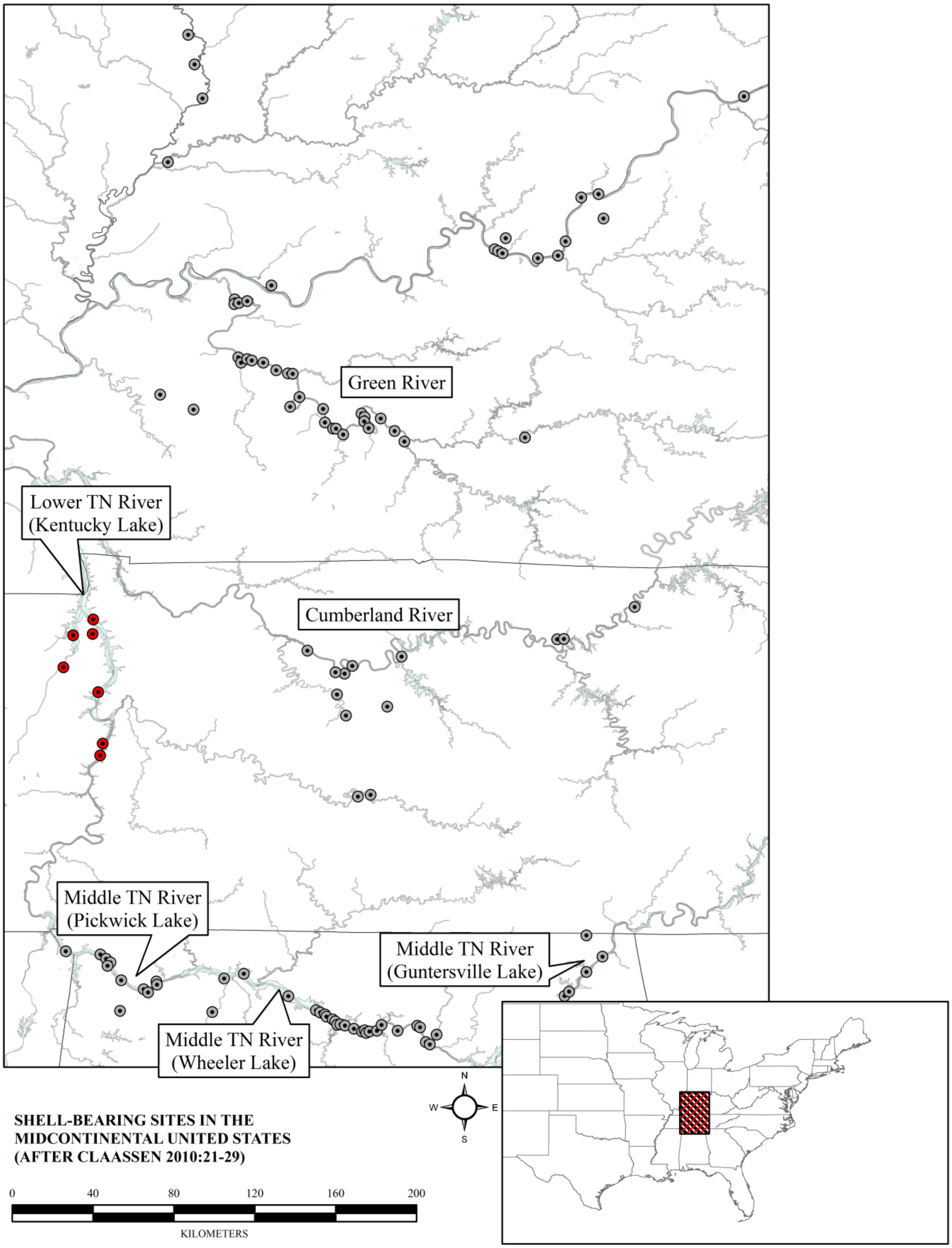

Figure 1.2. Major areas of the Shell Mound Archaic (after Claassen 2010:21-29).

across the Tennessee River, and due to the subsequent inundation of much of the Tennessee Valley beneath a series of man-made lakes, those regions have been largely inaccessible for further research. In the decades following the flooding, the impressive artifact collections and documentation produced from the New Deal era work, once championed as outstanding data, became increasingly ill-suited for addressing the new research topics being explored by the younger generation of New Archaeologists in the late 1960s and 1970s. Their efforts to create a more scientific approach to archaeology included an increased interest in questions about technology and subsistence that could not be readily addressed with collections that were produced decades earlier and that lacked representation of entire classes of materials, particularly chipped stone debitage and zooarchaeological remains. Without the possibility of revisiting the Alabama and Tennessee sites in order to "update" the Depression-era collections with new excavations, shell mound collections from those regions mostly languished in their curation facilities.

In contrast to the Tennessee River sites, the shell mounds along Kentucky's Green River have remained accessible in the decades since the Depression-era work. Beginning in the 1970s and continuing to the present, archaeologists have been able to revisit sites along the Green River that were initially documented by C.B. Moore and later extensively excavated by WPA-sponsored crews, updating those sites' collections with new work informed by more modern field and analytic methods (e.g., Claassen 2005; Crothers 1999; Marquardt and Watson [eds.] 2005; Marquardt and Watson 1983; Moore 2011; Stein 1983, 2005). That work prompted the re-investigation of the original data as well (e.g., Crothers 1999; Hensley 1996; Milner and Jefferies 1998; Moore 2011), and as a direct result of the recent work along the Green River, knowledge about the sites in that region has substantially surpassed our understanding of similar sites in

Alabama and Tennessee. Most of the recent debate about shell midden and mound origins and use in the interior midsouth has been generalized to a broader "Shell Mound Archaic" (see particularly Claassen 2010 and Sassaman 2010), but has been based to a significant degree on data from the decades of work in Kentucky, despite appreciable differences in the age, scale, and composition of shell-bearing sites across the SMA's core regions (see Chapter 9; Dowd 1989; Lewis and Lewis 1961; Marquardt and Watson [eds.] 2005; Webb 1939, 1946; Webb and DeJarnette 1942; Webb and Haag 1939, 1940). The research presented in this dissertation represents an attempt to rectify that situation, by analyzing historical collections to better contextualize and expand upon our understanding of Archaic-period occupation, including the creation of shell mounds, in the lower Tennessee Valley of western Tennessee.

Since the mid-1950s (Crane 1956; Lewis and Kneberg 1959) western Tennessee has been thought to represent one of the earliest locations in which cultural traditions associated with the SMA were believed to have originated. Early radiocarbon dating applied to the well-known Eva site (Lewis and Lewis 1961:13) indicated that its deepest shell-bearing stratum exceeded 7000 years of age (7150 ± 500 rcybp), but there has been no significant attempt since the late 1950s (Lewis and Kneberg 1959) to re-examine the chronological sequence and history of the lower Tennessee Valley. The general neglect of the region as source of new information has included particularly a failure to obtain better chronological information. In 2010, Claassen (2010:Table 2.1, 11-18) summarized the published radiocarbon dates from SMA sites, with 42 from Kentucky's Green River compared to four from western Tennessee. Recent descriptions of the chronology and history of the SMA in western Tennessee (e.g., Dye 1996:146-150), furthermore, contained essentially the same information published by Thomas Lewis and Madeline Kneberg in 1959 and 1961. In the sixty years since these sites were excavated, the development of new theoretical paradigms for the understanding of archaeological materials and sites, and more critically, the increased accessibility, affordability, and accuracy of radiocarbon dating, have rendered much of the earlier inferences about chronology obsolete; but, they have also made it possible to extract new data from the long-understudied site collections.

Organization of this Study

The Shell Mound Archaic in general has represented a topic of considerable interest to archaeologists for many decades, and the current body of literature is the result of excavations conducted throughout the midcontinental United States during that time. Chapter 2 provides a brief historic overview of the significant periods of shell midden excavation in Kentucky, Alabama, and particularly Tennessee, beginning with the work of Clarence Bloomfield Moore, who is generally considered to have been the person responsible for introducing to the archaeological profession the freshwater shell-bearing sites of interior eastern North America.

Chapter 3 provides a discussion of the historical development of current thinking on the origins and purposes of shellfishing, and shell mounding and deposition during the Archaic period.

Chapter 4 describes the specific site collections chosen for this project, and the methods used to integrate the seventy year-old data into modern formats and searchable archives and to incorporate that information into Geographic Information Systems (GIS)-based maps (both 2- and 3-dimensional) used for spatial analysis of the sites themselves, and to select representative samples to be submitted for radiocarbon dating.

Because detailed descriptions of most of the sites examined in this work have not been previously published (with the exception of the Eva site [Lewis and Lewis 1961]), Chapters 5 through 8 comprise largely descriptive reports of the seven study sites on which this research focused, Big Sandy (Chapter 5), Eva (Chapter 6), Kays Landing (Chapter 7) and Cherry, Ledbetter, McDaniel, and Oak View (Chapter 8). The history of excavation, recovered assemblages, features, burials, and the results of new radiocarbon dating are described for each site, and used to examine how these sites formed and were used.. These chapters, comprising the bulk of the dissertation, represent a modern reporting of these classic site assemblages, encompassing much previously unreported data.

Syntheses of the data presented in Chapters 5 – 8 are provided in Chapters 9 and 10. In Chapter 9, the occupational histories of the seven study sites are described within the regional chronological framework developed from the radiocarbon dates obtained in this study. Major periods of cultural occupation in the lower Tennessee Valley are indicated from the results of radiocarbon dating of the five shell-bearing and two shell-free sites examined in this project.

Chapter 10 presents an examination of the unique depositional and occupational histories of the Eva and Kays Landing sites, the two shell-bearing sites with the greatest time depth and stratigraphic complexity in the research sample, using contrasts in the depositional rates of cultural material between separate cultural strata to explore the question of how the intensity of site use through time can be studied. Additionally, a discussion of the nature and tempo of human burial at the seven study sites is presented. The presence of seemingly large numbers of interments in shell-bearing sites has been a focal point of debates during the last two decades about the significance of shell-bearing sites to the people who created and used them. Despite the many graves in shell mounds and middens in the lower Tennessee Valley, the results of this work suggest that shell-bearing sites were not locations of particularly high burial intensity, and that interpretations of their significance based on burial numbers may need to be revised based not only on the burial numbers and associated grave goods, but the amount of time during which they accumulated.

Chapter 11 provides an overview of the work and its results, and offers suggestions for future research.

Chapter 2. A Brief History of Shell Mound Archaeology in the Midcontinental United States

This chapter presents a brief history of major shell mound excavations in the midcontinental United States, beginning with the work of C.B. Moore in the early 20th century (Moore 1915, 1916) and ending with recent efforts undertaken along the Cumberland River in middle Tennessee (Miller et al. 2012; Peres et al. 2012). Particular focus is given to the large-scale investigations of shell mounds and middens conducted during the Great Depression under the direction of William Webb in Kentucky and Alabama, and Thomas Lewis and Madeline Kneberg in Tennessee. These projects represent some of the most extensive and significant investigations of shell-bearing sites in the region, and included work at the sites that are the focus of this study.

The choice to decouple discussions of the major historical periods in shell mound archaeology from those of the development of theoretical perspectives on the formation, use, and cultural significance of shell mounds and middens (discussed in the next chapter) derives from the manner in which the majority of shell-bearing sites have been excavated in the past century. Relatively few projects have been oriented around specific problems or research questions; instead, most midcontinental shell mound archaeology during and since the 1930s has been conducted in a salvage framework, with the notable exception of the Shell Mound Archaeological Project of the 1970s and 1980s along Kentucky's Green River (see below), and hypotheses about the origins and development of the Shell Mound Archaic have for the most part come later, as parts of syntheses of the results of many past research projects (e.g., Claassen 2010; Marquardt and Watson 2005;Sassaman 2010).

Significant published[2] excavations of shell-bearing sites are recounted here, together with the historical contexts in which fieldwork was conducted. Most theorizing about the origins and nature of shell mounds and middens, as we shall see, has been based on comparison of the results of the extensive excavations conducted during the New Deal in the 1930s and 1940s.

Clarence Bloomfield Moore Along the Tennessee River, 1914-1915

Although interest in midcontinental shell middens dates to well before the mid-19th century (see Chapter 3), historical accounts of shell mound archaeology in the interior Southeast (e.g., Crothers 1999:10-15; Funkhouser and Webb 1928:153) often begin with the exploits of C.B. Moore and his steamboat, the *Gopher of Philadelphia* (Figure 2.1). Despite the earlier published descriptions and even minor examinations of freshwater shell middens in the Midsouth (e.g., Atwater 1820; Brinton 1872), the excavations undertaken by Moore at shell mounds and middens along the Tennessee, Ohio, and Green Rivers between 1913 and 1915 (Moore 1915, 1916) are generally credited as the first scholarly investigations of such sites in interior eastern North America.

In 1913, after more than two decades exploring a multitude of sites along the coasts and rivers of Florida, Georgia, South Carolina, Alabama, Mississippi, Arkansas, and Louisiana, Moore began a three-year expedition along the Tennessee, Green, and Ohio Rivers in Tennessee, Alabama, and Kentucky (Polhemus 2002:7-8). Even for the period, compared with more academically-inspired archaeologists, Moore's methods of field excavation were relatively

[2] In the era of cultural resource management during the past forty years, there have been many excavations of interior shell mounds and middens conducted by private archaeological consultants. Some of these (e.g., Whitesburg Bridge [Gage et al. 2011]) have received wider dissemination and publication, but many remain inaccessible to the general public.

Figure 2.1. C.B. Moore's steamboat, *The Gopher of Philadelphia*, moored on the Upper Tombigbee River in Columbus, Mississippi, 1901 (Knight 1996:4, Figure 2).

crude[3] (Weinstein et al. 2013). His descriptions and the well-illustrated publications of his work suggest an interest in archaeology as an academic pursuit, but Moore's methods were never intended to provide the type of dense information that is today the primary goal of archaeological field excavations. While Moore's "ultimate goal" may have been "[the assembly] of distributional data on prehistoric earthworks, burial customs, and artifacts from sites on every southern waterway accessible to the *Gopher*" (Knight 1996:4), his more immediate goal was the procurement of museum-quality specimens and samples for display at the Academy of Natural Sciences in Philadelphia (Knight 1996:3).

Moore's field methods have not previously been well-documented[4]. Detailed written descriptions of his fieldwork are not provided in his field notebooks, although there are indirect references to his approach to excavation in some of his writings. Polhemus (2002:14) notes that "[g]raves were consistently searched for with a steel rod or probe, particularly on surface sites or 'dwelling-sites' where stone graves might be expected. Dwelling sites, shell mounds, and the summits of flat-topped domiciliary mounds were investigated through the use of an unspecified number of 'trial-holes'." Moore appears also, at some sites, to have made use of trenching; at least in some cases (e.g., Moundville [Knight 1996:9]) Moore backfilled his excavations prior to

[3] In other regions, such as California, shell midden archaeology during the period in which Moore plied the waterways of the southeastern US was considerably more sophisticated. Archaeologists in California, including Nelson (Nelson 1909, 1910) and Gifford (1916), were at that time working to quantify the composition of shell middens in that state, in part to estimate the duration of occupation of the large shell mounds and middens in that part of North America. This approach to midden research has been referred to as the "California School" and remains a part of shell midden research into the present day (see Crothers 1999; Marquardt and Watson [eds.] 2005).

[4] Although written descriptions of Moore's field methods are not available, a recently discovered set of twenty-two photos from the Andrew W. Clime photo collection at the Smithsonian Institution includes several illustrating Moore's crew, and Moore himself, digging along the Ouchita River in Louisiana in 1909 (Weinstein et al. 2013:246-249, Figures 9 – 14), several years before his trip down the Tennessee River. Moore's approach to the exploration of these sites was effectively indistinguishable from looting. Pits were seemingly excavated with little to no apparent concern for stratigraphic control and one photograph (Weinstein et al. 2013:247, Figure 10) clearly shows backdirt piles comprising a mixture of site overburden and dark midden soil. Moore's interests, it would appear, were directed solely at the identification of burials to the near exclusion of other archaeological deposits or information.

leaving each site, although whether this was Moore's standard practice, or done at the behest of individual property owners, is not clear.

In his work along the Tennessee, Green, and Ohio Rivers, Moore distinguished several types of sites. "Dwelling sites" consisted of artifact concentrations and surface scatters of material, including shell. Locations that contained stone box graves and little else were considered to be "cemeteries," and earthen mound sites were "mounds;" several types of mounds (conical, flat-topped, platform, occupational) were distinguished. A fourth class – an "other" category – generally included groupings of multiple features (mounds, surface scatters) (Polhemus 2002:16). Based on these criteria, Polhemus provides a total of 180 sites visited and documented by Moore along the Tennessee, Green, and Ohio Rivers (Table 2.1).

In his first season (1913-1914), Moore traveled up the Tennessee River into east Tennessee, exploring mainly earthen mound sites associated with the late prehistoric occupation of the region (Moore 1915). He does not appear to have located any large shell-bearing sites during that season's work along the upper Tennessee River, although small amounts of scattered shell were observed on the surface at three "dwelling-sites" in Knox County (Cox Island, Prater Island, and near Little River Shoals) (Moore 1915:420-422). One refuse pit at the site located on Prater Island also contained a small quantity of freshwater mussel shell. Based on Moore's descriptions and the apparently limited excavation or surface collection undertaken at these sites, there were no preserved shell-bearing deposits among the sites he explored along the upper Tennessee River in eastern Tennessee.

During his second season on the Tennessee River (1914-1915), Moore explored the Tennessee Valley below Chattanooga, Tennessee, where he encountered a greater variety of sites than he had found above that city, including both shell and earthen mounds, along the middle

Table 2.1. Number and type of sites documented by C.B. Moore along the Green, Ohio, and Tennessee Rivers (modified from Polhemus 2002:16, Table 1).

Site Type	Lower Tennessee Valley (western TN)	Middle Tennessee Valley (northern AL)	Upper Tennessee Valley (eastern TN)	Green River (KY)	Ohio River (KY, OH)	Total (Site Types)
Mound	22	21	58	3	2	106
Dwelling Site	6	22	10	5	3	46
Mound + Dwelling Site	1	7	4	1		13
Cemetery	2				4	6
Other sites / site groups		1	5	1	2	9
Total Sites, by Region	**31**	**51**	**77**	**10**	**11**	**180**

Valley in northern Alabama and the lower Valley in western Tennessee. Moore's investigations of the Tennessee River ended at Paducah, Kentucky, in April of 1915 (Moore 1915, 1916; Polhemus 2002:12).

The Middle Tennessee Valley (Alabama)

Moore's (Moore 1915:233-332) work in the middle Tennessee Valley of northern Alabama included the exploration of fifty-one sites, including twenty-seven sites that contained shell-bearing deposits (Table 2.2). Based on the description of materials recovered during his excavations, most of these sites consisted of multiple components; Moore frequently encountered burials in the upper, usually shell-free, deposits that contained shell-tempered pottery indicating a Mississippian-period affiliation (e.g., Moore 1915:238, Figure 24).

In general, Moore appears to have been relatively unimpressed by the results of his excavations along the middle Tennessee River, and did not devote much field time (or written description) to any single site; he often terminated digging prior to reaching the base of cultural deposits at shell-bearing sites when he and his men encountered dense shell deposits that slowed them down (e.g., Moore 1915:240). Moore noted that most sites containing shell were capped by dark, comparatively shell-free deposits underneath which shell and midden soil were encountered. In some cases, these deposits were of considerable depth. The shell midden at one site in Lauderdale County in northwestern Alabama – Baugh Landing – extended from 0.6 m (2 ft) below surface to approximately 2.7 m (9 ft). Moore described a second site, Milton Bluff, in Lawrence County, at which a 1.5 m (5 ft) deep hole into a roughly 2.7 m-high mound continued to encounter shell below approximately 0.6 m, and excavations failed to reach the base of midden deposits in the mound (Moore 1915:136-137). A third site located at the mouth of the

Flint River in Madison County, Alabama, consisted of alternating shell-bearing and shell-free deposits to a depth of at least 2.1 m (6.75 ft) (Moore 1915:278-279).

The Lower Tennessee Valley (Tennessee)

As underwhelmed as Moore was with the character and richness of the sites he examined along the middle Tennessee Valley, he was even less impressed by the shell-bearing sites he encountered in the lower Tennessee Valley in western Tennessee. Only three shell-bearing sites were examined by Moore along the Tennessee length of the river between Alabama and Kentucky; his descriptions of work at those sites are severely limited, and like his work in Alabama, there is no indication of the precise nature of the excavations, nor of the amount of time expended or the number of men used at each site.

A shell midden at Ledbetter Landing (see Chapter 8) was referred to as a dwelling site of “inconsiderable size” (Moore 1915:205) on which a large warehouse had been constructed. Moore excavated both within the warehouse (which had an earthen floor) and immediately outside its walls, and in an adjacent field, encountering eleven burials (four children, seven adults) (Moore 1915:205). Based on recent images of Moore’s field methods (see above; see also Weinstein et al. 2013), a pair of large holes identified during later Depression-era excavations at Ledbetter Landing may represent some of Moore’s activity at the site in 1915 (see Chapter 8, Figure 8.28).

Moore noted no particular commonality of burial orientation among the individuals he unearthed, but found the adult burials either partially or fully flexed. Consistent with the results of later TVA-sponsored work at the site, supervised by George Lidberg (see Chapter 8), burial goods associated with the individuals Moore unearthed included shell beads he described as discoidal, as well as others made from small marine gastropod shells (*Marginella*) (Moore 1915:205).

At Prevatt's Landing, roughly two miles upstream from the confluence of the Duck and Tennessee Rivers, scattered shell was found throughout Moore's excavations although there is no reference to consolidated shell-bearing deposits (Moore 1915:204-205). Eighteen burials, mostly adults, were found in the upper 0.9 m (3 ft), none with grave goods. Moore noted several artifacts uncovered while digging, including a well-used chert hammerstone, which he described as "a sphere of silicious material pecked into shape, slightly oblate on one side, having a diameter of three inches" (Moore 1915:204).

The final shell-bearing site Moore would excavate along the lower Tennessee River was the "dwelling-site on the Sykes Place," later known as Eva (see Chapter 6). Moore's initial observations were of a mounded site of significant size and density of deposits; he wrote that "the whole surface of this dwelling-place is so thickly strewn with fragments of flint (flakes, chippings, and here and there a broken point) that it was literally impossible to put one's foot down without treading upon a bit of flint of some kind, and sometimes upon a number of them" (Moore 1915:199). As with many other sites in this region, however, he was clearly disappointed with the rarity of "objects of interest" among the surface materials he examined (Moore 1915:199).

The main excavation at Sykes / Eva was located at the highest point of the mound and continued to subsoil, extending to an approximate depth of 2 m (6.5 ft). Moore's observations of the stratigraphy at Sykes / Eva were in agreement with later descriptions (Lewis and Lewis 1961:1-13; see also Chapter 6). No shell was observed on the surface. A dark, shell-free deposit extended to a depth of 0.45 m (ca. 18 in), below which Moore's diggers encountered a mixture of dark soil and freshwater shell. Like later excavators, Moore interpreted the transition from shell-bearing to shell-free as an indication of a change in the diet of the site's occupants (Moore 1915:200).

Below the upper shell-free soil, shell-bearing midden extended approximately 1.2 m (ca. 4 ft), with a gradual decline in the frequency of shell toward the base of the deposit "until in the last foot they were encountered at rare intervals" (Moore 1915:200). In the final foot of the excavation before reaching subsoil, however, shell density increased considerably. Based on this description, it is easy to pinpoint Moore's progress through the deposits later designated as Stratum II, II, and IV / V, based largely on relative shell content (Lewis and Lewis 1961).

Moore only found four burials at Sykes / Eva, all in the upper meter of the site; three of them were not accompanied by grave offerings. The fourth was accompanied by a "musselshell containing a small amount of red oxide of iron in powder" (Moore 1915:200).

The Green and Ohio Rivers (Kentucky and Ohio)

Moore left the *Gopher* in Paducah, Kentucky, in April 1915 at the end of the 1914 – 1915 field season, and returned in early November of that year to proceed northeast up the Ohio River and onto the Green River in Kentucky (Polhemus 2002:12). During the following season, 1915 – 1916, Moore investigated a total of 21 sites on the Green (n = 10) and the Ohio (n = 11) Rivers.

Most of Moore's efforts during the 1915 – 1916 season were focused on Indian Knoll in Ohio County, Kentucky, at which he estimated he spent a total of 179 hours: approximately 22.5 eight-hour working days with a crew of eight men (Moore 1916:445)[5]. In his later report of the

[5] Moore did not calculate working hours per digger, but only the number of raw hours spent at Indian Knoll. If Moore's crew's work hours per person at Indian Knoll are calculated, the total is 1,440 person hours.

Green River and Ohio River expeditions, Moore noted that he considered Indian Knoll to have been the most important site excavated by his crew on the Green River (Moore 1916:453) and much of his report of the 1915 – 1916 field season[6] was devoted to descriptions of the 298 burials he and his crew unearthed at the site, and the artifacts (particularly the antler atlatl hooks and groundstone bannerstones) associated with them.

Moore described Indian Knoll as comprising "considerable shell in varying proportions scattered throughout [the mound], but nowhere forming nearly a homogeneous deposit. The maximum depth of [the mound], the result of slow accretion during aboriginal occupancy, [was] 4 feet 7 inches" (Moore 1916:444).

At Indian Knoll, Moore found that burials with included offerings were considerably more frequent than at shell-bearing sites he had previously encountered in the middle and lower Tennessee Valley. A series of full-page plates provided clear illustration particularly of the range of shapes of antler atlatl hooks and groundstone bannerstones, as well as many of the chipped stone projectile points and bone and antler tools, that he had recovered. Roughly three pages were also given to a description, authored by Moore's physician, M.G. Miller, of a human vertebra with an antler projectile point embedded in it, and an accompanying short comparative discussion of known prehistoric skeletal trauma (Miller 1916:477-480).

The Impact of C.B. Moore's Work

The difference in the intensity, or lack thereof, of Moore's work at "dwelling sites" along the Tennessee River and his much more extensive, detailed, and comparatively enthusiastic

[6] Moore devoted roughly 66% of his report on the Green and Ohio River sites (41 pages) to Indian Knoll and the materials recovered from that site, specifically the antler hooks and groundstone objects that he considered to be net-making implements.

excavations and reporting of similar sites along the Green River, particularly at Indian Knoll, is notable. Much of the difference seems attributable to the large number of burials (n = 298) that Moore encountered at that site, and the unusual grave goods he encountered at that site and others in the region, which contrasted significantly with the relatively mundane (in Moore's view) results of his work at Alabama's and Tennessee's shell mounds on the Tennessee River (Moore 1916). In comparison to the Green River sites, Moore's work in the Tennessee Valley in Alabama and Tennessee yielded relatively few burials and even fewer notable artifacts. Only five shell-bearing sites in northern Alabama (Garland Ferry, n = 12; Penney Place, n = 13; Baugh, n = 25; Cox, n = 30; and Mason Island, n = 52) produced more than ten burials, and the majority were recovered from deposits overlying shell-bearing strata, or from stone box graves that intruded into lower shell midden deposits. Of the three sites visited in western Tennessee, only Ledbetter Landing produced more than ten burials, and the offerings associated with them – shell beads – were unimpressive to Moore (not surprisingly, given his interest specifically in burials and museum-quality artifacts), and probably explains his relative lack of interest in extensive excavation and reporting of those sites.

By contrast, the relatively rich grave offerings (and large numbers of burials) at Indian Knoll seem particularly to have piqued Moore's curiosity. The resulting detailed accounts of the Indian Knoll burials and their associated goods, in combination with his empirical approach to the formulation and experimental testing of his hypothesis about the function of the antler hooks and bannerstones he found in graves at Indian Knoll and other sites on the Green River (Moore 1916:432-437), were unusual for the period. Moore's observation of the common association (within burials) of hooks and bannerstones with each other (Moore 1916:440-487), his use of wooden replicas of the artifacts to test his hypothesis that they were net-making tools (Moore

1916:433), and his comparison of the artifacts with ethnographic examples to support his argument (Moore 1916:433-436) represented an empirically sound program of inquiry that used multiple lines of evidence and, while incorrect (the hooks were, in fact, part of composite spearthrowers as Charles Willoughby, the director of the Peabody Museum at Harvard, had initially surmised [Moore 1916:436]), was logically consistent[7].

Moore's other major contribution – and perhaps his most significant – was not specific to his work along the Tennessee, Green, and Ohio Rivers, but concerned his broader interest in writing about and publishing the results of his investigations in clear descriptive language, accompanied by large, detailed photographs and illustrations. With respect to shell mound archaeology along the Tennessee River in Tennessee and Alabama, and the Green River in Kentucky, C.B. Moore's most significant contribution is the attention the publication brought to these sites; the 1916 publication on his efforts along the Green River was specifically acknowledged by William Webb as one of the inspirations for his early forays into shell mound archaeology of that region during the 1920s (Funkhouser and Webb 1928:153; Webb 1974:121) and for his subsequent initiation of federally-sponsored archaeological work in Alabama's Wheeler (Webb 1939) and Pickwick (Webb and DeJarnette 1942) Basins and in Kentucky (Webb 1950a, 1950b, 1974; Webb and Haag 1939, 1942).

[7] Moore's successful manufacture of a section of net using replicated tools provides one of the best cautionary tales for the aspiring experimental archaeologist; experimental archaeology can indicate one way that a tool or technique might have worked, but not necessarily the only way, or the correct way.

Shell Mound Archaeology in Tennessee, Alabama, and Kentucky during the Great Depression, 1933 - 1941

C.B. Moore's descriptions of his exploration of shell mounds in Kentucky and Alabama were particularly important in helping to shape the archaeological interests of William Webb, a physics professor at the University of Kentucky in Lexington. Webb's fascination with Native American culture and history began with his position as secretary to the commanding officer of Indian Territory in the Oklahoma Territory, where he learned the Seminole language (Haag 1965:470). His later academic appointment at the University of Kentucky allowed him the opportunity, along with William Funkhouser, a professor of zoology, to explore Kentucky's archaeological and paleontological sites. The results of those explorations were published in Funkhouser and Webb's 1928 volume, "Ancient Life in Kentucky," and included specific reference to the published work of C.B. Moore. Moore's writings, as well as the high-quality plates and detailed descriptions of sites along the Green River, had both piqued Webb's curiosity and served as a guide to the region's archaeological resources. Webb and Funkhouser revisited many of Moore's documented sites, conducting a short examination of Indian Knoll as well as excavations at several others sites in the area (Funkhouser and Webb 1928:155-159).

Webb and Funkhouser continued their excavations and study of Kentucky's prehistory during the late 1920s and early 1930s. In 1933 the Roosevelt Administration created the Tennessee Valley Authority (TVA) with the responsibility to provide for improvements to the navigability of the Tennessee River, to improve flood control, and for the agricultural and industrial development of the region. The resulting plans to construct a series of nine dams along the length of the Tennessee River prompted professional archaeologists and amateur prehistorians alike to petition the TVA to consider archaeological salvage work in the valley (Webb 1938:1, 1939:1).

Webb was soon appointed to head the TVA's archaeological salvage efforts in Kentucky, Tennessee, and Alabama, after W.C. McKern of the University of Wisconsin refused the appointment (Lyon 1996:39-40). On McKern's recommendation, Webb hired one of his students, Thomas M. N. Lewis, to supervise the early work in east Tennessee 's Norris Basin, which began in early 1934 using labor provided by the Civil Works Administration (CWA) until March of that year and continuing through July using Federal Emergency Relief Administration labor (FERA) (Webb 1938:2). Lewis continued to oversee TVA archaeological projects in Tennessee after the conclusion of the Norris Basin operations (Lyon 1996:140-152), and several years later successfully lobbied to have Webb removed as manager of archaeological work in Tennessee; Lewis assumed the position of director of the TVA's projects in that state through the conclusion of the New Deal-era work in the early 1940s (see below).

The Pickwick and Wheeler Basins, Alabama (1934 – 1939)

With the Norris Basin work in Lewis's hands, Webb turned his attention to the Wheeler Basin in northern Alabama, elevating David DeJarnette of the Alabama Museum of Natural History to the position of supervisor of that operation. The Wheeler Basin salvage project ran concurrently with the Norris Basin project (Webb 1938:2, 1939:2), ending on July 1, 1934. As with Norris in Tennessee, the CWA provided labor until the dissolution of that agency in March of 1934, with FERA labor subsequently used until the end of the Wheeler project.

Among the sites investigated in the Wheeler Basin were seven large shell mounds, including two that had been visited by C.B. Moore (Webb 1939:21, 71). Webb had previously developed an interest in shell-bearing sites during his explorations of the Green River in Kentucky (Funkhouser and Webb 1928:153-162), and had concluded that their occupants were "a rather modern group, not numerous and much scattered, whose chief industry was fishing and who had developed to a remarkable degree the art of fashioning the implements needed in their craft" (Funkhouser and Webb 1928:161). He arrived at slightly different conclusions with respect to the presumed occupants of the sites in Alabama, noting that he believed the sites indicated the presence of a "rather primitive people living largely on shellfish and the products of the river" (Webb 1939:182). Webb advised that future investigations of sites in the region should include examination of additional shell mounds.

Webb had the opportunity to focus additional effort on shell middens in the Tennessee Valley with the TVA-sponsored investigation of the Pickwick Basin. On November 19, 1934, a little more than four and a half months after the completion of the Wheeler Basin project, the construction of the Pickwick Dam, located approximately 105 km (63 mi) downriver of the Wheeler Dam, was authorized. In 1936 a survey of the Pickwick Basin identified 323 sites (Webb and DeJarnette 1942:3), and shortly thereafter on May 4, 1936, archaeological salvage operations began, again overseen by DeJarnette. Major archaeological work ended on February 15, 1938, as the basin began to flood after the closing of the completed Pickwick Dam. Additional work on "marginal sites that were only partially submerged… the contents of which would… be destroyed by the high-water table" continued through the spring of 1939 (Webb and DeJarnette 1942:5).

Nine shell mounds were excavated during the Pickwick project (Webb and DeJarnette 1942:306), and in his report on the work in the basin, Webb devoted considerable time to their examination, focusing particularly on four sites – Perry (Lu25), Bluff Creek (Lu59), Long

Branch (Lu67) and Mulberry Creek (Ct27) – that he considered particularly representative of the Shell Mound complex in the basin (Webb and DeJarnette 1942:314). Webb and DeJarnette compiled extensive traitlists from the four sites (Webb and DeJarnette 1942:312, Table 43; 315, Table 44) which were used for comparison with shell mounds Webb had previously excavated in Kentucky (Webb and Haag 1939) (see below).

WPA Excavations at Shell Mounds along the Green River, Kentucky (1937 – 1941)

In 1937, as TVA salvage work in Alabama's Pickwick Basin under David DeJarnette and in eastern Tennessee's Chickamauga Basin under Thomas Lewis and Madeline Kneberg progressed, Webb was able to initiate a series of large-scale projects in Kentucky, including at a number of large shell mounds located along the Green River, using labor funded by the Works Progress Administration (WPA). Unlike the work conducted in Alabama and Tennessee, the Kentucky operations were not salvage excavations in areas scheduled for flooding, and many of the sites visited by the WPA crews were later revisited for additional, comparatively limited excavations in the 1970s and 1980s (see below).

Webb's existing interest in the archaeology of Kentucky coupled with his ongoing management of excavations at shell mound sites in the Wheeler and Pickwick Basins in Alabama, whose similarity to the shell mounds he had previously visited in Kentucky he had already noted (Funkhouser and Webb 1928), caused him to direct significant effort to shell-bearing sites along the Green River. Between 1937 and 1941, crews of WPA laborers overseen by university-trained archaeologists under the direction of William Haag dug at a series of shell mounds (and a number of shell free sites) in the region.

The Kentucky shell mounds were some of the largest excavated in the Southeast during or since the New Deal era. Indian Knoll alone, in addition to the 298 burials excavated by C.B. Moore in the winter of 1915 and 1916, produced an additional 880 burials (Webb 1974:173), and a total of 55,280 artifacts (Webb 1974:229). Other shell-bearing sites in the region varied in size and composition, but many of them yielded well over 100 burials each (Crothers 1999:23-33; Lyon 1996:95-101; Mensforth 2005; Milner and Jefferies 1998).

Based on the types of artifacts recovered during the excavations at Kentucky's shell mounds, and their similarity to the materials identified during the TVA salvage work he had overseen in Alabama, Webb adopted the term "Archaic" to describe them, following terminology first used in 1932 (and subsequently elaborated upon in 1938) by William Ritchie to describe the ceramic-free component at the Lamoka Lake site in New York (Ritchie 1932, 1938). Webb distinguished the Green River and Alabama shell mound sites as a variant of Archaic-type cultures. He believed that the "nonagricultural, nonpottery, hunter-fisher-collector pattern of culture may have been widespread in the eastern United States in early aboriginal times" (Webb and DeJarnette 1942:319).

In his report of the Pickwick Basin excavations in Alabama, Webb concluded his discussion of the Shell Mound Archaic with a caution that delineation of its cultural patterns was not complete, and that further work remained before a full understanding would be possible (Webb and DeJarnette 1942:319). Given Webb's familiarity with the work of C.B. Moore, including Moore's travel down the Tennessee River in western Tennessee, and the fact that Webb had already expressed interest in organizing an archaeological program in that region even prior to the authorization of the construction of the Kentucky Dam (Lyon 1996:158), it seems likely that he was specifically interested in linking the hunter-fisher-collector cultures of

Alabama and Kentucky by investigating shell-bearing sites in the lower Tennessee Valley. However, his efforts to organize and oversee the archaeological efforts in the Kentucky Basin were blocked by Thomas Lewis, who would ultimately manage the TVA's salvage operations in much of that area.

The Kentucky Basin, Tennessee (1939 – 1941)

During 1934, when TVA salvage work in Alabama proceeded under the direction of David DeJarnette, Thomas Lewis and his staff, including Madeline Kneberg (later Madeline Lewis), managed the TVA's east Tennessee archaeological operations in the Norris Basin. After the conclusion of the Norris work, Lewis was able to remain busy with smaller surveys and site excavations in Humphreys and Cheatham counties (Unpublished site records on file, Frank H. McClung Museum, Knoxville; Lyon 1996:140-141) until the TVA authorized work in the Chickamauga Basin, which extended from 1936 to 1939.

During the Chickamauga Basin project, tension between Lewis and Webb increased substantially, eventually causing a rift between the two men that led to the removal of the Tennessee TVA work from under Webb's control in favor of Lewis's management (Lyon 1996:155-161). As the Chickamauga project had progressed, Webb and Lewis disagreed on many of the specifics of work in the basin, including early survey methods (Lyon 1996:143), Lewis's desire to use TVA money to equip the laboratory at the University of Tennessee (Lyon 1996:144), and on the authorship and organization of the Chickamauga report (Lyon 1996:145). These disagreements led to an increasingly contentious relationship between the two men, and by the time plans for the Kentucky Basin salvage project were in development, Webb and Lewis were engaged in open warfare for control (Lyon 1996:155-161).

The Kentucky Dam was authorized in May of 1938, and construction began in July of that year (Tennessee Valley Authority 1951). The dam is located in Kentucky on the border of Marshall and Livingston Counties, and the resulting Kentucky Lake was approximately equally divided between Kentucky and Tennessee, a political-geographic division that proved to be a major point of contention in the battle between Lewis and Webb. Lyon (1996:155-161) notes that both men made multiple requests to the TVA to remove the other from involvement in the Kentucky Basin project. Webb sought unilateral control over the entire basin, while Lewis, unwilling to cede the Tennessee portion of the basin to Webb after an increasingly antagonistic feud, engaged supporters to argue his case to the TVA administrators, finally resorting to a visit to the University of Tennessee by Carl Guthe (a friend of Lewis's, and a member of the National Research Council's Committee on Basic Needs in American Archaeology [Lyon 1996:71; see also Guthe 1939]) to evaluate the state of the Tennessee program, and the ability of Lewis and his staff to manage work in western Tennessee (Lyon 1996:159-161).

Ultimately, the work in the Kentucky Basin was divided along state lines. In Tennessee, Lewis answered directly to the TVA, and the Tennessee archaeological staff under Lewis undertook the excavations in the lower Tennessee Valley south of the Tennessee-Kentucky state line.

In Tennessee's portion of the Kentucky Basin and the surrounding region, 259 sites, representing 296 temporal components, were recorded in Benton, Decatur, Henry, Houston, Humphreys, Perry, and Stewart counties during surveys conducted between 1936 and 1942 (Table 2.2).

In contrast to the TVA work conducted along the upper Tennessee River in eastern Tennessee, which focused predominately on sites representing the Woodland and Mississippian

Table 2.2. Site components recorded by University of Tennessee Division of Archaeology in western Tennessee, 1936 – 1942 (components by temporal affiliation) (data provided by Tennessee Division of Archaeology).

County	Total Sites Recorded	Components Represented					
		Prehistoric, Unidentified	Paleoindian	Archaic	Woodland	Mississippian	Components by County
Benton	95	45	3	11	40	10	109
Decatur	31	13	0	1	15	1	30
Henry	35	1	0	2	31	4	38
Houston	2	2	0	0	0	0	2
Humphreys	56	25	5	5	28	8	71
Perry	20	17	0	0	1	3	21
Stewart	20	4	0	4	10	7	25
TOTAL	259	107	8	23	125	33	296

Table 2.3. Sites excavated during TVA salvage operations in western TN, 1939 – 1942 (Chapman and Sullivan 2006:21-30, Table 1).

County	Archaic	Archaic / Woodland	Woodland	Woodland / Mississippian	Mississippian	Components by County
Benton	7	2	6	1	1	17
Decatur		3	3			6
Henry	2	1	1	1	2	7
Humphreys	1		1	1	1	4
TOTAL	10	6	11	3	4	34

periods in that region (see Lewis et al. 1995; Lewis and Kneberg 1946; Webb 1938), many of the largest excavations conducted in the Kentucky Basin focused on sites with Archaic components (Table 2.3).

Of the ten single-component Archaic and six Archaic – Woodland sites excavated in the Kentucky Basin, six constituted shell mounds or middens. Three were located in Benton County (Eva [Bn12], Ledbetter Landing [Bn25], and West Cuba Landing [Bn17]), two were in Henry County (Kays Landing [Hy13], Big Sandy [Hy18]), and one was in Decatur County (Oak View [Dr1]). With one exception – West Cuba Landing[8] – information on these sites may be found in Chapters 5 – 8.

Salvage archaeology in the Tennessee portion of the Kentucky Basin was begun in 1939 and concluded in 1942 (Chapman and Sullivan 2006), however a comprehensive report of the work done in the basin by the University of Tennessee's Division of Archaeology (UTDoA) was never produced. In the years following the end of TVA-sponsored work in the region, however, a series of articles (Kneberg 1952, 1954, 1956, 1957; Lewis and Kneberg 1959), books (Lewis and Kneberg 1947), and a monograph on the Eva site (Lewis and Lewis 1961) were produced by Lewis and Kneberg based on the Kentucky Basin sites and cultural materials recovered from them. Douglas Osborne also produced a master's thesis on the work he supervised at the Big Sandy site in 1942 at the University of New Mexico. The thesis, which was never published, was effectively a site report, and much of its content was later condensed and incorporated into Lewis and Kneberg's subsequent publications on the western Tennessee Archaic (Lewis and Kneberg 1947, 1959).

[8] Despite the presence of shell-bearing deposits at West Cuba Landing (Bn17), the spatial coordinates of datable materials from that site were too infrequently recorded to allow for adequate dating of the site's strata, compared to the data from the region's other excavated shell-bearing sites.

A short synthetic volume, “The Archaic Horizon in Western Tennessee,” (Lewis and Kneberg 1947) provided brief descriptions of what they considered the major representative Archaic sites that had been examined in the western Tennessee River valley, a total of eleven. The report included an extensive trait list and tabular comparison between those traits distinguished in western Tennessee (the “Eva focus”) and those of the sites in northern Alabama (“Lauderdale focus”) and in Kentucky’s Green River area (“Indian Knoll focus”) (Lewis and Kneberg 1947:15-17).

The 1947 publication was an early formulation of Lewis and Kneberg’s ideas regarding the cultural patterns and historical sequences in western Tennessee. Twelve years later, they published a significantly revised version of their 1947 volume as an article in *American Antiquity* entitled “The Archaic Culture in the Midsouth” (Lewis and Kneberg 1959). In the 1959 synthesis, a list of 83 separate cultural traits, including aspects of community plan, subsistence pattern, mortuary treatment and customs, and artifacts (Lewis and Kneberg 1959:Table 1), was defined from the ten primary Archaic sites identified in the Kentucky Basin. Using the “z-coefficient,” a statistic devised by A.L. Kroeber (1940) intended to quantify similarity or dissimilarity within a population based on proportions of both shared and unshared traits between sites[9], and in combination with a series of four radiocarbon dates obtained from Eva (Stratum IV, n = 1) and from Kays Landing (Stratum V, n = 1; Stratum II, n = 2), which were used to anchor the regional sequence, Lewis and Kneberg distinguished three sequential occupational phases associated with two distinct Archaic cultural patterns in the valley during

[9] Kroeber (1940) defined the calculation of the Z-coefficient as follows: *a*, *b*, *c*, and *d* represent the cell values in a 4-cell contingency table: *a* and *d* represent agreement values (shared traits and unshared traits between two sites); *b* and *c* are disagreements. Z = [(a+d) – (b+c)] / N, where N = the total number of traits being compared. In the case of western Tennessee, N = 83.

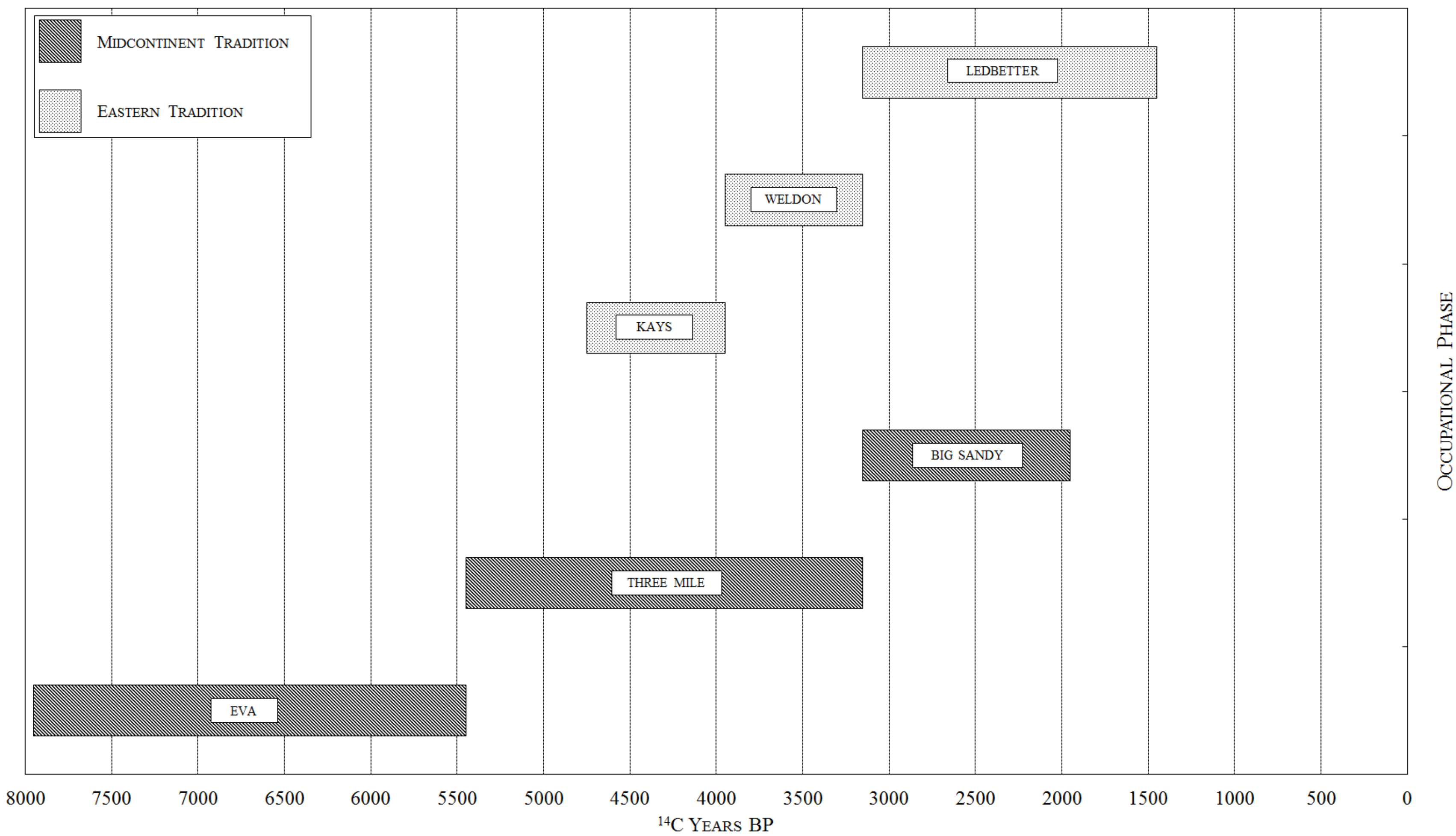

Figure 2.2. Occupational sequence in lower Tennessee Valley as interpreted from Eva, Big Sandy, Cherry, McDaniel, Frazier, Kays Landing, West Cuba Landing, Thomas, Ledbetter, and Oak View (Lewis and Kneberg 1959:163-173).

the period from 5200 BC (M-357 [Crane 1956:666]: Eva, Stratum IV) to approximately 500 AD (Figure 2.2).

Lewis and Kneberg's "Midcontinent tradition," consisting of the Eva, Three Mile, and Big Sandy phases, was estimated to have appeared several centuries prior to 5200 ± 500 years BC (Lewis and Kneberg 1961:173) and to have extended to roughly AD 1 (Lewis and Kneberg 1959:180).

Components associated with the Eva phase (ca. 6000 – 3500 BC [7950 – 5450 ^{14}C BP]) were distinguished particularly by the presence of freshwater mussel shell and the large, Eva basal-notched projectile point type (Lewis and Kneberg 1959:163-164).

The Three Mile phase followed, and was estimated to have spanned the period from 3500 to approximately 1200 BC (5450 – 3150 ^{14}C BP). Similar to the Eva phase in character, the Three Mile phase was identified only at the Eva site (Stratum II) and was defined particularly by the "marked shift from Eva basal-notched to Big Sandy side-notched" points (Lewis and Kneberg 1959:164), and by a series of other artifact types. The phase was thought to terminate during the early years of the "Medithermal" period "with a climate change which apparently eliminated mussels as a food supply… [and] ushered in the next phase of the sequence – the Big Sandy" (Lewis and Kneberg 1959:164-166).

The Big Sandy phase marked the last of the three phases of the Midcontinent tradition in the lower Tennessee Valley, and was defined principally by the shift away from the use of shellfish as climate fluctuations brought about changes in the region's rivers, eliminating the favorable shellfish habitats previously afforded by earlier climate conditions (Lewis and Kneberg 1959:166). Five components were associated with the Big Sandy phase: Stratum I at Eva, Stratum I at Big Sandy, and single occupational components at the Cherry, McDaniel, and

Frazier sites. Interestingly, Lewis and Kneberg noted that the assemblage at McDaniel, a site situated much later in time than initially suggested (see Chapter 8), suggested it was later than other sites of the Big Sandy phase, possibly more contemporaneous with the Ledbetter phase (Lewis and Kneberg 1959:169), a surprisingly accurate supposition (see below).

Lewis and Kneberg suggested that some 3,200 years after people of the Midcontinent tradition arrived in the lower Tennessee Valley, people of a second cultural tradition, the Eastern tradition, appeared in the region. Their arrival and occupation of the valley was characterized by components at the Kays Landing, Oak View, Ledbetter, Thomas, and West Cuba Landing sites (Lewis and Kneberg 1959:169-173). Based on the combination of shellfish remains in several of those sites, the overall similarity of the material assemblages (and contrast with the sites associated with the Midcontinent tradition), and the later radiocarbon dates obtained from Stratum V and II of the Kays Landing site (Crane 1956:665-666), Lewis and Kneberg believed that entry into the region by a second group of people, "possibly from a southeasterly direction" (Lewis and Kneberg 1959:175), was indicated by an initial occupation at the Kays Landing site that overlapped in time with the Three Mile phase of the Midcontinent tradition.

The Kays phase was represented by Stratum V and IV at Kays Landing, and extended from ca. 2800 to 2000 BC (4750 – 3950 ^{14}C BP). Characterized by shellfish exploitation and some similarity of technology to the Three Mile phase (e.g., stemmed scrapers), one of the Kays phase's principal distinguishing features from Three Mile was a straight-stemmed projectile point form. Craniometric measurements also suggested a different ancestry of the burials associated with the Kays Landing site; the crania at Kays Landing were thought to be more similar to those at eastern sites such as Stallings Island, in Georgia, and at Perry, in northern Alabama (Lewis and Kneberg 1959:169).

Following the Kays phase, the Weldon phase was also represented only by a single component, Stratum II, at Kays Landing. Also a shell-bearing deposit, the primary distinguishing characteristic of the Weldon phase was a pair of radiocarbon dates indicating an age considerably later than the earlier Kays phase (Lewis and Kneberg 1959:172), situating it during a period from approximately 2000 to 1200 BC (3950 – 3150 ^{14}C BP). Because the overlying Stratum I at Kays Landing was shell-free, the termination of the Weldon phase was, similar to the Three Mile phase, thought to be the onset of the Medithermal climatic period.

The third and final phase of the Eastern tradition, the Ledbetter phase, extended from 1200 BC until roughly AD 500 (3150 – 1950 ^{14}C BP). Two separate temporal horizons were included in this phase, which comprised Stratum I from Kays Landing, and the deposits at Ledbetter, Oak View, Thomas, and West Cuba Landing. The earliest horizon occurred during the Medithermal, as suggested by the shell-free upper deposits at Kays Landing and West Cuba Landing, and the lower deposits at Ledbetter and Oak View (Lewis and Kneberg 1959:172-173). The later horizon was signaled at Oak View and Ledbetter by the reintroduction of mussels in those sites' upper strata (Stratum I at Ledbetter and the remains of a shell-bearing stratum in the plow zone at Oak View). The proposed termination of the Ledbetter phase was based on the reappearance of shellfish, thought to have occurred with a return several centuries prior to AD 500 to favorable river conditions for shellfish proliferation that were similar to those that persisted during the Eva, Three Mile, Kays, and Weldon phases (Lewis and Kneberg 1959:173).

The analysis and interpretation produced by Lewis and Kneberg was rigorous by the standards of the period in which it was produced, combining environmental data, statistically-based inference, craniometry, and newly-developed radiocarbon dating with more established cultural historical approaches to synthesize the analyzed data and attempt to situate it not only within a cultural-historical framework for the Kentucky Basin, but also to place it more broadly into the regional Shell Mound Archaic. However, the accuracy of their interpretation was negatively affected by the lack of sufficient absolute chronological data from the sites on which they based their work, and by overly environmentally deterministic views about cultural practices, specifically the implied notion that shellfishing represented a step in the natural progression of Archaic peoples' increased adaptation to their local environments, a view (Caldwell 1958:71) called "Primary Forest Efficiency." The view that, once adopted, the practice of shellfishing might only be given up if a more "efficient" alternative was found, or if local environments no longer provided suitable shellfish habitat, led Lewis and Kneberg to focus too greatly on the presence or absence of shell-bearing deposits as temporal markers for periods of favorable (and unfavorable) environmental conditions for freshwater mollusks in the region (Lewis and Kneberg 1959:173). Consequently, they failed to consider the possibility that shell-bearing (and shell-free) deposits at the sites in their ten-site sample need not have formed during the same historical periods (see Chapters 5 – 8).

Despite minor misgivings expressed by Lewis and Kneberg about the sequence they proposed (e.g., Lewis and Kneberg 1959:169), the 1959 article was their final word on the nature of the western Tennessee Archaic, and by extension, of the shell mounds excavated there prior to the region's inundation. Although a detailed monograph on the Eva site was produced two years later (Lewis and Lewis 1961), the authors focused exclusively on the archaeology of that site, and made no effort to expand upon or revise the conclusions published in their 1959 article.

Legacy of the New Deal-era excavations

Although C.B. Moore's work in the early 20th century helped to introduce the shell mounds and middens of the midcontinent – particularly those of Kentucky – to the emerging Southeastern archaeological community of the 1920s and 1930s, it was the pioneering work of William Webb and his collaborators, David DeJarnette and William Haag in Alabama and Kentucky (respectively), and Thomas Lewis in western Tennessee in the 1930s and early 1940s, that helped to first define the region-wide cultural phenomenon that Webb had termed the "Shell Mound Archaic." The collections and documentation produced by those projects, while limited and incomplete by modern standards, have continued to provide substantial data on which decades of additional work have been based (e.g., this research project; see also Crothers 1999; Marquardt and Watson 1983, 2005; Moore 2011; Rolingson 1967; Winters 1968, 1974).

Equally as important, the Depression-era federally funded work helped to modernize Southeastern archaeology, introducing new field methods and an improved, scientific approach to the excavation of large (and small) sites. Previous approaches to archaeological investigation in the Southeast had been comparatively small-scale, and were usually conducted with a focus on the identification of burials and the recovery of artifacts and skeletal remains, often at the expense of sites' depositional integrity and much of the associated contextual information (e.g., Funkhouser and Webb 1928; Moore 1915, 1916). The initiation of the TVA salvage work in northern Alabama and in eastern Tennessee in the early 1930s, however, included the hiring of a number of graduate students from the University of Chicago, most of whom had been trained in the archaeological field methods developed by Thorne Deuel and Fay-Cooper Cole in the 1920s and early 1930s during archaeological work in the state of Illinois, particularly the excavations at the Kincaid site (Haag 1986:66; Lyon 1996:62). These students put their training into practice on the sites at which they directed excavations, and many of them would also later advise Webb and Lewis in Kentucky and Tennessee, respectively, on matters of field procedure, contributing to field manuals that were developed to better organize, manage, and standardize ongoing salvage and relief work in the states in which they were working (Lyon 1996:150; see also the UTDoA manual for field and laboratory procedures [Lewis et al. 1995: Appendix C]). The spread of the methods taught at Chicago to other archaeologists hired by Webb helped to revolutionize the ways that archaeological fieldwork was done in the Southeast (Haag 1986).

THE SHELL MOUND ARCHAEOLOGICAL PROJECT AND RELATED WORK ALONG THE GREEN RIVER, KENTUCKY, 1972 – PRESENT

For several decades following the end of the Great Depression, relatively little systematic work at the shell middens in Tennessee, Kentucky, or Alabama was undertaken. Completion of the TVA's dams along the Tennessee River in Alabama and Tennessee, and the resulting lakes created along much of the river's length, effectively ended most systematic shell mound studies in those regions, although amateur collectors have continued to walk the shorelines of those areas during periods of low water[10]. During the same period, work on the Green River sites in Kentucky was focused principally on the large collections and reports produced by the WPA efforts under Webb (Rolingson 1967; Winters 1968, 1969), and little new excavation was undertaken.

[10] The Ernest J. Sims Collection at the University of Tennessee, Knoxville, represents decades of surface and collecting by Dr. Sims along the shores of Kentucky Lake during periods when water was low, exposing eroded margins of many of the sites that were previously investigated by the TVA, including Eva. The collection is largely provenienced by site, including maps, and constitutes one of many underutilized, but invaluable, research collections housed at the Frank H. McClung Museum.

The initiation of the Shell Mound Archaeological Project (SMAP) along the Green River in the early 1970s, under the direction of Patty Jo Watson and her doctoral student, William Marquardt (then of Washington University), marked a resumption of significant shell midden archaeology in the Midsouth. In the ensuing decades, further small-scale excavations at several shell-bearing sites along the Green River by students of Marquardt and Watson (e.g., Crothers 1999) and University of Kentucky archaeologists (e.g., Moore 2011) have continued intermittently.

Unlike the large-scale WPA excavations, the SMAP excavations and the direct descendants of the SMAP program have been largely problem-oriented, directed to exploring specific research questions (Crothers 1999; Marquardt and Watson 2005; Moore 2011; Stein 1983), and were typically comparatively small-scale investigations at sites previously extensively explored by William Webb's WPA crews. The SMAP began in the early 1970s, spurred by Watson's interest in early indigenous plant domestication in the region, deriving from her previous work in the Mammoth Cave area upriver from the Green River shell mounds (e.g., Watson 1969, 1974 [ed.]). Watson and Marquardt initiated the project at the Carlston Annis site, which had been previously excavated by Webb (Webb 1950), and over subsequent field seasons expanded work to other shell-bearing sites in the region. Gradually concerns about the depositional histories and context of the sites, and about the nature of site formation processes in shell-bearing sites, prompted the SMAP to "evolve into a more detailed investigation of geoarchaeology, paleoenvironment, microstratigraphy, and a number of other related research interests" (Crothers 1999:50-51).

Work conducted by the SMAP during the 1970s, 1980s, and 1990s, and by its academic descendants (i.e., students of now-employed faculty who were formerly graduate students working on the SMAP), has contributed substantially to the modern body of theory focused on the formation and purposes of midcontinental shell mounds (e.g., Claassen 1991a, 1991b, 1991c, 1993, 1996, 2010; Crothers 1999, 2004; Marquardt and Watson 1983, 2005; Stein 1983; Thompson 2010), and of the Shell Mound Archaic in general (Claassen 2010; Sassaman 2010), as well as to continued advancement of modern archaeological field methods (see Chapter 3).

One of the most significant, and widely adopted, methodological contributions of the SMAP has been the flotation recovery technique developed by Patty Jo Watson (Watson 1976) to allow for the fine-grained recovery of minuscule paleobotanical and other remains typically missed when only 0.635 cm (0.25 in) dry screening is used. Flotation is so closely associated with the SMAP that the piece of equipment most often used for the method is known colloquially as an "SMAP machine." The use of flotation in archaeological excavations is now considered a standard practice, particularly in the excavation of dense cultural deposits such as those characterizing shell-bearing sites.

The publication of a substantial edited volume by Marquardt and Watson in 2005 provided a compendium of the range and depth of the questions addressed during the decades in which the SMAP operated along the Green River. In recent decades, much of the work conducted by the SMAP has also served as a model for conducting new excavations at shell-bearing sites elsewhere in the midcontinent, and has provided a theoretical and chronological framework for the interpretation of data from previously excavated sites in regions where modern excavations are no longer possible (e.g., Claassen 1991a, 1991b, 1993, 1996, 2010; Stein 1983; Thompson 2010).

EXCAVATIONS AT SHELL-BEARING SITES IN CENTRAL TENNESSEE, 1970S – 2012

Excavations at shell-bearing sites in central Tennessee in the Tennessee and Cumberland river basins have also contributed to the corpus of midcontinental shell mound and midden literature. Unlike the problem-oriented work undertaken along Kentucky's Green River, until quite recently much of the central Tennessee work has been opportunistic, mostly conducted as mitigation or salvage projects in advance of development and construction (Cridlebaugh 1986; Hofman 1984, 1986; Klippel and Morey 1986; Morey 1986; Morse 1967), including the Cordell Hull Reservoir east of Nashville, and the TVA's never-completed Columbia Reservoir project (Tennessee Valley Authority 1999), or in response to concerns about significant ongoing damage incurred from natural forces such as erosion, and from the effects of archaeological site looting (e.g., Miller et al. 2012; Peres and Deter-Wolf 2012). Recent work along the middle Cumberland River by the Bells Bend Archaeological Project (Miller et al. 2012) and the Middle Cumberland Archaeology Project (Peres and Deter-Wolf 2012) has focused particularly on the establishment of a radiocarbon chronology for the region's Archaic shell mounds.

The Anderson Site (40Wm9), 1981 - 1982

In 1980, John Dowd, an avocational archaeologist, organized an excavation of the Anderson Site (40WM9), a shell midden located on private land along the Harpeth River in Williamson County (Dowd 1989). Dowd and his crew, consisting of volunteers from the surrounding area, including relatives of the landowner, spent two seasons at Anderson and excavated roughly 1,500 ft^2 (139.36 m^2) (Dowd 1989:10). Several graduate students and faculty from the University of Tennessee, Knoxville, were recruited by Dowd to analyze the materials recovered during the two seasons of work, which consisted of human skeletal remains (Joerschke

1983), faunal remains and bone and antler tools (Breitburg 1984), freshwater mollusks and shell artifacts (Parmalee and O'Hare 1989), and chipped- and groundstone tools (Hofman n.d.). Seventy-four burials, including one canine burial, were excavated.

The final report of investigations on the work at the Anderson site (Dowd 1989) was intended for consumption by a popular audience rather than professionals, and consequently Dowd eschewed much of the more detailed descriptive data typical of most professional site reports. Nevertheless, Dowd's report provided significant information about the Anderson site and about an area of Tennessee along the Harpeth River that has otherwise received little professional excavation of its shell-bearing sites.

Sites on the Duck River (Columbia Reservoir), 1970s

In the late 1960s, the TVA recommended the construction of a dam on the Duck River for flood control and to create a reservoir intended to serve Maury and Marshall counties (Tennessee Valley Authority 1999:4-5). The TVA purchased the necessary land in the area that would be inundated, and construction of the dam began in mid-1973 (Tennessee Valley Authority 1999:5). After the passage of the Endangered Species Act of 1973, and the addition of a number of mussel species to the federal endangered species list maintained by the US Fish and Wildlife Service, the dam project ultimately was abandoned when no acceptable solution could be found to the problem of habitat relocation of the problematic mussel species (Tennessee Valley Authority 1999:5-7). Despite the TVA's failure to complete the Columbia Dam, several archaeological sites within the projected reservoir boundaries along the Duck River were investigated during salvage operations, including the Hayes site (40ML139), a stratified shell midden located in Marshall County (Morey 1986:1), and the Ervin site (40MU174), a large shell and rock midden situated in Maury County (Hofman 1986:1). Both sites were excavated as part of the larger Columbia Archaeological Project overseen by Walter Klippel, a faculty member and archaeologist at the University of Tennessee, Knoxville. Data from the Hayes and Ervin sites have been published in a series of management summaries (Hofman 1984; Morey 1986), graduate master's theses and dissertations (Carr 1991; Hofman 1986), and in a few cases peer-reviewed articles written by the project's supervisors (see Carr 1991; Crites 1987, 1993; Klippel and Morey 1986).

Klippel and Morey (1986) conducted a detailed study of the nutritional potential of the aquatic gastropods recovered in Morey's controlled excavation of a 3 m^2 block at Hayes, building on Morey's examination of the unmodified faunal assemblage represented in the sample column (Morey 1986). Hayes consisted principally of gastropod shell rather than bivalve shellfish remains; the authors concluded that the primary benefit of the consumption of freshwater gastropods was to be found in the minerals and vitamins they contained, rather than overall kilocalorie yield (Klippel and Morey 1986). This study complemented the findings of an earlier investigation of the nutritional value of freshwater bivalves published by Klippel with Paul Parmalee in 1974 (Parmalee and Klippel 1974).

The Ervin site has been notably less documented than Hayes, and no comprehensive report of the site's composition or detailed description of the excavation conducted has been published or otherwise produced. A management summary presented to the Tennessee Valley Authority in 1983 (Hofman 1984) indicates that Ervin was initially recorded in 1972; subsurface testing of the site commenced in 1981 with a series of backhoe trenches and two separate 4 m^2 hand-excavated trenches into the shell midden deposit (Hofman 1984). A subsequent block excavation measuring roughly 28 m^2 opened into the shell midden encountered nine burials at Ervin.

Sites along the Middle Cumberland River, 1980s – present

Until the last few years relatively little professional archaeological investigation had occurred at the many shell mounds and middens located along the Cumberland River, which originates in southeastern Kentucky and passes southwest into Tennessee. The river's course extends through metropolitan Nashville, Tennessee, before gradually turning northward back into Kentucky, where it joins the Ohio River in Livingston County.

Despite the presence of large numbers of shell-bearing sites, particularly along the middle Cumberland River – which extends from the confluence of the Cumberland and Obey rivers at the town of Celina to the mouth of the Harpeth River on the border of Cheatham and Dickson counties (Peres and Deter-Wolf 2012:5) – most work in that area has been recent (Carmody et al. 2013; Miller et al. 2012; Peres et al. 2012), although previous salvage archaeological investigations along the upper Cumberland River were conducted at the Late Archaic Penitentiary Branch (Cridlebaugh 1986) and Robinson (Morse 1967) sites.

In contrast with most previous excavations in central Tennessee, the recent work along the middle Cumberland River has been explicitly problem oriented, directed toward the establishment of a solid chronological framework for the region and to questions regarding long-term historical changes in subsistence and settlement practices in the region.

In May of 2010, heavy rains in central Tennessee caused severe flooding in the region; the Cumberland River crested in Nashville at levels not observed since 1937 (USGS Newsroom, http://www.usgs.gov/newsroom/article.asp?ID=2461, Accessed 9/1/2013), resulting in significant erosion along the river's banks downstream from Nashville, and damage to a number of prehistoric sites along the river, including a number of shell-bearing sites with shell deposits of considerable thickness (Deter-Wolf et al. 2011).

Subsequently, an emergency inventory of damaged sites along the Middle Cumberland River sponsored by the National Science Foundation was conducted by archaeologists from Middle Tennessee State University and the Tennessee Division of Archaeology to assess damage from the flood, and ongoing damage caused by looting of shell-bearing deposits in the area. The survey resulted in the documentation of a significant number of previously unrecorded shell-bearing sites along the river's banks (Peres and Deter-Wolf 2013).

Several of these were investigated from 2010 to 2012, when two separate archaeological research teams conducted limited sampling of shell-bearing sites along the Middle Cumberland River to study midden composition and to obtain materials for radiocarbon dating of the deposits, especially necessary because there had been no previous establishment of shell midden chronology in that region (see Claassen 2010; see also Chapter 10).

Excavations were undertaken in 2010 and 2012 by the Bells Bend Archaeological Project at Clees Ferry (40DV14), a large shell midden that had been largely destroyed by bank erosion and visits by local looters, and at 40CH171, a smaller shell midden located downstream that was also being actively looted. Three flotation columns at Clees Ferry and one at 40CH171 were removed to sample the sites' deposits, and paleoethnobotanical materials from those deposits were submitted for radiocarbon dating (Miller et al. 2012); results indicated both sites dated to the mid-Middle Archaic period between 7000 and 6000 cal yr BP (Miller et al. 2012:56, Table 1). A third site, the Bell Site (40DV307), contained shell-bearing deposits, but the only radiocarbon dates obtained were on nonshell features. At present the shell midden is undated but assumed to be late Archaic/Early Woodland in age based on the dates already obtained from the site (Miller et al. 2012:56, Table 1).

In 2011, work of a similar nature and scale to that undertaken by the Bells Bend Archaeological Project was done by Peres and Deter-Wolf at 40DV7, situated roughly 12.5 km upriver from Clees Ferry (40DV14) (Peres et al. 2012). A pair of flotation columns were excavated and analyzed, and indicated that the site's Archaic shell midden was contemporaneous to 40DV14 and 40CH171, forming during the 7th millennium BP (Peres et al. 2012:45-46). At present, no final reports have been produced for either project, although summary articles (Miller et al. 2012; Peres et al. 2012) have been published in *Tennessee Archaeologist*.

At present, the shell mounds and middens along the Cumberland River remain some of the least well-understood and documented of any in the midcontinent, due to the comparatively limited work so far completed in that region. Ongoing efforts by the Bells Bend Archaeological Project and the Middle Cumberland Archaeology Project have in the last two years, however, substantially contributed to the radiocarbon chronology of Tennessee's shell-bearing sites, and have helped to further demonstrate the effectiveness of using well-controlled and high-precision sampling strategies to obtain datable materials for assessing shell-bearing site formation. The large number of shell middens known in the region, as well as the ongoing threat from both natural and cultural sources (erosion and large-scale looting, respectively [Miller et al. 2012:54) to such sites, will likely help to make the Cumberland River one of the most productive areas for shell-bearing site research in future decades.

CONCLUSIONS

This chapter has presented a brief history of major archaeological work, by historical period, conducted at shell-bearing sites in the midcontinental United States, beginning with the work of Clarence Bloomfield Moore along the Tennessee, Green, and Ohio rivers in the early 20th century. Moore's published accounts, which contained many high-quality illustrations and site descriptions, served as inspiration to William Webb. Arguably one of the more polarizing and dominating figures of 20th century shell mound archaeology (Schwartz n.d.), Webb's early interest in what he would eventually describe as the "Shell Mound Archaic" was instrumental during the Great Depression in mobilizing federal funding for excavations at some of the most significant shell-bearing sites in the eastern United States; the collections resulting from those projects remain some of the most extensive and best preserved research collections curated at Southeastern universities.

In the decades following the end of the New Deal archaeological boom, reanalysis of Depression-era collections eventually prompted the initiation of new excavations at previously-studied sites along the Green River by Patty Jo Watson and William Marquardt of the Shell Mound Archaeological Project, while additional work at sites in central Tennessee, mostly conducted in a salvage capacity, provided further data on the Archaic cultural phenomenon that included shellfishing.

The next chapter discusses the historical development of the variety of theoretical approaches to understanding the Shell Mound Archaic as it has been defined on the basis of over 100 years of archaeological excavation and analysis.

CHAPTER 3. A SYNOPSIS OF PAST AND PRESENT PERSPECTIVES ON THE ORIGINS AND USE OF SHELL MOUNDS AND MIDDENS

The composition, physical forms, and histories of Archaic shell middens and mounds vary substantially, both temporally and geographically (e.g., Crothers 1999; Dowd 1989; Lewis and Lewis 1961; Marquardt and Watson [eds.] 2005; Miller et al. 2012; Russo 2004, 2006; Webb and DeJarnette 1942; Webb 1974), and there remains considerable debate regarding the nature of the cultural and historical contexts in which they were created and used (Claassen 1991a, 1991b, 1993, 2010; Crothers 1999, 2004; Marquardt 2010; Marquardt and Watson [eds.] 2005; Milner and Jefferies 1998; Russo 2004; Sassaman 2010; Thompson 2010). Long held traditional views that such sites represent true middens – deposits of accumulated domestic and occupational debris – have in the last twenty years been challenged by a variety of alternative hypotheses.

Beginning in the early 1990s, Claassen (1991a, 1991b, 1993) posed a new argument regarding the origins of midcontinental shell mounds, suggesting that shell was used as an alternative building material to earth or stone and that shell mounds were deliberately constructed as burial sites. This hypothesis was initially not widely accepted among Southeastern archaeologists, but it has nevertheless served to spur discussion and new lines of research (Crothers 1999:237).

The degree of intentionality of shell mound creation remains a contentious subject, but there has been in recent years growing acceptance of the notion that the characterization of such sites as simply quotidian subsistence debris is perhaps too reductionist. George Crothers (1999) and Victor Thompson (2010) (among others) have suggested some freshwater shell bearing sites may have begun essentially as subsistence debris, but that successive visits to the same locations by members of the same lineage or corporate group over many years or generations imbued these sites with cultural and historical significance. Such significance might have included the recognition of individual sites and the territories around them as the domain of the particular social groups who had created and used them, and as a number of researchers have recently argued, shell mounds might have served as historically significant locations for large ceremonial gatherings involving feasting on shellfish and the interment of the dead by members of the groups to whom each shell mound "belonged" (Claassen 2010). Those who have made these arguments point particularly to the large numbers of human burials contained within many of them (Lewis and Lewis 1961; Lewis and Kneberg 1959; Webb 1974) and to evidence that freshwater mollusks were nutritionally insufficient as a staple food resource (Klippel and Morey 1986; Parmalee and Klippel 1974). However, at productive locations large numbers of mussels and snails can be gathered relatively quickly under certain conditions (Klippel and Morey 1986:808), a quality that could contribute to their selection as a suitable feasting food (see Hayden 2001:20-21, Table 2.1).

The changing perceptions of Archaic shell-bearing sites, from essentially domestic dumps representing hundreds or even thousands of years of dietary and other occupational debris to possible monuments, intentional or otherwise, attesting to the activities of socially complex hunter gatherer societies, has paralleled a growing trend in Archaic studies during the past twenty years toward widespread acknowledgement that the antiquity of social complexity in the Southeast reaches into the Mid-Holocene period (Anderson 2002, 2004; Anderson and Sassaman 2004, 2012; Bender 1985; Gibson and Carr 2004; Jefferies 2008; Kidder and Sassaman 2009; Russo 2004; Sassaman 2004, 2005, 2006, 2010; Saunders 2004; Saunders et al. 1997; Thompson 2010). Much of the evidence suggesting early development of post-band, segmental – or "tribal" (e.g., Anderson 2002, 2004) – societies during the Middle Archaic period has in fact derived from Southeastern shell and earthen mound sites[11].

The recent renaissance in our understanding of Archaic shell-bearing sites as elements in a broader and more socially complex Southeastern landscape represents the second major period of investigation of, and reflection on, the origins and nature of shell mounds and middens in the eastern United States. The first occurred more than one hundred years earlier; during that time, what was described above as the "traditional" perspective – that shell-bearing sites comprised human occupational debris – developed and became entrenched in American archaeology.

This chapter provides a review of the past and current views on the formation, use, and cultural significance of the shell mounds and middens of the eastern United States, following the brief overview of the major periods of research and excavation of freshwater shell-bearing sites in the interior US presented in Chapter 2. The discussion begins in the early 19th century, with a synopsis of early investigations of shell middens and the development of the understanding that such sites derived from human rather than natural agency. Following a lengthy period in the late 19th and early and mid-20th century, when Southeastern research on particularly freshwater shell middens shifted to examinations of the contents of the sites rather than their origins, a second

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[11] There is at this point little question that people of the Shell Mound Archaic were integrated into larger regional spheres of social interaction. Long distance exchange networks among creators of shell mounds in Kentucky and Tennessee are suggested by shared bone pin styles found in some shell sites south of the Ohio River (see Jefferies 1995, 1996, 1997, 2004, 2008), while social interaction between groups in Tennessee, Alabama, and Mississippi is suggested by the regional distribution of well-made oversized bifaces (e.g., Brookes 2004; Johnson 1994; Johnson and Brookes 1989). Copper and marine shell objects found in shell mound burials in Kentucky and Tennessee attest to interaction with peoples located as far away as the Great Lakes and the Gulf or perhaps Atlantic coasts (Johnson 1994).

Less congenial contact between groups also may be indicated by patterns of skeletal trauma from some Tennessee, Kentucky, and Alabama shell mounds (Jacobi 2007; Mensforth 2007; Shields 2003; Smith 1995, 1996, 1997). Evidence for violent conflict, particularly the taking of body parts as trophies, suggests patterns of enmity and hostile interaction among separate groups within regions (Jacobi 2007; Mensforth 2007) and may provide further indication of the formation of separate, cohesive social or even political groups who occasionally clashed with each other.

major period of inquiry into the sites themselves began with new research initiated in the late 1970s and 1980s, and has continued to the present day.

EARLY DEVELOPMENT OF TRADITIONAL VIEWS ON SHELL-BEARING SITES

> "[a]long the Ohio, where the river is in many places wearing and washing away its banks, hearths and fireplaces are brought to light, two, four and even six feet below the surface. A long time must have elapsed, since the earth was deposited over them… Around them are deposited immense quantities of muscle [sic] shells, bones of animals, etc. From the depth of many of these remains of chimnies, below the present surface of the earth, on which… grew as large trees as any in the surrounding forest, the conclusion is, that a long period, perhaps of a thousand years, has elapsed since these hearths were deserted" (Atwater 1820:225-226).

The above passage was published in 1820 in the first volume of the Transactions of the American Antiquarian Society by Caleb Atwater, an Ohio lawyer and amateur archaeologist, and may be one of the earliest archaeologically-minded accounts of freshwater shell middens found along rivers of the midcontinental United States. Atwater considerably underestimated the age of the sites he visited along the Ohio and Muskingum rivers in Ohio, but his recognition of the origin of the deposits as deriving from human agency rather than natural processes was forward-thinking for the time. Elsewhere in the world, Atwater's contemporaries – zoologists, geologists, natural historians, and amateur prehistorians – were beginning efforts to determine the nature of the mounded deposits of marine and freshwater shellfish remains that were to be seen along the coastlines of every continent except Antarctica, and the along the shores of many of those continents' rivers and lakes (Waselkov 1987:126-131, Table 3.6).

Early interest in ancient shell middens coincided with broader questions in the developing natural sciences about the antiquity of the world and of the human species, and much of the early work directed at shell middens, particularly those located in coastal areas, was concerned with establishing the nature of their origins as either cultural or natural, specifically as their origins related to the determination of the chronology of human development (Gräslund 1987:34-39; Waselkov 1987:138). In Denmark, where a large number of marine shell-bearing deposits were to be found, three well-known researchers from the University of Copenhagen – Johan Forchhammer, a geologist; Jens Worsaae, an archaeologist; and Japetus Steenstrup, a zoologist and biologist – investigated a series of shell-bearing sites, or *kjoekkenmoeddinger* ("kitchen middens;" the singular form is *kjoekkenmoedding*), along the region's coastlines beginning in the late 1840s (Gräslund 1987:34-39).

Japetus Steenstrup's interest in the Danish *kjoekkenmoeddinger* actually dated back to the mid-1820s (Gräslund 1987:34) – roughly the same time during which Caleb Atwater published his account of the shell middens along the Ohio River – but unlike Atwater, Steenstrup's initial interpretation of the deposits was that despite the presence of cultural materials, the deposits themselves had developed naturally, washing up into mounded accumulations on the shores by natural wave action (Steenstrup 1848:7, cited in Gräslund 1987:35-35). However, following the formation of an interdisciplinary commission in 1848 to study the archaeology and geology of the Leire district of Denmark, and the discovery of a large *kjoekkenmoedding* containing substantial quantities of cultural remains, Worsaae, Steenstrup, and Forchhammer embarked on a multi-year investigation of shell-bearing sites throughout the district (Steenstrup 1853:14-24, 1854:191-197, 1855:1-20, cited in Gräslund 1987:35), eventually recording more than fifty in the region (Worsaae 1860:7, cited in Gräslund 1987:35).

In a series of publications during the late 1840s and 1850s[12] (e.g., Forchhammer and Steenstrup 1848; Steenstrup 1851, 1853, 1854, 1855) the three Danish researchers described their findings regarding the composition and ages of the various *kjoekkenmoeddinger* they had examined, having concluded that they were the product of ancient human subsistence and occupation of the region, rather than the result of natural processes (Gräslund 1987:35).

They noted that the *kjokkenmoeddinger* consisted of predominately adult mollusk shells, rather than a full range of represented ages of individuals (as should be found in naturally-formed deposits), indicating selection for larger individuals to be used as food (Gräslund 1987:35, citing an 1850 unpublished diary entry by Worsaae), and that they contained the remains of cultural activities: charcoal and ash, the bones of a variety of undomesticated terrestrial taxa and domesticated dog (The Academy 1872:474; Morlot 1861:292), and significant numbers of tools of stone and bone (Morlot 1861:301-304). Many of the bones exhibited cut marks and damage consistent with butchering (The Academy 1872:474; Morlot 1861:300, 303). Similar studies of shell middens undertaken elsewhere in the world (e.g., Brinton 1872:356-358; Chadbourne 1859:345-351; Lyell 1849:252-253; Putnam 1882:86-92; Rau 1865:370-374; Tait 1871:63-64; Vanuxem 1843:21-22; Wyman 1868b:561-584) led most scholars to the same conclusion: such shell middens were the result of cultural practices.

Most of these early investigations, in Denmark and elsewhere, were conducted at coastal shell middens, sites that were relatively easily-identified and conspicuous in their size. Contrasted with the significant interest in marine shell heaps during this period, however,

[12] To the author's knowledge, the multitude of historical publications on the Danish shell mounds by Steenstrup, Worsaae, and Forchhammer have not been translated from the original Danish. Discussion here of the content of the various publications written by Steenstrup et al. derives from synopses by Morlot (translated by Philip Harry and published in the 1861 Smithsonian Institution's Annual report) and Gräslund (1987). Where possible (e.g., where it was acknowledged in the original source), reference is provided for the original publication or publications.

comparatively few contemporary studies of freshwater shell-bearing sites appear to have been made[13]. As Jefferies Wyman noted in his discussion of the freshwater shell middens along Florida's St. Johns River Valley, such sites in the United States were "…from time to time noticed, [but had] not been generally recognized…" (Wyman 1868a:396), and were commonly "supposed to be either fluviatile or lacustrine deposits" (Wyman 1868a:396). Given Caleb Atwater's early 19th century observations on Ohio shell middens, Wyman's pronouncement may have been something of an exaggeration. To those who actually examined the interior middens, noting the clear association of obviously human-made bone and stone implements in association with shell and (sometimes) human remains, the fact that those sites had been created by humans seems to have been readily apparent. By the time Daniel Brinton (1872) published "Artificial Shell Deposits of the United States" fifty-two years after Atwater's brief reference to shell middens along the Ohio River, the question of the artificiality of shell mounds, both marine and freshwater, was settled.

Brinton's short article was essentially a restatement of ideas that, even in the early 1870s, appear to have been already viewed as relatively well-worn[14], but his descriptions of the

[13] Unlike the shell rings and mounds on the Atlantic coast and in Florida's St. Johns River Valley – many which were known for their great size before they were mined for shell in the 18th, 19th, and early 20th century (see Larson 1998:29, 52; Milanich 1998:38-39; Sassaman and Anderson 2004:108, Figure 7) – freshwater shell middens in the interior United States are more commonly found buried beneath significant alluvial deposits along the rivers where they occur (see Lewis and Lewis 1961; Marquardt and Watson [eds.] 2005; Miller et al. 2012; Morey 1986; Peres et al. 2012). While still sometimes mounded, they were never as visually impressive as many of the larger shell ring sites on the Georgia or South Carolina coasts, or as Turtle Mound in Florida (Milanich 1998:38-39). Whether the scale of interior shell middens and mounds was insufficient to spur greater scholarly interest in them is not clear, although the accounts of C.B. Moore certainly indicate that, by his estimation, interior shell-bearing sites along the Tennessee, Green, and Ohio rivers were disappointing.

[14] Brinton's article was among a large number of contemporary that firmly expressed the view that humans were the creators of the coastal and freshwater shell middens of the United States and elsewhere. The general consensus of the time is also summarized in the introduction to a paper by F.W. Putnam, published only nine years after Brinton's: "It now seems strange that any one [sic] could for a moment believe that the great deposits of oyster, clam, quahaug [sic] and other shells along the seacoast, and of the fresh-water clam along our interior rivers, were formed by natural agencies, but fifty years ago they were almost universally considered as natural deposits; the results of upheaval of ocean beds or ancient beaches" (Putnam 1881:86).

composition of the sites he visited, while short and relatively minimal in significant detail, were noteworthy for two reasons. First, although Brinton devoted the majority of his short article to coastal shell mounds and middens (many of which he had visited), he also made specific reference to the interior freshwater middens along the middle Tennessee River in northern Alabama, which he had observed in his time with the Army of the Cumberland during the Civil War (Brinton 1872:357-358). He described the sites as "very frequent at and above the Muscle Shoals, and composed almost entirely of the shells of the freshwater muscle [sic]" (Brinton 1872:357), and was able to closely observe the internal composition of one such mound when the troop company to which he belonged made use of the large shell mound near Shellmound, Tennessee[15], as a military post in early July of 1863 (House Miscellaneous Documents 1889:626-627) and dug materials from the slopes of the site to be used in erecting defensive embankments. Many of the bivalve shells within the mound, Brinton (1872:358) noted, were burned or scorched and "had evidently been opened by placing them on a fire"; this was one of several characteristics Brinton considered to be indicative of the cultural origin of such sites.

More critically in the context of this synopsis, Brinton's account represents a relatively early statement of what in the last two decades has become a guiding research question in shell-bearing site archaeology. Although Brinton considered most of the shell mounds and middens he observed (including, presumably, those in northern Alabama) to have been "mere refuse heaps… showing no indications of having been designedly collected in heaps, true analogues of the kjoekken-moeddings of the age of stone" (Brinton 1872:356), he suggested that, in at least a

[15] Shellmound, Tennessee, was a rail station and depot and was named for the eponymous feature described by Brinton (Brinton 1872:357). The station and site were located in Marion County, Tennessee, near Nickajack Cave. The area was flooded in the late 1960s with the completion of Nickajack Dam by the Tennessee Valley Authority in 1967 (Tennessee Valley Authority 1972).

few cases, some “shell-heaps” had been intentionally “collected… into artificial mounds, forming a class of antiquities heretofore unnoticed by archaeologists” (Brinton 1872:356). Such sites appear in Brinton’s estimation to have included the shell rings of the Georgia and South Carolina coasts, and the large shell mound at Crystal River (Brinton 1872:356, 357), the latter of which was suggested to have been erected as a lookout tower.

Brinton’s brief statements, encompassing both the coastal and interior shell-bearing sites in the eastern United States, provide an early expression of what would become larger questions concerning the origin and nature of shell-bearing sites in general, and the degree to which the accumulation of shell deposits, both freshwater and marine, bore the mark of intentionality of purpose. Suffice to say that this question has not yet been resolved to the satisfaction of modern shell midden researchers, particularly with respect to the freshwater middens of the continental interior, and much of the research directed at such sites in the last twenty years has been concerned with addressing this matter.

Brinton’s view that the histories of some shell-bearing sites were more elaborate than simply “the debris of villages of an icthyophagous population” (Brinton 1872:356) may have been shared by others, but more common for the period (and since) was a tendency to distinguish between monuments (made from earth or, in areas lacking suitable clays, from sand, as along Florida’s St. John’s River) and more quotidian occupational sites and their remains[16]. For most of the history of their study, shell-bearing deposits have been viewed primarily as subsistence or occupational refuse, a view that has persisted since the later 19th century and through much of the

[16] C.B. Moore distinguished between “dwelling-sites” (which included shell-bearing deposits, even large ones such as those along the middle Tennessee [Moore 1915] and Green and Ohio Rivers [Moore 1916]) and earthen mounds (Polhemus 2002:16). Jeffries Wyman made similar distinctions along the St. Johns River between that region’s sand burial mounds – which he considered to be monuments – and its large “shell-heaps,” which he viewed so concretely as refuse from occupation that the human remains found within them were, to his mind, evidence for cannibalism (see Wyman 1875:60-65).

20th among the scholars who examined or wrote about such sites (e.g., Brown and Vierra 1983:168; Funkhouser and Webb 1928:153-154; Lewis and Kneberg 1959:163-166, 169-175; Lewis and Lewis 1961:1724; Marquardt and Watson 1983:323-339; Moore 1892:913, 1915:200; Webb 1939:182; Webb and DeJarnette 1942:306-319; Wyman 1875:86).

Focus on the Contents, Composition, and Distribution of Shell-Bearing Sites

By the close of the 19th century, with the widespread acknowledgement that shell-bearing sites were the work of humans, archaeologists during the new century began to focus significantly on the types and varieties of cultural materials contained within shell mounds and middens, and on the geographic distribution and ages of these sites within the broader context of the regions in which they occurred.

Prior to the late 1980s, most of the 20th century's shell midden research, particularly in the eastern United States, can be grouped into four main categories (Stein 1992:Table 1, summarizing Ambrose 1967):

1) Quantification of shellfish for the purpose of estimating dietary composition, food supply, and population sizes;
2) Using changes in shellfish species represented within sequential deposits at shell-bearing sites as indicators of ecological change in associated riverine or marine habitats;
3) Using shell midden locations as markers of past shoreline stands; and
4) Use of the contents of shell middens (artifacts, human skeletal material) as a means of examining cultural historical sequences.

Stein notes (1992:7) that most early shell midden research (following the establishment of cultural origins of shell-bearing sites) fit either into category one (diet and subsistence reconstruction, and population size and site age) or category four (cultural history reconstruction). For example, on the Pacific coast, archaeologists associated with the "California School" of midden research of the early 1900s (Gifford 1916; Nelson 1909, 1910; Uhle 1907) used column sampling (adopted from the Danish shell midden archaeologists [Waselkov 1987:141]) to estimate shell midden composition in order to determine accumulation rates and the subsistence base of the cultures who had created the sites. Contrasting with the California midden studies, contemporary archaeologists in the interior US during the early 20th century (see Chapter 2) largely ignored the midden deposits themselves in their excavations, focusing their studies mainly on the cultural materials contained within the midden matrix to establish local and regional cultural historical sequences (e.g., Lewis and Kneberg 1947:12-17, 1959; Moore 1915, 1916; Webb 1939; Webb and DeJarnette 1942:306-319; Wyman 1868a, 1875).

By the middle of the 20th century and well into its latter half, in the eastern United States shell middens became less critical for the establishment of regional cultural historical sequences and chronology after the development of radiocarbon dating (Libby et al. 1949) and shell-bearing deposits increasingly were viewed as they had been by archaeologists of the early 1900s California school, as sources of information about geographic and temporal changes in subsistence practices and diet, and changes in prehistoric settlement patterns and mobility (e.g., Brown 1983; Brown and Vierra 1983; Carstens and Watson [eds.] 1996; Claassen 1982, 1991a; Crites 1987, 1993; Dye 1996; Klippel and Morey 1986; Marquardt and Watson 1983:323; Morey 1986; Parmalee and Klippel 1974; Styles and Klippel 1996). The long ingrained view that shell-bearing sites comprised accumulations of occupational debris prompted many to consider them as *de facto* indicators of an historical progression of hunter-gatherers during the Archaic toward decreased group mobility, increased sedentism, population increase, and a growing reliance on stable, localized resources (e.g., Brown and Vierra 1983; Smith 1986:22-28). Indications that shellfish were not necessarily nutritionally suitable as a staple food (e.g., Klippel and Morey 1986; Parmalee and Klippel 1974) prompted arguments that rather than staples, shellfish represented supplemental dietary contributions from a widening subsistence base. This also was an argument proposed by Dan Morse in the late 1960s (Morse 1967), who suggested that whitetail deer were the focus of Middle and Late Archaic "Shell Mound Archaic" groups, with shellfish constituting a "back-up food" similar to how they were used on the Northwest coast of North America (Morse 1967:296).

Conceptualized increasingly as hallmarks of sedentism and demographic growth, the "deep shell and midden-mound settlements" (Smith 1989:1568) along rivers of the interior Southeast were also envisioned by Bruce Smith as likely locations around which processes associated with indigenous plant domestication first occurred, as weedy floodplain species colonized habitats disturbed and enriched by long-term human activity (as evidenced by the presence of the sites themselves) (Smith 1992:52). Smith's hypothesis helped to further cement the association of shell-bearing sites with sedentism and population growth during the Mid-Holocene, associations that would become key elements in helping to reformulate the perception of the Southeastern shell mounds and middens.

NEW CONCEPTUALIZATIONS OF SHELL-BEARING SITES IN THE LATE 20TH CENTURY

The seeds of the late 20th century reconsideration of, and debate over, the nature of shell-bearing sites of the Southeastern United States germinated in the early 1970s, when Patty Jo

Watson and William Marquardt initiated the Shell Mound Archaeological Project (SMAP) at a series of shell-bearing sites along Kentucky's middle Green River (Marquardt and Watson 1983, 2005 [eds.]). Initially intended as an opportunity to "compare the subsistence patterns of their inhabitants with those known for the prehistoric cave miners of Salts… and Mammoth… caves" (Marquardt and Watson 1983:323), the SMAP gradually evolved into a much larger multidisciplinary and problem-oriented examination of that region's shell bearing sites (Crothers 1999:50-51; Marquardt and Watson 1983:323). Watson and Marquardt found that the shell-bearing deposits they intended to investigate were far more complex than they had expected. Difficulty resolving the "stratigraphic relationships between artifacts, datable charcoal, and both native and tropic cultigens" (Marquardt and Watson 1983:327) forced them to devote considerable time and resources to studying shell midden formation processes (e.g., papers in Marquardt and Watson [eds.] 2005). That research that would occupy many field seasons and a number of researchers in collaborative work (e.g., Baerreis 2005; Claassen 1986, 1996b; 2005; Crawford 2005; May 2005; Patch 2005; Stein 1983; 2005). Among these was Cheryl Claassen, whose initial association with the SMAP began with her analysis of indicators for season of harvest among freshwater mussels at the DeWeese site in 1982-1983 (Claassen 1986:24, 2005). She found that shellfish harvesting at DeWeese probably occurred during the summer-fall period (Claassen 1986:24), suggesting that the site (and potentially others like it) was not a year-round occupation, but was inhabited or used seasonally (Claassen 1996b:132). She also noted the occurrence of a large number of paired bivalve shells, which she believed supported an alternative explanation to the view of shell-middens-as-village-refuse, since "[v]illages are scenes of many surface and subsurface cultural formation processes that would quickly and easily disturb paired valves" (Claassen 1996b:133). Claassen also argued (Claassen 1996b:132-

133) that some species of mussels in the midden could not have been found in nearby waters, since they favored riffle/run habitats (see Patch 2005:270-272). She believed such habitats were not present, based on geoarchaeological research conducted by SMAP researchers (Stein 1980:26-28), which suggested that the Green River was narrow and deep, and dominated by fine-grained sediments with a silt bottom. Riffle/run species would have had to be transported from elsewhere at potentially significant expense of energy and effort (Claassen 1996:133).

Claassen also focused on the seemingly large numbers and high densities of burials, the apparent paucity of domestic features at many of the excavated sites, and the association of shell-bearing and shell-free sites (Claassen 1993:4-5, Table 1) in the continental interior. Based on these data, she proposed that the mounding of shell remains did not constitute long-term debris accumulation (as had been the generally accepted explanation for the freshwater shell mounds and middens in the Southeast since the sites were established as human in origin more than a century earlier) but was instead a component of Archaic-period ritual practice and mortuary symbolism. The large numbers of bodies in the shell-bearing sites in Kentucky, Tennessee, and Alabama were found in those locations because they were specially-prepared mortuary facilities constructed from freshwater shell: in other words, burial mounds (Claassen 1991a, 1991b, 1993)[17].

Claassen's hypothesis was not well-received by some Southeastern archaeologists (e.g., Crothers 1999:54-56; Hensley 1994:250-251; Marquardt and Watson 2005:111-113, 2005:636;

[17] Claassen's central hypothesis about shell mound burial monuments (1991a:295) was as follows: "[S]hellfish were gathered seasonally and ceremoniously and… many of the meats were ignored or stored for winter use (accounting for the frequent paired valves. Shells in DeWeese, Indian Knoll, and Carlston Annis mounds may even have been brought from elsewhere since Stein (1982) argues that the Green River was deep, sluggish, and middy, yet the species are riffle/run inhabitants. It was the shell itself that was valued to erect monuments and as a burial context for a specific subset of community members including many women who themselves may have been shellfishers, provisioners of storable protein, and shamans by virtue of an ideological system that associated shell with value, procreation, and death."

Milner and Jefferies 1998:119, 125-126; Morey and Crothers 1998:908-909, 920-922), particularly those who had worked in the Green River region and were also familiar with the data from sites in that region. Claassen's interpretation of some of the primary data was specifically questioned (e.g., Crothers 2004:87; Milner and Jefferies 1998:125-126; Morey and Crothers 1998:908-909, 920-922), but the opposition to Claassen's hypothesis seems to have been more broadly grounded in the fact that it presented a significant challenge to the traditional wisdom that shell mounds and middens, particularly those in the midcontinent, were effectively piles of the remains of generations-worth of meals. More critically, because of the Middle and early Late Archaic ages of many of the shell mounds and middens along the Green, Tennessee, and Ohio rivers (see Claassen 2010:11-18, Table 2.1), the implication that they had been intentionally constructed implied a degree of labor organization, monumental construction, and potentially group territoriality that were not thought to have existed during the period associated with the Shell Mound Archaic (see Anderson 2002:249; Gibson 1994; Russo 1994:93, 106; Saunders 2004; Saunders 1994:118-119), because many of the supposedly-necessary "preconditions"[18] of complexity were not believed to have been achieved prior to the emergence of plant cultivation and domestication in the Woodland period (e.g., Bense 1994:141; Smith 1986:43-50).

In the years immediately following the publication of Claassen's ideas, however, acceptance of the idea of "Archaic social complexity" as a general concept began to increase as evidence mounted that complex social organization in the eastern United States substantially pre-

[18] Price and Brown (1985:8-13) briefly outlined some supposed "preconditions" for hunter-gatherer complexity included environmental or social circumscription (which might mobility and require alternatives for conflict resolution other than relocation); resource abundance (potentially allowing the periodic organization of labor and tasks above and beyond those of food procurement by enabling the provisioning of laborers); and population size and density (which might require both increased hierarchical organization [see Johnson 1982], could contribute to increased territoriality and social differentiation between territories, and could force resource intensification to provide for groups of larger size [e.g., Keeley 1988]).

dated the development of intensive agriculture, extending at least into the Middle Archaic period (for detailed reviews of this subject, , see Anderson and Sassaman 2004:95-100; 2012; Kidder and Sassaman 2009:670-677; Sassaman 2010; see also Gibson and Carr [eds.] 2004). Mound construction in Louisiana and Florida was shown through radiocarbon dating to be far older than had been previously believed (Jackson and Jeter 1994; Piatek 1994; Russo 1994; Saunders 1994; Saunders and Allen 1994; Saunders et al. 1994; Saunders et al. 1997); researchers identified evidence for multiple Archaic long-distance exchange networks among groups throughout the eastern United States, including some groups associated with midcontinental shell mounds (e.g., Brookes 2004; Jefferies 1995, 1997, 2004, 2008; Johnson 1994; Johnson and Brookes 1989); and it became apparent that some groups located in the Midwest were constructing dedicated cemeteries (see Charles and Buikstra 1983, 2002), a practice thought to be associated mainly with the delineation, and maintenance, of territorial rights over critical and limited resources by corporate, relatively sedentary groups (Charles and Buikstra 1983:117-120). The gradual willingness of Southeastern archaeologists to consider the case for Archaic complexity, and the growing body of literature supporting such a case, have contributed to an atmosphere of tolerance, if not outright acceptance, for Claassen's hypothesis (e.g., Crothers 1999:56, 237). Most importantly, the basic notion expressed by Claassen – that Archaic shell mounds were not necessarily simply piles of domestic trash, and might have served a less quotidian purpose (particularly because of the burials in them, and the associated notion that mortuary practices incorporate ritual and ceremonial activity) – has spurred new debate and examination of such sites in the past twenty years.

In 1994, a themed issue of *Southeastern Archaeology* focusing on Archaic mounds was introduced by a provocatively-titled paper by Mike Russo – "Why We Don't Believe in Archaic

Ceremonial Mounds and Why We Should" (Russo 1994). Included in the issue were two articles specifically focused on mounded shell-bearing sites located in Florida (The Tomoka mound complex [Piatek 1994]) and on the Late Archaic shell rings of the south Atlantic coast (Russo 1994). In both articles, the sites in question were argued to be ceremonial in nature, and the product of intentional construction (Piatek 1994:115-118; Russo 1994:105-108), based on detailed examinations of their stratigraphy and composition.

Russo has been particularly involved in helping to make the case for ceremoniality and rituality at shell-bearing sites (Russo 1994, 2004). Although the level of intentional involvement in the construction of the shell rings of the lower Atlantic coast, and the degree of their monumentality, also remains a topic of debate (e.g., Marquardt 2011; see also papers in Sanger and Thomas [2011]), Russo's (2004) innovative use of social space theory (see Grøn 1991[19]) in combination with an evaluation of shell ring shape and size, and his incorporation of the idea that ceremonial feasting activities were the source for much of the shell deposited in the rings, has helped to further the broader acceptance of shell mound / midden / ring intentionality and monumentality. Russo contended that the asymmetrical distribution of shellfish remains at a series of rings in Florida (Russo 2004:55-66) – particularly larger amounts in areas of the rings

[19] Grøn (1991) figured prominently in Russo's (2004) examination of shell rings. Grøn suggested that people within groups organize themselves on the landscape in spatial arrangements that reflect social standing, including levels of hierarchical organization and status. In a space otherwise un-influenced by specific boundaries or natural features (e.g., rivers or other barriers), egalitarian groups might be more expected to organize themselves in circular arrangements, in which no one position is significantly emphasized within the collective whole. Groups exhibiting a greater degree of social inequality instead might create spatial arrangements that indicate the relative status of the members of the group, either in height or in horizontal distribution. Hence, we would expect a more-or-less circular arrangement of domestic structures in a village of "egalitarian" people, and an arrangement with one or more "privileged" positions (oblong – positions at either narrow end being considered of greater status; U-shaped, in which the position at the base of the U might be viewed as representing greater status) in more "socially complex" or non-egalitarian groups. A classic example of this arrangement may be seen in the arrangement of seating in the ceremonial earth lodge preserved at the Macon Plateau Mississippian site: just inside the entrance to the circular lodge are seats on a low earthen platform, which extends around the outer wall of the interior to the point opposite the entrance. The platform's height rises on both sides as it circles the room, reaching its highest point opposite the entry; the three "highest status" positions are also located atop an earthen falcon effigy (Larson 1994:108).

predicted to be locations of "higher status", represented differences in the relative social standing of occupants of the rings, and that "[s]hell rings reflect the social and power relations of their communities. As these increased in complexity, so did shell ring sites" (Russo 2004:53).

Russo's argument has been met with relatively widespread acceptance, and his incorporation of the idea that feasting not only occurred at, but was partly responsible for the formation of, shell-bearing sites, was been widely (and generally positively) incorporated into more recent discussions of Southeastern shell-bearing sites, and of Southeastern Archaic monumentality in general (e.g., Claassen 2010:8; Sassaman 2010:237; Thompson and Andrus 2011; Wallis 2008:246, 249, 251).

More recent examinations of interior shell-bearing sites (see Crothers 1999; Thompson 2010) have offered nuanced arguments for interpreting shell-bearing site histories, emphasizing gradually changing cultural significance as a consequence of their accumulated (literally, in the case of the growing deposits of shellfish remains) histories. Shell middens may have begun simply as accumulations of shellfish remains from subsistence practice, but Crothers suggested that the Green River shell middens…

> "became the most important places on the landscape… rich in aquatic animal life… convenient places to access the river, and… fixed locations. These elements combined to make them desirable locations. Hunters and gatherers would not only have returned to them seasonally, I think they would have controlled rights of exclusive access to the resources" (Crothers 1999:249).

Eventually the accumulated shell middens constituted, in Crothers' view, visible landmarks of individual groups' rights of access. Burial within the middens further cemented the association of specific lineages with specific mounds / middens (Crothers 1999:250).

Thompson (2010) has proposed similar ideas for the Green River shell mounds. Thompson proposed the concept of "persistent places" (Schlanger 1992:97) – locations on a landscape that are appealing for repeated use and occupation (e.g., ideal locations for accessing shellfish beds), and whose past occupational history is recognized by those who re-occupy them – to describe such sites. Similar to Crothers, Thompson considers the shell mounds in that region (and presumably, by extension, other areas as well) to represent long-term re-use and re-occupation of specific locations. Those who returned recognized the evidence of past visits (recent past and distant past), and were cognizant of their own ongoing contributions to those locations' histories (Thompson 2010:219-220).

In examining the freshwater shell-bearing sites situated along the St. Johns River Valley in Florida, Randall (2010a, 2010b) also emphasizes the historical transformation of relatively mundane accumulations of the remains of cultural activity (that included the use of shellfish) into "referentially important" locations on the regional landscape that were repeatedly re-used for similar types of activities (Randall 2010:358). Randall suggests that over a period of centuries, communities in the region began to separate pre-existing sites into what appear to be domestic, ceremonial / ritual, and mortuary locations, segregating the types of activities at each location (Randall 2008:14-15), but continuing to build upon earlier traditions.

These new conceptualizations of shell-bearing sites emphasize the recognition by those who created them that shell mounds and middens were potentially monumental, even if they were not necessarily originally planned as such. The enduring histories of groups' (or lineages') use of specific locations within geographic regions probably contributed to a continuation of practices that eventually produced the large accumulations of shellfish remains and other materials, and the incorporation of these sites as landmark locations into the larger set of social practices that included ritual and ceremonial gatherings, which included mortuary practices.

This is the modulated view that Claassen (2010) has adopted in recent years. She notes that, "[w]here before I had downplayed the importance of the food content of the shells (Claassen 1996), now I see that was a mistake and find the food content key to their presence and to understanding what occurred in these places" (Claassen 2010:9). She envisions many of the interior mounds and middens – explicitly those that contain burials (Claassen 2010) – as accumulated monuments resulting from the development and ongoing practice of "significant group rituals… hosted for the populace as well as for outsider guests" (Claassen 2010:135). Shellfish were incorporated as a feasting food, but also because they were ritually symbolic (Claassen 2010:136). Groups' feasts were, in Claassen's interpretation, accompanied by the burial "of many of their dead" (Claassen 2010:136), and might last for weeks, during which not only shellfish but also other faunal (and presumably botanical) resources were eaten in large quantities. Claassen suggests that the often remarked-upon accumulations of materials of seemingly domestic association (rather than ritual) may be explained by the need for the conduct of daily non-ritual tasks by those occupying the sites for extended periods (Claassen 2010:136).

Claassen further argued, following from Crothers, that individual shell mounds and associated sites might have been associated with ceremonial "districts" established by, and maintained by, separate social groups (e.g., Claassen 2010:48-49, 197, 224), pointing to clustered site groups (sometimes interpreted by Claassen to exist along alternating river banks on the same river [Claassen 2010:197]) that included not only shell mounds but also other types of ritual sites, including shell-free mortuaries, and occasional occupation sites (Claassen 2010:135-168). The idea that shell mounds were associated with specific cultural or social groups was elaborated upon further by Sassaman (2010:50-59), who conceptualized the origins of shellfishing and mounding in the midcontinent (i.e., the Shell Mound Archaic) with the immigration of peoples from the west into eastern North America. In such a scenario, Sassaman suggested that interaction between newly arrived groups and the already-present inhabitants of the region could lead to the development of, and subsequent elaboration upon, new cultural traditions: "ethnogenesis." Such traditions could have included the adoption of shellfishing (and mounding) and were specifically intended by the immigrants to differentiate themselves from those who were already present in the region (Sassaman 2010:54).

CONCLUSIONS

The origins of shell mounds and middens have represented significant topics of investigation to archaeologists, and to American archaeologists particularly, during the past two centuries. Early lines of inquiry into the origins of shell-bearing sites focused on the agency associated with their creation. The examination of shell-bearing deposits, both marine and freshwater, specifically for indicators of cultural or natural origins, had begun at least by the early 19th century (e.g., Atwater 1820), and by the mid-1850s investigations in Denmark were in full swing (see Gräslund 1987). By the mid-to-late 19th century, in Denmark and elsewhere in the world, scholars arrived at similar conclusions: the marine and freshwater shell mounds along coastlines, rivers, and some lakes, were of human origin, and were of significant antiquity.

For many decades after the firm conclusion of human origins for shell-bearing sites was reached, explanations of shell mounds and middens tended toward the quotidian, suggesting that shell mounds and middens were simply accumulated domestic refuse from increasingly sedentary groups of hunters and gatherers (e.g., Caldwell 1958:14; Lewis and Lewis 1961;

Milner 2004; Milner and Jefferies 1998). That interpretation was invoked in regional cultural historical sequences, and shell mounds were taken as evidence for increased long term occupation of locations, building to the establishment of permanent or semi-permanent settlements, and eventually to agriculture (e.g., Smith 1986, 1992:52).

By the late 1980s and early 1990s, however, the applicability of such conceptions to all shell-bearing sites began to be questioned (Claassen 1991a, 1991b) as evidence mounted that social complexity extended well into the Archaic period.

Radiocarbon dates indicated some monumental earthworks in the Southeast were of Archaic age, suggesting the mobilization of large labor forces for their construction (Saunders 1994; Saunders et al. 1997). Evidence of dedicated Archaic cemeteries argued for the establishment and demarcation of territories (Charles and Buikstra 1983), and long-distance trade networks (Johnson and Brookes 1989; Jefferies 1995, 1996, 1997) indicated the establishment and maintenance of social, and perhaps kin-based, relationships across vast distances. These new data inspired new ideas, and Claassen's argument – that shell mounds were intentionally-constructed burial locations – was one of a number of innovative interpretations of aspects of Southeastern prehistory that incorporated the growing body of evidence indicating a far earlier origin for complex social organization in the region (see Anderson and Sassaman 2012:66-111 for an extensive review). While Claassen's initial hypothesis was met with significant skepticism, much of that skepticism initiated new research on the origins of shellfishing and shell mounding, constituting a major period of investigations of the nature of shell-bearing sites in the Southeast, a movement to which the research presented in this dissertation is associated.

The purpose of this chapter and the preceding one has been to briefly outline significant historical development of shell mound and midden archaeology in the Southeast, both with respect to periods during which significant site excavations took place (Chapter 2), and the major developments in the conception and interpretation of those sites with respect to their origins and intended purposes.

The subsequent chapter (Chapter 4) discusses the methods by which materials and documentation from the seven sites in western Tennessee that are the subject of this research project were identified, organized, examined, and developed for the individual site descriptions that follow in chapters 5 – 8, and for the synthetic discussion (chapters 9 and 10) of the history of the Archaic-era occupation and use of the lower Tennessee Valley of western Tennessee as indicated by the data from those sites.

Chapter 4. Methods and Materials

Ideally, the principal goal of any archaeological excavation is the production of a detailed, multidimensional dataset that at some future time can be revisited by researchers seeking to answer questions that the site's original investigator did not anticipate. Recognizing that archaeology is a destructive endeavor, and that the annihilation of intact archaeological deposits is an unfortunate consequence of their investigation, modern archaeologists have in the past half-century adopted a more or less standard suite of field practices that are intended to provide for maximum recovery of cultural materials and information from archaeological deposits as they are excavated (e.g., Hester et al. 1975; Neumann and Sanford 2001). The end result is, ideally, the ability to reconstruct an archaeological site from the myriad datasheets, forms, artifacts, photographs, drawings, and field notes produced during the site's original excavation. In practice, complete documentation is impossible, but the quality of any such reconstruction is subject to decisions made by the archaeologist or archaeologists in charge of a site's investigation, as well as whether these materials are responsibly curated for the long term (Sullivan and Childs 2003).

Given the recent emergence of anthropological archaeology in the United States as an formal academic and practical discipline (Willey and Phillips 1958; Willey and Sabloff 1993; Trigger 1989), it is unsurprising that field and laboratory methods have likewise evolved considerably, maturing from the mostly unsystematic efforts of enthusiastic but largely untrained and uneducated practitioners of the early and mid-19th century into the standardized practices developed over the past century (see Hester et al. 1975) now commonly ingrained in new students of archaeology even before they fully understand the purpose of those practices.

However, such standardization was only beginning to develop during the 1930s and early 1940s, when federally-funded archaeologists conducted large excavations in the southeast during the Depression (Lyon 1996). The goals and large-scale nature of WPA and TVA archaeological projects required that consistent and systematic approaches to the excavation of sites be developed, both to maintain minimum levels of data quality and comparability between sites, and occasionally discrete strata or even excavation units, investigated by different supervisors, and at a more practical level, to reduce the day-to-day pressure on project field supervisors, most of whom were graduate students with relatively little field experience, much less supervisory experience managing large groups of untrained laborers (Lewis et al. 1995:608; Lyon 1996).

The creation of field manuals, first by William Webb during the Norris Basin project in northeastern Tennessee and later separately by archaeologists supervising work in Alabama and Tennessee (see Lewis et al. 1995:Appendix C; Lyon 1996:150), was intended to provide for improvement in the standardization of basic field procedures, including site layout and excavation, burial removal, feature documentation, and artifact identification and classification, and the preservation of delicate samples such as bone or antler, or botanical specimens for later paleoethnobotanical or dendrochronological studies. The University of Tennessee Division of Archaeology (UTDoA) field and laboratory manual (see Lewis et al. 1995:Appendix C), created by Thomas Lewis and Madeline Kneberg in collaboration with many of their junior colleagues (many of whom had received training and field experience at the University of Chicago [Lyon 1996]), also offered guidance and specifics regarding the roles of personnel and on the selection and training of workers for specific jobs, e.g., “shovel men,” “mattock men,” and “trowel men” (Lewis et al. 1995:606, Figure C.2). Workers who in the past had been convicted of “petty larceny” it was suggested, should be assigned to “wheelbarrows or other work which will provide them with the least opportunity to steal artifacts" (Lewis et al. 1995:608, Appendix C). A variety of data record forms were created that, in tandem with the field manual, ensured that specific types of information were documented consistently during excavations, regardless of the field supervisor in charge. Although some of the field and laboratory methods specified by the UTDoA field manual are no longer considered appropriate[20], the use of the manual and standardized forms contributed substantially to the creation of large and mostly comparable datasets from multiple sites excavated by UTDoA archaeologists.

This chapter provides a description of the methods by which data collected during the TVA-sponsored projects at the Eva, Big Sandy, Kays Landing, Cherry, Ledbetter Landing, McDaniel, and Oak View sites – comprising maps, profiles, photographs, and site record forms – were integrated into analytically useful formats used during the research reported here. A brief description of the types and format of data collected by the UTDoA archaeologists is followed by a discussion of the processes necessary to translate those data to usable formats applicable to the investigation of the questions addressed in this research project (see Chapter 3), and the ways in which those data were applied.

Digital Curation Statement

All archaeological and archival materials used in this study remain curated at the Frank H. McClung Museum of Natural History and Culture at the University of Tennessee, Knoxville.

[20] Preservation methods, both in the laboratory and the field, were significantly different in the years prior to the development of radiocarbon dating. The preservation of botanical specimens involved their saturation in gasoline and then encasing them in a paraffin-gasoline mixture. Bone and antler specimens were often coated or soaked in a light solution of nitrocellulose. Until the development of sophisticated pretreatment methods intended to remove contaminants, these techniques of preservation had the unintended (at the time) effect of rendering much of the organic material recovered during the UTDoA excavations unusable for radiocarbon dating.

New datasets generated from the work described in this dissertation have been submitted to the McClung Museum for curation and research purposes. These data include: (1) digitized site databases produced from the original site documentation; (2) incorporated UTM locational information for all sites and piece-plotted artifacts; (3) artifact classification data for curated materials; (4) GIS / digital maps of each of the sites discussed in this study (n = 7); (5) all ^{14}C dating results from the Eva (n = 16), Big Sandy (n = 10), Kays Landing (n = 12), Cherry (n = 3), Ledbetter (n = 3), McDaniel (n = 2), and Oak View (n = 2) sites. All data are also available on request from the author.

FIELD EXCAVATION METHODS USED BY THE UTDOA

By the time salvage archaeology in the lower Tennessee Valley of western Tennessee began in 1939, the UTDoA had been conducting river basin surveys and large-scale archaeological excavations in Tennessee for several years (e.g., Webb 1938; Lewis and Kneberg 1941; Lewis et al. 1995). The UTDoA field and laboratory manual had at that point undergone significant development and revision from an earlier version authored by William Webb (with assistance from Georg Neumann, Charles Wilder, David DeJarnette, and Thomas Lewis during the Norris Basin project [Lyon 1996:150]) and it provided detailed and well-organized guidance for the archaeologists conducting fieldwork in western Tennessee (see Lewis et al. 1995:Appendix C).

Grid Establishment and Excavation[21]

Following the identification of a new site, surface collection was initiated to identify the approximate boundaries of the bulk of the cultural deposits (Osborne 1942:28). Subsequently, if excavation was approved, the supervising archaeologist was responsible for establishing a site grid system, consisting of 10 x 10 foot squares oriented on magnetic north, and laid out from a central axis (the "CA" line), positioned to crosscut (on a north-south bearing) what was thought to be the densest concentration of cultural material, and consisting of grid squares numbered consecutively from south to north. From the CA-line, the grid was extended to the east and west at right angles; grid squares to the east of the central axis were designated "R" (right) and numbered sequentially from the CA-line eastward ("R1," "R2") and squares west of the central axis received an "L" (left) designation and were numbered sequentially to the west ("L1," "L2"). From these designations, given to the southeastern grid stake of each square, the coordinates of individual squares were constructed, consisting of a north-south and an east-west coordinate. Thus, grid stake 7L2 was nominally located 70 feet north of the southern extent of the grid system, and 20 feet west of the center axis.

Upon completion of the site grid, exploratory trenches or test pits were excavated to determine the stratigraphy of the deposits at the site. These initial test units were dug in arbitrary 0.5-ft levels, measured from the site datum station. Test trenches were often narrow, measuring either three or five feet wide, and might extend for well over 100 feet if the site's deposits were horizontally extensive. Test pits, when used, generally measured 5 x 5 ft. Trenches were oriented

[21] The majority of the description of standard UTDoA field excavation practices presented here is adapted from Douglas Osborne's unpublished master's thesis on the Big Sandy site (Osborne 1942). As a supervising archaeologist on a number of TVA salvage projects in the Kentucky Basin, Osborne's extensive and detailed description represents (to the best of the author's knowledge) the only detailed firsthand account of the standard field practices of the UTDoA archaeologist in western Tennessee.

on the site grid system, and were positioned to intersect at right angles to each other to provide sufficient stratigraphic information to enable an excavation block to be established that would sample the densest portion of the site's deposits. Subsequent excavation within the block, which was extended outward from the trenches, was most often accomplished by datum-controlled stripping, by square, of individual stratigraphic units in 0.5- or 1.0-ft levels. Excavations were always continued to subsoil, and occasionally deep test pits were extended well below the base of the remainder of the excavation block to verify that no further cultural deposits were present.

Documentation of Cultural Material, Features, and Burials

During the initial phases of excavation, the supervising archaeologist was responsible for the creation of site maps onto which the site excavation block and trenches, features, burials, and other data would be recorded. UTDoA archaeologists in the Kentucky Basin used large-format 1-inch gridded paper with minor gridlines at 0.5-in and 0.1-in intervals. Site location maps (e.g., Figure 4.1) were most often produced at a scale of one inch to fifty feet, and included topographical information measured from the site datum, as well as other local topographic features or major disturbances (such as buildings), or distances and bearing to features outside the area of the map, including rivers or streams, or nearby towns or roads.

Site plan maps and profiles were executed at a scale of one inch to five feet, and were one of the most significant (and informative) documents of record produced during the TVA salvage operations. These maps were highly detailed representations of the site excavation blocks and trenches, and often contained data not otherwise recorded on site forms, such as cultural features not considered significant enough to designate numerically, or record separately. These most often included areas of burned clay or soil or concentrations of charcoal or ash or other materials.

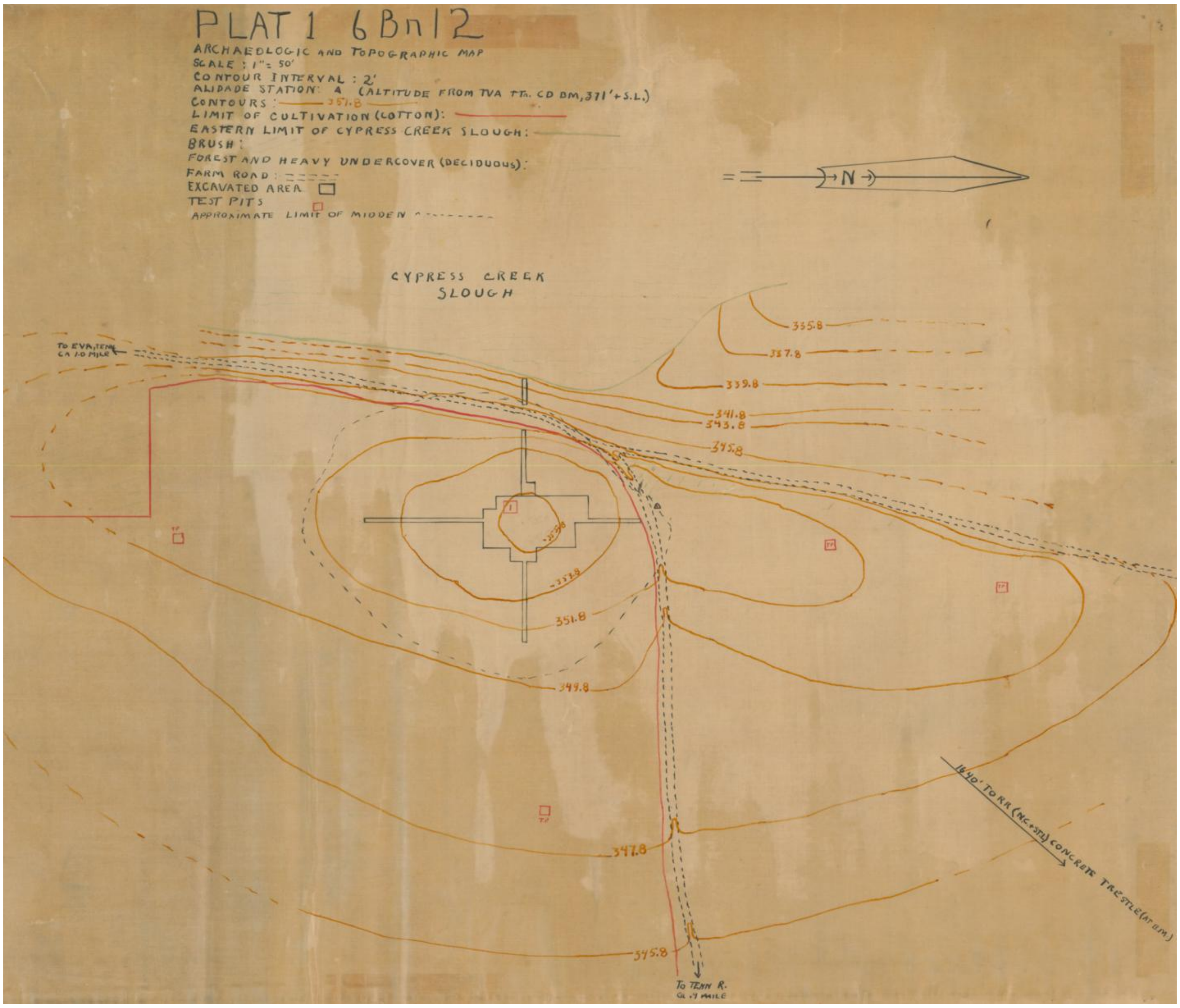


Figure 4.1. Example of a large-scale site area map drawn during the Kentucky Basin projects (Eva [40BN12] site) (D. Osborne 1940, original curated at the Frank H. McClung Museum of Natural History and Culture, University of Tennessee, Knoxville).

Documentation of burial and feature locations on site plan maps was meticulous, and burials were generally depicted as they were positioned (e.g., degree of flexure and position on which the body was laid), labeled with the designated burial number and stratum of association. Numerically designated features and pits received similar treatment. The positions and dimensions of burials, features, and the coordinates of most artifacts, were recorded in 0.1-ft (and occasionally 0.05-ft) intervals north (Y) and west (X) from the southeastern grid stake of the square in which they were identified; depths (Z) were taken in 0.1-ft from the site datum.

Relevant Field Forms

In addition to the site maps produced, specific data were also recorded on a series of standardized field forms. These included square data sheets, field specimen logs, feature forms, pit forms, and burial record forms. Each form was recorded by hand in the field, and later re-typed.

Square Data Form

Separate square data forms were, in theory, recorded for each excavated square within a block. These forms documented stratigraphic information by square (taken at the southeastern corner of each grid square) and consisted of the stratum or level description or designation (e.g., "Stratum I"), an opening and a closing depth below datum, and fields for recording associations within each square, including postmolds, pits, features, burials, and recovered artifacts. In practice, these forms were rarely filled out for every square within a block. Square data sheets were the record forms most often left incomplete.

Field Specimen Record Form ("FS Log")

The site archaeologist, or occasionally a worker upon whom the archaeologist could rely, kept a detailed record of artifacts recovered during excavation across the site. Artifacts were assigned a field specimen number and briefly described (e.g., "drill, broken"). The square in which the artifact was recovered, depth below datum, and distance north (Y) and west (X) from the southeastern corner of relevant grid square were recorded. The association of the object (e.g., "plow zone," "Stratum IV") was recorded, as was a photograph number, in the (rare) event that a photograph was taken of the object *in situ*.

Feature / Pit Forms

UTDoA archaeologists working in the Kentucky Basin distinguished specifically between pits and other cultural features, and typically designated them separately. There were separate forms intended for recording for pits and features, but in practice, pits were most often documented using re-purposed FS log forms, or occasionally using forms intended for feature documentation.

Numerical designation of cultural features aside from pits (which were numbered separately) was rare, and consequently feature data forms were sparingly used at most sites. Decisions regarding what constituted a designable feature seem to have been left to the field archaeologist in charge and it should be noted that this lack of standardization, and the tendency of most UTDoA archaeologists working in the Kentucky Basin toward conservative use of feature designations, is a significant contributing factor to the incorrect assumption that features in shell mounds and middens from that region were more sparse than other data sources (specifically the site plan maps) indicated.

Feature data forms included fields for the description of the documented feature and its stratum of association; the feature's vertical and horizontal coordinates; maximum dimensions and orientation; preservation; and any associated artifacts or samples recovered.

The reverse side of the feature form consisted of a 1-in grid subdivided into 0.1-in, and a small-scale plan view (and occasionally profile view) of each feature was sometimes drawn.

When feature forms were used to record pits, relatively little of the form was modified, although a separate numbering system was used. More often at the sites examined in this research, FS log forms were used to record pits. Minimally, the data entered on those adapted forms comprised a description of the shape in plan view (e.g., "circular / round," "elliptical / oval") and a depth to the base of the feature, as well as the stratum of association, the grid square in which the pit was located, and a north and west coordinate to the center of the pit.

Burial Data Form

Designed in a similar fashion to the feature form, and including the same fields for locational and provenience data, the burial data form included a set of additional fields specifically intended to document certain traits of interest. These included the degree of flexure ("partial," "fully," or "extended"), orientation (i.e., the direction of the head) and the positioning (i.e., left / right side, front or back), and age and sex when they could be assessed in the field. The condition of the bones was also recorded, as was whether or not the individual was a primary or secondary burial, or had been cremated. The presence of absence of grave goods was typically included at the bottom of the form, and (like the feature form) the gridded reverse side was nearly always used to include a small plan view map of the burial in question.

Despite encountering a significant number of interred dogs, no field was ever included on burial forms to identify a canine burial, and most often "dog" was simply written prominently near the top of the form. Dog burials were not typically segregated numerically from the other burials identified at sites.

DIGITAL INTEGRATION OF UTDOA DATA

This project required the integration of spatial information and artifact data for individual artifacts, cultural features, burials, and site depositional units from each of the seven study sites – Eva, Big Sandy, Kays Landing, Ledbetter, Cherry, McDaniel, and Oak View – into cohesive databases that could be used to: (1) guide the selection of representative radiocarbon-datable samples from among each site's curated artifact collection; (2) to examine the intra-site spatial patterning of cultural features, burials, and artifact distributions, visually and through software-based analytical methods; and (3) to conduct inter-site comparisons of spatial patterns and artifact assemblages. The preliminary processes necessary included the digitization of site maps into analytically-useful formats using Geographic Information Systems (GIS) software, and the creation of digital databases to store classificatory and spatial information for artifacts and other cultural material recovered at each of the seven sites.

The UTDoA archaeologists' use of standardized site documentation forms and formats for site mapping, and the consistent utilization of the same locational system at the sites at which they worked, led to the creation of multi-dimensional high quality datasets with sufficient similarity to provide for comparison and contrast of the sites excavated even under the supervision of different archaeologists, although it must be noted that there were notable

Table 4.1. Proportion of piece-plotted artifacts at sites in the study sample.

	Site						
	Eva[1]	Big Sandy[1]	McDaniel[1]	Cherry[1]	Kays Landing[2]	Ledbetter[2]	Oak View[3]
Total Artifacts	2252	1708	844	614	2445	606	1218
Plotted	1586	1435	608	356	764	299	896
Percent Plotted	70.42	84.01	72.04	57.98	32.25	49.34	73.56

[1]Excavated by Osborne

[2]Excavated by Lidberg

[3]Excavated by Burroughs

differences in datasets from sites excavated by different supervisors. This was especially evident in different archaeologists' approaches to the documentation of site features, and the use of piece-plotting for individual artifacts at sites under their direction (Table 4.1). Nevertheless, even among the sites excavated by George Lidberg (who was least rigorous in his use of piece-plotting), the detailed site maps and data from the seven sites in the study sample were of exceptionally high quality, particularly with respect to the period during which they were excavated, and the unskilled and largely inexperienced work crews that were used.

The seven sites selected for inclusion in this project were chosen for the nature of the individual sites themselves (e.g., shell mounds and middens, or sites located near shell-bearing sites and of likely contemporaneity) and for the potential of their curated assemblages and the recorded documentation associated with them to provide sufficient data to address the research questions posed in this study for the lower Tennessee Valley.

Digitization of Site Maps

Geographical Information Systems (GIS) software provides the user with multiple capabilities with respect to the creation, display, management, and analysis of spatial data. The ESRI software package ArcGIS® 9.3 was used for all GIS mapping and analysis. This package includes software capable of displaying and analyzing both two- (ArcMap) and three-dimensional (ArcScene) data.

As noted previously, two maps were typically produced by the supervising archaeologist: a highly-detailed site plan map and a larger area map that depicted the site's excavation block, but included also local topographic and geographic features. This large-scale site area map was imported into a previously-created basemap and georeferenced by matching features depicted on the area map to those illustrated on the appropriate georeferenced historic (1936) USGS 1:24,000 quadrangle maps. The Universal Transverse Mercator (UTM) zone 16N projected coordinate system (NAD83) was used for all maps, because of the ability to directly convert linear measurements (converted from feet to meters) taken from the UTDoA maps to UTM spatial X and Y coordinates in meters.

The now-georeferenced large-scale site area map was used to obtain the locational coordinates (northing and easting) for either the site grid's southeasternmost grid stake or the southeastern corner of the excavation block. A point shapefile of the site grid system was then created, using the southeastern point as an origin point and calculating each subsequent point north or west by adding to the north coordinate of the origin point in multiples of 3.048 m (10 ft) and subtracting multiples of 3.048 m from the east coordinate to create additional points to the west. Because a standard 10 x 10 foot (3.048 m^2) grid system was used on all sites, this procedure allowed the absolute X and Y coordinates for each grid point to be calculated in a standard Microsoft Excel spreadsheet using simple functions.

Next, the high-resolution UTDoA site map was imported into ArcGIS and georeferenced to the site grid shapefile, based on the grid stakes labeled on the high-resolution map and the corresponding stake in the grid shapefile.

After the site map had been fixed to its approximate geographic position, separate polygon shape files were created into which test trenches, the site excavation block, features, pits, and burials were digitized. Identifying data for each feature, pit, or burial were included as attributes for each polygon feature. In the case of large-scale site maps that included topographic contour measurements, additional shape files were also digitized to recreate the topographic relief indicated by the cartographer.

In order to integrate artifact data with the site maps, the geographic information from the grid shapefile was used to calculate location information for all piece-plotted artifacts in each site's assemblage (see below).

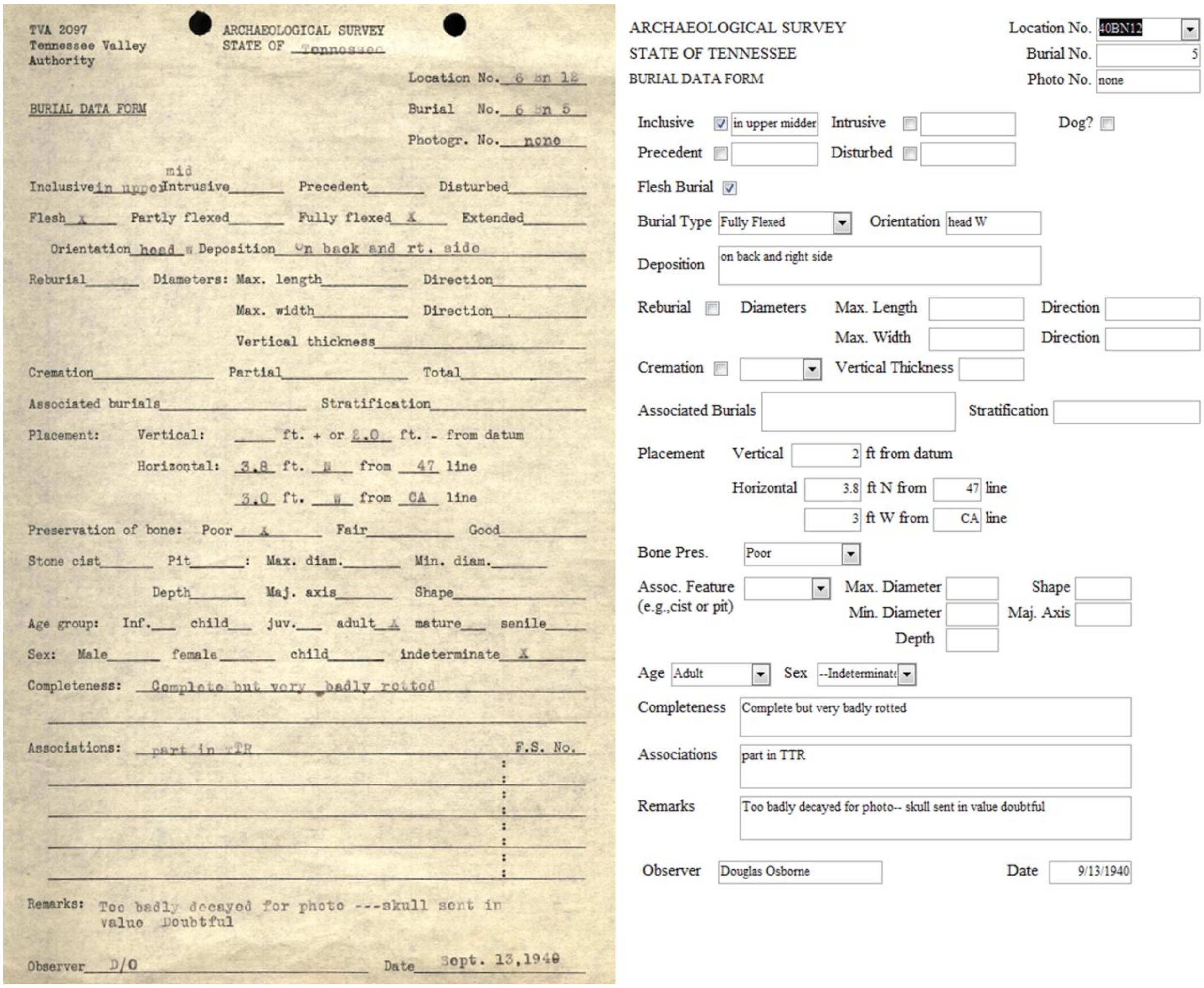
Digitization of Site Data

Site documents previously were optically scanned at high resolution by staff at the Frank H. McClung Museum, and the resulting portable document format (PDF) files were provided by the museum. However, the layouts of the site documents, the typeface of the text on the forms, and the faded quality of many of the original pages, made the use of standard optical character recognition (OCR) software unreliable.

Manual entry of the data into a Microsoft Access database by University of Tennessee, Knoxville, undergraduate students required several weeks. A series of simple digital data entry forms were created for the students' use, and data were stored in Access tables containing fields corresponding to those on the site field specimen logs. Similar digital forms were used for digitally entering burial record forms and feature forms.

Separate relational databases were created in Microsoft Access for each site to reduce processing time and the size of files. Each database was designed for efficient and relatively error-free data entry by any student regardless of his or her familiarity with the data or the sites, and so digital entry forms were created that closely replicated the format of the original forms (Figure 4.2).

Each site database was identical in structure and organization, and consisted of a combination of linked tables containing primary data and tables in which specific pre-selected



TVA 2097
Tennessee Valley
Authority

ARCHAEOLOGICAL SURVEY
STATE OF Tennessee

Location No. 6 Bn 12

BURIAL DATA FORM

Burial No. 6 Bn 5

Photogr. No. none

Inclusive in upper mid Intrusive ______ Precedent ______ Disturbed ______

Flesh X Partly flexed ______ Fully flexed X Extended ______

Orientation head W Deposition on back and rt. side

Reburial ______ Diameters: Max. length ______ Direction ______

Max. width ______ Direction ______

Vertical thickness ______

Cremation ______ Partial ______ Total ______

Associated burials ______ Stratification ______

Placement: Vertical: ____ ft. + or 2.0 ft. - from datum

Horizontal: 3.8 ft. N from 47 line

3.0 ft. W from CA line

Preservation of bone: Poor X Fair ______ Good ______

Stone cist ______ Pit ______: Max. diam. ______ Min. diam. ______

Depth ______ Maj. axis ______ Shape ______

Age group: Inf. ___ child ___ juv. ___ adult X mature ___ senile ___

Sex: Male ______ female ______ child ______ indeterminate X

Completeness: Complete but very badly rotted

Associations: part in TTR F.S. No.

Remarks: Too badly decayed for photo ---skull sent in value Doubtful

Observer D/O Date Sept. 13,1940

ARCHAEOLOGICAL SURVEY
STATE OF TENNESSEE
BURIAL DATA FORM

Location No. 40BN12
Burial No. 5
Photo No. none

Inclusive [x] in upper midden Intrusive [ ] Dog? [ ]
Precedent [ ] Disturbed [ ]
Flesh Burial [x]
Burial Type Fully Flexed Orientation head W
Deposition on back and right side
Reburial [ ] Diameters Max. Length Direction
Max. Width Direction
Cremation [ ] Vertical Thickness
Associated Burials Stratification
Placement Vertical 2 ft from datum
Horizontal 3.8 ft N from 47 line
3 ft W from CA line
Bone Pres. Poor
Assoc. Feature (e.g.,cist or pit) Max. Diameter Shape
Min. Diameter Maj. Axis
Depth
Age Adult Sex --Indeterminate
Completeness Complete but very badly rotted
Associations part in TTR
Remarks Too badly decayed for photo-- skull sent in value doubtful
Observer Douglas Osborne Date 9/13/1940

Figure 4.2. Original “Burial Data Form” (L) and Microsoft Access digital data entry form (R).

options were stored to populate data fields in linked tables (e.g., “male,” “female”) from pull-down menus in data entry forms.

Artifact Data

Artifact identification data and provenience data were maintained in separate tables; individual records were linked by items’ unique field specimen numbers using a standard SQL query.

The artifact identification table contained each object’s original identification information, recorded on the field specimen log form. An artifact analysis form was created with the ability to search by field specimen number, in order to provide for rapid examination and classification of artifacts by photograph. Fields were created in the artifact identification table for classification by material type (e.g., “antler,” bone,” “chipped stone”), artifact class (e.g., “projectile point,” “scraper,” “hammerstone”) and type (e.g., “Dalton,” “Eva I / Eva II,” “Benton”). Other fields in that table were included in order to specify if artifacts were also specimens selected for radiocarbon dating, and to display chronological information when completed (Figure 4.3).

An artifact photograph was also displayed for each record to allow for display and rapid cross-checking of FS identification information with the actual items. Artifacts were photographed using an Olympus® PEN E-P3 digital camera with a resolution of 12.3 megapixels. The camera was mounted on a copy stand and positioned directly above the photograph subject. Reverse and obverse photographs were taken of each artifact.

Two tables contained provenience information. The first contained the projected (UTM zone 16N) coordinates for the southeastern corner of every grid square, labeled by square. The

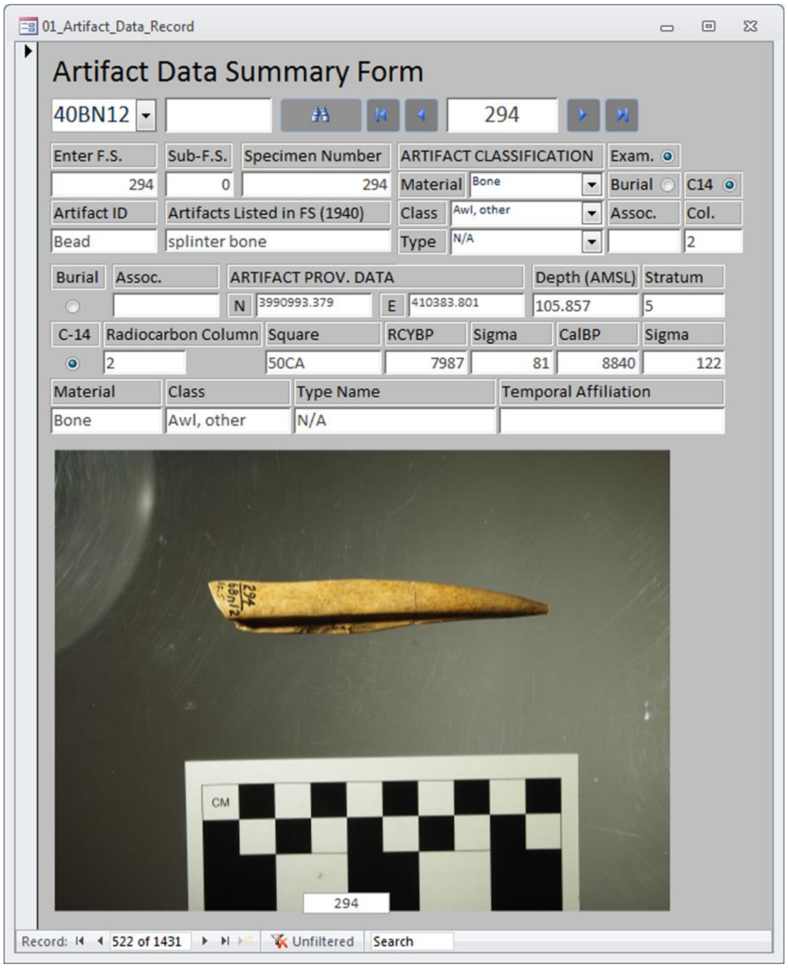


Figure 4.3. Artifact search, data entry and classification form.

second – the artifact provenience table – contained the locational information for each artifact recorded on the site's field specimen log, including stratigraphic association and all coordinate data. Provenience information varied from artifact to artifact, but the stratigraphic association and grid square of origin was documented for nearly every item in each site's assemblage. Table 4.1 indicates the proportion of artifacts at each site for which precise coordinate information was also documented. For those objects, distances north and west were recorded from the southeastern stake of the grid square in which each object was found. A database query was used to link the two provenience tables by grid square label, and calculated fields converted each piece-plotted item's original north and west coordinates from feet to meters, and determined their geographic coordinates by adding or subtracting those values to the coordinates of the matching grid square. The elevation of each artifact in meters above mean sea level was also calculated by converting recorded depths below datum in feet to meters, and subtracting from the relevant site's datum elevation level (converted to meters from in feet above mean sea level).

