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TABLE OF CONTENTS

VOLUME ONE

VOLUME TWO

CHAPTER 5: WOODLAND PERIOD[1]

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The Woodland period (1000 B.C. to A.D. 1000) in Kentucky was a time of cultural continuities as well as cultural innovations. Food collection remained the prevailing subsistence pursuit, populations lived in mostly small communities for varying lengths of time, utilitarian tools were used for a variety of domestic tasks, and inter-regional contacts including long-distance trade continued. Overlaying these continuities, however, were technological, social, and ideological developments or intensifications, most notably the adoption or elaboration of pottery and textile industries, introduction of the bow and arrow, cultivation of indigenous plants, development of substantial housing and nucleated settlements, construction of earthworks, and elaboration of mortuary-ritual activities. The pace and impacts of these cultural changes varied widely across Kentucky.

This chapter begins with brief summaries of the Woodland concept and Woodland research in Kentucky. Then Woodland chronological, formal, and culture-historical units are outlined. An overview of Woodland site inventories is followed by detailed information on the status of Woodland research in each management area. The chapter concludes with a summary of the major accomplishments in Woodland archaeology over the last two decades and a discussion of future research goals and objectives.

HISTORICAL DEVELOPMENT OF THE WOODLAND CONCEPT

References to Woodland first appeared in the archaeological literature in the 1930s and largely are products of the culture history paradigm in American archaeology. In 1935, "Woodland" was taken from the "Eastern Woodlands culture area" moniker to describe nonMississippian archaeological complexes in eastern North America (Griffin 1986). Deuel (1935) used the Woodland Basic Culture in reference to one of two pottery-bearing cultures of the Mississippi Valley. Following the Midwestern Taxonomic Method terminology, archaeologists designated the Woodland Pattern (a.k.a. Woodland Cultural Pattern, Woodland Basic Pattern, and Basic Woodland) as a series of phases exhibiting determinant traits related primarily to artifact types and mortuary

[1] Adapted from Railey 1990

treatment but also settlement (Cole and Deuel 1937; Jennings 1941; McKern 1937, 1939). Archaeologists compiled a list of 81 traits for the Woodland Pattern at the first Woodland Conference in Chicago (Baker et al. 1941). Subsequent to these early writings, however, Woodland was most frequently conceived as a developmental stage or a chronological period (Anderson and Mainfort 2002a).

Willey and Phillips (1958) viewed Woodland as a part of a developmental stage, the Formative. Similarly, Willey (1966) classified Woodland as a major cultural tradition distinguished by pottery manufacture, earthwork construction, and farming subsistence. Others (e.g., Caldwell 1962; Yerkes 1988) defined a Woodland (or Northern) Tradition using a more diverse set of traits within an ecological or adaptational perspective. Silverberg (1968), employing Willey and Phillips' (1958) systematics, referred to three Woodland traditions (though he also used the term "phases") in the Ohio Valley: Early Woodland, Middle Woodland, and Late Woodland.

The work of James Griffin (1946, 1952, 1967, 1978) was instrumental in designating the Woodland as a chronological unit. Initially, Griffin (1946:39; emphasis added) sought to identify "successive cultural *stages* … on the basis of local stratigraphy, the interchange of specific cultural items and the common possession of definite cultural concepts at specific chronological *periods*." For example, he identified Transitional, Early, and Middle subperiods of the Woodland pattern. In 1952, Griffin constructed five subperiods for Eastern Woodlands prehistory, three of which were Early Woodland, Middle Woodland, and Late Woodland-Mississippi. In a seminal 1967 article, Griffin separated the Late Woodland and Mississippi periods and proposed absolute beginning and ending dates for each of the periods.

In the archaeological literature, then, there are references to Woodland, Woodland culture, Woodland pattern, Woodland tradition, and Woodland period; these are sometimes used in combination in the same article. In Kentucky and in this chapter, Woodland is used as a chronological unit.

OVERVIEW OF WOODLAND RESEARCH IN KENTUCKY

In the Southeast, most archaeological research on the Woodland has focused on "culture-historical reconstruction and sequence building" (Anderson and Mainfort 2002a:2). Similarly, both foci have been goals of Woodland research in Kentucky, with research on the former outpacing investigations of the latter. Early (ca. 1930s-50s) interests in Woodland archaeology in Kentucky focused on particular types of sites (e.g., burial mounds with elaborate tombs, earthen enclosures, and rockshelters and caves with well-preserved organics) and artifact classes (e.g., pottery, stone tools, and grave goods). William S. Webb, the dean of Kentucky archaeology, resisted using the Woodland concept, so early interpretations were framed largely within the concept of Adena instead (Schwartz 1967).

Since the 1960s, the Woodland concept has increasingly entered into archaeological discourse in Kentucky, and the goals of Woodland research in Kentucky

have expanded. Especially as a result of reservoir projects in the 1960s-70s and academic and compliance archaeology projects since then, archaeologists have documented a wider range of Woodland site types in more parts of the Commonwealth. Advances in archaeological data recovery techniques resulted in the documentation and recovery of more diverse artifact assemblages, including faunal and floral remains, lithic production debris, and rock art. Analytical advances in areas like dating, pollen analysis, raw material sourcing, and artifact typology moved Woodland research in new directions. As new theoretical paradigms like culture process and evolutionary ecology were adopted, archaeologists reexamined old data sets and considered new ones.

Prior to these historical developments in Kentucky Woodland research, antiquarians and others conducted pre-scientific investigations in selected areas of Kentucky. The early work set the stage for later research on what would come to be known as "Woodland." As early as the 1820s, Constantine Rafinesque documented earthwork sites in the Lexington area. Decades later, Ephriam Squier and Edwin Davis mapped earthworks in major river drainages. In the late nineteenth century, geologists like R. H. Loughridge and William Marcus Linney reported on earthworks and other sites as part of regional-scale geological surveys, and citizens who dug into mounds reported their findings to academic institutions. Anthropological investigations, including more systematic excavations, were initiated in the 1910s-20s. Examples include Nels Nelson's work in Mammoth Cave and Gerald Fowke's excavations in Greenup-Lewis counties. Statewide inventories of archaeological sites, such as Bennett Young's 1910 publication, offered syntheses of prehistoric occupations in the Commonwealth. A culminating development was William D. Funkhouser and William S. Webb's entry into archaeology and their 1932 county-by-county survey of archaeological sites in Kentucky. Though the inventory of then-known sites contained inaccuracies and site type biases, as demonstrated by Clay (1985a) and Milner and Smith (1988), the publication represents the only documentation of some Woodland sites that are now destroyed.

WOODLAND SYSTEMATICS

Systematics is the process of creating and defining units of scientific analysis, which may be accomplished by classification or grouping (Dunnell 1971). Classification involves the creation of *a priori*, subjective, universal units (e.g., period, phase, horizon, and tradition), while grouping involves the creation of *a posteriori*, objective, particularistic units (e.g., Adena and Hopewell). Woodland research in Kentucky has involved both approaches to archaeological systematics, as demonstrated in the following discussion of chronological, formal, and cultural-historical units used by Woodland researchers in the Commonwealth.

CHRONOLOGICAL UNITS

In Kentucky, the Woodland period spans 1900-2000 years and is dated from 1000 B.C. to A.D. 900 or 1000. The lower boundary marker is the adoption of pottery technology, which occurred as early as cal 1606-802 B.C. in the Salt River Section, cal 1258-829 B.C. in the eastern Ohio River II Section, and cal 1432-950 B.C. in the Southeastern Mountains Section. The development of shell tempered pottery and the adoption of maize-based field agriculture demarcate the upper boundary of the Woodland period in Kentucky.

Following Griffin's (1967) scheme, archaeologists in Kentucky recognize three Woodland subperiods. Though there is debate about the absolute beginning and ending dates for each, the Early Woodland subperiod often is bracketed from 1000 to 200 B.C., the Middle Woodland subperiod from 200 B.C. to A.D. 500, and the Late Woodland subperiod from A.D. 500 to A.D. 900 or 1000. The Late Woodland subperiod begins and ends slightly earlier in western Kentucky than in eastern Kentucky. Boundary markers, variations in time ranges, and brief lifeways reconstructions for the three subperiods are discussed below.

Early Woodland (1000 to 200 B.C.)

There is some variation in the beginning and ending dates for the Early Woodland subperiod across Kentucky. Kreisa and Stout (1991), Duerksen et al. (1994, 1995), and O'Steen et al. (1991) bounded the subperiod at 1000-200 B.C. in the Mississippi River, Northern Bluegrass, and Lower Big Sandy sections. In the Ohio River II Section, deNeeve (2004) placed the end points at 1000-150 B.C. Schlarb (2005) bracketed the Early Woodland at 1000 B.C.-A.D. 1 in the Central Bluegrass. Time ranges of 800-200 B.C. and 1000-300 B.C. were suggested for the Gorge and Lower Big Sandy sections (Gremillion 1993a, 1998; Ison 1988; O'Steen et al. 1991; Railey 1991a).

Pottery technology, the defining characteristic of the Early Woodland subperiod, was adopted at different times across the Commonwealth. While chronometric determinations place pottery in some parts of Kentucky at or before 1000 B.C., there are few dates before 600 B.C. and many more after 400 B.C. As a result, there are aceramic Early Woodland sites (and a small number of pottery-bearing Late Archaic sites) in Kentucky. Not only did the timing of pottery adoption vary, the impact of pottery on cultural adaptations varied. For instance, pottery had little impact on technology in rugged portions of the Upper Green River Section, probably because it would have been too difficult to carry pottery vessels in the rough terrain when baskets and squash/gourd containers offered light-weight alternatives (Carstens 1996:10).

In the Salt River Management Area, the earliest date for pottery is cal 1606-802 B.C., and early Early Woodland pottery includes Chenaultt/Dexter and Arrowhead Farm types. In adjacent portions of the Ohio River II Section pottery was recovered from feature contexts dated cal 1258-829 B.C. In portions of the southeast, pottery from early Early Woodland sites includes quartzite tempered plain and cordmarked forms of the Pine Mountain series, dated as early as cal 1432-950 B.C. Information on early Early Woodland pottery types is limited for other parts of Kentucky.

In central and northeastern Kentucky, sites pre-dating ca. 600-400 B.C. typically yield small assemblages of very fragmentary sherds. Most of these specimens are thick and grit tempered with cordmarked, plain, or fabric-impressed surfaces. The earliest pottery in western Kentucky is late Early Woodland (post 500 B.C.) and includes Baumer and Alexander series types.

Two other technological changes that roughly coincide with the beginning of the Woodland subperiod are a shift from the grooved axe to the ungrooved celt, and a shift from chipped stone end scrapers to bone beamers. The grooved axe was lashed to a split haft and probably became frequently loosened during use, requiring constant re-securing of the assembly. A celt, on the other hand, is inserted into a socket carved out of a solid wooden haft, and, based in this way on the wedge principle, becomes more firmly secured to its haft during use.

During Paleoindian and Archaic times, hide working and other activities involving scraping were performed using chipped stone scrapers, a tradition reflected by the large number of hafted end scrapers (reworked projectile points) recovered from Middle and Late Archaic sites. During Early Woodland times, chipped stone endscrapers appear to have been replaced by bone beamers. Both the ungrooved celt and bone beamer continued in use until the Historic period.

Regarding other material culture, Early Woodland projectile point types in Kentucky are mostly notched and stemmed forms used as spear or dart tips. Types recovered from dated Early Woodland contexts are Wade (cal 1381-1008 B.C and cal 1373-978 B.C. [Ison et al. 1982]), Gary/Cogswell (cal 1493-849 B.C. [Fiegel et al. 1992] and cal 996-790 B.C. [Grench et al. 2007]), Buck Creek (1114-810 B.C. [Ledbetter and O'Steen 1992] and cal 769-207 B.C. [Carstens 1996]), Kramer (cal 767-411 B.C., cal 754-406 B.C. [French et al. 2007], and cal 761-403 B.C. [Duerksen et al. 1995]), and Turkey Tail (cal 789-394 B.C., cal 781-413 B.C., and cal 389 B.C.-A.D. 72 [Schock and Dowell 1981]). Point types associated with early Early Woodland site components are Merom, Late Archaic Stemmed cluster, Ledbetter, Saratoga/Cave Run, Savannah River/Swannanoa, Cotaco Creek, and Motley. Other types are found primarily in late Early Woodland assemblages: Cresap, Robbins, Adena Stemmed, Little Bear, and Cypress Creek. Other types of Early Woodland chipped stone tools are scrapers, knives, drills, and gravers.

Other than the aforementioned shift to celts, groundstone tools used during the Early Woodland subperiod did not differ significantly from those utilized during the previous period. Pestles and nutting stones were used in plant processing, hunting tools included atlatl weights, and hammerstones and abraders were used in tool manufacturing. Nonutilitarian items include gorgets and tubular smoking pipes. Steatite vessels are primarily known from sites in the Lake Cumberland and Lower Big Sandy sections. The extraction and modification of barite and galena minerals began after 800 B.C. in the Bluegrass Management Area.

Objects manufactured from bone and shell have been recovered from Early Woodland sites. Awls are one of the most prevalent bone artifact types; these were commonly made from deer ulnae or scapulae. Other antler/bone items are flakers,

reamers, handles, and bowls. Shell spoons, scrapers, beads, and gorgets have been found in some Early Woodland contexts.

The earliest textiles known in Kentucky were recovered from Terminal Archaic-Early Woodland sites. Caves and rockshelters in the Upper Green River and Gorge sections yielded the oldest dated specimens, but early Early Woodland textiles also are known from the Lower Big Sandy Section. Head and foot gear, bags and pouches, clothing, and other items were woven using a variety of techniques. Other objects made from plant materials like grasses, cane, and wood during the Early Woodland subperiod include sleeping mats, soil stabilizers, torches, digging sticks, baskets, bowls, and cradleboards.

Though trade networks existed since the Late Archaic, the use of exotic raw materials is evidenced infrequently at early Early Woodland sites. Copper is known from only one such site in the Interior Mountains Section, where a worked copper object was found with a burial. Mica is not documented at Early Woodland sites until after about 600 B.C. Toward the end of the Early Woodland, however, there was a notable increase in the frequency of copper, mica, and exotic cherts at Kentucky sites. These items were often used in mortuary-ritual contexts.

Early Woodland subsistence patterns in Kentucky changed little from Late Archaic times. Hunting and gathering continued as the main subsistence activities, with garden products supplementing the diet. Animal protein was obtained from a variety of sources, including deer, box turtle, small mammals, birds, and, in some areas, fish and mussels. As in the Archaic period, nuts were gathered and stored for year-round consumption. An important development that occurred during Early Woodland times was the intensified utilization and cultivation of weedy plants and cucurbits.

Plant husbandry, which began during the Late Archaic, was markedly intensified during the Early Woodland. Part of this process involved an increase in the exploitation of seeds relative to nuts, a trend that continued throughout the Woodland period and had a major impact on not only subsistence strategies, but on ceramic vessel form as well. Indigenous plant cultigens of the Eastern Agricultural Complex (EAC) found at Early Woodland sites are sunflower, sumpweed, goosefoot, maygrass, giant ragweed, and erect knotweed. Gourd and squash, some species of which were indigenous cultivars, also are found in Early Woodland plant assemblages.

Most Early Woodland populations resided in dispersed, un-nucleated settlements in upland, ridge top, and floodplain zones, as well as in rockshelters and cave vestibules. Midden deposits and/or clusters of artifacts and features, including, in few cases, the remains of temporary structures, demarcate domestic loci at Early Woodland open-air habitation sites. Rockshelters were used intensively in eastern and western Kentucky during the Early Woodland subperiod.

Cave exploration and mineral mining began during the Late Archaic but peaked during the Early Woodland. In the Upper Green River, Pennyroyal, and Lake Cumberland sections, small groups of miners used hammerstones, scrapers, torches, baskets, and bowls to extract and collect gypsum, mirabilite, and epsomite from cave walls, ledges, and sediments. Such practices are best documented at Mammoth and Salts caves in the Upper Green River Section.

Another archaeological characteristic of the Early Woodland is the appearance of social or ritual sites that are spatially segregated from domestic habitations. Initially, several forms of mortuary sites were utilized. In western Kentucky, individual graves were constructed in cave vestibules, and communal secondary interments were placed in pit caves. In eastern and western Kentucky, rockshelters contain primary and secondary burials. In other areas, isolated open-air mortuary sites were represented by a single burial or a limited number of interments, either as in-flesh burials or cremations. These graves often were associated with offerings, ranging from a few items to caches of bifacial blades or other materials. By about 500-400 B.C., groups in some parts of Kentucky began to construct burial mounds and irregularly shaped enclosures; these sites were typically associated with Adena. Mortuary processing camps, lacking earthworks and burials, also were part of the Adena settlement system.

In most parts of the Southeast and Midwest the upper boundary marker for the Early Woodland subperiod is the development of Hopewell (Anderson and Mainfort 2002a; Applegate 2005; Griffin 1967; Seeman 1986). In Kentucky, however, Hopewell did not have the pervasive effects on Woodland populations as it did elsewhere. As such, the cultural traits marking the boundary between the Early and Middle Woodland subperiods are not clearly delineated and considerable continuity exists. Presently, the division at 200 B.C. should be viewed as a mostly arbitrary one, not linked to the development of a particular artifact or site type(s).

Middle Woodland (200 B.C. to A.D. 500)

Like the previous subperiod, there is some variation in the beginning and ending dates for the Middle Woodland in Kentucky. Kreisa and Stout (1991) bounded the subperiod at 200 B.C.-A.D. 400 in the Mississippi River Section. In the Ohio River II Section, deNeeve (2004) bracketed the subperiod at 150 B.C.-A.D. 500. Richmond and Kerr (2005) and Schlarb (2005) proposed ranges of 400 B.C.-A.D. 400 and A.D. 1-500, respectively, for the Central Bluegrass Section. Gremillion (1993a) bracketed the Middle Woodland subperiod in the Gorge Section from 300 B.C.-A.D. 500. Some archaeologists recognize two subdivisions of the Middle Woodland subperiod: early (200 B.C.-A.D. 250) and late (A.D. 250-500).

Early Middle Woodland ceramics include conoidal, barrel-shaped, or flower pot-shaped jars with flat, rounded, subconoidal, or pointed bases. In general, ceramic vessels in the Bluegrass, Upper Kentucky/Licking, and Big Sandy areas tend to have plain exterior surfaces, while vessels with cordmarked, cord-wrapped dowel-impressed, or fabric-impressed exterior surfaces are more common in the Purchase, Green River, and Upper Cumberland areas. Small quantities of sherds that exhibit Havana-like or Hopewellian decoration, in the form of nodes and/or zoned incised-punctated or incised-dentate stamped, were found at sites in the Salt River and Ohio River I sections. Southeastern stamped ceramics were recovered in low frequencies from sites located in all areas of the state.

Late Middle Woodland ceramic vessels are predominantly subconoidal or subglobular jars, with outflaring, recurved, or direct rims. Most jars have cordmarked or plain exterior surfaces, while fabric or cord-wrapped dowel-impressed types and vessels

with flat bases are extremely rare. Small quantities of simple stamped or check stamped sherds are often present, and complicated stamped, brushed, or rocker stamped sherds were recovered from late Middle Woodland sites. Although the latter occur in relatively small frequencies, they are useful indicators for this temporal unit.

Some projectile point types recovered from Early Woodland sites also are found at early Middle Woodland sites, and several are associated with absolute dates. These include Robbins, Motley, Gary, and Adena Stemmed (cal 88 B.C.-A.D. 239 [Dowell 1981]). Triangular/Lanceolate forms such as Copena and Copena Triangular are diagnostic of the Middle Woodland subperiod, as are broad corner-notched forms like Snyders (cal 1258 B.C.-A.D. 425 [Mocas 1992]) and Affinis Snyders. Expanding stemmed and shallow side notched types derive from late Middle Woodland contexts and include Steuben, Bakers Creek, Lowe, and Chesser (cal A.D. 268-887 [Crane and Griffin 1966]) types. Besides projectile points, chert bladelets are diagnostic of the Middle Woodland subperiod. Other types of chipped stone tools were largely unchanged from the previous subperiod.

Similarly, utilitarian groundstone, bone, and shell tools from Middle Woodland sites are similar to those from Early Woodland sites. Changes were more prevalent in nonutilitarian artifacts. The use of groundstone smoking pipes, gorgets, steatite objects, and barite-galena items continued, but with greater frequency. Engraved and unengraved tablets derive from mortuary contexts. Groundstone discoidals and objects made of cannel coal were found at Middle Woodland sites, as were cut and modified canid/feline mandibles, bone combs, and shell gorgets.

The use of exotic raw materials, first evidenced during the Woodland period in Kentucky towards the end of the Early Woodland, peaked during the early Middle Woodland and continued to a lesser extent into the late Middle Woodland. Copper bracelets and breastplates/gorgets, copper and mica head ornaments, marine shell beads, and Vanport (Flint Ridge of Ohio) chert bladelets are among the types of items found almost exclusively in mortuary-ritual contexts.

There is less information about Middle Woodland subsistence compared to earlier and later subperiods. Research at sites in the Mississippi River, Lower Tennessee-Cumberland, Lake Cumberland, Southeastern Mountains, Central Bluegrass, Lower Big Sandy, and Upper Big Sandy sections has helped to remedy this disparity. In these sections, Middle Woodland faunal and floral assemblages indicate a generalized economy based on food collection and food production. Middle Woodland groups continued to rely more heavily on wild foods than on cultigens. The Middle Woodland diet in the Upper Green River Section, on the other hand, was characterized as focal.

Regarding settlement strategies, in many parts of Kentucky there was an increased focus on floodplain zones during the Middle Woodland. Habitation sites dating to this subperiod often contain midden deposits and feature clusters that suggest the presence of activity areas. At some sites in the Central Bluegrass, Eastern Bluegrass, Lower Big Sandy, and Upper Big Sandy sections, postmold patterns delineate small, single- and double-post circular and square/rectangular houses. In western Kentucky, habitation sites were sometimes associated with earthworks, while in central Kentucky the two site types remained spatially distinct. Rockshelter occupations declined considerably in the Gorge

Section during the Middle Woodland. Evidence of the development of settlement hierarchies has been noted in the Mississippi River and Ohio River II sections. During the late Middle Woodland, there appears to be a trend toward nucleation of settlements in the Bluegrass, Upper Kentucky/Licking, and Big Sandy management areas.

Archaeologists have documented several types of Middle Woodland mortuary-ritual sites. Best known are conical burial mounds, which date predominantly to the early Middle Woodland in the Bluegrass and Big Sandy management areas and to the late Middle Woodland elsewhere. Stone mounds and the use of stone in earthen mound construction were more common during the late Middle Woodland. Though uncommon, geometric earthworks and hilltop enclosures date predominantly to the late Middle Woodland and have been documented in several sections. Another mortuary-ritual site type that has been documented in the Central Bluegrass Section consists of nonmound ceremonial sites without burials. Middle Woodland sites in the Central Bluegrass Section also provide evidence of ritualistic feasting and ceremonial plant use.

Like the lower boundary, the upper boundary of the Middle Woodland subperiod traditionally has been demarcated by Hopewell-related criteria. These include declines in mound building activities, mortuary elaboration, and long-distance exchange. Again, the limited evidence of Hopewell in Kentucky creates challenges for applying these boundary criteria. Perhaps changes in pottery technology, like the development of subconoidal and subglobular cordmarked jar vessel forms, or other material culture traits would be more effective for delineating the Middle and Late Woodland transition in Kentucky.

Late Woodland (A.D. 500 to 1000)

"The Middle to Late Woodland transition in Kentucky does not appear to have been abrupt. Instead it was a gradual process, linked to changes in plant subsistence practices and hunting technology, a decline in long-distance exchange networks, and changes in ritual expression" (Pollack and Henderson 2000:615). There is more consensus among archaeologists about dates for the Late Woodland compared to the two earlier subperiods. Except in the Purchase Management Area, where the subperiod is dated from A.D. 400 to 900, in other parts of Kentucky the Late Woodland is dated from A.D. 500 to 1000 (deNeeve 2004; Gremillion 1993a; Kreisa and Stout 1991; O'Steen et al. 1991; Schlarb 2005). Some archaeologists use early Late Woodland (A.D. 400/500-800) and terminal Late Woodland (A.D. 800-900/1000) for finer temporal control.

The Late Woodland in the Southeast was "a time of appreciable cultural change," including population increase, development of bow-and-arrow technology, changes in the amount of mound construction, shifts in social organization, and subsistence change (Anderson and Mainfort 2002a:15). This was the case in some but not all parts of Kentucky, too. In the west and northeast, by the terminal Late Woodland there developed a great deal of regional diversity in pottery styles, subsistence strategies, settlement strategies, and social organization.

Spatially, the Late Woodland in western, northern, and eastern Kentucky is better documented than that in southern Kentucky. Accordingly, most of Kentucky's Late Woodland cultures are more midwestern than southeastern in terms of cultural

expression. In the Ohio River valley, the Falls of the Ohio at Louisville functioned as a cultural boundary and may be used to demarcate two Late Woodland regions, the lower Ohio River valley and the middle Ohio River valley (Pollack and Henderson 2000).

In most areas, early Late Woodland artifact assemblages are essentially similar to late Middle Woodland artifact assemblages. The former, however, usually lack Hopewellian decorated ceramics and other diagnostic Hopewell traits. Throughout most of Kentucky, early Late Woodland ceramics consist mainly of subconoidal and subglobular cordmarked jars. Vessel rims are unmodified and lips are usually flattened and plain except for occasional occurrences of diagonal or perpendicular notching. Decoration on vessel necks and bodies is extremely rare. Angular shoulders are one diagnostic trait of the widely distributed Newtown series.

Pottery from terminal Late Woodland contexts varies across Kentucky, though plain and cordmarked forms are common. Collared rims, carinations, and simple castellations are diagnostic traits of terminal Late Woodland vessels in several sections. In the lower Ohio River valley, pottery vessels with zones of incised geometric designs on the jar necks are common. In far western Kentucky, pottery attributes that are diagnostic of the Mississippi period, such as pan-shaped vessels and red film surface treatment, gradually appear in terminal Late Woodland assemblages. Vessels with angular shoulders continued in use in the Bluegrass Management Area.

Lowe cluster and occasionally Copena projectile points, which first appeared in the late Middle Woodland, are found at early Late Woodland sites. Unexpectedly, Adena Stemmed points have reported from early Late Woodland contexts by several researchers (Ahler 1987; Carstens 1996; Ison and Ison 1985; Kreinbrink 1992); an uncalibrated date of A.D. 540 was obtained for an Adena-bearing feature in western Kentucky (Dowell 1981). In some parts of Kentucky, bladelet production extended into the early Late Woodland.

The development of "true arrowheads" is considered a determinant trait for the terminal Late Woodland in Kentucky. Point types found at Late Woodland sites, including several from dated contexts, are Jacks Reef (cal A.D. 442-776, cal A.D. 548-859 [Ahler 1987], and cal A.D. 675-938 [Ledbetter and O'Steen 1992]), Raccoon (cal A.D. 663-1151 and cal A.D. 695-1223 [Lebetter and O'Steen 1992]), Hamilton (cal A.D. 223-592 and cal A.D. 569-768 [Des Jean 2004]), and Levanna. Throughout the Late Woodland, other chipped stone tool types are similar to those from earlier periods.

During the early Late Woodland wild plants and animals continued to be the mainstay of the subsistence economy. Cultivation of native plants continued and may have intensified, but plant husbandry contributed a small percentage of the diet. Though small amounts of maize are present in Middle and early Late Woodland contexts, it was not until the terminal Late Woodland (ca. A.D. 800) that it became a significant component of regional diets. In Kentucky, maize cultivation occurred primarily in portions of western Kentucky (Purchase and Green River management areas) during the terminal Late Woodland.

In general, Late Woodland settlement patterns exhibit a great deal of regional variability. Domestic structures include rectangular and circular single-post forms and a possible Late Woodland wall trench structure documented in the Pennyroyal Section. In

the Bluegrass Management Area, the typical environmental setting of Late Woodland sites is upland ridges, but in other areas the shift to floodplain zones, especially along trunk streams, continued. Early Late Woodland rockshelter components and smaller open habitation sites indicate that seasonal dispersal of local groups was an on-going element of regional settlement systems. Nucleated villages are present in some areas of Kentucky, including the Purchase Management Area, where two- and three-tiered settlement hierarchies have been documented. These sites date primarily to the terminal Late Woodland. In central and northeastern Kentucky, on the other hand, nucleated settlements, some of which were circular with central open areas, are more common in the early Late Woodland than in the terminal Late Woodland.

Although some burial mounds date to the early Late Woodland, the construction and use of large earthen or stone enclosures appears to have ceased by A.D. 500, if not earlier. Construction of stone mounds, which may have functioned as isolated mortuary-ritual locales, increased during the Late Woodland. Stone box grave cemeteries, often located adjacent to habitation areas, became common in western, southern, and parts of northern Kentucky.

There are several upper boundary markers for the Late Woodland subperiod. Shell tempered pottery is a widespread and useful diagnostic. The development of large nucleated settlements and maize agriculture are other boundary markers. In general, though, there are few indications that the Late Woodland to Mississippi/Fort Ancient transition was abrupt in Kentucky.

Other Chronological Units

Railey (1991b) proposed an alternative set of Woodland chronological units for sections in the Bluegrass Management Area. The model is based on diachronic variation in settlement strategies and delineates three Woodland subperiods. The Adena subperiod (400 B.C.-A.D. 250) spans portions of two traditional Woodland subperiods in Kentucky, Early Woodland and Middle Woodland, based on radiocarbon dates. Diagnostic artifacts of this chronological unit are carved paddle-marked pottery, tetrapodal vessels, platform pipes, and Middle-Woodland-like points of unspecified types (Railey 1991b).

The Newtown subperiod (A.D. 250-700) spans the traditional Middle Woodland and Late Woodland subperiods and is indicated by expanded stem points, pottery, and Hopewell materials, all of unspecified types. The Terminal Woodland subperiod (A.D. 700-1000) is poorly known but associated with bow-and-arrow technology. The upper boundary is marked by the adoption of maize agriculture (Railey 1991b).

FORMAL AND CULTURAL-HISTORICAL UNITS

Cultural Phases

Woodland phases in Kentucky are used in the tradition of Willey and Phillips' (1958) systematics - in which a phase refers to a series of similar components from

multiple sites - rather than the Midwestern Taxonomic Method. It is important to emphasize that cultural phases are formal, not chronological, units in Willey and Phillips' (1958) systematics. Phases typically are defined by assemblages of artifacts, though settlement patterns or subsistence strategies may be included. Though they have chronological dimensions, just as they have spatial dimensions, phases are intended not to divide the temporal continuum but to delineate formal similarities in artifact assemblages.

Though phases represent a fundamental means of classifying archaeological data, the designation of Woodland phases in Kentucky has been uneven temporally and spatially. There are few phases that subsume artifact assemblages from the earliest Woodland sites. There are five sections where Woodland phase development is lacking entirely: Western Coalfield, Upper Green River, Lake Cumberland, Southeastern Mountains, and Interior Mountains.

Four Woodland phases were delineated for the Mississippi River Section: Unnamed, LePlant or Belmont, Berkley, and Cane Hills. In the Ohio River I Section archaeologists defined Mulberry Creek and Lewis phases. The Baumer phase is recognized in the Lower Tennessee-Cumberland Section. The Mann complex/phase and the Yankeetown phase apply to assemblages in the Ohio River II Section. The Plum Springs phase was designated in the Pennyroyal Section, and the Riverside phase applies to assemblages in the Salt River Management Area. Archaeologists recognize the Cogswell phase in the Gorge and Lower Big Sandy sections. With assemblages throughout the Bluegrass and in the Salt River, Lower Big Sandy, and Gorge sections, the Newtown phase is the most widely distributed Woodland phase in Kentucky. Archaeologists defined the Everman phase in the Lower Big Sandy Section, and the Thacker and Sim's Creek phases in the Upper Big Sandy Section. These phases are described later in the chapter.

Integrative Culture-Historical Units

Culture-historical units serve to integrate large data sets and often cross the boundaries of archaeologists' spatial or temporal units, like Kentucky's management areas and the three Woodland subperiods. Two important culture-historical units in Kentucky Woodland research are Adena and Hopewell, which are group units defined in the pre-science era of archaeology. Two others are the Crab Orchard and Archaic traditions, with tradition defined as a class unit subsuming similar phases across a long time period but a limited spatial area (cf., Willey and Phillips 1958).

Adena

Named for a burial mound near Chillicothe (Mills 1902), the Adena unit developed as a result of excavations at burial mounds in southern Ohio. Greenman (1932) prepared the first synthesis of Adena, presented as a list of 59 formal traits observed at 70 mounds in the Ohio Valley. The Adena trait list grew over time, culminating in 1957 with Webb and Baby's 241-item trait list based on over 200 earthwork and rockshelter sites in several states. The research of Webb and his colleagues was instrumental in describing and explaining Adena, and Clay (2005) provided interesting insights into the larger academic milieu that influenced Webb's

views. The following discussion of Adena reviews the defining formal characteristics of the unit, outlines the temporal and spatial dimensions of sites designated as Adena in Kentucky, and summarizes attempts by archaeologists to incorporate Adena into modern classificatory schemes and theoretical paradigms.

The **defining traits** of Adena largely relate to earthwork construction, mortuary practices, and material culture. Regarding earthwork construction, a quintessential Adena trait is the conical mound, occurring in isolation or in groups. They may represent a single construction episode or accretional stages of construction. In either case, basket-loads of earth, sometimes incorporating rocks and logs, were used to cover burned areas, previous "village" occupations, and burials. Another diagnostic earthwork type is the circular embankment with interior ditches, a flat interior surface, and a raised "causeway" between the interior and exterior. Several irregular elliptical embankments with interior ditches are documented. The variously shaped embankments were constructed of largely sterile soils and did not cover burials but in some cases covered structural remains (Webb and Baby 1957).

Mortuary traits are an important defining component of Adena. Those related to body placement include extended burials, communal cremations, and redeposited or secondary individual cremations. Grave types are diverse but commonly include log tombs, puddled clay basins, and bark-lined pits. Submound structures ("houses") were circular (and occasionally rectangular) in shape and constructed of vertical or outward-slanting wooden posts set as pairs in pre-dug holes. Individuals were interred with burial furniture, red ochre, and associated artifacts. Other artifacts are commonly recovered from mound fill (Webb and Baby 1957).

The material culture component of the Adena trait list included not only classes of artifacts but formal characteristics within a particular class of artifacts. Worked items of rocks/minerals, clay, bone, shell, copper, and mica, mostly deriving from mortuary contexts, were listed. Many of the items were made from materials obtained through long-distance exchange networks. Among the many diagnostic lithic artifacts are reel-shaped and expanded-center bar gorgets, leaf-shaped and stemmed points (e.g., Cresap, Kramer, Robbins, and Adena Stemmed), tubular pipes, celts, engraved and unengraved tablets, and hemispheres or cones. Adena Plain, Fayette Thick, Wright Check Stamped, and Montgomery Incised pottery characterize Adena assemblages; at most mound sites. These ceramic vessels were primarily recovered from mound fill, and were rarely found in direct association with a burial or feature. Bone and shell diagnostics are awls, combs, flakers, handles, beads, spoons, and cut mandibles. Copper bracelets, beads, rings, pins, as well as copper and mica head ornaments, are important Adena traits. Other material culture traits relate to textiles and food remains (Webb and Baby 1957). The Adena trait list included artifacts also found in nonmortuary contexts, allowing for nonearthwork sites (e.g., eastern Kentucky rockshelters) to be designated as Adena.

With regard to **temporal dimensions**, Adena has long been associated with the Early Woodland subperiod in Kentucky and the middle Ohio Valley. Early archaeologists considered Adena a precursor, both chronologically and developmentally, of Hopewell. While a linear relationship between Adena and Hopewell has been documented for southern Ohio, with the former being restricted to the Early Woodland and the latter the Middle Woodland (Greber 2005; Seeman 1986), such a situation did not

exist in Kentucky. Although some Kentucky Adena sites date to the Early Woodland, others have been assigned to Middle Woodland as determined by chronometric dating or diagnostic artifacts.

Most Kentucky archaeologists concur that Adena spans the late Early Woodland to early Middle Woodland subperiods (Clay 1985b; Henderson et al. 1988; Pollack et al. 2005; Railey 1991b, 1996; Richmond and Kerr 2005; Schlarb 2005). Haag (1942) was among the first to recognize the late temporal placement of some Adena sites. The occurrence of Paintsville Simple Stamped sherds from C and O Mounds Jo2, which probably derived from one trade vessel, "lends some support to placing the Adena of eastern Kentucky in the same time horizon as Deptford, Copena, and, perhaps, Marksville" (Haag 1942:349), all of which are Middle Woodland archaeological manifestations.

The vast majority of chronometric dates for Adena earthwork sites in Kentucky fall between 500 B.C. and A.D. 250 (Anderson and Mainfort 2002a; Clay 1980, 1983, 1991; Crane and Griffin 1972; Fenton and Jefferies 1991; Griffin 1974, 1978; Hemmings 1978; Seeman 1986; Stoltman 1978). Two divergent and suspiciously early calibrated dates for Adena sites are 1735-548 B.C. for Auvergne Mound (15Bb16) (Clay 1983) and 1258-393 B.C. for the Dover Mound (15Ms27) (Webb and Snow 1959) (see Table 5.26). The widely divergent calibrated date of A.D. 603-1169 for the Drake Mound (15Fa11) (Arnold and Libby 1951; Libby 1955) is equally suspect (see Table 5.26). In these three cases, other chronometric dates for the sites fall within the date range for other earthworks (see Table 5.26).

Other archaeologists continue to view Adena as a largely Early Woodland archaeological manifestation. For example, Seeman (1986) set a terminal date of A.D. 1 for Adena based on artifactual differences between Adena and Hopewell site collections in southern Ohio, including the absence in Adena mounds of Hopewell items such as rocker-stamped pottery, chert bladelets, platform pipes, and obsidian. As discussed below, such items are known from mortuary sites in Kentucky, though not in the abundance documented at sites north of the Ohio River.

Dragoo (1963, 1976) recognized variation among Adena mound sites in terms of size, stratigraphic complexity, tomb types, presence/absence of submound structures, and grave goods. Considering these differences to be temporal, he divided Adena into early and late "phases." Webb and his colleagues also noted Adena variation interpreted as temporal. For example, in Kentucky bark-lined tombs are more characteristic of early-middle Adena, and log tombs are typical of late Adena (Webb and Snow 1959).

Clay (1991) proposed a "developmental trajectory" for Adena in the Ohio Valley. The three stages of Adena represent "*both temporal* stages and *levels* of organization" in mortuary and ritual activity (Clay 1991:35; emphasis original). Early Adena (500-150 B.C.) is the least complex of the three Adena organizational types. Sites like Fisher Mound in the Central Bluegrass exhibit the simple accretion of mortuary events, the inclusion of nonlocal grave goods, and the absence of spatial patterning in grave placement, submound structures and activity areas, and associated domestic sites (Figure 5.1). Within the broader settlement and social systems, mounds functioned as non-residential "communal mortuary facilities" for local related populations (Clay 1991).

Spatial separation of mortuary and nonmortuary sites continues with Middle Adena (150 B.C.-A.D. 1) (Figure 5.1). Two forms of Middle Adena ritual sites are mounds and mortuary camps, and mounds were located on the edges of social territories. Most Middle Adena sites like Robbins Mound (Northern Bluegrass), Morgan Stone Mound (Eastern Bluegrass), and C and O Mounds (Lower Big Sandy) are characterized by prepared floors, cremations, and submound mortuary camps with circular "screened enclosures." This elaboration of ritual activity, marked by "protracted mortuary cycles" at multiple locations, *may* indicate increased social complexity (Clay 1991).

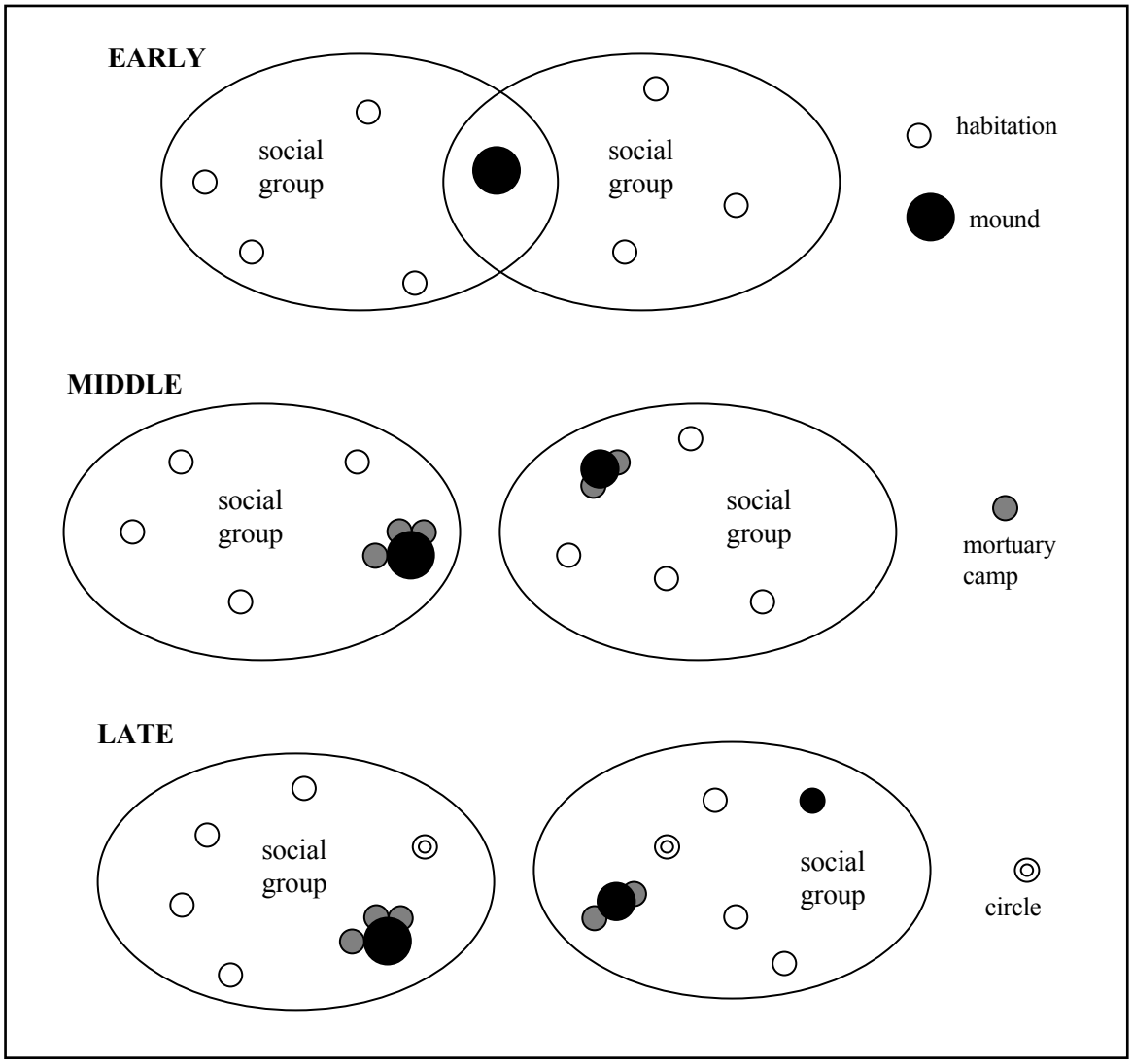

Figure 5.1. Adena Organizational Types (after Clay 1991).

Late Adena (A.D. 1-250) is the most complex stage of ritual organization, in which new mortuary activities are added to the preceding levels of organization (Figure 5.1). Separation of ritual and domestic space continued. Late Adena sites like Wright Mound Mm6 (Central Bluegrass Section) are characterized by overlapping submound enclosures, log tombs that were reused for multiple interments, and fewer individuals per

mound. Some Late Adena sites like Auvergne Mound, on the other hand, were comparatively "simple." Circular embankments like Mt. Horeb Enclosure were earthen representations of screened enclosures and may have functioned as permanent, nonmortuary ritual features (Clay 1991).

Research at Central Bluegrass Section sites has produced data that may be used to revise Clay's (1991) model (Figure 5.2). First, Schlarb et al. (2007) investigated a ritual site without earthworks, screened enclosures, or burials. The Evans site (15Mm192) is located near a mound and dates to ca. 400-200 B.C. (Table 5.26), which would fall within Clay's Early Adena. This site provides evidence of a second mortuary-ritual site type in Early Adena (in addition to burial mounds); artifacts indicate it served as a mortuary camp but separated from a mound not under one (and with no screened enclosure).

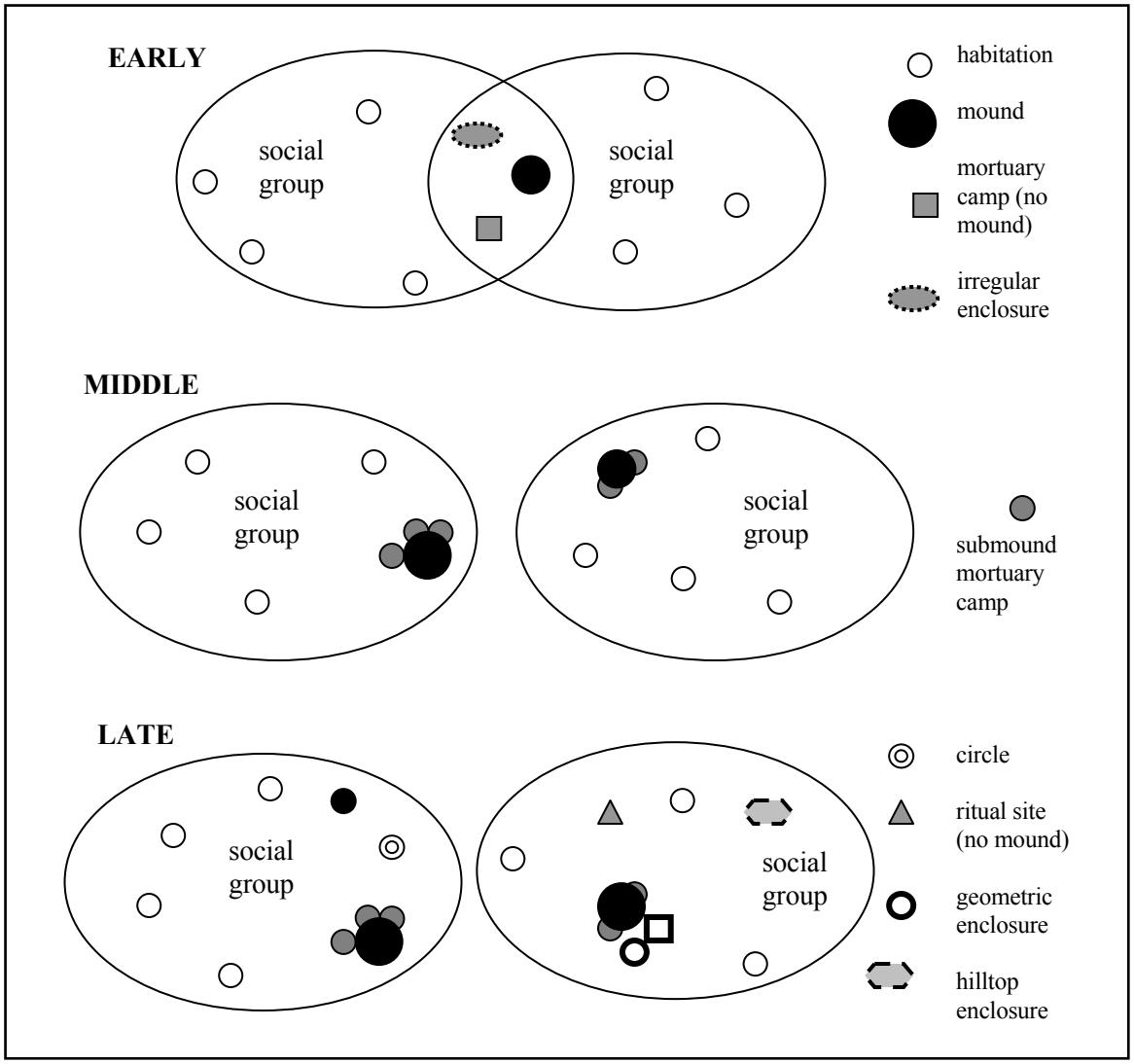

Figure 5.2. Revised Adena/Woodland Organizational Types (modified from Clay 1991).

Second, irregular enclosures like Peter Village (15Fa166) and Grimes Village (15Fa14) and hilltop enclosures like Indian Fort Mountain (15Ma25) have not been incorporated into the model. Radiocarbon dates for Peter Village (Clay 1985b, 1988) place it in Early Adena (see Table 5.26). There are no dates for Grimes Village, but it is structurally and artifactually similar to Peter Village. A calibrated radiocarbon date of 39 B.C.-A.D. 236 was obtained for Indian Fort Mountain, which places the site in Late Adena (Figure 2), though it may not be related to Adena (i.e., hilltop enclosures in southern Ohio typically are associated with Hopewell).

Third, Richmond and Kerr (2005) documented a ritual site without earthworks or burials, an additional Late Adena mortuary-ritual site type. Not only that, but Amburgey (15Mm137) may indicate the presence of different populations practicing different mortuary-ritual regimes during that time frame. Wright-Greene Mounds (15Mm6-8) are Adena, while nearby Camargo (15Mm30-33) (with mounds and geometric enclosures) and Amburgey (Figure 2) are "Hopewell-related" sites, yet all three are contemporaneous based on radiocarbon dates (see Table 5.26) (Richmond and Kerr 2005). Other geometric enclosures, like those at Old Fort Earthworks (15Gp1) and O'Byam's Fort Earthwork (15Fu37, 15Fu39-44), likely are Late Adena or contemporaneous with Late Adena sites.

Regarding **spatial dimensions**, "the Adena type of ritual organization developed roughly upstream from the Falls of the Ohio" (Clay 1991:35). Excluding nonmound sites yielding Adena Stemmed and Adena Plain pottery but few or no other diagnostic Adena traits, sites identified as Adena have been documented in several management areas in Kentucky. The core area, meaning the area with the largest percentage of sites rather than the developmental center, is the Central Bluegrass Section. There are a number of Adena earthwork sites in the Northern Bluegrass and Eastern Bluegrass sections, and the Salt River Management Area. Others are documented in the Lower Big Sandy Section. Adena sites in the Gorge Section are rockshelters, as delineated by Webb and Baby (1957).

Research on Adena profoundly affected Woodland investigations in Kentucky, leading to **critical reevaluations** of the unit. As more and more information was gathered on Early-Middle Woodland mortuary and ritual practices and, to a lesser extent, on technology, exchange, skeletal morphology, and paleopathology, little was learned about subsistence, settlement, and everyday lifeways. However, Webb and his colleagues recognized this bias (e.g., Haag 1974). "Mounds erected over log tomb burials … are today our chief source of information relative to the Adena complex, known largely even yet as a 'burial complex'" (Webb et al. 1942). Adena can (or should) only be used to characterize mortuary-ritual sites. This concern continued to be expressed by later researchers (e.g., Clay 1991; Fitting and Brose 1971), and the issue was among those discussed at a landmark symposium on Adena (Swartz 1971).

A second major critique of Adena focused on the trait list approach to defining Adena. Some archaeologists (e.g., Clay 2005; Fitting and Brose 1971) have concluded that the trait-list approach led to *less* clarity in what Adena is. It actually did more to demonstrate variability, not commonalities, in Adena. What is curious is that Webb recognized the shortcomings of the trait list approach yet continued to employ it. Webb and his colleagues recognized variation in Adena. For instance, Webb (1941a:191) remarked that Drake Mound "is so small and so unique that a trait list has little value by

way of comparison with trait lists of other sites." Webb and Haag (1947b:52) noted that the information learned from Fisher Mound (15Fa152) "could have been obtained nowhere else" because the mortuary practices evidenced there were so unique. Further, Webb and Funkhouser (1940) concluded that Ricketts was more like the Adena Mound in Ohio than the general Adena trait list. "We should consider Adena a dynamic cultural expression, one characterized by variability in mortuary treatment" (Pollack et al. 2005:75).

As archaeologists grappled with these issues, and with the tendency to equate Adena with a group of people or a culture in the ethnographic sense, they also attempted to incorporate Adena into prevailing classificatory schemes and theoretical paradigms. Some researchers (e.g., Caldwell 1962; Griffin 1943; McKern 1936), and even Webb and Funkhouser (1940:262) and Haag (1942:349) referred to Adena as an aspect using the Midwestern Taxonomic Method. Others (e.g., McMichael and Mairs 1969; Seeman 1992; Shane 1975; Shane and Murphy 1975) associated Adena with the phase unit, and O'Steen et al. (1991) classified Adena as a horizon, in both cases using Willey and Phillips' (1958) systematics. One problem with these attempts is that Adena already is a unit, a particularistic group that stands alone, while the other units are universal classes (Applegate 2005). The many problems with the Adena concept led Clay (2005) to propose abandoning Adena as a unit altogether.

Hopewell

As an archaeological construct, Hopewell shares a similar developmental history and definitional focus with Adena. Like Adena, Hopewell subsumes mortuary-ritual traits to the exclusion of other cultural traits. The concept of Hopewell developed as a result of excavations of several burial mounds and earthworks in southern Ohio (Mills 1907, 1909, 1917a, 1917b, 1922; Shetrone 1925, 1926; Shetrone and Greenman 1931) in the pre-scientific era of archaeological research. Researchers subsequently applied the Hopewell unit to archaeological sites and assemblages across much of the Eastern Woodlands (Sieg and Hollinger 2005), though to a lesser extent in Kentucky given Webb's classification of almost all excavated burial mounds as Adena. The following discussion of Hopewell reviews the defining formal characteristics of the unit, considers current archaeological interpretations about Hopewell systematics, delineates temporal boundaries of Hopewell, and outlines evidence of Hopewell traits at Kentucky Woodland sites.

Regarding **formal characteristics**, Hopewell descriptions, like those for Adena, focus on earthwork construction, mortuary practices, and material culture. Dancey (2005:129), however, cautioned that "there is no consistent 'Hopewell package' containing all elements of the list of diagnostics." Hopewell mounds tend to occur in groups, were constructed of a mixture of largely sterile soils, and were erected in a single episode. The mounds were constructed to cover burials that accumulated over time on the horizontal ground surface under the mound. In some river valleys stones were incorporated into mound construction, and platform mounds are documented in some areas. Another characteristic earthwork form is the geometric enclosure, also built of specially selected and layered sterile soils and often associated with conical mounds. Squares and circles, sometimes conjoined, are most common. Hilltop enclosures, or

linear mounds of earth and stone paralleling the contours of hilltops, represent another Hopewell earthwork type. Both types of enclosures are associated with interior ditches and have openings or "gateways" punctuating the earthen walls (Anderson and Mainfort 2002a; Dancey 2005; Greber 2005; Sieg 2005; Sieg and Hollinger 2005).

Hopewell mortuary practices emphasized special structures used in protracted burial events pre-dating mound construction. The mostly rectangular, single-post structures vary in size and layout. Complex structures were individual or conjoined roofed structures or unroofed enclosures with individual partitions. Often destroyed by fire, the structures are referred to as charnel houses. The deceased were placed in individual burial features, typically extended in pits or cremated in clay-lined basins, under Hopewell mounds. In many cases individuals were buried with numerous noteworthy grave goods (Anderson and Mainfort 2002a; Dancey 2005; Greber 2005; Sieg and Hollinger 2005). "In the early mound excavations [in the middle Ohio Valley] the finding of cremations was considered sufficient evidence to classify the site as Hopewell" (Webb et al. 1942). Later research revealed that it was more so the type of cremation (primary individual cremation) that was diagnostic of Hopewell.

Hopewell material culture includes diagnostic lithic, clay, bone, shell, copper, and mica artifacts. Whole pottery vessels placed in graves included zoned rocker-stamped types. Barite boatstones and groundstone platform and modified tubular pipes are distinctive. Chert items include bladelets, prepared bladelet cores, and projectile points like Snyders and Ross. Bear canines, shark teeth, pearls, and conch shell dippers, as well as modified human remains, are common organic artifacts. Spoonbill bird and cross-hatch-filled zones are common decorative motifs engraved on stone, bone, and/or pottery. Copper items include breastplates, bicymbal ear spools, bracelets, finger rings, celts, and cut-outs. The latter also were made of mica. Other items are panpipes and terra cotta figurines. In addition to copper, mica, and marine products, other exotic raw materials are obsidian, galena, meteoric iron, and Knife River flint (Dancey 2005; Greber 2005; Sieg and Hollinger 2005).

Reevaluation of the Hopewell concept has focused on incorporating the pre-science unit into contemporary classification schemes and theoretical paradigms. Attempts by archaeologists to do so have been as diverse and nonconsensual as with Adena. A number of archaeological units have been associated with Hopewell, including phase (in the Midwestern Taxonomic Method), ethnographic culture, climax, tradition (in the Willey and Phillips scheme), complex, or cult (Applegate 2005; Sieg and Hollinger 2005).

Two other interpretations of Hopewell garnered wider acceptance. Because exotic materials are prevalent at Hopewell sites, it became widely viewed by archaeologists as an "interaction sphere" defined in terms of ideological or economic exchange (Blosser 1996; Brown 1977; Caldwell 1964; Richmond and Kerr 2005; Seeman 1977; Struever 1964, 1968; Struever and Houart 1972). Others (e.g., Dancey 2005; Sieg and Hollinger 2005) proposed that Hopewell is best conceived as a horizon, or a set of contemporaneous phases that encompass a wide geographic area but a short temporal span (cf., Willey and Phillips 1958). Because it covered such a large geographic area, the Hopewell horizon was not "a unitary social organization" representing "a distinct Culture" (Dancey 2005:129).

One thing that has been consistent among archaeologists regarding Hopewell is the general **time frame**. They largely agree that Hopewell is a Middle Woodland archaeological manifestation. In fact, as discussed previously, the Middle Woodland subperiod is defined in part in relation to Hopewell, creating a bit of a tautology. The beginning and ending dates for Hopewell vary across space (Dancey 2005; Sieg and Hollinger 2005). Proposed time ranges are A.D. 1-500 or various 300-400-year intervals within this range (Dancey 2005; Greber 2005; Seeman 1986). In Kentucky, sites with Hopewell traits span ca. A.D. 1-350.

In the Eastern Woodlands the **spatial distribution** of Hopewell is discontinuous within the area of "Ontario to the Gulf of Mexico and from the Atlantic to the Plains" (Sieg and Hollinger 2005:132). Kentucky typically is not included in this distribution. Webb and his colleagues occasionally identified formal similarities between Ohio Hopewell and Kentucky earthwork sites, burial mounds, and material culture. Other researchers have made additional observations, sometimes anecdotal and sometimes thoroughly documented. But in general, Kentucky Hopewell studies have lagged behind those in neighboring states, and the distribution of Hopewell traits has not been systematically documented.

Applegate (2006) offered an initial attempt, outlining Hopewell traits at three dozen sites unevenly distributed throughout all management areas. Hopewell earthwork traits documented at Kentucky Woodland sites are groups of mounds, associated mounds and geometric earthworks, platform mound, stone used in mound construction, and use of special soils. With respect to mortuary practices, documented traits are individual primary cremations, rectangular submound structures, partitioning of space within submound structures, burning of submound structures, puddled clay platforms, and grave features on the submound surface. Hopewell material culture traits are hooked-beak bird motif; mica head ornaments and other cut mica; copper head ornaments, rings, gorgets or breastplates, solid bracelets, celts, and ear spools; modified human remains; marine and mussel shell spoons and dippers; cut canid or feline mandibles; Snyders and Affinis Snyders points; bladelets, including some made of Vanport (a.k.a. Flint Ridge of Ohio) chert; platform and modified tubular pipes; and stamped or cordmarked tetrapodal pottery vessels (Applegate 2006).

A number of Kentucky Woodland sites showing Hopewell influence are in the Central Bluegrass Section. Limestone slabs were used in the construction of Fisher Mound (15Fa152), and mortuary items include modified human remains. Webb and Haag (1947b) noted similarities between copper head ornaments, copper and barite boatstones, barite and hematite cones, and modified tubular pipes from Fisher with those from Tremper, Hopewell, Mound City, and other Ohio mounds. Copper celts were found as grave goods in the mound (Webb and Haag 1947b).

Copper breastplates/gorgets and barite boatstone fragments were recovered from Drake Mound (15Fa11) (Webb 1941a). Hopewell traits at Bullock Mound (15Wd10) are a rectangular submound structure marked by 80 postmolds and one bladelet made of Vanport chert (Schlarb 2005). Cremations, Vanport bladelets, and an Affinis Snyders point were documented at Walker-Noe (15Gd56) (Pollack et al. 2005). A complete modified tubular pipe was found at a three-mound complex on the property of Thomas Jones (no assigned site number) in Bourbon County (Webb and Haag 1947b).

At Ricketts Mound (15Mm3), Funkhouser and Webb (1935) noted similarities in puddled clay platform graves and a primary cremation in a square clay basin with those at Edwin Harness Mound in Ohio. "The copper [bracelets], together with the stone gorgets and the clay graves strongly suggest a northern influence if not actually representing a Hopewell influence on Adena culture" (Funkhouser and Webb 1935:100), the earliest published reference by Webb to Hopewell traits in Kentucky. Primary cremations, bladelets, and mica were found at the Evans site (15Mm182) (Schlarb et al. 2007), and solid copper bracelets and a copper breastplate/gorget reportedly were found in Mt. Sterling Mound (15Mm1) (Putnam 1882 as reproduced in Webb 1940).

At Wright-Greene Mounds (15Mm6-8), three mounds occurred in a group. Hopewell-like material culture includes mica and copper head ornaments, copper rings, modified tubular pipes, cut mandibles, and shell spoons. Webb (1940:127) described an engraved tablet with a hooked-beak bird motif as Adena but with a "Hopewell connection." Fenton and Jefferies (1991) characterized the Camargo Earthworks complex (15Mm30-33) as Hopewell related. The complex includes circular, square and hexagonal enclosures and two mounds, one of which had a low lobe that yielded a Connestee series tetrapodal vessel, part of a platform pipe, and mica fragments. One mound covered two *in situ* crematory features. At Amburgey, another Hopewell-related site, Richmond and Kerr (2005) recovered copper ear spools, a copper celt with mica fragments, a Snyders point, and a Connestee series tetrapodal vessel. These three Montgomery County sites were contemporaneous.

In the Northern Bluegrass Section at the Crigler (15Be20 and 15Be27) and Robbins (15Be3 and 15Be14) sites, conical earthen mounds occurred in groups. At both sites the larger of the two mounds covered charnel houses; though both were round, the submound structure at Robbins was associated with a rectangular occupation floor and the one at Crigler was internally partitioned. Artifacts from Crigler are mica head ornaments, platform pipe, and Snyders-like point, and artifacts from Robbins include mica head ornaments, copper ring, and shell spoon (Webb 1943a; Webb and Elliott 1942). Railey (1996) identified the Crigler pipe as Seeman's Hopewell-17 type. Another site, Riley Mound (15Be15), covered a rectangular submound structure and produced a copper breastplate/gorget (Webb 1943b). Stone was used in constructing Hartman Mound, which covered a primary cremation and yielded a copper ring (Webb 1943a).

The mound at the Rogers site complex (15Be33-35) was constructed with stone and covered burial features placed at one level on the submound surface. Diagnostic Hopewell artifacts are platform pipe, cut mica, cut mandibles, and bladelets (Kreinbrink 1992). A copper ear spool and galena fragments were recovered from Chilton (Funkhouser and Webb 1937).

In the Eastern Bluegrass Section, Webb and Snow (1959:70) recovered mica head ornaments and other cut mica items, a cut mandible, and solid copper bracelets that "link Adena and Hopewell cultures at this mound." At the Morgan Stone Mound (15Bh15), Webb (1941b) uncovered an elaborate primary cremation with two pottery vessels in a (circular) charnel house. Copena Triangular points also were recovered.

In the Lower Big Sandy Section, the Old Fort Earthworks (15Gp1) is a square enclosure that is part of the Portsmouth Works. The geometric enclosure with gateways

is associated with several mounds. Boatstones and mica fragments were found at the enclosure, and copper breastplates/gorgets reportedly were found by local residents. Bentley (15Gp15) and Hansen (15Gp14), two nearby habitation sites whose relationship to the earthwork complex is unclear, yielded imported Hopewellian Connestee Series pottery that suggest "a certain degree of participation by Newtown peoples in the Hopewellian exchange network" (Henderson et al. 1988:79).

At the C and O Mounds (15Jo2 and 15Jo9), the smaller southern mound yielded copper finger rings, Copena Triangular bifaces, mica fragments, and a perforated human parietal bone gorget. The northern mound was constructed in three stages using layers of sediments that varied in color and texture. The first stage was a "truncated pyramid" or flat-topped mound (Webb et al. 1942). Simple-stamped pottery with tetrapodal supports was recovered from the northern mound (Haag 1942).

Bladelets were recovered from the Brisbin site (15Bd311A), including some made of Vanport chert (Aument 1985; Dowell 1979b; Schock and Foster 1976). Ison and Ison (1985:130) documented a pair of sites reflecting "Hopewellian mortuary practices." A cremation with mica and simple stamped pottery were found at the Carroll Shelter (15Cr57), and mica was among the items in a nearby cache at Site 15Cr58.

In the Salt River Management Area, a copper ear spool reportedly was found in a Marion County mound (no assigned site number) (Richmond and Kerr 2005). Few sites in the Upper Cumberland Management Area have yielded Hopewell diagnostics. The Reiny (15Ru27) site in the Lake Cumberland Section yielded stamped pottery and Copena points (Railey 1990). In the Southeastern Mountains Section, mica, stamped pottery, and large corner-notched points were found at Site 15Bl52 (Niquette 1985).

Hopewell traits at Woodland sites in the Ohio River II Section are limited to stamped pottery sherds, such as those found at Site 15He315B (Schock and Stone 1985), and chert bladelets and prepared cores, such as those recovered from Sites 15He33, 15He34, 15He315B, and 15He323B (Dowell 1979b). In the Western Coalfield Section, the Ashby site (15Mu4) includes two earthen mounds, the larger of which incorporated stone and covered a (circular) charnel house with a prepared clay floor. A mica sheet and a piece of barite/galena were found in the mound (Hoffman 1965; Rolingson 1967). The Jones Mound (15Hk11) covered a circular earthwork [or perhaps a doughnut-shaped embankment like those at Drake Mound and C and O Mound Jo2] and smaller elongated mounds and yielded rocker stamped pottery (Purrington 1966b; Rolingson 1967).

A mica cut-out reportedly was found at Hidden River Cave (15Ht69) in the Upper Green River Section (Applegate 2001). Two sites in the Pennyroyal Section indicate possible Hopewell or Copena connections. The Watkins (15Lo12) site includes a pair of mounds, the larger of which yielded cut mica fragments, bladelets, Copena points, a conch shell dipper, an incised tetrapodal vessel, and a copper breastplate/gorget (Applegate 2000c; Ray n.d.). Cut mica was recovered from the Campbell Mound (15Wa324A) (Schock and Dowell 1991).

In the Mississippi River Section, the O'Byam's Fort Earthwork (15Fu37, 15Fu39-44) complex includes a three-sided square enclosure, a pair of linear earthen walls, and six conical mounds (Mainfort and Carstens 1987). An unnamed mound (no assigned site

number) in Ballard or Carlisle County excavated by Fain and Blanche King contained five copper celts (King 1939; Muller 1986).

In sum, the distribution of Hopewell diagnostic traits in Kentucky is discontinuous. There are a few sites that are identified as Hopewell or Hopewell-related (e.g., Camargo, Amburgey, Rogers, and Old Fort Earthworks), but most sites simply yielded some Hopewell diagnostics. Sites in the Bluegrass Management Area and the Ohio River area of the Lower Big Sandy Section reflect relationships with Ohio Hopewell. Other sites in the Lower Big Sandy Section and Upper Cumberland Management Area evidence interactions with Hopewell in the Appalachian summit. Green River Management Area and Mississippi River Section sites reflect inter-regional relationships with Copena of the lower Mississippi River valley. The smaller number of sites with Hopewell diagnostics in the lower Ohio River valley suggests comparatively limited interactions with Illinois Hopewell (Applegate 2006).

The Relationship Between Adena and Hopewell

With respect to similarities in Adena and Hopewell diagnostics, and the occurrence of Hopewell traits at otherwise Adena sites, Webb and his colleagues interpreted the relationship as developmental and sequential. Webb and Haag (1947b) proposed that late Adena was contemporaneous with early Hopewell, and some Hopewell traits first developed in Adena but were elaborated with Hopewell. For instance, "if the use of antler headdresses had a significant place in the symbolism of Ohio Hopewell, it is important to find evidence of its existence in Adena as a further confirmation of what seems to be established that many important Hopewell traits *find their beginnings* in Adena" (Webb and Haag 1947b:83; emphasis added). As another example, Webb and Haag (1947b:88) posited that "while the occurrence of cones and boat stones in an early Ohio Hopewell site such as Tremper points to close cultural associations with late Adena sites such as Fisher, and in point of time probably to partial contemporaneity, it suggests that these traits may have come to Tremper by way of Adena."

Clay (1991:35) has interpreted "Hopewell as an extension of the complexity that developed in Adena." Adena levels of organization "probably persisted into Hopewell," with Adena being comparatively less complex (Clay 1991:35). "Adena and Hopewell are products of the same set of factors. These are involved with the substantial modification of existing Eastern Woodlands social and political structures. They are expressed in enhanced inter-regional trade and resource exploitation, the construction of both 'defensive' and 'ceremonial' earthworks, and the elaboration of burial ritual" (Clay 1985b:41). Based on the occurrence of Hopewell traits at several Kentucky Woodland sites, Railey (1996:100) concluded that "Adena should be viewed as an early regional expression of Hopewell rather than as its predecessor."

Applegate (2006) suggested a similar interpretation. Adena developed during the late Early Woodland in Ohio and Kentucky. By early Middle Woodland times in Ohio, the Adena mortuary-ritual complex morphed into or was supplanted by Hopewell. In Kentucky, on the other hand, the predominate mortuary-ritual complex continued to be Adena with limited and uneven influences from Ohio Hopewell, Appalachian summit Hopewell, Copena Hopewell, and, to a lesser extent, Illinois Hopewell. The distinction

between Adena and Hopewell in Kentucky is much murkier than in Ohio, as might be expected in an area that was a "hinterland" or "periphery" for an archaeological manifestation like Hopewell.

Crab Orchard Tradition

Moreau Maxwell (1951) defined Crab Orchard based on materials recovered during WPA-sponsored excavations near Carbondale, Illinois. Originally formulated as a focus in the Midwestern Taxonomic Method, Struever (1964) redefined Crab Orchard as a tradition related to the Hopewell interaction sphere. Maxwell's initial work remained the basic descriptive reference for Crab Orchard until Winters (1967:49-52) described the Crab Orchard tradition in the lowermost portion of the Wabash Valley.

Formally, pottery is the primary criteria used by researchers to assign sites to the Crab Orchard tradition. As discussed later in the chapter, Crab Orchard series includes cordmarked, fabric impressed, plain, cord-wrapped stick impressed, and decorated types. It includes types previously classified as Baumer. Lithic diagnostics are chert bladelets and stemmed and corner notched projectile points. Point types include Late Archaic-Early Woodland straight stemmed forms like Saratoga; contracting stemmed types of the Dickson cluster; and expanding stemmed Manker, Motley, and Snyders/Affinis Snyders types. Exotic raw materials are found in Crab Orchard tradition assemblages (Bell 1958; deNeeve 2004; Maxwell 1951; Montet-White 1968; Scully 1951; Winters 1967).

The Crab Orchard tradition is documented in northwestern Kentucky, southwestern Indiana, southern Illinois, and southeastern Missouri. Unlike Adena and Hopewell, Crab Orchard was defined primarily from large habitation sites. These sites often consist of dense concentrations of midden and subsurface features. Smaller, open habitation sites and rockshelter occupations also are known. In Kentucky, Crab Orchard tradition sites are located in the Purchase (Lower Tennessee-Cumberland Section) and Green River (Ohio River II and Western Coalfield sections) management areas (Allen 1976; deNeeve 2004; Mocas 1977; Myers 1981; Nance 1985; O'Malley et al. 1983).

Regarding temporal dimensions, the Crab Orchard tradition spans the Early and Middle Woodland subperiods, ca. 600 B.C. to A.D. 250 (Butler and Jefferies 1986; deNeeve 2004). Most discussions of the Crab Orchard tradition, however, have assigned it to the Middle Woodland subperiod (Bader 1996; Butler and Jefferies 1986; Jefferies and Butler 1982; McNerney 1975; Muller and Davy 1977). Chronological variation within the Crab Orchard tradition relates to changes in pottery temper, vessel thickness, surface treatment, and decorations (Butler and Jefferies 1986; Denny 1972; Hargrave 1982; Maxwell 1951; Winters 1967).

Archaic Tradition

Based on work along middle Levisa Fork in Pike County, Dunnell (1972) delineated four phases that are associated with two traditions. Using "tradition" in the sense of Willey and Phillips (1958), the Archaic tradition in the Fishtrap Reservoir area

of the Upper Big Sandy Section subsumes the Slone, Thacker, and Sim's Creek phases, which represent "arbitrary stylistic divisions of a continuum" (Dunnell 1972:63).

Subsistence strategies associated with the Archaic tradition focused on gathering and hunting, with considerable reliance on nut resources and limited evidence of plant cultivation. Seasonal camps, residential mobility, generalized tool kits, and limited use of nonutilitarian items characterize the tradition. Major trends within the Archaic tradition are (1) increased number of artifact types, perhaps indicating expanded external contacts; (2) increased hunting activity, though wild plant resources remained more important than animals throughout the tradition; and (3) increased diversity of plant foods, including at least one cultigen, that may be related to use of pottery containers. Dunnell (1972) concluded that the Archaic tradition is an "extensive" or "generalizing" pattern, comparable to Cleland's (1976) "diffuse economy" (but more stable) and Caldwell's (1958) "primary forest efficiency" without residential permanence.

The 34 components of the Archaic tradition span a time frame from about 3000 B.C. to A.D. 1000 (Dunnell 1972), or the Late Archaic through Woodland periods. Of the three phases comprising the tradition, Slone is aceramic and falls within the Late Archaic subperiod. Thacker and Sim's Creek fall within the Woodland period as currently defined, with the former dating to the Early Woodland and the latter, Middle-Late Woodland. The change from the Archaic to the subsequent Fort Ancient tradition, according to Dunnell (1972), likely was due to population movements, with groups maintaining the Archaic lifeways moving to upland portions of the Levisa drainage.

WOODLAND SITE INVENTORY

A review of site inventory files at the Office of State Archaeology indicates that 2,920 Woodland period sites have been documented in Kentucky (Table 5.1). Woodland sites and site components are unevenly distributed across Kentucky. The largest number (25.6 percent) are located in the Green River Management Area, closely followed by the Bluegrass Management Area (22.6 percent) (Table 5.1), with these two management areas accounting for almost fifty percent of the documented Woodland sites in Kentucky. About 14.0 percent of the sites are located in the Salt River Management Area. Comparable percentages of 11.8 percent and 11.4 percent, respectively, of Woodland sites are located in the Upper Cumberland and Upper Kentucky/Licking management areas. Only 8.5 percent and 6.1 percent, respectively, of the sites are located in the Purchase and Big Sandy management areas.

Table 5.1. Woodland Sites by Management Area.

Management Area	No. Sites	Percent	Area (sq km)	Sites/km^2	Sites/acre*
Purchase	248	8.5	8,868	0.028	0.004
Green River	748	25.6	30,065	0.025	0.006
Salt River	410	14.0	11,261	0.036	0.005
Upper Cumberland	346	11.8	12,150	0.028	0.002
Bluegrass	659	22.6	18,686	0.035	0.011
Upper Kentucky/Licking	332	11.4	13,740	0.024	0.001
Big Sandy	177	6.1	8,438	0.021	0.002
Total	**2,920**	**100.0**	**103,208**	**0.028**	**0.004**
* number of sites per acre surveyed					

In order to standardize the percentages, the number of sites per sq km for each management area was calculated (Table 5.1). The average density of Woodland sites statewide is 0.028 sites per sq km. The Salt River and Bluegrass management areas have the highest densities at 0.036/sq km and 0.035/sq km, respectively. Site densities in the Purchase and the Upper Cumberland management areas are at the statewide average, and site densities in the Green River, Upper Kentucky/Licking, and Big Sandy management areas are below average.

Another standardization measure is the number of sites per acre surveyed in each management area (Table 5.1). The overall statewide density is 0.004 site/acre surveyed. The Bluegrass Management Area has the highest site density at 0.011 site/acre. Three other management areas have densities between 0.004-0.006 site/acre: Green River, Salt River, and Purchase. The Upper Cumberland, Upper Kentucky/Licking, and Big Sandy management areas - among the most rugged portions of Kentucky associated with the Cumberland Plateau - have below average site densities at 0.001-0.002 site/acre.

Among the seven management areas, Woodland sites and components are most common in the Bluegrass Management Area. This management area has the highest density of sites per acre surveyed, accounts for the second highest percentage of Woodland sites and site components, and has the second highest density of sites per sq

km within the management area (Table 5.1). Other management areas with relatively high Woodland sites densities are the Salt and Green rivers.

