Contract Publication Series 13-252

AN ARCHAEOLOGICAL SURVEY FOR THE PROPOSED BRIDGE REPLACEMENT AND APPROACH MODIFICATION ALONG KY 3376 OVER HAYS FORK IN MADISON COUNTY, KENTUCKY (ITEM NO. 7-1126.00)

by
Michael J. Curran

Prepared for

KENTUCKY TRANSPORTATION CABINET

Prepared by

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OSA Project Registration No.: FY14_7736

ABSTRACT

On August 13, 2013, Cultural Resource Analysts, Inc., personnel conducted an archaeological survey of a proposed bridge replacement and approach modification along KY 3376 over Hays Fork Creek in Madison County, Kentucky. The survey was conducted at the request of David Waldner of the Kentucky Transportation Cabinet (Item No. 7-1126.00). A records review was conducted at the Office of State Archaeology. The review indicated that no archaeological sites or investigations had been documented within the project area. The project area is located on the northwest side of KY 3376 and extends from the intersection of KY 3376 and U.S. 421 approximately 195 m (640 ft) to the southwest, covering .39 ha (.97 acres). The fieldwork consisted of an intensive pedestrian survey supplemented by screened shovel testing and bucket augering, and the project area was surveyed in its entirety.

One new cultural resource (15Ma499) was recorded as a result of this survey. Site 15Ma499 is a historic farm/residence dating from the late nineteenth through the twentieth centuries. The portion of the site within the project boundary is not considered to have the potential to provide important information about local or regional history, and Site 15Ma499 is recommended as not eligible for the National Register of Historic Places under Criterion D. No further work for this portion of the site is recommended. No cultural resources recommended eligible for listing, or listed, on the National Register of Historic Places will be affected by the proposed project, and archaeological clearance is recommended for the project.

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I. INTRODUCTION

On August 13, 2013, Cultural Resource Analysts, Inc. (CRA), personnel conducted an archaeological survey of a proposed bridge replacement and approach modification along KY 3376 over Hays Fork Creek in Madison County, Kentucky (Figure 1). The survey was conducted at the request of David Waldner of the Kentucky Transportation Cabinet (KYTC) (Item No. 7-1126.00) and only performed once landowner permission was obtained. Michael Curran and Lisa Kelley completed the survey in 20 person hours. Archival research was conducted at the Madison County Clerk's Office in Richmond by Michael Curran and Lisa Kelley on August 13, 2013. Office of State Archaeology (OSA) Geographic Information Systems (GIS) data requested by CRA on August 5, 2013, was returned on August 8, 2013. The results were researched by Heather Barras of CRA at the OSA on August 13, 2013. The OSA project registration number is FY14_7736.

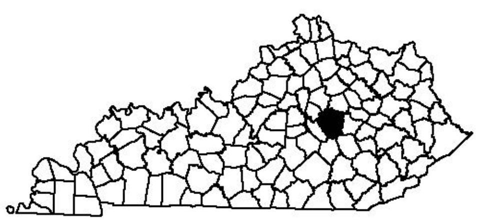

Figure 1. Map of Kentucky showing the location of Madison County.

Purpose of Study

This study was conducted to comply with Section 106 of the National Historic Preservation Act. This transportation project is federally funded, and therefore considered an undertaking subject to 106 review. Any state, county, or municipal lands in the project area were surveyed under OSA Kentucky Antiquities Act Permit Number 2013-038 pursuant to Kentucky Revised Statute (KRS) 164.720.

The purpose of this survey was to assess any potential effects the proposed development might have on identified cultural resources. To do this, the archaeologists followed these objectives:

identify prehistoric and historic archaeological sites located within the project area;

determine, to the extent possible, the age and cultural affiliation of sites;

establish the vertical and horizontal boundaries of sites; and

establish the degree of site integrity and potential for intact cultural deposits to be present.

For the purposes of this assessment, a site was defined as "any location where human behavior has resulted in the deposition of artifacts, or other evidence of purposive behavior at least 50 years of age (Sanders 2006:2)." Cultural deposits less than 50 years of age were not considered sites in accordance with "Archeology and Historic Preservation: the Secretary of the Interior's Standards and Guidelines" and were not assessed as part of this study (National Park Service [NPS] 1983).