Data were combined exported from the Microsoft Access database using a query and imported into Microsoft Excel, where calculations and frequency analysis were done. The exported Excel file was also imported into ArcGIS, where a point shapefile was created using the calculated UTM coordinates. That shapefile was added to the GIS sitemap and used in further spatial analyses.

Burial and Feature Data

Burial and feature data were entered into separate tables in each site database. Unlike the locational data for individual artifacts, the locations of burials and features were indicated on each site map. Most data on burial and feature forms were not, however, recorded on the site maps. Data tables for each site's burials and features were exported and joined (using the burial or feature number) to the sites' individual shapefiles. In this way, information such as the presence or absence of grave associations or the sex, age, or position of individual burials could be linked to the relevant shape files for visual inspection and use of the onboard spatial statistics tools in ArcGIS.

Radiocarbon Sampling Strategies

Problems with Dating Sites Excavated by the UTDoA

Radiocarbon dating was developed in the late 1940s (Libby et al. 1949), nearly ten years after the conclusion of the last major UTDoA excavations in the Kentucky Basin and five years after the Kentucky Dam was closed, flooding the lower Tennessee Valley and the sites situated along its floodplain. At the time of the investigation of the seven sites in the study sample, therefore, there was little concern with the specific recovery of objects suitable for an analytic method that did not exist. Furthermore, because the general practice of the period to discard unmodified animal bone after it was identified, and the standard procedure at the time for the preservation of carbonized botanical remains (i.e., soaking in gasoline and encasing in a mixture of paraffin and gasoline for curation and later examination), the application of radiocarbon dating to these sites' collections in the decades since has been sporadic, and methods for selecting datable materials contributed in some cases to inaccurate results (see Chapter 6).

One of the principal goals of this research project was to use multiple radiocarbon dates from the intact cultural deposits preserved at each of the study sites to ascertain not only the ages of the individual sites themselves, but also the chronology of the occupation of the lower Tennessee Valley during the period represented by the study sample. However, the identification of suitable, representative datable artifacts constituted a significant obstacle in this process.

One of the most significant benefits of the use of GIS in site analysis and interpretation is the ability to use spatial data and unique descriptive attributes assigned to classes of objects, or individual objects, to obtain a more nuanced, multidimensional perspective on site deposits and spatial relationships among features, graves, and individual artifacts. This capability was used to great advantage in selecting potential radiocarbon samples from the study sites, a critical component of this project.

Sample Selection Considerations

Determining the length of time represented by shell-bearing strata remains one of the most fundamental problems in the interpretation of the histories of shell-bearing sites such as those in the study sample of this research project. In the past, researchers lacking sufficient absolute dates from the upper and lower bounds of deposits to estimate the period of time over which they accumulated have often resorted to the use of the thickness of deposits as a proxy for time (e.g., Lewis and Lewis 1961:173), returning to a fundamental concept from relative dating: that the relative thickness of discrete strata within a site can provide a more-or-less reliable indicator of the relative amounts of time over which they accumulated. Shell-bearing strata are, however, largely anthropogenic in origin, and generally do not accumulate at a uniform rate across their entirety, but rather as discrete smaller piles of different sizes producing an aggregate deposit over a period of years, decades, or centuries (Russo 2004; Stein 1992:1-24, 2005; Stein et al. 2003; Waselkov 1987:114-117). A shell-bearing stratum might therefore be expected manifest quite different accretion rates in separate locations, associated with the relative intensity of use in those locations during a given period of time. Any effort to obtain representative radiocarbon dates from such deposits must take into account the potential variation in depositional rates over a large area and should, if possible, restrict the horizontal area from which samples are selected to as small as possible, and use materials whose vertical provenience allows for characterization of the initiation and termination of activities associated with the deposition of a discrete stratum.

This type of column sampling strategy has a long history in shell site research (Gifford 1916; Nelson 1909:345), and was used especially during the early 20th century by California shell midden researchers to estimate variation in site occupational duration (Gifford 1916:12-14; Nelson 1909:346; Uhle 1907:10). More recently, Julie Stein and colleagues (Stein et al. 2003) employed a modified column sampling strategy for the selection of charcoal samples for radiocarbon dating at a series of six shell-bearing sites in British Columbia. Stein and colleagues used multiple charcoal fragments from a series of 1 x 1 m excavation units at each of the six sites to characterize differences in *site accumulation rates* and *unit accumulation rates* (Stein et al. 2003:301). The authors noted that unit accumulation rates are more appropriate for the identification of variation in intensity of use and spatial variation in use through time at shell-bearing sites (Stein et al. 2003:309), while site accumulation rates are more suited to assessing the total duration of use of a site (Stein et al. 2003:301).

An adaptation of this approach has also proved successful in the examination of shell-bearing sites along the Cumberland River west of Nashville, where in 2010, column samples measuring 50 x 50 cm were removed from shell-bearing deposits at two previously recorded sites: 40DV14 and 40CH171[22]. Neither site had previously been subjected to absolute radiocarbon dating.

At 40DV14, two sample columns were excavated from the sites' deposits in 5 cm-thick levels. One column was situated in the thickest observable area of deposits, while the second was positioned approximately fifteen meters west of that location, near the horizontal terminus of the site, in order to assess potential variation in composition (and age) between the two locations. Paleobotanical samples were extracted from column levels corresponding to the top, middle, and bottom of the shell-bearing stratum (Miller et al. 2012:57-60).

Radiocarbon assays from the two columns suggested differences in unit accumulation rates, even over a relatively small horizontal distance. Mean intercept values for dates from the top and bottom of each of the two sample columns (Table 4.2) spanned 225 years in one column, and 390 in the other (Miller et al. 2012:56).

While the positive results achieved by Stein and colleagues, and by Miller and colleagues, attest to the effectiveness of dating materials from column samples for the characterization of accumulation rates and site occupational duration, such methods, while ideal, could not be directly applied to the sites in the study sample, since they were excavated long before these procedures became standard in shell midden archaeology in the Southeast.

[22] The sampling strategy used by the Bells Bend Archaeological Project (BBAP) represents an adaptation of long-standing sampling strategies employed by shell midden researchers since the 19th century (see Waselkov 1987:141). The strategy was used by the BBAP, at the initial suggestion of S.B. Carmody, a paleoethnobotanist and member of the 2010 BBAP staff, in order to provide for precise recovery of materials suitable for radiocarbon dating, as described by Stein and colleagues (Stein et al. 2003).

Table 4.2. Dated samples from columns at 40DV14 (Miller et al. 2012).

Column	Zone	Level	14C Yr BP			Cal Yr BP		
	A	3	5805	±	43	6603	±	58
1	B	12	5954	±	44	6787	±	59
	C	21	6101	±	44	6990	±	83
	A	1	5977	±	44	6815	±	58
2	C	18	6004	±	44	6845	±	59
	D	22	6136	±	45	7041	±	75

Identification and Selection of Samples

The ESRI ArcGIS® 9.3 software package includes ArcScene, an application intended for the graphical display and manipulation of three-dimensional spatial data, which allowed the visual inspection of individual piece-plotted artifacts, each of whose unique attributes included the identifying field specimen number, grid square of origin, stratum association, and material type. A simple SQL query was then used to delineate virtual sample columns at each site. At a resolution of 3.048 m^2 (10 ft^2), the scale of individual squares in the standard UTDoA grid system, the sample columns were coarser-grained than those used by Miller et al. (2012) and Stein et al. (2003), but they nevertheless offered significantly improved potential for sample selection than was otherwise possible. Using these methods, a total of 48 radiocarbon samples, representing fragments of antler and bone from the seven study sites, were selected that were thought to provide the best representation of the upper and lower bounds of each stratigraphic unit at each site, and to enable the creation of a multi-site chronology that could be used to better examine the histories both of individual sites in the study sample, and the larger history of human use of the lower Tennessee Valley during the Middle and Late Archaic periods. Specific provenience information and reasons for the selection of each sample are provided in the site-specific discussions that follow in Chapters 5-8.

CONCLUSIONS

The purpose of this chapter has been to provide a clear and detailed description of the original nature and condition of the curated site collections and field documentation available from the seven sites in the research sample – Eva, Big Sandy, Kays Landing, Ledbetter Landing, Cherry, McDaniel, and Oak View – and the processes by which those data were rendered useful for modern digital manipulation and analysis. This work has resulted in the integration of data from multiple field documents with locational and spatial information gathered from the original site maps to produce individual site databases that can be used to group and examine artifacts by attributes such as material type and typological classification, and to provide for spatial analysis of artifact, feature, and burial distributions within each of these sites.

Inventories of all analyzed cultural material are presented in appended tables at the end of this document. The digital databases described in this chapter are curated at the Frank H. McClung Museum of Natural History and Culture at the University of Tennessee, Knoxville, and are also available by request from the author.

In the following four chapters, reports for the seven sites examined in this dissertation are provided. Three sites - Big Sandy (40HY18), Eva (40BN12), and Kays Landing (40HY13) – receive individual treatment in Chapters 5, 6, and 7 in significant detail. These three sites were most extensively examined in this research project. The Eva and Big Sandy sites offered the two most well-provenienced artifact assemblages, including datable materials, from the western Tennessee Depression-era excavations. Further, based on evaluations of temporally diagnostic hafted bifaces from both sites (see Chapters 5 and 6), Eva and Big Sandy represented relatively early sites in the regional chronological sequence.

Kays Landing, while having an artifact assemblage that was less well-provenienced than Eva and Big Sandy, nevertheless offered an extensive and relatively well-documented collection, including datable materials. Its stratigraphic complexity suggested substantial time depth, while analysis of hafted bifaces from the site indicated that it represented a later period of time than Eva and Big Sandy, providing coverage of the later history of the region.

The additional four sites studied for this project – Cherry (40BN74), Ledbetter (40BN25), McDaniel (40BN77), and Oak View (40DR1) – were seemingly more hurriedly excavated than Eva, Big Sandy, and Kays Landing, and consequently the records and associated collections were less well-documented. For that reason, these four sites were less extensively radiocarbon dated and received a less in-depth examination than did Big Sandy, Eva, and Kays Landing. They are reported together in Chapter 8.

CHAPTER 5. THE BIG SANDY SITE (40HY18).

Big Sandy (40HY18) was located and first documented during a survey of the Big Sandy drainage (a tributary of the Tennessee River) in late March of 1940 by archaeologists from the University of Tennessee Division of Archaeology (UTDoA), and designated 25HY18. It was later named for the river it overlooked.

The site was located in a corn field on the property of R.T. Wilson, approximately 8.6 km northeast of the community of Springville, TN, and 61 m (200 ft) directly west of the left bank of a meander loop of the Big Sandy River (Figure 5.1). It was initially identified from a light surface scatter of shell and other cultural material extending over an area roughly 4,800 m^2 (ca. 51,670 ft^2).

Major excavations commenced almost immediately after Big Sandy's initial documentation, and lasted from early April through early May, 1940. Initially led by Charles Nash, who had worked with the UTDoA for several years in eastern Tennessee, the project was quickly taken over by Douglas Osborne, who directed the excavations until their completion, and who authored the preliminary site report (Original field report on file at the McClung Museum, University of Tennessee, Knoxville). Osborne later produced a substantially expanded report as his master's thesis project at the University of New Mexico in 1942 (Osborne 1942), which has remained unpublished.

ENVIRONMENT, GEOLOGY, AND SOILS

Big Sandy was located on a low ridge and east-facing slope, and was situated approximately 27 km (by river) upstream from the confluence of the Big Sandy River with the

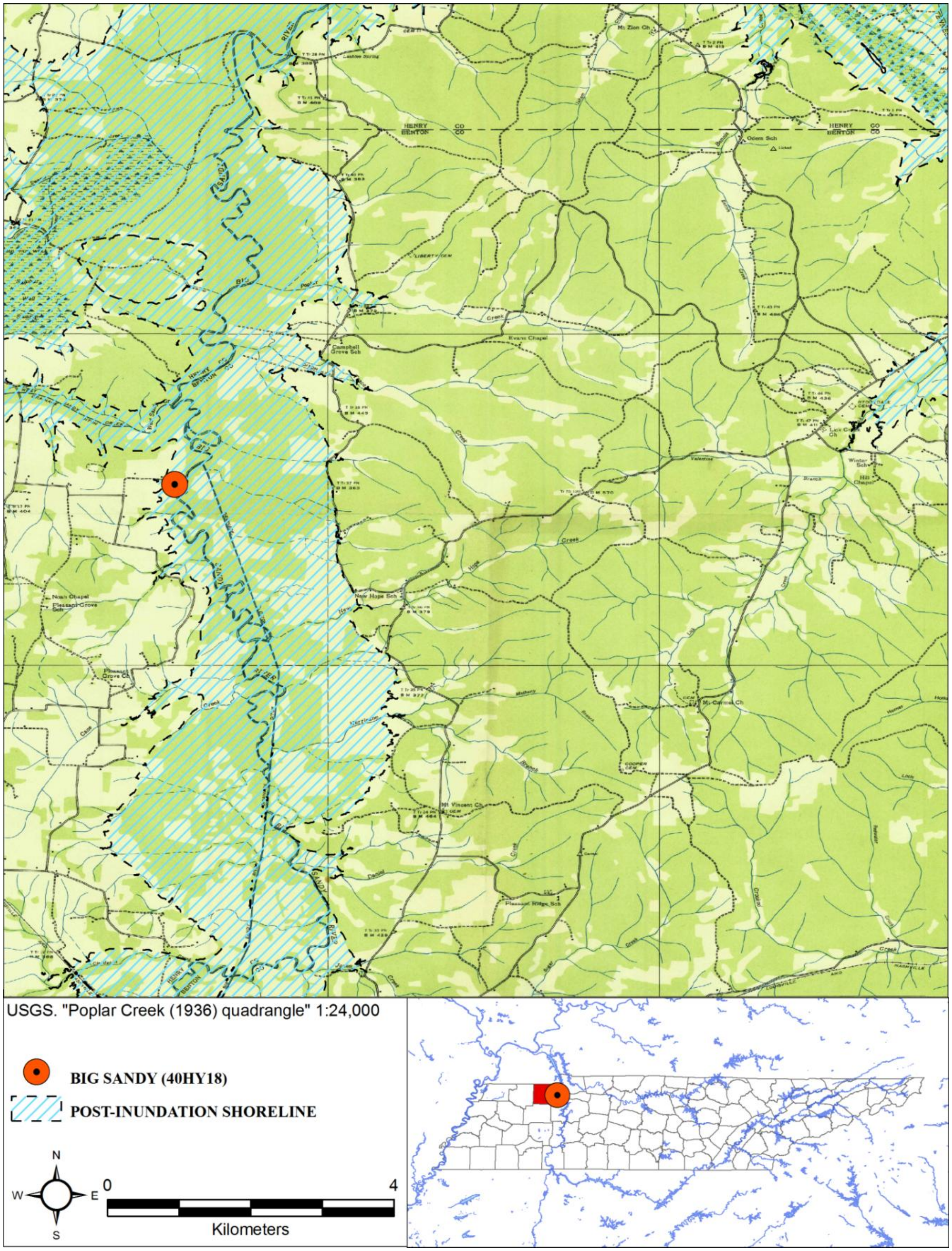


Figure 5.1. Location of the Big Sandy site (40HY18).

Tennessee River at river mile 67. The region surrounding the site straddles the physiographic boundary between the East Gulf Coastal Plain section of the Coastal Plain province to the west, and the Highland Rim section of the Interior Low Plateaus province to the immediate east (Fenneman and Johnson 1946). Bedrock in the area consists of mainly Mississippian and Devonian aged limestones and cherts (King and Beikman 1974; King et al. 1994).

The Big Sandy River valley has been inundated since shortly after the completion of the Kentucky Dam in 1941, but at the time of excavation the local environment of the site consisted of cleared, plowed agricultural fields (Osborne 1942:20-21). Braun (1950:156) classified the area within her Western Mesophytic Forest Region, and dominant forest taxa include a variety of oak (g. *Quercus*) and hickory (g. *Carya*) species on slopes and ridges, with beech, tuliptree, and sugar maple found in ravine communities.

Soils mapped in the vicinity of Big Sandy consist predominately of well drained Lexington silt loam (LaC2, 5 – 8% slopes) and moderately well drained Lax silt loam (5 – 12% slopes). These soils range up to 2 m (79 – 80 inches) in depth, and are formed from loess over marine deposits (LaC2) and loess over gravelly alluvium or gravelly residuum (LeC2) (USDA Web Soil Survey, Accessed 8/1/2013).

TVA EXCAVATION

Visually, Big Sandy was unremarkable at the ground surface (Figure 5.2), and had not been previously recorded or investigated. There was no indication of significant disturbance to the site, other than that resulting from plow damage corresponding to its long history of cultivation.

Figure 5.2. Pre-excavation photo (April, 1940) at the Big Sandy site (40HY18). Field crew in background (photo facing SW). Image from WPA / TVA Archives, courtesy Frank H. McClung Museum, The University of Tennessee.

Fieldwork commenced in early April of 1940. A 10 x 10 ft grid system was staked across the site. The grid was oriented on a north-south baseline designated “CA” (“center axis”), with grid squares numbered from “0” to “18” running from south (“0”) to north (“18”). East-west coordinates were designated by “R” (“right”) or “L” (“left”) and the square numbered from the center axis (e.g., L2, L1, CA, R1, R2, etc.). Grid squares were numbered from the location of their southeastern corner grid stake; all X- and Y-coordinates measured during the piece plotting of cultural material, features, and burials were measured in tenths of feet north (Y-axis) and west (X-axis) from the southeastern corner stake of each square. Z-coordinates were measured in feet below the site’s datum station, which was positioned outside and directly west of the excavation block in Square 14L2, on the highest point on the ridgetop: 343 ft above mean sea level (104.55 mAMSL).

Big Sandy was excavated using two different methodologies, corresponding to the respective tenure of Nash and Osborne. Initial work under Nash’s direction was done at 0.5 ft (15.24 cm) arbitrary levels, and using that approach a ten foot-wide trench positioned west of the “CA” line and oriented on a north-south axis (Trench 1) was opened along the ridgetop and later expanded to twenty feet. Subsequently, a second trench (Trench 2) oriented perpendicular to the first was extended eastward along the 10-line to identify deposits on the hill slope. The deposits delineated in Trench 1 did not prepare the excavators for the stratigraphy identified in Trench 2 or in Trench 3, a second north-south trench placed at the downhill edge of the excavation (Figure 5.3)

Deposits in Trench A were heavily organic, containing large numbers of chipped stone artifacts and debitage, and a number of pit features were identified both within the deposit and in the underlying yellow clay subsoil. However, as work moved further downslope in Trench B,

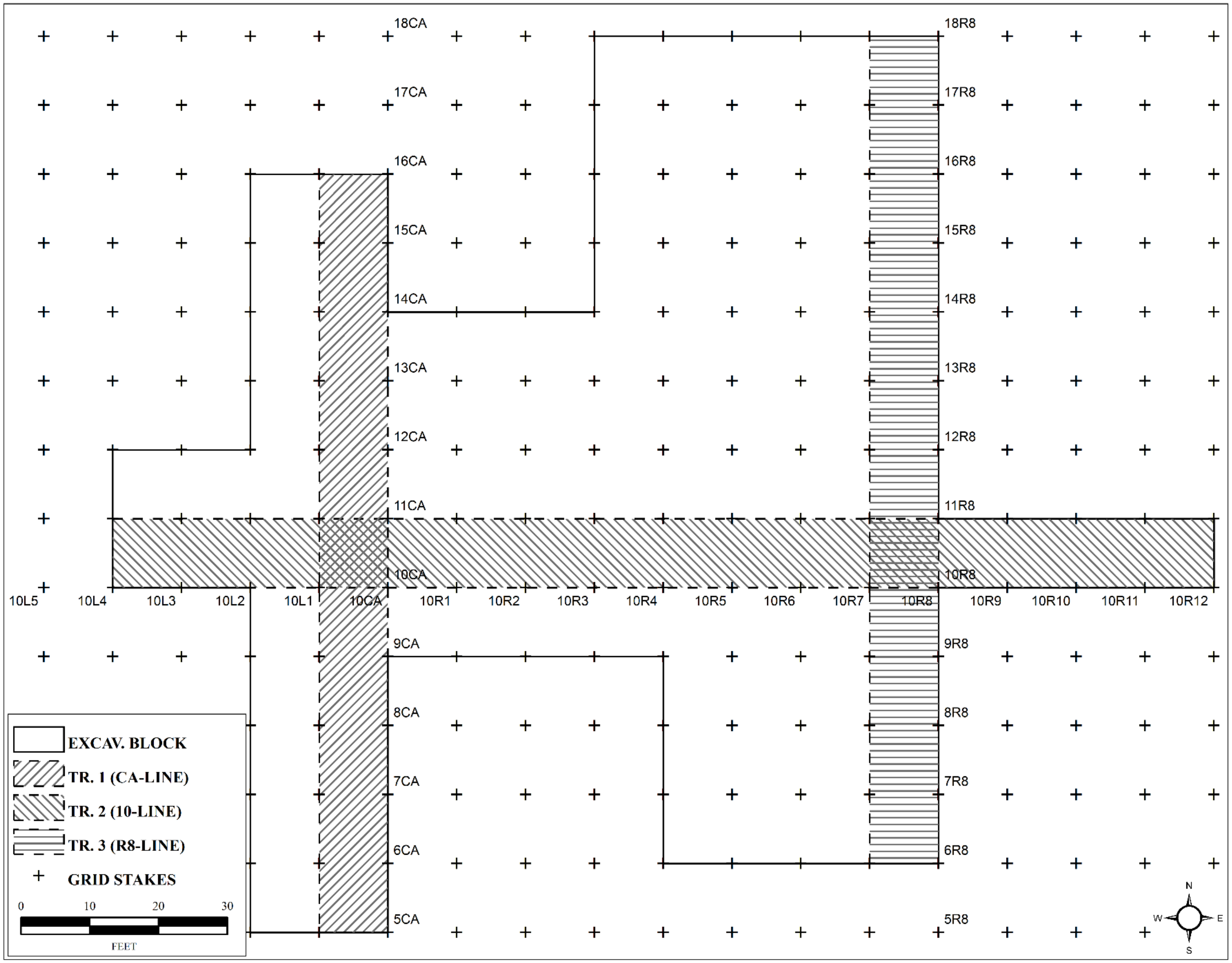


Figure 5.3. The Big Sandy site (40HY18) excavation block.

numerous human burials were encountered, both within the dark upper stratum and in a deeper greyish layer containing substantial cultural material and freshwater shellfish remains. Concern that the use of arbitrary levels was insufficient to distinguish between the distinct cultural deposits located on the hill slope prompted a decision by Osborne, who had assumed control of the project, to shift to excavation in 0.5 ft levels within strata (Osborne 1942).

Of the 930 m^2 total area opened (as illustrated in Figure 5.4), 640 m^2 (68.8%) was excavated by datum control (0.5 ft levels); the remaining 290 m^2 (31.2%) was stratigraphically excavated (Figure 5.4).

STRATIGRAPHY

Two main deposits were distinguished (see Figure 5.5). Beneath the plow zone, the deposit designated as Stratum I extended across the entirety of the site block, and included a series of pits and basins located mainly on the ridgetop (Figure 5.6). Stratum I was sub-divided based on color distinctions observed during excavation, and consisted of Stratum I-upper, a humic loam with a "strong red-brown cast… [which] dried into a fine punky-feeling powder" (Osborne 1942:43-44), blending smoothly into a lower and darker red-brown colored section, Stratum I-lower, which was more humic in consistency and containing a somewhat greater amount of cultural material (Osborne 1942:44-45). The nature of the difference in upper and lower portions was unclear to the excavators, although it may have been a consequence of tilling and other disturbance in the overlying plow zone over many years.

Between Stratum I and Stratum II, the excavators noted a pronounced boundary, a "thin black irregular line… [that] had every appearance of having been either an old surface for some time or some manner of seepage or leaching zone" (Osborne 1942:45). The higher clay content

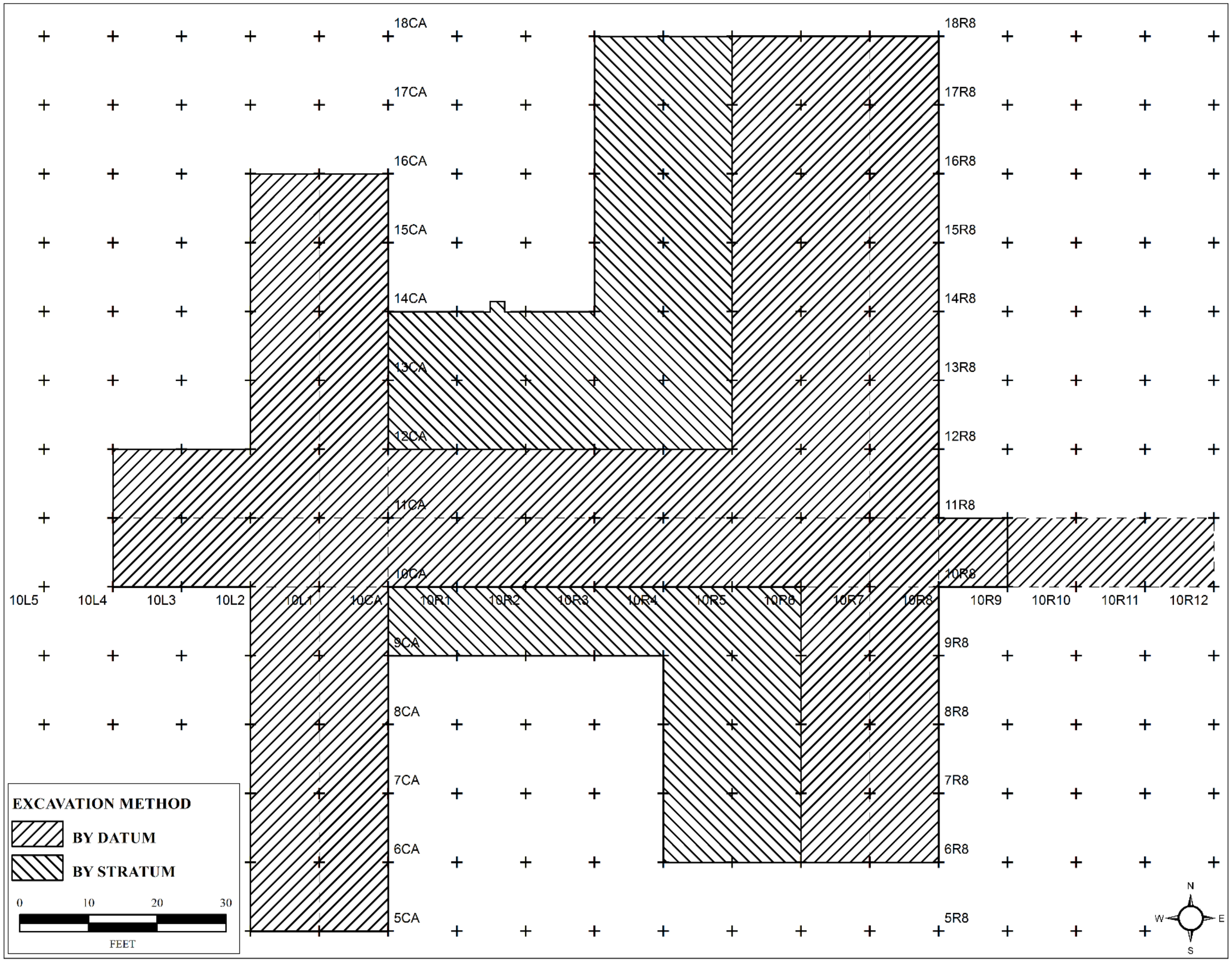


Figure 5.4. Portions of block excavated at the Big Sandy site (40HY18) by datum or stratigraphic control (arbitrary 0.5 ft vs. natural levels).

in Stratum II relative to Stratum I suggested the latter was more likely (Osborne 1942:45), as water percolating from above could have perched at the discontinuity.

Stratum II was grayish-black with a heavy organic content, containing large quantities of animal bone and ash, and a substantial amount of cultural material, consisting of antler, bone, and stone artifacts. Stratum II also contained freshwater mussel shell in varying amounts, although Osborne would later describe the quantity of shell as not overwhelming (Osborne 1942:156) compared to other shell-bearing sites in the Tennessee Valley, including Eva (40Bn12).

The areal extent of Stratum II was less than that of Stratum I; the deposit did not occur across the entirety of the excavation. It was predominately confined to the hill slope east of Trench 1 (Figure 5.6), beginning at the north-south R1-line and terminating roughly 25.9 m (85 ft) downhill within squares of the R9-line. The stratum's north-south extent was less well defined, and its extent was not determined beyond the edge of the excavation block. Beneath Stratum I (on the ridgetop) and Stratum II (on the slope), the subsoil , a "light, fine red-yellow clay with deeper hematitic spotting," was easily distinguished from the overlying deposits.

The site's stratigraphy appeared relatively uncomplicated, and Osborne's interpretation of its occupational history was similarly uncomplicated, stemming from what appeared to be a simple depositional sequence. Osborne's only profile drawing, representing an east-west transect along the 10N-line (see Figure 5.5), provides the only depiction of the site's stratigraphy based on direct observation. No profile photographs were taken.

Based in part on the stratigraphy at the site, Osborne considered Big Sandy to be a habitation site consisting of an occupation area and an associated, but separate, midden. Osborne

Figure 5.5. Stratigraphic profiles at the Big Sandy site (40HY18). Reproduced from the original field map, D. Osborne, 1940 (Original on file at the Frank H. McClung Museum of Natural History and Culture, University of Tennessee, Knoxville). (Oversized figure, see Appendix A.)

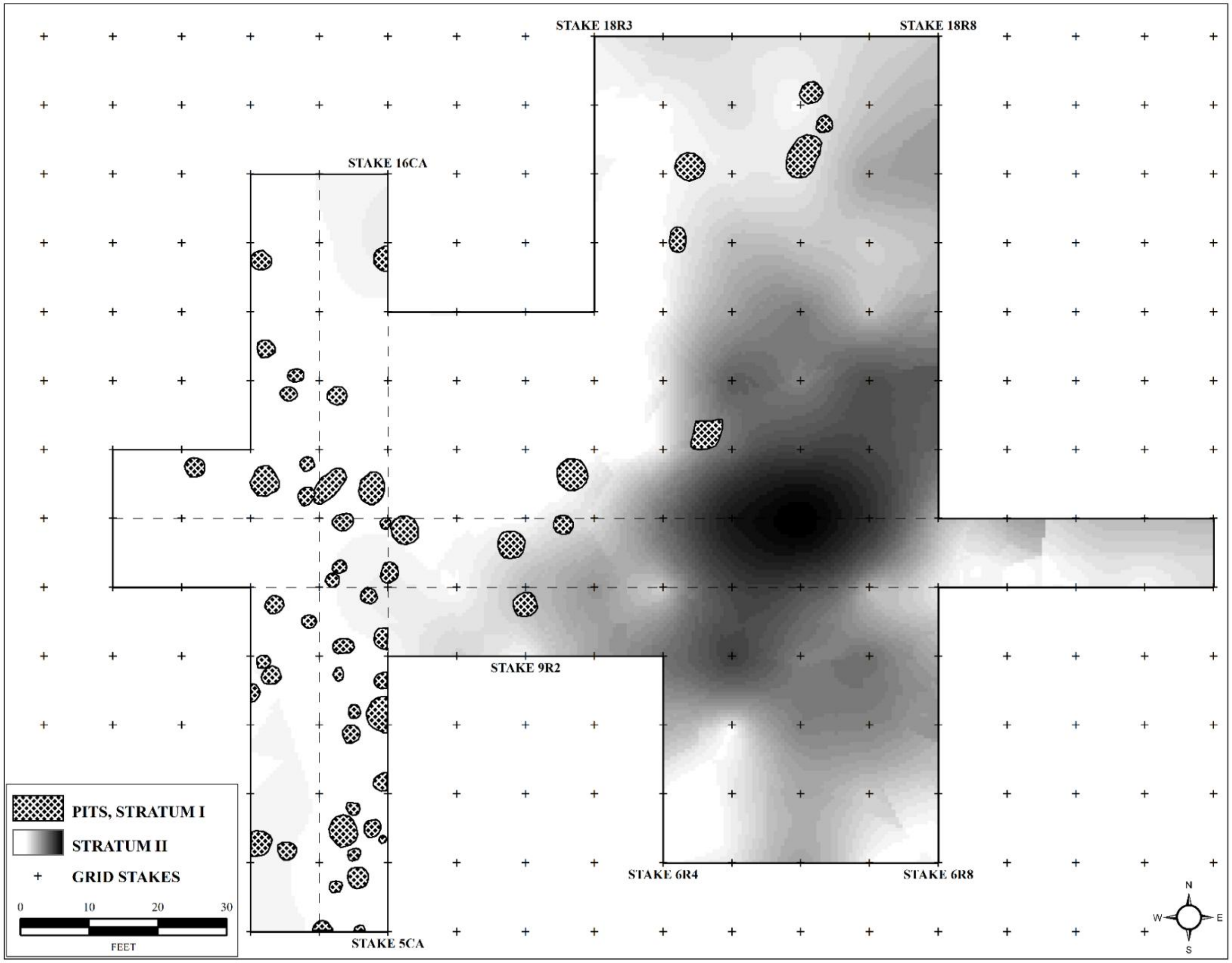


Figure 5.6. Pits associated with Stratum I on the ridgetop, and the approximate extent of Stratum II at the Big Sandy site (40HY18), projected using distribution of Stratum II cultural material within excavation block.

argued that the pits situated on the ridgetop represented the location of the former, and the restricted location of Stratum II on the hill slope defined the latter, an "over the hill dump" (Osborne 1942:46). Osborne did not believe that erosion had played a significant role in the distribution or location of the Stratum II deposit, noting that:

> …the subsoil, along the 10 line profile, rises at something more than an eleven percent grade. This will exceed by more than two percent the average grade of the midden deposit. This would suggest that the present position, as well as the deposition itself, had been conditioned by forces other than erosion. It seems reasonable to suppose that the friable Stratum I midden would not have a higher angle of repose than the clay subsoil and that the body of the midden along the whole slope is in much the same position and condition as it was when it was thrown there by the aborigines. The whole midden deposit seems to nestle in a shallow concavity of the slope of the subsoil. It thus has every appearance of an over the hill dump, although there is no foresetting[23] (Osborne 1942:46-47).

Features and Burials

The total number of burials and non-burial features encountered at Big Sandy was 144. These consisted of human (n = 63) and canine (n = 11) burials, pits or basins (n = 53), and a series of 17 additional features that were recorded on the site plan map, but were not assigned feature numbers (Figure 5.7). These features were not randomly distributed across the excavated site area, but defined two nearly separate areas: burials were located exclusively in the eastern portion of the block, positioned along the hill slope mostly in the vicinity of Stratum II, while pits and basins were clustered primarily along the ridgetop, although a few defined a loose linear

[23] Osborne's reference to "foresetting" here describes what he viewed as a lack of evidence of multiple, small-scale episodes of refuse dumping on the hillslope, which he expected would form a series of superimposed, downward-sloped depositional beds as the Stratum II midden extended down the hill over time.

arrangement extending northeast down the slope. Mapped, but otherwise unnumbered features consisted of patches of burned clay or earth (n = 8) or small clusters of hammerstones and chert nodules (n = 9). Although not recorded as numbered features, separate artifacts comprising the latter received field specimen numbers. The burned clay and cache features were distributed around the margins of the burial cluster, with the exception of a patch of burned clay situated near the center of the burial distribution (Figure 5.7).

Burials (Human, n = 63; Canine, n = 11)

A total of seventy-four interments were documented during the excavation of Big Sandy. Burials were not evenly distributed among the two strata. Stratum I contained the majority (n = 44; 59.5%); the remainder (n = 30; 40.5%) were associated with Stratum II. Human (Stratum I, n = 39; Stratum II, n = 24) and canine burials (Stratum I, n = 5; Stratum II, n = 6) alike were situated almost entirely within or vertically above the areal extent of Stratum II on the hill slope. This spatial distribution contrasted with the locations of most non-burial features at the site (as illustrated in Figure 5.7), and although the hillside at Big Sandy also represented a refuse disposal area (see below), Big Sandy's occupants appear also to have conceptualized the area as the site's cemetery, an area separate from what seems to have been the primary locus of most domestic and occupational activities. Summary data for each burial (both human and canine) at the site are provided in Table 5.1. Information with respect to burial position, location, orientation, and associated grave goods was taken from the original burial records made in the field during the 1940 excavations, and from the unpublished results of subsequent analyses presented by Osborne (1942). Age and sex data provided in Table 5.1 derive from two separate sources. Original age and sex estimations were made in the field and laboratory based on criteria

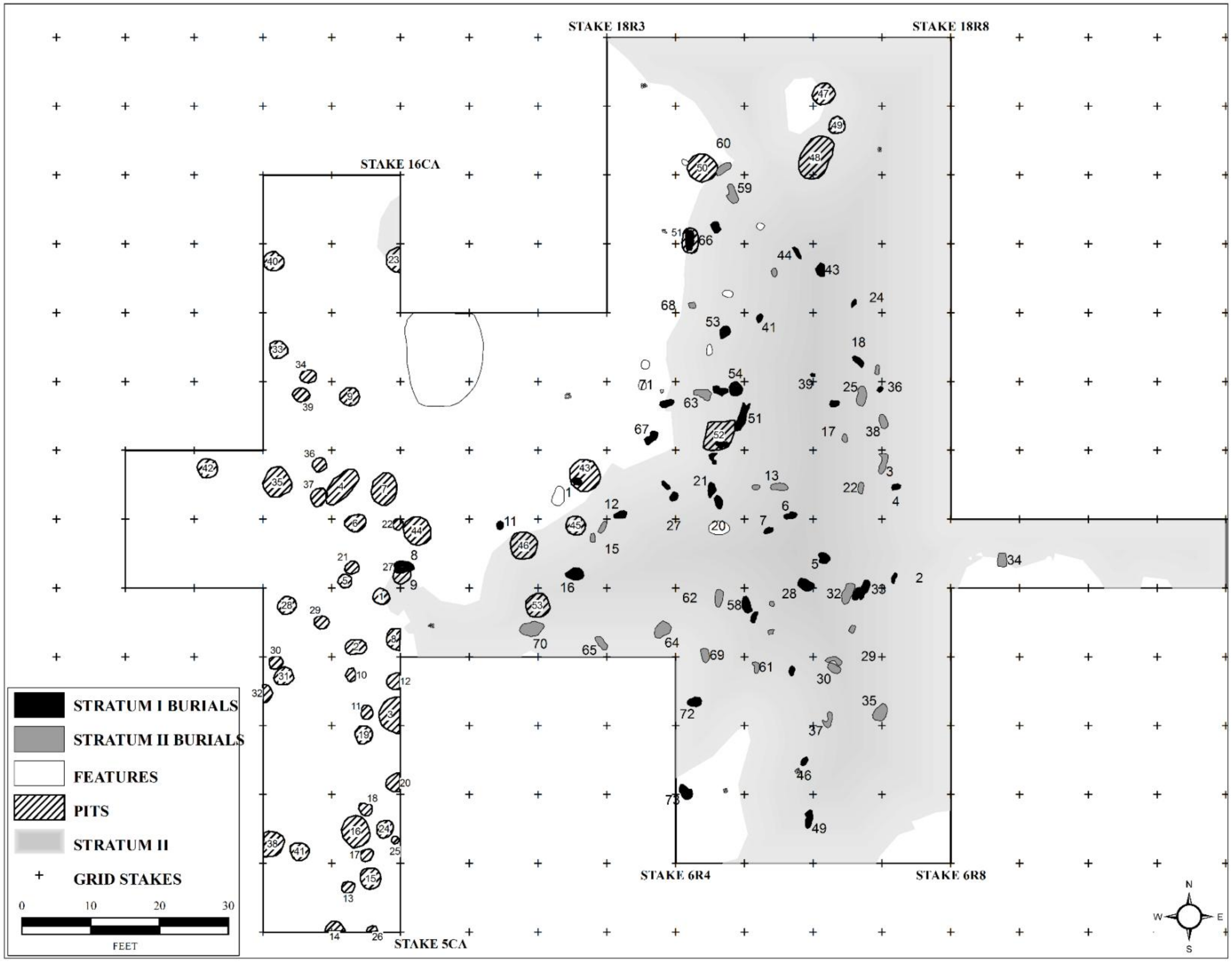


Figure 5.7. Locations of burials, pits, and other features (Stratum I and Stratum II), and approximate extent of Stratum II at the Big Sandy site (40HY18).

Table 5.1. Burial data from Big Sandy site (40HY18).

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
1	11R3	1	Fair	SE	Partly Flexed	Right	M	M	Adult	Adult	
2	10R8	1	Fair	N	Partly Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	
3	11R7	2	Good	S	Partly Flexed	Back	M	F	Adult	Adult	
4	11R8	1					Dog				
5	10R7	1	Poor	N	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	
6	11R6	1	Discarded	Unspecified	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
7	10R6	1	Fair	W	Partly Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	
8	10R1	1	Discarded	W	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Indeterminate	
9	10CA	1	Discarded	W	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Indeterminate	
10	10R3	2	Discarded	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Indeterminate	Indeterminate	red ochre; drill; side-notched point; stemmed point; 4 unhafted bifaces
11	10R2	1	Discarded	NW	Fully Flexed	Right	Indeterminate	Indeterminate	Indeterminate	Indeterminate	
12	11R4	1	Poor	W	Partly Flexed	Back	Indeterminate	Indeterminate	Adult	Adult	
13	11R6	2	Fair	W	Fully Flexed	Right	F	F	Adult	Adult	shell pendant, broken
14	12R7	1	Discarded	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Indeterminate	Indeterminate	
15	10R3	2	Fair	SW	Fully Flexed	Left	M	M	Adult	Adult	
16	10R3	1	Poor	W	Partly Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	5 beaver molars
17	12R7	1					Dog				
18	13R7	1	Poor	SW	Fully Flexed	Left	M	M	Adult	Adult	
19	11R5	1	Fair	S	Partly Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	
20	11R5	1	Fair	S	Fully Flexed	Left	F	F	Adult	Adult	
21	11R5	1	Good	NE	Fully Flexed	Left	F	F	Adult	Adult	
22	11R7	2	Fair	N	Fully Flexed	Right	F	F	Adult	Adult	basal-notched point
23	12R7	2					Dog				
24	14R7	1	Poor	NW	Fully Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	
25	12R7	2	Good	N	Fully Flexed	Left	M	M	Adult	Adult	
26	11R4	1	Poor	SE	Fully Flexed	Right	M	F	Adult	Adult	
27	11R4	1	Poor	SW	Fully Flexed	Right	F	M	Adult	Adult	
28	10R6	1	Fair	E	Fully Flexed	Right	M	F	Adult	Adult	
29	8R7	2	Good	W	Fully Flexed	Right	F	M	Adult	Adult	groundstone bead
30	8R7	2	Fair	Unspecified	Unspecified	Unspecified	M	Indeterminate	Adult	Adult	
31	11R5	2					Dog				
32	9R7	2	Fair	S	Fully Flexed	Back	M	M	Adult	Adult	
33	9R7	1	Fair	NE	Fully Flexed	Right	M	M	Adult	Adult	
34	10R9	2					Dog				
35	8R7	2	Fair	SW	Fully Flexed	Left	M	M	Adult	Adult	
36	13R7	2					Dog				

Table 5.1. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
37	8R7	2	Good	N	Fully Flexed	Right	F	F	Adult	Adult	
38	12R7	2	Good	N	Fully Flexed	Right	M	M	Adult	Adult	
39	13R7	1	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
40	10R7	1	Good	S	Fully Flexed	Right	F	F	Adult	Adult	
41	13R6	1					Dog				
42	9R7	2	Discarded	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Indeterminate	Indeterminate	
43	14R6	1	Good	N	Fully Flexed	Left	M	M	Adult	Adult	bannerstone (fragmentary)
44	14R6	1	Fair	NW	Extended	Back	Indeterminate	Indeterminate	Subadult	Subadult	
45	14R6	2					Dog				
46	7R6	1	Discarded	SW	Unspecified	Right	Indeterminate	Indeterminate	Indeterminate		
47	9R6	2					Dog				
48	8R6	1					Dog				
49	6R6	1	Fair	SW	Partly Flexed	Back	M	M	Adult	Adult	
50	9R6	2	Poor	Unspecified	Unspecified	Unspecified	F	F	Adult	Adult	
51	12R5	1	Fair	S	Partly Flexed	Front	M	M	Adult	Adult	
52	9R6	1	Discarded	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Indeterminate	Indeterminate	
53	13R5	1	Good	S	Fully Flexed	Left	M	M	Adult	Adult	
54	12R5	1	Poor	SW	Unspecified	Right	Indeterminate	Indeterminate	Adult	Adult	
55	12R5	1	Poor	E	Fully Flexed	Left	F	F	Adult	Adult	
56	12R5	1					Dog				
57	15R5	1	Discarded	S	Fully Flexed	Left	Indeterminate	Indeterminate	Subadult	Indeterminate	
58	9R6	1	Poor	N	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	
59	15R5	2	Fair	N	Fully Flexed	Right	Indeterminate	M	Adult	Adult	
60	16R5	2	Poor	E	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	
61	8R6	2	Poor	S	Fully Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	
62	9R5	2	Fair	S	Fully Flexed	Back	Indeterminate	F	Subadult	Adult	
63	12R5	2	Good	W	Fully Flexed	Right	M	M	Adult	Adult	
64	9R3	2	Fair	W	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	
65	9R3	2	Fair	SE	Fully Flexed	Left	F	F	Adult	Adult	
66	15R5	1	Poor	S	Fully Flexed	Right	F	F	Adult	Adult	
67	12R4	1	Poor	SW	Fully Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	basal-notched point
68	14R5	2	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
69	9R5	2	Poor	S	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	large notched biface
70	9R2	2	Poor	E	Partly Flexed	Back	Indeterminate	M	Adult	Adult	
71	12R4	1	Poor	E	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
72a	8R5	1	Poor	Unspecified	Fully Flexed	Front	Indeterminate	Indeterminate	Subadult	Indeterminate	2 bannerstones (fragmentary)
72b	8R5	1	Poor	W	Fully Flexed	Front	Indeterminate	Indeterminate	Adult	Indeterminate	
73	7R5	1	Fair	W	Fully Flexed	Left	M	M	Adult	Adult	

detailed in the University of Tennessee Division of Anthropology (UTDoA) laboratory and field manual (Lewis et al. 1995:619-621). These were treated with a measure of skepticism in light of a previous reassessment of demographic data produced by New Deal-era aging and sexing techniques at the Read shell midden in Kentucky; application of modern methods resulted in a 25% reclassification rate (Milner and Jefferies 1998:128). For Big Sandy, comparison of the original assessments (Osborne 1942:51, Table 1) with the results of the McClung Museum's 1990 inventory of skeletal material (produced in compliance with NAGPRA) indicated a slightly lower misclassification rate of 20%. Of the 50 skeletons reexamined (Smith 1990), nine were reclassified by sex, and one adult was found to have been misidentified as a child. Both the 1942 and 1990 results are provided.

The disparity between recorded burials and those re-assessed in 1990 is due in part to field recovery methods. Skeletal preservation varied considerably, and remains from ten burials were described on the original burial documentation forms as too fragmentary to be recovered intact. Those remains are listed as "discarded in field." Most human skeletons were recorded in either poor (n = 21, 33.3%) or fair (n = 22, 34.9%) condition, but ten (15.9%) were considered to be in good condition. Based on the burial data forms, nearly all burials – even those discarded – were primary interments.

Eighteen males and 13 females were distinguished among the 50 re-assessed burials. Ten individuals of adult age could not be assigned to either sex. The remains of four children, four infants, and one fetus were also present.

Burial position was recorded for 52 skeletons. Most were in a fully flexed (n = 40, 77%) or partially flexed (n = 11, 21.2%) position, but one extended burial was also documented. Few burial pits were identified, but the site field director suspected pit burials for most individuals, mostly based on the relatively tight flexure observed in many cases (Osborne 1942:54).

Where the direction of the long axis of individual burials, and the position of the head, could be determined, burial orientation was also assessed. Burial orientation – N, S, E, W – was defined based on the location of the head and the orientation of the long axis of each burial (i.e., in a grave oriented to the north, the long axis of the burial ran north-south, and the head was located at the north end of the burial). The orientations of most graves conformed to the contours of the hill side where they were located, generally running approximately parallel with the sides of the slope.

Grave accompaniments were rare, and only nine of the 63 burials (14.3%) – five adult, one subadult, and three of indeterminate age – had associated offerings (Figure 5.8; Figure 5.9). Most contained only a single artifact. Four adult graves included: a broken marine shell pendant (Burial 13), an Eva basal-notched point (Burial 22), a groundstone bead (Burial 29), and a fragmentary bannerstone (Burial 43). Burial 16, also an adult, contained a set of five truncated beaver molars (four of which could be located, see Figure 5.8). A subadult burial (Burial 67) contained a second Eva basal-notched point. Three individuals of indeterminate age (according to the results of the 1990 NAGPRA inventory) also contained grave goods. Two of them included, respectively, a large, well-made biface (Burial 69) and two fragments of two separate bannerstones (Burial 72a). The third individual, Burial 10, was unusual in the number of items included, which consisted of seven chipped stone artifacts and a large amount of red ochre covering the remnants of the skull.

Canine burials were positioned among the human graves. While no humans and dogs were directly associated, a small cluster of four was located in a small area near the eastern edge

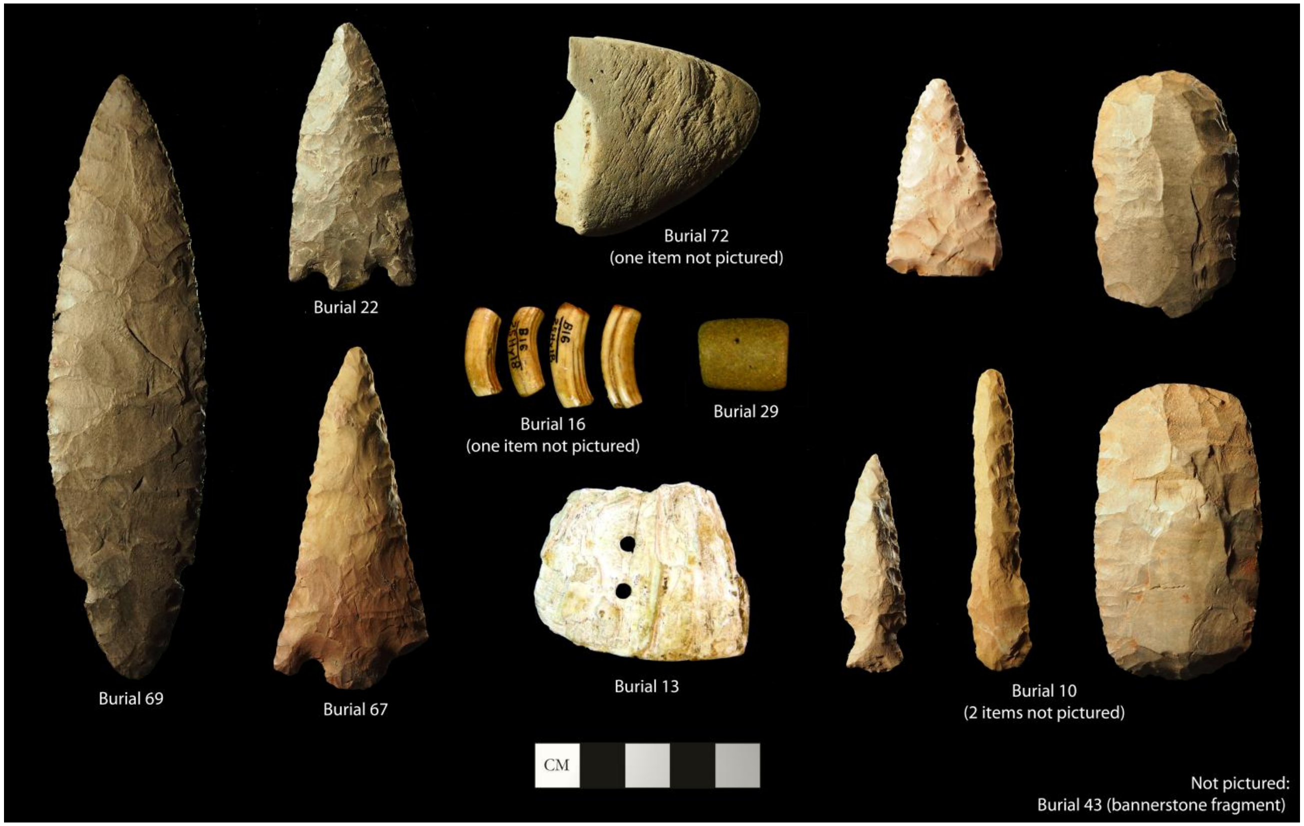


Figure 5.8. Artifacts associated with burials at Big Sandy (40HY18) (items not pictured were unable to be located for examination or photography).

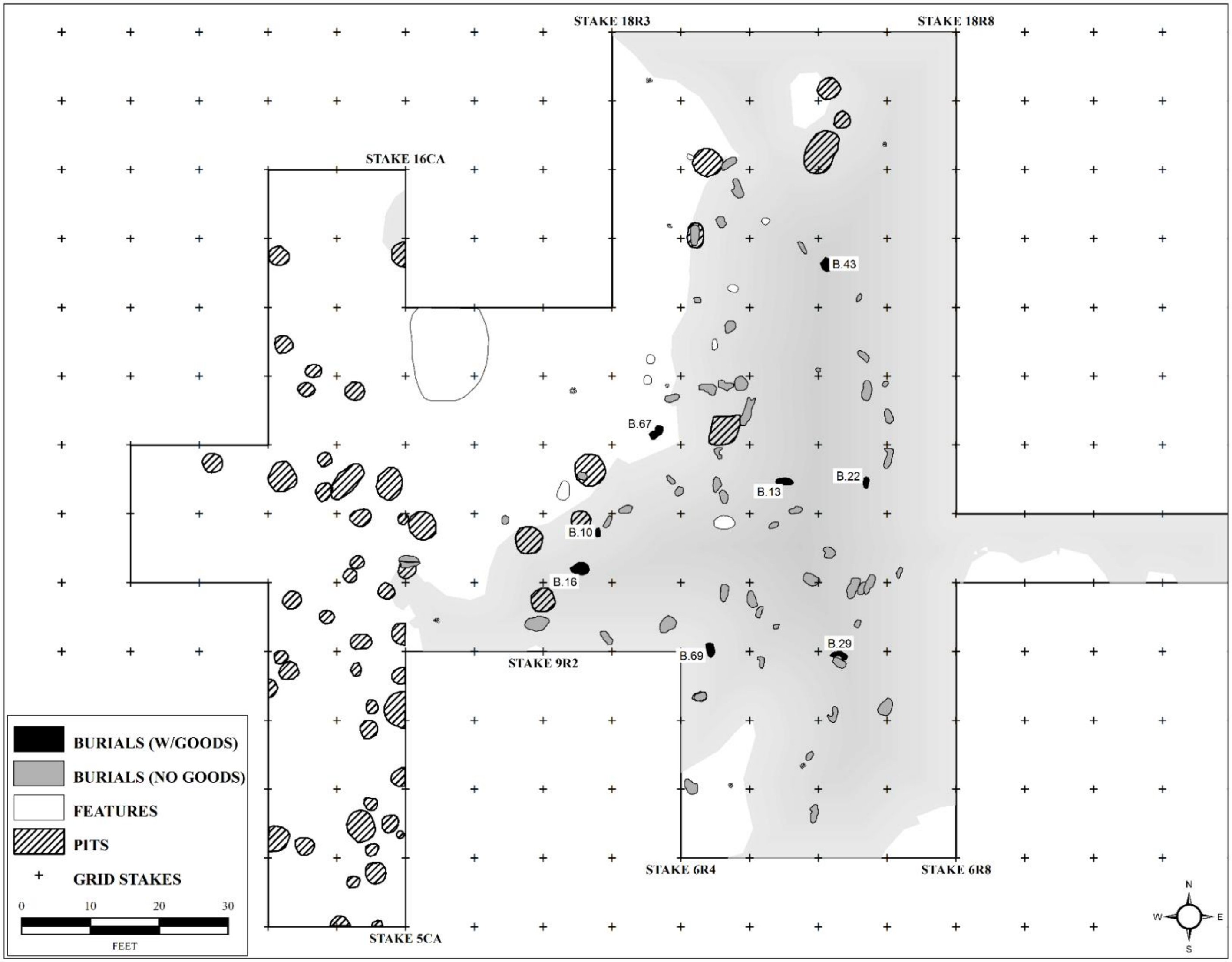


Figure 5.9. Locations of burials with associated grave goods at Big Sandy (40HY18).

of the block, interspersed among seven human burials. This cluster was slightly offset from other burials, but the degree to which such patterning was intentional is not apparent.

Pits and Basins (n = 53)

Pits were encountered primarily on the ridgetop and along its margins (n = 44, 83%) (Figure 5.7) in the western area of the block, although several (n = 9, 17%) extended in a roughly-defined line along a northeastern bearing down the hillside, a distribution that paralleled that of other non-burial features (see below).

Because Stratum II was not identified in the vicinity of the majority of pits (on the ridgetop), most were assigned to Stratum I. Six were tentatively associated with the plow zone, and two (Pits 46 and 52) were associated with Stratum II (Table 5.2).

Most pits were circular or oval in plan view, although two were more angular in shape (Pit 4, Square 11CA; Pit 52, Square 12R5), but little other characterization of pit shape was made in the original excavation forms or on the site map (data on individual pits and other features are provided in Table 5.2). Features are often classified qualitatively as “basins” or “pits” based on cross-sectional form, and possible function is often inferred on the basis of that form. Basins are typically described as shallow with gently sloping sides, and exhibit a larger diameter relative to depth. In contrast, features classified as pits usually exhibit steeper or parallel sides and a greater depth relative to diameter. These distinctions are qualitative, and are often made visually in the field, or on the basis of cross-sectional data from drawings or photographs. However, at Big Sandy, a lack of such data required the development of a quantitative classification index (I_B) to assess the relative “basin-ness” or “pit-ness” of features described as pits. This index was calculated as the ratio of the pit’s radius (r) in cm at its top to the depth (d) in cm. The value of

Table 5.2. Pits and unnumbered features* recorded at the Big Sandy site (40HY18).

Pit	Stratum	Origin (mbd)	Grid Square	Area (sq m)	Depth (cm)	Pit Index (I_B)	Description
Pit 1	pz	2.13	9CA	0.40	39.6	0.90	Small pit (Type 3)
Pit 2	1	2.13	9CA	0.51	18.3	2.20	Small basin (Type 2)
Pit 3	1	2.13	8CA	1.19	140.2	0.44	Large pit (Type 3)
Pit 4	1	2.13	11CA	1.37	30.5	2.17	Large basin (Type 2)
Pit 5	1	2.13	10CA	0.28	45.7	0.66	Small pit (Type 3)
Pit 6	1	2.13	10CA	0.55	27.4	1.52	Small basin (Type 2)
Pit 7	1	2.13	11CA	1.25	27.4	2.30	Large basin (Type 2)
Pit 8	1	2.29	9CA	0.48	36.6	1.07	Small basin (Type 2)
Pit 9	1	2.13	12CA	0.55	18.3	2.28	Small basin (Type 2)
Pit 10	1	2.26	8CA	0.21	15.2	1.68	Small basin (Type 2)
Pit 11	1	2.26	8CA	0.26	106.7	0.27	Small pit (Type 3)
Pit 12	1	2.29	8CA	0.34	3.0	10.87	Small basin (Type 1)
Pit 13	1	2.44	5CA	0.23	6.1	4.47	Small basin (Type 1)
Pit 14	pz	2.38	5CA	0.29	15.2	1.99	Small basin (Type 2)
Pit 15	1	2.44	5CA	0.69	15.2	3.07	Small basin (Type 2)
Pit 16	1	2.35	6CA	1.35	21.3	3.07	Large basin (Type 2)
Pit 17	1	2.35	6CA	0.25	24.4	1.15	Small basin (Type 2)
Pit 18	1	2.23	6CA	0.26	6.1	4.76	Small basin (Type 1)
Pit 19	1	2.23	7CA	0.48	21.3	1.83	Small basin (Type 2)
Pit 20	1	2.29	7CA	0.40	106.7	0.34	Small pit (Type 3)
Pit 21	1	2.16	10CA	0.28	21.3	1.39	Small basin (Type 2)
Pit 22	1	2.26	10CA	0.18	27.4	0.87	Small pit (Type 3)
Pit 23	1	2.32	11CA	0.55	33.5	1.25	Small basin (Type 2)
Pit 24	1	2.68	6CA	0.45	6.1	6.23	Small basin (Type 1)
Pit 25	1	2.56	6CA	0.09	9.1	1.80	Small basin (Type 2)
Pit 26	1	2.56	5CA	0.09	18.3	0.95	Small pit (Type 3)
Pit 27	1	2.10	10CA	0.56	3.0	13.89	Small basin (Type 1)
Pit 28	pz	1.92	9L1	0.50	15.2	2.61	Small basin (Type 2)
Pit 29	1	1.95	9L1	0.29	42.7	0.72	Small pit (Type 3)
Pit 30	1	1.98	8L1	0.28	3.0	9.88	Small basin (Type 1)
Pit 31	1	1.98	8L1	0.53	21.3	1.92	Small basin (Type 2)
Pit 32	1	1.98	8L1	0.25	21.3	1.33	Small basin (Type 2)
Pit 33	pz	1.89	13L1	0.49	30.5	1.30	Small basin (Type 2)
Pit 34	1	1.92	13L1	0.33	18.3	1.77	Small basin (Type 2)
Pit 35	1	2.01	11L1	1.27	3.0	20.83	Large basin (Type 1)
Pit 36	1	2.04	11L1	0.31	9.1	3.41	Small basin (Type 2)
Pit 37	1	2.04	11L1	0.45	42.7	0.88	Small pit (Type 3)
Pit 38	1	2.10	6L1	0.87	79.2	0.66	Small pit (Type 3)
Pit 39	1	1.92	12L1	0.35	48.8	0.69	Small pit (Type 3)
Pit 40	1	1.92	14L1	0.60	128.0	0.34	Small pit (Type 3)
Pit 41	1	2.26	6L1	0.52	24.4	1.67	Small basin (Type 2)
Pit 42	1	1.83	11L2	0.60	21.3	2.05	Small basin (Type 2)
Pit 43	1	2.90	11R3	1.49	30.5	2.26	Large basin (Type 2)

Table 5.2. Continued.

Pit	Stratum	Origin (mbd)	Grid Square	Area (sq m)	Depth (cm)	Pit Index (I_B)	Description
Pit 44	1	2.59	10R1	1.20	54.9	1.13	Large basin (Type 2)
Pit 45	1	3.08	10R3	0.57	24.4	1.74	Small basin (Type 2)
Pit 46	2	2.90	10R2	1.16	97.5	0.62	Large pit (Type 3)
Pit 47	pz	3.72	17R7	0.73	36.6	1.32	Small basin (Type 2)
Pit 48	1	4.11	16R7	2.13	45.7	1.80	Large basin (Type 2)
Pit 49	1	4.11	16R7	0.42	15.2	2.39	Small basin (Type 2)
Pit 50	pz	3.26	15R5	1.24	48.8	1.29	Large basin (Type 2)
Pit 51	1	3.26	14R5	0.67	3.0	15.11	Small basin (Type 1)
Pit 52	2	3.81	12R5	1.48	18.3	3.75	Large basin (Type 2)
Pit 53	1	2.80	9R4	0.89	24.4	2.18	Small basin (Type 2)
N = 9	St. 1, n = 6 St. 2, n = 3	Not recorded.	Multiple.		Not recorded.		Hammerstone and river cobble caches.
N = 8	St. 1						Thermal features.

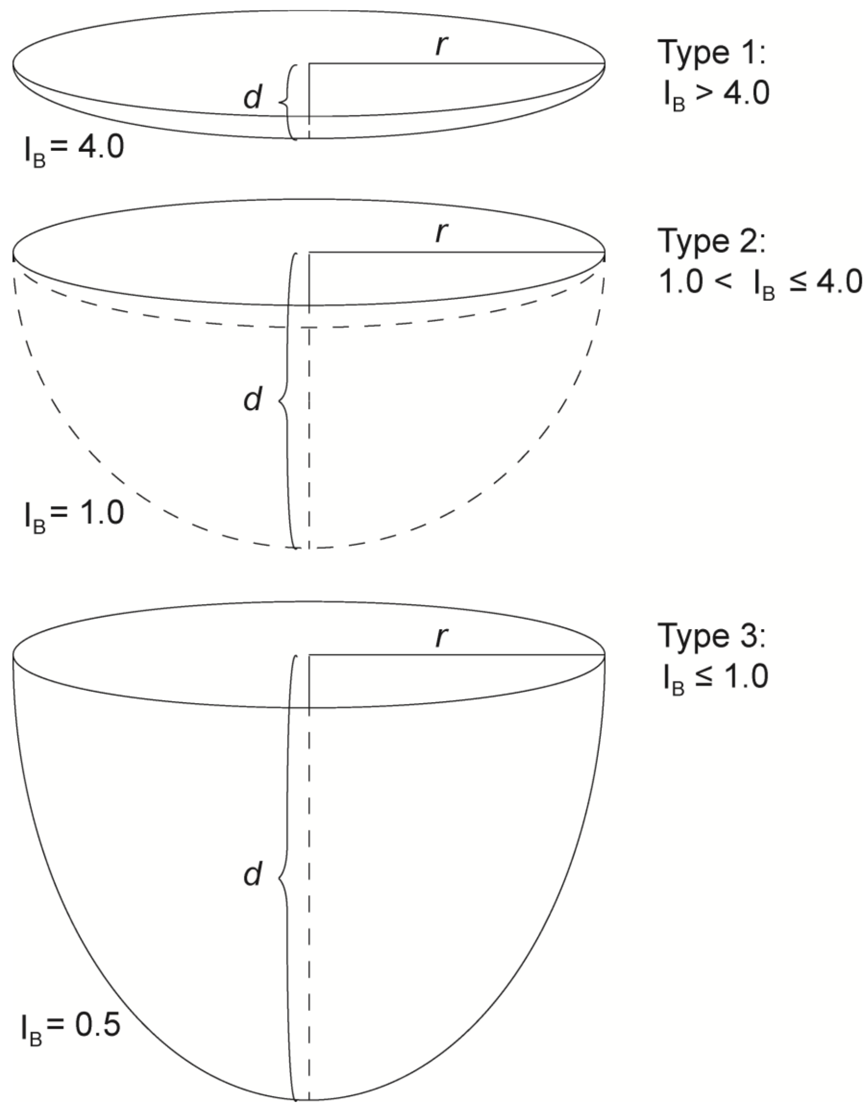


Figure 5.10. Illustration of pit types, 1 – 3.

the classification index is inversely proportional to the basin-ness of the pit; a high index value indicates a very shallow basin, while a low index (i.e., ≤ 1) indicates a feature more appropriately described as a "pit."

Type 1 pits ($I_B > 4.0$) approximated shallow basins or depressions in cross section (Figure 5.10). Eight pits (15%) were grouped as Type 1.

Type 2 pits ($1.0 < I_B \leq 4.0$) ranged between shallow basins and pits with a radius and depth of equivalent value (Figure 5.8). This category comprised the greatest proportion (60.3%; n = 32) of the pit features at the site.

Type 3 pits ($I_B \leq 1.0$) were most appropriately described as pits, with depths that were greater than their radii (Figure 5.8). Thirteen (24.5%) pits were classified as Type 3.

It should be noted that the I_B value is a relative term, and describes only the relationship between the size of the feature and its depth. It is unrelated to the overall size of a feature. Thus, a series of metric values was also calculated, using the digitized site map and field documentation.

Pit Depth (cm): Depths from datum of the top and bottom of pits were recorded in feet. Pit depth was calculated by conversion of feet to centimeters (1 ft = 25.4 cm), and taking the absolute value of the difference between top and bottom depths. Pit depths ranged from < 5 cm (1.9 in) to 140 cm (55.1 in) in depth, but the majority (n = 47) were less than 60 cm deep (skew =

2.4633) (Table 5.2). Two were between 70 and 100 cm deep, and four were one meter or greater in depth (Table 5.2). The four deepest pits were located on the ridgetop.

Pit Area (m^2): Area was determined using the "calculate geometry" option available in ESRI ArcGIS 9.3, which can calculate the unit area of polygon features in a shapefile. The original site map included all pits, represented accurately (based on cross-checking between the map and dimensions recorded on the pit log form). All pits were digitized, and the "calculate geometry" function was run to produce area values for each pit. In area, pit features ranged from < 0.1 m^2 to a maximum of 2.13 m^2 (Pit 48). However, most pits were smaller than 1 m^2, and the majority (n = 35, 66.0%) clustered between 0.2 m^2 and 0.65 m^2 in size (skew = 2.354) (Table 5.2). The single largest excavated pit by area, measuring slightly more than 2 m^2, was located on the hill slope in the northeastern area of the block (Figure 5.7).

For the purposes of spatial analysis and comparison with similar features at other Archaic-period sites, features described as pits at Big Sandy were ultimately grouped into two main categories: Basins (Type 1 and Type 2) and Pits (Type 3). Further subdivision by size within each category produced a total of four classes: small (Area ≤ 1 m^2) or large (Area > 1 m^2) basins, and small or large pits (classified similarly by area).

Basins (as classified here), both small (n = 31; 58.4%) and large (n = 9; 16.9%) dominated at Big Sandy. Only thirteen features were classified as pits (small, n = 11, 20.7%; large, n = 2, 3.8%). The prevalence of such shallow features is not uncommon at Archaic-period sites in the Southeast and Midsouth (e.g., Cridlebaugh 1986:31-38; Jefferies and Butler 1983:144; Winters 1969:88-90). At the Middle Archaic-aged Black Earth site, for example, Jefferies and Butler (1982:120-121) distinguished Type 1 features – defined as circular or oval pits greater than 30 cm in depth with straight or slightly tapering walls – from Type 2 features, which were less than or equal to 30 cm in depth and tended to exhibit a more basin-like profile with gently sloping sides. A pronounced difference in the distribution by component was noted, with the majority of Type 2 features associated with the Archaic levels at the site, while most Type 1 features – deeper and larger pits – were associated with the later Woodland-period occupation of Black Earth (Jefferies and Butler 1982:136-146). Contents of both Type 1 and Type 2 features were predominately carbonized plant material and charcoal, and few artifacts were found within them (Jefferies and Butler 1982:164-176).

In the Wabash River Valley, Howard Winters (1969:88-90) similarly differentiated between pits and basins at the Late Archaic Riverton site, describing five features in the lowest levels of the site as broad, shallow basins averaging 22 cm in depth. He contrasted those with five cylindrical pits, with an average depth of 81 cm, which were associated with slightly later use of the site (Winters 1969:88, 105). Basins contained mostly ash and freshwater shellfish remains, and Winters suggested they might have served for shellfish processing. The cylindrical pits' possible functions were less clear, but they contained dense deposits of ash that Winters believed might have been associated with their use as deep hearths, or for the processing of hides or acorns, both of which require the use of lye (which can be produced from the mixture of hardwood ashes with water) (Winters 1969:90).

At Penitentiary Branch, a Late Archaic shell midden located along the Cumberland River in Jackson County, Tennessee, comparison of the proportions of pits and basins identified in the site's report (Cridlebaugh 1986:31-38) favored pits over basins. Of the combined total of 124, 51 (41.1%) were classified as basins. Both basins and pits at Penitentiary Branch contained varying amounts of undifferentiated midden or combinations of fire cracked rock and shell, and several contained evidence of use as firepits or hearths (Cridlebaugh 1986:31-38). It should be noted that if the criteria used by Jefferies and Butler (1982:120-121) to distinguish Type 1 and Type 2 features are applied to Penitentiary Branch (i.e., basins ≤ 30 cm in depth), basins slightly outnumber pits (pits, n = 59; basins, n = 63). If the I_B described previously in this chapter is used to differentiate features at Big Sandy, basins outnumber pits by nearly 3:1 (n =91; n = 32).

Ultimately the purposes of the pits and basins at Big Sandy cannot be determined with any degree of certainty, given the relative lack of attention given to their excavation and description during the site's investigation, and the failure of the excavator to retain examples of their fill for later examination. However, in general description their based on recorded dimensions and calculations made from them, Big Sandy's pit features are sufficiently similar in character to other Archaic sites in the region, and in proportion of shallow, wide-mouthed to deeper, narrower-mouthed features, that the site's features do not appear to have been unusual.

Although the field descriptions of the pits and their contents at Big Sandy was extremely limited, the minimal coverage given to them was not symptomatic of a lack of familiarity with large-scale excavations or other prehistoric feature types, including postholes, nor does it indicate an inability to distinguish such features at Archaic sites in the region. Charles Nash, who oversaw the initial excavations on the ridgetop early in the investigation of Big Sandy, and where the majority of features at the site were located, had previously directed work at the late prehistoric Mississippian Dallas site (40HA1) in Hamilton County, where postholes and other pit and basin features were identified in profusion (Lewis et al. 1995:305-371). Additionally, at the nearby Cherry site (40BN74; see Chapter 8), also excavated by Osborne, large numbers of postholes (in addition to other feature types) were identified. Thus, it seems likely that the lack of reference to such features at Big Sandy is not indicative of carelessness on the part of the excavators, and probably indicates an actual absence of such features.

Thermal Features (n = 8)

Although they were not assigned feature numbers and do not appear to have been extensively examined[24], eight patches of burned clay or earth were identified during excavation. None appeared to have been specially prepared (Osborne 1942:48). They were found entirely associated with Stratum I, and were located east of the center axis line, occupying approximately the same area within the block as the northeastern-trending line of pits in the northeastern portion of the site (see previous section) (Figure 5.7). With one exception – a relatively large patch located in the eastern area of the excavation among the burials (Figure 5.7) – these features defined a loose boundary around the northeastern half of the block, circling the burial area.

Chert / hammerstone caches (n = 9)

Several small piles of stones, consisting of a combination of river cobbles, chert nodules, and hammerstones, were distributed in the area immediately northwest of the burials on the hill slope. Two more were positioned in the extreme southeastern edge of the block. Most (n = 6) were associated with Stratum I.

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[24] Thermal features were not only not extensively examined, but aside from notation on the site's field map, they were not documented. Despite having dedicated feature forms, thermal features do not appear to have warranted the assignment of feature numbers or other more detailed recordation. This lack of information, especially at shell-bearing sites, has contributed to the misconception that many shell-bearing sites were mostly devoid of "occupational" features. In fact, most of these sites contained much larger numbers of such features than have been widely reported (see also Chapters 6- 8), but relatively few researchers appear to have inspected the original large-scale, detailed site maps from which such information could be gleaned.

CULTURAL MATERIAL

The Big Sandy artifact assemblage was extensive, but it should be noted that a precise count or complete examination of the materials documented during excavation was not possible, due to the nature of field recovery and recording practices of the UTDoA (and most other practicing archaeologists) in the 1930s and 1940s. Some materials, such as chipped stone debris and unmodified shell, were neither counted nor entered into the field specimen (F.S.) log. Others, such as unmodified faunal remains, were sometimes grouped as a single F.S. and noted (occasionally by grid square of origin), classified and counted, but were not retained for further analysis.

Entries in the site's F.S. log indicate at least 1,708 items initially were recovered at Big Sandy. These included materials recorded but not retained and items collected during surface reconnaissance prior to the establishment of a grid system at the site. Table 5.3 provides a summary listing, by material, classification, and stratigraphic association, of all items or groups of items entered into the site F.S. log.

Artifacts were classified either by personal inspection or examination of photographs, or by the original description recorded on the F.S. log at the time of the item's entry into that list. Items that could not be inspected visually but had been identified in the log were classified based on the log identification (e.g., "stemmed proj. pt." = "PPK, Unidentified Stemmed").

Some items appear to have been noted in the F.S. log and discarded in the field during the excavation. These included objects such as geofacts and other seemingly unmodified materials. Some FS entries also included multiple artifacts, some or all of which were not retained. Table 5.3 presents a complete summary of all artifacts listed in the site's F.S. log by material, classification, and provenience.

Table 5.3. All artifacts at Big Sandy site (40HY18) by material and classification, grouped by provenience.

	ARTIFACT CLASSIFICATION	PROVENIENCE				
		Surface	Plow Zone	Stratum I	Stratum II	TOTALS
Chipped Stone	**Hafted Bifaces**					
	PPK	56	121	223	89	489
	PPK-Drill	11	10	23	5	49
	PPK-Scraper	32	17	13	4	66
	All Hafted Bifaces	**99**	**148**	**259**	**98**	**604**
	Bifacial Drills					
	T-base	1	4	7	4	16
	Lobe	6	5	8	1	20
	Expanding base	3	2	2	0	7
	Triangular base, small	3	3	1	2	9
	Triangular base, large	0	1	2	1	4
	Shaft only	2	5	3	4	14
	Perforator or borer	3	2	6	1	12
	Broken shaft	1	1	4	3	9
	Broken	2	1	1	1	5
	Unidentified	0	1	3	3	7
	All Drills	**21**	**25**	**37**	**20**	**103**
	Other Bifaces					
	Knife	2	6	6	3	17
	Scraper	2	1	3	0	6
	Lanceolate	2	2	2	1	7
	Triangular	2	2	6	3	13
	Ovate	0	1	0	3	4
	Discoidal	2	0	0	0	2
	Other	2	0	2	0	4
	Unidentified	1	24	46	36	107
	All "Other" Bifaces	**13**	**36**	**65**	**46**	**160**
	Unifaces	1	3	4	3	11
	TOTAL, Chipped Stone	**134**	**212**	**365**	**167**	**878**
Ground Stone	Abrader	0	0	6	8	14
	Anvil	0	0	0	4	4
	Bannerstone	4	0	6	2	12
	Bead	0	0	0	1	1
	Celt	0	1	2	0	3
	Grindstone	0	2	2	1	5
	Hammerstone	0	2	14	2	18
	Nutting stone	0	2	3	5	10
	Pestle	1	6	10	1	18
	Pendant	0	0	0	1	1
	Other	2	3	5	10	20
	TOTAL, Ground Stone	**7**	**16**	**48**	**35**	**106**
Antler	Socketed, pointed	0	0	5	9	14
	Socketed, non-pointed	0	0	0	1	1
	Latitudinally drilled	0	0	2	4	6
	Spatulate	0	0	4	1	5
	Modified tine	0	1	33	69	103
	Other	1	11	114	117	243
	TOTAL, Antler	**1**	**12**	**158**	**201**	**372**

Table 5.3. Continued.

	ARTIFACT CLASSIFICATION	PROVENIENCE				
		Surface	Plow Zone	Stratum I	Stratum II	TOTALS
Bone	Pointed w/articular surfaces	0	0	4	8	12
	Non-pointed w/articular surfaces	0	0	9	7	16
	Shaped / modified	0	0	6	9	15
	Pointed, other	1	2	23	29	55
	Spatulate	0	0	1	1	2
	Modified tooth	0	0	2	1	3
	Tube or bead	0	1	3	2	6
	Other bone	12	17	84	102	215
	TOTAL, Modified Bone	**13**	**20**	**132**	**159**	**324**
Other	**Pottery**	0	0	13	0	13
	Mineral	0	1	6	7	14
	Shell	0	0	0	1	1
	TOTAL, Other Materials	**0**	**0**	**3**	**8**	**28**
				TOTAL, ALL CULTURAL MATERIALS		**1708**

Summary of Cultural Material by Provenience

Chipped Stone

Despite the lack of chipped stone debitage in the Big Sandy site assemblage, the single largest category of cultural materials recovered at the site consisted of formal chipped stone tools (Table 5.3): 51.4% (n = 878) of the site assemblage. Most were hafted bifaces (n = 604; 68.7% of chipped stone), comprising projectile points (n = 489), probable drills made from recycled projectile points or exhibiting similar haft morphology (n = 49) and scrapers made from broken or modified projectile points (n = 66). Other typological classes used included drills not exhibiting temporally diagnostic haft morphology (n = 103), unifacial tools (n = 11), and bifaces with no identifiable haft morphology (n = 160).

The Stratum I provenience contained the majority of chipped stone artifacts (n = 365); two-hundred twelve were found in the site's plow zone, while Stratum II (n = 167) and the surface collection (n = 134) represented the rest of the chipped stone assemblage (Figure 5.11).

Groundstone

A relatively few groundstone artifacts (n = 106; 6.2% of the site assemblage) were documented or recovered at Big Sandy. Major functional classes distinguished included pestles and other tools associated with grinding and processing (e.g., anvils, nutting stones, and grinding stones), implements used in the manufacture or maintenance of other tools and equipment (e.g., hammerstones and abraders), and other artifacts including bannerstones, gorgets, a bead, a non-utilitarian celt made from a soft stone, and a pendant.

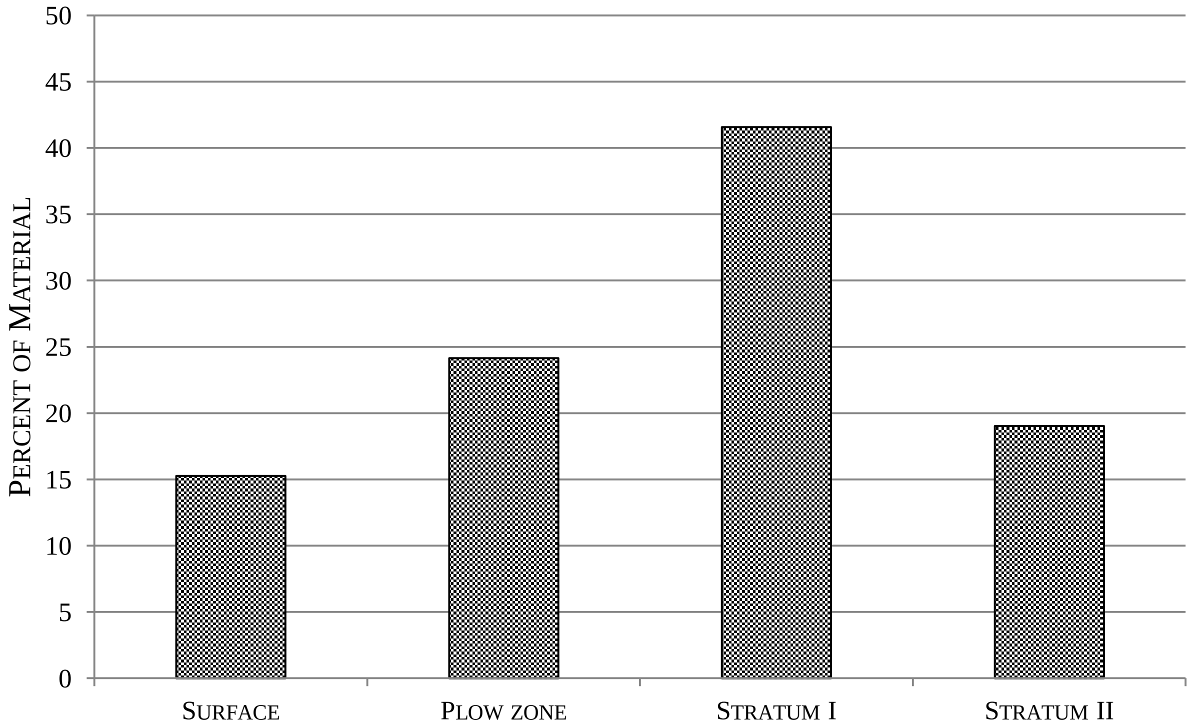

Figure 5.11. Proportions of chipped stone artifacts at the Big Sandy site (40HY18) by provenience.

Most documented groundstone items were found in Stratum I (n = 48) and Stratum II (n = 35). The surface collection (n = 7) and plow zone (n = 16) contained a relatively small number of the total groundstone artifacts at Big Sandy (Figure 5.12).

Antler and Bone

Due to the chemical properties of shell middens, specifically the alkaline properties of shell-bearing deposits resulting from the decay of mollusk shell (which is composed mainly of calcium carbonate [$CaCO_3$], an alkaline substance), and the subsequent leaching of calcium compounds into the site matrix, bone and antler tools generally are found in disproportionately large numbers within shell-bearing sites or strata. Bone and antler items recorded at Big Sandy totaled 324 (19% of the site assemblage) and 372 (21.8% of the site assemblage), respectively. Unsurprisingly, the shell-bearing deposit at Big Sandy produced the majority of those items: 49.1% of all bone (n = 159) and 54% of all antler (n = 201) (Figure 5.13).

A full list of the items in the site's F.S. log is provided in Appendix B, including provenience and classification.

Temporally Diagnostic Hafted Bifaces by Provenience

During this study, the artifacts most extensively analyzed from the Big Sandy assemblage were the diagnostic hafted bifaces, which were examined in order to evaluate the depositional integrity of the site, and to provide an additional means of determining the age of Big Sandy's primary periods of occupation beyond the planned radiocarbon dating (please see following section). A total of 604 potentially diagnostic hafted bifaces were noted in the site F.S. log; 440 were able to be located in the McClung Museum collections for examination. Of those, 88 could

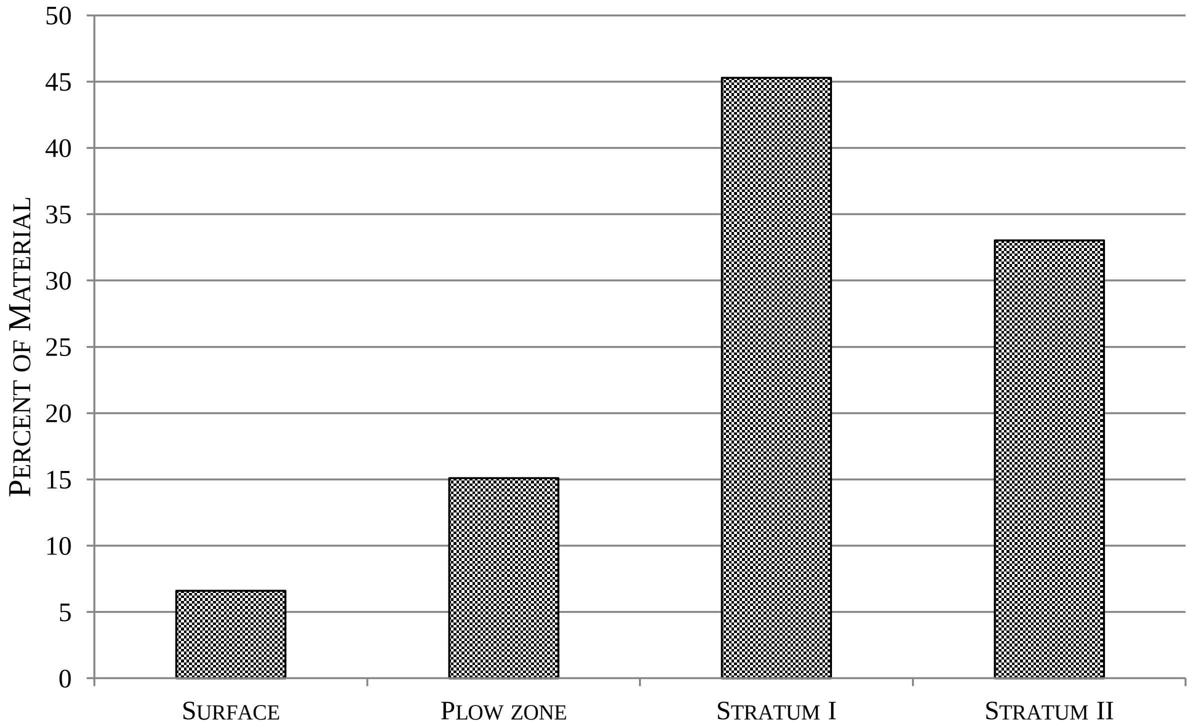

Figure 5.12. Proportions of groundstone artifacts at the Big Sandy site (40HY18) by provenience.

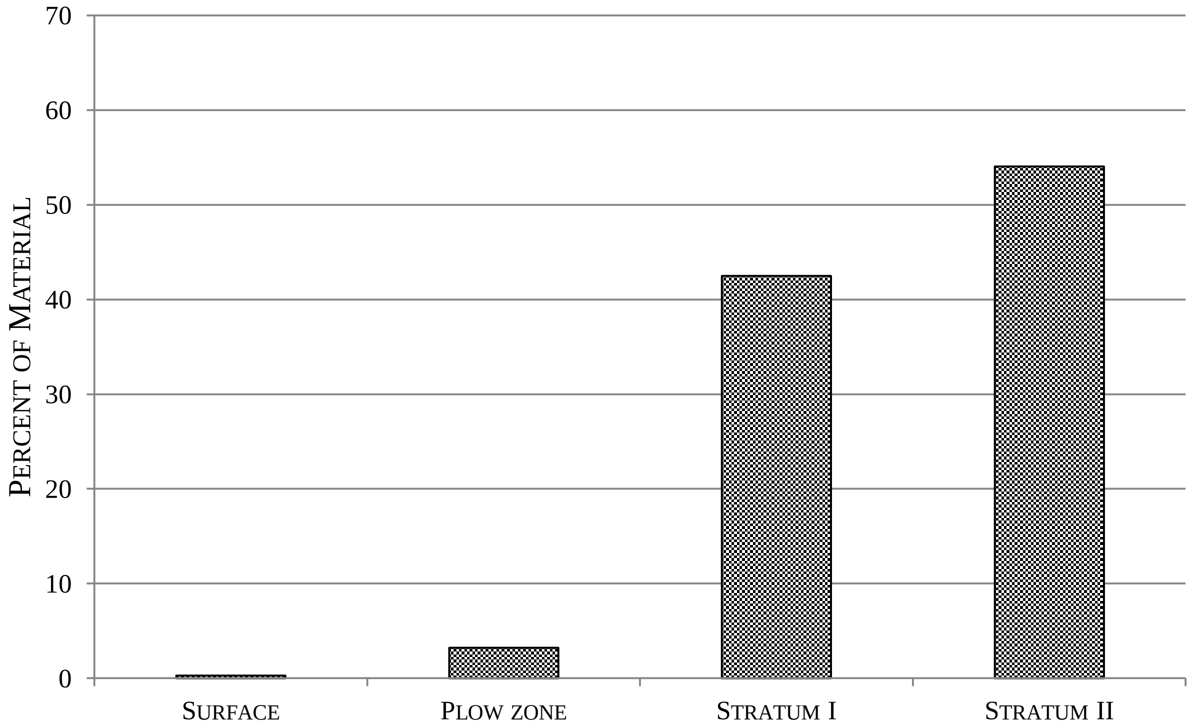

Figure 5.13. Proportions of antler artifacts at the Big Sandy site (40HY18) by provenience.

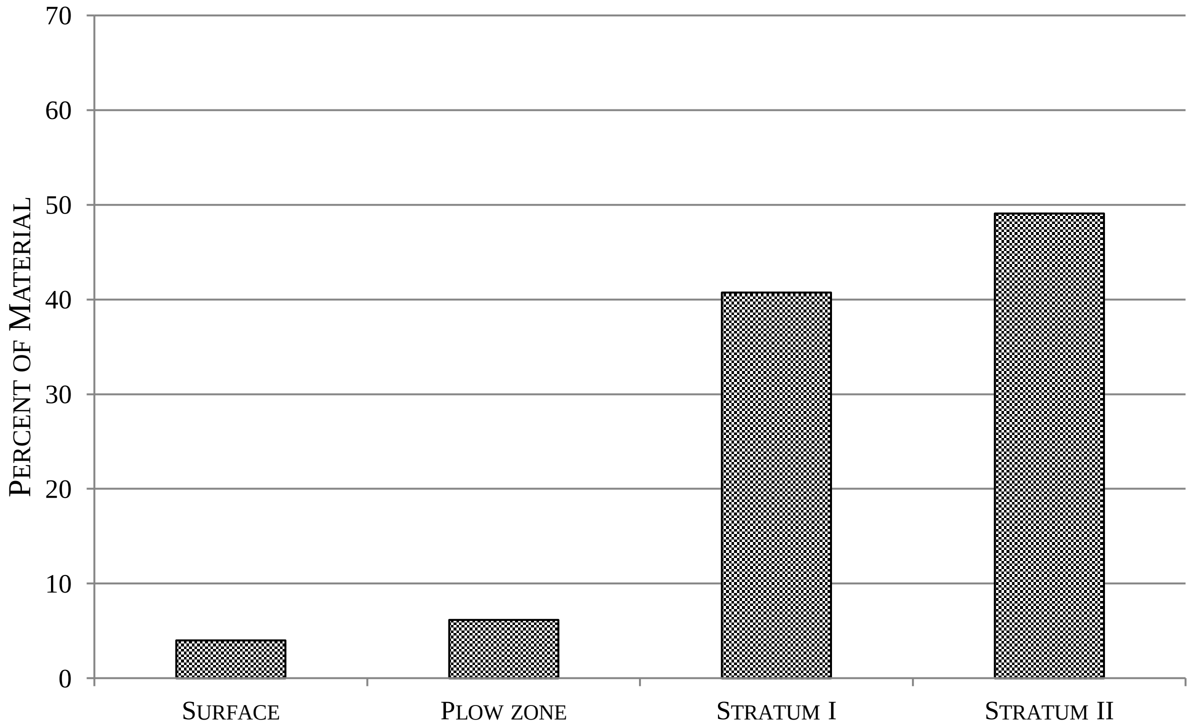

Figure 5.14. Proportions of bone artifacts at the Big Sandy site (40HY18) by provenience.

not be confidently assigned to a single type, and were classified by morphology. Twenty-three could be identified as hafted bifaces, but had been broken and did not retain sufficient basal morphology to allow for a characterization. Of the other 65 unidentified forms, the majority were stemmed (n = 31). The remainder (n = 34) included lanceolate, side- and corner-notched, and basal-notched forms that could not be confidently grouped with named diagnostic types.

Among classifiable hafted forms (n = 352), most were associated with Stratum I (n = 157). Stratum II contained fifty-four, while an additional fifty-eight were gathered during surface collection, and eighty-three derived from plow zone context.

By temporal affiliation, classifiable temporal diagnostics in every provenience at Big Sandy were overwhelmingly Middle Archaic in age (Table 5.4; Figure 5.15), although proportions by provenience differed from the site's surface to the base of the cultural deposits.

Disturbed Deposits: Surface Collection and Plow Zone

The surface collection (Table 5.4) contained the only definitive Woodland-period diagnostics identified at the site, two Snyders points. The surface assemblage was dominated by approximately equal numbers of Middle (n = 37; 44.6%) and Late Archaic (n = 35; 42.2%) varieties, with six Late Archaic-Early Woodland types also identified. Middle Archaic types comprised mainly Big Sandy (Justice 1987:60-62) and Eva (Justice 1987:100-103), with a smaller number of forms such as Morrow Mountain (Justice 1987:104-107), Benton (Justice 1987:111-112), Sykes (Justice 1987:108-110), and White Springs (Justice 1987:108-110). Late Archaic diagnostics were mainly represented by "Terminal Archaic Barbed" (Justice 1987:179-184) and "Late Archaic Stemmed" (Justice 1987:133-139) varieties. Two apparent Early

Table 5.4. Frequencies of diagnostic hafted bifaces by temporal affiliation and provenience at the Big Sandy site (4HY18).

Type	Temporal Affiliation	Surface	Plow Zone	Stratum I	Stratum II	Total (by Type)
Dalton	Late Paleoindian - Early Archaic	1		1		2
Decatur	Early Archaic			1		1
Kirk CN	Early Archaic	2	1	3		6
MacCorkle Stemmed	Early Archaic		1	2		3
St. Albans SN	Early Archaic		1			1
Hardin Barbed	Early Archaic		1		2	3
Kirk Serrated	Early Archaic		1	3	1	5
Kirk Stemmed	Early Archaic			2	1	3
Lost Lake	Early Archaic			1		1
Total, Early-Middle Archaic		**3**	**3**	**13**	**4**	**25**
Benton	Middle Archaic	8	5	2		15
Big Sandy	Middle Archaic	9	23	49	6	87
Elk River Stemmed	Middle Archaic	3		1		4
Eva I	Middle Archaic	9	6	68	36	119
Eva II	Middle Archaic		2	7	4	13
Morrow Mountain	Middle Archaic	3	2	2	1	8
Sykes	Middle Archaic	3	1	1	1	6
White Springs	Middle Archaic	2	1	1		4
Total, Middle Archaic		**37**	**4**	**131**	**48**	**256**
Late Archaic Stemmed	Late Archaic	14	6	8		28
Ledbetter	Late Archaic	2	2	1	1	6
Pickwick	Late Archaic	1	1			2
Terminal Archaic Barbed	Late Archaic	18	2	4	1	25
Total, Late Archaic		**35**	**11**	**13**	**2**	**61**
Dickson Cluster	Late Archaic - Early Woodland	2				2
Motley	Late Archaic - Early Woodland		1			1
Saratoga Cluster	Late Archaic - Early Woodland	1				1
Turkey Tail	Late Archaic - Early Woodland	3	1			4
Snyders Cluster	Middle Woodland	2				2
Total, Late Archaic - Woodland		**8**	**2**			**1**
Total, All Identified Hafted Bifaces		**83**	**58**	**157**	**54**	**352**
Unidentified Corner-Notched		3	2	8	2	15
Unidentified Side-Notched		2	1	4	0	7
Unidentified Basal-Notched		0	0	1	1	2
Unidentified Stemmed		6	7	10	8	31
Unidentified Lanceolate		0	1	8	1	10
Unidentified, Other		3	7	12	1	23
Total, All Unidentified Hafted Bifaces		**14**	**18**	**43**	**13**	**88**
Total, All Hafted Bifaces, By Provenience		**97**	**76**	**200**	**67**	**440**

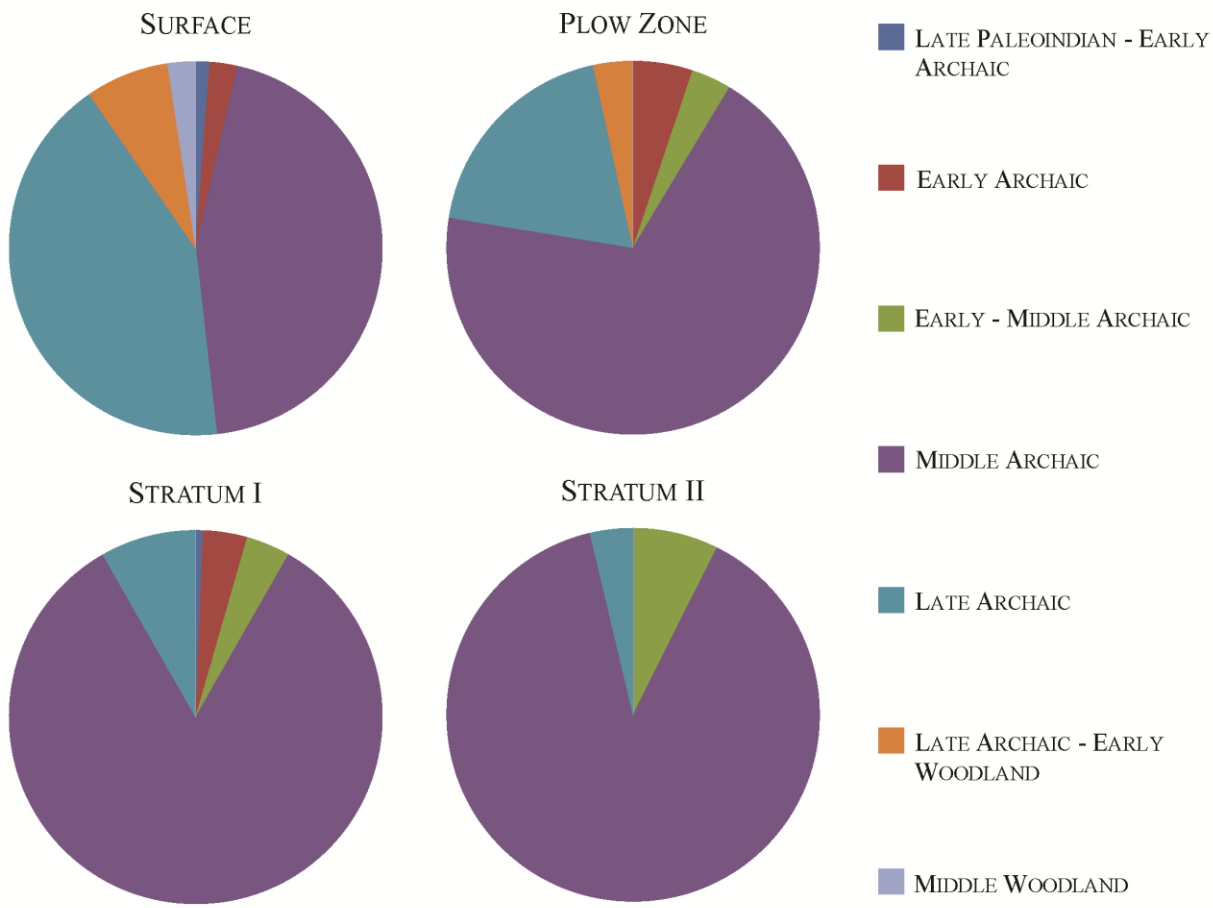

Figure 5.15. Proportions of temporal diagnostics by time period and provenience at the Big Sandy site (40HY18).

Archaic Kirk Corner-Notched (Justice 1987:71-72) were also identified among the surface material.

In contrast to the surface deposits, which contained approximately equivalent numbers of Middle and Late Archaic diagnostics, the plow zone contained largely Middle Archaic types (n = 40; 69%) of the plow zone collection, with mainly Big Sandy, Eva, and Benton types represented. Stemmed types dating to the Late Archaic (n = 11) included two Ledbetters, a Pickwick, and Terminal Archaic Stemmed and Late Archaic variants, as well as two Late Archaic – Early Woodland transitional types: a Motley (Justice 1987:198-201) and a Turkey Tail. Five Early Archaic points (one each of St. Albans Side-Notched, Kirk Corner-Notched, MacCorkle Stemmed, a possible Hardin Barbed [Justice 1987:51-53] and Kirk Serrated [Justice 1987:82-85]) were also identified.

The relatively large number of Late Archaic diagnostics identified in the surface collection suggest the presence of a Late Archaic cultural component at the site. A smaller, but nevertheless notable, number of Late Archaic types in the plow zone would appear to indicate that the stratigraphic transition between the site's Middle and Late Archaic occupations probably occurred in the upper reaches of the cultural deposits, and was likely destroyed by decades of plowing and other sub-surface disturbances. No intact Late Archaic deposits appear to have been preserved at Big Sandy.

Intact Deposits: Stratum I and II

In comparison to the surface and plow zone assemblages, proportions of temporal diagnostics in Stratum I and II indicate that those deposits were largely intact, although in the case of Stratum I, the upper margins were truncated by plowing and other disturbance. What remained of Stratum I, and all of Stratum II, appear to have been otherwise minimally disturbed. In both strata, Middle Archaic types dominated, with a small number of additional types represented (Table 5.6; Figure 5.11).

In Stratum I (Figure 5.16), of the 157 associated diagnostic hafted bifaces, 83.4% (n = 131) were of firmly Middle Archaic affiliation, including Big Sandy (n = 49) and Eva (n = 75) types, and a small number of other slightly later Middle Archaic varieties such as Morrow Mountain (n = 2), Benton Cluster (n = 3), and Sykes and White Springs (n = 1 of each). One possible Dalton, a Late Paleoindian – Early Archaic diagnostic (Justice 1987:35-42), and twelve possible Early Archaic types, as well as thirteen Late Archaic forms consistent with those recovered from overlying deposits were also present.

Stratum II (Figure 5.16) covered less area in horizontal extent than did Stratum I, and so the overall smaller number of diagnostics recovered from it (n = 54) in comparison to Stratum I is not surprising. In frequency of chronological types, however, the two deposits – Stratum I and Stratum II – were nearly identical (Figure 5.15, Table 5.4). Middle Archaic (n = 48; 88.9%) and Early Archaic types (n = 4; 7.4%) comprised a total of 96.3% of the Stratum II assemblage. These included mainly Eva (n = 40) and Big Sandy (n = 6) forms, with, with minor representation of Morrow Mountain and Sykes types. Four Early Archaic variants (a Kirk Serrated and a Kirk Stemmed, and two Hardin Barbed) were present, as were two Late Archaic (one Terminal Archaic Barbed and one Late Archaic Stemmed).

Stratum I and Stratum II appear to have been largely intact at the time of Big Sandy's excavation in 1940. Collectively, the temporal diagnostics associated with those strata were of predominately Middle Archaic age, counter to some previous descriptions of the site as "Late Archaic" (e.g., Mensforth 2007; Smith 1995), with minimal representation of other time periods.

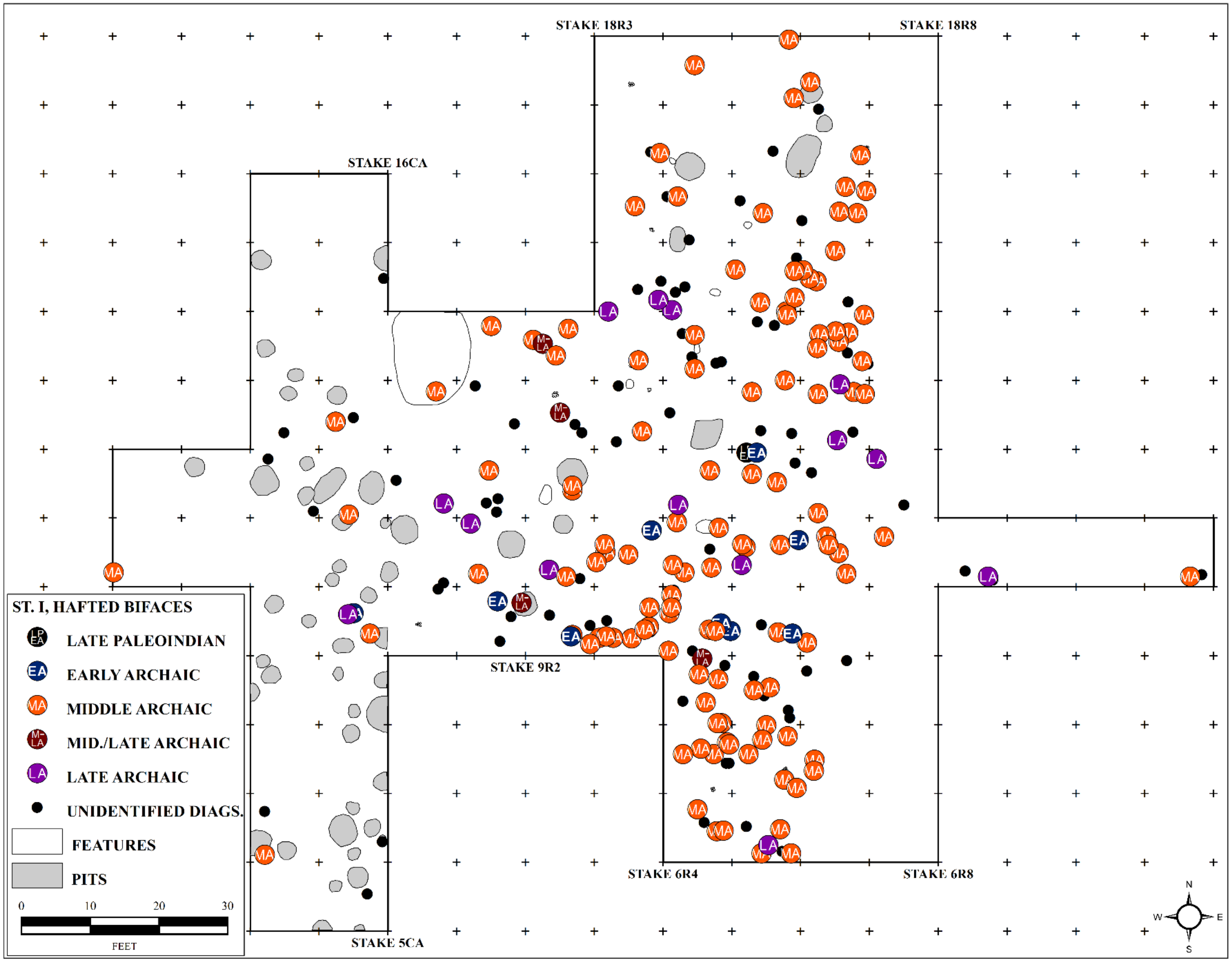

Figure 5.16. All piece-plotted Stratum I temporal diagnostics at the Big Sandy site (40HY18).

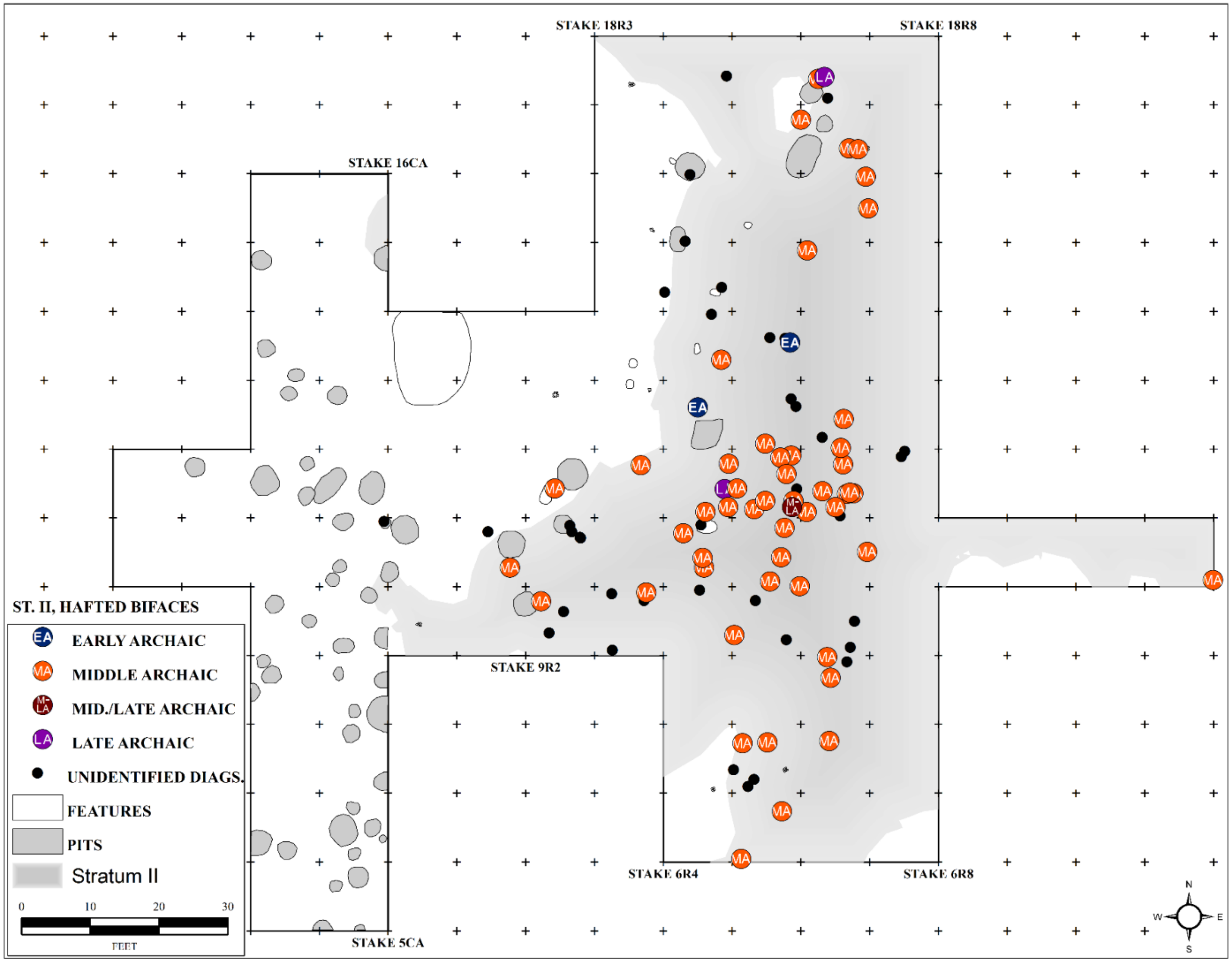

Figure 5.17. All piece-plotted Stratum II temporal diagnostics at the Big Sandy site (40HY18). Grey shading indicates extent of Stratum II deposit.

While the lack of appreciable numbers of later diagnostics in either deposit does not preclude the possibility of peri-depositional disturbance of the site's deposits by its occupants, it does appear to indicate relatively minimal post-Middle Archaic disturbance of the site's deeper deposits prior to the site's excavation.

Based on these results, there also appears to be little reason to consider (or to have considered, contra Lewis and Kneberg [1959]) Stratum II and Stratum I to be of significantly different ages[25]. Although Lewis and Kneberg believed that Stratum II was contemporary with the deepest shell-bearing component at Eva (Stratum IV, see Chapter 6), while the overlying Stratum I at Big Sandy was co-eval with Eva's Stratum I (Lewis and Kneberg 1959), temporal diagnostics from both deposits do not suggest significant difference between the ages of the two strata, but rather that they were deposited approximately contemporaneously.

These results are consistent with radiocarbon dating of the site's deposits (discussed in the subsequent section), which provided firm evidence both that the intact cultural strata at Big Sandy were created during the Middle Archaic period, and that Stratum I and Stratum II (shell-free and shell-bearing, respectively) were of approximately the same age.

Radiocarbon Dates

Accelerator mass spectrometry (AMS) dating allows the use of materials previously considered too small for reliable carbon dating, including fragments of bone or antler collected during excavations at Big Sandy. Although much of the animal bone initially recovered was

[25] Interestingly, these results are consistent with Douglas Osborne's initial suggestion that Stratum II comprised a midden associated with a habitation site, as discussed previously (see also Osborne 1942:46-47). It is difficult to understand why Lewis and Kneberg (1959) asserted that the two deposits – Stratum I and II – were sequential rather than contemporaneous, when they had access to the same typological data as are discussed here.

later discarded in the laboratory, bone or antler artifacts that appeared to represent potential tools, tool fragments, or were otherwise visibly “modified,” were retained. Many of these were unremarkable in the site’s collection, and represented potential sources of chronological information about the site.

Sample selection was planned and undertaken with the assumption that the site was stratigraphically intact. In order to assess variation in deposition rates, and to estimate the relative intensity of site use both during the presumed periods that corresponded to the deposition of Stratum I and Stratum II, two “virtual” sample columns were initially planned (see Chapter 4). These columns, located in the area of the site where both deposits were expressed, each contained three specimens of interest, representing the basal and upper margins of Stratum II, and the basal margin of Stratum I. There was no attempt to sample the upper margins of Stratum I, since it was clear from both site descriptions and from material culture examinations that the deposit had been truncated and mixed by extensive, but relatively shallow, plowing.

After completion of dating of the samples from the first two columns, it became clear that the site’s depositional sequence was not as straight-forward as initially believed. In order to clarify the situation, an additional three samples from a third column and a sample from feature context on the upper hill slope were added to provide more data (Figure 5.18).

In total, ten artifacts of mammalian bone (n = 1) or whitetail deer antler (n = 9) were submitted to the National Science Foundation-University of Arizona (NSF-UAz) Accelerator Mass Spectrometry (AMS) Facility between July, 2012, and January, 2013. Chronological data provided by those samples are contained in Table 5.5, and comprise both the uncalibrated conventional radiocarbon ages (^{14}C Yr BP) and calibrated dates. All calibrations were performed in OxCal 4.1 (Bronk-Ramsey 2001) using the IntCal 2009 calibration curve (Reimer et al. 2009).

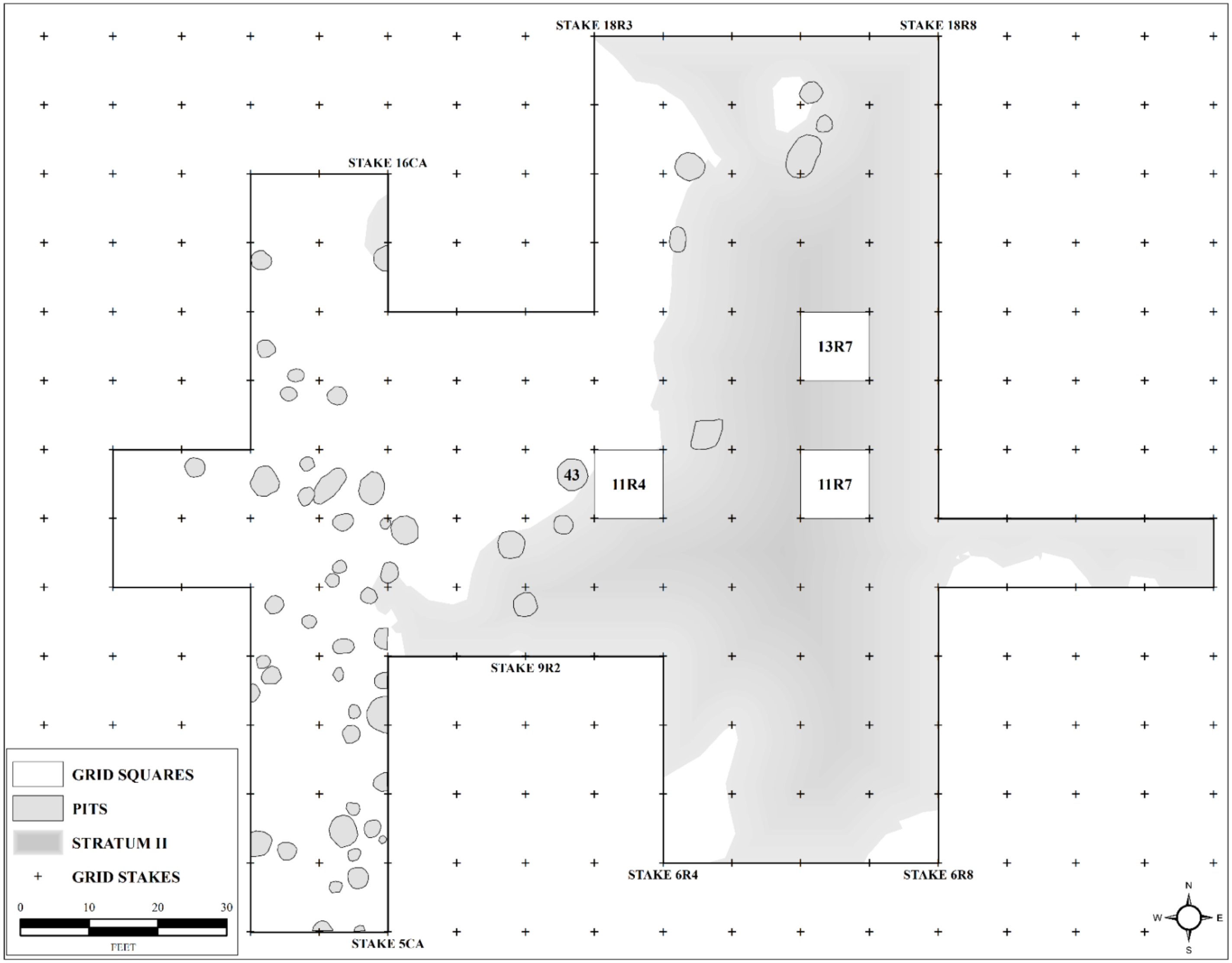

Figure 5.18. Locations of sample columns / grid squares (11R4, 11R7, and 13R7) and Pit 43 in excavation block at Big Sandy site (40HY18).

Table 5.5. Radiocarbon dates from the Big Sandy site (40HY18).

FS	Prov.	Square	Stratum	Depth (mbd)	Material	AA #	δ 13C	14C age BP	Cal BP	1-Sigma Range (calibrated)	2-Sigma Range (calibrated)
747	Pit 43	11R3	1	2.97	antler	AA100272	-21.7	7795 ± 78	8603 ± 121	8647 - 8450	8972 - 8410
568			1	3.20	antler	AA98908	-23.6	7715 ± 84	8512 ± 86	8580 - 8420	8699 - 8364
585	1	11R4	2	3.29	antler	AA98909	-23.4	8040 ± 170	8936 ± 232	9128 - 8642	9423 - 8541
639				3.78	bone	AA98910	-22.8	7786 ± 78	8588 ± 116	8638 - 8451	8951 - 8405
269			1	3.90	antler	AA98905	-23	7401 ± 75	8223 ± 88	8336 - 8167	8370 - 8044
386	2	11R7	2	4.08	antler	AA98906	-21.4	7646 ± 80	8456 ± 73	8537 - 8386	8597 - 8327
369				4.39	antler	AA98907	-22.1	7440 ± 75	8257 ± 78	8340 - 8190	8400 - 8051
580			1	3.66	antler	AA100269	-22.3	6460 ± 70	7371 ± 63	7432 - 7312	7502 - 7256
617	3	13R7	2	3.72	antler	AA100270	-21.9	6265 ± 69	7173 ± 94	7270 - 7028	7411 - 6983
661				4.05	antler	AA100271	-23.1	7564 ± 81	8364 ± 85	8448 - 8218	8538 - 8195

Column 1: Square 11R4

Because Stratum II was not present in the western area of the site block, and because sample selection was restricted to areas in which datable materials had been precisely plotted, the first sample column was positioned in Grid Square 11R4 (see Figure 5.19). The column was located as near to the top of the hill as a stratified sequence of samples could be obtained. Because of the fairly large number of artifacts of known location in the areas in which columns were eventually situated, most columns could be relatively small in horizontal area, allowing more accurate representation of depositional processes only in that area of the site: Column 1 represented a rectangular area measuring roughly 1.1 x 0.5 m, representing a horizontal area of only 0.54 m^2.

The total vertical distance represented by the Column 1 samples was 57.9 cm; the thickness of Stratum II in the area of Column 1 was between 48 and 50 cm.

FS 639 (8588 ± 116 cal yr BP) was a fragment of a pointed bone tool made from a long bone and recovered at a depth of 3.77 meters below datum (mbd), at or near the base of Stratum II. It lay 48.7 cm below FS 585 (8936 ± 232 cal yr BP), a large fragment of deer antler recovered near the top of Stratum II. FS 568 (8512 ± 86 cal yr BP), a nearly complete antler recovered at the base of Stratum I, was located at 3.2 mbd, approximately 9 cm above FS 585. Given the apparent reversal of ages and depths apparent in the two samples from Stratum II in this location, it is possible that the sediments in Square 11R4, where Column 1 was located, had experienced local disturbance during (or since) their initial deposition.

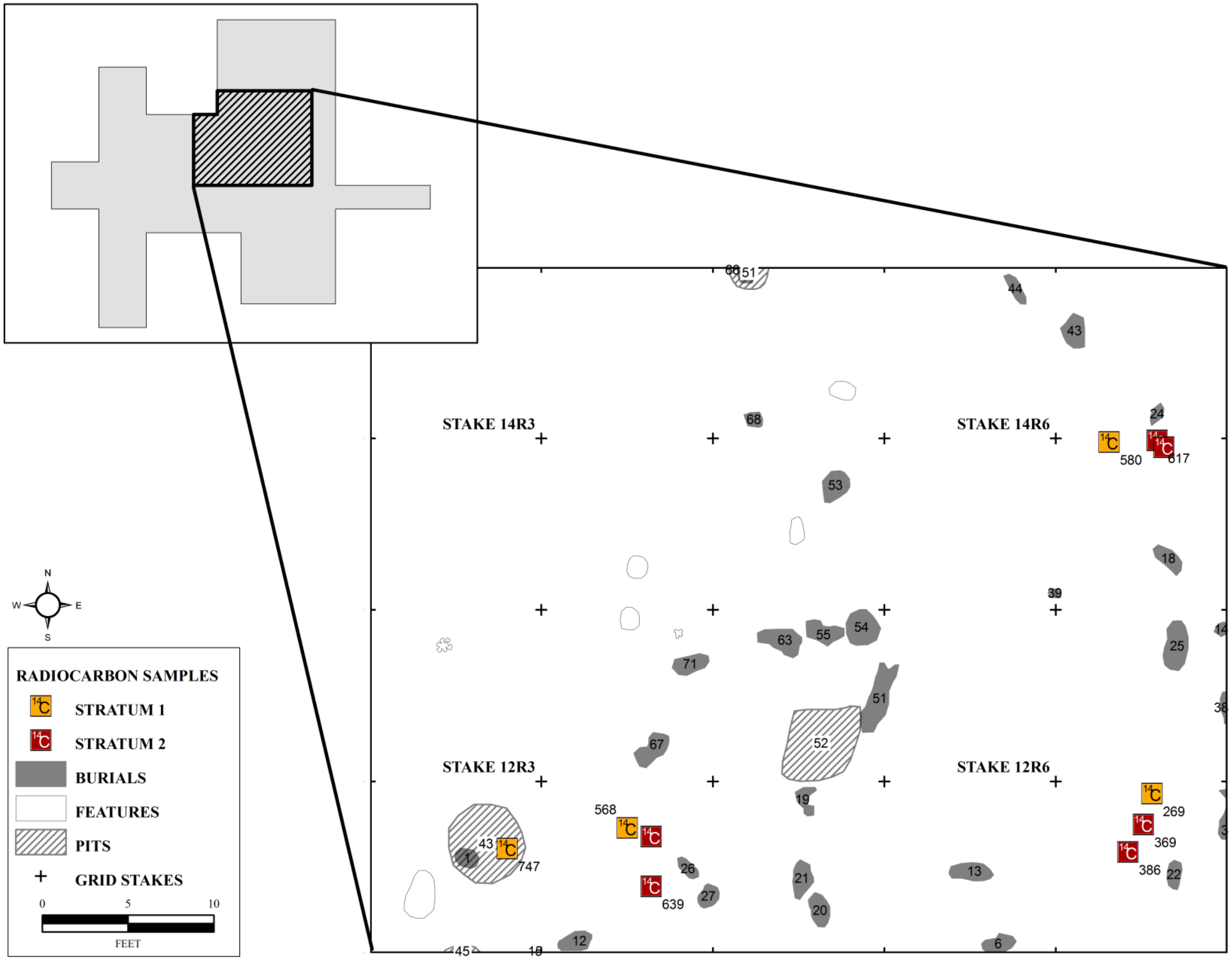

Figure 5.19. Provenience of radiocarbon samples at Big Sandy site (40HY18).

Column 2: Square 11R7

A second column at a distance and bearing 8.4 m directly east of Column 1, further downhill. The virtual column described a rectangular area 0.53 m^2 measuring 1.09 x 0.49 m.

Column 2 samples spanned a vertical distance of 49 cm, beginning at a depth of 3.9 mbd. The thickness of Stratum II in the column, as measured from the depths of dated specimens, was approximately 30 cm.

FS 369 (8257 ± 78 cal yr BP) was a large fragment of cut deer antler representing the base of Stratum II at depth of 4.38 mbd. FS 386 (8456 ± 73 cal yr BP) lay 30.4 cm above at the upper margin of Stratum II, and was a relatively small fragment of cut deer antler tine exhibiting a partial groove on one end. FS 269 (8223 ± 88 cal yr BP), at the base of Stratum I, was a large antler tine. As with Column 1, the two dates obtained from Stratum II in this column suggest that the deposit in the area of Square 11R7 where Column 2 was situated may have been disturbed or otherwise jumbled by peri- or post-depositional processes. This apparent inversion in the age and relative depths of the samples from Stratum II in both this column and in Column 1 is discussed briefly in a subsequent section, "Interpreting Big Sandy's Depositional History from the Radiocarbon Sequence."

Column 3: Square 13R7

Samples from Column 3 were selected and submitted (along with one from Pit 43, see below) were selected in an effort to clarify the nature of Big Sandy's depositional sequence. Column 3 was located 6 m directly north of Column 2. The column represented a horizontal area of 0.19 m^2, but the dimensions of the sampled area described a roughly linear distribution 1.08 m long and only 18 cm wide, rather than the more rectangular shape of the other columns.

All three samples submitted from Column 3 were fragments of whitetail deer antler of substantial size. FS 661 (8364 ± 85 cal yr BP), a large tine, represented the basal sample from the column (and of Stratum II in that location) at a depth of 4.05 mbd. FS 617 (7173 ± 94 cal yr BP), a large-diameter section of antler beam, was situated 27 cm above it at what was recorded as the upper margin of Stratum II, and FS 580 (7371 ± 63 cal yr BP), an antler tine, was recovered from 6 cm above at what was thought to be the base of Stratum I.

The total depth of the Stratum II deposit in Column 3 was 33.5 cm, and the total depth represented by the samples in the column was 39.6 cm.

Pit 43: Square 11R3

A sample was chosen from feature context to provide further information concerning the age of the pit features documented at Big Sandy, and the nature of their chronological association with either Stratum I or Stratum II, given the lack of expression of Stratum II in the area of the site with most of the documented features.

FS 747 (8603 ± 121 cal yr BP) was a large fragment of whitetail deer antler found at a depth of 2.97 mbd in Pit 43, representing the farthest uphill of any dated sample, and the only sample from within feature context at Big Sandy.

Interpreting Big Sandy's Depositional History from the Radiocarbon Sequence

The ten radiocarbon dates obtained from the three columns and Pit 43 at Big Sandy do not provide for an explicit or easily interpreted depositional sequence for the site. Dates from each of the three columns indicate different ages for each area of Big Sandy from which they were derived; additionally, the seemingly "inverted" dates from Stratum II in both Column 1 and

Column 2 suggest significant disturbance occurred in the deposits in those locations during or after their initial deposition. There are, however, several potential lines of evidence that, when taken together, suggest that the most parsimonious explanation for the distribution of the dates, horizontally and vertically, is that the hill slope at Big Sandy was used as a refuse disposal area by the site's occupants during the period when Big Sandy was most actively used during the 9th millennium BP.

The underlying topography of Big Sandy is reflected in the overall spatial organization of the site. The clustering of pit features atop the hill on which the site is located and the distribution of other non-burial features along the upper edge of the ridgetop contrast notably with the site's burial population, found almost exclusively on the hill slope. This pattern of spatial segregation of possibly domestic occupational features from burials is suggestive of clear maintenance of an area for occupation or other domestic activities, and a locus that seems to have been used mainly as a refuse disposal area and additionally as a cemetery.

The restricted spatial extent of Stratum II – situated on the slope only, with no appreciable evidence for shell-bearing matrix elsewhere within the excavation block – suggests, as Osborne observed, an "over-the-hill dump" (Osborne 1942:46-47), not an occupational stratum located only on the site's slope. It was in this area from which the bulk of plotted cultural material in both Stratum I and Stratum II was recovered (Figure 5.20). While there are other possible explanations for this distribution – i.e., most of the site's activities occurred in that location, or the cultural materials were transported to that area of the site from the ridgetop by natural forces such as erosion – neither alternative is plausible.

First, given the general size of most of the cultural material recovered at Big Sandy, its movement by natural erosional forces from the higher elevations of the site would have required substantial energy, and under such conditions it seems unlikely that the materials would have remained perched on the side of the hill in the area where they were found, but would instead have been likely to wash further downhill and into the Big Sandy River. The clustering of the materials on the hillside (see Figure 5.20) is not consistent with their transport to that location by natural forces.

Likewise, the distribution of non-burial features at Big Sandy would seem to preclude the possibility that most cultural materials (and the shell-bearing deposits [Stratum II]) were found on the hill slope because the activities that produced them were conducted in situ. While a few thermal features are situated along the upper margins of the slope, the overall density of features on the ridgetop and upper slope suggests that area as a location of significant activity. Furthermore, although most of the piece-plotted cultural material was found on the slope, there was also no identifiable pattern or clustering of artifacts into activity loci on the hill slope, a phenomenon that would be expected had the plotted materials been used and deposited in that location. Rather, the artifacts in both Stratum I and Stratum II appeared jumbled in their overall distribution. The fact that cultural materials associated with both strata were found in such context predominately on the hill slope (Figure 5.20) suggests that the explanation offered above – that the slope offered a location convenient for the disposal of occupational refuse – is a reasonable one.

Eight of the site's ten radiocarbon dates also appear to support this hypothesis.

Big Sandy's earliest radiocarbon assays derive from Column 1 and Pit 43 (Figure 5.18; Table 5.5), located farthest up the slope and nearest to the ridgetop. The summed age of the four dates in Column 1 and Pit 43 was 8554 ± 290 cal BP. By contrast, the mean intercept of the summed probability from four additional dates – three from Column 2, located approximately

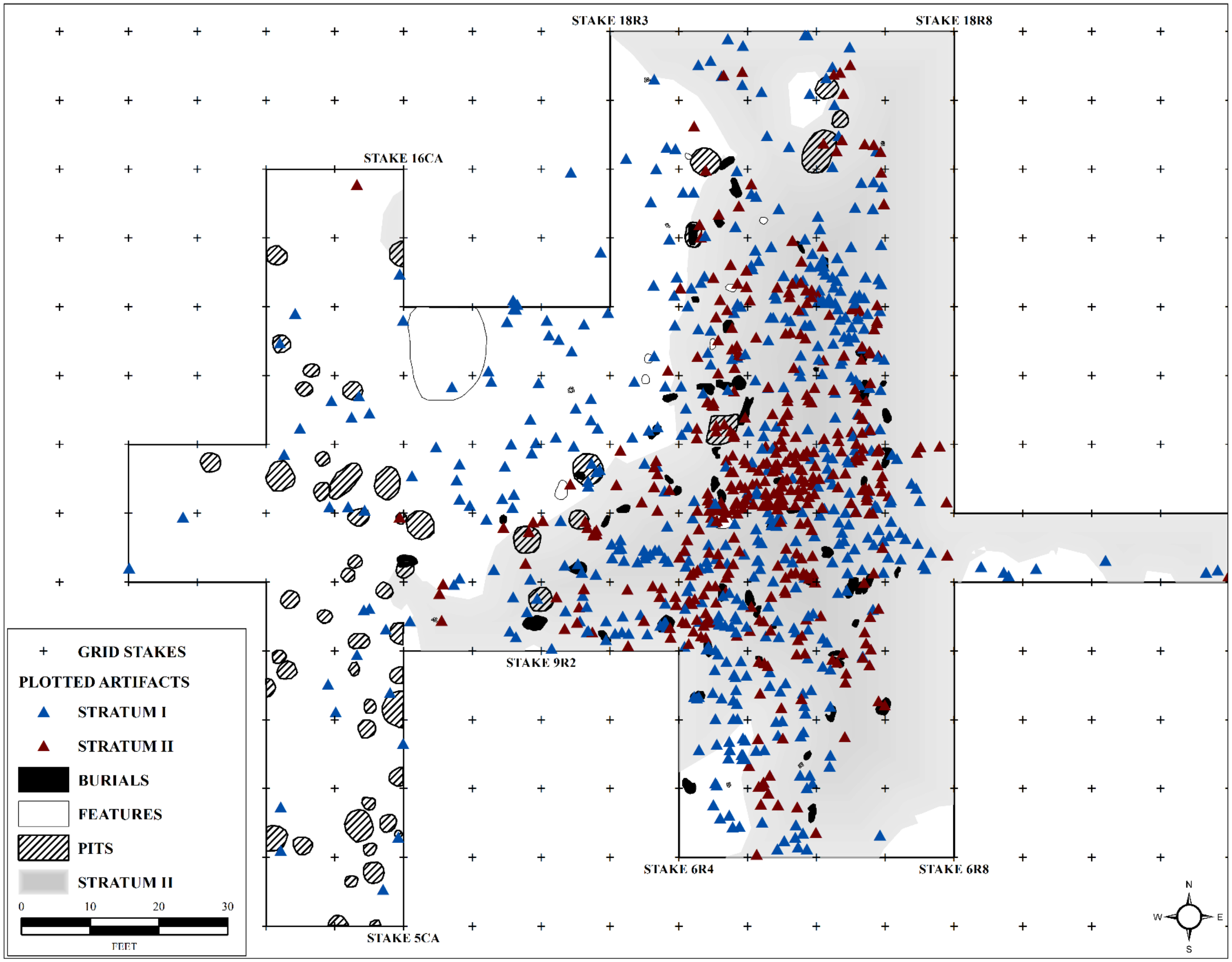

Figure 5.20. Distribution of all plotted artifacts at Big Sandy site (40HY18) illustrating the position of most plotted material on the hill slope.

8.4 m downhill from Column 1, and a single assay from the base of Column 3, 11.3 m downhill and northeast from, Column 1 – was 8317 ± 55 cal BP, several centuries later than the age of the deposits further uphill.

When considered together, the eight assays from Column 1 and Pit 43, from Column 2, and the basal date from Column 3 suggest the gradual accumulation and expansion of occupational refuse down the hillslope adjacent to the ridgetop as Big Sandy was repeatedly occupied in the period of its most intense use, occurring from approximately 8900 to 8200 cal BP. When the site was in use, debris could have been periodically removed from the ridgetop occupation area to the hill slope's accumulating midden, which expanded gradually downhill. This downhill expansion need not have occurred through the actions of individuals traveling farther from the hilltop downslope to deposit refuse; continual piling of debris on the hillside could have led to periodic downhill collapses of portions of the accumulated midden piles, and in combination with the casting of debris from the ridgetop down the hill, could have produced a gradually expanding fan of debris down and away from the ridgetop. In combination with occasional excavations of pits for burials (see Figure 5.19 for illustration of the proximity of several burials to the sample selection locations) and associated disturbance of subsurface deposits, these factors most likely contributed to the sort of locally "inverted" stratigraphy suggested by the sequences of dates from Column 1 and Column 2 as described in the previous section.

Occupational History of Big Sandy

By nature, shell midden and mound depositional histories are complex. Seemingly discrete stratigraphic units within shell bearing sites do not necessarily accumulate at the same rate or during the same period of time (Stein et al. 2003; Waselkov 1987). Furthermore, post-depositional processes, including erosion, bioturbation, and subsequent human cultural activities, can result in significant reworking of the primary sediments. Big Sandy was first reported as a site comprising two sequentially-deposited strata, representing an initial (and presumably earlier) occupation of the location by shellfishers (Stratum II) followed by later habitation of the site after shellfishing had apparently been abandoned (Stratum I) (Lewis and Kneberg 1959:163-169). However, data presented in this chapter – specifically, the ten radiocarbon dates obtained at the site, as well as the results of analyses of temporally diagnostic hafted bifaces – suggest an alternative interpretation of the site's depositional history. Rather than representing separate temporal components, the intact portions of Stratum I and all of Stratum II appear to constitute contemporaneous deposits deriving from the site's main period of use, which spanned several centuries between 8900 and 8200 cal BP. Earlier visitation of the site also occurred, as evidenced by a handful of primarily Early Archaic temporally diagnostic hafted bifaces; two late 8th millennium radiocarbon assays, as well as a significant number of Late Archaic temporal diagnostics, also indicate use of Big Sandy well after the 9th millennium BP.

Early-Middle Archaic Visitation or Use of Big Sandy, ca. 8900 cal BP

Prior to the earliest radiocarbon date from Big Sandy, there is only typological evidence for previous, earlier use of the location. A handful of pre-Middle Archaic (n = 13) or transitional Early-Middle Archaic (n = 12) diagnostics provide indication of human activity at the site before the site's more intensive use during the Middle Archaic after 8900 cal BP.

Middle Archaic Occupation, ca. 8900 – 8200 cal BP

Although the earliest radiocarbon date at Big Sandy suggests activity at the site as early as 8900 cal BP, seven of the assays from the three sample columns and from Pit 43 indicate that the period of most intensive use of the location began sometime around 8600 cal BP and lasted for between three and four centuries. Activities at Big Sandy appear to have been centered on the ridgetop when the site was in use, based on the large number of pit features in that location; the site's occupants discarded the refuse from their activities (which included shellfishing) on the upper flanks of the hillside, forming the early stages of the deposit that was eventually characterized as "Stratum II" by the site's excavators. That deposit, and the overlying Stratum I (or at least the lower portions of it that were intact at the time of excavation in 1940) appear to have formed approximately contemporaneously. Both strata contained nearly identical proportions of Middle Archaic temporal diagnostics (Table 5.4), and the Stratum I date obtained from Column 1 predates both the Stratum I and II dates from Column 2 downhill.

There remains no firm consensus on the nature of the black shell-free deposit that tops many shell mounds and middens in the interior US, and relatively little work has been conducted to clarify the origins of such deposits. Stein (1982:29-30) has previously suggested several possible origins for the shell-free deposits overlying shell-bearing strata at shell mounds along Kentucky's Green River, including cryoturbation (freezing and thawing), argilliturbation (the shrinking and swelling of clays), and bioturbation (activities of plants and animals). She discounted all three, since such processes would have resulted in movement of shell fragments upward in the stratigraphic sequence, producing a gradual transition between shell-free and shell-bearing deposits; instead, the discontinuity between shell-bearing and shell-free deposits was sharp, not diffuse. Stein concluded that the shell-free stratum represented "a layer produced by cultural transport of… sediment, and organic material sometime after the shell midden was deposited" (Stein 1982:30). At Big Sandy, because Stratum II was a horizontally-expanding as well as vertically-accreting refuse deposit, the organic-rich Stratum I occupational deposit may have been forming over the previously-deposited debris (Stratum II) as refuse continued to be deposited on the hillside, or rolled further downhill.

It is difficult to ascertain at what stage visitors to Big Sandy began to use the hillside not only for refuse disposal, but also as a cemetery. Lacking the opportunity to directly date burials at the site, it is assumed that the sixty-three human and eleven dog burials at Big Sandy were placed on the hillside in the mid-9th millennium BP during the site's principal period of use. Aside from the stratigraphic association, such an interpretation is also supported by the presence of two Eva I basal-notched projectile points in two separate graves at the site (Burial 22, FS 704; Burial 67, FS 1472 [see Figure 5.8]), suggesting those individuals were interred at a time when that form was being made at the site. The Eva I basal-notched type is an early Middle Archaic projectile point type found in large numbers in both strata at Big Sandy, and also found in profusion in Stratum V and IV at the Eva site, cultural deposits of similar antiquity to that of Big Sandy's intact cultural strata (see Chapter 6). Although Big Sandy was visited at a later time (as discussed below), and the possibility exists that interment continued at the site well beyond the end of its most intense period of use, it is suggested here that burial on the hillside in or atop the shell-bearing Stratum II deposit was primarily a tradition of the people who used the site during the 9th millennium.

Late Middle Archaic Occupation, ca. 7400 – 7100 cal BP, and later use

Sometime after ca. 8,200 cal yr BP, Big Sandy appears to have been abandoned, or experienced a significant decrease in activity at the location. The apparent "hiatus" in the site's use lasted for roughly 800 – 900 years; revisitation of the location during the late 8th millennium after 7,400 cal yr BP is indicated by two dates from Column 3 located on the hill slope.

There is no indication of what activities were undertaken at Big Sandy during the late 8th millennium. There are no burials containing temporally-diagnostic grave offerings that can be associated with that period of time. The location from which the two latest dates at the site were recovered was seemingly on the periphery, at the eastern edge of the burial area downhill from the ridgetop. No later Middle Archaic temporal diagnostics were plotted in that area. Whatever occurred at Big Sandy during its last conclusively dated period of visitation is unclear. However, the site was not permanently abandoned at that time.

Typological data indicate Late Archaic occupation of the Big Sandy location. A not-insignificant number of Late Archaic (or later) diagnostic hafted biface types were present at Big Sandy (n = 71; 20.1% of all classifiable diagnostics), although there appear to be no remaining stratigraphic evidence from that period. Most of the examples of Late Archaic types were recovered from the site's surface or from the plow zone, suggesting that Late Archaic and post-Late Archaic deposits at the location had been disturbed or destroyed long before the 1940 excavation.