There are several overall patterns in Woodland site distributions in terms of environmental contexts. Regarding landform, about 29 percent and 28 percent of Woodland period sites are associated with dissected uplands and floodplain zones, respectively. The remaining sites are associated with hillsides (18 percent), terraces (14 percent), and undissected uplands (8 percent). Landform is not known for 3 percent of Woodland sites. Regarding locality, almost three-quarters of Woodland sites are (in decreasing order) associated with level ground (33 percent), slopes (22 percent), and ridgetops (18 percent). About 17 percent of the sites are located at the base of a bluff and/or on knolls (8.5 percent each). A small percentage of sites are associated with bluff crests (4 percent), depressions (1 percent), or unspecified localities (5 percent).

About 70.2 percent of Woodland sites are open habitations without mounds. Rockshelters account for 18.7 percent of the sites, and about 4.9 percent are earth mounds. Small percentages of Woodland sites are open habitations with mounds (1.6 percent), caves (1.1 percent), mound complexes (0.8 percent), nonmound earthworks and specialized activity sites (0.5 percent each), workshops (0.4 percent), cemeteries and isolated finds (0.3 percent each), quarries, stone mounds, isolated burials (0.2 percent each), and petroglyphs/pictographs (0.1 percent).

The Woodland sites recorded in Kentucky encompass 3,614 components (Table 5.2). About 46 percent of the components are unassigned. Of the remaining 1,954 components, 47.0 percent have been assigned to the Early Woodland, 40.7 percent the Middle Woodland, and 12.3 percent to the Late Woodland subdivision. These percentages are similar to those reported in 1990. Many of the unassignable components represent small Woodland assemblages that lack sufficient numbers of diagnostic artifacts for assignment to a temporal subdivision. On the other hand, the low number of Late Woodland components is probably due to a relative lack of Late Woodland research in Kentucky, the poor definition of diagnostic Late Woodland attributes, and the difficulty distinguishing Late Woodland sites from earlier and later sites.

Table 5.2. Woodland Components by Management Area.

Management Area	Unassigned		Early		Middle		Late		Total	
Purchase	159	10%	61	7%	58	7%	38	16%	316	9%
Green River	369	22%	266	29%	231	29%	75	31%	941	26%
Salt River	148	9%	218	24%	145	18%	18	8%	529	15%
Upper Cumberland	207	12%	94	10%	96	12%	19	8%	416	12%
Bluegrass	444	27%	153	17%	153	19%	30	12%	780	22%
Upper Kentucky/Licking	227	14%	77	8%	66	8%	26	11%	396	11%
Big Sandy	106	6%	50	5%	46	6%	34	14%	236	6%
Total	**1,660**	**100%**	**919**	**100%**	**795**	**99%**	**240**	**100%**	**3,614**	**100%**

The percentages of site components (Table 5.2) follow the same distributional pattern as the total number of sites (Table 5.1). About 26 percent are located in the Green River Management Area and 22 percent are associated with the Bluegrass Management Area. About 15 percent of the Woodland components are located in the Salt River

Management Area. Comparable percentages of Woodland components are associated with the Upper Cumberland (12 percent), Upper Kentucky/Licking (11 percent), and Purchase (9 percent) management areas. About 6 percent of the Woodland components are located in the Big Sandy Management Area (Table 5.2).

The following sections on each management area provide additional details about the distributions of Woodland sites and site components. Information about each management area includes previous archaeological investigations, site density and distribution patterns, and chronometric determinations, as well as descriptions of important Woodland sites for each section. The site descriptions are arranged in chronological order and include information about cultural phases, material culture, subsistence and settlement strategies, exchange, social organization, mortuary-ritual activities, and beliefs and artistic expression, whenever such information is known.

PURCHASE (MANAGEMENT AREA 1)

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

The earliest information pertaining to a Woodland site in this management area is Loughridge's (1888) description of the "Tuning Fork" earthwork (15Fu37) in Fulton County. Large-scale investigations, however, were not conducted at any Woodland sites in this area until the late 1930s, when excavations were undertaken in the Kentucky Lake impoundment area along the lower Tennessee River. Later, in the late 1950s and early 1960s, investigations were conducted in the nearby Barkley Lake impoundment area along the Cumberland River. Woodland pottery assemblages from both reservoir projects were described by Clay (1963a). His study represented the first comprehensive attempt to deal with Woodland remains in the area. Schwartz's (1962a) publication on the Driskill site (15Ly9) provided information on this Late Woodland settlement. A subsequent publication by Rolingson and Schwartz (1966) described the Woodland materials from the Roach site (15Tr10).

During the late 1960s and early 1970s, Clay (1971) conducted an archaeological survey along the Ohio River in Ballard and McCracken counties. As a result of this study 35 sites were recorded, including several that contained large Woodland components. Excavations at the Dedmon (15Ml68) and Owen (15Ml69) sites by the University of Kentucky in 1969-70 produced information on Middle and terminal Late Woodland occupation of the Lower Tennessee-Cumberland Section (Allen 1976). The next major investigation took place between 1969 and 1972, when the University of Louisville conducted excavations at the Lawrence site (15Tr33) (Mocas 1977).

During the late 1970s and early 1980s, survey and/or testing projects in the Purchase Management Area resulted in the identification and assessment of several Woodland sites. A survey of Ballard County by the Kentucky Heritage Council recorded 37 sites with Woodland components, including two mounds (Weinland and Gatus 1979). The Kentucky Department of Transportation's survey of the Great River Road between Ballard and Fulton counties (McGraw 198l) also resulted in the identification of several Woodland sites, and some previously recorded sites were revisited.

Several research projects conducted during the 1980s made important contributions to the Woodland database. Murray State University conducted field school excavations at the Reed site (15McN51), a stratified Woodland-Mississippian site (Hensley-Martin 1982). Nance's work in the Lower Tennessee/Cumberland Section, though focused on the Archaic period (see Chapter 4), resulted in the identification and investigation of several Woodland components (Nance 1977, 1985). The University of Illinois' work at Indian Camp Lake, Marshall (Sussenbach and Lewis 1987), and in the Reelfoot Lake area (Kreisa 1987) produced information on Woodland chronological developments, settlement patterns, and subsistence patterns.

Autry et al. (1989) surveyed the floodplain of selected bends along the Lower Cumberland River in Livingston, Lyon, and Crittenden counties of the Purchase and Green River management areas. They discovered or revisited 27 archaeological sites,

several of which have Woodland period components. Most of these sites were located on the lowermost terrace or on levees in the bottoms. Middle and Late Woodland occupations tend to be associated with large multicomponent surface artifact scatters, while Early Woodland components have the highest potential to be preserved in subsurface deposits.

Since the late 1980s, several Woodland sites have been documented in the Purchase Management Area, with most of this work taking place in Livingston County. The Chestnut Lake site (15Lv222) was occupied during the Early, Middle, and Late Woodland subperiods (Herndon 2003). An Early Woodland occupation was identified at Site 15Lv208 (Schock 1994), and Site 15Lv204 yielded artifacts diagnostic of the Middle and Late Woodland subperiods (Anderson et al. 1992). Henderson and Pollack (1996; Pollack and Henderson 2000) documented the early late Woodland McGilligan Creek Village (15Lv199) and over 90 mounds at the nearby McGilligan Creek Mound Complex (15Lv203). Located on a ridge near the confluence of the Clarks and Tennessee rivers, Site 15McN116 is an intact early Late Woodland (ca. A.D. 500-800) settlement (Carstens 1999). Terminal Late Woodland ceramics were recovered from the Three Ponds Bluff site (15Hi74), a Cane Hills phase settlement in Hickman County (Schlarb 2002).

SITE DENSITY AND DISTRIBUTION PATTERNS

The 248 Woodland sites in the Purchase account for 8.5 percent of the Woodland sites in Kentucky (Table 5.1). Over 90 percent of the sites are open habitations without mounds, and almost 4 percent are earth mounds; open habitations with mounds, mound complexes, nonmound earthworks, rockshelters, caves, quarries, cemeteries, and workshops each comprise small percentages of Woodland sites in the Purchase Management Area (Table 5.3).

Table 5.3. Woodland Site Types by Section in the Purchase Management Area.

Site Type	Miss River	Ohio River I	Tenn-Cumb	Total	Percent
Open Hab w/o Mounds	70	74	80	224	90.3
Open Hab w/ Mounds	1	1	2	4	1.6
Rockshelter	0	1	0	1	0.4
Cave	0	0	1	1	0.4
Quarry	1	0	0	1	0.4
Earth Mound	8	0	1	9	3.6
Mound Complex	1	0	2	3	1.2
Nonmound Earthwork	3	0	0	3	1.2
Cemetery	0	0	1	1	0.4
Workshop	0	0	1	1	0.4
Total	84	76	88	248	100.0
Percent	33.9	30.6	35.5	100.0	

The three sections of the Purchase Management Area have roughly equal numbers of Woodland sites, with the Lower Tennessee-Cumberland containing slightly more than

the other two sections. There are 88 sites (35.5 percent) in the Lower Tennessee-Cumberland Section, 84 sites (33.9 percent) in the Mississippi River Section, and 76 sites (30.6 percent) in the Ohio River I Section (Table 5.3). In general, the distributions of site types in each section are similar to those for the entire management area (see above). However, the Mississippi River Section is the only one with quarry and nonmound earthwork sites, and earth mounds are much more abundant. The Ohio River I Section is the only one with a Woodland rockshelter. Cave, cemetery, and workshop sites are exclusive to the Lower Tennessee-Cumberland Section (Table 5.3).

The 316 Woodland components associated with Purchase Management Area sites account for 9 percent of the Woodland components in Kentucky (Table 5.2). Over half (n=159) of Purchase Management Area components are unassigned, 19 percent (n=61) and 18 percent (n=58) are Early and Middle Woodland, respectively, and 12 percent (n=38) are Late Woodland (Table 5.4). The Purchase has the highest percentage of Late Woodland site components of any management area. Early Woodland components have the highest potential to be preserved in subsurface deposits, while Middle and Late Woodland occupations tend to be associated with large multicomponent surface artifact scatters.

Table 5.4. Woodland Site Components by Section and Subperiod in the Purchase Management Area.

Subperiod	Mississippi River		Ohio River I		Lower Tenn-Cumb		Total	
Late Woodland	16	15.8%	16	15.0%	6	5.6%	38	12.0%
Middle Woodland	26	25.7%	14	13.1%	18	16.7%	58	18.4%
Early Woodland	9	8.9%	26	24.3%	26	24.1%	61	19.3%
Unassigned	50	49.5%	51	47.7%	58	53.7%	159	50.3%
Total	101	100.0%	107	100.0%	108	100.0%	316	100.0%

As with the entire management area, about half of the Woodland site components in each of the three sections of the Purchase Management Area are unassigned (Table 5.4). However, some other patterns are evident among the sections. The Ohio River I and Lower Tennessee-Cumberland sections have almost three times as many Early Woodland components as does the Mississippi River Section. There are more Middle Woodland components in the Mississippi River Section than in the other two sections. The Mississippi River and Ohio River I sections have almost three times as many Late Woodland components as does the Lower Tennessee-Cumberland Section.

CHRONOMETRIC DETERMINATIONS

Chronometric determinations for the Purchase Management Area are provided in Table 5.5. Unfortunately, the number of sites yielding Woodland radiocarbon dates in this management area is very small, with only one to four dated Woodland sites per section. There are few dated Early Woodland components, as a majority of the sites for which absolute dates are available are Middle or Late Woodland. Unless otherwise indicated, all radiocarbon dates reported here and throughout the chapter are two-sigma calibrated dates. Standard radiometric ages were converted to calendar dates using the

radiocarbon calibration program Calib v. 5.0.1 (Stuiver and Reimer 2005). Ages were calibrated using the IntCal04 data set (Reimer et al. 2004). No sample age span or additional error variance was used to calibrate the dates.

Table 5.5. Chronometric Dates for the Purchase Management Area.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Mississippi River Section			
Indian Camp Creek (15Ce19)			
ISGS-1542	3220±70	1681-1673, 1670-1379, 1336-1322 BC	Sussenbach and Lewis 1987
Ohio River I Section			
Twin Mounds (15Ba2) (see Chapter 6)			
ISGS-1728	1100±130	AD 667-1179	Kreisa 1988
Site 15Lv97			
Beta-3865	2060±60	345-322 BC, 205 BC-AD 69	O'Malley et al. 1983
Bridge (15Lv98)			
Beta-13416	2310±90	754-685, 668-609 B.C., 599-168 BC	Nance 1987
McGilligan (15Lv199)			
Beta-73164	1360±70	AD 548-783, 788-817, 843-859	Henderson and Pollack 1996
Beta-73165	990±0	AD 896-923, 940-1210	Henderson and Pollack 1996
Lower Tennessee-Cumberland Section			
Site 15Ml134			
Beta-56257	2660±100	1054-507, 460-452, 440-418 BC	Schenian and Mocas 1993a
Beta-56256	2170±70	384-53 BC	Schenian and Mocas 1993a
Owen (15Ml69)			
UGa-255	2040±80	352-295, 229-220, 211-128 BC	Allen 1976
not reported	1940±85	167 BC-AD 251	Nance 1974
UGa-256	1875±185	357-284, 256-248, 234 BC-AD 546	Allen 1976
Lawrence (15Tr33)			
UGa-242	2320±95	758-683, 670-173 BC	Mocas 1977
UGa-690	2100±90	370 BC-AD 60	Mocas 1977

MISSISSIPPI RIVER SECTION

The 84 Woodland sites documented in the Mississippi River Section contain 101 Woodland components. The vast majority of sites are open habitations without mounds, and nearly all earth mounds and all the nonmound earthworks in the management area are located in this section (Table 5.3). The number of Middle Woodland components outnumbers that of Late Woodland components, and few Early Woodland components are documented (Table 5.4). Substantial Woodland sites recorded in this section are listed in Table 5.6. Few significant sites have been reported since ca. 1990 (Kreisa and Stout 1991).

The Early Woodland (1000-200 B.C.) archaeological record in this section is poorly understood and no cultural phases have been identified. The oldest pottery dates to circa 500 B.C. in the section, so some Early Woodland sites are aceramic (Kreisa and Stout 1991). The multicomponent Indian Camp Lake site (15Ce19), for example, yielded a calibrated radiocarbon date that ranges from 1681 to 1322 B.C. (Table 5.5) (Sussenbach

and Lewis 1987). Generally small (2 ha or less) in size, Early Woodland sites are found in floodplain, loess bluff, tributary stream valley, and dissected upland contexts, though fewer sites are documented in the latter. There is insufficient data to evaluate Early Woodland site functions, and therefore settlement systems, at this time, though site types probably included small villages, base camps [cf. Binford 1980], and extractive locations. The absence of significant variation in material culture across site types during the Early Woodland subperiod in this section suggests that major changes in social organization did not occur over this time span (Kreisa and Stout 1991). There is no evidence of Early Woodland mortuary facilities or ritual sites in the Mississippi-Ohio confluence area.

Table 5.6. Important Woodland Period Sites in the Mississippi River Section.

Site No.	Site Name	Site Type	Affiliation	References
15Ce19	Indian Camp Lake	open habitation	MW, LW	Sussenbach and Lewis 1987
15Ce27	Marshall	open habitation (with mounds?)	LW	Sussenbach and Lewis 1987
15Fu3	Sassafras Ridge	open habitation with mounds	LW	Kreisa 1987; Lewis 1986a
15Fu4	Adams	open habitation (with mounds?)	LW	Lewis 1986a
15Fu15	Amburg Mounds	mound complex	MW	McGraw 1981; Railey 1985a
15Fu16	none	open habitation	MW, LW	McGraw 1981; Schwartz and Sloan 1960
15Fu17	none	open habitation	EW, MW	McGraw 1981; Schwartz and Sloan 1960
15Fu18	Rice	open habitation with mounds	LW	Kreisa 1987
15Fu24	White	open habitation	unassigned	Sussenbach and Lewis 1987
15Fu37, 39-44	O'Byam's Fort	mounds, enclosures	MW	Carstens 1982; Mainfort and Carstens 1987
15Hi12	none	mound	unassigned	McGraw 1981
15Hi16-30	none	open habitation	unassigned	McGraw 1981
15Hi74	Three Ponds Bluff	open habitation	LW	Schlarb 2002

Though more is known about Middle Woodland (200 B.C.-A.D. 400) settlement in this section, this information is primarily derived from large, often multicomponent sites. All ecological zones continued to be occupied, though most sites larger than 1 ha are found on floodplains and near backwater lakes (Kreisa and Stout 1991). Specific plant and animal resources utilized during this phase were hickory, black walnut, American lotus, white-tailed deer, small mammals, geese, fish, and reptiles. There are few reports of nonlocal materials from Middle Woodland sites in this section. However, an unnamed burial mound, located near Wickliffe[2] and presumably Middle Woodland in age, excavated in the 1930s by Fain and Blanche King contained a central burial with 619 solid copper nugget beads, six elongated [rolled] copper beads, five solid copper celts,

[2] The county in which this mound was located was not clearly indicated by King (1939:147), who described the location as "a short distance from the King [Wickliffe] Mounds near Wickliffe, Kentucky." Since Wickliffe is located near the Ballard–Carlisle border, it is possible that this mound was located in Carlisle County.

and lithic tools (King 1939; Muller 1986). Echoing a contention made by Mainfort and Carstens (1987), Kreisa and Stout (1991) argued that Middle Woodland populations in this section, along with those in nearby Tennessee (e.g., inhabitants of Pinson Mounds), were comparable to Ohio Hopewell socio-politically and religiously. The Middle Woodland subperiod in this section has been divided into two phases, only one of which has been assigned a phase name and described in the literature.

Kreisa and Stout (1991) identified an unnamed phase with unspecified formal traits and an early Middle Woodland time range of 200 B.C. to A.D. 200 in the Mississippi River Section. Two site types - large ceremonial centers and small habitation sites - characterize the early Middle Woodland settlement system. According to Kreisa and Stout (1991:103), sacred "space was defined by geometric enclosures or the placement of conical burial mounds." Large ceremonial sites with earthworks may or may not be associated with habitation debris. Small (ca. 1 ha) Middle Woodland habitations on floodplains are associated with the larger ceremonial centers (Kreisa and Stout 1991).

The Amburg Mounds site (15Fu15) in the Big Bottoms, for example, has two conical earthen mounds that were partially vandalized (McGraw 1981) and a light artifact scatter. Ceramics from looter dirt piles and an associated habitation area include very fragmentary grog tempered cordmarked or plain sherds and a single incised and punctated sherd. The site likely dates to the Middle Woodland subperiod (Railey 1985a). Few details about mound construction, mortuary practices, and bioarchaeology are available for Amburg and other mound sites in the Mississippi River Section, such as Site 15Hi12. A Hopewell-like punctated sherd was recovered from a looter dirt pile at this small conical mound, which may be affiliated with several small habitation sites in the vicinity (McGraw 1981).

With a late Middle Woodland date range of A.D. 200-400, the LePlant or Belmont phase was identified by Sussenbach and Lewis (1987) based on materials recovered from the Indian Camp Lake, a multicomponent site with thick midden deposits and features, and nearby sites. Diagnostic artifacts include Crab Orchard series cordmarked and plain pottery with interior nodes and rim folds and chipped stone tools made from local cherts. Habitation sites occupied by foragers tend to be small and occur in a variety of physiographic zones. LePlant/Belmont phase components are found at sites in Carlisle and Fulton counties (Kreisa and Stout 1991).

Located in the Obion Creek drainage paralleling the Mississippi River, O'Byam's Fort consisted of a geometric enclosure (15Fu37) and nine conical mounds (15Fu39-15Fu44; two mounds lack state site numbers and 15Fu41 subsumes two mounds) that were largely destroyed by agricultural activities. The larger northern element of Site 15Fu37 is a three-sided enclosure with rounded corners and open to the north; there may have been an embankment formerly along the northern side. The smaller southern element of Site 15Fu37 consists of two parallel embankments with a slightly rounded gateway at the southern end. Taken together, the two elements of Site 15Fu37 resemble a tuning fork. A low density of cultural materials representing a LePlant/Belmont phase assemblage was associated with this earthwork complex. Pottery types, which varied in proportions within the enclosure vs. around the mounds, include Baytown Plain and

Mulberry Creek Cordmarked. The site complex likely dates to the Middle Woodland subperiod, ca. A.D. 1-300 (Kreisa and Stout 1991; Mainfort and Carstens 1987).

The Late Woodland subperiod in the Mississippi River Section is divided into early and terminal Late Woodland units, each of which is associated with a cultural phase. Berkley phase components and sites date between A.D. 400-600. Diagnostic ceramic types include Mulberry Creek Cordmarked and Baytown Plain with minor amounts of Larto Red also being present. Berkley phase ceramic assemblages contain higher percentages of decorated rims (e.g., notches or punctations on simple or folded rims, dowel-impressed lips) than earlier LePlant/Belmont phase assemblages. Some sites also yielded baked clay objects of an unspecified function. Projectile points are notched and triangular forms (Table 5.7), and local cherts were preferentially used in tool manufacture (Kreisa 1987; Kreisa and Stout 1991).

Most food resources associated with Berkley phase assemblages are wild species, especially white-tailed deer and nuts. Fish and waterfowl were utilized but not extensively. There is no evidence of Eastern Agricultural Complex cultigens or maize. The settlement pattern did not differ significantly from that of the late Middle Woodland subperiod with occupations spanning all ecological zones, though fewer sites are found in the dissected uplands. In addition to Indian Camp Lake, several open habitation sites in Carlisle and Fulton counties yielded Berkley phase assemblages (Kreisa 1987; Kreisa and Stout 1991). For example, the Berkley phase occupation at Marshall (15Ce27), a predominantly Mississippian open-air habitation situated on the bluffs overlooking the Mississippi River floodplain, is marked by midden deposits and several types of cultural features (Sussenbach and Lewis 1987; see also Chapter 6).

Dated to the terminal Late Woodland subperiod (A.D. 600-900), the Cane Hills phase was defined by Kreisa (1987) based on research at the Rice site (15Fu18). While the pottery types are the same as those associated with the Berkley phase, Cane Hills phase pottery assemblages have smaller percentages of Mulberry Creek Cordmarked, larger proportions of Baytown Plain, some Yankeetown types, limited use of shell temper, more forms of jars and bowls, and new vessel forms (e.g., pans and funnels) (Kreisa 1987). Production of notched and triangular points continues, though the presence of previously undocumented nonlocal cherts, such as Dover from the south and Mill Creek from the north, suggests increased inter-regional interactions. A greater diversity of animal resources was utilized in the terminal Late Woodland, especially white-tailed deer, migratory waterfowl like geese, and terrestrial birds like turkey, prairie chicken, and bobwhite. Limited use of maize is documented at Late Woodland sites after A.D. 700, and maize becomes more abundant after A.D. 800 at terminal Late Woodland sites like Marshall (15Ce27) and Hoecake in Missouri (Kreisa and Stout 1991). Sites with Cane Hills phase assemblages were documented in Fulton and Hickman counties (Kreisa 1987; Schlarb 2002).

As with earlier phases, Cane Hills phase sites outside the Big Bottoms spanned all ecological zones, with larger sites in the floodplain and bluff zones (e.g., Marshall, cal A.D. 691-1013 to A.D. 1043-1382 [see Table 6.5]) and smaller seasonally occupied sites in tributary stream valleys and dissected uplands (e.g., Three Ponds Bluff site [15Hi74]) (Kreisa and Stout 1991; Schlarb 2002; Sussenbach and Lewis 1987). Within the Big

Table 5.7. Spatial Distribution of Woodland Projectile Point Types in Kentucky.

	Purchase			Green River				Salt	Upper Cumberland		Bluegrass			Upper Ky-Licking		Big Sandy	
Point Type	**MR**	**ORI**	**LTC**	**ORII**	**WC**	**PR**	**UGR**	**River**	**LC**	**SEM**	**CBG**	**NBG**	**EBG**	**GOR**	**IM**	**LBS**	**UBS**
Hamilton						x	x		x							x	
Levanna							x							x	x	x	
Madison						x	x				x	x		x	x	x	
Triangular	x	x	x	x		x		x	x	x		x	x	x	x	x	x
Raccoon												x		x		x	
Jacks Reef				x				x	x		x	x		x		x	
Chesser						x		x	x	x		x		x	x	x	
Lowe FB		x				x	x	x				x		x		x	
Bakers Creek		x		x		x	x	x				x		x		x	x
Steuben		x				x	x	x						x			
Lowe cluster	x		x						x	x	x	x		x		x	x
Copena				x		x	x		x	x		x	x	x			x
Snyders				x			x	x	x					x			
Motley			x			x	x		x			x		x			
Cypress								x									
Little Bear							x							x		x	
Adena			x		x	x	x	x	x	x	x	x	x	x	x	x	
Gary/Cogswell				x		x	x	x					x	x	x	x	
Dickson cluster				x		x					x	x	x	x			
Robbins					x	x	x	x	x		x	x	x	x		x	
Cresap								x			x			x			
Kramer							x	x			x			x			
EW Stemmed		x	x						x			x		x		x	
Cotaco Creek							x									x	
Buck Creek						x		x						x	x	x	
Wade			x	x			x		x	x	x	x		x		x	
Delhi						x			x					x			
TA Barbed							x							x		x	
Turkey Tail			x	x	x	x	x	x			x	x		x		x	
Savannah R										x							
Saratoga							x		x	x			x	x			
Ledbetter							x		x								
LA Stemmed		x							x					x		x	

Bottoms, on the other hand, changes in both settlement pattern and settlement system are documented for Cane Hills phase sites. The number of sites and site types increased. The density of floodplain and bluff crest sites increased, possibly to allow more use of productive agricultural lands (Kreisa and Stout 1991).

The Cane Hill phase settlement system in the Big Bottoms consisted of a two- (Kreisa and Stout 1991) or three-level (Kreisa 1987) hierarchy. Villages with multiple earthen mounds are exemplified by Rice. Covering 15 ha, this site complex includes an extensive midden, a possible plaza area, and three mounds (Kreisa and Stout 1991). The Rice site may have functioned as the major political center within the Big Bottoms area of the central Mississippi River valley during the terminal Late Woodland subperiod (Kreisa 1987). Villages with single mounds are exemplified by Site 15Fu16, a 3.5 ha Late Woodland-Mississippian site with an extensive midden, Site 15Fu17, a 5.9 ha Late Woodland site with an extensive midden, and Sassafras Ridge (15Fu3), a 1 ha Late Woodland-Mississippian site (Kreisa and Stout 1991). The Adams site (15Fu4) also had a substantial terminal Late Woodland component (Lewis 1986a). Hamlets, 31 of which were documented within the Big Bottoms, lack earthen mounds and dense midden deposits and encompass less than 1 ha (Kreisa and Stout 1991).

In the floodplain zone of the Big Bottoms, archaeologists documented "neighborhoods consisting of many small sites covering less than 1 ha and grouped around a few larger often mounded sites" that may have functioned as "ceremonial centers" (Kreisa and Stout 1991:103). Kreisa (1987) described three such Late Woodland clusters. The western cluster, dubbed the Sassafras Ridge district, includes the Sassafras Ridge site and 16 hamlets. The Rice site district, located in the south-central Big Bottoms, includes Rice and ten hamlets. An unnamed eastern cluster near the bluffline includes two villages (Sites 15Fu16 and 15Fu17) and four hamlets (Kreisa 1987). Most of these sites are associated with natural levee landforms along the Mississippi River, which afforded well-drained, fertile soils protected from flooding. In general, the Cane Hill phase Late Woodland settlement system foreshadowed that which existed during the subsequent Mississippi period (Kreisa 1987) (see Chapter 6).

OHIO RIVER I SECTION

The 76 Woodland sites documented in the Ohio River I Section contain 107 Woodland components (Table 5.3). Nearly all of the Woodland sites in this section are open habitations without mounds (Table 5.8). All Woodland subperiods are represented and Early Woodland components are most numerous (Table 5.4), though most of the important Woodland sites have Middle and/or Late Woodland components (Table 5.8). More is known about Woodland material culture and settlement strategies than subsistence, exchange, mortuary-ritual activities, and artistic expression in the Ohio River I Section.

Projectile points associated with Early Woodland occupations in the section, such as at the Chestnut Lake site in Livingston County (Herndon 2003), include Late Archaic Stemmed and Early Woodland Stemmed clusters (Table 5.7). Early Woodland pottery assemblages, however, are largely undated, such as that recovered from Site 15Lv208, a

multicomponent site along the lower Tennessee River near the Ohio River confluence. The Early Woodland occupation at this site lacked midden deposits but included a shallow circular refuse pit, from which excavators collected grog or limestone tempered cordmarked sherds from at least three vessels. Occupations were infrequent and of limited duration, and chipped stone tool production and food processing activities were spatially undifferentiated (Schock 1994). Little is known about Early Woodland subsistence in the Ohio River I section. Generally speaking, wild resources, such as deer and nuts, were obtained from forested areas, while fish and waterfowl were acquired from streams, oxbow lakes, and sloughs in the floodplain zone (Railey 1996). There are no reports of plant cultigens from Early Woodland sites in the section.

Table 5.8. Important Woodland Period Sites in the Ohio River I Section.

Site No.	Site Name	Site Type	Affiliation	References
15Ba2	Twin Mounds	open habitation (with mounds?)	LW	Burks and Stout 1996; Kreisa 1988
15Ba10	none	open habitation	LW	Weinland and Gatus 1979
15Ba14	Sandy Slough	open habitation	LW	Weinland and Gatus 1979
15Ba26	none	open habitation	MW, LW	Weinland and Gatus 1979
15Ba28	none	open habitation	LW	Weinland and Gatus 1979
15Ba41	none	open habitation	LW	Kreisa 1988
15Ba48	none	open habitation	LW	Weinland and Gatus 1979
15Ba54	none	open habitation	LW	Weinland and Gatus 1979
15Ba55	none	open habitation	LW	Weinland and Gatus 1979
15Ba60	none	open habitation	LW	Kreisa 1988
15Lv70	none	open habitation	EW, MW, LW	O'Malley et al. 1983
15Lv81	none	open habitation	LW	O'Malley et al. 1983
15Lv89	none	open habitation	EW, MW, LW	O'Malley et al. 1983
15Lv97	none	open habitation	EW, MW	O'Malley et al. 1983
15Lv98	Bridge	open habitation	EW, MW	Nance 1985
15Lv199	McGilligan Creek Village	open habitation with stone mound	LW	Henderson and Pollack 1996; Pollack and Henderson 2000
15Lv203	McGilligan Creek Mound Complex	stone mound complex	LW	Henderson and Pollack 1996; Pollack and Henderson 2000
15Lv204	none	open habitation	MW, LW	Anderson et al. 1992
15Lv208	none	open habitation	EW	Schock 1994
15Lv222	Chestnut Lake	open habitation	EW, MW, LW	Herndon 2003
15McN51	Reed	open habitation	MW, LW	Hensley-Martin 1982
15McN69	Puckett	open habitation	LW	Kreisa 1988
15McN116	none	open habitation	LW	Carstens 1999

The Middle Woodland subperiod in the Ohio River I Section has long been associated with Baumer and Crab Orchard units. The continued use of the Baumer pottery series and the assignment of sites to a Baumer phase, however, are somewhat problematic. In the 1950s-60s the Baumer phase was identified primarily by Baumer series pottery assemblages from southern Illinois and the lower Tennessee-Cumberland drainage. Since the late 1980s, most archaeologists have reclassified Baumer pottery as Crab Orchard (e.g., deNeeve 2004) and Baumer phase assemblages as Crab Orchard

phase assemblages. But some archaeologists continue to classify some Early and Middle Woodland ceramics as Baumer (Anderson et al. 1992; Herndon 2003; Schenian and Mocas 1993a - see next section).

The most important diagnostics of the Middle Woodland subperiod in the Ohio River I Section are pottery types. Crab Orchard (Baumer) series pottery assemblages were recovered from several sites in this section, including Site 15Lv97, Bridge (15Lv98), Site 15Lv204, Chestnut Lake (15Lv222), and Reed (15McN51) (Anderson et al. 1992; Henderson 1983; Hensley-Martin 1982; Herndon 2003; Nance 1985). At Site 15Lv97, which is located adjacent to the Ohio River near the mouth of the Cumberland River, Crab Orchard ceramics were recovered from a pit feature buried under alluvial deposits (Henderson 1983:311-317). Most of the sherds found at this site are limestone tempered, have cord-wrapped dowel-impressed exterior surfaces, and are from vessels that had flat bases. A few plain sherds, which may represent the upper portions of these vessels, also were recovered (Henderson 1983:315). Based on sherd thickness, the use of limestone temper, and a calibrated radiocarbon date of 345 B.C. to A.D. 69 (Table 5.5), an early Crab Orchard affiliation was suggested for this component (Henderson 1983; O'Malley et al. 1983).

Test excavations at the Bridge site (15Lv98) on the lower Tennessee River revealed a deeply stratified (over 1 m in thickness) sequence of prehistoric strata, including a Middle Woodland component with grit or sand tempered Crab Orchard sherds (Nance 1985). Exterior surfaces are overwhelmingly cord-wrapped dowel-impressed, with some cordmarked specimens also present. The few rims recovered are unmodified and direct. Decoration is restricted to occasional punctations located just below the rim. A single calibrated radiocarbon date of 754-168 B.C. (Table 5.5) was obtained from the lower-middle portion of the midden, and Nance (1985:8) suggested a temporal span of 400-100 B.C. for the Bridge site deposits. The size of the site (approximately 1 ha) and the intensity and nature of the cultural deposits suggest that it represents a base camp [cf., Binford 1980] or small village (Nance 1985).

Located along the lower Tennessee River, Site 15Lv204 is a multicomponent site that yielded artifacts diagnostic of the Middle and Late Woodland subperiods, including Crab Orchard or Baumer and Mulberry Creek pottery. Subsurface midden deposits and two pit features suggest low intensity occupations that were infrequent and of short duration. The limited range of activities at the site, including chipped stone tool manufacture and food processing, were not spatially differentiated (Anderson et al. 1992).

The Chestnut Lake site is a multicomponent site that was occupied during the Early, Middle, and Late Woodland subperiods. As with Site 15Lv204, this site is characterized by low intensity occupations during the Middle Woodland subperiod. Diagnostic artifacts include Baumer [Crab Orchard] and Lewis series pottery and Early Woodland Stemmed and Lowe cluster projectile points. In addition to sherds, excavators found two fired clay ear spools and one ear pin in subsurface contexts. Plant remains were recovered from the site (Herndon 2003). By the Late Woodland subperiod in the Ohio River I Section, native plant cultigens were added to the diet but comprised a minor component (Railey 1996).

One of two early Late Woodland phases in this section is Mulberry Creek, a poorly defined phase identified by Mulberry Creek series pottery and dated to ca. A.D. 500-800 (Carstens 1999). Mulberry Creek pottery has been recovered from sites across the section, including Twin Mounds (15Ba2), Site 15Lv204, Reed (15McN51), and 15McN116 (Anderson et al. 1992; Burks and Stout 1996; Carstens 1999; Hensley-Martin 1982; Kreisa 1988; Railey 1990). Located on a ridge near the Clarks-Tennessee river confluence, Site 15McN116 measured 28 x 50 m and contained a 25 cm thick midden. Chipped stone debitage and cores, fire-cracked rock, and pottery, including grog tempered Mulberry Creek Plain and Mulberry Creek Cordmarked ceramics, were recovered from this site. Multiple multi-season domestic habitations were dispersed across the ridge (Carstens 1999).

Other early Late Woodland sites, some of which produced Lewis phase assemblages, are located in upland ridge contexts and are characterized by more intense occupations (Pollack and Henderson 2000). The Lewis focus was defined by Richard MacNeish (1944) and published in relation to excavations at the Kincaid site in southern Illinois (Cole et al. 1951). Muller (1986) updated the Lewis description and changed the unit from a focus to a phase. Diagnostic artifacts are Lewis series pottery, Lowe cluster points, chert hoes, and, in some cases, triangular points (Butler 2007). Sites yielding Lewis phase assemblages are found in the Lower Ohio valley in counties in Illinois, Indiana, and Kentucky that border the river. The distribution of sites with Lewis phase assemblages in Kentucky beyond Livingston and McCracken Counties is poorly understood but in addition to the Ohio River I Section it may include the area around the Green River-Ohio River confluence and into the Purchase. Sites are located in floodplain and upland contexts and include small, low-intensity open-air habitations, rockshelters, caves, and stone forts. The remains of rectangular, single-post structures, which differ from the typical Late Woodland form as documented elsewhere, are found at Late Woodland sites yielding Lewis phase artifacts (Butler 2007; Butler and Wagner 2000). Muller (1986) dated the Lewis phase at A.D. 600-900, though in Kentucky such assemblages likely fall within the early part of this range as indicated by research at McGilligan Creek Village (Pollack and Henderson 2000).

McGilligan Creek Village (15Lv199) is a 1.6 ha settlement that covers two broad upland ridges and appears to have been organized around a central plaza. The presence of structural remains, hearths, well-developed midden deposits, and a possible stone mound point to a rather intensive occupation. The village's association with a mesa-like feature is suggestive of a concern for defense in residents' selection of a location for their village. (A similar site, the Fort Ridge site complex [15Ca57-60], was documented in the Pennyroyal Section.) Located below McGilligan Creek Village is the McGilligan Creek Mound Complex (15Lv203), which includes two clusters of a total of 94 stone mounds (Henderson and Pollack 1996; Pollack and Henderson 2000).

Ceramics recovered from McGilligan Creek Village are predominately grog tempered and cordmarked. Rims are notched and some vessel necks were decorated with incised lines. These ceramics are similar to Lewis phase materials from southern Illinois. Diagnostic chipped stone tools are Lowe Flared Base projectile points. Polished hoe flakes and a high density of starchy-oily seeds point to an increased reliance of native cultigens. Of the two calibrated radiocarbon dates from this site, the date of A.D. 548-

859 is associated with the Lewis phase component at this site, while the A.D. 896-1210 date (Table 5.5) appears to post-date this occupation as it is not consistent with the material culture recovered from McGilligan Creek Village (Henderson and Pollack 1996; Pollack and Henderson 2000).

In addition to McGilligan Creek Village, early Late Woodland Lewis series sherds were recovered from several nearby rockshelters (e.g., 15Lv37, 15Lv160, 15Lv200), as well as Chestnut Lake (Herndon 2003), Reed (Hensley-Martin 1982), and other sites along the Ohio River. Tempered with clay or crushed sherds, vessels are thin and cordmarked. Rims are notched from the exterior. Rim folding and lip lugs are traits that developed later in time. Some specimens exhibit punctations or wide-lined incised decorations on cordmarked surfaces (Butler 2007; Butler and Wagner 2000).

A number of important terminal Late Woodland sites are documented in the Ohio River I Section, especially in Ballard County. During their county-wide survey, Weinland and Gatus (1979) documented several Late Woodland sites in the Barlow and Oscar bottoms of the Ohio River floodplain: Sandy Slough, and Sites 15Bal0, 15Bal6, 15Ba22, 15Ba26, 15Ba28, 15Ba54, and 15Ba55. None of the unnamed sites were excavated, but materials from surface collections do permit some preliminary statements regarding their cultural-historical affiliation, which show affinities to terminal Late Woodland materials from southern Illinois (Railey 1990).

Sandy Slough (15Ba14), a major Late Woodland village site in Ballard County, yielded grog tempered, cordmarked ceramics with collared rims (i.e., folded rims and/or applied strips), many of which exhibit punctations or shallow notches on the lip. These ceramic attributes are comparable to those of the terminal Late Woodland Dillinger phase in southern Illinois (Maxwell 1951; see also Hargrave 1982; Butler and Wagner 2000). In contrast to the Sandy Slough site assemblage, some sites in the Barlow and Oscar bottoms (15Bal6, 15Ba26, and 15Ba28) have yielded much higher percentages of plain sherds, as well as small amounts of red-filmed pottery and grog tempered incised sherds (Clay 1971) that may be related to terminal Woodland types such as Yankeetown Incised and Lewis Incised (Cole et al. 1951:180-181). The Oscar Bottom sites may post-date the occupation at Sandy Slough and likely represent the immediate predecessor of Mississippian occupation of this region.

Terminal Late Woodland components were documented at Twin Mounds and several nonmound village sites, including Reed, Puckett (15McN69), Site 15Ba41, and Site 15Ba60 (Burks and Stout 1996; Hensley-Martin 1982; Kreisa 1988; Stout et al. 1996). Baytown Plain pottery was recovered from the Reed site (15McN51) (Hensley-Martin 1982; Railey 1990), as well as Ballard County sites (Burks and Stout 1996; Stout et al. 1996). Twin Mounds (15Ba2), located on a levee of the Ohio River at Barlow Bottoms, is best known as a Mississippian regional administrative center (see Chapter 6). However, a triangular projectile point, small percentages of Baytown Plain, Mulberry Creek Cordmarked, and Larto Red pottery sherds, and a calibrated radiocarbon date of A.D. 667-1179 (Table 5.5) indicate there is a terminal Late Woodland component at the site that may be affiliated with the previously described Cane Hills phase (Burks and Stout 1996; Kreisa 1988; Sussenbach and Lewis 1987). At Twin Mounds “the Late

Woodland material is primarily located on a ridge to the southwest of the Mississippian mound and plaza complex" (Burks and Stout 1996:235).

LOWER TENNESSEE-CUMBERLAND SECTION

The 88 Woodland sites documented in the Lower Tennessee-Cumberland Section contain 108 Woodland components. This section has the widest variety of Woodland site types in the Purchase Management Area, with open habitations without mounds predominating (Table 5.3). Early Woodland components outnumber later ones (Table 5.4), and over half of the important sites recorded in this section have Early Woodland components (Table 5.9). Compared to the other two sections in the Purchase Management Area, the number of Late Woodland components is considerably lower in the Lower Tennessee-Cumberland Section (Table 5.4).

Table 5.9. Important Woodland Sites in the Lower Tennessee-Cumberland Section.

Site No.	Site Name	Site Type	Affiliation	References
15Cw96	Crick	Cache	EW	Schenian 1987
15Ly9	Driskill	open habitation	MW, LW	Nance 1974; Schwartz 1962a
15Ly18	Tinsley Hill*	open habitation	MW, LW	Nance 1974
15Ly49	none	open habitation	EW	Nance 2001
15Ml8	Birmingham*	open habitation	EW, MW	Clay 1963a; Nance 1974
15Ml14	Goheen*	open habitation	LW	Clay 1963a
15Ml68	Dedmon*	open habitation	MW, LW	Allen 1976; Nance 1974
15Ml69	Owen	open habitation	MW, LW	Allen 1976; Nance 1974
15Ml77	Ford #5	open habitation	EW, MW	Carstens 1979
15Ml134	none	open habitation	EW	Schenian and Mocas 1993
15Tr1	Canton*	open habitation	LW	Bradbury 2006; Stout et al. 1996
15Tr10	Roach	open habitation	EW	Rolingson and Schwartz 1966
15Tr17	Rodgers*	open habitation	LW	Clay 1963b
15Tr33	Lawrence	open habitation	EW, MW	Mocas 1977
*Sites primarily known for their Mississippian components - See Chapter 6.				

Diagnostic artifacts associated with the earliest Woodland occupations in the Lower Tennessee-Cumberland Section are projectile points, including Terminal Archaic and Early Woodland Stemmed clusters (Table 5.7), such as those recovered from Canton (15Tr1) (Bradbury 2006; Stout et al. 1996). Another common type is Turkey Tail, specimens of which were recovered from Crick (15Cw96) (Schenian 1987), Lawrence (15Tr33) (Mocas 1977), and a number of other sites in this section. Alexander and Crab Orchard (Baumer) series ceramics are associated with late Early Woodland sites.

The Crick site (15Cw96) is situated on a knoll in the dissected uplands near tributaries of Jonathan Creek and Clarks River in the Tennessee River drainage. A cache of 81 Terminal Archaic-Early Woodland Turkey Tail points was discovered at the special-purpose site. Manufactured of St. Louis chert that resembled Wyandotte, the Crick site points were classified as Harrison (*var. Marshall*), Fulton (*var. Ross*), and other types (Schenian 1987). King (1939) reported a cache of 31 Turkey Tail points from

an unnamed and unrecorded Marshall County site in the cliff line overlooking the Ohio River floodplain. The single specimen pictured by King (1939) resembles the Harrison type. Six other lower Tennessee-Cumberland river valley sites yielded Turkey Tail caches. Though previous researchers interpreted Turkey Tail caching as evidence of mortuary rituals but without the physical remains of the deceased, Schenian (1987) suggested that Turkey Tail caches may be associated with alliance rituals or ceremonies. Alternatively, the caches may not be ceremonial at all but, instead, represent the storage of future trade items (Schenian 1987).

Many Early Woodland sites in the Lower Tennessee-Cumberland Section represent low-intensity domestic habitations: Ford #5 (15Ml77) (Carstens 1979), Birmingham (15Ml8) (Clay 1963a; Nance 1974), Dedmon (15Ml68) (Allen 1976; Nance 1974), Owen (15Ml69) (Nance 1974), and Site 15Ly49 (Nance 2001). Wild plant and animal remains were recovered from Early Woodland contexts at one of these sites, Owen, where the assemblage included nut, deer, and bison species but few shellfish remains. Because floral remains outnumbered faunal, the Owen site may provide evidence of increased plant use in the Early Woodland subperiod (Nance 1974).

On the other hand, three open-air sites provide evidence of settlement aggregation during the Early Woodland subperiod. Multi-season occupations at the upland Lawrence site (15Tr33) were substantial, marked by the construction of pits and at least two temporary structures. Ceramics recovered from the Lawrence site, which are similar to early Crab Orchard materials, include cordmarked, fabric-marked or plain quartzite- or flint tempered specimens that lack decoration. Projectile points include Turkey Tail, Wade, Adena Stemmed, and Motley types. Along with two calibrated radiocarbon dates of 758-173 B.C. and 370 B.C.-A.D. 60 (Table 5.5), the diagnostic artifacts suggest occupations potentially spanning the Early Woodland subperiod at Lawrence (Mocas 1977).

Site 15Ml134 was discovered eroding out of the bank of the Tennessee River. The open habitation site encompassed two stratigraphically distinct midden layers with domestic features. The less intense, aceramic Early Woodland component, dated to cal 1054-418 B.C. (Table 5.5), was evidenced by a sheet midden, hearth feature, and artifact assemblage indicating short-term occupations and a limited range of activities. The more intense, multi-season early Middle Woodland component yielded a calibrated date of 384-53 B.C. (Table 5.5). A daub structure lacking internal posts and features was associated with a sheet midden and two hearths, all external to the structure. Site activities involved chipped stone tool manufacture and processing/consumption of wild and cultivated foods. Sand tempered ceramics recovered from the site were classified as a regional variant of Crab Orchard, but the early Middle Woodland assemblage was assigned to the Baumer phase. Macrobotanical remains from a hearth included a high percentage of nut shell, especially hickory, and small percentages of wild fruit seeds and domesticated goosefoot fruits (Schenian and Mocas 1993a), the only report of weedy cultigens from important Woodland sites in the Lower Tennessee-Cumberland Section.

Situated on a terrace in the Ewes Branch floodplain, Roach (15Tr10) is a multicomponent site with a substantial late Early to early Middle Woodland deposit but few features. During this occupation the site functioned as a small habitation site. Diagnostic artifacts are Adena Stemmed points and Alexander series and O'Neal Plain

pottery, making Roach the only site in this section to yield Alexander series pottery (Clay 1963a; Rolingson and Schwartz 1966). Rolingson and Schwartz (1966) also recovered drilled rectangular and expanded bar gorgets, which co-occurred spatially with Alexander series pottery, from the Early Woodland component at Roach.

Besides Crab Orchard series pottery, Middle Woodland diagnostics in the Lower Tennessee-Cumberland Section are other local ceramics like Mulberry Creek series and O'Neal Plain. In addition to Site 15Ml134, Crab Orchard (Baumer) sherds were recovered from Birmingham (15Ml8), Goheen (15Ml14) (Clay 1963a), Dedmon (15Ml68) (Allen 1976), and Ford #5 (15Ml77) (Carstens 1979). Mulberry Creek sherds were recovered in small amounts from Tinsley Hill (15Ly18), Driskill (15Ly9), Birmingham, Goheen, Rodgers (15Tr17), Canton (15Tr1) (Clay 1963a, 1963b), and Dedmon (Allen 1976). In addition to Roach, Driskill and Goheen yielded small samples of O'Neal Plain (Clay 1963a; Lewis 1988). Besides Adena, Motley, and Lowe cluster projectile point types (Table 5.7), another potential Middle Woodland diagnostic from this section is a black steatite bird effigy platform pipe collected in about 1920 from the Land Between the Lakes area of Trigg County (McCoy 1984).

Limited evidence of Middle Woodland subsistence was derived from floated deposits at Dedmon (15Ml68). In addition to wild seeds and nuts, Nance (1974) recovered a high percentage (80 percent) of deer bones, as well as elk, wolf, fox, raccoon, opossum, squirrel, beaver, turkey, fish, and shellfish remains.

The multicomponent Owen site (15Ml69) was intensively occupied during the Middle-Late Woodland subperiods. The village or base camp covered an area of 3 ha and was occupied over multiple seasons. The Crab Orchard-like pottery assemblage consists primarily of cordmarked, cord-wrapped-dowel impressed, or plain sherds. Vessels with flat or rounded bases are present, as are jar rims with notched lips. Projectile points from Owen are dominated by expanded stem forms that may be Lowe cluster. While these artifacts suggest a late Middle and/or early Late Woodland component, calibrated radiocarbon dates of 352-128 B.C., 167 B.C.-A.D. 251, and 357 B.C.-A.D. 546 (Table 5.5) support an early Middle Woodland affiliation for this component at Owen (Allen 1976; Nance 1974).

A post-A.D. 600 Late Woodland occupation was documented at the Canton site (15Tr1), which is located on the east side of the Cumberland River, now Lake Barkley. Diagnostic artifacts are Baytown Plain sherds and small triangular points. The chipped stone tool assemblage is dominated by local cherts, especially Warsaw, which crops out below the site, and St. Louis, which was acquired from two quarries about 5 km from the site (Bradbury 2006; Stout et al. 1996).

Other than Dedmon, Owen, and Canton, there is little information about late Middle and early Late Woodland (ca. A.D. 250-800) occupations in the Lower Tennessee-Cumberland Section. One problem relates to the absence of diagnostic artifacts. There are few Middle Woodland point types from sites in the section (Table 5.7). Also, if there is a general lack of decorated Middle Woodland ceramics (e.g., noded Crab Orchard, Havana/Hopewellian, and southeastern stamped ceramics) in this area, as present evidence seems to suggest (see Allen 1976:70-71), then it would be difficult to distinguish many Middle Woodland occupations from early Late Woodland components. Second, because

large-scale excavations have tended to focus upon large and intensively occupied sites, smaller settlements in this section have been generally overlooked.

Information on terminal Late Woodland occupations in the section derives primarily from three sites: Dedmon (15Ml68) (Allen 1976; Nance 1974), Driskill (15Ly9) (Clay 1963a; Schwartz 1962a), and Tinsley Hill (15Ly18) (Nance 1974). The Dedmon site is a small (about 0.65 ha) but intensive habitation that contained the remains of terminal Late Woodland subperiod and early Mississippi period components (Allen 1976). Late Woodland ceramics from Dedmon are Baytown Plain, Yankeetown Incised, and Larto Red-Filmed types. Most vessels represent large subconoidal or globular jars, though shallow bowls also are common. Projectile points from Dedmon consist primarily of small triangular forms (Allen 1976; Nance 1974).

The upper component at the stratified Driskill site (15Ly9) (Schwartz 1962a) encompassed an oval area approximately 0.5 ha in extent. Cultural features are an ash lens, storage pit, hearth, and postmold (Nance 1974; Schwartz 1962a). Materials from this component, which Clay (1963a) designated Driskill #2, included Dillinger-like clay tempered ceramics (cf., Hargrave 1983; Maxwell 1951), a few Yankeetown sherds, and numerous small triangular points. Blue Lake Cordmarked pottery and a fired clay smoking pipe bowl also were recovered from terminal Late Woodland contexts at the Driskill site (Clay 1963a).

The Dillinger-like ceramics from Driskill are similar to those from Dedmon. No radiocarbon dates are available for the terminal Woodland components at either Dedmon or Driskill, but stylistic comparisons with materials from dated contexts at other sites provide for reliable cross-dating of both components. Dillinger components in southern Illinois date to the tenth century (see Hargrave 1982:1237), and Yankeetown ceramics also are associated with dates of A.D. 800-1100 (see the Ohio River II Section for radiocarbon dates associated with Yankeetown pottery).

Terminal Late Woodland subsistence information is lacking from both Dedmon and Driskill. However, data from southern Illinois and the Foster site (15Da68) in the Ohio River II Section suggest that there was some variability in the types of plants used by terminal Late Woodland groups. While some groups relied on seed-bearing plants, such as goosefoot and maygrass, and two varieties of maize (Lopinot 1982; Sussenbach 1992), others continued to rely primarily on nuts and only a few seed-bearing plants (Cremin 1985).

Tinsley Hill (15Ly18) was located near the confluence of Eddy Creek and Cumberland River on floodplain and low bluff landforms. Though known primarily for Mississippi period occupations, Nance (1974) reported the discovery of two Late Woodland subperiod structures at the site. The two structures, which measured 1 m and 2 m in length, were demarcated by a total of 12 postmolds, which ranged in diameter from 8.0 to 11.5 cm. The postmold features were covered with 15 cm of sterile soil, over which was constructed a Mississippian platform mound (Nance 1974).

GREEN RIVER (MANAGEMENT AREA 2)

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

One of the earliest archaeological investigations in the Green River Management Area was Nelson's (19l7a, 19l7b) excavations at Mammoth Cave (15Ed1), as well as surrounding cave and rockshelter sites. Nelson's work was one of the first to employ stratigraphic techniques and, as such, it made a significant contribution to the development of field methodology in American archaeology. Later research determined that the most intensive prehistoric use of Mammoth Cave occurred during the early part of the Woodland period (Crothers et al. 2002; Watson 1986, 1997).

In the 1930s, the University of Kentucky, under the auspices of the WPA, investigated several archaeological sites in the Green River Management Area. Although these investigations focused upon the Archaic shell midden sites located along the Green River and its tributaries (see Chapter 4), several of the investigated sites also contained Woodland components (Webb 1946, 1950a, 1950b; Webb and Haag 1939, 1947a).

Following the WPA era of Kentucky archaeology, the Green River Management Area experienced somewhat of a hiatus in Woodland period research. Work resumed in this region in the late 1950s and 1960s. During this period, the University of Kentucky conducted investigations within the areas to be impounded by construction of Rough River Lake (Schwartz et al. 1958a, 1958b), Barren River Reservoir (Sloan and Schwartz 1960), and Green River Lake (Duffield 1965; Hanson and Dunnell 1964). Schwartz's (1960) archaeological survey for the Nolin River reservoir located 55 sites, 15 of which were identified tentatively as Woodland based on diagnostic artifacts such as pottery and projectile points. Of these, 13 are open habitations ("villages" or "camps") and two are rockshelters (Schwartz 1960; Schwartz et al. 1960). An extensive survey and testing project conducted in the mid 1960s by the University of Kentucky along the Ohio River in Union, Henderson, and Daviess counties (Hoffman 1966) resulted in the identification of a number of Woodland sites, some with deep midden deposits.

Amateur/Nonprofessional studies undertaken within the Green River Management Area included investigations at several rockshelter and cave sites (Dossett 1965; Guthe 1964; Ray 1965, 1972; Vietzen 1956), and excavations at Watkins Mound A (15Lo12) by the now disbanded Southern Kentucky Chapter of the Tennessee Archaeological Society (Applegate 2000c, 2002; Dowell 1979; Ray n.d.). Watkins is one of the few Hopewellian mounds known in Kentucky and was one of only two sites from Kentucky included in Seeman's (1979:290) analysis of the Hopewell Interaction Sphere.

Two Woodland mound sites, Ashby (15Mu4) (Hoffman 1965; Rolingson 1967) and Jones (15Hk11) (Purrington 1966b), were excavated by archaeologists in the 1960s. Beginning in the late 1960s and continuing to the present, Washington University faculty and students conducted several research projects in the Green River Management Area. Although much of this work has focused upon the Archaic period (see Chapter 4), data on the Woodland period has been obtained as a result of investigations in the Mammoth Cave area (Horton 2003; Watson et al. 1969; Watson 1997), in the surrounding karst

region (Carstens 1980; Haskins 1988a, 1988b; Hemberger 1985), and at Green River shell midden sites such as Carlston Annis (15Bt5) and Bowles (15Oh13) (Marquardt and Watson 1983).

During the 1970s and 1980s, most of the archaeological work conducted in the Green River Management Area involved small-scale, cultural resource management projects. One of the larger projects was a survey of two large tracts located on the border of Breckenridge and Hancock counties (Turnbow et al. 1980). Of the 163 sites documented, 14 had one or more Woodland components. Elsewhere, the Kentucky Heritage Council conducted surveys of four counties: Adair (Boisvert and Gatus 1977), Christian (Sanders and Maynard 1979), Daviess (Weinland and Fenwick 1978), and Hopkins (Weinland and DeLorenze 1980). The Kentucky Heritage Council also funded a survey along the Ohio River in Union, Henderson, and Daviess counties (Ottesen 1981). This project was aimed at identifying settlement trends through time within the study area (Ottesen 1985). Murray State University's acquisition of Savage Cave (15Lo11) prompted a renewed interest in this site, with one result being a published description of the Woodland pottery (Lawrence 1985). Schock and Langford (1982) conducted excavations in the Barren River Reservoir in Barren, Allen, and Monroe counties, recovering data from six multicomponent sites threatened by wave erosion. Five of the sites yielded artifactual evidence of Woodland period occupations, mostly from surface contexts.

Haskins (1988a, 1988b) conducted an archaeological survey of Prewitt's Knob in Barren County. Her research involved examination of Late Archaic-Early Woodland artifact assemblages collected by landowners, archaeological survey of the knob surface, recovery of human remains from caves in the knob, and bioarchaeological analysis of human remains. The knob is best known for three mortuary caves: Crystal Onyx Cave (15Bn20), Roger's Discovery (15Bn55), and Pit of the Skulls (15Bn51). The knob surface (15Bn56) yielded chipped stone artifacts, including Turkey Tail and Wade points, manufactured of local chert types. A chert outcrop on the knob may have been quarried in prehistory (Haskins 1988a, 1988b; Hemberger 1985).

Archaeologists conducted several important excavations and surveys during the early 1990s. Sussenbach's (1992) research at the Foster site (15Da68) revealed important information about Late Woodland Yankeetown phase material culture, subsistence, and settlement. Schenian and Mocas (1993b) conducted a shoreline survey of Rough River Lake on the border of Grayson and Breckinridge counties. They documented 163 sites within a 3100 acre area along Rough River and its tributaries. Of these, 13 have Late Archaic-Early Woodland components, four are Middle Woodland, five are Middle-Late Woodland, and nine are Late Woodland-Late Prehistoric.

Prentice (1993) surveyed almost one-fourth of the more than 50,000 acres encompassed by Mammoth Cave National Park, including visits to sites recorded previously by Watson and Carstens (1982). The cultural site inventory for the park includes 223 prehistoric sites and 349 prehistoric site components (Prentice 1993). Of the 69 Woodland sites, 58 are rockshelters or caves, nine are upland artifact scatters, and two are bottomland artifact scatters. There are 43 Early Woodland, 31 Middle Woodland, 27 Late Woodland, 13 Late Woodland-Mississippi, and six unspecified Woodland components (Prentice 1993).

In the late 1990s, archaeologists working in Breckenridge County located several Woodland period sites, especially along or near the Ohio River. Three associated sites are in northern Breckenridge County in the Chenaultt Bottoms: Rockmaker (15Bc138), Yellowbank (15Bc164), and Chenaultt Crematory Pit (Bader 1996b).

Versluis (2003) surveyed 1645 acres a few km south of the Green River in Henderson County. Of the 32 sites recorded, three have Early Woodland components, four are Middle Woodland, and one is Late Woodland. Several temporally unassigned petroglyphs were documented. Adena Stemmed points and Adena Plain pottery are diagnostic Woodland artifacts recovered from the sites. One Early-Middle Woodland (15He847) site with subsurface features yielded a calibrated date of 356 B.C.-A.D 121 and Site 15He852 yielded a calibrated date of A.D. 344-541 (Table 5.12).

Building on Ottesen's (1985) study of settlement strategies in northwestern Kentucky, DeNeeve (2004) re-examined Crab Orchard settlement patterns and settlement systems in Daviess, Henderson, and Union counties. He also re-evaluated Crab Orchard systematics, including pottery types and culture-historical units.

Applegate (2007) surveyed the 671 acres of the Western Kentucky University Upper Green River Biological Preserve in Hart County a few km upstream from Mammoth Cave National Park. Of the 12 prehistoric sites, two yielded chronologically sensitive artifacts including Woodland diagnostics. The Gardner House site (15Ht83), an upland lithic scatter about 1 km south of Green River, had one Woodland pottery sherd of an uncertain type. The multicomponent Wild Onion site (15Ht92), a denser lithic scatter in a plowed field on a hill overlooking the Green River floodplain, produced a Cresap Stemmed point and bladelets indicating Early and Middle Woodland occupations.

SITE DENSITY AND DISTRIBUTION PATTERNS

The 748 Woodland sites in the Green River Management Area account for 25.6 percent of the Woodland sites in Kentucky, the largest percentage of the management areas (Table 5.1). Over 70 percent of the Woodland sites in the section are open habitations without mounds and almost 12 percent are rockshelters. At about 2.5 percent each, caves and open habitations with mounds are the next most abundant Woodland site types. Additional Woodland site types are (in decreasing order) earth mounds, cemeteries, mound complexes, quarries, isolated finds, workshops, and other types including single examples of rock art and specialized activity sites (Table 5.10). No Woodland stone mounds or earthen enclosures are recorded in the Green River Management Area.

Of the four sections of the Green River Management Area, the Ohio River II Section has the largest percentage (38.5 percent) of Woodland sites, followed by the Pennyroyal (24 percent) and Upper Green River (22 percent) sections, then the Western Coalfield Section (15.5 percent). The Upper Green River Section has the largest numbers of Woodland period rockshelters and caves, and the smallest numbers of isolated, grouped, or habitation-associated earthen mounds. Cave, quarry, and workshop sites are exclusive to the Pennyroyal and Upper Green River sections (Table 5.10).

Table 5.10. Woodland Site Types by Section in the Green River Management Area.

Site Type	Ohio River II	Western Coalfield	Penny-royal	Upper Green	Total	Percent
Open Hab w/o Mounds	222	82	122	102	528	70.6
Open Hab w/ Mounds	6	3	8	0	17	2.3
Rockshelter	16	14	23	36	89	11.9
Cave	0	0	7	11	18	2.4
Quarry	0	0	2	2	4	0.5
Earth Mound	3	5	3	0	11	1.5
Mound Complex	1	2	2	2	7	0.9
Cemetery	2	0	6	1	9	1.2
Workshop	0	0	2	2	4	0.5
Isolated Find	2	1	0	1	4	0.5
Other	36	8	7	6	57	7.6
Total	288	115	182	163	748	100.0
Percent	38.5	15.4	24.3	21.8	100.0	

The 941 Green River Management Area Woodland components account for 26 percent of the Woodland components in Kentucky (Table 5.2). About 39 percent (n=367) of the components are recorded in the Ohio River I Section, 22.5 percent (n=212) each in the Pennyroyal and Upper Green River sections, and 16 percent (n=150) in the Western Coalfield (Table 5.11). The low percentages of Woodland sites (see above) and site components in the Western Coalfield Section relative to the preceding Archaic period (see Chapter 4) may reflect differences in Archaic and Woodland settlement patterns and/or spatial biases in previous archaeological research within the management area.

Table 5.11. Woodland Site Components by Section and Subperiod in the Green River Management Area.

Subperiod	Ohio River I		West Coalfield		Pennyroyal		Upper Green		Total	
Late Woodland	43	11.7%	9	6.0%	7	3.3%	16	7.5%	75	8.0%
Middle Woodland	102	27.8%	34	22.7%	37	17.5%	58	27.4%	231	24.5%
Early Woodland	93	25.3%	51	34.0%	60	28.3%	62	29.2%	266	28.3%
Unassigned	129	35.1%	56	37.3%	108	50.9%	76	35.8%	369	39.2%
Total	367	100.0%	150	100.0%	212	100.0%	212	100.0%	941	100.0%

About 39 percent (n=369) of the Woodland components in the Green River Management Area are unassigned, 28 percent and 25 percent are Early and Middle Woodland, respectively, and 8 percent are Late Woodland (Table 5.11). Within the management area, the Pennyroyal Section has a significantly higher proportion of unassigned Woodland components and lower proportions of Middle and Late Woodland components than the other sections. The Ohio River I Section has the largest percentages of Middle Woodland (44 percent) and Late Woodland (57 percent) components in the management area, whereas the Early Woodland components are more evenly distributed among the four sections.

CHRONOMETRIC DETERMINATIONS

One of the most extensive Woodland radiocarbon series in Kentucky is for the Mammoth-Flint cave system in the Upper Green River Section (Table 5.12). There are 40 dates for Salts Cave, 18 for Mammoth Cave, two for Lee Cave, and two for Fisher Ridge Cave (DiBlasi 1996; Watson 1997). The dated materials represent a variety of artifact types that were obtained from various distances, up to several km, from the cave entrances. The two-sigma calibrated range for all sites is 2885 B.C. to A.D. 427, or Late Archaic through Middle Woodland, though most dates fall in the Early Woodland subperiod (Kennedy 1996). According to Kennedy (1996:79), "the major problem with the … series is one of precision." Therefore, "it seems prudent to regard these dates at the very least at their two sigma uncertainty" (Kennedy 1996:80).

In addition to the Mammoth-Flint cave sites, radiocarbon dates are reported for several other caves and rockshelters in the Upper Green River Section. There are absolute dates for Woodland occupations at seven-eight sites in each of the Ohio River II and Pennyroyal sections. Three of the four dated sites in the Western Coalfield Section are shell middens (Table 5.12).

OHIO RIVER II SECTION

The 288 Woodland sites documented in the Ohio River II Section contain 367 Woodland components. Open habitations without mounds account for a large percentage of the Woodland sites, followed by unspecified/other site types and rockshelters (Table 5.10). There are twice as many Early Woodland and Middle Woodland components as Late Woodland components in this section (Table 5.11). About half of the important Woodland period sites in the section are located in Henderson and Union counties, and no substantial Woodland sites are reported for Crittenden County (Table 5.13).

Most information about Early Woodland occupations in the Ohio River II Section derives from sites in Breckenridge County. The Beech Fork site (15Bc168) occupies a narrow ridge spur overlooking the bottoms of Beech Fork, a tributary of Clover Creek several km south of the Ohio River. Intact shallow deposits and one hearth feature likely dating to the Late Archaic-Early Woodland transition were documented at the site. The site yielded a Gary Contracting Stemmed point from the hearth. Storage features, postmolds, and refuse pits were not found, nor were groundstone tools or pottery. The low intensity occupations were short in duration and involved a limited range of activities, including chipped stone tool manufacture (Bader 1991).

Three other important Early Woodland sites are located in the Chenaultt Bottoms. Rockmaker (15Bc138) is a multicomponent site on the second terrace of the Ohio River floodplain at the confluence with Write's Branch. The Early Woodland component(s) are evidenced by Wade, Turkey Tail, and Dickson cluster points found in association with Arrowhead Farm (Zorn Punctate) and Chenaultt/Dexter series pottery. Both pottery types appear to have been used for mortuary-related activities at the site. Radiocarbon dates of

Table 5.12. Chronometric Dates for the Green River Management Area.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Ohio River II Section			
Rockmaker (15Bc138)			
Beta-49085	2840±80	1258-1232, 1218-829 BC	Bader 1996a, 1996b
Beta-49084	2495±60	789-482, 467-415 BC	Bader 1996a, 1996b
Beta-49086	2450±60	763-680, 673-405 BC	Bader 1996a, 1996b
Yellowbank (15Bc164)			
Beta-70923	2310±80	750-687, 666-641, 593-172 BC	Bader 1996a, 1996b
Chenaultt Crematory Pit (no state site number)			
Beta-49084	2495±60	789-482, 467-415 BC	Bader 1996a, 1996b
Foster (15Da68)			
Beta-42594	980±50	AD 973-1180	Sussenbach 1992
Beta-42593	840±50	AD 1044-1098, 1119-1142, 1147-1274	Sussenbach 1992
Site 15He847			
Beta-185504	2060±80	356-285, 255-249, 234 BC-AD 87, 104-121	Versluis 2004
Site 15He852			
Beta-185503	1620±40	AD 344-541	Versluis 2004
Slack Farm (15Un28)			
Beta-62693	1960±60	107 BC-AD 181, 187-214	deNeeve 2004
Beta-62691	1850±50	AD 53-259, 295-322	deNeeve 2004
Beta-62692	1460±60	AD 434-493, 506-520, 527-666	Pollack 1993
Beta-62696	1240±50	AD 699-889	Pollack 1993
Stull (15Un95)			
GX-7903	860±130	AD 897-922, 941-1322, 1348-1392	Ottesen 1981
Western Coalfield Section			
Carlston Annis (15Bt5) (see Chapter 4:Table 4.15)			
UCLA-2117D	2515±80	799-477, 474-413 BC	Marquardt and Watson 1977
C-152	2336±250	1004 BC-AD 174, 192-211	Webb 1950a
Read (15Bt10) (see Chapter 4:Table 4.15)			
ISGS-2245	2470±200	1040-1032, 1030-85, 80-54 BC	Haskins 1992
Annis Village (15Bt20) (see Chapter 4:Table 4.15)			
Beta-186154	2270±70	515-161, 132-118 BC	Hammerstedt 2005
Bowles (15Oh13) (see Chapter 4:Table 4.15)			
UCLA-2117F	2420±200	991, 979-37, 28-23, 10-3 BC	Marquardt and Watson 1977
UCLA-2117E	1820±300	522 BC-AD 827, 839-865	Marquardt and Watson 1977
Pennyroyal Section			
Site 15Al22			
ISGS-6029	2790 ± 80	1192-1175, 1164-1143, 1132-802 BC	Henry and Crothers 2007:42
ISGS-6030	2720 ± 70	1040-1032, 1030-788 BC	Henry and Crothers 2007:42
ISGS-6031	2800 ± 90	1249-1244, 1212-802 BC	Henry and Crothers 2007:42
Site 15Al329A (see Chapter 6:Table 6.8)			
UGa-4479	1170±70	AD 687-992	Schock and Langford 1982
Savage Cave (15Lo11)			
UGa-3594	2115±65	361-271, 263 BC-AD 5, 12-16	Lawrence 1985:92
UGa-3593	1765±100	AD 34-35, 53-465, 482-533	Lawrence 1985:92
UGa-3596	1735±35	AD 231-401	Lawrence 1985:92
UGa-3592	1495±65	AD 428-652	Lawrence 1985:92
Site 15Si7			
UGa-3689	2455±90	789-394 BC	Schock and Dowell 1981
UGa-3690	2485±70	781-413 BC	Schock and Dowell 1981

Table 5.12. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Crumps Cave (15Wa6)			
(Vestibule)			
UGa-1840	2365±95	769-347, 318-207 BC	Carstens 1980, 1996
UGa-1839	1920±150	356-286, 252-250, 234 BC-AD 424	Carstens 1980, 1996
(Interior)			
not reported	1980±60	165 BC-AD 134	Crothers et al. 2002; Davis 1996; Faulkner 1997
Beta-116408	1840±80	AD 5-12, 16-383	Crothers et al. 2002
Coca Cola (15Wa963)			
UGa-1712	1965±110	350-305, 209 BC-AD 262, 279-327	Schock 1979
UGa-1711	745±465	AD 435-491, 508-518, 528-1956	Schock 1979
Plum Springs (15Wa981)			
UGa-3742	2110±105	389 BC-AD 72	Schock and Dowell 1981
UGa-3291	2015±65	186 BC-AD 93, 97-125	Schock and Dowell 1981
n/a	1930±65	88-77 BC, 55 BC-AD 239	Schock and Dowell 1981
UGa-3741	1475±145	AD 252-874	Schock and Dowell 1981
n/a	1410*	* standard deviation not reported	Schock and Dowell 1981
Upper Green River Section			
Crystal Onyx Cave (15Bn20)			
ISGS-1665	2770±70	1113-1098, 1090-804 BC	Haskins 1988a, 1988b
ISGS-1673	2710±70	1024-774 BC	Haskins 1988a, 1988b
Teledyne 1971	2630±95	1003-504, 493-489, 462-450, 441-417 BC	Haskins 1988a, 1988b
ISGS-1675	2620±70	925-537, 528-524 BC	Haskins 1988a, 1988b
ISGS-1674	2330±90	757-684, 669-197 BC	Haskins 1988a, 1988b
ISGS-1676	2050±70	350-302, 226-225, 209 BC-AD 86, 107-118	Haskins 1988a, 1988b
Jewell (15Bn21, 15Bn349, 15Bn384, 15Bn390) (see Chapter 6:Table 6.8)			
UGa-4475	1340±340	41 BC-AD 1297, 1375-1375	Schock and Langford 1982
Mammoth Cave (15Ed1)			
(Upper Mammoth)			
X-9	2370±60	756-684, 699-360, 274-260 BC	Watson et al. 1969
X-8	2230±40	387-203 BC	Watson et al. 1969
(Lower Mammoth)			
UCLA-1730A	4120±70	2885-2562, 2535-2493 BC	Kennedy 1996
UCLA-1730B	3000±70	1413-1039, 1033-1029 BC	Kennedy 1996
SI-6890A	2920±60	1308-970, 961-933 BC	Kennedy 1996
SI-6890B	2495±80	791-413 BC	Kennedy 1996
(Mummy)			
SI-3007A	2395±75	772-364 BC	Watson et al. 1969
SI-3007C	1965±65	157-135, 114 BC-AD 179, 188-213	Watson et al. 1969
(Other)			
AA-11085	2700±80	1112-1101, 1086-1063, 1058-753, 685-668, 611-597 BC	Gremillion and Sobolik 1996
AA-16566	2675±50	926-781 BC	Crothers et al. 2002
Beta-47292	2630±55	914-748, 688-665, 643-589, 580-558 BC	Crothers et al. 2002
AA-10084	2605±70	914-517 BC	Gremillion and Sobolik 1996
AA-10081	2575±65	891-879, 844-505, 492-490, 462-450, 441-417 BC	Gremillion and Sobolik 1996
Beta-47470	2500±55	791-485, 464-416 BC	Kennedy 1992

Table 5.12. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
AA-10080	2485±70	781-413 BC	Gremillion and Sobolik 1996
AA-10083	2485±70	781-413 BC	Gremillion and Sobolik 1996
AA-10082	2365±70	759-683, 670-355, 290-232 BC	Gremillion and Sobolik 1996
AA-10079	2335±40	537-528, 525-355, 288-233 BC	Gremillion and Sobolik 1996
Patch Rockshelter (15Ed42)			
UGa-1837	1425±100	AD 408-782, 788-813, 844-857	Carstens 1980, 1996
Site 15Ed52			
UGa-1838	820±80	AD 1030-1291	Carstens 1980, 1996
Kingbird Rockshelter (15Ed162)			
Beta-31114	2585±65	897-513 BC	Prentice 1993
Beta-31115	2385±70	766-362, 269-264 BC	Prentice 1993
Salts Cave (15Ht4)			
(Mummy)			
M-2258	1960±160	365 BC-AD 390	Crane and Griffin 1972
M-2259	1920±160	359-275, 260 BC-AD 427	Crane and Griffin 1972
(Vestibule)			
GaK-2767	3490±110	2131-2085, 2051-1527 BC	Watson et al. 1969
GaK-2766	3410±100	1958-1493, 1476-1460 BC	Watson et al. 1969
GaK-2764	3360±220	2282-2249, 2232-2218, 2214-1112, 1100-1087, 1063-1059 BC	Watson et al. 1969
GaK-2765	2940±120	1427-893, 876-847 BC	Watson et al. 1969
GaK-2622	2660±100	1054-507, 460-452, 440-418 BC	Watson et al. 1969
Beta-4080	2520±70	800-482, 467-415 BC	Gardner 1987:359
Beta-4652	2510±60	796-485, 464-416 BC	Gardner 1987:359
Beta-4649	2470±60	767-411 BC	Gardner 1987:359
Beta-4651	2430±50	755-684, 669-607, 601-401 BC	Gardner 1987:359
Beta-4083	2410±60	756-684, 669-394 BC	Gardner 1987:359
Beta-4082	2380±60	756-684, 669-373 BC	Gardner 1987:359
Beta-4650	2340±60	748-687, 666-644, 590-578, 562-348, 317-207 BC	Gardner 1987:359
Beta-4081	2200±60	393-107 BC	Gardner 1987:359
(Upper Cave)			
I-256	3075±140	1632-968, 963-930 BC	Kennedy 1996
M-1586	2840±150	1434-760, 682-671 BC	Crane and Griffin 1968; Watson et al. 1969
M-1574	2570±140	1025-382 BC	Crane and Griffin 1968; Watson et al. 1969
M-1587	2520±140	974-955, 942-357, 284-256, 247-234 BC	Crane and Griffin 1968; Watson et al. 1969
M-1584	2510±140	970-961, 933-355, 289-232 BC	Crane and Griffin 1968; Watson et al. 1969
M-1585	2430±130	818-343, 324-205 BC	Crane and Griffin 1968; Watson et al. 1969
M-1777	2270±140	765-678, 674-37, 29-21, 11-2 BC	Crane and Griffin 1968; Watson et al. 1969
M-1573	2240±200	805 BC-A.D. 137, 200	Crane and Griffin 1968; Watson et al. 1969

Table 5.12. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
(Middle Cave)			
M-1770	2660±140	1188-1181, 1155-1145, 1130-405 BC	Crane and Griffin 1968; Watson et al. 1969
M-1577	2350±140	797-111 BC	Crane and Griffin 1968; Watson et al. 1969
(Lower Cave)			
M-1589	3140±150	1749-996, 986-980 BC	Crane and Griffin 1968
M-1588	2720±140	1267-506, 461-451, 440-418 BC	Crane and Griffin 1968
(Other)			
Beta-32685	2790±70	1127-807 BC	Tankersley et al. 1994
Beta-87915	2760±40	1002-825 BC	Kennedy and Watson 1997
AA-11738	2705±60	996-985, 980-793 BC	Gremillion and Sobolik 1996
AA-10088	2605±80	922-504, 493-489, 462-450, 441-417 BC	Gremillion and Sobolik 1996
AA-10089	2590±70	903-509, 437-421 BC	Gremillion and Sobolik 1996
AA-10090	2580±70	896-507, 459-453, 439-419 BC	Gremillion and Sobolik 1996
AA-10086	2570±70	840-484, 464-416 BC	Gremillion and Sobolik 1996
AA-10091	2500±80	793-413 BC	Gremillion and Sobolik 1996
AA-10087	2410±70	764-679, 674-390 BC	Gremillion and Sobolik 1996
Beta-47472	2495±60	789-482, 467-415 BC	Tankersley et al. 1994
Beta-47471	2490±60	786-480, 469-414 BC	Tankersley et al. 1994
Beta-60067	2410±90	792-360, 273-261 BC	Ruppert 1994
Beta-32684	2410±60	756-684, 669-394 BC	Tankersley et al. 1994

materials associated with the pottery are cal 1258-829 B.C. and cal 763-405 B.C. (Table 5.12) (Bader 1996a, 1996b), making the former one of the earliest absolute dates for pottery and the earliest date for mortuary use of pottery in Kentucky. The site yielded another radiocarbon date of cal 789-415 B.C. (Bader 1996a, 1996b).