The following is a description of the project area, previous research and cultural history of the area, field and laboratory methods, materials recovered, and results of this study. It conforms to the *Specifications for Conducting Fieldwork and Preparing Cultural Resource Assessment Reports* (Sanders 2006). Cultural material, field notes, records, and site photographs will be curated with the William S. Webb Museum of Anthropology, University of Kentucky, in Lexington.

Project Description

The project consists of an archaeological survey for the proposed KY 3376 bridge replacement over Hays Fork. It is located on the northwest side of KY 3376 and extends from the intersection of KY 3376 and U.S. 421 approximately 195 m (640 ft) to the southwest, covering .39 ha (.97 acres) (Figures 2 and 3). The study area included disturbed areas impacted by a commercial development, road ditch, utilities, and fallow lawn/agricultural fields. The proposed disturbance will occur at 283 m (930 ft) above mean sea level (AMSL). The project area was surveyed in its entirety by pedestrian survey supplemented with screened shovel testing and bucket augering (see Figure 3).

Summary of Findings

Prior to the field research, a records review was conducted at OSA. The review indicated that no archaeological sites or investigations had been documented within the project area.

One previously unrecorded cultural resource (15Ma499) was documented within the project boundaries during the survey. Site 15Ma499 is a farm/residence that dated from the late nineteenth through the twentieth centuries and a small portion of the site may extend outside of the project area. Site 15Ma499 is recommended as not eligible for the National Register of Historic Places (NRHP) under Criterion D. No cultural resources eligible for listing on the NRHP will be affected by the proposed development, and archaeological clearance is recommended for the project.

II. ENVIRONMENTAL SETTING

This section of the report provides a description of the modern and prehistoric environment and considers those aspects of the environment that may have influenced the settlement choices of past peoples. Attributes of the physical environment also often guide the methods used to discover archaeological sites. Topography, bedrock geology, vegetation, hydrology, soils, lithic resources, and climate for the Bluegrass region are discussed below.

The Bluegrass region of Kentucky (Figure 4) is third in size behind the Mississippian Plateaus and Eastern Kentucky Coal Field regions, but it is larger than the Western Kentucky Coal Field and Mississippi Embayment regions (Raitz 1973:53; Schwendeman 1979:28). The Bluegrass region acquired its name from the appearance of a bluish colored grass that is known botanically as *Poa Pratenis* and commonly as Kentucky Bluegrass, and the region is referred to as the “Heart of Kentucky” (Davis 1927:3; Raitz 1973:53). The Bluegrass region is divided into three subregions: the Inner Bluegrass, Outer Bluegrass, and the Knobs. Each of these subregions has unique physical differences that distinguish them from each other. Madison County is located within the Outer portion of the Bluegrass region.

The Outer Bluegrass

The Outer Bluegrass subregion of Kentucky is similar topographically and geologically to the Inner Bluegrass subregion in that it is somewhat karst and gently rolling, but it is also more rugged and is underlain by Ordovician siltstone, limestone, and shale, as well as by Silurian dolomite on its western edge (Newell 2001; O’Brien 1984:61; Pollack 2008:17). Situated between the Inner and Outer Bluegrass is a belt of shale commonly known as the Eden Shale Belt or Eden Shale Hills (O’Brien 1984:61; Raitz 1973:54; Schwendeman 1979:30). This area has been extensively eroded over time, which has contributed to the exposure of an underlying shale bed that is less resistant than other rocks (O’Brien 1984:61). The counties located completely within the Outer Bluegrass consist of Boone, Bracken, Campbell, Carroll, Gallatin, Grant, Henry, Kenton, Mason, Oldham, Owen, Robertson, Shelby, Spencer, Trimble, and Washington. Anderson, Clark, Harrison, Mercer, Nicholas, and Pendleton Counties encompass portions of both the Inner and Outer Bluegrass. Portions of Bath, Bullitt, Fleming, Jefferson, and Nelson Counties overlap with the Knobs. Portions of Boyle, Garrard, Madison, and Montgomery Counties are within the Inner Bluegrass, Outer Bluegrass, and Knobs subregions. Finally, Lincoln and Marion Counties overlap with the Knobs subregion, and small portions extend into the Mississippian Plateaus region.