CHAPTER 6. THE EVA SITE (40BN12)

The Eva site (40Bn12) was located on the property of the Sykes family near the town of Eva, situated on a relict levee of the Tennessee River approximately 1.6 km west of the pre-inundation channel, and on the right descending bank of Cypress Creek, a small waterway that occupied the remains of an ancient channel of the Tennessee River (Figure 6.1). Eva was previously visited (and investigated) by Clarence Bloomfield Moore in 1915 (Moore 1915:77-78; see Chapter 2).

When archaeologists from the University of Tennessee Division of Archaeology (UTDoA) visited the site in January of 1940, the principal investigator, Douglas Osborne, noted that the floodplain in the vicinity of Eva exhibited relatively low relief in comparison to the land adjacent to the river both south and north, but that the location of the site itself represented "high ground" on the plain, having only been previously inundated by a severe flood in 1897 and again in 1937 (D. Osborne, Original field report, on file at the Frank H. McClung Museum, University of Tennessee, Knoxville).

Initially numbered 6Bn12 by the UTDoA and later christened "Eva" (presumably for the nearby village of that name), the site was visually identified by the UTDoA surveyors by its comparatively high elevation on the floodplain, and by the dark midden, shell, and scattered artifacts exposed on the surface. Large-scale excavations commenced in early September of 1940, and continued through late November, using a rotating crew of WPA-funded laborers.

Of the sites investigated during the UTDoA's activities in the Kentucky Basin, Eva remains the best known and most well-described among them, having received individual

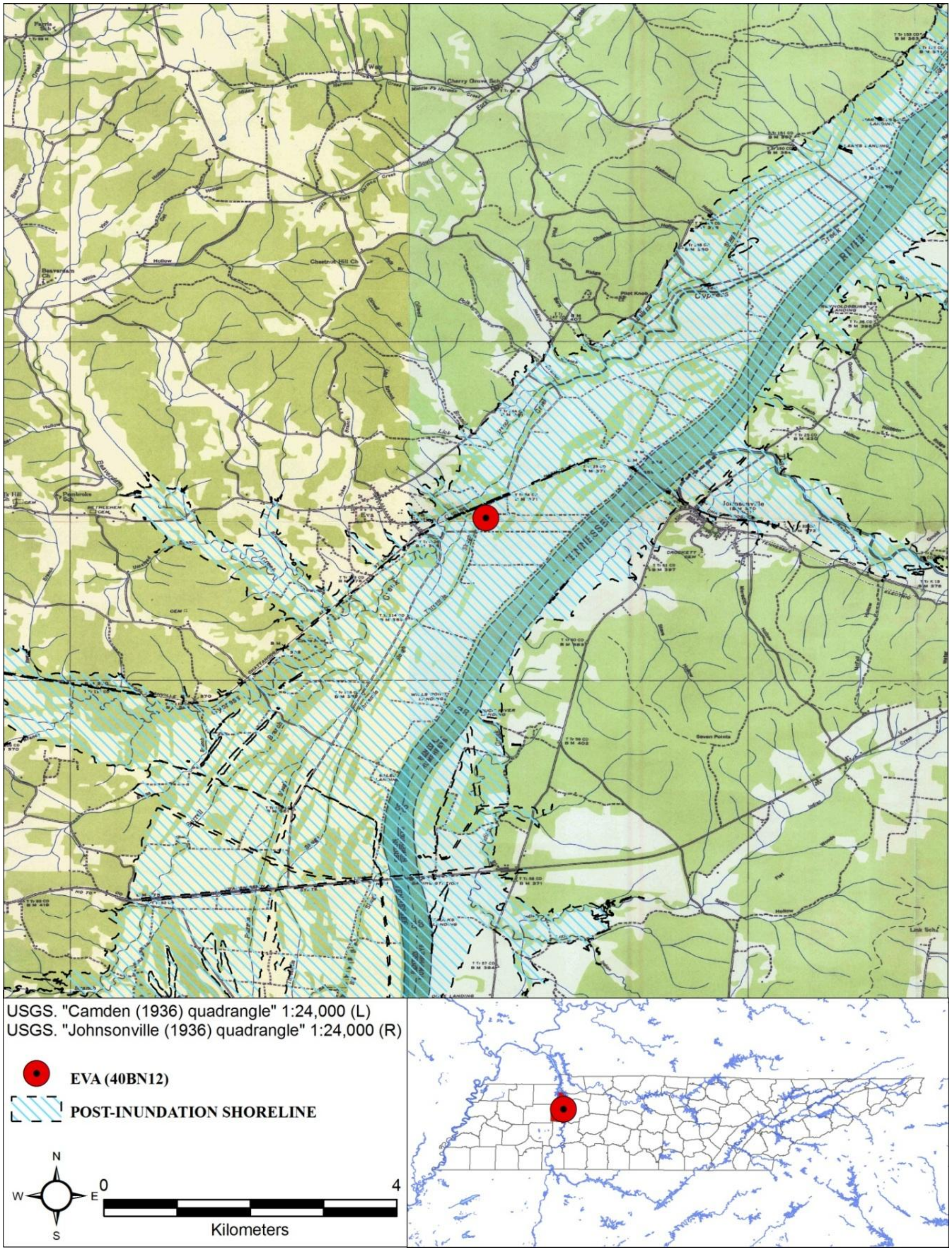

Figure 6.1. Location of the Eva site (40Bn12) along the left descending bank of the Tennessee River.

treatment in a detailed site report published nearly twenty years after its excavation (Lewis and Lewis 1961). The purpose of this chapter is not replace that volume, but to build on the work done by Lewis and Lewis, using the artifact collections and original field documentation from Eva, in order to provide a foundation for addressing new research questions (such as those examined in this dissertation) that have developed in the decades since the publication of the original site report.

Some of the data reported here differ from descriptions in the original report. In the fifty years since the publication of "Eva: An Archaic Site," and in the seventy years since the site's excavation and initial artifact analyses, approaches to artifact analysis, classification, and description have changed. Specifically, the typological systems employed here are not identical to those used in the original cultural material inventories presented in the site monograph. Furthermore, because of new chronological data obtained as part of this research project, much of the previous interpretation of the history of the site, in particular the age and duration of time represented by its separate cultural strata, can no longer be considered accurate. This is particularly relevant in the use here of the original assignments of burials to particular stratigraphic units, rather than the re-assignments undertaken by Lewis and Lewis, which reflected their interpretation of Eva's depositional history.

Consequently, direct comparison between the data presented here, and the data in the monograph, is not wholly appropriate. This chapter is not a recitation of the 1961 report.

Primary data sources examined herein included field data forms, maps, laboratory analysis sheets, and cultural materials from the site currently curated at the Frank H. McClung Museum. Burial data also include the results of the McClung Museum's 1990 inventory of human skeletal material (Smith 1990) in compliance with the Native American Graves Protection and Repatriation Act (NAGPRA).

ENVIRONMENT, GEOLOGY, AND SOILS

Eva was located on an unusually broad section of the Tennessee River floodplain directly west of Tennessee river mile 99.25, approximately 20 km downstream from the confluence of the Duck River with the Tennessee. The floodplain was characterized at the time of excavation as a minor example of “swell and swale topography” (Original field report on file at the McClung Museum, University of Tennessee, Knoxville), a result of the east-west migration of the river channel over time. Now submerged beneath the Kentucky Reservoir, the area surrounding the site is located on the eastern margin of the Western Highland Rim section of the Interior Low Plateaus province (Fenneman and Johnson 1946), and is underlain by bedrock consisting mainly of Mississippian and Devonian limestone and chert (King and Beikman 1974; King et al. 1994).

Soils mapped in the vicinity of Eva were moderately well drained Lax silt loams (LaB2, 2 – 5% slopes), which range up to 2 m (79 inches) in depth and are formed from loess over gravelly alluvium (USDA Web Soil Survey, Accessed 8/1/2013). The site lay in cleared fields at the time of its excavation, but the region is classified within Braun’s (1950) Western Mesophytic Forest Region, dominated by oak (g. *Quercus*) and hickory (g. *Carya*) on slopes and ridges. Sugar maples, beeches, and tuliptree occur in ravine communities (Braun 1950:156).

TVA EXCAVATION

Excavation at Eva began in early September of 1940, led by Douglas Osborne (who had previously supervised the excavation of the Big Sandy site [40HY18]; see Chapter 5) (Figure 6.2a). After setting grid stakes on a UTDoA-standard 10 x 10 ft grid system, the site was first surface collected by quadrant before two trenches (each 0.91 m [3 ft] wide) oriented north-south and east-west, and centered on the site's center gridstake (50CA), were opened in order to determine the site's stratigraphy (Figure 6.2b), and to establish the location of the greatest concentration of cultural deposits. Trench 1 extended along the north-south center axis ("CA") and was 210 feet in length (ca. 69 m); Trench 2, running east-west, crossed Trench 1 at the 50-line and was approximately 200 ft (ca. 67 m) long (Figure 6.3). Materials recovered in the two trenches during their excavation were not assigned to strata, but many were nevertheless piece-plotted and were labeled as "TTR" ("test trench").

After the exploratory trenches had been completed, and the excavators had been able to ascertain the approximate nature of the site's stratigraphy, large-scale excavation proceeded in the main block, which comprised thirty-four 10 x 10 ft grid squares and a total area of 3400 ft^2 (ca. 315.9 m^2). Excavation proceeded in arbitrary 0.5-ft. levels within the site's "natural" stratigraphic (and selected sub-stratigraphic) units. Locational information – X (east-west), Y (north-south) and Z (depth) coordinates – was documented for a significant proportion of cultural material (ca. 70%), and for all burials and other cultural features. Horizontal coordinates for artifacts and other features were measured in feet and tenths of feet from the southeastern corner of the grid square in which they were found; vertical coordinates (i.e., depth) were recorded in feet below datum (355.8 ft [108.442 m] above mean sea level).

Figure 6.2 Top, second day of excavation at the Eva site (40Bn12), crew in background (facing east). Bottom, progress on the north-south exploratory trench at the Eva site (40BN12) (facing north). Images from WPA / TVA Archives, courtesy Frank H. McClung Museum, The University of Tennessee, Knoxville

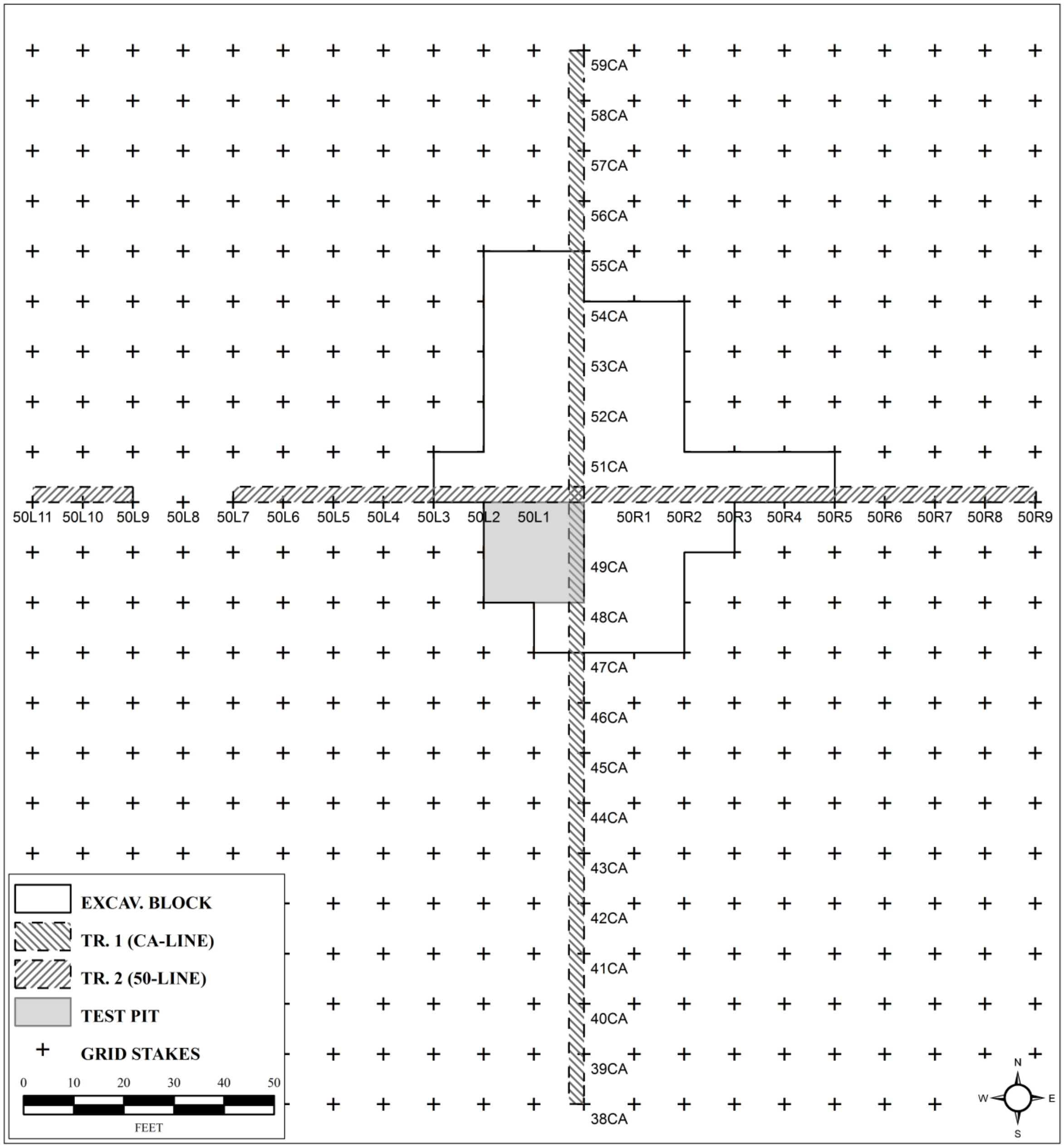

Figure 6.3. Eva site (40Bn12) excavation block.

Stratigraphy

The stratigraphic sequence at Eva was relatively well-defined, and has previously been characterized (Lewis and Lewis 1961:5-14), but is presented here for reference purposes. The descriptions here are drawn mainly from Osborne's field report, field drawings, and the site profile drawings (see Figure 6.4).

Beneath the plow zone, five strata were distinguished[26]. The clearest expression of these occurred near the center of the excavation in the densest area of most of the site's deposits, near the center stake (50CA). Stratum II and Stratum IV were also divided based on relative proportions of shell density into upper, middle, and lower; and upper and lower (respectively) sub-strata.

Stratum I was a shell-free deposit extending across much of the site, but reaching its greatest depth on the periphery of the excavation block. It was characterized as a "very heavy, black, shell-less humic soil with a greasy or waxy appearance" (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville), with medium to heavy midden content. Burials, both human (n = 42) and canine (n = 2), as well as significant amounts of cultural material and faunal remains, were present. The deepest expression of the Stratum I occurred on the periphery of the central portion of the site, and the areal extent and variation in its thickness – relatively thin on Eva's highest point, and deeper along the slope of the knoll, was thought to have been considerably influenced by post-depositional processes, including erosion and plowing of the site for a period of at least 46 years, having first been

[26] As noted in Chapter 2, C.B. Moore's description of the stratigraphy at the Eva site (Moore 1915:77-78: the "dwelling-site on the Sykes place") was quite similar to Osborne's. Moore sunk his exploratory shaft into the site in the area of maximum depth, near the center of the mound, and noted the same pattern of alternating shell-bearing and shell-free deposits, and the changes in density of shell that were later described for (and used to sub-divide) Stratum II and IV.

Figure 6.4. Stratigraphic profiles at the Eva site (40BN12). Reproduced from the original field map, D. Osborne, 1940 (Original on file at the Frank H. McClung Museum of Natural History and Culture, University of Tennessee, Knoxville). (Oversized figure, see Appendix A.)

cleared in 1894 (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville) and under cultivation from that time until excavation.

Stratum II comprised a thick, mounded shell-bearing deposit characterized by a dark, humic matrix that reached nearly one meter in thickness at or near the center stake of the site (50CA). The stratum continued beyond the boundaries of the main excavation block, and extended a total of approximately 140 feet (ca. 43 m) from east to west (Square 50L6 to 50R7) and 130 feet (ca. 40 m) north to south (Square 44CA to 56CA) (Figure 6.4).

Stratum II was described, both by the site's investigator (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville) and by Lewis and Lewis (1961:9), as having contained the greatest number of artifacts and burials, although comparatively little animal bone. However, while the majority of burials were, in fact, associated with Stratum II (human, n = 109, 60.5% of total human burials at Eva; canine, n = 15, 83.3% of all dog burials at the site), larger proportions of most other types of cultural materials were associated with the site's deeper deposits (Stratum IV).

Based on shell density, Stratum II was subdivided into three sub-strata: upper, middle, and lower. The greatest density of shell occurred in the upper third, while the lower two thirds were described as having a higher ash content.

Stratum III was not present across the entirety of the site. The composition of the stratum was described as significantly different from Stratum II (overlying) and Stratum IV (underlying). It was a sandy deposit varying in thickness from approximately 5 to 20 cm where present (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville), and was thought to represent a period of flooding or prolonged submersion during the site's history (Lewis and Lewis 1961:9). The stratum contained comparatively little animal bone, but a not insubstantial number of artifacts and thirteen human burials and one canine burial were associated with it. These, and the presence of thermal features and localized areas of ash and midden, suggest that some use of the site over the period during which Stratum III was deposited.

Stratum IV, like Stratum II, was subdivided into upper and lower sections based on relative density of cultural material within it. At its maximum vertical extent (located near the center of the site) it was roughly 45 – 46 cm thick, and based on the distribution of piece-plotted artifacts associated with the deposit, was encountered across the majority of the site's excavation block, but occurred most densely in the block's northeastern quadrant and southern half. The upper portion contained dense concentrations of chipped stone debitage and animal bone (Osborne 1942:7), while larger amounts of shell were noted in the lower portion. A relatively small number of burials (n = 15) were also associated with the deposit.

Underlying Stratum IV, primarily in the southern half of the site, a mostly shell-free deposit comprising sand and some cultural material was identified and termed Stratum V. The excavator's opinion (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville) was that it represented an early aspect of the site occupation defined principally by Stratum IV. A relatively small amount of cultural material and a single burial were associated with the deposit.

Subsoil at the site consisted of sandy clay. A single test pit measuring 20 x 20 ft (37.2 m^2; Squares 48L1, 48L2, 49L1, and 49L2) (Figure 6.3) was excavated to a total depth of approximately 5.2 m below datum in order to establish the underlying stratigraphy beneath the cultural deposits. Osborne (Original field report on file at the McClung Museum, University of

Tennessee, Knoxville) noted that clay content increased with depth “until finally an almost hardpan condition was reached.”

FEATURES AND BURIALS

A total of 208 cultural features were reported from Eva in the original site report, including 180 human burials (Lewis and Lewis 1961:103-171), 18 canine burials (Lewis and Lewis 1961:144), and ten cultural features (Lewis and Lewis 1961:15-17). While the burial enumeration appears to have been accurate, evaluation of the large-format site maps on which data were recorded during excavation indicates that other features (as they have been previously described) were not well-reported and numbers significantly exceed those reported in the past; a total of 80 additional features were identified in the present analysis. Although no depth was recorded for most, stratigraphic association was indicated for all but one.

Burials (Human, n = 180; Canine, n = 18)

Human burials were located throughout the excavation block and were recovered from every stratum at the site, although the majority (n = 109) were associated with Stratum II. Roughly equal numbers were contained within strata III and IV (n = 13 and n = 15, respectively), and an additional forty-two were recovered from Stratum I. A single burial (Burial 126) was associated with Stratum V.

Canine burials occurred in strata I – III, but predominately in Stratum II (n = 15). Stratum I contained two, and one was found in Stratum III.

Table 6.1 contains summary data for each burial. Two sets of age and sex estimates are provided. The first derive from the initial analyses conducted by UTDoA personnel in the early 1940s; the second are the result of the 1990 NAGPRA inventory (Smith 1990).

As noted previously, the stratum assignments as discussed in this section (and in Table 6.1) differ from those reported by Lewis and Lewis (1961; also presented in Table 6.1). A total of 81 burials (40.9% of the site total), human and canine, are indicated by field record forms to be associated with different strata than Lewis and Lewis indicated in the site report.

Record forms for each burial, completed during excavations by the principal investigator, included vertical and horizontal coordinates as well as data concerning the stratum in which burials were identified, the presence / absence of observed burial pits, and whether a burial was intrusive or "inclusive" to the stratum in which it was found.

Lewis and Lewis appear to have disagreed with many of the original assessments; laboratory analysis sheets completed after the end of field work at Eva include the original burial and stratum assignments, but also an added column – "Stratum of Origin." In thicker strata, such as Stratum II, the stratum (or sub-stratum) of origin was generally shifted to the overlying division (e.g., a burial originally recorded in Stratum II-B was given an origin of Stratum II-M), while burials at the upper or lower margin of strata might be wholly re-assigned to the over- or underlying stratum (e.g., a burial recorded in Stratum IV-T was interpreted as originating in Stratum II-B). These re-assignments appear to have been made during the analysis conducted for the 1961 site report, and apparently relied on the analyst's assumption that burials at the site were nearly always interred in deep pits, despite little indication of such pits for many of the site's graves. The re-assignments of the site's burials from the strata to which they were assigned based on field documentation thus seem to have been largely intuitive.

Table 6.1. Burial data for the Eva site (40BN12).

Burial ID	Grid Square	Stratum	L&L 1961 Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
								WPA	NAGPRA	WPA	NAGPRA	
1	51CA	1	pz	Poor	SW	Partly Flexed	Unspecified	Male	Male	Adult	Adult	
2	52CA	1	pz	Fair	Unspecified	Unspecified	Unspecified	Male	Male	Adult	Adult	
3	64CA	1	1	Poor	NE	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	possible red ochre
4	49CA	1	pz	Good	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	2 projectile points; 2 bifaces
5	47CA	1	pz	Poor	W	Fully Flexed	Back	Indeterminate	Indeterminate	Adult	Adult	
6	50CA	1	pz	Good	SW	Fully Flexed	Left	Female	Female	Adult	Adult	
7	51CA	1	pz	Good	SW	Fully Flexed	Left	Female	Female	Adult	Adult	antler tine; worked turkey bone
8	49CA	1	1	Good	NW	Fully Flexed	Left	Female	Female	Adult	Adult	
9	46CA	1	no assignment	Fair	S	Fully Flexed	Left	Female	Female	Adult	Adult	
10	45CA	2	no assignment	Good	N	Fully Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	
11	44CA	3	3	Good	W	Fully Flexed	Back	Indeterminate	Male	Adult	Adult	
12	49CA	2	2	Good	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
13	49CA	2	2	Fair	W	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	
14	51CA	1	1	Fair	S	Fully Flexed	Left	Indeterminate	Female	Adult	Adult	
15	46CA	2	no assignment	Good	NE	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	red ochre; 3 projectile points
16	46CA	2	no assignment					Dog				
17	51CA	1	pz	Poor	NE	Unspecified	Unspecified	Male	Indeterminate	Adult	Adult	
18	51CA	1	pz	Poor	NW	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
19	51L1	1	pz	Poor	NW	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	projectile point; biface
20	50CA	2	no assignment	Good	NW	Fully Flexed	Right	Male	Male	Adult	Adult	
21	50CA	2	2	Good	NW	Extended	Back	Male	Indeterminate	Subadult	Subadult	
22	50CA	2	2	Fair	SW	Fully Flexed	Back	Female	Indeterminate	Subadult	Subadult	
23	50R2	2	1	Good	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
24	50R3	1	pz	Poor	Unspecified	Unspecified	Unspecified	Female	Indeterminate	Adult	Indeterminate	
25	50R1	2	no assignment	Good	NW	Fully Flexed	Back	Female	Indeterminate	Subadult	Subadult	
26	50R2	2	2	Fair	S	Fully Flexed	Back	Female	Indeterminate	Subadult	Subadult	
27	50R3	1	pz					Dog				
28	50R5	1	no assignment	Poor	SE	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	
29	50R2	2	2	Good	N	Fully Flexed	Left	Female	Female	Adult	Adult	
30	50CA	2	2					Dog				
31	51CA	2	2	Fair	SW	Fully Flexed	Back	Female	Indeterminate	Subadult	Subadult	
32	50R4	2	no assignment					Dog				
33	50R3	2	2	Good	W	Fully Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	red ochre
34	52CA	1	1	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
35	5CA	1	1	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	

Table 6.1. Continued.

Burial ID	Grid Square	Stratum	L&L 1961 Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
								WPA	NAGPRA	WPA	NAGPRA	
36	51CA	2	2	Fair	E	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	
37	50R3	4	2	Good	W	Fully Flexed	Left	Male	Male	Adult	Adult	
38	47CA	1	pz	Poor	N	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Indeterminate	
39	52CA	2	1	Good	NW	Fully Flexed	Front	Male	Female	Subadult	Adult	
40	52CA	2	1	Fair	NW	Fully Flexed	Front	Indeterminate	Male	Adult	Adult	broken antler tine
41	52CA	2	2	Fair	E	Fully Flexed	Right	Male	Female	Adult	Adult	
42	49CA	2	2	Fair	NW	Fully Flexed	Unspecified		Indeterminate	Subadult	Subadult	
43	50L1	2	2					Dog				
44	51CA	4	4	Good	S	Fully Flexed	Right	Indeterminate	Female	Adult	Adult	
45	50L1	2	2	Good	N	Unspecified	Unspecified	Female	Indeterminate	Adult	Adult	
46	49CA	2	2					Dog				
47	9L1	1	pz	Poor	Unspecified	Unspecified	Unspecified	Male	Indeterminate	Adult	Adult	
48	47CA	2	1					Dog				
49	52CA	2	2					Dog				
50	53CA	3	2	Good	E	Fully Flexed	Left	Indeterminate	Male	Adult	Adult	projectile point
51	49CA	2	2	Good	E	Fully Flexed	Front		Male	Adult	Adult	
52	52CA	3	2	Fair	S	Fully Flexed	Left	Indeterminate	Female	Subadult	Subadult	
53	5R2	1	pz	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
54	47CA	2	2	Good	NW	Fully Flexed	Right	Indeterminate	Female	Adult	Adult	bone awl; 2 projectile points; biface
55	47CA	2	2	Good	SE	Fully Flexed	Front	Male	Female	Adult	Adult	
56	54CA	4	4	Good	W	Fully Flexed	Front	Male	Female	Adult	Adult	projectile point
57	54CA	4	2	Good	N	Fully Flexed	Front	Indeterminate	Male	Adult	Adult	
58	52CA	2	4	Good	S	Fully Flexed	Back	Indeterminate	Female	Adult	Adult	
59	49L1	2	1	Poor	N	Partly Flexed	Right	Female	Indeterminate	Subadult	Subadult	
60	48L1	2	1	Fair	SW	Fully Flexed	Right	Female	Indeterminate	Subadult	Subadult	
61	48CA	1	2	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
62	50R2	1	pz	Fair	SW	Fully Flexed	Front	Indeterminate	Male	Adult	Adult	canine burial; 2 bone awls; turtle carapace; 4 projectile points; articulated snake vertebrae
63	50R2	1	pz					Dog				
64	50R1	1	pz	Fair	NE	Fully Flexed	Left	Indeterminate	Male	Adult	Adult	2 bone artifacts

Table 6.1. Continued.

Burial ID	Grid Square	Stratum	L&L 1961 Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
								WPA	NAGPRA	WPA	NAGPRA	
65	51R2	1	pz	Poor	Unspecified	Fully Flexed	Unspecified	Indeterminate		Adult	Adult	awl; 4 fragments, groundstone gorget
66	51R1	1	pz	Fair	W	Fully Flexed	Left	Indeterminate	Female	Adult	Adult	projectile point
67	50R1	1	pz	Poor	E	Fully Flexed	Left	Indeterminate	Female	Adult	Adult	
68	51R1	1	pz	Poor	Unspecified	Fully Flexed	Left	Female	Female	Adult	Adult	projectile point (possible association)
69	50R2	1	1	Good	NE	Fully Flexed	Left	Indeterminate	Female	Adult	Adult	perforated bone; bone awl; 2 bifaces
70	51L1	2	2	Good	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Multiple	
71	48CA	2	1	Good	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Indeterminate	Adult	
71	48CA	2	1	Good	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Indeterminate	Adult	
72	49CA	2	no assignment					Dog				
73	50CA	1	1	Good	SE	Fully Flexed	Left	Indeterminate	Male	Adult	Adult	dog femur; canine tooth; antler tine
74	51L1	2	2	Fair	Unspecified	Unspecified	Unspecified	Female	Indeterminate	Subadult	Adult	
75	47CA	3	2	Good	E	Fully Flexed	Front	Indeterminate	Female	Adult	Adult	biface
76	51R1	2	1	Fair	E	Fully Flexed	Left	Male	Female	Adult	Adult	bone artifact
77	51CA	2	2	Poor	SW	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
78	48CA	2	2	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
79	50R1	1	1	Poor	W	Fully Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	
80	53L1	1	1	Poor	W	Partly Flexed	Left	Indeterminate	Female	Indeterminate	Adult	
81	51R1	2	1	Good	W	Fully Flexed	Right	Indeterminate	Male	Adult	Adult	
82	50R2	2	2	Fair	E	Fully Flexed	Right	Male	Indeterminate	Subadult	Subadult	
83	50R2	2	2	Good	SW	Fully Flexed	Front	Indeterminate	Indeterminate	Adult	Adult	
84	48L1	2	2	Good	NW	Extended	Back	Male	Indeterminate	Subadult	Subadult	
85	51R1	1	pz	Unspecified	SW	Fully Flexed	Back	Indeterminate	Male	Adult	Adult	worked bone; modified tooth
86	50R1	2	2	Fair	NW	Partly Flexed	Front	Indeterminate	Indeterminate	Subadult	Subadult	
87	48L1	2	2	Good	W	Fully Flexed	Left	Indeterminate	Male	Adult	Adult	
88	48L1	2	2					Dog				
89	48ca	2	2	Fair	SW	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Adult	abrader; perforator

Table 6.1. Continued.

Burial ID	Grid Square	Stratum	L&L 1961 Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
								WPA	NAGPRA	WPA	NAGPRA	
90	50R2	2	2	Good	S	Fully Flexed	Left		Female	Adult	Adult	ochre; bone bead; "green material"
91	50R2	2	2	Dog								
92	50R2	3	2	Good	SW	Fully Flexed	Right	Indeterminate		Adult	Adult	
93	50R2	2	2	Good	SE	Fully Flexed	Right	Female	Female	Adult	Adult	
94	49L1	2	2	Fair	SW	Fully Flexed	Left	Female	Female	Adult	Adult	
95	54L1	3	2	Fair	SW	Fully Flexed	Left	Male	Female	Adult	Adult	
96	50R1	2	2	Good	W	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	antler tine
97	50R2	3	2					Dog				
98	52R1	1	pz	Poor	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
99	53L1	2	2	Poor	N	Fully Flexed	Right	Indeterminate	Female	Adult	Adult	unidentified stone
100	50R2	2	2	Good	NE	Partly Flexed	Right	Indeterminate	Female	Adult	Adult	
101	51R1	2	2	Fair	E	Fully Flexed	Left	Female	Child	Subadult	Subadult	worked bone; 4 beads; possible pendant
102	51R1	2	2	Good	S	Fully Flexed	Front	Female	Female	Adult	Adult	projectile point
103	48CA	3	2	Good	NW	Fully Flexed	Back	Indeterminate	Male	Adult	Adult	
104	53L1	3	2	Fair	Sw	Fully Flexed	Front	Indeterminate	Male	Adult	Adult	projectile point; unidentified stone
105	48L1	3	2	Good	SE	Partly Flexed	Right	Female	Male	Adult	Adult	
106	48L1	2	2	Fair	SE	Fully Flexed	Right	Child	Indeterminate	Adult	Adult	worked bone
107	49L2	3	2	Good	E	Fully Flexed	Left	Male	Female	Adult	Adult	
108	48L1	2	2	Poor	Unspecified	Unspecified	Unspecified	Female	Female	Adult	Adult	
109	52R2	1	pz	Poor	NW	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	
110	52R1	1	1	Fair	SW	Fully Flexed	Back	Male	Male	Adult	Adult	biface
111	53R1	2	1	Fair	NE	Fully Flexed	Right	Male	Female	Adult	Adult	ulna awl
112	53R1	2	1	Fair	NE	Extended	Right	Male	Indeterminate	Subadult	Subadult	
113	52R1	2	1	Good	NE	Fully Flexed	Back	Male	Indeterminate	Adult	Adult	
114	52R1	1	2	Poor	E	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	atlatl hook; 2 projectile points; biface; bannerstone
115	50R3	2	1	Good	NW	Fully Flexed	Right	Indeterminate	Female	Adult	Adult	large Benton biface
116	5R3	2	1	Poor	Unspecified	Fully Flexed	Unspecified	Female	Indeterminate	Subadult	Subadult	
117	49L1	4	4	Fair	SE	Fully Flexed	Left	Indeterminate	Male	Adult	Adult	

Table 6.1. Continued.

Burial ID	Grid Square	Stratum	L&L 1961 Stratum	Condition	Orientation	Flexure	Position	Sex WPA	Sex NAGPRA	Estimated Age WPA	Estimated Age NAGPRA	Grave Associations
118	49L1	4	4	Fair	W	Extended	Back	Indeterminate	Indeterminate	Subadult	Subadult	
119	52R1	2	2	Poor	NW	Extended	Back	Female	Indeterminate	Subadult	Subadult	
120	49L1	4	4	Poor	W	Partly Flexed	Back	Female	Indeterminate	Subadult	Subadult	
121	52R1	2	2					Dog				
122	52R1	2	2					Dog				large rough biface; smaller biface; bone object
123	51R2	1	pz	Poor	Unspecified	Extended	Back	Female	Indeterminate	Subadult	Subadult	
124	54R1	1	no assignment	Fair	N	Fully Flexed	Back	Male	Male	Adult	Adult	bone awl; unidentified stone
125	51R2	1	pz	Fair	E	Fully Flexed	Back	Female	Female	Adult	Adult	
126	49CA	5	4	Good	NW	Fully Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	
127	53R1	2	2	Fair	E	Fully Flexed	Back	Female	Indeterminate	Adult	Adult	broken biface
128	50R3	2	2	Poor	S	Fully Flexed	Right	Indeterminate	Indeterminate	Subadult	Adult	
129	52R2	1	1	Poor	S	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	Eva projectile point
130	52R2	2	2	Fair	NE	Extended	Back	Indeterminate	Indeterminate	Subadult	Subadult	
131	53R1	2	1	Fair	S	Extended	Back	Indeterminate	Male	Adult	Adult	projectile point
132	56R3	2	2	Fair	N	Partly Flexed	Right	Female	Female	Adult	Adult	
133	50R3	2	2	Fair	E	Partly Flexed	Left	Indeterminate	Female	Adult	Adult	
134	53R1	2	2					Dog				
135	52R2	2	2					Dog				
136	52R1	2	2	Poor	NW	Partly Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	
137	53R2	2	1	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
138	53R1	2	2	Fair	W	Partly Flexed	Front	Indeterminate	Male	Adult	Adult	bone fishhook
139	53R1	2	2	Poor	W	Partly Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	
140	53R2	2	2	Fair	E	Partly Flexed	Front	Indeterminate	Indeterminate	Subadult	Subadult	
141	52R2	2	2	Fair	W	Fully Flexed	Right	Male	Female	Adult	Adult	
142	51R2	3	2	Good	E	Fully Flexed	Back	Female	Male	Adult	Adult	turtle carapace; ochre
143	51R2	3	2	Good	W	Fully Flexed	Front	Male	Male	Subadult	Adult	
144	49R2	2	2	Good	S	Fully Flexed	Right	Female	Male	Adult	Adult	
145	49R3	2	1	Fair	W	Fully Flexed	Back	Indeterminate	Male	Adult	Adult	projectile point; possible worked bone

Table 6.1. Continued.

Burial ID	Grid Square	Stratum	L&L 1961 Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
								WPA	NAGPRA	WPA	NAGPRA	
146	49R3	1	1	Fair	SE	Partly Flexed	Front	Indeterminate	Female	Adult	Adult	projectile point; red ochre
147	48R1	2	2	Fair	E	Partly Flexed	Left	Indeterminate	Male	Subadult	Subadult	
148	50R3	4	2	Fair	W	Partly Flexed	Left	Indeterminate	Male	Adult	Adult	
149	50R3	4	2	Fair	E	Partly Flexed	Left	Female	Female	Adult	Adult	
150	48R1	2	1	Fair	S	Fully Flexed	Right	Indeterminate	Male	Adult	Adult	
151	48R1	2	1	Fair	N	Fully Flexed	Front	Indeterminate	Male	Adult	Adult	
152	48R1	2	1	Fair	E	Fully Flexed	Back	Indeterminate	Female	Adult	Adult	
153	51R2	2	2	Fair	E	Fully Flexed	Back	Male	Female	Adult	Adult	antler tine
154	52R2	2	2	Poor	W	Partly Flexed	Unspecified	Female	Indeterminate	Subadult	Subadult	
155	53R1	4	2	Fair	N	Fully Flexed	Right	Male	Male	Adult	Adult	Eva II projectile point
156	49R2	2	2	Poor	NE	Extended	Right	Female	Indeterminate	Indeterminate	Adult	
157	49R2	2	no assignment	Poor	Unspecified	Partly Flexed	Unspecified		Male	Adult	Adult	
158	49R1	2	2	Fair	W	Partly Flexed	Back	0	Male	Adult	Adult	
159	49R1	2	2	Poor	E	Fully Flexed	Left	Indeterminate	Female	Adult	Adult	red ochre
160	53R2	2	no assignment	Fair	Unspecified	Fully Flexed	Left	Indeterminate	Female	Adult	Adult	projectile point; drill; red ochre
161	51R2	3	2	Fair	W	Partly Flexed	Front	Female	Female	Adult	Adult	Morrow Mt. projectile point; perforated bone
162	49R3	2	2	Fair	W	Partly Flexed	Left	Male	Indeterminate	Subadult	Subadult	biface; worked bone
163	49R3	2	2					Dog				
164	49R3	2	2	Good	W	Fully Flexed	Left	Indeterminate	Female	Adult	Adult	
165	49R2	2	2	Good	S	Fully Flexed	Front	Female	Male	Adult	Adult	
166	48R2	1	pz	Good	S	Partly Flexed	Left	Female	Male	Adult	Adult	
167	49R2	2	2	Good	SE	Partly Flexed	Back	Male	Female	Adult	Adult	
168	49R3	2	2	Poor	NE	Fully Flexed	Left	Male	Indeterminate	Adult	Adult	
169	48R2	2	1	Unspecified	SW	Fully Flexed	Back	Male	Indeterminate	Adult	Adult	projectile point
170	47R1	2	2	Fair	N	Fully Flexed	Right	Male	Indeterminate	Subadult	Subadult	
171	48R1	2	2	Poor	N	Fully Flexed	Right	Female	Indeterminate	Adult	Adult	large Benton biface
172	49R1	2	2	Fair	E	Fully Flexed	Front	Male	Indeterminate	Subadult	Subadult	
173	47R2	2	2	Fair	NE	Fully Flexed	Front	Male	Indeterminate	Adult	Adult	

Table 6.1. Continued.

Burial ID	Grid Square	Stratum	L&L 1961 Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
								WPA	NAGPRA	WPA	NAGPRA	
174	49R2	2	2	Good	SE	Fully Flexed	Left	Female	Male	Adult	Adult	Eva projectile point
175	49R3	4	4	Good	S	Fully Flexed	Right	Male	Female	Adult	Adult	
176	47R1	2	2	Fair	SE	Fully Flexed	Back	Male	Indeterminate	Subadult	Adult	
177	53R2	4	2	Poor	N	Fully Flexed	Right	Male	Indeterminate	Subadult	Subadult	
178	49R2	2	2	Good	N	Fully Flexed	Front	Male	Female	Adult	Adult	
179	48R2	2	2	Good	NE	Partly Flexed	Left	Female	Male	Adult	Adult	
180	49R3	4	4	Fair	N	Fully Flexed	Left	Male	Female	Adult	Adult	bone beads
181	48R1	2	4	Good	NW	Fully Flexed	Right	Female	Male	Adult	Adult	
182	52R2	4	4	Good	NE	Fully Flexed	Front	Male	Female	Adult	Adult	perforated bone spatulate; bone bead
183	47R2	2	2	Fair	SE	Fully Flexed	Right	Indeterminate	Male	Adult	Adult	
174	49R2	2	2	Good	SE	Fully Flexed	Left	Female	Male	Adult	Adult	Eva projectile point
184	47R1	2	2	Fair	NE	Fully Flexed	Right	Male	Indeterminate	Subadult	Subadult	
185	47R2	2	4	Poor	N	Fully Flexed	Right		Male	Adult	Adult	
186	47R2	2	2	Poor	NE	Fully Flexed	Left	Male	Indeterminate	Subadult	Subadult	bone beads
187	47R2	2	4	Poor	S	Fully Flexed	Right	Male	Indeterminate	Subadult	Subadult	
188	48R1	2	4	Fair	NE	Fully Flexed	Right	Female	Indeterminate	Adult	Adult	lignite
189	51R2	4	4	Good	N	Fully Flexed	Right	Female	Female	Adult	Adult	
190	48R2	2	2	Poor	S	Fully Flexed	Left	Female	Indeterminate	Adult	Adult	
191	47R1	2	4	Poor	SE	Fully Flexed	Right	Female	Female	Adult	Adult	
192	48R2	2	2	Good	S	Fully Flexed	Right	Indeterminate	Male	Adult	Adult	
193	48R2	2	2	Good	N	Partly Flexed	Left		Male	Adult	Adult	red ochre
194	48R2	2	2	Good	NE	Fully Flexed	Front	Female	Male	Adult	Adult	
195	47R2	2	2	Fair	NE	Fully Flexed	Right	Male	Male	Adult	Adult	
196	48R1	2	2	Fair	W	Partly Flexed	Right	Male	Male	Subadult	Adult	2 atlatl hooks; 2 bannerstones; red ochre
197	48R2	2	2	Good	S	Fully Flexed	Left	Female	Female	Adult	Adult	
198	48R2	2	2	Poor	N	Fully Flexed	Front	Indeterminate	Indeterminate	Subadult	Subadult	

Because no evidence can be found to independently verify assertions of stratigraphic association made by Lewis and Lewis, the stratigraphic associations presented herein were based on the reported stratum assignments from the original field records. The stratum assignment of each burial as depicted in the 1961 report is also included in Table 6.1 in the column, "L&L 1961 Stratum."

Stratum I (and plow zone)

Forty-two human and two canine burials were associated with Stratum I at the Eva site (40BN12). None was initially documented as originating in the overlying disturbed materials, although Lewis and Lewis (1961) later assigned 25 individuals to the plow zone. In horizontal distribution, Stratum I burials were encountered across the entirety of the excavation area, but clustered particularly in the central portion of the block near the highest point on the site (Figure 6.5). Most (n = 31, 73.8% of the Stratum I burials) were adults. A little more than one third (n = 20, 47.6%) of all Stratum I burials were accompanied by at least one artifact, and most graves with inclusions included two or more. Types of burial goods (Figure 6.6) included red ochre, projectile points and other bifaces, fragments of a groundstone gorget, a canine femur and tooth, antler atlatl hooks and other bone and antler tools. One grave (Burial 62) contained nine offerings (the most of any burial at Eva), including a turtle carapace (fragmentary), a series of articulated snake vertebrae, two bone awls, four projectile points, and a dog (Burial 63).

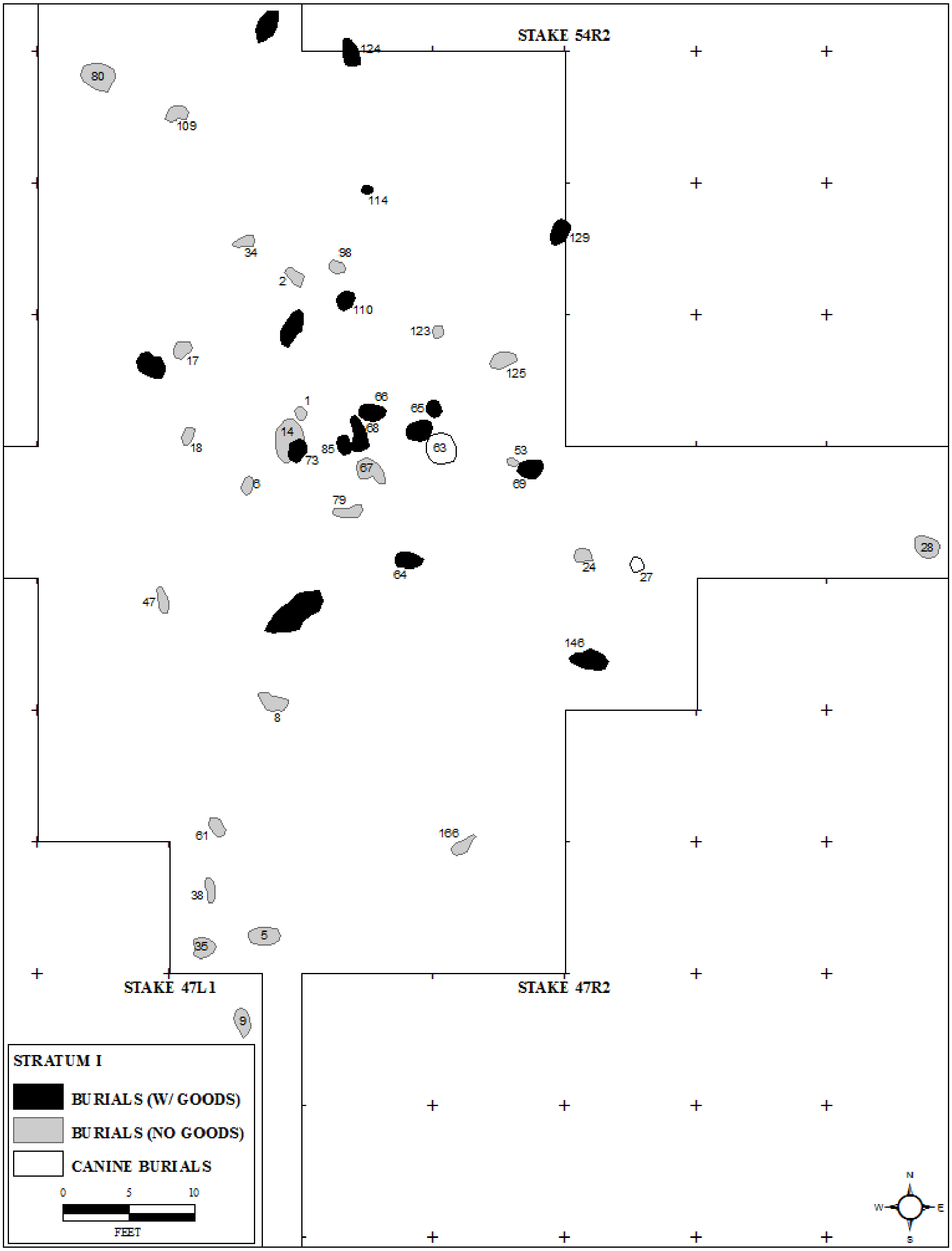

Figure 6.5. Stratum I burials, the Eva site (40BN12).

Figure 6.6. Selected artifacts associated with three Stratum I burials at the Eva site (40BN12): Two groundstone gorgets (Burial 65, Burial 69); one tubular groundstone bannerstone (Burial 114).

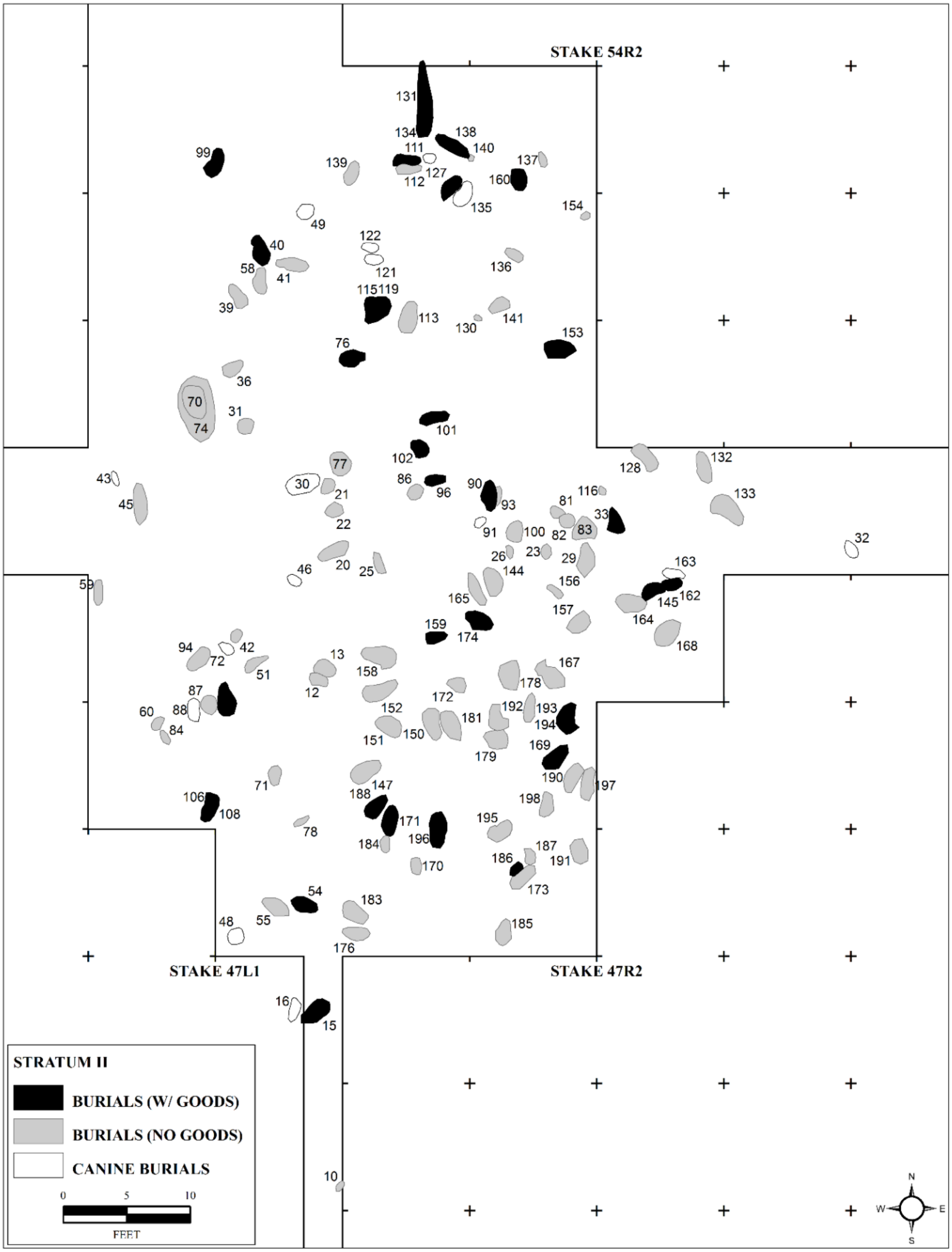

Figure 6.7. Stratum II burials, the Eva site (40BN12).

Stratum II

Stratum II contained the majority of burials, human or canine, at Eva (Figure 6.7). A total of 109 individuals and fifteen dogs were associated with the deposit; graves occurred throughout its vertical extent.

There were no identifiable clusters or patterns among individual burials within the excavated area. Most were adults (n = 65, 59.6% of all human Stratum II burials), but a relatively large number of infants – twenty-three (21.1% of the total Stratum II burials) – were also present, representing 85.2% of all identified infant burials at the site.

Only 29 (26.6%) of the 109 Stratum II human burials contained burial offerings (e.g., Figure 6.8), and most of those (n = 20) included only a single artifact. The largest number of items in any Stratum II grave accompanied Burial 196, which contained two antler atlatl hooks, two bannerstones, and red ochre, and was located in the southernmost quarter of the block.

Among the fifteen canine burials also associated with Stratum II, there was no spatial pattern evident in their locations. One dog – Burial 122 – was unique in that it was accompanied by three artifacts (two chipped stone bifaces – one representing the single largest chipped stone artifact from the site – and one bone awl [Figure 6.9]). These artifacts do not appear to have been associated incidentally, nor are they likely associated with a human interment in close proximity, since there was none. The dog skeleton in Burial 122 was otherwise unremarkable.

Stratum III

Based on stratum assignments on the original field forms, as well as comparison of recorded burial depths to the vertical and horizontal distribution of artifacts associated with Stratum III, a total of 13 human interments and one canine burial appear to have derived from

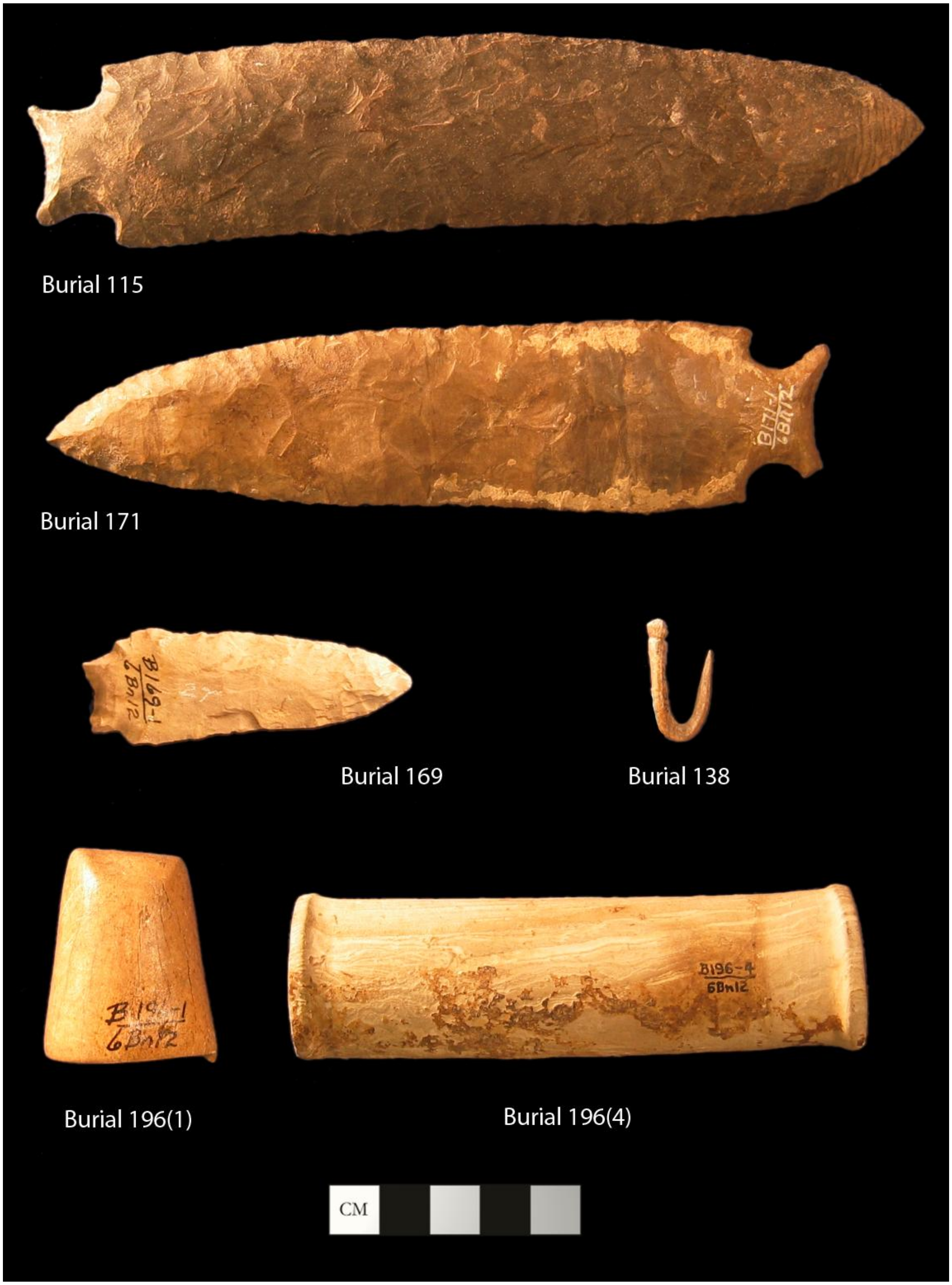

Figure 6.8. Selected artifacts associated with five Stratum II burials at the Eva site (40BN12): Two oversized Benton bifaces (Burials 115 and 171); one Benton stemmed hafted biface (Burial 169); bone fishhook (Burial 138); antler atlatl spur and tubular groundstone bannerstone (Burial 196).

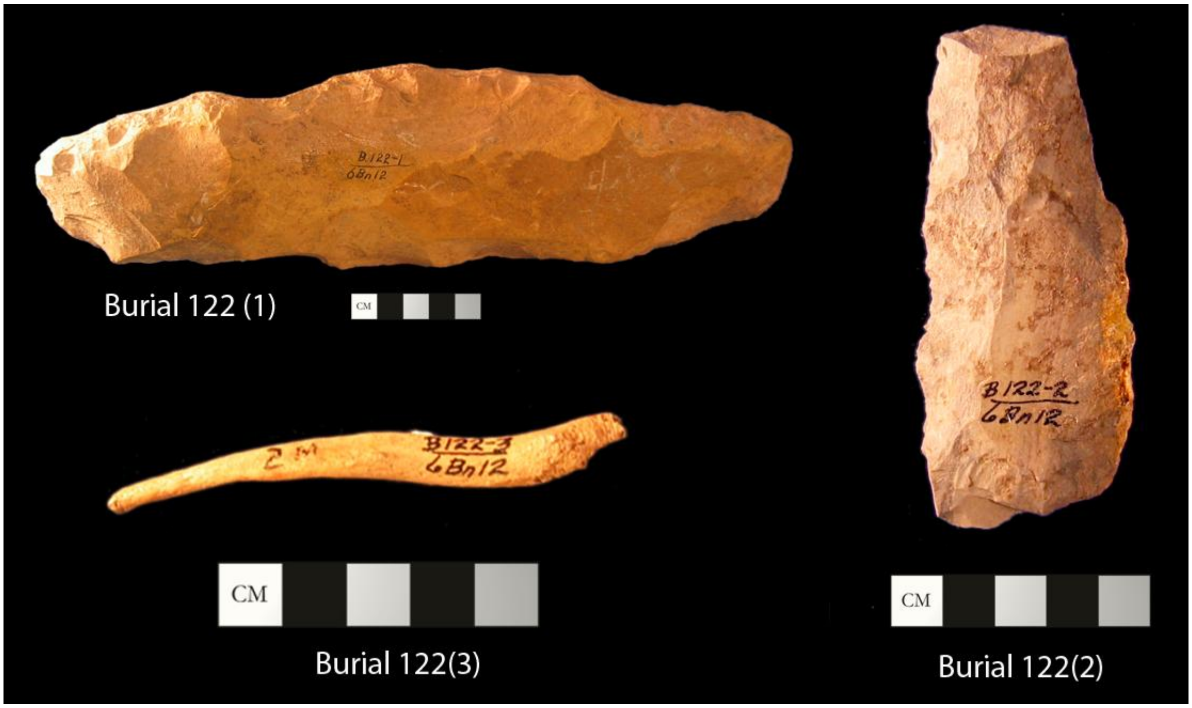

Figure 6.9. Grave goods associated with canine (Burial 122) in Stratum II at the Eva site (40BN12).

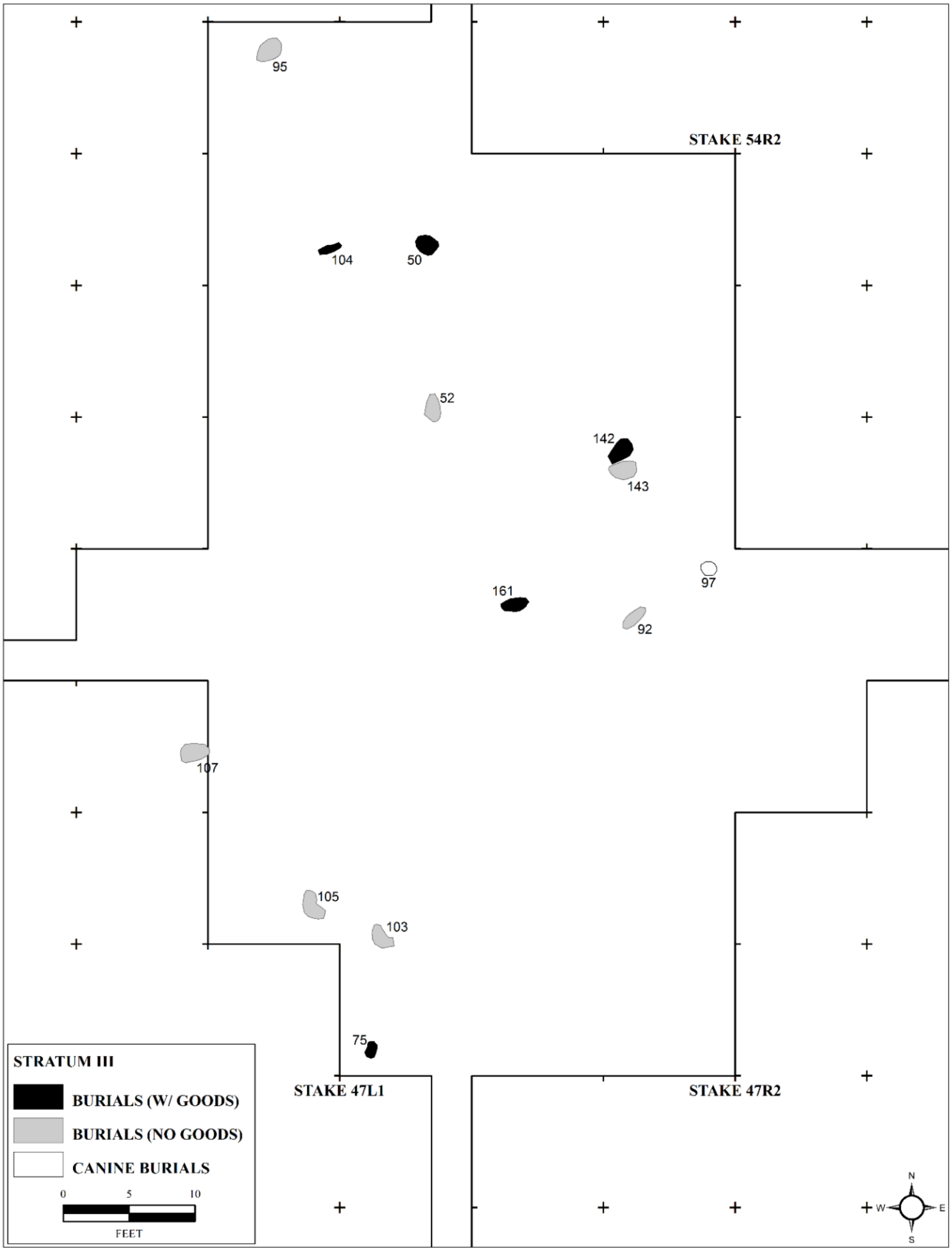

Figure 6.10. Stratum III burials at the Eva site (40BN12).

Figure 6.11. Selected artifacts associated with three Stratum III burials at the Eva site (40BN12): Eva II (Burial 75) and Morrow Mountain (Burial 161) hafted bifaces; lower portion (plastron) of turtle carapace (Burial 142).

that deposit (Figure 6.10). However, questions about the nature of the Stratum III deposit, distinct in composition from the over- and underlying deposits, and the length of time represented by it, may have led Lewis and Lewis to reclassify many of the burials initially assigned to it to other strata, retaining the Stratum III for only a single interment, Burial 11 (Table 6.1; Lewis and Lewis 1961:107, Table 20). However, the original association of multiple burials with the stratum appears appropriate, given the distribution of cultural material, features, and likely span of time represented by the Stratum III deposit (see following sections).

The majority of individuals buried in Stratum III were adults (n = 11), but two subadults were also present. There was no apparent pattern in their spatial distribution within the block. Five individuals (38.5% of the Stratum III total) were buried with accompanying artifacts, none with more than two objects. Burial inclusions (see Figure 6.11) consisted of projectile points (including an Eva II projectile point) and other chipped stone artifacts, a perforated bone object, a turtle carapace, and red ochre. One canine (Burial 97) was located in the eastern half of the excavation.

Stratum IV

Stratum IV contained a relatively small number of graves (n = 15) and no canine burials (Figure 6.12). Individuals were distributed in and around the periphery of the area of densest distribution of cultural materials (see Figure 6.39 in following section, "Occupational History of Eva"). The majority (n = 11) of Stratum IV burials were adults, although one adolescent and three very young infants (two possible "fetal") were also present. Four graves (26.7% of the Stratum IV burials) included burial objects (Figure 6.13), consisting of bone beads, a spatulate

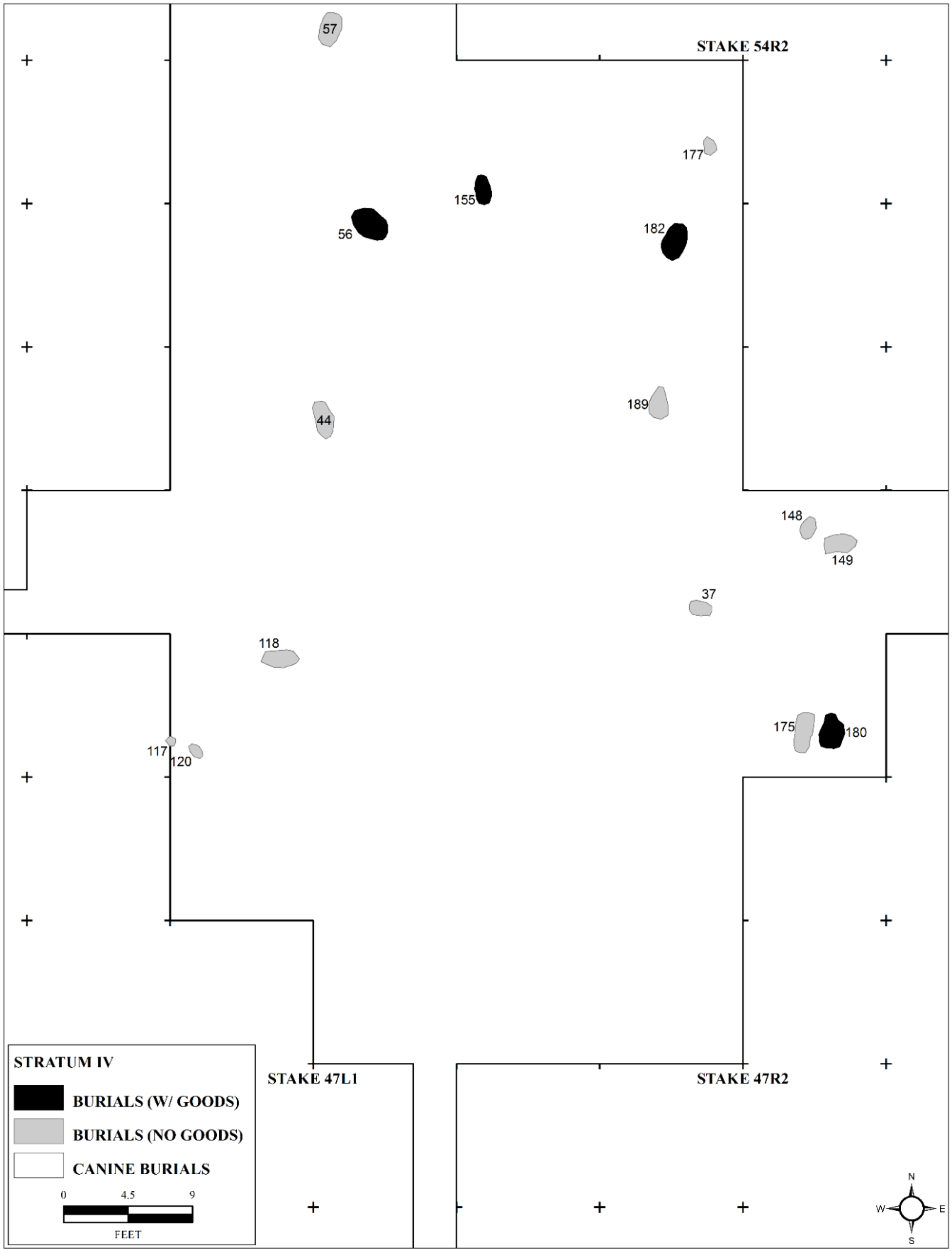

Figure 6.12. Stratum IV burials at the Eva site (40BN12).

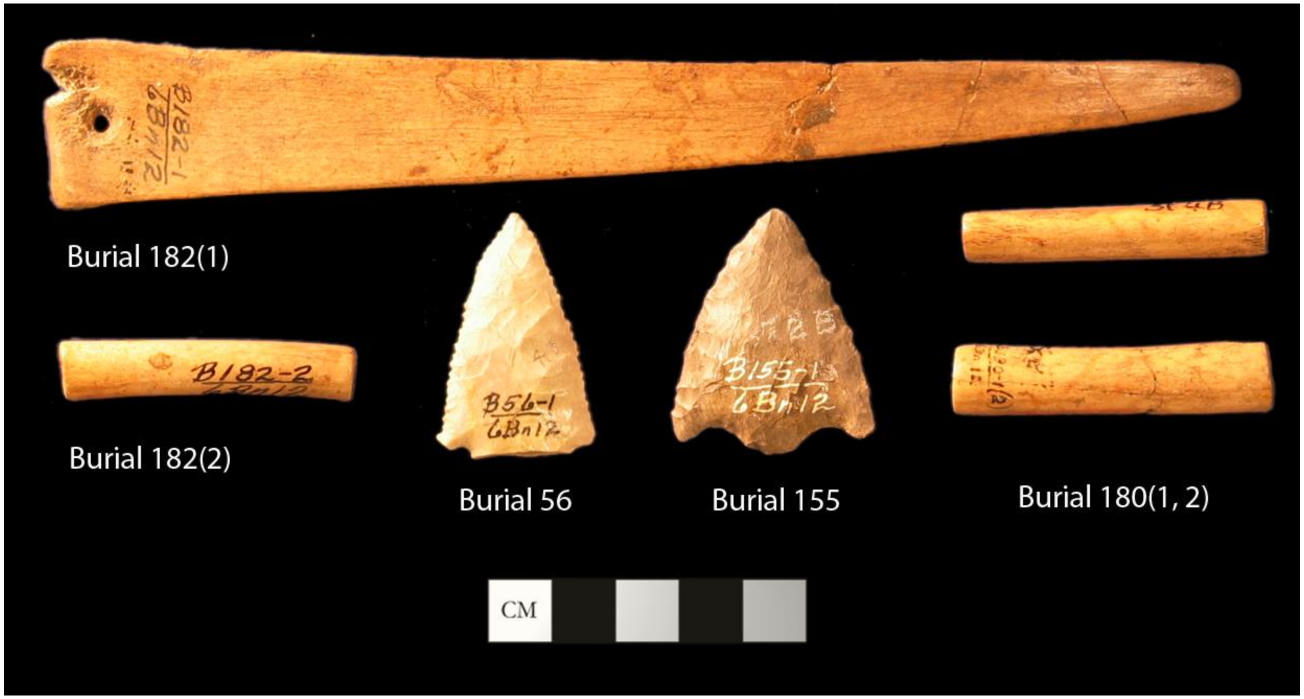

Figure 6.13. Selected artifacts associated with four Stratum IV burials at the Eva site (40BN12): Bone spatulate and bead (Burial 182); two bone beads (Burial 180); Morrow Mountain / Eva II hafted biface (Burial 155); unidentified hafted biface (Burial 56).

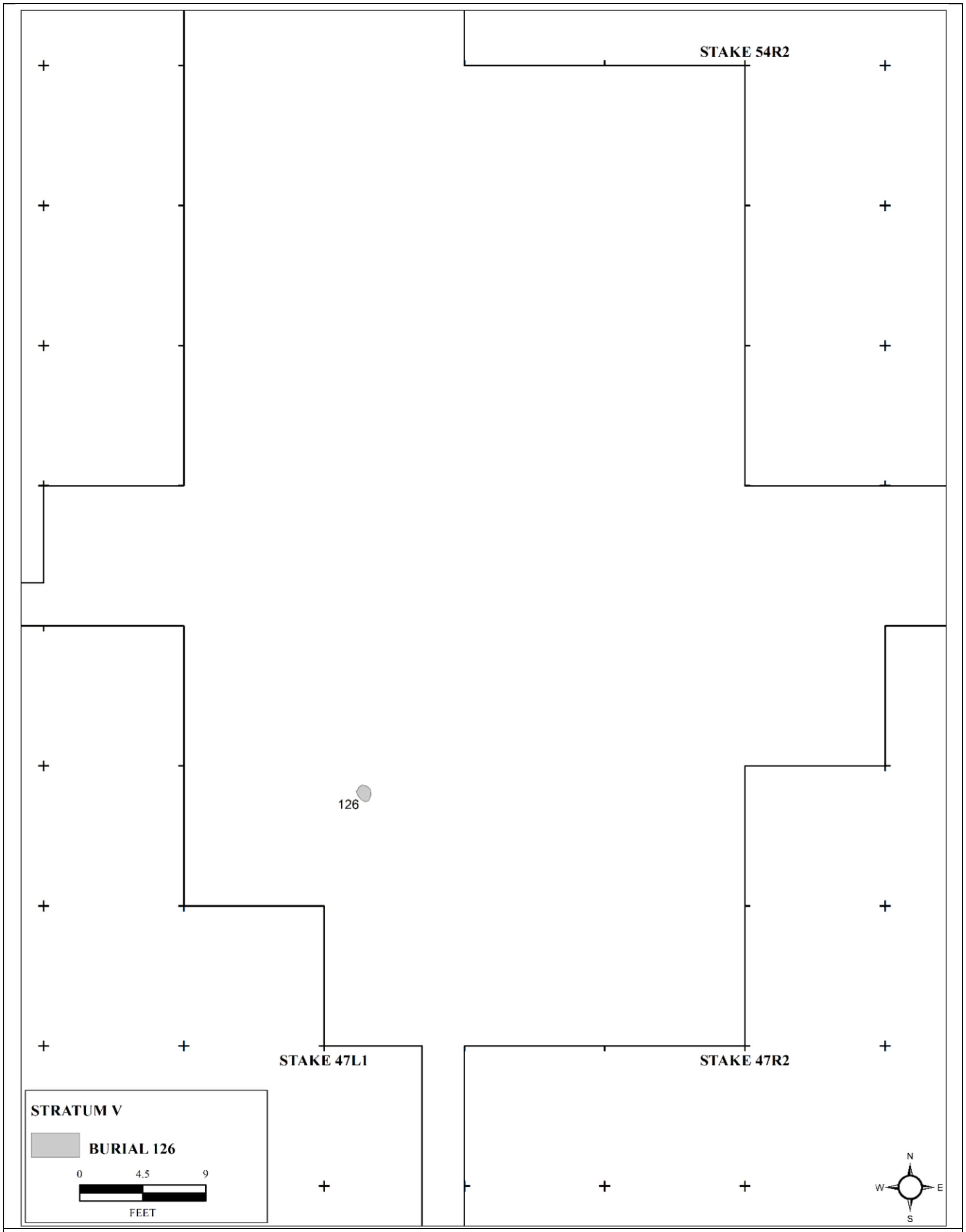

Figure 6.14. Burial 126 in Stratum V at the Eva site (40BN12).

bone tool with a perforation at one end, and two projectile points. Three of the graves included only a single variety of object; one (Burial 182), a young woman, contained two.

Stratum V

The original site report did not describe any burials present in Stratum V. However, original field documents indicated a single burial – Burial 126, an infant – in that deposit, recovered in the southwestern corner of the excavation block (Figure 6.14). The skeleton was in good condition, and no artifacts were found associated with the grave.

Features

As noted previously, contrary to the 1961 site report, non-burial features were not rare at Eva (Table 6.2). There were 87 documented, although most were recorded only on the site's detailed plan map. The stratum of association was indicated using a color-coded system employed by the map's illustrator (Osborne). Of the features indicated on the map, most bore descriptive labels identifying them by type ("ash," "burned soil," "charcoal"), however twenty-nine were not classified. Ten features were specifically documented on dedicated feature forms, given identifying numbers, and were labeled on the site map.

Stratum I

There were sixteen features documented in Stratum I (Figure 6.15), including the numbered Feature 1 (Figure 6.16), a series of superimposed thermal features that in total measured approximately 1.8 m east-west by 0.97 m north-south and were thought to represent

Table 6.2. All documented features* at the Eva site (40BN12).

Feature	Stratum of Assoc.	Meters below datum	Grid Square	Dimensions (cm)			Description (from original field forms, on file at McClung Museum, University of Tennessee, Knoxville)
				N-S	E-W	Depth	
Feature 1	1	0.85	51CA	182.88	97.54	30.48	Area of superimposed hearths, or at least areas of burned clay. Association of artifacts (hammerstone, awl, antler, drill, groundstone tool, groundstone anvil) is open to doubt. If they are associated, they would go with the lower and more extensive area.
Feature 2	2	1.92	50R2		Not recorded.		A small prepared bed of mussel shells, four of them arranged tulip fashion, a small terrapin shell placed top down in these and the whole covered with shell. Possibly a fortuitous placement but more likely the product of "kindergarten."
Feature 3	2	1.58	49CA	54.86	73.15	21.34	Small mass of fire cracked and otherwise broken rocks, shale and four "boiling stones" nearby.
Feature 4	2	1.40	51R1	57.91	54.86	36.58	Shell heap. Many of the shells show exposure to heat and smoke. Layer of ash and charcoal below. Shells and a layer of ash below that.
Feature 5	2	1.43	52R1	39.62	6.10	6.10	Small area of broken, tabular shales.
Feature 6	2	1.34	52R1		Not recorded.		Agglomeration of turkey bones.
Feature 7	4	2.19	50R1	Not recorded.		15.24	Pile of rock slabs, miscellaneous rocks, antler and stone artifacts found throughout the top of Stratum IV. Soil here is ashy and full of pink (heat treated?) [debitage]. Rich midden and artifact zone, rocks are fire cracked and lie on ash and char, but the bones in this ash and in the midden below are not burned.
Feature 8	2	1.77	50R1	Not recorded.		24.69	Rock pile; two pestles, three round "boiling stones," pieces of chert.
Feature 9	2	1.55	51R2		Not recorded.		Small animal skeleton. Possibly a member of the Mustelidae (mink / weasel) or a young dog. Made a feature of this merely to call attention. May have been a small burrowing animal that died in its burrow.
Feature 10	4	2.29	51R1	ca. 30.48 cm in diameter		12.19	Pile of bifacial preforms.
N = 7	Str. 2, n = 6 Str. 3, n = 1	Not recorded.	Multiple		Not recorded.		Charred or ash.
N = 18	Str. 1, n = 1 Str. 2, n = 8 Str. 3, n = 4 Str. 4, n = 3 Str. 5, n = 2	Not recorded.	Multiple		Average area (sq m): 0.06 Average area (sq m): 0.17 Average area (sq m): 0.17 Average area (sq m): 0.29 Average area (sq m): 0.29		Thermal feature (burned soil / clay).
N = 21	Str. 1, n = 2 Str. 2, n = 5 Str. 4, n = 14	Not recorded.	Multiple		Not recorded.		Cache / rock cluster.
N = 1	Str. 3	Not recorded.	51L1		Diameter: 39 cm		Pit.
N = 30	Str. 1, n = 12 Str. 2, n = 7 Str. 3, n = 4 Str. 54, n = 6 Str. 5, n = 1	Not recorded.	Multiple		Not recorded.		No description (possibly burned soil / clay areas).

* The area of features (where included) was calculated from the Eva site map in ESRI ArcGIS 9.3.

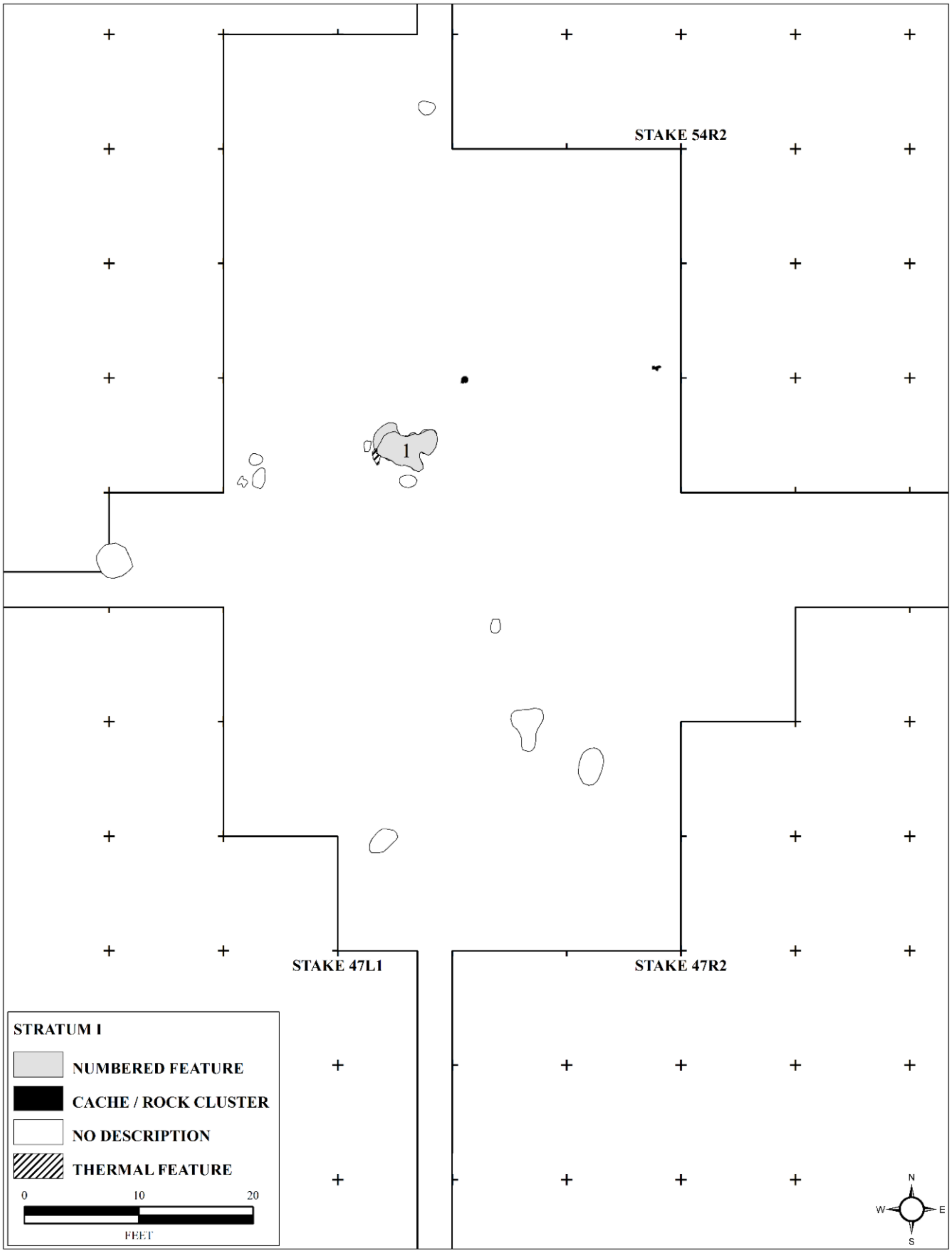

Figure 6.15. Features associated with Stratum I at the Eva site (40BN12).

Figure 6.16. Superimposed fired clay hearths (Feature 1) in Square 51CA, Stratum I, at the Eva site (40BN12) (facing east). Image from WPA / TVA Archives, courtesy Frank H. McClung Museum, The University of Tennessee.

hearths associated with occupation of the site. Six artifacts (three groundstone, one bone tool, and two chipped stone) were recovered in or around Feature 1.

Two small groupings of stones were located in the northern half of the block, and one additional area of burned clay was identified in the eastern half. Also indicated are eleven features of an unidentified nature, but likely to represent areas of burned clay, and distributed throughout the area of the excavation block. One was also identified in the southern extent of the north-south exploratory trench.

The number of features in Stratum I were too few to provide a basis for the identification of spatial patterning of activities during the period associated with that stratum's deposition. However, it is notable that Feature 1 was situated on what, at the time of occupation, would have been high ground at the site, suggesting repeated use of the crest of the Eva mound by occupants of the site during the period coinciding with the deposition of Stratum I.

Stratum II

Most features at Eva (n = 33, 37.9%), including numbered features 2, 3, 4, 5, 6, 8 and 9, were associated with Stratum II, and features within that deposit occurred throughout the main excavation area (Figure 6.17), exhibiting no spatial segregation from the large number of burials in that stratum.

Feature 2 constituted appeared to constitute a single event, and was represented by "[a] small bed of mussel shells, four of them arranged tulip-fashion [with] a small terrapin shell placed top down in these and the whole covered with shell…" (Feature form on file at the Frank H. McClung Museum of Natural History and Culture, University of Tennessee, Knoxville). The principal investigator suggested that the arrangement was the "product of kindergarten" (i.e.,

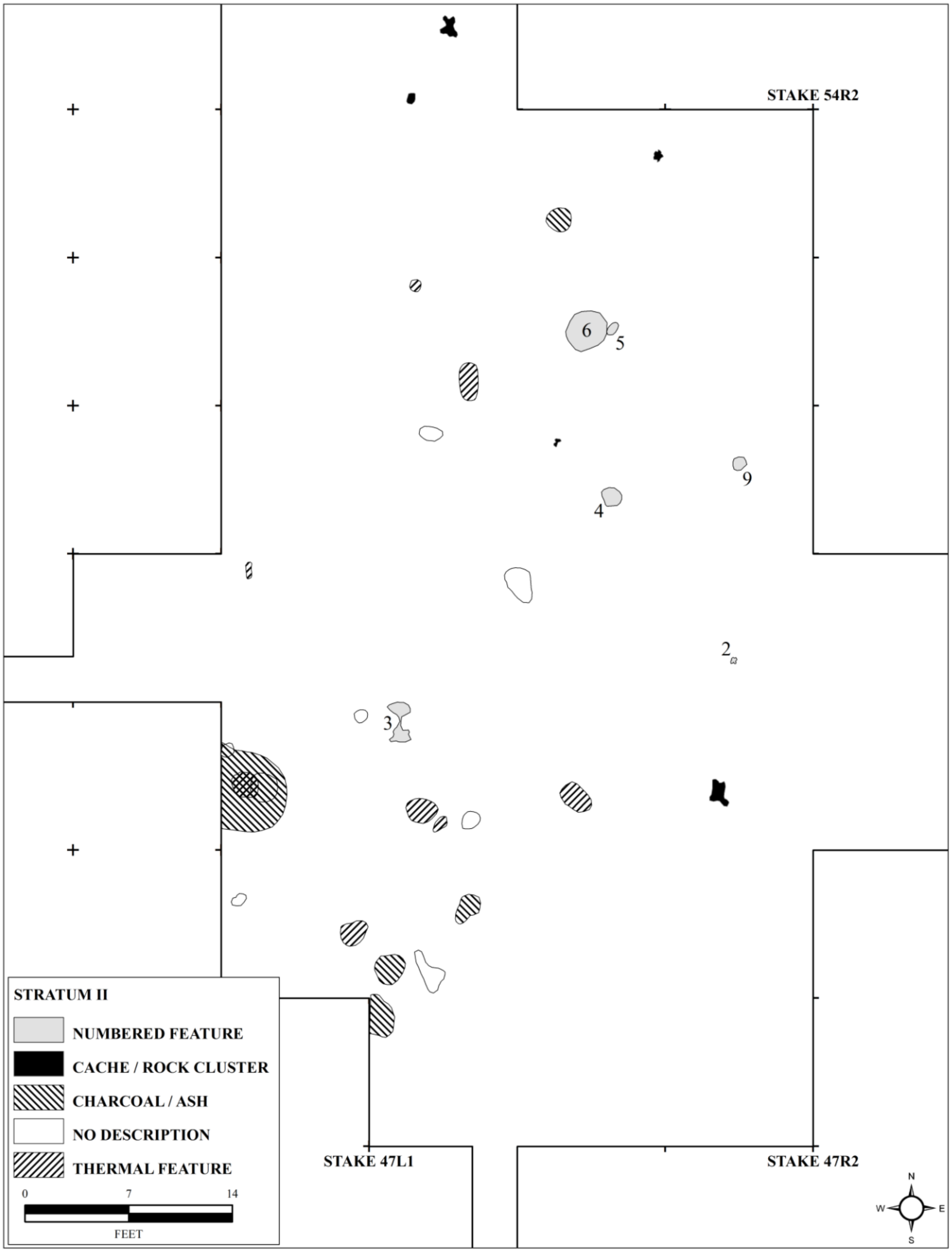

Figure 6.17. Features associated with Stratum II at the Eva site (40BN12).

children playing), an interpretation that was later repeated by Lewis and Kneberg-Lewis (1961:15). The feature was located at the same depth, and approximately 0.54 m from Burial 26, an infant, but there was no apparent association documented.

Feature 3 consisted of a grouping of fire cracked rock and shale, as well as small amounts of ash and burned clay. An end scraper and a fragment of red ochre were also recovered.

A small area of burned or otherwise thermally altered shells, ash, and charcoal was defined as Feature 4, and was located near and at approximately the same depth (but was described specifically as not associated with) Burial 101.

A small cluster of “broken, tabular shales” was designated as Feature 5, and was situated in the northeastern quadrant of the main block.

Feature 6, a small “[a]agglomeration of turkey bones” (Feature form on file, McClung Museum) was directly adjacent to Feature 5.

The skeletal remains of a small animal were identified approximately 1.5 m west of the east wall of the excavation block, and were designated Feature 9. The bones were highly fragmentary and not conclusively identifiable as canine. They were described as “[p]ossibly a member of the Mustelidae” or other burrowing animal, or the remains of a small dog.

Unnumbered features in Stratum II included six concentrations or ash or charcoal, five clusters or groupings of stones, eight thermal features and seven unlabeled (but probably) thermal features. There was little patterning in the distribution of features, numbered or unnumbered, throughout the stratum. A visual inspection suggests that Stratum II in the southeastern and northwestern quadrants of the block contained fewer features, but given the lack of depth information for most, full assessment of features’ spatial relationships is not possible.

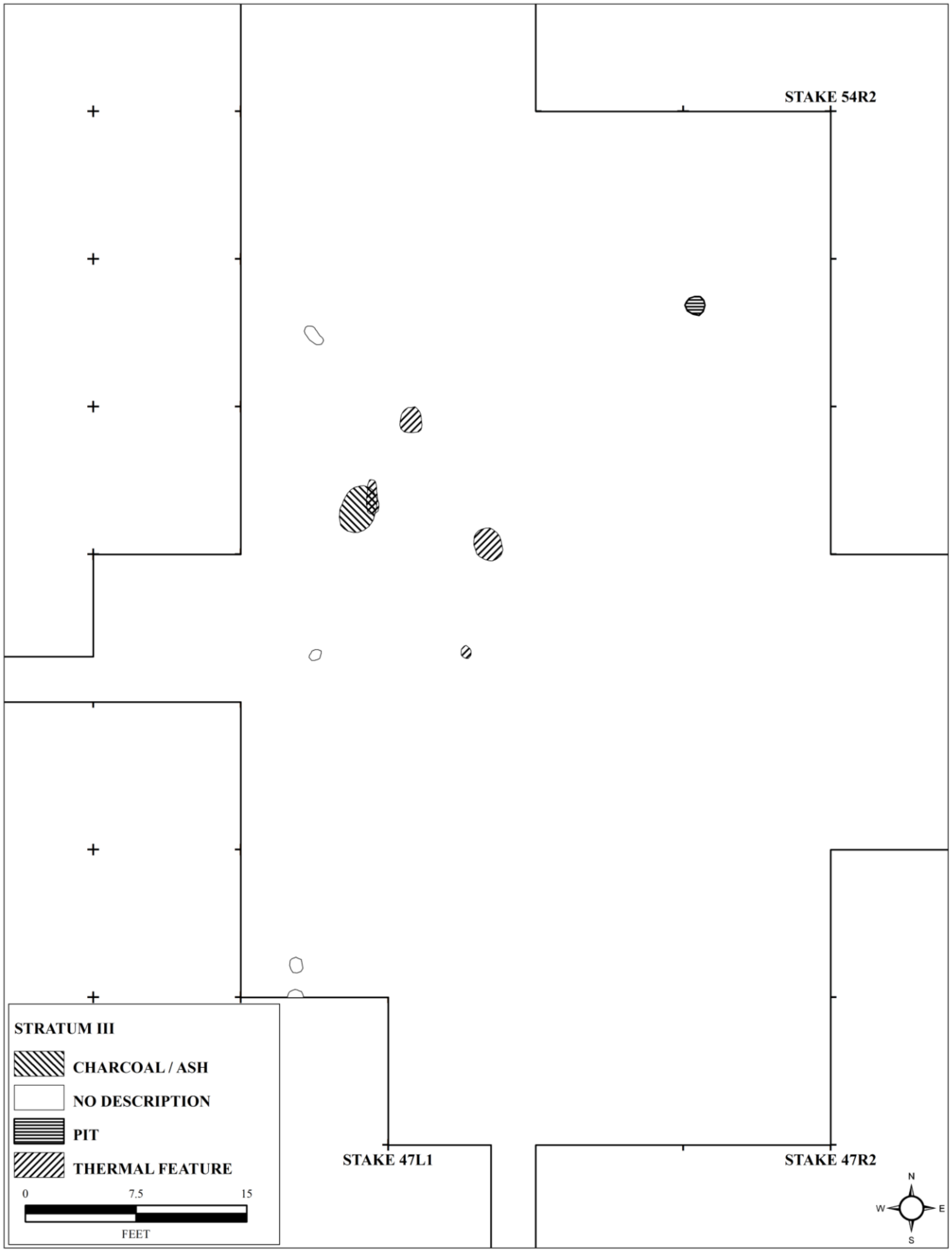

Figure 6.18. Features associated with Stratum III at the Eva site (40BN12).

Stratum III

There have previously been no features reported for the deposit delineated as Stratum III, and a description provided by Lewis and Lewis (1961:9) suggests that the stratum is best understood as a flood deposit or resulting from a period of prolonged submersion. However, the presence of ten features on or within Stratum III is indicated on the primary site map (Figure 6.18). All were located in the western half of the block, and most were identified as thermal features (n = 4) or were probable thermal features (n = 4). A large concentration of ash near the west edge of the block, and a possible pit was situated in the eastern half of the excavation.

Stratum IV

Twenty-five features, including two numbered (Features 7 and 10), were associated with Stratum IV. Most were located in the northeastern half of the site block (Figure 6.19), paralleling in distribution the locations of most Stratum IV burials.

Feature 7 (Figure 6.20) was represented by a thick (ca. 8 – 24 cm) concentration of fire cracked rock, fragments of cut antler (FS 4007.001 – 4007.002), a bone bead (FS 4007.004), three antler implements (FS 4007.003, 4007.006, 4007.007) and one biface (FS 4007.005). The field description noted the presence of ash in and around the main portion of Feature 7, and large quantities of “pink, jasper [flint] chips” (Feature form on file at McClung Museum), suggesting that the materials had been thermally altered, although there is no indication of the intentionality (or lack thereof) of that alteration, or whether Feature 7 represented the location of the fire where that alteration occurred. A concentration of ash and charcoal lay at the base of the feature, but no burning of the bone and antler materials found in the feature was noted.

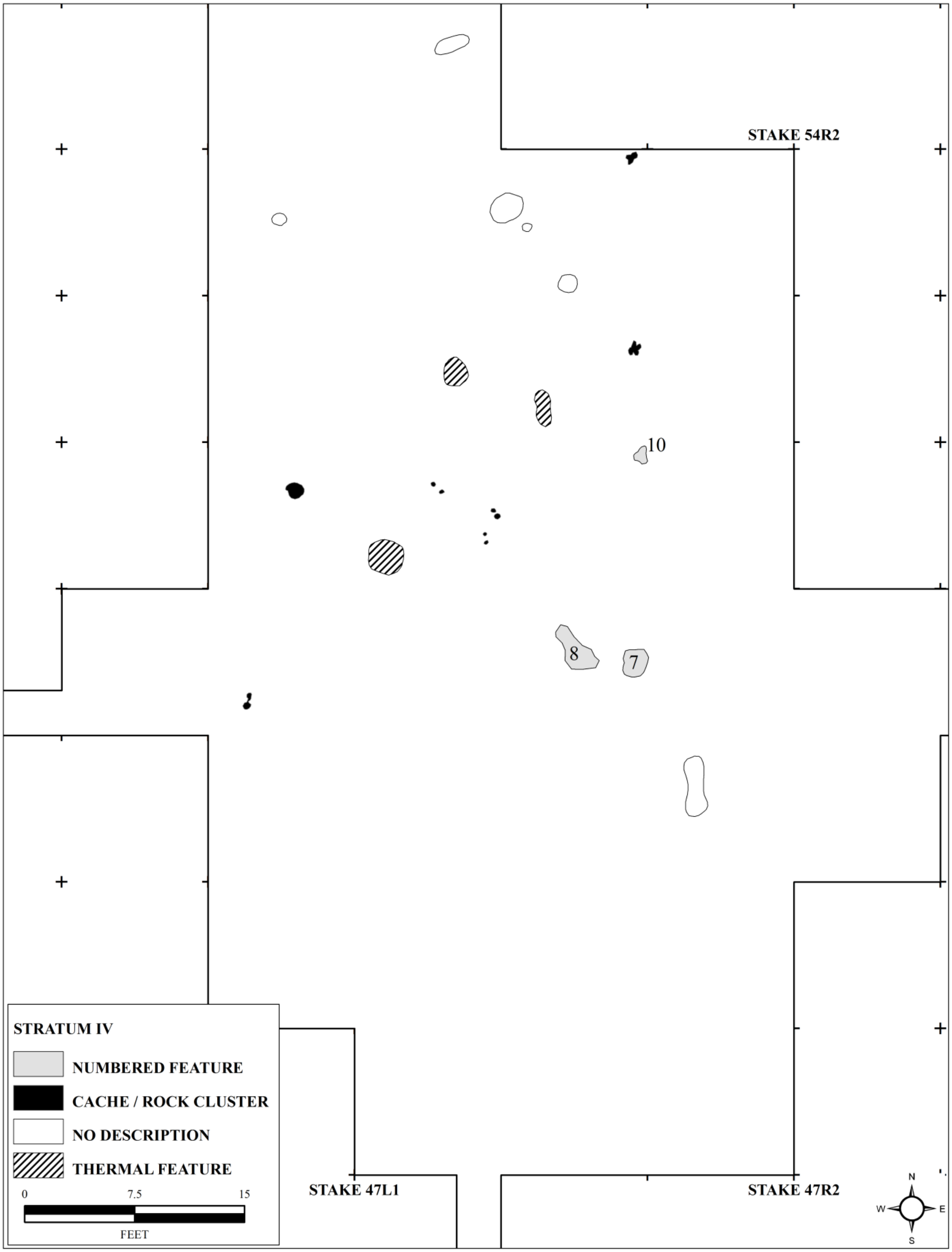

Figure 6.19. Features associated with Stratum IV at the Eva site (40BN12).

Figure 6.20. Feature 7 in Square 50R1, Stratum IV, at the Eva site (40BN12) (facing south). Image from WPA / TVA Archives, courtesy Frank H. McClung Museum, The University of Tennessee.


Figure 6.21. Un-numbered features in Squares 52R1 and 52CA, Stratum IV, at the Eva site (40BN12) (facing southwest). Image from WPA / TVA Archives, courtesy Frank H. McClung Museum, The University of Tennessee.

Feature 8 was a small grouping of three quartzite “boiling stones,” two pestles (FS 4008.001 and FS 4008.002), and an unspecified number of fragments of chert.

Feature 10 was a cache or pile of chipped stone preforms (n = 9) and one Eva I projectile point (FS 4010.001) located near the base of Stratum IV in the northeastern quadrant of the site block.

Three additional thermal features, fourteen stone or rock clusters (e.g., Figure 6.21), and six unidentified features (possibly thermal features) were also indicated on the site map as being associated with Stratum IV.

Stratum V

Three unnumbered features were documented in Stratum V. Two were identified as thermal features, one of which was located near the western extent of the east-west exploratory trench and the second in the southern half of the main block near the southern wall. The third may have been a thermal feature as well, and was situated closer to the center of the site block (Figure 6.22).

Cultural Material

Abundant cultural material was recovered from Eva’s deposits. Although dominated by chipped stone, significant numbers of artifacts of other material types were also recovered. Artifacts manufactured from perishable materials such as bone and antler were generally relatively well-represented, a characteristic of shell-bearing sites due to the favorable chemical environment resulting from large amounts of calcium carbonate dispersed into the site matrix from decaying mollusk shells.

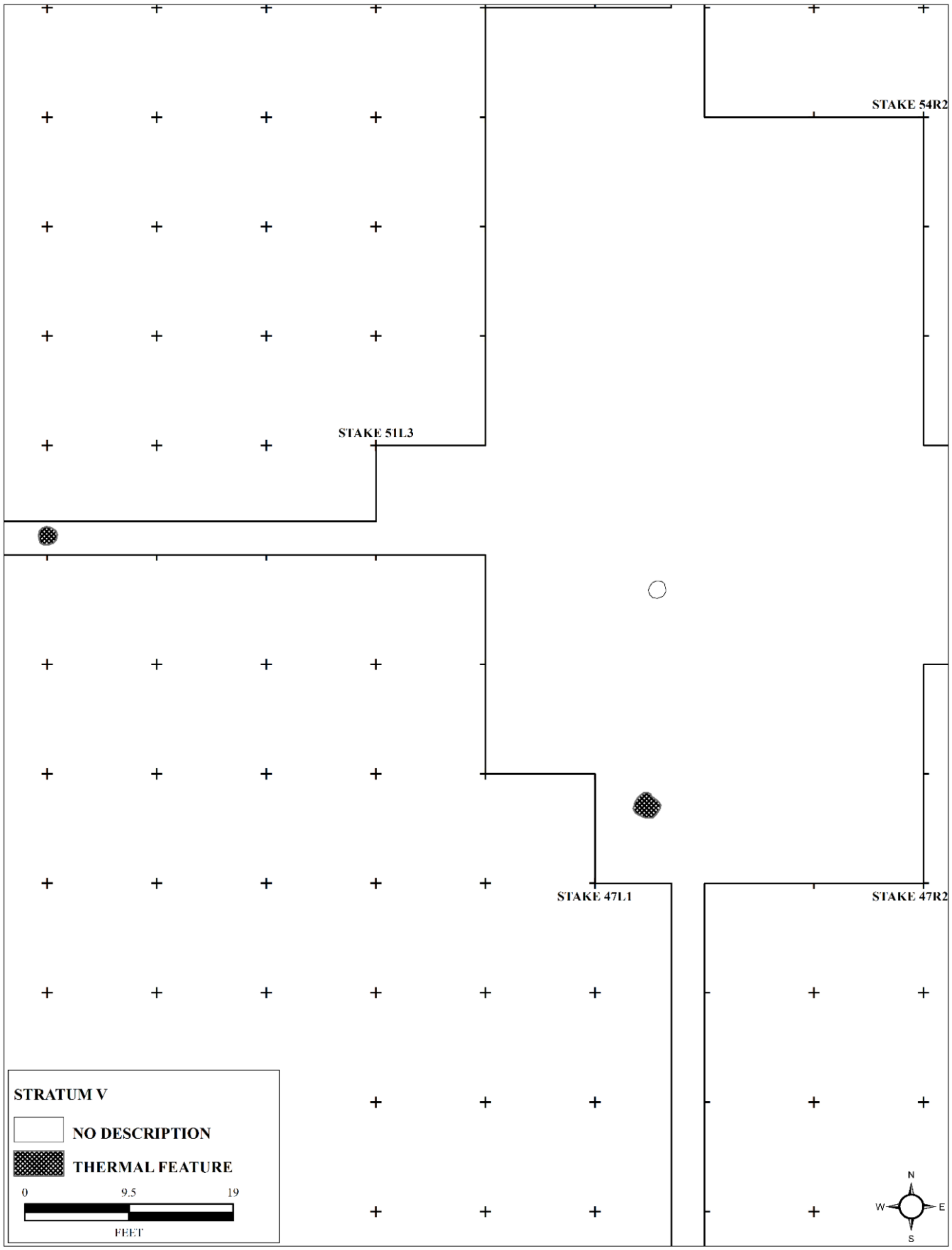

Figure 6.22. Features associated with Stratum V at the Eva site (40BN12).

Table 6.3. All artifacts recorded at the Eva site (40BN12), grouped by material and classification, and sorted by provenience.

	ARTIFACT CLASSIFICATION	PROVENIENCE						
		Unassigned	Stratum I	Stratum II	Stratum III	Stratum IV	Stratum V	TOTALS
Chipped Stone	**Hafted Bifaces**							
	PPK	89	122	141	31	193	12	588
	PPK-Drill	1	8	8	3	26	0	46
	PPK-Scraper	4	5	3	0	0	0	12
	All Hafted Bifaces	**94**	**135**	**152**	**34**	**219**	**12**	**646**
	Bifacial Drills							
	Lobe	2	0	4	2	7	0	15
	Large triangular expanding	0	0	1	2	3	0	6
	Shaft only	2	1	2	0	1	0	6
	Expanding	1	0	2	0	2	0	5
	Perforator or borer	2	2	0	0	0	0	4
	T-shaped	0	0	1	0	3	0	4
	Broken	2	0	0	0	0	0	2
	Small triangular expanding	0	0	0	1	1	0	2
	Other	0	0	1	0	0	0	1
	Unidentified	0	5	9	1	3	0	18
	All Drills	**9**	**3**	**11**	**5**	**17**	**0**	**63**
	Other Bifaces							
	Preform	22	4	9	3	102	6	146
	Triangular	3	3	5	2	9	0	22
	Lanceolate	2	2	0	0	4	0	8
	Ovate	4	0	0	0	0	0	4
	Discoidal	1	0	0	0	2	0	3
	Scraper	2	1	0	0	3	0	6
	Other	0	0	1	0	0	0	1
	Unidentified	7	4	10	3	20	2	46
	All "Other" Bifaces	**41**	**14**	**25**	**8**	**140**	**8**	**236**
	Unifaces							
	Scraper	3	0	7	4	18	2	34
	Flake	5	0	2	1	0	1	9
	Denticulate	0	0	0	0	0	0	1
	All Unifaces	8	0	9	5	18	3	**44**
	TOTAL, Chipped Stone	**152**	**157**	**206**	**53**	**397**	**23**	**989**
Ground Stone	Pestle	3	10	22	2	4	2	43
	Hammerstone	1	6	6	3	0	1	17
	Bannerstone	1	2	5	0	1	1	10
	Anvil	0	0	1	2	0	0	3
	Pipe	0	3	0	0	0	0	3
	Abrader	0	0	1	0	1	1	3
	Gorget	1	1	0	0	0	0	2
	Grindstone	1	1	0	1	0	0	3
	Nutting stone	0	0	1	1	0	0	2
	Other	8	2	5	2	5	0	22
	TOTAL, Ground Stone	**15**	**25**	**41**	**11**	**11**	**5**	**108**

Table 6.3. Continued.

	ARTIFACT CLASSIFICATION	PROVENIENCE						
		Unassigned	Stratum I	Stratum II	Stratum III	Stratum IV	Stratum V	TOTALS
Antler	Socketed, pointed	5	2	7	4	10	1	29
	Socketed, non-pointed	0	1	5	0	5	0	11
	Latitudinally drilled	0	1	1	1	0	0	3
	Spatulate	0	0	1	1	3	0	5
	Modified tine	7	5	20	4	21	0	57
	Other antler	126	15	57	16	72	5	291
	TOTAL, Antler	**138**	**24**	**91**	**26**	**111**	**6**	**396**
Bone	Pointed w/articular surfaces	2	3	9	0	8	0	22
	Shaped / modified	10	4	15	1	8	0	38
	Pointed, other	51	41	99	19	84	11	305
	Modified tooth	3	0	2	1	7	0	13
	Bead	6	0	6	0	1	0	13
	Other bone	132	21	68	6	20	1	248
	Ritual / ceremonial	2	2	2	0	7	0	13
	TOTAL, Modified Bone	**206**	**71**	**201**	**27**	**135**	**12**	**652**
Other	Coprolite	0	0	0	0	8	0	8
	Geofact	0	0	0	0	0	0	0
	Red ochre (sample)	7	7	19	1	10	2	46
	Copper	0	0	1	0	0	0	1
	Shell (sample)	0	0	2	0	0	0	2
	Pottery	0	5	1	0	2	0	8
	Other unidentified	3	13	18	4	5	0	43
	TOTAL, Other Materials	**10**	**25**	**41**	**5**	**25**	**2**	**108**
	TOTAL, By Stratum	**521**	**302**	**580**	**122**	**679**	**48**	
				TOTAL, ALL CULTURAL MATERIALS EXAMINED				2252

A total of 2,252 items were recorded in the site field specimen (F.S.) log during excavation. These included 2,104 unassociated items and 148 specimens that were recovered either from feature (n = 33) or burial (n = 115) context. Some items appear to have been noted and identified in the F.S. log, but were discarded in the field during the excavation or in the project laboratory later. These included objects such as geofacts and other seemingly unmodified materials, such as animal bone. Some FS entries also included multiple artifacts, some or all of which were not retained.

Table 6.3 presents a complete listing of artifacts by material, classification, and stratigraphic provenience. Artifacts were classified either by personal inspection or examination of photographs, or by the original description recorded on the F.S. log at the time of the item's entry into that list. Items that could not be inspected visually but had been identified in the log were classified based on the log identification (e.g., "stemmed proj. pt." = "PPK, Unidentified Stemmed").

A complete by-item listing of all records in the Eva site's F.S. log is provided in Appendix B.

Summary of Cultural Material by Provenience

Chipped Stone

As with other large-scale archaeological projects of the 1930s and 1940s, soil screening was not used during excavations – the established practice of the time is often referred to as "shovel sorting" – and thus the total number of chipped stone materials recovered at Eva was only a small proportion of the lithic materials likely present. There are multiple references in the original site documentation by the principal investigator to large amounts of debitage encountered throughout the excavation, but standard recovery practices of the period did not include the retention of chipped stone debris, a fact noted with some regret by Lewis and Lewis (1961:25).

Despite the lack of chipped stone debitage in the recovered site assemblage, the single largest category of cultural materials recovered at Eva consisted of chipped stone artifacts, that is, formal tools (Table 6.3), comprising 43.9% of the total site assemblage (n = 989). Most were classified as hafted bifaces (n = 646; 65.3% of all chipped stone), a total that includes projectile points (n = 589), probable drills made from recycled projectile points or exhibiting similar haft morphology (n = 46) and scrapers made from broken or modified projectile points (n = 12). Other typological classes used included drills not exhibiting temporally diagnostic haft morphology (n = 63), unifacial tools (n = 44), and bifaces with no identifiable haft morphology (n = 236).

Stratum IV contained the majority of chipped stone artifacts (n = 398), nearly twice the next largest proportion of chipped stone by stratum (Stratum II: n = 206). Approximately equivalent numbers occurred in the Stratum I (n = 157) and unassociated (n = 152) proveniences, and Stratum III (n = 54) and Stratum V (n = 23) contained the fewest (Figure 6.23).

Groundstone

In contrast with chipped stone artifacts, which were found in significant numbers at Eva, far fewer groundstone items were recorded or recovered (n = 108; 4.8% of the total materials documented). Major functional classes distinguished included pestles and other tools associated with grinding and processing (e.g., anvils, nutting stones, and grinding stones),

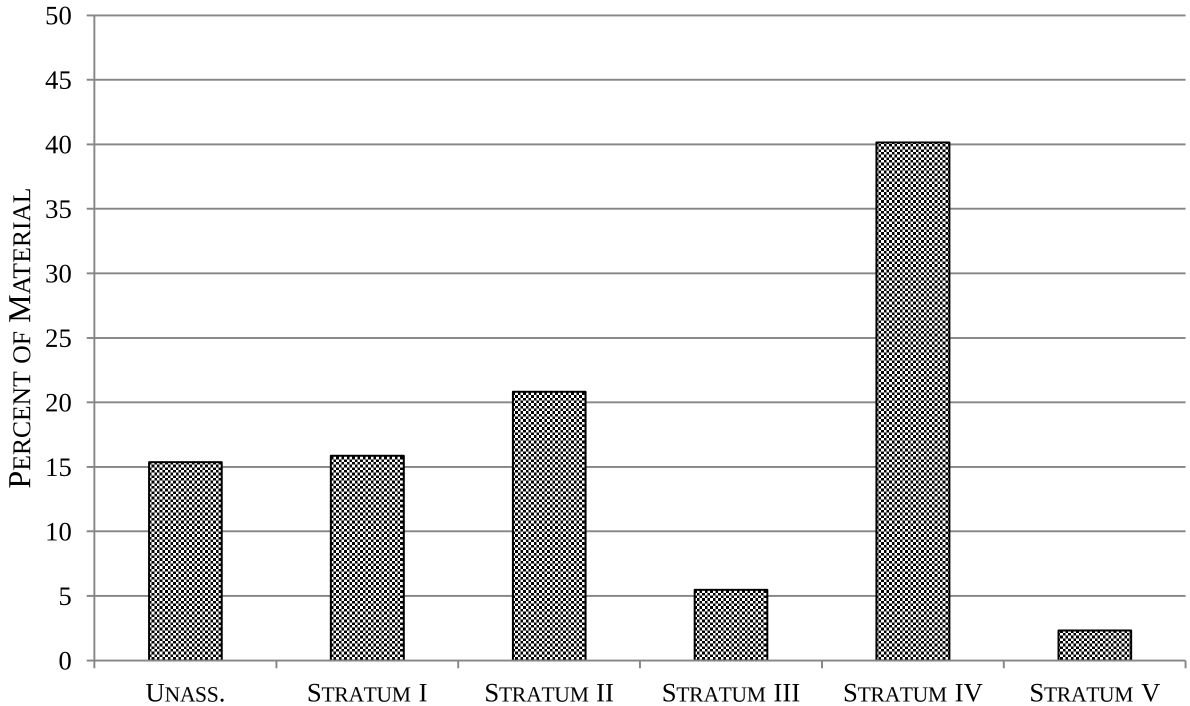

Figure 6.23. Proportions of chipped stone artifacts at the Eva site (40BN12) by provenience.

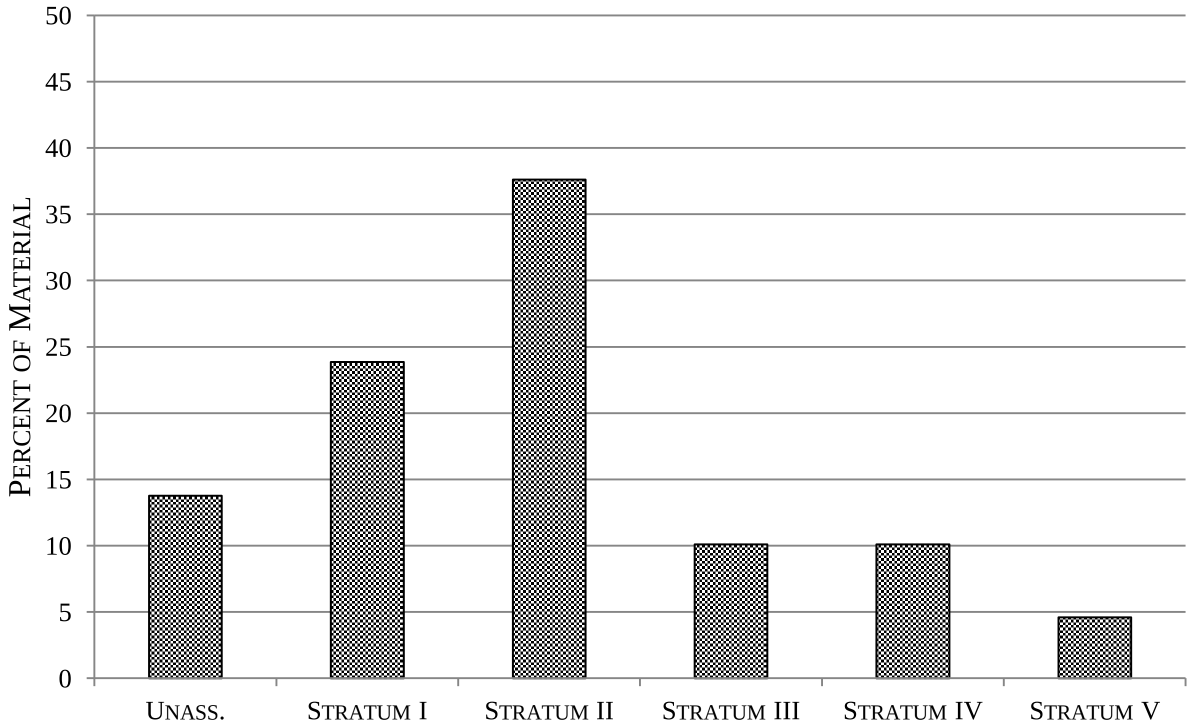

Figure 6.24. Proportions of groundstone artifacts at the Eva site (40BN12) by provenience.

implements used in the manufacture or maintenance of other tools and equipment (e.g., hammerstones and abraders), and artifacts such as bannerstones, gorgets, and a trio of possible pipes.

Most documented groundstone items were found in Stratum II (n = 41) and Stratum I (n = 26). Equal numbers (n = 11) were associated with Stratum III and Stratum IV, and two were found in Stratum V. A total of fourteen were listed in the F.S. log but were not assigned to a provenience (Figure 6.24).

Bone and Antler

As noted previously (see Chapter 5, "Bone and Antler") the chemical properties of shell-bearing deposits provide significant protection for artifacts made from perishable organic materials, particularly bone and antler. At Eva, considerable numbers of artifacts of antler (n = 396; 17.6% of the total site assemblage) and bone (n = 652; 28.9% of the site assemblage) were recorded or recovered.

By provenience, antler and bone artifacts were most frequent in the site's shell-bearing deposits. Stratum IV (n = 111) contained slightly more antler artifacts than Stratum II (n = 91), but fewer bone (Stratum IV, n = 135; Stratum II, n = 201). Bone and antler artifacts in Stratum I, III, and V were comparatively infrequent, but the large number of items of "unassociated" provenience may indicate misattribution of bone or antler artifacts to any of the five stratigraphic proveniences, or to all of them (Figure 6.25; Figure 6.26).

A substantial amount of unmodified animal bone was also recovered at Eva, representing the only reasonably well-documented assemblage of its type among any of the

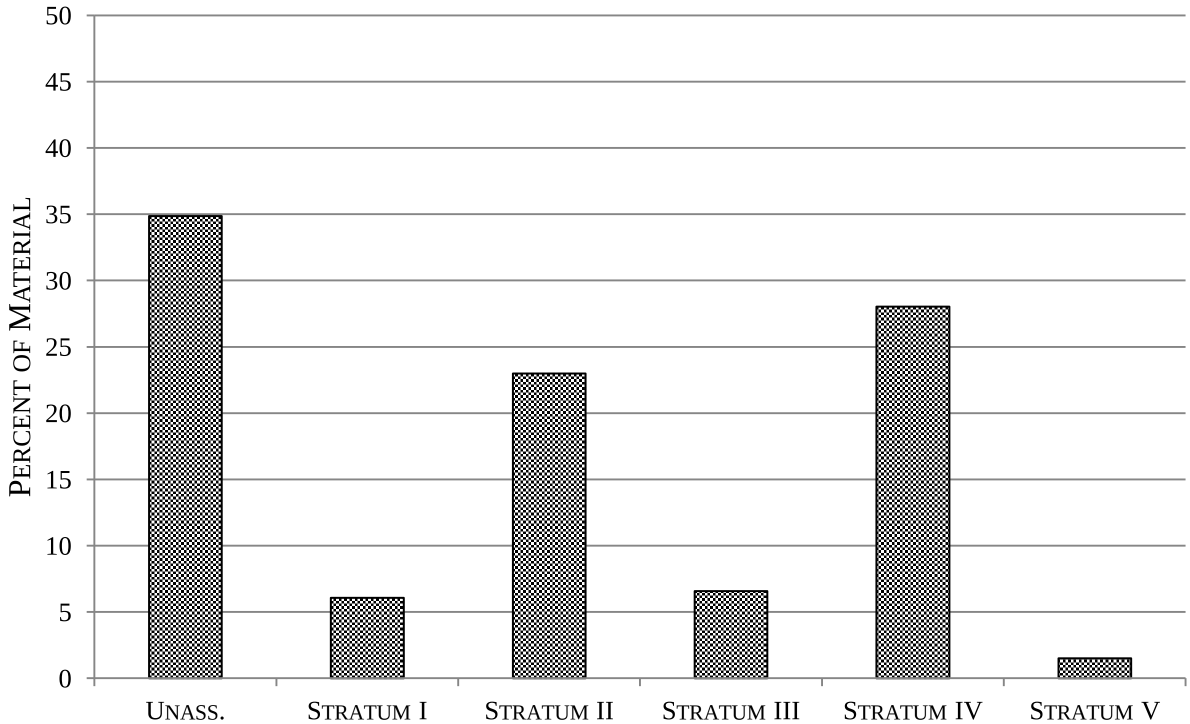

Figure 6.25. Proportions of antler artifacts at the Eva site (40BN12) by provenience.

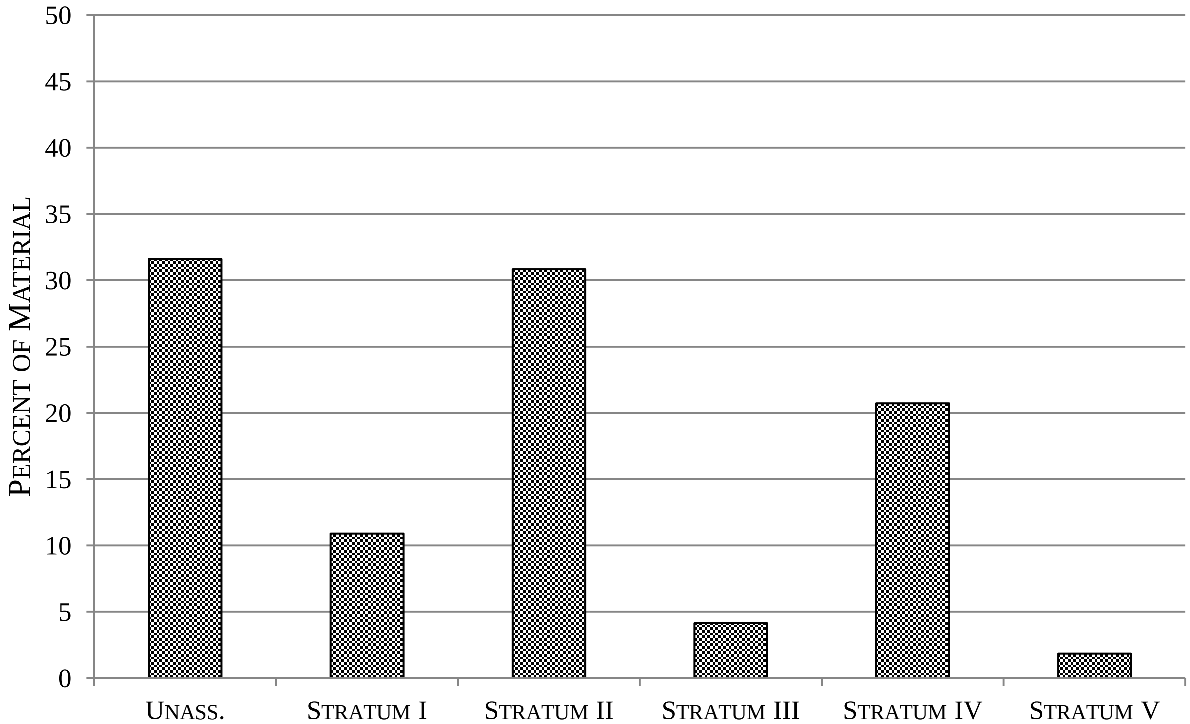

Figure 6.26. Proportions of bone artifacts at the Eva site (40BN12) by provenience.

Table 6.4. Unmodified faunal material (NISP) by provenience.

TAXON		Stratum I NISP	Stratum I %	Stratum II NISP	Stratum II %	Stratum III NISP	Stratum III %	Stratum IV NISP	Stratum IV %	Stratum V NISP	Stratum V %	TOTALS NISP	TOTALS %
Homo sapiens	(Human)	87	10.56	290	9.50	24	3.21	62	0.44	3	0.44	466	2.40
Canis lupus familiaris	(Dog)	18	2.18	206	6.75	1	0.13	46	0.33	22	3.23	293	1.51
Odocoileus virginianus	(Deer)	525	63.71	1819	59.56	611	81.79	12349	87.46	568	83.41	15872	81.71
g. *Meleagris*	(Turkey)	22	2.67	102	3.34	23	3.08	168	1.19	15	2.20	330	1.70
Turtle, undiff.	(Turtle)	47	5.70	127	4.16	23	3.08	465	3.29	10	1.47	672	3.46
Bird undiff.	(Bird)	16	1.94	79	2.59	2	0.27	24	0.17	4	0.59	125	0.64
Procyon lotor	(Raccoon)	32	3.88	170	5.57	16	2.14	277	1.96	19	2.79	514	2.65
Lontra canadensis	(Otter)	0	0.00	2	0.07	0	0.00	1	0.01	0	0.00	3	0.02
Castor canadensis	(Beaver)	1	0.12	21	0.69	3	0.40	92	0.65	5	0.73	122	0.63
Didelphis virginiana	(Opossum)	11	1.33	44	1.44	5	0.67	53	0.38	2	0.29	115	0.59
Fish, undiff.	(Fish)	11	1.33	37	1.21	1	0.13	24	0.17	2	0.29	75	0.39
g. *Ursus*	(Bear)	13	1.58	27	0.88	26	3.48	458	3.24	12	1.76	536	2.76
g. *Sylvilagus*	(Rabbit)	4	0.49	29	0.95	0	0.00	4	0.03	5	0.73	42	0.22
Marmota monax	(Groundhog)	1	0.12	15	0.49	0	0.00	0	0.00	0	0.00	16	0.08
Drumfish	(Drumfish)	31	3.76	77	2.52	10	1.34	89	0.63	14	2.06	221	1.14
Ondatra zibethicus	(Muskrat)	1	0.12	1	0.03	0	0.00	0	0.00	0	0.00	2	0.01
Neovison vison	(Mink)	1	0.12	4	0.13	0	0.00	0	0.00	0	0.00	5	0.03
g. *Rattus*	(Rat)	3	0.36	1	0.03	0	0.00	0	0.00	0	0.00	4	0.02
g. Puma	("Wildcat")	0	0.00	2	0.07	0	0.00	6	0.04	0	0.00	8	0.04
g. *Vulpes*	(Fox)	0	0.00	1	0.03	1	0.13	0	0.00	0	0.00	2	0.01
Squirrel, undiff.	(Squirrel)	0	0.00	0	0.00	0	0.00	1	0.01	0	0.00	1	0.01
Canis lupus	(Wolf)	0	0.00	0	0.00	1	0.13	0	0.00	0	0.00	1	0.01
	TOTALS	**824**		**3054**		**747**		**14119**		**681**		**19425**	

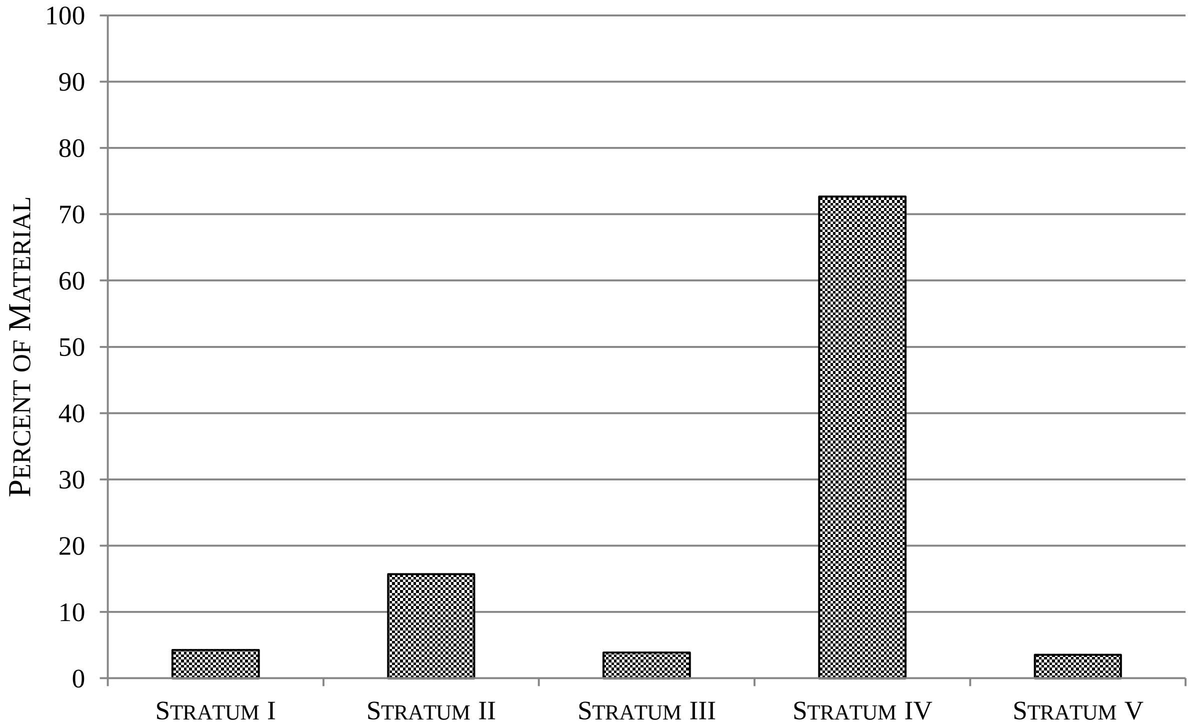

Figure 6.27. Proportions of unmodified animal bone documented at the Eva site (40BN12) by provenience.

seven sites examined in this project (Table 6.4). Unmodified animal bone was not retained for later analysis, but was collected, identified, and discarded in the field during the site's excavation. Records indicate that the overwhelming majority of faunal material at Eva derived from Stratum IV (NISP = 14,119; 72.7% of all identified faunal bone). Only 3,054 specimens were identified in Stratum II (15.7%). Stratum I (NISP = 824; 4.2%, Stratum III (NISP = 747; 3.8%) and Stratum V (NISP = 681; 3.5%) contained comparatively insignificant amounts of unmodified faunal material, by comparison (Figure 6.27).

Temporally Diagnostic Hafted Bifaces by Provenience

A detailed examination of all temporally diagnostic hafted bifaces from the Eva assemblage that could be located was undertaken, in order both to assess the overall degree of stratigraphic integrity of the site, and also to provide corroboration for the radiocarbon dating of the strata (see "Radiocarbon Dates"). The Eva site F.S. log noted a total of 646 potentially diagnostic hafted bifaces (projectile points or recycled projectile points), of which 526 (81.4%) were able to be located in the McClung Museum collections (Table 6.5). Roughly 19.8% (n = 104) could not be confidently classified by type, and were grouped by basal morphology. Of those, most (n = 67) were stemmed forms. The remaining thirty-seven included corner-notched and side-notched varieties, and a single lanceolate. An additional twenty-seven hafted bifaces did not retain sufficient portions of their bases to allow for a confident assessment even of basic morphology.

Hafted bifaces that were able to be grouped by named type numbered 395, and the vast majority was associated with Stratum IV (n = 166; 42% of classifiable diagnostics). Stratum II and I contained 83 (21%) and 74 (18.7%), respectively. Of the remaining seventy-two, most

Table 6.5. Frequencies of diagnostic hafted bifaces by temporal affiliation and provenience at the Eva site (40BN12).

Type	Temporal Affiliation	Unassoc.	Stratum I	Stratum II	Stratum III	Stratum IV	Stratum V	Total (By Type)
Dalton	Late Paleoindian - Early Archaic	1	0	0	0	0	0	1
Kirk CN	Early Archaic	1	1	2	0	4	0	8
Kirk Serrated	Early Archaic	1	0	1	0	0	0	2
Kirk Stemmed	Early Archaic	0	0	0	0	1	5	6
Lost Lake	Early Archaic	0	0	0	1	0	0	1
MacCorkle Stemmed	Early Archaic	0	1	0	0	0	0	1
Total, Paleoindian / Early Archaic		**3**	**2**	**3**	**1**	**5**	**5**	**19**
Big Sandy	Middle Archaic	4	3	16	3	0	0	26
Eva I	Middle Archaic	11	3	14	9	151	5	193
Eva II	Middle Archaic	0	0	10	2	7	0	19
Morrow Mountain	Middle Archaic	2	4	10	2	3	0	21
Raddatz SN	Middle Archaic	1	0	0	0	0	0	1
Benton	Middle Archaic	8	17	15	0	0	0	40
White Springs	Middle Archaic	1	4	2	0	0	1	8
Total, Middle Archaic		**27**	**31**	**67**	**16**	**161**	**6**	**308**
Elk River Stemmed	Late Archaic	2	1	2	0	0	0	5
Late Archaic Stemmed	Late Archaic	2	22	10	1	0	0	35
Ledbetter	Late Archaic	4	9	1	0	0	0	14
Pickwick	Late Archaic	0	2	0	0	0	0	2
Terminal Archaic Barbed	Late Archaic	2	6	0	0	0	0	8
Total, Late Archaic		**10**	**40**	**13**	**1**	**0**	**0**	**64**
Motley	Late Archaic - Early Woodland	2	0	0	0	0	0	2
Turkey Tail	Late Archaic - Early Woodland	1	1	0	0	0	0	2
Total, Late Archaic - Woodland		**3**	**1**	**0**	**0**	**0**	**0**	**4**
Total, All Identified Hafted Bifaces		**43**	**74**	**83**	**18**	**166**	**11**	**395**
Unidentified Corner-Notched		3	1	8	1	1	0	14
Unidentified Side-Notched		2	7	10	2	1	0	22
Unidentified Stemmed		7	11	17	7	24	1	67
Unidentified Lanceolate		0	0	0	1	0	0	1
Unidentified, Other		2	6	7	0	12	0	27
Total, All Unidentified Hafted Bifaces		**14**	**25**	**42**	**11**	**38**	**1**	**131**
Total, All Hafted Bifaces, By Provenience		**57**	**99**	**125**	**29**	**204**	**12**	**526**

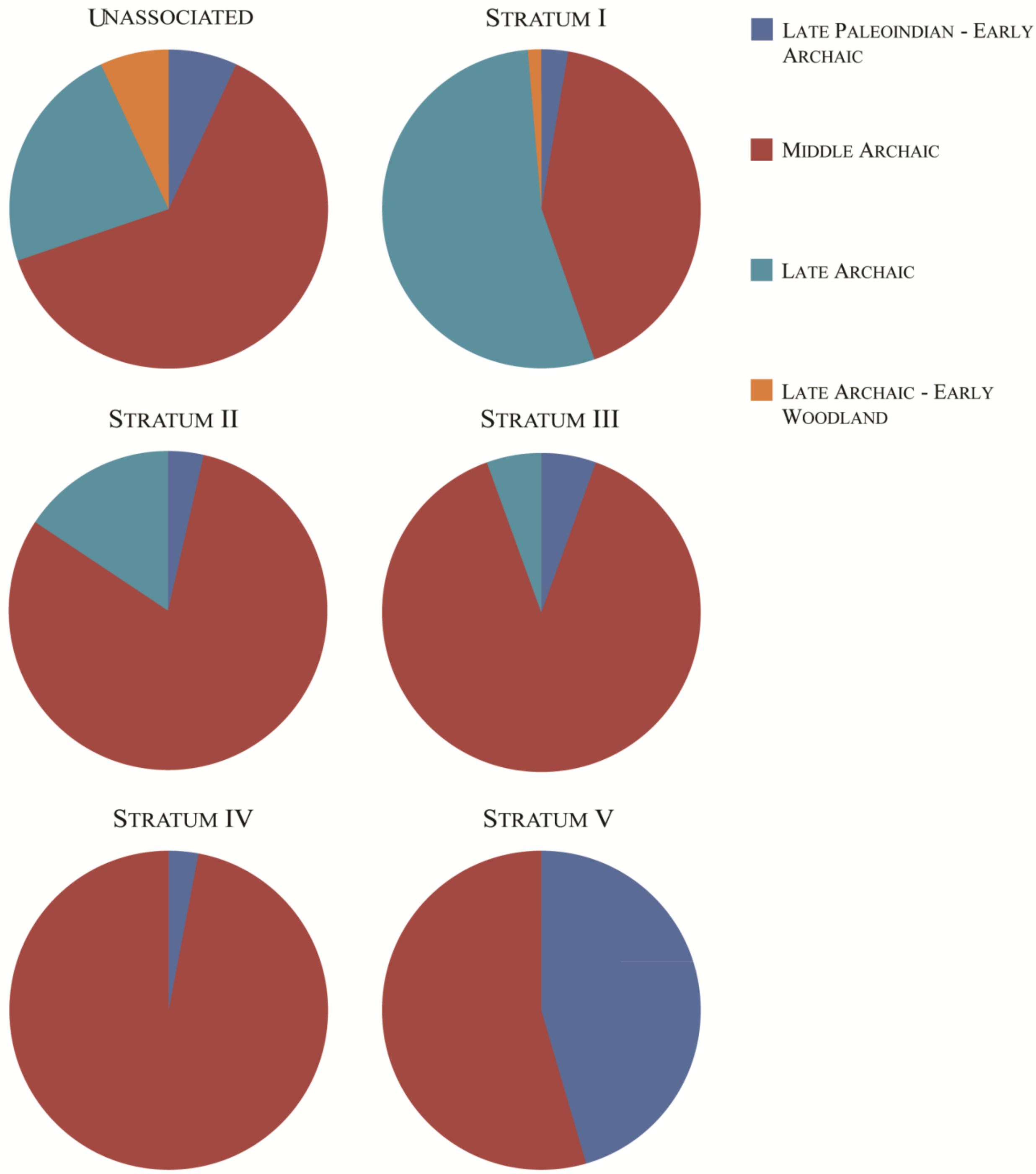

Figure 6.28. Frequencies of temporal diagnostics at the Eva site (40BN12) by stratigraphic provenience.

were among the unprovenienced artifacts (n = 43); Stratum V contained only eleven identifiable haftd bifaces, and Stratum III contained eighteen.

Depositional Integrity of the Eva (40BN12) Strata

In general, diagnostic hafted bifaces recovered at Eva indicate the site's most extensive use during the Middle Archaic, although diagnostics at the site included types associated with temporal periods from the late Paleoindian through the Early Woodland periods (Table 6.5 Figure 6.28). From the basal deposit at the site (Stratum V) to the upper cultural deposit (Stratum I), a gradual shift in proportions of early to later diagnostic types in the stratigraphic sequence is evident (see Figure 6.28), suggesting that the depositional integrity of the site was relatively well-preserved.

Some mixing of the upper deposits is indicated by proportions of diagnostics in the site's shell-free Stratum I, which was truncated by plowing and other historical activity such as clearcutting (Field report on file at McClung Museum) and C.B. Moore's visit to the site in 1915 (Moore 1915:77-78; see also Chapter 2). Classifiable temporal diagnostics (n = 74) in the assemblage indicate a mixed Middle and Late Archaic horizon (Figure 6.29).

A total of forty Late Archaic stemmed forms (Late Archaic Stemmed, Justice 1987:133-139; Terminal Archaic Barbed, Justice 1987:179-184) comprised 54% of the classifiable diagnostics in Stratum I; Middle Archaic forms (n = 31, 42%) constituted much of the remainder of the identifiable types, and included Big Sandy (Justice 1987:60-62), Eva (Justice 1987:100-103), Morrow Mountain (Justice 1987:104-107), and Benton Stemmed (Justice 1987:111-112) varieties (Figure 6.28; Figure 2.29). One Early Woodland turkey tail (Justice 1987:173-179) and two Early Archaic diagnostics (one Kirk corner-notched [Justice 1987:71-72] and a MacCorkle Stemmed [Justice 1987:86-90]) were also present.

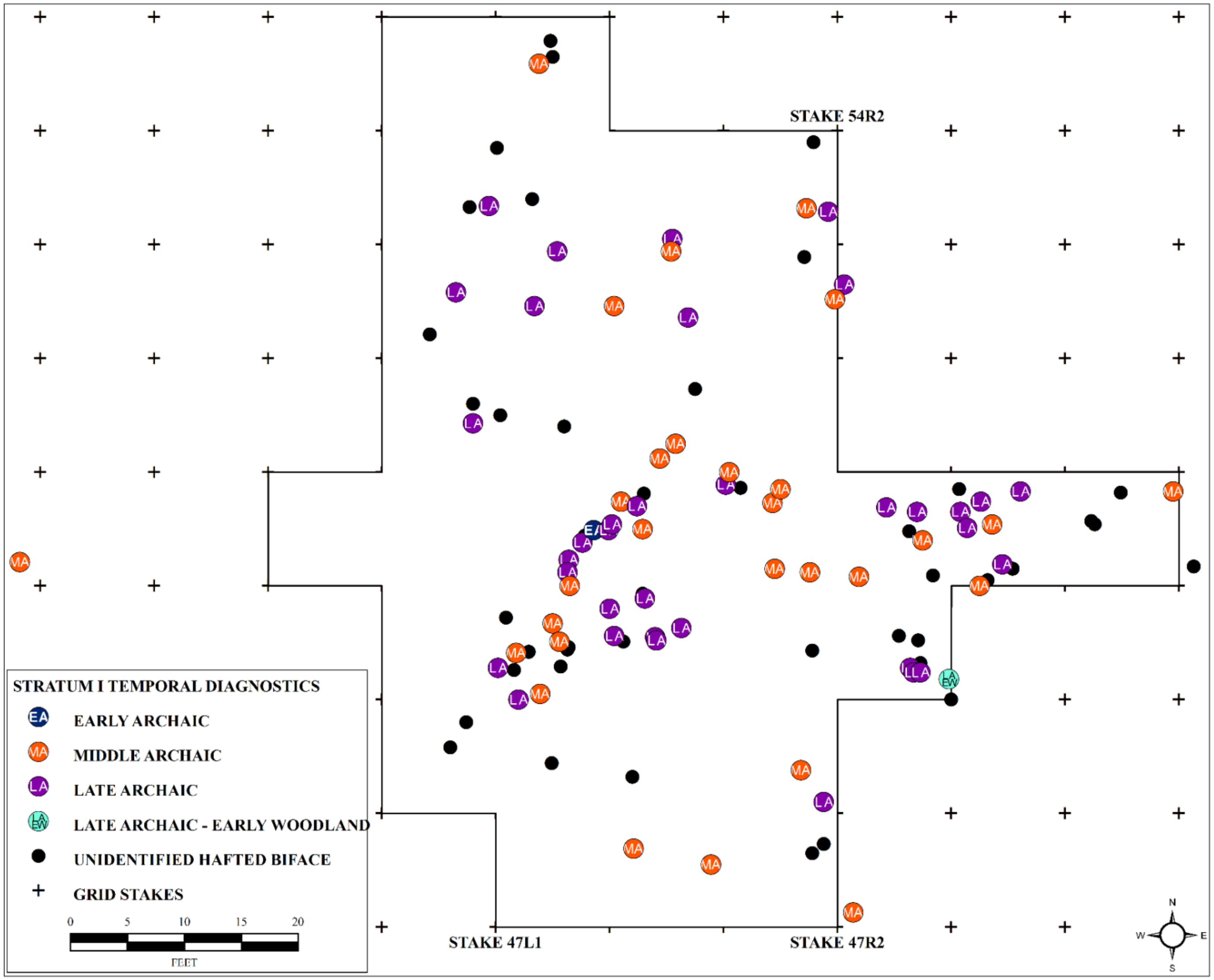

Figure 6.29. Spatial distribution of piece-plotted hafted bifaces in Stratum I at the Eva site (40BN12).

Diagnostic assemblages from the deposits underlying Stratum I at the Eva site were predominately Middle Archaic in age, with relatively little indication of intrusion from upper later occupations at the site.

Of the 83 diagnostics contained in Stratum II, sixty-seven (80.7%) were Middle Archaic, including Big Sandy (19.3%), Eva I (20.9%) and Eva II (14.9%), Morrow Mountain (14.9%) and Benton (22.4%) and White Springs (2.9%) forms. The deposit contained relatively minor representation of Late Archaic types (15.6%), and three Early Archaic diagnostics (3.6%) (Table 6.5; Figure 6.28; Figure 6.30).