The 25 features at Rockmaker consisted of 17 rockpiles, six hearths, one stratified pit with thermal debris, and one lithic production locus. Bader (1996a, 1996b) noted physical but not functional similarities between the rockpiles at Rockmaker, which she interpreted as fish smoking or drying features, and those described by Clay (1985) at Peter Village in the Central Bluegrass Section, which Clay interpreted as hot-rock cooking features. Bader (1996a, 1996b) concluded that the Rockmaker site functioned primarily as a short-term lithic workshop occupied during the fall. High-quality cherts were acquired from local sources and transported to the site, where blanks and finished bifacial tools were produced.

Located near and associated with Rockmaker is Yellowbank (15Bc164), a low intensity site that lacked cultural features. Dated at cal 750-172 B.C. (Table 5.12), Early Woodland occupations were of short duration and occurred primarily in the late fall and early spring. A narrow range of activities were related to chert acquisition, chipped stone tool manufacture, and riverine resource acquisition/processing/consumption. Lithic production activities at Yellowbank were similar to those at Rockmaker. Diagnostic

artifacts recovered from Yellowbank are Turkey Tail and Dickson cluster points (Bader 1996b; Evans et al. 1994).

Table 5.13. Important Woodland Period Sites in the Ohio River II Section.

Site No.	Site Name	Site Type	Affiliation	References
15Bc98	none	open habitation	MW	Turnbow et al. 1980
15Bc138	Rockmaker	open habitation	EW, LW	Bader 1996a, 1996b
15Bc164	Yellowbank	open habitation	EW	Bader 1996b; Evans et al. 1994
none	Chenaultt Crematory	mortuary (nonmound)	EW	Bader 1996b
15Bc168	Beech Fork	open habitation	EW	Bader 1991
15Da26	none	open habitation	unassigned	Hoffman 1966; Marquardt 1971; Weinland and Fenwick 1978
15Da39	none	open habitation with mounds	MW, LW	Ottesen 1981; Weinland and Fenwick 1978
15Da61	none	open habitation	EW, LW	Weinland and Fenwick 1978
15Da68-69	Foster	open habitation	LW	Sussenbach 1992
15Ha114	none	rockshelter	EW, MW	Turnbow et al. 1980
15Ha151	none	open habitation	EW, MW, LW	Turnbow et al. 1980
15He13	none	open habitation	MW	Hoffman 1966; Marquardt 1971
15He16	Smith	open habitation with mound	MW	Hoffman 1966; Marquardt 1971
15He33	none	open habitation	MW-LW	Dowell 1979b
15He34	none	open habitation	MW-LW	Dowell 1979b
15He35	none	open habitation	LW	Hoffman 1966
15He48	none	open habitation with mound	LW	Hoffman 1966; Marquardt 1971
15He157	none	open habitation	LW	Ottesen 1981
15He315B	none	open habitation	EW, MW-LW	Dowell 1979b; Schock and Stone 1985
15He323B	none	open habitation	MW-LW	Dowell 1979b
15He847	none	open habitation	EW-MW	Versluis 2004
15Un28	Slack Farm	open habitation	MW	Pollack 1993; Pollack and Munson 1989
15Un30	none	open habitation	LW	Marquardt 1971
15Un31	Y-in-the-Road	open habitation	LW	DiBlasi and Sudhoff 1978
15Un32	none	open habitation	EW, LW	Marquardt 1971
15Un39	none	open habitation	EW, MW, LW	Marquardt 1971
15Un40	none	cemetery?	EW, MW	Marquardt 1971
15Un95	Stull	open habitation	LW	Ottesen 1981
15Un109	none	rockshelter	MW, LW	Ottesen 1981
15Un111	none	mound	MW, LW	Ottesen 1981
15Un113	none	open habitation	LW	Ottesen 1981

The Chenaultt Crematory Pit (no site number assigned) is an isolated, nonmound mortuary site located on the Ohio River floodplain/terrace between the Yellowbank and Rockmaker sites. Cremated human remains, some in a flat-bottomed Zorn Punctate bowl, were found in a subsurface pit measuring 1 m across. The grit tempered vessel exhibited two rows of inverted, joined triangles with incised horizontal lines above and below. The feature yielded a calibrated radiocarbon date of 789-415 B.C. (Table 5.12).

Grave goods associated with the cremation are a barite bar gorget, a granitic gorget, a boatstone fragment of unspecified material, three celt or ax fragments, and a bone awl fragment. Fire-altered rock, burned clay, and burned nut shell and animal bone were also found in the crematory (Bader 1996b). The latter may evidence ritual feasting associated with mortuary activities, as is known from Woodland sites in the Bluegrass Management Area.

Regarding settlement strategies, Early Woodland occupations in the Chenaultt Bottoms involved short-term use of camps where limited ranges of activities occurred, as none of the sites had storage or refuse pits, structural remains, or deep midden deposits. Site locations were selected with respect to proximity to chert and food resources, and long parallel levees and terraces in the Ohio River floodplain were preferred locations for settlement. No Early Woodland base camps [cf., Binford 1980] have been documented in this portion of the Ohio River II Section, though such sites probably are located in tributary valleys between the uplands and bottoms, perhaps in rockshelters (Bader 1996b; Evans et al. 1994). While the short-term camps and lithic workshops likely were contemporaneous components of "a logistical mobility pattern," it is possible that the Early Woodland sites were used during different seasons (camps in warm seasons, lithic workshops in cold seasons) as part of "a residential mobility pattern" (Bader 1996b:109).

In contrast to the Breckenridge County sites, the multicomponent Site 15Ha151, which is located on the first terrace of the Ohio River in Hancock County, may have functioned as a base camp [cf., Binford 1980] during the Early Woodland subperiod. Fifteen Early Woodland features included eight fire-cracked rock clusters, three amorphous soil stains, one large circular pit, and three postmolds from a circular, single-post structure of undetermined size. There were no interior postmolds or other features associated with the structure, and overall the features lacked any patterning that would indicate activity areas at the site. The pit feature yielded a single Crab Orchard (Baumer) Cordmarked rim sherd (Turnbow et al. 1980).

Another high intensity habitation in the eastern Ohio River II Section is Site 15Bc98. The early Middle Woodland site is exposed on the bank of the Ohio River, where erosion revealed a buried midden with a high concentration of chipped stone artifacts, ceramics, burned rocks, mussel shell, and charcoal (Turnbow et al. 1980).

To the west, low intensity late Early to early Middle Woodland occupations were documented at Site 15He847, an open habitation on a small knob. The site was used frequently, but periods of occupation were short in duration and involved a limited range of activities. The site functioned as a locale for chipped stone tool manufacture and maintenance, food acquisition/processing, wood processing, and hide tanning. Refuse pits, hearths, and postmolds were clustered in such a way as to suggest activity areas. Diagnostic artifacts are Adena Stemmed points and Adena Plain pottery (Versluis 2004).

Several early Middle Woodland sites classified as base camps [cf., Binford 1980] or small villages are recorded in Daviess County. Located within alluvial floodplain zones and adjacent upland bluffs, Sites 15Da26 and 15Da61 are marked by extensive midden deposits and/or subsurface features. The multicomponent Stull site (15Un95) contains an early Middle Woodland habitation (Ottesen 1981). Other early Middle

Woodland habitations in Union County are Sites 15Un32, 15Un39, and 15Un40 (Marquardt 1971).

More than 30 Crab Orchard tradition/phase sites have been documented in the Ohio River II Section (deNeeve 2004). Those dating to the late Early-early Middle Woodland subperiods (ca. 600-150 B.C.) are found in Henderson and Union counties. Pottery types from these sites are Crab Orchard Cordmarked, Crab Orchard Fabric Impressed, and Sugar Hill Cordmarked. The latter type, which dates to about 600-300 B.C. in Kentucky, is characterized by thick walls (12-30 mm), coarse grit temper, and cordmarked exterior surfaces. Crab Orchard sites dating to the Middle Woodland (ca. 100 B.C.-A.D. 300) in northwestern Kentucky are associated with assemblages of Crab Orchard Cordmarked, Crab Orchard Fabric Impressed, Crab Orchard Plain, Crab Orchard Cord-Wrapped Stick Impressed, and Crab Orchard Decorated pottery (deNeeve 2004).

Crab Orchard assemblages and occupations at Site 15Da39, Smith (15He16), Slack Farm (15Un28), and Site 15Ha114 are well documented (deNeeve 2004; Ottesen 1981; Turnbow et al. 1980). Crab Orchard ceramics also are reported from Site 15Un109, a rockshelter (Ottesen 1981), and Site 15He13, a high intensity early Middle Woodland habitation (Hoffman 1966; Marquardt 1971).

Site 15Da39 contained a substantial early Middle Woodland component with extensive cultural deposits representing a base camp [cf., Binford 1980] or small village. A possible mound at the site has not been investigated. Diagnostic artifacts are Crab Orchard series pottery and a Snyders point (Weinland and Fenwick 1978).

Located at the confluence of the Ohio and Green rivers, Smith (15He16) is a large early Middle Woodland habitation site with an earthen mound that has not been excavated. A large assemblage of Crab Orchard cordmarked, plain, fabric impressed, and decorated pottery was recovered from this site (deNeeve 2004; Hoffman 1966; Marquardt 1971).

Slack Farm (15Un28) is situated opposite the confluence of the Ohio and Wabash rivers. Though the site encompasses over 12 ha, the Crab Orchard component is primarily restricted to a 3 ha area. Within this area several large pit features and a 20 cm thick midden were documented (Tune 1991). Calibrated radiocarbon dates of 107 B.C.-A.D. 214 and A.D. 53-322 (Table 5.12) were obtained from two of the Crab Orchard pits. Crab Orchard pottery types recovered from Slack Farm are cordmarked, fabric impressed, plain, and decorated (deNeeve 2004). A variety of botanical remains were recovered from Crab Orchard features at Slack Farm (Rossen 1995; see also deNeeve 2004). Cultigens include chenopod, maygrass, erect knotweed, and squash. A few maize kernels were recovered, but it is quite possible that they are associated with the late Mississippian Caborn-Welborn component (see Chapter 6). The high frequency of hickory nutshell relative to other nut taxa is similar to that documented at the Rose Hotel site in southern Illinois, but the high densities of native cultigens at Slack Farm distinguish it from the typical southern Illinois plant use pattern (Parker 1999:408).

Site 15Ha114 is a rockshelter with four spatial concentrations of chipped stone, pottery, faunal, and fire-altered rock artifacts dating to the Early and Middle Woodland (and possibly Archaic) subperiods. Diagnostic artifacts include Crab Orchard pottery. Archaeologists documented hand and foot climbing holds and three areas of petroglyphs

at the shelter. Regarding the latter, one part of the shelter had multiple geometric elements arranged in four clusters, and two other areas of the shelter had geometric renderings (Turnbow et al. 1980).

deNeeve (2004) studied settlement variation in 31 Crab Orchard sites within a 2123 ha study area in the western Ohio River II Section. Of these, 23 are located on floodplains, six on terraces, and two in uplands; three date to the Early Woodland, 18 to the Middle Woodland, nine to both periods, and one is undated. For all the sites, deNeeve (2004) reported statistically significant relationships between site locations and four of seven tested environmental variables: elevation, location within 120 m of high relief zones, distance to major stream, and landform. Crab Orchard sites are preferentially located at low elevations that provide easy access to upland zones and edge environments, are within 1 to 3 km of major streams, and on nonterrace floodplain landforms. According to deNeeve (2004:103), Crab Orchard site distributions reflect "perhaps an attempt to maximize returns by locating settlements within an area where productive floodplain and oak-hickory forest resource bases converge."

deNeeve (2004) documented temporal variation in the numbers, sizes, and distribution of Early Woodland and Middle Woodland Crab Orchard sites. The small number (n=12) of Crab Orchard sites with Early Woodland components are clustered in northwestern and northeastern Henderson County. Sites are dispersed within the two clusters. Floodplain sites near the Ohio River vastly outnumber terrace and upland sites, the numbers of the latter being roughly equal. Based on ceramic densities, deNeeve (2004) classified the Early Woodland Crab Orchard sites as very small and small. Site characteristics suggest low population density (deNeeve 2004).

The larger sample (n=27) of Crab Orchard sites with Middle Woodland components cluster in seven locations: northwestern Daviess County, northern Union County, and northwestern, north-central (two clusters), central, and northeastern Henderson County. All sizes of habitation sites, from very small to large, plus one burial mound are documented, though small sites predominate. Most sites are located close to the Ohio River and edge environments on floodplains and terraces. The two large-sized Middle Woodland sites, Slack Farm and Smith, are located near the confluences of the Ohio-Wabash and Ohio-Green rivers, respectively. The small camps probably were used seasonally or over several years, though no evidence of structures has been found yet. Middle Woodland Crab Orchard sites are more clustered with roughly equal spacing among sites. Site characteristics suggest increased population size (deNeeve 2004).

Ottesen (1985) found correlations between Middle Woodland Crab Orchard site distributions and soil drainage but not soil fertility in northwestern Kentucky. Like deNeeve (2004), Ottesen (1985) documented a preference for lowlands, where 87 percent of the Middle Woodland sites in her sample are located; the lowlands focus represents a decline in the breadth of environmental zones occupied compared to the Archaic period. All of the Middle Woodland sites are located along minor tributaries. The sites are evenly distributed within the Ohio and Green river drainages, with none documented in the Tradewater River drainage (Ottesen 1985).

Regarding the Middle Woodland Crab Orchard settlement system, Ottesen (1985) identified two Middle Woodland site types where different activities took place.

Considering that there is only one type of Archaic site type, temporary camps, in her study area, while not very complex the Crab Orchard settlement system represents the beginning of a trend toward "increasing diversity of functional site types" (Ottesen 1985:185). Mound/Burial sites, which are located in lowlands, yielded a greater diversity and percentage of artifact types. For example, all Middle Woodland pottery and faunal artifacts and about 75 percent of the manuports, projectile points, and other lithic artifacts were recovered from mound/burial sites. Temporary camps, which are found equally in lowland and uplands, produced small densities of a narrow range of artifact types. Temporary camps in the Green River drainage produced more projectile points than those in the Ohio River drainage (Ottesen 1985).

Other Middle Woodland sites in the Ohio River II Section may be affiliated with the Crab Orchard tradition and/or the Mann complex/phase. Dowell (1979b) proposed that a cluster of four sites on two ridges in the Ohio River floodplain of Henderson County functioned as "small communities" or low intensity domestic habitations. The absence of features and midden deposits indicate that occupations were of short duration at Sites 15He33, 15He34, 15He315B, and 15He323B. In decreasing ubiquity, Bakers Creek/Lowe cluster, small triangular, Copena, Jacks Reef Corner Notched, and Turkey Tail points were recovered from these sites. Metric data for Bakers Creek and Copena specimens were reported. Each site had bladelets, including over 70 plus a prepared bladelet core from Site 15He33. Other chipped stone artifacts from the sites include scrapers, knives, bifaces, drill, utilized flakes, and debitage. Groundstone artifacts include a two-hole slate gorget, a slate blade, utilized and nonutilized slate flakes, a sandstone abrader, and a pitted stone of unspecified rock. Crab Orchard (Baumer) series and/or untyped cordmarked, plain, stamped, and zoned local and nonlocal ceramics were recovered from the sites. Site occupants were engaged in a limited range of activities, including chipped stone tool manufacture, hunting, faunal/floral processing and preparation, hide preparation, and personal ornamentation. A small number of human remains were recovered from nonfeature contexts at Site 15He315B. The molar and femur fragments represent a least one adult of undetermined sex (Dowell 1979b; Schock and Stone 1985).

Site 15He315B may be associated with the Hopewell-related Mann complex/phase (Dowell 1979b; Schock and Stone 1985). Diagnostic Mann traits are plain, cordmarked, and decorated Mann pottery, Lowe cluster points, bladelets, platform pipes, obsidian debris, and anthropomorphic terra cotta figurines. Mann complex sites include large "corporate-ceremonial centers" with burial mounds and geometric earthworks, habitation sites in floodplain and terrace zones, and small aceramic logistic camps. Mann sites provide evidence of hunting-gathering and horticulture subsistence strategies (deNeeve 2004; Kellar 1979). Mann complex/phase components date to the late Middle Woodland subperiod, ca. A.D. 250-300 (Kellar 1979) or A.D. 300-500 (deNeeve 2004). While most Mann sites are located on the north side of the Ohio River in the Evansville-Owensboro vicinity, such sites are recorded in Union and Henderson counties in Kentucky (deNeeve 2004).

Based on the site sample examined by Ottesen (1985), the settlement pattern for the Mann complex/phase differs considerably compared to that of the early Middle Woodland Crab Orchard tradition. At 97 percent, the proportion of lowland sites peaked,

and sites are found in all zones of river systems (e.g., main river, major tributaries, minor tributaries, and headwaters), though sites along main river trunks are most common. A high proportion of sites are in the Ohio River drainage, with a small percentage in the Tradewater and none in the Green River drainage.

The Mann complex/phase settlement system is characterized by three site types, marking a continued increase in site type diversity and a greater degree of sedentism associated with food production. Upland temporary camps continue to be used but expanded into in all river zones within the Ohio and Tradewater drainages. Lowland habitation sites include hamlets, which are found along main rivers and minor tributaries, and small villages, both of which are found in the Ohio drainage only. Unlike the early Middle Woodland settlement system, there are no special-purpose mounds/burial sites (Ottesen 1985).

The early Late Woodland subperiod is poorly documented in the Ohio River II Section, but a number of sites with Yankeetown phase assemblages are recorded. Yankeetown components are most readily identified by their highly distinctive ceramics, which are well-consolidated, well-fired, and tempered with clay grog. Surface treatment includes smoothing and, less commonly, cordmarking. Distinctive stylistic elements of Yankeetown pottery are decorations, typically applied to the shoulder and neck. Incising was executed within a decorative zone delineated by parallel horizontal lines. Within the decorative field are primary parallel lines that demark smaller zones, which in turn are infilled with secondary lines at right or diagonal angles, though other forms of incising are known. Other decorative elements are complicated stamping, filigree, nodes, rim folds, lip notches, and punctations, which usually occur in zoned arrangements on individual vessels. Common vessel forms are jars, bowls, and sometimes pans. Large vessels have lugs or loop handles (Blasingham 1965; Clay 1963a; Curry 1954; Dorwin and Kellar 1968; Sussenbach 1992; Vickery 1970). Diachronic changes in Yankeetown ceramics include an increase in bowls and pans, a decrease in cordmarking, a decrease in folded rims, and incorporation of shell tempering (Sussenbach 1992).

Other diagnostic Yankeetown phase artifacts are unserrated and unnotched triangular points, abraders, celts, hammerstones, clay tempered pottery beads, anthropomorphic terra cotta figures, cannel coal disks, and cannel coal pendants. Typical site types are small dispersed hamlets or homesteads less than 1 ha in size, and bell-shaped pits are common cultural features (Blasingham 1965; Muller 1986; Seeman and Munson 1980; Vickery 1970). Yankeetown components in Kentucky, which date between A.D. 700 and 1100, were documented at Site 15Ha151 (Turnbow et al. 1980), Site 15He35 (Hoffman 1966), Site 15Un30 (Marquardt 1971), Y-in-the-Road (15Un31) (DiBlasi and Sudhoff 1978), and Site 15Un109 (Ottesen 1981).

An early Yankeetown phase occupation was identified at Slack Farm (15Un28). Radiocarbon dates indicating an early Late Woodland component are cal A.D. 434-666 and A.D. 699-889 (Table 5.12). Small amounts of maize were recovered from Late Woodland contexts, though it is possible the specimens are intrusive from later Mississippian occupations (Pollack 1993; Pollack and Henderson 2000) (see Chapter 6).

The multicomponent Stull site (15Un95) included a substantial terminal Late Woodland occupation. Midden deposits and six cultural features yielded late

Yankeetown phase materials, including Yankeetown pottery tempered with grog or grog and shell. Cordmarking was a minor surface treatment on the sherds. A calibrated radiocarbon date for the occupation is A.D. 897-1392 (Table 5.12) (Ottesen 1981; see also Chapter 6).

Located on a terrace overlooking the Green River near the Ohio River confluence, the Foster site (15Da68-69) produced Yankeetown phase diagnostics from feature and other contexts. A large, stratified, bell-shaped pit produced Yankeetown sherds with a high frequency of cordmarking or smoothed-over cordmarking. Ceramic disks, small triangular points, hoe flakes and other debitage made of Dover and other cherts, hammerstones, abraders, a mano, a stone discoidal, and worked cannel coal were found in the pit. Site occupants practiced a hoe-based agricultural economy supplemented by wild foods. Maize and hickory were the most abundant plant species recovered from the pit. Other cultigens are goosefoot, maygrass, and little barley, while other wild plants are pecan, walnut, acorn, beans, goosefoot, grape, persimmon, blueberry, and black- or raspberry. Faunal remains were burned and fragmented, but several taxa were identified: deer, raccoon, beaver, gray squirrel, opossum, bird, turtle, snake, and fish. Calibrated radiocarbon dates of A.D. 973-1180 and A.D. 1044-1274 (Table 5.12) indicate a terminal Late Woodland affiliation for the Foster site (Sussenbach 1992).

WESTERN COALFIELD SECTION

The 115 Woodland sites recorded in the Western Coalfield Section contain 150 Woodland components. There is a low diversity of Woodland site types in this section, with only seven site types recorded. In decreasing order of abundance, site types are open habitations without mounds, rockshelters, other/unspecified, earth mounds, open habitations with mounds, mound complexes, and isolated finds (Table 5.10). Early and Middle Woodland components greatly outnumber Late Woodland components in this section (Table 5.11). Important Woodland sites are reported for all counties in the section except Webster (Table 5.14). A number of these sites are shell middens that are better known for their Archaic period occupations (see Chapter 4).

The early Early Woodland subperiod is poorly documented in the Western Coalfield Section. Other than Turkey Tail forms, there are few diagnostic projectile point types recorded at early sites (Table 5.7). Further, the earliest pottery in the section dates to the late Early Woodland subperiod. Therefore, without chronometric dating, it is difficult to identify early Early Woodland sites. An early Early Woodland component at Read (15Bt10) is indicated by calibrated radiocarbon dates spanning 1946-1457 B.C. to 1040-54 B.C. (Table 5.12) (Haskins 1992).

The earliest pottery in the Western Coalfield Section is, in general, similar to early Crab Orchard-like materials from the Ohio River II Section to the north. These types of ceramics were recovered from the upper levels of shell midden sites such as Butterfield (15McL7), Jimtown Hill (15Ohl9), and Barrett (15McL4) (Rolingson 1967:390-391; Marquardt and Watson 1977; Watson 1985:118-119). Crab Orchard sherds, as well as Turkey Tail and Adena Stemmed points, are reported from Carlston

Annis (15Bt5), where radiocarbon dates place the late Early Woodland occupation at 799-413 B.C. (Marquardt and Watson 1977) and 1004 B.C.-A.D. 211 (Webb 1950a) (Table 5.12).

Table 5.14. Important Woodland Period Sites in the Western Coalfield Section.

Site No.	Site Name	Site Type	Affiliation	References
15Bt2, 20	Annis Village and Mound#	open habitation with mound	LW	Hammerstedt 2005; Young 1962
15Bt5	Carlston Annis*	open habitation	EW, MW, LW	Watson 1985; Webb 1950a
15Bt6	DeWeese*	open habitation	EW	Hensley 1991
15Bt10	Read*	open habitation	EW, MW	Rolingson 1967; Webb 1950b
15Bt40	Baby Track	rockshelter	LW	Coy et al. 1997
15Hk11	Jones Mound	mound	MW	Purrington 1966b; Rolingson 1967
15Hk22	Andalex Village#	open habitation	LW	Niquette 1991
15Hk49	Morris Village+	open habitation	EW, MW, LW	Rolingson and Schwartz 1966
15Hk279	none	rockshelter	MW, LW	Olmanson 2003
15McL4	Barrett*	open habitation	E-MW, LW	Rolingson 1967; Watson 1985; Webb and Haag 1947b
15McL7	Butterfield*	open habitation	EW-MW	Rolingson 1967; Watson 1985; Webb and Haag 1947b
15McL11	Ward*	open habitation	EW-MW	Rolingson 1967; Watson 1985; Webb and Haag 1947b
15McL12	Kirkland*	open habitation	EW, MW, LW	Rolingson 1967
15McL26	none	open habitation	LW	Hensley 1991
15Mu4	Ashby	mound complex	MW-LW	Hoffman 1965; Rolingson 1967
15Mu41	none	open habitation	MW, LW	Hensley 1991
15Oh1	Chiggerville*	open habitation	MW, LW	Rolingson 1967; Webb and Haag 1939
15Oh2	Indian Knoll*	open habitation	EW, MW, LW	Rolingson 1967; Watson 1985
15Oh13	Bowles*	open habitation	EW, MW	Hensley 1991; Rolingson 1967
15Oh19	Jimtown Hill*	open habitation	EW, MW, LW	Rolingson 1967; Watson 1985
15Oh50	Pleasant Point	open habitation	EW	Myers 1981

*These sites are primarily known for their Archaic components - See Chapter 4;
#These sites are primarily known for their Mississippian components - See Chapter 6;
+This site is primarily known for its Archaic and Mississippian components - See Chapters 4 and 6.

One the best known Crab Orchard habitations in this section is Pleasant Point (15Oh50), a single-component site located adjacent to Green River in Ohio County. In addition to Crab Orchard ceramics, diagnostic Adena Stemmed, untyped square stemmed, and slightly expanding stemmed points were recovered from the site. One of the few Western Coalfield Woodland sites yielding subsistence data, flotation samples from Pleasant Point yielded a variety of wild plant remains, especially hickory nutshell. No native cultigens were identified in the plant assemblage. Though no radiocarbon dates have been reported for this site, based upon comparisons with similar materials from dated contexts at other sites, the Pleasant Point site dates to ca. 500-200 B.C. (Myers 1981).

Rolingson and Schwartz (1966) recovered Crab Orchard series ceramics from the multicomponent Morris Village site (15Hk49), which is located on a terrace in the Sugar Creek floodplain of the Tradewater drainage. Among the ceramic materials was a small cylindrical jar with a flat base, thin walls, outflaring rim, and cord-wrapped dowel-impressed exterior surface. According to Lewis (1988), the site also yielded one complicated stamped sherd. There are no chronometric dates for the Woodland occupation at Morris Village, but Railey (1990) suggested a range of 200 B.C. to A.D. 250 based on pottery attributes.

Besides Crab Orchard-like materials, sand tempered sherds of the contemporary Alexander series (including Alexander Incised, O'Neal Plain, and Columbus Punctated) have been recovered from the upper levels of several shell midden sites, including Indian Knoll (15Oh2), Ward (15McLll), Butterfield, Jimtown Hill, and Barrett (Rolingson 1967:390-391; Watson 1985:118-119). Although Rolingson (1967) suggested that the Alexander series post-dated Crab Orchard (Baumer) pottery in the Green River Management Area, comparative chronometric evidence indicates that both types of ceramics date between ca. 600 and 100 B.C. and that Crab Orchard ceramics persisted later in time than the Alexander series (cf., Butler and Jefferies 1986; Jenkins et al. 1986:552).

Hensley (1991), who noted Woodland components were present at 16 of the 50 known Archaic shell midden sites in the Western Coalfield Section, concluded that the Woodland use of these sites was of short-term duration and occurred sporadically. Railey (1990) concurred, noting that midden deposits at the small number of Woodland sites indicate a dispersed settlement system or one that involved more frequent shifting of habitation loci during the Woodland period. As Jefferies (1988:24) noted, "the presence of grit tempered pottery at shell midden sites was a matter of concern for Webb and his associates." Given Hensley's research, the explanation proposed by Webb and his colleagues that the pottery evidenced transient occupations of the shell mounds by post-Archaic occupants is more likely than their explanation that the pottery was used by the comparatively more sedentary Archaic occupants (Jefferies 1988).

Few early Middle Woodland habitation sites have been documented in the Western Coalfield Section, but some of the Crab Orchard ceramics recovered from the upper levels of Archaic shell middens, as noted above, date to the early portion of the Middle Woodland subperiod. One of few such sites with chronometric dates, Bowles (15Oh13) yielded calibrated radiocarbon dates of 991-3 B.C. and 522 B.C.-A.D. 865 (Marquardt and Watson 1977). In addition to these sites, two Middle Woodland mounds (Jones and Ashby) have been excavated in this section.

The Jones Mound (15Hk11) was located on an upland ridge just east of Madisonville. Artifactual evidence including projectile points and pottery suggests this mound, which measured 12 x 18 m across and 1.2 m high, was constructed in the late Middle Woodland subperiod (Purrington 1966b; Rolingson 1967). Excavations revealed three sub-floor rectangular burial pits containing extended burials. These pits had been covered by two small elongated mounds that had been enclosed by a circular earthwork. Subsequent mound stages covered both the small mounds and the circular enclosure. Three additional (possibly intrusive) burials were encountered in the third mound stage (Purrington 1966b; Rolingson 1967). Though not identified as such, the "circular

earthwork" at Jones Mound sounds reminiscent of earthen rings surrounding central mortuary features underlying Drake Mound (Central Bluegrass Section) and C and O Mounds Jo2 (Lower Big Sandy Section).

Ceramics recovered from the Jones Mound included grit tempered sherds, most of which were cordmarked, and a few clay and quartz tempered sherds, two of which had rocker stamped exterior surfaces and another that exhibited wide, incised lines parallel to the rim. Most of the projectile points recovered from the Jones Mound are either expanded stemmed [possibly Lowe cluster] or wide, straight stemmed forms, but Robbins-like and Adena/Turkey Tail-like specimens are also present in the assemblage (Purrington 1966b; Rolingson 1967:321). The exact temporal placement of the Jones Mound within the Middle Woodland temporal unit is difficult to assess, but the presence of rocker stamped sherds suggests that the site dates later than A.D. 1.

The Ashby site (15Mu4) was a Middle Woodland to early Late Woodland mound complex located near the Green River. Investigators documented two small mounds spaced about 100 m apart and a low-density artifact scatter at the site. Mound A was the larger of the two, measuring 21 m in diameter and having a height of about 1.5 m. It covered a central feature consisting of a circular depression of white clay surrounded by a darkened rectangular area that measured about 3 m. Upright sandstone slabs were situated on the northern and western edges of the darkened area (Hoffman 1965; Rolingson 1967). Although it was not identified as such, the darkened area may represent the remains of a charnel house, if the soil darkening resulted from burning. Grave goods associated with the central feature include two stone gorgets, one mica sheet, one piece of barite/galena, two miniature copper celts, and two copper awls (Hoffman 1965; Rolingson 1967).

Mound B at Ashby was somewhat smaller, measuring about 15 m in diameter. It yielded no identifiable human remains, but did contain a "thin layer of whitish earth" and a "hearth area" within the mound strata (Hoffman 1965; Rolingson 1967). Though not specified as such, these deposits may represent cremations. Materials from Ashby Mound B, included three "caches" of flint debris and sandstone pebbles, as well as a broken cordmarked vessel (Hoffman 1965; Rolingson 1967). This vessel is an elongated jar with a slightly flattened base and an outflaring rim. The general form of the untyped vessel is very similar to that of late Middle Woodland and early Late Woodland outflaring jars from other portions of the Ohio Valley (cf., Fowler 1957:Plate Ia,d; Hargrave 1982:Plate 143; Prufer and McKenzie 1965:19-24, 45-49).

A light scatter of artifactual remains in the vicinity of the Ashby mounds suggests that a small settlement or mortuary camp may have been associated with the mounds. Expanded stem and contracting stem projectile point forms were recovered from the surface of the site and from the fill of both mounds (Hoffman 1965; Rolingson 1967). Although no chronometric data are available from Ashby, the recovered artifactual assemblage may date to the late Middle Woodland (ca. A.D. 250-500) (Railey 1990).

The Late Woodland subperiod in the Western Coalfield Section is poorly documented. Site 15Mu41 is reported to contain a Middle to Late Woodland component, and Site 15McL26 a Late Woodland component (Hensley 1991). Baby Track Rockshelter (15Bt40) is one of few confirmed Woodland rock art sites in Kentucky. The

petroglyphs are five human feet produced by pecking/grinding on a roof fall boulder. A hominy hole and Late Woodland artifacts were documented at the site (Coy et al. 1997).

Though few Late Woodland sites have been excavated in this section, early Late Woodland Rough River series pottery has been found at several sites in the Western Coalfield Section. Sites in Butler and Hopkins County, such as Annis Mound (15Bt20) and Morris (15Hk49), have produced Rough River Plain and Rough River Cordmarked samples (Clay 1963a; Lewis 1988). Rough River Smoothed-Over Cordmarked and Rough River Simple Stamped types are not known from sites in this section.

Yankeetown series pottery is associated with a terminal Late Woodland occupation at Andalex Village (15Hk22) (Niquette 1991), which is situated on a bluff overlooking Pond River. A calibrated radiocarbon date of A.D. 435-856 may be associated with this component (see Chapter 6). Yankeetown pottery also was recovered from Annis Village and Mound (15Bt2 and 15Bt20), located adjacent to the Green River. Other Woodland pottery types recovered from the Annis site complex are Mulberry Creek, Baytown Plain, O'Neal Plain, and Wright Check Stamped (Lewis 1988). A calibrated radiocarbon date of 515-118 B.C. (Table 5.12) from Annis Village is suggestive of an Early-Middle Woodland component, as well (Hammerstedt 2005). Both Andalex Village and Annis Village later became small Mississippian regional administrative centers with single platform mounds (see Chapter 6). A single specimen of Yankeetown pottery was found at the Barrett site (15McL4) (Rolingson 1967).

PENNYROYAL SECTION

The 182 Woodland sites recorded in this section contain 212 components. This section contains the greatest diversity of Woodland site types in the Green River Management Area, though many sites are open habitations without mounds and rockshelters (Table 5.10). Important Woodland sites include a large number of caves (Table 5.15). Like the Western Coalfield, in the Pennyroyal Section Early and Middle Woodland components vastly outnumber Late Woodland components (Table 5.11).

While Turkey Tail and Terminal Archaic Barbed cluster points are reported from ephemeral or multicomponent sites in the section (Table 5.7), there are few substantial early Early Woodland sites in the section. One exception, however, is Site 15Al22, where Henry and Crothers (2007) documented evidence of cave mineral mining (see also Upper Green River Section). Mining occurred in several parts of the cave, suggesting systematic exploitation of mineral resources: east passage, north passage, Crystal Palace, Bat Avenue, and Bat Avenue alcove. Circular pits with digging stick marks indicate that sulfate minerals were extracted from cave sediments. Torches were used as light sources, and fragments of burned river cane, sticks, and cordage (torch ties), as well as stoke marks, were found in areas of digging activity. Three dates obtained from river cane and stick fragments collected from undisturbed contexts near digging areas indicate that mining activities occurred during the early Early Woodland subperiod: cal 1192-802 B.C., cal 1040-788 B.C., and cal 1249-802 B.C. (Table 5.12) (Henry and Crothers 2007).

Site 15Si7 is one of the earliest pottery-producing sites documented in the Pennyroyal Section. Very fragmentary human remains were recovered from a simple pit grave at this nonmound mortuary site. The burial feature was circular in shape and measured 1 m in diameter and had a depth of 0.5 m. Body placement was not indicated, but given the size and shape of the crypt it likely was a flexed in-flesh burial or a secondary bundle burial. Grave goods include Turkey Tail and Big Sandy points and an untyped cordmarked pottery sherd. If not intrusive, the Early Archaic Big Sandy point suggests curation behavior. Radiocarbon dates of cal 789-394 B.C. and 781-413 B.C. (Table 5.12) indicate a middle Early Woodland affiliation (Schock and Dowell 1981).

Table 5.15. Important Woodland Period Sites in the Pennyroyal Section.

Site No.	Site Name	Site Type	Affiliation	References
15Al22	none	cave	EW	Henry and Crothers 2007
15Al329A	none	cemetery	LW	Applegate and Cannon 2003; Applegate and DeDominico 2002; Schock and Langford 1982
15Ch20	none	open habitation with mounds	LW	Sanders and Maynard 1979
15Ch50	Campbells	cave	unassigned	Sanders and Maynard 1979
15Ch314	Cedar Bluff	cave	EW	Sanders and Maynard 1979
15Ch315	Glovers	cave	unassigned	Sanders and Maynard 1979; Vietzen 1956
15Lo11	Savage	cave	EW, MW, LW	Lawrence 1985; Schenian 1988
15Lo12	Watkins	open habitation with mounds	MW, LW	Applegate 2000, 2002; Chapman 1972; Dowell 1979; McEuen 1978a, 1978b; Ray n.d.
15Si7	None	cemetery	EW	Schock and Dowell 1981
15Wa6	Crumps	cave	EW, MW, LW	Carstens 1980, 1996; Crothers et al. 2002; Davis 1996
15Wa316	None	cemetery	unassigned	Foster 1972
15Wa324A	Campbell Mound	mound	unassigned	Dowell 1979a; Schock and Dowell 1991
15Wa374	Dunkleau	mound complex and cemetery	LW	Foster 1972
15Wa963	Coca Cola	cemetery	EW, MW	Schock 1979a
15Wa981	Plum Springs	open habitation	EW, MW, LW	Applegate and McCray 2006; Dowell 1981; Schock 1979a

In addition to the Early Woodland use of caves to mine minerals, caves were used for ritual activities by at least the Middle Woodland subperiod. Located about 10 km southwest of Mammoth Cave in Warren County, Crumps Cave (a.k.a. Cave Springs Cave and Smiths Grove Cave [15Wa6]) is about 2050 m of passageways carved in the St. Louis limestone formation and entered through a sinkhole. This site is one of only 11 mud glyph sites in the Southeast. Crumps Cave contains a variety of anthropomorphic, zoomorphic, geometric, and weaponry motifs incised into sediments coating a 90 m stretch of cave passage about 1 km from the entrance (Davis 1996). Glyphs on the east wall of the passageway are horned snake, ax blade, stacked chevrons, two humans, bird, shield, barred oval, nested circles, and hand in a circle. The west wall has a turtle, individual and grouped humans, swastika, serpents, weeping eye and snake, and cross.

Also preserved in the sediments are imprints of a forearm, container, fabric, and rope. Though some of the motifs resemble icons of the Southern Ceremonial Complex, calibrated radiocarbon dates of 165 B.C.-A.D. 134 and A.D. 5-383 (Table 5.12) for a cane torch fragment embedded in one incised glyph and a torch smudge associated with the glyphs place at least some of the artwork in the early Middle Woodland subperiod (Crothers et al. 2002; Davis 1996; DiBlasi 1996; Faulkner 1997).

While no temporally diagnostic artifacts were recovered from the mud glyph portion of Crumps Cave, excavations in the vestibule yielded Buck Creek, Turkey Tail, and Adena Stemmed point types. The upper portion of a limestone tempered simple stamped Rough River series vessel with an incurved rim and a flattened and slightly crenulated lip was recovered below a stratigraphic level with a calibrated date of 356 B.C.-A.D. 424 (Table 5.12), an early date for Rough River pottery in western Kentucky. Coupled with another calibrated radiocarbon date of 769-207 B.C. (Table 5.12) for material recovered from the vestibule, the chronometric data indicate middle Early Woodland-Middle Woodland occupations (Carstens 1996).

Though primarily known for its Paleoindian and Archaic components (see chapters 3 and 4), the entrance to Savage Cave (a.k.a. Cooks Cave [15Lo11]) yielded Woodland period artifacts. Archaeologists from the Carnegie Institution conducted excavations at this site in the 1950s-1960s, and owner Genevieve Savage accumulated a large collection of artifacts from the cave. Woodland point types recovered from Savage Cave are primarily Middle to Late Woodland forms such as Copena Triangular (a.k.a. Greenville), Bakers Creek, Mud Creek, and Swan Lake (a.k.a. Chesser Side Notched) (Schenian 1988). A fiber tempered sherd from Savage Cave reportedly recovered from pre-600 B.C. contexts (Lawrence 1985) is suggestive of an Early Woodland component. The presence of Wright Checked Stamped and Rough River Series ceramics, the latter found in association with a Bakers Creek point, suggests that other site materials date to the Middle Woodland or early Late Woodland subperiods. Some of the Rough River rims exhibit lip notching. Calibrated radiocarbon dates are mostly Middle Woodland and range from 361 B.C.-A.D.16 to A.D. 428-652 (Table 5.12), but the site was occupied during all prehistoric time periods (Lawrence 1985).

One of the more extensive investigations of a Woodland site in this section was undertaken at the Plum Springs site (15Wa981), located on the Barren River floodplain of Beech Bend. This work resulted in the documentation of 72 postmolds and 54 pit and thermal features. Thirty-one of the latter were excavated, and 20 of these yielded Early-Middle Woodland diagnostics (Plum Springs series pottery and Turkey Tail, Adena Stemmed, Robbins, and Gary points) and/or calibrated radiocarbon dates of 389 B.C.-A.D. 72, 186 B.C.-A.D. 125, and A.D. 252-874 (Table 5.12). Of note was the long use of Adena Stemmed points at this site; three such points were recovered from two feature contexts, one with a date of cal 88 B.C.-A.D. 239 and another with a date of uncal A.D. 540 (standard deviation not reported) (Table 5.12) (Dowell 1981). The presence of Copena Triangular, Lowe Flared Base, Chesser Notched, and Bakers Creek points from surface contexts indicate that occupations continued into the late Middle-early Late Woodland subperiods (Applegate and McCray 2006; Dowell 1981; Schock 1979a).

The Plum Springs phase was defined by Schock and Dowell (1981) based on research at Plum Springs and other sites in the Barren River drainage. Diagnostic

artifacts are Plum Springs ceramics associated with Turkey Tail and Adena Stemmed points. The pottery series consists of three main types (Plum Springs Cordmarked, Plum Springs Smoothed-Over Cordmarked, and Plum Springs Plain) and three minor types (Plum Springs Fabric Impressed, Plum Springs Brushed, and Plum Springs Trailed). Though characterized as largely grit or rock tempered, Plum Springs pottery can contain a wide variety of tempering materials used in various combinations. Vessel forms are characteristically conical jars with flat narrow bases, and decorations, when present, consist of pinching and incising (Dowell 1981). Based on his work in the Upper Green River Section, Prentice (1993) noted formal similarities between Plum Springs and Crab Orchard pottery, suggesting that the relationship between the two should be examined.

Regarding patterns of chert use and chipped stone tool production associated with Early to early Middle Woodland features, the occupants of the Plum Springs site relied primarily on locally available chert resources, especially St. Louis, Ste. Genevieve, and Fort Payne. Bifacial items (projectile points, hafted scrapers, perforators, hoes, performs) were made primarily from these cherts, and all unifacial scraping tools, marginally modified flakes, and utilized flakes were manufactured from St. Louis chert. Debitage representing all stages of lithic reduction characterize the St. Louis, Fort Payne, and Ste. Genevieve samples. Two nonlocally available cherts (Haney and Elizabethtown) are represented predominantly by debitage from the late stages of lithic reduction. A small number of bladelets, some made from exotic Ohio Vanport (Flint Ridge) chert, were recovered from the site (Applegate and McCray 2006).

The Early to Middle Woodland component at Plum Springs represents the most intense occupation at the multicomponent site. Regarding intrasite patterning, two linear and three to five circular/semi-circular postmold clusters that may represent structural remains were documented. One possible interpretation is that the post clusters represent domestic windbreaks or drying racks. On the other hand, if Plum Springs was associated with the nearby Western Kentucky Coca Cola site, as Schock (1979a) suggested, it is possible that the structural remains at Plum Springs were used as screens for mortuary/ritual activities, such as feasting. This activity has been documented at other Early-Middle Woodland sites in Kentucky (e.g., Clay 1983, 1986, 1998a; Richmond and Kerr 2005), sans the mound construction. The rare occurrence of overlapping features, the apparently temporary nature of the "structures," and the limited range of tool types recovered suggest that the Plum Springs site was used frequently for short periods of time by groups engaged in a narrow range of activities (Applegate and McCray 2006).

Located near the Plum Springs site, Western Kentucky Coca Cola (15Wa963) was a late Early to early Middle Woodland mortuary site. Though at least half of the cemetery was destroyed by construction prior to archaeological investigation, 22 pit and stone-lined pit features were documented in the northern portion of the cemetery. Only seven of the features yielded human remains, which have not yet been analyzed. No grave goods were associated with any of the human remains. Two calibrated radiocarbon dates of 350 B.C.-A.D. 327 and A.D. 435-1956 (Table 5.12) are ambiguous (Schock 1979a) or indicate temporally distinct episodes of cemetery use.

One of the best documented mortuary sites in the Pennyroyal Section is the Watkins site (15Lo12), a mound-habitation complex on Clear Fork Creek in the Gasper River drainage. Mound A, the larger (22 x 15.5 x 1.5 m) of two earthen mounds,

contained 48 burials. Over 80 percent of the individuals in Mound A were extended fleshed burials, though several flexed fleshed, cremated, and bundled burials were found; the latter two likely represent secondary interments. Most of the individuals were interred in stone box graves (70 percent) or in pits with one to two limestone slabs and/or a limestone cap rock (16 percent); pit graves are an uncommon crypt form (14 percent) (Applegate 2000c, 2002; Ray n.d.).

Forty-six of the 48 burials were assigned to one of two zones based on their depth and associated grave goods. The lowermost Zone I (n=28) contained 11 adult females, seven adult males, six other adults, one subadult, and three infants. Grave goods included a variety of mostly Middle Woodland diagnostics, including limestone tempered sherds classified as Mulberry Creek or Candy Creek, a tetrapodal pottery vessel, three elbow pipes, bladelets, mica, conch dipper, and Adena, Motley, and Bakers Creek points. The uppermost Zone II (n=18) included five adult males, one adult female, four other adults, two infants, and six individuals of undetermined age/sex. These burials yielded late Middle Woodland to early Mississippian artifacts, such as limestone and shell tempered sherds and Bakers Creek and small triangular points. The property owner reportedly collected a copper breastplate from the mound (Applegate 2000c, 2002; Ray n.d.).

The complete tetrapodal vessel recovered from an adult female burial warrants special mention. Though it was not classified, many characteristics suggest it is a Middle Woodland or Hopewellian type: four sides, tetrapodal supports, and incised decorative motif. The smoothed exterior was decorated with a circle and curved line motif repeated eight times around the upper body within a zone demarcated by pairs of horizontal lines. Each of the eight circles had 5-13 shallow punctations or indentions. The straight-necked vessel measured 22.8 cm tall and 17.7-18.8 cm across. Podes measured 12 mm and the lip was five-six mm thick. The vessel had two pairs of mending holes (Ray n.d.; Schock and Dowell 1991). The decorative motif may represent a series of stylized migratory birds (Railey 1990).

Chapman's (1972) study of paleopathologies and osteometric variation in the Watkins Mound A burial population represents one of the few Woodland bioarchaeological studies in the Pennyroyal Section. Among the earlier Zone I burials, one adult male had two fused thoracic and lumbar vertebrae and lesions on thoracic vertebral bodies. Another adult male had a lesion in the nasal cavity and several skeletal changes associated with severe osteoarthritis. A bony growth was observed in the maxillary sinus of a third adult male. Among the later Zone II burials, two adult males had lesions on the vertebral bodies, and one of them also had two fused lower vertebrae and a humerus broken by a spear point (Chapman 1972).

Applegate (2000c, 2002) analyzed Chapman's (1972) osteometric data for 43 traits to study sexual dimorphism in the Middle Woodland Zone I burial population. Among other patterns, the average percentage of sexual dimorphism in stature is 8.3 percent, which is comparable to averages for food collecting populations in Ohio (Sciulli et al. 1991) and Europe (Frayer 1980). According to Applegate (2000c, 2002), the sexual dimorphism reflects sexual division of labor, an interpretation corroborated by analysis of differential mortuary treatment, as opposed to nutritional stress or sexual selection (Brown 1970; Hamilton 1982; Murdock and Provost 1973).

Applegate (2000c, 2002) documented inter- and intrazonal variation in mortuary treatment in the Mound A burials at the Watkins site. Zone I Middle Woodland burials have more elaborate grave offerings than Zone II late Middle Woodland-Late Prehistoric burials, indicating that some variation in Mound A burials can be explained by chronological factors. Data suggest that during all periods of mound use social status within the Watkins community was achieved rather than ascribed. In each zone, adults were interred with a much wider range of items, no subadults were interred with manufactured items, and a substantially higher percentage of adults have grave goods at all, as well as noteworthy items. Among the Zone I burials, there are statistically significant differences between males and females in types of grave goods, again suggesting sexual division of labor. Whereas females were associated with pottery, males were preferentially interred with lithic tools, copper, groundstone celts and adzes, chipped stone scrapers, bone bracelets, bone gorgets, and clay pipes.

Additional mortuary data was unearthed at Watkins Mound A. Features found during the course of excavation are two fire pits and a small hearth or remains of a funerary meal. Postmolds found to the northwest of the mound, some of them in a "double post" pattern, were interpreted as a "hut site" in a residential area (Ray n.d.). Ritual feasting associated with mortuary activities is known at several central Kentucky Woodland sites (see Bluegrass Management Area), and such activities apparently occurred at Watkins as well. The "double post" pattern sounds like the submound structures so common at Adena mounds and sacred circles elsewhere in Kentucky. Though not found under Mound A, the Watkins pattern actually was on the side of the mound opposite the known habitation area; perhaps, then, it represents the remains of a ritual structure.

The habitation area at Watkins covered an area of at least 370 x 400 m east of the two earthen mounds. Of the 44 typed points recovered from the habitation area, over 70 percent are potentially Woodland types that span the period: Delhi, Turkey Tail, Dickson cluster, Copena, Motley, Chesser, Steuben, Lowe Flared Base, Hamilton, and Madison. Chipped stone tool manufacture focused on two locally available cherts, St. Louis and Fort Payne. Nodular and tabular cores of chert were small in size, and the debitage reflects all stages of reduction. Other chert items are preforms, biface fragments, utilized flakes, hoe fragments, and bladelets (Applegate 2000c).

Of particular significance, Schock (1977, 1987, 1989b) discovered in the Watkins habitation area a rectangular corner-post wall-trench structure that measured 7.5 x 9.5 m. Two wall trenches and one corner post yielded limestone tempered pottery, and one wall trench also had a Bakers Creek point. Similar pottery was found in five hearth/pit features inside or west of the house, including one hearth inside the house footprint that also produced an Adena or Robbins point. Schock concluded that the Watkins house remains were Middle Woodland and the earliest evidence of such constructions in south-central Kentucky. Applegate (2000c) argued that the structure may instead date to a later period (see Chapter 6); the later site occupants dug the house structure into older deposits, and the earlier diagnostics became incorporated into the features as backfill. Two additional wall trench segments found at the site were devoid of diagnostic artifacts.

Campbell Mound (15Wa324A) was situated on the colluvial slope about 235 m from the north bank of Barren River, overlooking the comparatively broad floodplain of

Beech Bend on the south side of the river near Bowling Green. Because it was excavated by citizens and later destroyed, there is little documentation of the nature of the mortuary activities that were conducted at this site. There are no records about mound size, mound construction, mortuary preparation, body placement, or crypt types. Schock and Dowell (1991), however, did record information about selected grave items donated to Western Kentucky University: Bakers Creek point, chert biface, four groundstone celts, one cupstone (the only item from known burial contexts), one cut mica sheet measuring 6 mm thick, three beads of unspecified raw material, one conch shell cup/dipper, and four conch shell gorgets. Each gorget is circular in shape and has a pair of small drilled holes for suspension. Two of the gorgets have large holes in the center, giving the appearance of a ring shape. The other two gorgets have small holes in the center, creating a disk-like appearance. One of the disk-like gorgets is incised with an elaborate stylized design resembling a masked human figure and stained with pigment (Schock and Dowell 1991). The artifacts suggest a late Middle-early Late Woodland affiliation for Campbell Mound.

Though the early Late Woodland subperiod is poorly documented in the Pennyroyal Section, some stone box grave cemeteries may date to the terminal Late Woodland. Site 15Al329A is a Late Woodland-Mississippian mortuary site situated across the Barren River from the Jewell site (15Bn21, 15Bn349, 15Bn384, and 15Bn390), a Mississippi period administrative mound center (see Upper Green River Section below and Chapter 6). The cemetery probably is associated with an unexcavated/ undocumented habitation located upslope. Artifacts collected from the surface, disturbed burial contexts, and the upslope habitation are Bakers Creek and Jacks Reef points, other chert tools, shell tempered and shell/grit tempered pottery, and groundstone tools. Radiocarbon dates were obtained from two of the graves. One grave yielded calibrated dates of A.D. 687-992 and A.D. 899-1282, and the other a calibrated date of A.D. 1258-1625 (Table 5.12) (Applegate and DeDominico 2002; Schock and Langford 1979, 1982).

Of the 25 stone box graves documented at 15Al329A, 18 were excavated, and 10 of these yielded poorly preserved human remains. With the exception of a hexagonal crypt, the stone box graves were rectangular in shape. None contained grave goods (Schock and Langford 1982). Skeletal analyses are ongoing, but at least 21-22 individuals were interred in eight of the graves. Mortuary preparation included disarticulation and defleshing. Skeletal alterations (e.g., rodent gnawing) suggest that many burials are secondary interments; some individuals were placed as bundle burials, while the remains of others were restored to approximate anatomical order for interment. The in-flesh inhumations were extended burials (Applegate and Cannon 2003; Applegate and DeDominico 2002).

The skeletal remains from two of the graves were analyzed in depth (Applegate and Cannon 2003; Applegate and DeDominico 2002). A rectangular, partially stone-lined grave contained the commingled remains of at least two individuals, one subadult and one adult female who exhibited a number of dental pathologies. A roughly hexagonal stone-lined grave contained the commingled remains of at least seven individuals (including at least one adult male, one adult female, and one adolescent of unknown sex) and represents a secondary interment. At least two-three individuals exhibited dental pathologies. Other traumas/pathologies are a possible finger dislocation with one individual and neurocranial lesions suggestive of syphilis on an adult female.

Individuals in both graves, including the seemingly extended female burial in the rectangular grave, exhibited cut marks associated with disarticulation and defleshing, including scraping, slicing, and chopping marks.

Other stone box grave sites in the Pennyroyal are poorly reported. Site 15Wa316 contained 10 stone box graves and was assigned to the Woodland period (Foster 1972). The evidence used to make the chronological determination was not indicated, nor were the mortuary features or human remains described in detail. Dunkleau (15Wa374) is a Mississippi period cemetery that also has a Woodland component. Six mounds and 17 stone box graves were documented at the site (Foster 1972). The temporal affiliations of the site elements are unclear, but the site did yield a calibrated radiocarbon date of A.D. 1227-1435 (See Chapter 6:Table 6.8). Foster assumed that all the mound and mortuary constructions were late in time, but the aforementioned Woodland sites suggest this may not be the case.

UPPER GREEN RIVER SECTION

The 163 Woodland sites in this section contain 212 Woodland components. In addition to open habitations without mounds, the site inventory includes many rockshelters and caves but few earthworks (Table 5.10). Early and Middle Woodland components are comparable in number and exceed Late Woodland components (Table 5.11). Table 5.16 lists important Woodland sites recorded in the Upper Green River Section. These sites are concentrated in certain portions of the section, as substantial Woodland sites are not reported for Casey, Green, Metcalfe, and Taylor counties.

Occupations dating to the early Early Woodland subperiod in the Upper Green River Section are indicated by Ledbetter, Saratoga cluster, Turkey Tail, and Terminal Archaic Barbed cluster projectile point types (Table 5.7). Early pottery types are late Early to early Middle Woodland Crab Orchard and Plum Springs, two series originally defined in bordering sections. Early Woodland sites yielding these diagnostics are recorded in many counties throughout the Upper Green River Section.

Four important Woodland sites (15Bn303, 15Bn30A, 15Bn332B, and the Jewell site complex [15Bn21, 15Bn349, 15Bn384, and 15Bn390]) are located along Skaggs Creek and Peter Creek, which are tributaries of the Barren River. Schock and Langford (1982) assigned the Early Woodland components at sites 15Bn303 and 15Bn30A to the Plum Springs phase. Site 15Bn303 contained two Early Woodland pit features and yielded Adena Stemmed and Turkey Tail projectile points, and limestone and grit tempered cordmarked sherds. Undated burials also were documented at this site. Site 15Bn30A yielded one grit tempered eroded sherd and one fragment of a steatite vessel, both of which may date to the Early Woodland subperiod. Three stone box grave features at this site could not be dated (Schock and Langford 1982), but other such features in the vicinity are Late Woodland-Mississippian.

Adena and Bakers Creek points and grit tempered, cordmarked sherds were recovered from Site 15Bn332B, suggesting occupations during at least the Middle Woodland subperiod but potentially spanning the entire Woodland period. Though best known for

Table 5.16. Important Woodland Period Sites in the Upper Green River Section.

Site No.	Site Name	Site Type	Affiliation	References
15Ad59	none	mound	MW	Boisvert and Gatus 1977
15Bn20	Crystal Onyx	cave	EW	Applegate et al. 2001; Haskins 1988a, 1988b
15Bn21, 349, 384, 390	Jewell*	open habitation with mounds	EW, MW, LW	Hanson 1970; Lowthert et al. 1998; Schock and Langford 1982
15Bn30A	None	open habitation	EW	Schock and Langford 1982
15Bn51	Pit of the Skulls	cave	unassigned	Hemberger 1985
15Bn55	Roger's Discovery	cave	unassigned	Applegate et al. 2001; Haskins 1988a, 1988b
15Bn56	Prewitts Knob	open habitation	EW	Haskins 1988b
15Bn303	None	open habitation	EW	Schock and Langford 1982
15Bn332B	None	open habitation	EW	Schock and Langford 1982
15Ed1	Mammoth	cave	EW	Bryant 1997; Nelson 1917a, 1917b; Watson 1997; Watson and Carstens 1996
15Ed41	Nelson's	rockshelter	unassigned	Prentice 1993
15Ed42	Patch	rockshelter	EW, MW	Carstens 1980, 1996
15Ed43	Owl	cave	EW, LW	Applegate 2000; Carstens 1980
15Ed49	Martin	cave	EW	Prentice 1993
15Ed52	not disclosed	rockshelter	MW, LW	Carstens 1980, 1996
15Ed56	not disclosed	rockshelter	EW, MW, LW	Prentice 1993
15Ed61	not disclosed	rockshelter	EW, MW-LW	Prentice 1993
15Ed71	Mammoth Cave Fields	open habitation	unassigned	Nelson 1917a, 1917b; Prentice 1993; Schwartz and Sloan 1960;
15Ed85	Old Guides Cemetery	open habitation	EW, LW	Watson and Carstens 1982; Prentice 1993
15Ed95	Short	cave	EW	Horton 2003
15Ed162	Kingbird	rockshelter	EW, LW	Prentice 1993
15Ed163	not disclosed	rockshelter	EW	Prentice 1993
15Ed169	Lone Point	rockshelter	EW	Prentice 1993
15Ed176	Bluff	cave	EW, MW	Prentice 1993; Watson 1997
15Ed218	Ovenbird	rockshelter	EW	Prentice 1993
15Ed225	Dixon	cave	unassigned	Prentice 1993
15Ed367	Blue Heron	rockshelter	MW-LW	Prentice 1993
15Ed371	not disclosed	rockshelter	EW, MW-LW	Prentice 1993
None	Hilda Martin	rockshelter	LW	Applegate 2001
15Gy12	Rough River	rockshelter	MW, LW	Schlarb et al. 2008; Schwartz et al. 1958; Schwartz and Sloan 1960
15Gy32	Haycraft	open habitation	unassigned	Marquardt 1971; Schwartz et al. 1960
15Ht4	Salts	cave	EW	Watson et al. 1969; Watson 1997
15Ht14	Bratcher	open habitation	LW	Marquardt 1971; Schwartz et al. 1960
15Ht16	Higdon	rockshelter	EW, MW, LW	Marquardt 1971; Schwartz et al. 1960
15Ht26	Salts Cave Field	open habitation	EW	Carstens 1980; Watson et al. 1969; Watson 1997
None	Fisher Ridge	cave	EW	Crothers et al. 2002; DiBlasi 1996; Kennedy et al. 1983
15Ht69	Hidden River	cave	EW, MW, LW	Applegate 2000, 2009
*Site primarily known for its Mississippian component - See Chapter 6.				

its Mississippian component (see Chapter 6), Woodland materials from the Jewell site complex (15Bn21, 15Bn349, 15Bn384 and 15Bn390) consist of Wade, Motley, Adena, and Lowe cluster points and limestone tempered cordmarked sherds. A pit feature at Site 15Bn21 yielded a calibrated radiocarbon date of 41 B.C.-A.D. 1375 (Table 5.12) (Schock and Langford 1982). The large standard deviation associated with this date makes it somewhat suspect.

Near Glasgow, Woodland components at Site 15Bn82 yielded chipped stone points, scraper, and unifacial tools. Diagnostics Woodland points are Delhi, Gary Contracting Stem, Chesser Notched, Lowe Expanded Base, and Madison. Analysis of chipped stone tool manufacture during the Woodland, especially the Early Woodland subperiod when occupations were most intense, at Site 15Bn82 represents one of few systematic studies of lithic production systems in the section. Activities focused on amorphous core reduction and biface reduction using locally available cherts. The debitage assemblage is dominated by late-stage flakes (French et al. 2002).

In the Mammoth Cave National Park area, Early or Early-Middle Woodland surface, rockshelter, and cave sites yielded numerous Wade, Saratoga cluster, Turkey Tail, Adena Stemmed, Gary, and Little Bear Creek points, as well as small numbers of Epps or Motley, Ledbetter, Cotaco Creek, Kramer, and Robbins specimens (from Prentice 1993). Crab Orchard Fabric Impressed sherds occur in small numbers in pottery assemblages from Early or Early-Middle Woodland sites. Plum Springs Cordmarked and Plum Springs Plain are more prevalent at these sites than is Plum Springs Smoothed-Over Cordmarked (Prentice 1993). Within the Upper Green River Section, Prentice (1993) proposed two new Plum Springs varieties: Plum Springs Cordmarked, *var. Plum Springs,* and Plum Springs Cordmarked, *var. Green River*.

Evidence of Woodland period cave use was documented at six sites in Mammoth Cave National Park: Mammoth Cave (15Ed1), Salts Cave (15Ht4), Dixon Cave (15Ed225), Bluff Cave (15Ed176), Owl Cave (15Ed43), and Martin Cave (15Ed49). Though occupations span the Late Archaic to Late Prehistoric (Table 5.12), they were most intensive and extensive during the Early Woodland subperiod (Carstens and Watson 1996; Crothers et al. 2002; Prentice 1993; Tankersley 1996; Watson 1997). Traffic was most intense at Mammoth Cave followed by Salts Cave, especially the upper levels of both. Prehistoric cavers ventured more than one mile into both caves. A wide range of Woodland activities (habitation, exploration, mineral mining, ceremony-ritual, and burial) are evidenced at Mammoth and Salts caves, while fewer activities occurred at other caves. Preservation of normally perishable materials, including textiles and extensive paleofecal and archaeobotanical assemblages, is excellent (Crothers et al. 2002; Watson 1996, 1997). Caves were visited year-round, but the most intense use occurred during the spring-summer seasons. For example, pollen from a small sample of Mammoth Cave paleofeces suggests late spring-early summer and late fall-winter foci of cave use (Bryant 1997).

Archaeological investigations of Mammoth Cave (15Ed1) span almost a century. Following early excavations by Nelson (1917a, 1917b) and artifact analyses by Orchard (1920) and Neumann (1938), intense research resumed in the 1960s in and around the cave (Prentice 1993; Watson 1997). The upland ridge immediately outside the cave entrance was utilized prehistorically, including during the Woodland period, and is designated as two sites: Mammoth Cave Fields (15Ed71) and Old Guides Cemetery

(15Ed85) (Nelson 1917a, 1917b; Prentice 1993; Sloan and Schwartz 1960; Watson 1997; Watson and Carstens 1982).

Evidence of domestic and mortuary activities was documented in the Mammoth Cave Vestibule. Nelson (1917a, 1917b) described the habitation materials as "camp refuse," which included faunal and floral remains, pottery sherds, digging sticks, tied cane bundles, groundstone tools, bone implements, chert tools and debitage, and Wade, Dickson, and Lowe point types (Prentice 1993; Watson 1997). Several individuals were interred in the vestibule. According to Robbins (1997), Nelson found the remains of at least three individuals (adult female, subadult, fetus) from unspecified contexts during his excavations. Four additional individuals, who were interred in three grave features, were found by construction workers in the vestibule during the 1930s. The burials lacked grave goods and there are no chronometric dates, so their chronological/cultural affiliations are unclear (Prentice 1993). One individual was a flexed 18- to 19-year-old female interred in a shallow pit on a layer of burned grass or fiber, possibly a woven mat. Neumann's (1938) osteological analysis revealed a slightly long head, narrow face, and small but high cranial vault that, according to Robbins (1997), more closely resemble known Archaic rather than Woodland populations. Another individual of unspecified sex and age also was placed in a pit lined with grass or a fiber mat. Finally, a primary burial contained the commingled remains of an adult female and a 20- to 25-year-old adult male (Prentice 1993).

Additional human remains, as well as artifacts associated with cave exploration, mineral mining, and ceremonial-ritual activities, were found in dry levels of Mammoth Cave passageways, where most calibrated radiocarbon determinations for organic artifacts range from 1413-1029 B.C. to 387-203 B.C. (Table 5.12) (Kennedy 1996; Watson et al. 1969; Watson 1997). The mummified remains of a middle-aged male were found in 1935 under a large boulder, which became dislodged and crushed him as he mined cave minerals. The man carried a woven bag and wore a woven loin/breech cloth and a shell pendant (Prentice 1993). Previous osteological analyses by Neumann (1938) indicated that the man was about 45 years old and stood 160 cm tall. Craniometric traits include round head, high vault, broad face, and narrow forehead. Perimortem injuries are fractured right humerus, broken ribs, and skull fracture (Robbins 1997). Calibrated radiocarbon dates for this individual range from 772-364 B.C. to 157 B.C.-A.D. 213 (Table 5.12) (Watson et al. 1969). The desiccated body of a person of unspecified age and sex was found in Audubon Avenue of Mammoth Cave in 1814 and reburied in 1840. These remains were not scientifically analyzed, nor was information about the burial context published. Another individual from Mammoth Cave is represented by an adult skull cap found on the surface in the cave passageways (Robbins 1997).

Wood, cane, and textile objects were found on the surfaces of interior passageways in Mammoth Cave. The latter include slippers, torch ties, and cordage (King 1997). Upper Mammoth Cave yielded cane torch fragments, other fuel fragments, wood fragments, three climbing poles, gourd and warty squash fragments (possibly from containers), and torch stoke marks (Watson 1997). Carstens and DiBlasi (2004) described a partial cane flute (or flageolet) recovered from Upper Mammoth Cave. Because it exhibited signs of burning, the broken four-hole flute probably was reused by the prehistoric cavers as torch material. The likely Early Woodland item is only the second documented cane flute in the Eastern Woodlands, the other deriving from a

rockshelter in the Ozarks (Carstens and DiBlasi 2004). Pictographs were documented nearby on a breakdown boulder in the Devil's Looking Glass area of Upper Mammoth Cave. The cross-hatching, rectilinear, and spiral geometric designs were rendered with cane torch charcoal (Carstens and DiBlasi 2004; Crothers et al. 2002; DiBlasi 1996).

In Lower Mammoth Cave, a well-preserved split-cane basket, which had been damaged and repaired prehistorically, was recovered from East Ganter Avenue in an area of cave mineral mining. That passageway also produced a weed stalk, a wood/twig fragment, a gourd fragment, and torch smudges. Other items are cane and weed stalks and wood fragments from Jessup Avenue and Flint Alley (Watson 1997).

Evidence of gypsum, epsomite, and mirabilite mining in Mammoth Cave derives from the three uppermost dry levels of passageways, though most mining occurred in the middle level. Battering marks and mussel shell scrapers/spoons provide evidence of mining in Upper Mammoth Cave. In Lower Mammoth Cave, including Jessup Avenue, Ganter Avenue, and Flint Alley, archaeologists documented battering and ledge mining of gypsum, as well as limestone hammerstones (Tankersley 1989, 1996; Watson 1997). In addition, chert was mined from bedrock in the latter passageway (Watson 1997).

Watson (1997; Watson et al. 1969) led extensive investigations at Salts Cave (15Ht4), located on Flint Ridge and entered through a deep sinkhole, and the surrounding site Salts Cave Field (a.k.a. Salts Cave Surface [15Ht26]). The latter site yielded chipped stone tools and debitage from plow zone deposits. Knapping activities likely occurred near the sink, but it is unclear if they were related to cave use. Point types from Salts Cave Field are Saratoga Expanding Stemmed, Turkey Tail, and Early Woodland Stemmed cluster (Watson 1997).

Prehistoric activities are documented in all parts of Salts Cave. The vestibule contained a complex sequence of cultural deposits separated by natural strata marking periods between human occupations. Calibrated radiocarbon dates from these deposits span the Late Archaic and Middle Woodland subperiods, ca. 2131-1527 B.C. to 393-107 B.C. (Table 5.12) (King 1997; Watson 1997). Calibrated radiocarbon ranges for materials from the three levels of passageways are comparable, with Upper Salts at 1632-930 B.C. to 805 B.C.-A.D. 200; 1188-405 B.C. to 797-111 B.C. for Middle Salts; and 1749-980 B.C. to 1267-418 B.C. for Lower Salts (Table 5.12) (Kennedy 1996; Watson 1997). There are numerous additional calibrated radiocarbon dates for materials from Salts Cave (Table 5.12).

Like Mammoth Cave, at Salts Cave the vestibule was the focus of domestic and mortuary activities, while activities in the passageways involved exploration, mining, and ceremony-ritual. Unlike Mammoth Cave, however, the nature of domestic activities is thoroughly reported and mortuary practices were considerably different at Salts Cave. Vestibule occupations involved short-term, frequent visits by small groups, perhaps hunting parties. There are no architectural features in the vestibule, though two features may be postholes. Other features are pits, artifact clusters, midden pockets, and ash lenses. The vestibule artifact assemblage is diverse, but highly fragmented and burned faunal remains are ubiquitous. Other artifact types are chert celts, two of which exhibited plant polish, utilized flakes, and retouched flake tools; groundstone pestles, celts, atlatl weights, and two tubular pipes; mussel shell pendants, bead, and spoons or scrapers

(Watson 1997); and a bone bead, perforated raccoon canine tooth necklace, awls, needle, atlatl hook, and spatulate (Duffield 1997).

While the Mammoth Cave Vestibule held primary interments in formal grave features, in the Salts Cave Vestibule the commingled and fragmented remains of at least 41 individuals were recovered from domestic contexts. All major age groups are represented, with adults slightly outnumbering subadults. Of the adults, females and males are almost equally represented. Some of the more than 2000 skeletal specimens were unmodified while others were carbonized, calcined, cut, polished, crushed, or worked. Many cut marks suggest defleshing and scalping related to mortuary preparation, others are randomly oriented, while one may be an intentionally incised design. Three human long bone fragments were manufactured into awls, the first known case from a Kentucky cave (Robbins 1997).

Robbins (1997) offered two possible explanations for the Salts Cave Vestibule human skeletal assemblage. The first emphasized pre-interment mortuary preparation. The deceased were defleshed and the bones broken outside the cave, the remains were placed in the soft vestibule midden, and some bones were burned by subsequent occupations. The absence of significant meat protein levels in Salts Cave paleofecal specimens supports this explanation. The second explanation involves cannibalism, though whether it was ritual or nutritional is uncertain. That human and other animal bones were treated and disposed of in a similar manner, and the absence of comparable sites in the area, suggested that the deceased may have been consumed (Robbins 1997).

In addition to the human remains found in the vestibule, in 1875 a desiccated eight- to ten-year-old boy was found in Upper Salts Cave (Watson 1997). Soft tissue and associated organics yielded calibrated radiocarbon dates of 365 B.C.-A.D. 390 and 359 B.C.-A.D. 427 (Table 5.12), indicating his association with Middle Woodland use of Salts Cave (Kennedy 1996). Skeletal similarities with Adena burial mound populations include round head, high cranial vault, and occipital and frontal flattening. He consumed hickory, sumpweed, goosefoot, and meat protein (possibly grubs) prior to death, perhaps from a fatal injury (Robbins 1997).

Elsewhere in the interior, wood and cane objects from all three levels of Salts Cave include torch and other fuel items like twigs, cane, and weed stalks such as *Gerardia*; grass, vine, bark, and fiber torch ties; torch smudges; and squash and/or gourd container fragments. Some of the latter reportedly were charred and perhaps held fuels. Textiles recovered from Salts Cave include grass and bark torch ties (Watson 1997), "bags, what appears to be a tumpline, a band or belt, baskets or 'headdresses,' and possible mats or blankets as well as cordage and fiber bundles" (King 1997:31).

A variety of manufacturing techniques have been documented in the Salts and Mammoth textile assemblages. The slippers or shoes, which are the most common textile class, were mostly close twined, while the bag, blanket, and loincloth textiles are spaced or open twined. Other techniques are braiding, weaving, knotting, sewing, and twilling. Tassels, dyeing, and bird feather ornamentation were reported by previous researchers. Rattlesnake master (*Eryngium yuccafolium*) was the preferred plant fiber (King 1997). Chevron weaving patterns are present in many slipper specimens, which were woven in one piece with the slipper shape determined by the wefts (Orchard 1920). At least 68 slippers from Salts Cave are curated at universities and museums (Watson 1997).

In Upper Salts Cave, where mineral mining was most extensive, gypsum and other mineral crusts were scraped from the walls, crystals were recovered from cave sediments, and minerals were collected from ledges. Tools associated with mining activity, such as mussel shell scrapers or spoons, have been recovered from the upper passageways. There are mined areas in Middle Salts Cave, and "sporadic" evidence of mining in Lower Salts Cave includes an epsomite crystal and other minerals, a worked mussel shell spoon or scoop, and battered walls (Watson 1997). Regarding the nature of mining activities in Lower Salts Cave, "it is possible that the [artifactual] remains represent reconnaissance trips, and that the quantity of mineral available in Lower Salts was not adequate to justify regular work crews going there to remove it" (Watson 1997:70).

As with Mammoth Cave, rock art has been documented in Salts Cave at three locations up to 0.84 km from the entrance. Most ubiquitous are cross-hatched designs that were incised or drawn in charcoal. Another geometric motif consists of linear pictographs. Zoomorphic motifs in charcoal include a turtle, herpetomorphic, and an unidentified species (Crothers et al. 2002; DiBlasi 1996).