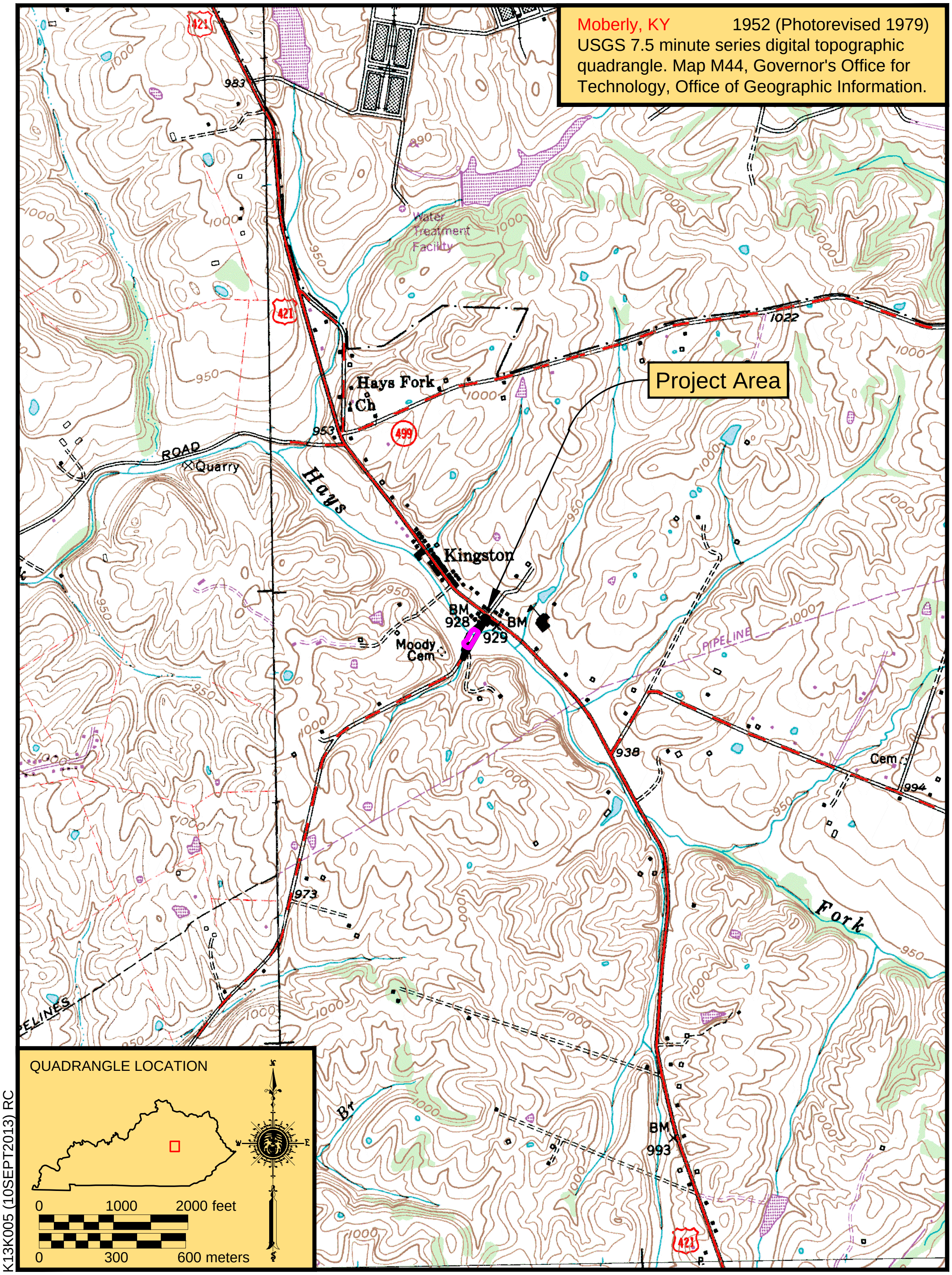

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Figure 2. Location of project area on topographic quadrangle.