Stratum III diagnostics numbered twenty-nine, of which 62.1% (n = 18) were classifiable. Most (n = 16; 88.9%) comprised Eva I (n = 9) and Eva II (n = 2), Big Sandy (n = 3) and Morrow Mountain (n = 2) Middle Archaic types, although a single possible Late Archaic Stemmed and an Early Archaic Lost Lake were also present (Table 6.5; Figure 6.28; Figure 6.31).

Below Stratum III, the diagnostic assemblage (n = 204) from Stratum IV included one hundred sixty-one (78.9%) classifiable artifacts, nearly all of which were Eva I (n = 151; 93.8% of the classifiable diagnostics) hafted bifaces. Seven Eva IIs and three Morrow Mountains were identified, and five Early Archaic or transitional Early – Middle Archaic diagnostics (four Kirk corner-notched and one Kirk Stemmed) were noted. Unidentified points numbered thirty-eight in Stratum IV (Table 6.5; Figure 6.28; Figure 6.32).

Stratum V contained only identifiable twelve hafted bifaces; eleven could be confidently classified. The deposit was nearly equally split between Middle Archaic (Eva I, n = 5; White Springs, n = 1) and Early Archaic (Kirk Stemmed, n = 5) (Table 6.5; Figure 6.28; Figure 6.33).

The analysis of temporal diagnostics by stratum revealed no significant stratigraphic disturbance at the Eva site; overall, the distribution of temporal diagnostics by stratum meets

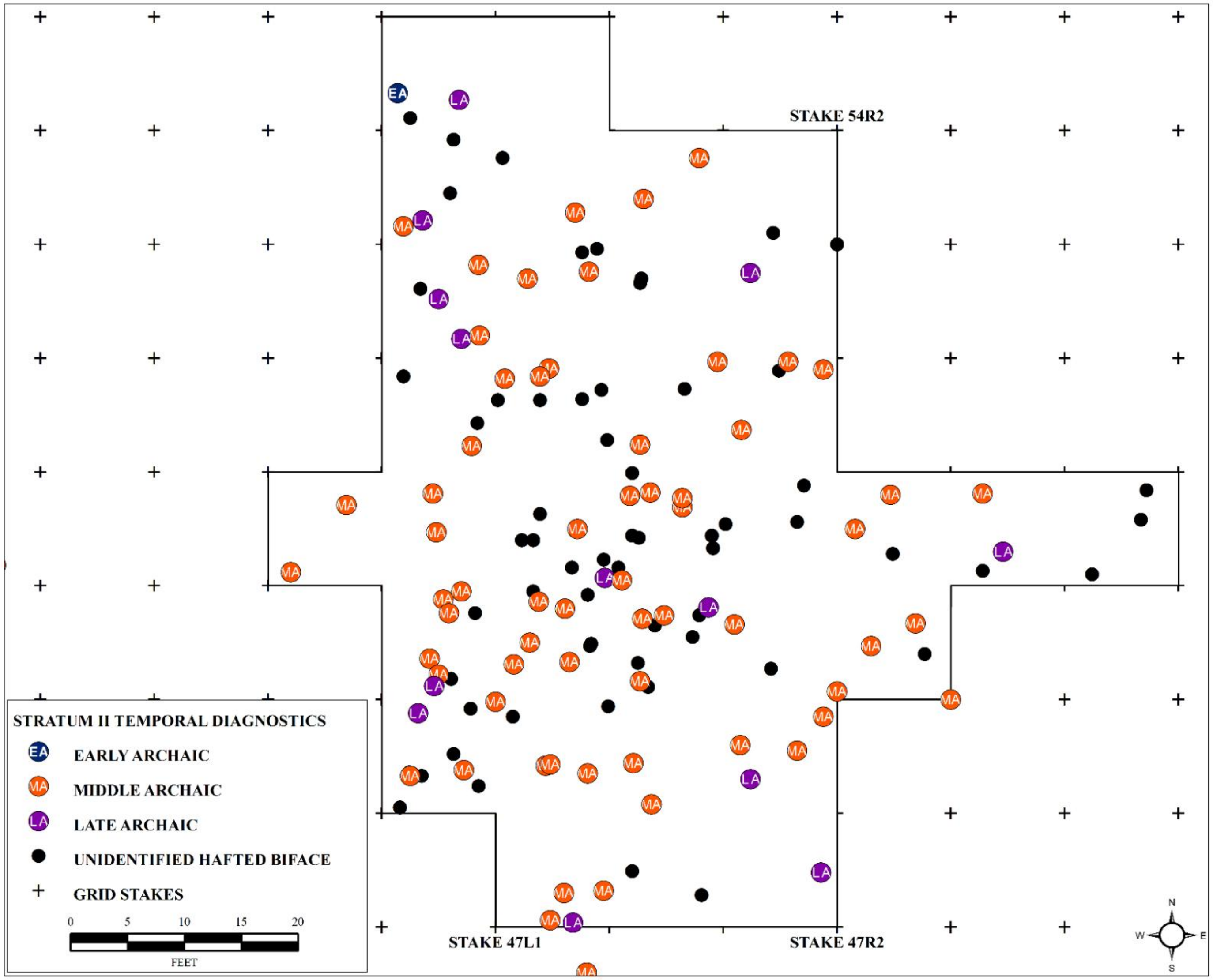

Figure 6.30. Spatial distribution of piece-plotted hafted bifaces in Stratum II at the Eva site (40BN12).

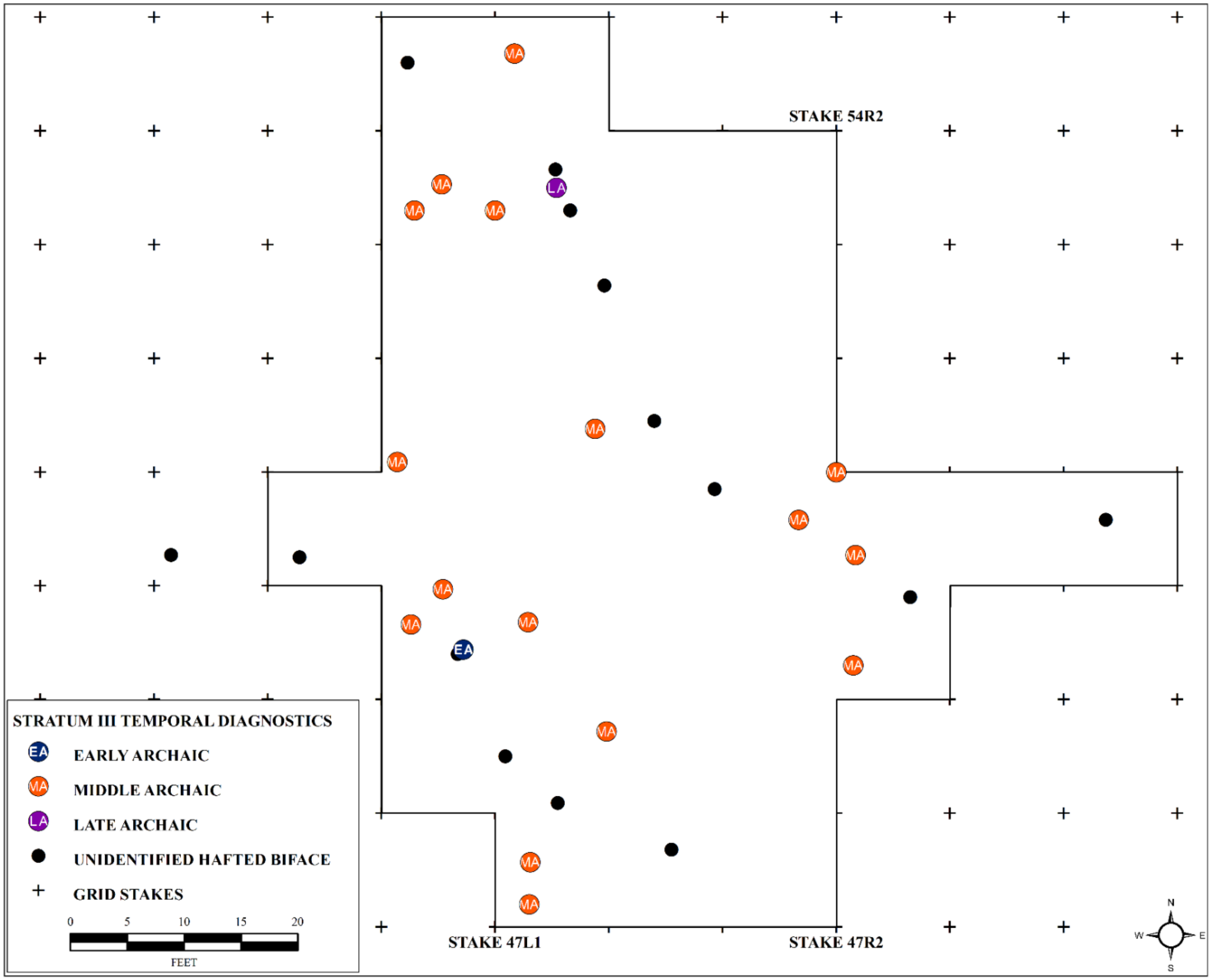

Figure 6.31. Spatial distribution of piece-plotted hafted bifaces in Stratum III at the Eva site (40BN12).

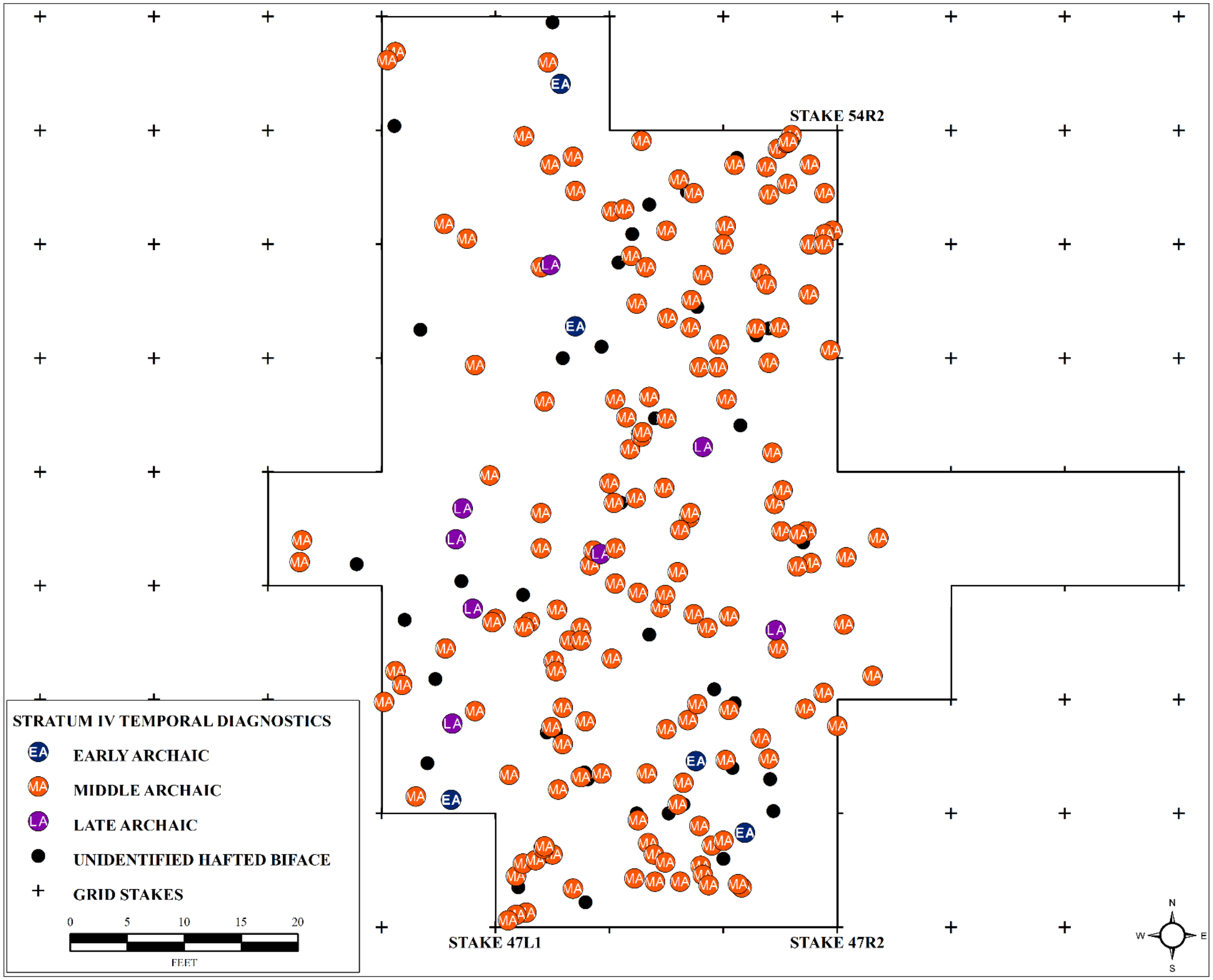

Figure 6.32. Spatial distribution of piece-plotted hafted bifaces in Stratum IV at the Eva site (40BN12).

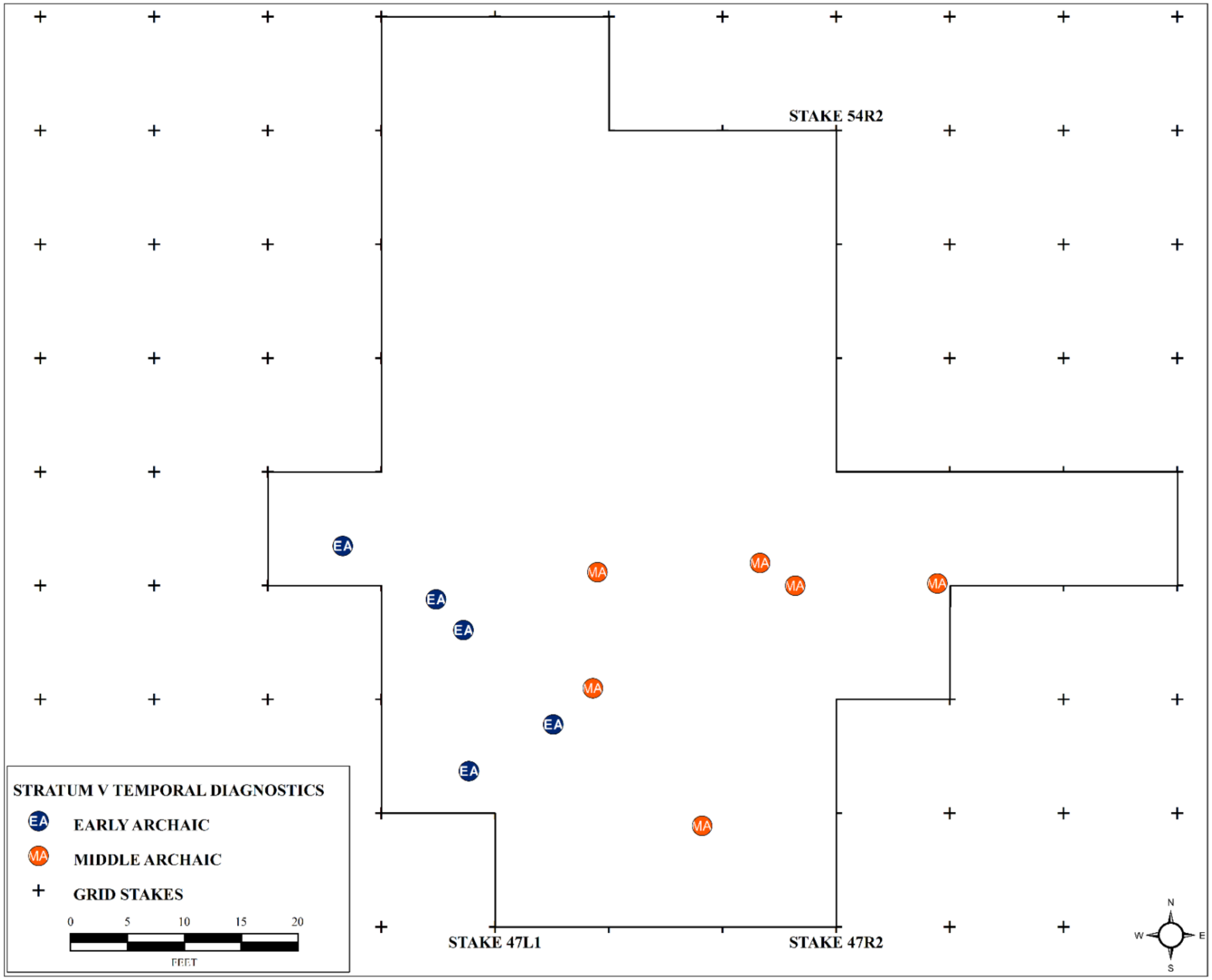

Figure 6.33. Spatial distribution of piece-plotted hafted bifaces in Stratum V at the Eva site (40BN12).

expectations for a deeply stratified and mostly intact site dating predominately to the Middle Archaic period. Given the presence of interments in every stratum, and the likely subsurface disturbance (and introduction to the surface of materials from deeper in the site) associated with the excavation of burial pits, some minor mixing of diagnostics between strata might be expected. However, as the diagnostic assemblage for each stratum indicates, such mixing does not appear to have been extensive, and may suggest relatively the excavation of (and interment in) relatively shallow pits that did not substantially penetrate underlying deposits. Given the comparatively infrequent identification of burial pits at the site (see previous section, "Burials"), this hypothesis seems likely.

RADIOCARBON DATES AND CHRONOLOGY

The relative temporal data obtained from the typological analyses of hafted bifaces presented in the previous section are generally in agreement with the results of radiocarbon dating of Eva discussed in this chapter section, suggesting the bulk of the site's deposits were of firmly Middle Archaic age.

The absolute ages of each of the strata at the Eva site have previously been a subject of some conjecture, having been estimated by Lewis and Kneberg (1959:162-169) from a single radiocarbon date obtained in the 1950s (Crane 1956:666) which was thought to situate the base of Stratum IV at 7150 ± 500 rcybp (8090 ± 536 cal years BP). This date has been used repeatedly in discussions of the Shell Mound Archaic and of Midsouth shellfishing in general (e.g., Dye 1996:147; Claassen 2010:11-18, Table 2.1; Sassaman 2010:183) and has even been literally carved in stone (Figure 6.34).

Figure 6.34. Monument erected in 1993 by the Benton Co. Genealogical Society on the shore of the Kentucky Lake near the former location of the Eva site (40BN12) in Benton County, Tennessee, and including reference to the original radiocarbon dated obtained from Stratum IV. (Image obtained from http://en.wikipedia.org/wiki/File:Eva-monument-tn1.jpg, accessed 1/27/2014).

However, recent evaluation of the site's records and the published description of the samples submitted for that radiocarbon date suggest that it is probably inaccurate. Early ^{14}C dating required large amounts of carbon in order to obtain a chronometric estimate, and particularly with respect to bone and antler, sample size requirements were exceptionally large (Broecker and Kulp 1956:6, Table 8). The samples submitted consisted of three fragments of antler (FS 312, 1453, and 1635) from three separate grid squares scattered across an area of the excavation block encompassing roughly 800 ft^2 (74.3 m^2) (Figure 6.35) at depths spanning 18 cm within the Stratum IV deposit. Given the nature of formation processes associated with midden deposition (including shell middens) – that is, the gradual accumulation of the aggregate deposit by repeated episodes of smaller-scale deposition – the aggregation of samples over such a large area into a single assay is unlikely to produce an accurate estimate (e.g., Stein et al. 2003).
The 1956 date nevertheless has served as the anchor for further studies of Eva and other presumed early Mid-Holocene sites in the region. Attempts to re-assess the age of Eva's deposits have been relatively few, and mostly were based on typological comparisons of materials from within the site's deposits with sites in the surrounding areas. In considering the age of Benton type hafted bifaces, which were originally defined from specimens at Eva (see Figure 6.6 for examples), McNutt (2008) developed what was probably the best revised chronology for the site. McNutt revised and calibrated the original Eva radiocarbon date based on the methods reported by the University of Michigan's radiocarbon laboratory. In order to compensate for possible unanticipated sources of error in the gas proportional counting method used by the lab at that time, early dates were reported with a doubled standard deviation (sigma) (Crane and Griffin 1958:1099). For M-356, the Stratum IV Eva radiocarbon date, that meant a reported standard deviation of 500 years. When McNutt recalibrated using a sigma of 250 years, his one-sigma

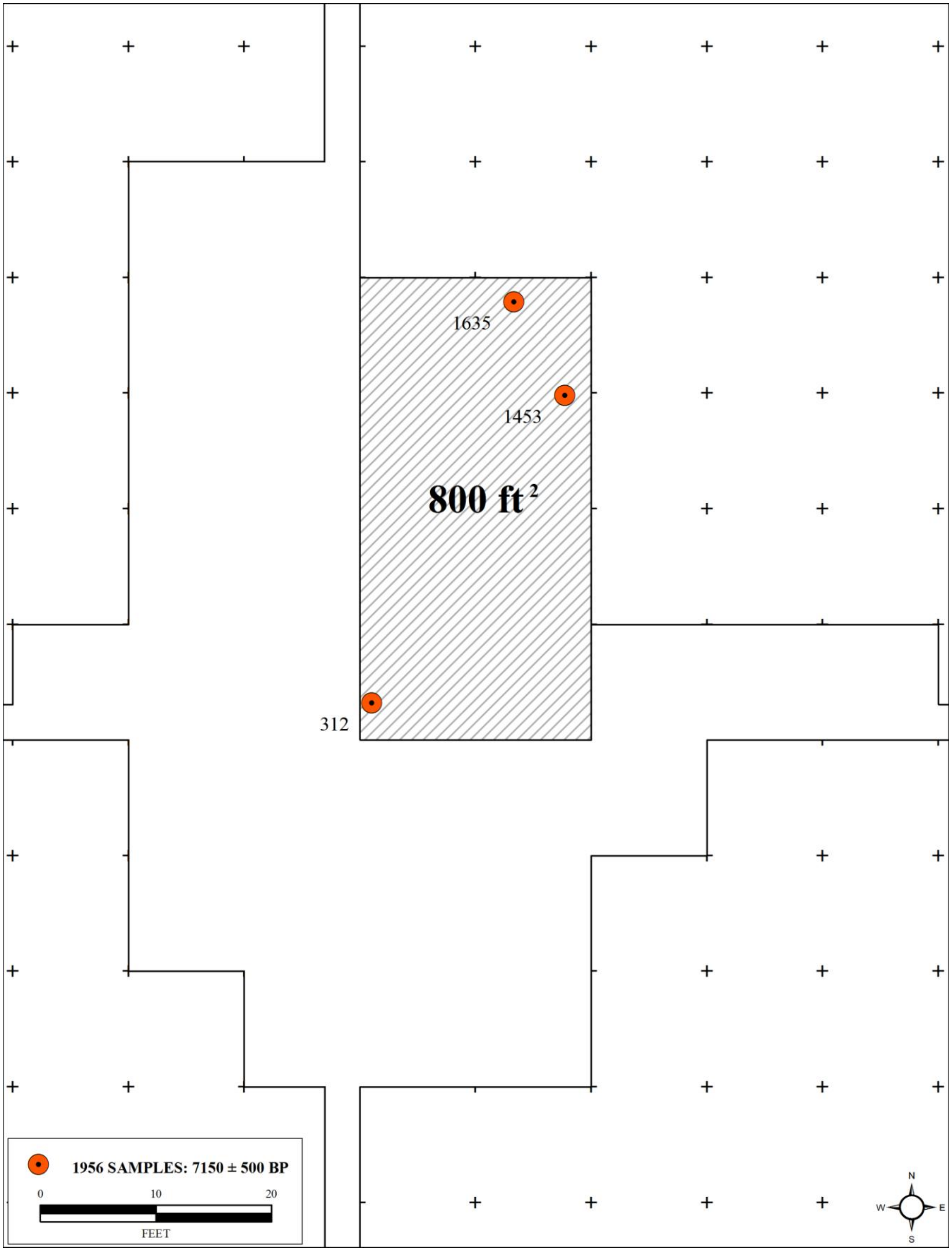

Figure 6.35. Location of antler samples combined and submitted for original Eva (40BN12) date (Crane 1956:666).

range was “6239 – 5761 BC… with a median probability of 6032 BC,” or 8189 – 7711 BP with a mean of 7982 cal yr BP (McNutt 2008:47)[27].

McNutt argued for an initial date of occupation at approximately 7000 BC (ca. 8950 cal BP) based on the presence of Kirk Serrated and Stanly Stemmed forms in Stratum IV and V at Eva (McNutt 2008:48).

In addressing the age of the overlying Stratum II deposit (the “shell mound proper” at Eva), McNutt based his assessment on dated Eva – Morrow Mountain cluster components elsewhere, suggesting a range approximating 5900 – 5300 BC (7850 – 7250 BP) (McNutt 2008:48). Deposition of Stratum I was estimated to have begun at roughly 3900 BC (5850 BP), with significant uncertainty regarding the termination, since the deposit was truncated by plowing (McNutt 2008:50).

McNutt’s chronological assessment of Eva was based almost entirely on classic seriation chronology, but was well-formulated and provided a suitable basis for a reassessment of the site’s age using radiometric dating.

Radiocarbon Dates[28]

Previous Radiocarbon Assays

In addition to the original radiometric determination made for Eva in the mid-1950s, a total of three additional radiocarbon dates were obtained for Eva prior to the assays resulting from this project.

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[27] McNutt does not directly indicate what calibration curve he employed in his recalibration of the Eva date, but he notes that he used Calib 5.0.1, citing a 2005 paper by the program’s authors. This suggests that his calibration was based on the IntCal 2004 curve (Reimer et al. 2004).

[28] All calibrations calculated for this chapter (and for those discussed in other chapters in this dissertation) were done using the OxCal 4.1 calibration software (Bronk-Ramsey 2009) with the IntCal09 calibration curve (Reimer et al. 2009).

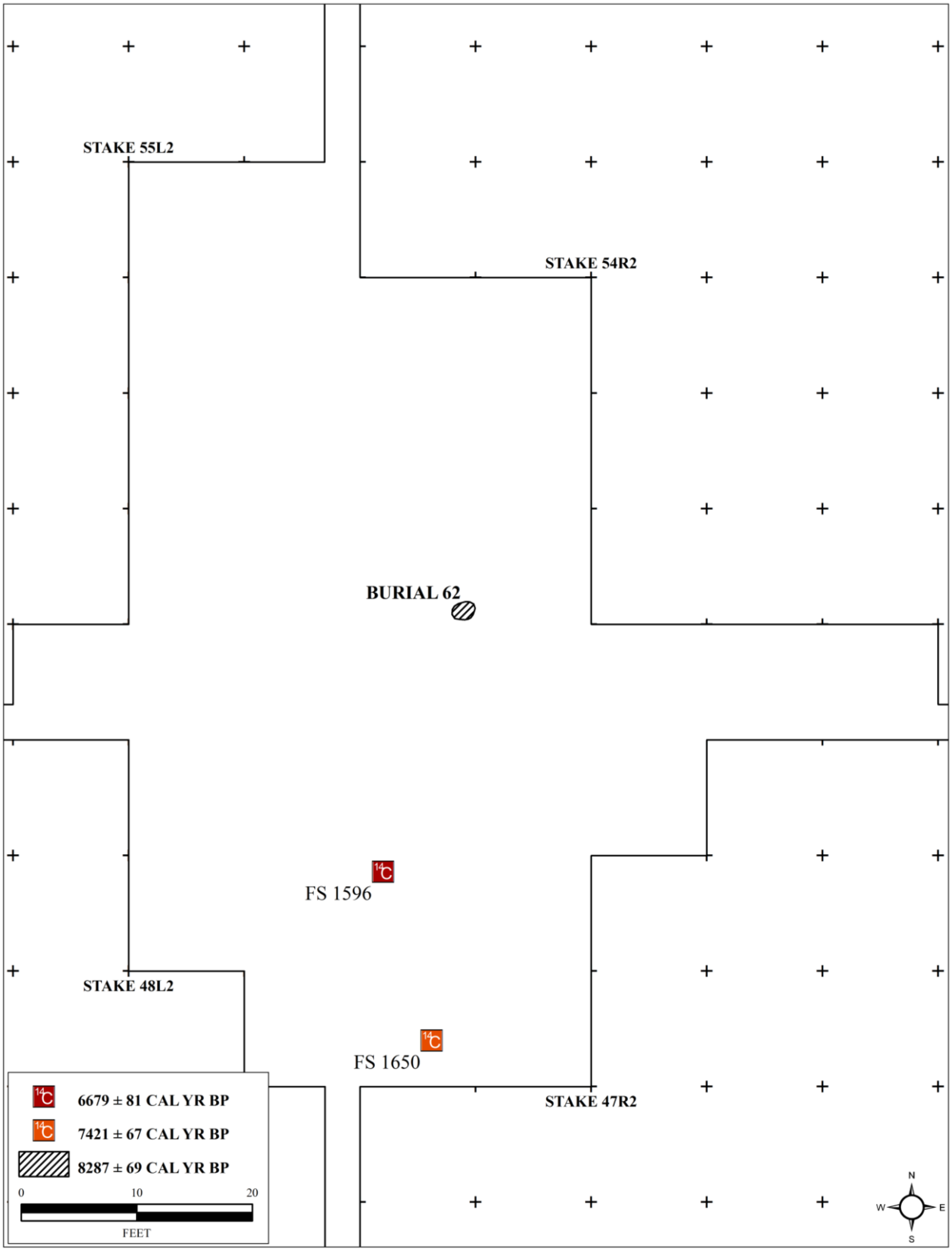

Figure 6.36. Locations of three radiocarbon samples (Burial 62; two antler samples from Stratum II) submitted for dating from the Eva site (40BN12) prior to the initiation of this dissertation project.

Stratum I, Burial 62 (n = 1)

A single previously unpublished date was obtained by Robert Mensforth in 1995 on a fragment of human rib from Burial 62, located in grid square 50R2 (Figure 6.36). The fragment was selected and identified by Maria Smith, and was submitted (with permission from the Frank H. McClung Museum) to Beta-Analytic for dating (Mensforth pers. comm. 2013).

Mensforth (pers. comm. 2013) notes that shortly thereafter he discussed the sample with a laboratory technician from Beta-Analytic, who informed him that the quality of the bone collagen yielded from the sample was poor and might potentially yield incorrect results, producing an estimate that was more recent than the actual age of the sample. The resulting assay was 7480 ± 70 rcybp (8287 ± 69 cal BP), considerably earlier than expected for any materials associated with Stratum I, which at the time was believed to be Late Archaic in age. At present, there is no adequate explanation for the early nature of this date. However, the burial itself was unusual in its treatment, having been buried face-down and with a significant number of grave goods (relative to other burials at Eva), as well as a dog. The possibility that the radiocarbon date obtained from the burial was in fact made on earlier material that was placed with (or fell into) in the grave during the interment of Burial 62 cannot be discounted.

Stratum II (n =2)

In 2010, a grant provided by the Tennessee Council for Professional Archaeology (TCPA) and a matching amount from the Frank H. McClung Museum provided funding for two radiocarbon determinations, which were made on fragments of deer antler from the upper and lower margins of Stratum II. The deeper of the two samples (FS 1650) derived from grid square 47R1 and produced an uncalibrated age of 6514 ± 66 rcybp (7421 ± 67 cal BP); the upper sample

(FS 1596) was recovered in the adjacent square (48R1) and was dated to 5865 ± 63 rcybp (6679 ± 81 cal BP).

The results of these determinations are somewhat later in time than McNutt (2008:48) estimated for the age of Stratum II.

New Dates (n = 16)

A total of sixteen radiocarbon samples from two vertical columns in grid squares 48L1 and 49L1 (Column 1; n = 8) and 50R1 and 50CA (Column 2; n = 8) (Figure 6.37) were submitted to the University of Arizona AMS Laboratory[29] in mid- and late 2012. Specimens were chosen to provide for thorough vertical sampling of the upper and lower margins of each of the strata in Eva's depositional sequence; two columns'-worth of specimens were used to improve the potential for site-wide assessment of the sequence (see Chapter 4 – Methodology).

Samples consisted of mammalian bone (n = 11) and whitetail deer antler (n = 5). Antler specimens were selected from the site's large collection of "cut antler," while bone artifacts used were selected from among fragmentary examples of common forms. Table 6.6 contains summary data for all dated samples from Eva. Temporal data are provided in three forms: conventional radiocarbon ages (^{14}C Yr BP), and calibrated unmodeled and Bayesian modeled ages.

Calibration of radiocarbon dates is required to convert radiocarbon ages – which are calculated by measuring the amounts of the ^{14}C radioisotope in a given sample based on its statistically-determined half-life – into elapsed time in calendar years. "Standard" ^{14}C calibration fits the estimated radiocarbon age to the derived calibration curve based solely on the measured radiometric data from individual assays. However, under circumstances in which groups of

[29] National Science Foundation Doctoral Dissertation Improvement Grant #1202960.

related radiocarbon dates from known context are used in combination, the application of Bayesian statistical methods can offer additional levels of analytic capability for assessing not only the ages of individual samples, but also the relationships between samples from sequential depths within a deposit, or from samples taken from multiple deposits within a stratigraphic sequence.

Bayesian modeling of radiocarbon calibration involves the imposition of known "priors" (e.g., relative depths of samples in stratigraphic context, or samples' known stratigraphic associations) within a specified depositional model to constrain calibration algorithms' fitting of measured radiocarbon ages to the reference calibration curve. Bayesian models can be used to trim the standard deviations of radiocarbon dates of known relative ages within the calibrated probability distributions of individual dates, helping to reduce the potential problem of statistical "indistinguishability" that can limit the interpretability of short-interval, high-resolution sequences of radiocarbon dates.

Bayesian methods can also be used to assess the integrity of a deposit or stratigraphic sequence based on the ages and relative positions of dated samples within that sequence. Using a series of radiocarbon dates from known provenience, the construction of a depositional model – which proceeds from the null hypothesis that individual samples within a stratigraphic sequence are *in situ* (i.e., that sample age and recovery depth are directly related, and that samples are therefore in intact depositional context) – enables quantitative testing of stratigraphic integrity by fitting calibrated ages of samples within the imposed prior constraints, using the measured probability distribution of the radiocarbon sample and the sample's standard deviation. Rejection of the null hypothesis for individual samples occurs when calibrated probability distributions for individual dates cannot be fitted to the sequence as specified in the calibration model.

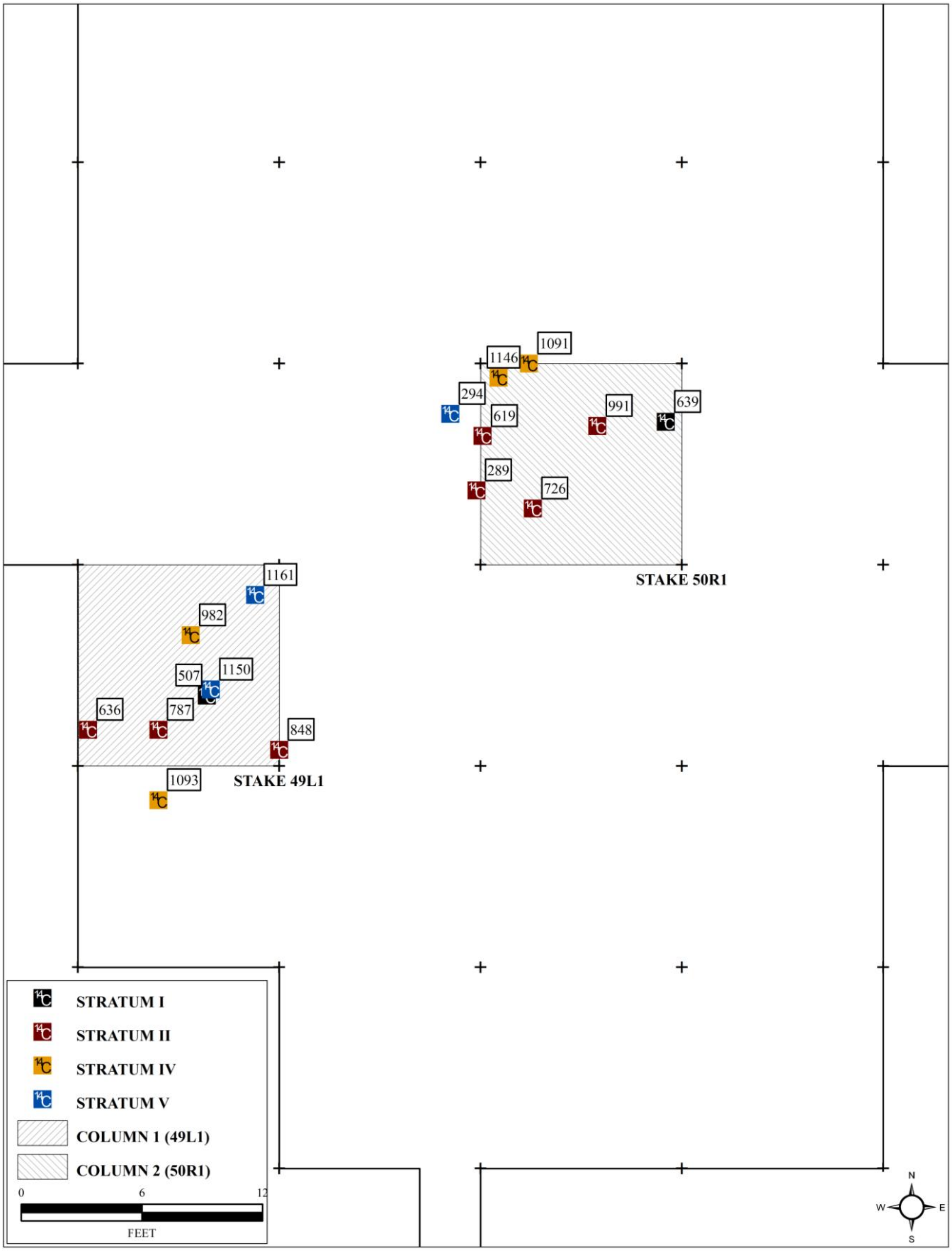

Figure 6.37. Locations of sixteen ^{14}C samples from the Eva site (40BN12)submitted during the course of this project.

Table 6.6. AMS radiocarbon dates (n = 18) from the Eva site (40BN12).

FS	Col.	Square	Stratum	Depth (m below datum)	Material	AA #	δ 13C	14C Yr BP			Unmodeled Cal BP			Modeled Cal BP		
507	1	49L1	1	0.73	bone	AA99305	-22.3	6186	±	71	7084	±	93	7021	±	93
639	2	50R1	1	0.76	bone	AA100256	-22.6	5799	±	65	6598	±	78	6636	±	83
636	1	49L1	2	0.88	antler	AA100255	-21.9	6249	±	69	7153	±	93	7214	±	93
619	2	50R1	2	0.91	bone	AA99308	-21.5	5922	±	66	6754	±	83	A = 21.6%		
1596	0	48R1	2	1.04	antler	AA90404	-20.6	5865	±	63	6679	±	81	A = 27.9%		
787	1	49L1	2	1.37	antler	AA99312	-23.2	6361	±	70	7296	±	78	7304	±	78
289	2	50CA	2	1.46	bone	AA99313	-22.8	6691	±	72	7558	±	59	7526	±	57
726	2	50R1	2	1.49	bone	AA99309	-21.9	5535	±	65	6338	±	61	A = 0%		
1650	0	47R1	2	1.68	antler	AA90405	-22.8	6514	±	66	7421	±	67	7417	±	66
848	1	49L1	2	1.92	antler	AA99314	-22.9	6258	±	68	7164	±	92	7219	±	92
991	2	50R1	2	1.92	bone	AA99311	-22.4	7596	±	80	8403	±	82	8392	±	51
982	1	49L1	4	1.98	antler	AA99301	-23.3	7530	±	77	8327	±	78	8351	±	51
1146	2	50R1	4	2.10	antler	AA99299	-23.1	7604	±	78	8413	±	79	8398	±	50
1091	2	50R1	4	2.32	bone	AA99303	-21.9	7608	±	78	8418	±	78	8400	±	50
1093	1	49L1	4	2.38	bone	AA99302	-22.5	7415	±	77	8235	±	86	8308	±	58
1150	1	49L1	5	2.44	bone	AA99304	-23	8086	±	82	8991	±	151	8879	±	114
1161	1	49L1	5	2.59	bone	AA99306	-22.4	7956	±	80	8813	±	120	8794	±	98
294	2	50CA	5	2.59	bone	AA99310	-22.9	7987	±	81	8840	±	122	8811	±	98

* FS 1596 and 1650 obtained by author prior to the initiation of this project, and are labeled “Column 0” for the purposes of this table.

In order to establish the degree to which dated artifacts from Eva could be used to assess the site's depositional history and degree to which the stratigraphic sequence remained intact, a Bayesian depositional model was used to calibrate the sixteen assays obtained during this project, and the two additional dated samples obtained with TCPA funding (as discussed previously).

Using the calibration program OxCal (version 4.1) (Bronk-Ramsey 2009) and the IntCal 2009 calibration curve (Reimer et al. 2009), samples were grouped by stratum and entered into the model in sequence, according to the depths below datum from which they were recovered. Of the eighteen assays included in the model, three from Stratum II (FS 726, 1596, and 619) were identified as most likely out of original depositional context, exhibiting "agreement indices" of less than 60%. The agreement index is a value calculated by OxCal that indicates measurement of the degree of agreement between the specified model priors (the specified depths of the samples, indicating the positions from which they were recovered) and the observations (the measured radiocarbon ages, and the degree to which those measured ages conform to the specified sequence). The potential implications of the positions and relative ages of the three possible out-of-context samples are discussed below with respect to the nature of the Stratum II deposit.

OCCUPATIONAL HISTORY OF EVA

Radiocarbon data and analyses of the material assemblage at Eva as discussed in this chapter provide strong support for the interpretation that the site represents a series of sequential cultural components (Stratum I – V) in largely primary depositional context. Radiocarbon dates from the site suggest that this is also largely true, although some mixing is evident (corresponding to the results of the temporal diagnostic analysis presented earlier in this chapter). As such, the occupational history of the site is here presented stratigraphically, beginning with the deepest and earliest deposit at the location.

Stratum V (^{14}C assays, n = 3): ca. 8,900 – 8,700 cal BP

Stratum V represents the earliest intact cultural deposit at Eva, with three dated samples spanning a period of roughly two centuries during the early Mid-Holocene period. A relatively small amount of cultural material was recovered from the deposit, which was dominated by chipped stone (n = 21), including 12 hafted bifaces. An equal number of Early Archaic Kirk forms and slightly later Eva I (early Middle Archaic) types were identified in the stratum, consistent with the temporal range indicated by the three radiocarbon dates.

Non-diagnostic chipped stone artifacts consisted of large bifacial preforms (or possible knives) and a small number of unifaces. All plotted chipped stone was concentrated in the southern half of the block, but distribution of projectile points and non-projectile points was to some degree contrastive (Figure 6.38), with the majority of projectile points occurring in the block's southwestern quadrant (labeled "Activity Locus A" on Figure 6.38). Most other chipped stone was concentrated in a relatively tight cluster measuring approximately 3 m^2 in grid square 50R2 ("Activity Locus B," Figure 6.38).

The distribution of bone and antler artifacts overlapped with that of projectile points in the southwestern portion of the opened excavation, although a single antler artifact – a modified tine – was also found in the northwestern-most grid square (54L1).

Two definitive and one possible thermal feature, the only documented features associated with Stratum V, were located in the block's southwestern quadrant. One possible associated burial, an infant (Burial 126), was found in this area as well.

The distribution of unmodified animal bone by square provides additional information concerning the areas of most intensive use during the site's early occupation (Figure 6.38). The majority of recorded animal bone was documented south of the 50-line with two or possibly three main concentrations indicated. One concentration, associated with Activity Locus A, occurred in the southwestern quadrant of the block. That quadrant comprised five grid squares, with the greatest concentration in square 48CA. The vast majority of identified bone was whitetail deer, but small amounts of the remains of other taxa, comprising (in order from most to least abundant) raccoon, turkey, turtle, dog, fish, beaver, bear, and undifferentiated bird, were also identified. This area also represented the main concentration of cultural material, features, and the burial possibly associated with Stratum V, suggesting that a significant amount of activity at the site was localized to the area. Deer bone associated with these squares provided representation of the majority of the skeleton, both cranial (n = 2) and post-cranial.

A second relatively dense concentration of animal bone was defined by two grid squares – 50R1 and 50R2 – located in the southeastern area of the block (Activity Locus B). The largest proportion was located in 50R2. Identified taxa consisted of whitetail deer (77%), bear, rabbit, fish (undifferentiated), undifferentiated bird, turtle, dog, and raccoon. Square 50R2 also represented the location of the majority of non-PPK chipped stone artifacts, largely preforms or large bifacial knives. No other cultural materials or features were documented in this area, which may indicate a small and relatively specialized activity area possibly associated with animal-processing activities that occurred after initial butchery, including perhaps the production of

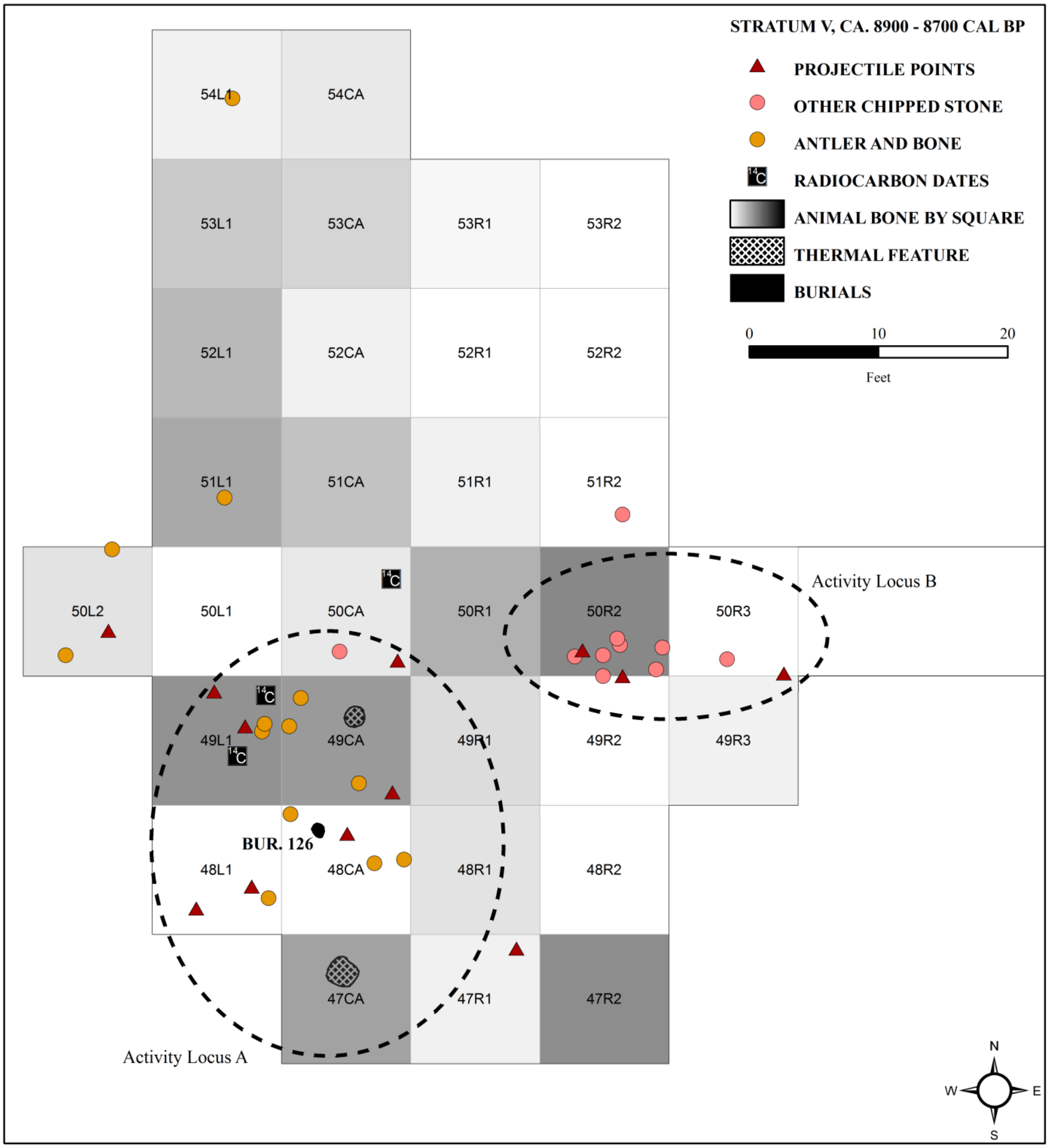

Figure 6.38. Spatial distribution of occupational materials in Stratum V at the Eva site (40BN12).

tools. Whitetail skeletal elements represented in this location consisted of antler, long bones, metapodials, and vertebrae.

The third possible concentration was located in a single square, 47R2, in the extreme southeastern corner of the excavation. Dominated by deer, a large amount of dog bone (n = 15 elements) was also found, with minimal representation of beaver, raccoon, and turkey. There was no recorded information regarding the nature of the canine bone found in the square, but whitetail deer remains in the location included representation of both cranial and post-cranial skeletal elements. A single Eva I projectile point was found in the adjacent square, but there were no other artifacts recorded in that area of the excavation, and thus no other indication of specific localized activities.

The comparatively small number of documented tools present in Stratum V, as well as the limited number of features and the relatively short duration of use represented by radiocarbon dates from the deposit, suggest that initial use of the Eva site was by a small group, seemingly limited enough in size and duration of stay that individual activity areas are apparent within the confines of the block. Because of the lack of data regarding the distribution of chipped stone debris or unidentified faunal material, it is difficult to ascertain whether areas with few artifacts or recorded animal remains may represent locations in which shelters might have been constructed (with sleeping areas kept clear of refuse), although the lack of identification of features in those areas – either small post holes (with which excavators at Eva were quite familiar) or thermal features suggesting internal hearths – argues against that hypothesis.

Stratum IV (^{14}C assays, n = 5): ca. 8,450 – 8,200 cal BP

Roughly three hundred years separated the dated materials in Stratum V from Stratum IV above it. In comparison to evidence from the earliest occupation of Eva, the period during which Stratum IV was deposited – a span of approximately one hundred years, based on five radiocarbon dates – corresponded to intensive use of the site.

Stratum IV represents the initial appearance of shellfishing at Eva, and in addition to the dense midden content (including significant quantities of animal bone) and large amounts of cultural material, the deposit was distinguished from the underlying and overlying strata based in particular on the presence of shellfish remains.

The appearance of shellfish in the stratigraphic sequence at Eva during this period suggests several possibilities. First, as noted early in this chapter, the floodplain of the Tennessee River was unusually wide and flat in the vicinity of Eva, and the site itself was positioned on a low linear ridge, possibly a former levee of the river when its channel was situated further to the west from the historic channel location. To the author's knowledge, there is no published history of the lateral movement of the Tennessee River channel in that region, but the nature of the floodplain itself, and the position of the site over 1.6 km from the historic channel prior to impoundment, suggests that such channel migration occurred in the past.

Occupation of Big Sandy, less than forty kilometers northwest of Eva over land, and roughly 75 km by river, was characterized by shellfishing early in its history during a period roughly contemporaneous with Stratum V and Stratum IV at Eva (see Chapter 5, "Occupational History of Big Sandy"). The lack of shellfish in Stratum V and appearance of shell in Stratum IV may indicate a shifting of the river channel to the west and nearer to the site location, or perhaps

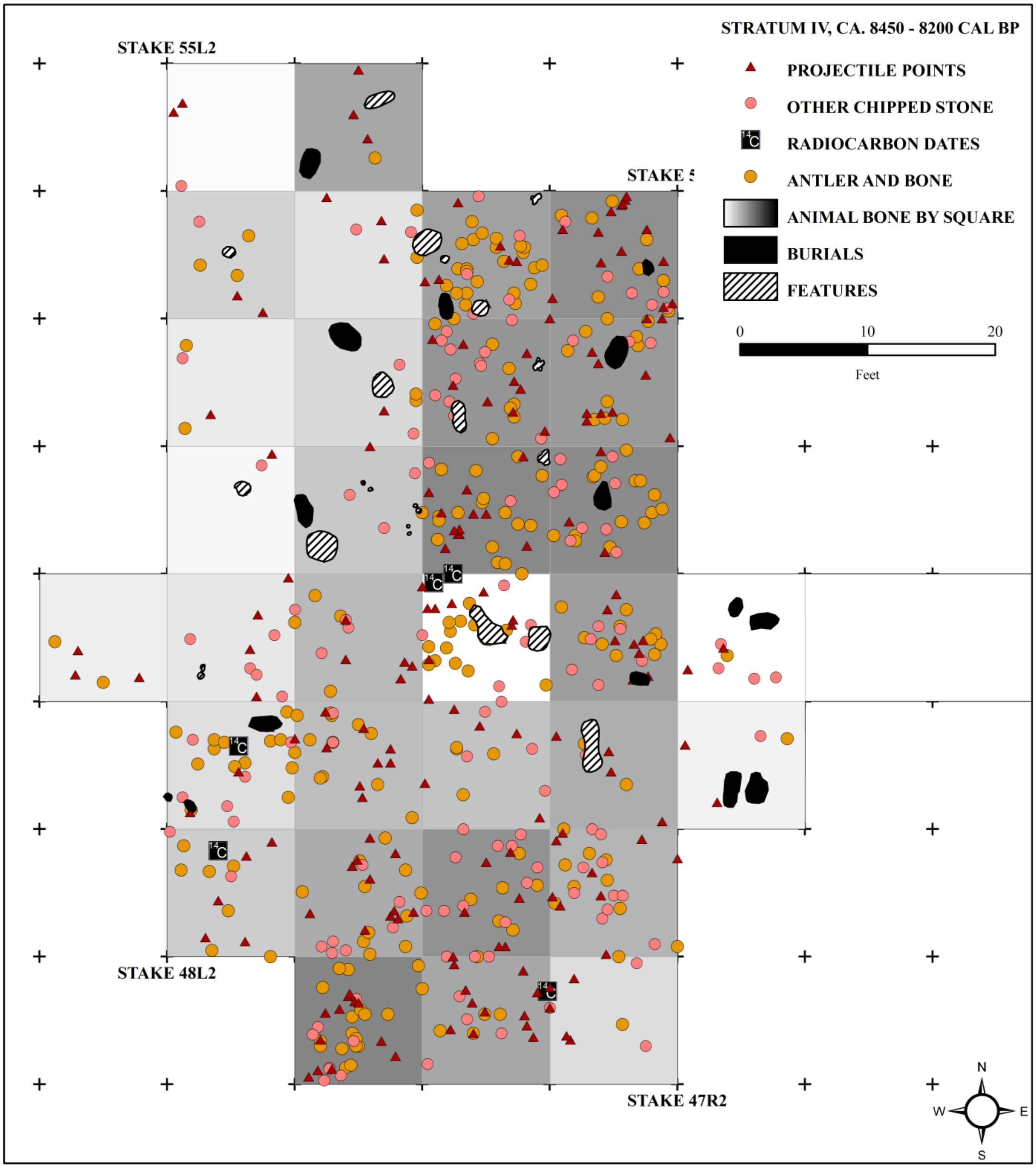

Figure 6.39. Spatial distribution of occupational materials in Stratum IV at the Eva site (40BN12).

(if shellfish were already available in the small drainage immediately west) a change in subsistence or other practices associated with the procurement of shellfish in the region.

In contrast to Stratum V, the identification of specific activity areas at Eva during the Stratum IV occupations is difficult, owing to the apparently dense and relatively undifferentiated midden extending across most of the block. However, some localization of activities onsite is nevertheless apparent (Figure 6.39).

The majority of burials (n = 12, 80%) and features (n = 22, 4.6%) were restricted to the northeastern half of the block; there is a relatively sharp decrease in the occurrence of features or interments southwest of a roughly diagonal line extending from the center of grid square 51L1 to the southeastern corner of 49R2. Southwest of that line, only five features and three burials were documented.

Distributions of cultural material and unmodified animal bone were less clearly indicative of activity areas than in the underlying Stratum V. However, Figure 6.39 illustrates an appreciably more dense distribution of animal bone and cultural material in the northeastern quadrant of the site excavation block.

It should be noted the degree to which the overall spatial distribution of cultural activity at the site favored the area encompassed by the eastern portion of the block may reflect the influence of the underlying topography on the organization of space and activity areas at the site is unclear. In overall orientation, the vertical distribution of cultural materials associated with Stratum IV defines a gentle slope of the original surface in the direction of what was at the time the main channel of the Tennessee River. Feature and burial distribution, and the occurrence of cultural material, indicated that activities were concentrated in the eastern half of the site facing the Tennessee River, but that there was no significant distinction made between burial locations and other appropriate areas for the conduct of daily practices at the site during this period.

Stratum III, ca. 8,200 to 7,500 cal BP

Due to the previously published interpretation of the depositional sequence at Eva, samples from the Stratum III were not submitted for radiocarbon dating. Lewis and Lewis (1961:9) attributed the deposit to prolonged inundation of the location, during which time Stratum III – consisting of sand and silt – accumulated. The sequence of radiocarbon assays does not, however, support such an interpretation. Upper samples from Stratum IV, and dated samples from the base of Stratum II, indicate a period of as much as 700 – 800 years between them. During that interval, the evidence, including a total of fourteen interments (thirteen human and one canine), indicates periodic use of the location, although it appears not to have been intensive or highly localized.

Owing to their view that Stratum III's deposition did not occur at a time when Eva was accessible for use or occupation, Lewis and Lewis re-assigned most cultural material and burials initially associated with the deposit to either Stratum II above or Stratum IV below. In light of radiocarbon results, this reassignment appears unjustified, particularly when the presence of features within Stratum III (recorded on the site map but not otherwise documented) is considered.

Features were found in the western half of Stratum III and consisted mostly of thermally altered clay, suggesting at least small-scale fires associated with domestic activities; burials (human, n = 13; canine, n = 1) were located in the northeastern and southwestern quadrants of the block; the lone canine burial was situated near the eastern edge of the main excavation. The

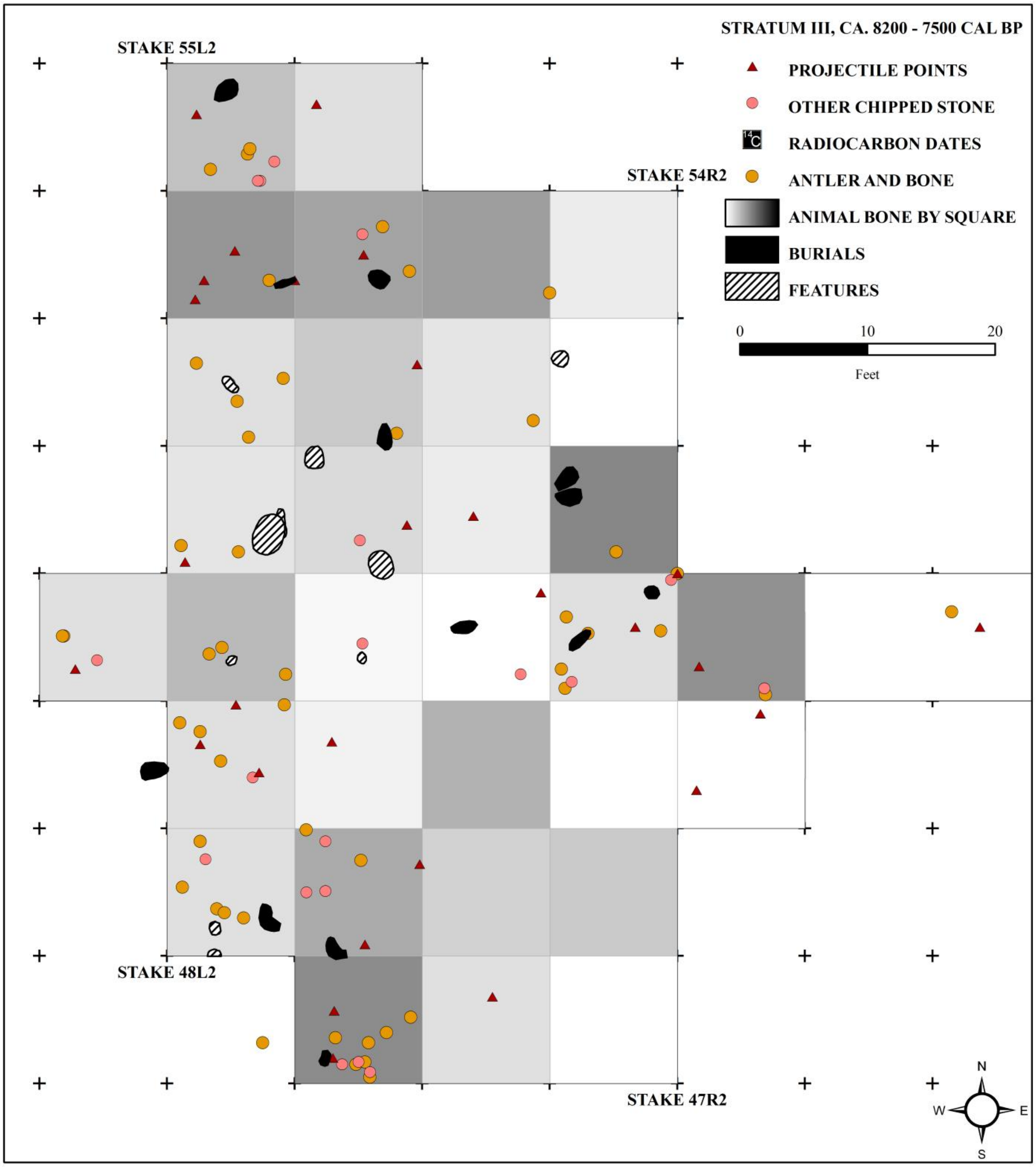

Figure 6.40. Spatial distribution of occupational materials in Stratum III at the Eva site (40BN12).

distribution of plotted cultural materials, and of unmodified faunal remains by grid square, was not appreciably clustered (Figure 6.40), although some minor grouping of artifacts in areas of the deposit that also appear contained more animal bone may perhaps indicate minor concentration of activities in those areas.

Overall, the data from Stratum III indicate that use or occupation of Eva during the period between 8,200 and 7,500 cal BP was not intensive, and probably consisted of sporadic visitation that, as a matter of course, also included burial of the dead when necessary. The lack of shellfish remains in Stratum III may indicate that the channel of the Tennessee River had migrated further to the east during this period, placing shellfish out of efficient harvesting range, or simply that visitors to the site during that period chose not to make use of shellfish.

Stratum II (^{14}C assays, n = 8): ca. 7,500 – ca. 6,300 cal BP

The re-appearance of shellfishing at Eva after approximately 7,600 cal BP, nearly 800 years after the previous period of shellfishing at the site had ceased, marked a re-initiation of more intensive use of the location after a relatively long period of comparatively low intensity, short-term occupations (Stratum III). Stratum II was a mounded accumulation of freshwater shell and other sediments, burials (both human and canine), and cultural materials – Eva's "shell mound." The deposit reached a thickness of over 1.25 m near the central portion of the excavation, and tapered to less than 30 cm near its edges outside the block (identified in the east-west and north-south trench profiles). Overall, the areal extent of the Stratum II deposit reached well beyond the boundaries of the excavation.

Eight radiocarbon dates obtained from Stratum II ranged between 7558 ± 59 cal BP and 6338 ± 61 cal BP, a span of 1,220 years. However, the ages and depths of the specimens were

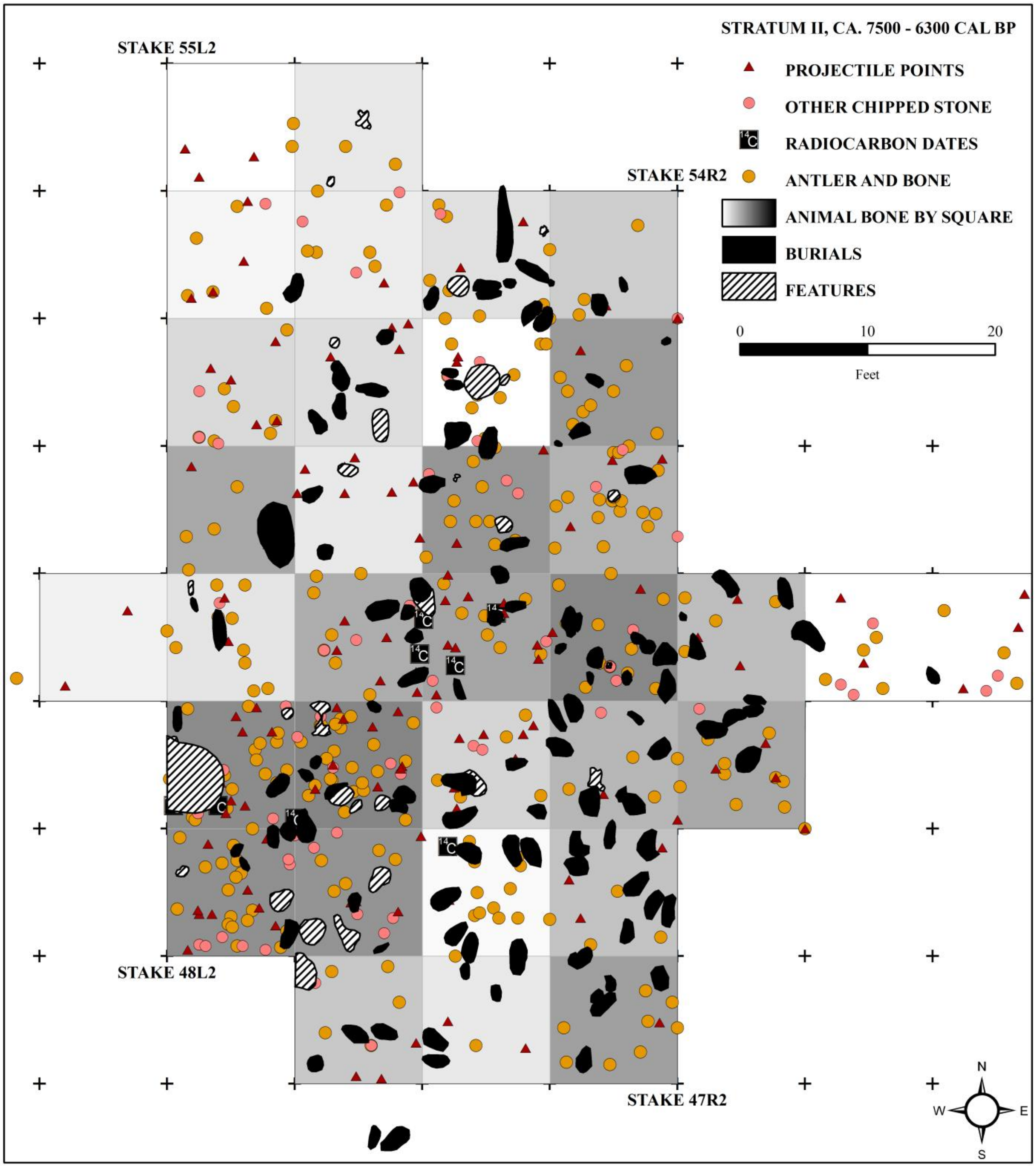

Figure 6.41. Spatial distribution of occupational materials in Stratum II at the Eva site (40BN12).

poorly correlated ($r = -0.543$). For example, the oldest sample confidently associated with Stratum II (FS 289: 7558 ± 59 cal BP) was recovered at a depth that was between 3 and 45 cm above three other samples that yielded later ages (FS 726: 6338 ± 61 cal BP; FS 1650: 7421 ± 67 cal BP; FS 848: 7164 ± 92 cal BP).

Bayesian modeling of the dated samples and the depths from which they were recovered indicates that three of the eight samples were most likely recovered from depths inconsistent with their ages. Those three dates – which produced agreement indices well below 60% (see Table 6.6) – were recovered from locations that contained multiple burials (Figure 6.41), and it is most probable that the activities associated with interment resulted in the vertical displacement of more recent materials from shallower depths to deeper locations in the deposit.

It is notable that the latest dated sample at Eva – FS 726, 6338 ± 61 cal BP – derived from a position deep within Stratum II rather than the overlying Stratum I, possibly indicating particularly severe disturbance (or perhaps bioturbation) in that location (Square 50R1), an area in which multiple burials were located.

It is difficult to ascertain the degree to which the duration of use of Stratum II, therefore, is represented by the eight dated samples associated with it. However, given the significant disturbance indicated by both the presence of burials and the results of Bayesian modeling of the dates, assessment of the length of time associated with the accumulation of Stratum II seems best accomplished simply by considering the latest and earliest dated samples, regardless of precise position within the deposit. While there is clear vertical displacement, the dated samples illustrate a relatively uninterrupted period beginning at approximately 7600 cal BP and extending to between 6500 and 6300 cal BP, a total period of time of roughly 1200 years.

The period of time represented by dates from Stratum II, when compared to the estimated duration of use of the site associated with Stratum IV (ca. 200 – 300 years) or Stratum V (ca. 200 years), was thus approximately four to six times as long as earlier phases. Thus, although the depth of the accumulated shell-bearing matrix appears to suggest relatively heavy use of the site, spread over more than a millennium of use, the deposit does not appear to indicate extensive occupation. Similarly, cultural materials contained within that matrix are not high in number when considered with respect to rates of accumulation. As indicated previously, in overall quantities of recorded artifacts, Stratum IV contained a greater proportion of materials recorded at the site, although only by approximately 5%. When quantities of unmodified faunal material are considered, the difference between that earlier shell bearing deposit and Stratum II is significant: by NISP, Stratum II contained less than 25% of the amount of faunal remains that were identified in Stratum IV, and only approximately 17% of the total recorded faunal material at Eva.

Using the maximum and minimum (unmodeled) calibrated mean intercepts for radiocarbon assays from Stratum V (n = 3; 178 years), IV (n = 5; 183 years), and the samples most likely to represent the duration of Stratum II (n = 8; 1,220 years), Figure 6.42 represents calculated accumulation rates (by decade) for interments, cultural material, and features within those strata. As indicated, evidence mostly indicative of occupational use of the site is significantly greater in Stratum IV; the period associated with Stratum II's accumulation is, by comparison, more appropriately viewed as one of increased use of the site for interment, although not representing a significant increase compared to Stratum IV; Stratum II also saw significantly less extensive use for other types of activities that were comparatively better represented in earlier deposits at Eva.

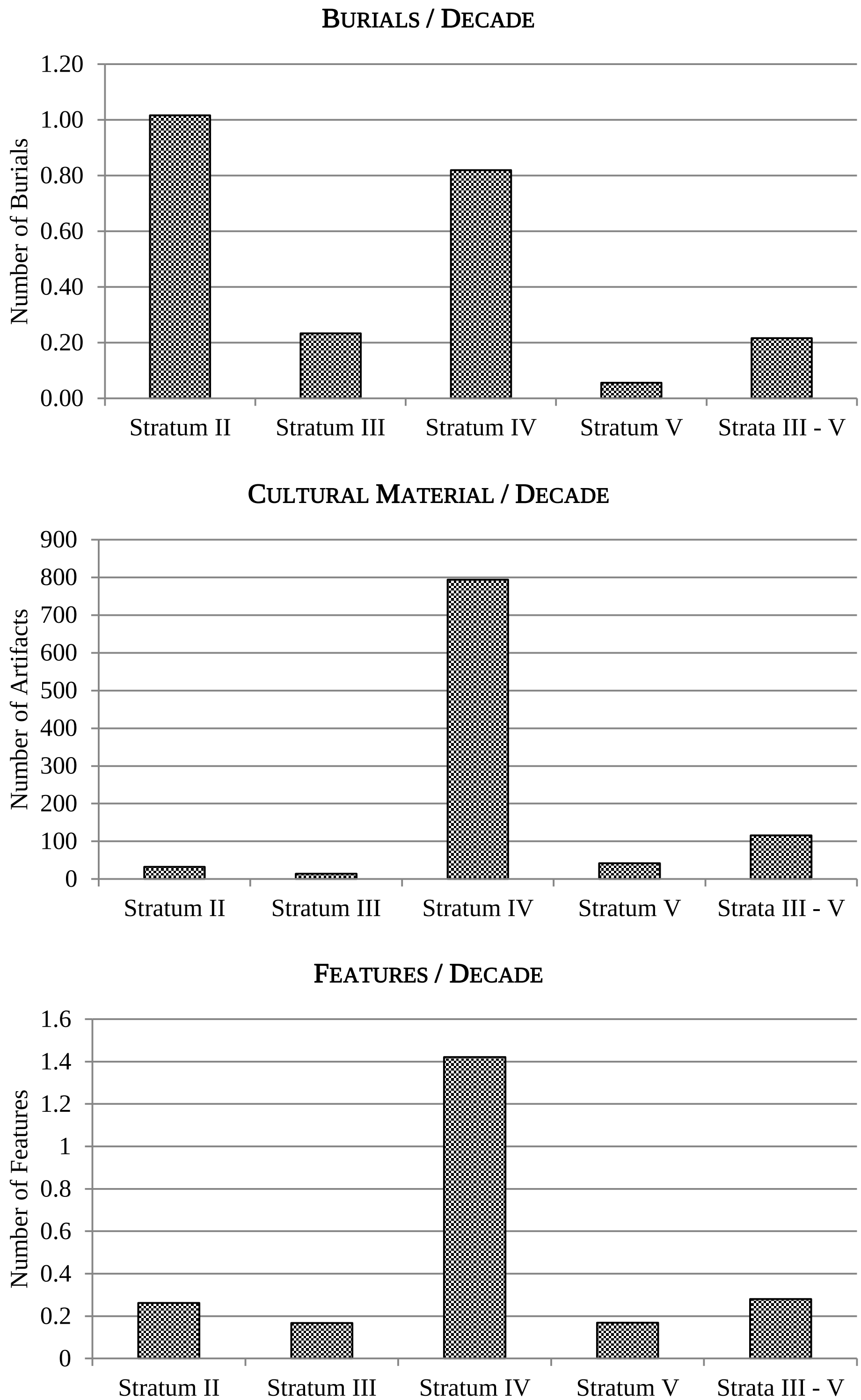

Figure 6.42. Average accumulation rates (materials/decade) of burials (top), cultural material (middle), and features (bottom) by stratum (Strata II – V) at the Eva site (40BN12).

Stratum I (^{14}C assays, n = 2): post-7,000 cal BP

Unlike the deeper strata at Eva, there was no attempt made to obtain chronometric data to estimate the age of the upper portions of Stratum I, because field notes and descriptions, as well as the history of the property on which the site was located, indicated that significant disturbance of the upper deposit from a variety of activities, both historic and prehistoric in age, had occurred. However, identifiable hafted bifaces recovered in Stratum I indicate that use of the location occurred well into the Late Archaic period, but did not extend much beyond that time. The primary characteristic used to distinguish Stratum I from Stratum II beneath it was the notable lack of shellfish remains, but the degree to which Stratum I and Stratum II can be considered separate deposits with respect to temporal and cultural separation is not, in fact, clear.

There was no clear temporal boundary defined based either on radiometric dating results or on the material culture recovered from the two deposits. It may be useful to consider that at Big Sandy (40HY18), available data suggest that Stratum I (shell-free) and Stratum II (shell-bearing) at that site appear to have formed contemporaneously in different areas of the site. A similar phenomenon may have occurred at Eva.

Only two specimens associated with Stratum I were submitted for radiocarbon dating, and due to the likelihood that the upper margins of Stratum I were disturbed, only samples from the basal portion of that deposit were selected. In both selection columns, Stratum I specimens were chosen that had been recovered from positions approximately 15 cm above dating samples taken from Stratum II. Despite care taken to identify samples intended to characterize the time period during which Stratum I was deposited, neither assay represented the latest date obtained at Eva. In fact the most recent date from a Stratum I specimen pre-dated the latest date obtained at the site (FS 726: 6338 ± 61 cal BP) by approximately 260 years.

Analysis of the temporal diagnostics from Stratum I indicated moderate mixing of the deposit, with both Middle and Late Archaic hafted bifaces in approximately equal proportions. In contrast with the typological assessment of age and disturbance of the Stratum I deposit, radiocarbon dates (both from Stratum I and from the underlying Stratum II) suggest substantial vertical mixing of the two uppermost cultural deposits. As such, estimation of the timing of termination of activities associated with Stratum II and the initial period during which Stratum I was formed is difficult. One sample – FS 507 in Column 1 – produced a date of 7084 ± 93 cal BP, and it is uncertain if that estimate represents the earliest age of Stratum I, or a vertically displaced artifact from Stratum II. A second assay specifically associated with the deposit (FS 639, Column 2) was dated to 6598 ± 78 cal BP.

The presence of a moderate number (n = 44; human, n = 42; canine, n = 2) (Figure 6.43) of burials in Stratum I indicates that, post-7,000 cal BP, activities conducted at Eva continued to include periodic interment and presumably the conduct of mortuary rituals, although if the shellfish remains in Stratum II indeed comprise evidence of feasting associated with mortuary activities, the lack of shellfish in Stratum I would seem to suggest a change in cultural practices corresponding with the deposition of Stratum I. Such a change may also be indicated in the increase in the number of graves in Stratum I that contained burial offerings (n = 20, 47.6% of all Stratum I human graves) in contrast with the number of Stratum II graves with accompaniments (n = 29; 26.6%).

Stratum I also contained evidence of probable domestic occupation of the site. There were 18 features present, including Feature 1, a series of superimposed patches of fired clay near the center of the excavation block. Feature 1 encompassed an area of roughly 2.4 m^2 in square 51CA, and was surrounded by other small areas of fired clay, a distribution suggestive of a

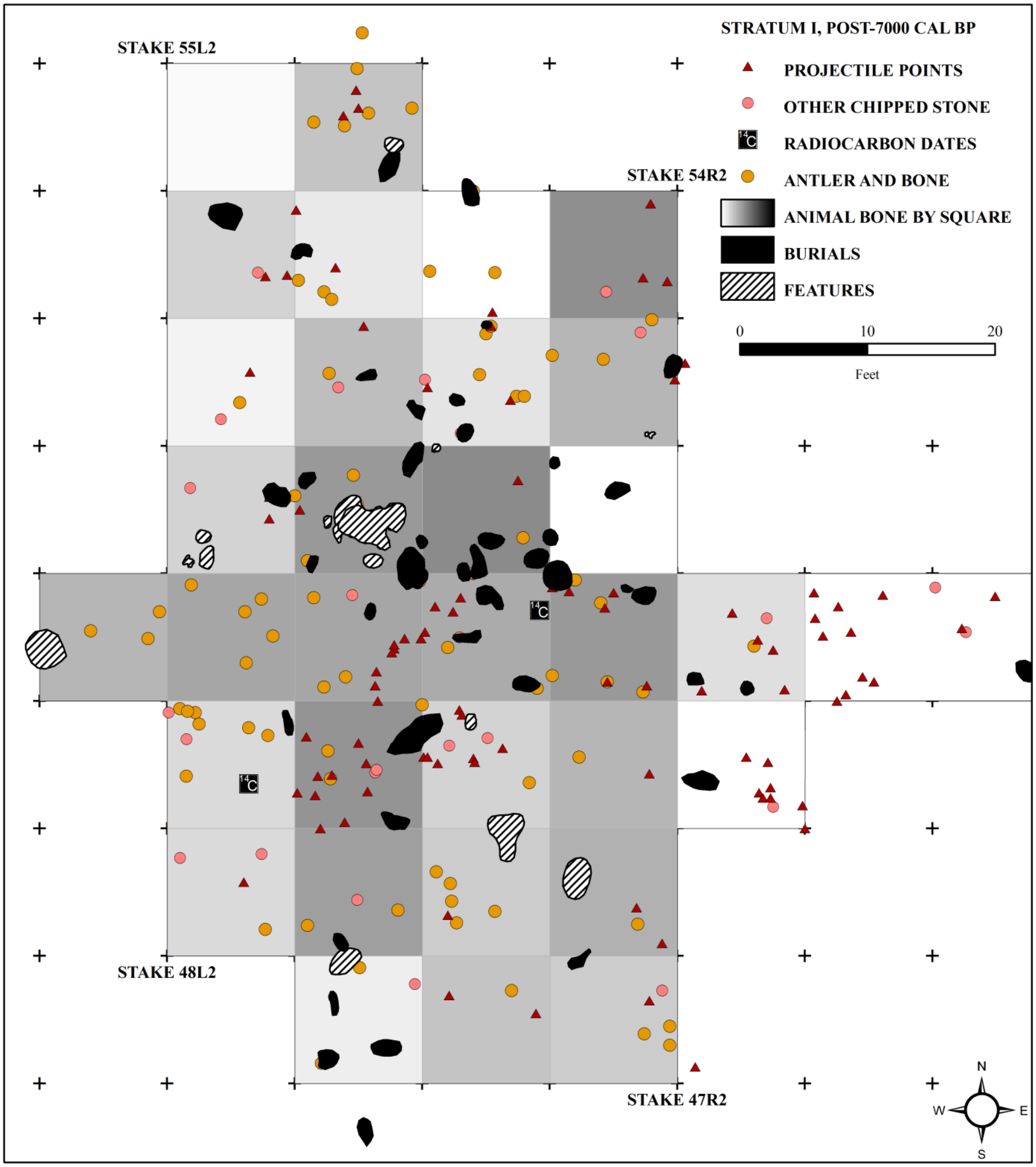

Figure 6.43. Spatial distribution of occupational materials in Stratum I at the Eva site (40BN12).

prolonged period of localized intense activity, possibly of a domestic nature. Although there were no features documented in the vicinity that suggested posts, Feature 1 represents the most likely candidate for structural evidence (e.g., domestic occupation) at Eva. Clustering (see above, Figure 6.43) of cultural material, features, and burials in that area may also suggest a locus of comparatively intense domestic activity; in Stratum I, that location represented the highest elevation at the site (atop the underlying mounded Stratum II deposit) and may have represented a "natural" point on which to locate activities at the site during the period post-dating the creation of Stratum II.

Results of dating generally support the conclusion that Stratum I dated post-7,000 cal BP, and probably post-dated 6500 cal BP. None of the intact deposits excavated at Eva appear to have post-dated 6,000 cal BP, placing the bulk of the site's stratigraphic sequence fully within the Middle Archaic cultural period, although Late Archaic diagnostics in Stratum I indicate later use of the location as well. Because disturbed portions of the Stratum I deposit were not separated from underlying, intact sediments during excavation, Late Archaic diagnostic bifaces in the assemblage cannot be isolated vertically, and the degree to which intact deposits of Stratum I included the remains of activity conducted at the site during the Late Archaic is not clear.

CHAPTER 7. THE KAYS LANDING SITE

Kays Landing (40Hy13) is located on the extreme eastern edge of Henry County, Tennessee, along the left descending bank of the historic channel of the Tennessee River (Figure 7.1). The site was initially recorded in early November of 1939 by archaeologists from the University of Tennessee Division of Archaeology (UTDoA), and was designated 15Hy13 (later 40HY13). The site was later named for the nearby river landing ("Kays Landing"), located a little more than 100 m downstream. By the time of the site's excavation –which began approximately eight months after it was initially recorded – the landing was no longer in use.

The site was identified in a cultivated agricultural field by a light scatter of cultural material and shell on the plowed surface, scattered over an area of approximately 490 m^2 (ca. 5274 ft^2) atop a natural levee of the adjacent Tennessee River. Excavations began in early July of 1940 and continued through late September of that year and were directed by George Lidberg, occasionally assisted by Douglas Osborne, who at the time had just completed work at Big Sandy nearby. In September, Osborne was reassigned to supervise excavations at the Eva site (40BN12).

Kays Landing has been poorly reported, and no monograph or other detailed report of the site's excavation has previously been published. Prior brief descriptions of the site were included in two publications by Lewis and Kneberg in the late 1940s (Lewis and Kneberg 1947:4-5) and the late 1950s (Lewis and Kneberg 1959:162-163, 169-173).

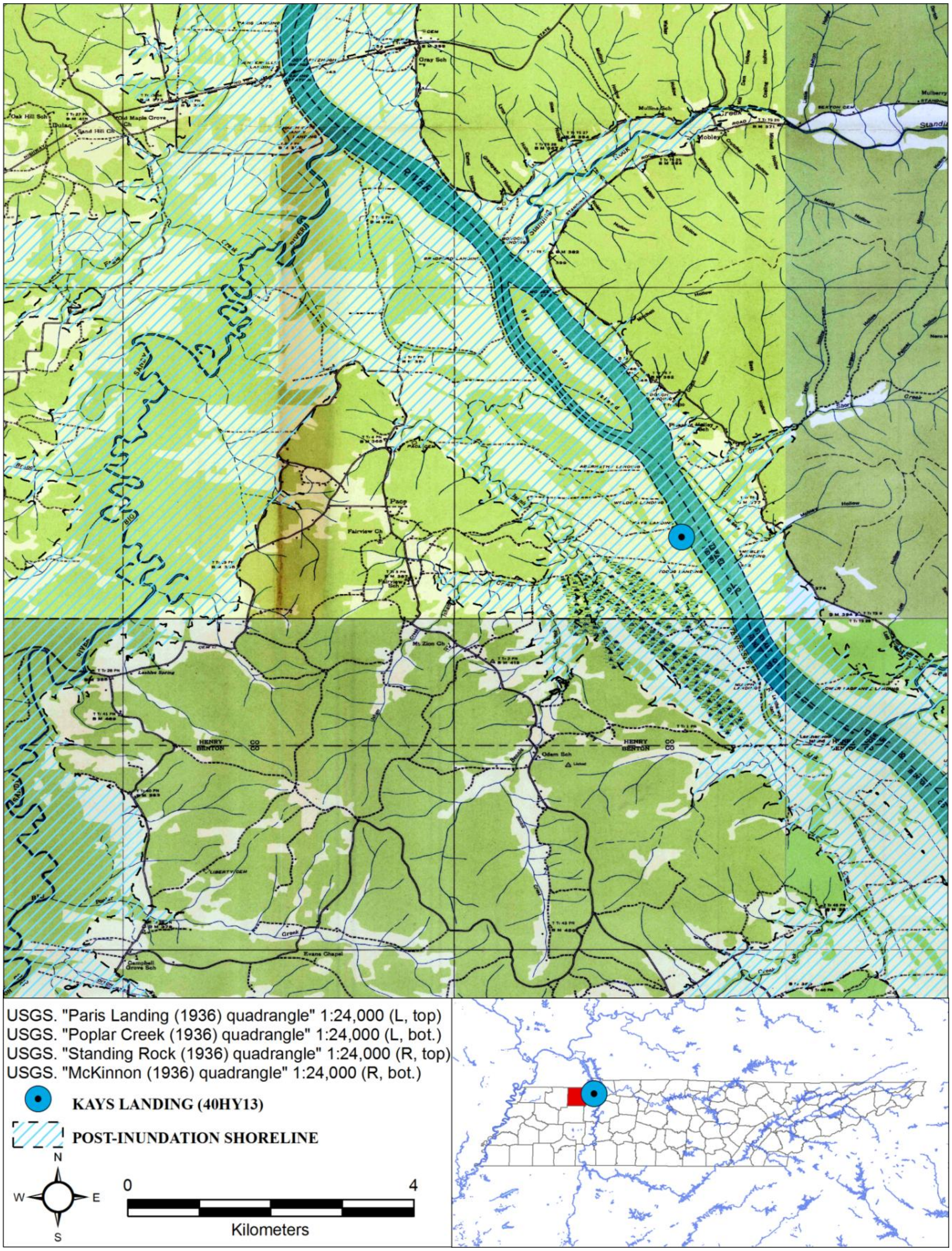

Figure 7.1. Location of Kays Landing (40Hy13).

Environment, Geology, and Soils

The eastern portion of Henry County straddles the intersection of the Interior Plains and the Atlantic Plain physiographic divisions. Kays Landing lies at the extreme western edge of the Western Highland Rim, a part of the Interior Low Plateaus physiographic province within the Interior Plains division (Fenneman and Johnson 1946). The East Gulf Coast Coastal Plain section of the Coastal Plain province is located to the immediate west.

Soils classed as Huntington and Elk silt loams were mapped in the vicinity of Kays Landing before the region was inundated after the 1941 completion of the Kentucky Dam. Huntington series silt loams are well drained and occur on bottomland along the Tennessee River. Soils of this type range up to 2 m (80 in) in depth (USDA Web Soil Survey, Accessed 8/1/2013). Elk silt loams are similar in character to Huntington series soils, and are found on terraces above the river valley floor. Depth to bedrock may extend beyond 1.5 m (60 in).

Bedrock in the area consists mainly of Mississippian and Devonian aged limestones and cherts (King and Beikman 1974; King et al. 1994); a chert ridge was noted approximately 1 km west of the site.

At the time of excavation, Kays Landing lay in plowed agricultural fields, but Braun (1950) grouped the region within the Western Mesophytic Forest. Dominant forest taxa included oaks (*Quercus*) and hickories (*Carya*) on slopes and ridges, and beech, tuliptree, and sugar maples found in ravine communities (Braun 1950:156).

TVA Excavation

The deposits preserved at Kays Landing were extensive, but were not evident from surface inspection during the initial site survey in late 1939. When excavations began in mid-

Figure 7.2. Profile illustrating Stratum II shell mound, grid squares 36R10 (left) to 31R10 (right) at the Kays Landing site (40Hy13) (see also Figure 7.4, the site profiles).

1940, the field director (Lidberg) had expected that the site consisted of an "undifferentiated village deposit" (G. Lidberg, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville), and was initially unprepared to deal with the complex alternating deposits of shell-bearing matrix and alluvial sediments that were revealed in the profiles of test pits positioned around the site (e.g., the profile illustrated Figure 7.2; see also the site profiles, Figure 7.4) and excavated to a set depth of 20 ft (6.1 m) below surface[30]. Nevertheless, following the completion of the test pits and subsequent appraisal of the stratigraphic sequence, Lidberg proceeded according to standard UTDoA procedures. A site grid was established using magnetic north (the adjacent river channel was oriented at a bearing of approximately 330°), and three 5-foot wide (1.52 m) exploratory trenches were excavated. Trench 1 was dug on a north-south axis through the center of the site, and was approximately 140 feet (42.7 m) in length. Trenches 2 and 3 were positioned perpendicular to Trench 1. Trench 2 was begun at the presumed center of the "shell mound" and extended east to the edge of the slope down to the river (40 ft; 12.2 m); Trench 3 was placed at the southern end of the north-south trench and was 27.4 m (90 ft) long.

An additional block was extended west from Trench 1, and measured approximately 84.4 m^2 (909 ft^2) while two "test columns" (Figure 7.3) covered an additional 34.4 m^2 (370 ft^2). In total, the main excavation area encompassed about 244.4 m^2 (2265 ft^2).

It should be noted that a considerable portion of the site outside the delineated boundaries of the excavation (specifically the test trenches and test pits) was substantially disturbed during the investigation of Kays Landing. To prevent collapse of the walls of the smaller excavation

[30] There were no cultural remains encountered beneath Stratum V at Kays Landing, and an analysis of the temporal diagnostics from the site (see below) revealed no indication in the material culture of prior occupations.

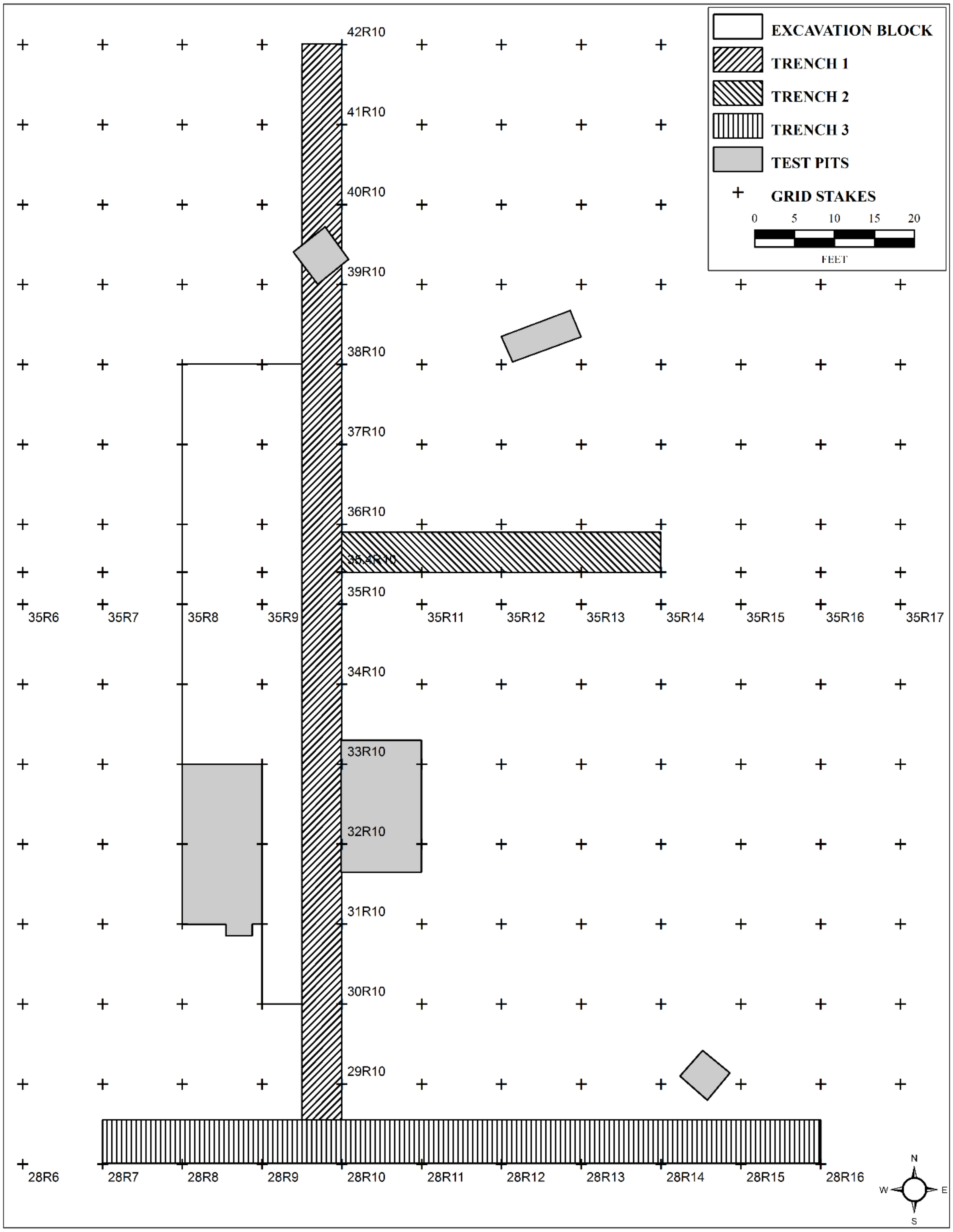

Figure 7.3. Excavation block, test trenches, and test pits at the Kays Landing site (40Hy13).

areas, the relatively narrow test trenches and the test pits (see Figure 7.3) were excavated as "inverted pyramids," with considerable soil removed (in a relatively uncontrolled manner) for a distance of several feet back away from the edges of units (G. Lidberg, Original field report, on file at the McClung Museum at the University of Tennessee, Knoxville). Thus, while the site map indicates a total excavation area of approximately 244 m^2, that area represents only controlled excavations at Kays Landing. The total amount of area disturbed at the site is not known, nor is there any indication whether any sampling or collection was made of the sediments removed from around the block, trench, and pit excavations, although the large proportion of unprovenienced artifacts listed in the site's field specimen log (see "Cultural Material" section below) may derive from that context.

With the exception of the initial test pits (which were dug stratigraphically) Kays Landing was excavated using arbitrary 0.5 ft levels. The site supervisor noted that "[t]he deposit was so variable on the horizontal and of such great depth that the true nature of it was disguised until a considerable profile had been exposed" (G. Lidberg, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville).

STRATIGRAPHY

Within the main area of the excavation, the stratigraphic sequence was relatively straightforward, extending an average depth (from surface to subsoil) of 2.49 m (8.175 ft). The area of greatest depth (2.76 m; 9.1 ft) was near the center of the excavation, due to the presence of the shell mound. Within the main area of investigation, five sequential stratigraphic deposits were distinguished beneath the plowzone (Figure 7.4).

Figure 7.4. Stratigraphic profiles at the Kays Landing site (40HY13). Reproduced from the original field map, G. Lidberg, 1940 (Original on file at the Frank H. McClung Museum of Natural History and Culture, University of Tennessee, Knoxville). (Oversized figure, see Appendix A.)

As at Big Sandy (Chapter 5) and Eva (Chapter 6), Stratum I (which overlay the main shell deposit) consisted of a dark, heavily organic clay loam of variable depth. At its thickest point in grid square 39R10, immediately north of the shell mound, it reached approximately 1 m in depth; near the crest of the mound, it amounted to only a few centimeters. Variation in the thickness of Stratum I is probably attributable to the long history of cultivation and plowing of the site.

Stratum I, described by Lewis and Kneberg (1959:163) as the “Kays III” component, was noted as the only deposit in which pottery was found, including two sherds identified as fiber-tempered. Five burials were also associated with Stratum I, although their age and association with the deposit was not entirely clear, due to its truncation by plowing.

Stratum II comprised the site’s “shell mound” and was termed “Kays II” by Lewis and Kneberg (1959:163). Two profiles illustrate the mounded nature of the deposit (Figure 7.4; see also Figure 7.2). On the site’s north-south profile, extending from grid square 29R10 to 42R10, the Stratum II shell mound extended approximately 23.5 m (77 ft) and was relatively sharply delineated at its northern edge, located approximately 0.61 m (2 ft) north of 39R10; at its southern boundary, the deposit trailed out for nearly ten meters, but the southern edge of the “mound” occurred roughly 1.5 m (5 ft) south of 32R10.

West of the R10-line, the dimensions and extent of Stratum II were not established. In the shorter of the site’s east-west profiles, which ran from the R10- to the R15-line at 35-North, Stratum II was well expressed, with its maximum depth at R10 and extending to a point approximately 2.3 m (7.5 feet) beyond R13, a distance of roughly 11.4 m (37.5 ft). The maximum vertical expression of Stratum II – a depth of slightly less than 1.5 m (4.75 ft) – appears to have been at or near grid stake 35R10, suggesting that the mound continued west in a similar configuration to its eastern projection. If so, then the Stratum II shell mound was roughly elliptical, measuring 23.5 m north-south by 22.8-23 m east-west, and covering an area of 410 m^2 (4414 ft^2). In comparison, north-south and east-west profiles at Eva indicate that site's shell mound (also Stratum II) encompassed an area of over 1100m^2 (11,970 ft^2).

Stratum II varied in composition from its upper to lower levels. Approximately 30-50% of the deposit was characterized as shell throughout, but the upper non-shell portion was more humic, while the lower levels contained a greater proportion of sand, which graded into Stratum III, which comprised mostly sand with small shell fragments. By number, cultural material and burials in Stratum II were surpassed only by materials contained within Stratum V. Over 300 chipped stone artifacts were recovered from the deposit, which also contained 18 human burials.

The deepest three strata at Kays Landing were grouped by Lewis and Kneberg (1959:163) as representing the "Kays I" component. Stratum III, underlying the shell mound, consisted of a deposit of mostly sand that reached a meter in thickness beneath the central portion of the mound, but averaged nearer to 0.62 m (2.04 ft) thick. The site's profile indicates that Stratum III did not extend fully across the excavated area, but appeared roughly 0.76 m (2.5 ft) south of the 40-line, filling a depression in the underlying sediments. The nature of the deposit was not clear, since it did not exhibit striations and banding often typical of water-laid sand (Lidberg n.d. 1941:5). This deposit contained a moderate amount of cultural material, and five burials.

Stratum IV occurred across the entirety of the excavation block, and was described as "thin bands of carbon-stained sand with thin layers of clean water-deposited sand between" (G. Lidberg, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville). The deposit varied considerably in thickness. Underlying the shell mound and further to the south, Stratum IV averaged approximately one-half meter (1.76 ft), but the north-south profile indicates that north of the northern projection of Stratum II and the depression in which Stratum III was accumulated, Stratum IV reached a depth of 0.9 m (2.97 ft).

Cultural material recovered from within Stratum IV was approximately equivalent to that associated with Stratum III, and was dominated by chipped stone artifacts. A single burial was associated with Stratum IV.

Stratum V represented a second, earlier shell-bearing deposit at Kays Landing, and was encountered throughout the excavation area. The deposit was described as comprising mainly sand and shell, lying on sterile water-deposited sand with a relatively sharp division between the two (G. Lidberg, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville). The largest proportion of cultural material that could be confidently associated with a specific stratum was contained within Stratum V, and the majority of burials at the site (n = 45) were also encountered in that deposit, which at its maximum reached 0.45 m (1.48 ft) in thickness, but was considerably thinner in the area underlying Stratum II.

It is necessary to separately describe the sequence identified in Trench 3 (squares 28R8 – 28R16), extending across the southern edge of the site. In contrast to portions of Kays Landing situated north of this trench, in which relatively clear stratigraphic separation was noted, the majority of the trench profile could not be resolved to strata comparable to those of the remainder of the site, except for Stratum I (Zone A) and Stratum V (Zone D), and was described by zone. The description of each zone as made by the principal investigator in the field is provided in Table 7.1 (see also Figure 7.4).

Table 7.1. Zone designations and descriptions for stratigraphy in the 28R7-28R23 profile at the Kays Landing site (40HY13) (see Figure 7.4).

Zone	Description (from "Profile Notes," Original site documentation on file at McClung Museum, University of Tennessee, Knoxville).
Plowzone	This zone is homogeneous and on this profile cannot be clearly distinguished from the soil beneath it. It probably is due to more cultivation here than further east.
Zone A	A loam with a large enough percentage of clay present to make it very cohesive and forms lumps in digging. Underlain by Zone A2, a thin band of sterile, water-laid sand.
Zone B	Much the same soil [as A] to all appearance but has a large addition of broken rock and pebbles. [The zone] contains a large number of burials all of which are in such exceedingly poor condition they cannot be cleaned without a great expenditure of too valuable time. Also present in this zone are small flecks of charcoal. It seems fairly certain that this soil is water deposited though the presence of rock is as yet inexplicable. The burials are intrusive to the prior and the laying down of Zone G. Artifact material is also present in this zone and it would seem that this material is redeposited though the origin of the material hasn't been determined. It is quite possible that the zone was laid down in indistinguishable bands and that habitation took place between these floodings. However, silt banding is not visible in the profile.
Zone C	[This zone] on the profile is over and under Zone D. This zone is clearly water deposited and has alternate bands of sandy loam and clay loam with an amount of charcoal or occupation detritus.
Zone D	Corresponds to Stratum V. This zone here contains no shell but has a large amount of fragmentary charcoal and includes small beds of charcoal and small patches of burnt nut shells.
Zone E	A layer of almost pure yellow sand with an occasional clay band. This seems to represent, if not one, very few floodings. This zone contains sparse minute bits of charcoal.
Zone F	Nearly all clay with a slight addition of sand.
Zone G	This zone is rock free and is of a far sandier composition than the surrounding soil. The band continues unbroken to the east at a consistent level. Its outlines are very clear and must represent a single silt deposit. It seems odd that successive siltings should change character as much as they do in this profile.

FEATURES AND BURIALS

In total, 84 burials (Table 7.2) and 96 features (Table 7.3) were documented at Kays Landing, although (as at Big Sandy and Eva [Chapters 5 and 6, respectively]) not all of the features identified at the site received specific numerical designations or were individually recorded on site paperwork. Eighteen pits of varying sizes and shapes received separate numbers (Pits 1 – 18), and seven individual features (Features 1 – 7) were designated. A total of fifty postmolds were collectively numbered Feature 8. An additional twenty-one features were noted on the site plan map, but received no numerical designations, and although they were labeled (e.g., "charcoal," "ash," "burned soil") neither depths nor the stratum of association was recorded.

Burials (Human, n = 83; Canine, n = 1)

Graves at Kays Landing consisted almost entirely of human interments; only a single canine burial was recovered. Summary data for each burial are provided in Table 7.2, and were derived principally from the original field record forms completed during excavation, although age and sex estimations were also included from the Frank H. McClung Museum's 1990 (Smith 1990) inventory of all skeletal material, as required for compliance with the Native American Graves Protection and Repatriation Act (NAGPRA). Age and sex assessments made in the field in 1940 were often done relatively quickly and were based on indicators that were, compared to modern standards, less reliable, and as a consequence, the 1940 and 1990 evaluations differed substantially. Because some skeletons were in poor condition and were either not recoverable or were in extreme fragmentary condition, only 74 of the 83 human burials identified during excavation were examined both in 1940 and 1990. Of those, a total of 35 (47.3%) were assessed differently on the basis of sex. Results of age assessments were more comparable, and the 1940 and 1990 results differed for only 16 individuals (21.6%).

Most skeletons at Kays Landing were recorded in good (n = 47; 56.6% of the 83 human burials) or fair (n = 22; 26.5%) condition. Of those described as "poor" (n = 14), the majority (n = 10) was recovered in the southern trench. Most were fully flexed (n = 53; 63.8%) or partly flexed (n = 18; 21.7%). Only three extended burials were identified, and flexure could not be determined for nine individuals (10.8%).

Burial position was recorded for 66 (n = 79.5% of the total 83) skeletons; of those, 43.9% (n = 29) were interred on their backs. Approximately equal numbers were laid on their right (n = 15; 22.7%) and left (n = 17; 25.7%) sides, while only a few individuals were laid face down (n = 5; 7.5%). Seventeen burials were either too fragmentary, or too incomplete, to determine position.

The orientation of graves was determined by the long axis of the burial, with the orientation direction indicated by the position of the head. Burial orientation was recorded for seventy-four burials (89% of the 83 human interments). Most graves for which orientation could be assessed were aligned toward the east (n = 17; 22.9%). Burials oriented to the south and west occurred in similar proportions (south, n = 13, 17.6%; west, n = 11, 14.9%). Only 5.4% (n = 4) were positioned to the north, although sixteen burials (eight each, 10.8%) pointed to the northeast and northwest. Graves aligned to the southeast and southwest numbered five (6.8%) and six (8.1%), respectively. No orientation could be determined for nine of the eighty-three human burials at Kays Landing.

Most of the site's burial population (n = 45, 53.6%) was recovered from Stratum V (Figure 7.9), with 21.4% (n = 18) in Stratum II (Figure 7.6). Of the remaining burials, no more

Table 7.2. Burial data for the Kays Landing site (40HY13).

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Assoc.
							WPA	NAGPRA	WPA	NAGPRA	
1	36R10	1					Dog				
2	33R10	2	Fair	W	Unspecified	Back	M	M	Adult	Adult	flint eccentric
3	34R9	2	Good	N	Fully Flexed	Right	F	F	Adult	Adult	gorget of undet. material; bone needle; projectile point
4	33R10	1	Good	W	Unspecified	Unspecified	F	F	Adult	Adult	
5	25R18	5	Fair	E-NE	Unspecified	Left	M	Indeterminate	Adult	Adult	
6	37R10	5	Good	N	Partly Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	
7	36R10	2	Fair	S	Fully Flexed	Left	M	M	Adult	Adult	
8	37R9	1	Poor	SW	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
9	33R9	2	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
10	32R10	2	Fair	E	Fully Flexed	Unspecified	F	F	Adult	Adult	
11	34R10	3	Good	S	Fully Flexed	Unspecified	Indeterminate	M	Adult	Adult	
12	28R9	no assignment	Poor	E	Fully Flexed	Left	M	Indeterminate	Indeterminate	Adult	
13	28R8	no assignment	Poor	E	Fully Flexed	Right	Indeterminate	M	Adult	Adult	
14	28R10	no assignment	Poor	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
15	32R10	2	Fair	Unspecified	Unspecified	Unspecified	M	Indeterminate	Adult	Indeterminate	
16	37R10	1	Fair	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
17	28R16	no assignment	Poor	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
18	28R16	no assignment	Poor	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
19	28R15	no assignment	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
20	40R10	5	Poor	NW	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	
21	34R10	3	Good	NE	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	split bone awl
22	36R9	3	Good	SW	Fully Flexed	Left	F	F	Adult	Adult	
23	28R16	no assignment	Poor	W	Extended	Front	M	Indeterminate	Adult	Indeterminate	
24	28R16	Zone B	Poor	N	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
25	28R16	Zone B	Poor	Unspecified	Fully Flexed	Unspecified	Indeterminate	F	Adult	Adult	
26	30R10	5	Good	NE	Fully Flexed	Back	M	M	Adult	Adult	
27	35R9	5	Good	SW	Partly Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	
28	36R10	3	Good	W	Fully Flexed	Right	F	F	Adult	Adult	
29	33R10	5	Good	E	Fully Flexed	Back	M	F	Adult	Adult	
30	37R10	5	Good	W	Fully Flexed	Left	M	F	Adult	Adult	
31	28R16	Zone B	Poor	NW	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Indeterminate	Indeterminate	2 stone beads
32	35R10	3	Good	S-SW	Partly Flexed	Back	F	F	Adult	Adult	split bone awl
33	37R9	5	Good	E	Unspecified	Back	Indeterminate	Indeterminate	Subadult	Subadult	
34	37R10	5	Good	E	Extended	Back	Indeterminate	Indeterminate	Subadult	Subadult	perforated carnivore canine teeth; red ochre
35	37R10	5	Good	SE	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	shell beads; red ochre; perforated carnivore canine teeth; stone bead with shell beads

Table 7.2. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Assoc.
							WPA	NAGPRA	WPA	NAGPRA	
36	37R10	5	Good	NW	Partly Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	perforated carnivore canine teeth
37	34R9	5	Poor	S	Partly Flexed	Back	M	M	Adult	Adult	
38	37R9	5	Fair	NW	Fully Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	
39	32R10	5	Fair	E	Partly Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	
40	36R10	5	Good	NE	Fully Flexed	Back	M	F	Adult	Adult	
41	37R9	5	Fair	Unspecified	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	
42	35R12	2	Good	E	Partly Flexed	Front	M	M	Adult	Adult	
43	35R12	2	Good	NE	Partly Flexed	Left	F	M	Adult	Adult	
44	35R11	2	Fair	NW	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
45	35R11	2	Fair	NE	Extended	Front	Indeterminate	Indeterminate	Subadult	Subadult	
46	35R10	5	Good	E	Fully Flexed	Left	M	F	Adult	Adult	
47	35R10	5	Fair	W	Fully Flexed	Left	M	M	Adult	Adult	
48	35R13	2	Fair	S	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	
49	35R13	2	Fair	S	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	
50	35R15	2	Good	W	Fully Flexed	Right	M	M	Adult	Adult	
51	35R14	2	Fair	W	Fully Flexed	Left	M	Indeterminate	Adult	Adult	
52	34R10	5	Good	E	Fully Flexed	Back	M	F	Adult	Adult	
53	35R10	5	Good	NW	Fully Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	
54	34R10	5	Good	S	Fully Flexed	Back	M	M	Adult	Adult	2 turtle carapaces
55	35R13	2	Fair	NE	Fully Flexed	Right	Indeterminate	M	Adult	Adult	
56	35R10	2	Fair	E	Fully Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	
57	33R10	5	Good	S	Partly Flexed	Back	F	F	Adult	Adult	
58	31R10	5	Good	W	Fully Flexed	Left	Indeterminate	F	Subadult	Adult	metate and nut cracker; cut antler
59	35R9	5	Good	E	Partly Flexed	Back	M	M	Adult	Adult	
60	33R11	5	Good	S	Fully Flexed	Back	M	F	Adult	Adult	
61	33R10	5	Good	SW	Fully Flexed	Back	F	F	Adult	Adult	
62	35R9	5	Good	W	Partly Flexed	Back	M	F	Adult	Adult	
63	35R13	2	Good	Unspecified	Unspecified	Unspecified	M	M	Adult	Adult	
64	35R13	2	Good	Unspecified	Fully Flexed	Unspecified	M	M	Adult	Adult	
65	33R9	5	Good	S	Fully Flexed	Back	M	M	Adult	Adult	beaver tooth; 2 bone awls; 9 flint tools
66	33R9	5	Good	E	Fully Flexed	Front	F	M	Adult	Adult	beads
67	33R9	5	Good	S	Fully Flexed	Left	F	M	Adult	Adult	
68	33R10	5	Good	SW	Partly Flexed	Back	M	M	Adult	Adult	
69	32R9	1	Fair	SW	Partly Flexed	Front	F	Indeterminate	Adult	Subadult	red ochre; bone tool; projectile point; 2 ulna awls
70	33R9	5	Good	SE	Fully Flexed	Right	M	M	Adult	Adult	
71	34R10	5	Good	NW	Fully Flexed	Back	M	M	Adult	Adult	

Table 7.2. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Assoc.
							WPA	NAGPRA	WPA	NAGPRA	
72	34R10	5	Good	NW	Fully Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	
73	33R11	5	Fair	S	Fully Flexed	Back	F	M	Adult	Adult	
74	32R11	5	Good	SE	Fully Flexed	Back	Indeterminate	F	Indeterminate	Adult	
75	32R11	4	Good	NE	Fully Flexed	Right	F	F	Adult	Adult	
76	31R11	5	Good	S	Fully Flexed	Back	F	F	Adult	Adult	
77	35R10	5	Good	E	Fully Flexed	Left	M	F	Adult	Adult	
78	35R11	5	Good	N	Fully Flexed	Left	Indeterminate	F	Adult	Adult	
79	31R9	5	Good	E-NE	Fully Flexed	Right	F	F	Adult	Adult	
80	32R11	5	Fair	SE	Fully Flexed	Back	M	F	Adult	Adult	turtle carapace
81	30R9	5	Fair	E-NE	Fully Flexed	Left	Indeterminate	M	Indeterminate	Adult	
82	33R11	5	Fair	SE	Fully Flexed	Back	M	F	Adult	Adult	
83	32R9	5	Good	NE	Fully Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	7 flint blades; 2 projectile points; bone artifact; antler butt; antler tine; worked antler
84	32R9	5	Good	W	Fully Flexed	Left	M	M	Adult	Adult	beaver incisor

than five were associated with any other provenience (Figures 7.5 and 7.8); the stratigraphic origin of seven was not recorded (Table 7.2).

Stratum I

Only five burials were associated with Stratum I, including the site's only canine burial (Burial 1) (Figure 7.5). Of the four human interments, two each were adults and subadults. Two of the five (Burials 4 and 69) contained associated offerings; included five artifacts or materials, comprising red ochre, three fragmentary bone tools and one stemmed projectile point, were found with Burial 69 (Figure 7.7).

Stratum II

Burials in Stratum II, the shell mound, numbered eighteen. The majority (n = 12) were identified in the eastward-projecting trench between the 35- and 36-lines and the remainder in the main excavation block. There was no identifiable pattern in the burials' spatial distribution within the open area. Most Stratum II burials were adults (n = 13); one of those (Burial 2) contained a single artifact, described as a "flint eccentric" (Figure 7.6). A second grave (Burial 3) contained three items, including a large gorget fashioned from an indeterminate stone material (Figure 7.7), a bone needle, and a hafted biface.

Stratum III

Stratum III contained five burials, all adults, positioned near the central area of the site's main excavation block (Figure 7.8). Two of the graves were accompanied by one bone awl each.

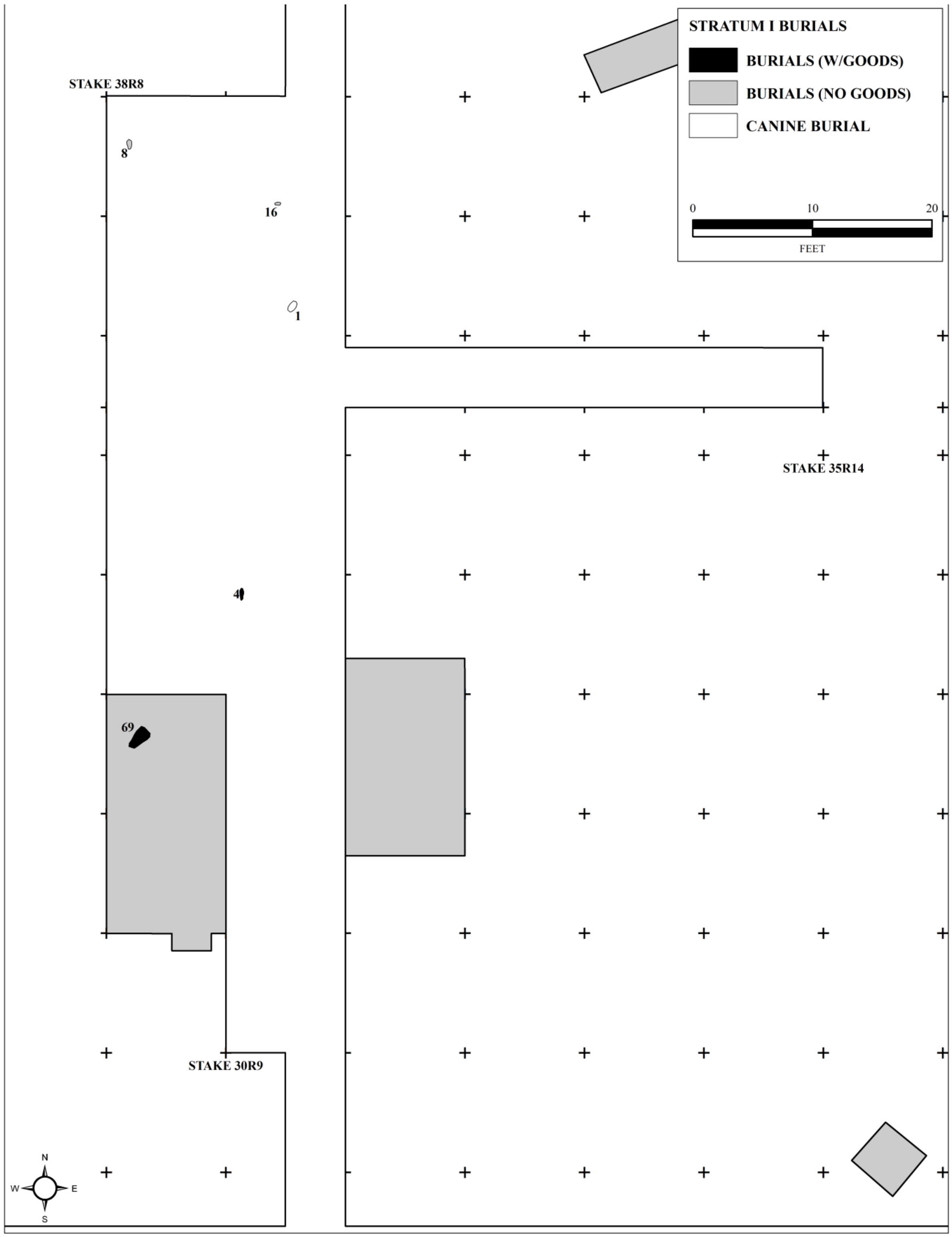

Figure 7.5. Burials associated with Stratum I at the Kays Landing site (40HY13).

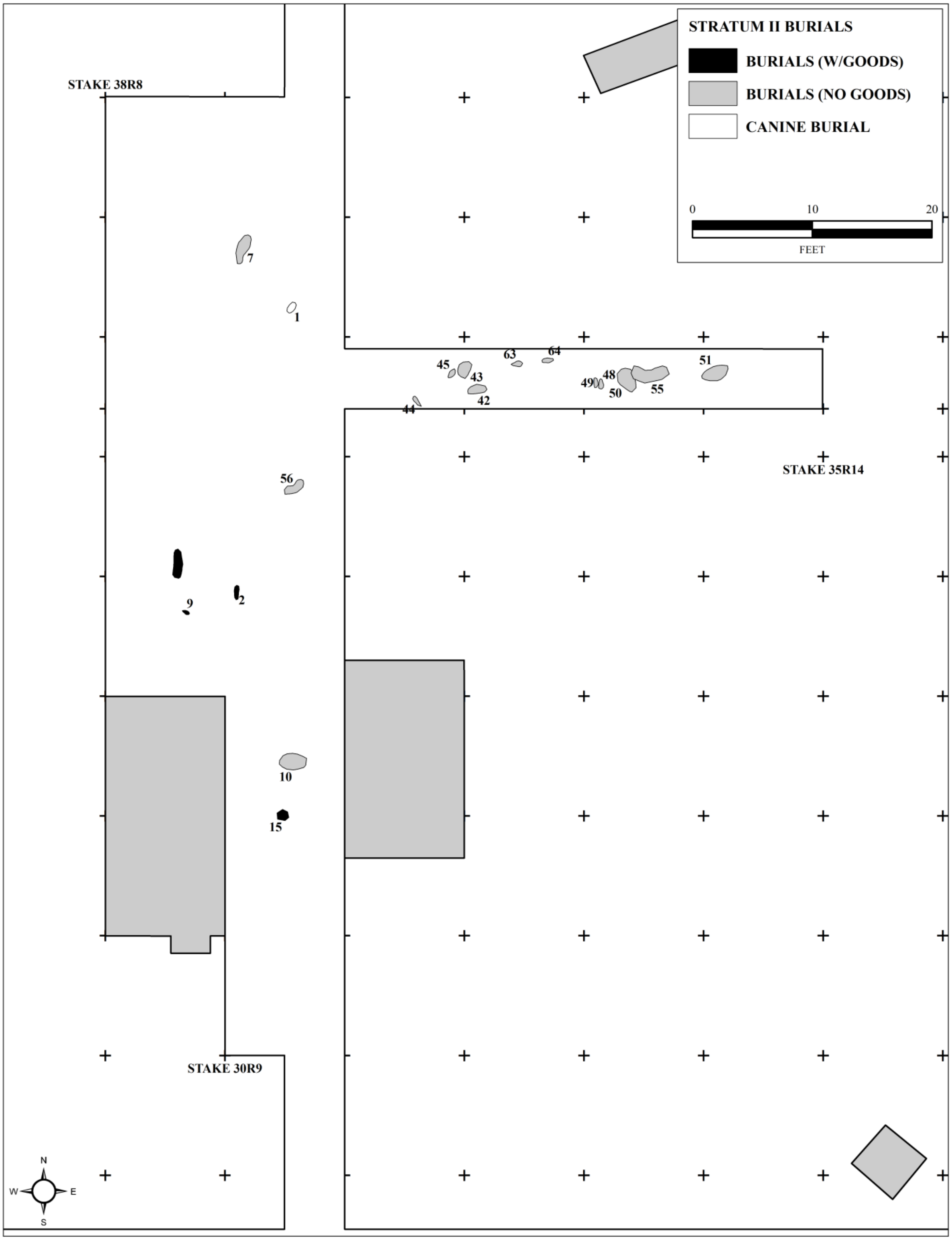

Figure 7.6. Burials associated with Stratum II at the Kays Landing site (40HY13).

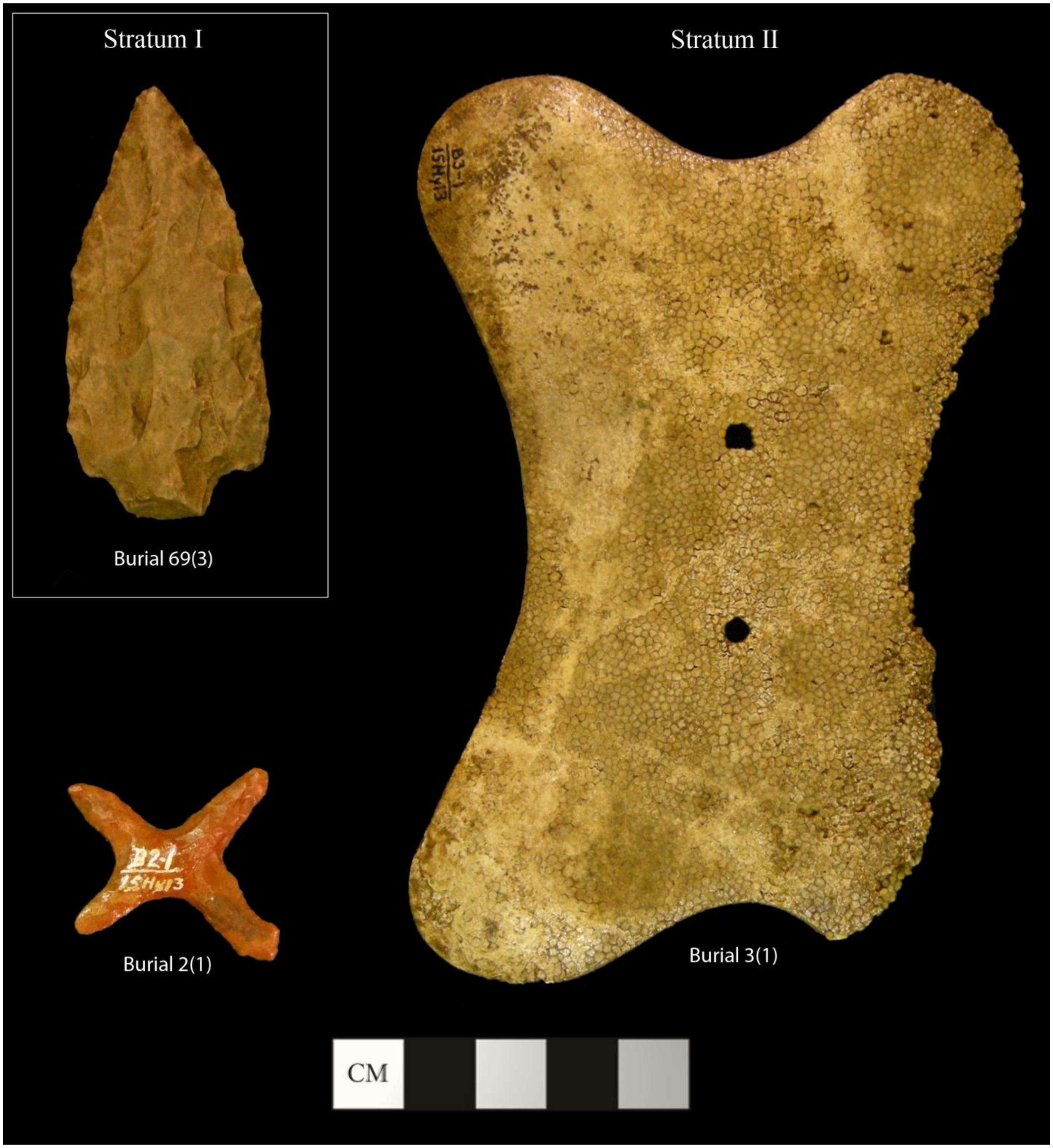

Figure 7.7. Selected artifacts associated with burials in Stratum I and Stratum II at the Kays Landing site (40HY13): stemmed projectile point (Burial 69, Str. I), chert eccentric (Burial 2, Str. II) and gorget of indeterminate material (Burial 3, Str. II).

Stratum IV

A single burial (Burial 75, an adult female) was associated with Stratum IV, and was recovered from within a test pit adjacent to the main block during early excavations at the site (Figure 7.8).

Stratum V

Most of the burials at Kays Landing (n = 45) were recovered from Stratum V (Figure 7.9). Most individuals in the deposit were adults (n = 30; 66.7%); thirteen (28.9%) were subadults, and two were not able to be reliably assessed.

Stratum V burials were encountered throughout the excavation, both in the main block and in the two adjacent test pits, but exhibited no distinguishable patterning of association. There was no clear separation of groupings indicative of definitive clusters among any burials.

Ten of the burials in Stratum V contained offerings. Seven included less than five items – three contained a single object each, and three more contained two each; two burials contained three and four items, respectively. Two graves, however, contained a substantially larger number of artifacts each (Table 7.2).

Burial 65, a probable adult male located in grid square 33R9, contained twelve items: a beaver tooth, a pair of bone awls, and nine chipped stone tools (Figure 7.10).

Burial 83, buried less than two meters southwest from Burial 65 (see Figure 7.9), was accompanied by thirteen items, comprising four bone and antler artifacts, two projectile points, and seven bifaces (Figure 7.10). Burial 83 was identified as a subadult.

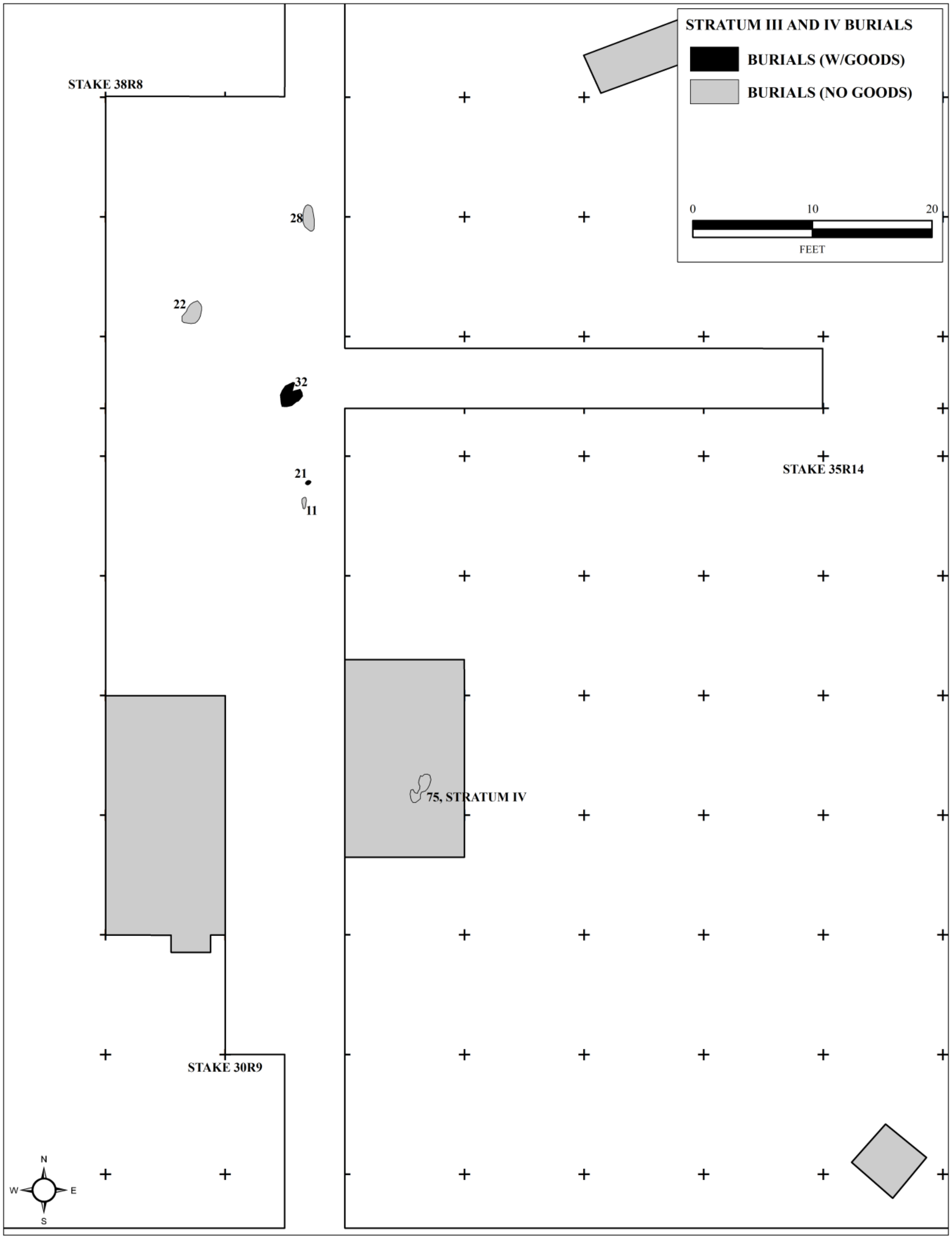

Figure 7.8. Burials associated with Stratum III and Stratum IV (Burial 75) at the Kays Landing site (40HY13).

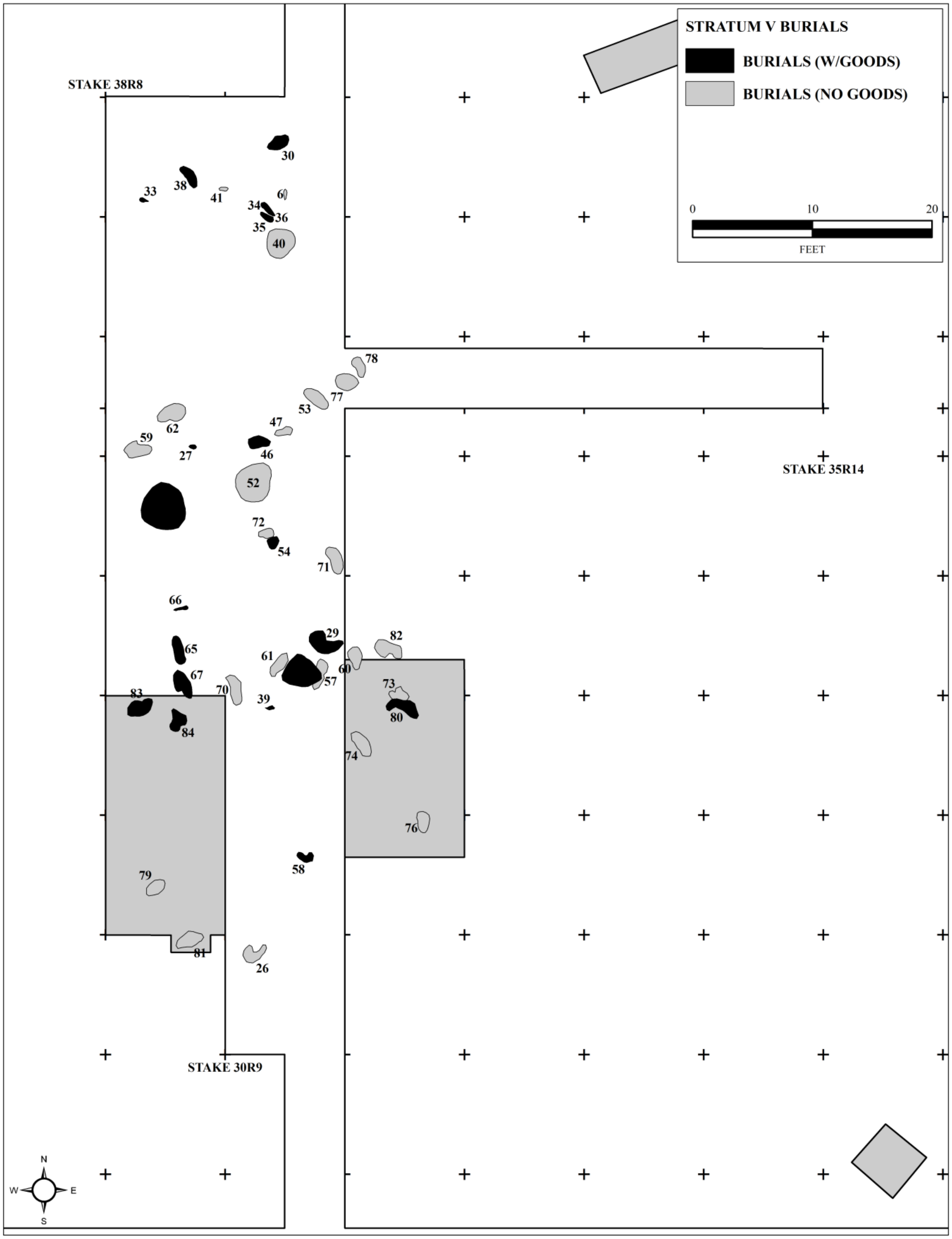

Figure 7.9. Burials associated with Stratum V at the Kays Landing site (40HY13).

Figure 7.10. Selected artifacts associated with burials in Stratum V at the Kays Landing site (40HY13): two stemmed projectile points, one hafted drill, and three bifaces (Burial 65); one hafted scraper and seven bifaces (Burial 83).

The close proximity of these two individuals, and the significantly larger number of items accompanying each of them, provides the strongest case for differential burial treatment of individuals at Kays Landing.

Zone B

Three burials were recovered in the eastern end of Trench 3 within Zone B, designated in that area. All three burials were fragmentary and in poor condition, but one – Burial 31 – was accompanied by two groundstone beads (Figure 7.11).

Burials with no provenience

The stratigraphic association of seven burials located in Trench 3 (Table 7.2) was not recorded. All of them were in poor condition, and none contained offerings of any kind.

Features

Numbered features at Kays Landing consisted of eighteen pits (documented and numbered separately from other features), eight numbered features, and twenty-one unnumbered features recorded only on the site plan map.

Pits

Of the eighteen pits recorded, most (n = 10) were associated with Stratum II. One (Pit 6) had its origin in Stratum I, and five were documented in Stratum III. Two additional pits were also recorded in the southern trench in Zone B (Table 7.3; Figure 7.12). There were no pits identified in either Stratum IV or Stratum V.

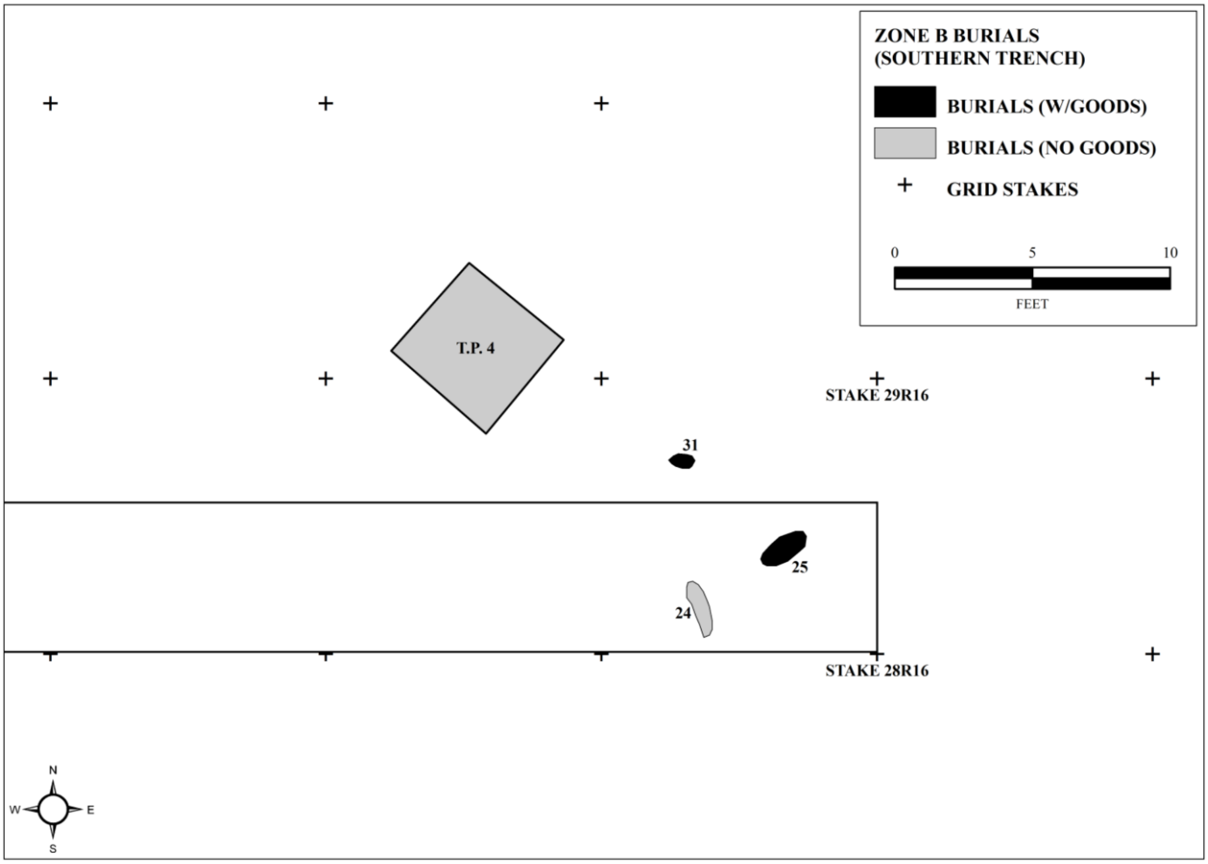

Figure 7.11. Top, Zone B burials in the southern trench at the Kays Landing (40HY13) site; Bottom, groundstone beads associated with Burial 31 (Zone B).

Most pits (n = 13) were described on the site paperwork as straight-sided and flat-bottomed, exhibiting a roughly cylindrical form, and most had burned sides but unburned bases (Table 7.3; see also Figure 7.13). They were predominately midden-filled, containing fragments of animal bone, occasionally shell, stone, and sometimes significant amounts of charcoal. These pits ranged in depth from 57.9 to 21.3 cm, and in volume from 0.53 to 0.09 m^3.

The remaining five pits were described as basin shaped in profile, and their interior surfaces were mostly unburned, although Pit 6, the only pit associated with Stratum I – contained evidence of in situ burning. These pits varied widely in depth (12.2 – 67.1 cm) and in volume (0.01 – 0.4 m^3).

Use of the "pit index" (I_B) value (see Chapter 5, "Pits and Basins") to classify the pits at Kays Landing provided similar characterization to the descriptions given on the respective record forms for the site's pit features. Based on the ratio of pit radius (determined from the site map) and pit depth (taken from each pit record form), most pits at the site had an I_B value between 1 and 2, indicating that most were relatively shallow relative to their size (see Chapter 5, Figure 5.10), and could be appropriately described as shallow pits or deep basins (Table 7.3; Figure 7.12). Three pit features, all associated with Stratum II (Pits 4, 9, and 13) with were deep enough to be classified as pits (i.e., $I_B < 1$, indicating the pit was relatively deep compared to its diameter). One of those – Pit 4 – is shown in profile in Figure 7.13.

Nine pits contained evidence of in situ fires; three had both burned sides and burned bases, while an additional six exhibited only burned sides, suggesting (assuming the lack of burned bases was not the result of over-enthusiastic excavation by laborers) that the pits had been excavated beyond the original (fired) bases to be used for another purpose. The remaining pits showed no evidence of burning.

Table 7.3. Features at the Kays Landing site (40HY13).

Feature	Stratum of Assoc.	Meters below datum	Grid Square	Dimensions (cm) N-S	E-W	Depth	Pit Index (I_B)	Pit Type	Description (from original field forms, on file at the McClung Museum, University of Tennessee, Knoxville)
Pit 1	II	2.1	35R10	88.4	88.4	30.5	1.50	Shallow Pit / Basin	This pit has straight sides and a nearly flat bottom. The sides are burnt lightly, though the burning at the top is heavier than at the base of the walls, The bottom is not burnt. The pit was dug into midden, and the matrix was humus without animal bone or flint, and very little shell.
Pit 2	II	2.01	34R10	91.4	91.4	33.5	1.39	Shallow Pit / Basin	This pit was much the same as pit #1. The conditions it occurred in are the same. There were some bones in this pit. Matrix was char-filled humus.
Pit 3	II	2.23	33R9	79.2	73.2	30.5	1.45	Shallow Pit / Basin	This is a basin-shaped pit which has burnt sides. The burning extends about 0.1 ft into the soil. The burnt sides are not prepared; there is no trace of soil differing from the surrounding soil.
Pit 4	II	2.13	35R9-34R9	91.4	91.4	57.9	0.89	Pit	This is a pit similar to pits 1-3 in that it has burnt sides and unburnt bottom. In the main the sides are vertical though the north side bellies out slightly. The fill is humus with considerable flints and animal bone. There was very little shell, though shell was present.
Pit 5	III	2.32	32R10-31R10	91.4	100.6	indet.		Indet.	This pit is a deep "inverted cone-shaped" pit with a black humic fill sparsely mixed with animal bone and shell.
Pit 6	I	1.98	31R10-30R10	152.4	182.9	54.9	1.70	Shallow Pit / Basin	This large pit is the first having an origin above 7.0 ft below datum. It is different from the other pits in shape, in construction, and the fill is a homogenous clay and humus. Beside the pit and visible far above its origin, at 5.5 ft bd, was found a heap of sand which undoubtedly represents the first soil dug from the pit. The bottom of the pit showed some evidence of having been burnt and some charred remains were found on the bottom. Several potsherds were found in the lower part of the pit.
Pit 7	II	2.29	37R9	140.2	112.8	42.7	1.52	Shallow Pit / Basin	This pit projected into the [R10] profile. We were unable to trace it above this level.
Pit 8	III	2.47	31R10-30R10	70.1	73.2	21.3	1.69	Shallow Pit / Basin	This pit lay under and precedent to Pit #6. It probably had its origin at around 7.5 - 8.0 ft bd. There is burning evident around the edges though the bottom is not burnt. Its sides are straight, bottom nearly flat.
Pit 9	II	2.07	36R10	115.8	100.6	67.1	0.83	Pit	This was a pit with matrix made up of charred material, shell and bone. It was not burnt. It was basin shaped.
Pit 10	Zone B	2.59	28R10	73.2	85.3	18.3	2.16	Shallow Pit / Basin	This was a small unburnt pit full of charred vegetable remains. Around the pit on the south side was a blackened area about 0.05 ft thick, which probably represents heaping over of the pit.

Table 7.3. Continued.