Regarding health, one paleofecal specimen from Salts Cave Interior contained nematode larva of an unidentified species, but the parasitic nature of the larva is unclear (Dusseau and Porter 1997). Other specimens yielded roundworm (*Ascaris lumbricoides*) eggs, likely derived from oral contact with "feces-contaminated soil, food, or drink" (Fry 1997:61). Only three paleopathologies were evidenced in the Salts Cave Vestibule burial population: osteoporosis, kidney stone, and dental hypoplasias (Molnar and Ward 1997; Robbins 1997).

Presently Salts and Mammoth caves hold the largest and most complete body of evidence available for Early Woodland subperiod hunting-gathering and horticulture in Kentucky (Kennedy 1996). The faunal, macrobotanical, paleofecal, and pollen evidence suggests a fairly uniform and limited range of foods were consumed (Watson 1997). Though a diverse range of animal species were consumed, animal foods comprised only 5-10 percent of the largely vegetarian diet (Duffield 1997; Watson 1997; Yarnell 1997a, 1997b).

Wild plant remains recovered from Upper and Lower Mammoth Cave and Upper Salts deposits, from the Salts Cave mummy, and from Salts Cave paleofeces are dominated by hickory nut shell. Other species are oak/acorn, hazelnut, *Gerardia* (perhaps used as torch fuel), panic grass and other unidentified grasses, portulaca, carpetweed, purslane, viburnum, honey locust, holly, poke, sumac, blueberry, elderberry, blackberry, strawberry, grape, and ground cherry. Pollen from Mammoth and Salts caves paleofeces represents intentional digestion of wild plants including dandelion, lily, sweetflag, grasses, cactus, iris, *Rosaceae sp.*, aryllis, and unspecified flowers. Other plants likely were used during spring-summer, while nuts were used in fall-winter or stored for year-round consumption. Some early spring plants may have been used for medicinal or ritual purposes. Though 29 percent of the wood charcoal from the Salts Cave Vestibule flotation samples was walnut, chestnut, beech, and cherry species, there is no indication that nuts from these trees were consumed, suggesting incomplete use of potential foods (Bryant 1997; Marquardt 1997; Schoenwetter 1997; Stewart 1997; Watson 1997; Yarnell 1997a, 1997b).

Faunal remains were recovered from Salts Cave vestibule sediments and paleofecal specimens, and there are differences in the species represented in assemblages from the two contexts. The former produced evidence of at least 19 consumed animals: deer, elk, turkey, opossum, raccoon, red fox, gray fox, dog or wolf, groundhog, striped skunk, Eastern cottontail, Eastern gray squirrel, field mouse, Hispid cotton rat, rice rat, box turtle, bass, catfish, and mussels (Duffield 1997; Stansberry 1997; Watson 1997). Faunal remains from Salts Cave paleofecal specimens are snake bones, fish scales, insect fragments, frog bones, unidentified remains (Stewart 1997), and mice, sparrow, salamander, and bobcat bones (Duffield 1997). Mammoth Cave paleofecal remains provided limited evidence of animal consumption. Bones from amphibians, reptiles, rodents, and a turkey foot suggest reliance on small vertebrates (Watson 1997).

Duffield (1997) reconstructed patterns of animal procurement based on the Salts Cave Vestibule faunal assemblage. The overall picture is one of a diffuse economy, as Carstens (1996) also postulated for the Early Woodland of the central Kentucky karst. While some species (deer, raccoon, and turkey) were intentionally hunted, other species were opportunistically exploited. The level of bone processing may indicate attempts to increase nutritional returns in the face of protein shortages (Duffield 1997). Aquatic resources like fish and mussel supplemented the largely terrestrially derived diet. Earlier occupations are associated with exploitation of animals from diverse environments, while species from the upper horizon were derived largely from closed or semi-open deciduous forest or forest edge zones (Duffield 1997; Stansberry 1997), patterns corroborated by plant pollen analyses (Schoenwetter 1997). The following diachronic trends in vertebrate animal exploitation at the Salts Cave Vestibule are evident in the data tables presented by Duffield (1997:Table 5.17.2). Over time there were substantial decreases in species diversity and minimum numbers of individuals, and a moderate decline in turkey exploitation. Food yields (measured in pounds of meat) are highest in the lower horizon and lowest in the middle horizon. Large mammals constitute a high percentage of faunal assemblages across time, and the level of deer exploitation varies little over time.

Cultivars were an important component of the Early Woodland diet of the Salts Cave occupants (Watson 1997). Except for a few bottle gourd seeds, the Salts Cave Vestibule flotation sample was comprised almost exclusively of Eastern Agricultural Complex species (Yarnell 1997a). Intensified use of seeds in the Early Woodland subperiod continued into the Middle Woodland at Salts, perhaps in response to environmental and demographic factors. There is a correlation between increased weedy seed use and development of open oak-hickory woodlands corresponding to the period of intensive cave use. The causal relationship between the two events, however, is not known at this time (Watson 1997).

Indigenous cultivars recovered from Salts Cave paleofecal specimens are sunflower, goosefoot, maygrass, sumpweed, squash, erect knotweed, giant ragweed, and amaranth (Schoenwetter 1997; Stewart 1997). Goosefoot, maygrass, and sunflower (with hickory) were among the four most common species (by weight) recovered from Mammoth and Salts paleofeces. Goosefoot was the most ubiquitous species, even in comparison to wild species (Marquardt 1997). Sunflower and sumpweed specimens from Salts and Mammoth caves qualify as cultigens, but the status of goosefoot and maygrass is unclear (Yarnell 1997b), though goosefoot "was at least an encouraged (harvested and stored) weed" associated with gardens (Watson 1997:234). Sizeable amounts of

sumpweed and goosefoot were recovered from the intestines of the mummified Salts Cave boy (Watson 1997; Yarnell 1997a, 1997b).

According to Yarnell (1997b), intentional garden cultivation (sunflower, sumpweed, cucurbits) accounted for about 42 percent of the diet at Salts Cave, while opportunistically harvested cultivars (goosefoot and maygrass) accounted for about 32 percent. "The indication is that garden production, fallow or otherwise, contributed two-thirds, more or less, of the total food supply. This estimate may turn out to be too high, but it should be obvious that the amount was somewhat greater than has generally been suspected for a subsistence pattern of this age in eastern North America" (Yarnell 1997b:122).

While Mammoth and Salts caves are the most thoroughly documented Woodland cave sites in the Upper Green River Section, other caves in and near Mammoth Cave National Park provide evidence of Woodland resource procurement, material culture, subsistence, mortuary practices, and belief systems. Undated but possibly Woodland period evidence of mineral mining derives from two other caves in Mammoth Cave National Park. Little is known about prehistoric mineral mining in Dixon Cave (15Ed225), located near Mammoth Cave. Despite significant disturbance, possible evidence of prehistoric mining activities includes a digging stick (Prentice 1993).

Prehistoric exploration of Bluff Cave (15Ed176), situated in Doyel Valley, is indicated by torch fragments, charcoal, and smoke-blackened walls. Torches were made of *Gerardia* and cane stalks, wood, and possibly solidago. Battering marks indicate where gypsum crusts were mined prehistorically. No diagnostic artifacts were recovered from Bluff Cave, but the mining activity there may have been contemporaneous with that at Salts and Mammoth caves (Late Archaic-Early Woodland subperiods) (Crothers et al. 2002; Prentice 1993; Tankersley 1996; Watson 1997).

> Prehistoric Indians entered this rather uncomfortable little cave and mined gypsum from it using weed stalk torches for light (presumably there were no cane stands nearby). So far, no textile fragments, squash or gourd remains, human paleofecal specimens, or other artifacts have been found in Bluff Cave, but it is possible that intensive and extensive removal of breakdown would reveal some of these items (Watson 1997:222).

There are two important caves in Woolsey Valley, also in Mammoth Cave National Park. Owl Cave (15Ed43) is a limestone cave with the entrance situated in the large Cedar Sink sinkhole. From the vestibule the wide trunk passageway drops substantially in elevation to a pool of water. Prehistoric artifacts are concentrated in the cave vestibule, with a scatter outside the cave entrance. In addition to chert tools/debitage and plant and animal remains, artifacts recovered from the vestibule are Late Archaic Stemmed cluster, Early Woodland Stemmed cluster, Delhi, and Steuben points, indicating occupations during the Early and late Middle-early Late Woodland subperiods (Applegate 2000b; Carstens 1980).

Regarding one of the few studies of archaeoastronomy in Kentucky, professional employees of Mammoth Cave National Park and cave scientists have documented a solar alignment at Owl Cave. On the equinoxes they observed that the sun aligns directly with

the entrance of the cave. Beams of sunlight pass through the sloping main trunk, strike the pool of water at the bottom of the passage, and reflect onto the back wall of the cave. The scientists suggested that this phenomenon may have had ritual significance for prehistoric cave occupants (Chris Groves, personal communication 2000).

To the southeast, the vestibule of Martin Cave (15Ed49) contains deep and, in some places, intact cultural deposits including components spanning the Middle Archaic to Middle Woodland subperiods. Excavations by Watson and Carstens (1982, as cited by Prentice 1993) revealed six pottery-bearing strata yielding limestone tempered cordmarked, smoothed, fabric-impressed, and simple-stamped sherds. Other artifacts include projectile points and other chipped stone tools, groundstone tools, faunal remains including mussel shells and abundant deer bones, and hickory nut shell. The presence of human skeletal remains indicates mortuary use of the cave, in addition to domestic habitation during the fall-early winter months. There was no evidence of prehistoric mining.

To the east and south of Mammoth Cave National Park are six important caves that provide evidence of Early Woodland and later occupations: Short Cave (15Ed95), Crystal Onyx Cave (15Bn20), Roger's Discovery (15Bn55), Pit of the Skulls (15Bn51), Hidden River Cave (15Ht69), and Fisher Ridge Cave (no state site number). The latter is the only one of several caves in the Northtown area that has been reported by archaeologists. This rock art site contains geometric motifs in the form of cross-hatching. With calibrated radiocarbon determinations of 1657-1223 B.C. and 1187-783 B.C. (Chapter 4:Table 4.15), cave occupations date to the Terminal Archaic-Early Woodland transition (Crothers et al. 2002; DiBlasi 1996; Kennedy et al. 1983; see also Chapter 4).

Short Cave (15Ed95) is a short, mostly horizontal, single-trunk passageway several miles south of Mammoth Cave. Evidence of prehistoric use comes from the vestibule and consists of four intentional burials. Besides providing information about mortuary activity, the site yielded evidence of textile manufacture, medicinal plant use, and religious beliefs. Calibrated radiocarbon dates for one of the burials overlap between 1260 and 1041 B.C. (Chapter 4:Table 4.15), placing the site at the Late Archaic-Early Woodland transition (Horton 2003, 2007).

In the early 1800s saltpeter miners discovered four desiccated individuals buried in the Short Cave Vestibule. The poorly preserved remains of an infant, consisting largely of the cranium, reportedly were wrapped in deerskin. An adolescent boy, allegedly with an occipital fracture that may have been the cause of death, was wrapped with grave goods in a deerskin. A subadult or young adult female was recovered from a prepared grave. These three individuals were not scientifically studied, and today the remains are either unaccounted for or destroyed. The flexed remains of an adult woman wrapped in deerskin were recovered in 1811 from an alleged stone box grave in the vestibule. After being displayed for a short time in Mammoth Cave, the woman was transferred to several museums and, in 1914, was defleshed (Horton 2003, 2007; Robbins 1997). Detailed bioarchaeological analyses have not been conducted on the remains.

Little is known about the burial context of the Short Cave mummy, and only a portion of the grave goods reportedly associated with this woman was curated. Lost items are textiles and hides, cane whistles, and worked animal bones (Horton 2003, 2007; Powell 1996). The two cane whistles reportedly measured about 20 cm in length, had flat

reeds placed in the openings in the tubes, and were tied together (Bullitt 1844 as cited in Carstens and DiBlasi 2004) like a panpipe.

The Short Cave woman reportedly was wrapped in two decorated deerskins and a bark sheet. Textiles included foot gear, woven bags, and a woven head cap (Powell 1996). Three of the existing textile fragments may be remnants of a wrap and/or bags woven of rattlesnake master, milkweed (*Asclepias sp.*), or some bast fiber, the latter processed by vetting. Fiber material, three strands of cordage, and a box of additional cord fragments revealed a predominance of Z-spin direction in cordage and S-spin direction in plied cords. Different fibers were used for different types (diameters) of cordage (Horton 2003, 2007; Powell 1996).

Faunal remains reportedly found with the Short Cave mummy include a headdress of seven Coopers hawk (*Accipiter cooperii*) feathers, two rattlesnake (*Crotulas horridus*) skins, a pierced raptor (eagle?) claw on a cord, a pierced bear jaw on a cord, seven bone needles or awls, deer sinew, and 20 leather pieces on a string (Powell 1996). Horton (2003) confirmed the existence of a leather object on a cord, seven small leather objects that may be the "fawn hooves," four Coopers hawk feathers plus additional strung feathers and feather fragments, and one fragment of a rattlesnake skin. The other items were not found in current museum collections.

Powell (1996) and Horton (2003, 2007) interpreted the Short Cave woman's burial items as evidence of her status as a medicine woman. The special items placed with the woman were in woven bags separate from the body. Feathers of Coopers hawk, part of one to two headdresses and streamers, may have represented "sky" and perhaps were part of a costume for "performative activities." The rattlesnake may signify "underworld." Motifs painted on deer hide may have had special significance. Cane whistles may have had "performative" functions. Plants with medicinal properties were associated with the woman; seeds of green dragon (*Ariseama dracontium*) or jack-in-the-pulpit (*Ariseama tripyllum*) strung on cordage may have been used to treat female afflictions. These plants are ammenorrheas, which relieve illness associated with pregnancy or cessation of menses, and contraceptive or abortifacients, which prevent or end pregnancies (Horton 2003; Powell 1996). They also may have been used in divination ceremonies (Horton 2003).

To the southeast of Short Cave, Prewitts Knob near Cave City is dotted with 16 caves, three of which yielded archaeological material including human skeletal remains dated to the Late Archaic-Early Woodland subperiods. Crystal Onyx Cave (15Bn20), a show cave for the last several decades, is the most extensive of the three caves with three levels and about 700 m of passageways. Six calibrated radiocarbon dates from the site range from 1113-804 B.C. to 350 B.C.-A.D. 118, though the dates cluster at the early end of this range (Table 5.12). Roger's Discovery (15Bn55) is a pit cave with five levels and 50 m of passageways, and Pit of the Skulls (15Bn51) is another pit cave with four levels and over 80 m of passageways (Haskins 1988a, 1988b; Hemberger 1985). The knob surface (15Bn56) produced Turkey Tail and Late Archaic-Early Woodland points, and a potential Ste. Genevieve chert quarry was identified on the northwestern edge of the knob (Haskins 1988b).

Of the Prewitts Knob sites, Crystal Onyx Cave yielded the largest burial population. Haskins (1988a, 1988b) identified a minimum of 36 commingled individuals

in a sample of 678 highly fragmented bone specimens and Applegate et al. (2001) identified a minimum of 33 individuals in a sample of 919 specimens. An unspecified number of specimens, including two partial crania, from Pit of the Skulls represent a minimum of five individuals (Hemberger 1985). The Roger's Discovery sample of 308 specimens represents a minimum of six individuals (Applegate et al. 2001). Individuals of both sexes and all major age groups are represented in the three burial populations. Adults comprise 74 percent of the minimum number of individuals, subadults 19 percent, and infants 7 percent. Of the 33 adults for whom sex could be determined, 55 percent are males and 45 percent are females. The demographic data indicate that interment in caves was not limited by age or sex in Late Archaic-Early Woodland society.

The three Prewitts Knob caves were special-purpose sites, as evidence of human activity relates solely to human burials. The interments are secondary in nature, and postmortem mortuary processing in the form of disarticulation and dismemberment, which presumably occurred at another location, occurred prior to burial in the caves. Though a variety of formation processes significantly impacted the distributions of human remains in the caves, the remains were commingled in each assemblage, suggesting a communal or "ossuary" character to the burial grounds. There is no indication that the human remains were buried in cave sediments but, instead, were deposited on the cave ground surfaces (Applegate et al. 2001; Haskins 1988a, 1988b; Hemberger 1985). Whether the bones were thrown into the caves or placed there by hand is unknown, though Haskins (1988b) suggested the former.

Overall, the individuals represented in the Prewitts Knob burial populations enjoyed good health. Paleopathologies documented in the samples include bone fractures, infectious diseases and reactions, nutritional stress indicators, and degenerative afflictions including arthritis and dental attrition. Small sample sizes and bone fragmentation prevented detailed analyses of age-related and sex-linked differences in paleopathology, but an estimated eight of the adults and subadults in the three assemblages exhibited traumas or pathologies (Applegate et al. 2001; Hemberger 1985).

Regarding cultural modifications, occipital flattening is apparent on two skulls from Pit of the Skulls (Hemberger 1985) and "a few skulls" from Crystal Onyx Cave (Haskins 1988b:242). One adult male from Pit of the Skulls exhibited grooving of a molar with a large cary, which may have been a means of medical treatment. He and another male exhibited excessive wear, flaking, and displacement of the front teeth resulting from using the mouth as a vice to grip materials as they were pulled upward and outward (Hemberger 1985). Cut marks indicating postmortem defleshing and disarticulation were documented for adults and subadults at Crystal Onyx Cave and adults at the two pit caves. Very limited evidence of burning, which may indicate cremation, was noted in the Crystal Onyx Cave and Roger's Discovery assemblages (Applegate et al. 2001; Haskins 1988a, 1988b; Hemberger 1985).

Located about 15 km east of Mammoth Cave in downtown Horse Cave, Hidden River Cave (15Ht69) is a show cave entered through a large sinkhole. Beyond the wide cave entrance the main passageway slopes down steeply to an active underground river. Excavation of a 2 x 3 m area on the sinkhole floor revealed intact but secondary prehistoric deposits, as well as mixed deposits (Applegate 2000a). Excavation of 12 m^2 on the plateau surface produced additional prehistoric materials but no midden or cultural features (Applegate 2008). Diagnostic artifacts indicate that all Woodland subperiods are

represented. Point types from the sinkhole and plateau are Saratoga cluster, Turkey Tail, Delhi, Motley, Kramer, Robbins, Gary, Adena, Copena, Lowe, Steuben, and Madison (Applegate 2000a, 2008). Pottery sherds from the sinkhole are untyped coarse and fine limestone tempered plain, limestone and sand tempered plain, sand tempered plain, limestone tempered incised, limestone and sand tempered incised, limestone tempered cordmarked or fabric impressed, and limestone, chert and shell tempered plain. A mica cutout reportedly was recovered from the sinkhole (Applegate 2000a).

In addition to caves, Woodland materials have been recovered from several rockshelters in and around Mammoth Cave National Park: Site 15Ed163, Site 15Ed56, Nelson's Rockshelter (15Ed41), Kingbird Rockshelter (15Ed162), Patch Rockshelter (15Ed42), Site 15Ed52, Ovenbird Rockshelter (15Ed218), Lone Point Rockshelter (15Ed169), Blue Heron Rockshelter (15Ed367), Site 15Ed61, Site 15Ed371, and Hilda Martin Shelter (no state site number). Most of these shelters yielded primarily chipped stone tools and debitage, with the Ovenbird Rockshelter and Lone Point Rockshelter each yielding a single point perhaps representing magico-religious offerings. Pottery, groundstone tools, and organic tools were recovered from some of these shelters. Six shelters contained intact human burials (sites 15Ed41 and 15Ed163) or disturbed human remains (sites 15Ed56, 15Ed61, 15Ed367, and 15Ed371) (Applegate 2001; Carstens 1980, 1996; Prentice 1993).

In addition to Early and Early-Middle Woodland point and pottery types mentioned previously, Mammoth Cave area rockshelters yielded diagnostics of the Middle and Late Woodland subperiods. Prevalent point types are Copena cluster, Lowe cluster (Lowe Flared Base, Bakers Creek, Steuben, and Chesser), and small triangular types including Madison and Hamilton; Snyders points are infrequently documented (Table 5.7) (from Prentice 1993). Pottery types are Mulberry Creek series, Rough River series, Wright Checked Stamped, Baytown Plain, and Yankeetown Incised and Burnished Ware (Applegate 2001; Carstens 1980, 1996; Prentice 1993). Based on his work in the park, Prentice (1993) defined three pottery varieties: Mulberry Creek Cordmarked, *var. Kingbird*, Mulberry Creek Plain, *var. Kingbird*, and Rough River Cordmarked, *var. Blowing Springs*.

Woodland period rockshelters in the Mammoth Cave area yielded faunal and floral remains indicative of food collection. Animal species are deer, bear, squirrel, raccoon, opossum, fox, dog/wolf, beaver, rabbit, duck, box and other turtles, gar, terrestrial gastropods, and several species of mussel. Plant species are exclusively nuts, especially hickory but also black walnut. The shelter assemblages evidence exploitation of multiple habitats, from riverine to uplands. To date, no plant cultigens have been recovered from Woodland contexts at these shelters, which is curious given the relative abundance of cultigens in similarly aged deposits at Mammoth and Salts caves (Carstens 1996; Prentice 1993). The difference may be due to season of occupation (caves were spring-summer and shelters were fall) and nature of site activities (mineral mining in caves and nut/deer acquisition at shelters) (Prentice 1993).

Concerning diachronic subsistence trends, Carstens (1996) characterized the Early Woodland subsistence strategy in the Mammoth Cave area as diffuse. Deer use continued, and there was a slight increase in hickory, walnut, and acorn utilization. There was an "increase in the number of environmental habitats exploited" (Carstens 1996:9). The Middle and Late Woodland subsistence strategies were focal. During the former,

only "open woodland, transitional forest edge, and riverine (Green River)" habitats were used, and deer exploitation was prominent. During the latter, deer hunting and hickory continued, and box turtle were opportunistically collected (Carstens 1996).

Among the most significant of the Mammoth Cave area rockshelters is Site 15Ed163, which contained a 20 cm thick midden both inside and outside the dripline. The Late Archaic-Early Woodland deposit yielded Late Archaic Stemmed and Dickson cluster points and other artifacts. No pottery or features were discovered in the 2 sq m excavation area. Site 15Ed56 is a southwest-facing shelter that measures 14 x 11 x 5 m in size. Despite considerable looting, a 25 cm thick subsurface midden was preserved in the dry deposits. In addition to unspecified human remains and nondiagnostic artifacts, diagnostic items from the midden are Plum Springs and Mulberry Creek pottery and Lowe cluster and small triangular points, indicating occupations potentially spanning the Woodland period. Elsewhere in the Mammoth Cave area, an adult female in a stone box grave was discovered by Nels C. Nelson at Nelson's Shelter (15Ed41). The primary burial did not contain grave goods, but artifacts such as grit tempered sherds found elsewhere in the shelter suggest a Woodland affiliation (Prentice 1993).

Surface collection and excavation of 3 m^2 at Kingbird Rockshelter (15Ed162) produced a number of Woodland period artifacts and revealed two intact subsurface deposits. The Early-Middle Woodland stratum produced Plum Springs and Mulberry Creek pottery, burned clay and daub, lithics, and faunal remains. Two storage pits are associated with this occupation, the larger of which yielded Mulberry Creek, Blue Lake, and Rough River pottery; burned clay and daub; Ledbetter drill, Lowe cluster point, and other point fragments; and hickory nutshell and faunal remains reflecting exploitation of diverse habitats. Calibrated radiocarbon dates for the large pit are 897-513 B.C. and 766-264 B.C. (Table 5.12). The Late Woodland layer contained a primary burial, Lowe Flared Base and Madison points, other chert items, and faunal remains. The flexed burial was a robust, young adult (18-25 years) female placed on her side in a pit and covered with sandstone slabs. There were no grave goods. The burial is significant because it is the only rockshelter interment placed outside the dripline found in the Mammoth Cave area (Prentice 1993).

Excavation of 4 m^2 at Patch Rockshelter (15Ed42) revealed six strata from two major occupational episodes. Woodland period occupations spanned ca. 500 B.C.-A.D. 500, though Adena Stemmed and Bakers Creek points and Rough River, Mulberry Creek, and Wright Checked Stamped pottery suggest a primary Middle Woodland component. A calibrated radiocarbon date of A.D. 408-857 (Table 5.12) was obtained for a feature with Rough River series pottery (Carstens 1980, 1996). A small triangular point, a shell pendant, and other artifacts were recovered from the shelter (Prentice 1993).

Excavation of 22.5 m^2 at Site 15Ed52 revealed a subsurface midden about 15 cm thick and a refuse pit. Projectile points representing all Woodland subperiods are Cotaco Creek, Adena Stemmed, Copena, Bakers Creek, Steuben, Levanna, and Madison. Pottery types are Rough River series, Yankeetown Burnished Ware, and Baytown Plain. Sherds of the latter were recovered from contexts that yielded a calibrated date of A.D. 1030-1291 (Table 5.12). Middle-Late Woodland activities, which predominated at this multicomponent site, included hickory nut processing, deer hunting, and opportunistic collecting of box turtles (Carstens 1996; Prentice 1993). According to Watson and Carstens (1980 as cited in Prentice 1993), the shelter was occupied by a nuclear family

during the mid-late fall for perhaps several months, and food acquisition activities involved a sexual division of labor.

In sum, Prentice (1993, 1996) found that selection of rockshelters in the Mammoth Cave area was based primarily on size; for large shelters, habitability and accessibility were additional relevant variables. Rockshelters with 10-50 m^2 area of usable space tend to be single component sites with relatively lower densities of artifacts representing limited types of activities. Shelters measuring at least 100 m^2 tend to be multicomponent sites with relatively higher densities of artifacts representing more diverse activities. For large shelters, dry and accessible sites were used preferentially; these sites tend to be located at the heads of hollows. Exposure direction (i.e., aspect) and rocky substrate were not found to be significant factors influencing shelter site selection (Prentice 1993, 1996). Regardless of size, Applegate (2001) found that rockshelters in Edmonson County served similar functions (e.g., chipped stone tool manufacture and maintenance, hunting, mussel collecting, and food preparation) with the frequency of shelter utilization declining throughout the Woodland period.

Prentice (1993) also documented several open habitation sites within Mammoth Cave National Park. These sites varied in size and occupational intensity by topographic location, with the highest site densities in the park associated with the bottomland zone. Large upland sites are situated within 1 km of the Green River or near springs. These sites are multicomponent artifact scatters lacking features but representing relatively long-term occupations compared to other open sites but less permanent than large rockshelters. They likely functioned as locales for fall hunting and nut harvesting. Small upland sites are located away from the Green River but within 1 km of water sources like ponds or intermittent stream confluences. They are characterized by lithic scatters representing single component, short-term occupations where lithic production activities occurred. Large bottomland sites representing repeated occupations are located near the confluences of the Green River with its tributaries, where the floodplain is relatively wide and occupants had easy access to uplands. Small bottomland sites were used infrequently and are found on levee and ridge topographic features away from stream confluences. Chert extraction activities occurred predominantly in upland valleys south of the Green River at about 213 m in elevation (Prentice 1993, 1996).

According to Prentice (1993), groups occupying the Mammoth Cave National Park area during the Middle Woodland subperiod did not participate in the ritual [mortuary] ceremonialism that is documented in other parts of Kentucky and the Ohio Valley. Schwartz et al. (1958b) made a similar observation, based on the results of their survey of portions of Hardin, Breckenridge, and Grayson counties in advance of construction of the Rough River reservoir. They noted that while they documented extensive Woodland use of this region, they found no evidence of mound construction or ceremonial elaboration (Schwartz et al. 1958b:17). Burial mounds, however, have been documented in other portions of the Upper Green River Section.

For instance, Site 15Ad59 is an Adair County burial mound located in the southeastern part of the section. Though it was not professionally investigated prior to its destruction, artifacts observed in a private collection provided some information about goods interred with the dead at this site. The items include an elbow pipe of unspecified material, seven Copena Triangular points, a copper bead, a rectangular drilled gorget fragment, two large scraps of mica, and plain pottery (Boisvert and Gatus 1977). The

material assemblage from this mound, which shares similarities with the Watkins Mound A assemblage in the Pennyroyal Section, suggests affinities with the Copena Complex of northern Alabama (Walthall 1979). In middle Tennessee, Copena traits such as triangular/ lanceolate points are restricted to the early Middle Woodland McFarland phase (ca. 100 B.C.-A.D. 200), with expanded stem and weakly notched points characterizing the subsequent early Owl Hollow phase (A.D. 200-400) (Cobb and Faulkner 1978; Dillehay et al. 1984; Kline et al. 1982). Based upon these phases, Site 15Ad59 likely dates to the early Middle Woodland subperiod.

Late Woodland occupation of the Upper Green River Section is not nearly as well documented as that of the Early and Middle Woodland subperiods. As noted previously, Baytown Plain and Yankeetown Incised ceramics were recovered from rockshelter sites and Lowe cluster and small triangular points from caves and shelters in the Mammoth Cave area. Late Woodland components were recorded at open habitation sites in the Barren River Lake vicinity, many of which, such as the Jewell site complex (15Bn21, 15Bn349, 15Bn384, and 15Bn390), have significant Mississippian occupations (see Chapter 6). At these sites Lowe cluster and small triangular points are prevalent.

One of the best known early Late Woodland sites is Rough River (15Gy12) in Grayson County. This rockshelter overlooks an intermittent tributary near its confluence with Rough River. The central 174 sq m of the 57.9 x 7.6 x 3.1 m shelter was accessible and contained prehistoric occupation debris about 86 cm deep. The upper 30 cm of the site contained predominantly late Middle to Late Woodland/early Mississippian materials; these deposits were underlain by about 15 cm of mixed Archaic-Woodland strata. Features include ash and ash-charcoal lenses, fire-hardened floors, and burials, though the relative ages of each were not clearly delineated. The secondary burial of a 30-year-old male was discovered in Woodland levels at this site (Schwartz et al. 1958a). This secondary burial was associated with abundant shells and was partly mixed with an underlying, possibly Archaic burial (Schwartz et al. 1958a; Schwartz and Sloan 1960). No other details about the interment, such as the type of shell (e.g., mussel and gastropod) and whether or not the shells represented incidental inclusions or grave goods, were given.

A majority of projectile points from the Rough River site are triangular (Hamilton Incurvate and Madison) and reflect more extensive or intensive use of the shelter after about A.D. 800, though only a few shell or mixed shell and limestone tempered sherds were recovered. The triangular points also may be associated with the small amount of clay/grog tempered ceramics found at this site. Though these ceramics could not be assigned to an established type, they may represent Yankeetown or Mulberry Creek Cordmarked/Baytown Plain (Schlarb et al. 2008).

Other Woodland point types recovered from the Rough River site are Bakers Creek, Lowe Flared Base, and Chesser Notched (Schlarb et al. 2008). These points may be associated with the limestone tempered ceramics that dominate the site ceramic assemblage. Middle/Late Woodland limestone tempered Rough River Series ceramics (Rough River Cordmarked, Rough River Plain, and Rough River Simple Stamped) are present and the Rough River shelter is the type site for the series (Schlarb et al. 2008; Schwartz and Sloan 1960). Of the three types, Rough River Simple Stamped ceramics is somewhat different from Rough River cordmarked or plain specimens, being tempered only with white limestone, exhibiting consistently thinner vessel walls, and, of course,

having stamped exteriors. These three pottery types are known from sites elsewhere in the section, such as in Edmonson County. In the Mammoth Cave area, Rough River Cordmarked is the earliest type of the series, and it is more prevalent than the other types. A fourth type, Rough River Smoothed-Over Cordmarked, is identified in these site assemblages (Applegate 2001; Carstens 1996; Prentice 1993). As discussed previously, sites in the Western Coalfield and Pennyroyal sections also yielded Rough River series pottery.

The temporal placement of Rough River pottery is unclear, but it may span the Woodland period. Many archaeologists assign it to the Middle-Late Woodland, and Lawrence (1985; see also Schlarb et al. 2008) observed that the Rough River series was most popular during the late Middle Woodland, ca. A.D. 400-600. Based on a review of the literature, however, the possible time range for sherds assigned to this series ranges from 769 B.C. (Crumps Cave) to A.D. 1291 (Site 15Ed52) (Table 5.12). Other calibrated absolute dates for contexts yielding Rough River pottery are 356-A.D. 424 at Crumps Cave and A.D. 408-857 at Patch Rockshelter (Table 5.12) (Carstens 1996). "The origin of this ceramic type and its morphological relationship to other Early Woodland ceramics is not currently known" (Carstens 1996:9), but the cordmarked type may be a limestone tempered precursor to clay tempered Mulberry Creek Cordmarked (Carstens as cited in Lawrence 1985).

SALT RIVER (MANAGEMENT AREA 3)

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

In the late nineteenth century William Marcus Linney conducted geological-archaeological surveys of 11 Kentucky counties including several in the Salt River Management Area. He reported on prehistoric sites in the Danville-Harrodsburg area in an 1881 letter to the Smithsonian Institution, recording 37 Woodland-Late Prehistoric earthworks, graves, rock piles, workshops, and villages in Boyle and Mercer counties (Clay 1985). According to Clay (1985:211), "the detail of Linney's survey data was ahead of its time." Few additional archaeological studies, however, were conducted in the Salt River Management Area until the 1970s.

More counties in the management area were surveyed by Funkhouser and Webb (1932) as part of their state-wide archaeological inventory. One of the few Woodland site archaeological excavations undertaken between the 1930s and 1970s involved salvage work at Zorn Avenue Village (15Jf250) (Matthews 1958; Mocas 1988). This site, which was located on a bluff top 30 m above the floodplain about 1.4 km south of the Ohio River, was discovered during construction of a Louisville subdivision in the 1950s. It was a substantial Middle Woodland habitation with features.

During the 1970s, several cultural resource management archaeological investigations were undertaken in this management area. Much of this work was conducted by the University of Louisville, and information on Woodland occupations was obtained from several sites, including Hornung (15Jf60), Site 15Jf161, McNeeley Lake (15Jf200), Bates Island (15Jf258), and Hunting Creek (15Jf268) (Mocas 1988, 1992, 1995). In 1974, excavations were conducted at the early Late Woodland SARA site (15Jf187), which is located on the central of three parallel ridges in the broad alluvial valley of the Ohio River floodplain. Work also was conducted at the nearby Early Woodland Arrowhead Farm site (15Jf237), which is located in a similar topographic setting as the SARA site (Mocas 1995).

The University of Kentucky's investigation of Archaic sites in southwestern Jefferson County (Collins 1979) produced important Early Woodland data. Woodland components were documented at Spadie (15Jf14), Rosenberger (15Jf18), Longworth-Gick (15Jf243), and Villier (15Jf110). In the Fort Knox area, O'Malley et al. (1980) identified a large number of habitation sites. Of these, sites 15Bu358, 15Hd229, and 15Md152 were assigned to the Woodland period based upon the occurrence of Adena, Turkey Tail, expanding stemmed points, or chert tempered ceramics. Site 15Hd126 is a mound that may date to the Woodland period.

In the early 1980s the University of Kentucky conducted limited excavations at the Old Bear site (15Sh18) in Shelby County, and in the early 1990s the Kentucky Heritage Council excavated the nearby Shelby Lake site (15Sh17). These projects, along with the University of Kentucky's work at Withrow Creek (15Ne55) in Nelson County (Davis et al. 1997) and Mocas' (1995) reporting on the SARA site (15Jf187), generated new information on the Late Woodland subperiod in this management area. To the southeast, Early Woodland data was recovered from the Danville Tank site (15Bo16) in Boyd County

(Boedy and Niquette 1987) and a buried Woodland-Mississippian midden was documented at Site 15Sp26 (Driskell et al. 1984).

Since 1990, a number of investigations have been undertaken in Jefferson County, the best-documented portion of the Salt River Management Area. In the early 1990s, Early Woodland materials were recovered from the Railway Museum site (16Jf630), which is located on a terrace of the Ohio River in Louisville (Ross-Stallings 1995). Located on the south bank of the Ohio River, the Shippingport site (15Jf702) is a multicomponent site with a significant Early Woodland occupation. Over 140 pits, thermal features, and postmolds indicate repeated site use (French et al. 2007). Mocas (1976, 1988, 1992, 1995) analyzed a number of Woodland ceramic assemblages from the Greater Louisville Area. In addition to this work, early, Middle, and Late Woodland assemblages have been recovered from Site 15Mn361 in Marion County (Bybee 2001).

SITE DENSITY AND DISTRIBUTION PATTERNS

The 410 Woodland sites in the Salt River Management Area account for 14 percent of the Woodland sites in Kentucky. This management area, however, has the highest density of Woodland sites per square km, and the density of Woodland sites per acre surveyed is slightly higher than the state average (Table 5.1).

Regarding site type, the vast majority (87 percent) of Woodland sites in the management area are open habitations without mounds. Rockshelters, earth mounds and mound complexes, and specialized activity sites each account for 2 percent of the Woodland sites. About 4 percent and 3 percent of the sites are unspecified types and other types, respectively. The low incidence of mounds and the absence of nonmound earthworks in this management area contrasts sharply with the adjacent Bluegrass Management Area, which contains an abundance of such sites. This pattern may reflect differences in social integration and expression between the two areas during the Woodland period.

The 529 Woodland components associated with sites in the Salt River Management Area account for 15 percent of the Woodland components in Kentucky. Over 41 percent of the Salt River components are Early Woodland, the highest percentage for all management areas. About 28 percent and 27.5 percent of the Salt River components are Middle Woodland and unassigned, respectively. Only about 3.5 percent are Late Woodland, which represents the smallest percentage of Late Woodland sites within any management area, though only slightly smaller than the percentage for the Bluegrass (Table 5.2).

CHRONOMETRIC DETERMINATIONS

Chronometric determinations for the Salt River Management Area are provided in Table 5.17. The dates, including some acquired through thermoluminescence, span all

Table 5.17. Chronometric Dates for the Salt River Management Area.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Riverwood (15Bu265)			
M-2462	2870±150	1436-788 BC	Crane and Griffin 1972; Janzen 1977
M-2463	2450±140	890-880, 844-336, 331-203 BC	Crane and Griffin 1972; Janzen 1977
Site 15Hd478			
OCR Dating	2959±88	1009 ± 88 BC *	Stallings and Ross-Stallings 1996
OCR Dating	2837±85	887 ± 85 BC *	Stallings and Ross-Stallings 1996
Villier (15Jf110)			
Tx-3010	2390±70	766-369 BC	Robinson and Smith 1979
SARA (15Jf187)			
Beta-12721	2250±70	479-470, 414-95 BC	Mocas 1995
UGa-1231	2065±60	347-318, 207 BC-AD 67	Mocas 1976
Beta-12720	1400±70	AD 442-452, 461-483, 533-776	Mocas 1995
Arrowhead Farm (15Jf237)			
UGa-677	2965±175	1606-1574, 1558-1551, 1538-802 BC	Mocas 1976
UGa-699	1285±70	AD 635-894, 927-934	Mocas 1976, 1995
UGa-678	920±245	AD 624-627, 631-1454	Mocas 1976
Site 15Jf246			
UGa-1337	2055±75	353-293, 230-218, 213 BC-AD 86, 106-120	Dobbs and Dragoo 1976
Hunting Creek (15Jf268)			
UGa-1259	2300±350	1258-1233, 1217 BC-AD 425	Mocas 1992
Long (15Jf549)			
Beta-42897	2440±60	761-682, 671-403 BC	Granger et al. 1992
Shippingport (15Jf702)			
Beta-215667	2470±60	767-411 BC	French et al. 2007:33
Beta-215903	2440±40	754-685, 668-610, 598-406 BC	French et al. 2007:33
Beta-215875	2420±60	757-684, 669-397 BC	French et al. 2007:33
Custer (15Jf732)			
Beta-24090	1520±40	AD 430-617	Anne T. Bader pers. comm. 2008
Site 15Mn361			
Beta-155127	2130±50	359-276, 259-42 BC	Bybee 2001
Withrow Creek (15Ne55)			
Beta-96394	1540±60	AD 410-637	Davis et al. 1997
Shelby Lake (15Sh17)			
Beta-73118	1480±60	AD 433-495, 503-656	Hockensmith et al. 1998
Beta-73162	1430±60	AD 437-488, 531-689, 752-761	Hockensmith et al. 1998
Old Bear (15Sh18)			
UGA-3706	1440±100	AD 392-780, 792-804	Brooks 1985
Site 15Sp26			
82-5-228-1*	1960±140	10±140 BC (TL date)	Driskell et al. 1984
82-5-228-2*	1940±250	AD 10±250 (TL date)	Driskell et al. 1984
Beta-4786	1695±125	AD 73-603	Driskell et al. 1984
82-5-B021-2*	1590±100	AD 360±100 (TL date)	Driskell et al. 1984
82-5-B021-1*	1550±110	AD 400±110 (TL date)	Driskell et al. 1984
82-5-346-1*	1320±100	AD 630±100 (TL date)	Driskell et al. 1984
Beta-4786	1080±65	AD 777-1045, 1094-1120, 1141-1147	Driskell et al. 1984
Beta-4787	595±55	AD 1288-1422	Driskell et al. 1984
* University of Missouri			

subdivisions of the Woodland period, especially the early Middle, late Middle, and early Late Woodland subperiods.

REGIONAL SEQUENCE

Most previous research on Woodland sites in the Salt River Management Area has been conducted the Falls region, with some important sites excavated in nearby Shelby, Nelson, and Marion counties (Table 5.18). In the upper reaches of the Salt River drainage, some work has been undertaken in Boyle County, but a large portion of this management area has received limited attention, and there are no substantial Woodland sites reported for Anderson, Larue, Mercer, Oldham, and Washington counties.

Table 5.18. Important Woodland Period Sites in the Salt River Management Area.

Site No.	Site Name	Site Type	Affiliation	References
15Bo16	Danville Tank	open habitation	EW	Boedy and Niquette 1987
15Bu265	Riverwood	rockshelter	EW, LW	Granger 1988; Janzen 1977
15Bu358	none	open habitation	EW	O'Malley et al. 1980
15Hd126	none	mound	unassigned	O'Malley et al. 1980
15Hd229	none	open habitation	EW, MW	O'Malley et al. 1980
15Hd478	none	open habitation	EW	Stallings and Ross-Stallings 1996
15Jf14	Spadie*	open habitation	EW, MW	Mocas 1988, 1992, 1995
15Jf18	Rosenberger*	open habitation	EW	Driskell 1979
15Jf60	Hornung*	open habitation	EW	Mocas 1988, 1992, 1995
15Jf110	Villier*	open habitation	EW	Robinson and Smith 1979
15Jf161	none	open habitation	unassigned	Mocas 1988, 1992, 1995
15Jf187	SARA	open habitation	EW, MW, LW	Mocas 1995
15Jf200	McNeeley Lake*	open habitation	MW	Mocas 1988, 1992, 1995
15Jf237	Arrowhead Farm*	open habitation	EW, MW, LW	Mocas 1988, 1995
15Jf243	Longworth-Gick*	open habitation	EW	Collins 1979
15Jf246	none	open habitation	MW	Dobbs and Dragoo 1976
15Jf250	Zorn Avenue Village	open habitation	MW	Matthews 1958; Mocas 1988, 1992
15Jf258	Bates Island	open habitation	unassigned	Mocas 1988, 1992, 1995
15Jf268	Hunting Creek	open habitation	EW, MW	Mocas 1992
15Jf549	Long	open habitation	EW	Granger et al. 1992
15Jf630	Railway Museum*	open habitation	EW	Stallings 1995
15Jf702	Shippingport	open habitation	EW	French et al. 2007
15Jf732	Custer	open habitation	MW-LW	Bader pers. comm. 2007
15Md152	none	open habitation	EW	O'Malley et al. 1980
15Mn361	none	open habitation	EW, MW, LW	Bybee 2001
15Ne55	Withrow Creek	open habitation	MW, LW	Davis et al. 1997
15Sh17	Shelby Lake	open habitation	LW	Hockensmith et al. 1998
15Sh18	Old Bear	open habitation	LW	Brooks 1985
15Sh33	Old Christianburgh Station	open habitation	LW	Hilgeman 1985
15Sp26	none	open habitation	LW	Driskell et al. 1984

*These sites are primarily known for their Archaic components - See Chapter 4.

Some of the earliest Woodland sites in the Salt River Management Area produced assemblages of the Riverwood phase, the only Woodland phase designated in the management area. Besides the type site of the same name (15Bu265), Riverwood phase components have been documented at Arrowhead Farm (15Jf237), Hornung (15Jf60), Rosenberger (15Jf18), Villier (15Jf110), Longworth-Gick (15Jf243), and Spadie (15Jf14), most of which are described below. Spanning the Terminal Archaic and Early Woodland subperiods, Riverwood phase components date to ca. 1200 to 300 B.C. The phase may be associated with Adena (Granger 1988), though there are few mounds and no enclosures in the management area and most Adena sites post-date ca. 500 B.C. Unfortunately, the Riverwood phase remains poorly defined and diagnostic artifact types are not clearly delineated. Artifact types that the aforementioned Riverwood phase sites have in common are thick grit tempered pottery and Adena Stemmed, Cogswell-like, and other stemmed points.

Regarding these diagnostic artifacts, Early Woodland Stemmed and Dickson cluster points are common at other Early Woodland sites in the Salt River Management Area (Table 5.7). According to Mocas (1988), some of the Early Woodland pottery from Jefferson County sites shares similarities with Crab Orchard series from the Ohio River II Section, but the Falls materials lack dowel-wrapped cordmarking. Some early sherds are classified as Zorn Punctate, such as three sherds representing two vessels and six pinched sherds from Rosenberger (15Jf18) and Hornung (15Jf60), respectively (Mocas 1988). The temporal affiliation of Zorn Punctate is unclear, however. Zorn Punctate sherds were recovered from several dated Early Woodland contexts in the Salt River Management Area (Mocas 1988; Robinson and Smith 1979) and Ohio River II Section (Bader 1996b), and Mocas (1988) indicated that Zorn Punctate probably was coeval with or pre-dated Fayette Thick, an Early Woodland pottery type in the adjacent Bluegrass Management Area. Despite these data, many archaeologists view Zorn Punctate as a Middle Woodland pottery type based on evidence outlined later.

Arrowhead Farm (15Jf237) is located on a linear ridge in the Ohio River floodplain. The multicomponent site is associated with a calibrated radiocarbon date of 1606-802 B.C. (Table 5.17), the earliest chronometric determination for Woodland sites in the management area. The dated charcoal sample was associated with Zorn Punctate pottery, which was recovered from mortuary and nonmortuary contexts at the site. Mocas (1988), however, considered the very early date suspect and instead associated the pottery with the Middle Woodland component at Arrowhead Farm. If the date and association are correct, the Arrowhead Farm pottery is among the oldest in Kentucky.

Riverwood Rockshelter (15Bu265) in Bullitt County yielded Early Woodland calibrated radiocarbon dates of 1436-788 B.C. and 890-203 B.C. (Table 5.17). Both dates were obtained from charcoal reportedly associated with thick, grit tempered pottery (Janzen 1977:138). Reexamination of these ceramics, however, suggests that they may actually date to the Late Woodland subperiod (Stephen T. Mocas, personal communication 1987).

Located on the south bank of the Ohio River, the Shippingport site (15Jf702) is a multicomponent site with a significant Early Woodland component. Point types are Buck Creek, Turkey Tail, Kramer, Cypress Stemmed, and Gary. Two features with Kramer points yielded calibrated radiocarbon dates of 754-406 B.C. and 767-411 B.C. (Table 5.17). French et al. (2007) recovered pottery tempered with coarsely ground gravel from

Early Woodland features at the Shippingport site. Some specimens exhibit cordmarked exterior surfaces, while other sherds have both exterior and interior cordmarking similar to Marion Thick wares. Grit tempered sherds were found in a feature with a two-sigma calibrated radiocarbon date of 757-397 B.C. (Table 5.17) (French et al. 2007).

Features associated with the Shippingport Early Woodland component indicate repeated site use and consist of 15 large pits, 47 thermal features (e.g., hearths, smoking/roasting pits, and stone oven), and 83 postmolds. Some postmolds are clustered but are not patterned in such a way as to suggest structures; perhaps they are associated with temporary single-post lean-tos. Most features tend were found outside the possible lean-tos. Some hearths are paired (French et al. 2007).

At the Villier site (15Jf110), Early Woodland materials were recovered from the upper levels of an 80 cm thick stratum, the bulk of which yielded Late Archaic occupation debris. Early Woodland diagnostics are Adena-like projectile points and thick, chert or limestone tempered sherds including Zorn Punctate. A calibrated radiocarbon date of 766-369 B.C. (Table 5.17) was obtained from an Early Woodland pit feature at this site (Collins 1979; Mocas 1988; Robinson and Smith 1979).

Joseph Granger surface collected and undertook limited excavations at the Hunting Creek site (15Jf268) in the 1970s. This bluff-top site overlooking Harrods Creek is 4.5 km east of the Ohio River. Six of the approximately 20 features documented at the site were excavated. The one radiocarbon date from this site has a very large standard deviation, which resulted in a calibrated date of 1258 B.C.-A.D. 425 (Table 5.17). This date, which is suggestive of an Early or Middle Woodland component, was obtained from a small charcoal sample recovered from a feature. Diagnostic artifacts from feature contexts, which may be associated with a Middle Woodland component, are Falls Plain pottery and Snyders cluster/variant points (Mocas 1992).

Other sites in this management area yielded Early Woodland chronometric dates. In Jefferson County, the Long site (15Jf549) produced a calibrated radiocarbon date of 761-403 B.C. (Table 5.17) (Granger et al. 1992). Though not identified as Riverwood phase, a likely contemporary site in Hardin County is 15Hd478, which yielded materials OCR dated at 1009±88 B.C. and 887±85 B.C. (Table 5.17) (Stallings and Ross-Stallings 1996). Early-Middle Woodland occupations at Site 15Mn361 in Marion County are indicated by a calibrated radiocarbon date of 359-42 B.C. (Table 5.17) (Bybee 2001). Similarly, an Early-Middle Woodland component dated at cal 479 B.C.-A.D. 95 and cal 347 B.C.-A.D. 67 (Table 5.17) is evidenced at the SARA site (15Jf187) (Mocas 1995).

Several Early Woodland sites in the Salt River Management Area lack chronometric dates but yielded diagnostic artifacts. The Railway Museum site (16Jf630) is located on a terrace of the Ohio River in Louisville. Though primarily a Late Archaic habitation with burials (see Chapter 4), an Early Woodland component is evidenced by three sherds classified as Mid-Valley Cordmarked. One of the grit tempered sherds also had crushed quartzite temper and two also had crushed igneous rock temper. One of the latter had fingernail impressions over the cordmarking (Stallings 1995). Based on Mocas' (1988) description, the Railway Museum sherds fall within the formal range of Zorn Punctate.

Early Woodland materials were recovered from the uppermost zones of the deeply stratified Longworth-Gick site (15Jf243), which is located on a ridge in the Ohio River floodplain. Early Woodland diagnostics associated with this component include Adena, Cogswell-like, and other stemmed points, along with grit tempered cordmarked or plain ceramics including Zorn Punctate. Dark midden staining and features, including small fire pits, were uncovered in the Early Woodland zone at the site (Collins 1979; Mocas 1988).

In the upper reaches of the Salt River drainage, Early Woodland materials were recovered from the Danville Tank site (15Bo16) in Boyle County. Though this is a large multicomponent site, the most substantial occupations occurred during the Late Archaic and Early Woodland subperiods. Artifacts were mixed vertically, but horizontal integrity was judged adequate. Lithic artifacts reflect a reliance on locally available cherts for tool production, supplemented by the use of tools of imported exotic cherts, during the Early Woodland subperiod. The Early Woodland occupation at Danville Tank reflects frequent reuse for short intervals of time. The site functioned as a hunting camp where stone tools were manufactured and maintained. The near absence of features indicates low occupational intensity (Boedy and Niquette 1987).

In the Upper Rolling Fork River valley, a tributary of Salt River in Marion County, Early Woodland knappers used a wide range of cherts, especially Muldraugh but also Boyle, Harrodsburg, and Gilbert cherts, each of which was locally available in residual and alluvial sources like gravel bars. Use of nonlocal St. Louis chert increased significantly during the Early and Middle Woodland subperiods, signaling expansion of socio-economic relations or trade networks beyond the local area. Though still secondary to Muldraugh, Boyle chert utilization increased during the Middle and Late Woodland subperiods. Due to their relatively poor quality and limited availability, Harrodsburg and Gilbert cherts were used infrequently over time. Heat treatment was employed throughout the Woodland period (Ray 2000).

Our knowledge of Woodland mortuary and ritual activity in the Salt River Management Area is limited. Archaeologists have documented only seven mounds, two mound complexes, and two open habitations with mounds in the Salt River Management Area. Further, few mounds have been investigated by professional archaeologists. For example, William Marcus Linney (1881 as cited in Clay 1985) recorded a complex of four earthen mounds in Mercer County. Based on the recovery of a copper bead from one of the mounds, this complex may date to the Early-Middle Woodland (Clay 1985).

There are no stone mounds, cemeteries, or isolated burials recorded in this management area, but three rock pile sites with burials were documented by Linney (1881 as cited in Clay 1985) in Boyle and Mercer counties. Owing to their similarity to the C. L. Lewis Mound in Indiana, Clay (1985) proposed a Woodland affiliation for the sites. Linney (1881 as cited in Clay 1985) also reported a stone box grave with mica sheets in Mercer County, a likely Early or Middle Woodland site (Clay 1985). Other exotic or unique artifacts that reportedly were found at Woodland mortuary sites in this management area are a copper ear spool from Marion County in the 1880s (Richmond and Kerr 2005) and a slate reel-shaped gorget reported from an unspecified Jefferson County site (Webb 1941a). There are no known earthen enclosures or rock art sites in this management area.

A large number of Middle Woodland or late Early-early Middle Woodland habitation sites are now reported in the Salt River Management Area, including the eight significant sites described below. Regarding diagnostic artifacts, Lowe cluster points are common at these sites (Table 5.7). During the Early and Middle Woodland subperiods, "relatively little change can be identified in the local ceramic sequence," perhaps because the ceramics were utilitarian wares that did not change very much (Mocas 1988:137). Pottery assemblages from Middle Woodland sites include Zorn Punctate and Falls Plain, while Newtown series pottery derives from late Middle to early Late Woodland sites. Mocas (1988) tentatively dated the former at ca. 200 B.C.-A.D. 200. For example, Zorn Punctate pottery was recovered from a pit feature at Site 15Jf246 that yielded a calibrated date of 353 B.C.-A.D. 120 (Table 5.17). This site is located adjacent to Longworth-Gick (15Jf243) in the Ohio River floodplain (Dobbs and Dragoo 1976:137). Mocas (1988) proposed a range of ca. A.D. 0-400 for Falls Plain pottery. However, subsequent research revealed that Zorn Punctate and Falls Plain are not exclusively Middle Woodland. As noted previously, Zorn Punctate has been recovered from Early Woodland contexts at sites in this management area.

Falls Plain pottery, which has been recovered from 10 sites in Jefferson County (Mocas 1992, 1995), may extend into the late Early Woodland and early Late Woodland subperiods. Falls Plain sherds are associated with Turkey Tail, Saratoga, Lowe cluster, and Snyders cluster points in dated feature contexts at four Falls area sites, though the former points may be intrusive (Mocas 1992, 1995). "The combination of limestone temper and smoothed surface treatment on ceramics from the Falls of the Ohio River region appears to be significant on a local level. The lack of other pottery types in association with Falls Plain and the frequent co-occurrence of Snyders cluster projectile points with these ceramics indicate Falls Plain pottery may be a useful cultural and temporal marker" (Mocas 1992:76). As use of Falls Plains declined, production of cordmarked wares resurged. Though there is some overlap, "Falls Plain occupies a temporal and stylistic position between the local grit tempered cordmarked and/or punctated pottery, typified by Zorn Punctate ceramics, and the Late Woodland limestone or siltstone tempered cordmarked pottery" (Mocas 1992:77) of the Falls area.

Matthews (1958) documented a substantial Middle Woodland component at the Zorn Avenue Village site (15Jf250), located on a bluff overlooking the Ohio River floodplain. Most of the projectile points recovered from features at this site are Adena Stemmed and Middle Woodland-like corner notched points. The pottery is mostly Zorn Punctate, but Falls Plain sherds also were identified. Zorn Avenue Village is the type site for Zorn Punctate and one of four type sites for Falls Plain (Matthews 1958; Mocas 1988). There are no absolute dates for Woodland occupations at the habitation site.

Similar artifacts were recovered from late Middle Woodland to early Late Woodland contexts at the multicomponent Arrowhead Farm site (15Jf237). Diagnostic artifacts include a Lowe Flared Base point, and Zorn Punctate and Falls Plain pottery. Features containing mostly pinched Zorn Punctate ceramics are a refuse pit, a bundle burial, and a funerary fire. A calibrated radiocarbon date of A.D. 635-934 (Table 5.17) was obtained from a circular pit feature that unfortunately lacked diagnostics (Mocas 1976, 1988, 1995).

Located on the narrow floodplain at the confluence of Salt River and Candy Creek at Taylorsville Lake, Site 15Sp26 contained a buried midden deposit with features. Five thermoluminescence dates ranging from 10±140 B.C. to A.D. 630±100 and a calibrated radiocarbon date of A.D. 73-603 (Table 5.17) are suggestive of a late Middle to early Late Woodland occupation. Artifacts recovered from the midden are chipped stone tools and debitage, pottery, fire-altered rock, and charcoal. Daub recovered from the site provided tentative evidence of structural remains. Vegetal processing likely occurred at the site, based on the recovery of hickory, black walnut, bedstraw, and goosefoot remains. The site may represent a temporary campsite occupied in the fall (Driskell et al. 1984).

Custer (15Jf732) is a late Middle Woodland or early Late Woodland site with intact subsurface midden and features. Diagnostic artifacts are Lowe Flared Base points, a Copena-like biface, a clay figurine fragment, and Wyandot bladelets and prismatic cores. Postmold, which may be part of a structure, yielded check-stamped pottery and mica. Most of the Newtown-like ceramics are thin, cordmarked, and tempered with limestone or limestone and shale/siltstone. Some of the rims exhibit lip notching. Large and small mammal bones and fish remains were recovered from subsurface contexts. The Custer site has yielded a calibrated AMS date of A.D. 430-617 (Table 5.17) (Anne Tobbe Bader, personal communication 2007, 2008).

Withrow Creek (15Ne55) is a multicomponent site located on a ridge crest in the uplands of Nelson County. Lowe, Steuben, and Chesser points and Newtown-like ceramics, as well as a calibrated radiocarbon date of A.D. 410-637 (Table 5.17), indicate late Middle to early Late Woodland occupations. Other tools are hafted end scrapers, drills, and bladelets. Plant remains include abundant nuts and two cultigens, goosefoot and maygrass. Several concentrations of pit and hearth features were uncovered in areas distinct from postmold clusters. Three semi-circular patterns of postmolds represent overlapping structures, one of which had been rebuilt. In general, occupations were of somewhat low intensity. Though the site was frequently reused, the duration of each occupation was short (up to several months). A limited range of activities occurred at the site, including chipped stone tool manufacture and food processing/consumption (Davis et al. 1997).

Two contemporaneous early Late Woodland sites in the Clear Creek drainage are Shelby Lake (15Sh17) and Old Bear (15Sh18). The former site, located on an upland ridge crest, covered an area of 100 x 156 m. Excavations focused on 10 refuse-filled cooking and storage pits within an area of 40 x 60 m on the west side of the site. Calibrated radiocarbon dates of A.D. 433-656 and A.D. 437-761 were obtained from two of the features (Table 5.17). Lowe cluster points, chert bifaces, a drill, a celt, flake tools, and bladelets were recovered from Shelby Lake. The flake sample represents all stages of reduction and use of both soft- and hard-hammer percussors. Newtown series pottery exhibited a low frequency of castellated rims. Shelby Lake is one of few Woodland sites in the Salt River Management Area that yielded worked bone; utilitarian tools include bird and mammal awls, mammal rib scraper, and polished and drilled mammal bones (Hockensmith et al. 1998).

Reliance on wild plant and animal species was documented at the Shelby Lake site. At least 19 individuals representing 12 animal species/groups were utilized: white-

tailed deer, black bear, mountain beaver, turkey, spiny soft-shell turtle, eastern box turtle, raccoon, cougar, elk, pit viper snakes, colubrid snakes, and unidentified fish. The faunal assemblage indicates the use of "first line food sources" primarily from forest edge environs. Despite the use of flotation recovery, the near absence of fish and mussel specimens indicates little use of aquatic resources. About one-fourth of the faunal specimens were burned and a small percentage exhibited cut marks. Because fewer than 25 percent of the specimens exhibited pathologies, the Shelby Lake site occupants selected young, healthy animals for consumption. Marrow extraction was practiced (Hockensmith et al. 1998).

Ten tree species were represented in the wood charcoal sample from Shelby Lake, indicating the presence of a mixed hardwood oak-hickory forest. Most of the wild plant remains are nut shells, with hickory remains greatly outnumbering those of black walnut, hazelnut, acorn, and butternut. A small number of fleshy fruit seeds were recovered: nightshade, sumac, blackberry, and persimmon (Hockensmith et al. 1998). The archaeobotanical remains evidence a "strong focus on potentially storable plant foods, especially hickory nuts" (Hockensmith et al. 1998:145). Of the wild plants from Shelby Lake, nightshade, sumac, and persimmon have medicinal properties. The site yielded 27 maygrass seeds and six goosefoot seeds, though the biological status of the latter (i.e., wild or domesticated) could not be determined. Other cultigens are 29 squash and one gourd rind fragments (Hockensmith et al. 1998).

The Old Bear site (15Sh18) had two refuse-filled roasting pit features and an artifact scatter covering 40,000 m^2. The single component early Late Woodland site produced a calibrated radiocarbon date of A.D. 392-804 (Table 5.17). Newtown phase diagnostics are Newtown Cordmarked pottery and Lowe cluster and Jacks Reef projectile points. The former lacked angular shoulders, and rim sherds exhibited carinations and a low frequency of castellations. Ste. Genevieve chert was transported to and worked at the site. Debitage from all stages of chipped stone tool manufacture were found, and the chipped stone lithic assemblage may have been produced by two knappers, one skilled and one novice. Other tools include sandstone and igneous hammerstones, bone pressure flakers, and a possible beaver incisor from a socketed antler tine (Brooks 1985).

Besides domestic activities, the Old Bear site was used for mortuary purposes. The remains of one young adult of undetermined sex were recovered from two pit features at the site. Cultural modifications to the bones, including burning and bone breakage presumably for marrow extraction, suggested cannibalism (Brooks 1985). Brooks (1985) also reported the discovery of two extended burials near the two pit features at Old Bear, but no details about these interments were provided.

Almost exclusive use of wild animal and plant species during the early Late Woodland subperiod was evidenced at the Old Bear site. A minimum of 25 individuals representing 11 species of animals were utilized: white-tailed deer, raccoon, black bear, gray squirrel, turkey, woodchuck, skunk, *Canis sp.*, beaver, soft-shell turtle, and terrapin. The damaged nature of the animal bones was consistent with intensive marrow extraction. The faunal remains suggest occupations spanning September to March and reliance on resources from two habitats: streams/stream valleys and upland ridges/drainages. The animals would have yielded 579 kg of edible meat and could have sustained an extended family or small band during a short-term occupation at the site.

Plant remains recovered from two pit features included four nut species used as food and fuel (walnut, butternut, hickory, and acorn) and honey locust seeds (Brooks 1985). The latter have medicinal properties. One squash/gourd seed, the only cultigen evidenced at the site, was recovered from a pit feature (Brooks 1985).

Shelby Lake and Old Bear were short-term habitation sites, not villages, occupied by small groups of people, perhaps one-two households. Plant and animal remains from Shelby Lake together were available during all seasons, though plants suggest late fall-winter and fauna indicate late winter-early spring foci (Hockensmith et al. 1998). In relating the two sites to other early Late Woodland sites in north-central Kentucky, Hockensmith et al. (1998) offered two hypotheses: (1) small sites like Shelby Lake and Old Bear represent a dispersed strategy that was contemporaneous with a nucleated settlement strategy as evidence by large/village sites like Pyles and Gillespie, or (2) small sites were occupied during cold seasons and large sites during warm seasons.

The SARA site (15Jf187) is located on the central of three parallel ridges in the broad alluvial valley of the Ohio River floodplain of the Falls area. Nine Woodland features, which may have been located near the former living area, included five refuse pits, two fire pits, and two of unknown function. Other cultural materials at the site (e.g., scattered features and debris scatter) were not investigated. The assemblage may represent a localized variant of the Newtown phase, though it has not yet been formally classified as such. Lowe cluster points, and Falls Plain and Newtown-like limestone tempered cordmarked and plain sherds were recovered from a refuse pit with a calibrated radiocarbon date of A.D. 442-776 (Table 5.17). Knappers manufactured specialized flake tools and reworked tools at the site, and there was little evidence in the features of extensive lithic reduction activities resulting in the production of large volumes of debitage. The predominant chert type used for chipped stone tool manufacture was Wyandotte, though other local cherts like Muldraugh, Boyle, and Salvisa were used on a limited basis. Unsystematic collection of plant remains from features yielded mostly wild species, including hickory, acorn, black walnut, sumac, and purslane (Mocas 1995). In addition to nutritional value, the latter two plants also have medicinal properties. Sunflower was the only cultigen recovered from feature fill (Mocas 1995).

Little is known about the terminal Late Woodland subperiod in the Salt River Management Area. Yankeetown phase materials were recovered from the Arrowhead Farm site (15Jf237), which yielded a calibrated radiocarbon date of A.D. 624-1454 (Table 5.17) (Brooks 1985; Mocas 1976). Artifacts and a calibrated radiocarbon date of A.D. 777-1147 (Table 5.17) from Site 15Sp26 are suggestive of a terminal Late Woodland component (Driskell et al. 1984).

UPPER CUMBERLAND (MANAGEMENT AREA 4)

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Archaeological research in the Upper Cumberland Management Area began in the late 1940s, when the University of Kentucky excavated several sites that were going to be impacted by the impoundment of the Cumberland River to form Lake Cumberland (formerly known as the Wolfe Creek Reservoir). One of the sites investigated as a result of this project was the Reiny site (15Ru27), a Middle Woodland settlement that contained a dense thick midden.

Since the late 1970s, cultural resource management-related projects generated additional information on the Woodland period. Investigations by the University of Tennessee in the Big South Fork Recreation Area (Ferguson et al. 1983) identified several rockshelters that contained Woodland components, and although the Kentucky Heritage Council's survey of Pulaski County (Gatus 1983) did not recover any ceramics, Woodland projectile points were recovered from several sites. Investigations by National Forest Service archaeologists in McCreary County resulted in the investigation of Woodland components at Tough Tree Shelter (15McY292) and Campbell Shelter (15McY322) (Knudsen 1985), and excavation of Sites 15Bl52 and 15Bl59 by Barcon (Autry and Duvall 1985) documented the presence of Woodland components.

Additional research in the Big South Fork River and Recreation Area by Prentice (1995) and Des Jean (2004) involved excavations at several rockshelter and open-air sites with Woodland components. Creasman (1994, 1995), Stokes and Shields (1999), and Hand (2000) recorded substantial Early-Middle Woodland habitations in Bell County, including Main (15Bl35), Mills (15Bl80), Bailey (15Bl100), Caldwell (15Bl103), and Site 15Bl105. Other cultural resource management projects resulted in the documentation of additional Woodland rockshelters and open-air sites in Cumberland (Bradbury 1996; Bradbury and Day 1998; Sussenbach 1993), Knox (Updike 1996), Laurel (Carmean 1994; Carmean and Sharp 1998), and Pulaski (Kerr 1994; Schock 1999) counties.

SITE DENSITY AND DISTRIBUTION PATTERNS

The 346 Woodland sites in the Upper Cumberland Management Area account for 11.8 percent of the Woodland sites in Kentucky. The density of sites per sq km in the Upper Cumberland is equal to that of the entire Commonwealth, but the density per acre surveyed is lower than the overall state average and the averages for most other management areas (Table 5.1).

The majority (54.9 percent) of Woodland sites in the Upper Cumberland Management Area are rockshelters (Table 5.19), which comprise over one-third (34.8 percent) of all Woodland rockshelter sites in Kentucky. Open habitation sites without

mounds account for an additional 39.0 percent of the Woodland sites in this management area. About 2.3 percent of the Woodland sites are caves. Very small percentages (0.6 percent each) of Woodland sites in the management area are quarry, earth mound, rock art, and specialized activity area sites. Open habitations with mounds, mound complexes, isolated burials, workshops, and isolated finds each account for only 0.3 percent of the Woodland sites (Table 5.19). There are no Woodland stone mounds or enclosures recorded in the Upper Cumberland Management Area.

Table 5.19. Woodland Site Types by Section in the Upper Cumberland Management Area.

Site Type	Lake Cumberland	Southeastern Mtns	Total	Percent
Open Hab w/o Mounds	96	39	135	39.0
Open Hab w/ Mounds	1	0	1	0.3
Rockshelter	133	57	190	54.9
Cave	8	0	8	2.3
Quarry	2	0	2	0.6
Earth Mound	0	2	2	0.6
Mound Complex	1	0	1	0.3
Isolated Burial	1	0	1	0.3
Rock Art	2	0	2	0.6
Special Activity Site	1	1	2	0.6
Workshop	1	0	1	0.3
Isolated Find	0	1	1	0.3
Total	246	100	346	100.0
Percent	71.1	28.9	100.0	

The Lake Cumberland Section has more than twice as many Woodland sites as does the Southeastern Mountains Section (Table 5.19). There are 246 sites (71.1 percent) in the Lake Cumberland Section and 100 sites (28.9 percent) in the Southeastern Mountains Section. The Lake Cumberland Section also has a greater diversity of Woodland site types with 10, whereas only five site types (including isolated finds) are recorded in the Southeastern Mountains Section (Table 5.19).

The 416 Woodland components in the Upper Cumberland Management Area account for 11.5 percent of the Woodland components in Kentucky (Table 5.2). Half of the Upper Cumberland components are unassigned. Nearly equal percentages of Early Woodland (22.6 percent) and Middle Woodland (23.1 percent) components have been recorded. Only about 4.6 percent of the Upper Cumberland components have been assigned to the Late Woodland subperiod (Table 5.20).

About two-thirds (67.0 percent) of the Woodland components in the Upper Cumberland Management Area are documented at sites in the Lake Cumberland Section, with about one-third (33.0 percent) being found in the Southeastern Mountains Section (Table 5.20). The distribution of Woodland components by subperiod for the Lake Cumberland Section is comparable for the entire management area, with nearly equal percentages of Early Woodland (24.0 percent) and Middle Woodland (22.7 percent) components and a small percentage (5.9 percent) of Late Woodland components. In the Southeastern Mountains, however, Middle Woodland components (24.1 percent)

outnumber Early Woodland components (18.5 percent), and only one site with a Late Woodland component (0.9 percent) has been documented (Table 5.20).

Table 5.20. Woodland Site Components by Section and Subperiod in the Upper Cumberland Management Area.

Subperiod	Lake Cumberland		Southeastern Mountains		Total	
Late Woodland	18	5.9%	1	0.9%	19	4.6%
Middle Woodland	70	22.7%	26	24.1%	96	23.1%
Early Woodland	74	24.0%	20	18.5%	94	22.6%
Unassigned	146	47.4%	61	56.6%	207	49.8%
Total	308	100.0%	108	100.0%	416	100.0%

CHRONOMETRIC DETERMINATIONS

The number of chronometric determinations for Woodland sites in the Upper Cumberland Management Area (Table 5.21) has increased significantly over the last two decades. There are eight dated sites in the Lake Cumberland Section and seven in the Southeastern Mountains Section, the latter including an extensive chronometric series from the Main site (15Bl35) (Creasman 1994). Many of the dates for the management area fall within the Early and Middle Woodland subperiods.

LAKE CUMBERLAND SECTION

Over the past 15 years archaeologists have collected considerable information about the Woodland record in the Lake Cumberland Section. Currently there are 246 sites with 308 Woodland components from all subperiods documented in this section (Table 5.20). Rockshelter sites significantly outnumber open-air habitations, and site types unique to this section within the management area are caves, quarries, open habitations with mounds, mound complexes, isolated burials, rock art sites, and workshops (Table 5.19). Many important Woodland sites are located in McCreary and Cumberland counties, and there are no substantial Woodland period sites reported for Clinton, Monroe, and Wayne counties (Table 5.22). There are no Woodland phases designated in the Lake Cumberland Section.

Early Woodland occupations at sites in the Lake Cumberland Section are indicated by diagnostic projectile point types, with Terminal Archaic Stemmed cluster (e.g., Wade and Delhi) and Adena Stemmed being most common (Table 5.7). Though Middle Woodland point types are not ubiquitous at sites in this section, they most commonly include Copena and Snyders. Lowe cluster and small triangular points are common types in Late Woodland lithic assemblages in the Lake Cumberland Section. Nearly all Woodland pottery assemblages from major sites in the Lake Cumberland Section are untyped, and none are associated with chronometric dates.

Table 5.21. Chronometric Dates for the Upper Cumberland Management Area.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Lake Cumberland Section			
Wolf River Rockshelter (15Cu23)			
Beta-64370	2570±60	838-508, 457-455, 438-420 BC	Sussenbach 1993
15Cu27			
Beta-114711	2230±60	401-163, 130-119 BC	Kerr et al. 2004
Beta-107300	2020±80	351-300, 227-224, 210 BC-AD 138, 197-207	Kerr et al. 2004
Beta-114710	1500±70	AD 421-655	Kerr et al. 2004
Site 15Cu110 (see also Chapter 6:Table 6.20)			
Beta-210619	1460±40	AD 540-654	Jones 2006
Tough Tree Shelter (15McY292)			
Beta-11586	910±60	AD 1019-1227, 1233-1241, 1247-1251	Knudsen 1985
Campbell Shelter (15McY322)			
Beta-11588	2400±60	756-684, 669-606, 604-389 BC	Knudsen 1985
Site 15McY325			
Beta-11587	2260±70	506-460, 452-440, 418-149, 140-112 BC	Ison pers. comm. 1990
Bare Bones Shelter (15McY414)			
Beta-28203	1780±50	AD 128-384	Boedy and Sharp 1992
Beta-33099	970±50	AD 984-1185	Boedy and Sharp 1992
Beta-28204	740±50	AD 1186-1202, 1205-1312, 1358-1387	Boedy and Sharp 1992
Wet Ledge Rockshelter (15McY837)			
Beta-96790	1650±80	AD 223-592	Des Jean 2004
Beta-96789	1380±50	AD 569-717, 743-768	Des Jean 2004
Site 15Pu299			
Beta-116132	1520±50	AD 428-633	Schock 1999
Beta-116133	1460±50	AD 441-484, 533-662	Schock 1999
Southeastern Mountains Section			
Main (15Bl35) (see also Chapter 4:Table 4.27)			
Beta-55107	2990±90	1432-976, 951-950 BC	Creasman 1994
Beta-62840	2990±60	1398-1048 BC	Creasman 1994
Beta-62838	2940±70	1379-1336, 1322-973, 958-939 BC	Creasman 1994
Beta-62837	2930±80	1380-1335, 1323-923 BC	Creasman 1994
Beta-56443	2920±60	1308-970, 961-933 BC	Creasman 1994
Beta-56447	2890±60	1263-916 BC	Creasman 1994
Beta-52009	2870±80	1290-1280, 1270-842 BC	Creasman 1994
Beta-62836	2850±70	1255-1237, 1214-842 BC	Creasman 1994
Beta-56446	2840±60	1207-1203, 1195-1141, 1134-843 BC	Creasman 1994
Beta-56441	2800±80	1194-1142, 1133-806 BC	Creasman 1994
Beta-56444	2780±60	1189-1179, 1157-1145, 1130-799 BC	Creasman 1994
Beta-62839	2770±70	1113-1098, 1090-804 BC	Creasman 1994
Beta-56445	2730±70	1047-792 BC	Creasman 1994
Beta-56442	2680±80	1044-747, 688-665, 644-588, 581-555 BC	Creasman 1994
Beta-56440	2540±100	889-881, 843-401 BC	Creasman 1994
Beta-56439	2500±90	799-407 BC	Creasman 1994
Beta-56431	2440±60	761-682, 671-403 BC	Creasman 1994
Beta-56435	2340±110	773-175 BC	Creasman 1994
Beta-56432	2320±70	748-687, 665-644, 590-579, 559-197 BC	Creasman 1994

Table 5.21. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Site 15Bl52			
Beta-90739	2540±70	810-483, 466-415 BC	Maslowski et al. 1995
Beta-90740	2510±100	817-399 BC	Maslowski et al. 1995
Beta-90738	2500±80	793-413 BC	Maslowski et al. 1995
Mills (15Bl80)			
Beta-61319	2730±60	1007-799 BC	Creasman 1995
Beta-56449	2710±70	1024-774 BC	Creasman 1995
Beta-56452	2710±60	997-795 BC	Creasman 1995
Beta-56451	2330±60	745-689, 664-647, 551-341, 326-204 BC	Creasman 1995
Beta-56448	2190±60	390-94 BC	Creasman 1995
Beta-56450	2120±60	359-275, 260 BC-AD 0	Creasman 1995
Bailey (15Bl100)			
Beta-125415	2890±60	1263-916 BC	Stokes and Shields 1999
Beta-125414	2060±60	345-322, 205 BC-AD 69	Stokes and Shields 1999
Site 15Kx91			
Beta-96277	1920±70	91 BC-253 AD	Updike 1996
Beta-96278	1780±70	AD 69-421	Updike 1996
Big Shelter (15Ll188) (see also Chapter 4:Table 4.26)			
Beta-72794	2410±60	756-684, 669-394 BC	Carmean 1994; Carmean and Sharp 1998
Rising Sun Shelter (15Ll189)			
Beta-76836	1690±70	AD 143-148, 171-193, 210-539	Carmean 1994; Carmean and Sharp 1998

Table 5.22. Important Woodland Period Sites in the Lake Cumberland Section.