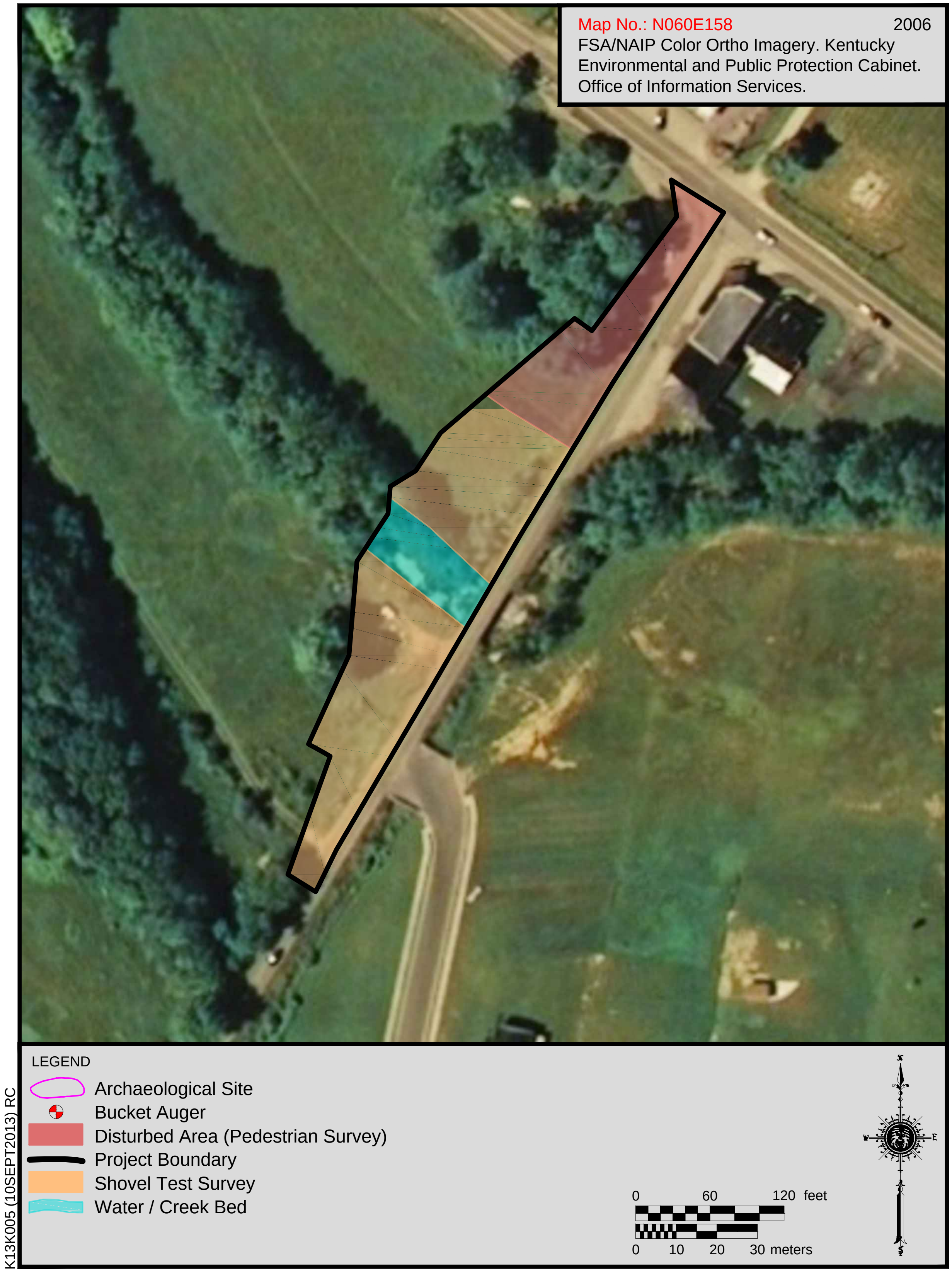

Figure 3. Project area plan map.