Feature	Stratum of Assoc.	Meters below datum	Grid Square	Dimensions (cm) N-S	E-W	Depth	Pit Index (I_B)	Pit Type	Description (from original field forms, on file at the McClung Museum, University of Tennessee, Knoxville)
Pit 11	III	2.56	31R10-30R10	54.9	57.9	12.2	2.37	Shallow Pit / Basin	This small pit lay under the edge of Pit #6. It was filled entirely with charred vegetable remains though no burning was visible.
Pit 12	Zone B	2.29	28R16	70.1	70.1	33.5	1.06	Shallow Pit / Basin	This circular pit has straight sides which were burnt and an unburnt bottom. Fill was clayey soil on top with charred material and stone in the bottom. No bone or artifacts were found in it. Around the pit in an ill-defined area the soil at 7.9 ft bd was burnt red. This burning was very thin and halfway suggests a floor. At least this has encouraged us in our search for a structure on the site.
Pit 13	II	2.44	37R10	79.2	97.5	48.8	0.95	Pit	This pit is compound, and the upper bottom is extremely uneven. The entire bottom is burnt, and the burnt soil is sand containing shell and an occasional scrap of burnt bone. This burnt soil extended 4 ft in depth and beneath it midden material extended 1.2 ft below that. The sides below the burnt soil are not burnt. The pit has vertical sides and a flat bottom.
Pit 14	II	2.44	37R10	109.7	115.8	30.5	1.06	Shallow Pit / Basin	This pit contained about 80 rocks and considerable animal bone. Several scapulae of deer were found among the rocks. The fill was midden material with high content of bone, shell, ash, and humus, but very little charcoal.
Pit 15	II	2.44	37R10	94.5	indet.	30.5	1.11	Shallow Pit / Basin	This pit will be seen in profile R10. Little of the pit was cleaned out. Probably the pit was oval in shape as are the others, but no burning was evident. Fill is mainly humic.
Pit 16	III	2.67	36R10	91.4	85.3	30.5	1.53	Shallow Pit / Basin	This was a straight-sided pit with a concave bottom. The fill was midden material consisting of considerable shell and humus and charcoal.
Pit 17	II		33R9	97.5	82.3	42.7	1.09	Shallow Pit / Basin	Uncertain level of origin. The pit cuts through (St III and IV) into the lowest midden layer. It has straight sides, but the bottom could not be found because of the midden surrounding it.
Pit 18	III	2.9	35R9	91.4	76.2	39.6	1.10	Shallow Pit / Basin	The bottom of this pit was heavily burned. Over this lay a hard layer of ashes. The remainder of the pit was filled with midden. The vertical sides were not burnt.

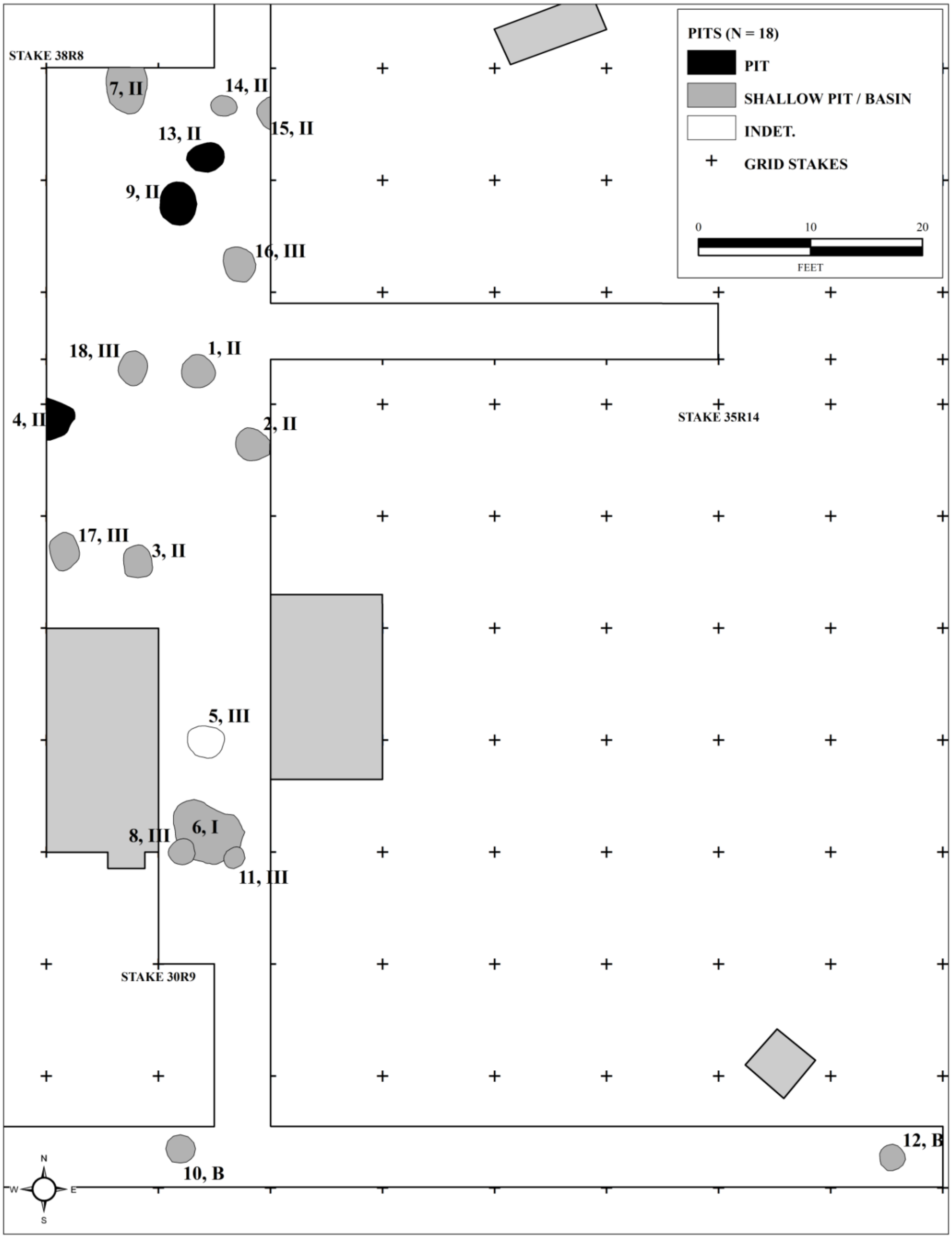

Figure 7.12. Pits (n = 18) at the Kays Landing site (40HY13), classified by pit type (see Table 7.3). Pits are labeled by assigned field number and by stratum.

Figure 7.13. Pit 4 in profile at the Kays Landing site (40Hy13), showing burned sides and base filled with charred material.

In combination with the general size and shape of the eighteen pits at Kays Landing, descriptions of the observed fill in nearly all of the pit features suggest that most of them were ultimately used for refuse disposal, although the evidence of burning noted in half of the pits at the site suggests that at least some of the pits served a prior function or functions (involving the use of fire) before they were repurposed as refuse pits and filled with debris. Whether they initially functioned as subsurface storage pits (as was suggested for similar features at the Black Earth site in Illinois [Jefferies and Butler 1982:183-186]), as earth ovens or subsurface firepits or hearths (e.g., as suggested for the Riverton sites [Winters 1969:88-91), or for some other purpose is unclear. The fact that six of the nine burned pits apparently were deepened suggests that their previous form was insufficient for their final function or functions.

Numbered features

Excepting pits (see above), individually-numbered features at Kays Landing (n = 7) were associated with Stratum I (n = 1), III (n = 2), and V (n = 3); one (Feature 3) was documented in Zone B in the southern trench (Figure 7.14). These included four areas of burned clay or soil thought to represent the remains of lightly-constructed structures (e.g., no associated postmolds suggesting larger, semi-permanent architecture). Two were found in Stratum V (Features 5 and 6), and one each in Stratum I (Feature 1) and III (Feature 4).

Two features, one in Zone B (Feature 3) and one in Stratum III (Feature 2), consisted of accumulations of charcoal and burned bone, although they were not underlain by burned clay or soil, and may have represented materials cleaned from hearths elsewhere (see descriptions of unnumbered features below).

Figure 7.14. Features documented at the Kays Landing site (40HY13).

Feature 7 consisted of a cache of six stones, comprising three nutting stones and three pieces of lithic raw material, and was associated with Stratum V. The description provided of the feature's context noted that the stones lay on "a small layer of charred grass." There is no photograph of this feature, making further elaboration upon this description impossible.

A series of fifty small pits or possible postmolds was scattered across much of the excavation area at a level consistent with the upper portion of Stratum III or base of Stratum II (Figure 7.14 and 7.15), and was collectively designated Feature 8. These features ranged from ca. 13 to 49.3 cm in diameter, although they averaged 20.8 ± 6.2 cm in diameter.

Postmolds were found through much of the excavation block, and most exhibited no clear pattern of distribution or obvious association with other features, although many of them were located in varying degrees of proximity to the fifteen pits also associated with Stratum II or III. However, they increased in frequency and density in the southern half of the excavation block south of the 35 N-line, and a particularly dense grouping of eighteen was found in an area roughly 300 ft^2 (27.7 m^2), representing grid squares 32R10, 33R10, and 33R9 (Figure 7.15), that also contained three pits (Pits 3, 5, and 17). A single burial (Burial 10, Stratum II) was found inside the main postmold grouping in grid square 32R10 and may have been in association, although individual depths of the features were not recorded.

On the eastern edge of the postmold grouping a small circular area of burned soil or clay, possibly representing a small hearth, was documented. Pit #5 (associated with Stratum III) was located immediately north of the cluster. These associations, comprising the concentration of postmolds, the possible hearth, Burial 10, and Pit 5, may indicate the construction of a substantial structure in that location during the period immediately precedent to the initiation of deposition of what became the Stratum II shell mound. The possible function or use of such a

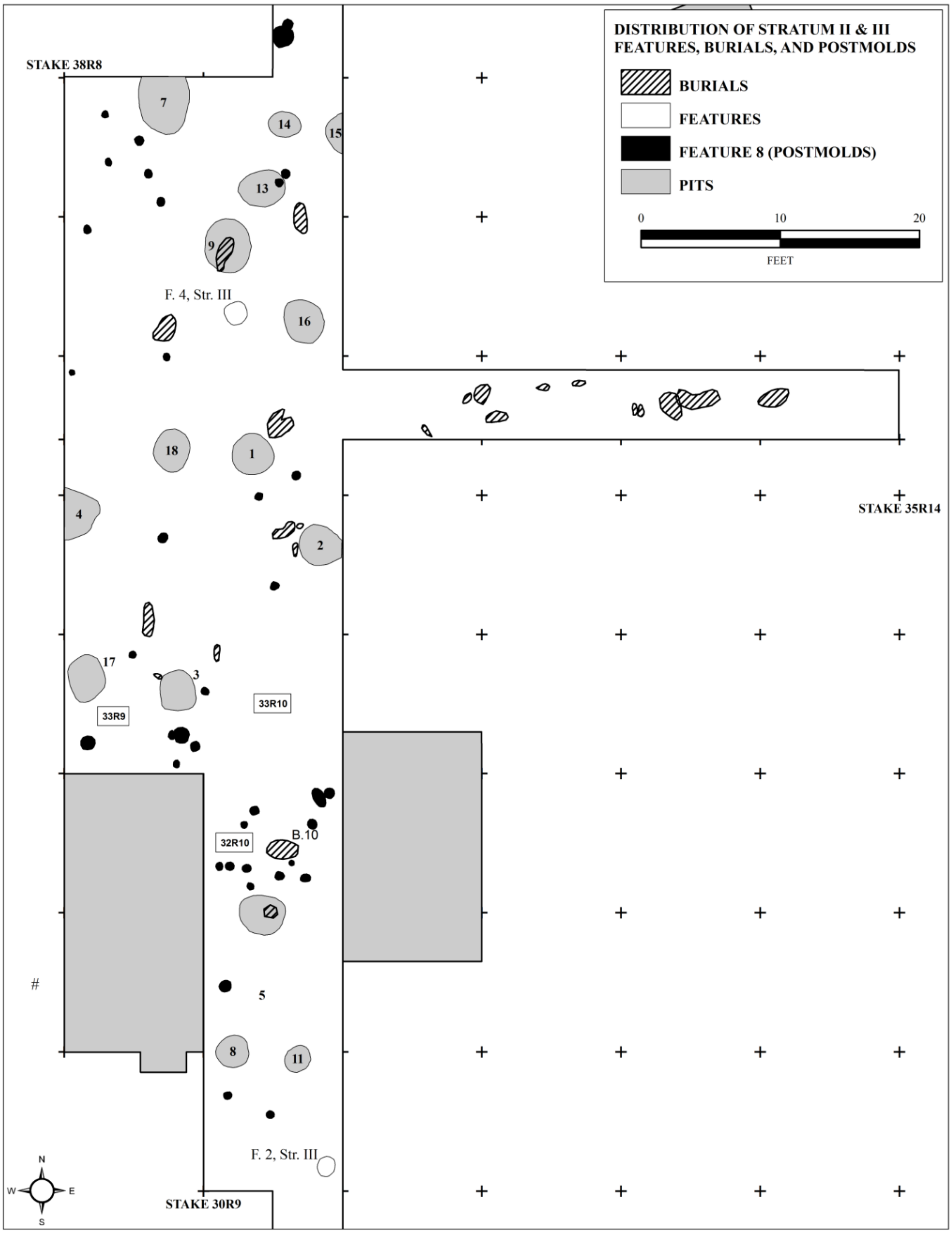

Figure 7.15. Distribution of possible postmolds, features, pits, and burials associated with Stratum II and III in the excavation block at the Kays Landing site (40HY13).

structure is unclear from the available data, although the occurrence of burials within postmold clusters (perhaps suggesting burial within a residential or other structure) was also noted at the Cherry site (see Chapter 8).

Unnumbered features

In addition to numbered features, twenty two additional features were also identified during excavation (Table 7.3). Although not assigned numbers, these features' locations, approximate sizes, and a brief description (e.g., "charcoal," "burned soil") were indicated on the site's large-format plan map (see Figure 7.14). However, because neither depth or stratum information was included, these features cannot be associated with specific deposits, and are of comparatively little interpretive value in assessing the patterning of activities at Kays Landing.

CULTURAL MATERIAL

As with other Archaic-period sites excavated in the lower Tennessee Valley by UTDoA archaeologists in the late 1930s and early 1940s, Kays Landing yielded an extensive assemblage, totaling at least 2,445 artifacts (Table 7.4), although (as with Big Sandy – Chapter 5 – and Eva – Chapter 6) entries in Kays Landing's field specimen (F.S.) log, which were recorded during the site's excavation, were not always consistent when compared to the materials available for examination. Some items appear to have been recorded and then discarded, either in the field or by laboratory personnel during the initial analysis and curation after the project fieldwork concluded.

Table 7.4. All artifacts recorded at the Kays Landing site (40HY13), grouped by material and classification, and sorted by provenience.

	ARTIFACT CLASSIFICATION	PROVENIENCE						
		Unassigned	Stratum I	Stratum II	Stratum III	Stratum IV	Stratum V	TOTALS
Chipped Stone	**Hafted Bifaces**							
	PPK	485	95	187	51	23	75	916
	PPK-Drill	21	5	7	5	5	5	48
	PPK-Scraper	32	3	4	5	4	10	58
	All Hafted Bifaces	**538**	**103**	**198**	**61**	**32**	**90**	**1022**
	Bifacial Drills							
	Lobe	14	4	3	4	6	0	31
	Large triangular expanding	1	0	0	1	0	0	2
	Shaft only	12	4	8	1	0	0	25
	Expanding	3	1	2	3	1	1	11
	Perforator or borer	2	2	2	0	1	1	8
	Broken	0	2	2	3	3	3	13
	Small triangular expanding	7	0	0	0	4	3	14
	Unidentified	4	1	3	0	1	3	12
	All Drills	**43**	**14**	**20**	**12**	**16**	**11**	**116**
	Other Bifaces							
	Preform	17	7	7	1	2	14	48
	Triangular	4	1	1	0	4	6	16
	Lanceolate	15	0	5	0	2	2	24
	Ovate	8	1	1	2	0	0	12
	Scraper	23	6	5	3	2	8	47
	Other	184	47	73	34	57	199	594
	Unidentified	69	5	1	0	14	125	214
	All "Other" Bifaces	**320**	**67**	**93**	**40**	**81**	**354**	**955**
	TOTAL, Chipped Stone	**901**	**184**	**311**	**113**	**129**	**455**	**2093**
Ground Stone	Pestle	9	1	0	1	1	2	14
	Hammerstone	6	2	1	1	0	0	10
	Bannerstone	1	0	0	0	0	0	1
	Bead	2	0	0	0	0	3	5
	Celt	2	1	0	1	0	0	4
	Discoidal	2	0	1	0	0	0	3
	Abrader	2	0	0	0	0	1	3
	Gorget	0	0	1	0	0	0	1
	Grindstone	0	0	0	0	0	2	2
	Nutting stone	2	0	0	0	0	1	3
	Other	18	1	2	4	3	4	32
	TOTAL, Ground Stone	**44**	**5**	**5**	**7**	**4**	**13**	**78**
Antler	Socketed, pointed	6	0	2	0	1	3	12
	Socketed, non-pointed	1	1	0	1	0	1	4
	Spatulate	1	0	0	0	0	1	2
	Modified tine	1	2	1	0	0	1	5
	Other antler	34	3	18	8	5	30	98
	TOTAL, Antler	**43**	**6**	**21**	**9**	**6**	**36**	**121**

Table 7.4. Continued.

ARTIFACT CLASSIFICATION		PROVENIENCE						
		Unassigned	Stratum I	Stratum II	Stratum III	Stratum IV	Stratum V	TOTALS
Bone	Pointed w/articular surfaces	6	3	3	0	2	5	19
	Shaped / modified	0	0	0	1	0	1	2
	Pointed, other	19	2	7	10	4	10	52
	Modified tooth	2	0	0	0	0	5	7
	Bead	3	0	0	0	0	0	3
	Other bone	0	0	0	0	5	3	8
	Ritual / ceremonial	12	1	2	7	1	17	40
	TOTAL, Modified Bone	42	6	12	18	12	41	131
Other	Pottery	9	1	0	0	0	0	10
	Ochre, red	3	1	1	0	0	2	7
	Copper	0	0	1	0	0	0	1
	Shell	0	0	0	0	0	1	1
	Other	2	0	0	0	0	1	3
	TOTAL, Other Materials	14	2	2	0	0	4	22
	TOTAL, By Stratum	1044	203	351	147	151	549	
				TOTAL, ALL CULTURAL MATERIALS EXAMINED				2445

Table 7.4 provides a summary listing, by material, classification, and stratigraphic association, of all items or groups of items listed in the site's F.S. log. A complete by-item listing of all materials recorded on the Kays Landing F.S. log is provided in Appendix B

Artifacts were classified either by personal inspection or by the examination of photographs, or using the original item description recorded on the F.S. log when the original F.S. number was assigned during excavation. Items that could not be inspected visually but were identified in the log were classified based on that description (e.g., "pp sm" = "PPK, Unidentified").

A significant proportion of the total recorded assemblage was not provenienced by stratum (Table 7.4) (n = 1,044; 42.7%). It is possible that many of these materials were recovered from the disturbed context around the site's excavation areas that resulted from the "stepping back" of the overlying deposits to prevent collapses of the walls around the controlled excavation.

Summary of Cultural Material by Provenience

Chipped Stone

By a significant proportion, chipped stone artifacts constituted the bulk of the site's documented assemblage, representing 85.6% (n = 2093) of the total artifacts documented (Table 7.4). Projectile points – or possible projectile points – and other implements manufactured or recycled from projectile points (i.e., drills or scrapers) comprised the majority (n = 1022). The bulk of the remainder consisted of a bifacial drills (n = 116) and a range of other bifacial forms (n = 955) that lacked diagnostic hafting elements.

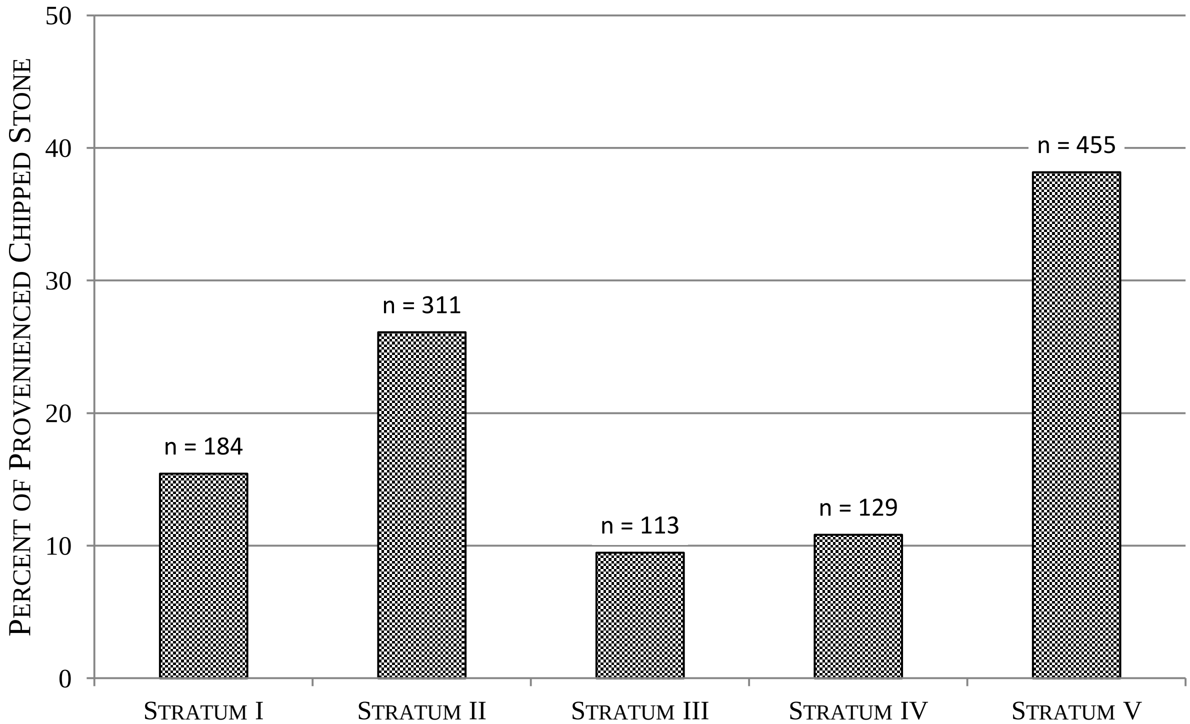

Figure 7.16. Proportions of provenienced chipped stone (n = 1192) by stratum at the Kays Landing site (40HY13).

Unprovenienced chipped stone accounted for 43% (n = 901) of the assemblage. Of the remainder (n = 1192) (Figure 7.16), most was found in the site's two shell-bearing deposits – Stratum V contained the majority (n = 455; 38.2% of the provenienced chipped stone), although only a small number (n = 90) of the hafted bifaces at the site. Most of the Stratum V assemblage comprised other bifacial artifacts (n = 365). By contrast, Stratum II contained more than twice Stratum V's total of hafted bifaces (n = 198), and considerably fewer other bifacial tools (n = 113). Of the remainder of provenienced chipped stone, the largest number was associated with Stratum I (n = 184), with roughly equal quantities in Stratum III (n = 113) and Stratum IV (n = 129).

Groundstone

Few groundstone artifacts were recorded at Kays Landing (n = 78), and even fewer were among the provenienced assemblage (n = 34; 43.5% of total groundstone). The majority of all groundstone tools (provenienced or unassociated) were either grinding or processing implements (e.g., pestles [n = 14], nutting stones [n = 3] or "grinders" [n = 2]) or equipment for tool manufacture and maintenance (e.g., hammerstones [n = 10] and abraders [n = 3]). Other tool classes included beads (n =5), celts (n = 4), discoidals (n = 3), one gorget and one bannerstone). Most of the provenienced material (n = 13) was found in Stratum V. The remaining strata each contained less than ten groundstone artifacts (Figure 7.17; Table 7.4).

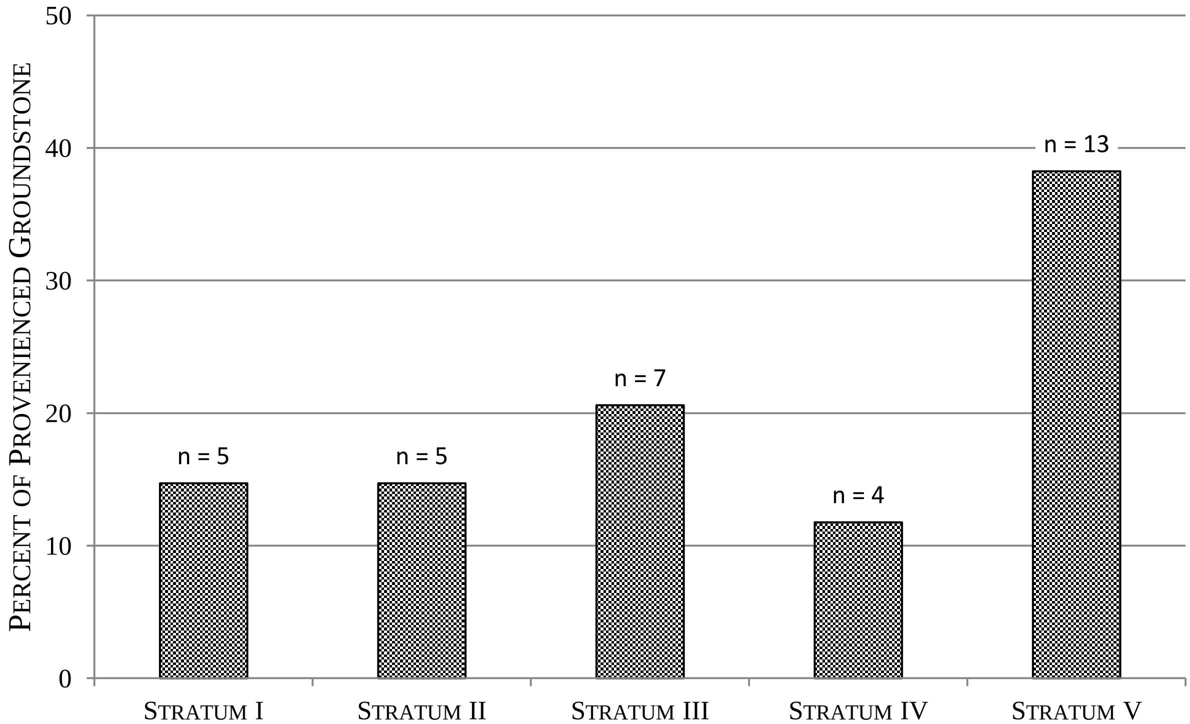

Figure 7.17. Proportions of provenienced groundstone (n = 34) by stratum at the Kays Landing site (40HY13).

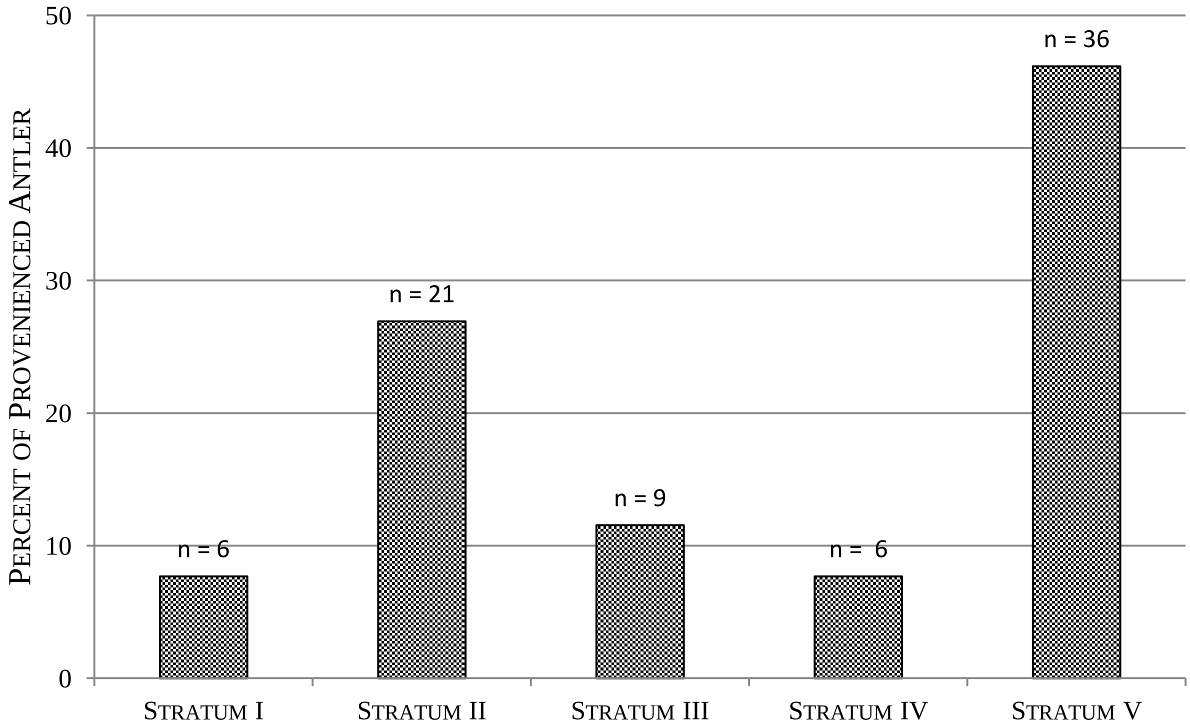

Figure 7.18. Proportions of provenienced antler (n = 78) by stratum at the Kays Landing site (40HY13).

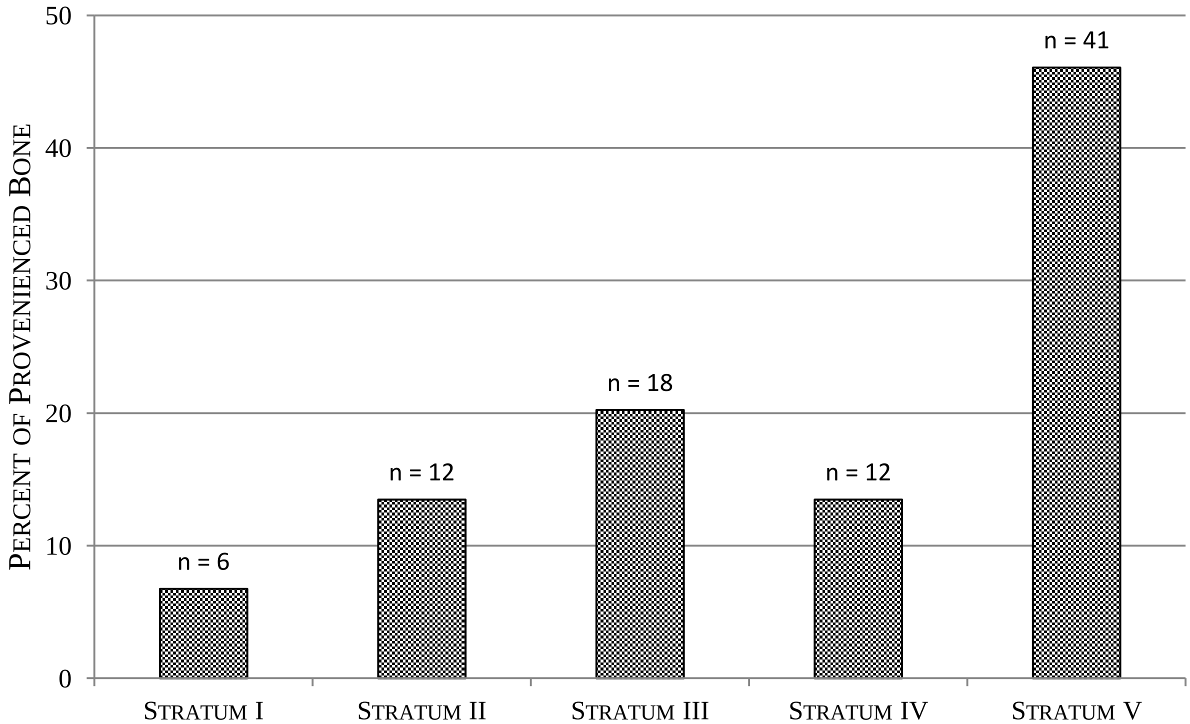

Figure 7.19. Proportions of provenienced bone (n = 89) by stratum at the Kays Landing site (40HY13).

Bone and Antler

When contrasted with assemblages from the Big Sandy (40HY18) and Eva (40BN12) sites (Chapters 5 and 6, respectively), the quantity of bone and antler artifacts recovered at Kays Landing was relatively small. Antler and bone items numbered 121 (64.4% - n = 78 – was provenienced) and 131 (67.9% - n = 89 – was provenienced), respectively. For both categories, the majority of provenienced material was recovered from Stratum V (Figures 7.18 and 7.19).

No documentation of the quantities of unmodified animal remains could be located, and there is no reference to such material in the site field report. Whether such data were collected under Lidberg's supervision is not clear.

Temporally Diagnostic Hafted Bifaces by Provenience

A detailed examination of all temporally diagnostic hafted bifaces that could be located from the Kays Landing assemblage was undertaken to assess the site's stratigraphic integrity and to provide for corroboration of the results of radiocarbon dating the site (see following section, "Radiocarbon Dates."). A total of 1022 potential temporally diagnostic hafted bifaces were listed in the site's F.S. log, of which 598 could be located for examination in the McClung Museum collections (58.5%) (Table 7.5). Of those, 74.1% (n = 443) could be confidently classified by type. Of the remaining hafted bifaces (n = 155), 78% (n = 121) were grouped by basal morphology, while a small proportion (n = 34; 22%) were unclassifiable as anything other than "Unidentified."

Temporal diagnostics that were able to be grouped by named type numbered 443. More than half (n = 263; 59.4%) were grouped in the "Unassigned" provenience, limiting their usefulness for further analysis. By temporal affiliation, the diagnostic types identified among the

Table 7.5. Frequencies of diagnostic hafted bifaces by temporal affiliation and provenience at the Kays Landing site (40HY13).

Type	Temporal Affiliation	Unassigned	Stratum I	Stratum II	Stratum III	Stratum IV	Stratum V	Total (By Type)
Morrow Mountain	Middle Archaic	1	0	0	1	0	1	3
Big Slough	Middle Archaic	28	0	0	1	2	26	57
Total, Middle Archaic		**29**	**0**	**0**	**2**	**2**	**27**	**60**
Elk River Stemmed	Late Archaic	0	0	0	0	1	0	1
Etley	Late Archaic	2	0	0	1	0	2	5
Late Archaic Stemmed	Late Archaic	150	11	34	11	2	9	217
Ledbetter	Late Archaic	14	2	5	2	1	0	24
Merom Expanding Stem	Late Archaic	1	0	0	0	0	0	1
Pickwick	Late Archaic	11	0	8	1	0	0	20
Savannah River Stemmed	Late Archaic	1	0	0	0	1	2	4
Table Rock Stemmed	Late Archaic	21	3	9	2	0	0	35
Terminal Archaic Barbed	Late Archaic	12	1	12	0	0	1	26
Total, Late Archaic		**212**	**17**	**68**	**17**	**5**	**14**	**333**
Beacon Island	Late Archaic - Early Woodland	1	1	0	0	0	0	2
Dickson Cluster	Late Archaic - Early Woodland	5	4	1	0	1	0	11
Flint Creek	Late Archaic - Early Woodland	0	2	0	0	0	1	3
Little Bear Creek	Late Archaic - Early Woodland	1	0	0	0	0	0	1
Motley	Late Archaic - Early Woodland	4	1	2	0	0	0	7
Saratoga Cluster	Late Archaic - Early Woodland	3	0	1	0	0	0	4
Turkey Tail	Late Archaic - Early Woodland	2	1	1	0	0	0	4
Total, Late Archaic - Early Woodland		**16**	**9**	**5**	**0**	**1**	**1**	**32**
Early Woodland Stemmed	Early Woodland	3	2	7	2	0	0	14
Lowe Cluster	Middle Woodland	1	0	0	1	0	0	2
Small Triangular	Late Woodland / Late Prehistoric	2	0	0	0	0	0	2
Total, Woodland and Late Prehistoric		**6**	**2**	**7**	**3**	**0**	**0**	**18**
Total, All Identified Hafted Bifaces		**263**	**28**	**80**	**22**	**8**	**42**	**443**
Unidentified Corner-Notched		1	1	0	0	0	2	4
Unidentified Side-Notched		2	1	8	0	0	0	11
Unidentified Stemmed		61	11	11	9	5	8	105
Unidentified Lanceolate		0	0	0	0	1	0	1
Unidentified, Other		25	5	2	2	0	0	34
Total, All Unidentified Hafted Bifaces		**89**	**18**	**21**	**11**	**6**	**10**	**155**
Total, All Hafted Bifaces, By Provenience		**352**	**46**	**101**	**33**	**14**	**52**	**598**

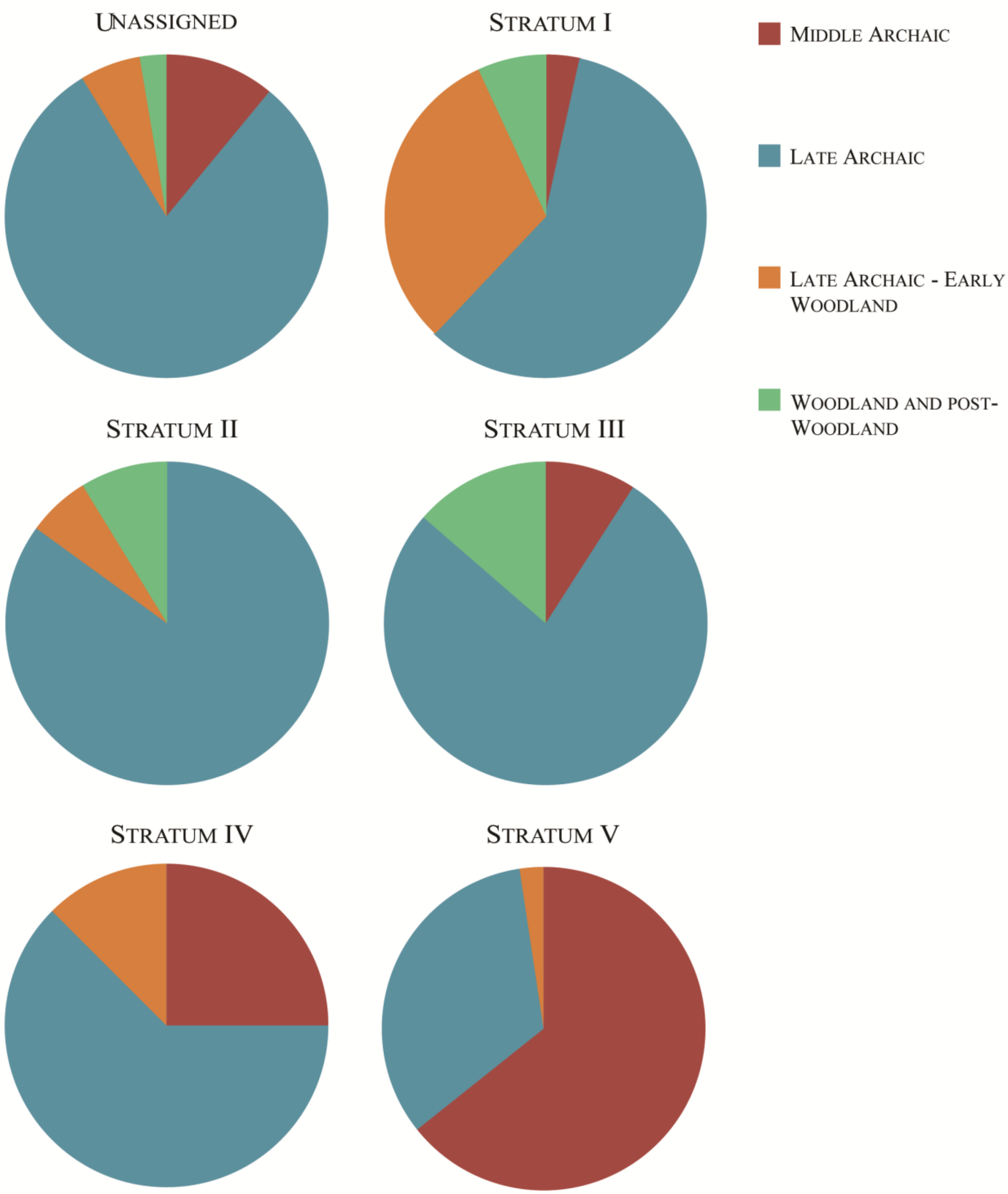

Figure 7.20. Frequencies of temporal diagnostics at the Kays Landing site (40HY13) by stratigraphic provenience.

“unassigned” artifacts were predominately Late Archaic (n = 212; 80.3%), consisting mostly of an array of stemmed forms (Table 7.5). Middle Archaic diagnostics, consisting of twenty-eight “Big Slough” (Figure 7.20) (Cambron and Hulse 1964:18) and a single Morrow Mountain (Justice 1987:104-107), constituted 11% of the unprovenienced assemblage. A small number of Late Archaic – Early Woodland (n = 16) and Woodland or later (n = 7) varieties were also noted.

Frequencies of temporal diagnostics among the provenienced assemblage described a generally Late Archaic age of the strata at Kays Landing, with proportions of Late Archaic diagnostics increasing with greater depth, and a reduction in the numbers of types associated with later periods (Table 7.5; Figure 7.20).

Of the one hundred eighty provenienced diagnostics, Stratum II contained the majority (n = 101; 56.1%), with nearly equal numbers associated with Stratum V (n = 52; 28.9%) and Stratum I (n = 46; 25.6%). Only a relative few were assigned to Stratum III (n = 33) or Stratum IV (n = 14).

Depositional Integrity of the Kays Landing (40HY13) strata

Kays Landing was most extensively used or occupied during the Late Archaic period, although diagnostics from the site suggest prior moderate use of the location during the late Middle Archaic (Stratum V) and later during the Woodland period (Stratum I). The degree of disturbance or mixing of the upper shell-free deposit at the site - Stratum I – was not described, although by temporal affiliation, diagnostic types associated with the deposit indicated Late

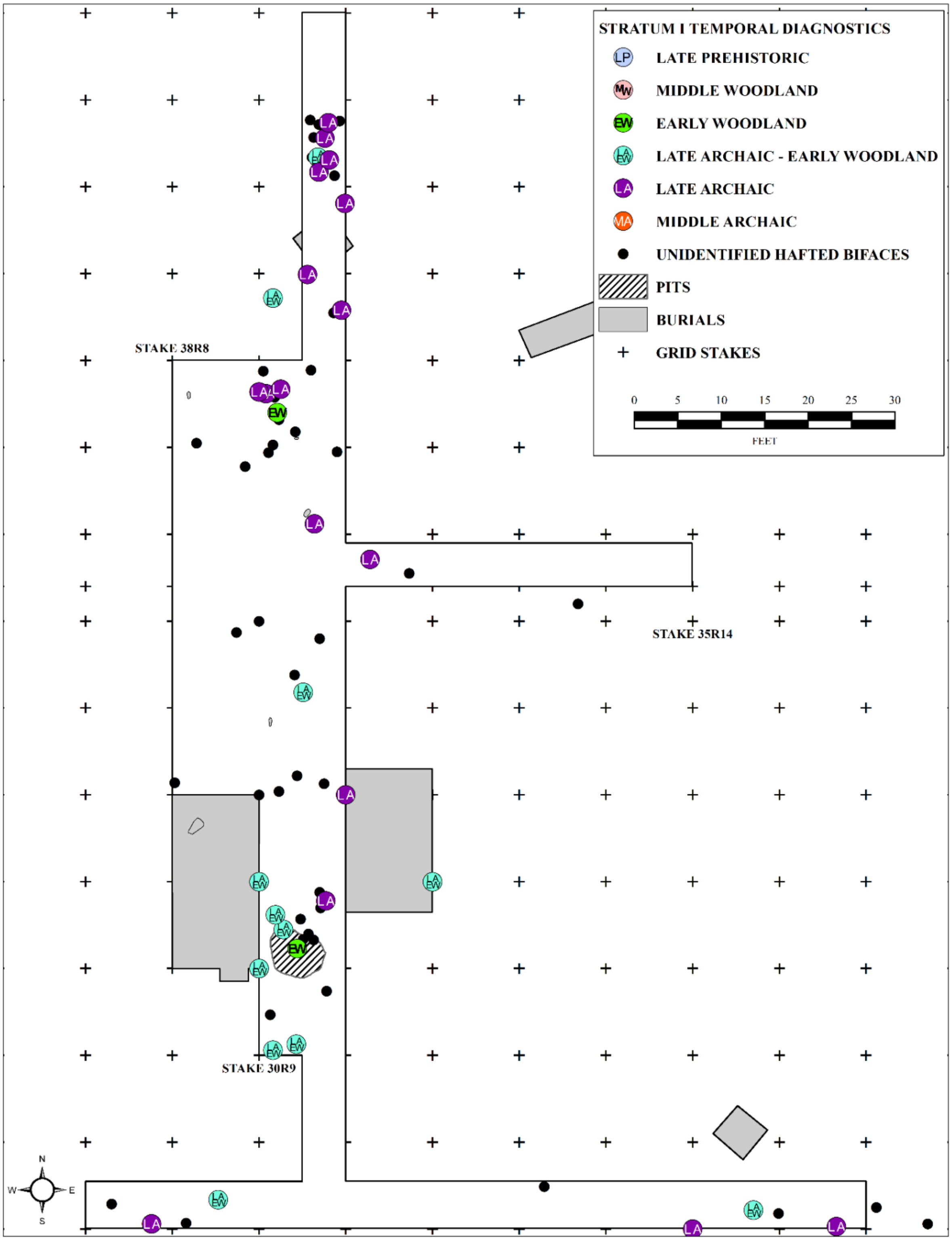

Figure 7.21. Locations of all piece-plotted temporal diagnostics (by period) in Stratum I at the Kays Landing site (40HY13).

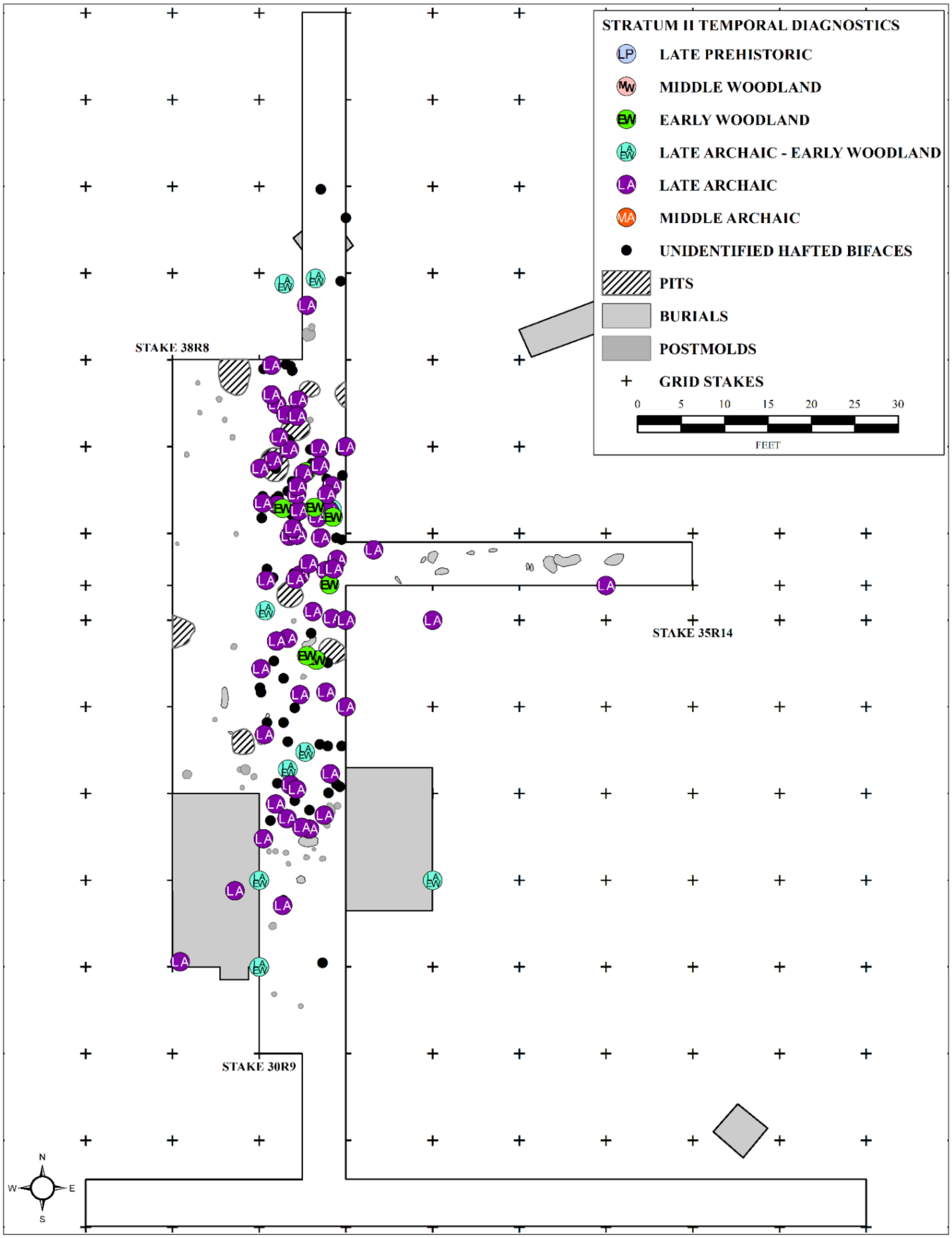

Figure 7.22. Locations of all piece-plotted temporal diagnostics (by period) in Stratum II at the Kays Landing site (40HY13).

Archaic and Early Woodland occupation[31]. Twenty-six Late Archaic (n = 17) or transitional Late Archaic – Early Woodland (n = 9) forms were present, mainly types of the Late Archaic Stemmed (Justice 1987:133-139) cluster, but also representing examples of Late Archaic – Early Woodland forms (n = 9), including the Dickson cluster (n = 4) (Justice 1987:189-198). Two Early Woodland Stemmed varieties (Justice 1987:184-189) were also present (Figure 7.21).

In comparison to Stratum I, the underlying deposits at Kays Landing were relatively homogeneous with respect to represented time periods. As noted above, Stratum II contained eighty classifiable hafted bifaces, the largest number of any stratum provenience at the site. Most (n = 68; 85%) were Late Archaic varieties of the Late Archaic Stemmed cluster (n = 34), as well as Ledbetter (n = 5; Justice 1987:149-153), Pickwick (n = 8; Justice 1987:153-154), Table Rock Stemmed (n = 9; Justice 1987:124), and types of the Terminal Archaic Barbed cluster (n = 12; Justice 1987:179-184). There were no Middle Archaic types represented in Stratum II, but a small number of Late Archaic – Early Woodland and Early Woodland forms (n = 12) were present (Table 7.5; Figure 7.22).

Diagnostics in Stratum III were mostly consistent with its position in the site's stratigraphic sequence. The deposit contained primarily Late Archaic stemmed varieties (n = 17; 77.3%) (Table 7.5), although three hafted bifaces were present that were typed as Lowe (n= 1) and Early Woodland Stemmed (n = 2) forms, suggesting either disturbance from upper deposits, or mis-classification by the author. Two Middle Archaic types – one Morrow Mountain and one Big Slough were also identified (Figure 7.23).

[31] It should be noted that stemmed projectile point types of the Late Archaic and Early Woodland periods are myriad, and many so-called separate types exhibit relatively minimal contrastive morphological variation. Most of the diagnostics examined from the Kays Landing assemblage were stemmed forms, and although significant care was taken to avoid misattribution of types by time period, occasional errors may have been made. What is clearly evident from the projectile point data is that Kays Landing is a Late Archaic site, containing a diagnostic assemblage that was dominated overwhelmingly by stemmed projectile point forms.

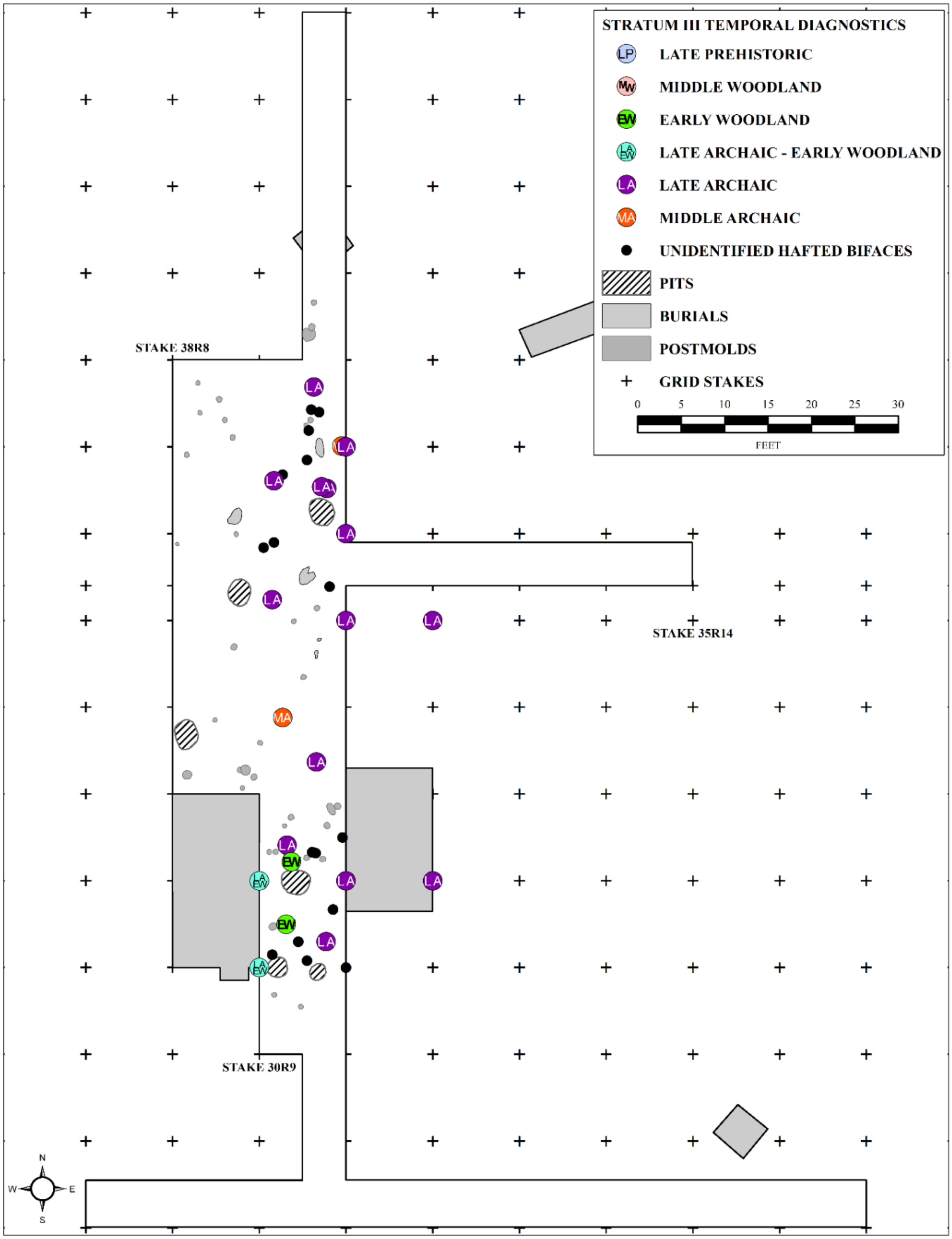

Figure 7.23. Locations of all piece-plotted temporal diagnostics (by period) in Stratum III at the Kays Landing site (40HY13).

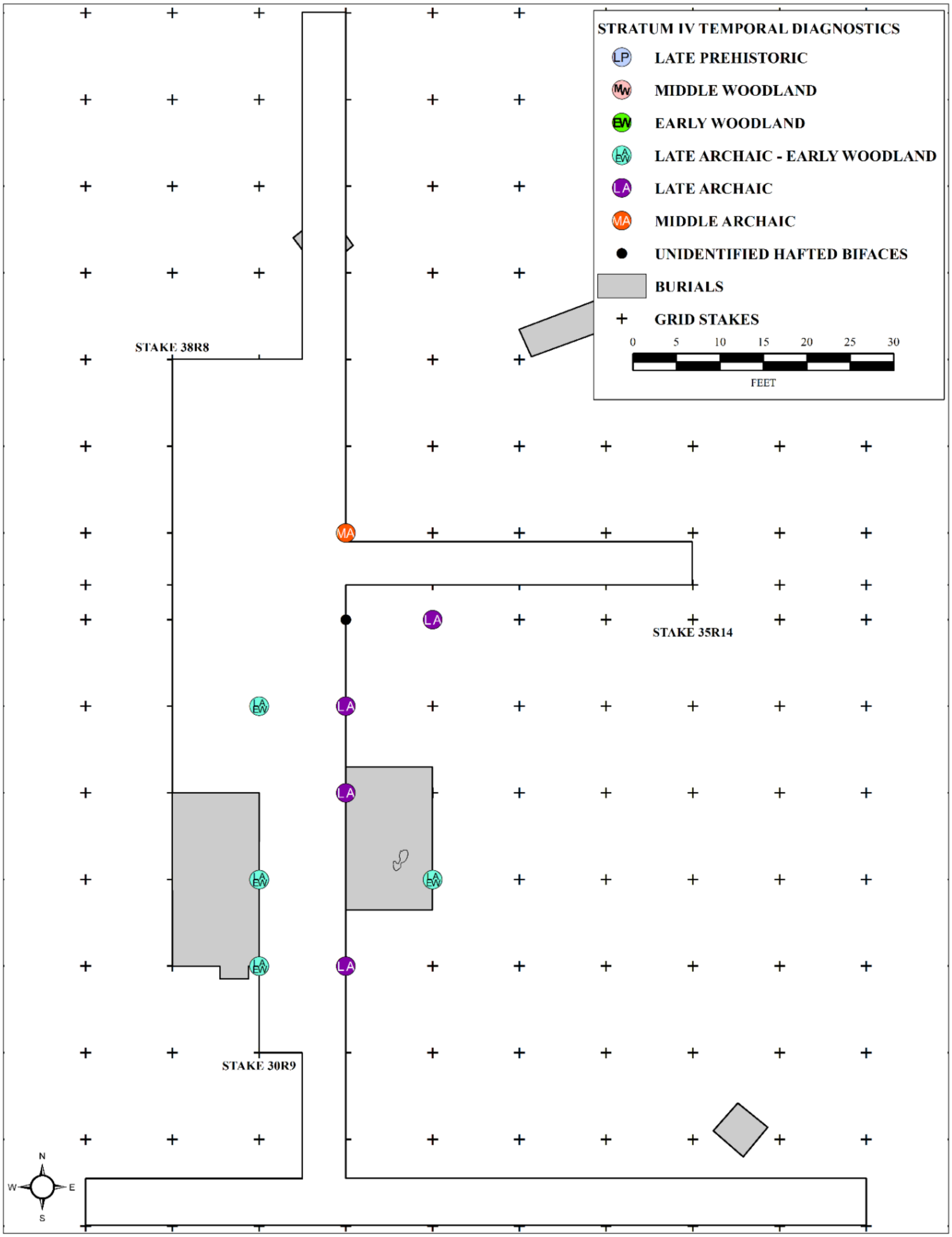

Figure 7.24. Locations of temporal diagnostics (by period) in Stratum IV at the Kays Landing site (40HY13). Locations of diagnostics in Stratum IV were plotted only to grid square and stratum, and are shown at the southeastern corner of the grid square from which they were recovered.

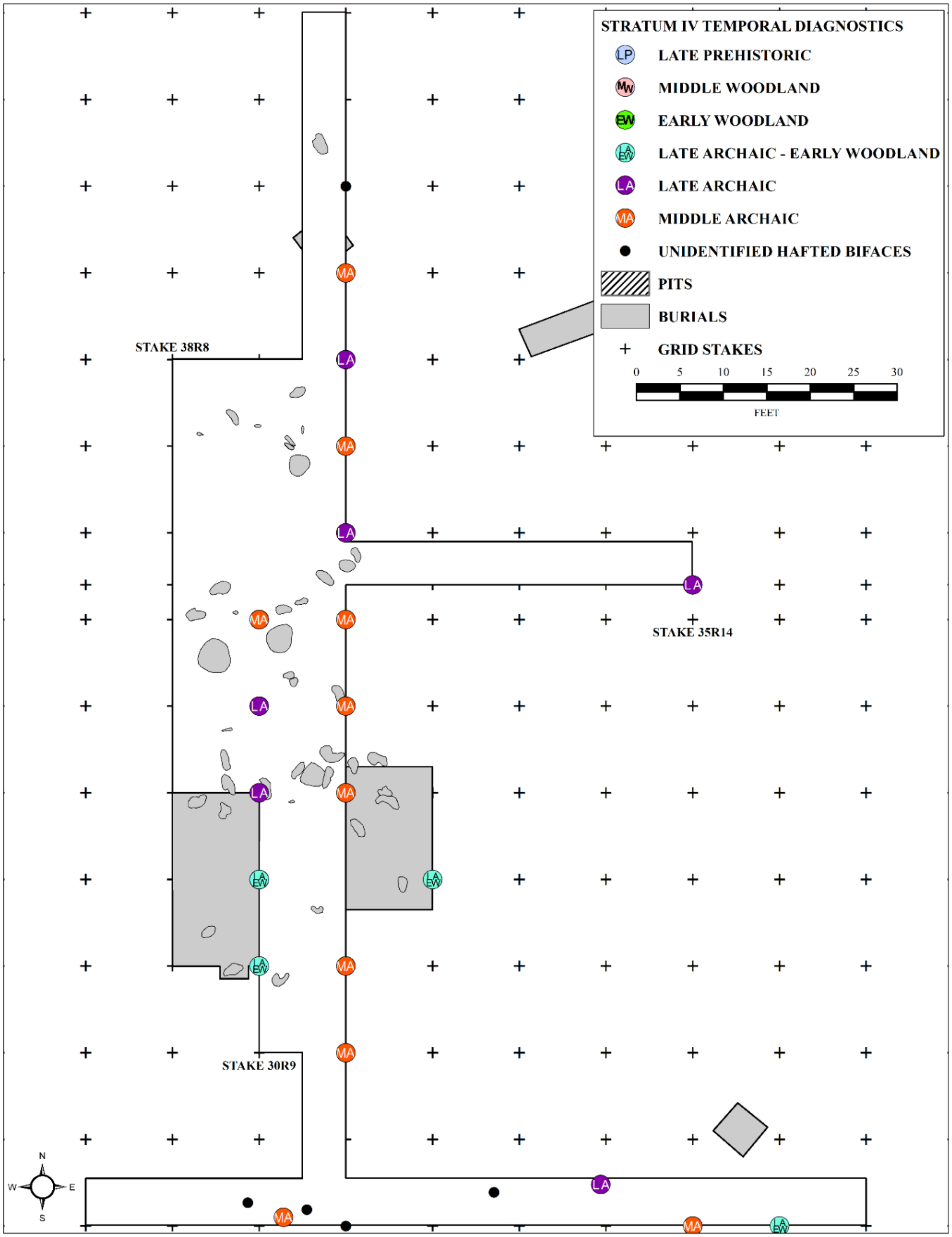

Figure 7.25. Locations of temporal diagnostics (by period) in Stratum V at the Kays Landing site (40HY13). Locations of diagnostics in Stratum IV were plotted only to grid square and stratum, and are shown at the southeastern corner of the grid square from which they were recovered.

Stratum IV and V appear to have been only moderately disturbed. In Stratum IV, only eight hafted bifaces were able to be classified. Two were Middle Archaic forms (Big Slough), five were stemmed Late Archaic varieties, and one was a transitional Late Archaic – Early Woodland type (Dickson Cluster). The Stratum V assemblage, despite representing a larger proportion of tools overall from Kays Landing's provenienced artifacts, contained only forty-two classifiable temporal diagnostics. Most – twenty-seven (64.3%) – were Middle Archaic in age: Big Slough (n = 26) and one Morrow Mountain point. Stemmed Late Archaic types comprised 33.3% (n = 14) of the Stratum V diagnostics, and one possible Late Archaic – Early Woodland form was also present (Table 7.5; Figures 7 .24, 7.25).

Analysis of temporal diagnostics by stratum at Kays Landing suggested comparatively minor disturbance of the site's stratigraphy. The distribution of temporal diagnostics, as a whole and by stratum, meets general expectations for a deeply stratified and mainly intact site dating principally to the Middle and Late Archaic period. Some disturbance of the site's deposits was to be expected, due to the combination of interments and multiple subsurface pits in the strata at Kays Landing. However, that mixing does not appear to have been extensive, based on the distribution of temporal diagnostics as described in this section.

Radiocarbon Dates and Chronology

Prior to the initiation of this research four radiocarbon dates had been obtained from the Kays Landing site. One – a fragment of red oak charcoal from Stratum V, taken as a sample from grid square 32R10, was submitted in 2006 to Beta Analytic (Beta-219573) (Original sample paperwork on file at the McClung Museum, University of Tennessee, Knoxville). The additional three, as well as the radiocarbon date taken from Stratum IV at the Eva site (see Chapter 6), were

Table 7.6. Radiocarbon dates from Kays Landing (40Hy13).

FS / Sample ID	Square	Stratum	Depth below datum (m)	Material	AA #	δ 13C	14C age BP	Cal BP
81	37R10	1	1.68	antler	AA100258	-22.3	3588 ± 55	3893 ± 84
58	35R10	2	1.40	bone	AA100257	-22.4	2939 ± 53	3104 ± 87
110	33R10	2	1.52 - 1.68	bone	AA100259	-22	3632 ± 57	3956 ± 83
235	36R10	2	1.71	antler	AA100262	-21.3	3699 ± 54	4041 ± 80
136	33R10	2	1.98 - 2.13	antler	AA100260	-22.4	3646 ± 63	3975 ± 90
430	36R10	2	2.19	antler	AA100263	-21.5	4261 ± 57	4804 ± 94
774	36R10	2	2.29	antler	AA100266	-21.7	4169 ± 56	4698 ± 85
M-356[a]	---	2		antler	M-356	---	3580 ± 300	3950 ± 396
M-109[a]	---	2		shell	M-109	---	4050 ± 300	4555 ± 411
604	35R10	3	2.29	antler	AA100264	-22.4	3851 ± 55	4271 ± 89
798	35R10	3	2.41	antler	AA100267	-22.3	4175 ± 56	4702 ± 84
229	37R10	3	2.59 - 2.74	antler	AA100261	-23.1	4178 ± 57	4704 ± 84
1350	33R10	4	3.20 - 3.35	antler	AA100268	-21.7	4688 ± 59	5430 ± 83
660	35R10	5	3.35 - 3.50	bone	AA100265	-20.9	4802 ± 59	5517 ± 76
1271[b]	33R10	5		wood charcoal	Beta-219573	-26.6	4470 ± 50	5127 ± 107
M-108[a]	---	5		antler	M-108	---	4750 ± 500	5431 ± 614

[a]Crane 1956:665-666; Lewis and Kneberg 1959:163.

[b]Fox, personal communication, 2012.

submitted by Lewis and Kneberg to the University of Michigan's Radiocarbon Laboratory in the mid-1950s, and were among the first dates run by that laboratory (Crane 1956:665-666; Lewis and Kneberg 1959:163). With the twelve new dates obtained for Kays Landing as a result of this project (Table 7.6), 40HY13 currently represents one of the two best-dated Archaic sites in the Kentucky Basin, exceeded in the total number of radiocarbon dates from its strata only by the Eva site (40BN12) (see Chapter 6).

Previous Radiocarbon Dates

Lewis and Kneberg 1959 (n = 3)

In 1959, Lewis and Kneberg reported a series of three radiocarbon dates submitted in the early 1950s from Kays Landing: M-108, M109, and M-356. These samples were chosen from among the available cultural materials excavated twenty years earlier. Due to the requirements of early radiocarbon dating methods, substantial quantities of organic matter were necessary to produce sufficient carbon for a date.

Two of the three assays reported by Lewis and Kneberg (1959:163) were made on fragments of whitetail deer antler. One, sample M-108, "consist[ed] of 14 cut fragments from Stratum V… representing a late part of… the initial occupation on the old land surface" (Lewis and Kneberg 1959:163). M-108 produced an estimate of 4750 ± 500 rcybp, and a calibrated mean intercept of 5431 ± 614 cal yr BP.

A second assay, M-356, comprised "[s]even cut antler fragments from Stratum II" (Lewis and Kneberg 1959:163). M-356 yielded a measured date of 3580 ± 300 rcybp, which (when calibrated) indicated an age of 3950 ± 396 cal yr BP.

A third date, M-109, was obtained from freshwater shell of unidentified type deriving from the “upper third” of Stratum II (Lewis and Kneberg 1959:163). There is no indication that a correction was made for the possibility of a reservoir effect that may result from the inclusion of older carbon in the shells of aquatic invertebrates from their surrounding environment, nor any indication of the area over which the shell was collected. M-109 produced a radiocarbon age of 4050 ± 300 rcybp; calibrated, the mean intercept of this assay is 4555 ± 411 cal yr BP.

In the case of each of these dates, there is no direct indication provided in the site documentation of specifically which specimens were combined and submitted (the relevant paperwork at the University of Michigan could not be located). There is no indication of the source of the sample of shell from which M-109 was produced. However, in the case of the antler specimens, it is possible to ascertain with reasonable certainty the locations from which these fragments derived.

The identities of specimens from which M-108 was calculated could be narrowed to a list of sixteen possible objects. Only thirty-six antler specimens were recovered from Stratum V (see Table 7.4), and of those, only thirty were described as “cut” or “worked” antler. Sixteen of those could not be accounted for in the site collections. Four derived from burial context (Burial 58 [n = 1] and Burial 83 [n = 3]), and with one exception (FS 5564), identified as an “antler scraper,” the remainder were described as “worked” or “cut” antler (n = 12), “antler artifact” (n = 1), “antler tool” (n = 1), or “antler tine” (n = 1). Two of these artifacts lacked any information regarding depth of origin. It is likely that the M-108 assay was run using the remaining 14 specimens, including those associated with burials 58 (n = 1) and 83 (n = 4). Depths associated with these artifacts were specified by 15.24 cm (0.5 ft) levels ranging from 3.35 to 3.81 m (11 to 12.5 ft) below datum or, in the case of the burials, the depth at which the burial was identified

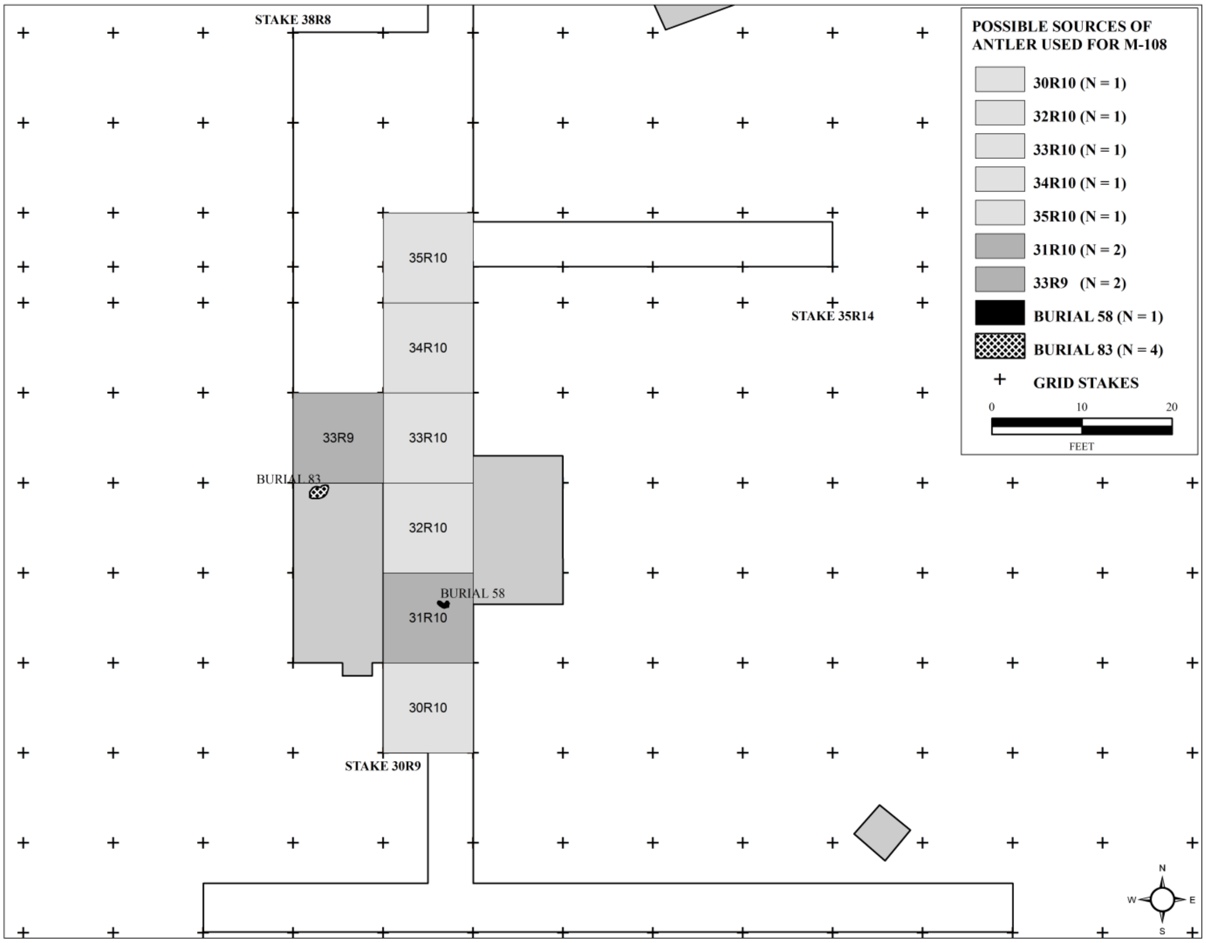

Figure 7.26. Provenience (by grid square and burial) of antler fragments (n = 14) combined for M-108 ^{14}C assay from the Kays Landing site (40HY13).

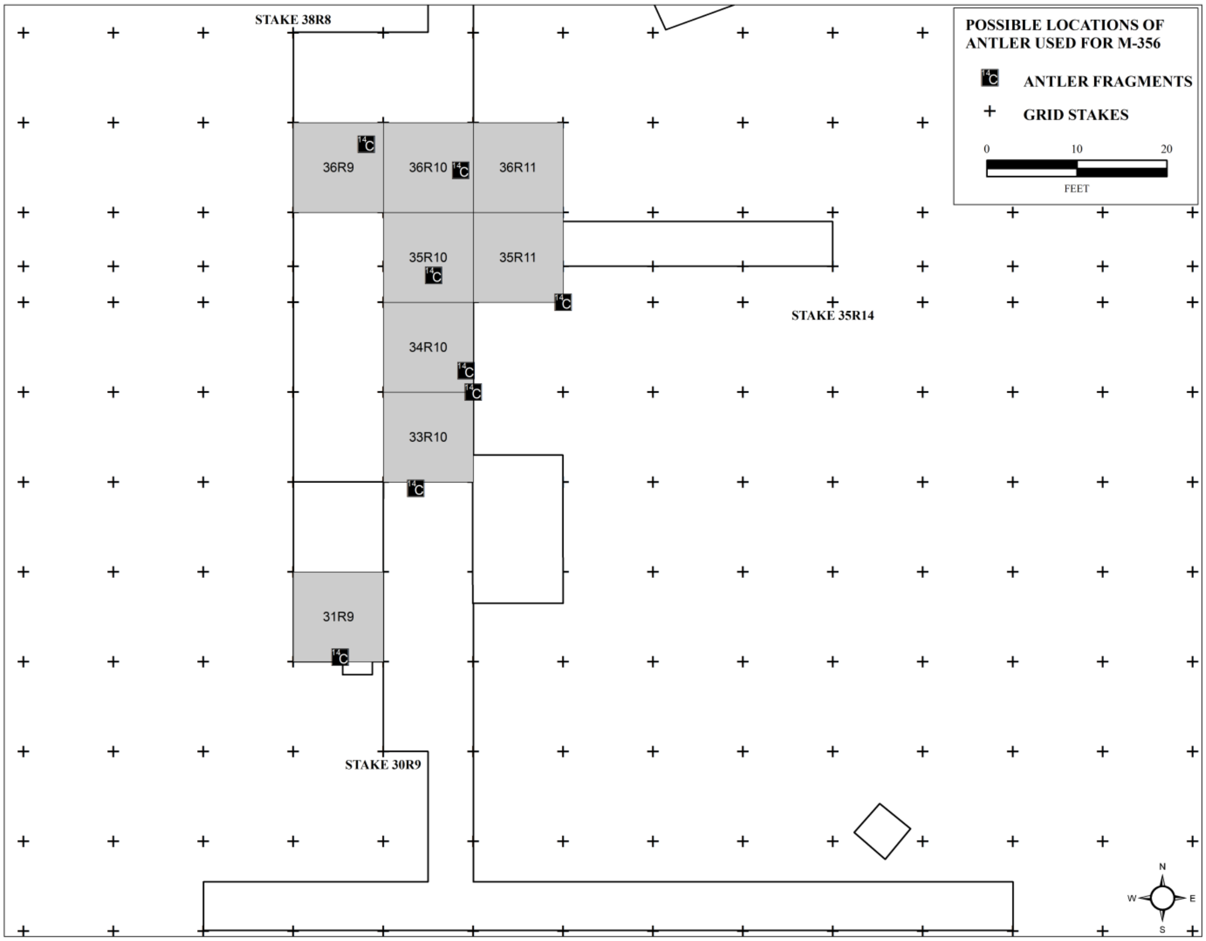

Figure 7.27. Provenience (by grid square and burial) of antler fragments (n = 8) combined for M-356 ^{14}C assay from the Kays Landing site (40HY13).

(No. 58, 3.5 m [11.5 ft]; No. 83, 3.6 m [11.8 ft]). In horizontal distribution, these samples were recovered from a contiguous area measuring 65.03 m^2 (700 ft^2), comprising seven eleven grid squares in the main excavation block), not including Burial 83, which was positioned immediately adjacent to (but outside) Square 33R9 (Figure 7.26).

Specimens combined to produce the M-356 date from the Stratum II shell mound were similarly widely distributed within the site's excavation block. Only ten specimens were unaccounted for among the curated assemblage, and of those two lacked any depth information, reducing the probable candidates to eight, recovered from seven grid squares situated throughout the excavation block and totaling 65.03 m^2 (700 ft^2). Depths ranged from 1.8 to 2.4 m (5.9 to 8 ft) below datum.

2006 Date

In 2006, at the request of a researcher at Trent University who was studying the antiquity of turtle shell rattles in the Southeast, a fragment of red oak charcoal was extracted from a paraffin-encased sample (FS 1271) taken from Stratum V between 3.66 and 3.81 m (12 – 12.5 ft) below datum in grid square 32R10 (Figure 7.26). The specimen was submitted to Beta Analytic (Beta-219573) and returned a radiocarbon date of 4470 ± 50 rcybp; calibration indicates an age of 5127 ± 107 cal yr BP (Fox, pers. comm., 2012; Radiocarbon paperwork on file at the McClung Museum, University of Tennessee, Knoxville).

New Radiocarbon Dates (n = 12)

Although the previous four dates from Kays Landing suggested that the site dated predominately to the late Middle and Late Archaic periods, significant question surrounded the

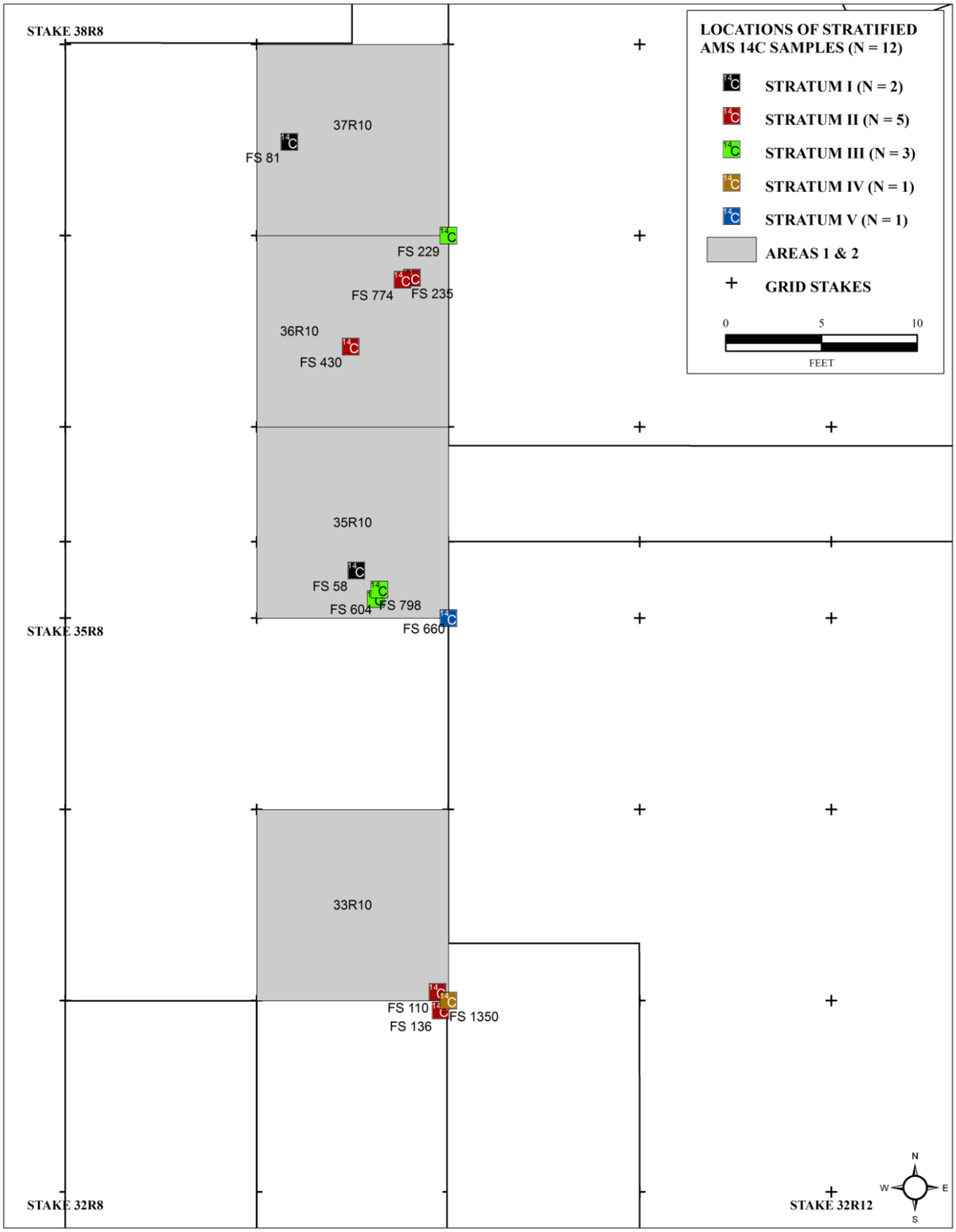

Figure 7.28. Location of samples dated during this project (n = 12) from the Kays Landing site (40HY13).

accuracy of the original three assays run in the 1950s. The considerable disparity between the date from Stratum IV at Eva and subsequent dates obtained from this research project, the similarity of that date's sample selection strategy to that used for the materials that were combined to produce M-108 and M-356, and the potential deleterious marine reservoir effect on M-109, suggested that additional dates would be necessary to properly situate Kays Landing in the regional historical framework of the lower Tennessee Valley.

A total of twelve fragments of antler or bone were selected, deriving from four grid squares comprising grid square 33R10 (Area 1: 9.29 m^2 [100 ft^2]) and squares 35R10 – 37R10 (Area 2: 27.9m^2 [300 ft^2]). Most of the samples were selected from Area 2, which contained a larger quantity of well-provenienced material. However, datable specimens in the deeper strata (IV and V) were rare, and depths (when specified) were only indicated by 15.24 cm (0.5-ft) levels. No datable material from Stratum IV could be located within Area 2, requiring the addition of Area 1. One antler fragment from Stratum IV was selected from Area 1, and two additional specimens from Stratum II in that square were included to cross-verify the relative age of the overlying strata in that location. The remaining nine assays were made on samples taken from Area 2 (Figure 7.28).

Stratum IV / V (n = 2)

A bone awl approximately 10 cm long (FS 660) from Stratum V at a depth of between 3.35 and 3.5 m (11 – 11.5 ft) datum dated to 5517 ± 76 cal yr BP (4802 ± 59 rcybp).

Located in grid square 33R10 at a distance of 6.1 m from FS 660, a grooved and snapped section of deer antler from Stratum IV (FS 1350) recovered at a depth of between 3.20 and 3.50

m (10.5 – 11 ft) below datum provided a calibrated mean intercept of 5430 ±83 cal yr BP (4688 ± 59 rcybp).

Stratum III (n = 3)

Two of the three samples submitted from Stratum III produced calibrated estimates within two years of each other, despite deriving from separate grid squares. A small fragment of deer antler (FS 229) recovered at a depth of 2.59 – 2.75 m (8.5 – 9 ft) below datum was dated to 4704 ± 84 cal yr BP (4178 ± 57 rcybp); FS 798, a worked antler fragment that was found at 2.41 m (7.9 ft) below datum approximately 5.8 m south of FS 229 produced an essentially identical age of 4702 ± 84 cal yr BP (4175 ± 56 rcybp).

A third specimen, FS 604, was recovered approximately 15 cm (ca. 6 inches) away and 12.2 cm (4.8 inches) above FS 798. Despite the proximity, that sample was dated to nearly 500 years later than the other two Stratum III specimens: 4271 ± 89 cal yr BP (3851 ± 55 rcybp). The reason for this disparity is not clear, although one possibility is intrusion by the excavation of a burial pit located less than two meters away (Burial 11 is located at a distance of 1.46 m).

Stratum II (n = 5) and Stratum I (n = 2)

Because Stratum II represented the principal shell mound deposit at Kays Landing, and because such contexts may be significantly disturbed due to occupational activity during and after their primary deposition, a total of six samples were selected from Stratum II to ensure accurate and redundant dating of the deposit. In general, the assays were consistent, indicating relatively good stratigraphic integrity of the shell mound (i.e., depths and ages were well correlated, ρ = 0.933). The dates were mostly distributed as expected, given their depths of origin at either the base of the deposit (FS 774, 430) or the upper portions of the midden (FS 235, 110). One (FS 136) was slightly later than expected, based on its depth; the sixth, FS 58, was significantly later than expected, and may (along with FS 81, described below) may represent a later date from the overlying Stratum I deposit.

FS 430, a fragment of worked antler, was recovered from near the base of the deposit and produced a date of 4804 ± 94 cal yr BP (4261 ± 57 rcybp). FS 774, found 10 cm deeper than FS 430, was dated slightly later at 4698 ± 85 cal yr BP (4169 ± 56 rcybp). These two dates indicate an approximate age for the initial deposition of the shell mound of ca. 4800 – 4700 cal yr BP.

Located in grid square 33R10, FS 136 (a small fragment of deer antler) yielded a date of 3975 ± 90 cal yr BP (3646 ± 63 rcybp), slightly later than expected for its depth, recorded between 1.98 and 2.13 m (6.5 - 7 ft) below datum.

Two additional pieces of deer antler, recovered from near the upper extent of the shell mound, yielded similar ages to that of FS 136. One (FS 110; Square 33R10) was recovered at a depth of 1.7 m (5.25 ft) below datum and dated to 3956 ± 83 cal yr BP (3632 ± 57 rcybp). The other (FS 235) derived from a vertical location 10 cm higher and from a point approximately 11.4 m north in square 36R10, but was estimated at an age of 4041 ± 80 cal yr BP (3699 ± 54 rcybp), a statistically insignificant difference.

A sixth specimen (FS 58, a fragment of mammalian long bone) that was ostensibly associated with the upper portion of Stratum II represented the latest date at Kays Landing, significantly post-dating not only the other five Stratum II radiocarbon dates, but also a sample identified as having been associated with Stratum I (FS 81, a large piece of whitetail deer antler). The age of FS 58 was determined to be 3104 ± 87 cal yr BP (2939 ± 53 rcybp); the age of FS 81 was estimated to be 3893 ± 84 cal yr BP (3588 ± 53 rcybp).

Further inspection of the relative depths and positions of these two samples suggests that they may in fact both represent Stratum I artifacts, based on the location of other materials associated with Stratum I and Stratum II in their respective grid squares. FS 58 was located at the transition between the Stratum II shell mound and the shell-free Stratum I deposit, and the reconstructed three-dimensional representation of the Kays Landing deposits indicates a relatively minimal expression of Stratum I in that area. It may be that in grid square 35R10, located near the apex of the shell mound and from which FS 58 was recovered, surface and near-surface disturbance (possibly the result of historical plowing) and erosion resulted in the transportation and mixing of materials at the transition of the two deposits.

Contrasting Early Radiocarbon Results with Recent Dates

The selection strategy employed by Lewis and Kneberg in choosing appropriate samples for submission to the University of Michigan Radiocarbon Laboratory was relatively simple, and uninformed by more modern concerns made possible by advances such as the development of AMS. The large amounts of carbon necessary for early radiocarbon methods to produce a date sometimes necessitated the combination of multiple specimens, an approach that appears to have been followed by Lewis and Kneberg. When material for four dates (three from Kay Landing, and one from Eva) was selected, it comprised several separate specimens for each intended date. In the case of Eva, three relatively large fragments of deer antler that derived from different areas of the site were chosen. Subsequent radiocarbon dating associated with this project indicated that the combination of those three samples produced a date (M-357; 7150 ± 500 rcybp [Lewis and Lewis 1961:13]) that was several centuries later than assays obtained during this study (see Chapter 6). There were similar concerns about the 1950s Kays Landing assays, which comprised considerably larger numbers of specimens per date. Surprisingly, the mean intercepts of the dates returned, although possessed of large standard deviations of several centuries, were in approximate agreement with the new AMS dates from similar contexts. M-108, based on fourteen antler fragments from Stratum V, was situated temporally between the dates obtained during this project from Stratum V (FS 660) and Stratum IV (FS 1350). Similarly, M-356, using seven antler artifacts from Stratum II, was in agreement with other AMS-dated Stratum II samples.

Perhaps most unexpectedly given the general expectation for radiocarbon dates on shell to require reservoir correction, the M-109 assay, representing a radiocarbon date from freshwater shell taken from Stratum II, was not significantly different from other Stratum II dates made on deer antler and bone.

OCCUPATIONAL HISTORY OF KAYS LANDING

The Kays Landing site was occupied and used for a period of at least 2,400 years, in an historical sequence that is similar to that of the Eva site, although Eva's occupation appears to have ended roughly 800 years prior to the earliest use of Kays Landing.

Like the stratigraphic sequence at Eva, the strata at Kays Landing represent phases of relatively intense use of the location (Stratum V, Stratum II) separated by sometimes extended periods of seemingly sparse occupation (e.g., most of Stratum IV, Stratum III).

Early Occupation: Stratum V / IV, ca. 5500 to 5100 cal yr BP

Three dates from Stratum V – one from this project (5517 ± 76 cal yr BP), one obtained in 1956 (5431 ± 614 cal yr BP) and one run in 2006 (5127 ± 107 cal yr BP) – and one from

Stratum IV (5430 ± 83 cal yr BP) provide a probable temporal range for this component. Although Stratum IV is considered here to be associated with the site's earliest occupation, based on the above radiocarbon date, the principal investigator's field report and profile drawings produced during excavation, as well as materials recovered from that deposit, provide a clear indication that Stratum V represented the primary deposit associated with early use of Kays Landing.

Initial occupation of the site began during the mid-6th millennium BP, lasting for a relatively short period of time, possibly as little as two hundred to three hundred years. No account of the unmodified faunal assemblage identified at Kays Landing was provided in the site's documentation, but the inclusion of shellfish in the deposit's matrix indicates that shellfishing supplemented the inhabitants' diets.

Based on total proportion of cultural material contained within Stratum V/IV (n = 700 items; 28.6% of the site assemblage) and the large number of burials recovered from the deposit (n = 45; 54.2% of all graves), the earliest deposit at Kays Landing constituted a comparatively intensive period of use of that location. That interpretation is further supported by the relatively large number of non-diagnostic chipped stone implements, which totaled 296, more than three times the number contained in any other stratum.

The Stratum V/IV component was characterized by the presence of 28 Big Slough hafted bifaces, a late Middle Archaic type, and by a series of stemmed bifaces generally consistent with the Late Archaic period. With the exception of a single Big Slough diagnostic associated with Stratum III, that type was restricted to the deepest occupational levels at Kays Landing. Surprisingly, given the long history of occupation of the region, deep testing revealed no earlier habitation at Kays Landing (G. Lidberg, Original field report, on file at McClung Museum, University of Tennessee, Knoxville), and temporal diagnostics recovered from Stratum V/IV did not include any examples characteristic of pre-Middle Archaic settlement.

In general, materials associated with Stratum V/IV were found in grid squares throughout the site's excavation block (the level of provenience for the deeper strata at Kays Landing was restricted only to depth, stratum, and square of origin rather than coordinates, as was the case in the upper strata). Materials associated with Stratum V were also identified in the southern east-west trench (along the 28-line); the assemblage was largely dominated by chipped stone (83.4%), followed distantly by antler and bone (13.6%). Relatively few groundstone implements were present, and those that were consisted primarily of food-processing implements and groundstone beads associated with burials.

The majority of burials at Kays Landing were associated with Stratum V (n = 45). The burial assemblage was dominated by adults, with minimal representation of children and infants; most burials that could be classified by sex were male. Only ten Stratum V burials were accompanied by grave offerings, but of the total burials at the site, those ten represented 62.5% of all interments that included grave goods. Artifacts or materials contained in Stratum V burials included perforated carnivore canines (three burials), turtle carapaces (two burials), shell and stone beads (two burials), red ochre (two burials), and other chipped stone, groundstone, bone, and antler artifacts.

Despite the substantial artifact assemblage and number of burials found in Stratum IV/V, which suggest considerable activity conducted at Kays Landing during its initial use, few cultural features were identified associated with either stratum. There were no pits identified, and only Features 5, 6, and 7 were recorded.

Second Occupation: Stratum III / II, ca. 4800 to 3800 cal yr BP

The upper portion of Stratum IV, and the lower margins of Stratum III, represented a period of sporadic use of Kays Landing, and were described as largely consisting of water-laid bands of sand and silt containing occasional evidence of light occupation, indicated by "thin bands of carbon-stained sand… represent[ing] levels of occupation" (G. Lidberg, Original field report, on file at McClung Museum, University of Tennessee, Knoxville) that occurred between periods of inundation of the site.

Unlike the significant hiatus indicated by radiocarbon dates at Eva between the deepest occupation levels and that site's Stratum II shell mound (see Chapter 6), there is little indication that a pronounced period of abandonment of Kays Landing occurred. At most, assays obtained during this project and in 2006 (Table 7.6) suggest a period of no more than three to four hundred years before major reoccupation of the site occurred, at which time initiation of deposition of what would become Stratum II – the shell mound – began.

The Stratum II shell mound at Kays Landing graded into the underlying Stratum III sand, and radiocarbon dates from both deposits demonstrate that the upper margins of Stratum III and the lower levels of Stratum II were essentially contemporary (Table 7.14). In horizontal extent, the upper shell-bearing deposit was noted across much of the site block, but its densest concentration (based on the distribution of cultural material and on profile drawings made in the field) occurred between the 32- and 38-lines (Figure 7.4).

Similarly to Eva, when evaluated by quantities of cultural material, the upper shell-bearing deposit at Kays Landing represented the second major period of use of the site; like Eva as well, Stratum II accumulated over a much longer period of time than did the earlier shell-bearing stratum. Dates from the Stratum II/III deposits extend over a period of roughly 900 years (4804 ± 94 to 3893 ± 84 cal yr BP), suggesting that the intensity of use compared to that represented in Stratum V was considerably less.

Of the total 351 artifacts associated with Stratum II, and 146 with Stratum III, the majority of recovered cultural material was chipped stone (88.6% of the Stratum II assemblage; 77.4% of Stratum III). Within that material category, diagnostic hafted biface types were dominated by stemmed forms generally thought to characterize the Late Archaic period. Two Middle Archaic diagnostics were found near the base of Stratum III.

Antler and bone together constituted an additional 9.4% of the materials recovered from Stratum II, and 17.8% of the remainder of Stratum III's assemblage. Only a small number of groundstone implements were found in either stratum, and most were classified either as hammerstones or pestles.

Stratum II and Stratum III contained a total of twenty-three of the burials at Kays Landing (Stratum II, n = 18; Stratum III, n = 5). Most (n = 19) were adults, and In contrast to burials in Stratum V, only four interments were accompanied by grave goods, and they were few and comparatively mundane in nature (Table 7.2). No graves in either Stratum II or III included red ochre.

Despite the seemingly lower intensity of site use during the Stratum II/III occupation, features and the distribution of materials associated with that deposit represent the most convincing evidence for residential occupation of the site. The majority of pits found at Kays Landing were associated with Stratum II/III, and a subs-set of the fifty possible postmolds (PPMs) mapped at the Stratum II – III transition (Figure 7.15) exhibited a pattern suggesting possible structural remains. Eighteen postmolds in three grid squares in the southern half of the site block (Figure 7.15) may indicate a pair of small (< 5 m^2 in horizontal area) structures erected on the site prior to or during the early stages of deposition of what would become the shell mound at the site. The presence of a single burial (Burial 10) within one of the postmold concentrations may indicate sub-floor burial, although existing data (i.e., the lack of depths for the postmolds in that concentration) are insufficient to provide support for such an interpretation.

Continued Occupation: Stratum I, post-3800 cal yr BP

Although thought to have been associated with Stratum II, a single radiocarbon date recovered from the interface between the shell-bearing Stratum II and the shell-free Stratum I deposits suggests that the artifact's origin was actually substantially later than the termination of shellfish deposition that marked the cessation of significant shellfishing at Kays Landing. Activity at the site continued until at least 3104 ± 87 cal yr BP; classifiable temporal diagnostics recovered in Stratum I indicate a largely Late Archaic age for the deposit, but provide indication of later activity as well.

Stratum I contained a relatively small amount of cultural material (n = 204), representing only a small proportion of the total site assemblage (8.3%), and only four burials, although that number included the only canine burial at Kays Landing (Burial 1).

The nature of occupation of the site during the period associated with Stratum I is difficult to determine. Upper deposits were disturbed by plowing and clearcutting, and few features were recorded in Stratum I. The relatively small amount of cultural material and few burials may indicate occasional visitation and use of the location, but generally do not seem to support an interpretation of significant use of Kays Landing continuing much beyond the Early Woodland period at the latest.

CHAPTER 8. CHERRY (40BN74), OAK VIEW (40DR1), LEDBETTER LANDING (40BN25) AND MCDANIEL (40BN77)

In addition to the three primary sites investigated during this project (see Chapters 5 – 7), documentation and curated museum collections from four additional sites from the WPA-era excavations in the Kentucky Basin – Cherry (40BN74), Oak View (40DR1), Ledbetter Landing (40BN25), and McDaniel (40BN77) – were also examined in order to provide for a more comprehensive sample of the region's occupational history. These sites, like Big Sandy (40HY18) and Kays Landing (40HY13), have been minimally reported since they were initially investigated (Lewis and Kneberg 1947, 1959). This chapter provides an abbreviated report of each site, presented in less detail than the preceding three study sites (but in far greater detail than previous discussions). A general background is provided, consisting of a brief history of excavation, site stratigraphy, and the overall proportions of cultural material by material type and provenience, together with the features and burials reported. Temporally diagnostic hafted bifaces from each site were examined to determine stratigraphic integrity and to provide an additional means of assessing the ages of the sites' cultural deposits. Radiocarbon dates and synopses of occupational histories for each site are then presented.

THE CHERRY SITE (40BN74)

The Cherry site (40BN74) was first recorded in March of 1941, and full-scale excavation of the site began five months later, extending from early August through September of 1941 and led by Douglas Osborne. The site was one of the last among those investigated in the lower

Tennessee Valley before the termination of the TVA salvage archaeology program in the region and the completion of the Kentucky Dam.

Environment and Soils

The Cherry site was situated between the Big Sandy River (located approximately 1.8 km west) and Rushing Creek, a small drainage located 1.2 km east of the site (Figure 8.1). The two waterways converged roughly 2.6 km north of the site.

The area in which Cherry was located is positioned at the physiographic boundary between the East Gulf Coastal Plain section to the west and the Highland Rim section of the Interior Low Plateaus province directly east (Fenneman and Johnson 1946). Chert-bearing limestone bedrock of Mississippian and Devonian age underlies the area (King and Beikman 1974; King et al. 1994). When Cherry was recorded and then excavated in 1941, the field in where the site lay was under cultivation, and had been for at least 50 years or perhaps longer, according to local informants (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville). However, at the time of the site's occupation, Braun (1950:156) indicates that the likely forest communities of the area were dominated by oak and hickory species on the gentle slopes and low ridges of the area, with tuliptree, beech, and sugar maple found in bottoms and ravines.

Cherry was located well upriver (south) from the furthest point of inundation of the Big Sandy river drainage by the closing of the Kentucky Dam, and the site remains uninundated to the present day (Figure 8.2). Soil maps indicate silt loams of the Providence series (0-2% and 2-5% slopes), moderately well-drained soils classified as prime farmland and extending to a depth of approximately 200 cm (79 in) (USDA Web Soil Survey, Accessed 8/1/2013).

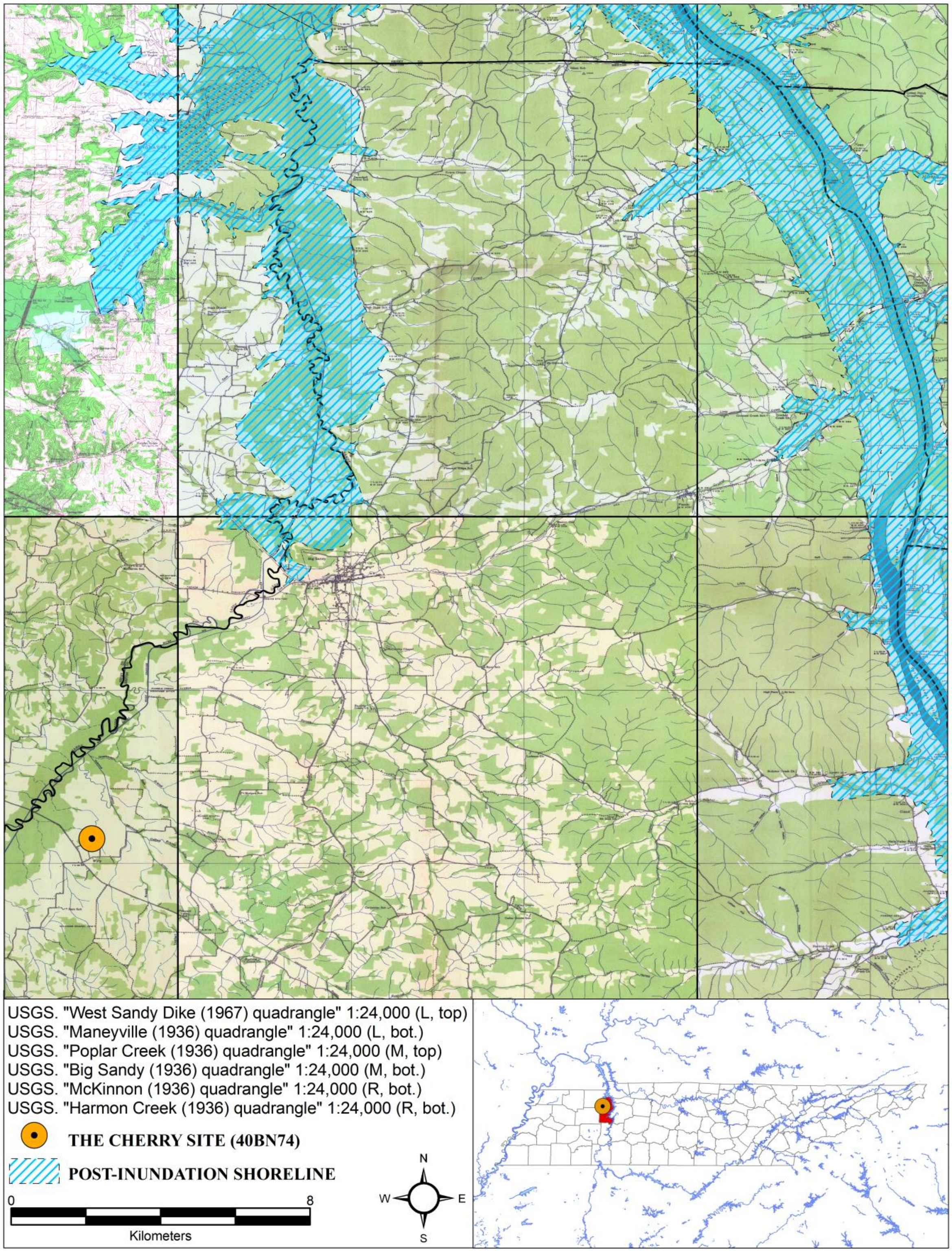

Figure 8.1. Location of the Cherry site (40BN74).

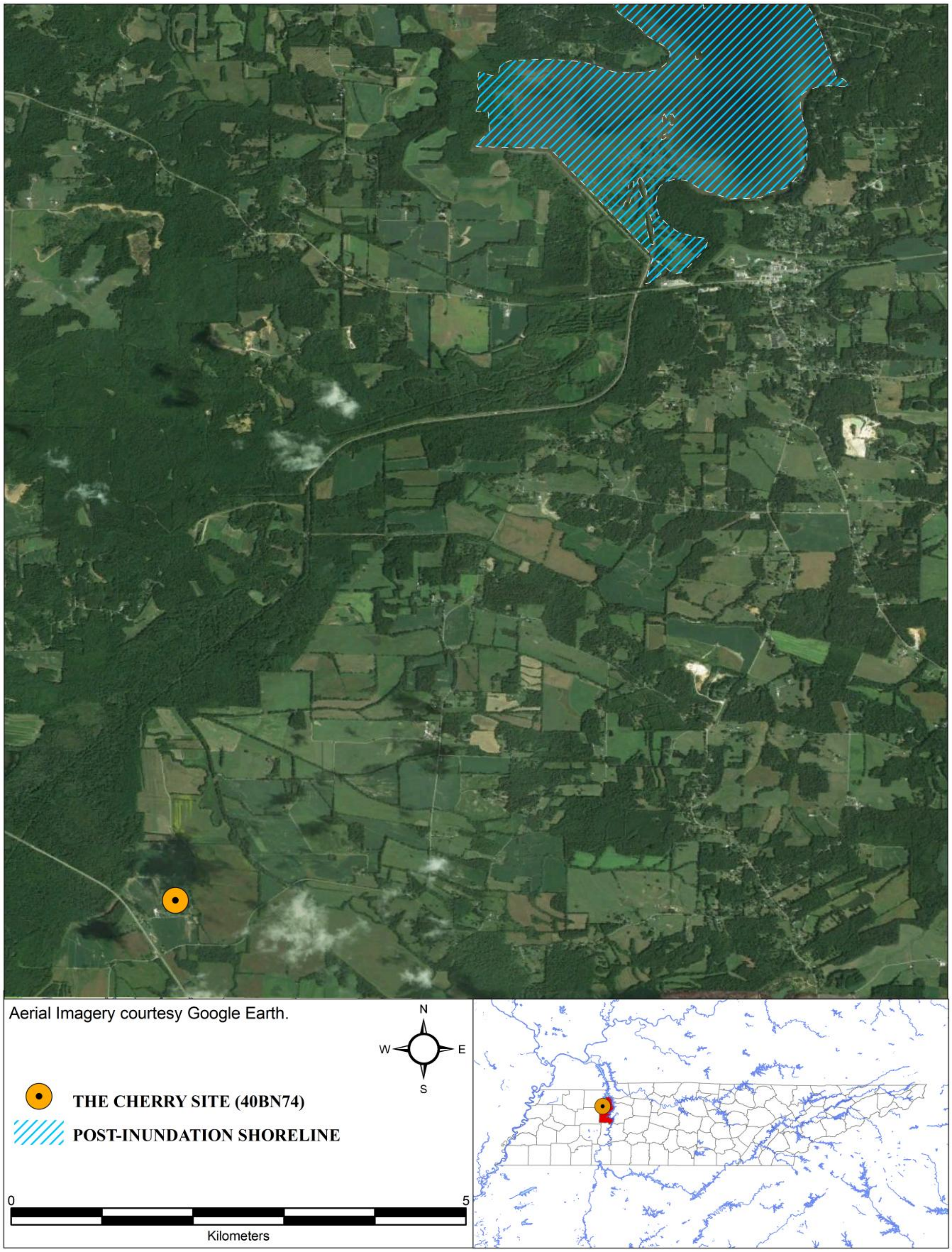

Figure 8.2. Location of the Cherry site (40BN74), present day.

TVA Excavation

At the start of excavations in August of 1941, two 3-ft wide (0.91 m) test trenches, oriented east-west (the main trench) and north-south, were opened to assess the stratigraphy of the site before the remainder of the block excavation was extended north and south of the east-west main trench (positioned along the 20-line). In total, the main block at Cherry encompassed 474.8 m^2 (ca. 5,111 ft^2) (Figure 8.3).

Beneath the plowzone at Cherry, only a single cultural deposit (Stratum I) was distinguished above subsoil (Figure 8.4). It consisted of a dark reddish-brown soil averaging 0.45 – 0.5 m (ca. 1.5 ft) thick, and although sporadic shells were encountered in the deposit the site was not characterized as a shell-bearing deposit by the excavator, who had previously excavated the Big Sandy and Eva sites. Stratum I was subdivided into upper and lower portions, mainly as a precautionary measure to provide for an additional level of provenience (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville).

A moderate amount of cultural material was contained within the plow zone and in Stratum I; a significant proportion of unmodified animal bone was noted throughout the excavation, although none was recovered for curation. Stratum I also contained a significant number of pits and other associated features, as well a substantial number of human (n = 67) and dog (n = 7) burials.

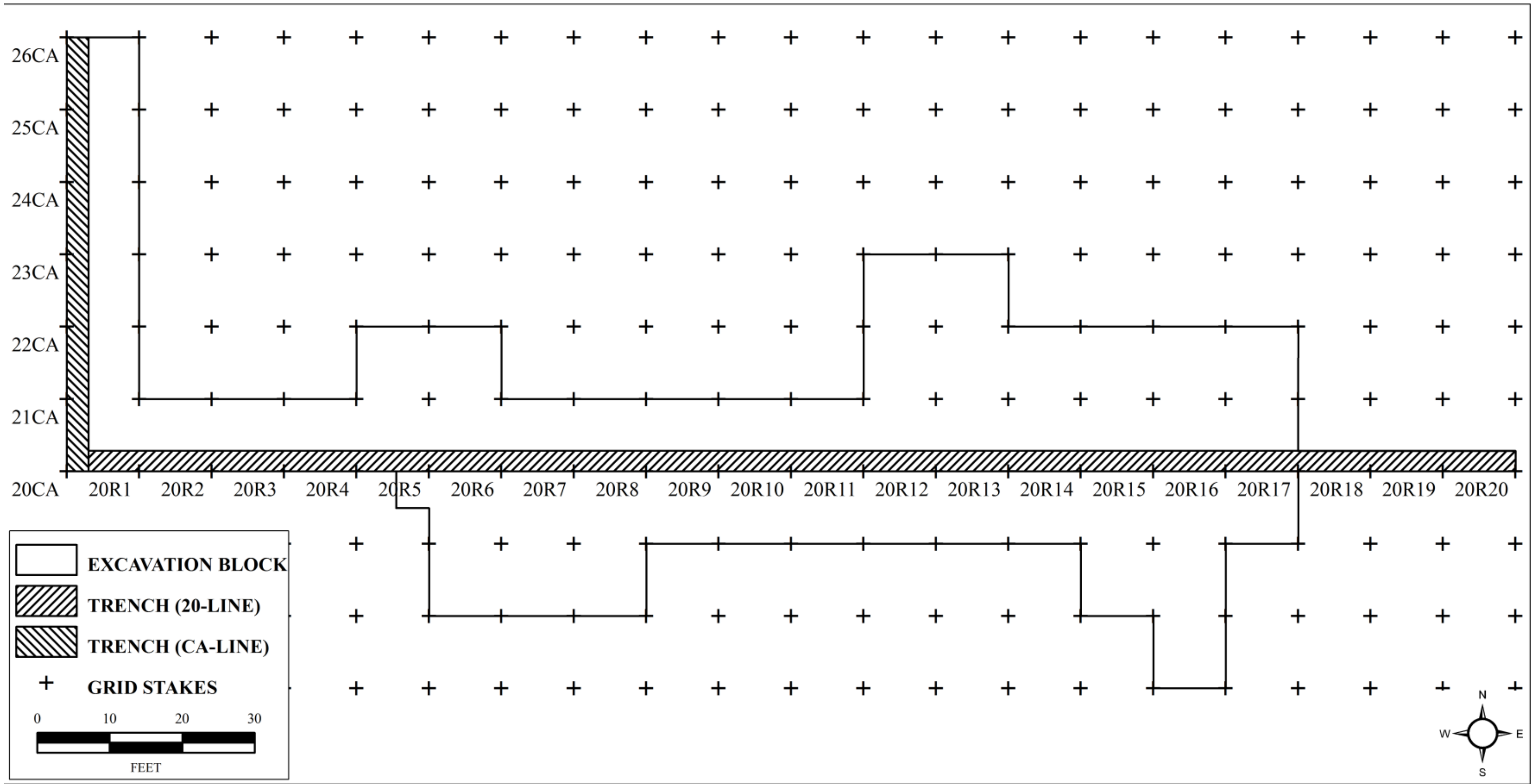

Figure 8.3. Plan map of excavation areas at the Cherry site (40BN74) (Reproduced from the original, on file at the McClung Museum, University of Tennessee, Knoxville).

Figure 8.4. Stratigraphic profile of the Cherry site (40BN74). Reproduced from the original field map, D. Osborne, 1941 (Original on file at the Frank H. McClung Museum of Natural History and Culture, University of Tennessee, Knoxville). (Oversized figure, see Appendix A.)

Burials and Features

Burials (Human, n = 66; Canine, n = 7*)*

The burial assemblage at Cherry was extensive (Figure 8.5), particularly for a site seemingly consisting of a single occupational stratum (but see below), and was referred to by as "the most spectacular yield" of the site. A total of seventy-three interments (Table 8.1) were documented and recovered. Aside from one cremation, thirty (45.5% of all human burials) of the site's skeletal assemblage were listed in "good" condition, twenty-one (31.8%) in "fair" condition, and only thirteen (19.7%) in "poor" condition. The degree of preservation for one burial was not recorded.

The relatively well-preserved condition of the skeletal material made reasonable accurate assessment of age-at-death possible for every burial recovered. Between the original 1941 classifications and the updated estimations resulting from the 1990 NAGPRA skeletal inventory, only 19.7% (n = 13) were classified differently (Smith 1990). Based on the original classifications, fifty-three adults and thirteen sub-adults were recovered during the investigation of Cherry. The 1990 assessment identified forty-seven adults and eighteen sub-adults, with one skeleton (initially identified as "adult") listed as "indeterminate."

Classification by sex was significantly less successful, and of the individuals identified as adult by analysts during the site's initial examination (n = 53), only 62.3% (n = 33) could be assigned as either male (35.8%, n = 19) or female (26.4%, n = 14). Among the 47 adults noted in the 1990 re-analysis, eighteen males (33.9%) and six females (11.3%) were identified (total classified by sex in 1990 reanalysis, 45.2%).

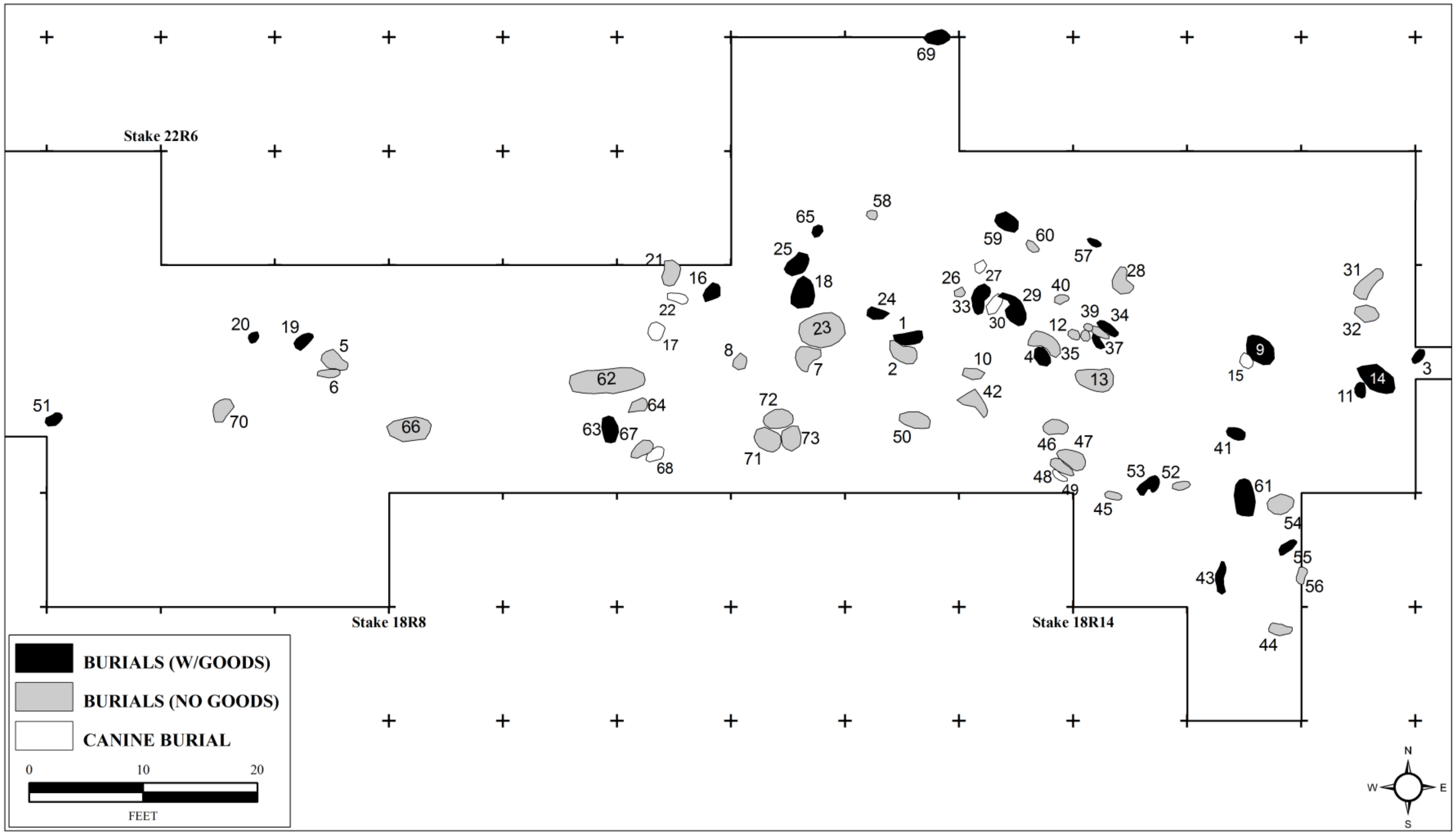

Figure 8.5. Position of identified burials in the excavation block at the Cherry site (40BN74).

Table 8.1. Burial Data from the Cherry site (40BN74).

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
1	20R13	1	Good	E	Partly Flexed	Front	M	M	Adult	Adult	projectile point
2	20R13	1	Good	N	Partly Flexed	Back	F	F	Adult	Adolescent	
3	20R18	pz	Fair	SW	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	bone bead; 2 projectile points
4	20R14	1	Fair	NW	Fully Flexed	Right	Indeterminate	Indeterminate	Infant	Child	broken tubular pipe; shell pendant; shell fragments; antler object
5	20R8	1	Good	NW	Fully Flexed	Right	M	Indeterminate	Adult	Adult	
6	20R8	1	Good	Unspecified	Fully Flexed	Unspecified	F	M	Adult	Adult	
7	20R12	1	Good	S	Partly Flexed	Front	M	Indeterminate	Adult	Adult	
8	20R12	1	Good	SW	Partly Flexed	Front	Indeterminate	Indeterminate	Infant	Child	
9	20R16	1	Good	SE	Fully Flexed	Left	M	Indeterminate	Adult	Adult	drilled antler; 2 bone awls; 4 antler projectile point; 2 drills; projectile point; beaver incisor
10	20R14	1	Poor	W	Partly Flexed	Left	Indeterminate	Indeterminate	Infant	Infant	
11	19R17	1	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	biface; projectile point
12	20R14	1	Good	NW	Partly Flexed	Back	M	M	Adult	Adult	
13	20R15	1, Pit 19	Good	W	Partly Flexed	Right	F	M	Adult	Adult	
14	20R17	1	Good	SE	Fully Flexed	Left	M	M	Adult	Adult	projectile point; 2 drilled antler; ulna awl (broken)
15	20R15	1, Pit 10					Dog				
16	20R11	1	Good	SW	Fully Flexed	Back	Indeterminate	Indeterminate	Infant	Child	*Busycon* shell; mussel shell; gastropods; gastropod shell beads (*Leptoxis*); broken ulna awl
17	20R11	1					Dog				
18	20R12	1	Good	N	Partly Flexed	Left	F	F	Adult	Adult	disk-shaped shell beads
19	20R8	1, Pit 5	Fair	SE	Unspecified	Unspecified	Indeterminate	Indeterminate	Child	Infant	cut deer humerus; projectile point; unworked deer cannon bone
20	20R7	1, Pit 6	Poor	NW	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Infant	Adolescent	projectile point
21	20R11	1	Good	S	Fully Flexed	Left	M	M	Adult	Adult	
22	20R11	1					Dog				
23	20R12	1	Fair	NW	Fully Flexed	Left	F	F	Adult	Adult	
24	20R13	1	Fair	NW	Partly Flexed	Front	Indeterminate	Indeterminate	Infant	Infant	disk-shaped shell bead; *Leptoxis* beads
25	29R12	1	Good	NE	Fully Flexed	Right	M	Indeterminate	Adult	Adult	scraper; hackberry seeds; 2 bone pins

Table 8.1. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
26	20R13	1	Fair	Unspecified	Unspecified	Front	M	M	Adult	Adult	
27	20R14	1				Dog					
28	20R14	1	Good	SE	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	
29	20R14	1	Good	NW	Fully Flexed	Right	M	M	Adult	Adult	shell; dog (burial 30)
30	20R14	1				Dog					
31	20R17	1	Good	NE	Partly Flexed	Left	F	F	Adult	Adolescent	
32	20R17	1	Fair	SE	Fully Flexed	Back	F	F	Adult	Adult	
33	20R14	1, Pit 11	Unspecified	S	Fully Flexed	Right	M	M	Adult	Adult	*Busycon* shell dipper
34	20R15	1	Fair	SW	Fully Flexed	Left	F	F	Adult	Adolescent	bone awl; groundstone bead; disk-shaped shell beads
35	20R15	1	Fair	N	Partly Flexed	Left	Indeterminate	Indeterminate	Child	Child	stone bead
36	20R15	1	Poor	N	Unspecified	Left	Indeterminate	Indeterminate	Infant	Child	
37	20R15	1	Good	S	Partly Flexed	Back	M	M	Adult	Adult	
38	20R15	1	Fair	S	Partly Flexed	Back	F	F	Adult	Adolescent	
39	20R15	1	Fair	NE	Partly Flexed	Right	Indeterminate	Indeterminate	Juvenile	Child	
40	20R14	1	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
41	19R16	1, Pit 18	Good	SW	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	biface; red ochre; 3 projectile points; 2 bone awls; bone whistle; turtle shell bracelet; antler tool
42	19R14	1	Fair	SW	Unspecified	Left	Indeterminate	Indeterminate	Adult	Adult	
43	18R16	1	Poor	S	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	quartzite bead
44	17R16	1	Poor	E	Fully Flexed	Right	Indeterminate	M	Adult	Adult	
45	18R15	1	Poor	W	Fully Flexed	Left	Indeterminate	Indeterminate	Child	Child	
46	19R14	1	Fair	SE	Fully Flexed	Left	Indeterminate	M	Adult	Adult	
47	19R14	1	Good	SE	Fully Flexed	Left	F	F	Adult	Adult	
48	19R14	1	Good	NW	Fully Flexed	Left	M	Indeterminate	Adult	Adult	
49	19R14	1				Dog					
50	19R13	1	Fair	E	Partly Flexed	Back	Indeterminate	Indeterminate	Adult	Adult	
51	19R6	1, Pit 1			Cremation		Indeterminate	Indeterminate	Adult	Adult	projectile point
52	19R15	1, Pit 24	Good	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
53	19R15	1, Pit 24	Good	SW	Fully Flexed	Right	M	M	Adult	Adult	snake vertebra
54	18R16	1, Pit 24	Fair	E	Extended	Back	F	M	Adult	Adult	
55	18R16	1	Poor	SW	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adolescent	shell pendant fragment
56	18R16	1	Fair	N	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
57	21R15	1	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	projectile point (broken)
58	21R13	1	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Infant	Infant	
59	21R14	1, Pit 32	Good	W	Partly Flexed	Unspecified	F	M	Adult	Adult	ulna awl
60	21R14	1	Poor	NW	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	

Table 8.1. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
61	18R16	1, Pit 29	Good	N	Partly Flexed	Back	M	M	Adult	Adult	antler tool; turtle plastron; cut antler
62	19R10	1	Good	W	Extended	Back	M	Indeterminate	Adult	Adult	
63	19R10	1	Good	N	Partly Flexed	Left	F	F	Adult	Adult	disk-shaped shell bead
64	19R11	1	Poor	SW	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	
65	21R12	1	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Infant	Infant	disk-shaped shell bead
66	19R9	1, Pit 37	Poor	E	Partly Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	
67	19R11	1	Poor	SE	Partly Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	
68	19R11	1					Dog				
69	22R13	1	Fair	E	Partly Flexed	Right	F	F	Adult	Adult	2 projectile points
70	19R7	1, Pit 40	Poor	SW	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Indeterminate	
71	19R12	1, Pit 43	Good	S	Partly Flexed	Left	M	M	Adult	Adult	
72	19R12	1, Pit 43	Good	NW	Partly Flexed	Right	M	M	Adult	Adult	
73	19R12	1, Pit 43	Good	S	Partly Flexed	Back	M	Indeterminate	Adult	Adult	

For individuals for whom burial flexure could be identified (n = 52), twenty-five each were recorded as “partly” and “fully” flexed. Flexure of thirteen skeletons could not be identified. Two (Burial 54 and Burial 62) were extended.

By a significant margin, interments were placed on their left sides (n = 23, 34.8% of the site’s 66 human burials). Eleven (16.7%) bodies were laid on their backs; twelve (18.2%) on their right sides; and five (7.6%) were placed face-down. The burial position of fifteen (including one cremation – Burial 51) could not be assessed.

With respect to burial orientation (i.e., the direction of the burial, defined by the long axis of the burial and the position of the head) no direction enjoyed an overwhelming majority. Burials oriented to the northwest or southwest numbered ten each (15.2%); eight each pointed toward the south, southeast, and north (12.1%); six (9%) to the east; five (7.5%) to the west; and only three (4.5%) to the northeast. The orientation of eight burials could not be determined in the field.

Twenty-seven of the sixty-six human interments (40.9%) were accompanied by burial offerings, a total of sixty-nine items or materials (see Figure 8.6). The most common objects in grave context were of chipped stone (n = 20), bone (n = 18), and shell (n = 14). Antler artifacts were also well-represented (n = 11). Few groundstone artifacts (n = 4) or other materials were encountered.

The most unusual class of burial items consisted of shell, both marine (g. *Busycon*) and fresh water (g. *Leptoxis*). In all, nine burials (33.3% of all “accompanied” burials) contained shell artifacts, comprising mainly beads of several designs. Two burials (Burial 16, a child; Burial 24, an infant) included beads made from the shells of a local gastropod species, *Leptoxis*

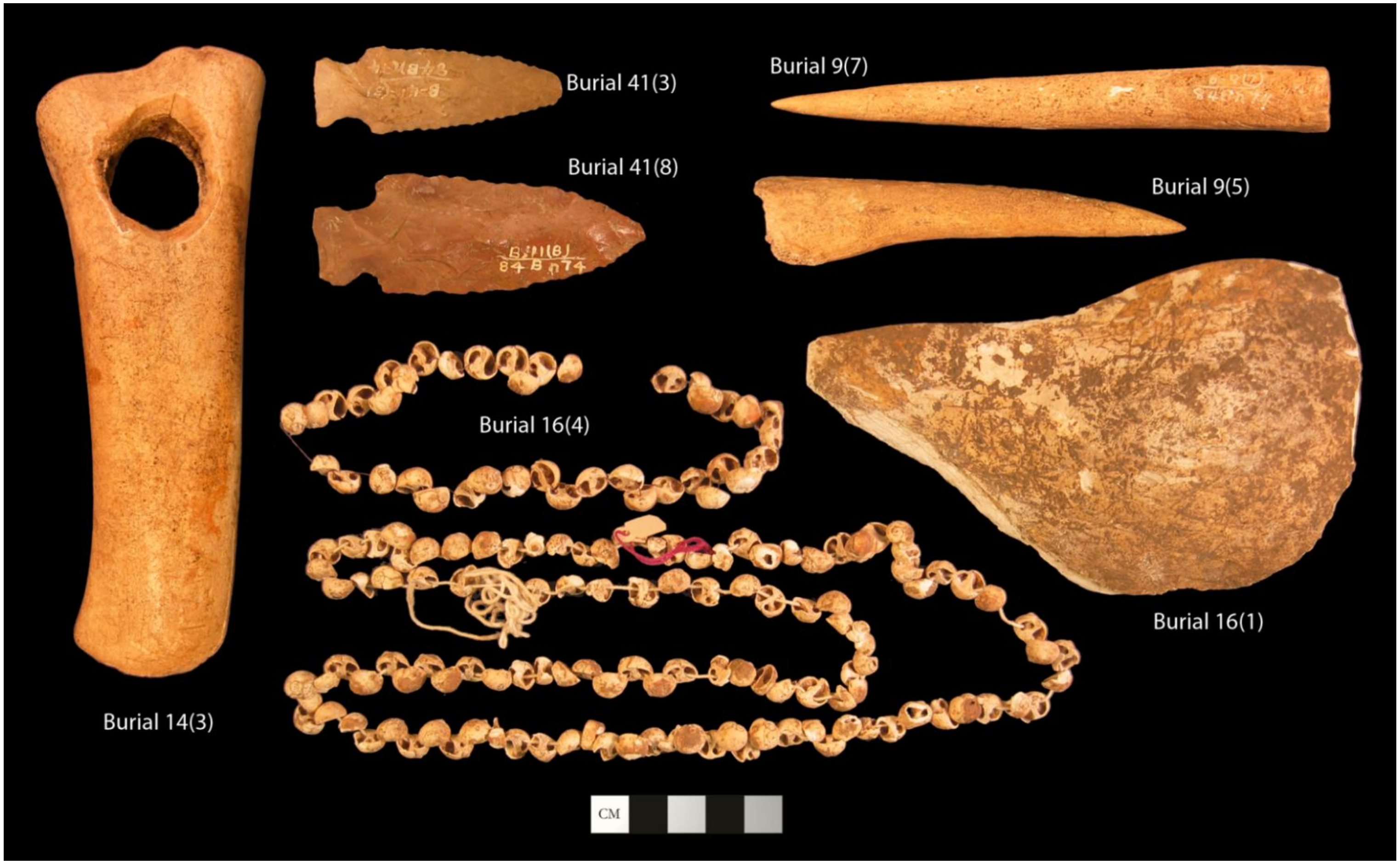

Figure 8.6. Selected artifacts associated with interments at the Cherry site (40BN74): drilled antler (left, Burial 14); projectile points (top left, Burial 41); antler objects (top right, Burial 9); *Leptoxis* beads (center bottom, Burial 16) and *Busycon* marine shell object (right bottom, Burial 16).[32]

[32] A note about artifact labeling on these figures: Like other proveniences containing multiple artifacts at the WPA sites, burial artifacts were assigned a field number that included the number of the burial and the number of the individual artifact. Thus, Burial 14(3) (see Figure 8.6) indicates the third artifact numbered among those found accompanying Burial 16.

praerosa, which were ground to expose the interior of the shell, including the columella (Figure 8.6), and presumably were strung or sewn to clothing. Disk-shaped shell beads of several sizes were also found with five burials.

Other shell artifacts included at least two *Busycon* marine whelk objects (Burial 16 [Figure 8.6], Burial 33) and two fragments of shell pendants of unknown origin (i.e., marine or fresh water).

Of the nine burials in which shell was recovered, nearly half (n = 4) were subadult, and two were infants. This fact was observed, with some humor, by Doublas Osborne, who noted about Burial 16, which included both marine and freshwater shell objects, that it was "[p]eculiar that these little brats get the shell[!!]" (Original burial record form, on file at the McClung Museum, University of Tennessee, Knoxville).

There was no discernable spatial pattern in the distribution of burials within the excavated portion of the site, either with grave goods in general, or by specific material or artifact type, including shell (Figure 8.5)

Canine burials at Cherry numbered seven, and were largely distributed throughout the burial area at the site (Figure 8.5). Of the seven, six were located in close proximity to one or more human interments, although only one (Burial 30) was recorded in the field as associated with a human burial (Burial 29, an adult M).

Burial 68 was located immediately beside Burial 67, an adult of indeterminate sex.

Burial 22 was positioned ca. 20 cm from Burial 21, an adult male, and 40 cm from Burial 16, a child accompanied by a number of grave goods, including both marine and fresh water shell.

Burial 30 was, as previously noted, associated with Burial 29 and positioned at the individual's head. Located immediately adjacent to the pair was Burial 33, a second adult male whose grave included a *Busycon* shell item. Both human interments and the associated dog were positioned in a pit (Pit 11). Immediately north (ca. 18 cm) a second dog burial (Burial 27) was recovered, while immediately west of Pit 11 (c. 14 cm) a third adult male (Burial 26) was located.

A pair of graves – an adult male (Burial 48) and an adult female (Burial 47), neither with artifactual burial accompaniments – were directly adjacent to a canine interment (Burial 49). These three burials were laid together in a pit (Pit 45).

Burial 15 was also recovered from a pit (Pit 10), positioned immediately beside Burial 9 (human), an adult male with a significant number of grave items (Table 8.1).

The seventh canine burial – Burial 17 was not positioned near any single human interment.

Features

There were 238 features documented at Cherry, the vast majority of which (n = 193, 81.1%) consisted of postmolds encountered throughout the excavation block. Forty-four pits of a variety of sizes and shapes were recorded, as were three additional numbered features (Table 8.2, Figure 8.7). Unlike many other sites excavated by UTDoA archaeologists (and Douglas Osborne in particular), excepting the postmolds, there were no other unnumbered features recorded on the site plan map.

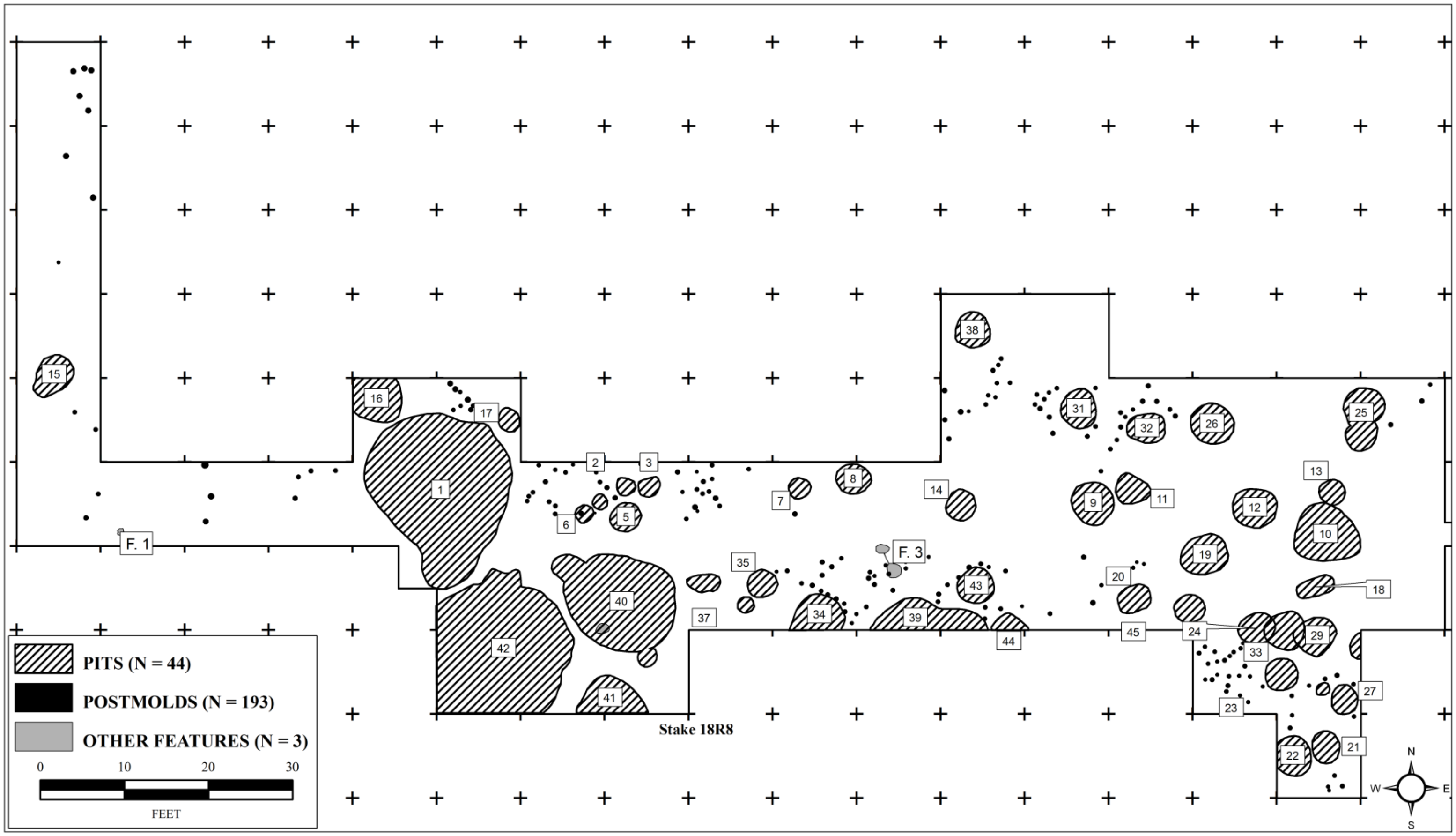

Figure 8.7. Features (pits, postmolds, and numbered features) documented at the Cherry site (40BN74).

Numbered Features (n = 3)

Two features (Feature 1 and Feature 2) consisted of small artifact clusters originating in the plow zone, and consisting mainly of clusters of broken pottery and other cultural materials. Feature 1 also contained a broken biface, an unidentified stone, and two pieces of what were thought to be kaolin, including one possible fragment of a groundstone celt.

Feature 3 also originated in the site's plow zone, and consisted of two roughly round concentrations of ash and charred material, positioned approximately 40 cm apart, and containing a moderate quantity of burned, fragmentary deer bone. Some of this material was collected and retained for further analysis.

Pits (n = 44)

There was relatively little information collected from the large number of pits at the Cherry site. Although the upper dimensions of the features were recorded (both on the field record forms and on the site plan map), and the vertical location of each pit (i.e., depth from the datum level to the base of the pit) was documented, individual pits' depths were not measured. As such, calculation of index values to more accurately characterize the cross-sections and possible functions of the Cherry pits, as was done for similar features at the Big Sandy (40HY18) and Kays Landing (40HY13) sites (see Chapters 5 and 7), was not possible.

Pits ranged considerably in size (Figure 8.7). The smallest (Pit 28) measured only 0.17 m^2, while the largest (Pit 1) was 23.1 m^2. Excepting three pits that were significantly larger than the majority (Pits 1, 40, and 42), however, average pit size was 1.25 ± 0.84 m^2.

Table 8.2. Features documented at the Cherry site (40BN74).

Feature	Stratum	Depth (mbd)[A]	Grid Square	Dimensions (cm) N-S	E-W	Depth	Description
Feature 1	Plow zone	1.62	20R1	79.25	42.67	12.7	Broken pot or pots with: 1) celt made of kaolin; 2) unidentified stone; 3) cut kaolin fragment; 4) broken biface
Feature 2	Plow zone	1.43	19R7	Not recorded.			Area of concentrated potsherds.
Feature 3	Plow zone	1.58	19R11	Not recorded.			Two adjacent areas of char and ash, seemingly originating in the plow zone. They contained poorly preserved charred wood (none large enough or good enough for specimens) and charred deer bones that were recovered.
Pit 1	All pits at 40BN74 associated with Stratum I.	2.41	20R5 / 20R6	67.06	70.10	Not recorded.	Irregular pit.
Pit 2		2.23	20R8	60.96	76.20		Round pit.
Pit 3		1.98	20R8	76.20	60.96		Round pit.
Pit 4		2.19	20R7	60.96	121.92		Round pit.
Pit 5		2.41	20R8	106.68	60.96		Round pit. Contained Burial 19.
Pit 6		2.04	20R7	73.15	82.30		Round pit. Contained Burial 20.
Pit 7		2.13	20R10	76.20	131.06		Round pit.
Pit 8		1.98	20R10 / 20R11	115.82	149.35		Round pit.
Pit 9		2.77	20R13	152.40	167.64		Round pit.
Pit 10		2.90	19R16 / 20R16	167.64	121.92		Round pit.
Pit 11		2.29	20R14	414.53	167.64		Round pit.
Pit 12		2.90	20R15	140.21	91.44		Round pit.
Pit 13		2.38	20R16	82.30	103.63		Round pit.
Pit 14		2.44	20R12	106.68	124.97		Round pit.
Pit 15		2.23	21R1 / 22R1	131.06	Not recorded.		Oval pit.
Pit 16		2.47	20R5 / 20R6	Not recorded.	Not recorded.		Round pit.
Pit 17		2.16	21R6	82.30	76.20		Round pit.
Pit 18		2.26	19R16 / 20R16	73.15	137.16		Oval pit.
Pit 19		2.93	19R15 / 20R15	146.30	170.69		Round pit. Contained Burial 13.
Pit 20		2.16	19R14	97.54	112.78		Oval pit.
Pit 21		2.04	17R16	118.87	103.63		Round pit.
Pit 22		2.53	17R16	140.21	137.16		Round pit.
Pit 23		2.80	18R15 / 18R16	Not recorded.	Not recorded.		Round pit.
Pit 24		2.56	18R15 / 19R15	106.68	128.02		Round pit.
Pit 25		2.71	21R16	228.60	91.44		Bilobate pit.
Pit 26		2.56	21R15	143.26	164.59		Round pit.
Pit 27		2.68	18R16	106.68	97.54		Round pit.
Pit 28		2.04	18R16	51.82	48.77		Round pit.
Pit 29		2.29	18R16	143.26	167.64		Round pit.
Pit 30		2.80	18R16	103.63	Not recorded.		Round pit.
Pit 31		2.47	21R13	140.21	128.02		Round pit.
Pit 32		3.11	21R14	137.16	109.73		Oval pit. Contained Burial 59.
Pit 33		2.68	14R16	143.26	149.35		Round pit.

Table 8.2. Continued.

Feature	Stratum	Depth (mbd)[A]	Grid Square	Dimensions (cm) N-S	E-W	Depth	Description
Pit 34		3.02	19R10	Not recorded.	182.88		Round pit.
Pit 35		2.19	19R9	94.49	106.68		Round pit.
Pit 36		2.04	19R9	42.67	48.77		Round pit.
Pit 37		1.95	19R9	121.92	60.96		Oval pit. Contained Burial 66.
Pit 38		3.02	22R12	118.87	121.92		Round pit.
Pit 39		2.47	19R12	Not recorded.	Not recorded.		Incomplete.
Pit 40		2.47	19R7 / 19R8	335.28	411.48		Round pit.
Pit 41		2.07	18R7 / 18R8	Not recorded.	Not recorded.		Incomplete.
Pit 42		2.10	18R6	Not recorded.	Not recorded.		Incomplete.
Pit 43		2.77	19R12	134.11	137.16		Round pit. Contained Burials 71, 72, 73.
Pit 44		2.87	19R12	Not recorded.	Not recorded.		Incomplete.
N = 193	1	Not recorded.	Multiple.	Diameter: $\mu = 7.78$ cm; $\sigma = 0.6$ cm[B]			Postmolds

[A] Pit depths in meters below datum indicate depth from the datum to the base of the excavated pit. Origin depths were not recorded.