Site No.	Site Name	Site Type	Affiliation	References
15Cu21	Wolfe	rockshelter	EW, MW, LW	Lane et al. 1995
15Cu23	Wolf River	rockshelter	EW	Sussenbach 1993
15Cu27	none	rockshelter	EW, MW, LW	Bradbury and Day 1998; Kerr et al. 2004
15Cu110	none	open habitation	MW, LW	French 2004; Jones 2006
15McY292	Tough Tree	rockshelter	MW, LW	Knudsen 1985
15McY322	Campbell Shelter	rockshelter	EW, LW	Knudsen 1985
15McY403	none	rockshelter	EW, MW, LW	Boedy 2001
15McY409	none	rockshelter	LW	Boedy 2001
15McY414	Bare Bones	rockshelter	MW, LW	Boedy and Sharp 1992
15McY837	Wet Ledge	rockshelter	EW, LW	Des Jean 2004
None	Oil Well Branch Road	open habitation	EW	Des Jean 1993
None	One Sherd Shelter	rockshelter	unassigned	Knudsen 1985
15Pu294	Sinking Creek	open habitation	MW, LW	Kerr 1994
15Pu299	none	open habitation	LW	Schock 1999
15Ru27	Reiny	open habitation	MW	Railey 1990

Early Woodland components are documented at both rockshelter and open-air sites in the Lake Cumberland Section. At the Early Woodland Wolf River Rockshelter (15Cu23), midden deposits, unspecified pits, and thermal features were recorded. One of

the thermal features yielded a calibrated radiocarbon date of 838-420 B.C. (Table 5.21). Expedient flake tools were made from locally available cherts. Sherds from pottery vessels made and used on-site include chert tempered plain and cordmarked, and siltstone tempered fabric impressed forms. Wild food resources include deer, squirrel, box turtle, mussels, hickory, walnut, and fleshy fruits like persimmon. Wolf River Rockshelter is one of few Lake Cumberland Section Woodland sites with cultivars; small amounts of goosefoot and maygrass seeds were identified. The shelter was used for long periods of time and/or frequently reoccupied by small groups of people who engaged in a wide range of activities including stone tool production, pottery production, hunting, gathering, and gardening (Sussenbach 1993).

Two sites in the Big South Fork National River and Recreation Area contained Early Woodland components. Located in the McCreary County uplands on a saddle between two sandstone ridges, the aceramic Oil Well Branch Road site (no state site number) yielded Wade, Ledbetter, Merom, and Spike cluster points from a feature. Subsurface deposits around the feature produced a drilled sandstone atlatl weight fragment and a large amount of lithic debitage. Site activities included chipped tool maintenance and hunting (Des Jean 1993).

Situated in Hunting Camp Hollow near a number of rockshelter and ridge top sites, the multicomponent Wet Ledge Rockshelter (15McY837) contained intact midden deposits and one nut processing feature. The Early Woodland component was indicated by Adena Stemmed points, as well as limestone tempered plain and sand tempered cordmarked sherds. One Hamilton Incurvate point was recovered from early Late Woodland contexts dated at cal A.D. 223-592 and A.D. 569-768 (Table 5.21), the latter date being more in line with the expected range for Hamilton points. Other artifacts from the Woodland deposits are scrapers, bifaces, blades, and a burned piece of daub with a finger impression (Des Jean 2004).

Three sites in the Lake Cumberland section produced evidence of substantial Early and Middle Woodland occupations. One such shelter that has been extensively investigated is Site 15Cu27, located at the base of a bluff line above the Big Renox Creek floodplain. The multicomponent rockshelter contained 85 cm of midden deposits, storage pits, hearths, and grave features spanning several Woodland components. The primary occupations occurred during the Early and Middle Woodland subperiods, when the site was used repeatedly as a mortuary, food and pottery caching, and temporary field camp. Calibrated radiocarbon dates range from 401-119 B.C. to A.D. 421-655 (Table 5.21). The minor Late Woodland-Late Prehistoric occupation reflects intermittent use for specialized procurement of deer plus stone tool production and maintenance (Bradbury 1996; Bradbury and Day 1998; Kerr et al. 2004). Important food sources during all Woodland occupations were deer, walnut, and hickory (Kerr et al. 2004).

Regarding Woodland lithic assemblages from Site 15Cu27, there was a shift over time from an emphasis on core production in the Early Woodland to tool production in the Late Woodland. Several local cherts were preferred during the Early and Middle Woodland occupations, while nearly all Late Woodland tools were made of local Fort Payne chert. Early-Middle Woodland tools were used for actions involving longitudinal motions on soft materials and transverse motions on medium-hardness materials. Late Woodland tools were used as arrowheads and for on-site deer butchering (Bradbury and

Day 1998; Kerr et al. 2004). Pottery from Site 15Cu27 includes Early Woodland shale tempered smoothed-over cordmarked and fabric impressed, early Middle Woodland grit tempered cordmarked and fabric impressed, Early-Middle Woodland limestone tempered cordmarked, and Late Woodland limestone tempered cordmarked sherds (Kerr et al. 2004).

One Early-Middle Woodland primary burial plus isolated human remains were discovered at Site 15Cu27. A 35-45-year-old male was placed in a vertically flexed position in a shallow grave within the shelter. The oval pit was bordered by limestone slabs representing natural roof fall rather than intentionally placed rocks. The grave fill contained various artifacts including grit tempered sherds, none of which were identified as grave goods. A calibrated radiocarbon date of 351 B.C.-A.D. 207 was obtained for the burial (Table 5.21). Isolated human remains represented at least three individuals, including one adult of undetermined sex and one infant aged less than six months. The disarticulated skeletal remains may evidence a mortuary program that involved rockshelter interment followed by removal for reinterment elsewhere. The four individuals from Site 15Cu27 were in good health, with only degenerative diseases like arthritis evidenced (Bradbury and Day 1998; Clay 1998; Kerr et al. 2004).

Site 15Cu110 is a multicomponent open-air habitation site. The most intense Woodland habitation occurred during the late Middle Woodland to early Late Woodland subperiod and was marked by a midden with a stone-lined hearth. A calibrated date of A.D. 540-654 (Table 5.21) was obtained from the Woodland midden. Diagnostic artifacts include Lowe cluster projectile points and pottery tempered with grit, limestone, or sand that resembles Owl Hollow materials from north-central Tennessee (French 2004; Jones 2006; see also Chapter 6).

Shallow but intact cultural deposits were uncovered outside the dripline at a multi-component rockshelter near the headwaters of Barren Fork River. The primary occupations at Site 15McY403 date to the Early and Middle Woodland subperiods. Diagnostic artifacts are siltstone tempered plain pottery and Late Archaic Stemmed cluster, Delhi, Adena Stemmed, Snyders-like, and small triangular points. Other chert artifacts include drills or perforators and utilized flakes. The shelter was used frequently for short periods of time by small (i.e., five-six individuals) special-task groups or nuclear family units engaged in hunting, food processing, and chipped stone tool manufacture (Boedy 2001).

The Reiny site (15Ru27) is a substantial Middle Woodland habitation in Russell County. Diagnostic artifacts include Copena and expanding stemmed points and pottery. Most sherds are fragments of thick, clay or mudstone tempered, cordmarked vessels with flat bases and inslanting or slightly outflaring rims with flattened lips. Thinner, plain vessels with flat bases also are represented, and the assemblage includes a few sherds with check stamped, simple stamped, or cord-wrapped dowel impressed exterior surfaces and at least one noded/punctated rim. The time range of occupation was estimated at 200 B.C. to A.D. 250 (Railey 1990).

In addition to several of the multicomponent Early Woodland sites discussed previously, evidence of Middle-Late Woodland occupations is documented at a number of other rockshelter and open-air sites in the Lake Cumberland Section, especially in

McCreary County. Middle-Late Woodland occupations at the multicomponent Bare Bones Shelter (15McY414) were indicated by Hamilton Incurvate points and cordmarked or plain ceramics tempered with limestone. Calibrated radiocarbon dates are A.D. 128-384 and A.D. 984-1185 (Table 5.21). Species represented in the faunal assemblage are deer, black bear, turkey, and box turtle (Boedy and Sharp 1992).

Knudsen (1985) investigated two rockshelters near a permanent water source on an unnamed tributary of Licking Creek in the South Fork Cumberland River drainage. Campbell and Tough Tree shelters may have been used by the same social group, based on similarities in pottery and projectile points, during different seasons of the year in the Middle-Woodland subperiods. Isolated human teeth recovered from the shelters suggest mortuary use during the Middle-Late Woodland subperiods.

Campbell Shelter (15McY322) is a partly dry shelter with multiple components. Woodland diagnostics from intact portions of one of three stratigraphic zones represent the most intense periods of occupation, and archaeologists uncovered two hearth features of unspecified age. Diagnostic Woodland artifacts are Adena Stemmed, Robbins, Chesser Notched, Jacks Reef, and small triangular points, as well as Wright Check Stamped and plain limestone and sandstone tempered sherds. Two steatite vessel fragments were recovered from Early Woodland contexts, which yielded a calibrated radiocarbon date of 756-389 B.C. (Table 5.21). Campbell Shelter yielded abundant deer and turtle bones, as well as other mammal, bird, mussel, hickory, and walnut remains. Site occupations were most intense during the Early and Late Woodland subperiods, when the site was used during cold seasons by small groups of perhaps 10-12 individuals. Lithic production, pottery manufacture, food preparation, wood and bone working, hide cleaning, and tailoring occurred inside and outside the dripline. Materials recovered outside the dripline likely represent peripheral activities (Knudsen 1985).

Tough Tree Rockshelter (15McY292) contained a dry area of 80-90 m^2 with cultural deposits up to 30 cm thick. Despite extensive disturbance from looting, at least four components, including Middle and Late Woodland, were evidenced. Occupations were most intense during the latter component, which was associated with a calibrated radiocarbon date of A.D. 1019-1251 (Table 5.21). Diagnostic artifacts are Chesser Notched and small triangular points, as well as Wright Check Stamped and sherds tempered with limestone, siltstone, shale, and sandstone and having plain, cordmarked, and check-stamped exterior surfaces. Food remains include unspecified mammal, snake, turtle, bird, mussel, and hickory species. A possible Middle-Late Woodland domestic structure was marked by an arrangement of rocks; no postmolds were found inside the rock enclosure. Middle-Late Woodland activities that occurred inside and outside the dripline are chipped stone tool manufacture and maintenance, pottery manufacture, wood and bone working, hide preparation, and sewing. There were no apparent special activity areas. The shelter likely was occupied during warm seasons by an extended family of about six-eight individuals (Knudsen 1985). One Sherd Shelter (no state site number), across the drainage from Tough Tree, yielded a single limestone tempered, cordmarked sherd and may represent a female special-purpose site (Knudsen 1985).

Wolfe Rockshelter (15Cu21) is located on Oil Fork, a tributary of the Cumberland River. Pockets of intact deposits produced evidence of Woodland period occupations, including Saratoga, Motley, Copena, Lowe or Jacks Reef cluster, and small triangular

points, as well as nonshell tempered sherds. An unspecified number of burial features in the shelter were attributed to the Woodland occupations, possibly spanning the Middle Woodland to Late Prehistoric subperiods (Lane et al. 1995).

Site 15Pu299 in northeastern Pulaski County is an open habitation site with midden deposits surrounding an open plaza. The midden, which ranged in thickness from 8 to 15 cm in thickness, contained ceramics, lithics, animal bone, and fire cracked rock. A large number of postmolds were documented within the midden, with at least two circular structures being identified (Schock 1999:24). Calibrated radiocarbon dates of A.D. 428-633 and A.D. 441-662 (Table 5.21) are suggestive of a late Middle Woodland/early Late Woodland occupation. Ceramics recovered from this site were predominately tempered with limestone and had plain or cordmarked exterior surfaces. Decoration was limited to notches or punctations associated with jar lips. Projectile points were predominately Bakers Creek and Copena-like. Botanical remains recovered from this site consisted primarily of hickory nuts (Schock 1999).

Shallow but intact cultural deposits were uncovered outside the dripline of Site 15McY409, a rockshelter near the headwaters of Barren Fork River. Archaeologists recovered a bar-shaped shale gorget, a small triangular point, other chipped stone artifacts, and faunal remains dated to the Late Woodland-Late Prehistoric periods. The component represents short duration, frequent reuse of the shelter by small (i.e., five-six individuals) special-task groups or nuclear family units engaged in a narrow range of activities, including chipped stone tool manufacture. While not a sedentary occupation, the late component at Site 15McY409 was comparatively more intense than earlier Archaic components (Boedy 2001).

SOUTHEASTERN MOUNTAINS SECTION

As in the Lake Cumberland Section, archaeological research in the Southeastern Mountains over the last 15 years has substantially expanded our understanding of the Woodland period in this part of Kentucky. There are 100 sites with 108 Woodland components in the section, and the site type diversity is low with rockshelters and open habitations without mounds predominating (Table 5.19). Early and Middle Woodland components greatly outnumber Late Woodland components in this section (Table 5.20). A small number of significant sites, including both open-air sites and rockshelters, yielded intact deposits and/or features (Table 5.23). The Bailey (15Bl100), Mills (15Bl80), and Main (15Bl35) sites, in particular, provide a great deal of information about Woodland adaptations in the Southeastern Mountains Section, especially during the Early and Middle Woodland subperiods. However, archaeologists have not reported substantial Woodland sites in Harlan and Whitley counties, and there are no Woodland phases defined for the Southeastern Mountains Section.

Early Woodland diagnostics common at sites in the Southeastern Mountains Section are Adena Stemmed points, while Lowe cluster types predominate at Middle-Late Woodland sites (Table 5.7). Like the Lake Cumberland Section, there have been few pottery studies in the Southeastern Mountains and many Woodland pottery assemblages are not typed. Unlike the Lake Cumberland Section, however, in the

Southeastern Mountains two local Woodland pottery series have been identified: Early Woodland Pine Mountain and Middle Woodland Mills. Further, imported wares have been documented, including Early Woodland Swannanoa pottery. There are limited reports of groundstone and organic tools from Woodland sites in the section.

Table 5.23. Important Woodland Sites in the Southeastern Mountains Section.

Site No.	Site Name	Site Type	Affiliation	References
15Bl35	Main	open habitation	EW, MW	Creasman 1994, 1995
15Bl52	none	open habitation	EW, MW	Autry and DuVall 1985; Maslowski et al. 1995
15Bl59	none	open habitation	EW, MW	Autry and DuVall 1985
15Bl80	Mills	open habitation	EW, MW	Creasman 1994, 1995
15Bl100	Bailey	open habitation	EW, MW	Stokes and Shields 1999
15Bl103	Caldwell	open habitation	MW	Stokes and Shields 1999
15Bl105	none	open habitation	EW, MW	Hand 2000
15Kx17	none	mound	MW	Hockensmith 1980; Railey 1985d
15Kx91	none	open habitation	MW	Updike 1996
15Ll188	Big Shelter	rockshelter	EW, MW, LW	Carmean 1994; Carmean and Sharp 1998
15Ll189	Rising Sun	rockshelter	EW, MW	Carmean 1994; Carmean and Sharp 1998
15Ll190	Groovey	rockshelter	LW	Carmean 1994; Carmean and Sharp 1998

One example of a single component Early Woodland site in the Southeastern Mountains is Site 15Bl59. This stratified site yielded Swannanoa-like pottery and other artifacts consistent with the Watts Bar complex, which is dated to ca. 900-600 B.C. in eastern Tennessee, and the Swannanoa phase of the Appalachian Summit (Autry and DuVall 1985). The Watts Bar complex and related Swannanoa phase (Keel 1976) are characterized by thick ceramics that are cordmarked or fabric-impressed and densely tempered with crushed quartz, quartzite, or coarse sand. Watts Bar projectile points are predominately triangular in form, with Adena Stemmed and deeply corner notched specimens also present. Substantial base camps with thick midden deposits characterize the Watts Bar complex (e.g., Lafferty 1978; Lewis and Kneberg 1957; Smith and Hodges 1968).

Bailey (15Bl100) is an open-air site in Pine Mountain State Park. Initially classified as a low-density surface lithic scatter, additional excavations documented 27 features (hearths, earth ovens, pits, and postmolds) that date to the Early or Middle Woodland subperiods. A calibrated radiocarbon date of 1263-916 B.C. was obtained from an Early Woodland feature and a date of 345 B.C.-A.D. 69 was obtained from a Middle Woodland feature (Table 5.21). Diagnostic artifacts include Swannanoa Stemmed (a.k.a. Savannah River), Adena Stemmed and Lowe cluster points, and quartzite tempered cordmarked and siltstone tempered plain pottery. Occupational intensity at the Bailey site increased somewhat over time. During the earlier component the site was used by small groups during the fall for a limited set of activities, especially nut harvesting. This pattern is similar to the early and late Early Woodland occupations

at the Main site (see below). Longer (but not sedentary) and more diverse occupations occurred during the Middle Woodland subperiod, when the site was used over multiple seasons, especially summer to fall, by small groups engaged in food production as well as food collection (Stokes and Shields 1999).

Diachronic changes in plant collecting were documented at the Bailey site. During the Early Woodland occupation plant use was specialized, focusing on several types of nuts, especially hickory and black walnut. Plant use was more generalized during the Middle Woodland occupation. Wild species include fruits (e.g., grape, sumac, blackberry, and elderberry) in addition to nuts. Substantial quantities of cultigens were recovered from Middle Woodland contexts. Both Eastern Agricultural Complex species and cucurbit species were identified. Among the most numerous cultigens were domesticated sumpweed, goosefoot, and maygrass, as well as cultivated erect knotweed. Fewer sunflower seeds were found. Limited numbers of domesticated squash and gourd remains also were recovered (Stokes and Shield 1999).

Three other sites (Main, Mills, and Site 15Bl52) with Early-Middle Woodland components in Bell County were documented adjacent to the Cumberland River floodplain or tributary valleys in Bell County. The stratified Main site (15Bl35) contained Early and Middle Woodland components that had associated calibrated radiocarbon dates ranging from 1432-950 B.C. to 748-197 B.C. (Table 5.21). The two intact Early Woodland horizons point to repeated occupation of this locality. Diagnostic artifacts are Pine Mountain series pottery and Ebenezer, Saratoga, and other stemmed and lanceolate points. During the early Early Woodland, the site served as a short-term residential camp that was used during the late fall-early winter in association with hunting and animal processing activities. Occupational intensity increased during the middle Early Woodland, when Main functioned as a logistical base camp. In addition to refuse pits and hearths, storage pits and postmolds associated with habitation structures were constructed at Main, one of only two Woodland sites in the Southeastern Mountains with structural remains. More diverse tool types indicate a wider range of activities, which were conducted at the site for longer intervals of time, perhaps spanning several months. Occupations during the early Middle Woodland subperiod again involved use of the site as a short-term residential camp. Mills series pottery and Greenville (a.k.a. Copena Triangular) and Nolichucky points were recovered from the early Middle Woodland horizon, the latter suggesting affiliations with the Ridge and Valley province to the south (Creasman 1994).

Similar occupations were recorded at the Mills site (15Bl80). Calibrated radiocarbon dates range from 1024-774 B.C. to 359 B.C.-A.D. 0 (Table 5.21). The Early Woodland component is associated with Swannanoa pottery from midden and feature contexts, again reflecting affiliations with the Ridge and Valley province to the south. Mills Plain and Mills Check Stamped pottery types are associated with the early Middle Woodland component at the site. Characterized as a short-term residential camp, the Mills site was occupied during the late fall-early winter by small groups engaged in a limited range of activities including food collection (Creasman 1994, 1995).

Site 15Bl52 contained intact deposits and cultural features associated with domestic activities. Although calibrated radiocarbon dates of 810-415 B.C., 817-399 B.C., and 793-413 B.C. (Table 5.21) obtained from Area C indicate the presence of an

Early Woodland component, most of the materials and features at this site date to the Middle Woodland subperiod. Diagnostic Middle Woodland artifacts include check-stamped pottery and corner-notched projectile points. Postmold patterns delineated a circular structure measuring 7.8 m in diameter. The structure was associated with a cluster of both interior and exterior features, including rock oven pits and fire-cracked rock and lithic debitage concentrations (Autry and DuVall 1985). In terms of size, shape, and feature associations, the 15Bl52 structure is very similar to houses of the Middle Woodland McFarland phase (150 B.C.-A.D. 150) in middle Tennessee (Kline et al. 1982) and the Hill Lake phase (A.D. 0-300) of the American Bottom (Fortier et al. 1984). Mica fragments, the only incidence of nonlocal materials reported for Woodland sites in the Southeastern Mountains, were recovered from Site 15Bl52 in the vicinity of the structure (Autry and DuVall 1985).

Located on the floodplain of Mill Creek in the Cumberland River drainage, Site 15Bl105 is an open-air site with an intact midden up to 50 cm thick. Dated to the transitional Early-Middle Woodland subperiods based on siltstone tempered Mills Cordmarked pottery sherds, the site yielded mostly chipped stone artifacts (Hand 2000).

Carmean (1994) and Carmean and Sharp (1998) documented three Laurel County rockshelters with similar lithic assemblages (e.g., scrapers, cores, and late-stage debitage) and feature types indicating low intensity Woodland components. Located on Wollum Branch in the Rockcastle River drainage, occupations at the multicomponent Big Shelter (15Ll188), Rising Sun Shelter (15Ll189), and Groovey Shelter (15Ll190) at least partly overlapped in time during the Middle Woodland subperiod. The shelters were used repeatedly for short-term domestic activities. Seasons of occupation were not indicated (Carmean and Sharp 1998), but plant and animal remains suggest fall and late spring-early summer occupations. The shelters either served as special-purpose sites associated with larger settlements used by one social group, or the shelters were part of a residentially mobile strategy practiced by a group of people distinct from those who occupied more permanent settlements nearby (Carmean and Sharp 1998). Carmean and Sharp (1998) favored the latter interpretation.

Big Shelter (15Ll188) encompasses an area of 87 m^2, about three-quarters of which was occupied. Excavation of 5 m^2 documented the presence of two hearths, one of which yielded a calibrated date of 1888-1536 B.C. and the other a date of 756-394 B.C. (Table 5.21; Chapter 4:Table 4.26). Diagnostic points are Wade, Adena Stemmed, Chesser Notched, and small triangular types. A small ceramic assemblage of thin sherds representing at least three vessels included limestone tempered plain, siltstone tempered plain, and siltstone tempered cordmarked forms that may be Middle-Late Woodland or, more likely, Late Woodland in age. The Early Woodland hearth contained a sandstone nutting stone, charred black walnut shell, nine seeds from unidentified wild fleshy fruits, and one squash rind fragment. The few animal bones recovered from other contexts were too fragmentary to identify beyond the mammal class (Carmean 1994; Carmean and Sharp 1998).

Excavation of 2 m^2 at Rising Sun Shelter (15Ll189) revealed one Woodland feature and a cluster of four Boyle chert bifaces that may represent a cache. The feature yielded a Middle Woodland date of cal A.D. 143-539 (Table 5.21), and a small assemblage of limestone tempered sherds, charred hickory and walnut, and deer, turkey

and snakes. Though most of the ceramic assemblage consisted of plain body sherds, one recurved rim had a flat lip with rounded corners. Four horizontal lines had been incised at an oblique angle to, and below, the lip. The rim sherd had an orifice diameter of 15 cm (Carmean 1994; Carmean and Sharp 1998).

At the Groovey Shelter (15Ll190) 3 m^2 were excavated within this 40 m^2 rockshelter. No features were documented, but two parallel abrading marks on a boulder were noted. An assemblage of 200 artifacts, mostly chipped stone debitage, was recovered. Chesser Notched points and two body sherds with undetermined temper, one with a plain exterior and one with a lug or podal support, suggest occupations during the Middle-Late Woodland subperiods (Carmean 1994; Carmean and Sharp 1998).

Site 15Kx91 is an open habitation site with intact midden deposits. Limited excavations documented the presence of two refuse pits and two hearths. Radiocarbon dates of 91 B.C.-A.D. 253 and A.D. 69-421 (Table 5.21) place the site in the late Middle Woodland subperiod. Pottery sherds recovered from feature and other contexts include sandstone tempered plain and cordmarked forms. Like some components at the Main and Bailey sites, during the Middle Woodland subperiod Site 15Kx91 functioned as a short-term residential habitation occupied by small groups (Updike 1996).

Little is known about one other potentially significant Middle Woodland site in the Southeastern Mountains Section. The Cobb Mound (15Kx17) in Knox County is a Middle Woodland mound that has not been professionally investigated (Hockensmith 1980; Railey 1985d).

Except for Late Woodland components reported at Big and Groovey shelters, as summarized above, little is known about this subperiod in the Southeastern Mountains Section.

BLUEGRASS (MANAGEMENT AREA 5)

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

During the nineteenth century, many Woodland mounds and earthworks were recorded in the Bluegrass Management Area (e.g., Linney 1881; Rafinesque 1824; Squier and Davis 1848;). C. S. Rafinesque, a naturalist and a professor at Transylvania University in Lexington, surveyed, mapped, and described Peter Village (15Fa166) and other Woodland sites in the Elkhorn Creek drainage (Tune 1985). Private citizens investigated several burial mounds, often reporting their findings to academic institutions (e.g., Peter 1871 as reproduced in Webb 1943b).

During the 1930s, University of Kentucky professors William S. Webb and William D. Funkhouser completed large-scale excavations at Woodland sites with the assistance of federal funding. Besides providing a program to employ those affected by the Great Depression, archaeological excavations funded by the New Deal in Kentucky also had a scientific goal. "Webb believed that archaeological investigations were justified on the basis of the pursuit of knowledge and the development of museum collections for educational purposes" (Milner and Smith 1988:3).

The primary Woodland period sites investigated during the New Deal era were Adena burial mounds in the Bluegrass Management Area. Webb's previous "experience with the Copena sites to the south was a factor in the choice of Adena mounds in Kentucky as prime sites for excavation" (Milner and Smith 1988:4). The particular mounds selected for investigation depended on a number of factors, including labor supply, unemployment rates, funding, weather conditions, research goals, previous looter activity, and input from the federal administrators (Clay 2005; Milner and Smith 1988). The mound sites were excavated between 1935-1942 and include Ricketts (15Mm3) (Funkhouser and Webb 1935; Webb and Funkhouser 1940), Wright (15Mm6-8) (Webb 1940), Drake (15Fa11) (Webb 1941a), Fisher (15Fa152) (Webb 1941a, 1943b; Webb and Haag 1947b), Morgan Stone (15Bh15) (Webb 1941b), Robbins (15Be3, 15Be14) (Webb and Elliott 1942), Crigler (15Be20, 15Be27), Hartman (15Be32) (Webb 1943a), Riley (15Be15), Landing (15Be17) (Webb 1943b), and Dover (15Ms27) (Webb and Snow 1959). Webb and his colleagues also investigated circular enclosures like Mt. Horeb Earthworks (15Fa1) (Webb 1941a, 1943b). The publications that stemmed from these investigations constitute a significant contribution to the archaeology of eastern North America. Webb and his colleagues did not publish the results of other investigations at Woodland sites (e.g., Bullock Mound [15Wd10] and Camargo Earthworks [15Mm30-33]), but other archaeologists later examined those collections and published the findings (Fenton and Jefferies 1991; Schlarb 2005).

Work at Adena burial mounds and other Woodland sites like Chilton (15Hy1), a Middle-Late Woodland mortuary site (Funkhouser and Webb 1937), was funded through three New Deal programs. The first archaeological project in Kentucky funded by New Deal initiatives was Ricketts Mound (15Mm3), where excavations were conducted in 1934 by Federal Emergency Relief Administration (FERA) workers under the direction

of University of Kentucky supervisors. Additional research at the site and many other mounds was supported by the Works Progress/ Projects Administration (WPA) in 1937-1942, with the excavations peaking in 1938-1939. Civilian Conservation Corps (CCC) projects in 1940-1942 focused on reservoir surveys and emphasized Late Prehistoric rather than Woodland sites (Funkhouser and Webb 1935; Milner and Smith 1988; Webb and Funkhouser 1940).

For two to three decades following the WPA era, few investigations were undertaken at Woodland sites in the Bluegrass Management Area, as large reservoir projects in other areas of the state commanded the attention of archaeologists. One exception in the Northern Bluegrass was Crawford's (1959) investigation of the Rogers site complex (15Be33-35) in Boone County, which Kreinbrink (1992) re-evaluated in the early 1990s. In the Eastern Bluegrass Section, Rolingson and Rodeffer (1968) and Marquardt (1970) documented an Early Woodland component with midden and features at Zilpo (15Bh37).

In the 1970s and 1980s, cultural resource management-related projects and academic-sponsored research generated new information on Woodland period adaptations in the Bluegrass Management Area. Regarding contract projects, the University of Kentucky's investigation of the J. K. Smith Power Station in Clark County documented several Woodland sites including the Early Woodland Stone site (15Ck89) (Turnbow et al. 1983). Investigations in Bourbon County revealed a late Middle-early Late Woodland habitation with a mound (Jackstown [15Bb68]), a Late Woodland habitation with a mound (Site 15Bb58), and a Late Woodland habitation without mounds (Stringtown [15Bb67)]) (Estes 1983a, 1983b, 1983c).

In the Eastern Bluegrass Section, Schock (1984) recorded a substantial Middle Woodland component at the Gibson Greeting Card site (15Ke4). Archaeologists documented several significant Woodland sites on the Ohio River floodplain of Lewis County, including Site 15Lw5, a late Middle-early Late Woodland habitation with a large earth oven feature (Maslowski 1980; Turnbow 1981). As part of the Carrs Power Plant survey, Schock and Langford (1980, 1981) investigated several multicomponent open habitation with mostly Middle-Late Woodland components and some with structural remains: Site 15Lw301C, Site 15Lw302A, Site 15Lw314C, Site 15Lw315A, Site 15Lw316A, Site 15Lw325E, and Site 15Lw353.

Research-oriented projects included Clay's (1983, 1985b, 1986, 1987) investigations of the Auvergne Mound (15Bb16) and Peter Village (15Fa166), Milner and Jefferies' (1987) reexamination of the materials recovered in the 1930s from the Wright (15Mm6) and Robbins (15Be3) mounds, and Jefferies' (1987) research in the vicinity of Greene Mound (15Mm8). County-wide surveys conducted by the Kentucky Heritage Council documented Woodland sites in Boone (Fenwick and Weinland 1978) and Franklin (Sanders and Weinland 1976) counties. Also during this period, the William S. Webb Archaeological Society investigated the Pyles (15Ms28), Gillespie (15Ms50), and Mayslick (15Ms53) sites in Mason County (Collins 1980; Railey 1984).

Since 1990 research in the Central and Northern Bluegrass sections resulted in the documentation of additional Woodland open habitation sites and off-mound ritual sites that compliment previous investigations focused on mound sites. In the Central

Bluegrass Section, features at the Evans (15Mm182) and Amburgey (15Mm137) sites yielded artifacts associated with nonmound ritual activities, including late Early Woodland mortuary preparation and feasting at Evans (Schlarb et al. 2007) and late Middle Woodland feasting and ritual offerings at Amburgey (Richmond and Kerr 2005). The Kentucky Archaeological Survey excavated about 65 percent of a deflated Middle Woodland mound at Walker-Noe (15Gd56) in the Paint Lick drainage (Pollack et al. 2005). Elmore and Stallings (2006; Ross-Stallings and Stallings 2007) documented late Middle Woodland features and midden at the Miller site (15Gd44), an open habitation near Walker-Noe and other mounds. McBride and Fenton (2007) documented the presence of a Late Woodland Newtown habitation locale at the Dreaming Creek site (15Ma97).

In the Northern Bluegrass Section, excavations were conducted at sites in Boone and Carroll counties. In Boone County Duerksen et al. (1994, 1995) documented Early Woodland subplowzone features at the West Runway site (15Be391). Other Woodland habitation sites excavated in this county since 1990 are the M. B. Green site (15Be485), an early Woodland habitation/mortuary locality (Purtill et al. 2006); Site 15Be509, a late Middle-early Late Woodland habitation (Breetzke 2001); Wackenstein (15Be467), a Middle Woodland habitation (Walley et al. 1997); and Big Bone Lick (15Be269), a Late Woodland habitation located directly adjacent to a salt lick (Lowthert 1998; Miller and Duerksen 1995).

Research in the Ohio River and Kentucky floodplain of Carroll County resulted in the documentation of several important Woodland sites, each of which encompassed midden and/or cultural features. The Panther Rock site (15Cl58) yielded evidence of Early Woodland and Middle Woodland components (Stallings 2007). A late Middle Woodland component was documented at the Hayes site (15Cl67) (Hall 2005) and Middle-Late or Late Woodland occupations were recorded at Site 15Cl44 (Doershuk et al. 1992) and Froman (15Cl51) (Hockensmith et al. 1998; Ross-Stallings and Stallings 1996; Stallings and Ross-Stallings 1993).

SITE DENSITY AND DISTRIBUTION PATTERNS

The 659 Woodland sites in the Bluegrass Management Area account for over 22 percent of the Woodland sites in Kentucky, representing the second highest percentage after the Green River Management Area. Adjusting for differences in area, the Bluegrass Management Area has the highest density of sites per acre surveyed and the second highest density of sites per sq km of any management area (Table 5.1).

Though there is a diverse range of Woodland site types in the Bluegrass Management Area, over 75 percent are open habitations without mounds. Earth mounds account for 16 percent of the Woodland sites in this management area; further, about 74 percent of all Woodland earth mounds in Kentucky are located in the Bluegrass Management Area. Open habitations with mounds comprise about 2.5 percent of the Woodland sites, and rockshelters, enclosures, and mound complexes each comprise over

1 percent. Stone mounds, caves, isolated burials, workshops, special activity areas, and isolated finds together account for less than 2 percent of the Woodland sites (Table 5.24).

Table 5.24. Woodland Site Types by Section in the Bluegrass Management Area.

Site Type	Central	Northern	Eastern	Total	Percent
Open Hab w/o Mounds	343	98	58	499	75.7
Open Hab w/ Mounds	9	4	4	17	2.6
Rockshelter	7	0	2	9	1.4
Cave	1	0	0	1	0.2
Stone Mound	1	3	0	4	0.6
Earth Mound	59	29	18	106	16.1
Mound Complex	1	2	5	8	1.2
Enclosure	8	0	1	9	1.4
Isolated Burial	2	0	0	2	0.3
Workshop	1	0	1	2	0.3
Specialized Activity Site	1	0	0	1	0.2
Isolated Find	1	0	0	1	0.2
Total	434	136	89	659	100.0
Percent	65.9	20.6	13.5	100.0	

Most (65.9 percent) of the Woodland sites in this management area are located in the Central Bluegrass Section, followed by the Northern Bluegrass and Eastern Bluegrass sections (Table 5.24). The Central Bluegrass Section also has the highest diversity of Woodland site types.

Similar patterns are evident with Woodland site components in the Bluegrass Management Area. The 780 Woodland components in the Bluegrass comprise 22 percent of the Woodland components in Kentucky. The highest percentage of unassigned Woodland components in Kentucky is recorded for sites in the Bluegrass Management Area (Table 5.2). About 57 percent of the Woodland components in the Bluegrass Management Area are unassigned, 19.5 percent each are Early Woodland and Middle Woodland, and almost 4 percent are Late Woodland (Table 5.25).

Table 5.25. Woodland Site Components by Section and Subperiod in the Bluegrass Management Area.

Subperiod	Central Bluegrass		Northern Bluegrass		Eastern Bluegrass		Total	
Late Woodland	23	4.4%	5	3.3%	2	1.9%	30	3.8%
Middle Woodland	98	18.8%	38	25.0%	17	16.0%	153	19.6%
Early Woodland	98	18.8%	29	19.1%	26	24.5%	153	19.6%
Unassigned	303	58.0%	80	52.6%	61	57.5%	444	56.9%
Total	522	66.9%	152	19.5%	106	13.6%	780	100.0%

At 67 percent, the largest proportion of Woodland components is recorded for sites in the Central Bluegrass Management Area. About 19.5 percent of the Woodland components are in the Northern Bluegrass Section and 13.5 percent in the Eastern Bluegrass Section. In the Central Bluegrass Section, equal percentages of Early and Middle Woodland components greatly outnumber Late Woodland components, though of

all three sections the Central Bluegrass Section has the highest percentage of Late Woodland components. In the Northern Bluegrass Section Middle Woodland components predominate, and in the Eastern Bluegrass Section Early Woodland components outnumber later components (Table 5.25).

CHRONOMETRIC DETERMINATIONS

Chronometric determinations for the Bluegrass Management Area are provided in Table 5.26. Nearly three dozen dated sites include mounds, other earthworks, nonmound mortuary/ritual sites, and open habitations. Though the radiocarbon dates span the Woodland period, there are few early Early Woodland and terminal Late Woodland determinations. Excluding three outlying dates from Auvergne Mound (15Bb16), Bullock Mound (15Wd10), and Dover Mound (15Ms27), mounds in the Bluegrass Management Area date from cal 833-113 B.C. (Hartman Mound [15Be32]) to cal A.D. 28-890 (Gaines Mound [15Be23]) and cal A.D. 268-887 (from a sheet midden adjacent to a mound at the Rogers site complex [15Be33-35]).

CENTRAL BLUEGRASS SECTION

Archaeologists have recorded 434 Woodland sites in the Central Bluegrass Section. Within the management area, caves, isolated burials, specialized activity areas, and isolated finds are unique to this section, though open habitations without mounds predominate (Table 5.24). Of the 522 Woodland components at the Central Bluegrass sites, equal proportions are Early Woodland and Middle Woodland, while a small percentage are Late Woodland (Table 5.25).

Long known mostly for earthwork sites, an important development in Woodland archaeology in this section is the detailed examination of residential habitation sites, including Stringtown (15Bb67) and Jackstown (15Bb68) in Bourbon County, Sheep House Rockshelter (15Ma137) in Madison County, Miller (15Gd44) in Garrard County, Site 15Js151 in Jessamine County, and Dreaming Creek (15Ma97) in Madison County. These and other significant Woodland sites are listed in Table 5.27.

Little is known of the early Early Woodland subperiod in the Central Bluegrass, and few artifacts diagnostic of this time are reported at Woodland sites. One possible exception, however, is Site 15Ck126, an aceramic open habitation site where a Wade point was recovered from subplowzone deposits dated at cal 1381-1008 B.C. and cal 1373-978 B.C. (Table 5.26), the earliest Woodland radiocarbon dates in this section (Ison et al. 1982; see also Chapter 4).

The late Early Woodland subperiod is better documented in the Central Bluegrass Section. Diagnostic point types include Early Woodland Stemmed (Kramer, Cresap, Robbins) and Dickson (Adena Stemmed) clusters, the use of which extended into the early Middle Woodland subperiod (Table 5.7). For example, Stone (15Ck89) is an open

Table 5.26. Chronometric Dates for the Bluegrass Management Area.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Central Bluegrass Section			
Auvergne Mound (15Bb16)			
UGa-1239	2945±225	1735-1713, 1694-739, 689-663, 648-548 BC	Clay 1983
UGa-3617	1680±115	AD 87-104, 121-602	Clay 1983
Stone (15Ck89)			
DIC-2334	2390±50	751-686, 667-637, 622-614, 595-387 BC	Turnbow et al. 1983
Drake Mound (15Fa11)			
M-19	2200±250	827 BC-AD 340	Dragoo 1963; Libby 1955; Webb and Baby 1957
C-126	1168±150	AD 603-1169	Arnold and Libby 1951; Libby 1955
Peter Village (15Fa166)			
Beta-7758	2560±90	891-879, 844-409 BC	Clay 1985b
Beta-7755	2260±60	409-171 BC	Clay 1985b
Beta-7757	2220±100	516 BC-AD 1	Clay 1985b
Beta-7756	2140±110	399 BC-AD 68	Clay 1985b
Miller (15Gd44)			
Beta-166112	1940±60	86-79, 54 BC-AD 229	Elmore and Stalling 2006
Beta-166113	1970±60	162-132, 117 BC-AD 139, 154-169, 195-209	Elmore and Stalling 2006
Walker-Noe (15Gd56)			
Beta-152838	2000±60	166 BC-AD 93, 97-125	Pollack et al. 2005
Beta-152839	1990±60	165-127, 123 BC-AD 129	Pollack et al. 2005
Indian Fort Mountain (15Ma25)			
Beta-2861	2530±130	917-960, 935-375 BC	Moore 1982
Beta-2862	1910±60	39-7, 5 BC-AD 236	Moore 1982
Dreaming Creek (15Ma97)			
Beta-93739	1460±40	AD 540-654	Fenton and McBride 2007
Beta-93740	1380±60	AD 560-730, 735-772	Fenton and McBride 2007
Beta-93741	1380±70	AD 536-782, 789-810, 848-854	Fenton and McBride 2007
Gate Eleven (15Ma218)			
Beta-111633	1710±80	AD 132-468, 479-534	French and Bader 2001
Wright Mound (15Mm6)			
not reported	1900±50	AD 3-235	Crane and Griffin 1972
M-2238	1740±140	19-13, 1 BC-AD 600	Crane and Griffin 1972
Camargo Mound (15Mm32)			
Beta-33159	1780±60	AD 88-103, 122-397	Fenton and Jefferies 1991
Beta-33160	1600±60	AD 264-275, 332-596	Fenton and Jefferies 1991
Amburgey (15Mm137)			
Beta-158296	1890±40	AD 28-39, 49-230	Richmond and Kerr 2005
Beta-174892	1720±60	AD 133-433, 500-500	Richmond and Kerr 2005
Site 15Mm140			
Beta-174893	2120±40	352-295, 229-220, 211-42 BC	Anderson 2003
Beta-174895	1970±40	48 BC-AD 93, 97-125	Anderson 2003
Beta-174894	990±80	AD 891-1216	Anderson 2003
Evans (15Mm182)			
ISGS-6034	2150±70	385-5 BC	Schlarb pers. comm. 2007
ISGS-6035	2350±70	753-685. 668-610, 598-350, 306-209 BC	Schlarb pers. comm. 2007
ISGS-6036	2300±140	771-50 BC	Schlarb pers. comm. 2007
ISGS-6037	2090±80	360-273, 261 BC-AD 62	Schlarb pers. comm. 2007

Table 5.26. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
DeGaris (15Sc154)			
Beta-106284	1070±60	AD 780-791, 806-1046, 1091-1121, 1140-1148	Henderson 1997
Site 15Sc230			
Beta-173854	1180±130	AD 662-1052, 1081-1128, 1134-1152	Haag et al. 2004
Beta-187113	1100±60	AD 778-1025	Haag et al. 2004
Bullock Mound (15Wd10)			
Beta-180784	190±40	AD 1645-1699, 1721-1818, 1833-1880, 1915-1953	Schlarb 2005
Northern Bluegrass Section			
Robbins Mound (15Be3)			
M-2242	2100±140	411 BC-AD 237	Crane and Griffin 1972; Webb and Elliott 1942
Gaines Mound (15Be23)			
M-908	1975±200	406 BC-AD 469, 477-534	Crane and Griffin 1960
M-1075	1560±200	AD 28-39, 50-890	Crane and Griffin 1962
Hartman Mound (15Be32)			
M-2241	2400±150	833-154, 137-113 BC	Crane and Griffin 1972
Rogers - South Village (15Be35)			
M-1353	2380±130	800-180 BC	Crane and Griffin 1966
M-1351	1440±130	AD 268-271, 335-887	Crane and Griffin 1966
M-1352	500±100	AD 1285-1529, 1543-1634	Crane and Griffin 1966
Ronald Watson Gravel (15Be249) (see also Chapter 4:Table 4:31)			
AA-10459	1805±50	AD 83-342	Huebchen 2006; Trader 2003
AA-10457	1655±45	AD 258-298, 319-472, 476-534	Huebchen 2006; Trader 2003
AA-10458	1285±45	AD 655-827, 839-864	Huebchen 2006; Trader 2003
AA-10460	1235±50	AD 668-893	Huebchen 2006; Trader 2003
Pitt-1047	1195±40	AD 692-749, 764-899, 918-954, 957-961	Huebchen 2006; Trader 2003
Pitt-1048	1110±35	AD 785, 828-838, 866-1017	Huebchen 2006; Trader 2003
West Runway (15Be391)			
Beta-56397	2720±90	1188-1181, 1155-1146, 1130-752, 686-667, 632-625, 612-596 BC	Duerksen et al. 1994, 1995
Beta-65613	2590±60	895-868, 856, 850-536, 533-521 BC	Duerksen et al. 1994, 1995
Beta-65616	2560±160	1111-1102, 1084-1064, 1057-355, 288-233 BC	Duerksen et al. 1994, 1995
Beta-65614	2440±60	761-682, 671-403 BC	Duerksen et al. 1994, 1995
Beta-65615	2400±60	756-684, 669-606, 604-389 BC	Duerksen et al. 1994, 1995
Beta-65617	1790±70	AD 79-397	Duerksen et al. 1994, 1995
Beta-66429	980±70	AD 898-920, 946-1214	Duerksen et al. 1994
Wackenstein (15Be467)			
ISGS-3537	1970±70	164-128, 121 BC-AD 179, 188-213	Walley et al. 1997
Beta-101738	1790±80	AD 63-416	Walley et al. 1997
M. B. Green (15Be485)			
Beta-216458	2300±40	412-347, 318-207 BC	Purtill 2008
Site 15Be509			
Beta-157384	2010±85	347-318, 207 BC-AD 180, 187-214	Breetzke 2001
Beta-157382	1810±110	44 BC-AD 436, 490-509, 517-529	Breetzke 2001
Beta-157383	1720±90	AD 91-99, 124-538	Breetzke 2001

Table 5.26. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Site 15Cl44			
Beta-51426	1360±60	AD 563-779, 795-799	Doershuk et al. 1992
Beta-51425	920±80	AD 989-1261	Doershuk et al. 1992
Beta-50976	880+30	AD 1043-1106, 1118-1221	Doershuk et al. 1992
Beta-50975	420±80	AD 1327-1342, 1394-1649	Doershuk et al. 1992
Froman (15Cl51)			
Beta-73118	1440±60	AD 436-489, 511-516, 530-682	Ross-Stallings & Stallings 1996
Beta-73115	1410±70	AD 441-484, 532-730, 735-772	Ross-Stallings & Stallings 1996
Beta-73114	1400±50	AD 549-692, 749-763	Ross-Stallings & Stallings 1996
Beta-73117	1380±60	AD 560-730, 735-772	Ross-Stallings & Stallings 1996
Beta-59844	890±70	AD 1023-1260	Ross-Stallings & Stallings 1996
Beta-73116	430±50	AD 1411-1525, 1557-1632	Ross-Stallings & Stallings 1996
Hayes (15Cl67)			
Beta-192389	1810±60	AD 74-380	Hall 2005:78
Gibson Greeting Card (15Kt4)			
Beta-65617	1790±70	AD 79-397	Duerksen et al. 1994
Eastern Bluegrass Section			
Site 15Lw5			
DIC-996	1450±45	AD 538-662	Maslowski 1980
DIC-997	1370±85	AD 468-480	Maslowski 1980
Site 15Lw315A			
UGa-3525	3080±110	1606-1573, 1558-1550, 1538-1013 BC	Schock and Langford 1981
UGa-3526	1310±80	AD 585-894, 929-931	Schock and Langford 1981
Site 15 Lw316A			
UGa-3028	1990±95	348-316, 207 BC-AD 240	Schock and Langford 1980
UGa-3528	1620±285	349-314, 208 BC-AD 995, 1008-1011	Schock and Langford 1981
Site 15Lw325E			
UGa-3529	1680±120	AD 85-110, 116-604	Schock and Langford 1981
Dover Mound (15Ms27)			
C-759	2650±170	1258-1232, 1218-393 BC	Crane and Griffin 1972
M-2239	2260±140	759-683, 670 BC-AD 0	Crane and Griffin 1972
C-760	2169±175	755-684, 669-607, 600 BC-AD 141, 149-171, 193-210	Dragoo 1963; Libby 1955
Pyles (15Ms28)			
not reported	1590±120	AD 143-147, 171-193, 210-662	Railey 1984
not reported	950±260	AD 566-1456	Railey 1984
not reported	850±230	AD 669-1477	Railey 1984

habitation discovered during investigations at the J. K. Smith Power Station. A mid-late Early Woodland component at this aceramic site was indicated by a calibrated radiocarbon date of 751-387 B.C. (Table 5.26) and an Adena Stemmed point. Postmolds delineated a small structure (4.5 m in diameter) with an interior hearth and several exterior cooking pits and a two-post rack or lean-to. This component also yielded charred nutshell, wood charcoal, and a few carbonized seeds (Turnbow et al. 1983).

Table 5.27. Important Woodland Period Sites in the Central Bluegrass Section.

Site No.	Site Name	Site Type	Affiliation	References
15Bb1	Lebus Circle	enclosure	EW-MW	Funkhouser and Webb 1932
15Bb16	Auvergne	mound	EW	Clay 1983
15Bb58	none	open habitation with mound	LW	Estes 1983b
15Bb67	Stringtown	open habitation	LW	Estes 1983c
15Bb68	Jackstown	open habitation with mound	LW	Estes 1983a
15Ck1	Indian Fort	enclosure	unassigned	Fiegel 2005
15Ck7	none	mound	unassigned	Fiegel 2005
15Ck10	Nelson Gay	mound	EW-MW	Weinland 1976
15Ck89	Stone	open habitation	EW	Turnbow et al. 1983
15Ck126	none	open habitation	EW	Ison et al. 1982
15Fa1A	Mt. Horeb	enclosure	EW-MW	Webb 1941a, 1943a
15Fa1D	none	enclosure	unassigned	Webb 1941a, 1943a
15Fa4	Rockefeller	mound	unassigned	Clay 1987
15Fa11	Drake	mound	EW-MW	Webb 1941a
15Fa12	Elam	mound	unassigned	Clay 1987
15Fa14	Grimes Village	enclosure	EW-MW	Webb 1943b
15Fa15	Tarlton	mound	EW-MW	Webb and Haag 1947b
15Fa152	Fisher	mound	EW-MW	Webb 1941a; Webb and Haag 1947b
15Fa166	Peter Village	enclosure	EW-MW	Clay 1985b, 1988; Webb 1941a, 1943a
15Fr21	none	mound	EW-MW	Sanders and Weinland 1976
15Gd44	Miller	open habitation	MW	Ross-Stallings & Stallings 2007
15Gd56	Walker-Noe	mound	MW	Pollack et al. 2005
15Hr4	none	mound complex	EW-MW	Stafford 1985
15Js151	none	open habitation	LW	Bybee 1999
15Ma14	Noland	mound	MW	Clay and Stafford 1982; Funkhouser and Webb 1932
15Ma24	Round Hill	mound	MW	Webb and Baby 1957
15Ma25	Indian Fort Mountain	enclosure	MW	Burroughs 1926; Moore 1982; Tincher 1973; Young 1910
15Ma44	Bogie Circle	enclosure	MW	Stafford 1983
15Ma45	Robbins Stone	mound	EW-MW	O'Malley and Jefferies 1998a
15Ma70	Harvey Tudor	open habitation	EW-MW	Brenyo 1983
15Ma97	Dreaming Creek	open habitation	LW	Fenton and Lozny 1995
15Ma112	Corneilison	mound	MW	O'Malley and Jefferies 1998b
15Ma137	Sheep House	rockshelter	LW	not available
15Ma177	none	open habitation	EW	Ensor et al. 1996; French and Bader 2001
15Ma196	none	open habitation with mound	MW	Ensor et al. 1996; French and Bader 2001
15Ma218	Gate Eleven	open habitation	EW, MW, LW	Ensor et al. 1996; French and Bader 2001
15Mm1	Mount Sterling	mound	EW-MW	Funkhouser and Webb 1932; Webb 1940
15Mm3	Ricketts	mound	EW-MW	Funkhouser and Webb 1935; Rafferty 2005; Webb and Funkhouser 1940

Table 5.27. Continued.

Site No.	Site Name	Site Type	Affiliation	References
15Mm5	Gaitskill	mound	EW-MW	Funkhouser and Webb 1935; Webb 1940
15Mm6-8	Wright-Greene	mound complex	EW-MW	Jefferies 1987; Rafferty 2005; Webb 1940
15Mm30-33	Camargo	earthwork complex	MW	Fenton and Jefferies 1991
15Mm137	Amburgey	specialized activity	MW	Richmond and Kerr 2005
15Mm140	none	open habitation	EW, MW, LW	Anderson 2003
15Mm182	Evans	specialized activity	EW	Schlarb et al. 2007
15Sc154	DeGaris	open habitation	LW	Henderson 1997
15Sc230	none	open habitation	LW	Haag et al. 2004
15Wd10	Bullock	mound	MW	Schlarb 2005

The earliest pottery in the Central Bluegrass dates to the late Early Woodland subperiod. These materials are classified as Fayette Thick, which predates Adena Plain and Montgomery Incised types (Clay 1985b; Duerksen et al. 1995). Griffin (1943) published the type description for Fayette Thick based on materials recovered from Peter Village (15Fa166) and Grimes Village (15Fa14). The singular trait of Fayette Thick pottery is its thickness, followed by the large size of temper particles, which Tune (1985) used to delineate chert from limestone tempered varieties. Fayette Thick sherds from dated contexts in the Central and Northern Bluegrass sections have a the time range of is ca. 650 to 300 B.C. (Clay 1985b; Duerksen et al. 1995) (Table 5.26). Based on ditch stratigraphy, radiocarbon dates, and spatial patterning within the excavation block at Peter Village, Fayette Thick and Adena Plain overlapped in time, and the transition between the two types occurred around 300-200 B.C. (Clay 1985b:30).

Adena Plain was one of the first types of siltstone tempered Woodland pottery to be defined in Kentucky. Haag (1940, 1941) developed the type description for Adena Plain using materials from the larger Wright Mound (15Mm6) and nearby Morgan Stone Mound (15Bh15, Eastern Bluegrass Section). Clay (1985b, 1988) and Tune (1985) further defined Adena Plain based on materials from Peter Village and Grimes Village. Tempered with finely crushed limestone, Adena Plain vessels are smoothed, burnished, or plain, and several forms of decoration (e.g., applied paired conical nodes) are documented. Rims are outflaring and exhibit exterior rim folds, rim strips, rolled rims, or rim thickening (Clay 1985b, 1988; Haag 1940, 1941; Tune 1985). Adena Plain pottery traditionally is considered a late Early Woodland type with a beginning date of ca. 300-200 B.C. (Clay 1985b, 1988).

A large number of late Early-early Middle Woodland Adena mounds and enclosures plus several potentially contemporaneous habitation sites have been documented in the Central Bluegrass Section. To facilitate description of these sites, they are grouped into five clusters: North Elkhorn Creek, Town Branch-South Elkhorn Creek, Paint Lick Creek-Silver Creek, Muddy Creek, and Somerset Creek-Hinkston Creek-

Brush Creek-Sycamore Creek. The remaining sites are discussed individually within general geographic divisions of the section.

North Elkhorn Creek Cluster

The North Elkhorn earthwork group in Fayette County includes the Mt. Horeb complex, Grimes Village (15Fa14), Tarleton Mound (15Fa15), Rockefeller Mound (15Fa4), Elam Mound (15Fa12), and Site 15Fa159, the latter three representing presumed Adena mounds about which little is known. The Mt. Horeb complex includes three enclosures (Peter Village [15Fa166], Mt. Horeb Enclosure [15Fa1A], Site 15Fa1D) and one mound (Fisher Mound [15Fa152]) situated along/near the bluff edge overlooking North Elkton Creek. According to a map made by Rafinesque in 1820 (as reproduced in Clay 1987), there were additional earthworks, including an unidentified mound, in this cluster. Archaeologists have not documented substantial Woodland habitation sites near this earthwork group.

Peter Village (15Fa166, formerly 15Fa1B) is the largest of the three enclosures and likely the oldest element of the Mt. Horeb Earthworks complex. The irregular earthwork, which encompasses an area of 9.2 ha, is an elliptical enclosure measuring 347-372 m across with an exterior ditch up to 1.8 m deep; there is no "causeway" (Peter 1871 as reproduced in Webb 1943b; Clay 1985b, 1988). Surface collections produced stemmed and other projectile points, drills, gravers, reamers, scrapers, hafted cutters, knives, celts, hammerstones, rectangular items, and cores. Groundstone items are quartzite and sandstone tubular pipe fragments, worked pipestone, unengraved sandstone tablet fragment, igneous celts and abraders, slate pendant fragment and gorgets, hematite cones/hemispheres, unworked cannel coal fragments, quartz and quartzite celts, sandstone whetstone, and groundstone anvil and hammerstones. Items of barite or galena are boatstones or atlatl weights, beads, and cones/hemispheres. Fayette Thick and Adena Plain ceramics were recovered from the surface (Griffin 1943; Webb 1941a, 1943b).

Subsurface contexts at Peter Village yielded similar artifacts. Clay (1985b, 1988; see also Tune [1985]) excavated a trench across the ditch and placed a small excavation block just inside the enclosure. He discovered evidence of a wooden stockade that predated construction of the ditch-embankment. Despite its name (Webb 1941a), Peter Village did not function as a habitation site. Nor was it a sacred circle or burial mound like other Adena earthworks. Instead, the stockade and ditch-embankment features could have served defensive functions and/or defined "an area for secular or sacred purposes" (Clay 1985b:22). Peter Village was special activity site or "defensive resource exploitation center" where barite/galena was acquired from a vein deposit and processed into rectangles and cones that commonly occur as grave goods at Adena mortuary sites (Clay 1985b:39). Food preparation and mortuary feasting, pottery manufacture, and chipped stone tool manufacture also occurred at the site. Accepted calibrated radiocarbon dates range between 409-171 B.C. and 399 B.C.-A.D. 68 (Table 5.26) (Clay 1988), making Peter Village the only chronometrically dated site in this cluster.

Measuring 91.4 m across, the circular Mt. Horeb Enclosure (15Fa1A) consists of an outer earthen embankment, a ditch, a flat interior area representing the original ground surface, and a causeway on the west side (Webb 1943b). The remains of a circular,

mostly paired-post structure were discovered in the hardpan of the original ground surface in the center of the enclosure. The large size (29.6 m diameter) and absence of internal postmolds indicated that the structure was not roofed, and there was no apparent opening or entranceway. The structure may have been a wooden wall or stockade scaled by a ladder. Archaeologists recovered few artifacts from the Mt. Horeb Enclosure. A single sherd classified as Adena Plain was recovered from the ditch. Other items are seven projectile points (photographs of which resemble Adena Stemmed and triangular forms), a scraper, a knife, and a grooved granite ball. The enclosure was not a defensive or mortuary site, though human tooth fragments were recovered during WPA excavations. Instead, the "sacred circle" and circular structure may have functioned as a location for meetings of kin groups (Webb 1941a).

Dr. Robert Peter described the third enclosure, Site 15Fa1D, in an 1871 letter to the Smithsonian Institution. The circular enclosure is situated in a hollow between the two hills on which the Mt. Horeb Enclosure and Peter Village are located. The smallest of the three enclosures in the earthwork complex, the interior portion and shallow ditch measure 25 m across (Peter 1871 as reproduced in Webb 1943b). The low exterior embankment measures 38.1 m in diameter and only 0.6 m in relief. A "gateway" or unmodified ground surface is located in the southwest (Webb 1941a). This site has not been excavated.

Fisher Mound (15Fa152, formerly 15Fa1C) is the fourth element of the Mt. Horeb Earthworks complex. The 21.3 m wide and 0.8-1.2 m high mound was excavated by the landowner and by WPA crews. There are no chronometric dates for the mound, but Webb and Haag (1947b) assigned it to Late Adena and Dragoo (1963), Early Adena. Fisher Mound was constructed of relatively sterile fill with limestone slabs over six burial features and a thermal feature on the relict humus layer. Red ochre stains with artifacts on the submound floor may represent three more interments. Two additional graves were added after mound construction or in a second, now-eroded mound layer. The remains of one individual represented a secondary cremation, and at least five individuals were presumably extended, in-flesh burials (Webb and Haag 1947b). Due to the fragmentary nature of the remains, few details about the Fisher Mound burial population are known.

Seven of the eight formal grave features at Fisher Mound yielded grave goods, two of which only contained red ochre. Items include a single sherd of Adena Plain, modified human bones, sandstone pipes and atlatl weights, drilled barite, hematite and barite cones or hemispheres, igneous celts and ax, chert celts, shell beads, antler tools, and unmodified faunal remains. Copper artifacts are a battered breast plate or gorget, battered boatstone, folded and battered bracelet, two celts, and five folded and battered bars with ears or horns that were part of antler headdresses (Peter 1871 as reproduced in Webb 1943b; Webb 1943b; Webb and Haag 1947b). Projectile points pictured resemble Early Woodland Stemmed and Dickson cluster and possibly Turkey Tail types (Webb and Haag 1947b).

Known locally as Grimes Field, Grimes Village (15Fa14) is an irregularly shaped earthen enclosure. It is located opposite the mouth of a bend in North Elkhorn Creek, about two km northwest of the Mt. Horeb Earthworks complex. No subsurface investigations have been conducted at Grimes Village, but surface materials were collected in the 1870s by local residents and in the 1940s by Webb and his associates. In

addition to barite/galena items and a unengraved sandstone tablet, a thin sheet of copper was collected from the surface inside the earthen enclosure. The chipped- and groundstone artifact assemblages, the overall form of the site, and presumably the site function and age are similar to nearby Peter Village (Webb 1943b).

Tarlton Mound (15Fa15), which measured 15 m across and 1 m high, is about 1.5 km southwest of the Mt. Horeb Earthworks complex. Excavations were conducted by Dr. Robert Peter and his sons in October 1872 (Peter 1871 as reproduced in Webb 1943b; Webb and Haag 1947b). The cremated remains of at least one adult male and a second individual were found, and no mention was made of skeletonized remains being uncovered. The calcined bones of the former were mixed with red ochre and associated with a cache of leaf-shaped chert blades. Some of these blades were intentionally broken before being covered with red ochre. The calcined bones of the second individual were mixed with red iron oxide and charcoal inside an oval arrangement of leaf-shaped chert blades placed end-to-end and slightly overlapping one another. Other artifacts found in the mound include additional leaf-shaped blades and other chert tools, barite/galena, copper bead, sandstone tubular pipe and whetstone fragments, slate pendant fragment, and diorite celt (Peter 1872 as reproduced in Webb 1943b). A projectile point recovered from the mound (Webb 1943b; Webb and Haag 1947b) resembles a Kramer point and suggests that mound dates to the late Early Woodland subperiod.

Town Branch-South Elkhorn Creek Cluster

Several sites along Town Branch and South Elkhorn Creek in western Fayette County and eastern Woodford County constitute another late Early-early Middle Woodland earthwork cluster. Two professionally investigated sites are Drake Mound and Bullock Mound, neither of which has credible chronometric dates. An unnamed earthwork site, located 0.5 mi southwest of Drake Mound at the confluence of South Fork and Town Fork of North Elkhorn Creek, was recorded by Rafinesque (1820) and Squier and Davis (1848) (Webb 1941a). There are no substantial Early-Middle Woodland habitation sites reported near this cluster.

Situated on a hilltop in the Town Branch drainage, Drake Mound (15Fa11) measured 15.2 m across and 1.3 m high. A minimum of eight individuals were interred in a central subsurface pit feature within this unique earthen mound, which was constructed of three mostly sterile strata on the relict humus layer. Four individuals are extended in-flesh inhumations and four are secondary cremations. The burial population included four young adult females, one young adult male, one adult of undetermined sex, one two-six-month-old infant, and one additional individual (Webb 1941a). Calibrated radiocarbon dates of 827 B.C.-A.D. 340 and A.D. 603-1169 (Table 5.26) suggest that the Drake Mound was used throughout the Woodland period, and are thus not very informative. Projectile points recovered from mound fill (Webb 1941a) resemble Dickson cluster and possibly Lowe cluster types. Dragoo (1963) classified Drake Mound as Late Adena.

Among the grave goods found with five individuals at the aceramic Drake Mound were barite fragments, a sandstone gorget, large shell disk beads, and small *Olivella* shell beads. Copper artifacts are rolled cylindrical beads, two gorgets or breast plates, one of

which was folded and battered, and one dagger or knife in a wooden handle secured with withes. The latter was wrapped in two layers of textiles, which were preserved on one side of the dagger blade (Carey 1941; Webb 1941a). Four strips of varying widths were wrapped and wound diagonally around the dagger blade to form the innermost textile layer. Comprised of bast fiber, possibly milkweed (*Asclepias sp.*), the textile cords were two-twisted strands woven by multiple-ply braid plaiting. The textile forming the outer layer also was wrapped diagonally around the blade and consisted of double-twisted strands, but the cords were woven by lattice (bird-cage) twining and comprised at least partly of cedar bark. This was the first example of cedar bark textiles documented in Kentucky (Carey 1941).

The Bullock Mound (15Wd10) is located on a ridge overlooking an unnamed tributary of South Fork Elkhorn Creek. It is the largest of a three-mound complex, measuring 20 x 10 x 2.6 m when Haag excavated the mound in 1947 under Webb's direction. A rectangular structure, a burned clay floor, five features, and several isolated postmolds were found under the mound, which was constructed to cover cremations. Woodland diagnostics from Bullock Mound are Adena Plain sherds and a Vanport chert bladelet. Archaic period points, bifaces, hafted scrapers, a chert adze, flakes, and a sandstone abrader recovered from mound fill (Schlarb 2005).

Below the mound 80 postmolds demarked an 8 x 15 m rectangular submound structure, which distinguishes Bullock Mound from other central Kentucky Adena sites and is suggestive of Hopewell interaction. A burned clay floor extended within the postmold pattern, perhaps resulting from burning of the structure. Three postmolds and five features were documented within the postmold pattern. Two pits and one ash deposit were devoid of artifacts. A centrally located rectangular crematory pit surrounded by baked clay contained calcined and carbonized human bone, copper fragments, and pottery sherds. It is unclear if the human remains represent a primary or secondary cremation. A soil sample from a rectangular fire-burned basin feature, which was capped with limestone slabs, yielded small fragments of calcined human bone, pottery, chert, red ochre, charcoal, and ash. At least one female adult was interred in Bullock Mound (Schlarb 2005).

Paint Lick Creek-Silver Creek Cluster

Another Central Bluegrass earthwork cluster is in the Paint Lick Creek and Silver Creek drainages, which are tributaries of the Kentucky River in western Madison County and eastern Garrard County. Mortuary-ritual sites include Round Hill (15Ma24), Indian Fort Mountain (15Ma25), Bogie Circle (15Ma44), Robbins Stone Mound (15Ma45), Corneilison Mound (15Ma112), and Walker-Noe (15Gd56). Of these, only Walker-Noe and Indian Fort Mountain have been investigated by professional archaeologists. The Miller site (15Gd44) is an open habitation site associated with this cluster.

Walker-Noe (15Gd56) is a multicomponent site covering almost 50 ha on Walker Branch, a tributary of White Lick and Paint Lick creeks in Garrard County. The site includes a small Middle Woodland Adena earthen burial mound measuring 10 m across and 0.3-0.4 m high. Calibrated radiocarbon dates of 166 B.C.-A.D. 125 and 165 B.C.-A.D. 129 (Table 5.26) point to its use as a mortuary facility during the early portion of

the Middle Woodland subperiod. Calcined human remains were recovered from a large thermal feature under the mound. At least 17 individuals of all ages were cremated in the central burned area and then buried to the periphery; the last cremations, however, were left in the burned area. Most represent fleshed cremations, but some appear to have been defleshed prior to cremation. This mortuary facility probably functioned as a charnel house or crematorium for a limited time frame, perhaps one or several seasons or years.

Domesticated (erect knotweed, goosefoot, maygrass, sunflower, marsh elder, squash, gourd), cultivated (sumac), and wild (grape, grasses, persimmon, honey locust, bedstraw, blackberry/raspberry, spike rush, hickory, other nuts) plant remains associated with the cremated remains at Walker-Noe suggest mortuary feasting that involved the use of several pottery vessels (Adena Plain and Wright Check Stamped). Adena Stemmed and Affinis Snyders points, bladelets, a sandstone pipe fragment, copper beads, and other artifacts were recovered from the submound floor, mound fill, and plow zone. Some of these items likely were grave goods (Pollack et al. 2005).

Pollack et al. (2005) concluded that Walker-Noe is similar to other Adena mounds in that mortuary preparation involved cremation, which is especially common for individuals interred near the bottoms of other mounds. However, at Walker-Noe cremation is the *only* form of mortuary treatment as there were no extended burials. In addition, Walker-Noe is unlike other Adena mounds in that it lacked circular submound structures, had no log- or bark-lined pit graves, and did not occupy a prominent geographic location.

Located on a ridgetop in the Paint Lick Creek drainage near several mounds including Walker-Noe, the Miller site (15Gd44) is a residential hamlet with intact Middle Woodland midden and associated features. Calibrated radiocarbon dates of 86 B.C.-A.D. 229 and 162 B.C.-A.D. 209 associated with the Middle Woodland component are similar to those obtained from Walker-Noe (Table 5.26). Affinis Snyder, Snyder, and Lowe cluster points, Adena Plain pottery, and faunal and botanical remains but no ceremonial objects were associated with the Middle Woodland component. Miller is one of the few Woodland sites in Kentucky where there is definitive evidence of dog consumption in the form of butchered dog bones, though several other site assemblages contain canid remains. Carbonized seeds of sumpweed and goosefoot as well as sunflower and amaranth pollen were recovered from the Miller site (Elmore and Stallings 2006).

Indian Fort Mountain (15Ma25), not to be confused with Indian Fort Earthworks (15Ck1), is an irregularly shaped hilltop enclosure with one-two m high stone and earth walls that encompass approximately 25 ha. Located in the Knobs physiographic province, descriptions and speculations concerning the earthwork and its function were provided by Burroughs (1926), Young (1910), and Tincher (1973). Limited research at Indian Fort Mountain was conducted by Moore (1982), who excavated a small trench across a section of the enclosure wall. Although no diagnostic materials were recovered, information was obtained on wall construction techniques and several features were recorded. Radiocarbon samples were collected from two of these features. Moore (1982) discounted the date of 580 B.C. (uncalibrated; standard deviation unavailable) as too early, but he accepted a later calibrated date of 39 B.C.-A.D. 236 (Table 5.26).

Muddy Creek Cluster

A cluster of Woodland mortuary-ritual and open habitation sites is located in the north-south-trending Muddy Creek drainage of eastern Madison County. The former include the Noland Mound (15Ma14) and Moberly Mound (no state site number). Several habitation sites (Harvey Tudor [15Ma70], Site 15Ma177, Site 15Ma196, and Gate Eleven [15Ma218]), which may be coeval with these mounds, have been recorded at or within the vicinity of the Bluegrass Army Depot.

Moberly Mound (no state site number) was excavated in 1897 by Colonel Bennett Young. Constructed of approximately 3,000 cubic yards of earth, this burial mound covered six burials. The grave of an older adult male, who may have died from a projectile point embedded in his left femur, was interred with a grooved syenite ax, flint scraper, groundstone whetstone, clay tubular pipe wrapped in mica, and ochre (Young 1910).

Harvey Tudor (15Ma70) is an Early-Middle Woodland open habitation site (Brenyo 1983). Site 15Ma177 is a Late Archaic-Early Woodland base camp. It may be associated with nearby Adena sites. Site 15Ma196 is an open habitation with a mound that probably dates to the Middle Woodland subperiod and may be associated with Adena or Hopewell (Ensor et al. 1996; French and Bader 2001).

The Gate Eleven site (15Ma218) is an open habitation site with subsurface deposits and Early, Middle, and Late Woodland components. Thin limestone tempered plain and cordmarked ceramics, Lowe Flared Base/Chesser Notched and Copena projectile points, and mica were recovered from several Middle Woodland features. Maygrass, squash, and hickory nut shell also was recovered from these features, one of which yielded a calibrated radiocarbon date of A.D. 132-534 (Table 5.26) (Bader and French 2001; Ensor et al. 1996).

Thicker limestone tempered plain and cordmarked ceramics recovered from the Gate Ellen site may be associated with a terminal Late Woodland component. An appendage scar was observed on one sherd, and one had fine incised lines on the exterior surface. Mica also was recovered from one of the terminal Late Woodland features, as was a single kernel of maize (Bader and French 2001; Ensor et al. 1996).

Somerset Creek-Hinkston Creek-Brush Creek-Sycamore Creek Cluster

A fifth Central Bluegrass Early-Middle Woodland site cluster is associated with several streams (Somerset Creek, Hinkston Creek, Brush Creek, and Sycamore Creek) in Montgomery County that are tributaries of the Licking River. Most are burial mounds, including Mount Sterling (15Mm1), Gaitskill (15Mm3), Ricketts (15Mm5), and Wright-Greene (15Mm6-8). Other sites in the cluster are enclosures, such as Camargo (15Mm30-33), and nonmound ritual sites, such as Amburgey (15Mm137) and Evans (15Mm182). With the exception of Site 15Mm140, few late Early Woodland-early Middle Woodland habitation sites are associated with this cluster.

The Mount Sterling Mound, known locally as “Little Mountain,” was located in the community of Mt. Sterling prior to its destruction in the 1840s for clay to make

bricks. It measured about 30.5 m in diameter and 6.1-7.6 m in height. This presumed Adena mound reportedly held the remains of a single individual and associated grave goods. Among the items donated in the late 1800s to the Peabody Museum were a broken stone smoking pipe, a copper bracelet, and a copper breastplate (Putnam 1882 as reproduced in Webb 1940; Webb 1940).

Gaitskill Mound is located north of Mt. Sterling in the Hinkston Creek drainage. The sugar-loaf-shaped mound measures 30 x 9-12 x 9 m. Amateur excavations in the 1880s or early 1900s uncovered an apparent cremation with grave goods about 6 m below ground surface. Noteworthy items include complete engraved sandstone and clay tablets, large mica sheets, an unspecified number of copper bracelets, and an unspecified number of soapstone or limestone tubular pipes. The mound has not been investigated by professional archaeologists, but detailed descriptions and interpretations of the engraved tablets have been published. The clay tablet was incised on one side with anthropomorphic motifs, and the sandstone tablet bore a zoo-anthropomorphic motif (Funkhouser and Webb 1932; Webb 1940).

Located south of Mt. Sterling, the Ricketts Mound was a steeply sloping but eroded mound that lacked internal stratification and measured 27.4-30.5 m in diameter with a height of 3.7 m. There are no chronometric dates for the Ricketts site, but recovered projectile points resemble Cresap and Robbins and thus suggest an Early-Middle Woodland age. Rafferty (2005) proposed an early Middle Woodland affiliation (ca. 200 B.C. and A.D. 1), concurring with Dragoo's (1963) placement of the mound in Late Adena. Ricketts Mound was constructed in two episodes (Rafferty 2005) of local yellow clay deposited as 25-pound basket loads on a relict ground surface. In addition to grave features, sandstone rocks, rock piles, and fire pits were documented in the mound (Funkhouser and Webb 1935; Webb and Funkhouser 1940).

At the Ricketts Mound at least 43 individuals were interred in puddled clay graves, log tombs, crematory basins or pits, simple pits, a square clay basin, and a bark-lined pit. The burial population was dominated by comparable numbers of male and female adults, but included subadults and infants. Most were in-flesh extended inhumations, though some cremations were documented. Almost half of the individuals (mostly adults) were interred with grave goods, and about one-fourth had elaborate items like groundstone smoking pipes, celts, and gorgets; shell gorgets, beads, and spoons; bone beads, combs, and other items; freshwater pearls; and copper bracelets, rings, and beads. Pottery was conspicuously absent in the Ricketts mound (Funkhouser and Webb 1935; Webb and Funkhouser 1940). Rafferty (2005) concluded that adornment artifacts were more common than tools/weapons. The latter were placed only with adults and cremated individuals and were more abundant at Ricketts than at the nearby Wright Mound.

Also located near Mt. Sterling on a hilltop near Somerset Creek, the Wright-Greene Mounds group consists of three mounds (and possibly a fourth) (Jefferies 1987; Webb 1940). The larger Wright Mound (15Mm6) stood 9.4 m high and 51.8-57.9 m across, and the smaller (15Mm7) stood 16.2 m high and 18.3 m across (Webb 1940). Two calibrated radiocarbon dates of 19 B.C.-A.D. 600 and A.D. 3-235 obtained from Wright Mound Mm6 place it in the late Middle Woodland subperiod (Table 5.26) (Jefferies 1987; Rafferty 2005) or Late Adena. The Greene Mound (15Mm8), the only

extant mound of the group, measures 18.0 m across and 2.5 m high and is surrounded by a shallow ditch (Jefferies 1987). There is a low "lobe" that extends from the otherwise conical outline of Greene Mound (Fenton and Jefferies 1991).