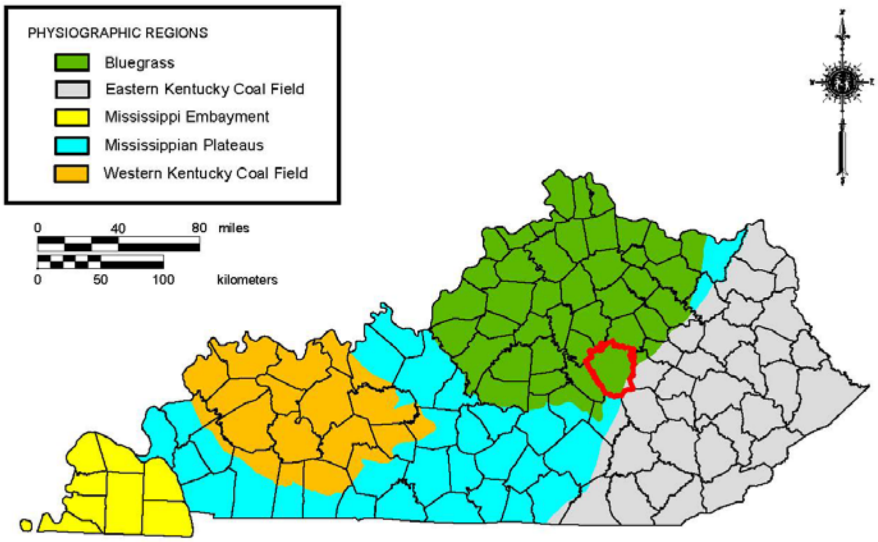

Figure 4. The Bluegrass region.

Like the Inner Bluegrass subregion, rivers that cross the Outer Bluegrass flow through meandering courses that are entrenched well below the plains and low hills. River bottoms within the Outer Bluegrass are narrow, discontinuous, and confined by limestone cliffs and wooded slopes, although they widen at their confluence with the Ohio Valley (Newell 2001). The Outer Bluegrass is bordered to the north and west by the Ohio River and to the south and east by the Knobs region. The Outer Bluegrass circumscribes the Inner Bluegrass region on all sides. The Kentucky, Licking, Ohio, and Salt Rivers and their tributaries drain this region (Figure 5).

Vegetation in the Bluegrass

The Inner and Outer Bluegrass and the western portion of the Knobs are located within the Western Mesophytic Forest region as defined by Braun (2001:122–161), whereas the eastern portion of the Knobs is situated within the Mixed Mesophytic Forest region. The Western Mesophytic Forest region offers a mosaic pattern of climax vegetation types that are often less luxuriant than those observed for the Mixed Mesophytic Forest region (Braun 2001:122–123). The Western Mesophytic region is considered a transition zone in which the effects of local environments allow different climax types to exist in proximity. Braun (2001:529) states that the modern pattern of forest distribution is the result of past and present environmental influences, such as changes in climate, topography, or soil, bringing about changes in vegetation.

The Mixed Mesophytic Forest region is described as the most complex and oldest association of the Deciduous Forest Formation (Braun 2001:39). Mixed mesophytic refers to a climax association in which dominance is shared by a number of species, and the dominant trees are beech, tulip tree, basswood, sugar maple, chestnut, sweet buckeye, red oak, white oak, and hemlock (Braun 2001:40). The composition and abundance of dominants in the Mixed Mesophytic Forest region vary by geographic location and correlate to soil moisture, humidity, and the character of underlying rock (Braun 2001:119). Oak-hickory and oak-chestnut communities are typically located along dry slopes and ridges, while scrubby oak thickets and groves of pine can be found along low slopes of wide valleys (Braun 2001:121). Secondary white oak forest occupies much of the valley floors not in pasture or cultivation, whereas swampy valley flats are composed primarily of pin oak, sweet gum, and red maple (Braun 2001:121).