[B] Mean diameter / standard deviation for postmolds was calculated in ArcGIS 9.3 using the "field geometry" option to determine the perimeter of each polygon. The perimeter value was divided by π to produce an approximate diameter value.

As noted above, the upper and lower depths of pits were not recorded, nor were descriptions provided of pit cross-sections. However, the site supervisor defined three general types into which he classified the forty-four pits, based on upper dimensions and cross-section or depth. The first consisted of small pits, circular or irregular in shape, that were relatively shallow and extended into subsoil. Typically these pits contained burials (see Table 8.2) but were otherwise unremarkable.

The second type, comprising most of the site's pits, comprised "generally evenly circular [pits, cut] deeply from two to four feet into the subsoil and… often slightly kettle shaped" (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville). The contents of these pits were approximately identical in composition to the overlying midden deposit of Stratum I, and no pit apparently showed any indication of thermal alteration. Several were noted to have been outlined by clusters of post features (see Figure 8.7), and were suggested to "represent some sort of tipi-like sheltering superstructure" (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville).

The third pit type consisted of the series of four unusually large pits (Pits 1, 39, 40, and 42) exposed during excavation. These were substantially larger than any other pit at the site. The possibility that these represented pit houses was raised in the Cherry site field report and later repeated by Lewis and Kneberg (1947:2). Their irregular shape in plan view was suggested, hypothetically, to represent the semi-subterranean main area and entrance to large enclosed structures. However, given the general profusion of postmolds in or around many of the other pits at the site (see above, and Figure 8.7) and the lack of similar associations with the largest pits, such an interpretation seems less likely. Further, while it is tempting to suggest, in favor of an argument supporting an interpretation of the large pits as house basins, that postmolds located within them could simply have been overlooked by the excavators, it is useful to note that in at least one case, a postmold *was* identified within a smaller pit (Pit 6) at the site (see below).

Postmolds (n = 193)

A total of 193 postmolds was recorded on the Cherry plan map, constituting the feature type at the site. Data regarding these features are limited; there was no information recorded regarding their typical depths or cross-sections. However, in spatial distribution, the postmolds at Cherry strongly suggest the presence of a number of small structures at the site during its occupation.

In shape, individual postmolds were round or oval, averaging 7.8 cm in diameter (σ = 0.56 cm). They occurred in several dense concentrations in grid squares 19R10 – 19R14 (n = 48); 21R2 – 21R14 (n = 36); 20R7 – 20R9 (n = 34); 18R15 – 18R16 and 17R16 (n = 37); and in 21R5 (n = 15). Additional postmolds (n = 23) were organized in scattered linear or paired combinations elsewhere in the block (Figure 8.7).

Most postmold groupings defined what appeared to be two- or three-walled structures similar to Middle Archaic structures at Koster (Horizon C, ca. 7800 cal BP; see Brown and Vierra 1983:184) and Late Archaic-aged structures found in western North Carolina (Bissett et al. 2009:214-235) and at sites in Georgia along the Savannah River Valley (e.g., Elliot et al. 1994; Ledbetter 1994; Sassaman and Ledbetter 1996). At Cherry, these arrangements consisting of closely-spaced posts in linear clusters defining walls measuring between two and three meters long. If the postmolds were indicative of architecture, the structures with which they were associated were relatively small; the internal area of most postmold groupings was typically less than 4 m^2. In combination with the small size and the lack of internal thermal features, it seems likely that these were not intended as cold-weather shelters, but perhaps might have functioned simply as light protection for sleeping.

Although the main excavation block was relatively small, limiting the potential to examine large-scale spatial relationships at the site, the distribution of structures within the exposed portion of Cherry suggested the possibility of at least three and perhaps four separate groupings, separated in the central portion of the excavation block by an open area several meters wide. Each cluster consisted of between two and three small structures immediately adjacent to each other and arrayed in a linear arrangement. Separate groups of structures were spaced between two to three meters apart from each other.

Locations of structures also provided a reference for the examination of other spatial patterns among pit features and among burials, and more generally the use of space at Cherry. The nearly complete lack of overlap of postmold lines and pits indicates either that already-erected structures were avoided when pits were excavated, or that structures were built around (but intentionally avoiding) pits. Only a single postmold intersected a pit – Pit 6 – situated at what appeared to be the south-facing entrance to a small enclosure.

Because full pit depths (i.e., a top and a bottom depth) were not recorded, association of structures with specific types of pits is not possible. Thus, the relationship between within-structure pits or pits adjacent to structures, and other pits unassociated with structures, is unclear.

Cultural Material

The Cherry site artifact assemblage was one of the smallest among those of the study sample; only 614 items or materials were documented in the site field specimen (F.S.) log (Table

8.3). With the exception of four items (one copper, two bone, and one groundstone) that were unprovenienced, objects recorded at Cherry derived from five proveniences: test trenches (n = 60, 9.8%), features (n = 83, 13.5%), burials (n = 69, 11.2%), the plow zone (n = 156, 25.4%), and Stratum I (n = 242, 39.4%).

Chipped stone artifacts dominated all proveniences, and with one exception – burials – exceeded 70% of the artifacts in each context. Among burial goods, chipped stone and bone artifacts were nearly identical in number.

Burials also represented the only context in which significant numbers of shell artifacts were recovered; 73.7% of all shell (n = 14 items or groups of items) was documented as grave accompaniments.

In non-burial proveniences representative of excavations into predominately intact deposits (i.e., "test trenches," "features" and "Stratum I"), chipped stone artifacts comprised ca. 70% of materials in each of those contexts. Proportions of antler and bone were nearly identical both in the general Stratum I collection and in features (not unexpectedly, since all documented features and pits were associated with Stratum I). The reason for the difference in numbers of bone and antler items recorded in test trenches (in contrast to Stratum I and features) is unclear, given the trenches' excavation into the same deposits as the remainder of the block. Considering the small number of documented artifacts in test trench provenience as a whole, it is difficult to argue for any cultural or taphonomic basis for this difference, and it is probable that the variation is due to selective recording and recovery of bone and antler by the excavators during the initial excavations into the site.

The differences in proportions of bone and antler artifacts in the plow zone, compared to Stratum I and feature context, are likely the result of the deleterious effects of exposure of bone

Table 8.3. All cultural material recovered from the Cherry site (40BN74) by stratum assignment, based on field specimen logs.[33]

MATERIAL	PROVENIENCE						
	Unassigned	Test Trench	Features	Burials	Plow Zone	Stratum I	TOTALS
Antler	0	5	5	11	2	17	40
Bone	2	4	13	18	5	37	79
Chipped Stone	0	44	59	20	139	170	432
Groundstone	1	5	2	4	9	11	32
Mineral	0	0	1	1	0	2	4
Copper	1	0	1	0	0	1	3
Pottery	0	1	0	0	1	0	2
Shell	0	0	2	14	0	3	19
Other	0	1	0	1	0	1	3
TOTALS	4	60	83	69	156	242	614

[33] A complete listing of all items recorded in the site F.S. log is provided in Appendix B

and antler materials to weathering in combination with the physical damage done by plowing and other activities associated with the cultivation of the fields overlying Cherry.

It should be noted that, as in several other cases, some of the material specifically referenced in other site documentation – e.g., pottery associated with Feature 1 and Feature 2 and elsewhere in the deposit, and shell samples taken when encountered – was not recorded in the field specimen logs and is not included in the artifact counts in Table 8.3. If that material was collected and saved, its whereabouts are not known.

Temporally Diagnostic Hafted Bifaces at the Cherry site (40BN74)

Diagnostic hafted bifaces from Cherry were examined to assess the depositional integrity of the site, and to provide a means of corroborating the radiocarbon dates obtained from the site (see following section). Because Cherry consisted of only a single cultural stratum, the degree to which mixing of the deposits had occurred, both from the decades of historic disturbance from agricultural activities, and from millennia of potential use of the location by myriad groups and individuals, was not clear.

The total number of hafted bifacial temporal diagnostics at Cherry – i.e., "projectile points" and tools made from recycled projectile points – was three hundred nine, roughly 50% of the total site assemblage (n = 614), and 71.5% of the chipped stone assemblage (n = 432).

Of the hafted bifaces documented in the Cherry F.S. log, 212 were able to be examined. Ninety-seven were recorded but could be located, and were counted as "Unidentified, Other" (Table 8.4).

Table 8.4 provides a count of all diagnostics by type and provenience.

Table 8.4. Frequencies of diagnostic hafted bifaces by temporal affiliation and provenience at the Cherry site (40BN74).

Type	Temporal Affiliation	Test Trench	Features	Burials	Plow Zone	Stratum I	Total (By Type)
Archaic Stemmed	Archaic, Undifferentiated	6	2	0	8	6	**22**
Kirk CN	Early Archaic	1	0	0	0	3	4
Kirk Stemmed	Early Archaic	0	0	0	0	1	1
MacCorkle Stemmed	Early Archaic	1	0	0	0	0	1
Total, Early Archaic		**2**	**0**	**0**	**0**	**4**	**6**
Benton	Middle Archaic	2	0	0	2	4	8
Big Sandy	Middle Archaic	0	0	0	0	1	1
Eva II	Middle Archaic	0	0	0	0	1	1
Morrow Mountain	Middle Archaic	2	0	0	1	7	10
Stanly Stemmed	Middle Archaic	0	0	0	0	0	0
White Springs	Middle Archaic	0	1	0	4	11	16
Total, Middle Archaic		**4**	**1**	**0**	**7**	**24**	**36**
Ledbetter	Late Archaic	1	1	1	0	1	4
Late Archaic Stemmed	Late Archaic	3	15	2	19	24	63
Matanzas	Late Archaic	0	0	0	1	0	1
Pickwick	Late Archaic	0	2	1	4	4	11
Table Rock Stemmed	Late Archaic	1	2	0	2	6	11
Terminal Archaic Barbed	Late Archaic	2	0	0	4	3	9
Flint Creek	Late Archaic - Early Woodland	0	1	0	1	0	2
Motley	Late Archaic - Early Woodland	0	1	1	2	6	10
Saratoga Cluster	Late Archaic - Early Woodland	1	0	0	0	0	1
Turkey Tail	Late Archaic - Early Woodland	0	0	0	0	1	1
Total, Late Archaic - Early Woodland		**8**	**22**	**5**	**33**	**45**	**113**
Adena Stemmed	Early Woodland	2	1	0	1	2	6
Early Woodland Stemmed	Early Woodland	0	0	0	0	1	1
Lowe Cluster	Middle Woodland	0	0	0	1	1	2
Total, Woodland		**2**	**1**	**0**	**2**	**4**	**9**
Total, Indentified Hafted Bifaces		**22**	**26**	**5**	**50**	**83**	**186**
Unidentified Corner-Notched		0	0	0	1	2	3
Unidentified Side-Notched		2	2	2	3	5	14
Unidentified Stemmed		1	1	0	4	2	8
Unidentified Lanceolate		0	0	0	0	1	1
Unidentified, Other		5	19	0	35	38	97
Total, All Unidentified Hafted Bifaces		**8**	**22**	**2**	**43**	**48**	**123**
Total, All Hafted Bifaces, By Provenience		**30**	**48**	**7**	**93**	**131**	**309**

In addition to the 97 hafted bifaces that could not be examined, twenty-six were unable to be classified to a named diagnostic type and were grouped by basal morphology. Most of those (n = 14; 53.8%) were side-notched forms, although stemmed varieties (n = 8; 30.8%) were also reasonably well represented.

Among the hafted bifaces that could be located and were classifiable (n = 186; 60.2% of the total hafted bifaces), frequencies of distribution by time period at Cherry suggest that the site's deposits comprised the remains of accumulated activities of multiple periods spanning the Archaic and into the Woodland, although there was apparently little to no stratification observed during excavation.

The plow zone and Stratum I assemblages were similar to each other in represented types by time period (Figure 8.8), and that despite the additional disturbance at the site from cultivation, there was no apparent significant separation with respect to the age of the disturbed versus the supposedly intact deposits. In both, Late Archaic forms - predominately of the Late Archaic Stemmed cluster (Justice 1987:133-139) – were the most common types; such types comprised 49.4% (n = 38) of the diagnostics associated with the plow zone and 60.4% (n = 99) of those in Stratum I.

Middle Archaic types also occurred in both proveniences (plowzone, n = 7; Stratum I, n = 24). Most common in both were White Springs (plow zone, n = 4; Stratum I, n = 11) (Justice 1987:108-110), but Morrow Mountain (Justice 1987:104-107) and Benton (Justice 1987:111) were also present (Table 8.4).

Four Early Archaic diagnostics in Stratum I attested to a possible earlier occupation at the site, while Woodland-period diagnostics in both the plow zone (n = 2) and Stratum I (n = 4) suggest post-Archaic use of Cherry as well.

The number of classifiable hafted bifaces associated with burials at Cherry was too small (n = 5) to provide a reliable indicator more than a small number of the burials at the site, although (if the classifications are accurate) the associated diagnostics – a series of four Archaic- and one Woodland-period hafted biface – suggest that burials occurred at Cherry during several temporal periods (see below).

However, several pits at the site (Tables 8.4 and 8.5) contained sufficient numbers of classifiable temporal diagnostics (n = 26; 54.2% of all hafted bifaces in pit context) to suggest an approximate age for certain features.

Nineteen diagnostics were found in Pit 1, one of the site's largest by area (Figure 8.7, Table 8.5). Of those, eleven were classifiable by type, and most (n = 9) were Late Archaic in temporal affiliation. Pit 40, another of the site's largest pits, contained six hafted bifaces; three of those were identified as Late Archaic or transitional Late Archaic - Early Woodland. Most identifiable diagnostics in other pits at Cherry were also of Late Archaic age.

The temporal diagnostic assemblage at Cherry was dominated by Late and Middle Archaic types in both the site's plow zone and Stratum I assemblages (Figures 8.8, 8.9); given the presence of diagnostics associated primarily with two temporal periods at Cherry, it is difficult to make a case for Stratum I representing an entirely intact cultural deposit, but rather at least two separate occupations occurring during the Middle and Late Archaic.

Radiocarbon Dates

The preceding discussion suggests that Cherry's deposits represented two primary periods of time, based on the frequency of occurrence and spatial distribution of temporal

Table 8.5. Diagnostics in pit context at the Cherry site (40BN74).

Pit Number	Temporal Affiliation					Total Hafted Bifaces
	Middle Archaic	Late Archaic	Late Archaic - Early Woodland	Early Woodland	Unidentified	
1		9		1	8	18
4			1			1
6				1		1
9			1		1	2
16		1				1
19					1	1
23		2				2
24		1			1	2
25		1			3	4
27		1			1	2
31	1					1
32		2				2
34					2	2
39					1	1
40		2	1		3	6
41					1	1
42		1				1
Totals, By Period	**1**	**20**	**3**	**2**	**22**	**48**

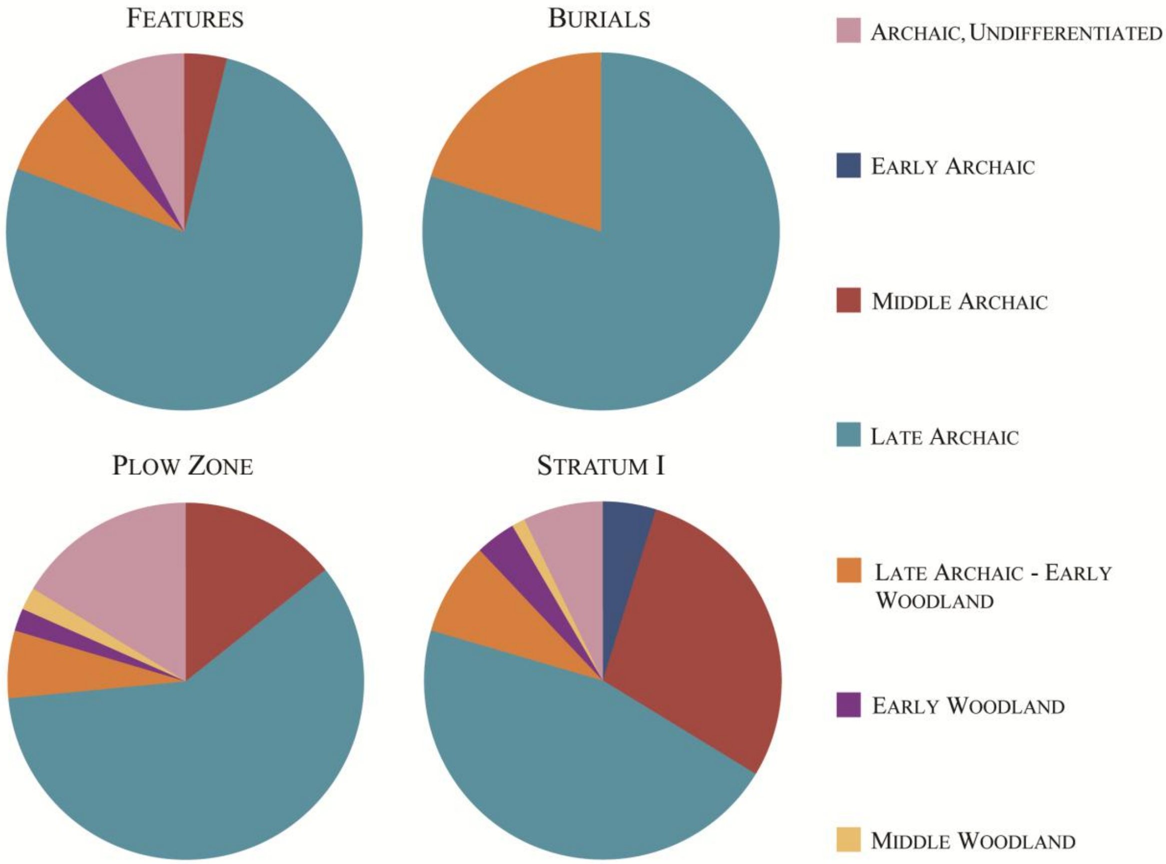

Figure 8.8. Proportions of identifiable temporal diagnostics by time period and provenience at the Cherry site (40BN74).

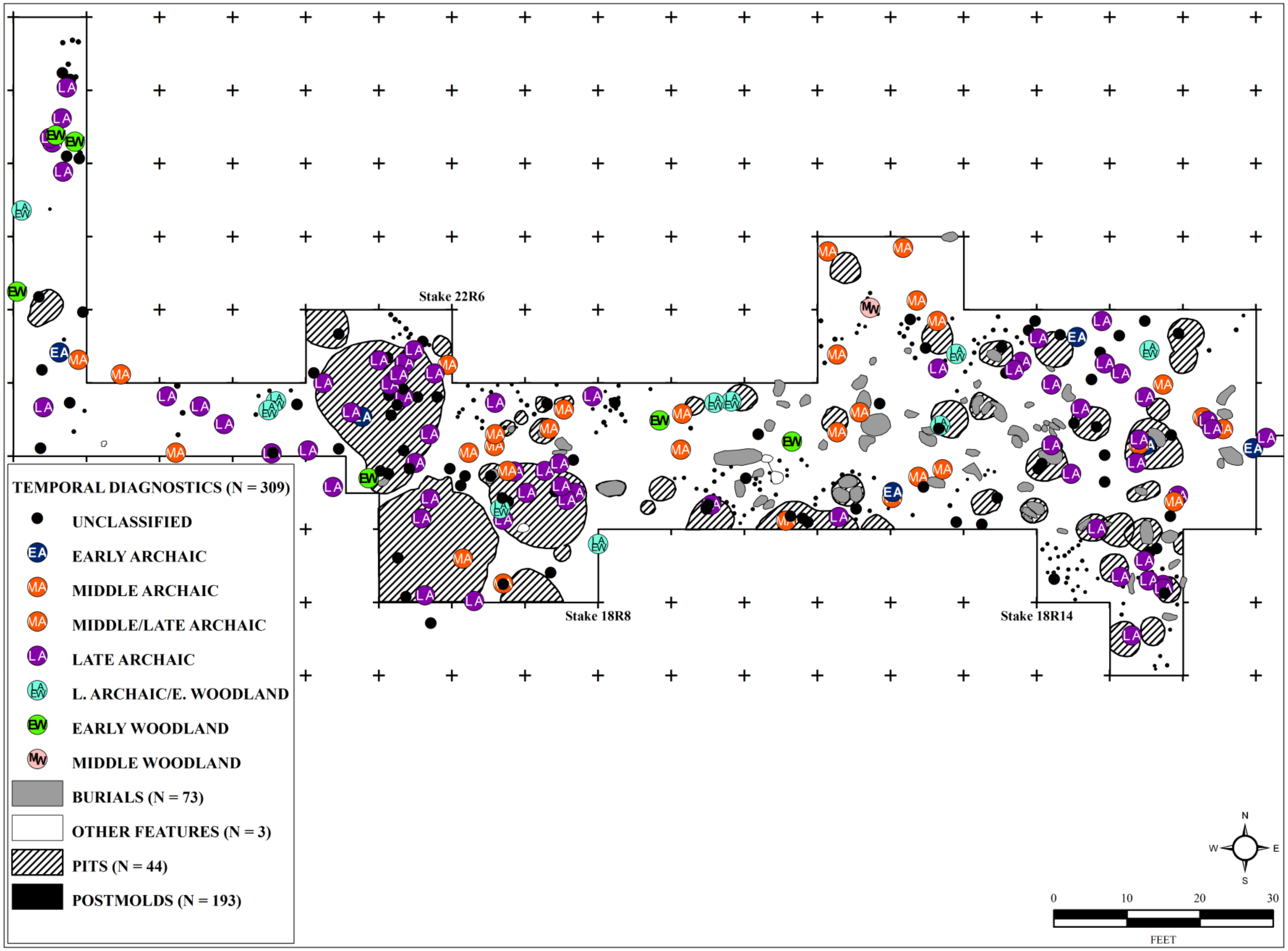

Figure 8.9. Distribution of classified (and unclassified) temporal diagnostics in the excavation block at the Cherry site (40BN74).

diagnostics at the site. However, radiocarbon dates were also obtained from Cherry to assess the site's age.

Prior to the initiation of this research project, materials from the Cherry site had never previously been directly dated. On the basis of the site's stratigraphic composition, specifically its lack of significant amounts of shellfish remains and similarity of its material culture to artifacts recovered particularly from the Stratum I deposits at both Eva and Big Sandy, Cherry was thought by Lewis and Kneberg (1959) to be associated with what they considered the "Big Sandy Phase" in the western Tennessee Valley, a period post-dating early shellfishing as it was thought to be represented at Eva and at Big Sandy.

Datable materials at Cherry were recovered in moderate numbers (bone and antler, see Table 8.3), but many were associated with pits and were considered less useful for obtaining general temporal data on the site's major cultural deposit. Ultimately, three radiocarbon samples were selected from among bone and antler materials recovered from in the northeastern portion of the site block (Table 8.6; Figure 8.10). The samples consisted of fragments of tools made from mammalian long bones, and were thought to represent the best choice for obtaining accurate chronological data from the site's primary cultural deposit.

Two of the samples (FS 474 and FS 480) derived from grid square 22R13; the third (FS 509) was from an adjacent square, 21R12. The maximum horizontal distance between any of the three samples was less than three meters (Figure 8.10); the vertical distance spanned by the plotted locations of the artifacts' recovery was 24 cm.

Unlike the results of the classification of temporal diagnostics, the radiocarbon dates obtained from Cherry (Table 8.4) were restricted to a relatively short period during the end of the 8^{th} millennium and the beginning of the 7^{th} millennium, occurring over a span of between two and four centuries. These dates are contemporaneous with radiocarbon assays from Stratum II at Eva (Chapter 6) and two dates from Big Sandy associated with the Stratum I – II transition (Chapter 5), and suggest that at least a portion of the site's cultural deposits in the area from which samples were selected were relatively intact, dating to that relatively restricted time period.

Occupational History of the Cherry Site

Data recovered during excavation of the Cherry site comprised a substantial number of occupational features, consisting mainly of pits and a large number of postmolds, as well as a moderately-sized assemblage of cultural material consisting of over 600 items, including 309 potentially diagnostic hafted bifaces (of which 186 could be confidently classified by temporally diagnostic type). In addition, three radiocarbon dates obtained from site's deposits provided chronological data about the age of the cultural stratum – Stratum I – identified during excavation.

The data suggest that the occupational stratum identified at Cherry mainly comprised the accumulated remains of two periods of occupation, but that later activity also occurred at the site. Radiocarbon dates and roughly 19% (n = 36) of classified temporal diagnostics demonstrate the presence of a Middle Archaic component extending across much of the excavated site block. The short period of time represented by the radiocarbon dates taken from Stratum I suggests that, in at least the location where the samples were selected, a portion of Stratum I represented an intact Middle Archaic midden or other occupational deposit.

Although radiocarbon dates did not provide absolute chronological data beyond the Middle Archaic period, a substantial Late Archaic occupation of Cherry is indicated by the

Table 8.6. Radiocarbon dates from the Cherry site (40BN74).

FS	Square	Stratum	Depth (mbd)	Material	AA #	δ 13C	14C Yr BP			Cal BP			1-Sigma Range (calibrated)	2-Sigma Range (calibrated)
480	21R2	1	1.95	bone	AA101230	-21.6	6092	±	51	6975	±	90	7151 - 6883	7158 - 6800
474	22R13	1	2.19	bone	AA101229	-22.1	6153	±	52	7056	±	77	7157 - 6994	7230 - 6895
509	22R13	1	2.07	bone	AA101231	-21.9	6189	±	65	7088	±	87	7170 - 6995	7258 - 6935

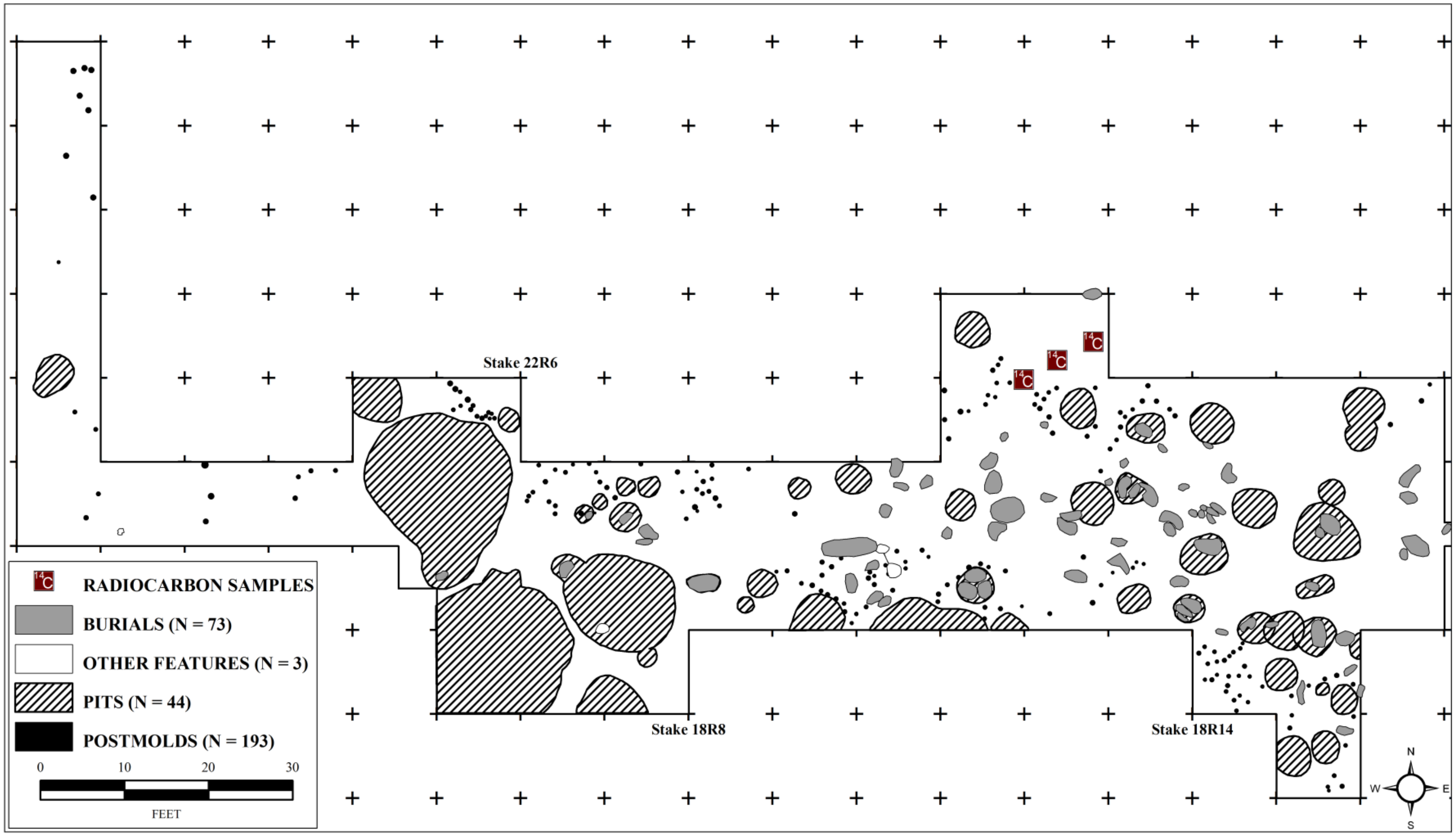

Figure 8.10. Location of radiocarbon samples submitted for dating from the Cherry site (40BN74).

relatively large number of Late Archaic-aged (n = 99) hafted bifaces. Their spatial association with many of the features at the site, particularly the pit features, and the occurrence of Late Archaic diagnostics within several pits (including two of the largest, Pits 1 and 40) suggests that much of the most intensive activity at Cherry occurred during later occupations of the site.

Postmold clusters were found in arrangements suggesting structures at the site, but the period during which those structures might have been built and occupied is difficult to establish with certainty. Some areas in which clusters of postmolds were found contained only Late Archaic diagnostics (see Figure 8.9), while others contained a mix of mainly Middle and Late Archaic hafted bifaces. Contrastively, there were no groupings of posts found with only Middle Archaic diagnostics. In combination with the indication of substantial activity at the site deriving from the spatial association of pits and Late Archaic temporal diagnostics, the evidence appears to suggest that most of the occupational features, including posts, are a result of Late Archaic use of the Cherry site for occupation.

Such a conclusion suggests that the burial population of the site may also be largely of Late Archaic age. Of the seven hafted bifaces found associated with burials, five were classifiable, and all of them comprised Late Archaic (n = 4) or transitional Late Archaic – Early Woodland (n = 1) forms. While such associations certainly cannot be viewed as temporally diagnostic of all burial activity at the site, other evidence as discussed above suggests the possibility that most of the interments at Cherry co-occurred with the excavation of the site's pit features and the construction of shelters during the Late Archaic period.

Based on these results, Cherry is here argued to represent a multi-component occupational site that, at the time of excavation, contained an intact midden dating to the late 8th

and early 7th millennium during the Middle Archaic period, but that consisted largely of Archaic cultural deposits dating to the Late Archaic.

The presence of a small number of post-Archaic temporal diagnostics indicates that later use of the Cherry site probably occurred occasionally, although the frequency of occurrence of such later diagnostics does not seem to indicate extensive use of the location much beyond the Early Woodland period.

OAK VIEW (40DR1)

The Oak View site (40DR1) is located in the northeastern corner of Decatur County, on the left descending bank of the Tennessee River approximately 6 km south of Ledbetter Landing (40Bn25) (Figure 8.11). Oak View was the furthest south of the seven sites in the research sample, and based on dates from field documents was the last excavated among the seven in this project's study sample. Oak View was first recorded in 1940; full-scale excavations at the site began in early August of 1941, and were completed in mid-October of that year. The Oak View site was previously summarized by Lewis and Kneberg (1947:11, 1959), but a detailed description of the site has never been published.

Work at Oak View began on August 8, 1941, led by Carroll Burroughs. Burroughs noted (C. Burroughs, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville) that by the time the excavation was initiated, the previously significant presence of mussel shell observed on the site's surface at the time it was initially recorded was considerably diminished. Cultivation and plowing of the field in which Oak View was located began at least as early as 1870, and by the turn of the 20th century, a residence was situated on an elevated area of the property coinciding with what was thought to be the densest concentration of

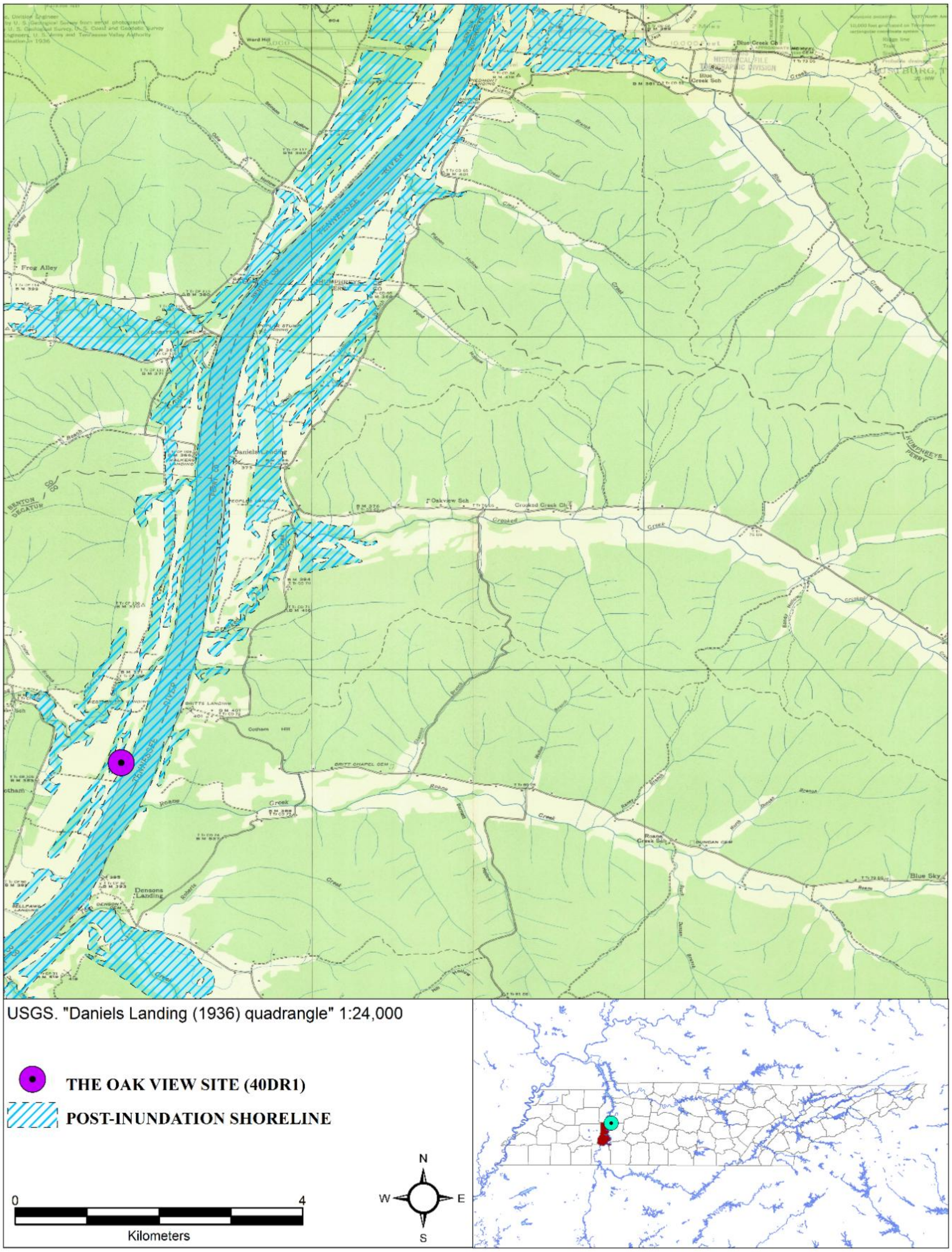

Figure 8.11. Location of the Oak View site (40DR1) along the historic channel of the Tennessee River.

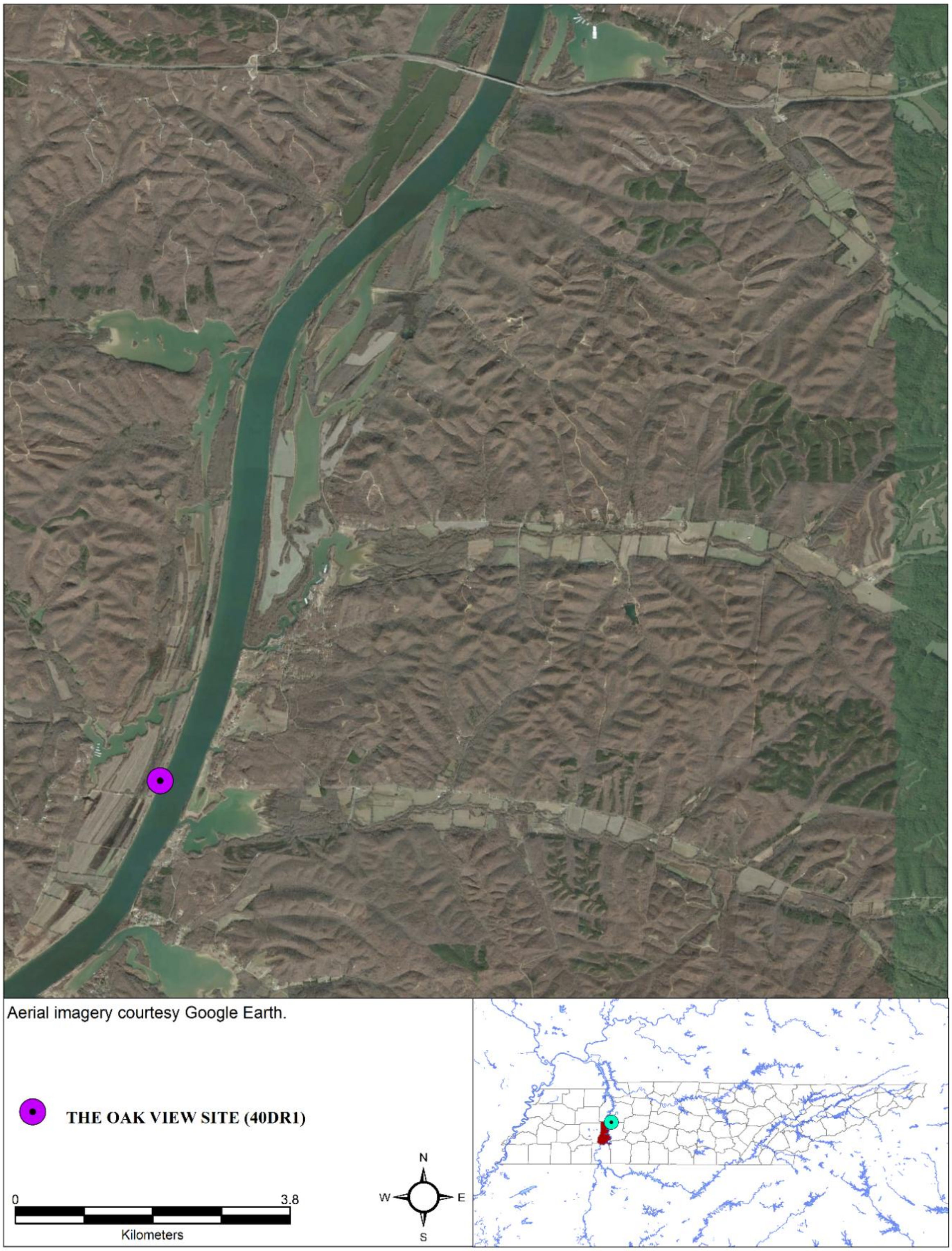

Figure 8.12. Modern location of the Oak View site (40DR1) along the Tennessee River.

archaeological materials. A well was dug during the house's occupation, and a root cellar was among the features documented at the site.

A local informant indicated to Burroughs that during the six-year period of time when the house was occupied, the surface of the Oak View site was thickly covered by mussel shell and assorted cultural material (mainly chipped stone debitage and artifacts). Approximately fifteen years later, after the house had been demolished and the field had again been put under cultivation, annual plowing began to unearth human skeletal material. Despite significant disturbance extending over multiple decades, Burroughs noted that "[w]hen the site was first spotted for the University of Tennessee in 1940, it was reported to have 'a great amount of pure mussel shell' showing on the surface" (C. Burroughs, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville). By 1941, however, mussel shell on the site's surface was significantly diminished, despite the passage of only a year. The subsequent excavations indicated that the majority of shell-bearing deposits were largely destroyed by decades of agricultural plowing on the site (see below).

Environment and Soils

Oak View is situated near the western edge of the Highland Rim of the Interior Low Plateaus physiographic province (Fenneman and Johnson 1946), an area underlain by chert-bearing limestones of Devonian and Mississippian age (King and Beikman 1974; King et al. 1994). The region was classified by Braun (1950:156) within the Western Mesophytic Forest Region, an area whose upland deciduous forests are dominated by oak and hickory species.

Located on a levee of the historic channel of the Tennessee River (see Figures 8.11, 8.12), the soils at Oak View were predominately alluvial deposits, and were mapped as Bruno fine sandy loam, Egam silty clay loam, and Melvin silt loam. The site was situated directly atop an area mapped as Egam silty clay loam, a well-drained soil with a typical profile extending to a depth of 190.5 cm (75 in). The upper 55.9 cm (22 in) consist of silty clay loam, beneath which clay extended from 55.9 to ca. 142.2 cm (56 in); silty clay loam is noted from 142.2 cm to 190.5 cm (USDA Web Soil Survey, Accessed 8/1/2013).

TVA Excavation

Large-scale investigations at Oak View began with a pair of exploratory trenches, ca. 3 feet (0.91 m) wide, oriented on what was thought to be the site's centroid and extending north-south (CA-line, 150 ft / 45.5 m long) and east-west (16-line, 100 ft / 30.5 m long). The remainder of the site was excavated by arbitrary 0.5-ft levels within strata. In total, the main excavation block measured approximately 371.6 m^2 (4000 ft^2) (Figure 8.13).

Including the plow zone, six stratigraphic units were distinguished at Oak View[34]. Based on the descriptions provided by Burroughs and local informants, the plow zone comprised the bulk of the shell-bearing deposit at the site, and so is included as a separate stratigraphic unit, although it is evident from the information provided that the majority of that deposit was destroyed prior to systematic excavation of 40Dr1.

The plow zone ranged between 9 and 25 cm (0.3 – 1.0 ft) thick, and consisted of a heavy, black sandy loam in which significant shell was observed, as well as pottery and abundant chipped stone artifacts and debitage (the latter of which was not collected). Nearly 30% of pits at the site originated in the plow zone; they contained what appeared to be refuse, consisting of

[34] Oak View is alone as the only site in the study sample for which no profile was drawn during excavations. Unfortunately, an idealized recreation of the site profile was also not a possibility, because the necessary information was not recorded consistently on the site's gridsquare data sheets.

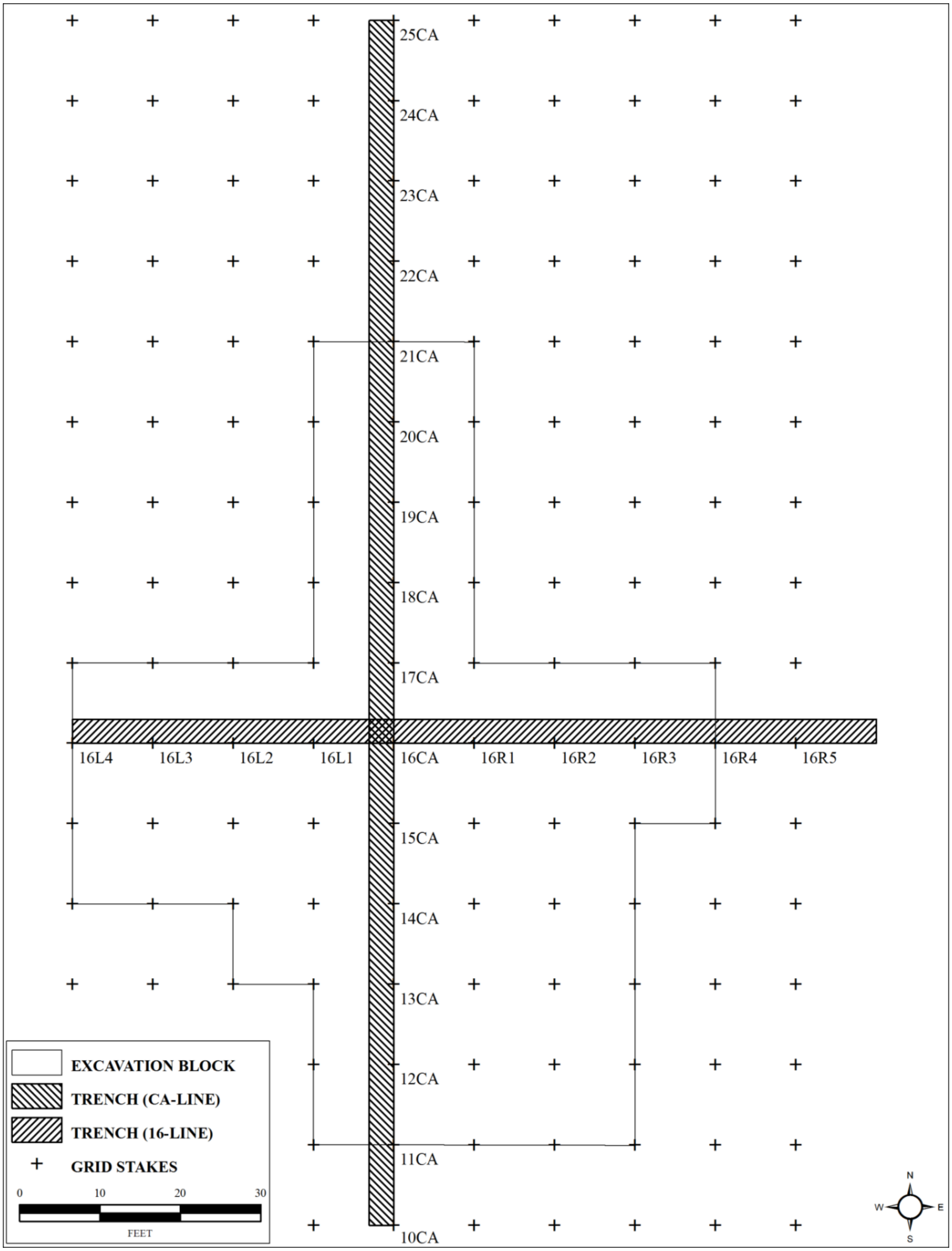

Figure 8.13. Plan view map of the excavation block and exploratory trenches at the Oak View site (40DR1).

large quantities of animal bone, shell, broken artifacts, and charred material. The plow zone contained the only ceramics recovered at the site.

Stratum I was most likely the intact, lower portion of the site's shell-bearing stratum, and its matrix – a heavy, black sandy loam – was similar to that of the overlying disturbed sediments. There was a noticeable decrease in shell content in Stratum I, which was between 20 and 64 cm (0.8 – 2.5 ft) in thickness. There was no pottery identified in the deposit.

Stratum I faded into a lighter, sandier consistency near its base. The deposit contained a significant number of features, including more than half the site's pits, some of which extended into the underlying Stratum II. The bulk of Oak View's burial assemblage derived from Stratum I, as did – in combination with the plow zone – the majority of the cultural materials recovered at the site (79.7%). Given the association of most of the site's recovered assemblage with the plow zone and Stratum I, it is probable that these two proveniences comprise the site's main occupational deposit.

Stratum II was interpreted as the result of a flooding episode, and comprised mainly yellow sand containing minimal cultural material and no burials or other features.

Stratum III was a thin deposit, generally less than 20 cm (0.8 ft) thick. A small amount of cultural material, two burials, and two features were associated with the deposit.

Stratum IV was a second sandy layer thought to represent an alluvial flood deposit. It contained no cultural material.

Stratum V was characterized as similar to Stratum III, consisting of a thin band of sediments containing almost no cultural material, but possible thermal alteration of one location in square 11R1 suggested possible occupation during that period. Stratum V lay atop subsoil (defined as Stratum VI by the site's excavators).

Burials and Features

Burials (Human, n = 81; Canine, n = 2)

The burial assemblage at Oak View consisted of a total of 81 interments and two dog burials associated with two individuals but not separately numbered (see Table 8.5, "Grave Associations"). The majority of graves (n = 73, 90.1%) were contained within Stratum I (Figure 8.15); an additional six (7.4%) were associated with the plow zone (Figure 8.14), and two (2.4%) were documented in Stratum III (Figure 8.16). Table 8.5 contains summary data for each burial, drawn from the site's burial records and from the 1990 NAGPRA inventory (Smith 1990).

Most of the skeletons recovered were judged in "good" (n = 20, 24.7%) or "fair" (n = 41, 50.6%) condition. Only seventeen (21%) were listed in "poor" condition. Three burials were cremations.

Despite the relatively intact condition of most burials, assessments of sex and age differed between the original WPA-era classifications and those produced during the 1990 re-assessment of the museum skeletal inventory (Smith 1990). There was a 34.5% disagreement rate (n = 28) with respect to individuals' sex, and a 35.8% (n = 29) frequency of differing assessments for age. Furthermore, 76.5% of the skeletons recovered were indicated by either the WPA or NAGPRA analysts to be of indeterminate sex.

It is apparent that the analyses of skeletal material at Oak View are of insufficient quality to provide accurate assessment of the burial population by sex; considerably better agreement (76.5%) was achieved when age categories were collapsed to either "adult" or "subadult."

Some disagreement remained between WPA and NAGPRA assessments of skeletal maturity. The WPA analyses indicated 40 adults and 33 subadults were present, with 8 individuals unable to be classified (including three cremations). The 1990 NAGPRA analyses

Table 8.7. Burial data from the Oak View site (40DR1).

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
1	14CA	pz	Cremation				F	M	Adult	Adult	5 projectile points
2	15L2	pz	Poor	N	Fully Flexed	Left	Indeterminate	Indeterminate	Child	Child	
3	11CA	1	Poor	Unspecified	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Child	Indeterminate	antler tool; animal tooth
4	14R1	1	Fair	S	Partly Flexed	Back	Indeterminate	Indeterminate	Child	Child	bone bead; projectile point
5	13CA	1	Good	SE	Fully Flexed	Back	M	M	Adult	Adult	3 projectile points
6	18R1	1	Fair	Unspecified	Unspecified	Unspecified	M	Indeterminate	Adult	Adult	
7	16R1	1	Fair	N	Partly Flexed	Right	F	M	Adult	Adult	
8	16CA	1	Fair	S	Partly Flexed	Left	Indeterminate	Indeterminate	Child	Child	
9	12R1	1	Poor	Unspecified	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Indeterminate	Adult	
10	20CA	1	Poor	W	Partly Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	projectile point
11	17CA	pz	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Child	Child	
12	13R1	1	Cremation				Indeterminate	Indeterminate	Child	Child	
13	16L2	1	Good	W	Fully Flexed	Left	Indeterminate	Indeterminate	Child	Child	animal scapula; 3 antler tools; bone tube; projectile point
14	15L1	1	Good	N	Partly Flexed	Back	Indeterminate	F	Adult	Adult	
15	17CA	1	Good	SE	Partly Flexed	Back	Indeterminate	Indeterminate	Infant	Infant	shell beads
16	16L1	1	Fair	N	Partly Flexed	Right	Indeterminate	Indeterminate	Infant	Child	
17	16L1	1	Good	NE	Partly Flexed	Back	Indeterminate	F	Adult	Adult	drill; abrader; 2 projectile points; worked bone; antler; turtle shell; hammerstone; deer scapula
18	19CA	1	Fair	E	Fully Flexed	Right	M	M	Adult	Adult	4 projectile points; deer calcaneus
19	16L3	1	Good	SW	Partly Flexed	Left	M	Indeterminate	Juvenile	Adolescent	2 projectile points
20	14L1	1	Fair	NW	Partly Flexed	Back	Indeterminate	Indeterminate	Infant	Infant	dog jawbone; dog molar; hematite; bone awl; beaver tooth; bone needle; unmodified bone
21	15L1	1	Fair	W	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Infant	Indeterminate	projectile point
22	15L2	1	Fair	S	Partly Flexed	Left	Indeterminate	Indeterminate	Juvenile	Adolescent	slate gorget; squirrel jaw; bone awl; biface; bone awl; beaver tooth; projectile point; drilled dog tooth;
23	14L2	1	Fair	Unspecified	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	7 projectile points; 2 gorgets; 7 antler tools; 2 bifaces; 2 bone awls; unmodified animal bone
24	14L2	1	Cremation				Indeterminate	Indeterminate	Indeterminate	Child	
25	15L1	1	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Indeterminate	Infant	
26	15CA	1	Fair	E	Unspecified	Unspecified	Indeterminate	Indeterminate	Infant	Infant	

Table 8.7. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
27	15L1	1	Fair	NW	Unspecified	Right	Indeterminate	Indeterminate	Infant	Infant	
28	16L1	1	Good	SE	Partly Flexed	Left	M	M	Adult	Adult	
29	15L2	1	Good	S	Fully Flexed	Back	F	Indeterminate	Adult	Adult	
30	15L1	1	Fair	SE	Partly Flexed	Right	Indeterminate	Indeterminate	Infant	Infant	
31	15L1	1	Fair	SW	Partly Flexed	Back	Indeterminate	M	Adult	Adult	
32	15L1	1	Fair	E	Fully Flexed	Right	Indeterminate	F	Adult	Adult	
33	15L1	1	Good	E	Partly Flexed	Back	M	F	Adult	Adult	copper beads; fired clay object
34	15L1	1	Fair	E	Partly Flexed	Unspecified	Indeterminate	M	Adult	Adult	
35	14L2	1	Good	SW	Partly Flexed	Left	F	M	Adult	Adult	
36	14L2	1	Fair	W	Fully Flexed	Front	Indeterminate	M	Adult	Adult	
37	15L2	1	Good	W	Fully Flexed	Front	F	F	Adult	Adult	
38	16L2	1	Fair	E	Partly Flexed	Left	Indeterminate	Indeterminate	Juvenile	Child	"paint rock"; sherd
39	15L2	1	Poor	E	Partly Flexed	Back	Indeterminate	Indeterminate	Child	Infant	
40	15L2	1	Good	S	Partly Flexed	Back	M	M	Adult	Adult	
41	14CA	1	Good	E	Partly Flexed	Right	F	M	Adult	Adult	2 projectile points; 5 bone awls; biface; 2 worked bone; worked antler
42	14CA	1	Good	NW	Partly Flexed	Left	M	M	Adult	Adult	
43	14CA	1	Fair	S	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Infant	Infant	
44	14L1	1	Fair	N	Fully Flexed	Right	F	Indeterminate	Adult	Adult	
45	14L1	1	Fair	NE	Fully Flexed	Left	Indeterminate	F	Juvenile	Adult	
46	14L1	1	Poor	E	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Infant	Infant	
47	14L1	1	Fair	N	Fully Flexed	Back	Indeterminate	Indeterminate	Indeterminate	Indeterminate	
48	14L1	1	Fair	SE	Fully Flexed	Right	Indeterminate	Indeterminate	Juvenile	Child	
49	15L1	1	Fair	E	Partly Flexed	Right	M	M	Adult	Adult	2 beaver teeth; drill; projectile point; biface; dog burial
50	15L1	1	Fair	SW	Partly Flexed	Right	Indeterminate	F	Juvenile	Adult	
51	15CA	1	Fair	SE	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	projectile point; "paint rock"; scraper
52	15CA	1	Fair	SW	Partly Flexed	Left	Indeterminate	Indeterminate	Adult	Adolescent	
53	14L1	1	Fair	W	Fully Flexed	Right	Indeterminate	Indeterminate	Child	Child	
54	14L2	1	Fair	NE	Partly Flexed	Back	Indeterminate	M	Adult	Adult	
55	12CA	3	Poor	S	Partly Flexed	Right	F	Indeterminate	Adult	Adult	
56	15R2	pz	Poor	W	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	
57	15R3	1	Fair	W	Fully Flexed	Left	Indeterminate	F	Juvenile	Adolescent	
58	15R3	1	Fair	W	Fully Flexed	Right	Indeterminate	Indeterminate	Juvenile	Adult	
59	12R1	3	Fair	SW	Partly Flexed	Back	F	Indeterminate	Adult	Adolescent	
60	14R2	1	Fair	NW	Fully Flexed	Right	F	M	Adult	Adult	3 projectile points
61	15L3	pz	Poor	W	Partly Flexed	Unspecified	Indeterminate	M	Indeterminate	Adult	
62	12R1	1	Fair	SE	Partly Flexed	Back	Indeterminate	F	Adult	Adult	
63	15L3	pz	Poor	W	Partly Flexed	Back	Indeterminate	Indeterminate	Indeterminate	Adult	projectile point

Table 8.7. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
64	18CA	1	Poor	S	Partly Flexed	Left	Indeterminate	Indeterminate	Infant	Infant	
65	13R1	1	Good	NE	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	
66	12R1	1	Fair	E	Partly Flexed	Back	Indeterminate	Indeterminate	Juvenile	Child	
67	12R1	1	Poor	S	Partly Flexed	Unspecified	Indeterminate	Indeterminate	Infant	Child	
68	12R2	1	Poor	NE	Partly Flexed	Right	Indeterminate	Indeterminate	Indeterminate	Adult	biface; drill; projectile point
69	12R2	1	Poor	SE	Partly Flexed	Left	Indeterminate	Indeterminate	Juvenile	Child	
70	12R2	1	Fair	E	Partly Flexed	Right	F	F	Adult	Adult	"chalk"; projectile point
71	12R2	1	Poor	S	Partly Flexed	Left	M	M	Adult	Adult	2 projectile points
72	12R2	1	Fair	S	Partly Flexed	Left	Indeterminate	M	Adult	Adult	
73	14R1	1	Good	S	Fully Flexed	Left	F	F	Juvenile	Adult	
74	13R1	1	Good	N	Partly Flexed	Left	F	F	Juvenile	Adult	
75	14R3	1	Good	N	Partly Flexed	Right	F	F	Adult	Adult	
76	13R2	1	Good	E	Fully Flexed	Seated	Indeterminate	F	Juvenile	Adult	2 projectile points
77	16R2	1	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Indeterminate	Adult	2 projectile points
78	12R2	1	Good	E	Fully Flexed	Back	M	M	Adult	Adult	projectile point; scraper
79	14R2	1	Fair	E	Fully Flexed	Seated	F	Indeterminate	Adult	Adult	projectile point; 3 bone awls; dog tooth; unmodified animal bone; 2 bone scrapers; abrader; animal humerus; 3 antler objects
80	13R2	1	Fair	S	Partly Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	
81	14R2	1	Fair	SE	Partly Flexed	Back	Indeterminate	F	Adult	Adult	

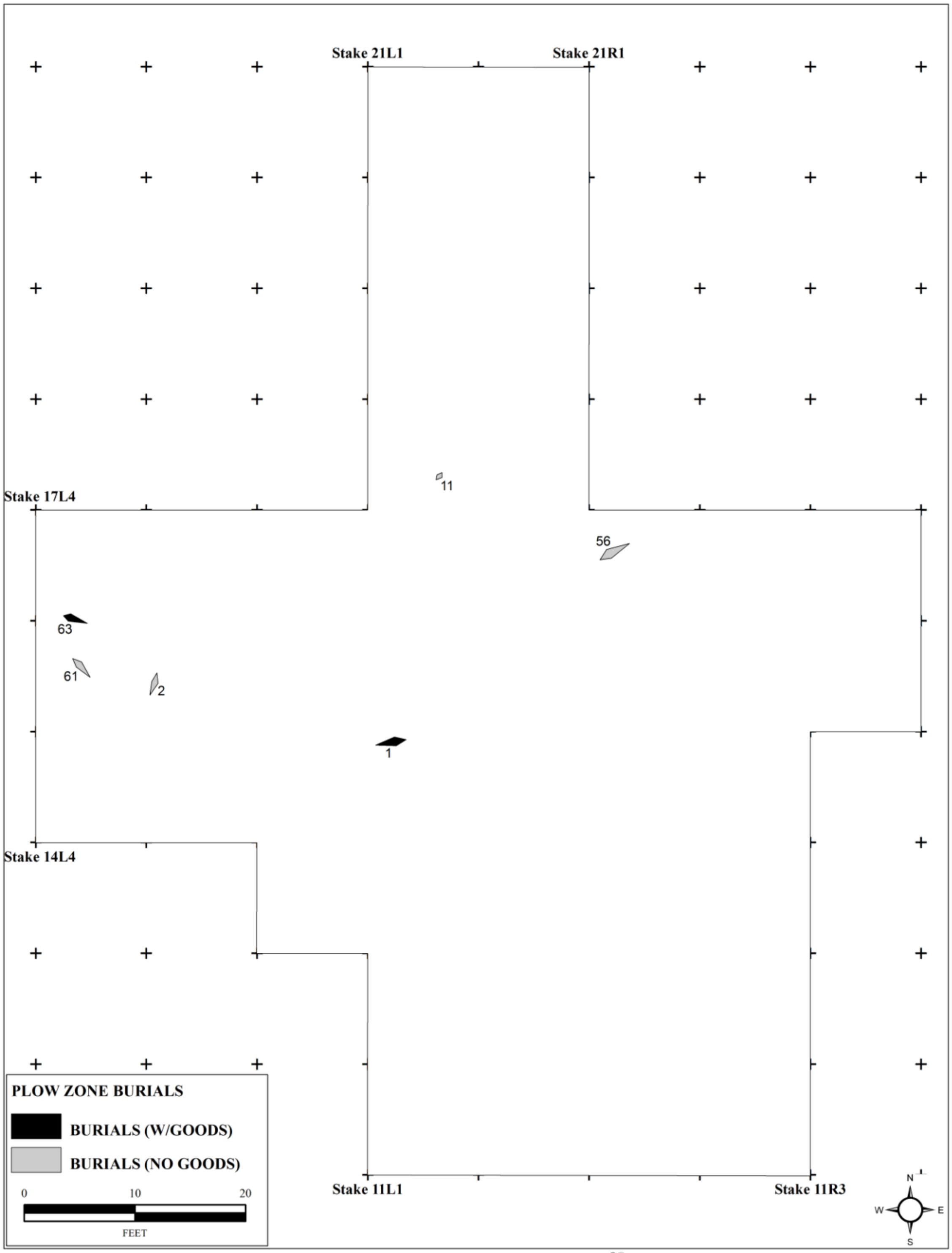

Figure 8.14. Plow zone burials at the Oak View site (40DR1)[35].

[35] Unlike the remaining six sites in the study sample, the draftsperson responsible for creating the Oak View site's plan map chose to use asymmetrical elongated diamonds to indicate burials. The wider end of each diamond indicated the location of the head, and thus the orientation of the burial.

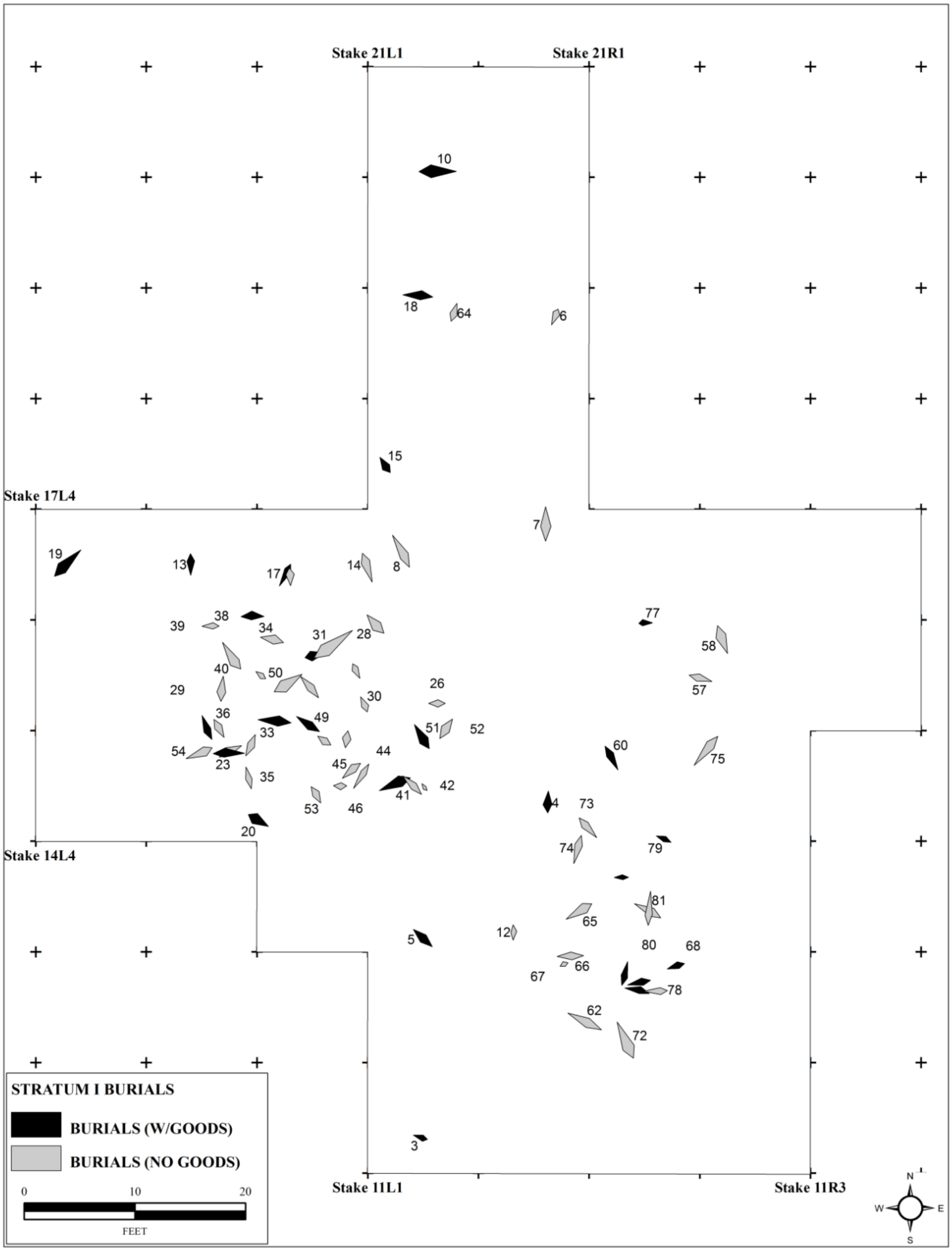

Figure 8.15. Stratum I burials at the Oak View site (40DR1).

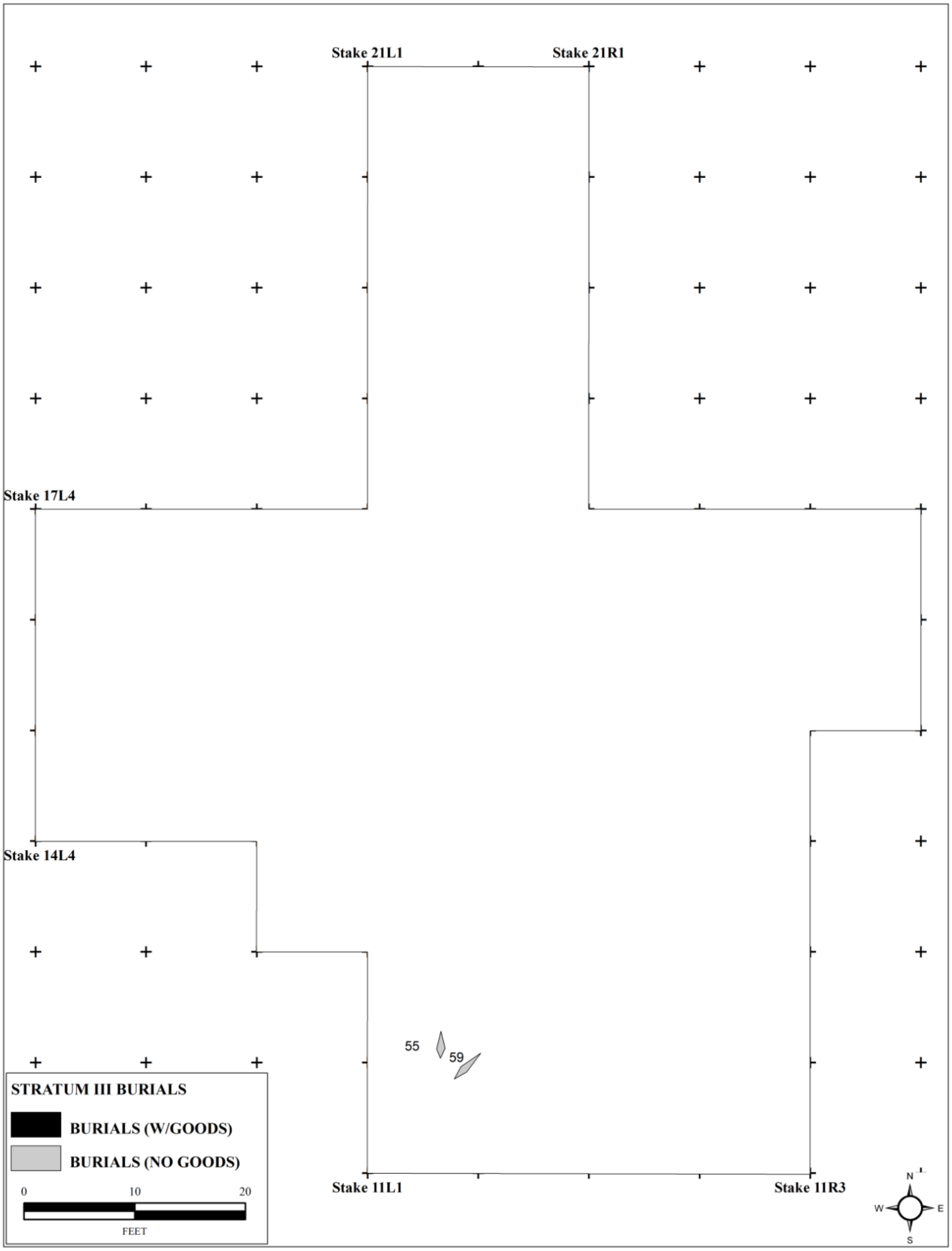

Figure 8.16. Stratum III burials at the Oak View site (40DR1).

concluded that the burial assemblage comprised 51 adults and 25 subadults, with five un-classifiable (Table 8.7).

Degree of flexure was reported seventy-eight of the burials at Oak View (96.2%). Most of those (n = 48, 61.5%); half that number were fully flexed (30.8%) and flexure was not documented for six burials (including the three cremations) (Table 8.7).

There was no significant difference in the number of burials placed on the left (n = 18), right (n = 23) or back (n = 19). Only two bodies were placed face down, and two were buried in a seated position. The burial positions of fourteen skeletons were not documented.

There was no single direction toward which burials were overwhelmingly oriented. Orientation was determined for seventy-seven graves (95% of the total burials at Oak View). The largest number (n = 15, 19.5%) pointed east, while bodies facing south and west totaled thirteen (16.9%) and eleven (14.3%), respectively. Fewer than ten burials were oriented to the southeast (n = 9, 11.7%), north (n = 8, 10.4%), southwest (n = 6, 7.8%), northeast (n = 5, 6.5%) and northwest (n = 4, 5.2%). The orientation of seven burials (9.1%) was not recorded.

Burial accompaniments (Figures 8.14 – 8.16, Table 8.7) at Oak View totaled 124, and were found with more than one third (n = 31, 38.3%) of all graves. The overwhelming majority of grave goods consisted of either chipped stone (n = 56, 45.2%) or bone (n = 40, 32.3%) items. The most common burial offerings were projectile points – 23 graves contained at least one, and eleven of those contained two or more.

Significantly fewer graves contained bone artifacts, but most included multiple objects, including unworked bone, bone awls, drilled (and undrilled) teeth, and a variety of other tools and decorative objects (Figure 8.17). Two individuals – Burial 49, an adult male, and Burial 52,

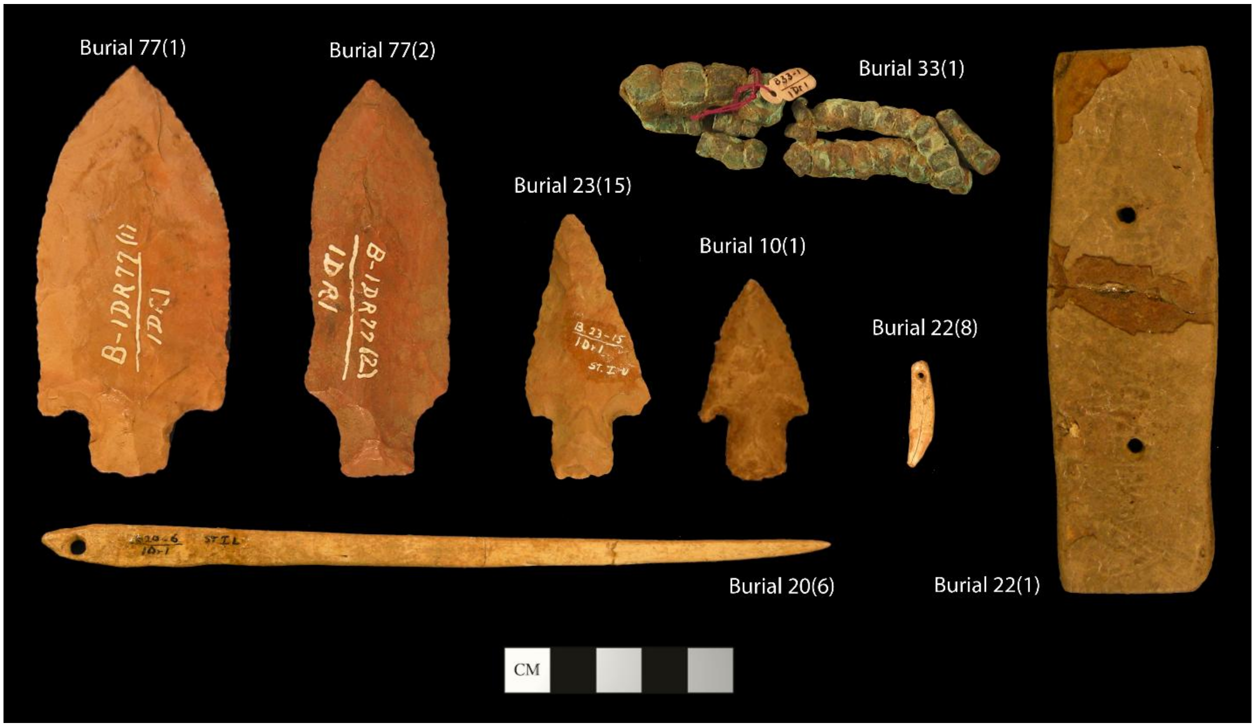

Figure 8.17. Selected grave goods from burials at the Oak View site (40DR1): Chipped stone projectile points (Burials 77[1] and [2]; Burial 23[15]; Burial 10[1]); Copper beads (Burial 33[1]); Groundstone gorget (Burial 22[1]); Perforated canine tooth / pendant (Burial 22[8]); and bone needle or pin (Burial 20[6]).

an adult of indeterminate sex – contained dog skeletons. Many burials including bone objects also contained antler items.

There was only one instance of shell beads noted, and one occurrence of copper beads (Figure 8.17). Red ochre was recorded with four burials, three of which were subadults.

One recorded burial (Burial 23) in fact consisted only of a set of four arms (articulated) and two legs. This "grave" contained twenty-one items, more than twice the number of burial objects of any other at Oak View. It was located immediately above Burial 36, a probable adult male and one of only two individuals at Oak View buried face down, suggesting the possibility that the items in Burial 23 were in fact associated goods and trophies interred with the male in Burial 36. The taking and display of body parts as trophies in the Archaic Southeast is well documented (see Mensforth 2007 for an extensive review; see also Jacobi 2007), and evidence for such practices in burials at Archaic shell-bearing sites in Tennessee (Smith 1995, 1997) has been documented. Extra skeletal elements or entire body parts are sometimes found included in burials with complete individuals (see Jacobi 2007; Mensforth 2007:231-249, 253-255), and presumably were taken by the victor at the conclusion of a violent conflict.

Despite the large number of potential associations, it is difficult to assess whether "Burial 23" may in fact have represented grave goods and trophies interred with the male in Burial 36, because of the unusual position of Burial 36. Burial face down is sometimes considered a sign of manifest disrespect of the dead individual (Jacobi 2007:311), but may also suggest violent death (Bridges et al. 2000:38; Claassen 2010:115, 2012). If the male in Burial 36 was in fact accompanied with the materials found in Burial 23, the treatment would represent the most significant example of differential treatment of an individual in burial among the skeletal assemblages of the seven study sites examined in this project.

Features

A number of features were recorded at Oak View, but the manner in which they were recorded was not straightforward. The site supervisor chose to distinguish between "pits" and other "features" at the site, as did many of the UTDoA archaeologists (see previous chapters, and additional sections of this chapter). However, the choice appears to have been made to enter some cultural features into both of the records – "features" and "pits" – maintained during excavation. Thus, although seventeen "features" and forty-six "pits" are indicated on the site documentation, all of the separately-recorded features also received pit numbers (Table 8.8).

Table 8.8 presents both feature and pit data as recorded, but the associated pit number is included in the description for each feature.

In total, seventy-eight individual features were documented at Oak View (Table 8.8; Figure 8.18). Forty-four of those were labeled as "pits."

As at other sites excavated by the UTDoA in the Kentucky Basin, many cultural features at Oak View did not receive numerical designations, but were recorded on the site's plan map. These included three "caches" of river-worn stones, two large "depressions" (one was quite large and a number of burials were associated with it), six areas of burned or thermally altered clay that were likely small surface hearths, and twenty-three postmolds scattered throughout the excavation block.

Pits (n = 44)

Pit features documented at Oak View were identified almost exclusively as refuse pits based on their contents. Ten contained evidence of in situ burning and were labeled as "fire pits."

Table 8.8. Features documented* at the Oak View site (40DR1). Descriptions of features are derived from the original feature forms on file at the McClung Museum.

Feature	Stratum of Assoc.	Meters below datum	Grid Square	Dimensions (cm) N-S	E-W	Depth	Description
Feature 1	1	Not recorded.	16R1	91.4	61	30.5	Pit 6; oval pit lined with burned sand - no curb or lip - sides nearly vertical. Filleed with charcoal, animal bone, and black humic sand-loam.
Feature 2	1	Not recorded.	16CA	85.3	73.2	103.6	Pit 7; originally a firepit, extremely deep with nearly straight sides. Later filled with charcoal, shell, and animal bone. As it filled, Burial 8 (subadult) was laid in it.
Feature 3	1	Not recorded.	13R1	137.2	121.9	Not recorded.	Pit 9; originally a fire pit, nearly round, no lip, sand lining, was filled with refuse, animal bone, charcoal, shell and artifacts in black sand loam. Was expanded as it became a refuse pit.
Feature 4	1	Not recorded.	14R1	144.8	91.4	30.5	Pit 13 (actually two pits); B apparently cut through A, both contained animal bone and shell in black sand and loam fill.
Feature 5	1	Not recorded.	19CA	192	158.5	54.9	Pit 15; Burial 18 was placed in bottom and sides of pit apparently intended for it. Animal bone, shell, and black sand loam covered burial. Tree apparently grew on this spot later and disturbed burial.
Feature 6	pz	Not recorded.	17CA	106.7	76.2	39.6	Pit 17 was completely within Pit 3, both intrusive from plow zone. Pit 3 was refuse pit containing shell, pottery, animal bone and artifacts in black sand loam. Pit 17 contained an infant burial - Burial 11 - in a yellow sand fill.
Feature 7	1	Not recorded.	15R1	131.1	94.5	64	Pit 20; fire pit, burned sand lining. Straight sides, nearly flat bottom. Pit rectangular with rounded corners, no lip. Pit contained animal bone, shell, and artifacts in black sand loam. FS 613, 665, 692, and 763. (Pit 20)
Feature 8	pz	0.61	15L1	39.6	36.6	21.3	Pit 26; small, round, straight-sided put containing charcoal and fragments of burned bone.
Feature 9	1	0.94	15CA	85.3	76.2	48.8	Pit 30; fire pit later used for burial (Burial 52).
Feature 10	1	1.19	15L2	82.3	76.2	30.5	Pit 34; firepit containing charcoal, ashes, burned sand lining and animal; Burial 37 partly intrusive (Pit 34)
Feature 11	1	1.37	14L3	85.3	48.8	54.9	Pit 38, burned sand linined fire pit - rectangular in shape, no lip or rim. Filled with layers of grey ashes, charcoal, and shell.
Feature 12	historic	Not recorded.	14L3		Not recorded.		Pit 39; Root cellar from previous house onsite. Contained mixture of historic and prehistoric artifacts - projectile points and pieces of tin roofing.
Feature 13	1	1.52	14R1	48.8	45.7	15.2	Pit 40; round, basin shaped fire pit, burned sand lining, no rim. Filled with burned limestone and charcoal.
Feature 14	1	Not recorded.	12R1	152.4	100.6	45.7	Pit 42; Old fire pit later used for burial pit - burned sand lining, irregular oval shape, contained charcoal and artifacts. Burial 66 near top of pit.

Table 8.8. Continued.

Feature	Stratum of Assoc.	Meters below datum	Grid Square	Dimensions (cm)			Description
				N-S	E-W	Depth	
Feature 15	1	1.65	12R2	149.4	85.3	42.7	Pit 43, two pits; Pit A, deeper and longer than Pit B, was originally a firepit lined with burned sand, with a layer of charcoal at the base ca. 0.1 ft thick; over this a clay daub pit lining, burned, 0.4 ft thick, probably accretive since it was burned through. Burial 78 lay on this, burials 69, 70, and 71 on top of this. Pit B cut the edge of A, was 1.2 ft deep, burned sand lining with charcoal. Burial 68 in this.
Feature 16	1	1.43	13R2	128	121.9	42.7	Pit 44; old refuse pit containing black humic sand, shell, some charcoal. No evidence of burning. Burial 76 interred in seated position - crumpled down, head between knees.
Feature 17	3	1.37	13L1	51.8	45.7	Not recorded.	Pit 46, firepit, burned sand lining, containing charcoal, shell, and burned animal bone.

Pit	Stratum of Assoc.	Meters below datum	Grid Square	Area (sq m)	Depth (cm)	Description
Pit 1	pz	Not recorded.	12R1	0.53	24.4	Refuse pit.
Pit 2						Part of central burial depression - disregard.
Pit 3	pz		17CA	2.51	64	Refuse pit.
Pit 4	pz		16L3	0.51	54.9	Refuse pit.
Pit 5	pz		18CA	0.29	27.4	Refuse pit.
Pit 6	1		16R1	0.43	30.5	Feature 1; Firepit.
Pit 7	1		16CA	0.49	103.6	Feature 2; Fire, refuse, and burial pit.
Pit 8	1		16L1	1.66	24.4	Refuse pit.
Pit 9	1		13R1	1.32	45.7	Feature 3; Refuse pit.
Pit 10	pz		13CA	1.54	94.5	Refuse pit.
Pit 11	1		11CA			Refuse pit. Not excavated.
Pit 12	1		11R1	0.6	36.6	Refuse pit.
Pit 13	1		14R1	2.11	36.6	Feature 4; Refuse pit.
Pit 14	1		16CA	0.61	27.4	Refuse pit.
Pit 15	1		19CA	2.18	54.9	Feature 5; Refuse and burial pit.
Pit 16	1		15L2	0.47	39.6	Refuse pit.
Pit 17	pz		17CA	0.7	39.6	Feature 6; Burial pit in refuse pit.
Pit 18	pz		15L1	0.57	73.2	Refuse pit.
Pit 19	1		13R1	0.41	39.6	Refuse pit.
Pit 20	1		15R1	1.02	64	Feature 7; Fire pit.
Pit 21	1		13L1	0.5	27.4	Refuse pit.
Pit 22	pz		13CA	0.64	64	Refuse pit.
Pit 23	pz		14L2	1.16	30.5	Refuse pit.
Pit 24	1		15R2	0.7	33.5	Refuse pit.
Pit 25	pz		11R2	0.47	36.6	Refuse pit.
Pit 26	1		15L1	0.11	21.3	Feature 8; Cremation pit.
Pit 27	1		12R1	0.39	30.5	Refuse pit.

Table 8.8. Continued.

Feature	Stratum of Assoc.	Meters below datum	Grid Square	Dimensions (cm) N-S	E-W	Depth	Description
Pit 28	2		15R1	0.13		39.6	Refuse pit.
Pit 29	2		15R1	0.09		33.5	Refuse pit.
Pit 30	1		15CA	0.42		48.8	Feature 9; Firepit.
Pit 31	3		12R1	1.17		57.9	Refuse pit.
Pit 32	pz		16R2	0.43		91.4	Refuse pit.
Pit 33	pz		16R2	0.53		42.7	Firepit.
Pit 34	1		15L2	0.43		30.5	Firepit.
Pit 35							Number not used.
Pit 36	pz		14R3	1.21		51.8	Refuse pit.
Pit 37	1		14L3	0.43		36.6	Refuse pit
Pit 38	1		14L3	0.43		54.9	Feature 11; Firepit.
Pit 39	pz		14L3	2.58		0	Feature 12; historic root cellar.
Pit 40	1		14R1	0.18		15.2	Feature 13; Firepit.
Pit 41	pz		15R3	0.62		48.8	Refuse pit.
Pit 42	1		12R1	1.18		45.7	Feature 14; Burial pit.
Pit 43	1		12R2	4.14		42.7	Feature 15; Burial pit.
Pit 44	1		13R2	1.22		42.7	Feature 16; Burial pit.
Pit 45	1		13R3	0.9		33.5	Refuse pit.
Pit 46	3		13L1	0.2		12.2	Firepit.
N = 3	1	Not recorded.	Multiple.	Not recorded.		Not recorded.	Caches of river-worn stones (n = 2) and one cache containing 11 bifaces.
N = 2	1	Not recorded.	Multiple.	Not recorded.		Not recorded.	Depressions used for burial locations.
N = 6	1 (n = 5) 5 (n = 1)	Not recorded.	Multiple.	Not recorded.		Not recorded.	Thermal features or hearths. One associated with St 5, all others with St 1.
N = 23	pz (n = 1) 1 (n = 20) 2 (n = 2)	Not recorded.	Multiple.	Not recorded.		Not recorded.	Scattered postmolds located throughout excavation block. No structural pattern evident.

* Un-numbered features at Oak View, which includes caches, several thermal features, and postmolds, were documented only on the site's detailed plan map. While information on the stratum of association and the type of feature was usually recorded, these features' depths and other dimensions typically were not.

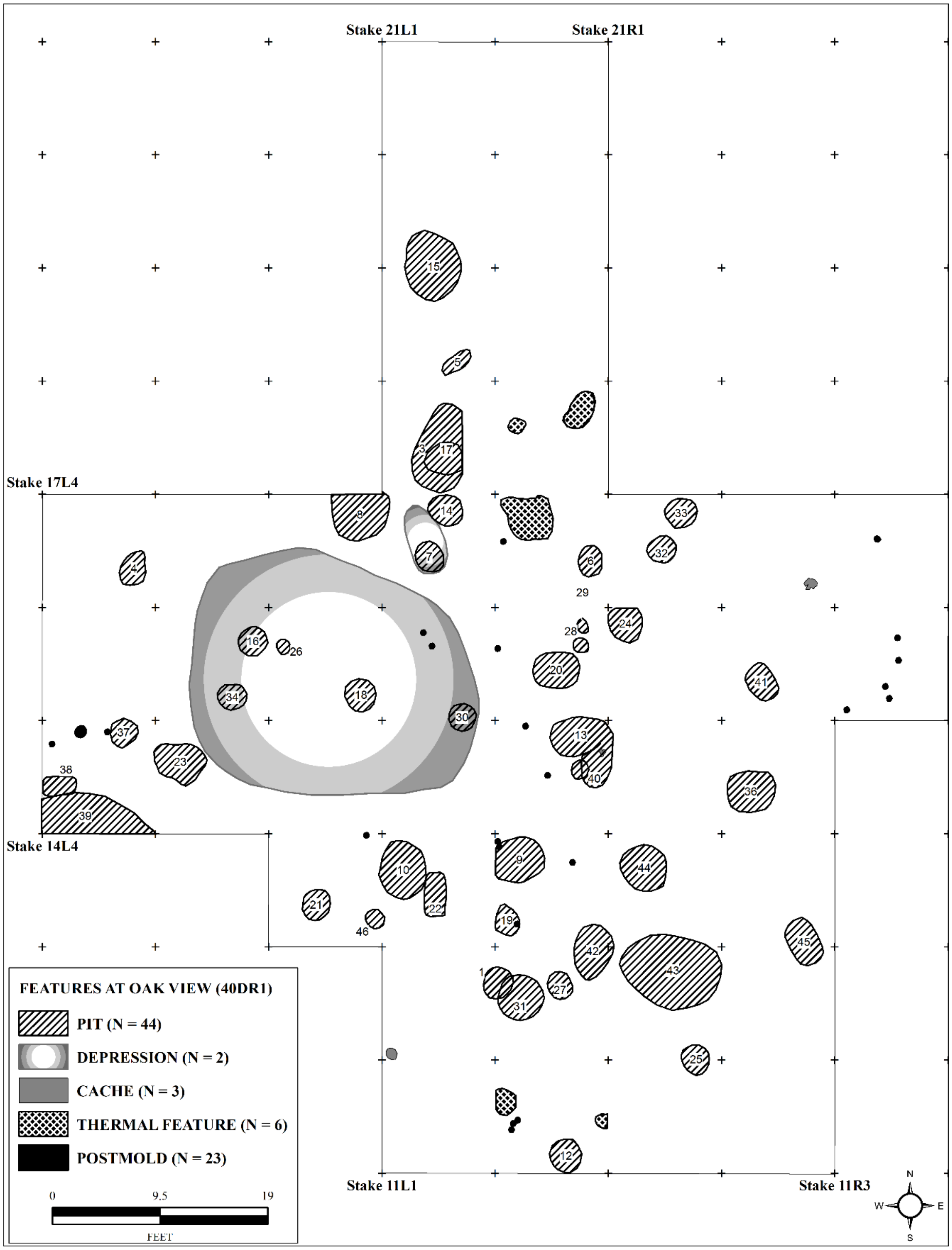

Figure 8.18. Features documented at the Oak View site (40DR1).

The majority of pits were associated with Stratum I (n = 25; 56.8%); fifteen (34.1%) originated in the plow zone, and two each were within Stratum II and Stratum III (Table 8.8).

Two pit numbers (2 and 35) were not assigned (Table 8.8).

Unnumbered Features (n = 34)

Features that were not recorded individually, but only on the site plan map, numbered thirty-four and consisted mainly of scattered postmolds (n = 23), three caches of lithic raw material or hammerstones (n = 3), two "depressions" (presumably large shallow basin-shaped features), and six thermal features that were probably surface hearths.

Nearly all of these features were associated with Stratum I (n = 30). The remaining four consisted of one postmold in the plow zone and two in Stratum II, and a small thermal feature in Stratum V (Table 8.8).

Cultural Material

Artifacts and other materials documented at Oak View comprised a moderate to large assemblage, consisting of 1,218 items recorded in the site's field specimen (F.S.) log (Table 8.9)[36]. When sub-proveniences, such as features (n = 104) and burials (n = 116) – most of which were associated with Stratum I or the plow zone – are considered, nearly all of the Oak View assemblage derived from the component comprising the plow zone and Stratum I (n = 1,180). A negligible number (n = 39) of artifacts were recovered from other strata.

[36] A complete listing of all items recorded in the site F.S. log is provided in Appendix B

Table 8.9. All cultural material recovered from the Oak View site (40DR1) by stratum assignment, based on field specimen logs.

MATERIAL	PROVENIENCE							
	Features	Burials	Plow Zone	Stratum I	Stratum II	Stratum III	Stratum VI	TOTALS
Antler	7	14	3	25	0	0	0	49
Bone	6	32	9	23	0	0	0	70
Chipped Stone	82	57	383	453	28	3	1	1007
Groundstone	6	11	10	36	4	0	0	67
Mineral	0	1	0	3	0	0	0	4
Copper	0	1	0	0	0	0	0	1
Pottery	0	0	1	1	0	0	0	2
Shell	0	0	0	1	0	1	0	2
Other	3	0	2	10	0	1	0	16
TOTALS	**104**	**116**	**408**	**552**	**32**	**5**	**1**	**1218**

Chipped stone artifacts constituted the vast majority of recovered or recorded materials (82.7%). Among the individual larger proveniences, such as the plow zone and Stratum I, chipped stone comprised greater than 80% of all recovered material. Relatively few bone or antler artifacts were recorded in any provenience, although among artifacts associated with burials, bone was proportionally better represented.

Temporally Diagnostic Hafted Bifaces at the Oak View site (40DR1)

Most cultural materials from Oak View were subjected to comparatively minimal examination during this project. However, to determine the site's overall stratigraphic integrity (or the lack of integrity) and to provide an alternate means of assessing the age of the deposits at Oak View, temporally diagnostic hafted bifaces from the site's artifact assemblage were examined and classified (where possible) by type.

A total of 732 hafted bifaces were recovered or listed as recovered in the Oak View F.S. log, representing 72.7% of the site's chipped stone assemblage. More than half (58.9%, n = 432) were unable to be classified by diagnostic type. Of those, forty were grouped by basal morphology (Table 8.10). The remainder (n = 391) could not be located in the site collections during this project, and were classified only as "Unidentified, Other."

Of the 301 classified temporal diagnostics, most were found in the plow zone (n = 116, 38.6%) or Stratum I (n = 123, 40.1%), and Late Archaic stemmed types were dominant in every assemblage (Table 8.10; Figures 8.19 and 8.20). One Early Archaic form, a Kirk Stemmed, was found in the plow zone, and the Woodland and later periods were represented by seventeen hafted bifaces, thirteen of which (76.4%) were found in the plow zone and Stratum I.

Table 8.10. Temporally-diagnostic hafted bifaces from the Oak View site (40DR1).

Type	Temporal Affiliation	Features	Burials	Plow Zone	Stratum I	Stratum II	Stratum III	Stratum V	Total (By Type)
Archaic Stemmed	Archaic, Undifferentiated	2	3	16	6	0	0	0	**27**
Kirk Stemmed	Early Archaic	0	0	1	0	0	0	0	**1**
Late Archaic Stemmed	Late Archaic	13	11	44	47	1	0	0	116
Ledbetter	Late Archaic	2	5	17	16	2	2	0	44
Pickwick	Late Archaic	0	3	2	9	0	0	0	14
Savannah River Stemmed	Late Archaic	0	0	0	5	1	0	0	6
Table Rock Stemmed	Late Archaic	0	1	11	11	1	0	0	24
Terminal Archaic Barbed	Late Archaic	4	2	11	16	2	0	0	35
Dickson Cluster	Late Archaic - Early Woodland	0	0	6	3	1	0	0	10
Flint Creek	Late Archaic - Early Woodland	0	0	0	3	1	0	0	4
Motley	Late Archaic - Early Woodland	0	1	0	0	0	0	0	1
Saratoga Cluster	Late Archaic - Early Woodland	0	0	0	1	0	0	0	1
Turkey Tail	Late Archaic - Early Woodland	0	0	1	0	0	0	0	1
Total, Late Archaic / Late Archaic - Early Woodland		**19**	**23**	**92**	**111**	**9**	**2**	**0**	**256**
Adena Stemmed	Early Woodland	0	0	0	2	0	0	0	2
Early Woodland Stemmed	Early Woodland	1	1	2	3	0	0	0	7
Lowe Cluster	Middle Woodland	0	1	0	0	0	0	0	1
Small Triangular	Late Woodland / Late Prehistoric	1	0	5	1	0	0	0	7
Total, Woodland		**2**	**2**	**7**	**6**	**0**	**0**	**0**	**17**
Total, Indentifiable Hafted Bifaces		**23**	**28**	**116**	**123**	**9**	**2**	**0**	**301**
Unidentified Side-Notched		0	0	0	1	0	0	0	1
Unidentified Stemmed		3	2	20	14	0	0	0	39
Unidentified, Other		37	1	152	192	7	1	1	391
Total, Unidentified Hafted Bifaces		**40**	**3**	**172**	**207**	**7**	**1**	**1**	**431**
Total, All Hafted Bifaces		**63**	**31**	**288**	**330**	**16**	**3**	**1**	**732**

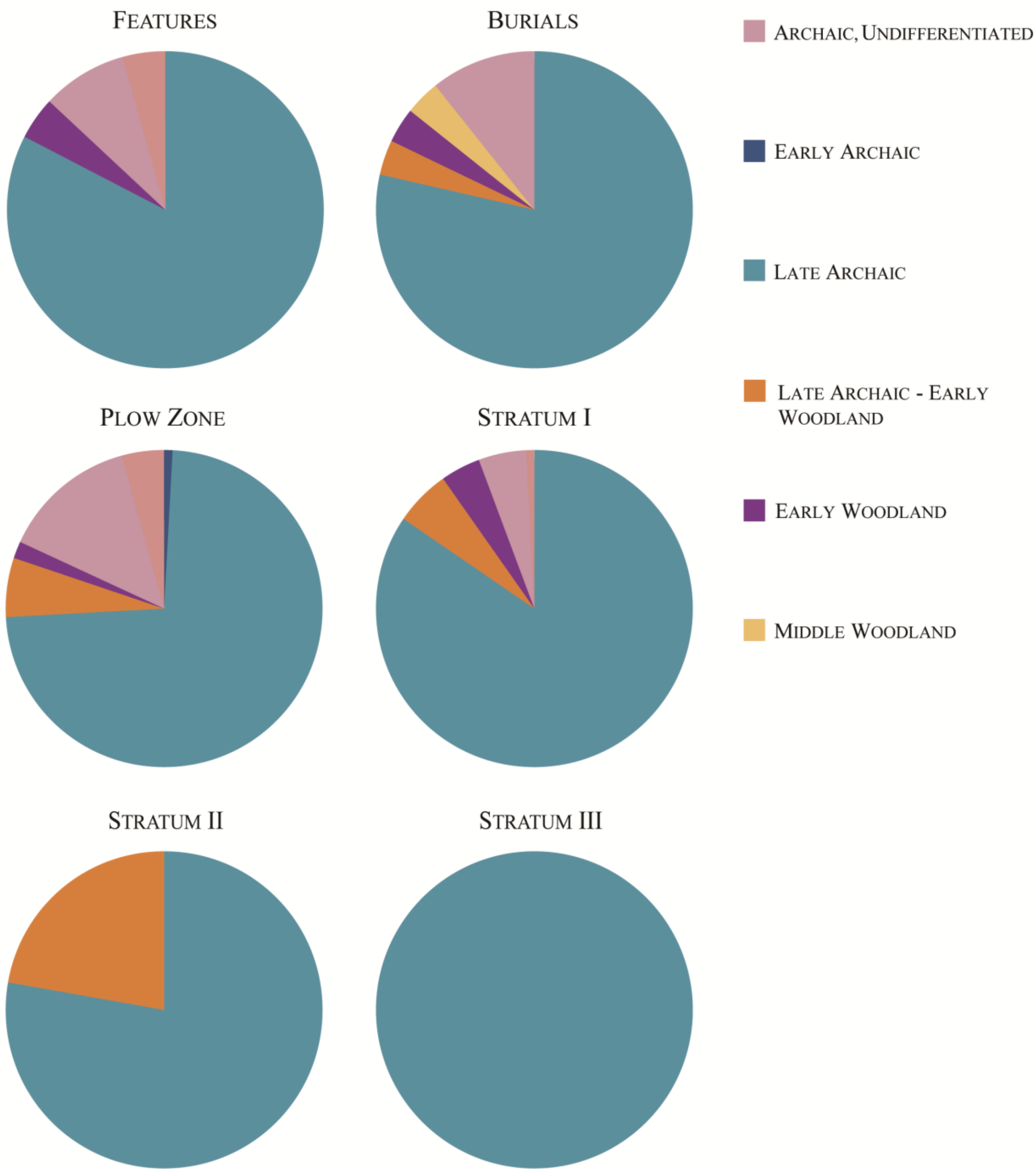

Figure 8.19. Temporal diagnostics by provenience at the Oak View site (40DR1).

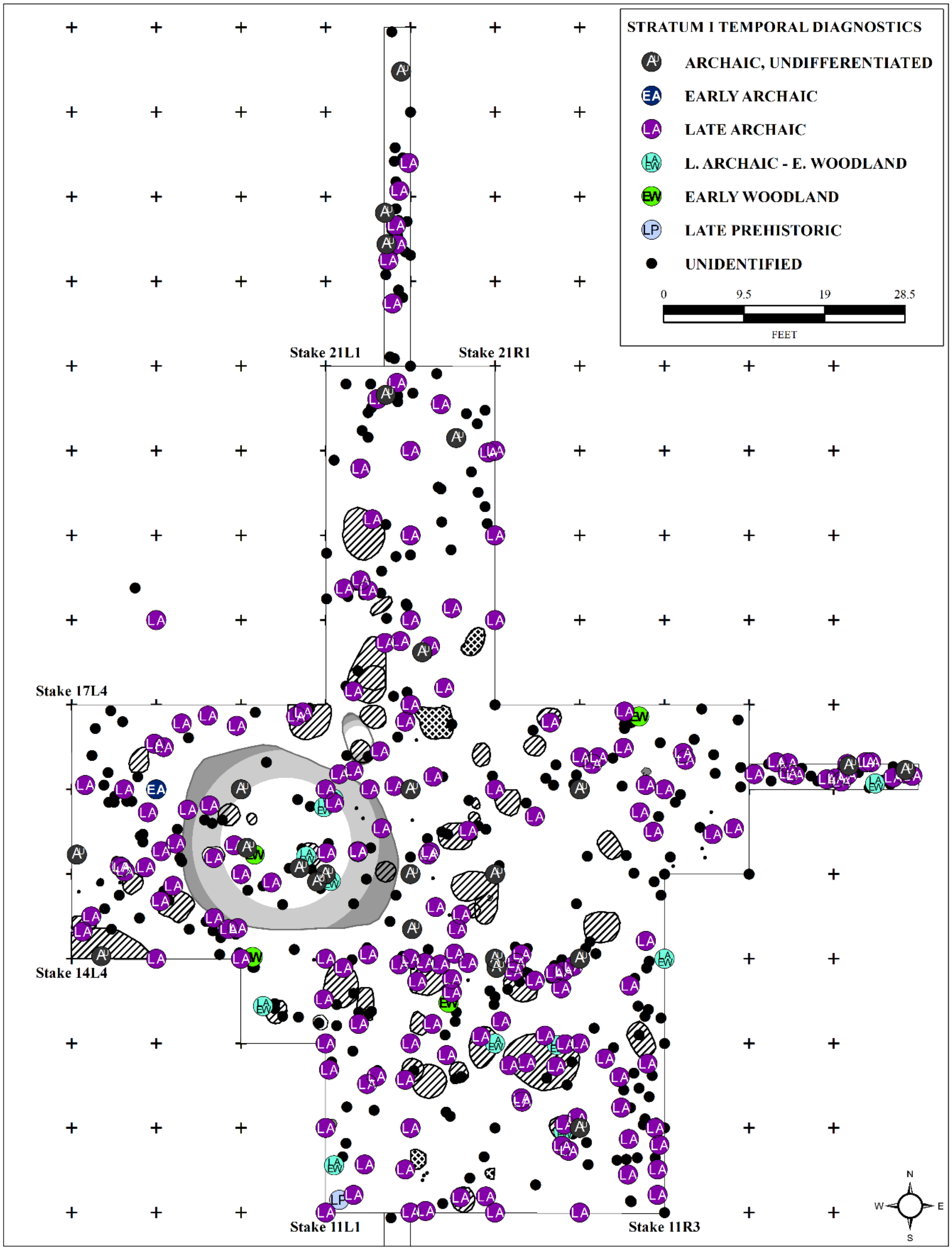

Figure 8.20. Distribution of temporal diagnostics in the plow zone and Stratum I at the Oak View site (40DR1).

Regardless of provenience, frequencies of temporally diagnostic hafted bifaces at Oak View indicated that site use was primarily during the Late Archaic. Even in the site's deepest and earliest deposits – Stratum V and III – Late Archaic types were dominant, with little to no representation of earlier types. The only pre-Late Archaic form identified was an Early Archaic Kirk Stemmed found in the plow zone.

The distribution of cultural material by provenience strongly indicates that that site's primary period of activity is encompassed in the Stratum I and plow zone deposits, which contained the bulk of Oak View's cultural material, and also appear to have been predominately Late Archaic in age (Figure 8.19). Minor representation of later types in Stratum I suggests the possibility of later, moderately ground-disturbing activity at the site after the end of the Late Archaic period, but neither the seemingly intact cultural deposits represented by Stratum I, nor the disturbed plow zone above, contained less than 79% Late Archaic or Late Archaic – Early Woodland forms among their identifiable diagnostic assemblages. These results are consistent with the two radiocarbon dates obtained from Oak View.

Radiocarbon Dates

The age of the deposits at Oak View has not previously been determined. Lewis and Kneberg (1959:172) suggested that the site was contemporaneous with Ledbetter (this chapter, following section) and Stratum I at Kays Landing (see Chapter 7), and was thought to date between ca. 3150 and 1450 B.P.

Due to the relatively small amount of datable material recovered from most deposits at Oak View, only two radiocarbon samples from Stratum I, which presumably underlay the shell-bearing deposit, were able to be identified and dated (Table 8.11).

Table 8.11. Radiocarbon dates from the Oak View site (40DR1).

FS	Square	Stratum	Depth (mbd)	Material	AA #	δ 13C	14C Yr BP			Cal BP			1-Sigma Range (calibrated)	2-Sigma Range (calibrated)
71	16L3	1	0.94	antler	AA101234	-21.9	3713	±	43	4056	±	67	4143 - 3984	4225 - 3925
670	15R1	1	1.25	bone	AA101235	-21.1	4280	±	53	4847	±	84	4960 - 4729	5034 - 4645

One (FS 71) was a fragment of deer antler recovered from the northeastern corner of the excavation block at a depth near the upper margin of the intact Stratum I deposit. Lacking sufficient well-plotted material to obtain a second assay from directly beneath FS 71, a second fragment of mammal bone (FS 670) was recovered from near the central area of the main excavation at a distance of 11.5 m east of FS 71, and approximately 30.5 cm (ca. 1 ft) deeper, near the base of the Stratum I deposit. Results of both assays are presented in Table 8.11.

Occupational History of Oak View

Although cultural material was found at Oak View in deposits below Stratum I, the evidence as presented here suggests that the site's primary period of use is probably best characterized by the radiocarbon dates obtained from Stratum I, which indicate that deposit began forming sometime after 5000 cal BP. The intact portion of Stratum I spans several centuries, extending until at least 4000 cal BP. A shell-bearing deposit of unknown thickness was situated atop Stratum I (as was indicated by local informants and by the observed scatter of mussel shell in the field where Oak View was located), but by the time of the site's excavation in 1941, none of the deposit remained intact; the site's plow zone presumably contained a combination of materials from that deposit as well as a portion of the underlying Stratum I.

The bulk of cultural material from Oak View was found in Stratum I and the plow zone and suggest that significant occupation of the location did not significantly pre-date those deposits. Oak View's primary period of occupation bracketed the early and late dates from the Stratum II shell mound at Kays Landing (see Chapter 7).

The occupation or occupations associated with the deposition of Stratum I appear to have been relatively intensive. Multiple pits and thermal features, as well as a relatively varied assemblage of cultural material, attest to likely residential occupations of the site, and the large number of burials indicate that when members of the groups occupying the site died, they were interred there.

Because the site's shell-bearing deposit was destroyed before it could be examined, the timing of the emergence of shellfishing at Oak View is unclear, but it appears to have post-dated 4000 cal BP. While there are no firm indications of its age relative to other sites in the area, it is useful to note that a radiocarbon date from the shell-bearing deposit at the nearby Ledbetter Landing site (40BN25, see following section) post-dated 3000 cal BP, suggesting in that area of the lower Tennessee Valley, shellfishing continued at least until the Early Woodland period.

LEDBETTER LANDING (40BN25)

Ledbetter Landing was located at the extreme southeastern corner of Benton County, on a low bluff on the left descending bank of the Tennessee River immediately north of the river's confluence with Morgan Creek (Figures 8.21, 8.22). The site was recorded in January of 1940 during a cultural resources survey of the area by archaeologists from the University of Tennessee Division of Archaeology (UTDoA). Large-scale excavations, led by George Lidberg, began in late September or early October of that year and continued through December.

The Ledbetter Landing site has previously been reported in three publications. A brief description of the site was provided by C.B. Moore (Moore 1915), who visited the site during his trip down the Tennessee River, and dug into it (see also Chapter 2). In the years following the major excavations at the site by the UTDoA (which are reported here), brief descriptions of Ledbetter Landing were included in two publications by Lewis and Kneberg (1947:9-10; 1959). However, a detailed description of the site has not been previously published.

Environment and Soils

The Ledbetter Landing site is located approximately six kilometers directly downriver from Oak View (40DR1), and as such, the two sites are found in the same physiographic province and forest region.

Soils mapped in the vicinity of Ledbetter Landing were of similar composition to those at Oak View. Silt loams of the Wolftever series and Nugent loamy sand (both 0 – 3% slopes) are present in the site's local area. Wolftever silt loam is a moderately well drained variety found on relatively level (0 – 3% slopes) stream terraces, and extending to a depth of approximately 200 cm (ca. 79 in), grading from a silt loam in the upper 20 cm (ca. 8 in) to a silty clay below 81 cm (ca. 32 in) (USDA Web Soil Survey, Accessed 8/1/2013). Nugent loamy sand is excessively drained, and a typical profile consists of loamy sand in the upper 30 cm, below which depth the profile grades from sand to fine sand to loamy sand to silt loam, reaching an average depth of 200 cm.

Previous Disturbances and TVA Excavation

There was significant disturbance of the Ledbetter Landing site's deposits prior to the initiation of TVA excavations. In addition to the adverse effects of plowing and cultivation on the upper deposits, the site plan map and the excavator's field report indicate a small access road passing between the location of the main excavation block and the bluff descending to the edge of the river, less than 6 m east of the block. One warehouse was present on the property at the time of excavations, and in the field report two previous warehouses are described that previously had been constructed (and removed) in the area in which the block was opened, leaving large postholes (see Figure 8.28).

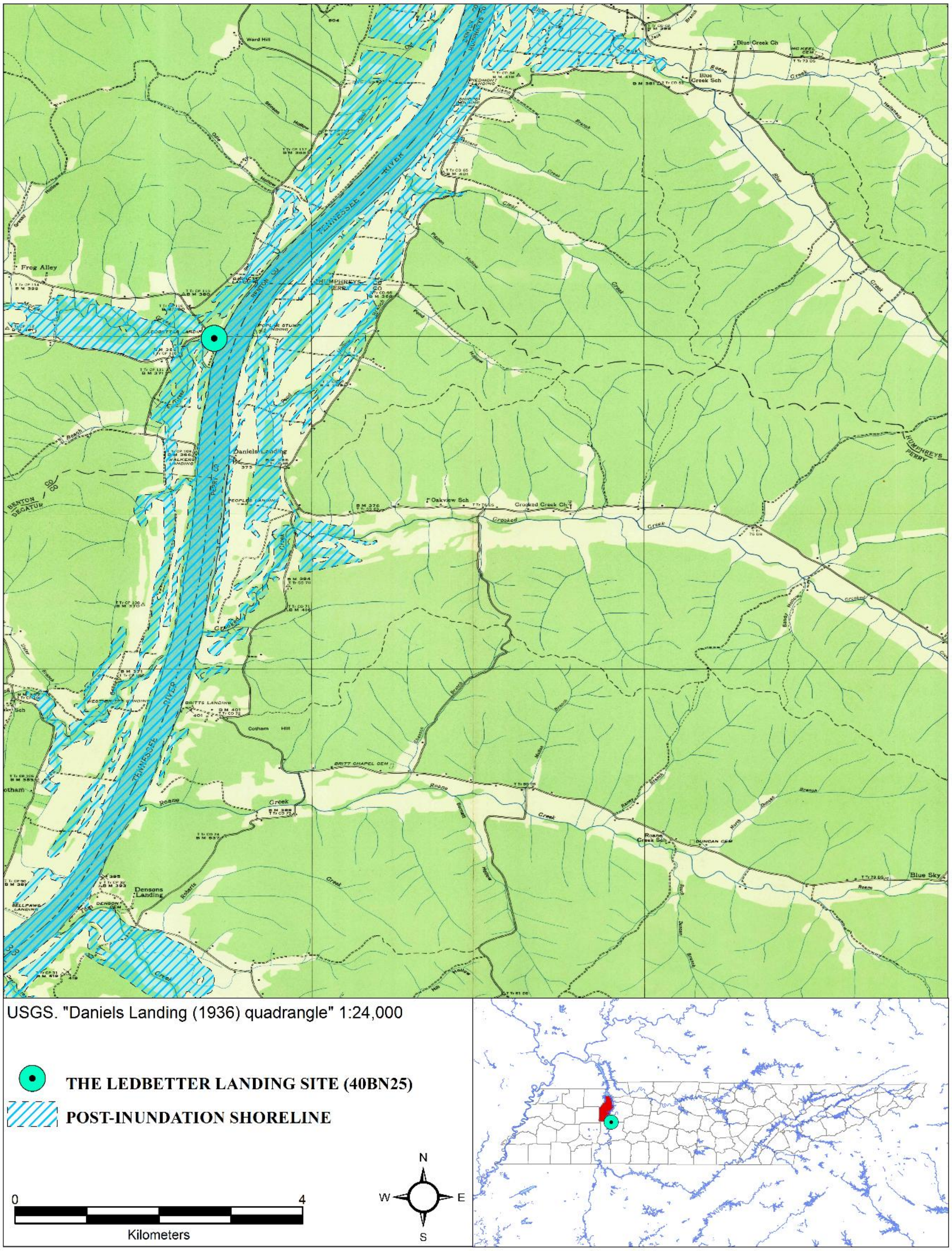

Figure 8.21. Location of the Ledbetter Landing site (40BN25) along the Tennessee River.

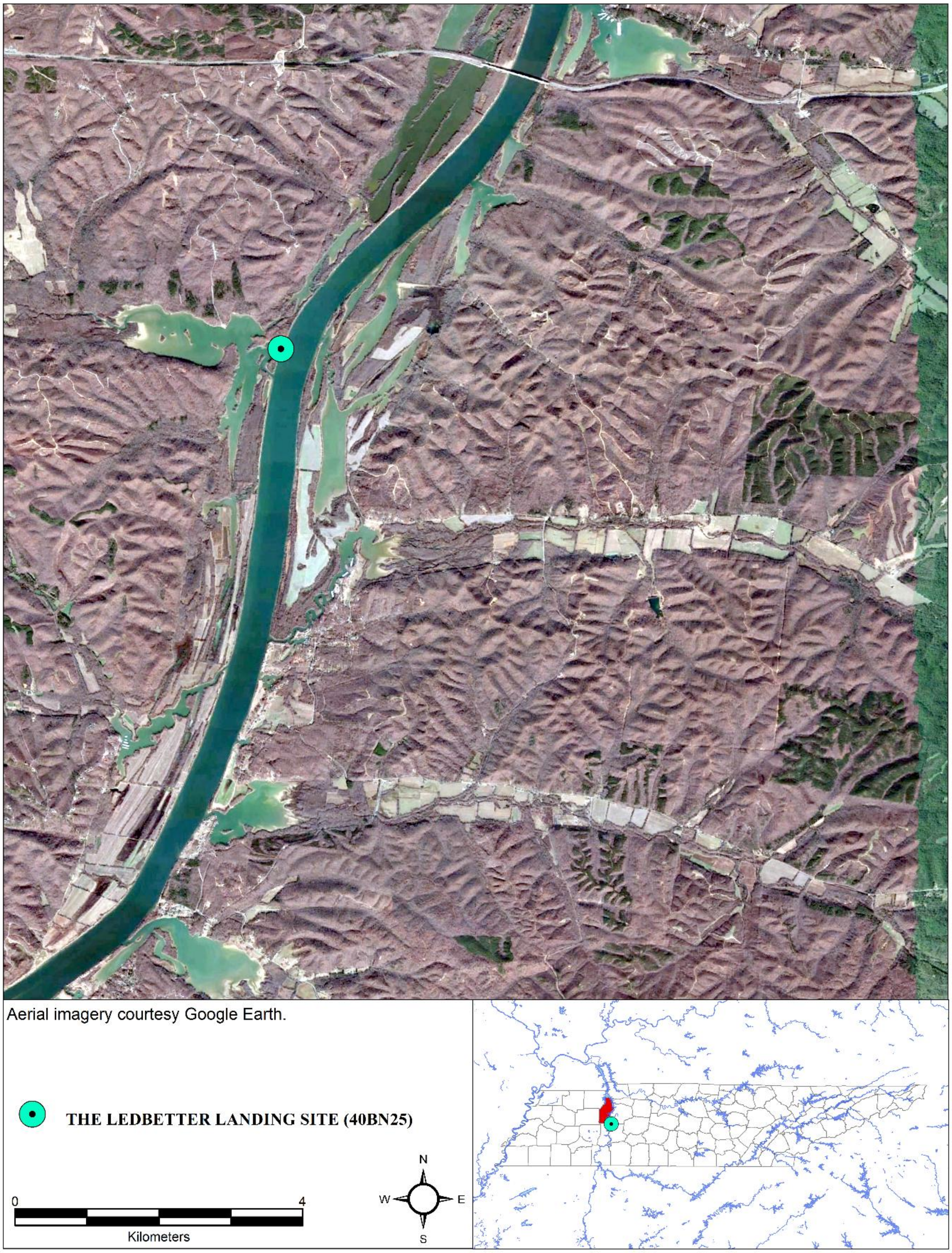

Figure 8.22. Modern location of the Ledbetter Landing site (40BN25) along the Tennessee River.

Additional disturbance noted included relatively minor excavations into the site conducted by C.B. Moore during his expedition down the Tennessee River twenty-five years earlier (Moore 1915:205-206; see also Chapter 2), as well as the effects of many years of less systematic pot-hunting and looting, the latter in part by local residents searching for buried treasure. The site supervisor noted, with mild humor, that:

> …It is perhaps proper to mention here that this immediate area has large numbers of people who are convinced of the efficacy of gold-locating machines. Too, in spite of all argument to the contrary they are certain that the Indians invariably buried inestimable treasures with their chiefs (and somehow it seems that only chiefs were buried, for all skeletons which are dug into are chiefs). The fact that they have never recovered any of these valuable caches is explained easily through the often used story that an Indian returned just before and took it away with him. The Indian who digs up this wealth always boards nearby and pays for his food each day with coin. He usually carries away three to five large sacks of (here the informant has a very mysterious, knowing look on his face) some unidentified material. This composite story has been made up from at least four like recitations, and represents the building of a local mythology which is based on the sworn word of countless of the local inhabitants. Stories such as these are, of course, widespread but West Tennessee in general and this locale in particular has taken a far more than average interest in them. I believe that this section of Tennessee has a far larger number of collectors than any other region with which I am acquainted. Hence, sites which have been disturbed by looters are to be expected, and, it should be stated, are found almost invariably. There is one encouraging aspect: those who want easy wealth do not like too well to work and hence abandon their labors quickly, and before the damage has proceeded too far (G. Lidberg, Original site report, on file at the McClung Museum, University of Tennessee, Knoxville).

Lidberg believed that the long history of disturbance, particularly the construction of warehouses and roads onsite, had resulted in the destruction of much of the site aside from the cemetery.

At the initiation of TVA excavations in early fall of 1940, following the establishment of a standard 10 x 10 ft (3.04 m^2) grid system, a series of test pits and two test trenches were dug. At least twelve test pits, measuring 5 ft^2 (2.32 m^2) were excavated at the site. The two test trenches, each measuring 3 ft (0.91 m) wide, were oriented north-south and east-west; the north-south trench extended along the CA-line (center axis) and the east-west was located at the 20-line (Figure 8.23).

The main excavation was opened in the area indicated by trenching to represent the main concentration of the site, comprising twenty-two contiguous grid squares positioned to the west of the CA-line. The total excavated area, including the main excavation block and the two trenches, was approximately 226.8 m^2 (ca. 2,441.2 ft^2), of which the block alone comprised 207.15 m^2 (2,229.7 ft^2).

The stratigraphic sequence at Ledbetter Landing was relatively straightforward, consisting of only two main strata. Having previously been under cultivation and subject to plowing, the site's intact stratigraphy was overlain by a plow zone of varying thickness, but generally less than one foot (ca. 30.5 cm) deep.

Beneath the plow zone, two strata were evident within the test trenches and block excavation (Figure 8.24). Stratum I constituted the site's "shell midden," and was described by the field director as a "humic loam plentifully interspersed with river shells of all local varieties" (G. Lidberg, Original field report, on file at the McClung Museum,

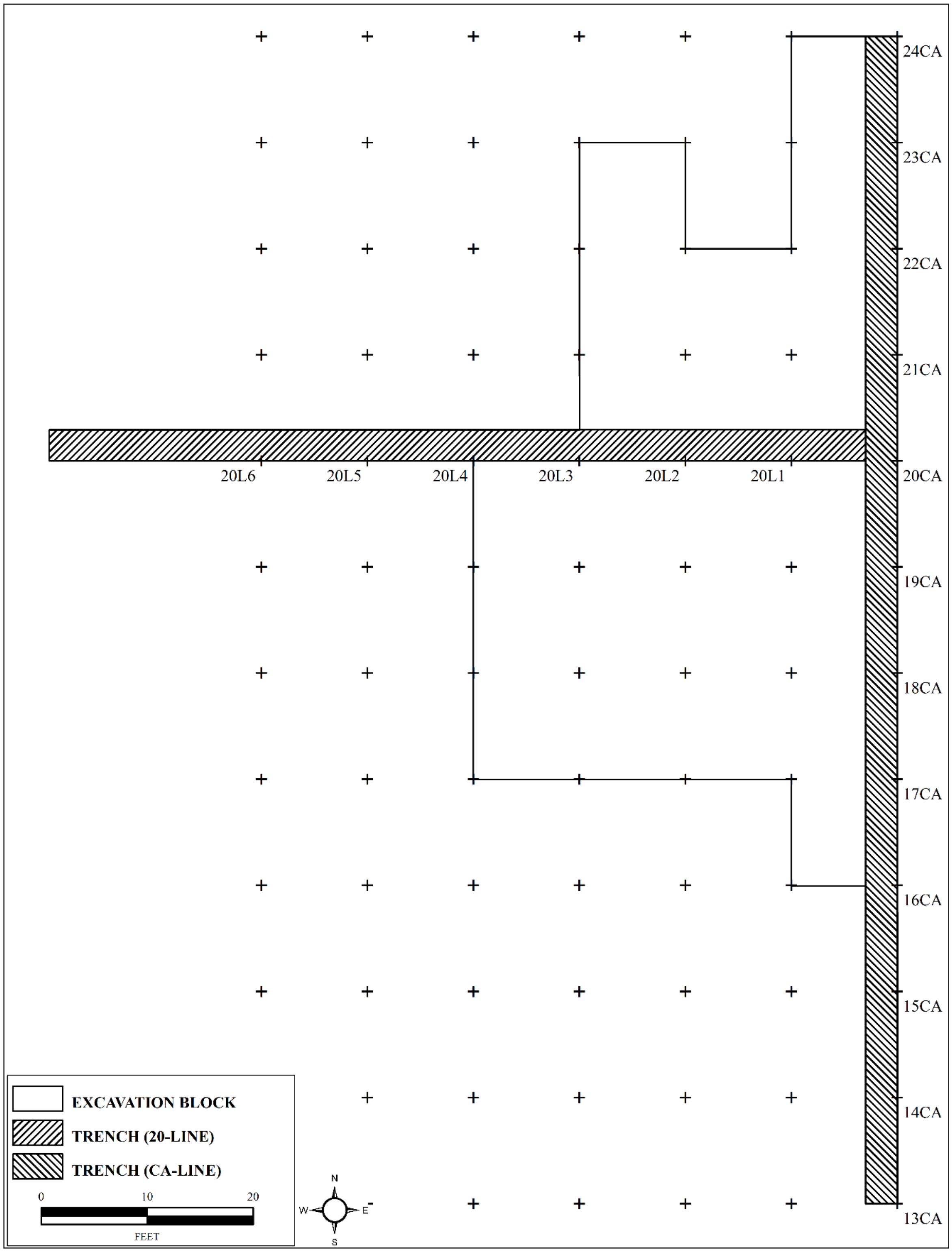

Figure 8.23. Plan map of the excavation block and exploratory trenches at the Ledbetter Landing site (40BN25).

Figure 8.24. Stratigraphic profile of the Ledbetter Landing site (40BN25). Reproduced from the original field map, G. Lidberg, 1940 (Original on file at the Frank H. McClung Museum of Natural History and Culture, University of Tennessee, Knoxville). (Oversized figure, see Appendix A.)

University of Tennessee, Knoxville). Stratum I contained moderate amounts of cultural material, and the majority of burials (n = 83) at the site.

Underlying Stratum I was a deposit consisting mainly of "yellow sand with flecks of shell, charcoal, and burnt soil scattered through it" (G. Lidberg, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville), described as Stratum II, and containing approximately equal amounts of cultural material as Stratum I, but significantly fewer burials (n = 35). The boundary between the base of Stratum II and the subsoil beneath was not sharp, and some difficulty was noted in distinguishing between the two during excavation. The subsoil was a yellowish-tan sandy clay.

Features and Burials

Burials (Human, n = 114; Canine, n = 4)

A total of 118 interments were recorded during excavation (Table 8.12). The majority of burials, both human (n = 80) and canine (n = 3), was associated with Stratum I (Figure 8.25). Thirty-four human and one canine burial were documented in Stratum II (Figure 8.26). Summary data for each burial is provided in Table 8.12, and derive from the primary burial record forms used in the field, and (for age and sex) also include reassessments made during the 1990 NAGPRA inventory of all human skeletal material at the Frank H. McClung Museum (Smith 1990).

There was significant disagreement in the results of classification by sex (35.9% differently classified by sex) by the WPA-era analysts and the recent re-assessments by Smith, but less divergence between assessment by age (19.3%).

Table 8.12. Burial data from the Ledbetter Landing site (40BN25).

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
1	14CA	1					Dog				
2	14CA	1	Fair	S	Fully Flexed	Right	M	Indeterminate	Adult	Adult	
3	18CA	1	Good	Unspecified	Partly Flexed	Unspecified	M	Indeterminate	Adult	Subadult	
4	18CA	1	Good	Unspecified	Unspecified	Unspecified	F	Indeterminate	Adult	Subadult	
5	13CA	1	Fair	N	Fully Flexed	Left	F	Indeterminate	Adult	Adult	
6	14CA	1	Fair	W	Fully Flexed	Left	F	Indeterminate	Adult	Adult	
7	21CA	1	Good	W	Extended	Right	Indeterminate	Indeterminate	Subadult	Subadult	
8	21CA	2	Fair	W	Unspecified	Back	Indeterminate	Indeterminate	Subadult	Subadult	
9	17CA	1	Fair	E	Fully Flexed	Left	M	Indeterminate	Adult	Adult	
10	18CA	1	Good	E	Partly Flexed	Back	F	F	Adult	Adult	
11	16CA	1	Good	E	Partly Flexed	Back	M	M	Adult	Adult	
12	16CA	1	Good	E	Partly Flexed	Back	M	M	Adult	Adult	shell pendant
13	20L3	1	Good	W	Fully Flexed	Seated	M	M	Adult	Adult	
14	20CA	2	Good	E	Fully Flexed	Left	M	M	Adult	Adult	
15	20CA	1	Good	E	Fully Flexed	Front	M	F	Adult	Adult	
16	20CA	1	Fair	E	Fully Flexed	Back	Indeterminate	F	Subadult	Adult	
17	13CA	1	Fair	W	Fully Flexed	Right	Indeterminate	F	Indeterminate	Adult	
18	15CA	1	Fair	N	Fully Flexed	Back	Indeterminate	M	Adult	Adult	
19	20L2	1	Good	NE	Fully Flexed	Back	F	Indeterminate	Adult	Indeterminate	
20	17CA	2	Fair	N	Partly Flexed	Unspecified	M	F	Adult	Adult	ulna awl
21	18CA	1	Good	E	Fully Flexed	Back	Indeterminate	M	Adult	Adult	
22	19CA	1	Good	W	Extended	Back	Indeterminate	Indeterminate	Subadult	Subadult	
23	16CA	1	Fair	W	Fully Flexed	Unspecified	F	F	Adult	Adult	
24	20CA	1	Good	Unspecified	Fully Flexed	Back	Indeterminate	Indeterminate	Subadult	Indeterminate	
25	16CA	1	Fair	NW	Fully Flexed	Left	F	Indeterminate	Adult	Indeterminate	
26	15CA	1	Good	W	Fully Flexed	Back	F	Indeterminate	Adult	Adult	
27	20CA	1	Fair	E	Fully Flexed	Unspecified	M	F	Adult	Adult	
28	20CA	2	Fair	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	2 tubular shell beads; several small perforated shells
29	21CA	1	Fair	SE	Fully Flexed	Right	Indeterminate	Indeterminate	Subadult	Subadult	sherd
30	17CA	1	Good	E	Partly Flexed	Back	F	F	Adult	Adult	shell beads
31	22CA	1	Good	W	Unspecified	Back	Indeterminate	Indeterminate	Subadult	Subadult	
32	18CA	1	Good	S	Fully Flexed	Back	M	F	Adult	Adult	
33	32CA	1	Fair	E	Fully Flexed	Back	F	F	Adult	Adult	
34	19CA	1	Good	S	Partly Flexed	Left	M	M	Adult	Adult	
35	20CA	2	Poor	S	Unspecified	Back	Indeterminate	Indeterminate	Subadult	Subadult	quartz pebbles; ochre; 2 bone awls; antler tools; ulna awls
36	18CA	1	Fair	E	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Indeterminate	
37	17CA	1	Good	E	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Adult	

Table 8.12. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
38	20CA	1		Good			E	Fully Flexed	Seated	M	Indeterminate
39	20CA	2		Cremation			Indeterminate	Indeterminate	Adult	Adult	
40	16CA	2	Good	NE	Partly Flexed	Back	M	M	Adult	Adult	projectile point
41	16CA	2	Fair	W	Partly Flexed	Seated	M	Indeterminate	Adult	Indeterminate	
42	16CA	1		Cremation			M	M	Adult	Adult	2 projectile points
43	16CA	2	Poor	NW	Partly Flexed	Seated	Indeterminate	M	Indeterminate	Adult	
44	19CA	1	Good	W	Partly Flexed	Back	M	M	Adult	Adult	
45	18CA	2	Fair	SW	Unspecified	Reburial	F	M	Adult	Adult	
46	16CA	1	Good	W	Partly Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	
47	18CA	1	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
48	18CA	1		Cremation			Indeterminate	Indeterminate	Indeterminate	Adult	
49	16CA	2	Good	N	Fully Flexed	Back	M	M	Adult	Adult	
50	16CA	2	Good	S	Fully Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	
51	19CA	1	Unspecified	N	Fully Flexed	Back	Indeterminate	Indeterminate	Subadult	Adult	perforated pebble
52	19CA	1	Good	NW	Fully Flexed	Right	F	Indeterminate	Adult	Indeterminate	
53	19CA	1	Fair	S	Fully Flexed	Left	M	F	Adult	Adult	
54	16CA	2	Fair	Unspecified	Unspecified	Unspecified	M	Indeterminate	Adult	Adult	
55	18L1	1	Good	W	Fully Flexed	Left	F	Indeterminate	Adult	Adult	
56	18L1	1	Fair	SE	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
57	19L1	1	Good	S	Fully Flexed	Left	M	F	Adult	Adult	
58	21L1	1	Good	E	Partly Flexed	Back	F	F	Adult	Adult	
59	20L2	1	Fair	Unspecified	Fully Flexed	Back	F	F	Adult	Adult	
60	19CA	1	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
61	20L2	1	Fair	E	Partly Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	shell bead
62	18L1	2	Good	E	Fully Flexed	Back	F	F	Adult	Adult	
63	19L1	2	Fair	W	Fully Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	worked animal bone; shell beads
64	18L1	1	Good	S	Fully Flexed	Front	M	M	Adult	Adult	shell "discoidal" (gorget?); shell object; copper
65	18CA	2		Cremation			M	Indeterminate	Adult	Adult	
66	18L1	1	Good	NW	Fully Flexed	Right	M	F	Adult	Adult	copper beads
67	21L2	1	Fair	W	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
68	21L1	1	Good	N	Extended	Back	Indeterminate	Indeterminate	Subadult	Indeterminate	
69	21L1	1	Fair	W	Extended	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	worked antler; antler flaker; antler tools
70	20L2	1	Good	S	Partly Flexed	Left	Indeterminate	Indeterminate	Subadult	Adult	
71	19CA	1	Fair	NE	Fully Flexed	Back	F	F	Adult	Adult	
72	19CA	2	Fair	NE	Fully Flexed	Left	Indeterminate	F	Adult	Adult	
73	19CA	1	Fair	W	Fully Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	

Table 8.12. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
74	19CA	2	Fair				NW	Partly Flexed	Seated	M	Indeterminate
75	19CA	2	Good				E	Partly Flexed	Seated	M	Indeterminate
76	19CA	2	Cremation				M	M	Adult	Adult	projectile point
77	18L1	1	Cremation				M	Indeterminate	Adult	Adult	projectile point
78	18L1	2	Good	E	Extended	Back	Indeterminate	Indeterminate	Subadult	Subadult	cut / polished human femur; 13 projectile points; 5 bone awls; unmodified cannon bones; worked bone; bone artifacts; abrader; incised bone awl; 2 broken bone awls; red ochre
79	19L1	1	Good	NE	Fully Flexed	Seated	Indeterminate	Indeterminate	Subadult	Subadult	
80	19L2	1	Fair	NW	Partly Flexed	Left	Indeterminate	Indeterminate	Subadult	Subadult	
81	20L2	1	Good	SE	Partly Flexed	Back	F	F	Adult	Adult	
82	18L1	1	Fair	SE	Fully Flexed	Front	F	M	Adult	Adult	
83	19L2	1	Fair	SW	Fully Flexed	Right	F	Indeterminate	Adult	Adult	
84	19L1	2	Cremation				Indeterminate	Indeterminate	Adult	Adult	
85	19CA	2	Fair	W	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	
86	19L2	1	Good	E	Partly Flexed	Right	F	F	Adult	Adult	
87	21L1	2	Fair	NE	Extended	Back	Indeterminate	Indeterminate	Subadult	Subadult	
88	22L2	1	Fair	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
89	19L2	1	Fair	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
90	16CA	1	Poor	W	Fully Flexed	Right	Indeterminate	F	Adult	Adult	
91	19L1	1	Good	N	Partly Flexed	Left	M	M	Adult	Adult	cut human femur; graver
92	18L1	1	Good	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
93	22L2	2	Fair	SE	Fully Flexed	Left	M	Indeterminate	Adult	Adult	
94	22L2	2	Fair	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Subadult	Subadult	
95	19L2	1	Good	E	Partly Flexed	Back	M	M	Adult	Adult	
96	18L2	1	Good	E	Fully Flexed	Front	F	F	Adult	Adult	
97	18L2	1	Good	SE	Partly Flexed	Left	M	M	Adult	Adult	
98	21L1	2	Cremation				Indeterminate	Indeterminate	Indeterminate	Adult	broken bone awl
99	18L1	2	Unspecified	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Adult	
100	19L2	1	Fair	E	Partly Flexed	Front	F	F	Adult	Adult	shell beads
101	18L2	2	Cremation				Indeterminate	F	Adult	Adult	
102	19L2	2					Dog				
103	17L1	1					Dog				
104	19L2	2	Good	NE	Partly Flexed	Back	F	F	Adult	Adult	nutting stone

Table 8.12. Continued.

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
105	19L3	1	Good	SW	Partly Flexed	Right	M	M	Adult	Adult	
106	19L3	1	Fair	NE	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	shell beads
107	19L3	1	Dog								
108	18L1	2	Good	W	Fully Flexed	Back	M	M	Adult	Adult	4 projectile points; 2 drills; ulna awl; cannon bone awl; antler tine
109	17L3	1	Good	SW	Fully Flexed	Left	M	M	Adult	Adult	
110	17L1	2	Good	SW	Partly Flexed	Back	M	M	Adult	Adult	projectile point
111	17L1	2		Cremation			M	F	Adult	Adult	shell beads
112	19L3	1	Good	S	Partly Flexed	Back	M	M	Adult	Adult	sherd
113	19L3	2	Fair	SE	Partly Flexed	Back	F	Indeterminate	Adult	Adult	
114	18L3	1	Fair	SE	Unspecified	Back	Indeterminate	Indeterminate	Subadult	Subadult	
115	18L3	1	Fair	S	Partly Flexed	Back	Indeterminate	Indeterminate	Subadult	Subadult	
116	17L3	1	Good	N	Partly Flexed	Right	F	M	Adult	Adult	
117	17L3	1	Fair	E	Extended	Back	Indeterminate	Indeterminate	Subadult	Subadult	
118	17L2	1	Good	SE	Fully Flexed	Back	F	M	Adult	Adult	projectile point

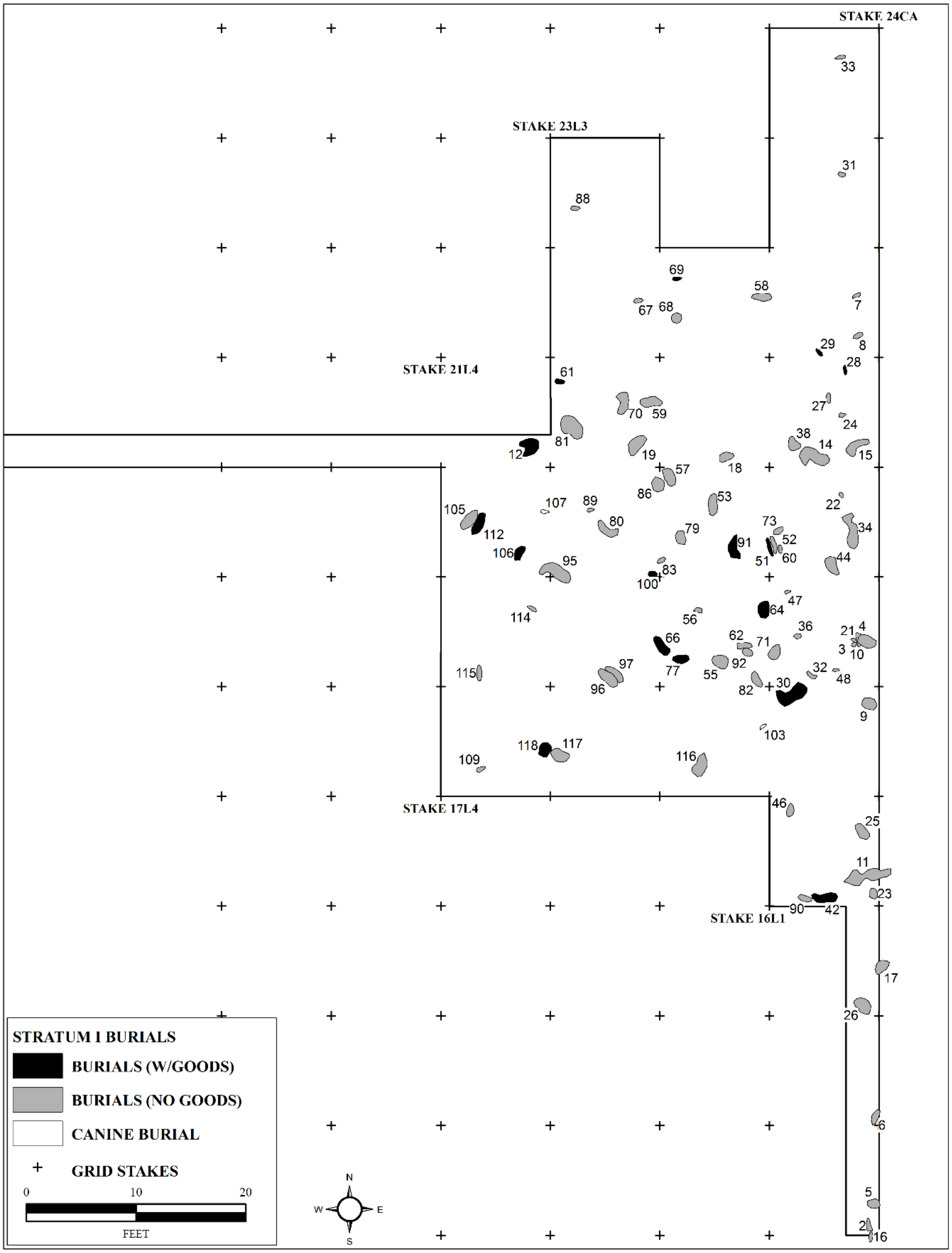

Figure 8.25. Burials associated with Stratum I at the Ledbetter Landing site (40BN25).

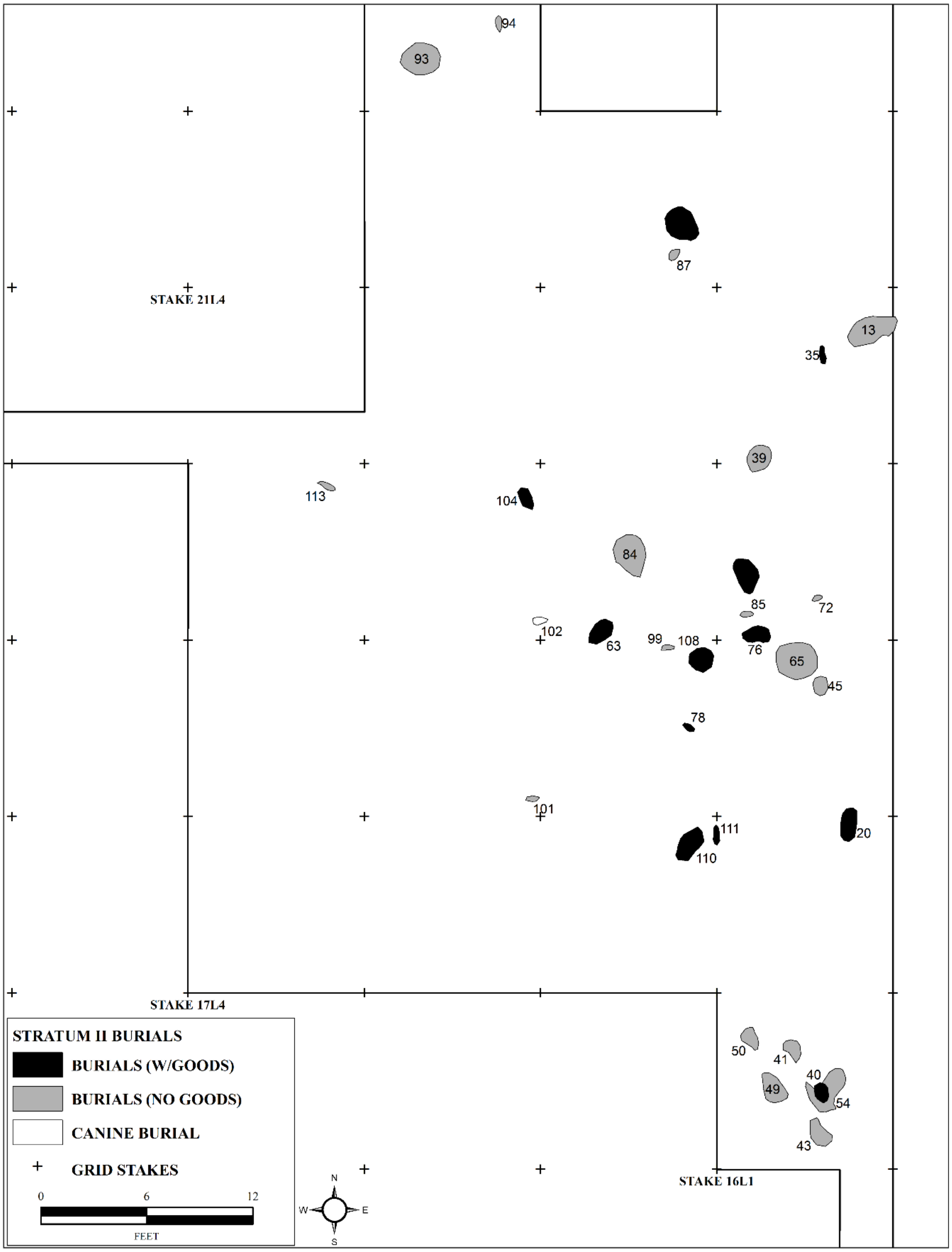

Figure 8.26. Burials associated with Stratum II at the Ledbetter Landing site (40BN25).

WPA-era evaluation indicated that of the 114 burials present, thirty-eight males (33.3%) and twenty-seven females (23.7%) were represented, with the remainder (n = 49; 43%) of indeterminate sex. The 1990 NAGPRA reassessment found a greater proportion of the site's skeletons of indeterminate sex (n = 62; 54.4%) and equal numbers of males and females (n = 26; 22.8%).