Excavation of Wright Mounds Mm6 and Mm7 generated important information about Woodland ritual structures, mound construction, crypt types, body placement, and grave goods. The smaller Wright Mound (15Mm7) was constructed in one phase over a complete paired-post, circular postmold pattern. Two single interments were placed in oval pit graves; one was extended and one was cremated. The latter was associated with three unengraved sandstone tablets, two bone flakers, and a bone comb. The mound fill yielded chert points, blanks, scrapers, and a drill; groundstone celts, cupstones, a discoidal, a drilled sandstone, and a nonengraved sandstone tablet; and a bone comb, flakers, chisels, and awls (Webb 1940).

In his analysis of Adena tomb types, grave goods, and demography, Rafferty (2005:159) concluded that, unlike some Adena mounds in the Scioto and upper Ohio valleys, Wright Mound Mm6 "represents a highly formulaic mortuary program." The submound hard pan under this mound contained one complete and five partial paired-post, circular postmold patterns and one partial single-post rectangular postmold pattern (Webb 1940). The internal stratigraphy of Wright Mound Mm6 revealed four stages of construction, each of which was separated by an interval of humus formation (Jefferies 1987; Webb 1940). Of the 21 single interments in Wright Mound Mm6, two-thirds were placed in four types of log tombs; other individuals were buried in simple pits or unprepared graves. Seventeen of the individuals were extended in-flesh inhumations and four were represented by fragmentary remains (Webb 1940).

A wide range of grave goods were placed with the deceased at Wright Mound Mm6. These include copper bracelets and a concentric headdress; bone or shell disk beads, *Marginella* beads, combs, a spatulate, and a conch shell; mica crescents and fragments; groundstone tubular pipes, a whetstone, a cylinder, and a spatula; fabric, leather, and other textile fragments; red ochre; snake bones; and a cane stalk bundle (Webb 1940). Two-thirds of the individuals were interred with "adornment artifacts," such as shell necklaces and copper bracelets. Tools/weapons were not commonly placed in graves (Rafferty 2005), though they were recovered from mound fill and submound contexts. The stage 1 fill contained, among other artifacts, items that likely were displaced grave goods: a cut wolf mandible, a shell spoon, a partial limestone engraved tablet, a copper pin and a ring (Webb 1940), and polished galena (Webb 1943b). The motif on the tablet may represent a raptorial bird (Webb 1940) or a pair of turkeys (Carter 2007).

Though a variety of artifacts were recovered from the mound fill, some of these materials may predate its construction. Of the almost 250 points about one-third are weak-shouldered, stemmed forms resembling Dickson cluster types. Other chert tools are, in decreasing abundance, scrapers, knives, blanks, hammerstones, gravers, cores, and a celt. Groundstone items, several of which are made of barite, are gorgets, saws, cupstones, celts, cones/hemispheres, atlatl weights, hammerstones, hoes, anvils, abrading stones, a bead, a discoidal, and smoking pipe fragments. Faunal items are animal teeth including bear; bone awls, a hook, and a handle; turtle carapace; antler flakers and a drift; and a shell spoon, a ring, and a polished shell (Webb 1940).

Wright Mound Mm6 is the type site for Wright Check Stamped pottery. The diagnostic trait of this type is its exterior surface treatment, which involved impressing with stamps bearing a square or rectangular checkerboard pattern. Some specimens exhibit S-twist cordmarking, and interior surfaces are smoothed. Jars and other vessels were tempered primarily with crushed limestone, though some specimens were tempered with siltstone or grit. Wright Check Stamped dates primarily to the Middle Woodland subperiod in Kentucky, but it continued to be manufactured into the early Late Woodland (Carstens 1996; Dunnell 1972; Haag 1940; Henderson and Pollack 1985). In addition to Wright Check Stamped, a few Montgomery Incised sherds were recovered from the fill of Wright Mound Mm6 (Haag 1940).

Of the two excavated Wright-Greene Mounds, osteological data is available only for Wright Mound Mm6. The burial population of 21 individuals was not considered demographically representative of the larger community. All but three of the individuals are adults, with three times as many males as females. Traumas and pathologies include fractures, cribra orbitalia, osteomyletis, periostitis, and heavy tooth wear. Skeletal modifications include occipital flattening and squatting facets (Hertzberg 1940b).

The ritual patterning evident at Wright Mound Mm6 and Ricketts Mound, both considered chronologically late (post-300 B.C.) Adena sites, has three fundamental characteristics (Rafferty 2005). First, both are accretional and represent the remains of multiple ritual events. Though simple with few stages of construction, mound construction at both was preceded by use of mortuary camps, which were particularly intensively used at Wright Mound Mm6. Second, there were abundant grave goods, especially adornment items, placed with the deceased. Adults had more grave goods than subadults, and male and female adults were equally likely to have items. The grave goods pattern suggests "collective representation," meaning group identity is emphasized over individual status. Third, reusable, log-lined tombs were used for cycling bodies (Rafferty 2005). The latter, however, is only evidenced at Ricketts, where five of the seven log tomb contained the remains of two to three individuals (Funkhouser and Webb 1935; Webb and Funkhouser 1940). None of the 14 log tombs at Wright Mm6 held the remains of multiple individuals (Webb 1940).

Jefferies' (1987) research provided important information about off-mound activities at the Wright-Greene Mounds complex, especially around the Greene Mound. Shovel probes and hand excavated units documented a discontinuous "lightly stained midden deposit" and artifact scatters (Jefferies 1987:23). Chipped stone artifacts, which included an Adena Stemmed and a corner-notched point fragment, were concentrated between Wright Mound Mm6 and Greene Mound. The low density of pottery sherds suggests that either ceramics were used away from Greene Mound or most sherds were incorporated into the mound fill (Jefferies 1987). Similarities between the thin, siltstone tempered sherds from off-mound contexts and those recovered from Wright Mound Mm6 suggest that "the Greene Mound material is at least contemporary with the construction of the Wright Mound, if not predating it" (Jefferies 1987:30). Jefferies (1987) noted similarities between Greene Mound sherds and Inez Plain pottery, suggesting an early Middle Woodland date for the mound.

The Camargo Earthworks complex on Brush Creek south of Mt. Sterling, now mostly destroyed, consisted of three enclosures and two mounds. Tate C. Page led WPA-

funded excavations at three elements of the complex in 1941, but the results of this research were not published for fifty years. The three enclosures were circular (15Mm30), square (15Mm31), and hexagonal (15Mm33) in shape. The two mounds included 15Mm32 and an un-numbered mound. The former measured 20-30 m in diameter and 1.5-2.0 m high, and the conical outline was interrupted by "a low, southwest-extending lobe" (Fenton and Jefferies 1991:46). Of the two calibrated radiocarbon dates from submound features, one ranges from A.D. 88-397 and the other from A.D. 264-596 (Table 5.26) (Fenton and Jefferies 1991).

About 286 m^2 of Camargo Mound Mm32, excluding the center of the mound, was excavated, providing information about late Middle Woodland crypt types, mortuary preparation, and grave goods. Of the 38 features documented at this site, 32 were postmolds arranged in no apparent pattern, except for two that appeared to be paired. A rectangular basin that may have functioned as an *in situ* crematorium was found under the mound lobe; feature fill yielded small calcined human bones, mica traces, Adena Plain sherds, charcoal, and ashes. Another submound feature, a circular pit with calcined human bone, mica, pottery, charcoal, and ash, was interpreted as a crematory pit. Mound Mm32 also yielded a reconstructed Connestee Simple Stamped or Brushed vessel, a platform pipe fragment, a partial engraved sandstone tablet, and expanding-stemmed and corner-notched points. Tempered with micaceous and ferric sand, the Connestee vessel had four panels with stamped or brushed surface treatment (Fenton and Jefferies 1991).

The circular enclosure at Camargo Earthworks measured less than one m high and 50 m in diameter, encompassing an area of 1850 m^2. About 13 percent of the circular enclosure, both inside and outside the embankment, was excavated. The interior of the enclosure, referred to as a "plaza," was surrounded by a ditch of unspecified depth. The earthen embankment surrounded the ditch, and there was an unmodified "opening" in the northwest. Several prehistoric postmolds and burned features were documented. Chipped stone tools and debitage, pottery, and botanical artifacts were recovered, including Robbins, Merom-Trimble, and straight- and expanding-stemmed projectile points. The density of artifacts was greater on the outside of the enclosure than on the inside; chipped stone tools were more abundant on the inside and debitage on the outside (Fenton and Jefferies 1991).

The square enclosure at Camargo measured 45 m on each side with a possible opening in the southeast corner. About 8 percent of the 2025 m^2 of the enclosure was excavated. Like the circular enclosure, the square consisted of an open "plaza" area, an interior ditch, and a low embankment. Cultural materials were scarce and included three postmolds and three artifacts (Fenton and Jefferies 1991). The Camargo hexagonal enclosure was not described.

Evans is a nonburial ritual site located to the north of Mt. Sterling on an upland ridge in the Hinkston Creek drainage. Four calibrated radiocarbon dates from this site overlap between about 400 and 200 B.C. (Table 5.26). Late Early Woodland features at Evans were arranged around a central activity area marked by yellow clay, concentrations of ash and fire cracked rock, two postmolds, and two pits. This space may have served as a cremation area, with cremated remains transported off-site for interment, perhaps in a mound (15Mm11) 350 m west of the site. To the northeast and southeast of the central activity area were two large, irregularly shaped pits lined with artifact-bearing organic

soil and filled with sterile clay. These features may represent storage areas for special symbolic clays, perhaps used for off-site mound construction. To the southwest of the central activity area was a cluster of pits and postmolds, the latter representing racks or screens. The pit features, which may have been used for food storage, food preparation, and/or food offerings, yielded artifacts commonly found as grave goods at Early-Middle Woodland sites (mica, barite, stemmed points, leaf-shaped blades, bladelets, and a celt), as well as Adena Plain pottery, wild plants (nuts, purslane, and persimmon), and cultigens (goosefoot, sunflower, and maygrass). American chestnut dominated the wood charcoal sample. Site activities involved processing and offering food, storing special clays, and cremating the deceased for transport to a nearby burial location (Schlarb et al. 2007).

Another nonburial ritual site located to the north of Mt. Sterling is Amburgey (15Mm137), which is situated on a high ridge overlooking Sycamore Creek. Amburgey was used as a ritual locality where nonburial features and artifacts were concentrated in an area of less than 400 m^2. Calibrated radiocarbon dates of A.D. 28-230 and A.D. 133-500 indicate this late Middle Woodland site was contemporaneous with nearby Wright Mounds and Camargo Earthworks (Table 5.26). The spatial distribution of features at Amburgey and their associated artifacts provide a unique perspective on Woodland ritual activity in central Kentucky (Richmond and Kerr 2005). The site has "characteristics of a Middle Woodland mortuary facility but lacks … burials" (Richmond and Kerr 2005:91). Perhaps "feasting in conjunction with ritual offerings constituted the major Middle Woodland activities at Amburgey," with associated mortuary facilities located nearby (Richmond and Kerr 2005:91).

A temporary structure or screen at Amburgey was evidenced by 11 postmolds arranged in an oval pattern measuring 12 x 17.5 m. One large central postmold with artifacts in the fill was located within this oval structure, though its association with the structure was unclear. The central postmold yielded debitage and a small number of dock, goosefoot, knotweed, marsh elder, and purslane seeds, which may represent incidental inclusions in the feature fill. The goosefoot did not appear to be of a domesticated form. Feature 2, also located within the structure, was interpreted as a ritual artifact cache. In addition to debitage, plant remains, and charcoal, one complete and one fragmentary copper bicymbal ear spools were found beneath a Connestee Brushed tetrapodal vessel in the feature. Stylistically, the ear spools resemble Styles 6-9 in Katherine Ruhl's (1992; Ruhl and Seeman 1998) seriation, corresponding to the middle to end of her relative chronology. The complete ear spool was manufactured in four pieces (three plates and one stem). Cordage associated with the copper ear spools is bast from an unidentifiable species; the type of twisting and number of strands were not reported. The four-paneled Connestee vessel, tempered with crushed granitic rock and mica, was decorated with brushing and herringbone incising on the exterior surfaces. Squash, goosefoot, bedstraw, sticky catchfly, and purslane were recovered from Feature 2 fill (Richmond and Kerr 2005).

Feature 5 was a thermal feature found outside the oval structure. This food preparation and processing feature, which may have been associated with ritual feasting, yielded fire cracked rock, a celt made from folded sheets of hammered copper, mica fragments, a Snyders point, and burned plant and animal remains. The latter included

nutshell, goosefoot, pokeberry, chokeberry, bedstraw, sticky catchfly, St. John's wort, and eastern redbud plant remains, and calcined white-tailed deer, canid, bird, and other mammal bones. The thermal and artifact cache features at Amburgey provide evidence of ceremonial and medicinal plant use. Bedstraw may have been used for medicine or incense/fragrance, and sticky catchfly and St. John's wort have medicinal properties (Richmond and Kerr 2005). Purslane, dock, and marsh elder also have curative properties (Williams 2000).

In addition to the mortuary and ritual sites, a Woodland habitation site is associated the Somerset-Hinkston-Brush-Sycamore Creek cluster. At Site 15Mm140 Early, Middle, and Late Woodland components were documented. Though a variety of feature types were documented at this site, only four could be assigned to the Woodland period. They consisted of an Early-Middle Woodland thermal feature (cal 352-42 B.C.), a Middle Woodland refuse pit (cal 48 B.C.-A.D. 125), a Late Woodland feature with a Jacks Reef point, and a terminal Late Woodland-Fort Ancient earth oven (cal A.D. 891-1216) (Table 5.26) (Anderson 2003).

Other Adena Sites

Woodland earthwork and mound sites in Bourbon County include Lebus Circle (15Bb1), Auvergne Mound (15Bb16), and an unnamed mound. The former has never been excavated, so little is known about this likely Adena circular enclosure. A complete modified tubular pipe was found on the property of Thomas Jones, three km north of North Middleton on Stoner Creek, where there were three stone mounds. The pipe was found in a presumably Woodland period mound that also yielded disintegrated human bones, a flint celt, and point fragments (Webb and Haag 1947b).

Auvergne Mound measured 12 m in diameter and 0.6 m high (Clay 1983). Charcoal recovered from mound fill yielded a calibrated radiocarbon date of 1735-548 B.C. (Table 5.26), a date that Clay (1983:111) considered "extraordinarily early," especially since artifactual remains pointed to a more recent date. Another calibrated date of A.D. 87-602 (Table 5.26) was considered acceptable and placed Auvergne Mound in late Middle Woodland subperiod (Clay 1983:11). The Late Adena Auvergne Mound was considered an "atypical" Adena mound because it lacked multiple accretional burials, copper and mica artifacts, and Adena Stemmed points (Clay 1983).

Excavation of Auvergne Mound provided data about mound construction, crypt types, body placement, and grave goods. The burial mound was associated with an "ephemeral" settlement, which is evidenced by concentrations of pottery sherds and small numbers of chipped stone and faunal artifacts in a shallow deposit. There was no evidence of pre-mound modification of the ground surface or construction of submound structures, though a single postmold was found south of the single burial feature. It is likely the mound was used in a single event. Unlike other early mounds, midden from the post-mound-construction occupations contributed to mound deposits (Clay 1983).

One adult individual was interred in an extended position in a simple, shallow pit under Auvergne Mound. The pit was then infilled, a 30 cm mound was constructed, and fires were burned on the mound surface north of the burial pit. A second thin layer of soil, which was scraped from the surrounding area producing a borrow pit, was deposited

on the mound. Grave goods included a cluster of chert debitage, which may have been placed in a small bag on the chest of the one interred individual. Crude points, several other chert tools, and a triangular sandstone palette were associated with post-mound occupations. Over 300 Adena Plain sherds were recovered from burial pit fill and other contexts at Auvergne (Clay 1983). Rim specimens have a rolled appearance rather than the more typical collaring of classic Adena Plain sherds. This unique rim form may represent a late Adena Plain variant (R. Berle Clay, personal communication 1986).

Finally, a number of Woodland earthen and stone constructions in Clark County have been documented but none have been investigated professionally. For example, Indian Fort Earthworks (15Ck1) is located on an escarpment overlooking Upper Howard Creek. The circular embankment-ditch enclosure, described as a "sacred circle," measures 47 x 50 m across. An elevated "causeway" leading across the ditch is located in the southeast quadrant. An interior mound measures 22 m across and has been reduced to about 0.5 m high. An associated unnamed mound, Site 15Ck7, that is adjacent to the enclosure measures 16 x 25.5 in diameter and less than 1 m high. The earthworks have been degraded significantly since they were originally recorded (Fiegel 2005). Nelson Gay Mound (15Ck10) is an irregularly shaped, well-preserved Woodland mound (Weinland 1976).

In sum, archaeologists know quite a bit about the late Early and Middle Woodland subperiods in the Central Bluegrass, especially mortuary-ritual activities. Since the 1990s, however, more attention has been paid to Late Woodland sites located in the Central Bluegrass Section. For example, Dreaming Creek (15Ma97) is a large, single component habitation site with subplowzone features and discrete activity areas. Calibrated radiocarbon dates of A.D. 540-654, A.D. 560-772, and A.D. 536-854 (Table 5.26) place this site in the early Late Woodland subperiod. Artifacts were recovered from three distinct clusters, where a small number of large and small pits, hearths, and postmolds were found. No house patterns were apparent in the postmolds. The eastern artifact/feature cluster represented one activity area, and two activity areas were documented in the central cluster. Newtown phase artifacts include Lowe cluster points and Newtown series pottery, which exhibits properties in common with sites to both the northeast (check stamping) and the west (castellations). Debitage indicates that biface reduction occurred at the site (Fenton and Lozny 1995; Fenton and McBride 2007).

Faunal remains recovered from feature contexts at Dreaming Creek include deer, raccoon, other small- and medium-sized mammals, and turkey. Significantly, the Dreaming Creek site provided evidence that during summer and early fall site occupants relied on cultigens more so than nuts, the opposite of the usual Woodland pattern. Equally important is the co-occurrence of EAC crops (e.g., maygrass and goosefoot), tropical species (e.g., maize and tobacco), and cucurbits (e.g., squash) at a site with a short time span of use. Further, the tropical domesticates from Dreaming Creek are among the oldest (ca. A.D. 550-650) found to date in Kentucky (Fenton and Lozny 1995; Fenton and McBride 2007).

Site 15Sc230 is another large Late Woodland site. It is located in Scott County to the west of Georgetown and south of North Elkhorn Creek. Mechanical removal of the plowzone from a portion of this site documented several features. Of interest were three large features, two of which were C- or U-shaped with dark brown clay silt and charcoal

inclusions surrounding a yellowish brown clay. Though somewhat smaller, these features are reminiscent of the clay storage facilities documented at the Evans site (15Mm182) in Montgomery County (Schlarb et al. 2007) (see above). The other feature had a diameter of 1.4 m. It contained dark brown/black clay soil with a zone of charcoal at a depth of 30 below the base of the surface; at a depth of about 75-80 cm below the surface a layer of burned limestone was encountered above subsoil. The walls of the feature had been fired a bright orange/red. Calibrated radiocarbon dates of A.D. 662-1152 and A.D. 778-1025 were obtained from this feature (Haag et al. 2004).

The only diagnostic artifacts recovered from features at Site 15Sc230 were 10 sherds. All were tempered with limestone or limestone and other types of crushed rock. Based on thickness of the sherds and their overall similarity to the Beals Run series (see Chapter 7), and taking into consideration the radiocarbon dates, Henderson (2004) argued that they date to the terminal Late Woodland/early Fort Ancient. Though no projectile points were recovered from feature contexts, 36 of the 50 blades found at the site were associated with features. Single specimens of Chesser Notched, Steuben Expanded Stem, and Snyders points were recovered from the surface of Site 15Sc230 (Haag et al. 2004).

Sites like Jackstown (15Bb68) and Site 15Bb58 may provide evidence for a settlement trend toward nucleation during the late Middle Woodland/Late Woodland (post A.D. 250) similar to that observed for the Northern Bluegrass Section (see below). The Jackstown site consists of an oblong midden stain and a low mound. Surface collections at the site produced a large number of expanded stem points, as well as limestone tempered cordmarked body sherds and rims with notched lips (Estes 1983a). Site 15Bb58 also contains a mound and has yielded expanded stem and Jacks Reef Comer Notched points along with thin, limestone tempered cordmarked pottery (Estes 1983b). Neither site has been excavated, but both have the potential to yield important information on late Middle/Late Woodland settlement patterns.

Another Late Woodland component is Stringtown (15Bb67). This site, which postdates Jackstown and Site 15Bb58, is marked by a surface scatter of materials and includes one area of light midden. Artifacts collected from the surface include several Jacks Reef Pentagonal points and limestone tempered cordmarked and plain ceramics (Estes 1983c). Stringtown has not been excavated.

Though little currently is known about the terminal Late Woodland subperiod in the Central Bluegrass Section, further investigation of sites, such as Old Springs (15Fa20), Paddock 9 (15Wd84), and DeGaris (15Sc154), the latter yielded a calibrated radiocarbon date of A.D. 780-1148 (Table 5.26), may provide information on the transition from Late Woodland to Fort Ancient (Henderson 1997, 1998) (see Chapter 7). The presence of angular shoulders on large jars with direct or recurved rims at the Muir site (15Js86) in Jessamine County (Sharp and Turnbow 1987; Turnbow and Sharp 1988) and several other very early Fort Ancient sites suggests a linear temporal relationship between Newtown and early Fort Ancient ceramics similar to that observed by Riggs (1986) in southwestern Ohio.

In conclusion, Railey (1991b) proposed a Woodland settlement model for the Central Bluegrass and surrounding sections. Between ca. 400 B.C.-A.D. 250, the settlement system was dispersed and habitation and ritual sites were spatially distinct. Isolated ritual sites continued to be used ca. A.D. 250-700, though most ritual facilities

(including stone mounds) were associated with nucleated settlements (Railey 1991b) with a variety of intrasite patterns (Pollack and Henderson 2000). "The construction of a single mound within or adjacent to a village was a marked change from Middle Woodland mound-building practices" (Pollack and Henderson 2000:628). In addition, smaller habitation sites without ritual facilities, such as Dreaming Creek, also are present (Fenton and Lozny 1995; McBride and Fenton 2007). After ca. A.D. 700, the settlement system was again dispersed and spatial separation of habitation and ritual sites resumed (Railey 1991b).

NORTHERN BLUEGRASS SECTION

The 136 Woodland sites documented in the Northern Bluegrass Section contain 152 Woodland components. Though there is less site type diversity than in the Central Bluegrass Section, the proportions of earthen mounds and open habitations without mounds are less disparate in this section (Table 5.24). Slightly more than half of the Woodland components in this section are not assigned to a subperiod. Of the assigned sites, the largest proportion are Middle Woodland, followed closely by Early Woodland components. As in other section, few components have been assigned to the Late Woodland subperiod (Table 5.25).

In the Northern Bluegrass Section significant Woodland sites include burial mounds, residential habitations, temporary encampments, and resource extraction sites (Table 5.28). In addition to several important sites in Carroll County, a great deal of what we know about the Woodland period in this section is based on research at sites in Boone County. Most Woodland mound sites in Boone County have one or two burial mounds with no associated residential loci: Robbins, Riley, Landing, Crigler, and Hartman. These sites date to the late Early-early Middle Woodland subperiods. In other cases, mounds were associated with habitation areas, such as at the Rogers and Ogden-Moore site complexes, which date to the late Middle-Late Woodland subperiods.

In the Northern Bluegrass Section, early-middle Early Woodland diagnostics include Turkey Tail, Wade, and Early Woodland Stemmed cluster points, especially Kramer (Table 5.7). Pottery may be as old as the middle Early Woodland in this section. For example, at the West Runway site (15Be391), which is located on a level upland ridgetop in the Gunpowder Creek drainage, sherds from one broken Fayette Thick vessel were recovered from contexts with calibrated radiocarbon dates of 895-521 B.C., the oldest date for Fayette Thick in Kentucky, and 761-403 B.C. (Table 5.26) (Duerksen et al. 1995:85). The Fayette Thick assemblage from West Runway is distinguished from contemporary assemblages in the Central Bluegrass Section by an absence of finger pinching (Clay 1985b; Duerksen et al. 1995). Evidence of an association between Fayette Thick pottery and Kramer points was found at West Runway, where they occurred in the same dated pit feature (Duerksen et al. 1995; Wall et al. 1995).

In addition to the large number of Kramer specimens, other point types from West Runway are Cresap, Robbins, and Adena Stemmed. Most points were made of Wyandotte, Vanport, and local glacial drift cobbles. Experimental and use-wear analyses

Table 5.28. Important Woodland Period Sites in the Northern Bluegrass Section.

Site No.	Site Name	Site Type	Affiliation	References
15Be3, 14	Robbins	mound complex	MW	Webb and Elliott 1942
15Be15	Riley	mound	MW	Webb 1943b
15Be17	Landing	mound	MW	Webb 1943b
15Be20, 27	Crigler	mound complex	MW	Webb 1943a
15Be23	Gaines	mound	MW	Crane and Griffin 1962
15Be32	Hartman	mound	MW	Webb 1943a
15Be33-35	Rogers	open habitation with mounds	MW-LW	Crawford 1959; Kreinbrink 1992
15Be50-52	Ogden-Moore	open habitation with mounds	MW-LW	Henderson 1995
15Be61	none	open habitation	EW, MW	Fenwick and Weinland 1978
15Be228	none	open habitation	MW	Fenwick and Weinland 1978
15Be229	none	open habitation	unassigned	Fenwick and Weinland 1978
15Be232	none	open habitation	unassigned	Fenwick and Weinland 1978
15Be249	Ronald Watson Gravel	open habitation	LW	Huebchen 2006; Trader 2003
15Be252	Stephens	mound	MW	Fenwick and Weinland 1978
15Be269	Big Bone Lick	open habitation	MW	Lowthert 1998; Miller and Duerksen 1995
15Be391	West Runway	open habitation	EW, MW	Duerksen et al. 1995
15Be410	Bob Schwenke	open habitation	unassigned	Henderson 1995
15Be416	Cosmic View	open habitation	LW	Henderson 1995
15Be431	none	open habitation	LW	Henderson 1995
15Be467	Wackenstein	open habitation	MW	Walley et al. 1997
15Be485	M. B. Green	open habitation	EW	Purtill et al. 2006
15Be509	none	open habitation	MW	Breetzke 2001
15Cl44	none	open habitation	LW	Doershuk et al. 1992
15Cl51	Froman	open habitation	MW-LW	Ross-Stallings and Stallings 1996
15Cl58	Panther Rock	open habitation	MW	Stallings 2007
15Cl67	Hayes	open habitation	MW	Hall 2005
15Hy1	Chilton	cemetery	MW-LW	Funkhouser and Webb 1937
15Ke4	Gibson Greeting Card	open habitation	MW	Duerksen et al. 1994; Schock 1984
15On50	none	open habitation	MW-LW	Schock 1989a

revealed that Kramer and Robbins points were used in hunting, butchering, and hide preparation. Kramer points also were used for boring hide, boring bone/antler, grooving bone/antler, and planing wood (Wall et al. 1995).

Investigation of over 765 m^2 at West Runway revealed seven "individual depositional loci" below the plowzone (Duerksen et al. 1995:85), with calibrated radiocarbon dates clustered in the Early Woodland subperiod (between 1188-596 B.C. and 756-389 B.C.) and one late Middle Woodland subperiod date of A.D. 79-397 (Table 5.26). Each locus represents an individual occupation episode, and the loci were associated with five pits and two shallow basins of unspecified functions. Artifacts from each locus evidenced a consistent variety of domestic activities: knapping, wood and bone working, animal processing, feature use and maintenance, and ceramic use. The West Runway site was reused frequently for short periods of time by small groups of

mobile hunter-gatherers who performed similar sets of activities. The pottery recovered from the site was made, used, and discarded on site, as opposed to being transported by the transient occupants. Evidence of plant use is represented by an unspecified number of maygrass seeds from a pit feature with a calibrated radiocarbon date of 1188-596 B.C. (Table 5.26) (Duerksen et al. 1995), the earliest date for cultigens in this section.

M. B. Green (15Be485) is another important nonmound Early Woodland site. Limited excavations at this site recovered thick quartz tempered plain ceramics from intact sub-plowzone midden deposits. These materials, which are associated with a calibrated radiocarbon date of 412-207 B.C. (Table 5.26), postdate the Fayette Thick ceramics from the West Runway site, but predate Adena Plain. Of interest was the presence of a human tibia. The association of ceramics and human bone with fire cracked rock and debitage may represent an example of a late Early Woodland nonmound burial/crematory locale (Purtill 2008; Purtill et al. 2006).

Though no identifiable Adena habitation sites have been documented in the Northern Bluegrass Section, several late Early to early Middle Woodland Adena mounds have been excavated. Of these, Robbins Mound Be3 was biggest and contained the largest number of burials (Webb and Elliott 1942). The earliest absolute dates were obtained from the Hartman Mound (15Be32) (Webb 1943a) (Table 5.26), the earliest dated mound in Kentucky. Other excavated mound sites are Riley (15Be15), Landing (15Be17), Crigler (15Be20 and 15Be27), and the smaller Robbins Mound Be14 (Milner and Jefferies 1987; Webb 1943a, 1943b; Webb and Elliott 1942).

Hartman Mound (15Be32) was located at the bluff edge overlooking the Ohio River floodplain and the confluence with the Great Miami River. The mound measured 18 m across and 0.9 m high, but plowing had reduced its original height and increased its diameter. A calibrated radiocarbon date of 833-113 B.C. (Table 5.26), Fayette Thick-like pottery, and points that resemble Turkey Tail and Adena Stemmed types from mound fill indicate a middle-late Early Woodland affiliation. Hartman Mound provides information about mortuary features, mound construction, mortuary preparation, body placement, and grave goods. The former included a central burial pit and two peripheral features (oval crematory pit and hearth), but no postmolds. The primary mound was a ring constructed of excavated earth plus rocks around the central burial pit (Webb 1943a).

Fourteen individuals, possibly representing two different populations based on mound context and skull traits, were interred in eight numbered burials in Hartman Mound. Other than an adolescent male and an infant, most of the individuals are adults. Twice as many adult males as females were interred in the mound. Several individuals exhibited traumas, pathologies, or occipital flattening. Three individuals are in-flesh extended burials, two are secondary bundle burials, which are not documented at other Kentucky Adena mounds, one is a cremation, one is an *in situ* burial of unknown form, and seven are displaced burials of unknown form. Only two individuals were found in formal mortuary features. A young adult male in the central burial pit was interred with large and small shell beads, groundstone gorgets and reel, worked animal bones, worked wood item, a copper ring, textiles, and burned red ochre. Another individual was buried with an antler point and a bone awl, twined bast fiber textiles were found with one individual, and two others were associated with red ochre and a ferric iron compound. A

smoothed, modified wooden stick that may be part of a bow or atlatl was placed with another individual (Snow 1943b; Webb 1943a).

Robbins Mounds were two Adena mounds located on a ridge crest near several springs in the dissected uplands about three km northeast of the Ohio River. Testing on the ridge around the mounds failed to produce evidence of associated habitations. The smaller Robbins Mound Be14 was located 280 m south of the larger mound. Plowing reduced the mound to only 0.6 m high and so blurred the mound edges that the diameter could not be determined. The mound contained a single burial feature that probably was a log tomb with one to several individuals, though no organic material was preserved at the site. One copper bracelet was recovered from the fill, the only grave good recovered from the mound (Webb and Elliott 1942). Robbins Mound Be14 represents short-term mound use, probably a single ritual event, and it adds to our knowledge of variation in Woodland mortuary behavior in that respect.

Robbins Mound Be3, which measured 38-41 m across and 6 m high, provided evidence of mound construction, submound structures, crypt types, mortuary preparation, and grave goods. Consisting of three major stratigraphic zones, 15Be3 represents long-term mound use with multiple episodes of mortuary activities. The initial mortuary event at Robbins Mound Be3 involved construction of a circular, outward-slanting, paired-post structure containing secondary cremations covered by a small primary mound (Webb and Elliott 1942). A calibrated radiocarbon date of 411 B.C.-A.D. 237 (Table 5.26) was obtained for a feature associated with the submound structure (Milner and Jefferies 1987). A secondary mound was constructed over the burned structure, and log and other tombs were built in the secondary mound. Over several decades or centuries, additional graves were constructed in earth rings around the secondary mound, which finally was capped with a layer of soil (Milner and Jefferies 1987; Webb and Elliott 1942).

Three temporally distinct patterns of mortuary preparation and tomb types at Robbins Mound Be3 are communal cremation in the submound structure, interment in bark-lined graves, and construction of log tombs. Most of the 52 log tombs held the remains of single individuals, while some tombs had none, two, or three individuals. Log tombs vertically overlaid each other, though lateral similarities in tomb depth suggest contemporaneous intervals of tomb construction. Most in-flesh inhumations in the bark and log tombs were extended with the bodies oriented northeast-southwest (Webb and Elliott 1942).

At least 100 individuals were buried in Robbins Mound Be3, with adults outnumbering subadults by almost six times (Snow 1942). Snow (1942) concluded that there were three times as many adult males as females, but Milner and Jefferies (1987) found sexual parity. And while Snow (1942) estimated most adult ages at 21-35 years, Milner and Jefferies (1987) found both young and old adults. Cultural modifications are occipital flattening, red ochre coatings, and defleshing. Traumas and pathologies include arthritis, squatting facets, bone fractures, metabolic disorders, infectious diseases and reactions, and dental pathologies (Snow 1942). An adult male had a projectile point embedded in his lumbar vertebrae (Webb and Elliott 1942).

Grave goods were placed with only 13 of the 89 individuals in log tombs and bark graves at Robbins Mound Be3. Seven individuals had copper items; five each had shell

objects, groundstone tools, or red ochre fragments; two each had projectile points, graphite lumps, or textiles; and one each had mica, worked bone, or chert blade cache. Worked items recovered from the floor of the structure include pottery sherds, chipped stone tools, worked and unworked bone, and a sandstone tablet. Artifacts recovered from mound fill and unspecified contexts include chipped stone and groundstone tools, sherds, worked bone/shell, and copper. Noteworthy items from the various contexts of Robbins Mound Be3 include copper bracelets, "pendants," and ring; mica crescent head ornaments; shell beads and spoon; stone gorgets, smoking pipe, and unengraved tablet; Robbins points and leaf-shaped blades; and Adena Plain pottery (Webb and Elliott 1942). Projectile points were placed only with individuals older than 15 years, while shell beads, copper bracelets, and red ochre were found with both subadults and adults (Milner and Jefferies 1987).

Situated almost 1 km northwest of Robbins Mounds on the crest of a long ridge is Riley Mound (15Be15). It is about three km north of the Ohio River, which is visible from the top of the mound. The plowed and deflated mound measured 18 m across and 1.8 m tall. It was constructed over an intact humus layer containing chert and groundstone tools, pottery, and faunal remains (Webb 1943b). No absolute dates are available for Riley Mound, but Adena Plain pottery and Robbins and other Early Woodland stemmed types from the submound humus suggest a possible late Early to early Middle Woodland affiliation. Riley Mound generally is considered a Late Adena site.

Riley Mound provides information about Woodland submound structures and mortuary features, body placement, and grave goods. An unspecified number of mostly paired postmolds marked, from oldest to youngest, one partial spiral, one circular, and one rectangular submound structures. Other submound features are two pits and three thermal features. Eight burials were uncovered within the footprints of the circular and rectangular submound structures at Riley Mound, but none of the individuals were found in formal crypts. Three were in-flesh extended inhumations, one a secondary cremation, and four unknown. Six are young adults (three males, one female) and age could not be determined for two individuals. Only one worked item was found in association with a burial at Riley Mound, a young adult male who was buried with a copper gorget (Webb 1943b).

Landing Mound (15Be17) was situated about midway between Robbins Mounds and Riley Mound. It was located at the end of a narrow ridge about 450 m from Landing Spring and 2.5 km north of the Ohio River. The unplowed conical mound measured 18 m across and 2.1 m high. Landing Mound was erected in one episode of mostly sterile sandy clay over an artifact-bearing humus zone, which yielded Adena Plain pottery and a point resembling an Early Woodland Stemmed or Gary cluster type. Nineteen postmolds under the mound probably indicate the presence of a submound structure, though excavators were unable to delineate a pattern in the postmolds (Webb 1943b).

Fifteen likely contemporaneous burials were found under Landing Mound, including five in a central pit, seven ringing the pit on the humus zone, and three isolated skulls. Excluding the latter, all individuals were in-flesh extended burials. Ten are adults (including seven males and two females), two are subadults, and three are of undetermined ages (Snow 1943d; Webb 1943b). Based on osteological analyses, Snow

(1943d) concluded that individuals buried in Landing Mound were the same population as individuals interred in nearby sites Robbins Mound Be3 and Riley Mound. Other than red ochre, only one burial under Landing Mound contained grave goods. An adult male in the central pit was interred with three diorite celts and one cut antler handle (Webb 1943b).

Crigler Mounds (15Be20 and 15Be27) were a pair of Adena earth mounds about 76 m apart on a north-facing bluff edge overlooking the Ohio River. There are no chronometric dates for either mound, but at least the larger Crigler Mound 15Be20 is considered Late Adena. The dimensions of the smaller Crigler Mound 15Be27 could not be determined due to severe deflation from cultivation. The low mound of unstratified, homogenous fill covered the secondary cremains of an adult with red ochre, two points, and a one-hole sandstone gorget (Webb 1943a).

Crigler Mound 15Be20 was an elongate earthen mound that measured 29 x 49 m across and 4.6 m in height. It was constructed of local, mostly sterile soils over an artifact-bearing humus zone. A series of mortuary-ritual activities occurred at the site, beginning with the construction of a paired-post circular structure that measured 17 m across. This special-purpose structure with out-slanting walls was internally partitioned with a log-clay platform and flanking seating or stalls along the perimeter. Of the six mortuary features, three are log crypts, one is associated with a clay floor, one is an earth wall crypt, and one an unspecified crypt (Webb 1943a).

Crigler Mound Be20 held the remains of at least 19 individuals. Fifteen are adults, including seven males and one female, and four are subadults. Of the 10 individuals buried in the prepared graves, seven were extended in-flesh interments and three were cremations. In addition, the remains of three cremated individuals were found on the structure floor and two fleshed individuals were found above a collapsed log tomb in the mound fill. Several pathologies and traumas were noted in the Crigler Mound Be20 burial population (Snow 1943a; Webb 1943a).

Grave goods were associated with five individuals in Crigler Be20. The most elaborate burial was that of a young adult male, who was interred in the log tomb where the platform inside the structure formerly stood. He had copper bead bracelets, mica crescent fragments, a projectile point, red ochre, and graphite. Other individuals were associated with a possible Motley point, shell beads, slate/shale pendants, and cut/perforated mica. A cache feature had two abrading stones and numerous mica fragments. Under the mound skirt investigators found fragments of a platform pipe and a cannel coal ring. Burned limestone, flakes, and animal bones were found in the ash deposit at the center of the structure. The mound fill contained a possible unengraved tablet fragment, other groundstone tools, points and other chert items, and a copper pin fragment. At least six partial Adena Plain pottery vessels (Webb 1943a) and a possible Motley point indicate a late Early to early Middle Woodland affiliation.

Finally, other mounds in the Northern Bluegrass Section may be related to Adena, though little is known about these sites. The Gaines Mound (15Be23) has calibrated radiocarbon dates of 406 B.C.-A.D. 534 and A.D. 28-890 (Table 5.26). Site 15Be228 is an open habitation that may have been associated with the nearby Stephens Mound

(15Be252). Both sites, neither of which has been excavated, date to the Middle Woodland subperiod (Fenwick and Weinland 1978).

While Adena burials mounds were the focus of Webb's work in the Northern Bluegrass Section, several early Middle Woodland habitation sites have been documented in Boone, Kenton, and Carroll counties. Though some were contemporaneous, currently there is no direct connection between any of the mortuary and domestic sites. The Middle Woodland Wackenstein site (15Be467) is located about three km southwest of the Ohio River on an interior ridgetop. The three features excavated at this site consisted of a possible house floor with two associated pits. Diagnostic artifacts are thin, limestone tempered plain sherds assigned to the Miami Series. These ceramics, along with calibrated radiocarbon dates of 164 B.C.-A.D. 213 and A.D. 63-416 (Table 5.26), are suggestive of a Middle Woodland occupation, ca. A.D. 50 to 200 (Walley et al. 1997).

Site 15Be509 yielded similar calibrated radiocarbon dates, which range from 347 B.C.-A.D. 214 to A.D. 91-538 (Table 5.26). This site, which contained intact subplowzone deposits, was used on a temporary basis by small groups of people as a procurement station for the acquisition of local food resources. Scattered cultural features relate to plant and animal processing, and chipped stone tool manufacture was another activity at the site (Breetzke 2001).

The Gibson Greeting Card site (15Ke4) consisted of a sub-plowzone midden deposit, three pits, and a hearth within a small area measuring 7 m in diameter. Artifactual debris was concentrated near the features, suggesting activity areas. A projectile point resembling Affinis Snyders or Lowe Flared Base, limestone tempered plain and cordmarked pottery, and a calibrated radiocarbon date of A.D. 79-397 (Table 5.26) suggest a Middle Woodland affiliation (Duerksen et al. 1994; Schock 1984).

The Panther Rock site (15Cl58) is located along an old terrace line of the Ohio River floodplain near the confluence with Four-Mile Creek. Most residential activities during the Early and Middle Woodland subperiods occurred along and downslope of the former terrace line. Site use during the Middle Woodland subperiod may have been associated with mounds reported on the nearby bluffs. Middle Woodland pit features were deep, flat-bottomed, steep-walled storage pits filled with secondary refuse. These pits tended to be much larger than the earlier Late Archaic-Early Woodland features documented at the site. They were patterned in four-five clusters, suggesting activity areas across the site. In addition to lithics, faunal, and floral remains, the pottery assemblage from Panther Rock is dominated by Adena Plain sherds, which represent at least four-five vessels. A complete, tetrapodal Connestee Cordmarked or Connestee Cord Impressed vessel was recovered from a Woodland pit feature (Stallings 2007; see also Chapter 4).

Early Middle Woodland deposits consisting of a 50 cm thick midden were documented at the Hayes site (15Cl67) (Hall 2005). This component yielded a calibrated radiocarbon date of A.D. 74-380 (Table 5.26). Ceramics recovered from the midden were primarily tempered with limestone, had plain exterior surfaces, and were relatively thick (8.5 mm). In general, these ceramics are similar to Falls Plain (Myers 1989). A small number of smoothed cordmarked limestone tempered sherds and two grit tempered sherds also were recovered. The latter were interpreted as representing trade items and

were tentatively classified as McGraw Cordmarked (Prufer 1968), though similarities also were noted with the Kope and Miami Series (Hawkins 1996). Of interest was a concentration of ceramics that may represent a "pot drop." Three Lowe Flared Base projectile points were associated with this component (Hall 2005).

Subsistence activities at the Hayes site focused on the collection of nuts and wild fruits, such as grape and pin cherries, the cultivation of tobacco, goosefoot, and maygrass, (corn phytoliths were identified in residue associated with Falls Plain pottery) and the hunting of white-tailed deer. A secondary juvenile burial was documented within the Middle Woodland midden, but was not excavated. This individual was not interred in a formal burial pit. Nor were any grave goods associated with this subadult (Hall 2005). As at the earlier M. B. Green site in Boone County (see above), the Hayes site represents one of the few instances of Middle Woodland mortuary behavior not directly associated with a mound in the Northern Bluegrass Section.

Several late Middle Woodland and early Late Woodland sites have been excavated in the Northern Bluegrass Section. Of these, the Rogers Site Complex (15Be33-35), Cosmic Vista (15Be416), Site 15Be431, and Froman (15Cl51) have been assigned to the Newtown phase (Henderson 1995; Kreinbrink 1992; Ross-Stallings and Stallings 1996; Stallings and Ross-Stallings 1993). Other possible Newton sites are the Ogden-Moore Mound and Village Complex (15Be50-52), Big Bone Lick (15Be269), and Site 15On50 (Henderson 1995; Lowthert 1998; Miller and Duerksen 1995; Schock 1989a).

Newtown as a cultural unit was first used by Griffin (1956:187) in reference to cultural materials recovered from a Late Woodland component at the Turpin site in southwestern Ohio (Oehler 1973). Although Griffin did not use McKern's (1939) nomenclature in direct reference to Newtown, the unit came to be classified as a focus in the regional literature (Oehler 1973; Prufer 1964b; Reidhead and Limp 1974). It is now defined as a phase in the Willey and Phillips (1958) scheme. In addition to the Bluegrass Management Area, Newtown components have been documented in the Salt Creek, Upper Kentucky/Licking, and Big Sandy management areas (Ahler 1987; Brooks 1985; Burdin and Pollack 2006; Collins 1980; Hockensmith et al. 1998; O'Steen et al. 1991). Newtown phase assemblages in Kentucky have been dated from the late Middle to early Late Woodland subperiods, ca. A.D. 300-800 (Pollack and Henderson 2000).

The diagnostic artifact of the Newtown phase is Newtown series pottery, including plain, cordmarked, and check-stamped types. Typical Newtown vessels are collarless, limestone or grit tempered subconoidal or subglobular jars with angular shoulders and flattened lips. Angular shoulders are a critical defining character. Newtown phase assemblages often are associated with local and imported stamped and brushed pottery, including Newtown Check Stamped, Wright Check Stamped, Hopewell series, Chillicothe Rocker Stamped, Miami series, McGraw series, Turner Simple Stamped, Pickwick/Mann Complicated Stamped, and Connestee series (Ahler 1987; Brooks 1985; Collins 1980; Henderson and Pollack 1985; Hockensmith et al. 1998; Kreinbrink 1992; O'Steen et al. 1991).

Projectile points associated with Newtown phase assemblages are Lowe cluster (Lowe Flared Base, Steuben Expanding Stemmed, Chesser Notched, and Bakers Creek),

Jacks Reef Pentagonal and Corner Notched, and large triangular types. Newtown assemblages also may include chert bladelets, limestone hoes, chert adzes, chipped stone pick-like objects, expanded-center polished stone bars, rectangular bone and slate gorgets, groundstone celts and manos, and large quantities of fire altered rock.

Floral and faunal remains associated with Newtown components indicate a generalized hunting-gathering-horticultural subsistence base. Sites with Newtown components can be nucleated communities, including circular villages with central plazas (Railey 1984) or smaller camps (Hockensmith et al. 1998). Nucleated villages in the Bluegrass have intrasite artifact patterns (e.g., spatially distinct artifact clusters and segregation in chert type usage) that may be indicative of kin groups or social divisions (Railey 1991b). Newtown structures are rectangular, oval, or circular in outline, and posts often are chinked with sandstone (Ahler 1987; Henderson and Pollack 1985). In general, Newtown sites in this section tend to be larger and were occupied for longer periods of time than earlier Woodland sites. Stone or earth-stone mounds are associated with some Newtown habitations (Pollack and Henderson 2000), such as the Rogers Site Complex.

Located on a glacial terrace of the Ohio River, the Rogers Site Complex consists of an earth and stone burial mound (15Be33), an "upper village" or a sheet midden north of the mound (15Be34), and a "lower village" or southerly sheet midden (15Be35). Calibrated radiocarbon dates from the lower village of 800-180 B.C. and A.D. 268-887 (Table 5.26) point to occupations during the Early Woodland subperiod and the Middle-Late Woodland boundary. The latter date is supported by diagnostic artifacts - including Newtown and Connestee series pottery; Lowe, Jacks Reef, and large triangular points; bladelets; and platform and elbow pipes - from all three sites that point to a primary late Middle Woodland-early Late Woodland component. Rogers is one of few sites in Kentucky where Newtown pottery was recovered from both domestic and mortuary contexts (Kreinbrink 1992).

The two sheet middens at the Rogers Site Complex each cover several hundred square meters (Kreinbrink 1992) and their spatial distinctions may provide evidence of moieties (Railey 1991b). Six large, deep pits with no apparent spatial patterning were found in the southern sheet midden, which was a habitation area associated with the mound. The northern sheet midden encompassed postmolds in four clusters around a large storage or cooking pit feature with a trough-like trench radiating out from it. At least one postmold cluster may represent a circular structure. Other features are one large and six small storage or cooking pit features (Kreinbrink 1992).

The mound at the Rogers Site Complex, which measured either 21.3 m in diameter or 15 x 20 m and had a height of only 1.2 m, was built of unstratified local sandy soil covered with limestone slabs and concretions. The mound contained 39 mortuary features (13 pits, nine stone box graves, and 17 unspecified), all but one of which were constructed at the same stratigraphic level in this "horizontal cemetery" (Kreinbrink 1992). Lateral "clustering of burials within the mound is suggestive of kin-related burial areas" (Kreinbrink 1992:94). Of the 43 individuals, most (n=34) are in-flesh extended inhumations, seven are secondary bundle burials, and two are secondary cremations. Over half (n=24) were adults, four were subadults, and 15 could not be aged. Sex was determined for 15 adults and included almost three-fourths males and one-fourth females (Kreinbrink 1992).

Grave goods were found with 18 individuals, especially the extended burials, and two individuals had a substantially larger number of items compared to the others. The most prevalent class of grave goods was modified and unmodified bone items, at least one of which was recovered with 16 individuals. One adult male in a stone box grave was buried with a Newtown Cordmarked bowl. Five bladelets were recovered from three burials, and one burial contained seven projectile points, including two Lowe Flared Base or Chesser Side Notched. Other notable grave goods are six slate gorget fragments, two sandstone elbow pipes (one from mound fill), one beaver platform pipe (found outside an empty stone box grave), and two mica sheets (Kreinbrink 1992).

Another example of an early Late Woodland open habitation with mounds is the Ogden-Moore Mound/Village Complex, which includes Boh Mound (15Be50), Ogden-Moore Village (15Be51), and Gregory Mound (15Be52). This complex differs in several ways from the Rogers site complex. For example, not all of the complex components are contemporaneous, with Late Woodland occupations documented at the village and Gregory Mound only. These occupations may be related to the Newtown phase. Boh Mound is middle Fort Ancient (Henderson 1995).

Other Newtown or possible Newtown open habitation sites without mounds are documented in Boone County. Two important open habitation sites, which were discovered during a survey in the Ohio River bottoms zone, may be parts of the same site. Newtown phase artifacts such as Newtown series ceramics were recovered from the Cosmic Vista site (15Be416) and Site 15Be431. Both sites are classified as hamlets (Henderson 1995). The Big Bone Lick site (15Be269) is located several meters above Big Bone Creek about "50 m southeast of an intact saline spring" (Miller and Duerksen 1995:138). Late Woodland occupations at this multicomponent site are represented by thin, limestone tempered cordmarked pottery and two Raccoon Notched points. Most chipped stone items were made of locally available glacial drift cobbles, with small percentages of Wyandotte and Vanport artifacts. Debitage from all stages of reduction are indicative of material conservation due to small core sizes (Miller and Duerksen 1995). It is possible that the Big Bone Lick site contains a Newtown component, but more work is needed to confirm this.

In northeastern Carroll County, extensive excavations were conducted at the Froman site (15Cl51), an open habitation on the Ohio River floodplain (Ross-Stallings and Stallings 1996; Stallings and Ross-Stallings 1993). A thin subsurface midden measuring 30 x 15 m was bordered to the south by a postmold cluster and associated pits and to the north by a single postmold and several pit features. Within the excavation area artifacts were concentrated in a semi-circular pattern, which may extend outside the project area. Newtown phase artifacts from Froman are Newtown series pottery, bladelets and patterned cores, and Copena Triangular, Chesser, Steuben, Bakers Creek, Lowe, Jacks Reef Corner Notched, and large triangular points (Ross-Stallings and Stallings 1996). Diagnostic artifacts and calibrated radiocarbon dates ranging from A.D. 436-682 to A.D. 560-772 (Table 5.26) indicate a Middle-Late Woodland affiliation. Though Newtown sherds were recovered from a pit with an associated calibrated date of A.D. 1023-1260 (Table 5.26), which represents the oldest absolute date for Newtown pottery in Kentucky, Ross-Stallings and Stallings (1996) questioned the reliability of this

date. They also rejected the calibrated radiocarbon date of A.D. 1411-1632 (Table 5.26) obtained from a Newtown feature.

Early Late Woodland occupations at the Froman site involved long-term seasonal or year-round habitation by small groups of people who engaged in a limited range of activities, including manufacture of chipped stone tools and acquisition/processing of food resources such as starchy/oily seeds. Artifacts accumulated in the shallow midden deposit and were discarded in shallow trash pits. Site residents lived in small structures, as evidenced by an arc-shaped pattern of postmolds from a circular domicile. No internal posts or features were associated with the structure, but refuse and other pits may have been used by the occupants of this dwelling (Ross-Stallings and Stallings 1996; Stallings and Ross-Stallings 1993).

Also located in Carroll County, Site 15Cl44 is a multicomponent site with a terminal Late Woodland component. Postmolds, hearths, and a midden or diffused feature were documented at the open habitation. Diagnostic artifacts include a triangular point and limestone tempered pottery that is similar to terminal Woodland ceramics recovered from the Haag site in Indiana, the Grayson site (15Cr73) in Carter County (Lower Big Sandy Section), and the Woods site in West Virginia. Calibrated radiocarbon dates associated with the terminal Late Woodland deposits are A.D. 989-1261 and A.D. 1043-1221 (Table 5.26). Calibrated dates of A.D. 563-799 and A.D. 1327-1649 (Table 5.26) for the same stratum were considered unreliable (Doershuk et al. 1992).

Site 15On50 in Owen County is an open habitation with a stone mound measuring 6.1 m across and 0.3 m high. Though no artifacts were found at the mound, the association of a stone mound with a habitation area is suggestive of a late Middle Woodland to early Late Woodland temporal affiliation. No subsurface features or midden deposits were discovered during limited testing at the associated site (Schock 1989a).

Though not assigned to the Newtown phase, it is possible that the Chilton site (15Hy1) is a Newtown mortuary site. Located along Emily Run, a tributary of Drennon Creek, the Chilton site consisted of eight stone-covered crypts within an area of over 65,000 sq m. The mortuary features at Chilton may have been associated with a habitation site (Funkhouser and Webb 1937). The period of site use was not indicated, but two projectile points pictured in Funkhouser and Webb (1937) resemble late Middle Woodland-Late Woodland Lowe cluster types. Brooks (1985) suggested a Late Woodland temporal affiliation for the site.

Thirty of the 32 individuals interred at the Chilton site were adults, one was a child, and one was a fetus interred with an adult female. Of the adults, half were males and about one-fourth each were females and those for whom sex could not be determined. Pathologies observed in the Chilton burial population are vertebral osteophytosis associated with arthritis and a number of dental afflictions, including caries, abrasions, faulty occlusion, pyorrhea, impacted third molar, and retroverted incisor. Two adult males had projectile points lodged in their right os coxae; in one case, the trauma was judged sufficient enough to have been fatal (Funkhouser and Webb 1937).

The Chilton site provides information about Late Woodland crypt type, body placement, and grave goods. The site encompassed 23 pit features within eight stone-capped crypts or "units." The mortuary features were constructed by excavating clusters of parallel-oriented pits, placing one-three individuals in each pit, infilling the pits to the level of the hardpan, and covering the entire cluster of partially infilled pits with a rectangular pavement of limestone slabs one-three layers thick. Thirty-one of the 32 individuals interred at the Chilton site were in-flesh extended burials and one was flexed. Lithic items associated with human burials at Chilton are projectile points, galena, a sandstone elbow pipe, a greenstone celt, a celt fragment, a two-hole slate bar gorget, a bar gorget fragment, and a hammerstone. Other objects interred with the dead include cut wolf mandibles, strings of drilled elk tooth beads, a bone gorget, and two fragmentary concave copper disks that were identified as a perforated ear ornament (Funkhouser and Webb 1937).

The Ronald Watson Gravel site (15Be249) is the best-documented terminal Late Woodland site in the Northern Bluegrass Section. This small open habitation covered about 0.4 ha adjacent to the Ohio River on an alluvial terrace in western Boone County. Middle Woodland (cal A.D. 83-342 and cal A.D. 258-534) and Late Woodland (cal A.D. 655-864, cal A.D. 668-893, cal A.D. 692-961, and cal A.D. 785-1017) occupations (Table 5.26) were documented from midden deposits on the terrace near the river and from feature clusters concentrated along the midline of the terrace ridge to about 60 m from the terrace (Huebchen 2006; Trader 2003).

The significance of the Ronald Watson Gravel site stems from the materials recovered from midden contexts and 49 cultural features including postmolds, amorphous stains, rock concentrations, small to large shallow and deep basin-shaped pits, and bell-shaped pits. Projectile point types are Chesser Notched, Jacks Reef Pentagonal, and Hamilton Incurvate (Trader 2003). Faunal remains indicated year-round occupation with a focus on deer, supplemented with other mammals, birds, and fish. Floral remains, considered typical of a terminal Late Woodland occupation (Rossen 1994), reflected a heavy reliance on nut resources and use of native cultigens (goosefoot, maygrass, erect knotweed, and sunflower) and very low frequencies of corn and squash. Newtown series ceramics at the Ronald Watson Gravel site were mostly grit tempered and cordmarked with a few angular shoulders and flat-lipped rims. Some specimens, however, were tempered exclusively with shell and were interpreted as shell tempered Newtown ceramics (Trader 2003). As such, these are among the earliest dated shell tempered ceramics in the Ohio Valley (Seeman and Dancey 2000).

EASTERN BLUEGRASS SECTION

The 89 Woodland sites in the Eastern Bluegrass Section contain 106 Woodland components. Though no Woodland stone mounds, caves, isolated burials, or specialized activity sites are documented, a large percentage of the mound complexes in the Bluegrass Management Area are located in this section. As with other sections in the management area, in the Eastern Bluegrass large percentages of Woodland sites are

earthen mounds and open habitations without mounds (Table 5.24). Early Woodland components outnumber Middle Woodland components in this section, and all chronometric determinations are Middle Woodland; very few Late Woodland components are recorded (tables 5.25 and 5.26). Important Woodland sites recorded in this section are located in Bath, Lewis, and Mason counties only (Table 5.29).

Table 5.29. Important Woodland Period Sites in the Eastern Bluegrass Section.

Site No.	Site Name	Site Type	Affiliation	References
15Bh15	Morgan Stone	mound	MW	Webb 1941b
15Bh37	Zilpo	open habitation	EW	Marquardt 1970; Rolingson and Rodeffer 1968
15Lw5	none	open habitation	MW-LW	Maslowski 1980; Turnbow 1981
15Lw301C	none	open habitation	MW, LW	Schock and Langford 1981
15Lw302A	none	open habitation	EW, MW, LW	Schock and Langford 1981
15Lw314C	none	open habitation	EW-MW, LW	Schock and Langford 1981
15Lw315A	none	open habitation	EW, MW, LW	Schock and Langford 1981
15Lw316A	none	open habitation	MW	Schock and Langford 1981
15Lw325E	none	open habitation	MW-LW	Schock and Langford 1981
15Lw353	none	open habitation	EW-MW	Schock and Langford 1981
15Ms27	Dover	mound	MW	Webb and Snow 1959
15Ms28	Pyles	open habitation with mounds	MW-LW	Collins 1980; Railey 1984
15Ms50	Gillespie	open habitation with mounds	MW-LW	Collins 1980; Railey 1984, 1985c
15Ms53	Mayslick	open habitation with mounds	MW-LW	Collins 1980; Railey 1984

The Zilpo site (15Bh37) is situated on a low terrace in Zilpo Bend of the Licking River. Covering an area of about 2.5 ha, Zilpo contained a low density of artifacts from plowzone and buried midden deposits and features (earth ovens and hearths). Diagnostic artifacts from Zilpo are Johnson Plain pottery and Cogswell and Cave Run (a.k.a. Saratoga) projectile points, which suggest an Early Woodland affiliation (Table 5.7) (Marquardt 1970; Rolingson and Rodeffer 1968). The Terminal Archaic-Early Woodland Cogswell Contracting Stemmed point type was defined based on specimens recovered from Zilpo (Rolingson and Rodeffer 1968:38). During the Early Woodland subperiod, Zilpo functioned as an intermittently occupied habitation. Site occupations were of short duration and involved a narrow range of activities, including chipped stone tool manufacture, hunting, hide processing, and food preparation (Rolingson and Rodeffer 1968).

Adena mortuary patterns in the Eastern Bluegrass are known primarily from two mounds, Morgan Stone (15Bh15) (Webb 1941b) and Dover (15Ms27) (Webb and Snow 1959). Located in Bath County, the Morgan Stone Mound was excavated by WPA crews in 1939. The 48.8 x 3.7 m earthen mound was situated on a prominent ridgetop near Flat Creek and Maux Branch, tributaries of the Licking River. Several projectile points illustrated in Webb (1941b) resemble Dickson cluster, Adena Stemmed, and Copena Triangular types. Ceramics recovered were predominately Adena Plain with

some Montgomery Incised (Haag 1941; Webb 1941b). These diagnostics suggest a late Early to early Middle Woodland temporal placement for this site.

Fragmentary remains of a minimum of seven individuals were recovered from four mortuary features in Morgan Stone Mound. There is little demographic variability in the burial population, as all were aged between 20-26 years and six of the seven are female. Several pathologies and traumas were noted, including impacted molar, cribra orbitalia, periostitis, and osteomyletis. Several individuals exhibited occipital flattening (Snow 1941). Five of the seven individuals were extended in-flesh inhumations, one female of whom was partly cremated when the submound structure was destroyed; the remains of two individuals were fragmentary but may have been extended (Webb 1941b).

Webb (1941b) described mound construction, submound structure and features, crypt type, and grave goods at Morgan Stone Mound. Two strata of basket-loaded mound fill were piled over the scraped ground surface. The mound covered a circular, paired-post structure, upon which the now-famous scaled reconstruction of an Adena "house" was based. The outward-slanting structure lacked an apparent entryway but encompassed several interior features, including four large interior postmolds, small postmolds, thermal features, rock concentrations, and a pit. Mortuary features were an elaborate log platform on the submound surface within the structure, which was charred when the structure was burned, a bark-lined pit outside the structure footprint, and two log tombs within the mound fill (Webb 1941b).

The Morgan Stone Mound fill contained Adena Plain sherds, copper beads, a sandstone cupstone, granitic celts, an expanded-bar gorget fragment of unspecified material, worked galena, chert tools, and worked bone. Two of the four mortuary features contained grave goods. There were three or four conch columella beads in a triple-burial log tomb (Webb 1941b). The partly cremated female in the central log crypt was wrapped in textiles and cordage. The five weaving techniques identified reflect the variety of skill levels of the Woodland weavers: plain plaiting, twilled plaiting, plain twining, twilled twining (with five varieties), and chevron twining (Carey 1941). She was buried with *Marginella* beads, columella disk beads, a slate hoe, an expanded bar slate gorget in three pieces, and two complete pottery vessels (Webb 1941b). One vessel conforms to the Adena Plain type, while the other was classified as Montgomery Incised. Characteristics of Montgomery Incised are smoothed exterior surfaces with a series of nested diamonds deeply incised with a sharp tool on the vessel from base to rim. The typical vessel form is a large jar with a convex base and a slightly outflaring rim thickened by an applied clay strip (Haag 1941; O'Malley 1988). Montgomery Incised is a late Adena pottery type that dates to the early Middle Woodland subperiod.

Dover Mound (15Ms27) was located on a terrace of the Ohio River floodplain in Mason County in association with the Barrett site. The mound diameter ranged from 33.5-36.6 m and, though eroded, the height was about 6 m. Low places in the surrounding land surface may represent borrow pits, and abundant artifacts were discovered in the adjacent agricultural fields where shovel testing was conducted. This early-middle Adena mound yielded calibrated radiocarbon dates of 1258-393 B.C., 759 B.C.-A.D. 0, and 755 B.C.-A.D. 210 (Table 5.26). All of the dates have large standard deviations, which limit their utility, but the earliest date appears to predate construction of this mound (Webb and Snow 1959).

At least 60 individuals were interred in the Dover Mound. Of the 48 for whom sex and/or age could be determined, 40 are adults and eight are youths and children. Twenty-one of the 30 sexed adults are males, a large number of whom exhibited an unusual, broad, squared chin that, in some cases, appeared "bilateral." Eleven individuals from Dover Mound had evidence of pathologies, anomalies, or cultural modifications, including arthritis, bone fracture, dental afflictions, femoral bowing, and squatting facets. Though cranial deformation is a common Adena trait, it was extreme in the Dover Mound burial population and, in at least some cases, was intentional (Webb and Snow 1959).

Dover Mound was constructed in four major stages, and the fill of all except the lowermost stratum was largely devoid of artifacts. The lowermost zone included three circular fired areas, interpreted as loci of food preparation and consumption, and an unspecified number of possible postmolds in no apparent pattern. The second and third strata covered numerous mortuary features, completing the mound core. The outer mound mantle was deposited after a hiatus in mound use of one to several hundred years. The second, third, and upper zones of Dover Mound contained burials of distinct crypt form, mortuary treatment, and body placement. In total, of the 60 individuals buried in the mound, 37 were extended, 12 were cremated, one was partially flexed, and 10 were undetermined or not reported. The single and multiple interments were placed in 49 burial features: 20 bark-lined pits, 11 ochre-covered pits or surfaces, eight clay mounds, five log tombs, three puddled clay graves, one mat-lined pit, and one unspecified (Webb and Snow 1959).

About half (n=26-28) of the 55 Dover Mound burials contained grave goods. All but three contained the remains of adults; half of the adults were males and about one-quarter each were females and those for whom sex could not be determined. Grave goods, in decreasing order of ubiquity, included copper artifacts (e.g., bracelets, ring, and pendant), textile/leather fragments (e.g., mortuary mats), worked shell and animal bone (e.g., mussel and marine shell beads, and bone cylinders), mica crescents, chipped stone tools (e.g., mortuary blade), groundstone implements (e.g., expanded-bar gorget or atlatl weight), lumps of pigments, and wooden stave. No pottery artifacts were found in grave contexts, but untyped sherds were recovered from the lowermost stratum under the mound. Two of the projectile points illustrated in the site report resemble the Robbins type. Of particular note at Dover Mound was Burial 9, which contained an extended male aged 35-40 years overlain by a young female adult. The possible shaman was buried with mica cut-outs, modified mountain lion mandibles, copper items, points, and pigments (Webb and Snow 1959).

Turning to late Early-early Middle Woodland and Middle-Late Woodland nonmortuary sites, Schock and Langford (1980, 1981) documented several open habitations (sites 15Lw353, 15Lw316A, 15Lw301C, 15Lw314C, and 15Lw302A) in the Ohio River floodplain at the Carrs Power Plant in Lewis County. The frequency and diversity of features (e.g., house patterns, pits, hearths, and rock ovens) and artifacts (e.g., celts, points, bifaces, scrapers, lithic waste debris, and ceramics) excavated at these sites is suggestive of a large dispersed community of scattered households, or smaller noncontemporary hamlets or base camps. Other sites (15Lw325E and 15Lw315A) lacked structural remains but contained other Woodland features.

Site 15Lw353 is a small (30 x 40 m) multicomponent site located on a sand knoll upslope of the river terraces. A substantial Early-Middle Woodland domestic occupation was evidenced by a possible house floor with eight postmolds in a square or rectangular arrangement. No other features were associated with the postmolds. Of the Carrs Power Plant sites, Site 15Lw353 was the only one that yielded plant remains and a substantial sample of Woodland pottery. The former are exclusively walnut shells, some of which were burned. Ceramics represent at least 10-11 vessels that were tempered with grog, grit, or limestone and have cordmarked (one rim was thickened on the interior), smoothed-over cordmarked, or plain (some rims have scratched lips) exterior surfaces. Point types are Robbins and contracting stemmed forms. Other artifacts from Site 15Lw353 are difficult to separate by component: pigments, scrapers, bifaces, utilized flakes, cores, debitage, a nutting stone, and chert and greenstone celts (Schock and Langford 1980, 1981).

Site 15Lw316A is a large (100 x 220 m) mid-late Middle Woodland habitation situated on the fourth terrace. While few diagnostic Woodland artifacts (e.g., small triangular points) were found, the site contains two structures with associated calibrated radiocarbon dates of 348 B.C.-A.D. 240 and 349 B.C.-A.D. 1011, respectively (Table 5.26). The earlier structure was circular to elongate with a curved end. It measured about 6 m wide and may have been associated with two nearby features. The later structure was delineated by 17 postmolds, two of which were excavated, in a semi-circular pattern open to the north and spanning over 7 m. To the north was a cluster of seven postmolds (Schock and Langford 1980, 1981).

Measuring 80 x 330 m, Site 15Lw301C was located on the third floodplain terrace. A Hopewell-like cross-hatched rim and Copena and small triangular points indicate Middle Woodland and perhaps later components. Other items recovered from 15Lw301C are a mica sheet fragment, limestone tempered plain and cordmarked sherds, scrapers, bifaces, utilized flakes, cores, and debitage (Schock and Langford 1981). Analysis of data presented by the authors indicates a possible structure at the east end of 15Lw301C, the portion of the site most intensively occupied during the Middle Woodland subperiod. Four postmolds are suggestive of the corner of a square or rectangular structure of undetermined size. Another unexcavated feature is similar in diameter and alignment as the four postmolds. A large unexcavated feature was less than one m south of the postmold cluster. About 15-20 m southeast of the postmold cluster were three hearths, as well as a pit that yielded Hopewell-like cross-hatched rim sherds.

Site 15Lw314C measured 100 x 420 m and was located on the second floodplain terrace. Robbins and small triangular points and sand tempered pottery indicate Early-Middle Woodland and perhaps later components. The remains of three structures of uncertain age were found at Site 15Lw314C. Seven postmolds uncovered during initial fieldwork delineated a portion of a structure of unspecified size and shape. A parallel-stemmed point was found near the postmolds but not in direct association. A second structure found during Phase II investigations was delineated by an arc of nine postmolds opening to the south. An additional postmold was found south of the 3.75 m arc, which was classified as a windbreak or lean-to. The third structure was delineated by a semi-circle of seven unevenly spaced postmolds opening to the southeast. Measuring 2 m across, the structure was identified as another windbreak or lean-to. An undated hearth

was found about 6 m to the east of this postmold pattern (Schock and Langford 1980, 1981).

Measuring 100 x 180 m in size, Site 15Lw302A was located near Site 15Lw316A on the fourth terrace. Diagnostic artifacts include contracting stemmed, Lowe cluster, and small triangular points, suggesting occupations potentially spanning the Woodland period. A cluster of features at Site 15Lw302A included five postmolds near three hearths and one rock scatter. Four of the postmolds formed an arc opening to the south and measuring 4.4 m across, and a fifth postmold was found to the south. Chipped stone items from 15Lw302A are scrapers, bifaces, utilized flakes, and debitage including a core. Groundstone items are a mano and a tubular sandstone bead (Schock and Langford 1981).

Site 15Lw325E was located on the fifth floodplain terrace and measured 40 x 200 m. Robbins and small triangular points, as well as a calibrated radiocarbon date of A.D. 85-604 (Table 5.26) from a feature with plain indeterminate temper ceramics, indicate late Middle Woodland and perhaps later components. Other artifacts recovered from Site 15Lw325E are bifaces and debitage (Schock and Langford 1981). Finally, one of the latest Woodland sites in the Carr Power Plant project area is 15Lw315A, which measured 150 x 350 m and was located on the fourth terrace. A calibrated radiocarbon date of A.D. 585-931 (Table 5.26) was obtained from a feature. Diagnostic artifacts are Robbins, expanding stemmed, and small triangular points. Other artifacts include bifaces and debitage. Several Woodland period hearths were among the many features found at the site, which also had a Late Archaic-Early Woodland component with an associated calibrated radiocarbon date of 1606-1013 B.C. (Table 5.26) (Schock and Langford 1981).

Elsewhere in Lewis County, Maslowski (1980) investigated Site 15Lw5, a buried Middle Woodland hamlet in the Ohio River floodplain. Ceramics tempered with limestone, limestone and quartzite, or siltstone were recovered from a large earth oven feature eroding from the river bank. With calibrated radiocarbon dates of A.D. 468-480 and A.D. 538-662 (Table 5.26) this feature is contemporaneous with Newtown sites (e.g., Pyles, Gillespie, and Mayslick) in the area, but how the materials recovered from this site compare to Newtown materials has yet to be determined (Maslowski 1980; Turnbow 1981).

Several Late Woodland open habitation sites with stone mounds in northeastern Kentucky have circular, donut-shaped domestic areas around interior open areas or "plazas." These small (ca. 1.3 ha or less) sedentary settlements include Pyles (15Ms28), Gillespie (15Ms50), and Mayslick (15Ms53) in Mason County. Pyles and Gillespie provide evidence for a shift toward nucleated settlements from late Middle Woodland to Late Woodland times, a pattern suggested for other sections of the Bluegrass Management Area. The close proximity of the Pyles and Gillespie sites (1.5 km apart), coupled with the other Newtown settlements reported in this portion of Mason County, have led researchers to ask questions regarding the temporal relationships of these sites. These sites may reflect the shifting residential patterns of a single community, possibly due to exhaustion of local resources (Railey 1984).

In some regional syntheses the Late Woodland subperiod has become synonymous with circular settlement plans. However, there are as many noncircular habitation sites as circular-plaza habitation sites in northeastern Kentucky. Structural

remains at the larger of the habitation sites were simple/temporary or lacking altogether; in the latter case, domestic loci are identified by artifact and feature clusters. Rockshelters were also the loci of Late Woodland habitations, albeit nonsedentary settlements.

One of the best documented donut-shaped habitation sites is Pyles (15Ms28). Situated on a ridgetop in the North Fork Licking River drainage, Pyles is a single component late Middle-early Late Woodland site that produced a Newtown phase assemblage. A calibrated radiocarbon date of A.D. 143-662 was obtained from this site (Table 5.26). Midden deposits covered a circular area about 150 m in diameter, with the interior 50 m area largely devoid of material remains but with high soil phosphate levels. There were no postmold patterns indicating structures at the site, but "domiciliary loci" were delineated based on dense artifact clusters where the incidence of sherds, burned rock, lithic hoes, nutting stones, daub, and phosphate were highly correlated. Stone mounds are located adjacent to the midden ring. Excavations along the outer periphery of the Pyles site midden did not reveal evidence of a stockade (Collins 1980; Railey 1984).

In addition to Newtown series pottery, especially cordmarked varieties, a small amount of Wright Check Stamped was recovered from this site (Henderson and Pollack 1985). Biface shaping was the primary lithic production activity during the Middle-Late Woodland occupation at Pyles. Most on-site knapping was done with locally available cherts, and exotics were imported in partly finished forms. Though the ceramic assemblage exhibited a similar distribution throughout the midden ring, spatial variation was noted in the distribution of flake debitage. Within the midden ring, nonlocal cherts from sources to the south (e.g., Haney, Paoli, and St. Louis) were recovered primarily from the south side of the site, while nonlocal cherts from northerly sources (e.g., Vanport) were found primarily on the north side. On the other hand, there were no loci of specialized chert-type usage evidenced in the nonflake debitage sample from Pyles (Collins 1980).

Pyles is one of few Woodland sites in the Eastern Bluegrass Section that yielded subsistence data. Deer was the most abundant animal species in the Late Woodland faunal assemblage from Pyles. Other species recovered from the midden were bear, groundhog, turkey, and box turtle (Railey 1984).

The Gillespie site (15Ms50) is located on a ridge crest along Mill Creek, a tributary of North Fork Licking River. This single component Woodland site yielded a Newtown phase assemblage (dominated by Newtown Cordmarked pottery) within a circular area measuring 30 m in diameter. The center portion of the site was relatively clean of artifacts. A stone mound reportedly is located adjacent to this site (Collins 1980; Railey 1984, 1985c). Like Gillespie, the Mayslick site (15Ms53) is situated on a ridge crest in the same drainage and yielded a single Late Woodland component with Newtown phase artifacts, including Newtown Cordmarked and small amounts of Newtown Plain pottery. Mayslick has a dark brown, circular midden and an associated mound (Collins 1980; Railey 1984).

There is little information available on terminal Late Woodland occupations in the Eastern Bluegrass Section. A possible terminal Late Woodland component was evidenced at Pyles by calibrated radiocarbon dates of A.D. 566-1456 and A.D. 669-1477 (Table 5.26) (Railey 1984).

UPPER KENTUCKY/LICKING (MANAGEMENT AREA 6)

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

Rockshelters situated along the Cumberland Escarpment in eastern Kentucky were among the earliest sites investigated by archaeologists in Kentucky. Excavations at rockshelters in Lee (Funkhouser and Webb 1929), Menifee (Funkhouser and Webb 1930), Wolfe, and Powell (Webb and Funkhouser 1936) counties were conducted under the auspices of the University of Kentucky. Researchers excavated numerous sites along the North Fork of the Red River, such as Newt Kash Shelter, focusing on the recovery of normally perishable materials. Following the decade of University of Kentucky research in the Gorge between 1929 and 1939, however, little attention was paid to the archaeological resources in the Gorge until the 1960s.