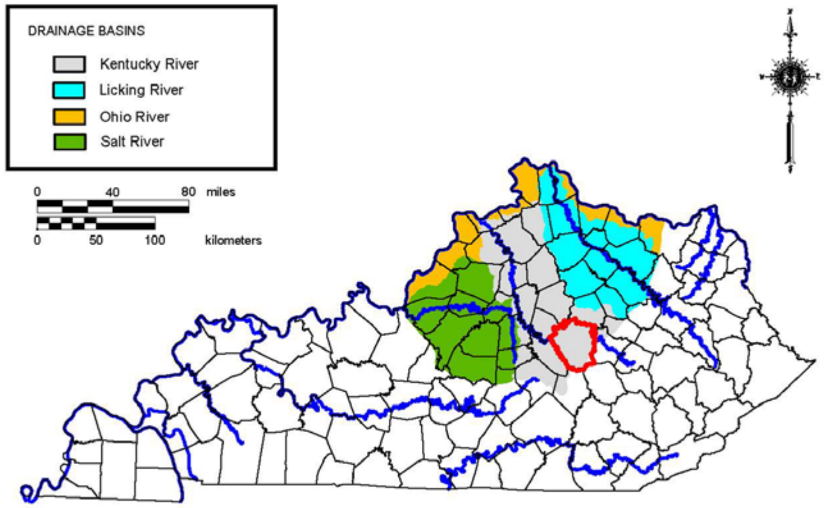

Figure 5. Rivers that drain the Bluegrass region.

A historic account from 1784 indicates that a variety of vegetation types were abundant in the Bluegrass region in general, including sugar maple, honey locust, mulberry, wild cherry, laurel, buckeye, cane, wild rye, clover, buffalo grass, wild lettuce, and pepper grass (Braun 2001:127–128). Mid-nineteenth-century accounts indicate that at least 25 species of trees were present in the Inner Bluegrass region, including sugar maple, walnut, several oaks, hickories, ash, wild cherry, black locust, honey locust, and mulberry. Notably, beech was not mentioned in the early accounts (Braun 2001:129). Blue ash and bur oak are the dominant tree types in the modern Inner Bluegrass. Interestingly, the bluegrass for which the region is named is not considered an indigenous species (Davis 1927).

Locust, sugar maple, hickory, black walnut, ash, wild cherry, white oak, and an undergrowth of cane were reported for the Outer Bluegrass during the mid-nineteenth century, and unlike the Inner Bluegrass, the presence of beech was noted in some communities (Braun 2001:130). In areas of the subregion that have a more rolling topography, beech, tulip tree, sugar maple, white oak, and red oak were abundant (Braun 2001:130).

Burroughs (1926:93) states that a late-nineteenth-century account indicated maples and white oak were historically common in the Knobs subregion; that beech and red cedar were common in areas underlain by limestone; that pine, hemlock, laurel, and holly were located along cliffs and peaks; and that chestnut and oak forests were located along plateaus. During the 1920s, the natural forest growth consisted of oaks, hickory, chestnut, and Virginia pine, and sycamores were found along streams. Redbud and dogwood were found along knob slopes, and mistletoe was often seen along the limestone belts (Burroughs 1926:93–94).

Soils of the Bluegrass

The inner and outer portions of the Bluegrass region are predominantly mapped as the Alfisols order of soils. Alfisols developed on Late Pleistocene or older surfaces or on erosional surfaces of similar age. They have a thin, dark A-horizon rich in organic matter and nutrients and a clay-enriched subsoil, and they are relatively high in fertility due to being only moderately leached (Soil Survey Staff 1999:163–165). Alfisols may contain intact archaeological deposits very near or on the ground surface, depending upon the landform on which they formed (e.g., sideslope vs. ridgetop).

The Inner and Outer Bluegrass subregions are predominantly mapped as the Udalfs suborder of soils, which are the more or less freely-drained Alfisols in areas with well-distributed rainfall and seasonally varying soil temperatures. Some of the Udalfs are underlain by limestone or other calcareous sediments. Udalfs are thought to have developed under forest vegetation, and depending on temperature regime, they supported either a deciduous forest (mesic or warmer) or a mixed coniferous and deciduous forest (frigid). Many Udalfs have been cleared of trees and are intensively farmed. As a result of erosion, many now have only a clay-enriched or iron and aluminum oxide-enriched horizon below an Ap-horizon that is mostly made up of material once part of the subsoil. Udalfs on stable surfaces retain most of their weathered or leached eluvial horizons above the subsoil. A few Udalfs have a natric, or clay and sodium-enriched, horizon, and others have a compacted zone, such as a fragipan, in or below the subsoil (Soil Survey Staff 1999).