With respect to age estimation, results of the WPA and NAGPRA analysts were in closer agreement. The original estimates indicated the burial population was largely adult (n = 75; 65.8%). Subadults comprised 23.7% (n = 27) of the sample, and twelve (10.5%) skeletons were of indeterminate age. The 1990 NAGPRA evaluation indicated adults at 68.4% (n = 78) and subadults at 23.1% (n = 32) of the Ledbetter Landing burials, with only four (3.5%) indeterminate (Table 8.12).

Despite the differences particularly in sex assessments of the Ledbetter Landing population, the description of the overall condition of the material was surprising. In general, skeletal condition was recorded as either good (n = 52, 45.6%) or fair (n = 47, 41.2%) condition, although some burials that were listed as such were also noted in "fragmentary" condition. Only three individuals were indicated to be in "poor" condition; the condition of two others was unspecified. The condition of ten burials (8.8%) was recorded as "cremation;" three were associated with Stratum I and seven with Stratum II (Table 8.12).

Flexure was able to be documented for 80.7% (n = 92) of the burials. Of those for which flexure could be recorded, the largest proportion was in a "fully flexed" burial position (n = 50, 54.3%); most of the remainder for whom position could be ascertained were "partly flexed" (n = 35, 38%). Seven extended burials (7.6%) and twelve with no burial position specified were also documented, in addition to the ten cremations for which degree of flexure was not applicable (Table 8.12).

Burial position (e.g., “back,” “right side,” “left side,” “front”) was recorded for a total of 104 burials, not including the ten cremations. By a significant margin, most of those were on their backs (n = 43, 41.3% of the 104 for which position was recorded). Other skeletons were positioned on their left (n = 20, 19.2%) or right (n = 11, 10.6%). Only five were placed face down. Seven were in a seated position, and there was a single possible bundle burial documented (Burial 45, Stratum II [Figure 8.26]). Burial position could not be determined for 17 skeletons (Table 8.12).

Grave orientation (defined as the direction of the long axis of the grave and the location of the head) could not be assessed for thirteen of the 104 non-cremation burials at Ledbetter Landing. Of the remaining 91, most were oriented to the east (n = 24, 26.4%) or west (n = 20, 21.9%). The remainder of individuals for which orientation was recorded were divided between south (n = 11; 12.1%), north (n = 8; 8.8%), southeast (n = 9; 9.9%), northeast (n = 8; 8.8%), southwest (n = 5; 5.5%) and northwest (n = 6; 6.6%) (Table 8.12).

Grave accompaniments were not unusual in burials in either stratum, although by proportion a significantly larger number of Stratum II burials (n = 14, 40% of Stratum II) contained offerings than did Stratum I (n = 15, 18.1% of Stratum I) (Figures 8.25, 8.26, Table 8.12). Burial items were highly varied. Chipped stone implements and bone and antler tools were most common. Shell beads of several types, including disc-shaped, tubular, and half-ground *Leptoxis* (gastropod) varieties (Figure 8.27), were also present in several burials. Burial items of non-local origin included copper beads and other copper items, marine shell (possibly

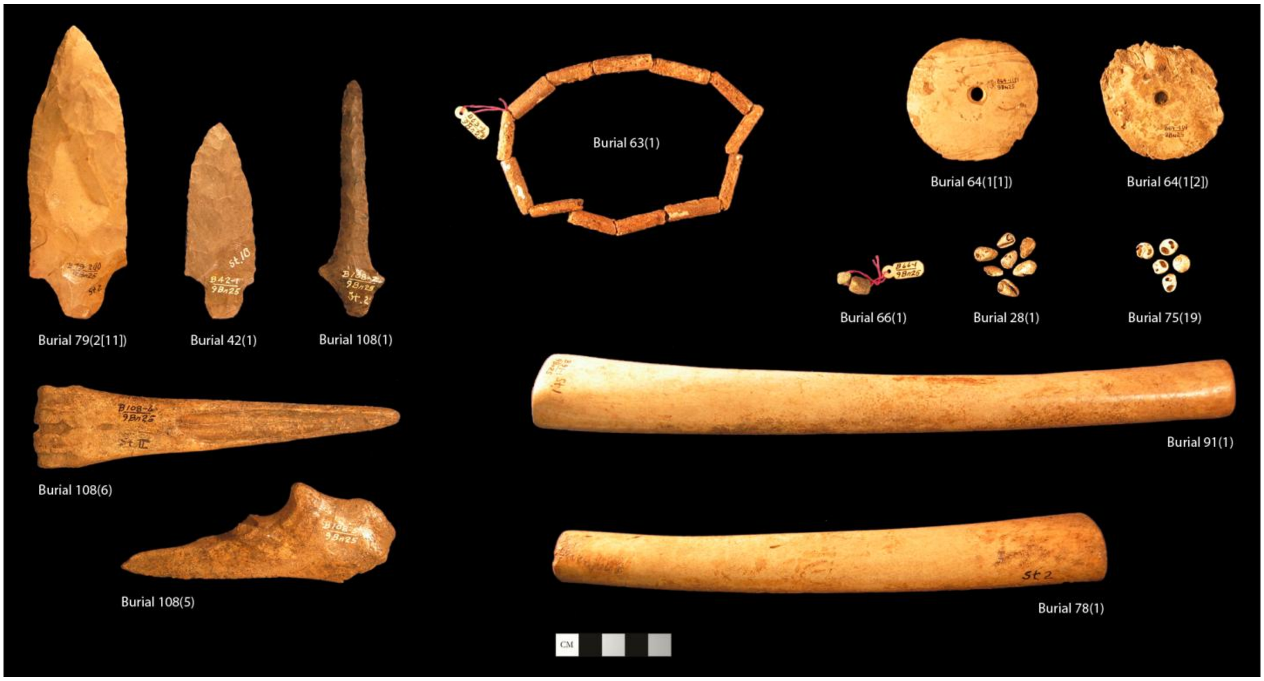

Figure 8.27. Selected burial objects from the Ledbetter Landing site (40BN12): chipped stone (top left, Burials 79, 42, and 108); bone tools (bottom left, Burial 108); tubular shell beads (top center, Burial 63); Busycon perforated discs (top right, Burial 64); beads (copper, Burial 66; Marginella marine gastropods, Burial 28; Leptoxis freshwater gastropods, Burial 75); polished human long bone segments (bottom right, Burials 91 and 78).

Busycon) discs, and *Marginella* shell beads (Figure 8.27). Two burials also contained cut and polished human long bone segments (Figure 8.27).

Most burials (n = 18) contained only a single item or type of item (e.g., ulna awl, “shell beads”); among those accompanied by more than one object, five contained two items, and three contained three. Only three burials included more than three items, and all three were associated with Stratum II (Table 8.12).

Burial 35, a subadult, included five items or materials, consisting mainly of bone or antler tools, but also ochre and several small quartz pebbles.

Burial 108, an adult male, contained a total of nine artifacts: four projectile points, two drills, two bone awls, and a whitetail deer antler tine.

A second subadult, Burial 78, contained a total of twenty-seven objects or materials (Table 8.9), including at least one and possibly two modified segments of human long bone.

Four canine burials were documented at Ledbetter (Table 8.9). None was associated with any human interment. Three were found in Stratum I (Burials 1, 103, and 107 [Figure 8.25]) and one was recorded in Stratum II (Burial 102 [Figure 8.26]).

Features

There were few non-burial prehistoric features documented at Ledbetter (Table 8.10; Figure 8.28). Only eight were identified and recorded[37]. Two pits were associated with Stratum I. One (Pit 3) was encountered in the northeastern corner of the excavation

[37] Unlike many other sites discussed in this and other chapters, Ledbetter’s site map does not depict prehistoric features that were otherwise undocumented on field paperwork. Whether this reflects an absence of features such as those that typically were not assigned numbers by WPA supervisors in western Tennessee (e.g., thermal features, postmolds), or simply a choice not to include unnumbered features, is not clear. Considering that Lidberg previously excavated Kays Landing, and included a significant number of un-numbered features on that site’s plan map, the absence of such features on the Ledbetter map may in fact indicate a lack of such features at the site.

and extended to a depth of nearly 2.5 m (ca. 8 ft) with a likely diameter measuring two meters or more.

Additional documented prehistoric features consisted of a small mass of mussel shells; two concentrations of charred material or ash; a small poorly defined pit containing several artifacts and unmodified animal bone; a large stone of indeterminate function; and several limestone slabs found near the western edge of the excavation, and thought by the investigator to be the remains of a looted Mississippian-period stone box grave (Table 8.13).

Modern intrusions accounted for a significant proportion of the recorded features onsite, including thirteen postmolds representing the previous construction of two warehouses on the location (Table 8.13). Three additional modern intrusions of relatively large size were also identified (Figure 8.28), including one (Pit 1) that was initially documented as a prehistoric feature but found to contain modern debris, including nails.

Cultural Material

There was relatively little cultural material recovered at Ledbetter Landing (Table 8.14)[38]. The material assemblage consisted of a total (including burial accompaniments) of 606 items or samples taken, dominated by chipped stone (n = 383, 63.2%). Bone (n = 114, 18.8%) and antler (n = 62, 10.23%) represented the next largest material categories, with others (e.g., groundstone) comprising small proportions of the total.

By provenience, there are notable differences in the frequency of some categories, most evident in the lack of shell artifacts recovered in contexts outside of burial inclusion; eleven burials contained shell beads or other decorative objects made from freshwater or marine shell.

[38] A complete listing of all items recorded in the site F.S. log is provided in Appendix B

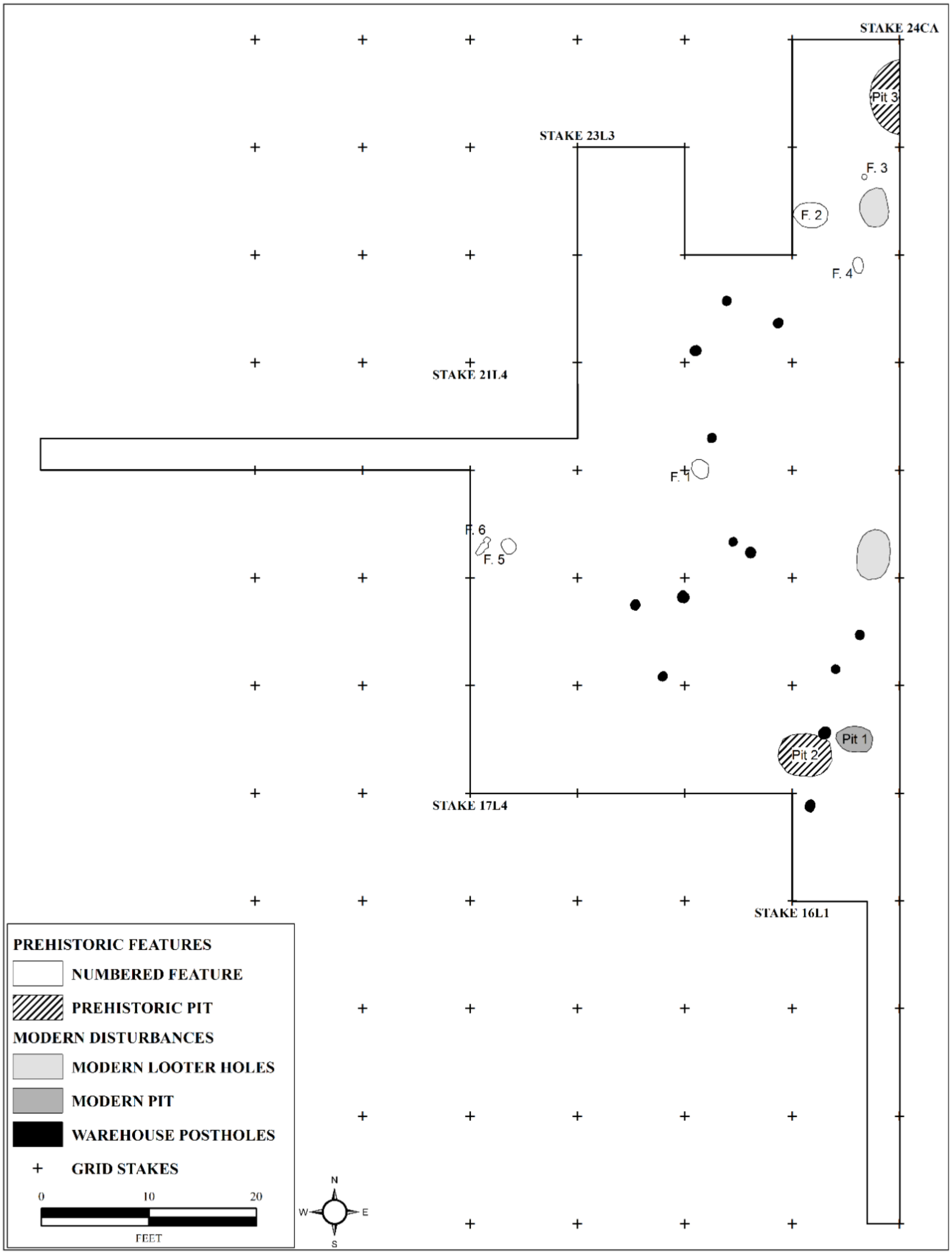

Figure 8.28. Prehistoric features and modern disturbances at the Ledbetter Landing site (40BN25).

Table 8.13. Features documented at the Ledbetter Landing site (40BN25). Feature descriptions are taken from the field forms.

Feature	Stratum	Meters below datum	Grid Square	Dimensions (cm) N-S	E-W	Depth	Description
Pit 1	II	1.52	17CA	76.20	103.6 3	18.29	Only part of this pit was found. When it was dug out it proved to be a modern pit. Nails and other modern material was found in the fill.
Pit 2	I	Not recorded.	17CA	121.9 2	152.4 0	12.19	This was a large shell filled pit the intruded from Stratum I though no horizontal outline could be seen until a surface was cleared well into Stratum II. The bottom of the pit was covered 0.2 ft deep with mussel shell. Sides of the pit were straight, bottom flat.
Pit 3	I	Not recorded.	23CA	152.4 0	167.6 4	243.84	This pit was very large and extended to an extreme depth. It would have been necessary to excavate an additional square to completely clean the pit so only half of it was dug. The sides sloped toward the bottom which was only about 1.5 ft in diameter. The fill was of sandy clay with a slight addition of detritus. Very little animal bone was found in it.
Feature 1	II	Not recorded.	19L1	60.96	70.10	9.14	This feature is a small ash heap. It was expected that a fireplace should be found nearby that these ashes had come from, but no such thing was found. The ashes lay in a four-layer heap.
Feature 2	I	1.46	22CA	73.15	88.39	9.14	This was a small shell heap of mainly mussel shell inclusive in Stratum I. The shells were not burned and there were no artifacts or material other than shell present. One sample taken.
Feature 3	I	1.77	22CA	48.77	30.48	30.48	The presence of this large rock is inexplicable. It shows no wear - probably was abandoned before utilization.
Feature 4	I	1.86	21CA	48.77	39.62	6.10	This probably was a refuse put which was dig into the top of Stratum II from Stratum I. It consists simply of a thin bed of charred material (unidentifiable) with bone fragments scattered over it and through it.
Feature 5	II	Not recorded.	19L3	60.96	39.62	21.34	This was an ill-defined pit containing an antler tool, three projectile points, and unidentified animal bone. It may have been a refuse heap. The outline could not be traced clearly.
Feature 6	I	Not recorded.	19L3	Not recorded.			There were three limestone slabs about 1 foot in diameter and about 0.1 ft thick. At first we thought them a stone box burial but they proved unassociated with any burial. As yet the reported excavation of Moore has not been found and I believe this may have been a late stone box grave which was dug up and the slabs tossed into the pit, which we found in profile.
Modern post holes (n = 13)	Intrusive to subsoil.	From surface, depths not recorded.	Multiple.	Average diameter: 29 cm.		Not recorded.	A series of large, modern post holes were documented onsite, resulting from the construction (and demolition) of a pair of warehouses on the location.

Table 8.14. Total artifacts documented at the Ledbetter Landing site (40BN25) by material type and provenience.

MATERIAL	PROVENIENCE						
	Unassigned	Trench or Test Pit	Burial	Plow Zone	Stratum I	Stratum II	TOTALS
Antler	37	6	5	0	7	7	62
Bone	52	6	21	6	20	9	114
Chipped Stone	1	95	27	11	114	135	383
Groundstone	0	2	5	2	7	4	20
Mineral	0	1	1	0	0	0	2
Pottery	0	0	2	1	0	0	3
Shell	1	0	13	0	0	1	15
Other	1	2	1	0	1	2	7
TOTALS	**92**	**112**	**75**	**20**	**149**	**158**	**606**

Among materials with no assigned provenience, there was a significant lack of representation of chipped stone. The majority of unassigned materials consisted of antler and bone.

In contrast, test trenches and test pits produced principally chipped stone materials, with relatively small amounts of bone, antler, or other artifact types documented. Due to the wide distribution of test pits around the area of the site, the lack of preserved bone or antler outside of the main shell-bearing area is not unexpected.

The plow zone produced relatively minor quantities of any material, including chipped stone (plow zone artifacts accounted for only 3.3% of the total assemblage), possibly a reflection of visitation of the site by local collectors as described previously in this section.

Stratum I and II were largely intact, and produced the majority of materials. There was a minor increase in chipped stone recovered, and a decrease in bone artifacts, from Stratum I to Stratum II, but in most respects the material assemblages were not significantly different.

It should be noted here that the above data depended on the choices made by the field supervisor during excavation, and reflects significant biases not only in collection of materials, but also in later analysis in the laboratory. The site supervisor specifically noted the presence of pottery at Ledbetter Landing:

> The pottery found on this site seemed to be isolated in the upper reaches of the deposit… A great range of pottery types was found, most of them in very small percentages. In fact, it seemed in cursory examinations as the pottery was packed that it ran nearly the entire gamut of types of pottery found in this West Tennessee region. The bulk of the pottery found on the site was tempered with crystalline limestone and was impressed with a cord-wrapped dowel or with basketry… The remaining pottery types occurred in such small percentages that it would be

> unwise for the excavator to discuss their significance. It may be mentioned, however, that shell tempered, clay-grit tempered, sand tempered, and limestone tempered wares were found (G. Lidberg, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville).

Despite indications in the site field report of a wide array of ceramic types represented, neither the site field specimen log nor the collections available for examination suggested the recovery of any pottery. There is no explanation provided for the lack of this material among the museum's collections.

Temporally Diagnostic Hafted Bifaces

The relatively small assemblage of temporal diagnostics from Ledbetter Landing was analyzed to assess stratigraphic integrity of the site's deposits and to provide an additional means beyond the limited radiocarbon dating conducted (see below) of temporally situating the two main strata at the site.

Relatively few hafted bifaces were among the artifacts from the Ledbetter Landing site, totaling 187 (48.8% of the site's 383 chipped stone artifacts). Of those, six could not be relocated for examination; another thirty-two were not able to be confidently classified into any defined type and were grouped by morphology, comprising corner-notched (n = 3), lanceolate (n = 3), and stemmed (n = 26) forms (Table 8.15).

Of the remaining 149 diagnostics that could be classified, most derived from the shell-bearing Stratum I (n = 42, 28.2%) or shell-free Stratum II (n = 53, 35.6%). The site's plow zone contained only two, while test trenches (n = 35) and burials (n = 16) constituted the remainder.

Table 8.15. Frequencies of diagnostic hafted bifaces by temporal affiliation and provenience at the Ledbetter Landing site (40BN25).

Type	Temporal Affiliation	Test Trench	Burials	Plow Zone	Stratum I	Stratum II	Total (By Type)
Morrow Mountain	Middle Archaic	0	0	0	0	1	1
Late Archaic Stemmed	Late Archaic	2	9	0	10	6	27
Ledbetter	Late Archaic	16	3	1	7	18	45
Pickwick	Late Archaic	1	3	0	2	5	11
Savannah River Stemmed	Late Archaic	3	0	0	1	3	7
Table Rock Stemmed	Late Archaic	0	0	0	1	0	1
Terminal Archaic Barbed	Late Archaic	1	1	0	2	7	11
Dickson Cluster	Late Archaic - Early Woodland	4	0	1	6	7	18
Motley	Late Archaic - Early Woodland	0	0	0	3	0	3
Saratoga Cluster	Late Archaic - Early Woodland	1	0	0	0	0	1
Turkey Tail	Late Archaic - Early Woodland	1	0	0	1	3	5
Total, Late Archaic / Late Archaic - Early Woodland		**29**	**16**	**2**	**33**	**49**	**129**
Adena Stemmed	Early Woodland	6	0	0	6	1	13
Early Woodland Stemmed	Early Woodland	0	0	0	0	1	1
Jack's Reef	Late Woodland	0	0	0	1	1	2
Small Triangular	Late Prehistoric	0	0	1	2	0	3
	Total, Woodland	**6**	**0**	**1**	**9**	**3**	**19**
	Total, Indentified Hafted Bifaces	**35**	**16**	**3**	**42**	**53**	**149**
Unidentified Corner-Notched		0	0	0	2	1	3
Unidentified Stemmed		5	5	1	7	8	26
Unidentified Lanceolate		1	0	0	1	1	3
Unidentified, Other		1	2	2	0	1	6
	Total, All Unidentified Hafted Bifaces	**7**	**7**	**3**	**10**	**11**	**38**
	Total, All Hafted Bifaces, By Provenience	**42**	**23**	**6**	**52**	**64**	**187**

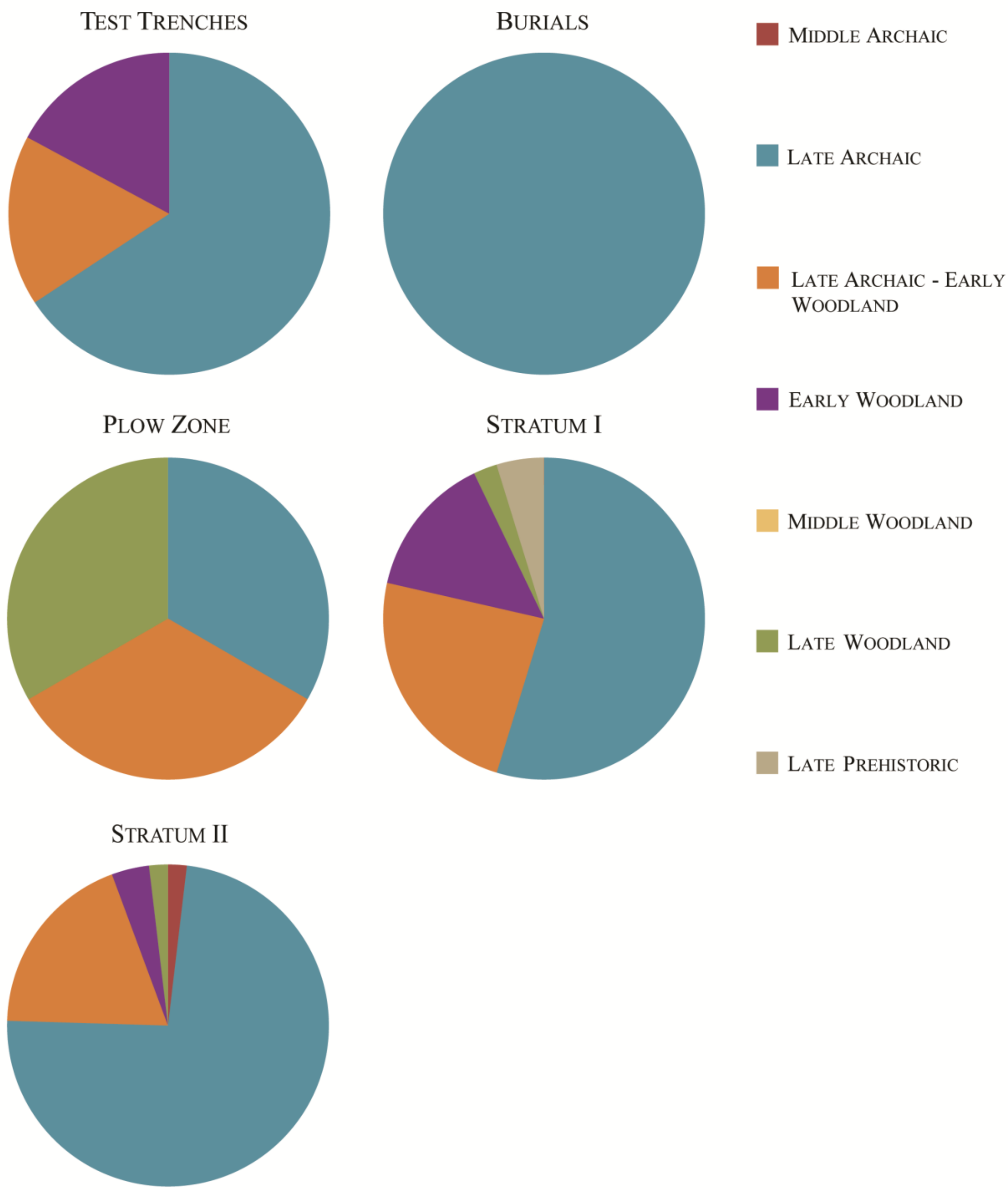

Figure 8.29. Temporal affiliation of diagnostic hafted bifaces at the Ledbetter Landing site (40BN25) by provenience.

All proveniences at the Ledbetter Landing site were dominated by Late Archaic (n = 102, 68.4%), transitional Late Archaic – Early Woodland (n = 27, 18.1%), and Early Woodland (n = 14, 9.4%) diagnostic types (Figure 8.29). Only six classified hafted bifaces indicated any other temporal period (Table 8.15).

These analyses indicate that, like Oak View (40DR1) just upriver, the Ledbetter Landing site was first occupied during the Late Archaic period, and probably saw its greatest intensity of use (Stratum II and Stratum I) during that time period. Subsequent occupation during the transitional Late Archaic – Early Woodland and Woodland periods characterized the upper shell-bearing Stratum I, suggesting that shellfishing in this part of the lower Tennessee Valley did not end with the termination of the Archaic period. This is consistent with results of analysis of the Oak View site, which contained a shell-bearing deposit of probable Late Archaic – Early Woodland age prior to its destruction by plowing before that site was excavated.

Distributions of piece-plotted hafted bifaces by stratum (Figures 8.30 and 8.31) show no identifiable spatial patterning within the site block. Late Archaic diagnostics occurred throughout the excavation, interspersed with scattered later diagnostic types.

Radiocarbon Dating

The presence of a shell mound (Stratum I) at Ledbetter Landing suggested the possibility of contemporaneity of that deposit with other shell-bearing strata located in the western Tennessee Valley. Neighboring sites included Oak View, located roughly 6 km upstream of Ledbetter, and Eva, situated approximately 34 km downstream. Shell deposits at the two nearby sites represented significantly different temporal periods (see Eva, Chapter 6, Oak View, this

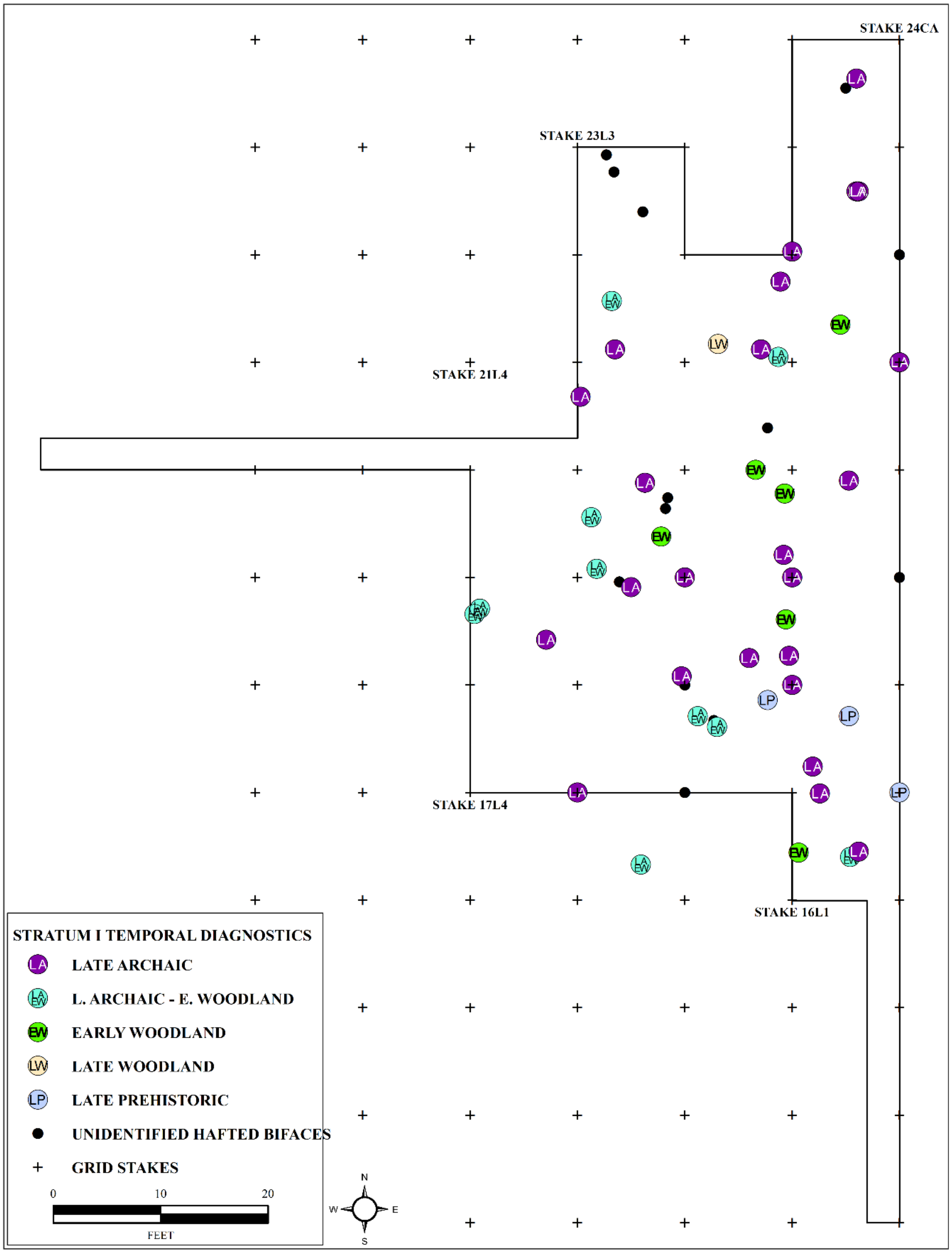

Figure 8.30. Distribution of temporal diagnostics in Stratum I and the plow zone at the Ledbetter Landing site (40BN25).

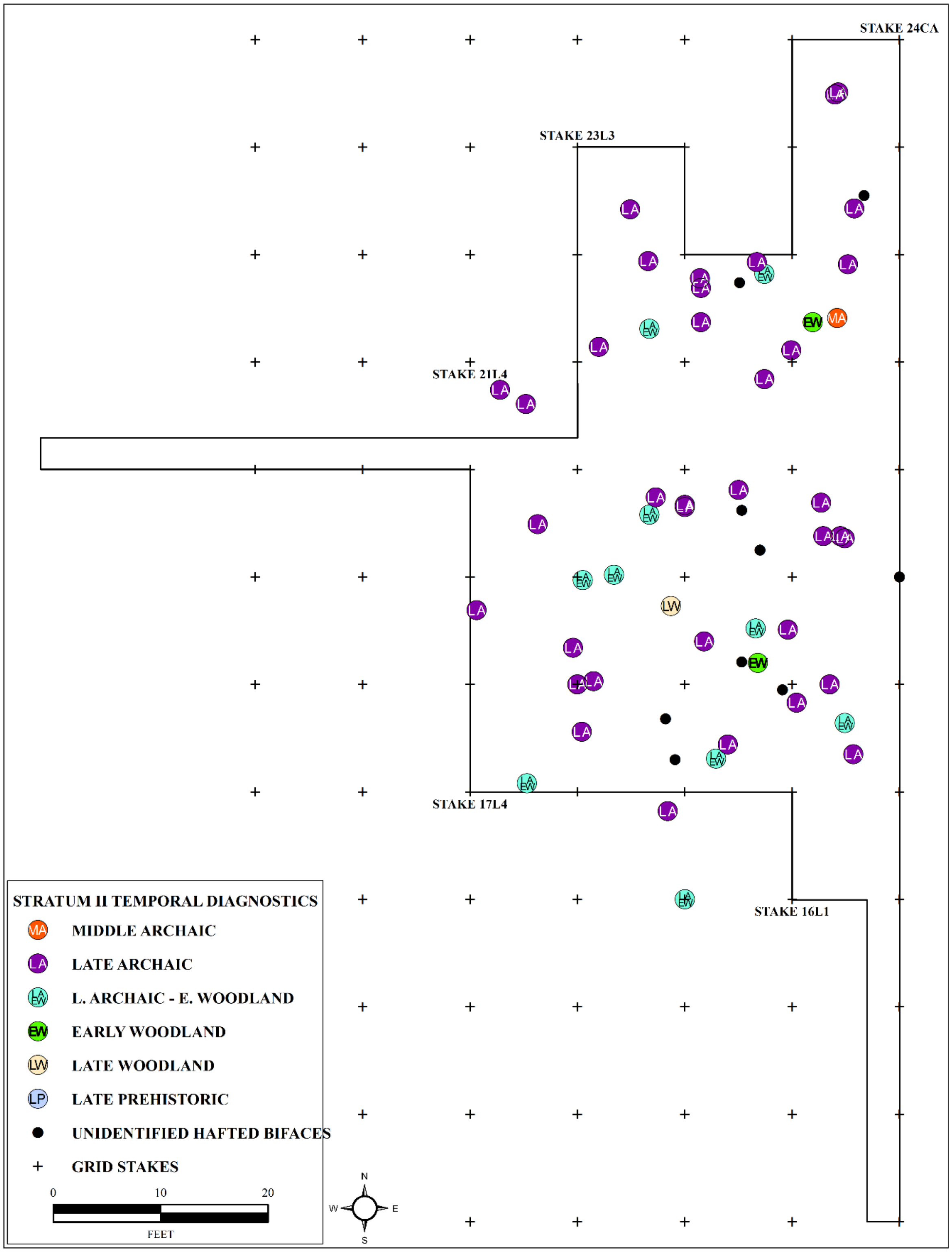

Figure 8.31. Distribution of temporal diagnostics in Stratum II and the plow zone at the Ledbetter Landing site (40BN25).

chapter), dating from ca. 7,500 to 7,200 cal yr BP (Eva, Stratum II) or to a period post-dating 4,000 cal yr BP (Oak View, destroyed shell-bearing deposit overlying Stratum I). Three radiocarbon samples, all of which consisted of fragments of tools made from mammalian bone, were selected to date the upper and lower portions of shell-free Stratum II at Ledbetter, and the base of the shell-bearing Stratum I (Table 8.16). The three specimens derived from the same grid square – 18L1 – in the southern central portion of the site's main excavation block, and were recovered from an area less than 3 m^2. Potential disturbance throughout the site, resulting from a significant number of burials in both deposits, made identification of areas in which no disturbance was likely nearly impossible, and in combination with the relatively minimal amount of bone and antler material recovered, the three samples selected represented the best choices available.

Despite precautions taken to avoid disturbed deposits, the interment of five individuals in the vicinity of the three samples origin (Burials 55, 56, 66, 77, and 101) may have affected particularly the relative positions and vertical integrity of the Stratum II specimens.

In order to test the relative reliability of the dated samples with respect to their stratigraphic positions, Bayesian modeling of the three dates was run to ascertain the likelihood that they represented significantly out-of-place materials, indicating disturbance. The results (Table 8.17) indicate that the variation between the dated samples from Stratum II was within an acceptable temporal range (A > 60.0), and that although a comparison of relative depths and ages suggests disturbance, the two samples were not dissimilar enough in age to conclude that vertical displacement had occurred.

Table 8.16. Radiocarbon dates from the Ledbetter Landing site (40BN25).

FS	Square	Stratum	Depth (mbd)	Material	AA #	δ 13C	14C Yr BP			Cal BP			1-Sigma Range (calibrated)	2-Sigma Range (calibrated)
229	18L1	1	1.31	bone	AA101226	-21.1	2560	±	47	2636	±	89	2752 - 2520	2763 - 2487
231	18L1	2	1.49	bone	AA101227	-22.1	4005	±	52	4489	±	88	4529 - 4417	4789 - 4295
292	18L1	2	1.89	bone	AA101228	-21.7	3889	±	52	4314	±	79	4412 - 4250	4437 - 4152

Table 8.17. Results of Bayesian modeling of dated from the Ledbetter Landing site (40BN25).

FS	Stratum	Depth (mbd)	14C Yr BP			Unmodeled Cal BP			Modeled Cal BP			Modeled 1-Sigma Range	Modeled 2-Sigma Range	Agreement Value (A)
229	1	1.31	2560	±	47	2636	±	89	2635	±	89	2752 - 2541	2763 - 2487	99.1
231	2	1.49	4005	±	52	4489	±	88	4458	±	78	4524 - 4414	4777 - 4288	98.6
292	2	1.89	3889	±	52	4314	±	79	4345	±	75	4422 - 4287	4514 - 4160	100.5

Occupational History of the Ledbetter Landing site

Use of the landform at the Ledbetter Landing site does not appear to significantly pre-date the mid-5th millennium BP. Stratum II, the site's deepest deposit, contained only Late Archaic temporal diagnostics in appreciable numbers, and radiocarbon dates from the stratum indicate a Late Archaic-aged occupation, albeit one that extended over a relatively short period of time, perhaps as little as one to two centuries. The relative lack of features identified at Ledbetter during that span, as well as the small material assemblage, may indicate minimal use of the site in a domestic capacity, although the presence of multiple burials during that period indicates funerary activities were occurring.

The substantial amount of time separating the Stratum II and Stratum I radiocarbon dates was not expected, and given the nature of Stratum I – a shell-bearing deposit of considerable thickness – its indicated age is somewhat unusual. If it its location in the shell deposit was accurately recorded and thus it can be considered to accurately date the shell midden / Stratum I, this assay would place the deposit well into the Woodland period, representing the latest date of any obtained during this project. Assuming the date's accuracy, it would indicate shellfishing at Ledbetter Landing was contemporaneous with other late shell-bearing sites such as Penitentiary Branch (Cridlebaugh 1986) and Robinson (Morse 1967) located in the Cumberland River valley.

The nature of the site's use during its later occupational phase is not clear. The relative lack of domestic features such as pits and hearths contrasts with the much larger number of features at other sites described as part of this project. Whether the smaller feature numbers represent what was present at the site, or if the excavation crew simply missed a significant number of hearths, pits, and other cultural features is unclear. As noted previously in this section, the supervisor in charge of work at Ledbetter Landing, was experienced and had previously excavated shell-bearing sites, and documented multiple features at those sites. Combined with the relatively small artifact assemblage from Ledbetter's deposits, which is also unusual compared to other sites of the research sample, the dearth of cultural features, and the relatively large number of burials in Stratum I, it is difficult to arrive at a conclusion regarding the nature of potential cultural activities that occurred at Ledbetter during the period when its shell-bearing deposit was accumulating, nor during the site's prior occupational phase. The possibility that it may have served as a mortuary location cannot be discounted, although lacking bracketing radiocarbon dates for the initiation and termination of deposition of the shell midden, it is difficult to ascertain the period of time over which the Stratum I burials accumulated (see Chapter 9).

McDaniel (40BN77)

The McDaniel site was located on the property of Porter McDaniel on Lick Creek, which emptied into the Tennessee River approximately 6 km upstream from Kays Landing, and 12 km from the confluence of the Tennessee and Big Sandy rivers (Figure 8.32). Currently McDaniel lies at the upper end of a small inlet of Kentucky Lake (Figure 8.33).

McDaniel was first visited by archaeologists from the UTDoA on May 13, 1941, and initial impressions of the site (observed shortly after plowing) were of a "dark brown, circular, slightly elevated patch in the field… [with] a thin scattering of spalls and artifacts" (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville). Two

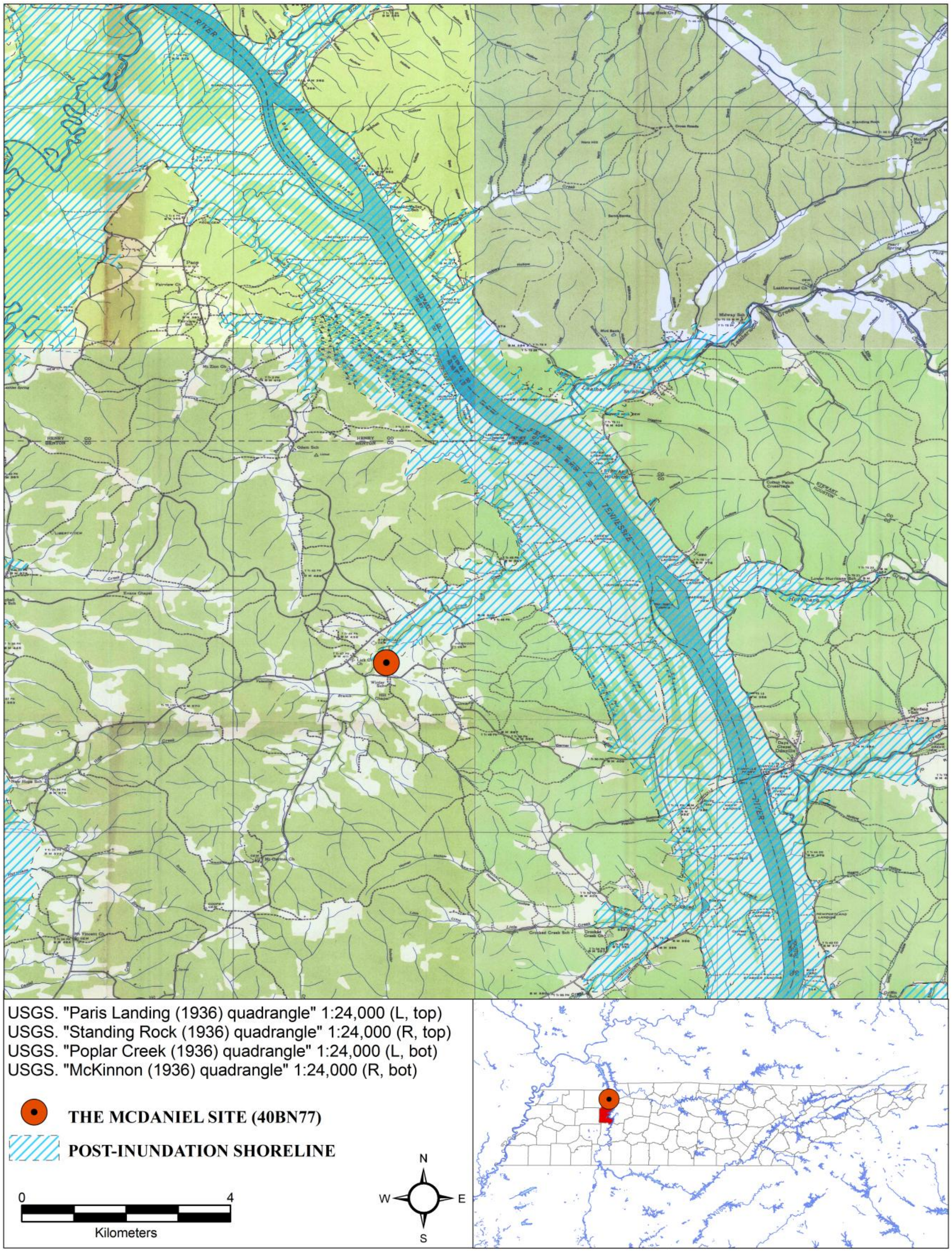

Figure 8.32. Location of the McDaniel site (40BN77).

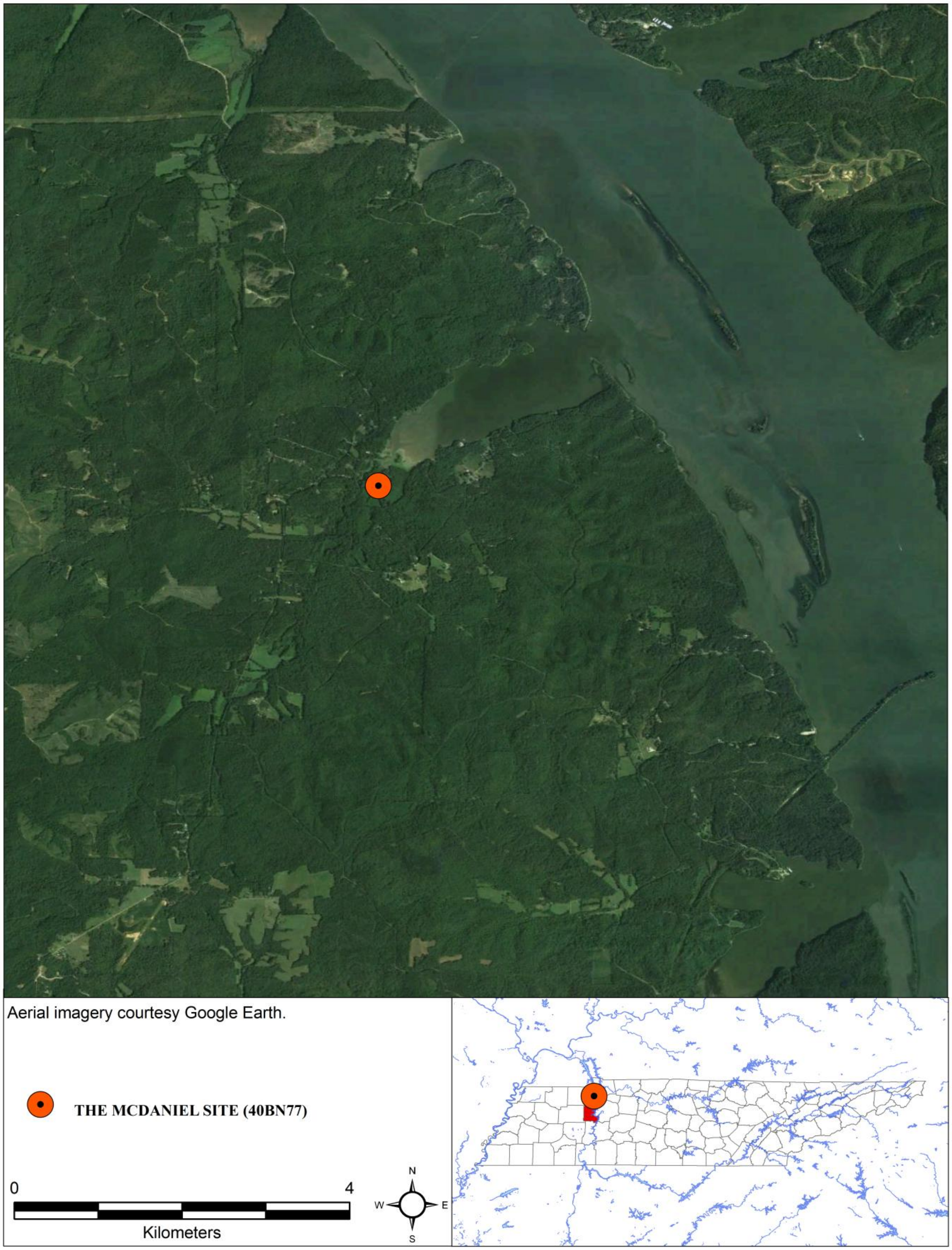

Figure 8.33. Modern location of the McDaniel site (40BN77).

months after the visit, a small crew led by Douglas Osborne began excavations at the site that lasted for approximately two and a half weeks.

Detailed information about McDaniel has not been previously published, although the site was among those used by Lewis and Kneberg to define the Archaic period in the Midsouth. McDaniel has been briefly described in two previous publications (Lewis and Kneberg 1947:6; 1959).

Environment and Soils

At the time of its excavation, McDaniel was located on a low rise between two small drainages (including Lick Creek) roughly four kilometers from the left bank of the Tennessee River. The site lay in corn fields at the time of its excavation, but is within the area classified by Braun (1950:156) as the Western Mesophytic Forest region. Oaks and hickories dominate uplands and slopes, but areas such as that in which McDaniel was located (bottoms and ravines), beeches, poplar, tulip tree, and sugar maple are dominant canopy species. McDaniel is positioned at the extreme western edge of the Western Highland Rim, a part of the Interior Low Plateaus province (Fenneman and Johnson 1946).

Soils in the area around the McDaniel site have been mapped as Chenneby silt loam (0 – 2% slopes) and silt loams of the Arktabutla-Rosebloom complex (0 – 2% slopes). Chenneby silt loam is a poorly drained soil found on floodplains; a typical profile extends to a depth of approximately 200.7 cm (79 in), and comprises silt loam from the ground surface to ca. 144.7 cm (57 in), below which stratified loamy sand transitions to fine sandy loam to silt loam (USDA Web Soil Survey, Accessed 8/1/2013). Arktabutla-Rosebloom complex soils are poorly drained, with a typical profile consisting entirely of silt loams extending to a depth to bedrock of 200.7 cm. Bedrock in the area is limestone of Mississippian and Devonian age (King and Beikman 1974; King et al. 1994).

TVA Excavation

A full excavation at the McDaniel site was not originally planned, but after initial testing the site supervisor determined that a more thorough investigation was warranted. However, because of the changed plans and need for rapid progress, McDaniel was not trenched prior to the opening of the excavation block. Several test pits provided information concerning the site's stratigraphy.

The long axis of the site's excavation block was oriented N-S, measuring 45.7 m (150 ft) long along its east side, and 12.2 m (40 ft) on its western side (Figure 8.34). At its widest, the block was 12.2 m extending E-W. The total area encompassed was 304.9 m^2 (ca. 3300 ft^2).

The cultural deposits at McDaniel lay atop a gray clay subsoil at depths reaching 2 m (ca. 79 inches), corresponding to the basal depth reached by the typical profiles of soils mapped in the area. Stratigraphy at McDaniel was defined as two stratigraphic units. According to the site supervisor, these deposits were in some areas of the excavation well separated by color distinctions, while in others the dividing line between the two strata were "rather arbitrary" (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville).

The description of the stratigraphic sequence at McDaniel lacked the clarity of most of the other stratigraphic descriptions produced by the UTDoA supervisors, and is difficult to “decode,” given what appears to be a measure of internal inconsistency regarding the ways in which the two strata at the site were delineated. The site supervisor noted that:

> Stratum I was a dark red brown-to-black humic band varying around one foot [in thickness], but rather more than less… [fading], sometimes suddenly but more often gradually, into the clayey or loamy mixture and thus became the diluted humic Stratum II. This in turn changed somewhat abruptly into the ‘crawfishy’ limonitic gray clay subsoil. Thus the stratigraphic division does not have an actual podologic [sic] basis. Stratum II is, over most of the dig, a thinned mixture of Stratum I… On the profile [see Figure 8.35], Stratum I shows a sharp delimitation. This unconformity exists throughout most of the dig and lends color and strength to the separation. This separation is irregular but has been followed when possible. Both plow and Stratum II are light in color (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville).

There is some indication that there may have been two deposits present in at least some areas of the site, although the site supervisor appears to have believed that the stratigraphic separation was largely a matter of convenience for excavation. The site profile, a 21.34 m (ca. 70 ft) section along the eastern edge of the block from square 7CA to 14CA (Figure 8.17), indicates an area extending from approximately 9CA to 11CA characterized by a thin layer of chipped stone debitage lying along the vertical separation between Stratum I and Stratum II. It is possible that the variation in color that was viewed as characteristic of a transition between strata represented differential intensity of use of separate areas of the site during its occupation.

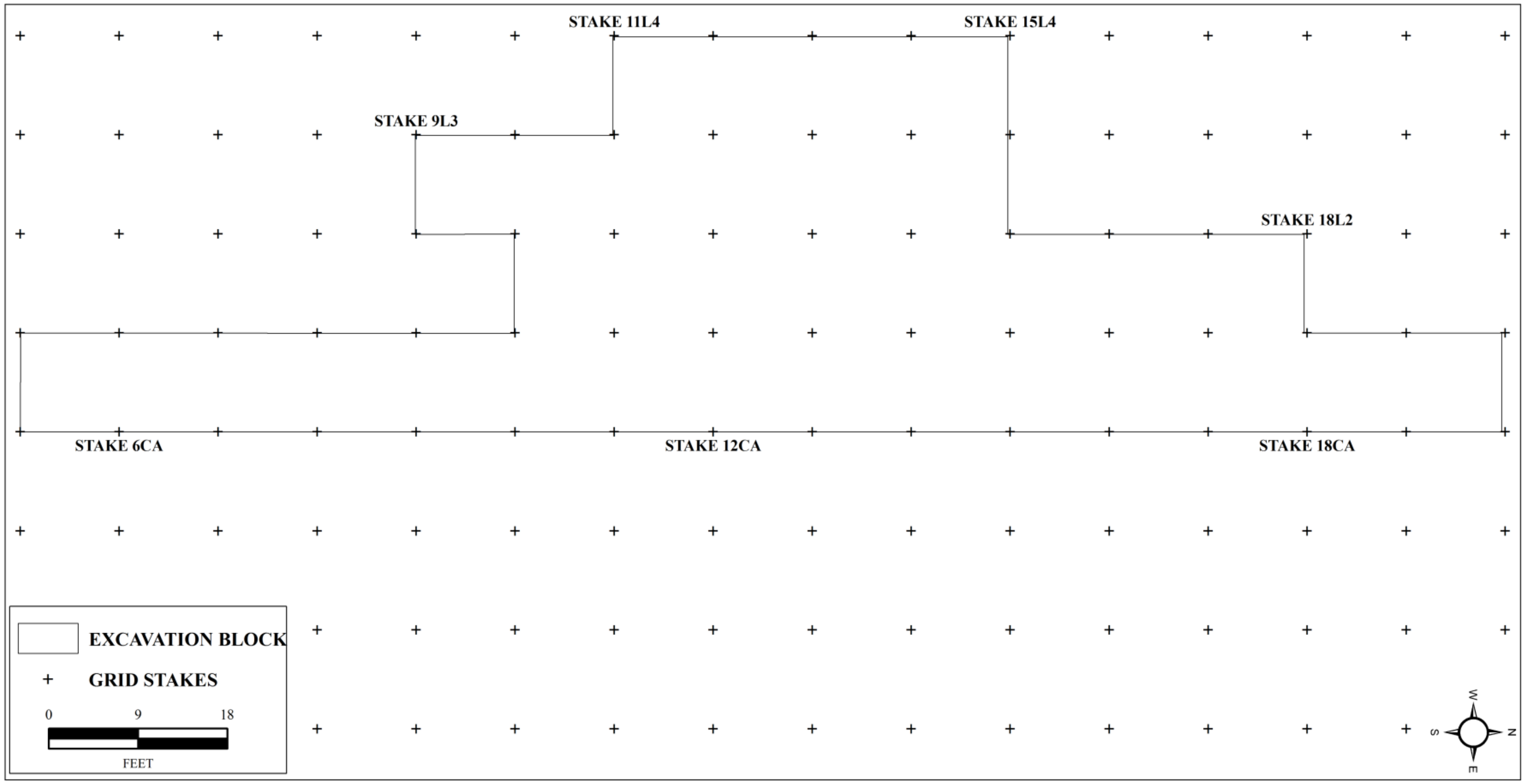

Figure 8.34. General plan map of the McDaniel site (40BN77).

Figure 8.35. Stratigraphic profile of the McDaniel site (40BN77). Reproduced from original field drawing made by D. Osborne, 1941 (original on file at the Frank H. McClung Museum of Natural History and Culture, University of Tennessee, Knoxville). (Oversized figure, see Appendix A.)

Burials and Features

Burials (Human, n = 27; Canine, n = 7)

In contrast to other sites examined during this project, the burial assemblage at McDaniel was relatively small, totaling only thirty-four interments (Table 8.18). Of those, 61.8% (n = 21) were documented in Stratum I (Figure 8.36), and the remainder (n = 13; 38.2%) in Stratum II (Figure 8.37). Table 8.14 contains burial data as recorded during field investigations in 1941, and includes revised sex and age assessments made in 1990 during the McClung Museum's NAGPRA inventory (Smith 1990). Due to the poor condition of most burials – only ten were described in "fair" or "good" condition – few skeletons could be classified by sex; most individuals were believed to be of adult age, and only three skeletons of those in suitable condition for analysis were identified as subadult (Table 8.18).

Nearly all individuals in both strata for which burial position could be determined were fully flexed (Stratum I, n = 14; Stratum II, n = 8). Three "partly flexed" burials (two in Stratum I and one in Stratum II) were recorded, and position could not be determined for two burials. Similarly, the majority of skeletons in both strata were placed on their right sides (Stratum I, n = 11; Stratum II, n = 6). Only four Stratum I burials and two from Stratum II were laid on their left sides, and one adult male in Stratum II was placed on his back (Table 8.18).

The largest number of individuals was oriented to the southeast (n = 8) or to the southwest (n = 6); three each pointed south and east; two to the west; and one each to the north, northeast, and northwest (Table 8.18).

Burial offerings occurred in 37% (n = 10) of graves (see Figures 8.36 and 8.37), including two of the three children. Projectile points and bifaces were the most common artifact

Table 8.18. Burial data from the McDaniel site (40BN77).

Burial ID	Grid Square	Stratum	Condition	Orientation	Flexure	Position	Sex		Estimated Age		Grave Associations
							WPA	NAGPRA	WPA	NAGPRA	
1	10CA	1	Poor	SW	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	red ochre
2	9L2	1	Poor	SE	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	
3	10L2	2	Poor	E	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	projectile point
4	9L2	2	Poor	SE	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	
5	13CA	1	Poor	S	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	projectile point
6	12CA	2	Poor	SW	Fully Flexed	Right	M	F	Adult	Adult	
7	12CA	1	Fair	SW	Fully Flexed	Left	M	M	Adult	Adult	5 antler spatulates; turtle plastron pendant; 3 projectile points; antler tool; 2 dog burials (8 and 9)
8	12CA	1	Dog								
9	12CA	1	Dog								
10	10L1	1	Poor	SE	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Indeterminate	
11	10L1	1	Poor	Unspecified	Unspecified	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
12	10L2	2	Poor	SE	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Indeterminate	
13	19CA	2	Poor	SE	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	biface
14	14CA	1	Poor	SW	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	
15	11L1	1	Poor	Unspecified	Fully Flexed	Unspecified	Indeterminate	Indeterminate	Adult	Indeterminate	
16	11L1	2	Dog								
17	12L1	2	Poor	SE	Partly Flexed	Left	Indeterminate	Indeterminate	Child	Child	biface; projectile point; red ochre
18	12L2	1	Fair	W	Partly Flexed	Right	M	M	Adult	Adult	drill; broken projectile point
19	12L1	2	Dog								
20	19CA	2	Poor	W	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	
21	15L1	2	Poor	S	Unspecified	Unspecified	Indeterminate	Indeterminate	Juvenile	Child	
22	13L1	2	Good	E	Fully Flexed	Back	M	M	Adult	Adult	
23	14L1	1	Dog								
24	14L1	1	Good	N	Fully Flexed	Right	F	F	Adult	Adult	
25	14L1	1	Good	S	Fully Flexed	Right	Indeterminate	M	Adult	Adult	3 projectile points
26	14L1	1	Dog								
27	14L1	1	Good	SE	Partly Flexed	Left	Indeterminate	Indeterminate	Juvenile	Child	dog (burial 26); 2 projectile points; broken ulna awl
28	14L1	1	Fair	NE	Fully Flexed	Right	F	Indeterminate	Adult	Adult	
29	13L2	1	Poor	SW	Fully Flexed	Right	M	M	Adult	Adult	
30	13L2	1	Fair	SE	Fully Flexed	Right	F	Indeterminate	Adult	Adult	
31	13L2	1	Fair	NW	Fully Flexed	Right	Indeterminate	Indeterminate	Adult	Adult	worked mussell shell; ulna awl
32	12L2	2	Fair	SW	Fully Flexed	Right	F	Indeterminate	Adult	Adult	
33	12L2	2	Dog								
34	12L3	1	Poor	E	Fully Flexed	Left	Indeterminate	Indeterminate	Adult	Adult	

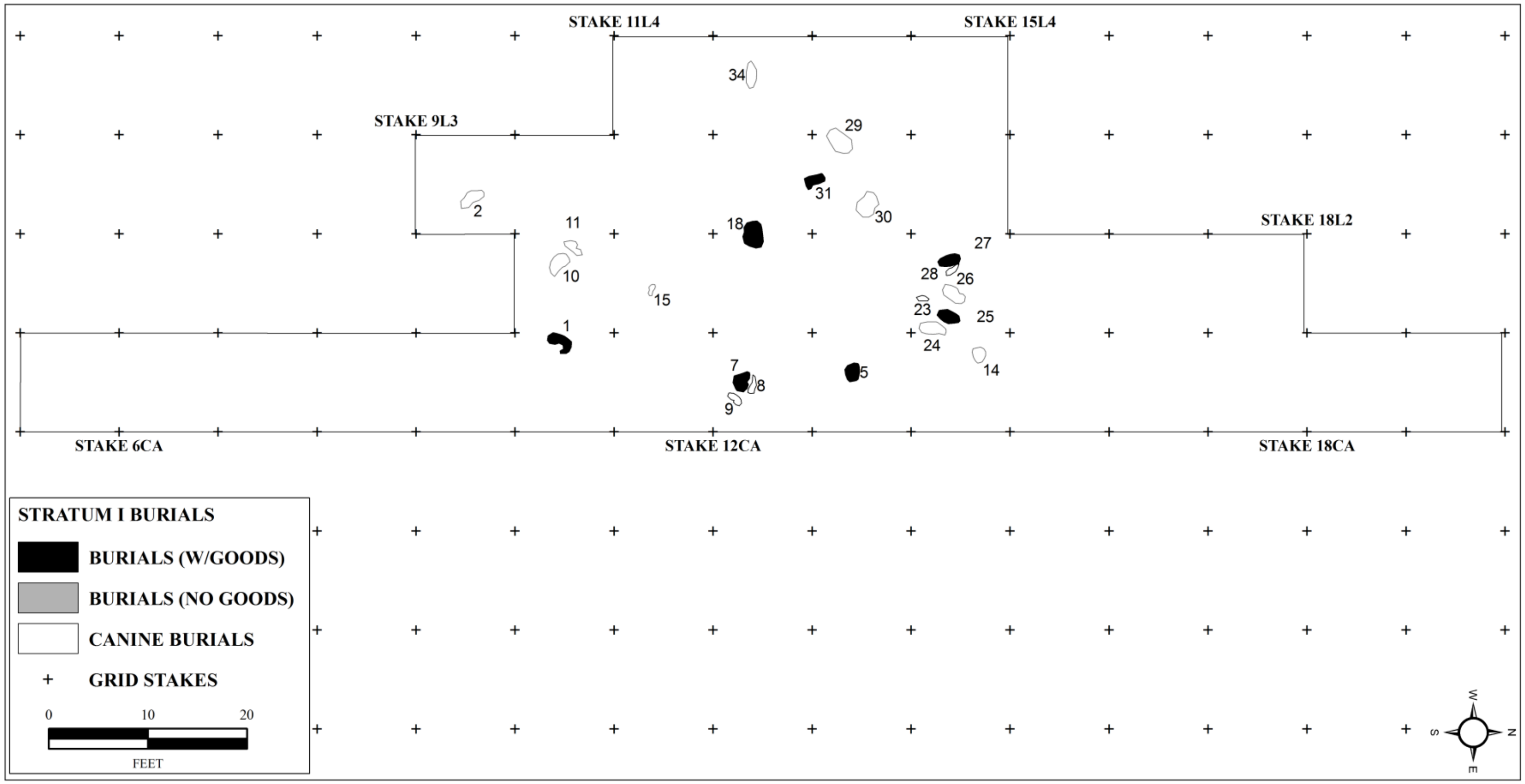

Figure 8.36. McDaniel site (40BN77) burials, Stratum I.

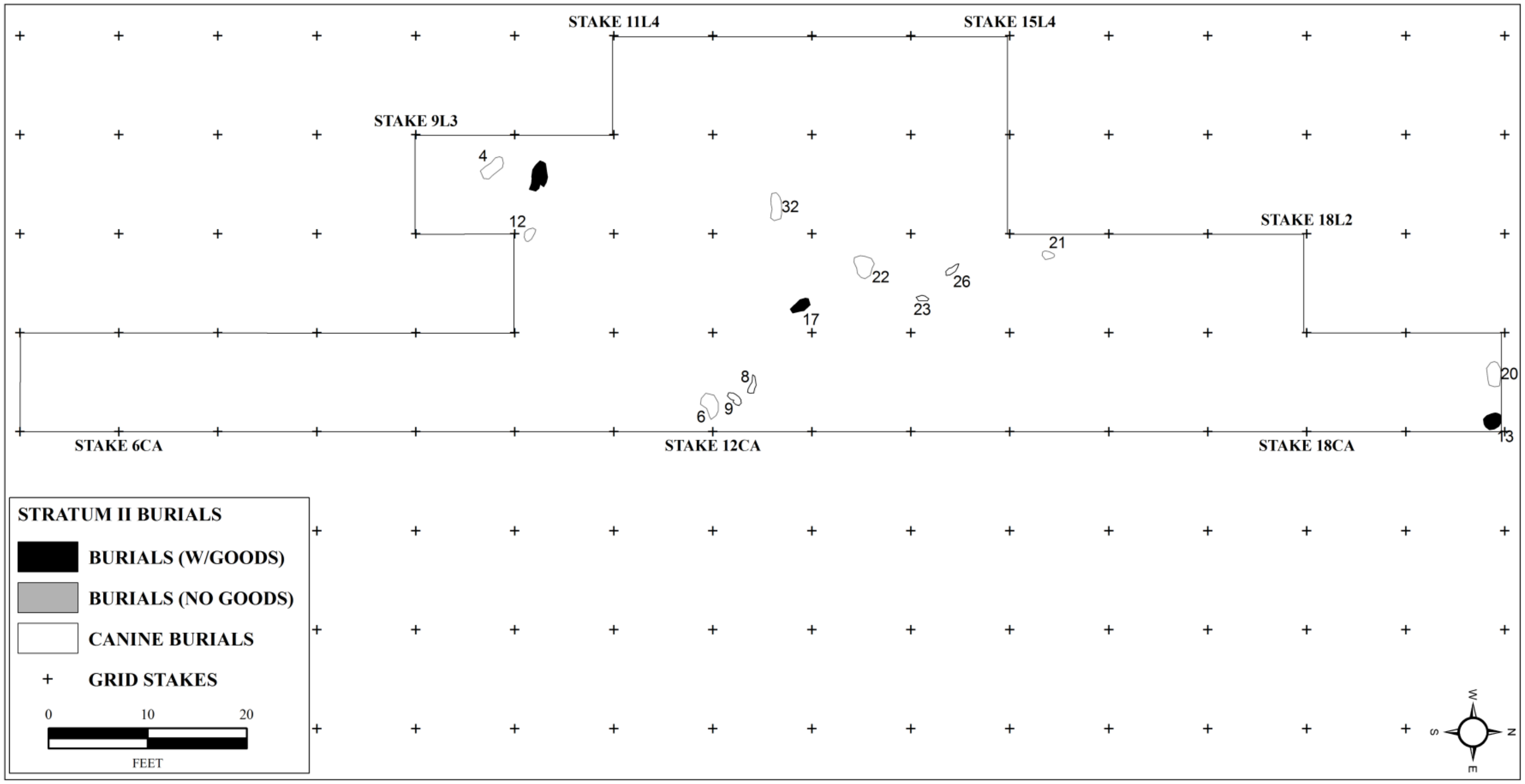

Figure 8.37. McDaniel site (40BN77) burials, Stratum II.

included, but bone and antler tools were also frequent (see Figure 8.38), and red ochre was found in two graves (Table 8.18).

Four graves contained only a single artifact or material – projectile points, a biface, and red ochre (Table 8.18). Two items were encountered with two separate burials, and three burials contained three offerings each. One of the latter (Burial 27) also included a canine burial (Burial 26).

One burial (Burial 7), an adult male in Stratum I, contained a total of ten objects – five double-beveled antler tools ("spatulates") and a sixth antler tool, a pendant made from a turtle plastron, three projectile points – and was accompanied also by two dog burials (Burials 8 and 9). Burial 7 (and 8 and 9) may have been interred in the eastern end of a large pit (Pit 13) (Figure 8.36), although records indicate the pit's association with Stratum II rather than Stratum I. Burial 7 was located near the eastern edge of the block, and despite the unusually large amount of grave furniture, there is no indication that its placement within the site was unusual.

In addition to human burials, seven dogs were also interred at McDaniel. As noted above, three accompanied human burials associated with Stratum I. Of the remaining four, three were found in Stratum II and one in Stratum I (Figures 8.36 and 8.37; Table 8.18).

Features

In total, 118 features were present at McDaniel (Figures 8.39 and 8.40), the majority of which (66.9%) were unnumbered postmolds (n = 79) associated with Stratum II (Table 8.19; Figure 8.40). Thirty-two pits (Stratum I, n = 9; Stratum II, n = 22; unassociated, n = 1) and six unnumbered thermal features and one rock cluster were documented. Only one non-pit feature was numerically designated; Feature 1 consisted

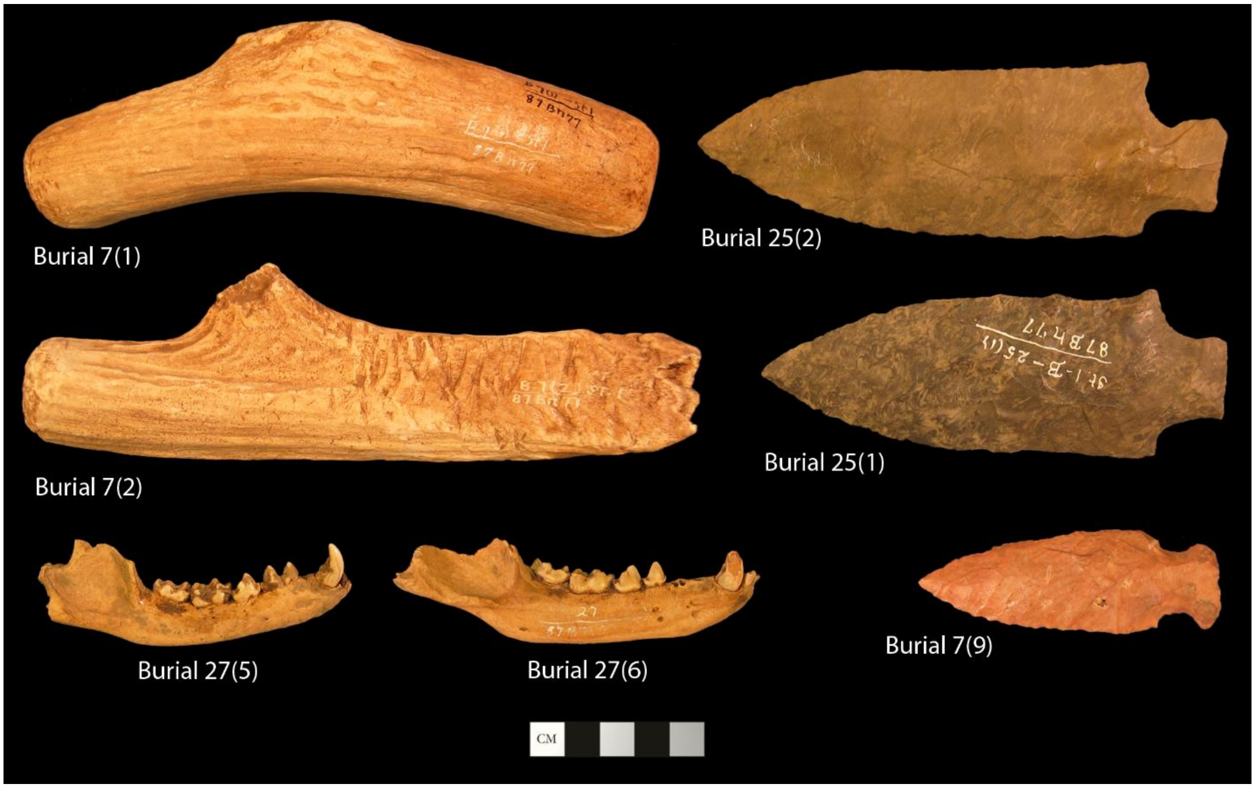

Figure 8.38. Selected objects included with burials at the McDaniel site (40BN77): Antler tools (Burial 7[1] and [2]); canine jaws associated with human burials (Burial 27[5] and [6]); and chipped stone projectile points (Burial 7[9], and Burial 25[1] and [2]).

Table 8.19. Features documented at McDaniel site (40BN77).

Feature	Stratum of Assoc.	Meters below datum[A]	Grid Square	Dimensions (cm) N-S	E-W	Depth	Description
Feature 1	1	1.46	14L1	Not recorded.			Circular group of stones in pit, one deer bone inside.
Pit 1	1	1.71	11CA	152.40	137.16		Round pit.
Pit 2	1	2.04	11CA	137.16	146.30		Round pit.
Pit 3	1	1.95	10CA	121.92	121.92		Round pit.
Pit 4	1	1.71	10CA	109.73	106.68		Round pit.
Pit 5	1	Not recorded.	9L2	Not recorded.			Round pit.
Pit 6	1	2.29	9CA	60.96	73.15		Round pit.
Pit 7	1	1.83	8CA / 9CA	167.64	109.73		Irregular pit.
Pit 8	2	2.44	8CA / 9CA	91.44	82.30		Round pit.
Pit 9	1	2.10	13CA	143.26	121.92		Amorphous pit.
Pit 10	2	1.83	8CA / 9CA	76.20	60.96		Round pit.
Pit 11	2	2.10	12CA / 13CA	207.26	213.36		Round pit.
Pit 12	2	2.16	9L2 / 10L2	91.44	79.25		Oval pit.
Pit 13	2	1.98	12CA / 13CA	Not recorded.			Irregular pit.
Pit 14	Not recorded.	2.01	13CA	121.92	106.68		Round pit.
Pit 15	2	1.80	10L1	91.44	91.44		Round pit.
Pit 16	2	2.26	10L2	91.44	91.44		Round pit.
Pit 17	1	2.44	17CA	91.44	106.68		Oval pit.
Pit 18	2	2.29	13CA	79.25	67.06		Round pit.
Pit 19	2	Not recorded.	11L1	70.10	70.10		Round pit.
Pit 20	2	2.13	13L1	432.82	457.20		Irregular pit.
Pit 21	2	1.68	15L1	48.77	57.91		Round pit.
Pit 22	2	2.59	15CA	79.25	79.25		Round pit.
Pit 23	2	1.89	17CA	Not recorded.			Bilobate pit.
Pit 24	2	2.04	17L1	76.20	152.40		Oval pit.
Pit 25	2	1.46	17L1	103.63	103.63		Round pit.
Pit 26	2	2.07	11L1	106.68	121.92		Round pit.
Pit 27	2	2.10	14L1	91.44	91.44		Round pit.
Pit 28	2	2.07	17L2	252.98	152.40	Not recorded.	Irregular pit.
Pit 29	2	1.89	14L2	252.98	152.40		Irregular pit.
Pit 30	2	2.01	14L2	91.44	213.36		Irregular pit.
Pit 31	2	1.71	14L3	143.26	213.36		Square pit.
Pit 32	2	1.77	14L3	91.44	82.30		Round pit.
N = 79	2	Multiple.	Multiple.	Average diameter: 16.6 ± 3.1 cm			Postmolds
N = 6	Unspecified.	Multiple.	Multiple.				Thermal features.
N = 1	1		9CA				Rock cluster.

[A] Pit depths (mbd) are recorded from the site datum elevation to the base of the excavated pit. Origin depths were not recorded.
[B] The mean diameter of postmolds was calculated from the digitized site map using the “calculate geometry” and “field calculator” functions in ESRI ArcGIS 9.3.

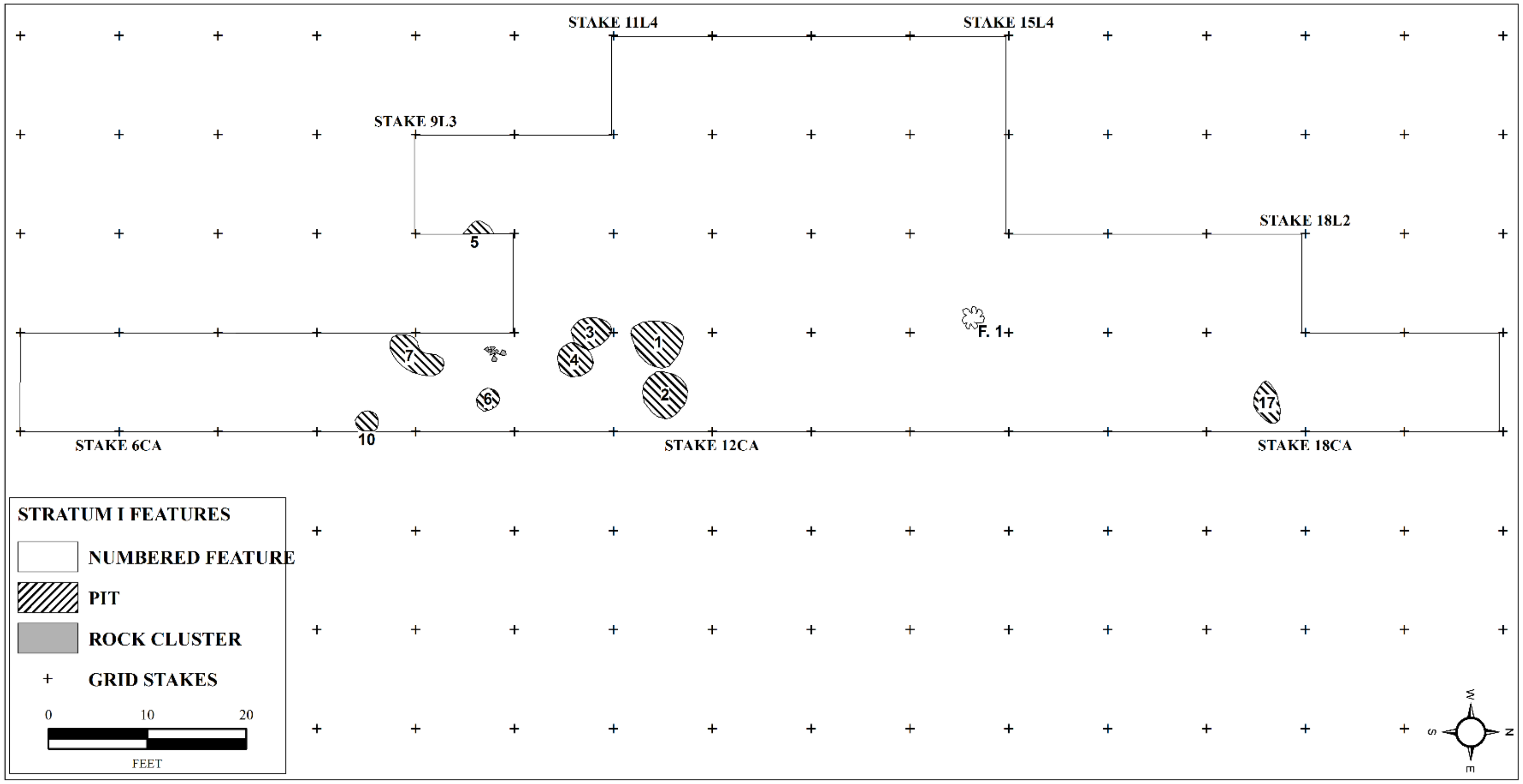

Figure 8.39. Features associated with Stratum I at the McDaniel site (40BN77).

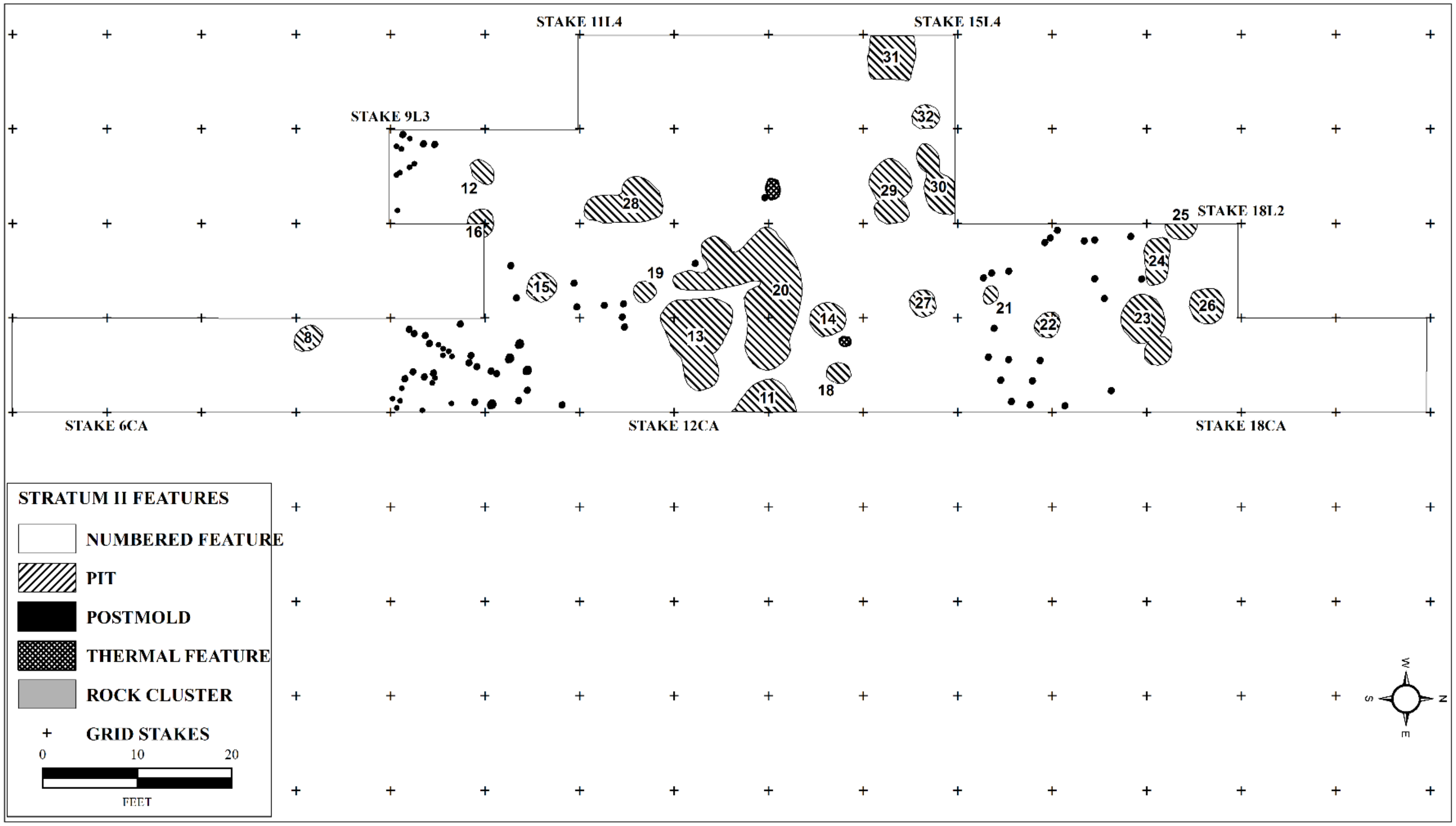

Figure 8.40. Features associated with Stratum II at the McDaniel site (40BN77).

of a circular group of stones (and a single deer bone) located in Pit 27 (Stratum I) (Figures 8.39).

Pits (n = 32)

Most pits were associated with Stratum II (n = 22; 68.8%). Nine were grouped in Stratum I (28.1%), and one was documented but no stratum association was recorded. (Table 8.19).

Pits varied significantly in size and shape (Figures 8.39 and 8.40). Upper and lower depths were not recorded, nor were profiles of individual pits; thus, characterization by cross-section, directly or by extrapolation, is not possible. Twenty-four were classified as round or oval, six as "irregular," and two were relatively amorphous in form.

Specific pit contents were not recorded, although the site supervisor's field report noted that "all of the pits must have been trash pits par excellence; their contained midden was most heavy and black" (D. Osborne, Original field report, on file at the McClung Museum, University of Tennessee, Knoxville).

Thermal features (n = 6)

Six thermal features – only two of which were associated by stratum (Stratum II) – were documented on the site's plan view map (Figures 8.39 and 8.40). There were no artifacts in association with them, and they were not associated with other documented features.

Postmolds (n = 79)

Seventy-nine postmolds were documented on the McDaniel plan map, but none was numbered individually as a feature. All documented postmolds were associated with Stratum II (Figure 8.40). Although the site supervisor was discouraged at what he viewed as a lack of structural evidence, examination of the distribution of postmolds in the excavation block seems to suggest the presence of at least two, and perhaps three or more structures.

Possible Structure, Northern Area (Locus 1): In the northern end of the excavation, separated from a second cluster of postmolds in the southern portion of the block (Locus 2, see below) by a series of pits of varying sizes, a roughly circular array of twenty-three postmolds (average diameter, 8.6 cm [3.4 in]) in grid squares 15CA, 15L1, 16CA, and 16L1 indicates the presence of a large, circular structure (Figures 8.40 and 8.41). The area encompassed by the postmolds was approximately 23.3 m^2 (251.3 ft^2), and the distance across their widest point was 6.65 m (21.8 ft). A large gap between posts located on the northern side of the arrangement suggests an entrance or other opening, and a single pit (Pit 22) was located in the approximate center of the circular arrangement, where a hearth or firepit might be expected, although no fired clay or other thermal alteration was identified in that pit's fill. Several large pits were located directly north of the postmold cluster (Figure 8.41).

Possible Structure or Structures, Southern Area (Locus 2): A cluster of thirty-four postmolds / postmolds located in squares 9CA, 10CA, 10L1, 11CA, and 11L1

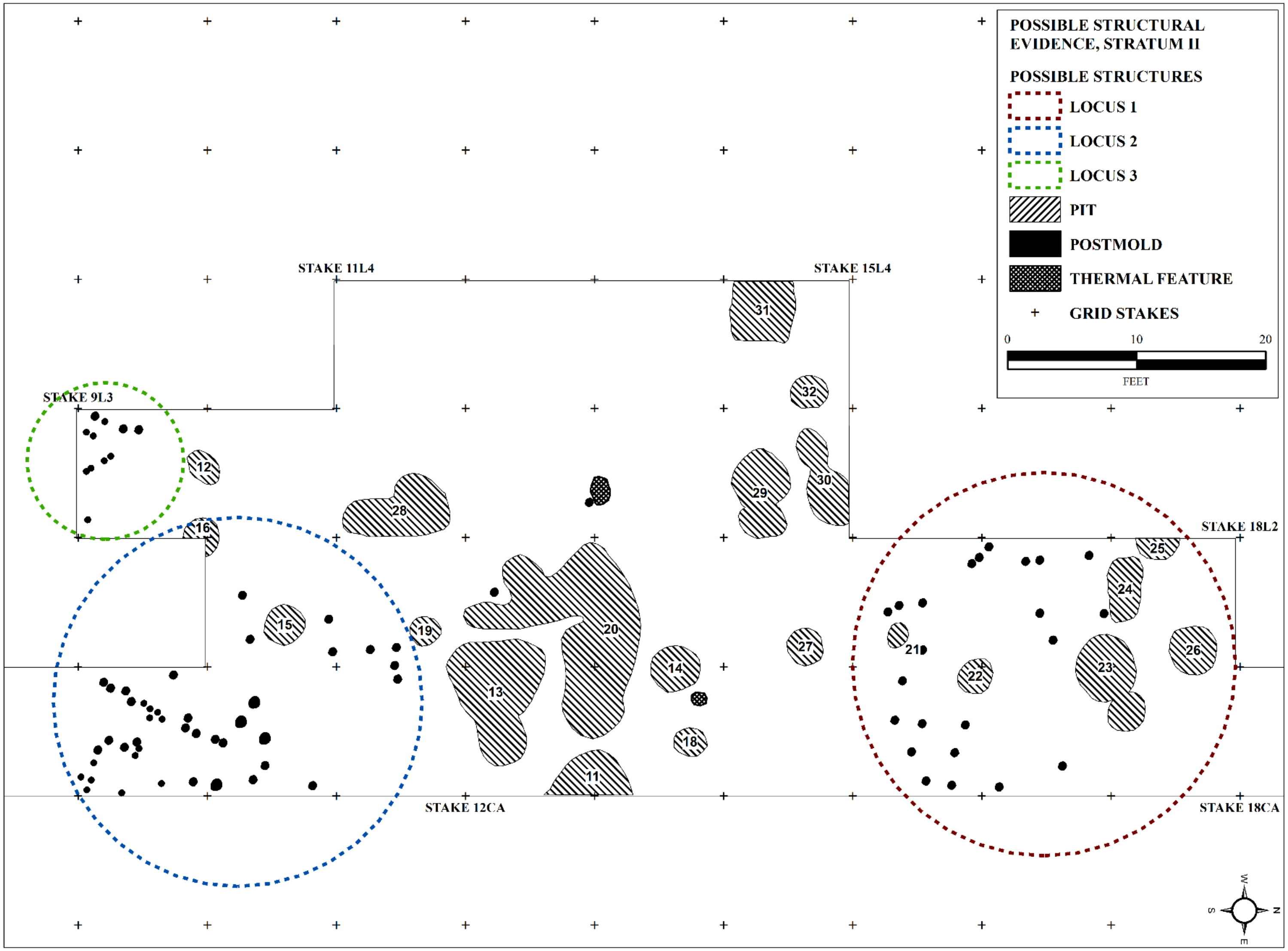

Figure 8.41. Possible structural evidence from Stratum II at the McDaniel site (40BN77).

indicate the presence of at least two and possibly three or more structures (Figures 8.40 and 8.41). Ten postmolds in the southeastern corner of square 9CA defined the intersection of two walls; an adjacent cluster of fourteen postmolds in a linear arrangement indicates a portion of a third wall in the northwestern corner of 9CA and southern half of 10CA. Adjacent to these concentrations, fifteen postmolds in 10CA, 10L1, 11CA, and 11L1 included several larger-diameter posts (Figure 8.41).

Additional Structural Remains (Locus 3): An additional cluster of eleven postmolds was situated in grid square 9L2, but the excavation failed to expose enough area in that location to identify a spatial pattern (Figure 8.41).

Cultural Material

A moderate amount of cultural material (n = 844) was recovered during the McDaniel excavation, consisting principally of chipped stone in proportions exceeding 88% in every provenience, excepting burial contexts (where it nevertheless remained the dominant material type in that provenience as well) (Table 8.20)[39].

The bulk of materials derived from Stratum I and Stratum II context, with 52.7% recovered from Stratum I and an additional 24.4% from Stratum II. Most of the remaining materials were found in the plow zone (13%). Lacking the alkalinity of molluscan shell in the site matrix, preservation of organic materials at McDaniel was poor, and as noted above, in every provenience chipped stone artifacts were the dominant material class. Only a small number of groundstone, bone, and antler artifacts was

[39] A complete listing of all items recorded in the site F.S. log is provided in Appendix B

Table 8.20. Cultural material recorded at the McDaniel site (40BN77).

MATERIAL	PROVENIENCE						
	Unassigned	Test Pits	Burials	Plow Zone	Stratum I	Stratum II	TOTALS
Antler	0	0	6	1	2	9	18
Bone	0	0	3	0	11	6	20
Chipped Stone	11	40	15	109	420	183	778
Groundstone	0	1	0	0	7	4	12
Mineral	1	2	2	0	5	2	12
Pottery	0	2	0	0	0	0	2
Other	0	0	0	0	0	2	2
TOTALS	**12**	**45**	**26**	**110**	**445**	**206**	**844**

recovered. Although pottery was noted in the upper levels of Stratum I during excavation (and in the site field report) there was none documented among the materials saved.

Temporally Diagnostic Hafted Bifaces

Of the 778 chipped stone artifacts recorded, 601 (77.2%) were identified as hafted bifaces (Tables 8.20 and 8.21). Most of those (n = 403; 67% of all recorded hafted bifaces) could not be located and were counted here as "Unidentified, Other." Of the remainder, an additional twenty-six could not be confidently classified to a single type, and were grouped by morphology. Most (n = 13) were stemmed or side-notched (n = 11); one corner-notched and one lanceolate were also noted (Table 8.21).

Classifiable diagnostics totaled a relatively moderate 28.6% (n = 172) of the site's hafted biface assemblage, and a significant majority of those (n = 160; 93%) consisted of Late Archaic forms (n = 147) or Late Archaic – Early Woodland transitional types (n = 13) (Figure 8.42). In both Stratum I and II, Late Archaic types comprised 94% or greater of the classifiable assemblage from those respective proveniences.

Other time periods were poorly represented among the diagnostic assemblage. Seven Middle Archaic types were found mainly in Stratum I (n = 4) or the plow zone (n = 2), and a total of four Woodland-period types were found (Table 8.21).

Lacking a more thorough evaluation of the hafted bifaces from McDaniel, a confident assessment of the site's vertical depositional integrity is difficult to make; efforts to assess McDaniel's relative chronological age from the assemblage are equally problematic. However, based on the results of the analyses as presented here, McDaniel appears to represent site occupied primarily during the Late Archaic period, within continued use likely into the Early Woodland. Although the site contained evidence of extensive subsurface disturbance (i.e., pit excavation, burials) there is little indication that the cultural deposit at McDaniel was, overall, significantly disturbed.

Radiocarbon Dates

During excavation, two strata were delineated at McDaniel, although that separation was characterized by the site's principal investigator as "rather arbitrary" in nature. There is reason to believe that the two deposits did comprise separate temporal components, although the degree to which those strata were separated in time is not clear.

Both strata at McDaniel contained significant evidence of occupation, including burials and considerable amounts of cultural material. However, despite the larger quantity of material in Stratum I, more than double that of Stratum II, radiocarbon samples (n = 2) were selected only from the Stratum II deposit's assemblage, primarily because most bone or antler artifacts suitable for destructive testing derived from Stratum II. Although overall numbers of datable materials (i.e., antler and bone) in both strata appear approximately equivalent (see Table 8.20), many from Stratum I were significantly smaller in size, or represented unique artifacts that could not be used.

FS 685 derived from the upper margins of Stratum II and consisted of a piece of whitetail deer antler. FS 624 was a fragment of mammalian bone, and derived from the lower portion of Stratum II. The samples were found in relatively close proximity to each other, but as illustrated in Table 8.21, the returned radiocarbon dates suggest possible minor disturbance in the area from which they were recovered, a not-unlikely possibility, given the proximity of one of the samples (FS 685) to a pit feature. However,

Table 8.21. Frequencies of diagnostic hafted bifaces by temporal affiliation and provenience at the McDaniel site (40BN77).

Type	Temporal Affiliation	Unassigned	Test Pits	Burials	Plow Zone	Stratum I	Stratum II	Total (By Type)
Archaic Stemmed	Archaic, Undifferentiated	0	0	0	1	0	0	1
Big Sandy	Middle Archaic	0	0	1	0	1	0	2
Big Slough	Middle Archaic	0	0	0	1	1	0	2
Eva II	Middle Archaic	0	0	0	1	0	0	1
Morrow Mountain	Middle Archaic	0	0	0	0	2	0	2
Total, Middle Archaic		**0**	**0**	**1**	**2**	**4**	**0**	**7**
Late Archaic Stemmed	Late Archaic	0	1	1	11	24	9	46
Ledbetter	Late Archaic	1	1	1	7	28	14	52
Pickwick	Late Archaic	0	1	4	1	13	9	28
Savannah River Stemmed	Late Archaic	0	0	0	0	9	2	11
Table Rock Stemmed	Late Archaic	0	0	0	0	2	0	2
Terminal Archaic Barbed	Late Archaic	0	1	0	2	5	0	8
Dickson Cluster	Late Archaic - Early Woodland	0	1	0	1	2	0	4
Flint Creek	Late Archaic - Early Woodland	0	1	0	1	0	1	3
Motley	Late Archaic - Early Woodland	0	0	1	1	2	0	4
Turkey Tail	Late Archaic - Early Woodland	0	0	0	1	1	0	2
Total, Late Archaic / Late Archaic - Early Woodland		**1**	**6**	**7**	**25**	**86**	**35**	**160**
Jack's Reef	Middle Woodland	0	0	0	1	0	0	1
Lowe Cluster	Middle Woodland	0	0	1	0	0	1	2
Small Triangular	Late Woodland / Late Prehistoric	0	0	0	0	1	0	1
Total, Woodland / Post-Woodland		**0**	**0**	**1**	**1**	**1**	**1**	**4**
Total, Identifiable Hafted Bifaces		**1**	**6**	**9**	**29**	**91**	**36**	**172**
Unidentified Corner-Notched		0	0	0	0	1	0	1
Unidentified Side-Notched		0	1	0	1	6	3	11
Unidentified Stemmed		0	0	2	2	6	3	13
Unidentified Lanceolate		1	0	0	0	0	0	1
Unidentified, Other		6	23	0	49	226	99	403
Total, Unidentified Hafted Bifaces		**7**	**24**	**2**	**52**	**239**	**105**	**429**
	Total, All Hafted Bifaces	**8**	**30**	**11**	**81**	**330**	**141**	**601**

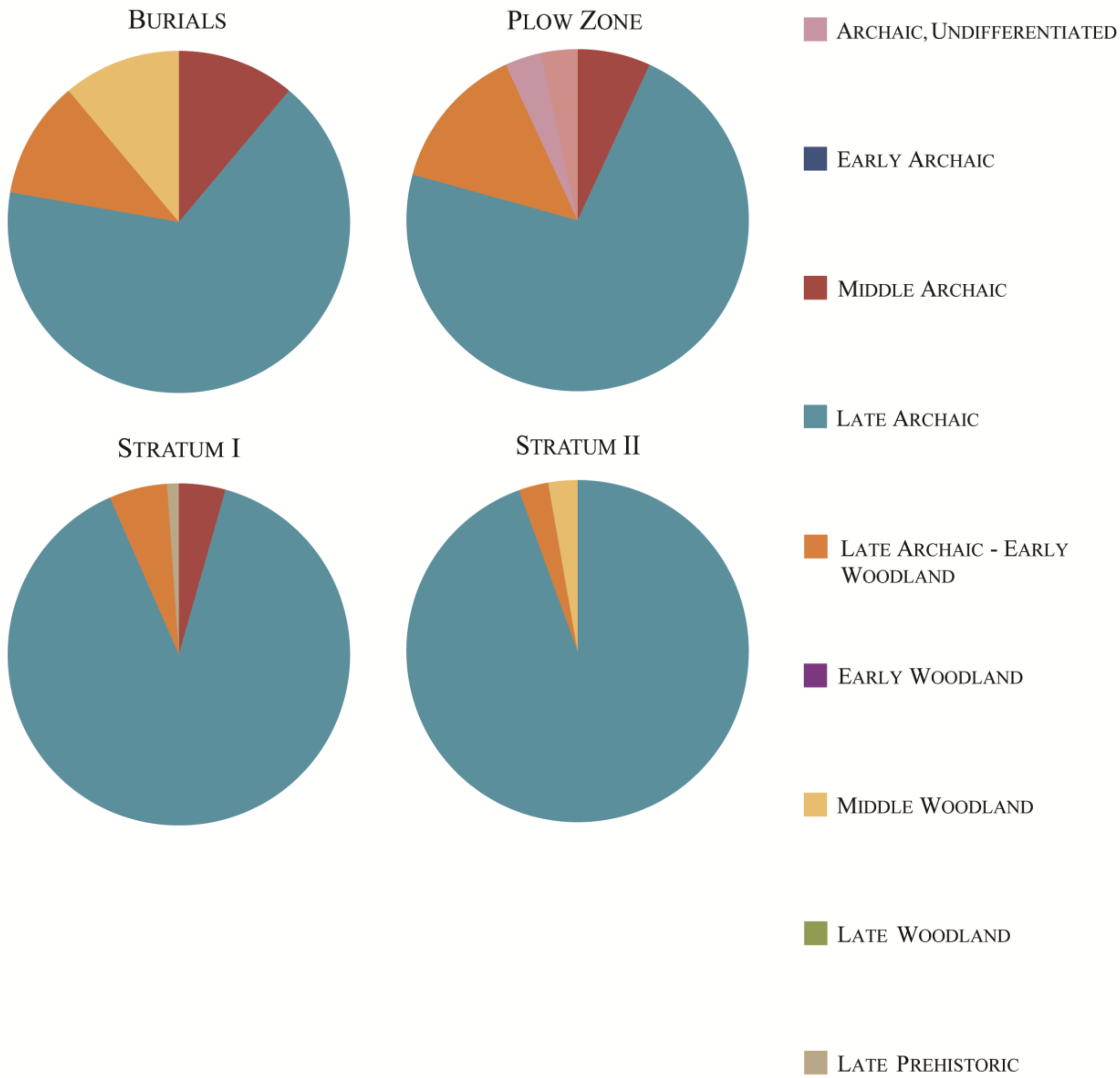

Figure 8.42. Temporal diagnostics by provenience at the McDaniel site (40BN77).

Table 8.22. Radiocarbon dates from the McDaniel site (40BN77).

FS	Square	Stratum	Depth (mbd)	Material	AA #	δ 13C	14C Yr BP			Cal BP			1-Sigma Range (calibrated)	2-Sigma Range (calibrated)
685	14L2	2	1.37	antler	AA101233	-21.5	3996	±	44	4474	±	66	4520 - 4420	4780 - 4298
624	13L1	2	1.68	bone	AA101232	-21.9	3830	±	52	4243	±	90	4380 - 4150	4413 - 4090

FS 685 derived from the upper margins of Stratum II and consisted of a piece of whitetail deer antler. FS 624 was a fragment of mammalian bone, and derived from the despite the apparent "inversion," the ages of the two samples were not statistically different, and indicate a relatively short period of time associated with the accumulation of Stratum II in that portion of the site, perhaps a century or less.

These results also indicate that the occupation of the McDaniel site that produced Stratum II was approximately contemporaneous with the Stratum II and III occupations at the nearby Kays Landing site (40HY13) and with occupations to the south at Oak View (40DR1) and at Ledbetter Landing (40BN25).

Occupational History of McDaniel

McDaniel was located less than 10 km from Kays Landing, and the radiocarbon data indicate contemporaneity of occupation of the two sites. McDaniel, like Oak View and Ledbetter, appears to have represented a site of relatively short-term use in comparison to the long-duration visitation and occupation of the Kays Landing site. The moderate amounts of cultural material present, in addition to the short duration indicated by the radiocarbon data, indicate a likely use of the location that lasted for only a few generations, an interpretation further suggested by the relatively small burial population in comparison to other sites examined as a part of this project.

The McDaniel site is notable among the seven research sites for containing possibly the best evidence for a semi-permanent occupation. The site excavation block included not only postmold clusters indicative of structural remains (postmold clusters were also identified at

Cherry, see previous section), but also a series of pit features that were positioned contrastively with the structural remains, suggesting separate activity areas within the site.

The relatively large size of the circular arrangement of posts in the northern part of McDaniel is also unusual in the research sample. Although the Cherry site contained a significant number of postmolds, they enclosed small areas generally less than a few square meters, seemingly too small to have permitted any significant amount of activity inside. At McDaniel, in comparison, the large postmold concentration – Locus 1 – enclosed more than 23 m^2 and had a diameter of approximately 5 – 6 m. The second major postmold cluster at McDaniel, located in the southern portion of the block (Locus 2) was less suggestive of a specific structural shape than Locus 1, but was of a similar size. If these clusters do represent structures, they would have been of sufficient size to allow for considerable freedom of movement for several persons inside. Although no fired or unfired daub was noted in the description of field excavations, such structures (if properly weather-proofed) would have been large enough to serve as cold-weather shelters for multiple people.

Chapter 9. The Middle and Late Archaic Occupational History of the Lower Tennessee Valley

How are shell-bearing sites to be interpreted within the broader historical context of the regions in which they were located? What were freshwater shell accumulations to the people who created them and used them over many generations? Were shell-bearing sites viewed as "special" locations where certain types of activities were conducted, including mortuary rituals associated with the interment of the dead? Were they refuse? Can these questions be answered with the data available?

In the preceding four chapters, summaries were provided of the archaeological data recovered from seven Middle and Late Archaic sites in the lower Tennessee River Valley, including five that contained at least one shell-bearing deposit. New analyses of the archaeological remains from the sites, comprising the cultural materials, features, and burials recovered from stratified context, were used in conjunction with recently obtained chronological data deriving from extensive radiocarbon dating of the sites' separate cultural strata to produce individual occupational histories for each of the seven sites: Big Sandy (40HY18), Eva (40BN12), Kays Landing (40Hy13), Cherry (40BN74), Oak View (40DR1), Ledbetter Landing (40BN25), and McDaniel (40BN77).

In this chapter, the results of the site-level analyses and histories presented in chapters 5-8 are drawn upon to develop a region-wide, multi-site occupational history of the lower Tennessee Valley during the Middle and Late Archaic periods. The establishment of such an historical framework is critical to addressing broader questions about the nature of Archaic freshwater shell-bearing sites in the lower Tennessee Valley of western Tennessee.

The discussion evaluates the major arguments advanced with respect to the adoption, persistence, and eventual abandonment of shellfishing as a cultural practice, specifically as related to the data and chronology compiled herein.. Was shellfishing—as represented by the shell-bearing middens in western Tennessee—a practice that developed and continued largely in response to expansion of dietary needs? Can shellfishing be situated primarily within the larger subsistence base of the creators and occupiers of these sites, as a basic contributor to the larger range of faunal and botanical resources exploited? And as such, can (or should) shell-bearing deposits be conceptualized as occupational debris?

Do the accumulated remains of shellfish in midden and mound sites, as some researchers have argued in recent decades (see particularly Claassen 1991a, 1991b, 1993, 1996, 2010; see also Chapter 3), constitute more than simply dietary contributions? Might they instead represent the remains of multiple ritually-charged events that included the use of molluscs as ceremonial feasting foods, or as building materials to intentionally create landmarks or monuments?

Or do these two differing views constitute the end points on a spectrum of practices that included shellfish use for a variety of purposes, both quotidian and ritual, that cannot be easily separated conceptually, and are even more difficult to separate archaeologically? Data collected during the excavations of the seven study sites discussed here provide some means of addressing those questions.

THE RADIOCARBON RECORD IN THE LOWER TENNESSEE VALLEY

This project has considerably expanded the Archaic period radiocarbon database for the lower Tennessee Valley, which now consists of fifty-four reliable radiocarbon dates, comprising fifty obtained by the author and four past dates from Kays Landing. Three of those (M-108, M-

109, and M-356) were among the first radiocarbon dates from western Tennessee (Crane 1956; Lewis and Kneberg 1959) and are consistent with the dates obtained by the author from similar stratigraphic context at the site. A fourth sample was submitted by William Fox in 2006 to Beta Analytic (Beta-219573) and likewise produced results consistent with the dated samples from this study (see Chapter 7). Table 9.1 presents the full sequence, ordered chronologically from earliest to latest.

Radiocarbon Chronology in the Lower Tennessee Valley

Two sets of chronological data are provided in Table 9.1, representing fifty-four radiocarbon dates from sixteen stratigraphic components at the seven study sites. The first set (^{14}C Age BP) comprises the conventional radiocarbon ages of the respective samples. The second set of radiocarbon ages (Calibrated Years BP) constitutes the standard calibrated radiocarbon dates, based on the established radiocarbon correction curve (Reimer et al. 2009). These calibrated dates span a period of time extending from ca. 9,000 years ago, from the onset of the Hypsithermal Interval at the beginning of the Middle Archaic period (ca. 8900 to 5700 cal BP) to the Late Archaic-Early Woodland transition between 3200 and 2900 ago. Continuous occupation of the study sites over this interval is not indicated.

Figure 9.1 provides an illustration of the valley radiocarbon sequence, based on the 1-sigma range for each date. When illustrated in chronological order from earliest to latest, gaps in the sequence are apparent, suggesting possible periods of occupation in the region separated by episodes of relatively minimal activity, at least at the sites in the study sample.

Table 9.1. Radiocarbon Sequence from Lower Tennessee River Valley (calibrations from Intcal09 using OxCal 4.1 [Bronk Ramsey 2001, 2009; Reimer et al. 2009]).

							14C age BP			Unmodeled Cal BP				
Site	FS	Square	Stratum	Material	AA #	δ 13C	μ	±	σ	μ	±	σ	1-σ Range	2-σ Range
Eva	1150	49L1	5	bone	AA99304	-23	8086	±	82	8991	±	151	9132-8779	9272-8660
Big Sandy	585	11R4	2	antler	AA98909	-23.4	8040	±	170	8936	±	232	9128-8642	9423-8541
Eva	294	50CA	5	bone	AA99310	-22.9	7987	±	81	8840	±	122	8997-8726	9030-8598
Eva	1161	49L1	5	bone	AA99306	-22.4	7956	±	80	8813	±	120	8980-8663	9008-8601
Big Sandy	747	11R3	1, Pit 43	antler	AA100272	-21.7	7795	±	78	8603	±	121	8647-8450	8972-8410
Big Sandy	639	11R4	2	bone	AA98910	-22.8	7786	±	78	8588	±	116	8638-8451	8951-8405
Big Sandy	568	11R4	1	antler	AA98908	-23.6	7715	±	84	8512	±	86	8580-8420	8699-8364
Big Sandy	386	11R7	2	antler	AA98906	-21.4	7646	±	80	8456	±	73	8537-8386	8597-8327
Eva	1091	50R1	4	bone	AA99303	-21.9	7608	±	78	8418	±	78	8515-8348	8582-8212
Eva	1146	50R1	4	antler	AA99299	-23.1	7604	±	78	8413	±	79	8514-8345	8579-8209
Eva	991	50R1	2	bone	AA99311	-22.4	7596	±	80	8403	±	82	8515-8336	8553-8203
Big Sandy	661	13R7	2	antler	AA100271	-23.1	7564	±	81	8364	±	85	8448-8218	8538-8195
Eva	982	49L1	4	antler	AA99301	-23.3	7530	±	77	8327	±	78	8410-8214	8507-8178
Big Sandy	369	11R7	2	antler	AA98907	-22.1	7440	±	75	8257	±	78	8340-8190	8400-8051
Eva	1093	49L1	4	bone	AA99302	-22.5	7415	±	77	8235	±	86	8338-8176	8380-8045
Big Sandy	269	11R7	1	antler	AA98905	-23	7401	±	75	8223	±	88	8336-8167	8370-8044
Eva	289	50CA	2	bone	AA99313	-22.8	6691	±	72	7558	±	59	7615-7493	7668-7440
Eva	1650	47R1	2	antler	AA90405	-22.8	6514	±	66	7421	±	67	7489-7328	7564-7291
Big Sandy	580	13R7	1	antler	AA100269	-22.3	6460	±	70	7371	±	63	7432-7312	7502-7256
Eva	787	49L1	2	antler	AA99312	-23.2	6361	±	70	7296	±	78	7416-7248	7425-7165
Big Sandy	617	13R7	2	antler	AA100270	-21.9	6265	±	69	7173	±	94	7270-7028	7411-6983
Eva	848	49L1	2	antler	AA99314	-22.9	6258	±	68	7164	±	92	7266-7028	7321-6979
Eva	636	49L1	2	antler	AA100255	-21.9	6249	±	69	7153	±	93	7260-7027	7316-6973
Cherry	509	22R13	1	bone	AA101231	-21.9	6189	±	65	7088	±	87	7170-6995	7258-6935
Eva	507	49L1	1	bone	AA99305	-22.3	6186	±	71	7084	±	93	7172-6983	7257-6909
Cherry	474	22R13	1	bone	AA101229	-22.1	6153	±	52	7056	±	77	7157-6994	7230-6895
Cherry	480	21R2	1	bone	AA101230	-21.6	6092	±	51	6975	±	90	7151-6883	7158-6800
Eva	619	50R1	2	bone	AA99308	-21.5	5922	±	66	6754	±	83	6845-6666	6936-6568
Eva	1596	48R1	2	antler	AA90404	-20.6	5865	±	63	6679	±	81	6779-6569	6845-6499
Eva	639	50R1	1	bone	AA100256	-22.6	5799	±	65	6598	±	78	8638-8451	8951-8405
Eva	726	50R1	2	bone	AA99309	-21.9	5535	±	65	6338	±	61	6398-6288	6451-6208
Kays Landing	660	35R10	5	bone	AA100265	-20.9	4802	±	59	5517	±	76	5600-5471	5650-5328
Kays Landing	M-108	--	5	antler	--	--	4750	±	500	5431	±	614	6172-4835	6651-4157
Kays Landing	1350	33R10	4	antler	AA100268	-21.7	4688	±	59	5430	±	83	5572-5322	5583-5312
Kays Landing	1271	31R10	5	wood charcoal	Beta-219573	-26.6	4470	±	50	5127	±	107	5280-4980	5303-4892
Oak View	670	15R1	1	bone	AA101235	-21.1	4280	±	53	4847	±	84	4960-4729	5034-4645
Kays Landing	430	36R10	2	antler	AA100263	-21.5	4261	±	57	4804	±	94	4876-4652	4972-4617
Kays Landing	229	37R10	3	antler	AA100261	-23.1	4178	±	57	4704	±	84	4830-4626	4845-4535
Kays Landing	798	35R10	3	antler	AA100267	-22.3	4175	±	56	4702	±	84	4828-4626	4844-4535
Kays Landing	774	36R10	2	antler	AA100266	-21.7	4169	±	56	4698	±	85	4826-4625	4841-4532
Kays Landing	M-109	--	2	shell	--	--	4050	±	300	4555	±	411	4959-4089	5445-3723

Table 9.1. Continued.

Site	FS	Square	Stratum	Material	AA #	δ 13C	14C age BP μ	±	σ	Unmodeled Cal BP μ	±	σ	1-σ Range	2-σ Range
Ledbetter	231	18L1	2	bone	AA101227	-22.1	4005	±	52	4489	±	88	4529-4417	4789-4295
McDaniel	685	14L2	2	antler	AA101233	-21.5	3996	±	44	4474	±	66	4520-4420	4780-4298
Ledbetter	292	18L1	2	bone	AA101228	-21.7	3889	±	52	4314	±	79	4412-4250	4437-4152
Kays Landing	604	35R10	3	antler	AA100264	-22.4	3851	±	55	4271	±	89	4405-4158	4419-4094
McDaniel	624	13L1	2	bone	AA101232	-21.9	3830	±	52	4243	±	90	4380-4150	4413-4090
Oak View	71	16L3	1	antler	AA101234	-21.9	3713	±	43	4056	±	67	4143-3984	4225-3925
Kays Landing	235	36R10	2	antler	AA100262	-21.3	3699	±	54	4041	±	80	4145-3933	4227-3889
Kays Landing	136	33R10	2	antler	AA100260	-22.4	3646	±	63	3975	±	90	4082-3885	4153-3735
Kays Landing	110	33R10	2	antler	AA100259	-22	3632	±	57	3956	±	83	4073-3869	4145-3735
Kays Landing	81	37R10	1	antler	AA100258	-22.3	3588	±	55	3893	±	84	3976-3833	4080-3719
Kays Landing	M-356	--	2	antler	--	--	3580	±	300	3950	±	396	4293-3485	4821-3219
Kays Landing	58	35R10	2	bone	AA100257	-22.4	2939	±	53	3104	±	87	3205-3005	3319-2947
Ledbetter	229b	18L1	1	bone	AA101226	-21.1	2560	±	47	2636	±	89	2752-2520	2763-2487

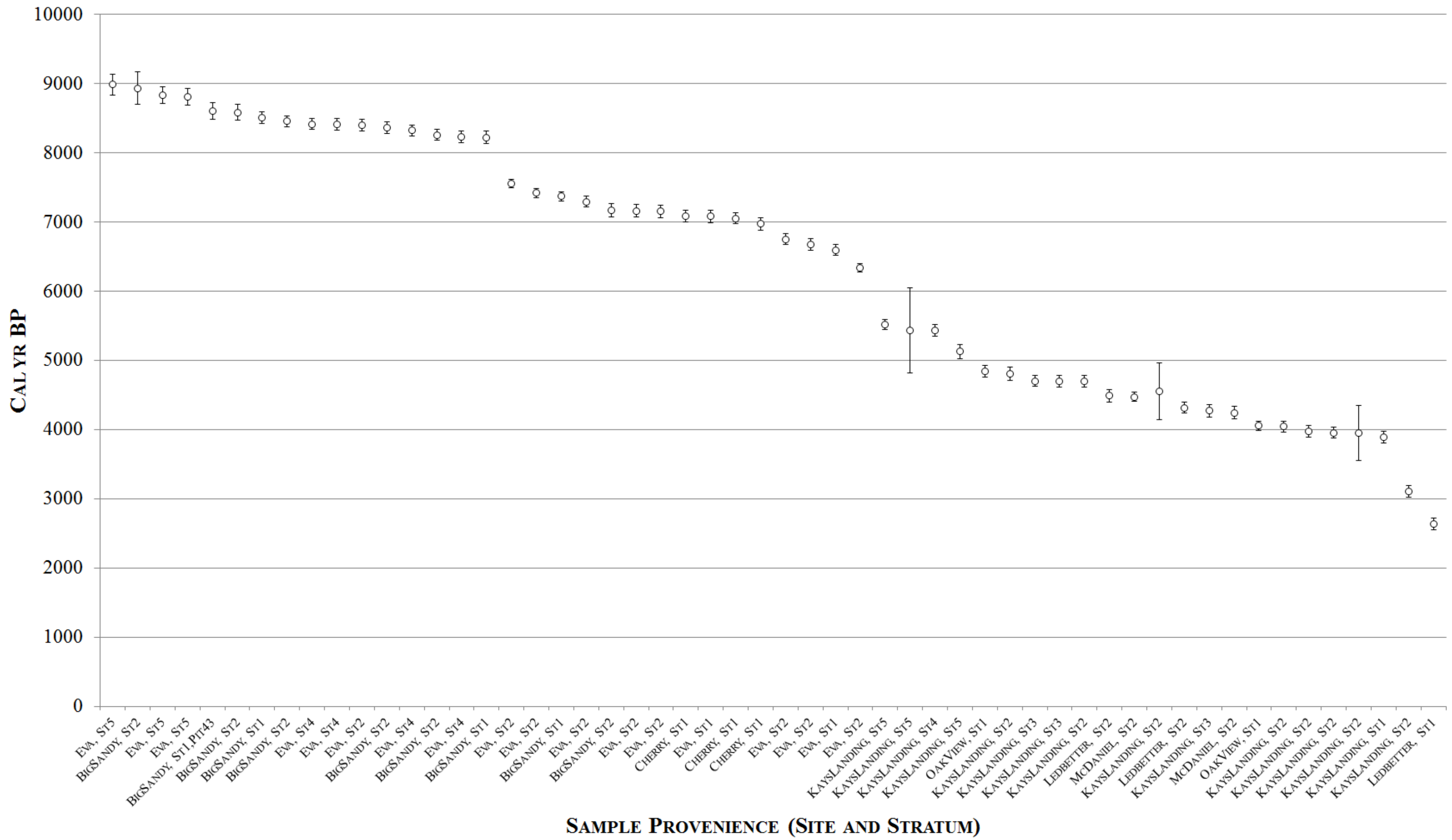

Figure 9.1. Sequence of calibrated 1-sigma intervals for radiocarbon dates from the seven study sites (n = 54). The three assays with unusually large sigmas represent dates obtained from Kays Landing in the mid-1950s (M-108, M-109, and M-356).

Visual inspection suggests two unusually long gaps in the dates straddling the period from ca. 8200 to 7600 cal yr BP (based on the calibrated mean intercept of each date), and from 6300 to 5500 cal yr BP. The final three dates in the sequence, from ca. 4000 to 2500 cal BP, also are separated by significant intervals. Two approaches were used to assess whether these intervals could be justifiably interpreted as hiatuses in occupation in the area.

First, pairwise intervals between sequential dates (calibrated mean intercepts) were calculated ($n_i - n_{i-1}$). Most intervals ranged between 0 and 100 years (n = 39); only five intervals were from 100 to 200 years in length, and four were between 200 and 300 years. Four intervals exceeded 300 years in length; these intervals coincided with the gaps in the plot noted above (Figure 9.1).

The sequence of intervals was then tested for the presence of outliers to determine if the four large intervals exceeding 300 years represented unusually large values. There are multiple tests available to detect significant outliers, but one of the simplest is to use the three-sigma (standard deviation) rule: in a sample population conforming to the normal distribution, the majority of data points (99.73%) fall within three sigmas of the sample mean. Data points falling outside that interval—i.e., data points occurring at greater than three sigmas from the mean value—represent outlier values. Modified z-scores (using the median value rather than the mean, making the modified test more resistant to outliers in the sample population) can be calculated for each value in the sample dataset; each data point is then tested against critical values of Z to yield a probability value for the hypothesis that the given value lies outside the three-sigma range.

This approach requires data conforming to a normal distribution. Because the interval data were heavily skewed to the right (skew = 2.729), a natural log transformation was first run on the data to normalize them. The result of a Shapiro-Wilk normality test on the transformed data indicated conformity to a normal distribution (Statistic = 0.983; df = 53; p = 0.681).

A one-tailed test was used, focusing only on positive z-scores; only values significantly *larger* than the median value were of interest. Values that were significantly smaller than the median simply represented radiocarbon dates that were relatively close in age, and were not relevant.

With respect to the pairwise interval data for the lower Tennessee Valley radiocarbon distribution, the results of the application of the above method indicated that intervals in the main sequence included two significant outliers at $\alpha = 0.05$, with additional outliers at the late end of the sequence. These results suggested that the full sequence could be appropriately divided into three groupings (Table 9.2), and that the two most recent assays in the sequence probably represented later visitation or use of two sites (Kays Landing and Ledbetter) after the periods of most intensive and frequent use. The results of the outlier analysis provided quantitative justification for the grouping of the full sequence into sequential occupational periods. The appropriateness of this grouping was tested using Bayesian radiocarbon calibration to evaluate the hypothesis that dates occurring within these sequences could be grouped together.

Standard radiocarbon calibration is a necessity for the conversion of calculated radiocarbon years (based on the half-life of the ^{14}C radioisotope [see Chiu et al. 2007:26-33; Ramsey 2008:254]) into calendar years. Because the half-life of ^{14}C is statistically-determined, both raw radiocarbon estimates and the calibrated calendar dates calculated from them are statistical predictions, characterized by a degree of known statistical uncertainty: the standard deviation (sigma). Although the last sixty years have seen substantial improvement in the sensitivity and accuracy of radiocarbon measurement, and the development of highly effective

Table 9.2. Z-scores for outlier detection in pairwise intervals between radiocarbon dates in lower Tennessee Valley sequence.

Sample Provenience	Mean Intercept (cal yr BP)	Interval (years)	Natural Log Transform	Z-Score	Z > 3σ , p = 0.05) Critical z-value = 1.6449
Eva, St5	8991	--			
Big Sandy, St2	8936	55	4.007	0.086	
Eva, St5	8840	96	4.564	0.462	
Eva, St5	8813	27	3.296	-0.394	
Big Sandy, St1,Pit43	8603	210	5.347	0.990	
Big Sandy, St2	8588	15	2.708	-0.791	
Big Sandy, St1	8512	76	4.331	0.304	
Big Sandy, St2	8456	56	4.025	0.098	
Eva, St4	8418	38	3.638	-0.164	
Eva, St4	8413	5	1.609	-1.532	
Eva, St2	8403	10	2.303	-1.065	
Big Sandy, St2	8364	39	3.664	-0.146	
Eva, St4	8327	37	3.611	-0.182	
Big Sandy, St2	8257	70	4.248	0.248	
Eva, St4	8235	22	3.091	-0.533	
Big Sandy, St1	8223	12	2.485	-0.942	
Eva, St2	7558	665	6.500	1.767	p = 0.05
Eva, St2	7421	137	4.920	0.701	
Big Sandy, St1	7371	50	3.912	0.021	
Eva, St2	7296	75	4.317	0.295	
Big Sandy, St2	7173	123	4.812	0.629	
Eva, St2	7164	9	2.197	-1.136	
Eva, St2	7153	11	2.398	-1.000	
Cherry, St1	7088	65	4.174	0.198	
Eva, St1	7084	4	1.386	-1.683	
Cherry, St1	7056	28	3.332	-0.370	
Cherry, St1	6975	81	4.394	0.347	
Eva, St2	6754	221	5.398	1.024	
Eva, St2	6679	75	4.317	0.295	
Eva, St1	6598	81	4.394	0.347	
Eva, St2	6338	260	5.561	1.134	
Kays Landing, St5	5517	821	6.711	1.910	p = 0.05
Kays Landing, St5	5431	86	4.454	0.387	
Kays Landing, St4	5430	1	0.000	-2.618	
Kays Landing, St5	5127	303	5.714	1.237	
Oak View, St1	4847	280	5.635	1.184	
Kays Landing, St2	4804	43	3.761	-0.080	
Kays Landing, St3	4704	100	4.605	0.489	
Kays Landing, St3	4702	2	0.693	-2.150	
Kays Landing, St2	4698	4	1.386	-1.683	
Kays Landing, St2	4555	143	4.963	0.730	
Ledbetter, St2	4489	66	4.190	0.209	
McDaniel, St2	4474	15	2.708	-0.791	
Ledbetter, St2	4314	160	5.075	0.806	
Kays Landing, St3	4271	43	3.761	-0.080	
McDaniel, St2	4243	28	3.332	-0.370	
Oak View, St1	4056	187	5.231	0.911	
Kays Landing, St2	4041	15	2.708	-0.791	
Kays Landing, St2	3975	66	4.190	0.209	
Kays Landing, St2	3956	19	2.944	-0.631	
Kays Landing, St2	3950	6	1.792	-1.409	
Kays Landing, St1	3893	57	4.043	0.110	
Kays Landing, St2	3104	789	6.671	1.883	p = 0.05
Ledbetter, St1	2636	468	6.148	1.530	

means of treating samples to reduce the potential effects of contamination resulting from improper treatment of samples, reducing the size of the typical standard deviation for assays (either using standard methods or using accelerator mass spectrometry [AMS]), radiocarbon dates that are closely spaced in time can often exhibit overlapping standard deviations that can present problems when interpreting site depositional sequences in which events occurred over a relatively short period.

A significant strength of the application of Bayesian radiocarbon calibration over standard calibration is the ability to use known conditions about the depositional (and recovery) context of closely-spaced samples to constrain the calibration of multiple assays (Bronk Ramsey 2009). Known conditions, or *priors*, which may include the recognized association of multiple samples with a single depositional event or of sub-sets of samples with closely-spaced depositional events or periods, are used to adjust the posterior probability densities of calibrated dates. Such priors can also include known vertical provenience information; assuming a single cultural deposit in primary depositional context, materials at the base of the deposit will pre-date materials from the middle, or the upper bounds of that deposit. When dating samples with known vertical and horizontal provenience (as was the case with the samples dated for this project), a model can be constructed, using Bayesian algorithms, that imposes constraints on the calculation of the mean intercept and standard deviation for each individual radiocarbon sample based on the measured ^{14}C ages of the other samples included in the model.

Bayesian analyses can be used to trim overlapping standard deviations of radiocarbon dates in stratified deposits, which can reduce the degree to which 1- or 2-sigma ranges may yield two or more dates “statistically indistinguishable.”

The use of Bayesian models in radiocarbon calibration also can provide a diagnostic tool for assessing the stratigraphic integrity of a site based on the ages and positions of dated radiocarbon samples from that site's deposits. In the case of the stratigraphic sequence at the Big Sandy site, for example, a model was constructed to test the null hypothesis that there was a direct relationship between the age of radiocarbon samples and the depths from which they were recovered, e.g., that the deposits at the site were intact and the dated samples had been recovered from the primary context in which they were originally deposited.

The OxCal 4.1 software package (Ramsey 2009) offers a versatile and powerful implementation of Bayesian modeling for radiocarbon calibration, and was used (with the IntCal 2009 calibration curve [Reimer et al. 2009]) to produce calibration models not only for the samples in stratigraphic context at each of the seven study sites in the sample (see Chapters 5–8), but also to test the hypothesis that the large, statistically-significant intervals between sequential dates in the lower Tennessee Valley radiocarbon sequence marked breaks in the occupational history of the region.

For both individual dates within models, and for the models themselves, OxCal calculates "agreement indices," tests of the likelihood that the model and specified priors are in agreement with the model's calculated posterior probabilities. Agreement indices of greater than 60% are considered to be acceptable, while agreement indices less than 60% may indicate a problem with the model as a whole, or with the inclusion of individual dates (Ramsey 1995:427-428). The 60% threshold value is consistent with significance at an alpha of 0.05 for a χ^2 test (Ramsey 1995:428).

Table 9.3. Bayesian modeled three-period sequence (Ramsey 2009; Reimer et al. 2009).

				14C age BP			Modeled Cal BP					
Period	**Site**	**FS**	**Stratum**	**μ**	**±**	**σ**	**μ**	**±**	**σ**	**1-σ Range**	**2-σ Range**	**A**
Period 1: ca. 8900 - 8200 cal BP	Eva	1150	St5	8086	±	82	8780	±	102	8832-8645	9020-8603	59.5
	Eva	294	St5	7987	±	81	8747	±	96	8818-8634	8958-8592	91.2
	Eva	1161	St5	7956	±	80	8734	±	97	8799-8609	8959-8585	96
	Big Sandy	585	St2	8040	±	170	8711	±	129	8833-8590	8967-8431	96.9
	Big Sandy	747	St1, Pit 43	7795	±	78	8584	±	99	8641-8456	8776-8411	105.5
	Big Sandy	639	St2	7786	±	78	8573	±	96	8633-8456	8767-8412	104.6
	Big Sandy	568	St1	7715	±	84	8508	±	78	8577-8421	8692-8368	101.1
	Big Sandy	386	St2	7646	±	80	8456	±	70	8538-8386	8595-8330	100.4
	Eva	1091	St4	7608	±	78	8420	±	75	8511-8348	8583-8219	100.9
	Eva	1146	St4	7604	±	78	8415	±	76	8513-8345	8581-8216	101
	Eva	991	St2	7596	±	80	8407	±	79	8512-8337	8554-8210	101.4
	Big Sandy	661	St2	7564	±	81	8370	±	80	8451-8301	8538-8205	102.2
	Eva	982	St4	7530	±	77	8336	±	72	8414-8225	8456-8183	102.9
	Big Sandy	369	St2	7440	±	75	8282	±	64	8355-8224	8396-8170	105.6
	Eva	1093	St4	7415	±	77	8272	±	66	8345-8216	8401-8151	107.9
	Big Sandy	269	St1	7401	±	75	8265	±	67	8342-8205	8390-8111	108.1
Period 2: ca. 7600 - 6300 cal BP	Eva	289	St2	6691	±	72	7558	±	59	7615-7493	7668-7440	100.1
	Eva	1650	St2	6514	±	66	7421	±	67	7488-7329	7565-7291	99.7
	Big Sandy	580	St1	6460	±	70	7371	±	63	7433-7311	7502-7256	99.8
	Eva	787	St2	6361	±	70	7296	±	78	7416-7247	7425-7165	99.8
	Big Sandy	617	St2	6265	±	69	7173	±	93	7270-7028	7410-6983	100.1
	Eva	848	St2	6258	±	68	7164	±	92	7266-7028	7321-6978	100
	Eva	636	St2	6249	±	69	7152	±	93	7260-7027	7315-6972	99.9
	Cherry	509	St1	6189	±	65	7088	±	87	7171-6996	7258-6936	100.1
	Eva	507	St1	6186	±	71	7084	±	93	7172-6984	7258-6909	100
	Cherry	474	St1	6153	±	52	7056	±	77	7156-6995	7230-6895	100
	Cherry	480	St1	6092	±	51	6976	±	90	7150-6884	7158-6800	99.9
	Eva	619	St2	5922	±	66	6754	±	83	6844-6666	6938-6567	99.8
	Eva	1596	St2	5865	±	63	6679	±	81	6779-6569	6844-6500	99.5
	Eva	639	St1	5799	±	65	6598	±	78	6668-6505	6745-6445	99.9
	Eva	726	St2	5535	±	65	6340	±	60	6398-6290	6453-6209	100.1
Period 3: ca. 5500 - 3900 cal BP	Kays Landing	660	St5	4802	±	59	5500	±	80	5597-5335	5644-5326	97.5
	Kays Landing	1350	St4	4688	±	59	5423	±	81	5566-5320	5581-5311	100.8
	Kays Landing	M108	St5	4750	±	500	5140	±	443	5662-4731	5944-4153	108
	Kays Landing	1271	St5	4470	±	50	5127	±	107	5281-4982	5303-4890	99.9
	Oak View	670	St1	4280	±	53	4847	±	84	4960-4730	5034-4644	99.2
	Kays Landing	430	St2	4261	±	57	4804	±	94	4876-4652	4971-4616	99.4
	Kays Landing	229	St3	4178	±	57	4704	±	84	4830-4627	4846-4536	99.8
	Kays Landing	798	St3	4175	±	56	4702	±	84	4828-4626	4844-4535	99.9
	Kays Landing	774	St2	4169	±	56	4698	±	85	4827-4625	4841-4533	99.9
	Kays Landing	M109	St2	4050	±	300	4576	±	385	4958-4096	5317-3857	102.7
	Ledbetter	231	St2	4005	±	52	4489	±	88	4530-4416	4789-4295	99.8
	McDaniel	685	St2	3996	±	44	4473	±	65	4520-4420	4780-4298	99.9
	Ledbetter	292	St2	3889	±	52	4314	±	79	4411-4251	4437-4152	99.9
	Kays Landing	604	St3	3851	±	55	4270	±	89	4404-4158	4419-4094	99.8
	McDaniel	624	St2	3830	±	52	4244	±	90	4381-4150	4413-4091	99.9
	Kays Landing	M356	St2	3580	±	300	4161	±	302	4406-3828	4825-3658	103
	Oak View	71	St1	3713	±	43	4057	±	66	4143-3985	4225-3925	100.1
	Kays Landing	235	St2	3699	±	54	4043	±	78	4145-3972	4227-3892	100.6
	Kays Landing	136	St2	3646	±	63	3985	±	84	4082-3895	4150-3836	102.5
	Kays Landing	110	St2	3632	±	57	3967	±	77	4075-3882	4144-3832	102.4
	Kays Landing	81	St1	3588	±	55	3919	±	75	3977-3849	4084-3733	102.7
Early Woodland	Kays Landing	58	St2	2939	±	53	3103	±	87	3205-3005	3319-2946	99.9
	Ledbetter	229	St1	2560	±	47	2661	±	84	2755-2547	2765-2493	107.7

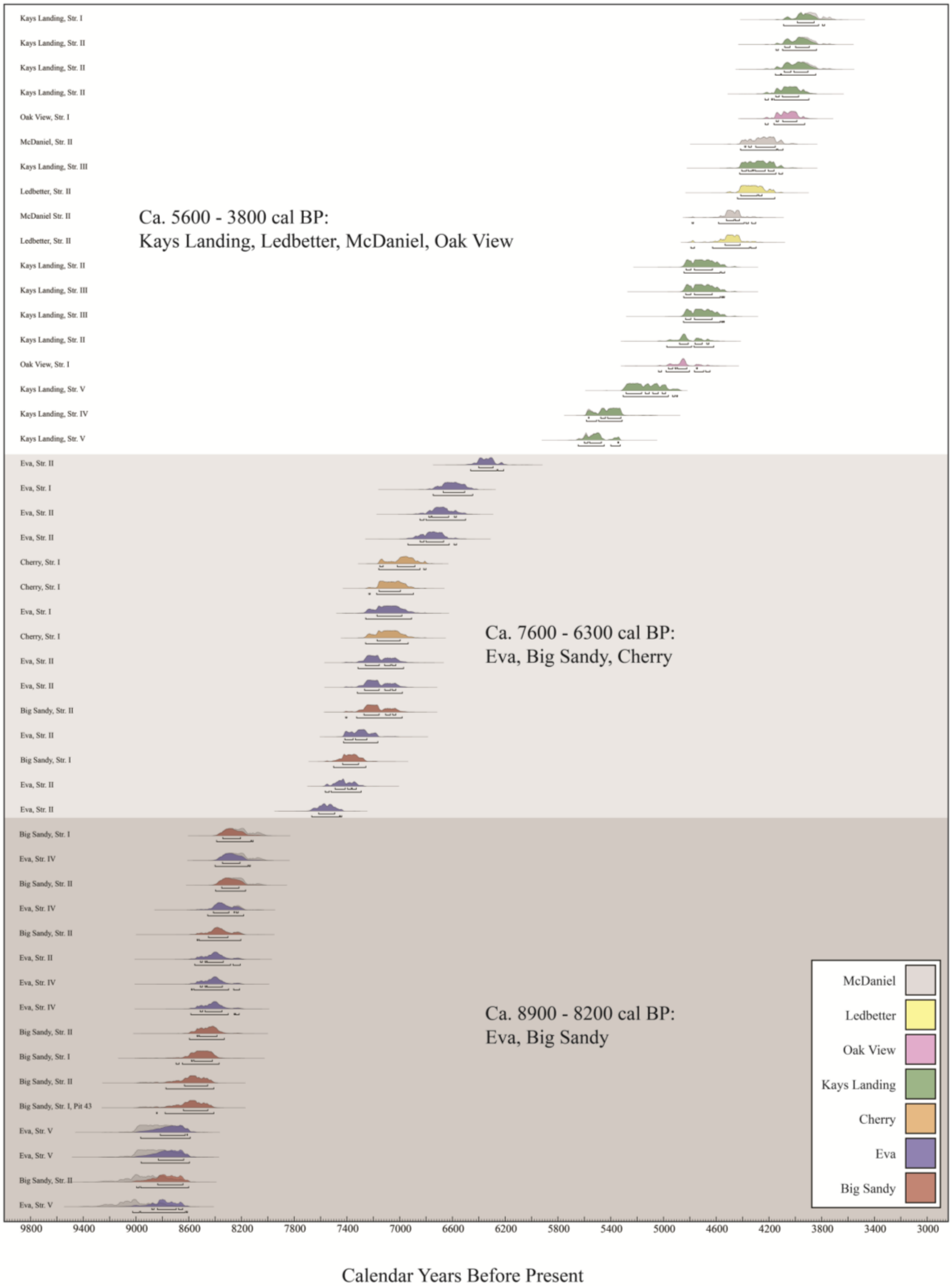

Figure 9.2. The augmented radiocarbon sequence, organized chronologically and by period, for the lower Tennessee Valley based on 54 dates from the seven research sites.

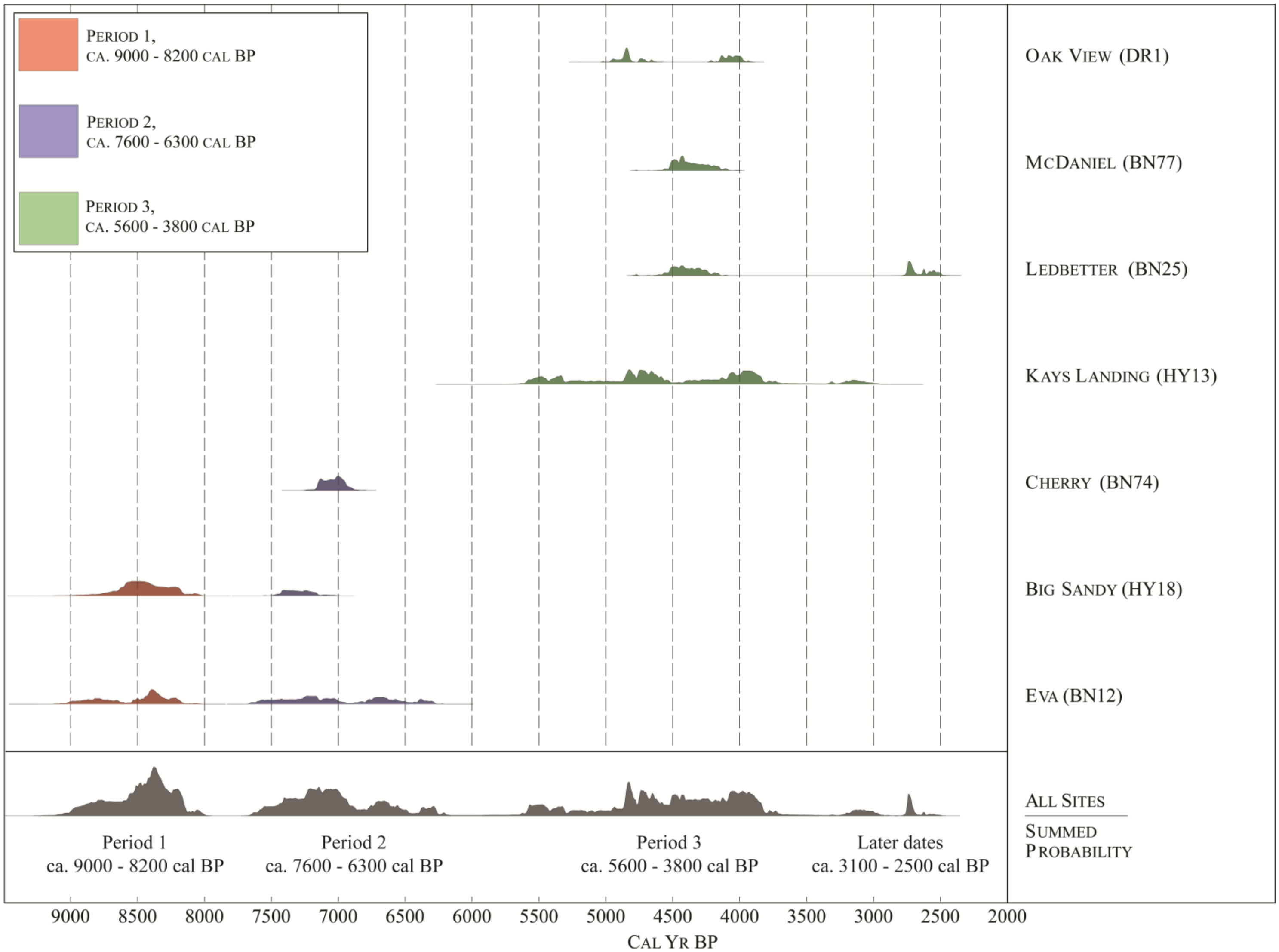

Figure 9.3. Occupational sequence of the lower Tennessee Valley, illustrated with summed probability distributions of radiocarbon dates (n = 54) obtained during this research project (n = 48) and previously-obtained reliable dates (n = 6) at each of the seven study sites.

Bayesian Modeling of Periods in the lower Tennessee Valley

A Bayesian calibration model was programmed in OxCal 4.1 to test the accuracy of the three-period sequence for the lower Tennessee Valley. Individual dates were organized in chronological sequence from earliest to latest, and with two exceptions, were placed into three sequential periods: early, middle, and late. Two unusually late dates from Kays Landing and Ledbetter fell during the Early Woodland period, and were modeled as outliers outside the occupational sequence. The two Woodland-aged dated samples provide further indication, when combined with the presence of pottery previously noted (Chapters 7 and 8), that use of the sites did not end with the terminal Archaic, but continued at least through the Early Woodland period.

Table 9.3 provides the uncalibrated radiocarbon age, the Bayesian modeled and calibrated mean intercept and sigma, the 1- sigma and 2-sigma ranges for each date, and the agreement values (A) for each value in the three-period (plus Early Woodland) model. Figure 9.2 illustrates the full span of radiocarbon dates by period, while Figure 9.3 illustrates the radiocarbon periods for the lower Tennessee Valley as represented at the study sites.

A Potential Source of Error with the Calibration Curve: Plateaus and Cliffs

In seeking potentially culturally- or environmentally-informative patterns among long series of calibrated radiocarbon dates spanning several millennia, it is important to assess the degree to which perturbations in the radiocarbon calibration curve may affect the accuracy of the conversion from “radiocarbon years” to “calendar years,” and how such accuracy may affect efforts to examine a given period of time at relatively high-resolution.