Work resumed in the area during the 1960s in response to proposed reservoir projects such as Carr Fork, Cave Run, and Red River (Dorwin et al. 1970; Fryman 1967; Fryman et al. 1967a, 1967b; Marquardt 1970; Purrington 1966b, 1967; Rolingson and Rodeffer 1968). Surveys of these reservoirs documented a large of number Woodland sites. In the Red River Gorge area of Menifee, Powell, and Wolfe counties, the surveys continued into the 1970s in conjunction with the proposed Red River and North Fork Red River reservoir projects, neither of which was constructed. These studies resulted in the documentation and investigation of a large number of Woodland components - such as at Skidmore, Seldon Skidmore, Haystack Rockshelter, and Cloudsplitter Shelter - and generated important information on regional Woodland settlement/subsistence patterns (Cowan 1974, 1975, 1976, 1978, 1979a, 1979b, 1985; Cowan and Wilson 1977; Cowan et al. 198l).

Archaeological research during the 1970s and 1980s largely involved surveys completed in response to federal preservation laws. In particular, several surveys in the Daniel Boone National Forest produced important information on Woodland settlement patterns (Wyss and Wyss 1977). According to Cowan (1985:39), in the Red River Gorge "almost all of the work had been limited to reconnaissance; excavations had been limited to a total of about 33 m^2." However, documentation of site distributions proved to be important in developing site prediction and settlement pattern models. The work of Wyss and Wyss (1977), for example, resulted in the documentation of 117 sites and identification of spatial patterning in site locations. Sites with significant Woodland components include Cloudsplitter (15Mf36) (Cowan et al. 1981; Cowan 1985), Haystack Rockshelters (15Po47A-B), Rogers Rockshelters (15Po26-27) (Collins 1980; Cowan 1974, 1975, 1978, 1979a, 1979b, 1997), Site 15Cy24 (Bush 1988; Bush and Thomas 1986), and Hall Shelter (15Pe8) (Gatus 1981).

The pace of archaeological excavations in the Red River Gorge quickened in the 1980s and has remained steady to date, with projects pursued by both contract archaeologists and academic researchers. Open habitation sites investigated in this section include Short Fork (15Mg38) (Richmond et al. 2002), Rhondle Lee (15Po302) (Applegate 1998), and Little Spring Creek (15Cy166) (Boedy and Faulkner 2001).

Important rockshelters include Cherokee Arch (15Wo32) (Faulkner and Grench 2007; Grench et al. 2007), Rock Bridge (15Wo75) (Gremillion 1993a, 1996), Kay (15Br118) (Fiegel et al. 1992; McGraw et al. 1991), Cliff Palace Cave (15Ja41), Dark House (15Ja59) (Ison and Sharp 2004), Doty Creek #1 (15Lr60) (McGraw and Duffield 2002), Grouse (15Kt72) (Creasman et al. 1995), Enoch Fork (15Pe50) (Evans 1996), Carr Fork (15Kt15) (McGraw and Ericksen 1993), Cornett Woods (15Lr23) (Miday 1996), and Gays Creek (15Pe186) (Bradbury 2000). The O'Hare Site Complex (15Mf632) consists of an open habitation and adjacent rockshelter (Davis and Rossen 2000).

Extensive research on the origins of plant domestication and food production has been conducted at both rockshelter and open-air sites in this management area (Gremillion 1994, 2002; Ison 1991). Since the late 1980s, important Woodland subsistence data was acquired from several sites and from the reanalysis of museum collections, including Cold Oak Shelter (15Le50) (Gremillion 1993c, 1995a, 1998; Ison 1988; O'Steen et al. 1991), Newt Kash Hollow Shelter (15Mf1) (Gremillion 1995b, 1997b; O'Steen et al. 1991; Turnbow 1981), Hooton Hollow Shelter (15Mf10) (Gremillion 1995b), and Military Wall Rockshelter (15Po282) (Schlarb and Pollack 2002).

SITE DENSITY AND DISTRIBUTION PATTERNS

The 332 Woodland sites in the Upper Kentucky/Licking Management Area account for 11.4 percent of the Woodland sites in Kentucky. Site densities are low, with the densities of sites per sq km (0.024/sq km) and per acre surveyed (0.001/ac) being below the densities for the entire Commonwealth (Table 5.1).

In addition, there is a limited range of Woodland site types in the Upper Kentucky/Licking Management Area. Rockshelters (66.0 percent) and open habitations without mounds (31.6 percent) together account for 97.6 percent of the Woodland sites in this management area. Caves, isolated finds, open habitations with mounds, earth mounds, stone mounds, and specialized activity areas together account for 2.4 percent of the Woodland sites (Table 5.30). No Woodland period quarries, mound complexes, enclosures, cemeteries, isolated burials, or workshops are reported. Though a number of Woodland rockshelter sites in this management area contain rock art, no exclusively rock art sites are identified.

Woodland sites in the Gorge Section of the Upper Kentucky/Licking Management Area outnumber those in the Interior Mountains, which is probably due to both geological factors (with more rockshelters being located in the Gorge Section) and site survey biases. There are 193 sites (58 percent) in the Gorge Section and 139 sites (42 percent) in the Interior Mountains Section. Despite the larger number of sites, the Gorge Section has a limited number of Woodland site types, with only rockshelters, open habitations without mounds, caves, isolated finds, and other site types recorded (Table 5.30).

The 396 Woodland components at sites in this management area account for about 11 percent of the Woodland components in Kentucky. About 57 percent of the Upper Kentucky/Licking components are unassigned. Nearly equal percentages of Early

(19 percent) and Middle (17 percent) Woodland components are recorded. The percentage of Upper Kentucky/Licking site components dating to the Late Woodland (7 percent) is among the highest among all management areas (Table 5.2).

Table 5.30. Woodland Site Types by Section in the Upper Kentucky/Licking Management Area.

Site Type	Gorge	Interior Mountains	Total	Percent
Open Hab w/o Mounds	56	49	105	31.6
Open Hab w/ Mounds	0	1	1	0.3
Rockshelter	134	85	219	66.0
Cave	1	1	2	0.6
Earth Mound	0	1	1	0.3
Stone Mound	0	1	1	0.3
Specialized Activity	0	1	1	0.3
Isolated Find	2	0	2	0.6
Total	193	139	332	100.0
Percent	58.1	41.9	100.0	

About 59 percent of the Woodland components are recorded for sites in the Gorge Section, with 41 percent in the Interior Mountains Section. Early Woodland components comprise a larger proportion of the Woodland sites in the Gorge, while Middle Woodland components comprise the largest percentage of Interior Mountain Woodland period sites. There is a slightly larger proportion of Late Woodland components in the Gorge compared to the Interior Mountains (Table 5.31).

Table 5.31. Woodland Components by Section and Subperiod in the Upper Kentucky/Licking Management Area.

Subperiod	Gorge		Interior Mountains		Total	
Late Woodland	17	7.3%	9	5.5%	26	6.6%
Middle Woodland	34	14.6%	32	19.6%	66	16.7%
Early Woodland	50	21.5%	27	16.6%	77	19.4%
Unassigned	132	56.7%	95	58.3%	227	57.3%
Total	233	100.0%	163	100.0%	396	100.0%

CHRONOMETRIC DETERMINATIONS

Chronometric determinations for the Upper Kentucky/Licking Management Area are provided in Table 5.32. There are more dated sites in the Gorge Section than in the Interior Mountains Section. Overall, sites in this management area, especially Gorge rockshelters like Cold Oak (15Le50), produced one of the most extensive sets of absolute dates for the early Early Woodland subperiod in Kentucky. The chronometric determinations, however, span the entire Woodland period.

Table 5.32. Chronometric Dates for the Upper Kentucky/Licking Management Area.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Gorge Section			
Little Sinking Cave (15Le9)			
Beta-10441	1780±140	83-81, 54 BC-A.D. 573	O'Steen et al. 1991
Cold Oak Shelter (15Le50) (see Chapter 4:Table 4.37)			
Beta-38435	2590±90	907-481, 468-415 BC	O'Steen et al. 1991
Beta-84751	2490±70	787-477, 473-414 BC	Gremillion 1998
Beta-55370	2470±90	791-402 BC	Gremillion 1998
Beta-22518	2470±60	767-411 BC	O'Steen et al. 1991
Beta-84753	2420±60	757-684, 669-397 BC	Gremillion 1998
Beta-84754	2230±60	401-163, 130-119 BC	Gremillion 1998
Beta-22519	2210±60	396-149, 140-112 BC	O'Steen et al. 1991
Beta-76309	2190±80	395-51 BC	Gremillion 1998
Beta-84752	2170±70	384-53 BC	Gremillion 1998
Beta-76307	2060±70	352-295, 229-220, 211 BC-AD 80	Gremillion 1998
Beta-76308	2060±60	345-322, 205 BC-AD 69	Gremillion 1998
Beta-76306	1910±50	20-12, 1 BC-AD 232	Gremillion 1998
Big Turtle (15Le55)			
Beta-10444	2260±120	753-685, 668-611, 597-39, 8 BC- AD 4	O'Steen et al. 1991
Pine Crest Shelter (15Le70) (see Chapter 4:Table 4.37)			
Beta-10444	3310±60	1739-1706, 1698-1487, 1484-1454 BC	Moore 2003; O'Steen et al. 1991
Beta-10443	2810±70	1192-1176, 1163-1143, 1132-814 BC	Moore 2003; O'Steen et al. 1991
Beta-22516	2390±70	766-369 BC	Moore 2003; O'Steen et al. 1991
Beta-22517	2140±80	383-17, 15 BC-AD 0	Moore 2003; O'Steen et al. 1991
Newt Kash Hollow Rockshelter (15Mf1) (see Chapter 4:Table 4.37)			
not reported	2650±300	1500-53 BC	Crane 1956
not reported	2600±300	1449-19, 13-1 BC	Crane 1956
Cloudsplitter Rockshelter (15Mf36) (see Chapter 4:Table 4.37)			
UCLA-2313A	2791±60	1114-1097, 1091-818 BC	Cowan et al. 1981
UCLA-2313F	2791±60	1114-1097, 1091-818 BC	Cowan et al. 1981
UCLA-2313C	2693±60	995-988, 980-785 BC	Cowan et al. 1981
UCLA-2340C	2513±80	799-477, 474-413 BC	Cowan et al. 1981
UCLA-2313D	2441±60	762-681, 672-403 BC	Cowan et al. 1981
Buck Creek Shelter (15Mf379)			
Beta-33100	3840±60	2469-2139 BC	Boedy and Sharp 1992
Beta-33101	2920±60	1308-970, 961-933 BC	Boedy and Sharp 1992
O'Hare Site Complex (15Mf632)			
Beta-143433	2500±70	792-479, 470-414 BC	Davis and Rossen 2000
Beta-143430	1790±60	AD 85-109, 117-387	Davis and Rossen 2000
Beta-143431	1540±70	AD 390-647	Davis and Rossen 2000
Beta-143429	1210±70	AD 670-906, 911-971	Davis and Rossen 2000
Beta-143432	230±100	AD 1476-1893, 1906-1953	Davis and Rossen 2000
Short Fork (15Mg38)			
Beta-164566	2370±100	775-347, 319-206 BC	Richmond et al. 2002
Beta-164565	1900±60	38-9, 4 BC-AD 242	Richmond et al. 2002
Rogers Rockshelter - Upper (15Po26)			
UGA-553	1485±55	AD 433-494, 505-653	Turnbow 1981
UGA-749	1345±60	AD 575-782, 789-811, 846-855	Turnbow 1981

Table 5.32. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Rogers Rockshelter - Lower (15Po27)			
UGA-552	1470±65	AD 433-97, 502-661	Turnbow 1981
UGA-552	1415±60	AD 468-480, 534-716, 744-768	Turnbow 1981
UGA-750	1245±60	AD 659-895, 925-937	Turnbow 1981
Site 15Po160			
Beta-27770	1070 ± 70	AD 778-1051, 1082-1127, 1135-1152	Ison pers. comm. 1990
Site 15Po210			
Beta-51948	2430±70	764-679, 674-398 BC	Esarey and Evans 1992
Military Wall Rockshelter (15Po282) (see Chapter 4:Table 4.37)			
Beta-152834	5080±80	4041-4011, 4004-3696 BC	Schlarb and Pollack 2002
Beta-159713	3020±60	1419-1111, 1101-1083, 1064-1057 BC	Schlarb and Pollack 2002
Beta-152835	2270±60	483-466, 416-169 BC	Schlarb and Pollack 2002
Cherokee Arch Shelter (15Wo32)			
Beta-203284	2700±60	996-987, 980-790 BC	Grench et al. 2007:63
not available	not available	AD 80-250	Grench et al. 2007
Rock Bridge Rockshelter (15Wo75)			
Beta-33102	1380±50	AD 569-717, 743-768	Gremillion 1993a, 1996
Beta-55368	1310±60	AD 636-876	Gremillion 1993a, 1996
Beta-55369	1170±70	AD 687-992	Gremillion 1993a, 1996
Interior Mountains Section			
Kragon (15Br9) (see Chapter 7:Table 7.10)			
Beta-24807	2820±60	1189-1180, 1157-1145, 1130-830 BC	McIlhany 1991
Beta-24805	1430±50	AD 539-674	McIlhany 1991:41
Kay Shelter (15Br118)			
GX-16825	2970±130	1493-1475, 1461-894, 873-849 BC	Fiegel et al. 1992
Beta-40185	1430±50	AD 539-674	Fiegel et al. 1992
Site 15Cy24			
Beta-15422	2230±90	510-436, 425-42 BC	Bush and Thomas 1986
Alpha-2816	2100±180	150±180 BC (TL date)	Bush and Thomas 1986
Site 15Cy56			
Beta-15421	1180±70	AD 686-987	Bush and Thomas 1986
Beta-15422	1020±80	AD 784-786, 827-840, 864-1212	Bush and Thomas 1986
Cliff Palace Cave (15Ja41)			
UGa-3300	3000±75	1415-1020 BC	Ison and Sharp 2004
Dark House Shelter (15Ja59)			
Beta-126497	2760±60	1048-805 BC	Ison and Sharp 2004
Grouse Rockshelter (15Kt72)			
Beta-81936	2390±70	766-369 BC	Creasman et al. 1995
Doty Creek Shelter (15Lr60)			
Beta-148125	2370±80	766-353, 293-230, 218-213 BC	McGraw and Duffield 2002
Beta-148124	350±70	AD 1433-1790	McGraw and Duffield 2002
Enoch Fork Shelter (15Pe50) (see Chapter 3 and Chapter 4:Table 4.37)			
Beta-15423	2050±100	366 BC-AD 132	Bush 1988
Beta-27765	1980±70	172 BC-AD 143, 147-172, 193-210	Evans 1996
Beta-27764	1230±80	AD 658-906, 911-971	Evans 1996

GORGE SECTION

The Gorge Section has been the focus of much archaeological research, and rock-shelter sites with Woodland components are especially well known. The 193 Woodland sites recorded in this section contain 233 Woodland components. Site type diversity is low in the Gorge; many of the sites are rockshelters, followed by open habitations without mounds (Table 5.30). Early Woodland components outnumber Middle Woodland components, which significantly exceed Late Woodland components (Table 5.31).

The Gorge is one of few sections in Kentucky where substantial Woodland sites have been documented in every county (Table 5.33). (Morgan County sites in the Paintsville Reservoir vicinity are discussed in the Lower Big Sandy Section.) The distribution of known Woodland sites, however, is uneven with many sites clustered in the Red River drainage; this may be, in part, a function of the biased spatial foci of previous studies. Unfortunately, the chronological affiliations of a number of important sites are poorly understood, except to say they were occupied during the Woodland period. Webb, Funkhouser, and their colleagues investigated many of these sites before absolute dating and point and pottery typologies were developed.

Diagnostic Woodland artifacts from sites in the Gorge Section are mostly projectile points (Table 5.7). Early Woodland point types, such as Terminal Archaic Barbed, Early Woodland Stemmed, and Dickson cluster are ubiquitous within the Gorge Section. Copena is a Middle Woodland point type documented at Gorge sites. At later sites, Lowe cluster and small triangular types predominate. There have been few analyses of Woodland pottery in the Gorge Section, and most ceramics have yet to be assigned to specific types. Only one pottery series, Middle-Late Woodland Newtown, has been identified at Gorge Section sites.

The Cogswell phase is the earliest Woodland phase identified in the Gorge Section (see also Chapter 4). It is characterized by Cogswell, Wade, Buck Creek, Little Bear Creek, and/or McIntyre points; prevalence of Newman formation cherts, such as Haney and Paoli; small amounts of limestone tempered pottery; and hunting-gathering-gardening subsistence (Ison 1988; O'Steen et al. 1991). The Cogswell phase was defined by Ison (1988) based on assemblages from sites in the major drainages of this section, including Cold Oak and Cloudsplitter shelters, which are discussed below. Subsequently, Cogswell phase components have been identified at sites like Grayson in the Lower Big Sandy Section (Ledbetter and O'Steen 1992) and Zilpo in the Eastern Bluegrass Section (O'Steen et al. 1991. The Cogswell phase is considered a transitional Terminal Archaic-Early Woodland phase (ca. 1200-800 B.C.) (Ison 1988).

Though heavily impacted by looting, intact Woodland strata and features (e.g., storage pits, hearths, and postmolds) have been documented at the Cold Oak Shelter (15Le50) in the Sinking Caves Creek drainage of Lee County (Gremillion 1993c, 1995a, 1998; Ison 1988; O'Steen et al. 1991). The 18 calibrated radiocarbon dates from this site range from 1373-932 B.C. to 20 B.C.-A.D. 232 (Table 5.32; see also Chapter 4:Table 4.37). The most intense occupations occurred during the Early Woodland subperiod, but diagnostic projectile point (Cogswell, Wade, Adena, Jacks Reef Pentagonal, small

Table 5.33. Important Woodland Period Sites in the Gorge Section.

Site No.	Site Name	Site Type	Affiliation	References
15Es19	none	open habitation	EW	Ison and Boisvert 1981
15Le1	Red Eye Hollow	rockshelter	unassigned	Funkhouser and Webb 1929
15Le2	Little Ash Cave	rockshelter	unassigned	Funkhouser and Webb 1929
15Le3	Big Ash Cave	rockshelter	unassigned	Funkhouser and Webb 1929
15Le5	Buckner Hollow	rockshelter	unassigned	Funkhouser and Webb 1929
15Le9	Little Sinking	cave	MW	O'Steen et al. 1991
15Le31	Crystal Creek	rockshelter	unassigned	Turnbow 1981
15Le50	Cold Oak	rockshelter	EW	Gremillion 1993c, 1998; Ison 1988; O'Steen et al. 1991
15Le55	Big Turtle	rockshelter	EW-MW	O'Steen et al. 1991
15Le70	Pine Crest	rockshelter	EW, MW	O'Steen et al. 1991
15Mf1	Newt Kash Hollow	rockshelter	EW	Gremillion 1995b, 1997b; Jones 1936; O'Steen et al. 1991; Webb and Funkhouser 1936
15Mf10	Hooton Hollow	rockshelter	EW, MW, LW	Cowan 1978; Gremillion 1995b
15Mf36	Cloudsplitter	rockshelter	EW	Cowan et al. 1981
15Mf178	Stone Foot	rockshelter	EW	Coy et al. 1997
15Mf379	Buck Creek	rockshelter	EW	Boedy and Sharp 1992
15Mf632	O'Hare Site Complex	open habitation and rockshelter	EW, MW, LW	Davis and Rossen 2000
15Mg38	Short Fork	open habitation	EW, MW	Richmond et al. 2002
15Mo5	Big Mine Fork	rockshelter	MW, LW	Adovasio 1982
15Mo10	Burchett Flats	open habitation	EW	Adovasio 1982
15Mo13	Patoker	open habitation	EW	Adovasio 1982
15Mo28	Ray Hill	open habitation	EW, LW	Adovasio 1982
15Mo35	none	open habitation	MW, LW	Adovasio 1982
15Po1, 2	Steven DeHart	rockshelters	unassigned	Funkhouser and Webb 1930
15Po17	Seldon Skidmore	open habitation	EW	Cowan 1976
15Po26, 27	Rogers	rockshelters	LW	Cowan 1974, 1975, 1978, 1979a, 1979b
15Po31	Anderson	open habitation	MW	Cowan 1975, 1976
15Po47A, 47B	Haystack	rockshelters	LW	Cowan 1974, 1975, 1978, 1979a, 1979b
15Po160	none	rockshelter	LW	Ison pers. comm. 1990
15Po210	none	open habitation	EW	Esarey and Evans 1992
15Po282	Military Wall	rockshelter	EW	Schlarb and Pollack 2002
15Po302	Rhondle Lee	open habitation	EW, MW, LW	Applegate 1998
15Ro34	Deep Shelter	rockshelter	EW	Dorwin et al. 1970
15Wo1	Sampson Spencer	rockshelter	unassigned	Funkhouser and Webb 1930
15Wo2	Worth Creech	rockshelter	unassigned	Funkhouser and Webb 1930
15Wo6	George W. Spencer	rockshelter	unassigned	Funkhouser and Webb 1930
15Wo10, 11	Dillard Stamper	rockshelters	unassigned	Funkhouser and Webb 1930
15Wo14	Green Gentry	rockshelter	unassigned	Funkhouser and Webb 1930
15Wo32	Cherokee Arch	rockshelter	EW, MW	Faulkner and Grench 2007; Grench et al. 2007
15Wo75	Rock Bridge	rockshelter	LW	Applegate 1997; Gremillion 1993b, 1996

triangular) and pottery (Newtown series) types span the Woodland period. Chipped stone artifacts from Early Woodland contexts are gravers, bladelets, bifaces, a hoe, a hammer- stone, and debitage; groundstone items include a pin or plummet and a nutting stone. The site was used as a year-round base camp by a small group of people, perhaps an extended family. An increase in the number of features and ash deposits during the Early Woodland suggests a shift in occupational intensity at Cold Oak (Applegate 1997; Gremillion 1993c, 1995a, 1998; Ison 1988; O'Steen et al. 1991).

Cold Oak is best known for perishable artifacts (especially food remains) recovered from the dry Early Woodland deposits. Organic tools consist of a bone awl, an unidentified wooden tool fragment, a burned cane or wood basket fragment, S-twist cordage, and a leather fragment. Regarding subsistence remains, wild animal utilization focused on deer and bear, followed by box and mud turtles, turkey, ruffed grouse, hawk, squirrel, eastern cottontail, eastern woodrat, and mussels. The wild plant assemblage includes hickory and several other nut taxa, various grasses, and fleshy fruits. Cultivated plants representing incipient horticulture at Cold Oak are EAC species and cucurbits: sunflower, sumpweed, goosefoot, maygrass, knotweed, ragweed, amaranth, squash, and bottle gourd (Gremillion 1993c, 1995a, 1998; Ison 1988; O'Steen et al. 1991).

Excavations at Cloudsplitter (15Mf36) in the Red River drainage documented a complex occupational history with a substantial Early Woodland component marked by over 40 features in three clusters. The central cluster contained mostly thermal features like surface hearths plus several possible storage pits. The two clusters on either end of the shelter were characterized as extensive ash lenses with numerous features including postmolds from temporary structures (i.e., back-slanted screens or windbreaks) that provided shelter to perhaps nuclear family units. During the Early Woodland occupation, the site was used by a small group as a short-term extractive camp primarily during the fall. Calibrated radiocarbon dates for the Early Woodland component range from 1114-818 B.C. to 762-403 B.C. (Table 5.32) (Cowan 1985; Cowan et al. 1981).

As at Cold Oak, excavators recovered well-preserved plant materials from Early Woodland contexts at Cloudsplitter. Cultivated species in the macrobotanical sample, which increased in abundance compared to the Terminal Archaic subperiod, are sunflower, sumpweed, goosefoot, maygrass, erect knotweed, amaranth, squash, and gourd. Wild plant species are dominated by hickory and walnut, though other nut taxa and few grasses and fleshy fruits are represented. The Early Woodland faunal assemblage is dominated by deer/large mammals, turkey/large birds, turtles, and bear (Cowan 1985; Cowan et al. 1981; see also Chapter 4).

Other Cogswell phase or possible Cogswell phase sites have been documented in Rowan, Estill, Lee, Menifee, and Powell counties (see also Chapter 4). Deep Shelter (15Ro34) yielded Cogswell Contracting Stemmed and Cave Run Expanding Stemmed (a.k.a. Saratoga) projectile points from disturbed contexts, suggesting Terminal Archaic-Early Woodland occupations (Dorwin et al. 1970). Located on an erosional terrace of the Kentucky River, Site 15Es19 is an open habitation site with a surface midden stain that covers 3.1 ha. It yielded a high density of artifacts, including a Cogswell-like point and a limestone tempered sherd that suggest an Early Woodland occupation (Ison and Boisvert

1981). Calibrated radiocarbon dates for Pine Crest Shelter (15Le70) range from 1739-1454 B.C. to 383 B.C.-A.D. 0 (Table 5.32; Chapter 4:Table 4.37) (O'Steen et al. 1991). A calibrated radiocarbon date of 1308-933 B.C. was obtained from the Buck Creek Shelter (15Mf379) (Boedy and Sharp 1992) and a calibrated radiocarbon date of 764-398 B.C. was obtained from Site 15Po210 (Table 5.32) (Esarey and Evans 1992).

Other sites in the Gorge Section contain Early Woodland deposits and assemblages not classified as Cogswell. An extremely important site is Newt Kash Hollow (15Mf1) in the Beaver Creek drainage, which contained up to 1.2 m of cultural deposits, storage pits, postmolds, hominy holes, a burial, and vegetal beds (Webb and Funkhouser 1936). Diagnostic artifacts pictured in the site report suggest occupations spanning the Woodland period: grit tempered plain and cordmarked pottery, Delhi-Wade, Cresap, Robbins, Adena Stemmed, Motley, Steuben Expanded Stemmed, and Jack's Reef points. The most intensive occupations, however, occurred during the Terminal Archaic-Early Woodland subperiods. Calibrated radiocarbon dates associated with these materials range from 2134-1390 B.C. to 1449-1 B.C. (Table 5.32; Chapter 4:Table 4.37) (Gremillion 1995b; O'Steen et al. 1991; Smith and Cowan 1987; Turnbow 1981; see also Chapter 4). Besides subsistence, tool manufacturing, and habitation functions, Newt Kash was the site of mortuary activities. The poorly preserved remains of an infant were found under a thin layer of sediments between two boulders in the shelter (Webb and Funkhouser 1936).

Compared to other rockshelters of its size, Newt Kash yielded a smaller assemblage of inorganic artifacts. Chipped stone artifacts include scrapers, flint hoes and fragments, hammerstones, and celts. Celts, discoidals, gorget fragments, a whetstone, and a "lap-stone" with three depressions are among the groundstone items. Bone and shell tools are deer and turkey bone awls, worked antler, bone needles, shell spoons and pendants, and a deer molar tied with a bark cord. A rattlesnake rattle may have been used as an ornament, though it showed no evidence of modification. Excavators recovered a wooden cradleboard and digging sticks, as well as possible cane torch material (Webb and Funkhouser 1936). An incredible array of textiles and related items derived from Newt Kash Shelter, including coarse woven mats and carriers, fine foot gear and bags, and cordage of leather, paw paw, Indian hemp, milkweed, maygrass, rattlesnake master, and other plant species (Jones 1936; Webb and Funkhouser 1936). The temporal affiliations of the artifact assemblages are unclear, but given the occupational histories at other shelters in the vicinity and radiocarbon dates for the site, it is likely at least a portion were recovered from Woodland (especially Early Woodland) contexts.

Diverse wild plant resources likely utilized for subsistence by the Newt Kash Shelter occupants, such as various nuts, fleshy fruits, and tubers, indicate that a wide range of the available taxa were utilized. The faunal assemblage includes mammals of all sizes, terrapin, and mussels. Plant cultigens recovered from feature, midden, and/or paleofecal samples are sunflower, sumpweed, goosefoot, maygrass, giant ragweed, bottle gourd, fleshy squash, maize, and tobacco. Absolute dates for some of the cultigens place them in the late Terminal Archaic and early Early Woodland subperiods (Gremillion 1995; Jones 1936; Webb and Funkhouser 1936; see also Chapter 4). Jones (1936) also noted the likely nonsubsistence uses (e.g., medicine, ceremony, and tanning) of some plant taxa, such as compass plant, sumpweed, tobacco, and nut oils.

Little Ash Cave (15Le2) is a large shelter that contained up to 1.4 m of ashy deposits with fire or charcoal pits, burial features, and hominy holes (Funkhouser and Webb 1929). Grit tempered pottery and point types resembling Early Woodland Stemmed and Dickson clusters (including Adena Stemmed) suggest Early Woodland occupations. Funkhouser and Webb (1929) recovered from general excavation levels gorget and bannerstone fragments, a hoe, awls, a bone reamer, and worked mussel shells. Slippers, a woven bag, cordage, leather, and other textiles were found in pits and caches. Subsistence remains from Little Ash Cave are deer, elk, bear, water fowl, unidentified small birds, box turtle, fish, and mussel. The site also contained a dog burial and fragments of gourd rind. At least some of these artifacts may be associated with Woodland component(s) at Little Ash Cave. In addition to habitation activities, Little Ash Cave was used for mortuary purposes. Investigators discovered three-four individuals, including two in burial features, at Little Ash Cave. Only one individual, an older adult female, was interred with a small collection of undiagnostic grave goods (Funkhouser and Webb 1929).

Located along Crooked Creek at the confluence with Brushy Fork, Big Ash Cave (15Le3) contained 1.7 m of dry deposits with fire or charcoal pits and vegetal beds (Funkhouser and Webb 1929). In addition to a small assemblage of Woodland-like sherds, likely Early Woodland Stemmed cluster points were found. Funkhouser and Webb (1929) recovered a pestle, ax, whetstone, and gorget fragment among displaced human remains outside the dripline. Organic tools include awls, a net spacer, and a drilled bone. Faunal remains are mussel and turkey, the latter including five complete skeletons found on a boulder arranged in a row and covered with ash (Funkhouser and Webb 1929). At least some of the artifacts from Big Ash Cave may be associated with the Woodland component(s). The shelter was used for both habitation and mortuary functions.

William Haag excavated Hooton Hollow Shelter (15Mf10) but the field notes were borrowed and lost before a report was prepared. Chipped stone tools including points, pottery sherds, textiles, cordage, plant remains, and paleofeces were recovered from the site (Gremillion 1995). Gremillion (1995) reported calibrated Terminal Archaic radiocarbon dates of 1493-1212 B.C. and 1499-1212 B.C. (Table 5.32; Chapter 4:Table 4.37) obtained from paleofeces, but she noted that occupations spanned the Woodland and Fort Ancient periods with the most intensive site use during the Early Woodland. Sumpweed, goosefoot, and giant ragweed cultivars were recovered from Terminal Archaic paleofecal samples (Gremillion 1995).

Military Wall Rockshelter (15Po282) is a dry shelter with intact deposits dated to Archaic and Early Woodland periods. Like other shelters in the Gorge section, Military Wall Rockshelter contained interbedded ash deposits and it was used most intensively during the Late Archaic-Early Woodland periods. It also contained a large earthen oven. Calibrated radiocarbon dates of 1419-1057 B.C. and 483-169 B.C. were associated with the midden deposits and earth oven, respectively (Table 5.32; Chapter 4:Table 4.37). Early Woodland deposits yielded a wide range of wild and cultivated plants, indicating broad-spectrum subsistence. The site was used primarily as a locus for plant processing, including various nuts, fleshy fruits, and seeds. Cultivars are goosefoot, sunflower, marsh elder, and erect knotweed (Schlarb and Pollack 2002; see also Chapter 4).

Sampson Spencer Shelter (15Wo1) on Rock Bridge Creek in the Red River drainage contained damp deposits and habitation debris. The remains of an infant were found in an extended position between two rocks. Faunal specimens include deer, elk, bear, ground hog, turkey, and mussel (Funkhouser and Webb 1930). Terminal Archaic Barbed cluster points and grit tempered pottery pictured in the report suggest at least Early Woodland occupations.

Several Gorge Section sites with Early Woodland components also were occupied during subsequent Woodland subperiods. For instance, at Big Turtle Shelter (15Le55) an Early/Middle Woodland feature, which consisted of a stone-lined wall trench or base of a stone wall and an associated post, yielded a calibrated radiocarbon date of 753 B.C.-A.D. 4 (Table 5.32). An Adena-like projectile point and thick grit tempered sherds were assigned to the Early Woodland component. This shelter also had a Late Woodland component, as indicated by siltstone tempered cordmarked and sandstone tempered plain ceramics, Chesser Notched points, and a Madison/Levanna projectile point (O'Steen et al. 1991).

Substantial Woodland occupations were documented at Worth Creech Shelter (15Wo2), located on Mill Creek in the Red River drainage. These components were associated with stratified deposits of sand, clay, and vegetal beds that marked living floors (Funkhouser and Webb 1930). Projectile points pictured in the report resemble Terminal Archaic Barbed, Early Woodland Stemmed, and Lowe cluster types, and suggest occupations potentially spanning the Woodland period. Grit tempered pottery, including folded rims with vertical cordmarking or concentric fingernail impressions, probably date to the Woodland period. Funkhouser and Webb (1930) also recovered groundstone gorgets, bone awls and other modified bones, a shell spoon, cane matting, gourd fragments, and one mica specimen of unspecified form or function that may be associated with Woodland components at Worth Creech Shelter.

Located on Smoky Fork in the Kentucky River drainage, George W. Spencer Shelter (15Wo6) contained damp and dry deposits almost 1 m thick (Funkhouser and Webb 1930). Points resembling Terminal Archaic Barbed, Dickson, and Lowe cluster types suggest occupations potentially spanning the Woodland subperiods. Grit tempered pottery sherds recovered from the site also probably date to the Woodland period and include one sherd with a node or handle, one with incising, and some rims with squared lips. Funkhouser and Webb (1930) recovered a large sample of bone awls, as well as reamers and a shell spoon, from George W. Spencer Shelter. In addition to mussel shell, faunal remains included elk and deer, the former outnumbering the latter, an unusual pattern in Gorge shelters. The extended remains of a child, which were not associated with a formal grave feature or grave goods, were found near the back wall of this shelter (Funkhouser and Webb 1930).

Located near the confluence of Gladie Creek and North Fork Red River, Cherokee Arch Shelter (15Wo32) may be related to the Gladie Creek site complex. This shelter was occupied during the Early (cal 996-790 B.C.) and Middle (cal A.D. 80-250) Woodland subperiods (Table 5.32). An amorphous oxidized zone, an oval pit with faunal remains, an earth oven, and four hearths were spread throughout the shelter, and no postmolds suggestive of structures were found. Diagnostic artifacts from feature and nonfeature contexts include Motley, Robbins, Gary, Adena, and Lowe Flared Base

points. Ceramics had plain or smoothed exterior surfaces and were tempered with grit (i.e., sandstone, limestone, and siltstone) and grog temper. Early and Middle Woodland occupations at Cherokee Arch Shelter were seasonal and short in duration. A limited range of activities, including chipped stone tool manufacture and food preparation, occurred at the shelter. Lithic production activities focused on late stage reduction, especially the manufacture of projectile points. Knappers used mostly locally available cherts (Faulkner and Grench 2007; Grench et al. 2007).

Middle Woodland deposits were documented at Little Sinking Cave (15Le9), based on a calibrated radiocarbon date of 83 B.C.-A.D. 573 (Table 5.32) (O'Steen et al. 1991). Also located in the Little Sinking Creek drainage, Buckner Hollow Rockshelter (15Le5) yielded coarsely tempered ceramics suggesting Woodland occupations. Leaf, grass, and moss sleeping features that contained textile fragments; twisted, plaited, and braided cordage fragments; and leather scraps, one of which was pierced with holes, were documented at this shelter. Several spear/arrow shafts, one of which held a side-notched chert point, also were found (Funkhouser and Webb 1929).

Red Eye Hollow Rockshelter (15Le1) is situated along an upstream tributary of Big Sinking Creek. Hominy holes, caches, plant-lined pits, and vegetal beds were found in the 0.8 m thick ashy deposits. There are no absolute dates for the shelter, but grit tempered cordmarked pottery was recovered and projectile points pictured in Funkhouser and Webb (1929) resemble Early-Middle Woodland forms: Terminal Archaic Barbed, Early Woodland Stemmed and/or Dickson cluster, and reworked Adena Stemmed. Groundstone artifacts from the shelter are a hammerstone, pestle, ax, whetstone, hoes, bannerstone fragment, and barite net sinker. Organic tools include bone awls, bone handle, worked deer antler, worked mussel shell, and wooden pestles. Unmodified rattlesnake master also was recovered. Animal species documented at Red Eye Hollow Rockshelter are deer, raccoon, ground hog, turkey, terrapin, and mussel. Nuts including hickory were found in lined storage pits and caches, and one textile bag was filled with 350 cc of shelled yellow oak acorns. The site also yielded fragments of gourd rind (Funkhouser and Webb 1929; Jones 1936). At least some of the artifacts may be associated with the Woodland component(s).

The remains of at least 14 individuals, some potentially interred during the Woodland period, were found in ash layers at various depths at Red Eye Hollow Shelter. Subadults slightly outnumbered adults, with 57 percent and 43 percent, respectively. Of the six adults, half were females and sex could not be determined for the other half. The subadults were mostly infants but also included children and an adolescent. No evidence of formal burial features was found, but if such features existed they would have been difficult to detect in the unconsolidated ash. Two individuals were found in small spaces between rocks, and rocks were placed over one of these individuals. Eleven (78 percent) individuals were found in proximity to the back wall, while the other three were within the main shelter area or at the dripline. Eight of the individuals were flexed in-flesh inhumations, while body placement could not be determined or was not reported for six individuals. Only three individuals were buried with grave goods, which included groundstone items, worked wood, and worked and unworked animal bone (Funkhouser and Webb 1929).

Steven DeHart Shelter No. 1 (15Po1) and No. 2 (15Po2) are a pair of adjacent, southwest-facing shelters along Middle Fork of Red River. Shelter No. 2 contained limited ash deposits and a hominy hole feature. The larger Shelter No. 1 contained over 90 cm of disturbed but dry stratified deposits of ash, clay, sand, and vegetal beds. One adult was interred as a bundle burial near the dripline; there was no clear burial feature and no grave goods. Near the back wall a child was interred without grave goods on a layer of pine bark (Funkhouser and Webb 1930).

A large assemblage of grit tempered pottery and points resembling Cresap and possibly Copena types suggest Early and/or Middle Woodland components at Steven DeHart Shelter No. 1. Funkhouser and Webb (1930) reported celts, whetstones, hoes, awls, turtle and mussel shell spoons, worked teeth and antler, and a cut bone handle from the site. Two moccasins of tanned deer or elk hide, which were manufactured by sewing precut portions with leather thongs or fiber cordage, also were recovered. Textiles and raw materials include bark, cordage fragments, and a folded/tied hank of four-ply linden bark cordage with feather quills; in addition, unworked rattlesnake master was found. Wild foods are deer, elk, bear, turkey, and nuts; maize cobs that unfortunately cannot be associated with specific stratigraphic contexts at this shelter (Funkhouser and Webb 1930). At least some of the artifacts may be associated with Woodland component(s) at Steven DeHart Shelter No. 1.

Located on Holly Creek in the Kentucky River drainage, Dillard Stamper Shelter No. 1 (15Wo10) is a large shelter with ashy deposits and hearth and burial features (Funkhouser and Webb 1930). Projectile points spanning a number of prehistoric periods were recovered from Dillard Stamper No. 1, with Early-Middle Woodland types resembling Terminal Archaic Barbed cluster, Dickson cluster, and possibly Copena. Domestic contexts at Dillard Stamper Shelter No. 1 produced nutting stones and hoes, antler and bone awls, bone reamers, and a geometrically engraved bone gorget (Funkhouser and Webb 1930), some of which may have derived from Woodland contexts.

Dillard Stamper Shelter No. 1 held the remains of six-seven individuals, some of whom may have been buried during the Woodland period. An infant was placed in an extended position near the back wall; no grave goods were associated with the infant, but one limestone rock was placed on top. One individual from an unspecified location was represented by disarticulated skeletal elements and probably was disturbed. Another four or five individuals were found in the center of the shelter. Two of these individuals were extended and vertically stacked one over the other. The partial secondary cremains of an adult male were found in a sand pocket within a pit feature. Adjacent to the pit was a cache of grave goods: polished antler tines, awls, beaver tooth, canine tarsus bones, and mussel shell. A small child was found near a hearth feature; the skull of the extended burial was covered with four box turtle carapaces. An isolated but articulated arm found near a turtle shell spoon may represent an additional individual (Funkhouser and Webb 1930).

A smaller shelter, Dillard Stamper Shelter No. 2 (15Wo11) contained about 46 cm of disturbed midden deposits without features (Funkhouser and Webb 1930). Early-Middle Woodland subperiod occupations are indicated by grit tempered pottery and possible Early Woodland Stemmed cluster and/or Snyders cluster point types. One

poorly preserved extended burial was found without grave goods under the drip line of a rock ledge at Dillard Stamper Shelter No. 2 (Funkhouser and Webb 1930).

Green Gentry Shelter (15Wo14) is a southeast-facing shelter on Left Fork in the Kentucky River drainage that contained up to 1 m of mostly intact, stratified, midden deposits, ash lenses, and vegetal beds (Funkhouser and Webb 1930). Woodland diagnostics are projectile points that resemble Terminal Archaic Barbed cluster, Lowe cluster, and Levanna types. Other artifacts, at least some of which may be associated with Woodland components, reported by Funkhouser and Webb (1930) include pebble hoes, mussel shell spoons, single- and double-pointed awls, and drilled bone pins or fasteners. Green Gentry Shelter yielded deer, bear, turkey, and mussels. The fragmented and disarticulated remains of three individuals of unspecified sex/age, which likely represent secondary burials, were recovered from ash deposits at Green Gentry Shelter. There were no burial features or grave goods (Funkhouser and Webb 1930).

As outlined above, important Early and Middle Woodland Gorge Section sites are mostly rockshelters. One exception is the Short Fork site (15Mg38), an open habitation site located along Short Creek. It had intact deposits dated to the Early (cal 775-206 B.C.) and Middle (cal 38 B.C.-A.D. 242) Woodland subperiods (Table 5.32). Subsurface features indicate that chipped stone tool production and food acquisition/processing occurred at the site. Site occupations either were frequent and of short duration, or they were infrequent and of long duration. In other words, the Short Fork site may have been used by mobile groups as a transient camp, or it served as a seasonal base camp for a small group of more sedentary occupants. Diagnostic Early Woodland Stemmed cluster points and sandstone tempered Johnson Plain, *var. Unspecified*, as well as faunal and floral remains, were recovered from the Short Fork site (Richmond et al. 2002).

Another open habitation, the Rhondle Lee site (15Po302), is located on a terrace spur extending into the Red River floodplain. Boyle chert crops out immediately east of the site, which measures at least 85 x 165 m. Surface collections produced a large assemblage of lithic artifacts, including over 600 projectile points, many of which date to the Woodland period. Woodland point types are Buck Creek, Fulton Turkey Tail, Gary or Cogswell, Merom-Trimble, Saratoga, Late Archaic Stemmed cluster, Cresap, Kramer, Adena Stemmed, Little Bear Creek, Robbins, Motley, Snyder, Copena Triangular, Steuben, Bakers Creek, Chesser, Lowe, Jacks Reef, Raccoon, Madison, and Levanna. Woodland period occupants relied exclusively on immediately (Boyle) and locally (Paoli) available cherts for chipped stone tool production (Applegate 1998). Using mathematical formulas described by Thomas (1978), Applegate (1998) concluded that that half of the Late Archaic, two-fifths of the Early Woodland, and all of the Fort Ancient specimens were arrow points. Most of the Late Woodland specimens, however, were dart points.

There are few single component Middle Woodland sites in the Gorge Section. One such open habitation site is Anderson (15Po31), which contained cultural deposits up to 80 cm thick. Diagnostic artifacts, including a straight-stemmed (Robbins-like) point and sandstone and limestone tempered plain and cordmarked pottery, are suggestive of an early Middle Woodland temporal affiliation (Cowan 1975, 1976).

Haystack Rockshelters (15Po47A and 15Po47B) are a pair of stacked shelters overlooking an unnamed tributary of the North Fork of Red River. The smaller upper

shelter (15Po47A) has damp sediments and is extensively disturbed. Limited excavation of the lower shelter (15Po47B) yielded a Newtown phase assemblage spanning the Middle and Late Woodland subperiods. Diagnostic artifacts include Newtown series pottery and Lowe Flared Base and small triangular points. Other chert items are bifaces, flake tools, and debitage including a core. Haystack Rockshelter Po47B produced black walnut and wild fruits, as well as goosefoot, maygrass, sumpweed, sunflower, squash, and gourd. This single component site was occupied during mid-late summer, through the fall, and possibly into the winter; it is possible the site was also used during the spring, though the evidence is weaker. Haystack Rockshelter Po47B likely was used by a small group of people, perhaps a nuclear or extended family, who engaged in collecting, tool manufacturing, and other activities (Collins 1980; Cowan 1974, 1975, 1978, 1979a, 1979b, 1997).

Several other rockshelter and open-air sites with Late Woodland components have been documented in the Gorge Section. Like Haystack Rockshelters, Rogers Shelters (15Po26 and 15Po27) are a pair of single component shelters in the Red River drainage that yielded Newtown phase assemblages. Most occupation debris, including lithics, pottery, and faunal-floral remains, obtained from the upper shelter (15Po26), while the lower shelter (15Po27) had mostly refuse. Rogers Rockshelters produced a large assemblage of EAC (e.g., sunflower, sumpweed, goosefoot, and maygrass) and cucurbit macrobotanical remains (Collins 1980; Cowan 1974, 1975, 1978, 1979a, 1979b). The assemblage of 1500 squash and gourd specimens represents "one of the largest and best-preserved populations of archaeological *Cucurbita* from the Midcontinent" (Cowan 1997:77). Cowan (1997) presented a detailed analysis of the smooth, lobed, and warty cucurbit varieties, comparing their morphology with specimens from Early Woodland sites in the Gorge Section. Both shelters were used on a seasonal basis over a span of about 250 years during the Late Woodland subperiod (Collins 1980; Cowan 1974, 1975, 1978, 1979a, 1979b), with five calibrated radiocarbon dates ranging from A.D. 433-653 to A.D. 659-937 (Table 5.32) (Turnbow 1981).

The single component Rock Bridge Rockshelter (15Wo75) is a damp shelter on Rock Bridge Fork in the North Fork of Red River drainage. The shelter is not easily accessible from below or above, perhaps explaining the relatively undisturbed nature of the site. Eighteen mostly amorphous and indistinct features were documented within the shallow deposits of the shelter. Calibrated radiocarbon dates ranging from A.D. 569-768 to A.D. 687-992 (Table 5.32) place occupations during the early-mid Late Woodland subperiod. The small number of features, absence of special activity areas except knapping loci, and the low diversity of artifacts suggest low intensity occupations involving hunting, plant collecting, and chert acquisition (Gremillion 1993a, 1996).

Newtown phase artifacts are Bakers Creek and Chesser points and Newtown Cordmarked and Newtown Plain sherds representing at least six vessels. Other tools recovered from the shelter include hammerstones, perforator, scrapers, spokeshave, knife, biface fragments, bone awls, and net or loom shuttle. The lithic production system is characterized by reliance on locally available Haney and Paoli cherts, importation of blanks and performs for on-site reduction, intentional thermal alteration of cherts, and emphasis on late stages of tool manufacture and maintenance. White-tailed deer, black bear, turkey, eastern box turtle, snapping turtle, cooter/slider turtle, mussel, hickory,

walnut, hazelnut, acorn, chestnut, purslane, blackberry or dewberry, and an unspecified legume were identified in the archaeobotanical sample. Cultigens from Rock Bridge Shelter include goosefoot and cucurbit (Applegate 1996; Gremillion 1993a, 1996).

The O'Hare Site Complex (15Mf632) consists of an open-air habitation locality and a rockshelter. Cultural features at the former include several associated with Early and Late Woodland components. A calibrated radiocarbon date of 792-414 B.C. was obtained from an Early Woodland feature (Table 5.32). The Late Woodland component was more intense and had associated calibrated radiocarbon dates ranging from A.D. 390-647 to A.D. 670-971 (Table 5.32). A Middle Woodland component is indicated by a calibrated radiocarbon date of A.D. 85-387 (Table 5.32). Excavations produced lithics and botanical remains, the latter including hickory and other nuts, blackberry, raspberry, and huckleberry (Davis and Rossen 2000). Another site in the Gorge Section with a dated Late Woodland component is 15Po160, which yielded a calibrated radiocarbon date of A.D. 778-1152 (Table 5.32) (Cecil Ison, personal communication 1990).

INTERIOR MOUNTAINS SECTION

The 139 Woodland sites documented in the Interior Mountains Section contain 163 Woodland components. Archaeological research conducted since the mid-1980s has greatly expanded our knowledge of Woodland period lifeways in this section, though much more is known about Woodland occupations in rockshelters than at open habitation sites. A greater variety of Woodland site types have been recorded in the Interior Mountains Section than in the Gorge Section (Table 5.30), and Middle Woodland components outnumber Early Woodland components in this section (Table 5.31). Significant sites with intact deposits and features are summarized in Table 5.34; all counties in the Interior Mountains section are represented except Leslie and Rockcastle. Few single component Woodland sites have been reported.

Some of the earliest Woodland sites in the Interior Mountains Section have Cogswell phase assemblages. One well-documented example is Kay Shelter (15Br118), a south-facing rockshelter overlooking Kay Fork, a tributary of North Fork of Kentucky River. Excavation of six of the 84 m^2 of usable space in this damp shelter documented intact stratified deposits and features representing multiple components, with the transitional Archaic-Woodland occupation dated to cal 1493-849 B.C. and the Middle-Late Woodland component dated to cal A.D. 539-674 (Table 5.32). Wild plant and animal remains - including hickory, walnut, deer, birds, and mussel - indicate heavy reliance on resources from upper slope and ridgetop zones, supplemented by lower slope resources, during the Woodland occupations (Fiegel et al. 1992; McGraw et al. 1991).

A Cogswell phase burial was documented at Kay Shelter, providing information about Terminal Archaic-Early Woodland crypt types, body placement, and grave goods. The burial was encountered in the back-central portion of the shelter at a depth of 30 cm below datum. The simple pit contained the flexed remains of an 18-19 year old male who had been covered with small rocks. Grave goods consisted of Cogswell and Buck Creek points and other chipped stone tools, pitted stones, shell beads, mussel shell

fragments (one with ochre staining), and unmodified deer and box turtle bones (Fiegel et al. 1992). Fiegel et al. (1992) argued that an unspecified copper object in the burial is among the earliest evidence of long-distance trade in eastern Kentucky.

Table 5.34. Important Woodland Period Sites in the Interior Mountains Section.

Site No.	Site Name	Site Type	Affiliation	References
15Br118	Kay Shelter	rockshelter	EW, MW, LW	McGraw et al. 1991; Fiegel et al. 1992
15Cy24	none	rockshelter	EW, MW, LW	Bush 1988; Bush and Thomas 1986
15Cy55	none	rockshelter	LW	Bush and Thomas 1986
15Cy56	none	rockshelter	LW	Bush and Thomas 1986
15Cy59	none	rockshelter	MW, LW	Bush and Thomas 1986
15Cy166	Little Spring Creek	open habitation	MW, LW	Boedy and Faulkner 2001
15Ja6	none	rockshelter	MW	Fryman et al. 1967a
15Ja41	Cliff Palace Cave	rockshelter	EW	Ison and Sharp 2004
15Ja59	Dark House	rockshelter	EW	Ison and Sharp 2004
15Ja355	Peter Cave Branch	rockshelter	LW	Coy et al. 1997
15Kt1	Craft	rockshelter	EW, LW	Purrington 1967
15Kt15	Carr Fork	rockshelter	MW, LW	McGraw & Ericksen 1993
15Kt72	Grouse	rockshelter	EW, MW	Creasman et al. 1995
15Lr6	none	rockshelter	MW	Fryman et al. 1967b
15Lr23	Cornett Woods	rockshelter	MW-LW	Miday 1996
15Lr60	Doty Creek	rockshelter	EW, LW	McGraw and Duffield 2002
15Ow100	Hawk View	rockshelter	unassigned	Boedy and Faulkner 2001
15Pe8	Hall Shelter	rockshelter	EW, LW	Gatus 1981
15Pe50	Enoch Fork	rockshelter	EW, MW	Bush 1988; Evans 1996
15Pe186	Gays Creek	rockshelter	LW	Bradbury 2000

Almost half of the lithics and seven of the eight nonmortuary features at Kay Shelter originated in the Middle-Late Woodland level. Diagnostic artifacts consisted of Chesser, Hamilton Incurvate, and Madison points, as well as a small number of limestone tempered sherds with unspecified surface treatment. Kay Shelter likely was a short-term seasonal (early spring and early fall) camp during the Middle-Late Woodland occupation (Fiegel et al. 1992; McGraw et al. 1991).

Two important early Early Woodland sites are among a number of rockshelters ringing the bluffline of Keener Point in Jackson County, where Cliff Palace Pond is located. Cliff Palace Cave (15Ja41) is a multicomponent site with a substantial Terminal Archaic-Early Woodland occupation. This component, which was associated with seven hearths, one postmold, and petroglyphs, yielded a calibrated radiocarbon date of 1415-1020 B.C. (Table 5.32). Dark House Shelter (15Ja59) contained intact midden deposits spanning the Woodland period. Charcoal from the base of the midden yielded a calibrated radiocarbon date of 1048-805 B.C. (Table 5.32). It was at this time that the most intensive use of the shelter began (Ison and Sharp 2004).

The Kragon site (15Br9) is located in the bottoms along North Fork of Kentucky River in Breathitt County. This multicomponent habitation site yielded a small number of Early Woodland period stemmed points and a calibrated radiocarbon determination of

1189-830 B.C. (Table 5.32). While a calibrated date of A.D. 539-674 from a large pit feature is suggestive of a Middle-Late Woodland component at this site, based on its association with Fort Ancient shell tempered ceramics and beans, McIlhany (1991:54) questioned the reliability of this date (see Chapter 7).

Located on a bench overlooking Doty Creek, Doty Creek #1 Rockshelter (15Lr60) is a multicomponent site with Early Woodland and Late Woodland components. Limited excavations documented the presence of midden and cultural features, including one feature that yielded a calibrated radiocarbon date of 766-213 B.C. (Table 5.32). A Wade projectile point recovered the midden may be associated with this component. A second feature contained limestone tempered cordmarked ceramics. Though this feature yielded a late Fort Ancient radiocarbon date (Table 5.32), the ceramics were classified as Late Woodland. Single Levanna and Madison specimens were the only other diagnostics recovered from this shelter. Wild plant species recovered from Woodland contexts are nuts (hickory, black walnut), bulrush, and fleshy fruits (raspberry or bramble). Cultigens include goosefoot and maygrass (McGraw and Duffield 2002).

Four rockshelters in the Interior Mountains Section contained substantial Early and Middle Woodland components. Situated near the head of Dykes Branch, a tributary of the North Fork of Kentucky River, Hall Shelter (15Pe8) was the focus of hunting, gathering, and tool maintenance activities throughout the Woodland period, especially between ca. 500 B.C. and A.D. 800. Adena-like, Madison, and contracting stemmed points were recovered. The diverse assemblage of Woodland pottery from this site includes sherds tentatively identified as Wright or Turner Check Stamped; Candy Creek Cordmarked, Hamilton Creek Cordmarked, Watson Cordmarked, Flint River Cordmarked, Radford Cordmarked, or Rough River Cordmarked; Watson or Adena Plain; Levissa Cordmarked; Half Moon Cordmarked; and Lee Plain. Participation in extraregional exchange networks during the Woodland period is evidenced by steatite fragments recovered from this site. This interaction probably first developed in the Late Archaic subperiod or around the Archaic-Woodland transition (Gatus 1981).

Grouse Shelter (15Kt72) in Knott County was occupied during the Early-Middle Woodland subperiods. Though disturbed, the shelter yielded lithics, pottery, and plant remains. Ceramics were tempered primarily with siltstone and had plain or check stamped exterior surfaces. One smoothed over cordmarked siltstone tempered sherd and one check stamped sherd tempered with a combination of siltstone and sandstone also were recovered from this site. Botanical remains consisted primarily of nutshell. Most of the faunal remains had been burned and could not be classified. The calibrated radiocarbon date of 766-369 B.C. (Table 5.32) obtained from the site is suggestive of an Early Woodland component, but the ceramics are more indicative of a Middle Woodland component (Creasman et al. 1995).

Located on a tributary of Big Johns Creek in the Goose Creek drainage, Site 15Cy24 is a dry, multicomponent rockshelter with Early-Middle Woodland, Middle-Late Woodland, and Late Woodland-Late Prehistoric strata. The former yielded a calibrated radiocarbon date of 510-42 B.C. and a thermoluminescence date of 150±180 B.C. (Table 5.32). Point types are stemmed and side-notched expanding stemmed forms. Most sherds are tempered with limestone, sandstone, or grit and have plain or cordmarked

exterior surfaces, though one Middle-Late Woodland check stamped sherd was recovered (Bush 1988; Bush and Thomas 1986).

Enoch Fork Shelter (15Pe50) is located on an unnamed tributary of Enoch Fork in the Kentucky River drainage (see also chapters 3 and 4). Two strata produced Woodland artifacts and features, the older of the two representing the more intense episode of occupation. The Early-Middle Woodland stratum had associated calibrated radiocarbon dates of 366 B.C.-A.D. 132 and 172 B.C.-A.D. 210 (Table 5.32) and yielded Cogswell points and sandstone tempered sherds. Poor-quality, locally available cherts were acquired as part of an embedded procurement strategy (Evans 1996). Late Woodland contexts at Enoch Fork Shelter have an associated calibrated radiocarbon date of A.D. 658-971 (Table 5.32) and yielded grit, limestone, siltstone, or sandstone tempered sherds (Bush 1988; Evans 1996).

Several other sites in this section contain Middle or Late Woodland components. For example, the Little Spring Creek site (15Cy166) is an open habitation site situated on a saddle ridge. Though the site was primarily utilized during the Early and Middle Archaic subperiods (see Chapter 4), a Middle-Late Woodland occupation at this site is associated with a thermal feature, a Chesser Notched projectile point, and siltstone tempered cordmarked ceramics (Boedy and Faulkner 2001).

Site 15Cy56 was used throughout the Woodland period based on diagnostic artifacts including an Adena Stemmed, a Snyder-like, and three small triangular points. The most intensive occupation occurred during the Late Woodland subperiod, which is associated with calibrated radiocarbon dates of A.D. 686-987 and A.D. 784-1212 (Table 5.32). In addition to subsurface features, a small assemblage of limestone tempered plain, grit tempered plain, and grit tempered "roughened" ceramics was recovered from Late Woodland contexts at this rockshelter (Bush and Thomas 1986).

Carr Fork Rockshelter (15Kt15), located in the Carr Fork drainage in southern Knott County, may have been occupied during the Middle Woodland subperiod based on the presence of siltstone tempered cordmarked ceramics and mica. Seasonal occupations from late June through January are indicated by raspberries, which can be eaten fresh from late June to September, jimson weed, which also is available from June through September, and nuts, which are available in the fall (McGraw and Ericksen 1993).

Intact late Middle to early Late Woodland deposits and features representing intensive occupations were documented at Cornett Woods Rockshelter (15Lr23), which is located along an unnamed tributary of the North Fork of Kentucky River. In addition to a single Wright Check Stamped sherd, limestone, sandstone, and siltstone tempered plain and cordmarked sherds were recovered from this site. Other artifacts include one Madison point, bifaces, unifaces, and marginally modified flakes. Flotation of fill from two features produced considerable evidence of late spring-early summer subsistence. Wild plants are hickory, walnut, butternut, grape, and sumac. One feature classified as a maygrass storage pit contained almost 2700 achenes. Other cultigens are amaranth, cucurbit, and maize. Sticky catchfly and pokeweed likely represent medicinal or nonfood items. Most of the faunal remains had been burned, and slightly more than eighty percent were classified as mammal. The remainder consisted of birds and amphibians (Miday 1996).

Excavation of 17 m^2 at Gays Creek Shelter (15Pe186) produced a small assemblage of artifacts, including a single small triangular point indicating a Late Woodland-Fort Ancient component. No midden deposits or cultural features were documented at this site. Occupations were short-term and ephemeral, and the shelter was reused repeatedly for a limited range of activities, including core reduction, tool production, expedient tool use, tool maintenance and refurbishing, and hunting (Bradbury 2000).

One of four confirmed Woodland rock art sites in Kentucky is Peter Cave Branch (15Ja355), a rockshelter that yielded Late Woodland diagnostics. On the rear wall of the shelter is a panel of petroglyphs, including two human feet, one bear track, eight bird tracks, three mink or squirrel tracks, and numerous abrading marks (Coy et al. 1997).

Excavation of Hawk View Shelter (15Ow100) in Owsley County documented the presence of intact Woodland and Archaic components (see Chapter 4). During the Woodland period the shelter was used as a temporary camp for hunting and butchering animals. Lithic production activities involved late-stage reduction and rejuvenation of expedient flake tools using low-quality, locally available cherts (Boedy and Faulkner 2001).

BIG SANDY (MANAGEMENT AREA 7)

PREVIOUS ARCHAEOLOGICAL INVESTIGATIONS

In this management area, the earliest archaeological studies focused on the earthworks clustered on the floodplain of the Ohio River south of Portsmouth, Ohio, which were mapped in the early to mid-1800s (Squier and Davis 1848). Gerard Fowke (1928) conducted excavations in this area in the 1920s. He noted discrepancies in Squier and Davis's map of the Old Fort Earthworks (15Gp1) and excavated a portion of this site, as well as the nearby Bentley site (15Gp15) and Stephenson Mound (15Lw139).

During the WPA era, excavations were carried out by the University of Kentucky at several Woodland sites in the Portsmouth area, including the Old Fort Earthworks, the Jim King Mound (15Gp7), Biggs (15Gp8), Bentley, and Mays Mound (15Gp16) (Milner and Smith 1986). The results of these investigations were not published, however, until Hardesty's (1964) article on the Biggs site, Henderson and Pollack's (1985) article on the Middle/Late Woodland component at Bentley, and Henderson et al.'s (1988) article on the Old Fort Earthworks. An influential project conducted by the University of Kentucky under the auspices of the WPA involved excavations of the C and O Mounds (15Jo2 and 15Jo9) in the Paint Creek drainage (Webb et al. 1942).

As with most areas of the state, few archaeological investigations were undertaken in this management area from the early 1940s to the mid 1960s. Since the mid 1960s, most archaeological studies were conducted prior to the development of proposed reservoirs or highway projects. The University of Kentucky conducted investigations in the Fishtrap Reservoir during the 1960s (Dunnell 1966a), and Dunnell (1972) prepared a monograph on the prehistory of the region. Work in the Paintsville Reservoir by the University of Kentucky and the University of Pittsburgh during the 1970s and 1980s produced important data on the Woodland occupations of this area, especially at sites like Dameron (15Jo23A) and Sparks (15Jo19) rockshelters (Vento et al. 1980). [Note: Although half of the Paintsville Reservoir lies within the Gorge Section of the Upper Kentucky/Licking Management Area, the entire reservoir area is covered here since it is part of the Big Sandy River drainage.]

Other cultural resource management projects contributed to the Woodland database, including excavations at Blanton (15Jo32) (Adovasio 1982), Brisbin Mound (15Bd311A) (Aument 1985; Dowell 1979a; Schock and Foster 1976), Viney Branch Mound (15Bd306) (Aument 1985), Stone Serpent Mound (15Bd316) (Brisbin 1976; Sanders 1988), Hansen (15Gp14) (Ahler 1987, 1988), Calloway (15Mt8) (Niquette 1985; Niquette and Boedy 1986), and Grayson (15Cr73) (Kerr and Niquette 1989; Ledbetter et al. 1991; Ledbetter and O'Steen 1992). Excavations at other open-air and rockshelter sites in the Little Sandy drainage near Grayson yielded Woodland materials: Site 15Cr61, Site 15Cr64 (Stallings et al. 1995), and Site 15Cr74 (Kerr and Niquette 1989). Another pair of important Woodland sites in Carter County are Carroll Shelter (15Cr57) and Site 15Cr58 (Ison and Ison 1985). Several rockshelters with Woodland period components, including Two Sandal (15Cr173) (Gremillion et al. 2000a) and Conley-Greene (15El4) (Railey

1991a), were investigated in the upstream portions of the Tygarts Creek drainage in Carter and Elliott counties.

A survey of the Yatesville Reservoir in Lawrence County documented a number of sites with Woodland components (Niquette and Donham 1985; Niquette et al. 1987). Among the most important are Dow Cook (15La4) (Niquette et al. 1987; Niquette et al. 1989; Niquette and Kerr 1989) and Graham (15La222) (Niquette et al. 1987, Niquette et al. 1989). Investigation of the Wiley Creek site (15Jo74) located to the south of Dow Cook produced considerable evidence about Middle-Late Woodland settlement and subsistence (Burdin and Pollack 2006).

Excavations conducted at Woodland sites like Prime Farmland (15Fd78) (Richmond et al. 2002) and Martin Justice (15Pi92) (Kerr et al. 1995; Kerr and Creasman 1998) are among the most significant investigations in the Upper Big Sandy Section since the Fishtrap project. In addition, the Pine Fork site (15Fd47) provided evidence of Late Woodland settlement and material culture (Edging et al. 1988; McGowan 1988).

SITE DENSITY AND DISTRIBUTION PATTERNS

The 177 Woodland sites in the Big Sandy Management Area account for 6 percent of the Woodland sites in Kentucky, the lowest percentage among the management areas. Further, the densities of sites per sq km and per acre surveyed are low for the management area, both falling below the densities for the entire Commonwealth (Table 5.1). Site types include open habitations without mounds (70.6 percent), rockshelters (16.9 percent), earth mounds (4.0 percent), and open habitations with mounds, isolated burials, stone mounds, nonmound earthworks, specialized activity areas, mound complexes, and workshops, which together account for 8.5 percent. No caves, quarries, rock art sites, cemeteries, or isolated finds are reported (Table 5.35).

Table 5.35. Woodland Site Types by Section in the Big Sandy Management Area.

Site Type	Lower Big Sandy	Upper Big Sandy	Total	Percent
Open Hab w/o Mounds	98	27	125	70.6
Open Hab w/ Mounds	3	1	4	2.3
Rockshelter	28	2	30	16.9
Stone Mound	2	0	2	1.1
Earth Mound	7	0	7	4.0
Mound Complex	1	0	1	0.6
Enclosure	2	0	2	1.1
Isolated Burial	2	1	3	1.7
Workshop	1	0	1	0.6
Specialized Activity Site	1	1	2	1.1
Total	145	32	177	100.0
Percent	81.9	18.1	100.0	

Woodland occupations in the Lower Big Sandy Section are better documented than those in the Upper Big Sandy Section, a pattern best explained by the small size of the latter section (only two counties), its extremely rugged terrain, and the smaller number of large-scale archaeological investigations. There are more than four times as many Woodland sites in the Lower Big Sandy Section (n=145, 82 percent) as in the Upper Big Sandy Section (n=32, 18 percent). In addition, a wider range of site types is recorded for the Lower Big Sandy Section. While all 11 site types documented for this management area have been recorded in the Lower Big Sandy Section, only six site types have been recorded in the Upper Big Sandy Section (Table 5.35). Because of geological factors, nearly all of the Woodland rockshelters recorded in this management area are located in the Lower Big Sandy Section. Mound sites (stone mounds, earth mounds, mound complexes, earthworks, and open habitation with mounds) are almost wholly restricted to the Lower Big Sandy Section.

The 236 Woodland components at sites in the Big Sandy Management Area account for 6 percent of the Woodland components in Kentucky (Table 5.2). About 45 percent of the Big Sandy components are unassigned. Nearly equal percentages of Early Woodland (21 percent) and Middle Woodland (19.5 percent) components are recorded. About 14.5 percent of the components are Late Woodland (Table 5.36), the third largest percentage of Late Woodland components among the management areas (Table 5.2).

Table 5.36. Woodland Site Components by Section and Subperiod in the Big Sandy Management Area.

Subperiod	Lower Big Sandy		Upper Big Sandy		Total	
Late Woodland	5	3.0%	29	42.6%	34	14.4%
Middle Woodland	37	22.0%	9	13.2%	46	19.5%
Early Woodland	35	20.8%	15	22.1%	50	21.2%
Unassigned	91	54.2%	15	22.1%	106	44.9%
Total	168	71.2%	68	28.8%	236	100.0%

Over 71 percent (n=168) of all Woodland components in this management area are recorded for sites in the Lower Big Sandy Section, with almost 29 percent (n=68) in the Upper Big Sandy Section. There are differences between the two sections in the distribution of Woodland components. The percentage of unassigned Woodland sites in the Lower Big Sandy is over twice that in the Upper Big Sandy, while the percentage of Late Woodland components in the Upper Big Sandy is over 14 times that in the Lower Big Sandy. In fact, the high percentage of Late Woodland components in the Upper Big Sandy Section is noteworthy for the entire Commonwealth. The Lower Big Sandy has a larger percentage of Middle Woodland components, while the percentages of Early Woodland components is comparable for the two sections (Table 5.36).

CHRONOMETRIC DETERMINATIONS

Chronometric determinations for the Big Sandy Management Area are provided in Table 5.37. As with the history of archaeological research in this area, the vast majority

Table 5.37. Chronometric Dates for the Big Sandy Management Area.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Lower Big Sandy Section			
Viney Branch Mound (15Bd306)			
Beta-10316	2470±125	890-880, 844-354, 291-231, 216-215 BC	Schock and Foster 1976
UGa-869	2310±165	798-36, 32-20, 12-1 BC	Aument 1985
Beta-10314	2055±110	383 BC-AD 138, 197-207	Schock and Foster 1976
Site 15Bd313			
UGa-870	1285±150	AD 433-495, 503-1026	Schock and Foster 1976
Carroll Shelter (15Cr57)			
Beta-4317	1390±60	AD 546-724, 739-771	Ison and Ison 1985
Site 15Cr61 (see Chapter 4:Table 4.31)			
Beta-64040	2450±80	775-400 BC	Stallings et al. 1995
Beta-64039	2410±60	756-684, 669-394 BC	Stallings et al. 1995
Site 15Cr64			
Beta-47039	2370±50	750-686, 667-640, 594-365 BC	Stallings et al. 1995
Grayson (15Cr73) (see Chapter 4:Table 4.31)			
UGa-6122D	2872±392	2032-92, 68-61 BC	Ledbetter and O'Steen 1992
UGa-6098D	2781±67	1114-1097, 1094-810 BC	Ledbetter and O'Steen 1992
UGa-6097D	2702±260	1494-348, 318-207 BC	Ledbetter and O'Steen 1992
UGa-6130	2412±124	805-345, 322-205 BC	Ledbetter and O'Steen 1992
UGA-6124*	1221±91	AD 656-986	Ledbetter and O'Steen 1992
UGA-6078*	1220±48	AD 675-896, 924-938	Ledbetter and O'Steen 1992
UGA-6053D*	1136±108	AD 663-1049, 1085-1123, 1137-1151	Ledbetter and O'Steen 1992
UGA-6052*	1112±48	AD 782-789, 809-1018	Ledbetter and O'Steen 1992
UGA-6051D*	1040±120	AD 695-698, 708-747, 765-1223	Ledbetter and O'Steen 1992
Two Sandal Shelter (15Cr173)			
Beta-91918	2580±60	893-875, 846-512 BC	Gremillion et al. 2000a
Conley-Greene Rockshelter (15El4)			
Beta-28608	2760±60	1048-805 BC	Railey 1991a
Beta-28609	2380±60	765-684, 669-373 BC	Railey 1991a
Beta-28610	2370±60	756-684, 669-360, 274-260 BC	Railey 1991a
Beta-28611	2280±60	505-493, 490-460, 452-440, 418-176 BC	Railey 1991a
Hansen (15Gp14) (see Chapter 4:Table 4.31)			
Beta-14577	2750±70	1110-1103, 1076-1065, 1056-796 BC	Ahler 1987, 1988, 1992
Beta-14576	2710±60	997-795 BC	Ahler 1987, 1988, 1992
Beta-15085	2460±70	769-406 BC	Ahler 1987, 1988, 1992
Beta-15511	1770±90	AD 35, 53-436, 489-510, 517-529	Ahler 1987, 1988, 1992
Beta-15082	1630±90	AD 222-618	Ahler 1987, 1988, 1992
Beta-15510	1630±100	AD 177-189, 213-638	Ahler 1987, 1988, 1992
Beta-14573	1520±60	AD 423-642	Ahler 1987, 1988, 1992
Beta-15084	1510±70	AD 416-652	Ahler 1987, 1988, 1992
Beta-15509	1410±90	AD 424-781, 791-807	Ahler 1987, 1988, 1992
Beta-15512	1400±70	AD 442-452, 461-483, 533-776	Ahler 1987, 1988, 1992
Beta-14575	1360±70	AD 548-783, 788-817, 843-859	Ahler 1987, 1988, 1992
Bentley (15Gp15)			
Univ Missouri	3500±320	1550±320 BC (TL date)	Henderson and Pollack 1985
Univ Missouri	3280±300	1330±300 BC (TL date)	Henderson and Pollack 1985
Univ Missouri	3190±320	1240±320 BC (TL date)	Henderson and Pollack 1985
Univ Missouri	3180±200	1230±200 BC (TL date)	Henderson and Pollack 1985
Univ Missouri	2800±190	850±190 BC (TL date)	Henderson and Pollack 1985

Table 5.37. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Univ Missouri	2480±160	530±160 BC (TL date)	Henderson and Pollack 1985
Univ Missouri	2250±160	300±160 BC (TL date)	Henderson and Pollack 1985
Univ Missouri	1965±160	15±190 BC (TL date)	Henderson and Pollack 1985
Univ Missouri	1790±170	AD 160±170 (TL date)	Henderson and Pollack 1985
Univ Missouri	1800±150	AD 190±150 (TL date)	Henderson and Pollack 1985
Beta-11850	1380±60	AD 560-730, 735-772	Henderson and Pollack 1985
Univ Missouri	1350±125	AD 600±125 (TL date)	Henderson and Pollack 1985
Univ Missouri	1225±170	AD 725±170 (TL date)	Henderson and Pollack 1985
Univ Missouri	1220±160	AD 730±160 (TL date)	Henderson and Pollack 1985
Sparks Rockshelter (15Jo19)			
SI-3167	2810±70	1192-1176, 1163-1143, 1132-814 BC	Adovasio 1982; Fitzgibbons et al. 1977
Win Rockshelter (15Jo40)			
DIC-1343	2440±210	1022-18, 14-0 BC	Adovasio 1982
DIC-1342	2290±50	482-467, 415-200 BC	Adovasio 1982
DIC-1340	1160±95	AD 668-1024	Adovasio 1982
McKenzie Farmstead (15Jo67)			
Beta-71510	2380±70	766-677, 675-359, 275-259 BC	McBride 1994
Beta-71513	2000±60	166 BC-AD 93, 97-125	McBride 1994
Beta-71512	1770±70	AD 85-109, 117-413	McBride 1994
Beta-71511	1750±70	AD 87-104, 121-428	McBride 1994
Wiley Creek (15Jo74)			
Beta-200565	1790±60	AD 85-109, 117-387	Burdin and Pollack 2006:118
Beta-200562	1460 ±70	AD 430-670	Burdin and Pollack 2006:118
Dow Cook (15La4)			
Pitt-233	1420±80	AD 433-496, 503-727, 737-771	Niquette and Kerr 1989
Pitt-234	1302±45	AD 647-783, 788-815, 843-858	Niquette and Kerr 1989
Blankenship Rockshelter II (15La31)			
UGa-1326	1985±80	185 BC-AD 215	Fenwick 1976
Blankenship Rockshelter III (15La45)			
UGa-1325	2285±245	915 BC-AD 237	Fenwick 1976
Graham (15La222)			
Beta-3095	2620±60	913-732, 691-661, 650-545 BC	Niquette et al. 1989
Beta-28861	2190±80	395-51 BC	Niquette et al. 1989
Beta-28862	2070±50	338-330, 203 BC-AD 30, 37-51	Niquette et al. 1989
Big Mine Fork (15Mo5)			
DIC-1345	2430±340	1388 BC-AD 244	Adovasio 1982
Burchett Flats (15Mo10)			
DIC-1348	2350±50	746-688, 664-646, 587-583, 553-354, 290-231 BC	Adovasio 1982
Ray Hill (15Mo28)			
DIC-3197	2600±230	1371-1344, 1317-193 BC	Adovasio 1982
Alonzo Rice (15Mo38)			
DIC-1344	2930±110	1413-895, 869-854 BC	Adovasio 1982
C. K. Stacy Rockshelter (15Mo40)			
DIC-1340	1940±80	162-131, 118 BC-AD 244	Adovasio 1982
DIC-1339	1660±50	AD 256-304, 313-472, 476-534	Adovasio 1982

Table 5.37. Continued.

Lab No.	Age (B.P.)	Calibrated Date (2-sigma)	References
Calloway (15Mt8)			
Beta-13737	2280±120	755-685, 668-608, 600-50 BC	Niquette and Boedy 1986
Alpha-2633	2260±120	310±120 BC (TL date)	Niquette and Boedy 1986
Alpha-2632	2080±210	130±210 BC (TL date)	Niquette and Boedy 1986
Beta-16315	1970±90	198 BC-AD 240	Niquette and Boedy 1986
Beta-16316	1880±70	39-8, 4 BC-AD 259, 284-323	Niquette and Boedy 1986
Alpha-2343	1040±100	AD 910±100 (TL date)	Niquette and Boedy 1986
Upper Big Sandy Section			
Prime Farmland (15Fd78)			
Beta-164563	2570±40	813-735, 690-662, 649-546 BC	Richmond et al. 2002
Beta-164562	2520±90	808-407 BC	Richmond et al. 2002
Sim's Creek (15Pi7)			
I-1781	1530±135	AD 183-185, 214-776	Dunnell 1966b, 1972
Martin Justice (15Pi92) (see Chapter 4:Table 4.31)			
Beta-79599	2590±110	907-961, 932-405 BC	Kerr et al. 1995
Beta-79597	2250±60	405-171 BC	Kerr et al. 1995
Beta-80889	1870±70	37-30, 22-11, 2 BC-AD 263, 277-331	Kerr et al. 1995

of chronometric determinations derive from sites in the Lower Big Sandy Section. This large set of dates span the Woodland period, with the fewest dates corresponding to the terminal Late Woodland subperiod. Absolute dates are available for only three Woodland sites in the Upper Big Sandy Section.

LOWER BIG SANDY SECTION

Considerable archaeological research has been conducted in the Lower Big Sandy Section, where 168 Woodland components have been recorded at 145 sites. The vast majority of Woodland sites in the section are rockshelters and open habitations without mounds. All Woodland subperiods are represented, though few sites have terminal Late Woodland components (tables 5.36 and 5.37). Sites with substantial Woodland occupations are documented in all counties within this section (Table 5.38). These sites represent a mixture of open-air habitations and rockshelters, domestic and mortuary/ritual sites, and trunk and tributary stream sites.

Sites with Cogswell phase assemblages are among the earliest Woodland sites in the Lower Big Sandy Section. One well-documented example is Grayson (15Cr73), an elliptical multicomponent site covering two terrace crests along the Little Sandy River. Terminal Archaic-Early Woodland diagnostics include Cogswell, Wade, Little Bear Creek, Buck Creek, and McIntyre projectile points. A series of calibrated radiocarbon dates for this component range from 1606-1304 B.C. to 805-205 B.C. (Table 5.37; Chapter 4:Table 4.41) (Ledbetter and O'Steen 1992; Ledbetter et al. 1991).

Almost two-thirds of the plant remains associated with the aceramic Early Woodland component at Grayson were nut shells, especially hickory, and over one-third was wood charcoal from mixed mesophytic tree species. Only 0.1 percent of the plant

Table 5.38. Important Woodland Period Sites in the Lower Big Sandy Section.

Site No.	Site Name	Site Type	Affiliation	References
15Bd306	Viney Branch	stone mound	EW	Aument 1985
15Bd311A	Brisbin	stone mound	MW	Aument 1985
15Bd313	none	mound	MW-LW	Schock and Foster 1976
15Bd316	Stone Serpent	stone effigy	MW	Brisbin 1976; Sanders 1988; Schock and Foster 1976
15Cr57	Carroll	rockshelter	MW, LW	Ison and Ison 1985
15Cr58	none	specialized activity	MW	Ison and Ison 1985
15Cr61	none	open habitation	EW	Stallings et al. 1995
15Cr64	none	open habitation	EW, MW, LW	Stallings et al. 1995
15Cr73	Grayson	open habitation	EW, LW	Ledbetter et al. 1991; Ledbetter and O'Steen 1992
15Cr74	none	open habitation	LW	Kerr and Niquette 1989
15Cr173	Two Sandal	rockshelter	EW	Gremillion et al. 2000
15El4	Conley-Greene	rockshelter	EW	Railey 1985e, 1991a
15Gp1	Old Fort	enclosure	MW	Henderson et al. 1988
15Gp8	Biggs	enclosure and mound	MW	Hardesty 1964
15Gp14	Hansen	open habitation	MW, LW	Ahler 1987, 1988
15Gp15	Bentley	open habitation	MW, LW	Henderson and Pollack 1985
15Gp16	Mays	mound	MW	Henderson et al. 1988; Milner and Smith 1986
15Gp265	Hicks	mound	MW	Henderson et al. 1988
15Jo2, 9	C and O	mound complex	EW-MW	Webb et al. 1942
15Jo19	Sparks	rockshelter	EW	Adovasio 1982; Vento et al. 1980
15Jo23A	Dameron	rockshelter	EW, MW, LW	Adovasio 1982; Vento et al. 1980
15Jo32	Blanton	open habitation	EW, MW, LW	Adovasio 1982
15Jo40	Win	rockshelter	EW, MW, LW	Adovasio 1982
15Jo42	Ruie Pickle	rockshelter	EW-MW	Adovasio 1982
15Jo67	McKenzie Farmstead	open habitation	EW, MW	McBride 1994
15Jo74	Wiley Creek	open habitation	MW-LW	Burdin and Pollack 2006
15La4	Dow Cook	open habitation	EW, MW, LW	Niquette et al. 1987, 1989; Niquette and Kerr 1989
15La31, 45	Blankenship II, III	rockshelters	EW, MW	Fenwick 1976
15La222	Graham	open habitation	EW, MW	Niquette et al. 1987, 1989
15Lw139*	Stephenson	mound	MW	Henderson et al. 1988
15Mo5**	Big Mine Fork	rockshelter	EW	Adovasio 1982
15Mo10**	Burchett Flats	open habitation	EW	Adovasio 1982
15Mo13**	Patoker	open habitation	EW	Adovasio 1982
15Mo28**	Ray Hill	open habitation	EW	Adovasio 1982
15Mo38**	Alonzo Rice	rockshelter	EW	Adovasio 1982
15Mo40**	C. K. Stacy	rockshelter	MW	Adovasio 1982
15Mt8	Calloway	open habitation	MW	Niquette and Boedy 1986

*This site is located in the Eastern Bluegrass Section but is associated with other sites of the Portsmouth Earthworks.

** These sites are located in the Gorge Section but are associated with other sites in the Paintsville Reservoir.

specimens were wild seeds, and no cultigens were recovered. Terminal Archaic-Early Woodland features (chert-filled cache pits, thermal features, and postmolds) were situated on the western ridge of the site. One circular structure measured 10 m in diameter and may have been open to the southeast, or the postmold features were eroded away. There were no internal postmolds and no other features inside the structure, though pit features outside the structure may be associated (Ledbetter and O'Steen 1992; Ledbetter et al. 1991; see also Chapter 4). Ledbetter and O'Steen (1992:20, 41) classified the Terminal Archaic-Early Woodland occupation at Grayson as a "residential site or settlement" and a "seasonal base camp," using Winter's (1969) nonsynonymous terms.

Another Early Woodland site is Dameron Rockshelter (15Jo23A), a south-facing shelter overlooking Paint Creek (see also chapters 4 and 7). Two Woodland strata and eight thermal features were concentrated in the western portion and along the back wall of the dry shelter. During the Woodland period, when occupations were most intense, Dameron Rockshelter functioned as a locale from which hunting, collecting, and food processing activities were scheduled. Cotaco Creek, Adena Stemmed, and Turkey Tail points indicate an Early Woodland component. The pottery assemblage may include some of the earliest sherds in the Paint Creek drainage (Johnson in Vento et al. 1980; Vento et al. 1980).

Chipped stone preforms, biface fragments, drills, unifaces, modified and utilized flakes, and debitage including cores were recovered from Woodland contexts at Dameron Rockshelter. Groundstone tools include pitted stones, manos, hammerstones, chopper, and a modified fossil fragment possibly from a smoking pipe. Bone shuttles or punches, needles, atlatl hooks, projectile points, snare trigger, beamer, bead, and turtle carapace container, as well as one perforated mussel shell fragment, were recovered. Faunal remains consisted of deer, fox squirrel, gray squirrel, ground hog, eastern chipmunk, raccoon, beaver, opossum, striped skunk, fisher, porcupine, rabbit/hare, timber wolf, turkey, grouse, box turtle, musk turtle, hellbender, bullfrog, gar, and five species of mussel. Plant remains were exclusively wild species: walnut, hickory, beech, acorn, cherry, grape, black haw, buckwheat, and goosefoot. Plant exploitation patterns suggest primary site use during late summer-fall and secondary site use during the spring and possibly summer (Applegarth in Vento et al. 1980; Dirkmaat 1980; Vento et al. 1980).

The nearby Sparks Rockshelter (15Jo19), which is on the opposite bank and upstream from the roughly contemporaneous Dameron Rockshelter, was used sporadically during the Woodland period. A calibrated date of 1192-814 B.C. (Table 5.37) was obtained from this north-facing shelter. Diagnostic artifacts include a sandstone tempered sherd and a steatite vessel fragment (Applegarth in Vento et al. 1980; Fitzgibbons et al. 1977; Niquette and Henderson 1984; O'Steen et al. 1991; Vento et al. 1980). If the sherd is associated with the calibrated radiocarbon date, it is among the earliest pottery in the Lower Big Sandy Section. An assemblage of over 900 macrobotanical specimens was recovered from Sparks Rockshelter. The primary edible plants are beech, hickory, acorn, dogwood, and *Aesculus sp*., the latter absent at Dameron Rockshelter. Also unlike Dameron, walnut and cherry constitute a small percentage of the Sparks assemblage and black haw is absent. Sparks Rockshelter yielded ragweed and cucurbits from unspecified Woodland contexts (Applegarth in Vento et al. 1980).

Several other sites in the Paintsville Reservoir area yielded Early Woodland materials. The Alonzo Rice site (15Mo38) is an open habitation that produced a collared

Adena Plain sherd from a stratum with a calibrated radiocarbon date of 1413-854 B.C. (Table 5.37), a date Adovasio (1982) considered to be too early for this ceramic type. A calibrated radiocarbon date of 1371-193 B.C. (Table 5.37) was obtained for materials from the Ray Hill site (15Mo28). At the Win Rockshelter (15Jo40), charcoal samples, which were taken from deposits containing Early Woodland ceramics, yielded calibrated radiocarbon dates of 1022-0 B.C. and 482-200 B.C. (Table 5.37) (Adovasio 1982; Johnson 1982). The Big Mine Fork site (15Mo5) is an open habitation site with a calibrated radiocarbon date of 1388 B.C.-A.D. 244 (Table 5.37). Though no diagnostic artifacts were found at the Burchett Flats site (15Mo10), a calibrated radiocarbon date of 746-231 B.C. (Table 5.37) was obtained from a thermal feature at this open habitation site. Limited excavations at the Patoker site (15Mo13) documented midden and features, including a storage/refuse pit, two fire hearths, several postmolds, and a portion of an occupation/living floor. The site was identified as one of the few possible Early Woodland base camps (cf., Binford 1980) within the Paintsville Reservoir. Diagnostic artifacts include an Adena Stemmed point and sandstone tempered ceramics (Adovasio 1982).

Site 15Cr61 is a multicomponent open habitation with midden and features. The Early Woodland occupation, dated at cal 775-400 B.C. and cal 756-394 B.C. (Table 5.37), was less intense than earlier Archaic period occupations (see Chapter 4). Though a wide range of activities, including tool manufacture and food processing, are evidenced, occupations were infrequent and of short duration. Site occupants transported partially modified raw materials to the site, where late-stage and finished bifaces were produced. Multiple stages of biface reduction and biface curation are evidenced. Microwear analysis reveals that curated and expedient chipped stone tools were used for hide processing mostly, but also meat, bone, and wood working. Untyped sherds recovered from feature contexts are among the oldest ceramics in the Lower Big Sandy Section (Stallings et al. 1995).

Conley-Greene Rockshelter (15El4) is a complexly stratified shelter with damp sediments. Excavations revealed a thin midden composed primarily of wood ash, as well as seven features identified as earth ovens, basin-shaped pits, and possible postmolds. A calibrated radiocarbon date of 1048-805 B.C. places initial site occupation in the early Early Woodland subperiod, but three other calibrated dates overlap between 765-176 B.C. (Table 5.37). Associated diagnostic artifacts from dated late Early Woodland contexts include Adena points and Adena Plain and Fayette Thick-like sherds. Other artifact types are pitted stones, grooved abraders, celt, bone awls, bone pin, worked antler, and turtle carapace bowl. A high density of debitage made of locally available materials including silicified shale is representative of all stages of reduction, though early-stage debitage indicative of biface production and maintenance predominated. Vertebrate faunal remains, some of which were burned, are large mammals, small mammals, birds, reptiles, amphibians, and fish. Carbonized plant remains are predominantly wild species, especially nuts and fleshy fruit seeds, and gourd is the only cultigen. The shelter likely served as a home base (cf., Binford 1980) for a small group of people who engaged primarily in chipped stone tool manufacture and maintenance, as well as food acquisition and processing (Railey 1991a).

Two Sandal Shelter (15Cr173) is a dry rockshelter with deposits measuring up to 1 m thick. The Early Woodland occupation has an associated calibrated radiocarbon date of 893-512 B.C. (Table 5.37). Diagnostic artifacts are Adena points and limestone and

sandstone tempered pottery. Textiles from the shelter include a nearly complete but worn sandal from subsurface contexts, a coarse fiber textile fragment, and plant material around an Adena point. The slipper was found to be similar in construction and fiber type to slippers from other eastern Kentucky sites and western Kentucky caves (Gremillion et al. 2000a).

One of three important Woodland stone constructions in Boyd County, Viney Branch Mound (15Bd306) is a 4.0 x 2.5 x 0.5 m stone mound located on a ridgetop in the Big Sandy drainage. Calibrated radiocarbon dates of 890-215 B.C. and 798-1 B.C. (Table 5.37) place the mound in the Early Woodland subperiod, though the order of the two dates does not correlate with the relative stratigraphic positions of the dated materials. A third calibrated radiocarbon date of 383 B.C.-A.D. 207 (Table 5.37) suggests an early Middle Woodland affiliation. The mound was constructed in one episode, which involved clearing surface vegetation, creating a hearth, depositing clay over the hearth, placing two secondary cremains (one in a pit feature) and one crematory facility on either side of the hearth, placing projectile points (Big Sandy base and unspecified corner-notched type) on each individual, and covering the burials with limestone and sandstone (Aument 1985, 1986; Schock and Foster 1976).

Early-Middle Woodland sites in the Lower Big Sandy Section include several burial mounds and open habitations, though associations between the two types are uncertain. C and O Mounds (15Jo2 and 15Jo9) are a pair of Adena burial mounds on Paint Creek in the Levisa Fork drainage. Due to the lack of absolute dates, their temporal affiliations are unclear. Dragoo (1963) assigned the mounds to Late Adena, circa 400-0 B.C. Purrington (1972), on the other hand, suggested that the mounds are not contemporaneous, with the smaller Jo2 being earlier than the larger Jo9. Johnson (1982) questioned the ceramic basis of Purrington's argument and concurred with Dragoo that both mounds are Late Adena mortuary facilities. Projectile points pictured in the original site report (Webb et al. 1942) suggest that the mounds were at least partly contemporaneous, as indicated by the common occurrence of specimens resembling Early Woodland Stemmed cluster and Lowe cluster forms. Mound Jo2 also yielded points resembling Dickson cluster and Copena Triangular.

Mound Jo2 was erected in one episode and covered at least six circular, paired-post superimposed structures and other features. One female adult and four subadults were interred in extended positions in three mortuary features under the mound. Grave goods included 17 copper bracelets and one projectile point. The mound fill yielded a large assemblage of Johnson Plain, Adena Plain, Montgomery Incised, and net or fabric impressed pottery sherds; copper bracelets, bead, and ring; groundstone gorgets, unengraved tablets, cones/hemispheres, celts, cupstone/pitted stone, tubular pipe, lead/galena plate, and steatite pendant, cylinders, and vessel fragments; mica fragments; bone awls and handle; and a shell spoon (Haag 1942; Webb et al. 1942).

The larger mound Jo9 was constructed in three stages over a series of central log tombs. Four circular submound structures, graves, and thermal features were found under the mound. Twenty-five numbered burials plus a un-numbered log tomb were recorded. The extended and cremated remains of at least 27 adults and subadults were recovered from the mortuary features and submound floor. Grave goods were recovered from 10 burial contexts and included points resembling Robbins, Early Woodland Stemmed cluster, and Lowe cluster forms; chipped stone knife; groundstone grooved

tablet, unengraved tablets, and slate object; Adena Plain and Johnson Plain pottery; copper bracelets with textile fragments; bone awl, beads, and raccoon baculum; and worked shell. Archaeologists recovered mica fragments from a burned area under the primary flat-topped mound. The mound fill yielded Johnson Plain, Adena Plain, Montgomery Incised, and plain appliqué strip and check-stamped sherds; clay beads; and groundstone gorgets, hammerstones, celt, plummet, pitted stone, tubular pipe, and unengraved tablets. Sherds of tetrapodal Paintsville Simple Stamped pottery recovered from the mound (Webb et al. 1942) have since been reclassified as Connestee Simple Stamped (Fenton and Jefferies 1991).

Early-Middle Woodland open habitation sites in the Lower Big Sandy Section include Graham, McKenzie Farmstead, Calloway, and Blanton. Located in the Yatesville Reservoir area, Graham (15La222) is a stratified multi-component habitation site. Calibrated Woodland radiocarbon dates range from 913-545 B.C. to 338 B.C.-A.D. 51 (Table 5.37). The Early-Middle Woodland component, classified as "Adena" and associated with midden deposits and cultural features (e.g., storage pits and thermal features), was more substantial than the Late Woodland component. During the earlier occupation Graham was used frequently on a short-term basis, probably by multiple groups of people. Domestic activities included chipped stone tool manufacture, nut gathering and processing, and gardening. Researchers characterized the Middle Woodland occupation as a transient camp. Graham is the type site for Graham Roughened and Johnson Plain, *var. Yatesville*, dated ca. 100 B.C. Middle Woodland features yielded potential cultigens (sumpweed and squash) that, coupled with wild nuts, may have been eaten as a "trail mix" (Niquette et al. 1987; Niquette et al. 1989).

Intact deposits and features associated with prehistoric components at the McKenzie Farmstead site (15Jo67) represent substantial occupations, perhaps a hamlet or village. The Early-Late Woodland chipped stone assemblage and botanical remains, however, point to a limited range of activities being undertaken at this site. One of the four calibrated radiocarbon dates reflects Early Woodland (766-259 B.C.) use of this locality, while the other three dates indicate occupations during the Middle Woodland subperiod (166 B.C.-A.D. 125, A.D. 85-413, and A.D. 87-428) (Table 5.37). The latter dates are consistent with the ceramic assemblage, which is dominated by Johnson Plain sandstone tempered ceramics (McBride 1994).

The Calloway site (15Mt8) is located on a low terrace of Middle Fork Rockcastle Creek within the maturely dissected Cumberland Plateau of Martin County. Diagnostic artifacts, including Adena Stemmed-like points and Inez Plain and Johnson Plain sherds, as well as calibrated radiocarbon dates ranging from 755-50 B.C. to 39 B.C.-A.D. 323 (Table 5.37) place site occupations in the Early and Middle Woodland subperiods. A high frequency of tertiary flakes indicates that tool sharpening was an important activity. A low density of wild and cultivated plants was recovered from Early-Middle Woodland contexts: hickory, walnut, hazelnut, acorn, possibly chestnut, grape, persimmon, honey locust, caryophyllaceae grasses, possibly tick trefoil, goosefoot, maygrass, erect knotweed, and little barley. The nonoverlapping distribution and low diversity of hearth and pit features, the preservation of plant remains to the exclusion of faunal material, and the nature of the lithic assemblage suggest that the site functioned as a low intensity, short-term vegetable food extraction camp (Fritz 1986; Niquette and Boedy 1986).

Located in Johnson County, Blanton (15Jo32) is an open habitation that covering 1 ha. Large-scale excavations have not been conducted at this site, so little is known about intrasite patterning. However, the artifact assemblage includes exotic materials and objects (e.g., mica and imported pottery including Connestee) indicative of interregional exchange during the Middle Woodland occupation (Adovasio 1982). Apparent intermediaries, the site residents appear to have been directly involved in the transport of mica from the southern Appalachians to Ohio Hopewell centers (Railey 1990).

Another Early-Middle Woodland open-air domestic site is Site 15Cr64, which yielded a calibrated radiocarbon date of 750-365 B.C. (Table 5.37) (Stallings et al. 1995). Blankenship Rockshelters II (15La31) and III (15La45) in Lawrence County yielded calibrated Early-Middle Woodland radiocarbon dates of 185 B.C.-A.D. 215 and 915 B.C.-A.D. 237 (Table 5.37), respectively (Fenwick 1976). Two Paintsville Reservoir sites provide evidence of Middle Woodland domestic rockshelter occupations. Calibrated radiocarbon dates for C. K. Stacy Rockshelter (15Mo40) are 162 B.C.- A.D. 244 and A.D. 256-534 (Table 5.37). Diagnostic artifacts from the Ruie Pickle Rockshelter (15Jo42) include one cordmarked and linear-dentate-stamped sherd (Adovasio 1982; Johnson 1982).

Middle Woodland mortuary-ritual sites include Brisbin Mound (15Bd311A), situated on ridge in the Big Sandy floodplain near the confluence with Lockwood Creek. Diagnostic artifacts, such as bladelets and Adena and Bakers Creek points, suggest use during the Middle Woodland subperiod, and possibly before or after. The site consisted of two mortuary features, the contemporaneity of which is suggested by the presence of Paoli and/or Vanport bladelets in each. The largest feature was a pit dug into a natural mound-like knoll and lined and capped with limestone slabs. It contained an artifact cache of points, bladelets, pendant, whetstone, and copper awl fragment; two concentrations of cremated remains with a clay pipe, ceramics, turtle carapace fragments, chert flakes, and polished hematite; and possibly an extended burial. About 1 m south of the rock-lined pit was a cache of bladelets and other chipped stone items (Aument 1985; Dowell 1979b; Schock and Foster 1976).

Another presumed Middle Woodland stone construction in Boyd County is Stone Serpent Mound (15Bd316), a zoomorphic effigy located on the hillside and ridge top of the Ashland Oil property near Catlettsburg (Brisbin 1976; Sanders 1988). This snake effigy, which measures 191 m long, was constructed of portable (i.e., not quarried) sandstone and no earth. A stone ring was situated to the east of the snake. The function of the site is unclear, but it was not a mortuary site. Nearby, but not necessarily associated, sites are a stone quarry (15Bd19), an earth mound with lithic scatter (15Bd70), two rockshelters, one camp site, and two rock cairns, the latter lacking state site numbers (Sanders 1988).

At the northwestern edge of the Lower Big Sandy Section, the Middle Woodland Portsmouth Works is an extensive complex of earthworks at the confluence of the Scioto and Ohio rivers in northern Kentucky (Greenup-Lewis counties) and southern Ohio. Group A, located on an uneven third terrace of the Ohio River floodplain, is the westernmost portion of the Portsmouth Works. Group A elements are Old Fort Earthworks (15Gp8), Mays Mound (15Gp16), Hicks Mound (15Gp265), Stephenson Mound (15Lw139, Eastern Bluegrass Section), and unnamed mounds and enclosures. To the east of Group A are Groups B and C. Circles, walls, and mounds comprise Group B on the north side of the Ohio River in Portsmouth. To the East of Group A is Group C,

which consists of Biggs Mound (15Gp8) and a surrounding embankment and ditch. West of Biggs Mound is Group D, a large circular enclosure with four gateways. Parallel earthen walls connect Groups A and B and Groups B and D. Many of the mounds in the Portsmouth Works, including Stephenson Mound and Hicks Mound, have not been professionally investigated (Henderson et al. 1988).

Biggs Mound and Old Fort Earthworks are the best-documented elements of the Portsmouth Works south of the Ohio River. The former, an early Middle Woodland ceremonial facility, consists of a mound enclosed by a circular ditched earthwork. According to Clay (1987), the earthen embankment with interior ditch predated construction of the small central burial mound. Hardesty's (1964) excavation of the mound revealed a central cremation placed on a clay platform and an associated fire basin. Material remains include hematite- and/or quartz tempered pottery, a tubular smoking pipe of unspecified material, four celts, and one fragment of mica (Hardesty 1964).

Old Fort Earthworks consists of two pairs of roughly parallel earthen walls extending from the northeast and southwest walls of a square enclosure. Midden deposits, features, and artifacts were documented primarily from underneath or to the exterior of the enclosure walls, suggesting the interior was maintained during site occupations. The site was used for ceremonial and/or economic activities during the early Middle Woodland subperiod, ca. A.D. 0-200. Adena traits include Adena Plain pottery, two limestone tempered smoothed pottery vessels, and two boatstones. Whether the Adena materials predate or were concurrent with enclosure construction is unclear (Henderson et al. 1988). Though few Hopewell diagnostics were found, the square enclosure resembles similar sites in southern Ohio and was "undoubtedly associated with Hopewell" (Henderson et al. 1988:79).

Located on a terrace of the Ohio River floodplain, Bentley (15Gp15) is associated with Group A of the Portsmouth Earthworks. A radiocarbon date of cal A.D. 560-772 was obtained from a feature excavated in 1984, and 13 thermoluminescence determinations for Woodland ceramics from features (10 on sherds recovered in 1938 and three on sherds recovered in 1984) yielded dates ranging from 1550±320 B.C. to A.D. 730±160 (Table 5.37). The wide range of thermoluminescence dates obtained from this site, coupled with the fact that sherds selected from a feature could range from 1230±200 B.C. to A.D. 725±170, raises doubts about the reliability of these dates (Henderson and Pollack 1985). Of the thermoluminescence dates obtained from this site, Henderson and Pollack (1985:153-155) only considered the dates of A.D. 600±160, A.D. 725±170, and A.D. 730±160 to be acceptable, with the dates of A.D. 160±170 and A.D. 190±150 being marginally acceptable, as both of the latter dates were obtained from features that yielded acceptable dates (Henderson and Pollack 1985).

Though Henderson and Pollack (1985) argued for the presence of a single component early Late Woodland settlement at this site, the recovery of Middle Woodland ceramics may indicate the presence of an earlier Woodland component associated with the nearby Old Fort Earthworks. The possible Middle Woodland component was functionally and spatially distinct from later occupations. The low density and limited spatial distribution of artifacts suggest that the Middle Woodland occupation was of comparatively low intensity Middle Woodland diagnostics derived primarily from the central portion of the site, include mica, Snyders points, and Hopewell-related pottery types (e.g., Connestee series, Hopewell series, and Chillicothe Rock Stamped)

(Henderson and Pollack 1985). It should be noted, however, that similar amounts and types of ceramics were recovered from Late Woodland contexts at the nearby Hansen site (see below).

The more intense but short-term (ca. 20 years) early Late Woodland component at Bentley was focused in the northern, western, and central parts of the site, where domestic activities (e.g., dwellings [concentrations of rock-lined postmolds], cooking, and trash disposal [concentration of large deep pits along terrace edge]) likely occurred around an open area. The Newtown phase assemblage included Newtown series pottery. As at other Newtown sites, the ceramic assemblages include a small amount of Wright Check Stamped pottery (Ahler 1987; McBride and Fenton 2007; Railey 1984). A second possible Late Woodland occupation, marked by the predominance of Peters Creek series pottery, was documented in the southern part of the site where few features were found (Henderson and Pollack 1985). Alternatively, these ceramics "may represent contemporary occupation by social groups with different ceramic tempering preferences or traditions" (Henderson and Pollack 1985:159).

Hansen (15Gp14) is located slightly upstream from Bentley on the Ohio River floodplain. Excavation along the eastern edge of this 6 ha site documented the presence of three stratigraphically distinct components. The site was initially occupied during the Late Archaic subperiod (see Chapter 4). This was followed by an ephemeral Early Woodland component with associated calibrated radiocarbon dates ranging from 1110-796 B.C. to 769-406 B.C. (Table 5.37). Calibrated radiocarbon dates for a more substantial late Middle Woodland-early Late Woodland component range from A.D. 35-529 to A.D. 548-859, with most postdating A.D. 400 (Table 5.37) (Ahler 1987, 1988, 1992).

Newtown phase artifacts include bladelets; Adena-like, Lowe cluster, Jacks Reef cluster, and large triangular points; and Newtown series, Wright Check Stamped, Connestee series, McGraw series, Turner Simple Stamped, Pickwick/Mann Complicated Stamped, Hopewell-like Dentate Stamped, and Southeastern series pottery. Other artifacts are celts, axes, gorgets, utilized flakes, bifacial tools, and unifacial tools. The large debitage assemblage represented all stages of lithic reduction, especially late stage. Local cherts (e.g., Haney, Paoli, St. Louis, Upper Mercer, Breathitt, Kanawha, and gravels) were more abundant than nonlocal types Vanport and Boyle. Wild and cultivated plants from Middle-Late Woodland contexts are hickory, walnut, acorn, sumpweed, goosefoot, maygrass, erect knotweed, and squash; relative species proportions suggest a greater reliance on gathering than horticulture. About 95 percent of the faunal remains from Hansen were classified as general mammal remains, but deer, elk, passenger pigeon, and drumfish were identified (Ahler 1987, 1988, 1992).

Throughout the Newtown occupation of Hansen, domestic activities were of short duration, focused during the late summer to early fall seasons, and consistent over time. Based on the spatial distribution of features and artifacts, Ahler (1987) argued for the presence of two temporally distinct Newtown occupations at this site. The earlier occupation (ca. A.D. 300-450) was comparatively more intense than the later one, and activity areas were tied to household clusters associated with at least three circular or oval single-post structures. Activities included chipped stone tool manufacture, food storage, food preparation, and refuse disposal (Ahler 1987, 1988). The later occupation, ca. A.D. 500-600, was "more specialized or more communally oriented, with the very large

facilities [i.e., deep cylindrical pit features] indicating the presence of multiple households interacting on a communal or cooperative level" (Ahler 1987:54). Besides domestic activities, chipped stone tool manufacturing occurred communally in two parts of the site. The later occupation at Hansen was similar to that at nearby Bentley (Ahler 1987).

Located in the interior of the Lower Big Sandy Section, the Wiley Creek site (15Jo74) is situated on a high terrace overlooking Levisa Fork. Excavations revealed postmolds and a variety of pit features dated to the Middle and early Late Woodland subperiods. Calibrated radiocarbon dates of A.D. 85-387 and A.D. 430-670 were obtained from two of the features excavated at this site (Table 5.37). The recovery of an angular shoulder sherd marks the first discovery of Newtown ceramics in the Levisa Fork drainage. In general the ceramics recovered from this site are similar to Blaine Cordmarked (see below). The only other diagnostic recovered from intact deposits at this site was a possible Lowe Flared Base point. Additional lithic artifacts include an adze, drill, marginally modified flakes, pitted stones, grinding stones, abrader, and celts. Wild plants remain included nuts, wild sumac, grape, persimmon, and honey locust; only a small number of native cultigens (goosefoot) were recovered from this site (Burdin and Pollack 2006).

Lithic tool manufacture, plant processing, and food preparation were among the activities that occurred at the Wiley Creek site. One of three artifact/feature clusters is an oval-shaped area measuring about 10 m across. A linear pattern of three postmolds along the southwest edge may be the remains of a drying rack or windbreak. Another cluster is irregularly shaped, had one postmold, and yielded fewer artifacts. The third cluster consisted of a few postmolds and several large pits, some of which were similar to those documented at Hansen (Burdin and Pollack 2006).

Dow Cook (15La4) is a multicomponent site along the periphery of a terrace knoll/ridge in the former Blaine Creek drainage, now Yatesville Reservoir. Compared to the Early Woodland component, the Middle to early Late Woodland occupation at the site was more intense, being classified as a hamlet. Calibrated radiocarbon dates of A.D. 433-771 and A.D. 647-858 were obtained from features associated with the latter component (Table 5.37). Intact midden deposits and a small number of nonoverlapping cultural features (postmolds, thermal features, and storage pits) yielded diagnostic lithic tools and ceramics, as well as faunal and floral remains, including maygrass seeds. Dow Cook is the type site for Blaine Cordmarked, which is characterized by thin walled jars that are tempered with coarse sandstone or siltstone. In general, Blaine Cordmarked is similar to Newtown Cordmarked, but at Dow Cook none of the vessels had angular shoulders (Niquette et al. 1987, 1989; Niquette and Kerr 1989).

The Carroll Shelter (15Cr57) is situated at the head of a hollow in the Everman Creek drainage, a tributary of the Little Sandy River. Excavation of 14 m^2 of this mostly dry shelter revealed a midden layer, shallow hearths, and deep storage pits. The Middle Woodland component was concentrated along the back wall and was marked by a high density of artifacts including faunal remains, Paintsville or Connestee Simple Stamped pottery, mica sheets, and a cremated individual. The presence of these materials and the cremated burial may reflect Hopewellian mortuary practices. A second individual was found beneath a boulder. Other diagnostic artifacts include Adena Stemmed points and Adena Plain sherds (Ison and Ison 1985).

The western portion of Carroll Shelter contained a more intense early Late Woodland (cal A.D. 546-771 [Table 5.37]) occupation floor marked by compact, burned soil and hearths. Postmolds delineated the remains of the front wall of a structure that had been constructed near the dripline. Late Woodland artifacts included small triangular points and Peters Creek series pottery, bone drills, gravers, bifaces, flake tools, flesher, flaker, and turtle carapace cups. Lithic production involved all stages of chipped stone tool production, and knappers relied on locally available cherts, especially Haney and Paoli. Faunal and floral remains suggest at least summer and winter seasons of occupation. A diverse range of animal species were exploited: deer, eastern chipmunk, box turtle, raccoon, opossum, squirrel, groundhog, rabbit, bear, dog, mouse, pine vole, mole, water shrew, turkey, passenger pigeon, *Passerine sp.*, snakes, amphibians, bass, and mussel. Hickory nut shell comprised a high percentage of the plant materials, and no cultigens were recovered (Ison and Ison 1985).

Located about 300 m from Carroll Shelter, Site 15Cr58 consisted of an open-air cache of over 100 chipped stone blades, a slate pendant, and several mica pieces (Ison and Ison 1985). These materials may be related to the Middle Woodland Hopewellian component at the nearby Carroll Shelter (Ison and Ison 1985:130).

Other sites in the Lower Big Sandy Section were occupied during the late Middle-early Late Woodland subperiods. Middle to early Late Woodland occupations at Dameron Rockshelter (15Jo23A) are indicated by bladelets and Jacks Reef Pentagonal, Madison, and Hamilton points (Johnson in Vento et al. 1980; Vento et al. 1980). Materials recovered from a feature at Site 15Bd313 yielded a calibrated radiocarbon date of A.D. 433-1026 (Table 5.37) (Schock and Foster 1976).

The Everman phase is a terminal Late Woodland (ca. A.D. 700-900) phase defined by assemblages recovered from the Grayson site in Carter County (Ledbetter et al. 1991; Ledbetter and O'Steen 1992). Calibrated radiocarbon dates for the Everman phase component at Grayson range from A.D. 656-986 to A.D. 695-1223 (Table 5.37). Diagnostic artifacts include sandstone and siltstone tempered cordmarked and plain pottery, which resembles Peters Creek Cordmarked and exhibits similarities with Woods and Parkline ceramics from West Virginia, and Chesser, Lowe, Jacks Reef, Raccoon, Madison, and Levanna projectile points.

At Grayson Late Woodland knappers relied on local Newman chert, and chipped stone tools produced on-site may have been distributed within the local area. Debitage represents all stages of reduction, with an emphasis on late-stage reduction. Pottery sherds include Peters Creek Cordmarked and several untyped varieties. Wood charcoal and nut shell, especially walnut and acorn, comprised 92 percent and 8 percent by weight of the archaeobotanical remains, respectively, and the former included secondary growth taxa indicative of ground disturbance. Small numbers of wild (bedstraw, poke, green briar, grape, goosefoot) and domesticated (squash) plant remains were identified. Animal utilization during the Late Woodland differed little from earlier occupations. Midden-filled pits, thermal features, and postmolds delineating a structure were scattered on both ridges at the site, peripheral to earlier features. The site functioned as a mid-summer to late fall residential locus where tool manufacturing activities predominated (Kerr and Niquette 1989; Ledbetter et al. 1991; Ledbetter and O'Steen 1992).

Possible terminal Late Woodland occupations also have been documented at Win Rockshelter, which had a significant Early Woodland component (see above), Calloway, and Site 15Cr74. Materials from a firepit at Win Rockshelter (15Jo40) yielded a calibrated radiocarbon date of A.D. 668-1024 (Table 5.37) (Adovasio 1982). Unfortunately, no diagnostics were recovered from this pit. Pottery from Calloway (15Mt8) produced a thermoluminescence determination of A.D. 910±100 (Table 5.37) (Niquette and Boedy 1986). Site 15Cr74 is an elliptical site in the Little Sandy River drainage. Located on the second terrace at Barrett Creek, the site measures 250 x 500 m. A terminal Late Woodland component is represented by small triangular points and sandstone and siltstone tempered sherds that likely are Late Woodland in temporal affiliation (Kerr and Niquette 1989).

UPPER BIG SANDY SECTION

A high ratio of Woodland components (n=68) to Woodland sites (n=32) has been documented in the Upper Big Sandy Section, suggesting frequent reoccupation of certain locales over the Woodland period. On the other hand, site type diversity is rather low compared to the Lower Big Sandy Section (Table 5.35). In contrast with other sections in Kentucky, the proportion of Late Woodland components in the Upper Big Sandy is quite high at 42.6 percent (Table 5.36). All of the substantial Woodland sites - those with midden/features and diagnostic artifacts or absolute dates - are open habitations, including several in the Fishtrap Reservoir vicinity (Table 5.39). Though the number of substantial Woodland sites in the section is small, the sites do span the Woodland period, especially the late Early Woodland to early Late Woodland subperiods.

Table 5.39. Important Woodland Period Sites in the Upper Big Sandy Section.

Site No.	Site Name	Site Type	Affiliation	References
15Fd47	Pine Fork	open habitation	LW	Edging et al. 1988; McGowan 1988
15Fd78	Prime Farmland	open habitation	EW, MW, LW	Richmond et al. 2002
15Pi7	Sim's Creek	open habitation	MW, LW	Dunnell 1966a, 1972
15Pi11	Stone	open habitation	MW, LW	Dunnell 1966a, 1972
15Pi12	Blackburn	open habitation	MW, LW	Dunnell 1966a, 1972
15Pi16	Thacker	open habitation	EW	Dunnell 1966a, 1972
15Pi92	Martin Justice	open habitation	EW, MW, LW	Kerr et al. 1995; Kerr and Creasman 1998
15Pi303	none	open habitation	MW	Dowell 1979b; Schock et al. 1976

Some of the earliest Woodland sites in the Upper Big Sandy Section are associated with the Thacker phase. Determinants of the Thacker phase are Turkey Tail-like points, siderite and chert debitage, and quartz tempered cordmarked ceramics, the latter of which is the earliest pottery in the section and the latter two of which are found at all six Thacker phase sites recorded in the Fishtrap Reservoir area (Dunnell 1972). Other Thacker phase traits are pigment stones, stone bowls, atlatl weights, whetstones, and Dickson cluster-like projectile points. Hunting-gathering was the prevailing

subsistence strategy, with plant use focusing on nut collection (Dunnell 1966a, 1972). Based on stratigraphic and artifactual evidence, Dunnell (1972) rejected as too early a calibrated radiocarbon date of 4325-3956 B.C. for the phase that was obtained from the Thacker site (15Pi16) (Chapter 4:Table 4.41). Lafferty (1978) suggested a range of ca. 900-500 B.C. or early Early Woodland for this phase.

The Thacker site (15Pi6) covered an area 35 m in diameter. Clusters of associated features including earth ovens indicate a series of overlapping, short-term seasonal encampments spanning the earlier Slone (see Chapter 4) and later Thacker phase occupations. Thacker site diagnostics include stemmed points and quartz tempered pottery, the latter exhibiting affinities to types in the south (Dunnell 1966a, 1972).

Early through Late Woodland occupations were documented at the Prime Farmland site (15Fd78). The most intense occupations occurred during the late Early Woodland, cal 808-407 B.C. and cal 813-546 B.C. (Table 5.37), when the site functioned as a short-term camp. Intact midden deposits and features are associated with this component. Diagnostic early Late Woodland Lowe cluster points were found in association with Johnson Plain and Blaine Cordmarked sherds. These ceramics are similar to those recovered from the Dow Cook site (15La4) in the Lower Big Sandy Section (Richmond et al. 2002).

The Martin Justice site (15Pi92), located on a terrace of Fishtrap Lake at the headwaters of Island Creek in the Levisa Fork drainage, is one of the most significant Woodland sites discovered in the Upper Big Sandy Section since Dunnell's (1966a, 1966b, 1972) Fishtrap survey. This largely unstratified, multicomponent site yielded Early through Late Woodland diagnostics, but the most intense occupation occurred during the late Early Wooodland/early Middle Woodland subperiod. Adena Plain *var. Inez* and Johnson Plain ceramics were recovered from contexts dated at cal 405-171 B.C. (Table 5.37). Stemmed dart points were divided into three subgroups and assigned to the Early Woodland (cal 970-405 B.C. and cal 405-171 B.C.) and Middle Woodland (cal 37 B.C.-A.D. 331) subperiods based on radiocarbon dates (Table 5.37). A variety of lithic reduction activities, especially late-stage biface production and rejuvenation, occurred at the Martin Justice site during the Woodland occupations (Kerr et al. 1995; Kerr and Creasman 1998).

Regarding Middle Woodland subsistence evidence, Kerr and Creasman (1998) recovered nutting stones, hickory and walnut remains, and at least one feature used for nut processing and discard. Other wild plants are goosefoot and spurge, while possible cultivars are maygrass and cucurbit. Plant remains indicate secondary growth forest with open areas. The small faunal assemblage was most unidentifiable but included mussel, small mammal, and bird remains. Over much of the Woodland period, the Martin Justice site was used frequently as a residential base camp for short periods of time. Domestic activities focused on daily acquisition and processing but not long-term storage of food resources. Two spatially and temporally distinct occupations occurred during the Middle Woodland subperiod, and the remains of at least one Middle Woodland single- and double-post rectangular structure were documented. During the terminal Late Woodland, however, occupational intensity decreased and the site functioned as a logistical field camp (Kerr et al. 1995; Kerr and Creasman 1998).

Dunnell (1972) delineated the Sim's Creek phase based on Middle-Late Woodland assemblages at 15 sites along Levisa Fork in the Fishtrap Reservoir area. The four phase determinants are sandstone tempered cordmarked pottery lacking angular shoulders, side-notched points, groundstone adzes, and igneous hammerstones, with the pottery and points being found at all Sim's Creek sites. Other diagnostic traits, which may be used to subdivide the phase, are points that resemble Dickson cluster, Chesser Notched, and Lowe Flared Base forms; mica; limestone tempered pottery; and pigment stones, effigies, and personal ornaments. Faunal and floral assemblages include hickory, walnut, acorn, pecan, deer, box turtle, and fish. Sim's Creek phase assemblages date to the Middle-Late Woodland, ca. A.D. 440 (Dunnell 1972; Gremillion 1993a).

The type site, Sim's Creek (15Pi7), is located at the confluence of Sim's Creek and Levisa Fork. The Middle-Late Woodland component encompassed earth oven, pit, and postmold features with an associated calibrated radiocarbon date of A.D. 183-776 (Table 5.37). Diagnostics include side-notched points and sandstone tempered cordmarked or plain sherds. A single sunflower achene, a charred plaited basket made of oak splints, and oak splint fragments were recovered from undated feature contexts. Highly fragmented and burned human skeletal remains mixed with calcined animal bones in a thermal feature may represent evidence of dietary cannibalism. The Sim's Creek phase occupation, the most intense at this multicomponent site, was associated with three semi-circular post patterns representing temporary windbreaks or lean-tos. Associated with the terminal Late Woodland Woodside phase occupation were two postmold patterns delineating more substantial rectangular structures (Dunnell 1966b, 1972).

At the nearby Blackburn site (15Pi12), Dunnell (1966b) documented small-post structures similar to those at the Sim's Creek site. The semi-circular postmold patterns delineated temporary windbreaks or lean-tos, which were associated with other features. A Fishtrap Reservoir site known primarily for Archaic period occupations (see Chapter 4), Slone (15Pi11) had a Middle-Late Woodland component associated with earth oven and storage pit features. Chipped-stone tools, manos, metates, and nutting stones were recovered from the low intensity open-air habitation (Dunnell 1966a, 1972).

Site 15Pi303 is located downstream of Fishtrap Reservoir in the Raccoon Creek drainage near the confluence with Johns Creek. This substantial Middle-Late Woodland habitation site yielded Copena, Bakers Creek, and small triangular points, bladelets, and a sandstone/grit tempered sherd (Dowell 1979b; Schock et al. 1976).

Finally, the Pine Fork site (15Fd47) covers a mountain slope or ridge spur near several springs at the head of Pine Fork Creek, a tributary of Left Fork of Beaver Creek. Artifacts were recovered from three-five thin cultural strata within an area of 125 m^2. The multicomponent site has Archaic (see Chapter 4) and Late Woodland components. Diagnostic Late Woodland artifacts are Madison and Levanna points and siltstone tempered Armstrong or Lick Creek series pottery. Biface production and maintenance, especially late stage reduction, were the primary lithic-related manufacturing activities at the site, and most chert artifacts were made of nonlocal materials. Other domestic activities involved processing of plant and animal resources. Feature types include rock concentrations and rock-filled pits, and no evidence of domestic structures was found. Pine Fork was used repeatedly as a short-term logistical base camp for populations residing at lower elevations (Edging et al. 1988; McGowan 1988).

FUTURE RESEARCH GOALS AND OBJECTIVES

This section outlines research objectives that may be used to direct future Woodland period investigations in Kentucky. While it is hoped that these objectives will help shape future Woodland period research, this section is not intended to restrict future archaeological investigations in Kentucky. Other researchers will undoubtedly propose additional research objectives, and as more data are collected, it is expected that more complex and in-depth Woodland period problems will be investigated by archaeologists working in Kentucky. The research objectives listed below are organized topically: classification and culture history, material culture and technology, subsistence, settlement patterns, exchange and interaction, social and political organization, bioarchaeology, mortuary practices, and ideology.

1. CLASSIFICATION AND CULTURE HISTORY

Archaeologists in Kentucky have made significant advances in Woodland chronology building since the publication of the first edition of the state plan. Chronometric dating has become common practice in academic and contract projects, and this has led to improvements in our understanding of culture history. Extensive radiocarbon sequences have been published in some sections of the Commonwealth, such as the Upper Green River, Gorge, and Lower Big Sandy sections. Archaeologists are increasingly employing thermoluminescence dating at Woodland sites. Culture historical sequences are available in all management areas, though in more detail for some sections.

Issues of systematics, on the other hand, have received less attention. Confusion about the proper use of Adena and Hopewell, for example, continues. The appropriate archaeological units for constructs like Crab Orchard remain elusive. Only one new Woodland phase has been delineated since 1990. Suggestions for the continued advancement of Woodland systematics, chronology, and culture history in Kentucky are outlined below.

* Define local Woodland phases and refine existing phases. Identify temporal and spatial variation in ceramic types that were manufactured for long periods of time and have broad geographic distributions.
* Define time ranges specific for Woodland diagnostic artifacts (e.g., projectile point types, ceramic types, and bladelets) based on specimens recovered from chronometrically dated contexts at Kentucky sites.
* Develop a consistent approach to the use of Adena, Hopewell, and Crab Orchard archaeological units. Determine if formal or chronological subdivisions of these units are feasible and identify their spatial relationship.
* Assess the viability of Dragoo's (1963) Early-Middle Adena vs. Late Adena as a relevant chronological or formal framework for Kentucky.

* Reconsider the validity and utility of Baumer as a culture-historical unit in western Kentucky.
* Reexamine the taxonomic definition (e.g., phase, focus, horizon, and complex) of Newtown. Identify interregional artifact assemblage variation can be used to subdivide Newtown temporally and spatially. Define the temporal, spatial, and formal relationships between Newtown and terminal Late Woodland (e.g., Intrusive Mound) archaeological units.
* Identify boundary markers that clearly delineate the Early, Middle, and Late Woodland subperiods in Kentucky. Reconsider the validity and utility of 1000 B.C., 200 B.C., and A.D. 500 as the divisions between the subperiods.
* Develop additional chronological schemes that may be used to address regional research questions in each management area.
* Determine if ceramic chronometry (Braun 1983) and dendrochronology are feasible dating methods for Woodland period assemblages.
* Expand the use of thermoluminescence dating and use organic artifacts other than charcoal and burned plant remains to radiocarbon date assemblages when botanicals are not available.

2. MATERIAL CULTURE AND TECHNOLOGY

Material culture typology and patterns of tool manufacture and utilization have been important topics of interest to archaeologists for many years. Typological research aids in chronology building and cultural studies. Technological research allows for the study of patterns of behavioral modes and adaptive strategies directly relating to technological systems. Such studies also have provided data essential for understanding broader issues, such as subsistence and settlement strategies, trade and exchange, and social organization. Typological and technological studies in Kentucky have advanced furthest within the realms of lithic and pottery analyses, although important studies have involved other materials like textiles and bone/shell tools.

Important contributions have been made by archaeologists studying cave mineral mining, and several studies of chert and barite/galena availability have been published. However, these studies are temporally and spatially limited. In general, Woodland resource extraction strategies in Kentucky have received less attention by archaeologists than other areas of Woodland lifeways. One problematic issue regarding such studies will be establishing temporal controls. Possible approaches are dating associated artifact assemblages and comparison of mineral sources with chronologically diagnostic manufactured goods using trace element analysis, petrographic analysis, and similar techniques.

The wide range of typological approaches (e.g., pottery nomenclature), explanatory models (e.g., debitage analysis and lithic production systems), and analytical techniques (e.g., experimental archaeology, microscopic use wear, sourcing, and residue analysis) developed in American archaeology should be utilized to address Woodland material

culture and technology research questions in Kentucky. The following research objectives are arranged by material class.

Lithic Analysis

* Analyze untyped projectile point assemblages from important Woodland sites in order to assign specimens to recognized types.
* Document temporal and spatial variation of Woodland projectile point types.
* Reconstruct Woodland lithic production systems in each management area, and across time and space.
* Determine temporal and spatial patterns in Newtown chert preferences and chert selection for tool manufacture.
* Document inter- and intrasite variation in Turkey Tail blade form and raw material utilization, and identify diachronic changes in Turkey Tail caching behavior (Schenian 1987).
* Determine the extent to which the shift from grooved axes to ungrooved celts at the beginning of the Woodland period was associated with changes in Woodland subsistence patterns.
* Determine the functions of unhafted bifaces, scrapers, expedient tools, and groundstone tools recovered from Woodland sites.
* Identify the locations of chert sources in each management area and compile macroscopic and elemental data for each source.
* Document Woodland chert quarrying practices, including tools and methods, and identify temporal and spatial variability in chert quarrying techniques.
* Identify barite/galena acquisition techniques (e.g., tools and methods) in the Central Bluegrass and Ohio River II sections. Conduct formal analyses of barite/galena objects (Clay 1985b, 1988).

Fired Clay Industries

* Identify Woodland clay quarrying practices, including tools and methods, and document temporal and spatial variability in Woodland clay quarrying techniques.
* Examine unanalyzed pottery assemblages in museum collections, assign them to recognized types, and define new types.
* Document temporal and spatial variation in Woodland pottery types. Update the formal descriptions of established pottery types to accommodate this variation and identify pottery types that are regional variants of these types.
* Identify and describe the earliest pottery types in each management area. Determine direction(s) of diffusion of pottery technology and/or areas of independent invention.

* Determine the validity of the Baumer ceramic series relative to Crab Orchard, and determine the spatial and chronological ranges of both ceramic series.
* Determine the spatial and chronological range of Zorn Punctate.
* Determine the spatial and chronological range of Fayette Thick.
* Determine the spatial and chronological relationship of Adena Plain and Inez Plain.
* Determine the functions of Woodland pottery vessels and document variation in vessel functions across time, space, and site types.
* Identify Woodland ceramic functional attributes that can be used in chronometric studies (Braun 1983) and that can be used to define intrasite activity areas.
* Determine the range of items, other than ceramic vessels, manufactured from fired and unfired clay (e.g., engraved tablets, ear spools, and smoking pipes).

Bone, Antler, and Shell Industries

* Document the types and functions of bone, antler, and shell tools associated with Woodland habitation sites.
* Identify the genera/species used by Woodland groups to manufacture bone, antler, and shell objects, and determine the relative use of freshwater mussel shell and marine shell in mortuary contexts.

Textile Industry

* Identify plant genera/species used to manufacture Woodland textiles and determine if there are temporal and spatial differences in the plant species used in textile manufacture.
* Expand textile analyses to consider issues of fiber selection, fiber preparation, production decisions, status, and ethnicity (Gremillion et al. 2000a).
* Identify the temporal and spatial ranges of different techniques used by Woodland weavers.
* Determine the functions of Woodland textiles (Gremillion et al. 2000a).
* Determine the socio-cultural context of textile use, modes of textile production, and gender differentiation in textile manufacture and use (Gremillion et al. 2000a).
* Assess the reliability of cordage twist as an independent index of chronology and ethnic identity (cf., Maslowski 1984b).

Wood, Cane, and Grass Industries

* Identify plant genera/species for Woodland wood, cane, and grass objects.

* Examine the developmental, technological, functional, and stylistic relationships among carrying devices made of wood/cane (i.e., baskets) vs. those made of woven plant material (i.e., textile bags) vs. those made of cucurbit shells (i.e., squash and gourd bowls).

Mineral Industry

* Determine why cave mineral mining became an intensive Early Woodland extractive activity and the extent to which caves outside the Mammoth-Flint system of the Upper Green River Section were mined for minerals during the Woodland period.
* Document spatial and/or temporal variation in Woodland cave mineral mining.

3. SUBSISTENCE

While Woodland food collection strategies were not substantially changed from previous times, significant changes in food production have been documented. Of particular interest to researchers studying Woodland subsistence patterns are issues surrounding the mechanisms of native plant domestication, the adoption of maize and other Mesoamerican domesticates, the integration of cultigens into existing subsistence economies, and the relative dietary contribution of domesticated plants through time. The timing of the appearance of various Woodland cultigens has been well documented. Questions regarding the adoption, ecology, consequences, and selective factors surrounding plant husbandry have been addressed.

As research continues in new and existing directions, "the rockshelters of eastern Kentucky are likely to continue to play a prominent role both in documentation of agricultural origins and in development of paleoethnobotanical techniques and methods" (Gremillion 1997b:40). Western Kentucky caves can be added to this list, and, increasingly, open habitation sites. The latter are important because they show similarities in dietary patterns compared to rockshelter and cave sites, indicating that the evidence is not simply the result of preservation biases among site types.

Besides subsistence, however, archaeologists have expanded paleoethnobotanical research into the areas of medicinal and ritual plant use. Further, in eastern Kentucky, archaeologists and archaeobotanists have studied the relationship between ecological modifications (human forest management using fire) and the adoption of weedy cultigens during the Woodland period. Specific research objectives related to Woodland subsistence are outlined below.

* Document Woodland subsistence patterns for each cultural/temporal unit, including the technologies used to procure and process various subsistence resources, the contribution of cultigens to the diet, regional and temporal variability in the exploitation of cultigens, and the nature (e.g., generalized or specialized) of food collection strategies.

* Document Late Woodland subsistence strategies in the Big Bottoms area of the Mississippi River Section (Kreisa 1987).
* Document Late Woodland faunal exploitation in all management areas (Hockensmith et al. 1998; Pollack and Henderson 2000).
* Document Woodland period subsistence strategies in the Ohio River I, Ohio River II, Western Coalfield, and Eastern Bluegrass sections.
* Determine the initial appearance of maize in Kentucky and its importance to Woodland diets.
* Determine where in Kentucky indigenous cultigens, especially sunflower, goosefoot, and cucurbits, were domesticated.
* Determine the contribution of maygrass, which does not show signs of morphological change resulting from human interactions, to Woodland diets. (At Newt Kash, maygrass is not present in paleofecal samples but was used to weave textiles found at the site [Gremillion 1995b; Jones 1936]. Nor were maygrass seeds found in Hooton Hollow paleofeces [Gremillion 1995b]).
* Determine the extent to which plant greens and tubers were utilized by Woodland groups (Cowan 1985).
* Determine the extent to which changes in subsistence strategies affected Woodland food storage practices, settlement patterns, technology, socio-political organization, and ideology (Gremillion 1993c; Mickelson 2002).
* Determine if the Woodland period shift from closed to open forest canopy in the Mammoth Cave area was due to human slash-and-burn subsistence activities, regional climatic change, and/or natural forest fire. Determine if the shift resulted in reduced mast resources, and what relationship this might have had to plant husbandry (Watson 1997).
* Determine if nut mast production changed over time (Cowan 1985), and assess the extent to which the adoption of cultigens was a way to minimize subsistence risks (Gardner 1997).
* Determine if sumpweed and goosefoot were imported to the Upper Kentucky/Licking Management Area from elsewhere, perhaps western Kentucky (Cowan 1985).
* Determine the extent to which seasonal variations in wild plants affected the relative contributions of wild and cultivated species to Woodland diets.
* Determine if stalking (as opposed to communal drives) was the principal deer-hunting strategy employed during the Woodland period (Waselkov 1978).
* Assess the adoption of bow and arrow technology, including timing and effects on hunting efficiency and other aspects of culture.
* Document nonsubsistence uses of plants (e.g., medicine, ceremony, dye, and textiles) at Woodland sites, including species with expected or demonstrated mortuary or ritual uses.

* Determine if bark recovered from Woodland paleofeces reflects incidental ingestion during textile manufacture or if it represents a famine food (Cowan 1978; Gremillion 1995b).
* Document the range of human impacts to the landscape, including earthwork construction, field clearing, mast maintenance, and firewood acquisition (Anderson and Mainfort 2002b).
* Assess Watson and Carsten's model of environmental stability in the Mammoth Cave area since the end of the Middle Archaic period by coring Beaver Pond or the Hawkins Farm site in Mammoth Cave National Park (Prentice 1993:152).
* Determine if changes in ceramic vessel functional attributes are correlated with shifts in food storage and processing patterns.
* Determine the extent to which studies of pottery residue analysis, pollen, phytoliths, and starchy grains can contribute to our understanding of Woodland subsistence.
* Expand research on food remains from paleofecal specimens, especially those dating to the Terminal Archaic-Early Woodland period when critical subsistence changes occurred.

4. SETTLEMENT PATTERNS

Archaeologists have learned a great deal about Woodland intersite settlement patterns in Kentucky, though less is known about intersite settlement systems. Some interesting information about intrasite patterning has been assembled, but the temporal and spatial coverage of these studies is quite limited. Though progress has been made in documenting Woodland house types, the least is known about Woodland settlement at the microsettlement level, perhaps due in part to the nature of archaeological investigations and to the degree of settlement impermanence (e.g., short-term use and limited durability of shelters) during much of the Woodland period. Specific research objectives related to Woodland settlement patterns are outlined below.

* Identify variation in Woodland house types across time and space in each management area.
* Identify contemporaneous Woodland sites and develop Woodland site prediction models for each section.
* Conduct systematic excavations at Woodland rockshelters, including portions beyond shelter driplines, outside the Upper Kentucky/Licking Management Area.
* Assess the role that single-purpose (e.g., Crystal Onyx Cave) and multi-purpose (e.g., Mammoth Cave and Salts Cave) cave sites played in Woodland settlement systems (Carstens and Watson 1996; Crothers et al. 2002).

* Determine the relationship (e.g., conflict or cooperation, subsistence, social organization, and settlement) between Woodland rockshelter and cave sites and open habitation sites (Applegate 1997; Carstens and Watson 1996; Crothers et al. 2002; Gremillion 1993a, 1996; Gremillion et al. 2000b; Lane et al. 1995; Mickelson 2002; Prentice 1993).

* Determine why only some Newtown habitation sites have associated mortuary facilities (e.g., burial mounds) (Kreinbrink 1992).

* Determine the extent to which large terminal Late Woodland sites in the Jackson Purchase and Green River management areas reflect increased sedentism and socio-political complexity and a greater reliance on cultivated plants (Kreisa 1988).

* Determine the extent to which solar radiation affected rockshelter utilization in the Upper Kentucky/Licking Management Area (Gremillion 1996; Gremillion et al. 2000b).

* Determine if the sporadic, short-term Woodland use of shell midden sites in the Green River Management Area (Hensley 1991; Jefferies 1990) reflects population decline, population dispersal, or a reorientation of subsistence-settlement strategies away from the river.

* Assess the relationship between large base camps, burial mounds, and small camps within the Crab Orchard settlement system of the Ohio River II Section. Determine if the Slack Farm and Smith sites were used by different Crab Orchard groups (deNeeve 2004).

* Identify Yankeetown phase settlement patterns.

* Identify habitation sites associated with Adena mortuary sites in central Kentucky and assess Clay's (1991) and Railey's (1991b) models of Adena settlement patterns.

* Determine if there is a relationship between late Early Woodland-early Middle Woodland circular embankments and Late Woodland donut-shaped habitation sites in the Bluegrass and Big Sandy management areas.

* Assess the case for population aggregation and settlement nucleation in the Bluegrass Management Area during late Middle and early Late Woodland times. If this pattern is confirmed, explore the processes that were responsible for these demographic and settlement shifts.

* Document diachronic variation in the intensity of Woodland rockshelter occupations in the Upper Kentucky-Licking and Big Sandy management areas (Ison and Ison 1985).

* Determine if inter-drainage settlement pattern differences in the Upper Kentucky/Licking Management are related to quantitative economic costs and returns distinctive to each drainage (Gremillion 1996; Gremillion et al. 2000b).

* Determine the range and distribution of earth, stone, and earth-stone mound complexes in the Big Sandy Management Area (Kerr and Creasman 1998:112).

5. EXCHANGE AND INTERACTION

Patterns of interregional exchange and interaction comprise a major topic of research in Woodland studies, especially during the Middle Woodland subperiod. Woodland exchange systems in eastern North America are often viewed from a perspective that focuses upon geographical, environmental, and ecological factors (e.g., Goad 1979; Seeman 1979; Struever and Houart 1972). The role that social relationships played in controlling and maintaining Woodland exchange systems, and developments and changes within these systems, have yet to be fully explored. Listed below are research goals related to Woodland exchange and interaction.

* Document the nature and extent of interregional exchange and interaction between Early, Middle, and Late Woodland groups in Kentucky and those in other parts of the Eastern Woodlands.
* Determine the mechanisms through which Early, Middle, and Late Woodland groups obtained nonlocal raw materials and finished goods.
* Identify regional and local patterns of Hopewellian exchange networks in Kentucky.
* Examine diachronic variation in Woodland exchange patterns, especially the proliferation and eventual decline of exchange during Middle Woodland times.
* Identify the source of barite/galena objects (including specimens from southern Ohio Woodland sites) and examine their spatial distributions to trace the movement of these goods (Clay 1985b, 1988).
* Determine types of materials and goods that were exported from Kentucky to other parts of the Eastern Woodlands during the Woodland period.
* Determine the role of trade and exchange in the development of village farming communities during terminal Late Woodland times.
* Determine the extent to which interregional exchange relationships affected the procurement of lithic raw materials and the production of chipped stone and groundstone tools.

6. SOCIAL AND POLITICAL ORGANIZATION

The basic outlines of prehistoric social structure can be reconstructed from various lines of data, including settlement pattern studies (particularly intrasite patterning), mortuary patterns, exchange systems, subsistence data, and physical anthropological studies. For the Woodland period, social structure traditionally has been addressed through comparisons of burial mound patterns (e.g., Braun 1979; Tainter 1977), including method of mound construction (accretionary vs. single episode); interment mode; the age and spatial distribution of individuals interred within the

mounds; the amount, diversity, distribution, and nature of grave goods; the physical context of mounds relative to habitation sites, earthworks, and other mounds; and the remains of attendant mortuary ritual. Researchers also addressed questions relating to the sizes of groups who occupied sites, gender roles related to subsistence and other aspects of culture, and levels of socio-political complexity in Woodland societies. Research objectives related to Woodland social organization are listed below.

* Determine the size and composition of Woodland residential social unit(s).
* Document the differential distribution of nonlocal raw materials and other artifacts among burials in Woodland mortuary areas, and determine if they reflect achieved vs. acquired status or age- and sex-related variation in access to resources.
* Identify and examine patterns of labor organization in the Woodland period, and assess the identified developments with respect to social transformations.
* Determine if some rockshelters were special-purpose sites used by women (Claassen 1998; Funkhouser and Webb 1929; Knudsen 1985) and if other sites, such as some caves, were special-purpose sites used by men (Crothers et al. 2002).
* Identify factors responsible for the rise of social inequality during the Woodland period.
* Determine the nature and extent of status differentiation with Adena society (Anderson and Mainfort 2002a).
* Determine if earthwork construction in Kentucky is correlated with other socio-cultural changes that occurred during the Early and Middle Woodland subdivisions.
* Explore the relationships between changes in social organization and changes (or continuity) in economic systems, ideology, and other aspects of Woodland culture.
* Determine the level of socio-political complexity throughout the Woodland period in all management areas.
* Determine if earthwork construction in Kentucky is correlated with other socio-cultural changes that occurred during the Early and Middle Woodland subdivisions.

7. BIOARCHAEOLOGY

Bioarchaeological research is important because it informs about demography; health, disease patterns, traumatic injuries, and medical treatments; subsistence and nutritional stress; and gender roles, social status, differential access to resources, armed conflict, and other aspects of social organization. Woodland period bioarchaeological investigations in Kentucky have expanded beyond the classic studies of craniometry and racial types in Adena skeletal series. Human remains from other site types and other time

periods have been analyzed, and paleofecal studies are expanding. Research objectives related to Woodland bioarchaeology are listed below.

* Identify the physical characteristics of various Woodland period burial populations; determine their demographic composition, including age-sex distributions and mortality rates; and identify paleopathologies and traumatic injuries.
* Use DNA analysis (e.g., Mills 2003) or craniometric analysis of biological relatedness (Herrmann 2006) to distinguish among burial populations interred in large Woodland mounds and cemeteries.
* Use stable isotope and trace element analyses to assess Woodland subsistence and population movements.
* Analyze curated skeletal series that have not yet been studied and reanalyze previously reported skeletal series, such as those from Adena mounds, with respect to sex determinations and age estimations (Milner and Jefferies 1987).
* Document copper staining, pigment staining, and other cultural modifications in Woodland burial skeletal analyses.
* Identify post-mortem modifications of human bones (e.g., drilled skull fragments and trophy skulls) placed as grave goods at Woodland sites.
* Determine the extent to which linear enamel hypoplasias, dental caries, long bone length and circumference, Wilson bands, Harris lines, trace elements (strontium:calcium and nitrogen-15), cribra orbitalia anemia, arthritis, sexual dimorphism, bone fractures, and degenerative pathologies are related to repetitive activities and reflect changes in women's work load as well as women and children's access to resources (Claassen 1998).
* Identify incidences of cannibalism in Woodland burial populations and distinguish among different types of cannibalism (e.g., ritual, dietary or gustatory, and survival).
* Analyze paleofecal materials to address questions relating to health, gender differences in site use and activities, and gustatory cannibalism (human myoglobin and other indicators).

8. MORTUARY PRACTICES

Woodland mortuary practices continue to capture the interest of archaeologists in Kentucky. We now have a better understanding of mortuary practices throughout the Woodland period, though the late Early-early Middle Woodland subperiod is still best understood. Research on Woodland mortuary-ritual has expanded beyond the early focus on Adena into cave and rockshelter burials, nonmound and nonmortuary ritual sites, ritual feasting and graveside activities, and ceremonial plant use. Despite these developments, there remain many interesting and compelling research issues that should be investigated

using new analytical methods, multiple scales of investigation, and contemporary theoretical paradigms, as outlined below.

* Identify inter-regional variation in Early, Middle, and Late Woodland mortuary practices, and investigate how changes in social organization are reflected in mortuary patterns.
* Identify changes in preferred locations for mortuary areas/cemeteries during the Woodland period.
* Identify the factors that resulted in the appearance of cemeteries/mounds removed from habitation sites.
* Identify the association of nonmound mortuary sites with burial mound building in Kentucky.
* Determine if Adena mounds primarily contain high status populations and if differences in mortuary treatment (e.g., in-flesh burial vs. cremation) are correlated with status.
* Determine the functions of submound Adena structures.
* Document and assess activities related to graveside ritual, such as charnel house form and function, behavioral implications of pottery from mound and off-mound contexts, and the presence or absence of associated "mortuary camps".
* Determine the temporal and functional relationship among Peter Village, Grimes Village, and other large Early Woodland ditched enclosures (Clay 1985b).
* Use geophysical techniques at mound sites to delineate associated features, such as postmold patterns and off-mound activity areas.
* Identify contextual patterns in the spatial distributions of pottery and other artifacts associated with Adena mound stages (O'Malley 1988).
* Determine the sequence of construction of Woodland earthwork complexes (e.g., Camargo, Old Fort, and O'Byam's Fort).
* Determine the amount of time that elapsed between the use of submound structures and mound construction, and between deposition of different layers at stratified mounds.
* Identify spatial variation in Woodland mortuary and ritual activities among sites, drainages, sections, and management areas (Greber 1991, 2005; Rafferty 2005; Sieg 2005).
* Determine the socio-cultural and ideational factors that led to the development of integrative Woodland mortuary facilities (e.g., Adena mounds) (Wall et al. 1995).
* Determine if the mortuary caves on Prewitt's Knob in the Upper Green River Section were used contemporaneously or sequentially. Identify other caves in this section and in other management areas that were used for mortuary purposes during the Woodland period (Crothers et al. 2002).

* Identify temporal, socio-cultural, and ideational variation in mortuary practices in the Mammoth Cave area (e.g., individual vs. communal burial, formal crypt construction vs. absence of formal graves, and rockshelter vs. cave interment) (Horton 2003).
* Identify the types of foods consumed during ritual-related feasting activities, as well as associated features and preparation/storage practices.
* Determine the temporal and spatial range of stone box grave construction during the Woodland period.
* Determine the significance of the association of Archaic diagnostics with Woodland mortuary-ritual sites (e.g., recovery of a Big Sandy point from a burial at Viney Branch site in the Lower Big Sandy Section).

9. IDEOLOGY

Prehistoric belief systems often are reconstructed by relating changes in cosmography and ritual behavior to economic and social developments (e.g., Drennan 1976; Rappaport 1971). Analysis of icons expressed in ceramic decoration or ritual items are often key indicators of past ideologies. The symbolic richness of Adena-Hopewell ritual complexes offers an exciting, but largely untapped, data source for examining Woodland period belief systems. Increasing attention has been given to Woodland period artistic expression, especially rock art (e.g., Coy et al. 1997; Davis 1996; DiBlasi 1996). Archaeologists working in the region have come to recognize the role that beliefs played in shaping the archaeological record of the Woodland period (e.g., Cowan 1985). Potential avenues for expanding research on Woodland ideology are outlined below.

* Identify and interpret stylistic patterns of decorative motifs on pottery, engraved tablets, and other portable items (e.g., Carter 2007).
* Assess the symbolic implications of decorative motifs, burial patterns, site structure, and other cultural elements.
* Identify socioeconomic factors related to ideational trends.
* Identify enduring and discontinuous ideational elements within the Woodland period, and assess the possible relationships of these to earlier Archaic, and later Mississippian and Fort Ancient ideational elements.
* Examine the potential time depth of historically-recorded native ideological themes with respect to Woodland period icons and symbols.
* Examine Woodland earthworks and other sites for evidence of archaeoastronomy.
* Identify temporal and spatial variation in Woodland rock and cave art motifs, and determine their function.

MAJOR ACCOMPLISHMENTS

Since 1990 there have been a great many advances in Woodland period research in Kentucky. Though most research has focused on newly discovered sites, archaeologists continue to analyze and reanalyze existing collections and site records. Spatially, the most substantial advances have been made in areas where little previously was known about the Woodland archaeological record: Upper Cumberland Management Area, Interior Mountains Section of the Upper Kentucky/Licking Management Area, and Upper Big Sandy Section of the Big Sandy Management Area. Temporally, more is now known about two previously poorly documented subperiods, the early Early Woodland and the terminal Late Woodland. Topically, major accomplishments in Kentucky Woodland archaeology relate to technology, subsistence and settlement strategies, exchange activities, social organization, mortuary and ritual practices, and beliefs and artistic expression.

There have been several advances in the study of Woodland technology and material culture. Archaeologists employing existing methodological approaches, such as experimental archaeology and microscopic use wear, have provided new information about lithic tool functions and manufacturing techniques. Typological issues continue to dominate Woodland pottery research, and important developments include delineation of new pottery types, such as Inez, Main, Mills, and Pine Mountain, and documentation of temporal and spatial variability in existing pottery types, including Crab Orchard, Falls Plain, and Fayette Thick. Much has been learned about Woodland textile industries, especially technological aspects.

More is now known about Woodland hunting and gathering strategies, especially in the Mississippi River, Lower Tennessee-Cumberland, Lake Cumberland, Southeastern Mountains, Central Bluegrass, and Interior Mountains sections, where little data previously was available. The fundamental Woodland foraging pattern across time and space involved reliance on deer and other large mammals, turkey, turtles, and nuts. These primary food sources were supplemented by a variety of wild plants and animals, the combinations of which varied temporally and spatially. A related development in Woodland research deals with medicinal and ritual uses of plants.

Woodland subsistence research in Kentucky, however, continues to the dominated by studies of plant husbandry and food production. Research conducted since 1990 has confirmed initial hypotheses about the timing of plant domestication and the rate of adoption of plant cultigens. An extensive series of absolute dates consistently indicates that cucurbits were among the initial cultigens, followed by indigenous weedy species, all of which were managed/domesticated in the Terminal Archaic to early Early Woodland periods. Quantitative studies have documented that plant cultigens were adopted as a package and gradually incorporated into the Woodland diet, never exceeding wild resources in dietary importance. Another important development is the identification of some cucurbit subspecies/varieties as indigenous North American domesticates as opposed to tropical imports. Archaeobotanists have learned a great deal about morphological and genetic changes, or the lack thereof, in cucurbits and weedy plant cultigens, as well as the ecology of cultivated plant species. Several hypotheses have

been proposed regarding the ecological context of Woodland plant husbandry and the reasons why the new subsistence strategy was selected. Research has examined the impacts of plant husbandry on other aspects of Woodland lifeways, like settlement, overall subsistence, environmental modifications, and, to a lesser degree, beliefs, artistic expression, and gender roles. Importantly, more is now known about plant husbandry in parts of Kentucky other than western caves and eastern rockshelters.

There have been a number of developments in Woodland settlement studies in Kentucky. With structural remains now documented at more than two dozen sites in Kentucky, our understanding of Woodland microsettlement has advanced significantly. Woodland houses were circular, oval, square, or rectangular in shape, were constructed with individually-set unpaired posts, and varied in size in relation to social residence patterns and season of occupation. Archaeologists have documented considerable variation in Woodland intrasite patterning. Though rockshelters continue to receive a great deal of attention, important advances have been made in the study of Woodland open habitations and cave sites. Regarding the former, information is available about feature types, activity areas, and overall site layout. In terms of cave sites, research has focused on dating periods of intensive cave use and understanding the mineral extraction and mortuary uses of caves. Regarding intersite patterning, Woodland settlement patterns across time and space are now extensively documented in Kentucky, in some areas to such an extent that site location predictive models have been proposed.

One of the more significant advances in the study of Woodland exchange concerns the occurrence of imported pottery wares at Kentucky sites, especially those dating to the Middle-Late Woodland subperiod. Previously viewed as incidental or curiosities, the increasing frequency with which imported pottery types like Connestee are reported from Woodland sites indicates the pervasive nature of Woodland trade of such commodities and the directions of exchange activities.

Woodland period social organization has received increasing attention by archaeologists in Kentucky. Researchers have studied gender roles, social status, and ranking in Woodland societies. Some studies have focused on reconstructing levels of socio-political complexity during the Woodland period.

Mortuary and ritual activities have long dominated Woodland period research in Kentucky, but researchers also have focused on documenting variability in mortuary practices and incorporating this variability into explanatory frameworks. Much more is now known about nonmound mortuary sites like caves, rockshelters, and open-air burial grounds. In addition to mortuary sites, archaeologists have documented Woodland ritual localities not associated with burials or mounds. Analyses of Adena mortuary-ritual practices continues, though now with a focus on understanding regional and temporal diversity; research issues include staged ritual programming, ritual feasting activities, and mound functions other than burial. Based on additional research since 1990, there now can be little question that in Kentucky Adena is late Early to early Middle Woodland in age. Archaeologists have also studied post-Adena mortuary-ritual activities, including the occurrence of Hopewell traits at Kentucky Woodland sites. Whereas past assessments concluded that "virtually nothing is known about Kentucky Late Woodland burial practices or ceremonialism" (Pollack and Henderson 2000:617-8), information about some Late Woodland mortuary-ritual sites is now available.

Regarding cognitive archaeology, the most significant advances in Kentucky Woodland research deal with artistic expression. Much of this work has focused on documentation of rock and cave art sites and description of individual motifs and composite panels. Archaeologists also have proposed functional interpretations of Woodland art.

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