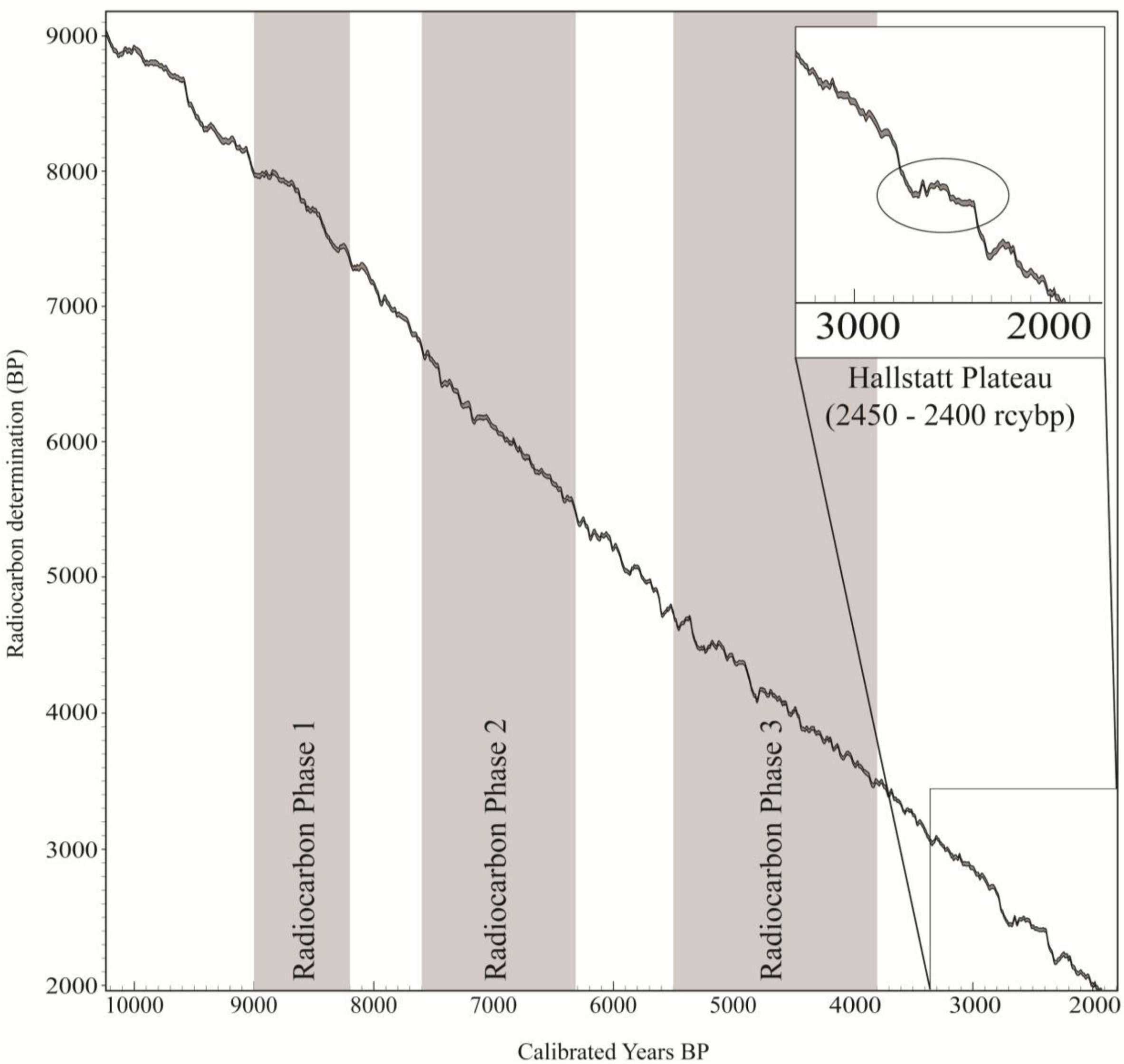

Figure 9.4. Radiocarbon “cliffs” and “plateaus” illustrated on the IntCal13 radiocarbon calibration curve (Reimer et al. 2013).

Variations in the production of radioactive carbon-14 (^{14}C) in the upper atmosphere can result in “plateaus” (relatively flat areas) or “cliffs” (steep declines) in the calibration curve (Fiedel 2001:121-123; Thomas 2008:437-442). Plateaus result from lower-than-average production of ^{14}C in the atmosphere; the effect of a radiocarbon plateau is to compress a long period of time in calendar years into a short radiocarbon span. One such plateau occurs in the mid-3rd millennium BP and is known in some areas as the Hallstatt plateau (a reference to the Hallstatt period in central Europe [Millard 2008:257]; see Figure 9.4). The plateau effectively compresses between three and four centuries of calendar time into about fifty radiocarbon years occurring between ca. 2450 and 2400 rcybp. This severely negatively impacts efforts to calibrate high-resolution sequences of radiocarbon assays from this period. Anderson (2010:280) notes that this is particularly problematic when using numbers of radiocarbon dates as a proxy to identify historic trends in population size.

The effect of a “cliff” on the radiocarbon calibration curve is the inverse of that of a plateau: a steep increase in the production of ^{14}C in the upper atmosphere can lead to an appreciable number of radiocarbon years encompassing comparatively few calendar years, appearing as a sharp downward trend (a “cliff”) in the calibration curve. Such steep declines can be observed on either side of the 2450–2400 rcybp plateau (Anderson 2010:279; Fiedel 2001:121-123) (see Figure 9.4).

Visual inspection of the most recent iteration of the radiocarbon calibration curve (IntCal13 [Reimer et al. 2013]; Figure 9.4) illustrates several slight plateaus and cliffs along the length of the curve during the periods associated with the three proposed occupational periods in the lower Tennessee Valley, particularly during the third period (Figure 9.4). A minor cliff can also be noted near the end of the first period at approximately 8200 cal BP (Figure 9.4). While the cliff observed just prior to ca. 8200 cal BP is not as extreme as that encountered before and after the Hallstatt plateau, it nevertheless may have had a minor effect of compressing the "terminal" dates from Eva's Stratum IV and from Big Sandy's primary period of occupation[40].

Occupational Periods in the Lower Tennessee Valley, 8,800—2,500 cal yr BP

Bayesian modeling of the radiocarbon sequence for the lower Tennessee Valley suggests that a three-period model of the region's occupational history is well-suited to the distribution of dates in the sequence deriving from seven study sites. These sites effectively span the Middle and Late Archaic periods and may indicate three primary periods of occupation separated by two significant temporal gaps.

Period 1, ca. 8900—8200 cal yr BP

The first period in the occupational sequence, Period 1, was represented by a total of sixteen radiocarbon dates from two sites, Eva and Big Sandy. At Eva, these dates, with one exception (see below), derived from Stratum IV and Stratum V, the deepest cultural deposits at the site. At Big Sandy, Period 1 dates were associated with both Stratum I and Stratum II. In

[40] It is important to note that, while a calibration cliff may be exerting influence on the calibration of these late 9th millennium dates, an alternative explanation is also possible. At approximately 8200 cal BP, an abrupt period of several centuries of unusually cool temperatures is indicated (see Alley et al. 1997), and is thought to represent the effects of an interruption of the thermohaline conveyor by the last major meltwater pulse into the Hudson Bay from glacial Lake Agassiz (Barber et al. 1999). Some researchers (e.g., Bicho et al. 2010; Weninger et al. 2006) have suggested significant cultural impacts occurred as a result of this cool period. Evidence of the effects of this cooling on Middle Archaic cultures of eastern North America may include a decline observed in bifurcate-base projectile points on the Coastal Plain, and an expansion of pine (and decrease in mast-producing species), although Anderson (2001:159-160) notes that the link between these "movements of people and biota" and the cold event at 8200 cal BP is largely circumstantial (Anderson 2001:160). Although additional research is necessary, the apparent end of use of both Eva and Big Sandy might, if further evidence of interruptions in the occupation of sites in the region could be found, suggest some degree of effect on the people occupying the lower Tennessee Valley during that period of time.

total, the modeled weighted mean intercepts of these dates indicate a total span of time of approximately 500–600 years.

The Period 1 strata constitute the earliest dated Archaic-aged cultural deposits in the lower Tennessee Valley; the earliest dates fall within the initial century of the Mid-Holocene / Middle Archaic cultural period in the region (Anderson and Sassaman 2004:94; Anderson et al 2007:457; Sassaman and Anderson 1996:xvii-xviii; Smith 1986:18). Although earlier occupation in the lower Tennessee Valley is indicated by the widespread presence of Early Archaic and Paleoindian projectile points (see Kerr and Bradbury 1998), no radiocarbon dating of these assemblages has occurred.

Two sub-periods of occupation are suggested by the distribution of dates from Eva and Big Sandy. Although the nature of the dates in the Big Sandy radiocarbon sequence may indicate disturbance of the site either during its occupation or subsequent to the Period 1 use of the location (see Chapter 5), dates from Eva suggest two separate periods of use associated with Stratum V and Stratum IV, respectively.

Four dates—three from Stratum V at the Eva site, and one from Stratum II at Big Sandy—fall within an intervals from approximately 8,900 to 8,700 years ago.

The three early dates associated with Eva's Stratum V make it the only well dated example of a transitional Early-to-Middle Holocene occupation site in the lower Tennessee Valley. Although a fourth early Mid-Holocene date was associated with Stratum II at Big Sandy, suggesting the possibility of visitation as early as 8700 cal BP, the remainder of Period 1 dates from that site suggest its main use occurred during the later Period 1 period (see below).

By the end of the first century of what is commonly viewed as the beginning of the Mid-Holocene period at ca. 8,900 years ago, Eva was occupied, although use of the site during that period, which may have lasted for as little as two centuries, was not intensive. Appropriate to its age, Stratum V does not appear to be dissimilar to the type of short-term encampment or residential base that Kerr and Bradbury (1998) have previously described for the Early Archaic period in the Kentucky Basin; such sites are characterized by relatively low artifact diversity and sparse assemblages, suggesting comparatively short-term occupation. Diagnostic hafted bifaces associated with the late Early Archaic period, as well as the early Middle Archaic, were present in the Stratum V assemblage (see Chapter 6), further supporting the supposition that this deposit was created during what might be viewed as a "transitional" period in the region.

There was no evidence of shellfishing at Eva during this period, and the site was not occupied intensively during its initial use. However, use of the location during this time was apparently intensive enough, or occupied by enough people, to have warranted spatial segregation of tasks or activities. The ability to resolve such locations within the deposit suggest that perhaps only a single period of relatively intensive, but short-duration, use characterized the deposition of Stratum V.

The distribution of identified animal bone within the site's excavation block suggested three areas of most intense use during Eva's early occupation. The main area of heaviest use was in the lower southwestern corner of the block, spanning three grid squares and containing the majority of the Stratum V artifacts, a significant concentration of unmodified animal bone, two features (two thermal features, suggesting hearths) and a single infant burial (Burial 126; see Figure 6.38).

A second area of relatively intense activity was in a single grid square in the central, eastern portion of the block, in which a large amount of animal bone and most of the documented Stratum V non-projectile point chipped stone artifacts were found. Animal bone identified in that area was dominated by whitetail deer, and skeletal elements represented consisted of bones of the legs, antler, and vertebrae; no worked bone was found in that location, but in combination with the chipped stone artifacts found there, which included two unifacial scrapers, a bifacial scraper, several broken bifaces and two projectile points, the relative lack of axial skeletal elements (e.g., ribs, elements of the pelvis, skull) suggests the possibility that the bones constituted the remains of butchering or other animal processing activity. A third heavy concentration of animal bone in the extreme southeastern corner of the block was associated with no other cultural material, but contained deer, turkey, and most of the identified dog bone in Stratum V.

In contrast to Eva, which contained intact deposits dating to the early Mid-Holocene, there is no indication of any substantially differentiated discrete deposit associated with the single early date from Big Sandy (Tables 9.1, 9.3).. Like Eva, the presence of late Early Archaic and early Middle Archaic diagnostic bifaces in the deposits at Big Sandy (see Chapter 5), in combination with the early age of the dated sample (Table 9.1, 9.3) suggests that visitation of the location occurred during the transitional Early-to-Middle Archaic periods, but only one of ten dated samples from Big Sandy indicated an age similar to that of Eva's Stratum V. The remainder post-dated 8600 cal BP, suggesting that whatever use of the site occurred in the very early centuries of the Mid-Holocene, it was likely minimal.

Seven of the remaining nine dated samples from Strata I and II at Big Sandy indicate both deposits likely date to the site's primary period of use, which occurred during an approximately four-hundred year span between 8600 and 8200 cal yr BP. At both Big Sandy and at Eva, the adoption of intensive shellfishing is indicated in shell-bearing deposits dated to this time. At Big Sandy, situated on a hilltop and hill slope several tens of meters from the left bank of the Big

Sandy River, Stratum II, which was found mainly on the slope contained notable quantities of shellfish remains.

Big Sandy was characterized (see Chapter 5) as an encampment or occupation. The site's spatial organization suggested the maintenance of separate areas for habitation (located on the hilltop, and indicated by the large number of shallow pits) and for refuse disposal and burial of the dead (represented by the area on the hillslope in which Stratum II was situated, and from where much of the site's cultural material was recovered). The distribution of radiocarbon dates at Big Sandy was indicative of an expansion of the site's "midden" (Stratum II) downhill during the period of its creation. The earliest dated samples derived from the upper slope, while later dates were found downslope, suggesting the deposition of refuse further downhill as the upper midden increased in size. It may also reflect the occasional downhill collapse of growing refuse piles deposited on the upper slopes near the main habitation area; the deliberate disposal of debris downslope, or some combination of these possibilities.

The accumulation of shell-bearing midden on the hillslope occurred during the primary period of occupation of Big Sandy, and although the Stratum II deposit likely represents refuse disposal, the area also served as a cemetery. Maintenance of a soft boundary between the hilltop occupation area (where the site's pit complex was found) and the hillslope disposal area and cemetery is indicated not only by the near total absence of pits on the hillslope, but also by the occurrence of burials on the slope, not only in Stratum II but also in the Stratum I deposit above it. The presence of several features and a few pits along the edge of that area, intermingling with burials along the northwestern edge of the main concentration (see Figure 5.7), suggests that no hard boundary was maintained, and at least some domestic activities may have been conducted in or adjacent to that location. Nevertheless, the degree of separation at Big Sandy between what appears to have been the primary locus of occupation and the primary refuse disposal and burial area is not observed at other excavated Archaic sites in the area, either during this period or later.

Shortly after the adoption of shellfishing at Big Sandy, similar practices appear at Eva, as indicated in that site's early shell-bearing Stratum IV, dating to between 8400 and 8200 cal yr BP (Tables 9.1, 9.3). During that time, occupation of the location was intensive; in addition to shell, the Stratum IV deposit contained more than 70% of the total amount of animal bone recorded at the site, representing over 14,000 identified specimens, and nearly 40% of the site's documented artifact assemblage. Stratum IV also contained fifteen burials and a significant number of features, consisting of sixteen clusters or caches of lithic raw material, nine thermal features, and a mass of burned bone, projectile points, ash and stone[41]. In general, occupation during the period associated with Stratum IV was sufficiently intensive to produce a relatively undifferentiated deposit, although concentrations of animal bone and cultural material seem to suggest a large area representing heavier activity that running diagonally through the center of the excavation block (see Figure 6.39).

Early shellfishing at Eva and Big Sandy appears to have terminated at approximately the same time, just prior to 8200 cal yr BP, although (as noted in the previous section and illustrated in Figure 9.4) a minor cliff in the radiocarbon calibration curve occurs at approximately 8200 cal BP and may contribute to the apparent dramatic reduction in occupational intensity at both sites at this time.

Lacking additional excavated shell-bearing sites in the region dating to this period, it is difficult to determine if this time in the lower Tennessee Valley marks a region-wide hiatus in shellfishing before its resumption in the early centuries of the 8th millennium BP, as evidenced

[41] Recorded as Feature 7 during excavation (Chapter 6, Table 6.2; see also Lewis and Lewis 1961:15).

by basal dates from Eva's Stratum II shell-bearing deposit (see below). At Big Sandy, the period appears to mark the end of significant use of that site, although there is evidence of revisitation roughly 1000 years later.

At Eva, a period of some 600 years separates the upper Stratum IV deposit from the base of Stratum II, from ca. 8200 to 7600 cal BP. Eva was not wholly abandoned during this period; contrary to previous interpretations of the site's depositional history, which suggested that the intervening Stratum III represented an extended period during which Eva was inundated and inaccessible (Lewis and Lewis 1961:9), over the six-to-seven hundred years separating Stratum IV and Stratum II, the site appears to have been used sporadically. Artifact and animal bone counts for the deposit indicate generally sparse use of the location during the period from 8200 to 7600 cal BP (see Figures 9.5a – d), but ten features were documented in Stratum III, and original field documents indicate fourteen burials were associated with the deposit; these appear to have been reassigned to Stratum II and IV by Lewis and Lewis based on their interpretation of the origins of Stratum III.

Period 2, ca. 7600 – 6300 cal yr BP

The reappearance of shellfish in the depositional sequence at Eva marks a period of extended use or visitation of that site occurring between approximately 7600 and 6500 cal BP. Dated samples from both Big Sandy and Cherry fall within this span, and are considered as part of a second period of occupation or use of the region encompassing the Tennessee and Big Sandy valleys. Ten dates from the lower, middle, and upper portions of Stratum II at Eva, that site's later shell-bearing deposit, define the beginning and end of this period. Additional dated samples from Big Sandy indicate visitation or use at that site occurred between 7400 and 7100 cal BP, and three dates from Cherry situate that site's initial period of occupation between approximately 7100 and 6900 cal BP.

The apparent boundary between Stratum III and the overlying shell-bearing Stratum II marks a significant shift in the pattern of use of Eva during the mid-to-late 8th millennium BP. Stratum II represents, in form (see Chapter 6, Figure 6.4), a shell mound, but dated samples indicate a span of between 1000 and 1200 years from the base of the deposit at 7600 BP to its upper termination sometime between 6500 and 6300 BP. Stratum II has often been suggested to represent an extended period of relatively intense use of Eva, and the deposit's composition—109 human and fifteen dog burials, together with a considerable quantity of cultural material and animal bone (although significantly less than Stratum IV), and thirty-two features—has been previously interpreted as evidence of such heavy use (but see below).

Temporally diagnostic projectile points associated with Stratum II were largely Middle Archaic in age, conforming to the radiocarbon distribution from that deposit, although some mixture of earlier forms such as Eva I (dating to the early Middle Archaic) and later forms, including Bentons and several examples of stemmed projectile points of probable Late Archaic age, suggested disturbance of the deposits occurred during the site's use during that period and after.

Roughly three centuries after the reappearance of shellfishing in Eva's depositional sequence, two dated samples from the northeastern corner of Big Sandy (FS 617, 7173 ± 94 cal BP; FS 580, 7371 ± 63 cal BP) indicate that site was revisited between 7400 and 7100 cal BP. However, given the spatial distribution and number of radiocarbon dates at that site that are associated with its previous period of occupation prior to 8200 cal BP, the two late 8th millennium dates seem to suggest relatively minimal activity there during this period.

Located 17 km upriver from Big Sandy, dated samples from the shell-free Cherry site indicate occupation of that location also occurred during the late 8th and early 7th millennia. The degree of intensity of the use of Cherry during the second period is not entirely clear. Appraisal of the site during its excavation indicated a single occupational stratum containing significant evidence of intense use, including the possible presence of a number of small structures or shelters. As discussed in Chapter 8, however, analysis of hafted bifaces from Cherry suggests two primary periods of occupation, occurring not only during the Middle Archaic (as indicated by the radiocarbon dates from the site and by Middle Archaic temporal diagnostics) but also during the Late Archaic. The clustering of Late Archaic diagnostics in areas containing large numbers of postmolds and pits (see Chapter 8, Figure 8.7) may indicate that many of those features, and the much of the site's burial population as well, resulted from later occupations. Because radiocarbon dates were taken from one area of the site that appeared to contain larger numbers of datable materials in primary context (i.e., not in direct association with pit features or burials), it is likely that the dated samples in fact were associated with a portion of an intact Middle Archaic midden at Cherry, and while the site was clearly used during that period of time, the association of occupational features and burials period cannot be considered secure.

At Eva during the late 8th and early 7th millennia, use or occupation of that site continued for another 400 – 500 years, during which time shellfishing (and shell deposition) appears to have occurred on what appears to have been a limited or sporadic basis.

The second period of occupation in the Kentucky Basin, as indicated by radiocarbon dates in the study sample, "ended" in the late centuries of the 7th millennium BP, with the termination of shellfishing evidenced at Eva sometime between 6500 and 6300 cal BP. Whether these dates, taken from the upper margins of Stratum II at Eva, represent the beginning of a period in the lower Tennessee Valley of reduced occupational intensity is not entirely clear, although they certainly mark a change in the use of Eva. The presence of an overlying shell-free deposit at that site indicates that occupation or use of the location continued on some level, and similar occupations may characterize the broader use of the valley during that time.

It must be noted that the lack of dates from the period after 6300 cal BP but before 5600 cal BP is probably a reflection of sampling bias rather than an indicator of Archaic-era population or settlement patterns. The UTDoA were unable to thoroughly investigate every site in the region that had been documented in the preliminary cultural resources survey conducted in 1939 (Lyon 1996:158), and decisions to excavate specific sites appear to have been made sometimes on relatively short notice. For example, Douglas Osborne concluded his field report for the McDaniel site with a note that he hoped that the "big Indian site near Bain's store, Bn74, [would] be checked" (McDaniel site original field report, on file at the Frank H. McClung Museum, University of Tennessee, Knoxville). The excavation at Cherry (40BN74) was initiated less than two weeks later.

One hundred sixty-four sites were documented in the Tennessee portion of the Kentucky Basin identified during the 1939 survey (Lyon 1996:158), and it is possible that among those that remained unexcavated in the region were deposits dating to the period between 6300 and 5600 cal BP. Continued occupation of the valley during this period is also indicated by results of analysis of the Cherry site temporal diagnostics, which indicate that location was probably not abandoned (as the radiocarbon dates from the site might suggest), but was reoccupied during the Late Archaic period. Whether a hiatus in Cherry's use occurred between the Middle and Late Archaic periods (i.e., sometime between 6300 and 5600 cal BP), or indeed whether that period represented a time of reduced cultural activity in the region, cannot be conclusively demonstrated from the data presented here. However (and as noted previously), Stratum I at Eva, as well as deep cultural deposits at Oak View that were too sparse to yield datable materials, suggest some degree of cultural presence in the region during the second "gap" in the radiocarbon sequence.

Period 3, ca. 5600 – 3800, and continued occupation

Dated components at the remaining sites in the study sample—Kays Landing, Oak View, Ledbetter, and McDaniel—indicate an increased presence on the regional landscape of the Kentucky Basin after 5600 cal BP during the Late Archaic. The bulk of dated samples from this period derive from Kays Landing, and including early assays obtained by Lewis and Kneberg (n = 3), totaled sixteen. Modern AMS dated samples from that site numbered thirteen, including a fragment of red oak (*Erythrobalanus*) charcoal (FS 1271) submitted in the mid-2000s (William Fox, personal comm., 2012). Seven additional dated samples (three from Ledbetter, two from McDaniel, and two from Oak View) situate these four sites' main periods of use during a roughly1600 year span, although two late dates from Kays Landing (FS 58, 3104 ± 87 cal BP) and Ledbetter (2636 ± 89 cal BP) indicate visitation of those sites beyond the Late Archaic and into the Early Woodland period, matching pottery evidence from both Eva and Big Sandy's upper deposits indicating continued use of the region during later cultural periods (see Chapters 5 - 8).

Between 5600 and 5100 cal BP, dates obtained during this project indicate occupation or use of a single site, Kays Landing, as documented in Stratum V, the earliest of two shell-bearing components at the site. Anchored by three AMS dates—two from Stratum V, and a single dated sample from the base of Stratum IV that probably originated in the upper margins of Stratum V—this deposit's age is not matched by other dated Late Archaic deposits in the region, although at Oak View, Strata III and V contained ephemeral cultural material suggesting possible contemporaneity with Kays Landing during this period.

The distribution of cultural material in Stratum V is not easily interpretable—artifacts from the deep deposits at the site were provenienced by square, stratum and level, but not individually piece plotted, precluding the potential identification of activity areas. —In combination with the relatively small area of the site exposed, it is difficult to ascertain the nature of the occupation during this period. Only four features were associated with the deposit, and combined with a lack of postholes the available data suggest relatively little domestic occupation of the site occurred prior to 5100 cal BP.

After 5100 cal BP, use of Kays Landing lapsed for a period of between three and four centuries. Postholes identified at the interface between Stratum III and II, and several pits associated with Stratum III, suggest that reoccupation of the site initially was characterized by use as a residential or domestic location, before the renewal of shellfishing at the location between 4800 and 4700 cal BP. A series of nine AMS dates from the upper margins of Stratum III (n = 3) and from the full vertical extent of Stratum II (n = 6), situate the site's second shell-bearing deposit during a roughly 1,000 period, extending from ca. 4800 to 3800 cal BP. During the time represented by Stratum II, use of the Oak View, Ledbetter, and McDaniel sites, scattered throughout the lower Tennessee Valley, also took place.

By 4800 cal BP, both Oak View and Kays Landing, located at opposite ends of the lower Tennessee Valley, were in use; by 4500 cal BP, additional occupations at Ledbetter (4489 ± 88 cal BP) and McDaniel (4474 ± 66 cal BP) are evidenced by dates from those sites, indicating contemporaneous or overlapping periods of use of all four locations at this time and for at least five centuries.

In contrast with the shell-bearing Stratum II at Kays Landing, the lack of shellfish remains at Ledbetter (Stratum II) McDaniel, and Oak View (Stratum I) during the same period of time suggests the possibility that significantly different activities occurred at these sites. Clear evidence at McDaniel of structural remains (i.e., postholes) and other evidence for intensive use (e.g., pits, hearths), suggests residential behavior. Although postholes at Oak View were scattered and did not appear to delineate patterns consistent with structural association, the substantial number of occupational features, including pits and hearths, suggest a similar function for that site. At Ledbetter, there were no postholes identified in the shell-free Stratum II, but the few features identified included both pits and hearths, suggesting some level of domestic or residential occupation may have also occurred at that site during this period.

It is difficult to estimate the duration and termination of later occupations at these four sites. However, deposits overlying the dated strata at these sites indicate clear use of these locations beyond the dated samples from each of them.

Although assays from McDaniel's Stratum II indicated a span of between two and three hundred years, continued occupation at that site through the Late Archaic and perhaps into the Woodland period is indicated by temporal diagnostics from Stratum I and from the site's plow zone (Figure 8.42, Table 8.21). A lack of significant variation in the color or texture, or overall character, of the Stratum I and Stratum II deposits suggests that any continued occupation of the location beyond 4200 cal BP was not appreciably different from the site's earlier use.

In contrast to McDaniel, significant variation in site use from earlier purposes appears to characterize later deposits at Kays Landing, Ledbetter, and Oak View. After 3800 cal BP, dated samples from Kays Landing and Ledbetter indicate that use of both sites continued until at least the middle of the 3rd millennium BP (Ledbetter, FS 229, 2636 ± 89 cal BP) during the terminal

Archaic and Early Woodland. At Ledbetter, this period of use was characterized by shellfishing, and the accumulation of a shell-bearing deposit of moderate thickness that began sometime after 4300 cal BP and continued until at least 2600 cal BP; the majority of burials identified at the site were recovered from it (n = 83), extending the temporal estimate for shellfishing in the Kentucky Basin into at least the middle of the Early Woodland period. At Kays Landing, the shell-free Stratum I deposit appears to represent a terminal Archaic or Early Woodland occupation, based on a single radiocarbon date (FS 58, 3104 ± 87 cal BP) that likely derived from that deposit (see Chapter 7).

Oak View also experienced an apparent shift in use after 4000 cal BP. The site is often characterized as shell-bearing, based on the documentation in original survey notes of a significant amount of shell scattered on the site's surface and in the plow zone prior to excavation. However, by the time of excavation, the presence of shell was significantly diminished; there was little remaining evidence that a substantial shell midden had ever been present. There is no way to know the depth or composition of that deposit, nor the time during which it was used, but it seems apparent that shellfishing characterized that site's later (and undated) use, possibly coinciding in age with the late Stratum II deposit at Kays Landing, and (depending on the duration of activities at Oak View) the early periods of shellfishing at Ledbetter.

Comparison of the New Sequence with the Lewis and Kneberg 1959 Chronology

The occupational history of the lower Tennessee Valley as presented in the preceding section contrasts substantially with a previous synthesis of the Archaic period occupation of the region published in 1959 by Thomas Lewis and Madeline Kneberg (see Chapter 2). Lewis and

Kneberg used the seven sites examined in this study, as well as three others (West Cuba Landing [40BN17], Frazier [40BN59], and Thomas [40BN11]) that were not included in this research project because of a lack of datable materials. In their synthesis, Lewis and Kneberg employed a quantitative method developed by Alfred Kroeber (Kroeber 1940) to assess the similarity of site components based on a list of eighty-three cultural traits they had distinguished among their ten study sites (Lewis and Kneberg 1959:174-175, 176-177).

Lewis and Kneberg distinguished three sequential periods within two separate cultural "traditions", the Midcontinent and the Eastern (see Chapter 2, Figure 9.1). In actuality, much of the variation that they identified as indicative of cultural traditions appears to have been, as the above analysis indicates, temporal and activity related in nature. Generally, sites distinguished as belonging to the "Midcontinent" tradition—i.e., Eva, Big Sandy, and Cherry—consisted entirely of, or contained, Middle Archaic-aged deposits. "Eastern" tradition sites—Kays Landing, Oak View, McDaniel, and Ledbetter Landing—were predominately Late Archaic in age (see Figure 9.3).

As noted in Chapter 2, the principal weakness in Lewis and Kneberg's analysis was their interpretation of shell-bearing deposits as indicators of periods of time during which environmental conditions in the region were favorable for freshwater molluscs (Lewis and Kneberg 1959:173), and their failure to seriously consider the possibility that the adoption or abandonment of shellfishing was not strictly based on environmental conditions. The analysis presented in the preceding section indicates, in fact, that shellfishing during the periods of time encompassed by deposits at the seven sites examined in this study was not strictly a function of availability due to environment. Shellfish appear to have been available in the region's rivers, and in sufficient numbers for harvesting, from the early-to-mid 9th millennium BP (Eva and Big

Sandy) to at least the middle of the 3rd millennium BP (Ledbetter Landing). But they appear to have been harvested at only some sites during that period of time.

Shellfishing in the Midcontinental United States

In light of the chronological framework discussed in the preceding section, how is the Archaic-period history of occupation in the lower Tennessee River Valley now to be understood? And specifically, given the primary focus of this research project, how can the history of shellfishing as a practice, and the individual histories of shell-bearing sites in the study sample, be contextualized and interpreted? During the roughly 6,400 years represented by the dated deposits from the study sites, spanning the Middle and Late Archaic and extending into the Early Woodland periods, shellfishing appears to have been an ongoing, but not universally practiced, activity.

Early shell-bearing deposits at both Eva (Stratum IV) and Big Sandy (Stratum II) were contemporaneous, and represented one of only two periods of time in the dated occupational sequence of the region during which shellfishing appears to have occurred at more than one site. After the early occupations at Eva and Big Sandy, shellfishing during the next period in the regional chronological sequence was indicated only by the gradual accumulation of the main "shell mound" at Eva (Stratum II). Several centuries later, shellfishing at Kays Landing (Stratum V) commenced, continuing for several centuries before a short hiatus at the site; resumption of shellfishing at Kays Landing (Stratum II) was accompanied by occupations first at Oak View (shell-free), and then at Ledbetter (Stratum II, shell-free) and McDaniel. By sometime between 4000 and 3800 cal BP, shellfishing at Kays Landing ceased, and the practice appears to have begun at Ledbetter (Stratum I) and perhaps at Oak View, indicated at the latter site by the shell-bearing deposit seemingly destroyed by plowing.

There can be no absolute estimate of the termination of shellfishing in the Kentucky Basin, because Oak View's shell-bearing deposit was not intact enough to permit either excavation or even an approximation of the depth of the deposit. However, the Early Woodland-aged date of the Ledbetter shell-bearing stratum (Stratum I) suggests that shellfishing in the region continued at least until the mid-Early Woodland.

Whatever the primary purpose or purposes of shellfishing was (or were) in the Tennessee Valley in the early centuries of the Mid-Holocene when the practice was in evidence both at Eva (Stratum IV) and Big Sandy (Stratum II), the contemporaneity of both shell-bearing and shell-free deposits in that region among the study sites, particularly during the Late Archaic period (during the third radiocarbon period), suggests that the use of freshwater molluscs may not always have been associated strictly with subsistence[42]. The shell-bearing Stratum II at Kays Landing, for example, was contemporaneous with shell-free deposits at Ledbetter and Oak View[43]. Shell-free and shell-bearing deposits of the same age at different sites in the region may indicate differences in the availability of or access to shellfish at different locations along the river; they may suggest that different sites had different uses; or they may simply indicate choices to harvest or not to harvest shellfish. Whatever the reason, there does not seem to have been a region-wide shift toward the wholesale adoption of shellfishing.

[42] The accumulation of the Stratum II shell-bearing deposit at Eva is at least partially contemporaneous with some portions of the Cherry site, which contained no shell. However, Cherry was situated at least a kilometer distant from the nearest drainage (see Chapter 8, Figures 8.1, 8.2), and the presence of shellfish at a site so distant from a water source capable of supporting a shellfish population should not be expected.

[43] Like Cherry, the McDaniel site appears to have been located far enough from any body of water sufficient to supporting a shellfish population (see Chapter 8, Figures 8.32, 8.33), and its "shell free" status seems likely to have been a consequence of its location.

There has been much written regarding the potential nutrition (or the lack thereof) that shellfish may have provided to prehistoric hunter-gatherers. Despite long-standing assumptions that shell mounds and middens reflected the adoption of shellfishing as a major dietary adaptation (Chapters 2 and 3; see also Claassen 1991c; Waselkov 1987), nutritional studies of freshwater molluscs conducted in the 1970s and 1980s (e.g., Klippel and Morey 1986; Parmalee and Klippel 1986; Post 1982) concluded that freshwater bivalves and gastropods were relatively inefficient as a nutritional staple. Rather than representing a primary food resource, shellfish would more likely have been a resource of last resort, or could have provided supplemental sources of minerals such as calcium, iron, phosphorus, sodium, and potassium (Klippel and Morey 1986:808-809). Others (e.g., Claassen 1986; Erlandson 1988) have argued that shellfish provided important macronutrient supplementation, either in the form of protein (Erlandson 1988, 1994, 2001) or carbohydrates (Claassen 1986), or that their contributions varied seasonally (Claassen 1986, 1998).

Substantially contrasted with the dietary perspective, there are those (e.g., Claassen 2010; see also Russo 2004) who favor less quotidian explanations. Although Claassen has largely abandoned her initial suggestions that freshwater shell specifically represented a building material for the construction of burial monuments (Claassen 1991a, 1993), more recently she and other scholars have argued that shellfish represent ideal feasting foods (e.g., Russo 2004, *sensu* Hayden 2001) and that their appearance in large quantities at riverside sites in the interior US represent gatherings (sometimes over many generations) held by occupants of the region, in which feasting (specifically on shellfish, among other things) occurred. Some (e.g., Crothers 1999; Thompson 2010) have noted that early use of shellfish as subsistence-level foods may have resulted in the creation of visible accumulations that served as landmarks and reminded the inhabitants of a region of previous group gatherings and reinforced territorial claims.

Ultimately it is difficult to evaluate the degree to which the large shell-bearing deposits along the interior rivers of eastern North America are indicative of feasting. Conclusive evidence for feasting has yet to be produced, either for the interior sites or for marine shellfish accumulations (shell "rings") found in some coastal areas of the Southeastern United States. As discussed in Chapter 3, Russo (2004) has made an innovative circumstantial case for the use of shellfish as a feasting food at some shell rings, arguing that the presence of seemingly discrete shell "piles" in some sites (Russo 2004:43-45) are indicative of depositional episodes corresponding to individual feasts. However, recent efforts (Thompson and Andrus 2011) to identify evidence of feasting at a complex of three shell rings on Sapelo Island, Georgia, failed to find conclusive indicators of such practices. Thompson and Andrus used growth band analysis of clams from two rings, and oxygen isotopic analyses of clam and oyster shells from all three shell rings, to identify the season of collection of the shells (Thompson and Andrus 2001:326-330). They found that two rings (Rings II and III) contained shells in close proximity within the midden that appeared to have been harvested during both the summer and winter months (Thompson and Andrus 2011:330-331, Figure 9A), suggesting gradual accumulation of midden deposits throughout the year. Shells sampled from the third ring (Ring I, the largest of the three Sapelo rings) appeared to have been mainly collected during the colder winter months (Thompson and Andrus 2011:332-335), the best evidence for a short-term rapid accumulation event consistent with expectations for the remains of feasting. However, they noted that other activities besides feasting, such as bulk shellfish gathering and processing (see Waselkov 1987:96-109), could produce similarly uni-seasonal assemblages (Thompson and Andrus

2011:337-338). To the best of the author's knowledge, similar efforts to identify feasting deposits at interior freshwater middens have not been published, and the degree to which interior *or* coastal shell midden deposits are indicative of feasting remains to be determined definitively[44].

Whether representative of feasting or basic subsistence, or (more likely) something in between, the chronological data from western Tennessee presented in the preceding section suggests that shellfishing was conducted intermittently at only some sites in the region during the Middle and Late Archaic, rather than representing a region-wide practice dating to a single period of time. Further, as a cultural practice, and regardless of its specific purpose, shellfishing was also not "made or broken" by long-term environmental factors (see also Claassen 2010:69-83). In the past the use or exploitation of freshwater molluscs has been argued to have arisen during the Hypsithermal Interval (ca. 8900–5700 cal BP) as a consequence of the increased productivity and accessibility of shellfish beds in rivers, resulting from lower water levels and less frequent disruption of the river environment by severe flooding (e.g., Lewis and Kneberg 1959; Lewis and Lewis 1961; Marquardt and Watson 2005b:638). However, increasingly it has become apparent that freshwater shellfishing during the Archaic was not restricted to the Hypsithermal Interval; in the Kentucky Basin (see Tables 9.1, 9.3) and elsewhere (see Claassen 2010:Table 2.1; Miller et al. 2012), the practice continued into the Late Holocene. Whatever

[44] Approaches such as the microstratigraphic analyses conducted by Linda Gorski at the Carlston Annis shell midden (Gorski 1980, 2005) offer significant potential for the development of the kind of high-resolution data necessary for distinguishing individual depositional episodes from larger aggregate deposits at shell-bearing sites. Gorski's technique involved painstakingly hand-illustrating shell midden profiles while in the field, a time-consuming and labor-intensive process not necessarily suitable for most modern excavations. However, recent efforts by Sanger (2013) may offer a modernized update to Gorski's methods. Sanger used sophisticated digital image processing software to evaluate midden profiles from shell rings on St. Catherines Island. The approach still requires significant time, since individual shells in the images have to be outlined manually. However, provided photographs of sufficiently high-quality are taken during excavations, the bulk of the work can be done in the laboratory, saving valuable field time. After shells and other components of the midden profile have been outlined, processing algorithms can be used to identify patterns in the orientation and distribution of shells (Sanger 2013).

environmental changes occurred in the region from 8900 to 5700 cal BP and after (see Viau et al. 2006), they do not appear to have affected river environments sufficiently to bring an end to the harvesting of shellfish, which continued in many areas of the midcontinent well into the Late Archaic period and into the Early Woodland (e.g., this study; see also Cridlebaugh 1986; Gage et al. 2011; Little et al. 2012; Marquardt and Watson [eds.] 2005; Miller et al. 2012; Morse 1967).

Chapter 10. Evaluating Accumulation Rates and Burial Practices at Sites in the Lower Tennessee Valley

In this chapter, the chronological data obtained in this study are used to evaluate the intensity of the use of shell-bearing and shell-free sites in the lower Tennessee Valley, and to examine how rapidly (or slowly) these sites and the materials within them (such as human burials) accumulated. As indicated in the preceding chapter, and in Chapters 5–8, shell-bearing deposits among the study sites do not appear to have accumulated rapidly. Based on the periods of time represented by radiocarbon dates obtained from the upper and lower portions of the stratigraphic components examined in this project, most of these sites represent many centuries of accumulated materials. As such, it is important to consider how the represented temporal duration may affect our interpretation of site use and the cultural significance of sites to the people who created and used them.

The first section of the chapter focuses on the depositional rates of cultural materials at two sites, Eva and Kays Landing, representing the two longest-occupied sites in the study sample, to examine patterns of long-term site use during the creation of successive aggregate deposits (strata). Variation in rates of deposition of cultural material and, where present, unmodified identified faunal remains serve as proxies for changes in the intensity of use and, potentially, the scale of site use during the periods of time associated with each deposit (following Jerardino 1995; Stein et al. 2003).

In the final section of this chapter, data from the burial assemblages from the study sites are examined to evaluate the potential role of shell-bearing sites as dedicated locations for ritual activity, specifically activity associated with mortuary practice, during their histories. Much of the debate about the roles and cultural significance of shell mounds and middens to their creators—specifically, the question of whether these sites served as, or became, locations used largely for the conduct of large communal gatherings marked by rituals associated with the interment of the dead—has revolved around the large numbers of burials found in such sites. However, although the raw numbers of burials recovered at shell mound and midden sites are often impressive, there have been few attempts to evaluate these numbers in light of the amount of time during which they accumulated.

Using the radiocarbon data obtained from the study sites, interment rates in well-dated shell-bearing and shell-free components in the research sample are examined. These data are then compared with mortality rates from ethnographic hunter-gatherer groups in order to assess the degree to which the shell-bearing sites in the research sample may be considered representative of the mortuary traditions and practices in the lower Tennessee Valley during the Middle and Late Archaic periods.

Finally, in order to further examine whether the burials at shell-bearing sites exhibited significant differences in treatment (beyond their having been buried in shell-bearing deposits) that indicate "special" mortuary treatment associated with burial in a location of particular cultural significance, mortuary variables across sites are also examined. Variables associated with burial deposition (i.e., position, orientation, flex), with the individuals placed in the graves (i.e., age, sex, the presence of burial goods), and with the types of burial accompaniments, are examined where possible across sites of similar ages in the research sample to determine if burials in shell-bearing and shell-free deposits exhibit significant differences in individual mortuary treatments that might suggest that shell-bearing and shell-free sites (and the individuals interred in them) were viewed differently.

DEPOSITIONAL RATES OF CULTURAL MATERIALS AT EVA AND KAYS LANDING

While it may not be possible to determine with certainty *why* groups along the Tennessee and Big Sandy rivers initially began harvesting shellfish during the mid-9th millennium BP, it is possible to derive some operative concept of how the study sites were used before, during, and after the initiation and abandonment (either permanently or intermittently) of shellfishing as one of a suite of cultural practices, and how those practices (and the use of the sites at which they were conducted) may have changed through time. Within an appropriate analytic framework, expectations for site use (and particularly, intensity of use) under certain sets of conditions may be tested.

The calculation and comparison of accumulation and deposition rates at sites and between strata can provide significant interpretive value in divining the changing nature of site use (Stein et al. 2003:297). Theoretically, the intensity of the use of a location by a group of people for a given period of time is encapsulated in the accreted cultural deposits at that location. If the scale and intensity (and nature) of individual depositional episodes was relatively comparable, aggregate deposits resulting from multiple episodes should exhibit a relatively consistent signature with respect to the rate at which sediments, including cultural materials, accumulated. That signature—the average accumulation rate of a single deposit and its contents, as calculated by the number of artifacts (or measured thickness of deposit) accumulated per unit time (Jerardino 1995)—for a given deposit might be expected to differ from the signature of a second deposit if the activities from which the deposit was formed were significantly different in nature, frequency or intensity. While such a comparison cannot hope to derive fine-grained contrasts, even large-scale resolution at the intra- or inter-site level has the potential to provide further data toward the current (and continuing) lack of consensus regarding shell-bearing site histories and purposes.

However, by framing such an examination within a dichotomy, using the "refuse vs. ritual/feasts" approach that has frequently been employed in discussions of shell-bearing sites (see Chapter 3; Claassen 1991a, 1991b, 1993; Milner and Jefferies 1998), it is possible to construct a general expectation about how quickly sediments, including cultural material suspended in shell-bearing (or shell-free) site matrix, might be deposited, based on the relative frequency and intensity of occupation. Data necessary for more fine-grained examinations of site function, and in particular data with the potential to inform on the character of individual depositional episodes or patterns of deposition (as more recent excavations have provided [e.g., Gorski 1980, 2005; Russo 2004; Thompson 2007]), are in general not available for the Depression-era excavations.

The "refuse" argument assumes that shell middens comprise the aggregate remains of every-day activities (that included shellfishing, shellfish consumption, and shell discard) produced by the conduct of daily practices associated with the long-term (but not necessarily permanent) occupation of a location. The scale of the individual deposits comprising the midden may vary, but in general the rate of accumulation (or of the deposition of cultural material) when considered as an average, is expected to be *relatively* high for a residential refuse deposit when compared to a site or deposit resulting from low-intensity use, such as a short-term encampment or (perhaps) a ritual location.

The "ritual / feasting" argument presumes that shell middens formed as an aggregate from the result of comparatively infrequent, although perhaps intense, use of locations principally for feasting (that included the consumption of shellfish) associated with a variety of rituals or ceremonies practiced by the group or groups who visited those locations. The feasting argument is, as noted previously, comparatively new in shell mound archaeology, having sprung from a broader movement (see Claassen 1991a, 1991b, 1993) initiated in the early 1990s to consider shell-bearing deposits outside of normative views of them as essentially subsistence debris. Inspired in part by Hayden's (2001: Table 2.1) attempt to define some of the archaeological signatures of feasting (which included particularly the remains, in large quantities, of rare or labor intensive foods), a number of researchers (e.g., Claassen 2010; Russo 2004; Thompson and Andrus 2011) have attempted to conceptualize shell-bearing sites as the remains of feasting practices.

While occupational refuse deposits are assumed to accumulate on a daily basis during the inhabitation of a site or location, feasts (and the rituals and ceremonies accompanying them) are by nature special events held relatively infrequently, possibly separated by substantial periods of time.

Given two deposits formed over the same period of time—one resulting from daily use and discard of occupational debris, and the other resulting from several episodes of feasting punctuated by periods of occupational hiatus—a higher rate of accumulation of cultural materials should be expected in the occupational deposit, reflecting a constant rate of daily discard of materials. While feasting episodes might result in more rapid accumulation of materials in the short duration over which a feast was conducted, the subsequent hiatus until the next feast would represent a period of minimal (or no) deposition of cultural materials.

In this comparison, the two deeply stratified sites in the study sample—Eva and Kays Landing—provided a basis for evaluation of changes in site use intensity during each of two time periods, the Middle Archaic (Eva) and the Late Archaic (Kays Landing). However, the data from these two sites are somewhat different in quality, having been excavated by two different supervisors, Douglas Osborne (Eva) and George Lidberg (Kays Landing), and as such must be considered individually.

Eva, with multiple sequential dated deposits, provided a basis for comparison of site use intensity during the accumulation of shell-bearing deposits during the two early radiocarbon phases described previously (8600–8200 cal BP; 7600–6300 cal BP), during which the Big Sandy and Cherry sites were (at times) occupied or used.

Kays Landing's deposits are like those of Eva in approximate time depth, and represent two sequential periods of shellfishing and use of the site, but date to the Late Archaic period (ca. 5600–3800 cal BP) and served as an indicator for the third radiocarbon phase, which included at various times occupation of Ledbetter, McDaniel, and Oak View (and likely Cherry, although no radiocarbon dates were obtained from it for this period).

As noted above, data used in these calculations also vary considerably between Eva and Kays Landing. At Eva, quantities of animal bone were relatively well documented by individual stratum. Such data were not available for any other site in the study sample. Consequently, the depositional rate calculations from Eva represent three separate data sets: overall cultural material, unmodified animal bone, and features. At Kays Landing, only depositional rates of cultural material could be determined, due to a lack of faunal data from that site, and to a large number of features (n = 21 of 47) that were of unassigned stratigraphic provenience.

Unlike Stein et al. (2003), this approach does not consider midden accumulation rates (i.e., sediment accumulation). While Stein, a geoarchaeologist, was able to closely inspect the shell-bearing deposits that she and her colleagues evaluated, no such detailed evaluation of site matrix was made of the deposits at Eva or Kays Landing during the WPA-era excavations.

Lacking such data, which—most critically—would include indications of the degree to which sediments in each stratum had become compacted differentially, the calculation of sediment / midden accumulation rates is not viewed as methodologically sound for these sites.

Depositional Rates of Cultural Material at Eva, Strata V – II

At Eva, depositional rates for cultural materials in three well-dated deposits (i.e., deposits from which ^{14}C assays were taken from the bottom and top, providing an estimate of the start and end of deposition) were calculated (Strata V, IV, and II) (Table 10.1). Rates for Stratum III, using upper dates from Stratum IV and lower dates from Stratum II to approximate beginning and end points, were also assessed. Lacking upper estimates of its age, Stratum I was not assessed in this way. For determination of the length of each of the temporal periods assessed, radiocarbon dates are treated as points in time rather than probability density values (see Jerardino 1995:24). Only counts of material from the grid squares in which reliable dated samples were obtained, or squares immediately adjacent to those squares, were used, in order to minimize the potential effects of variations in depositional rate across the site (Table 10.1).

Stratum V represented a period of 178 years, or 17.8 decades, while the earliest and latest dates from Stratum IV suggest a span of 183 years. Approximately 677 years extended between the latest date from Stratum IV and the earliest from Stratum II, yielding a length of time for Stratum III of 67.7 decades. Verifiable dated samples from Stratum II spanned 1220 years (122.0 decades).

Stratum V has previously (see Chapter 6) been characterized as a relatively short-term encampment (with no evidence of shellfishing); Stratum IV represented a comparatively

Table 10.1. Deposition rates per decade, Strata II - V* at the Eva (40BN12).

Stratum	Elapsed Time (cal yr)	Rate per decade		
		Artifacts	Faunal	Features
II	1220	2.03	10.83	0.27
III	677	0.61	3.78	0.15
IV	183	16.28	348.14	1.37
V	178	2.08	26.80	0.17

* Artifact and faunal material counts from grid squares: 47R1, 48CA, 48L1, 48R1, 49CA, 49L1, 50CA, 50R1, 50R2, 51CA, 51R1

intensive use (and possible residential occupation) during which shellfishing was practiced at the site; Stratum III constituted a period of relatively light, infrequent use of the site with no indication that shellfishing was practiced during that period. The principal use of the site during the period coinciding with Stratum II, representing the site's most vertically and horizontally extensive shell-bearing deposit, could not be determined. However, comparison of rates of deposition by decade for cultural material, unmodified animal bone, and features suggest that despite the thick shell-bearing deposit, the average intensity of use of the site as Stratum II was being created was more comparable to that of the light occupations suggested by the Stratum V and III deposits than the higher-intensity activity suggested for Stratum IV.

Stratum V

Consistent with the interpretation that the Stratum V deposit represented a short-term encampment during the terminal Early Archaic (see Kerr and Bradbury 1998), average deposition rates for cultural material and animal bone per decade were low, suggesting comparatively light use of the location: 2.08 artifacts per decade, and 26.80 faunal specimens. The small number of features (n = 3) associated with Stratum V makes rate-by-decade comparisons relatively unrevealing.

Stratum IV

By the mid-9th millennium, when Stratum IV appears to have accumulated, significant increases in activity indicate intensive occupation of the Eva location. Artifacts and unmodified faunal material were deposited at a substantially greater rate than in any other deposit at Eva, with an average of 16.28 artifacts and 348.14 identifiable bone specimens per decade. Likewise, the number of features per decade of occupation (1.37) far exceeded other stratum at the site.

Stratum III

As discussed previously (Chapter 6), Stratum III was not (counter to Lewis and Lewis [1961:9]), a flood deposit indicating a period of substantial abandonment of the site. Deposition rates suggest that during the 600 – 700 years indicated between Stratum IV and Stratum II, the site was lightly, and at most probably infrequently, used; accumulation was slow, with by-decade rates of only 0.61 artifacts, 3.78 fragments of identifiable faunal material, and 0.15 features. These exceptionally low rates do not provide a strong argument for intensive use of the site during this period, although the presence of cultural features (n = 10) and human interments (n = 14) does suggest multiple visitations to the site.

Stratum II

The uppermost shell-bearing deposit was also the most vertically extensive, but as has been discussed above, also encompassed the longest period of time at Eva, based on radiocarbon dates from the upper and lower deposits. While disturbance of the materials within Stratum II is indicated by the vertical displacement of materials, which produced ages that did not in every case directly correlate with depths, the combined eight radiocarbon dates from Stratum II indicate a relatively steady period of use extending over 1220 years (calibrated).

Rates of deposition of artifacts in Stratum II were 2.03 per decade. Animal bone (identified) was deposited at a rate of 10.83 specimens per decade. Only 0.27 features per decade are indicated.

Comparison of Artifact Depositional Rates at Eva, Strata V - II

Figures 9.4a-9.4c provide a graphical illustration of the differences in depositional rates of the three classes of cultural remains examined by stratum, and demonstrate that Stratum IV, as previously noted, represented a period of comparatively heavy use of the Eva site in contrast to the earlier Stratum V and later Stratum III and Stratum II.

Clear and significant differences are seen in depositional rates of artifacts, faunal material, and in the accumulation of features during the period associated with Stratum IV and that associated with Stratum II. These differences suggest different uses of the site during the creation of the respective deposits. Thick shell-bearing deposits have often been considered to be de facto evidence for relatively intensive occupation of locations by large groups for extended periods of time (e.g., Milner and Jefferies 1998; Marquardt and Watson 2005b). The rates calculated for Stratum IV may suggest such an interpretation, and appear to indicate (in particular) relatively rapid discard of large amounts of cultural material and animal bone, material classes whose quantities might be expected to reflect the level of intensity at which occupational activities occurred. However, if thick shell-bearing deposits can be viewed as representative of intensive activity, and activities similar to those during the Stratum IV period characterized the period of time during which Stratum II accumulated, then the amounts of material recovered in that stratum should have far exceeded what was identified in Stratum IV.

Assuming Stratum II exhibited a similar depositional rate to that of Stratum IV, values for the expected quantities of artifacts and animal bone in the upper deposit—accumulated over a period approximately 6.7 times that of the 183 years calculated for Stratum IV—would be approximately 1990 artifacts and 45,500 identified fragments of animal bone. Even if deposition rates in Stratum II were half of those from Stratum IV, the materials in the upper deposit should

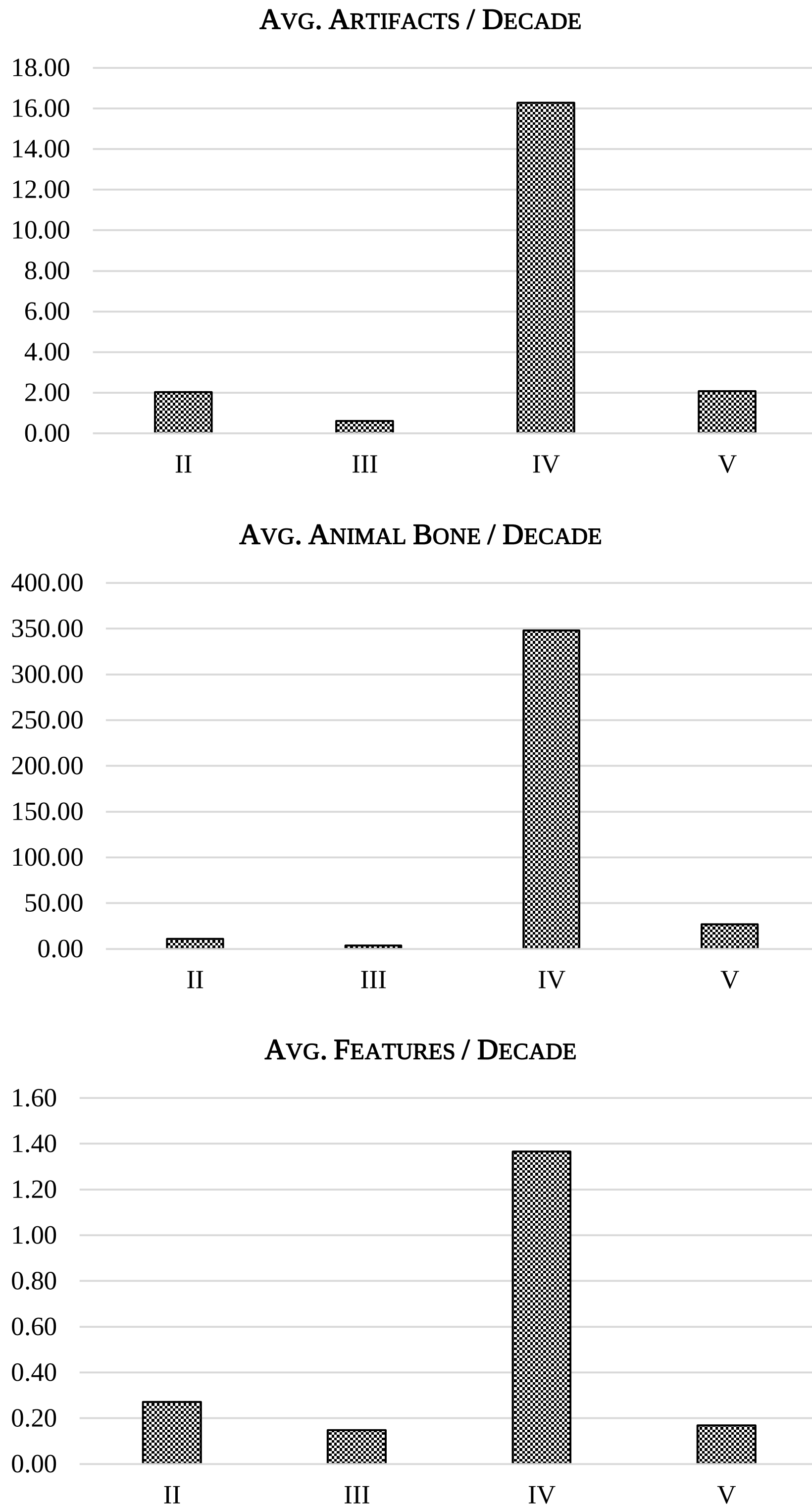

Figure 10.1 a – d (a, top; b, middle; c, bottom). Comparison of depositional rates (numbers / decade) of cultural materials in Strata II – V at Eva.

have substantially outnumbered those in the lower deposits. As indicated previously in Chapter 6, this was not the case.

In fact, depositional rates of artifacts, animal bone, and cultural features in Stratum II were most similar to those of Stratum V (Table 10.1), and while such a comparison should be considered hypothetical, given what is known to be missing from the site data (i.e., unidentified animal bone, chipped stone debris), it nevertheless suggests that activities conducted during the use of Eva during the Stratum II period (ca. 7600 to 6300 cal BP) may be far more comparable in *intensity* (although not necessarily in character) to the use of the site in its earliest period of occupation.

Interpreting Depositional Rates of Cultural Material at Kays Landing, Strata V – II

Like Eva, Kays Landing contained multiple components, including at least two distinct shell-bearing deposits separated by several centuries. Lacking information on the numbers and taxa of faunal material represented within the site's deposits, and because a total of twenty-two of the identified forty-eight features at the site were not provenienced by stratum or component, only depositional rates for cultural material are discussed here for two components, as defined by the thirteen AMS radiocarbon dates obtained from its strata.

The earliest component at Kays Landing comprised Stratum V (the deepest shell-bearing deposit at the site) and the lower margins of Stratum IV, while the later consisted of Stratum III and Stratum II (the upper shell-bearing deposit). Like the depositional rate calculations for Eva, only artifacts recovered from squares in which dated samples were recovered, or adjacent squares, were used (Table 10.2).

Table 10.2. Deposition rates per decade, Strata II/III and IV/V at the Kays Landing site (40HY13)*.

Stratum	Elapsed Time (cal yr)	Rate per decade	
		Artifacts	Features
II / III	911	2.66	0.27
IV / V	390	5.26	0.15

* Artifact and faunal material counts from grid squares: 32R10, 33R10, 34R10, 35R10, 36R10, 37R10

The earliest (5517 ± 76 cal BP) and latest (5127 ± 107 cal BP) dates associated with the Stratum IV / V component indicate a period of 390 years (39 decades) from the approximate initiation of deposition at or near the base of Stratum V (shell-bearing) to the lower margins of Stratum IV. A second period, with a duration of 911 years, and comprising the second shellfishing phase at the site, extended from the mixed base of Stratum II and upper margins of Stratum III (4804 ± 94 cal BP) to the top of Stratum II (ca. 3893 ± 84 cal BP).

Stratum IV / V

As noted in Chapter 7, the initiation of shellfishing at Kays Landing by the middle of the 6^{th} millennium BP marked the initial occupation of the site, a period that appears to have endured for slightly less than four centuries and produced a relatively thin shell-bearing deposit (Stratum V). During that time, the average deposition rate for cultural material was 5.26 artifacts per decade. There was no indication of residential occupation of the site during this period—a near total lack of features were recognized in the deposit—and the failure of the site supervisor to piece-plot the majority of material from the deeper strata, and apparent lack of features from that deposit, precludes the possibility of identifying activity areas associated with the initial use of the location.

Stratum II / III

Reminiscent of Stratum II at Eva, Stratum II at Kays Landing represented the site's most vertically extensive shell-bearing deposit, defining a mounded form lying atop the sandy Stratum III. The Stratum II / III component, consisting of the upper margins of Stratum III and all of

Stratum II, exhibited relatively low deposition rates for cultural material (2.66 artifacts per decade) in contrast to the deeper and earlier Stratum V.

Interestingly, despite the apparently reduced intensity of activity suggested by artifact deposition rates in the upper shell-bearing component, relatively clear evidence of structural remains—a series of fifty postmolds identified at the base of Stratum II or top of Stratum III, and fifteen medium-sized pits associated with those deposits—suggests the possibility that the site was occupied for a time when shell-fishing activities were occurring. If so, the lack of similar features in the deeper deposits, given the higher associated artifact deposition rate, is difficult to explain.

Comparison of Artifact Depositional Rates at Kays Landing, Strata V - II

Contrasts in the depositional rates of cultural material at Kays Landing describe an historical pattern of the intensity of the site's use similar to that of Eva's upper and lower shell-bearing deposits, suggesting heavier intensity use of the site during its early phase (Stratum IV / V) than in its later history (Stratum II / III) (Figure 10.2). Like Eva, despite the apparently more intense (and shorter in duration) use of the site corresponding to its deeper shell-bearing component, the site's upper shell-bearing component—a mounded deposit like that of Stratum II at Eva—represented a significantly longer period of time.

Despite the creation of a shell mound during Kays Landing's later history, use of the site appears to have decreased considerably in the centuries after 5000 cal BP. By the second century of the 4th millennium BP, shellfishing at Kays Landing ceased, although (as noted previously) visitation appears to have continued sporadically at least until the Early Woodland period.

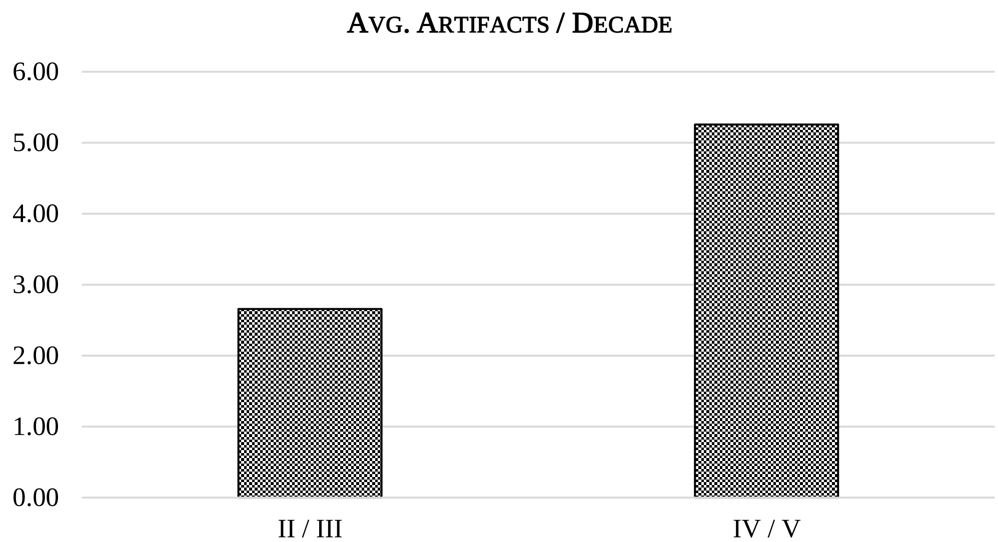

Figure 10.2. Comparison of depositional rates (numbers / decade) of cultural materials and burials in Strata II / III and IV / V at the Kays Landing site (40HY13).

Synopsis, Artifact Depositional Rates at Eva and Kays Landing

The use of artifact depositional rates specifically for comparing intra-site variations in the history of use of a location offers the opportunity to more accurately establish the degree to which site use intensity—indicated in overall depositional rates within discrete strata—correlates with other well-worn approaches to site histories, such as deposit thickness. At both Eva and Kays Landing, it is therefore useful to contrast these two interpretive approaches.
Although it is not appropriate to directly compare artifact depositional rates between the two sites (owing to their excavation by different supervisors and the different ages of the two sites), relative contrasts of the two sites' histories illustrate a similar pattern of use of the locations.

Based on earliest and latest radiocarbon dates from both sites, the use of both locations can be measured in periods of time approximating 2500 years: 8900 to 6300 cal BP at Eva, and 5600 to3100 cal BP at Kays Landing. Although the terminal date at Kays Landing is most likely associated with later use of the site (and disturbance of the upper Stratum II deposit, introducing later material into the shell-bearing deposit), a more conservative interpretation of the site's occupation as presented previously, extending from approximately 5600 to 3800 cal BP, a period of time nearly two millennia in length.

There are similar patterns in the use and history of both sites, from early to late. At each, the initial shell-bearing deposit represented a relatively short period of time, but a more intense use of the site for that interval. Given the significant difference in the two sites' ages—specifically, the amount of time by which Eva's shell-bearing deposits pre-date those at Kays Landing—this is a difficult pattern to evaluate, since it does not suggest the continuation or elaboration of earlier traditions of shellfishing in the region (i.e., development and elaboration at Eva, with continued, later elaboration and practice at Kays Landing), an historical progression that might be expected if shellfishing and “mounding” of shellfish remains represented the continuation of specific cultural traditions. Rather, it appears to indicate similar histories of use of both locations. At both sites, the sequence of occupation or use suggested is one of initial heavy use, characterized by relatively rapid deposition of cultural material but for a comparatively short period of time within the two sites’ full histories. After a period of abandonment or very light, sporadic visitation, the periods during which re-initiation and continuation of the sites’ use occurred were characterized by lower rates of deposition of cultural material over a much longer span of time.

These patterns—in particular, the apparently (comparatively) low-intensity use of these sites during their later (and longer-duration) are not easily interpreted. However, the inclusion of an additional dataset—human burials—provides another perspective from which to consider the history of these sites, and specifically to contrast the tempo of their use during the respective periods of that use.

Depositional Rates of Human Interments during the Middle and Late Archaic

The large numbers of human burials encountered in freshwater shell-bearing sites in the interior eastern United States were frequently discussed prior to the early 1990s, but they became a major pivot point in the broader consideration of the Shell Mound Archaic in 1991 (Claassen 1991a, 1991b, 1993), when it was proposed that shellfish were removed from the region’s rivers and piled as a building material to construct mortuary facilities, rather than used (and discarded) as a consequence of food procurement. This argument was based not only on the seemingly substantial numbers of interments found in many shell-bearing sites, but also on indicators such as paired valves in some sites’ deposits, suggesting to Claassen that activities atop shell mounds were of sufficiently low intensity that the two halves of individual bivalve shells could remain associated. Claassen suggested that the shell, not the meat, was the primary goal of shellfish harvesting (Claassen 1991:285); shell was intended as building material, and shell-bearing sites were better viewed as mortuary locations, not as village refuse and habitation sites.

After a number of years of intense, and occasionally acrimonious, debate, shell-bearing site research has coalesced around the dichotomous framework “refuse versus ritual” previously discussed in this chapter; shell mound burials have remained a major area of contention in these discussions. However, it has rarely if ever been asked whether or not the burials in shell mounds and middens are unique with respect to their numbers, in comparison with other sites of similar age within the same regions controlling for factors of preservation, discovery, and extent of excavation. Lacking time depth, the burial compliments in deposits at sites such as Eva seem to represent significant concentrations of interments. As demonstrated below, however, when the period of time during which many shell-bearing sites accumulated is taken into consideration, and when ethnographic data on mortality rates among modern hunter-gatherer populations are examined, burial numbers at shell-bearing sites in western Tennessee (and perhaps elsewhere) are seemingly not particularly unusual.

Mortality Rates Among Ethnographic / Modern Hunter-Gatherers

It has long been recognized that there are inherent problems in comparing modern (or recent historic) hunter-gatherer populations to prehistoric hunter-gatherers (e.g., Headland and Reid 1989; Kelly 1995; Sassaman 2004; Wobst 1978) and such problems include the direct, uncritical comparison of factors such as mortality and health among modern or historic hunter-gatherers to those in the distant past. However, while modern hunter-gatherer mortality and health is most likely different from that of groups occupying the lower Tennessee Valley during the Middle and Late Archaic periods, a general comparison of modern hunter-gatherer mortality rates may be useful simply for the purpose of assessing the degree to which the burial populations in shell-bearing (and shell-free) sites in that region represent notable accumulations of interments.

Four studies of modern hunter-gatherers provided interview-based life table data for the determination of mortality rates: the Hiwi (Hill et al. 2007), the Agta (Early and Headland 1998), the Aché (Hill and Hurtado 1996), and the Dobe !Kung (Howell 1979) (Table 10.3).

The Aché of eastern Paraguay were a full-time foraging group until the 1970s (Kaplan and Hill 1985), when they began to adopt swidden agricultural methods in combination with foraging. Interview-based census data compiled by Hill and Hurtado covered a period from 1890 until 1993 (Hill and Hurtado 1996:83) indicated a total of 1,423 people recorded as alive (including births) over a 103-year period, and 881 deaths documented. The average mortality rate, based on the crude death rate (619.11 deaths per 1000 population of the 103-year study period) for the group of Aché studied was 6.01 persons per year.

The Agta are among the Negrito aboriginal inhabitants of Luzon, a Philippine island, and like the Aché, underwent a process of transformation from strictly hunter-gatherers to a group with more active ties to their non-forager neighbors over the period represented by the census data published by Early and Headland (1998). During the forty-four years spanned by the demographic data (compiled largely from Headland's efforts among the Agta in the mid-20th century), 364 deaths were recorded for among the San Ildefonso Agta. A total of 633 people (including all live births) was recorded during the 44-year study period, yielding an average annual mortality rate of 13.07 deaths per year (Table 10.3).

Table 10.3. Ethnographic mortality rates for hunter-gatherer groups.

Group	Period	Years	Individuals Recorded Over Period[1]	Total Recorded Deaths	Crude Death Rate (Deaths / 1,000 people)	Average Deaths / Year	Reference
Aché	1890-1993	103	1423	881	619.11	6.01	Hill and Hurtado 1996
Agta	1950-1994	44	633	364	575.04	13.07	Early and Headland 1998
Dobe !Kung	1963-1973	10	841	94	111.77	11.18	Howell 1979:87-88
Hiwi	1985-1992	6.4	779	427	548.14	85.65	Hill et al. 2007

[1] Represents all members of group born since beginning of period

One of the earliest interview-based censuses among a modern hunter-gatherer population was published by Howell (1979), and focused on the well-studied !Kung of the Dobe area of the Kalahari Desert. Howell's data covered an approximately ten-year period between 1963 and 1973. A total of 841 people were documented during that period, consisting of members of the group who were alive in 1963 and those born before 1973. Ninety-four deaths were recorded. The average annual mortality rate for the Dobe !Kung over the 10-year study was 11.18.

Most recently, Hill and colleagues published additional census-based demographic data on a sub-group of the Hiwi, a Venezuelan hunter-gatherer population who first initiated contact with outsiders in the early 1960s, although they had previously obtained modern European tools and other goods in trade with their farming neighbors (Hill et al. 2007:444). Mortality among the Hiwi in the post-contact period was characterized as unusually high, on the basis of poor health (e.g., malnutrition, disease) and because of significant inter- and intra-group violence (Hill et al. 2007:444), but was also indicated (based on interviews) to have been even higher prior to 1960 (Hill et al. 2007:444). During a period from September of 1985 through January of 1992 (six years, four months), the total number of deaths documented among 779 individuals was 427 (Hill et al. 2007:445). The Hiwi exhibited an extraordinarily high average annual mortality rate of 85.65 death per year.

Excluding the Hiwi, whose mortality rates are clearly significantly higher than those of the other three hunter-gatherer groups discussed here, averaging the annual mortality rate of these three groups produced an estimate of 10.09 deaths per year.

Burial Deposition Rates in the Lower Tennessee Valley

The view that the seemingly high number of burials within shell-bearing sites made those locations notable or otherwise unusual is at the root of the conceptualization of shell mounds and middens as having represented special sites for those who buried their dead within them. The basic assumption—that these sites in actuality *did* represent locations of note and so were used for burial, or became locations of note because of the burials contained within them (or both, as George Crothers has implied [Crothers 1999])—has not been fully evaluated. We also need to ask 'Are the numbers of burials found in sites such as Eva notable when viewed historically, taken in the dual context of hunter-gatherer mortality rates and the long temporal periods over which they were deposited?'

Although it is inappropriate to attempt any direct comparison of the mortality rates of hunter-gatherers of Archaic-period eastern North America with those of ethnographically-recorded modern hunter-gatherers, the mortality data for the Aché, Agta, and !Kung offer a useful heuristic for evaluating whether the numbers and rate of interments in sites of the study sample might indicate suggest that these sites were unusual, either in the rate at which burials were deposited, or in the number of burials contained within them.

Burial deposition rates were calculated for a total of eight[45] stratigraphic components at McDaniel (n = 1), Ledbetter (n = 1), Kays Landing (n = 2), Eva (n = 2), Oak View (n = 1), and Big Sandy (n = 1); these strata or components were considered sufficiently well-dated to provide

[45] Sites or components for which reasonably confident assessments could not be made of the period of time during which burials accumulated were not included. Unfortunately, this included the Cherry site, the grave population of which could not confidently be assigned to the period indicated by the site's three radiocarbon dates. Also excluded were Eva, Stratum I; Ledbetter, Stratum I; and McDaniel, Stratum I.

Table 10.4. Burial rates by component at Eva, Big Sandy, Kays Landing, Ledbetter, McDaniel, and Oak View.

Site	Component	Latest (cal BP)	Earliest (cal BP)	Years of Deposition	Burials in Component	Burials per Year	Years per Burial
Eva	St 4	8235	8418	183	15	0.082	12.200
Eva	St 2	6338	7558	1220	109	0.089	11.193
Eva	St 5	8813	8991	178	1	-	-
Big Sandy	St 1/2	8223	8603	380	63	0.166	6.032
Big Sandy	St 1/2	8223	8936	713	63	0.088	11.317
Big Sandy	St 1/2	7173	8936	1763	63	0.036	27.984
Kays Landing	St 4/5	5127	5517	390	46	0.118	8.478
Kays Landing	St 2/3	3893	4804	911	23	0.025	39.609
Ledbetter	St 2	4314	4489	175	34	0.194	5.147
Oak View	St 1	4056	4847	791	73	0.092	10.836
McDaniel	St 1/2	4243	4474	231	27	0.117	8.556

basic estimates for the initiation and termination of deposition, including interments (Table 10.4; Figure 10.3).

It is important to note that the burial numbers listed (and the rates calculated from them) most likely do not represent 100% recovery of all interments at the sites in question. Although the goal during the TVA salvage projects in western Tennessee was the nearly complete excavation of significant deposits, excavation blocks did not encompass the full estimated site areas, but rather focused on as large and complete an excavation as could be accomplished in the allotted time. Burials probably were left unexcavated at most if not all sites. Based on overall site maps and profile drawings of the seven study sites, excavation blocks were positioned over the sites' most extensive deposits, but they did encompass the entirety of the sites' cultural deposits. However, most of the sites in the study sample were extensively excavated and it is probable that in most cases (with one possible exception, see below) the bulk of each site's skeletal population is represented in the collections described here.

Eva, Stratum II and Stratum IV

Artifact deposition rates calculated for Stratum II and IV at Eva suggested a significant difference in the intensity of activity at the site during the two respective time periods encompassed by the two shell-bearing deposits (refer to table 10.1). Surprisingly, this variation was not paralleled in burial rates between the two strata.

In Stratum II, accumulated over a period approaching 1220 years, a total of 109 human burials were recovered, producing an average deposition rate of 0.089 interments per year, or approximately one person every 11.2 years. Stratum IV's total of fifteen burials accumulated at

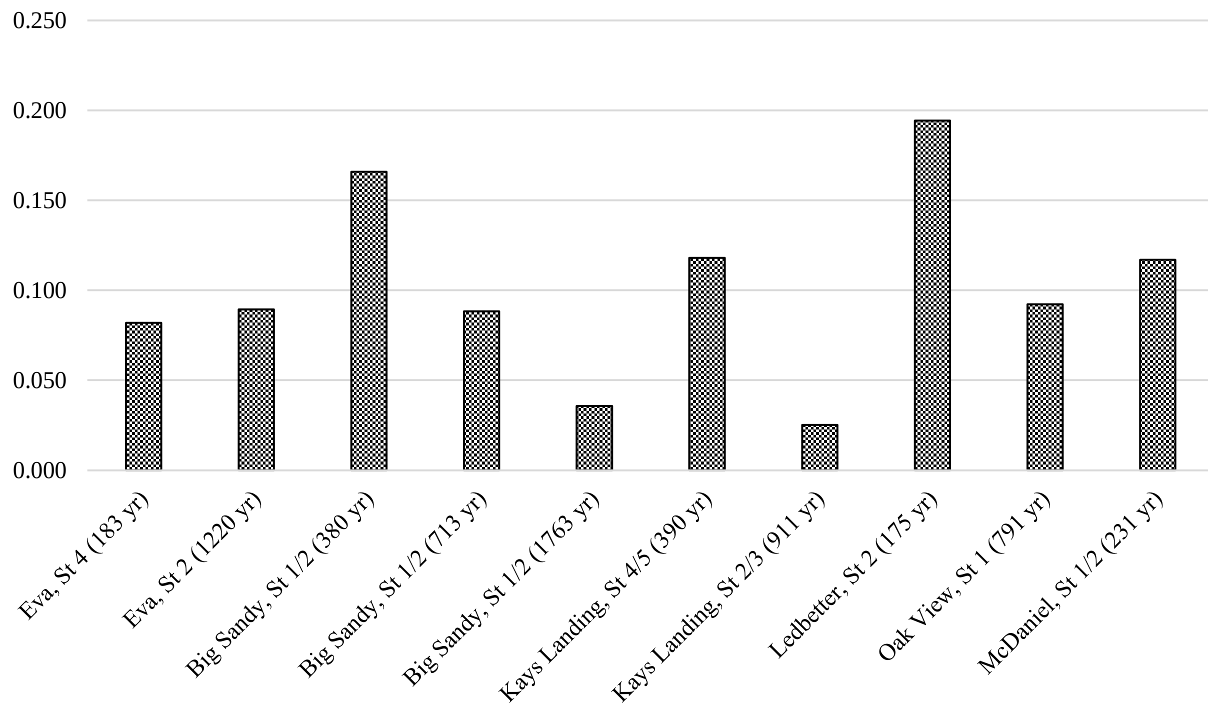

Figure 10.3. Average burial rates per year among well-dated components at the study sites. Components include: Eva (St 2, St 4); Big Sandy (St 1 / 2); Kays Landing (St 2, St 5); Oak View (St 1); Ledbetter Landing (St 2); McDaniel (St 2).

a nearly identical average rate of 0.082 burials per year over 183 years, about one person every 12.2 years.

When contrasted with deposition rates of other cultural materials (Table 10.1), the interment rates at Eva in both shell-bearing strata show a surprising similarity, suggesting approximately equal average rates of burial at the site during its earlier and later shell-bearing deposits, rather than the substantially different rates of deposition for other materials.

Big Sandy, Stratum I / II

As noted in Chapter 5, firmly assessing the age of the deposits at Big Sandy presents a difficult challenge, because dated samples from different areas of the site represented significantly different ages (Chapter 5, Section 5.6). In general, however, dates from the shell-bearing (Stratum II) and overlying shell-free (Stratum I) deposits suggest relative contemporaneity. As such, and given the temporal distribution indicated by seven of the ten dated samples from the site, the most likely period over which burial occurred at Big Sandy extended approximately 380 years (from 8223 to 8603 cal BP). This is thought to be the most probable characterization of the site's main period of use, and if so, then burials at Big Sandy occurred at an average rate of 0.17 burials per year, or approximately one burial every 6.03 years, to produce the 63 human burials identified at the site.

Less probable, if burial at Big Sandy began relatively shortly after the earliest date at the site (8936 cal BP) and continued through to 8223 cal BP—a period of 713 years—then the site's 63 individuals were interred at a pace of one every 11.32 years (0.088 burials / year).

Finally, if the full temporal range indicated by the site's ten dates is used to calculate burial rates—8936 to 7173 cal BP, a span of 1763 years—then the site's average burial rate is further decreased, to approximately one burial every 28 years, or about 0.04 burials per year. Although this possibility seems least likely of the three suggested, it has the virtue of representing the most likely *total* span of time during which the site was used, and so might technically be considered to be appropriate as an option.

Kays Landing, Stratum II / III and IV / V

Kays Landing's deepest component, Stratum IV / V, which included the shell-bearing Stratum V deposit, represented a period of approximately 390 years, and an average interment rate of approximately 0.118 persons per year (forty-six burials, ca. one burial ever 8.48 years). This rate contrasted significantly with the later Stratum II / III component, which exhibited the lowest interment rate of any well-dated deposit in the study sample (0.03 persons per year).

The Stratum II / III burial rate of 0.03 persons per year translates to approximately one interment every 39.6 years, substantially lower than any other site examined, including those indicated to have been contemporaneous with Stratum II / III (see below). Because of the exceptionally low value, the degree to which excavation at the site may have failed to recover the majority of burials in the deposit is not entirely clear, although the site's profile (Chapter 7, Figure 7.4) suggests that the majority of the deposit was in fact excavated.

Ledbetter Landing, Stratum II

At Ledbetter, the only well-dated deposit was Stratum II, underlying the site's only shell-bearing deposit, which was largely scattered and incomplete after decades of cultivation and plowing. The short period of time represented by dated samples, 175 years, and the thirty-four burials in the shell-free Stratum II yielded an average burial rate of 0.194 persons per year, roughly 1 burial each 5.15 years.

Oak View, Stratum I

Like the contemporaneously-occupied Ledbetter site, Oak View's Stratum I was shell-free, underlying a shell-bearing deposit of more recent (but unverifiable) age. Occupation or visitation of Oak View occurred over a nearly 800 year period, and with a total of seventy-three burials, the average interment rate at the site was roughly one person every 10.84 years, or about 0.09 persons per year. This calculation is deceptive, however; burial of multiple individuals during a short period of time probably occurred in several instances, most notably in a large (ca. thirty-five burials) group of interments found in association with a single large pit. This may indicate that an average interment rate calculation for Oak View is not entirely appropriate.

McDaniel, Stratum II

McDaniel represented an entirely shell-free occupation site. Posthole concentrations indicated structures were present, and a significant number of pits suggest intense use. Burials at McDaniel totaled only twenty-seven, and with an estimated occupation spanning 231 years, the site's average interment rate was a relatively low 0.117 persons per year, or approximately one burial every 8.56 years, on the average. However, like Oak View, burial clusters, including at least one cluster of three burials located within a pit, and a second association of three burials in close proximity to each other and aligned in the same direction, suggest the possibility of multiple interments over a comparatively short period of time. It is possible that the average deposition rate for McDaniel is not reflective of the actual burial rate at the site, and that interments there occurred at several discrete intervals.

Assessing Burial Deposition Rates in the Lower Tennessee Valley: Are Shell-Bearing Sites Special?

Modern hunter-gatherer mortality rates, representing census data assembled from ethnographic research, cannot (as previously noted) be used reliably to estimate mortality rates of hunting and gathering populations inhabiting eastern North America, and specifically the lower Tennessee Valley, millennia ago. There have been intense debates between anthropologists who have attempted, essentially, to do exactly that and those who consider such methods to be fraught with inherent sources of bias and error (e.g., Bird-David 1992; Bower 1989; Schott 1992; Smith 1991; Solway and Lee 19900; Rowley-Conwy 2001; Wilsen and Denbow 1990; Wobst 1978).

However, while such comparisons are certainly not useful for developing quantitative models of Archaic hunter-gatherer behavior or practices, they nevertheless retain some validity for establishing simple comparisons in order to better contextualize archaeological data, as has been done here for the seven study sites from the Archaic of western Tennessee.

Given the extraordinary focus upon the seemingly large number of burials in Archaic shell-bearing sites of the midcontinent, the question as stated in the introduction to this section remains: are these numbers truly unusual? More importantly, are shell-bearing sites unusual *within the context of other contemporaneous sites* with respect to the number of burials they contain? And, based on deposition rates, do shell-bearing appear to have manifested unusual or unique levels of significance to the people who created them? I believe the answers to these questions are: “no,” “yes” (but not necessarily in the way that many people believe), and “perhaps.”

Modern hunter-gatherer mortality and estimated burial rates for Archaic western Tennessee.

There is no question that modern hunter-gatherer mortality, as documented for three groups—the Aché in Venezuela, the Agta of the Philippines, and the Dobe area !Kung in sub-Saharan Africa—is not directly comparable to calculated average annual burial rates among sites in western Tennessee (Figure 10.4). Individual sites or site components such as those in the research sample cannot be equated with entire cultural groups. However, such data provide a hypothetical baseline for considering what might be expected, in highly generalized terms, if full census-based mortality data were available for the Archaic hunter-gatherers of the lower Tennessee Valley, and this comparison suggests that the supposedly “large” burial populations at these sites in fact reflect only a tiny proportion of the likely total number of deaths during the period of time spanned by these sites.

Among the three modern groups referenced—the Aché, the Agta, and the !Kung—average annual mortality rates were relatively comparable for the periods encompassed by the published data: between eight and ten members of each group died each year. The average annual mortality rate across the three groups was 10.19 deaths per year.

Halving these rates for the sake of basic contrast, and to account for the potentially negative influence of modern factors (e.g., nutrition, modern disease, high levels of violence) on groups’ mortality, provides a hypothetical annual rate of 5.1 deaths per hypothetical group. This value does not take into account differential mortality rates during the year as a result of climate

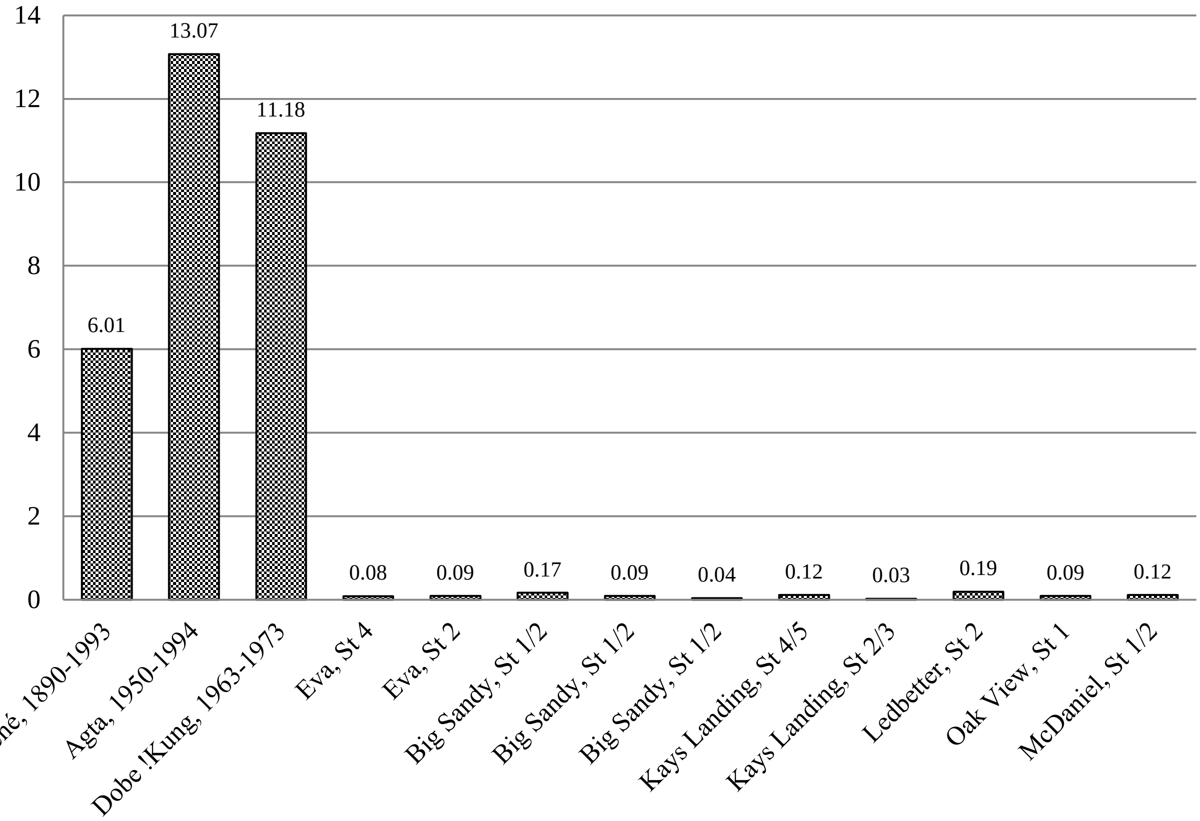

Figure 10.4. Average annual burial rates for eight components at Archaic sites in western Tennessee, and average annual mortality rates for three modern hunter-gatherer societies (see also Tables 10.3 and 10.4).

or nutritional stress, or as influenced by higher or lower birth rates during certain times of the year.

The periods of time represented by the best-dated components in the research sample (e.g., Stratum II at Eva or Stratum II at Kays Landing) comprised many centuries: ca. 1200 years for Eva's Stratum II, and ca. 900 years for Stratum II at Kays Landing. If either site had served as the primary locale for burial for a single group for only one fifth (20%) of the period of time indicated by the span of dates from their respective Stratum II deposits (240 years, Eva; 180 years, Kays Landing), with a mortality rate of 5.1 individuals per year, the expected number of interments in Eva's Stratum II alone would be approximately 1,224, or roughly one per year. In actuality the deposit contained only 8.9% of that number (n = 109).

In Stratum II / III at Kays Landing, roughly 929 burials (as with Eva, approximately one person per year) would be expected, rather than the twenty-three (2.5% of expected) found in that deposit. Even assuming that the excavation of Eva or Kays Landing was incomplete, and burials were left in situ outside of the excavation areas in those and other Depression-era excavations of shell-bearing (as Claassen notes may be the case [Claassen 2010:106-107]), the existing burial numbers are so small that even a 200% increase in the number of recovered dead from these sites would not substantially alter these results. Relative to the amount of time represented by these sites, they do not contain very many burials.

At Eva, burials in Stratum II occurred on average once every eleven years, and once every thirteen years in Stratum IV. For a group with an average annual mortality rate of 5.1 deaths over the duration of the accumulation of Stratum II (1220 years), interment of only one of every 57.1 deaths would be required to produce the 109-grave assemblage associated with Stratum II. A similar low proportion is suggested for Eva's Stratum IV: 1 death of every 64.8

Table 10.5. Burial rates by component at the Eva, Big Sandy, Kays Landing, Ledbetter, McDaniel, and Oak View sites.

Site	Component		Years of Deposition	Burials in Component	Burials per Year	% Annual Group Deaths, at 5.1 / yr, Necessary to Achieve Component's Burial Assemblage
Kays Landing	St 2/3	Shell-bearing	911	23	0.02	0.50
Eva	St 4	Shell-bearing	183	15	0.08	1.61
Eva	St 2	Shell-bearing	1220	109	0.09	1.75
Oak View	St 1	Shell-free	791	73	0.09	1.81
McDaniel	St 1/2	Shell-free	231	27	0.12	2.29
Kays Landing	St 4/5	Shell-bearing	390	46	0.12	2.31
Big Sandy	St 1/2	Shell-bearing	380	63	0.17	3.25
Ledbetter	St 2	Shell-free	175	34	0.19	3.81

years. These values, as noted previously, are not intended to provide quantitative comparisons, but to better contextualize the exceptionally low interment rates that appear to characterize the sites in question.

If interments were drawn from a population or populations exhibiting a rate of 5.1 deaths annually, the skeletal assemblages at most of the study sites would represent less than five percent of annual deaths over those sites' use periods (Table 10.3).

While it is probable that burial numbers for the sites in western Tennessee have been affected by a number of post-depositional factors, the burial deposition rates as calculated for the eight components in Table 10.5 are sufficiently low to call into question the degree to which most skeletal assemblages, but especially those often considered to be unusually large—as are the burial populations at sites such as Eva—may actually not have been especially notable in their historical context.

Do burials at shell-bearing sites in western Tennessee suggest they were unusual within their historical and regional context?

Of the eight fully-dated components for which burial deposition rates have been discussed, five represent, or contain, shell-bearing deposits (Eva II, Eva IV, Kays Landing II/III, Kays Landing IV, V, and Big Sandy I/II). In comparison to shell-free deposits (McDaniel Stratum I/II, Oak View Stratum I, Ledbetter Stratum II), shell-bearing strata in the lower Tennessee Valley during the Middle and Late Archaic do not exhibit burial deposition rates suggestive of exceptionally high or exceptionally low levels of use during the periods in which they served as cemeteries.

Table 10.6. Variables used to assess variation in burials by dated site component.

ID	Variable Name	Variable Levels	Description
-	SHELL	2	Shell-free = 0; Shell-bearing = 1
-	PHASE	3	Assigned to one of three radiocarbon phases as determined by 14C dating of components.
1	AGE	3	Adult = 1; Subadult = 0; Indeterminate = -1
2	SEX	3	Male = 1; Female = 2; Indeterminate = -1
3	POSITION	5	Left = 1; Right = 2; Front = 3; Back = 4; Reburial = 5; Seated = 6; Indeterminate = -1
4	ORIENT	5	Burial orientation: North = 1; East = 2; South = 3; West = 4; Indeterminate = -1
5	FLEXURE	4	Extended = 1; Partially Flexed = 2; Fully Flexed = 3; Indeterminate = -1
6	ASSOCYN	2	Associated goods: Yes = 1; No = 2
7	ASSOCUTIL	2	Associated utilitarian objects: Yes = 1; No = 2
8	ASSOCCR	2	Associated ceremonial / ritual objects: Yes = 1; No = 2
9	ASSOCCS	2	Associated chipped stone: Yes = 1; No = 2
10	ASSOCGS	2	Associated ground stone: Yes = 1; No = 2
11	ASSOCBONE	2	Associated bone: Yes = 1; No = 2
12	ASSOCANT	2	Associated antler: Yes = 1; No = 2
13	ASSOCFWS	2	Associated freshwater shell: Yes = 1; No = 2
14	ASSOCMS	2	Associated marine shell: Yes = 1; No = 2
15	ASSOCALLS	2	Associated shell (freshwater or marine): Yes = 1; No = 2
16	ASSOCOCHRE	2	Associated ochre: Yes = 1; No = 0
17	ASSOCCU	2	Associated copper: Yes = 1; No = 2

The burials at shell-bearing and shell-free sites are, however, not entirely identical in their character. Data collected during the excavation of interments included classification of position, orientation, degree of flexure, age, sex, and the presence (or absence) and types of burial offerings identified with each individual (Table 10.6).

Using the well-dated components previously assessed for burial deposition rates, and using a dependent variable with binary levels—either "shell-bearing" or "shell-free"—individual χ^2 tests of independence were run for variables 1 – 6 (Table 10.6), subdividing the dataset according to radiocarbon phase. Phase 1 could not be assessed in this manner, because components classified as Phase 1 consisted of only shell-bearing (or mixed shell-bearing and shell-free) deposits. For the Phase 1 assessment, comparisons were made at the site / component level, Eva IV and Big Sandy I / II.

Additionally, because the Cherry site's burial population could not confidently be associated with either the Phase II period (contemporaneous with Eva's Stratum II) or with the later Phase III sites, the site was excluded from testing. Unfortunately, because Eva's Stratum II comprised the only other site containing burials associated with the Phase II period, the burials from Stratum II could not be included in this test.

Where possible, tests of independence were made using the Pearson χ^2 statistic. In some cases—such as the separate assessments made for types of burial offerings (variables 7 – 17), which used only burials that were recorded as containing some variety of inclusion—sample sizes were small, producing expected cell counts less than five. For these instances, a Fisher's exact test (and *p*-value) was used to assess independence in place of the Pearson statistic.

Tests of independence for burials (n = 78) in the two Phase 1 components (Eva IV and Big Sandy I / II) showed almost no significant differences in the two sites' burial populations by

Table 10.7. Results of χ 2 Tests of Independence for Burials in Period 1 Components (Eva IV, Big Sandy I / II).

Variable	*N*	χ 2-Statistic	*df*	*p*-value	Comments
AGE	64	0.02	1	0.887	Only 64 burials assessed to individual's age.
SEX	44	0.744	1	0.388	Only 44 burials assessed to individual's sex.
POSITION	68	3.364	3	0.339	
ORIENT	68	3.295	3	0.348	
FLEXURE	68	0.936	2	0.626	
ASSOCYN	78	1.816	1	0.178	
ASSOCUTIL	12	-	-	0.576*	
ASSOCCR	12	-	-	0.576*	
ASSOCCS	12	-	-	0.576*	
ASSOCGS	12	-	-	0.255*	
ASSOCBONE	12	-	-	0.236*	One bone implement at Big Sandy, 2 at Eva.
ASSOCANT	12	-	-	-	No burials in these components contained antler implements.
ASSOCFWS	12	-	-	-	No burials in these components contained freshwater shell.
ASSOCMS	12	-	-	0.667*	One burial at Big Sandy contained a marine shell pendant.
ASSOCALLS	12	-	-	0.667*	See above.
ASSOCOCHRE	12	-	-	0.667*	
ASSOCCU	12	-	-	-	No burials in these components contained copper.

* Includes expected cell counts < 5, Fisher's Exact test used.

age, sex, position, orientation, or flexure, and no significant differences in proportions of burials containing at least one offering (Table 10.7). Burials containing offerings (n = 12) were separately assessed; results of Fisher's Exact tests for these variables indicated no significant differences between the two components.

Dated components associated with the third radiocarbon phase (Phase 3) contained a total of 205 burials (shell-bearing, n = 64; shell-free, n = 141). Like the shell-free and shell-bearing Phase 2 burials, significant variation (where it occurred) was not easily interpretable, and did not provide any strong indication of unusual treatment for burials in shell-bearing deposits. Several variables indicated significant differences between burials in shell-free and shell-bearing deposits dated to the third radiocarbon phase. Recorded positions for burials included left, right, front, back, and seated; "reburials" were also included in this category. Seated burials were documented only in shell-free deposits, as was the only recorded reburial. Flexure also varied significantly—greater-than-expected numbers of partially-flexed individuals were noted among burials in shell-free deposits, while burials in shell-bearing components showed greater-than-expected occurrences of full flexure. This is a similar pattern to that observed among Phase 2 burials.

A total of sixty-four Phase 3 burials contained offerings; twelve (18.75%) were associated with shell-bearing deposits at Kays Landing, while the remaining fifty-two (81.25%) were from shell-free components. Only two variables showed significant differences in proportions between shell-bearing and shell-free strata. The association of utilitarian items with burials occurred at in higher-than-expected numbers among burials in shell-free deposits; in contrast, the association of bone implements with burials in shell-bearing strata was significantly more frequent (Table 10.8).

Table 10.8. Results of χ 2 Tests of Independence for Burials in Shell-Bearing and Shell-Free Components, Period 3.

Variable	*N*	χ 2-Statistic	*df*	*p*-value	Comments
AGE	187	0.096	1	0.757	
SEX	99	0.039	1	0.843	
POSITION	169	11.555	5	0.041	Obs > Exp for shell-free, but see text.
ORIENT	179	3.024	3	0.388	
FLEXURE	177	8.432	2	0.015	See text.
ASSOCYN	205	6.738	1	0.009	Obs > Exp for shell-free components.
ASSOCUTIL	64	14.527	1	< 0.001	Obs > Exp for shell-free components.
ASSOCCR	64	0.528	1	0.463	
ASSOCCS	64	3.629	1	0.057	
ASSOCGS	64	1.462	1	0.227	
ASSOCBONE	64	7.201	1	0.007	Obs > Exp for shell-bearing components
ASSOCANT	64	0.003	1	0.958	
ASSOCFWS	64	0.109	1	0.741	
ASSOCMS	64	0.726	1	0.394	
ASSOCALLS	64	0.103	1	0.748	
ASSOCOCHRE	64	0.083	1	0.773	
ASSOCCU	64	0.234	1	0.628	

Did shell-bearing sites in the lower Tennessee Valley constitute "special locations" to the people who created them?

Shell mounds and middens of the interior eastern United States are a very specific type of site, defined by the presence of freshwater shellfish remains and containing seemingly large amounts of cultural material, animal remains, and (usually) human and occasionally dog burials.

For archaeologists, shell-bearing sites are unusual for several reasons.

First, freshwater shell mounds and middens are often easily recognizable from the ground surface by the presence of fragmentary and whole shells, which easily stand out in color from the surrounding ground cover or soil. These sites may also be readily observed in the eroded banks of rivers and streams beside which they were created. Thus, they represent a comparatively rare case, particularly for Southeastern archaeologists: sites that pre-date earthen moundbuilding in the interior of the eastern US, but have historically been relatively easily identified without extensive subsurface exploration.

Second, in temperate regions in which average soil conditions are relatively acidic, such as Southeastern North America (Figure 10.5), and where preservation of perishable organic cultural materials is relatively poor over long periods of time, the slightly alkaline chemical environment within shell-bearing deposits, produced by the slow decay of the mollusk shells and the dissolution of calcium into the surrounding sediment, provides protection for such materials as plant remains, and antler and bone, including burials (see Linse 1992). The inorganic hydroxyapatite crystals that are the main constituents of bone and antler are least soluble (i.e., potentially least degraded) in solutions with a pH of approximately 7.8 – 7.9 (Lindsay 1979, cited in Linse 1992:341); soil pH measured in the Carlston-Annis shell mound in Kentucky's Green River region ranged between 7.6 and 8.3, averaging 7.8 (Stein 1983:283). Soils in the

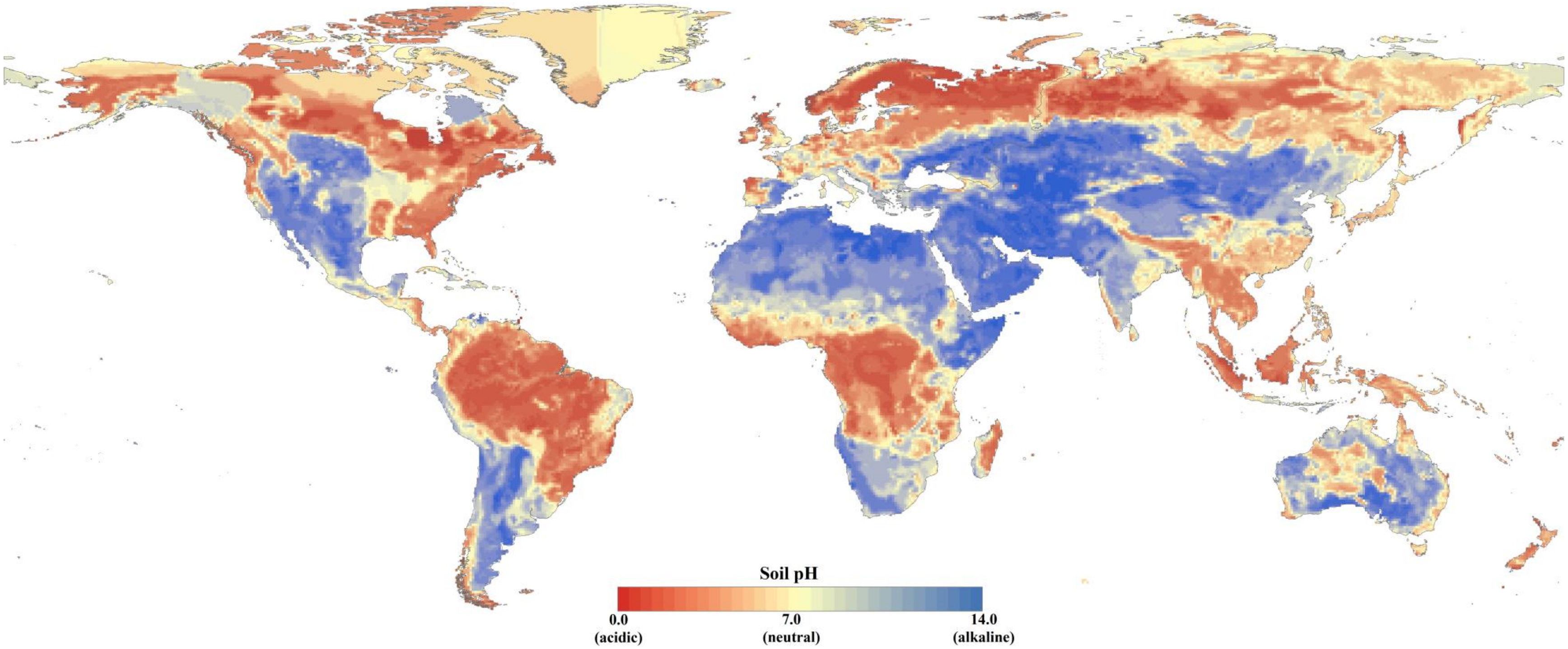

Figure 10.5. Global soil pH illustrating relative acidity of Southeastern soils (Global soil pH data courtesy ISRIC – World Soil Information [http://
http://www.isric.org/], website accessed 12/9/2013.)

eastern US are, on average, mildly acidic, grading to relative neutrality along the Mississippi River and the midcontinental prairie (Figure 10.5), and bone and other perishable organic materials do not typically preserve well. Thus, the differential preservation afforded particularly to bone (including human remains) and antler in shell-bearing sites in the Southeast has provided opportunities for archaeologists to study material classes that elsewhere did not survive the centuries and millennia. However, it is critical to note that the prevalence of bone and antler in shell mounds and middens, and the relative lack of these materials in many other archaeological sites lacking the alkaline environment of shell-bearing deposits, has never been viewed as an indicator that such materials were most commonly used or deposited at shell-bearing sites. Rather, the disproportionate quantities of perishable materials are recognized as evidence of sample bias resulting from post-depositional processes.

Similarly, in the context of evaluating the seemingly large burial populations contained within many shell-bearing sites as indicative of those sites' special significance to the people who created and used them, it is necessary to ask: to what extent are those burial numbers representative of larger patterns of group behavior, and to what extent are they indicative of preservation bias, or the flattening effects of time on archaeological deposits?

Do the existing archaeological data provide support for the hypothesis that Middle and Late Archaic shell bearing sites in the lower Tennessee Valley were locations of special cultural significance and importance?

Conceptions in the last three decades of the uniqueness of shell-bearing sites have been grounded in large part on the presence of significant numbers of human remains within them and particularly the view that such numbers were unusual within the historical context in which they were deposited (e.g., Claassen 1991a, 1991b, 1993; Crothers 1999). It was within that interpretive framework that Cheryl Claassen first advanced hypotheses that shell-bearing sites should be considered as more than simply village refuse. Recently, in discussing the nearly 18,000 burials either recovered or estimated to remain in midcontinental shell-bearing sites, Claassen inquired, “Can there be any doubt that shell-bearing sites were the primary mortuary facilities for people during the Archaic in the southern Ohio Valley? They even may have been the mortuaries for people living beyond this region” (Claassen 2010:107).

Ultimately, based on the results of this research, the reply to Claassen’s hypothetical must be that there is indeed reason to doubt either that such sites served as primary mortuary facilities for local groups, or that groups from outside the region could have been using these locations as mortuary facilities.

The chronological data obtained, and site occupational histories constructed, during this research project, do not appear to support the assumption that shell-bearing deposits were necessarily viewed as unusual by those who created them, or that they served as those peoples’ principal burial locations. The numbers of interment in the sites examined in this study are minuscule compared to what might be expected if these sites were used consistently as mortuary facilities, and seem to suggest instead a pattern almost of incidental and sporadic use for burial during short stays by a variety of groups during their long histories.

Further, the condition of the burials in the study sites does not support an interpretation requiring long-distance travel prior to burial, as implied by the notion that shell-bearing sites represented primary burial locations either for local groups or for those from outside the region. Nearly all the burials recorded at sites in the study sample were primary inhumations. In a temperate and relatively humid environment such as that of western Tennessee, an untreated and exposed body decomposes relatively rapidly and would likely have been untransportable after only a few days. The length of time from death to full skeletonization of an unburied and otherwise untreated body varies considerably based on temperature, humidity, the size and weight of the individual, and the presence (and degree) of any trauma (Mann et al. 1990). In "ideal conditions (warm to hot weather) it usually takes between two and four weeks for a body to become nearly or completely skeletonized" (Mann et al.1990:105). A multitude of interacting factors determine the rate at which a body would reach a state of decomposition that would likely make it untransportable or substantially unpleasant to transport (e.g., bloating, odor, skin slippage, maggot activity, and purge from the body's orifices), but generally in a warm and temperate climate, commencement of these changes occurs after two to three days, and lasts for roughly a week before advanced decomposition (during which time the body effectively falls apart) sets in (see Parks 2011). Thus, the fact that the burial populations in the sites examined in this project consisted predominately of primary inhumations, rather than mostly secondary reburials or cremations, as might be expected if the dead had been transported to these locations, probably denotes a relatively local "catchment" from within which each of these sites might have drawn their respective burial populations.

The characteristics of burials (when compared by site-type, and within phases, where possible) also show little significant variation between those in shell-bearing or shell-free deposits. There was a lack of consistent patterning in most attributes associated with burial ritual, although flexure—when separated as "partial" or "full"—produced results indicating significantly more fully-flexed burials in shell-bearing than in shell-free deposits. There was, however, little significant difference in the occurrence of burial offerings with individuals in shell-bearing or shell-free strata, nor were there (for the most part) notable patterns of inclusion of specific materials among burials in either type of deposit. The only observed exception was among Phase 3 burials, where a significant difference in the frequency of utilitarian objects buried with individuals in shell-free components was noted, while burials in shell-bearing components exhibited significantly greater occurrences of bone implements.

Among shell-bearing and shell-free sites in the lower Tennessee Valley, the lack of significant, patterned differences in grave inclusions between the two types of deposits, as well as non-significant variation by either age or sex among burial populations, or with respect to association of burial goods, does not suggest differential (or preferential) treatment of individuals in shell-bearing deposits in contrast to those interred in sites lacking shell.

Given the evident lack of patterning in the choice and number of burial associations with individuals in both shell-bearing and shell-free sites in the study sample, it is important to then ask: might the choice of burial location—i.e., within shell-bearing deposits, representing culturally-created locations on the regional landscape—represent the most significant variable in assessing differences in significance between shell-bearing and shell-free sites or components?

This is a difficult argument to address, because in general there are few documented shell-free sites with comparable burial populations to those recovered from Eva or Kays Landing, or in the shell-bearing (but not well-dated) component at Ledbetter (Stratum I, n = 83). However, while there is no way to fully address what ultimately is a hypothetical argument, it is interesting to note that among the eight well-dated shell-bearing and shell-free components among those in the sample examined in this project, the average time separating burials is significantly lower for shell-free components (Table 10.9).

As noted previously, there were no significant differences in proportions of burials by sex or age between shell-bearing and shell-free deposits identified among the study sites. Coupled with an apparent lack of demographic selectivity in the individuals interred in shell-bearing

Table 10.9. Burials grouped by component, and average time between burials in shell-bearing and shell-free sites.

Site Type	No. of Components	No. of Burials	Total Time Represented by Components	Avg. Years Between Burials
Shell-Free	3	134	1197	8.9
Shell-Bearing	5	256	4467	17.4

deposits (there were no significant differences in proportions of burials by sex or age between shell-bearing and shell-free components), and the overwhelming presence of primary burials suggesting local deaths rather than transport of the dead to these sites, the only evident conclusion implied by the data is that the thick shell-bearing deposits such as Stratum II (and the burials contained within them) at both Eva and Kays Landing constituted infrequent use of those locations as occasional burial sites, and probably represent use of those areas for burial if and when groups located nearby or at the sites experienced the death of one of their number. The small number of total burials over the time represented by these sites' deposits suggests that a multitude of such sites may have existed at one time. Aside from interment at permanent or semi-permanent occupation sites over relatively short periods of time (such as at the Late Archaic sites of McDaniel, or the shell-free Stratum I at Oak View and Stratum II at Ledbetter, and the Middle-and-Late Archaic Cherry site), much of the population of the region was similarly "opportunistically" interred in deposits that looked much like those at Eva and Kays Landing, but were never identified or excavated, or that may simply not have survived the millennia.

CHAPTER 11. CONCLUSIONS

The first chapter of this dissertation opened with a series of questions (below) that the research described in the remainder of this work was intended to address:

> What are shell mounds? How were the locations where shell mounds would eventually develop first used, and how did that use translate into the often substantial accumulations of cultural material, shellfish remains, and interred individuals that Southeastern archaeologists and, before them, amateur prehistorians, naturalists, zoologists, and geologists have been investigating for at least two centuries? What did shell mounds mean to the people whose actions and decisions produced them?

These questions do not have simple answers, nor are the answers that are appropriate to one region's shell-bearing sites (or sites of one period) necessarily appropriate to those of another. Sites containing large amounts of accumulated freshwater or marine molluscan remains are found on every continent except Antarctica (Waselkov 1987:Table 3.8), and in eastern North America, the region on which this study focuses, they have been studied, informally and formally, by amateur antiquarians, geologists, zoologists, naturalists, and finally by archaeologists for almost two hundred years (e.g., Atwater 1820; Brinton 1872; Claassen 1991a, 1991b, 1993, 1996, 2010; Crothers 1999; Funkhouser and Webb 1928; Hofman 1986; Klippel and Morey 1986; Lewis and Lewis 1961; Marquardt and Watson 1983, 2005 [eds.]; Milner and Jefferies 1998; Morey 1986; Moore 2011; Moore 1892, 1893, 1899, 1915, 1916; Morlot 1861; Morse 1967; Rolingson 1967; Sassaman 2010; Shields 2003; Webb 1939; Webb and DeJarnette 1942; Webb and Haag 1939, 1940; Webb 1946; Winters 1969).

As discussed in Chapter 2, many of the largest and most extensive excavations of shell-bearing sites in the interior eastern United States were conducted during the New Deal-era, federally-funded archaeological boom. In Alabama and Tennessee, the planned construction of dams along the river by the Tennessee Valley Authority and the threatened flooding of the valley and destruction of the cultural resources found along the Tennessee River and its tributaries, spurred the creation of archaeological salvage programs during the mid-1930s and early 1940s under William Webb and David DeJarnette in Alabama, and Thomas Lewis and Madeline Kneberg in western Tennessee. Labor provided by the CCC, WPA, and CWA allowed the excavation of a number of large shell mounds in those regions before the closing of the TVA's dams, while in Kentucky, Webb was able to marshal federal funding and labor to conduct archaeological investigations of a number of the sites along the Green River, an area in which he had become interested during his explorations of the state's prehistory, including many that previously had been examined by C.B. Moore two decades earlier. In subsequent decades, the accessibility of the Kentucky sites to new generations of researchers, and the corresponding lack of access to the New Deal-era sites of similar antiquity in western Tennessee and northern Alabama, has contributed to a biased interpretation of Archaic shell mounds, focused heavily on the mostly late Middle Archaic Green River sites that have been the subject of multiple well-organized and problem-oriented archaeological research projects (e.g., Crothers 1999; Moore 2011; Marquardt and Watson 1983, 2005 [eds.]).

The purpose of the research presented in this dissertation has been directed toward shedding greater light on a region that has long been discussed as part of the larger midcontinental Shell Mound Archaic, but has received comparatively little attention in the development of the existing body of literature on that subject. The research sample examined here consisted of seven Archaic-age sites in Benton, Henry, and Decatur Counties, Tennessee—Eva, Big Sandy, Cherry, Kays Landing, Ledbetter, Oak View, and McDaniel—that were excavated between 1939 and 1941. Of those sites, five contained at least one shell-bearing deposit; two (Eva and Kays Landing) contained two each. Two additional shell-free sites—McDaniel and Cherry—provided comparative datasets to assess evidence for differences in the use of locations where shellfishing was seemingly not a part of the activities conducted.

One of the most significant and long-standing problems in developing a more thorough and nuanced understanding of the Shell Mound Archaic as a cultural phenomenon has been the lack of sufficient temporal resolution among known shell-bearing sites throughout the midcontinental United States. As recently as 1999, Crothers noted that "[We] have not derived specific methods for estimating duration of site occupation… We have to devise objective criteria that reflect duration and frequency of occupation before we can proceed with assuming [that shell mounds and middens indicate an increase in sedentism]" (Crothers 1999:238). The lack of good temporal resolution for interior shell-bearing sites, and for western Tennessee in particular, is also emphasized by recent syntheses of the eastern Archaic as a whole (Sassaman 2010) and of the Shell Mound Archaic specifically (Claassen 2010). Claassen (2010:11) suggested on the basis of a small handful of early radiocarbon dates from western and central Tennessee (Figure 11.1) that early shellfish use began in the west and gradually moved eastward, then re-emerged in central Tennessee along the Cumberland River during the late Middle and Late Archaic. Based on the same limited temporal data, Sassaman (2010) argued that early basal dates at shell-bearing sites in western and central Tennessee indicated that the apparent early

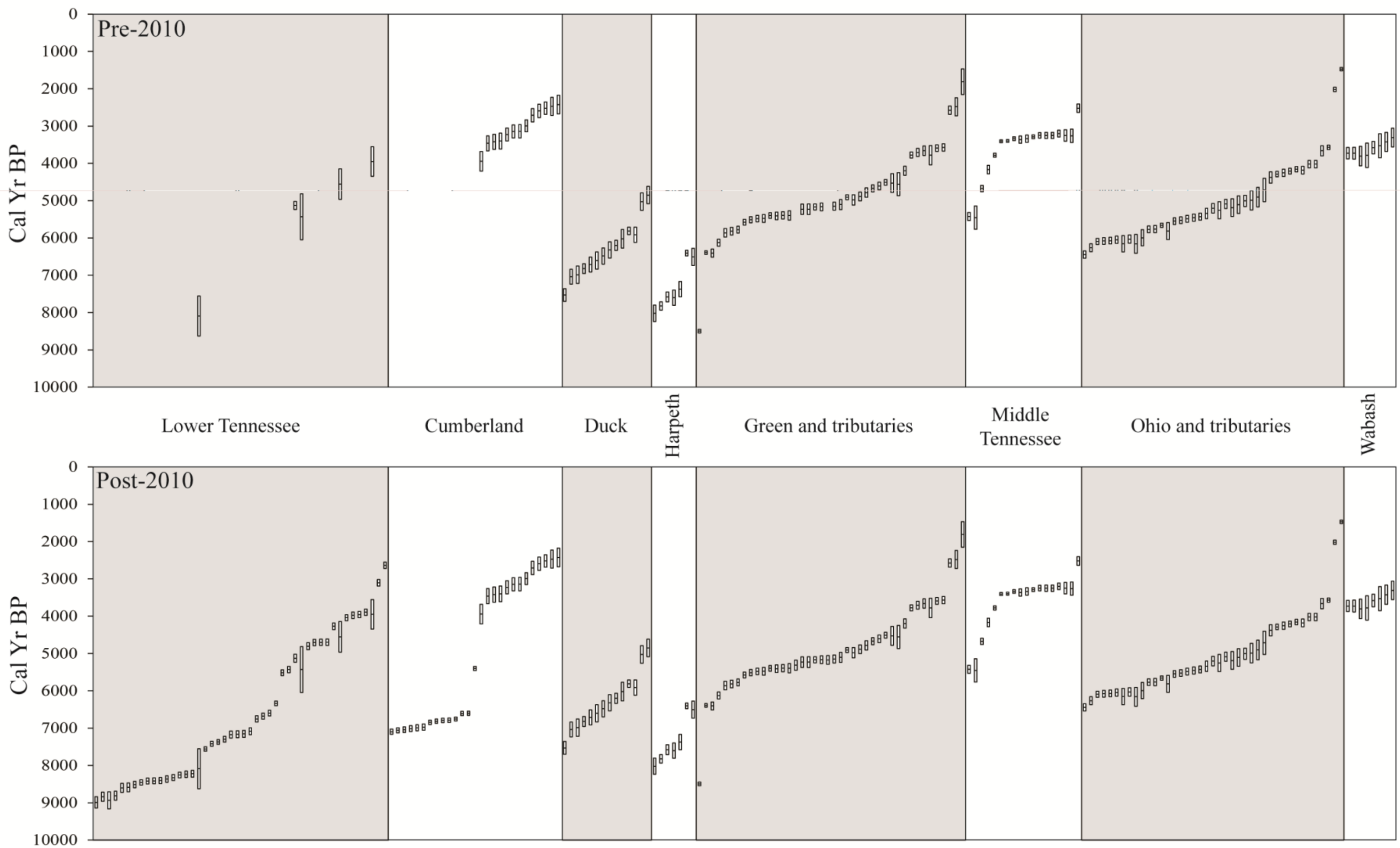

Figure 11.1. Radiocarbon dates from shell-bearing sites in the interior eastern United States, pre- and post-2010.

adoption of shellfishing and accumulation in those regions represented evidence of entry by an immigrant population from the west (Sassaman 2010:50-54).

At the time of Claassen and Sassaman's publications, the necessary chronological data to test their hypotheses did not exist, but it soon became apparent that such data were not impossible to develop or to create. The primary reason that the Archaic chronology of western Tennessee was insufficient was simply because the region had been neglected as a source of new information since the late 1950s.

In Chapter 4, the methods by which sites in the study sample were identified and selected are described. Data from the Depression-era excavations were of surprisingly high quality and consistency, but nevertheless varied on the basis of the archaeologist in charge of each project. Three archaeologists led the excavations of the seven study sites: Douglas Osborne was responsible for Big Sandy, Eva, Cherry, and McDaniel; George Lidberg supervised Kays Landing and Ledbetter, and Oak View was dug under Carol Burroughs. Through the use of modern digital databases and spatial analysis software, the data recorded during excavations—which included locational coordinates of individual artifacts and of burials and other features, and high-quality site maps—were used to reconstruct each site from the base up. A total of 50 radiocarbon samples were submitted for dating, providing the chronological foundation for the research with materials from these sites discussed in this dissertation. Three sites were extensively dated (Big Sandy, Eva, and Kays Landing) while between two and three dates were submitted for each of the remaining four (Cherry, Ledbetter, Oak View, and McDaniel).

Chapters 5 through 8 represent site reports for each of the seven sites examined. Chapter 5 focuses on Big Sandy, a site whose name has long been known from its use as a type name for a characteristic side-notched projectile point form (Kneberg 1956). Big Sandy was excavated in

1939 by Douglas Osborne. Ten radiocarbon dates from Big Sandy indicated that the site's main period of use or occupation likely extended from approximately 8500 to 8200 BP, although one dated sample suggested possible visitation as early as 8900 BP, and two samples show a return to the site between 7300 and 7100 BP, in the late 8th millennium before present. Big Sandy was located on the crest and east-facing slope of a small ridge on the left descending bank of the river after which it was named. Excavations revealed a significant number of pits, but little else, on the ridgetop; this was interpreted by the excavator as the main living area, and this interpretation is supported by this reanalysis. Further down the hillside a shell midden (Stratum II) was identified beneath the dark humic deposit (Stratum I) that extended across the entirety of the excavation block. Most of the site's burials were deposited in or above the shell midden on the hillside. The ridgetop pits and the shell midden and large number of interments on the hillside suggest the maintenance of separate areas for occupation and burial and refuse disposal. Such spatial separation of occupation and burial / refuse areas at a shell-bearing site is relatively unique among such sites in the midcontinental United States.

Chapter 6 reported on the well-known Eva site, which previously was described in a monograph published in 1961 (Lewis and Lewis 1961). Despite the detailed and data-laden nature of that report, review of the primary site data, consisting of field specimen logs, site maps, and burial records, indicated that details were not entirely consistent with the original field documentation. To an extent, some inconsistencies, such as lack of agreement of data tables in the site report and those provided in Chapter 6, can be attributed to simple typographical and transcription errors. However, others—in particular, disagreement on the assignment of burials to discrete strata between this dissertation and the 1961 report—are a consequence of an incorrect understanding of depositional context and history of deposition at the site.

Sixteen radiocarbon dates indicate that during the early and mid-Middle Archaic, Eva represented a known location on the regional landscape of the Tennessee Valley. The site was first occupied in the early 9th millennium BP and used as a relatively short-term encampment, but long enough in duration to have allowed one occupant to give birth (either to a stillborn infant or one that died shortly after birth—Burial 126). Perhaps several centuries later, and for a period of two to three hundred years, the site was re-occupied and used relatively extensively. Shellfishing was conducted at Eva during that period, but the large artifact and unmodified faunal assemblage from this first shell-bearing deposit indicate considerable and varied activity at the location. A total of fifteen primary inhumations indicate the deaths of several members of the group or groups at or near the site during occupation of the location.

A period of several centuries of relatively minimal use of Eva characterized the late 9th and early 8th millennia, before visitors to the site again took up shellfishing during their use of the location. By that period, Eva appears to have become a site of some historical significance to inhabitants of the region, and ongoing, periodic use for the next twelve centuries occurred, from approximately 7600 to 6300 cal BP. Occasional burials were conducted at the site for individuals who presumably died in relatively close proximity to, or at, the location. The intensity of Eva's use during this period was, on average, much less than that of its earlier occupation, suggesting either significantly less frequent use, or perhaps infrequent but intense occupations associated with occasional burials at the site.

By the late 7th millennium, shellfishing at Eva ceased, and although radiocarbon data were not obtained for the upper, shell-free deposit, use of the location (which included interment) continued for many generations afterward. A small amount of pottery manufactured during the Woodland period suggested use of the location well after the end of the Archaic.

The Kays Landing site, a Late Archaic counterpart to Eva, was reported in Chapter 7. No significant previous report was published on Kays Landing, which (like Eva) consisted of a series of occupational deposits, including two separate shell-bearing strata. Twelve dates from the site indicate that its occupation began in the early Late Archaic after 5600 cal BP, and like Eva, the site's initial period of use appears to have been its most extensive. The majority of Kays Landing's burial population, and cultural material assemblage, were associated with its basal deposits, which were separated from the upper shell-bearing stratum by a period of several hundred years.

Re-occupation of the site after 4800 cal BP is indicated, at which time it may have been used as a residential location (based on a series of postholes near the base of the upper shell-bearing stratum). For approximately 900 years, deposition of freshwater shell, cultural material, and an occasional burial, occurred at Kays Landing, producing a shell mound. By the middle of the 4^{th} millennium, shellfishing at the site ended, although use of the location continued for some time afterward, as indicated by a single late radiocarbon date from the Early Woodland period.

The final descriptive chapter, Chapter 8, contains abbreviated site reports for Cherry, Oak View, Ledbetter, and McDaniel. Two of these sites (Ledbetter and Oak View) represented terminal Late Archaic and Early Woodland shell-bearing deposits, suggesting that shellfishing in the lower Tennessee Valley did not end at the close of the Archaic period. The remaining two—Cherry and McDaniel—constitute shell-free habitation sites that were occupied or used during the Middle and Late Archaic periods. These sites, while less extensively dated as Big Sandy, Eva, and Kays Landing, provided additional comparative data for better contextualization of the Archaic occupation of the lower Tennessee Valley.

The data and preliminary interpretations of each site's depositional history presented in Chapters 5 through 8 were synthesized in Chapters 9 and 10. The new radiocarbon dates obtained in the course of this research provide a substantially improved window on the Middle and Late Archaic chronology of the lower Tennessee Valley, indicating both significantly greater antiquity of some individual sites (Eva, Big Sandy, Cherry) than has previously been suspected, as well as more firmly establishing the contemporaneity (or lack thereof) between some deposits previously suggested to be of approximately the same age (Lewis and Kneberg 1959). Deposits at the seven sites examined in this project encompass three periods of use. Initial occupation of the oldest sites in the sample, Eva and Big Sandy, began at the transition between the Early and Middle Holocene approximately 8900 to 9000 years ago, but intensive occupation and re-use of those locations does not seem to have occurred until several centuries later. At both sites, shellfishing accompanied these occupations. The burial of the dead, when it occurred, was probably of individuals who died while their group was in the immediate area or occupying the locations; the relatively low number of individuals represented at these sites, given the duration of time represented by both Eva's and Big Sandy's 9th millennium deposits, suggests that many such locations probably existed on the regional landscape. When compared to mortality rates among modern or historical hunter-gatherer populations, even at rates that have been reduced to reflect the effects of modern health problems and conflict, burial rates (average years per burial) at Eva and Big Sandy are too low to indicate these sites' exclusive use as group cemeteries.

Some 800 to 1000 years after their apparent abandonment, both Eva and Big Sandy were re-visited. There is no strong evidence for the activities that transpired at Big Sandy, but at Eva, the re-emergence of shellfishing at that site, and continued visitation to, and use of, the location for another twelve centuries points to local, and perhaps regional, recognition of the location's significance. Occasional interment in Eva's later shell-bearing deposit, which seems to have occurred at an average rate of less than one burial per decade, suggests that, like the site's earlier shell midden, use of the location as a cemetery by a single social group (as hypothesized by Claassen [2010:135]) is unlikely, unless each group in the region established many such cemeteries were established by each separate social group occupying the region. The number of burials found in each of the seven study sites is, simply put, far too small to be in any way representative of the number of dead in the region over any single period of time represented by the shell-bearing or shell-free deposits examined in this study.

Radiocarbon-dated Late Archaic use of the lower Tennessee Valley is represented by the later-dated sites of Kays Landing, Ledbetter, Oak View, and McDaniel, while the Cherry site also appears to have represented a Late Archaic occupation. These sites define similar patterns of use and re-use of locations, which sometimes included shellfishing, occasional interments, and presumably the conduct of daily activities. The average rates of burial at these four sites, like those at Eva and Big Sandy, suggest that they are unrepresentative of the totality of the region's population, constituting only a small proportion of deaths in the area during the period of time encompassed by the sites' deposits.

Since the early 1990s, when Cheryl Claassen first proposed a ritual role and purpose for the many large shell-bearing sites located along interior rivers of the midcontinental United States, scholars have worked to identify new approaches to the analysis and interpretation of such sites that had the potential to address Claassen's hypotheses. One of the most significant problems facing such efforts has been the relative lack of high-quality data on regions outside of Kentucky's Green River.

This dissertation has presented new data intended to help to further examine these questions. To date, few shell-bearing sites in the interior eastern US have been as thoroughly dated as Eva or Kays Landing. In addition to developing a more precise and higher-resolution chronology for western Tennessee's Archaic period than previously existed, the use of digital visualization of spatial data enabled the isolation, selection, and submission and dating of materials suitable to addressing questions of depositional histories for the study sample sites, a critical step in gaining a more accurate understanding of how Archaic shell-bearing formed and how they were used.

To those outside archaeology, and often to the discipline's practitioners themselves, archaeologists often seem frustratingly equivocal in their conclusions. Rarely are complex problems in archaeology easily answered, and because the subjects of examination and analysis were humans, or the materials produced by human agency, it is often the case that there are no easy answers.

Debate and discussion about the reasons that shell mounds were created and ultimately abandoned has dominated shell mound research for over twenty years. Were they village dumps, burial mounds, or locations where shellfish feasting accompanied the burial of the dead? At the conclusion of this research, I suggest, following Victor Thompson (2010), that shell mounds and middens are best understood as persistent places, locations on the landscape that acquire historical significance in the estimation of the people who occupied the geographic areas in which such sites were created, and that served a variety of functions at every stage of their development.

In the lower Tennessee Valley between 8900 and 2600 cal BP, the complex, stratified shell-bearing sites excavated by New Deal era archaeologists in the late 1930s and early 1940s began in most cases as encampments or occupational sites, although the nature and intensity of use of those locations initially varied from place to place. At the two sites with the greatest time depth—Eva and Kays Landing—earlier and comparatively intensive use later gave way to periods of many centuries during which occasional occupation or use occurred, sometimes accompanied by the harvest of shellfish and the deposition of their remains. Relatively infrequently over the decades and centuries, these visits appear to have also involved the conduct of mortuary rituals, as members of the group or groups occupying the site(s) were buried. The nature and extent of the ritual and ceremony practiced during these events is unclear—even the degree to which shellfish feasting may have, as suggested by Claassen, attended such events—but evidence from contemporaneous shell-free sites and deposits in the region (e.g., Cherry) suggests that those buried at shell mounds in the Tennessee Valley, both during the Middle and the Late Archaic, were not accorded special treatment in death when compared to those buried at non-shell-bearing sites. Sites like Eva and Kays Landing, which appear to have eventually presented the classic "shell mound" appearance in their later incarnations, nevertheless do not seem to have represented cemetery locations of particular note in the larger sample examined here, if the lack of differential treatment of those interred within them, or slow rate of burial, is any indication. While it may be simply that the location of burial—within or near a shell-bearing deposit—was important, the lack of significant variation in age or sex when compared to non-shell-bearing burials does not suggest that the dead in these shell mounds derived from a special (perhaps higher status) subset of these populations.

What is clear is that shell mounds were recognized as landmarks, and were revisited many times over many generations. In the case of both Eva and Kays Landing, the later accumulation of the sites' upper mounded shell deposits appears to have been contingent on the recognition (and perhaps re-enactment) of earlier use of the locations. Artifact deposition rates in the upper deposits at both sites were significantly lower than those of the deeper (and probably occupational) deposits, suggesting, in combination with the overall low rate of accumulation, that whatever activities transpired occurred periodically, and perhaps even infrequently.

The low number of burials, relative to the time represented by Eva's Stratum II (1220 years) and Stratum II at Kays Landing (900 years), suggest either that visitation to these sites occurred on the apparently rare occasion that a member of a group located nearby died, or that occasional deaths during visits to the sites occurred, and the dead were interred in those locations. Such events probably occurred at many different locations over the region's landscape and over time. The lack of excavations of other sites resembling Eva and Kays Landing does not preclude their existence, and the fact that the dead at Eva and Kays Landing were not substantially differently treated than other burial populations in the region argues against these sites having unusual significance in the eyes of those who used them, even as they continued to revisit them over centuries. Based on this, I suggest that sites such as Eva and Kays Landing—seemingly monumental locations on the regional landscape—represent only two of what probably constituted a significant number of sites of similar composition, size, and depth of history.

It is important to remember that the sites excavated during the New Deal era were not a comprehensive sample of the region's prehistory, but were chosen, sometimes quickly, from among a large number of sites previously identified by extensive, but rapid, survey of the area. As noted in Chapter 2, twenty-three Archaic-period sites were recorded in the lower Tennessee Valley between 1936 and 1942; of those, only ten were excavated (see Tables 2.1 and 2.2).

During the Depression-era salvage projects in the Tennessee Valley, sites chosen to be investigated further from among those identified during the initial region-wide appraisals were selected on the basis of their estimated potential to provide maximum data return for effort. The ease of identifying shell-bearing sites from a distance by the light-colored shell fragments scattered on the ground surface, coupled with the perception that shell-bearing sites were villages (and later the view that shell mounds and middens were effectively treasure troves of data as village locations, representing potentially high-yielding sites for good-quality artifact assemblages that could be used in the reconstruction of regional cultural historical sequences), made these sites attractive to the archaeologists engaged in a race against the TVA's construction timetable to complete as much work as possible, and gather as much information as they could before the valley was dammed and flooding began.

For this reason especially, it is necessary to remain cautious in drawing conclusions about the importance of shell-bearing sites to those who created and used them. We must be careful not to allow these sites unique significance to archaeologists to be unduly projected onto interpretations of their significance to their creators. There can be no question that shell mounds and middens are critical sites to those who, thousands of years after their creation and eventual fall into disuse, continue to study them intensely. The sites that today serve as touchstones for what continues to be described as the "Shell Mound Archaic" were very likely a small sample of the totality of the archaeological record of the regions in which they occurred, and we must take this into consideration when attempting to estimate the cultural significance of the few sites we have investigated. Along the Cumberland River in middle Tennessee, for example, Peres and Deter-Wolf (2013) noted that despite only a few professional excavations (e.g., Miller et al. 2012; Peres et al. 2012), dozens of shell-bearing sites can be observed eroding from the banks of the river west of Nashville, Tennessee. Had the middle Cumberland Valley been subjected to salvage excavations during the Great Depression, and subsequently dammed, how many of the large Archaic shell mounds along that river's length might have been excavated, and how many sacrificed? Until 2012, the only published radiocarbon dates from that region, and indeed the only professional excavations of shell-bearing sites, indicated that shellfishing was largely a Late Archaic phenomenon. The Cumberland River was, in the absence of dated sites, suggested to have experienced a several millennia-long hiatus in shellfishing between the early Middle Archaic period and the Late Archaic (Claassen (2010:11). However, multiple dates since obtained from shell-bearing sites in the drainage indicate substantial shellfishing during the 7th and 8th millennium (Miller et al. 2012; Peres et al. 2012; Peres and Deter-Wolf 2013).

In the mid-1990s, re-survey of the Kentucky Reservoir's banks located or relocated a number of shell-bearing sites eroding on the shoreline (Kerr and Bradbury 1998). Had the UTDoA been granted more time for salvage work by the TVA prior to the completion of the Kentucky Dam, how many additional sites of similar antiquity and size to those that have been discussed here might have been excavated? Might the Shell Mound Archaic in western Tennessee appear more intense as a cultural phenomenon? How many other "Evas" were located in the Tennessee Valley when the Eva site was actively being created?

Conclusions

The primary purpose of this dissertation has been to provide illumination on a region that has long been neglected as a source of primary data, and to contribute to general discussions of the Shell Mound Archaic within Southeastern archaeology. The expanded database provided here, including a total of fifty radiocarbon dates, and extensive descriptions of Archaic sites excavated in the lower Tennessee Valley during the Great Depression, offers significant information appropriate to a more in-depth and nuanced interpretation of a region that has been widely acknowledged as a location of early development of intensive shellfishing during the Archaic period.

A second, and unanticipated, result of this work, has been to demonstrate the potential effects of incomplete sampling—unavoidable in archaeology—on regional historical syntheses. Sites such as Eva, Big Sandy, Kays Landing, Cherry, Oak View, Ledbetter, and McDaniel were part of a larger historical and cultural landscape, and it is important to actively acknowledge that fact. In particular, a general trend in recent years toward the re-investigation and examination of previously excavated, and often well-known, sites has in some cases (such as this one) forced considerable revisions of accepted archaeological data and interpretations. I do not suggest in closing that large-scale interpretations and syntheses are inappropriate to archaeological inquiry. They are supremely necessary, serving to provide an interpretive framework for existing and new archaeological data, as well as stimulating discussion and new research such as that presented here. Cheryl Claassen's early 1990s suggestions that shell mounds were constructed as burial facilities sparked a new approach to research on the phenomenon of the Shell Mound Archaic. However, in producing new publications, interpretations, and syntheses we must take pains to recognize that archaeology focuses on what *remains* of the past; the archaeological record is incomplete, and the degree of "incompleteness" may be unknowable. As such, the type of vitriolic and acrimonious debate such as has occasionally surfaced in discussions of the Shell Mound Archaic and some other contentious areas of archaeology (e.g., the decades-long "was Clovis first?" debates in Paleoindian research) is unwarranted.

FUTURE RESEARCH DIRECTIONS

The new data provided by this research project have substantially added to our understanding of the Archaic-period use of the lower Tennessee Valley, but there remains considerable work to be done, both in the area of the lower Tennessee Valley, and elsewhere at freshwater-shell bearing sites of the Archaic period.

Greater efforts need to be made to more fully document preserved shell mounds and middens in areas in which such sites are still found. These sites are highly endangered by looting, erosion, and climate change, and more dedicated efforts to produce updated inventories in areas where many such sites are still found (such as along many of the rivers in middle Tennessee) like those undertaken by Peres, Deter-Wolf, and Hodge (Peres et al. 2012), or Miller and colleagues (2012), should be initiated immediately. The potential for severe damage or destruction of these sites by forces such as bankline erosion (particularly in the future, when increasing climatic instability may contribute to a rise in severe weather events leading to flooding of the type that inundated downtown Nashville and scoured the Cumberland River's banks in May of 2010) remains a persistent threat. Danger to these sites also from cultural activities, including commercial development and the continued problem of looting, paints a dire future for archaeologists who wish to examine shell-bearing sites in their primary depositional context rather than working with previously-excavated collections made decades ago.

There is, of course, also considerable work to be done with the remains from sites already excavated and curated at facilities across the Southeast, particularly for multi-site artifact collections and documentation from regions no longer accessible for modern work, or from sites that have been damaged or destroyed by modern development. The extensive site collections and documents from western Tennessee that were examined for this study comprise only a small proportion of the total number of records and site collections that resulted from the Depression-era efforts in Kentucky, Alabama, and Tennessee. These materials represent a potentially significant resource to present and future researchers, but many will also require considerable work before they are truly useful to modern researchers for developing a better understanding of the regions from which they derived. Such is the case, for example, in northern Alabama. Although this dissertation has in expanding western Tennessee's database, much about the shell mounds and middens of northern Alabama's middle Tennessee Valley, which contained some of the largest such sites in the eastern United States, is not well understood. Work done in that area largely dates to the Depression era as well, and methods such as those employed in this project, particularly with respect to the use of radiocarbon dating to establish a region-wide chronological sequence, should be undertaken to better place northern Alabama into the Shell Mound Archaic of the eastern United States.

The construction of high-resolution chronologies of regions, sub-regions, and at individual sites is critical to answering broader questions about the nature and role of shell-bearing sites in the lives of the people who created, occupied and used, and were occasionally buried in them. As demonstrated in this dissertation, the amount of time encompassed by such sites is not always fully considered when examining them. Sites created over centuries or millennia cannot be investigated without first understanding the amount of time they represent; human agency on a daily, annual, or even decadal scale is not the same as agency on the scale of centuries or even millennia. Without a clear understanding of the scale of time that was involved in the creation of such large, stratigraphically-complex sites, it may be premature to become too attached to specific hypotheses about their cultural meaning to those who inhabited the region around them, and who contributed to their formation.

Finally, greater efforts are needed to develop research designs capable of better addressing questions directly related to improving our understanding of the formation processes and uses of shell mounds and middens, and the meaning such sites had to the people who created and used them. Many of the arguments that have been made in recent years about these sites' histories are compelling, but they lack the necessary supporting data to shift them into the realm of "accepted" ideas.

How is feasting to be recognized archaeologically? Mike Russo's work at shell rings along the Atlantic coast (e.g., Russo 2004) has provided valuable guidance for archaeologists working in the continental interior. Feasting episodes may be identifiable within larger aggregated shell deposits if sufficient care is taken in excavation to distinguish separate depositional episodes.

Radiocarbon dating of shell-bearing sites, as well, must be undertaken on a much more significant scale than it has in the past, and even than it has been in this research project. Precise sampling of shell-bearing sites, such as that conducted by Miller et al. (2012) along the Cumberland River, must become the norm rather than the exception. The capabilities of accelerator mass spectrometry dating to obtain chronological information from minute fragments of organic material have eliminated the excuse that sufficient datable material could not be found. In combination with tightly controlled excavation of column samples from shell middens, the recovery of suitable materials from multiple levels to obtain information about depositional rates should be a standard part of any field project involving the excavation of shell-bearing sites. Even if project budgets do not include funding for dates, the materials can be examined later.

Were freshwater shell mounds refuse heaps? Were they monuments (intentional or "accidental")? Were they ceremonial sites where feasting and mortuary rituals were carried out?

Some sites probably fulfilled some aspect of one or more of these roles, and some probably served in every role at some stage in their respective histories. Only with improved datasets from excavations such as those examined in this dissertation, and from new excavations conducted with well-developed problem orientations and explicit research goals, can we hope to make sense of the regional Archaic phenomenon that has fascinated Southeastern archaeologists for more than a century.

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APPENDICES

APPENDIX A. OVERSIZED STRATIGRAPHIC PROFILES.

Oversized files are attached (see "List of Attachments").

APPENDIX B. FIELD SPECIMEN CATALOGS.

All digital field specimen catalogs are on file at the Frank H. McClung Museum of Natural History and Culture.

VITA

Thaddeus "Thad" G. Bissett was born in Dallas, Texas, but spent his childhood in Lexington, Virginia. After high school, he entered Wake Forest University in Winston-Salem, North Carolina, where he received his Bachelor of Arts degree in anthropology in 1999. He was accepted to Florida State University in 1999 and began his graduate studies there that year, eventually discovering Southeastern archaeology, on which he focused his master's thesis. Thad completed his M.S. at FSU in 2003, and spent two years on staff at cultural resource management firms in New Orleans, Louisiana, before evacuating ahead of Hurricane Katrina in 2005. He spent two more years in CRM before entering the Ph.D. program at the University of Tennessee, Knoxville, in the fall of 2007. Thad has spent most of his time at the University of Tennessee studying Archaic shell middens along the lower Tennessee River Valley, specifically the Eva site (40BN12), and questions developed early in that research informed this dissertation project. Thad earned his Doctor of Philosophy in Anthropology (with a minor in Statistics) in May of 2014.