The Knobs portion of the Bluegrass region is predominantly mapped as the Inceptisol soil order. Inceptisols developed in silty, acid alluvium during the Late Pleistocene or Holocene time periods on nearly level to steep surfaces. Inceptisols may have deeply buried and intact archaeological deposits, depending upon the landform on which they formed (e.g., sideslope vs. alluvial terrace). Inceptisols exhibit a thick, dark colored surface horizon rich in organic matter and a weakly developed subsurface horizon with evidence of weathering and sometimes of gleying (Soil Survey Staff 1999:489–493).

The Knobs subregion is predominantly mapped as the Udepts suborder of soils, which are mainly the more or less freely-drained Inceptisols in areas with well-distributed to excessive rainfall. In these areas of excessive rainfall, the soils formed in older deposits. Most of the soils are thought to have developed under forest vegetation, but some supported shrubs or grasses. The majority of the soils have either a thinner or a thicker but leached surface horizon and a weakly developed subsoil or B-horizon. Some also have a sulfuric acid-enhanced horizon that is commonly the result of artificial drainage or surface mining or other earthmoving activities. Some also exhibit a subsurface cemented zone, such as a duripan, or a compacted zone, such as a fragipan (Soil Survey Staff 1999).

Finally, Gallatin and Trimble Counties make up a small area that is predominantly mapped as the Mollisols soil order. They are grassland soils, and because of long-term addition of organic material to the soil from plant roots, the surface horizon is thick, dark, and fertile. They can exhibit clay, sodium and/or carbonate enriched, or even leached subsoil horizons. These soils formed on level to sloping ground in Late Pleistocene to Holocene or even earlier deposits and generally under grassland that could have been previously forested. They have the potential to contain deeply buried and intact archaeological deposits on level floodplain or terrace landforms (Soil Survey Staff 1999:555–557).

Gallatin and Trimble Counties are predominantly mapped as the Udoll suborder of soils, which are mainly the more or less freely-drained Mollisols of humid climates in areas with well-distributed rainfall. They formed mainly in Late Pleistocene or Holocene deposits or on surfaces of comparable ages (Soil Survey Staff 1999).

Lithic Resources

The Bluegrass region displays diverse and abundant sources of lithic raw material that could have been exploited by prehistoric inhabitants. Silurian- and Ordovician-age dolomite, limestone, siltstone, and shale deposits outcrop in various areas of the region (United States Geological Survey [USGS] 2013). These deposits contain Grier cherts, which predominate in the Inner Bluegrass area, and Gilbert, Tyrone, and Salvisa cherts, which predominate in the Outer Bluegrass. In the Knobs area, the Devonian to Mississippian-age limestone and shale deposits contain predominantly Boyle and Brassfield cherts. Pleistocene to Holocene-age glacial deposits in the Louisville area contain a variety of cherts. Grier chert is a low to moderate quality chert; however, it is abundant in some areas and was often used as a source of tool stone for prehistoric groups. Gilbert, Tyrone, and Salvisa cherts exhibit a more restricted geographic range than Grier chert; therefore, they are not as commonly recovered on prehistoric sites in the region. Boyle and Brassfield cherts are both high quality cherts and are abundant in the Outer Bluegrass region. Both of these materials were used by prehistoric people in the region.

Prehistoric and Historic Climate

Climatic conditions during the period of human occupation in the region (Late Pleistocene and Holocene ages) can be described as a series of transitions in temperature, rainfall, and seasonal patterns that created a wide range of ecological variation, altering the survival strategies of human populations (Anderson 2001; Niquette and Donham 1985:6–8; Shane et al. 2001). The landscape during the Pleistocene was quite different from that of today. Much of the mid-continent consisted of periglacial tundra dominated by boreal conifer and jack-pine forests. Eastern North America was populated by a variety of faunal species, including megafaunal taxa such as mastodon, mammoth, saber-toothed tiger, and Pleistocene horse, as well as by modern taxa such as white-tailed deer, raccoon, and rabbit.

The Wisconsinan glacial maximum occurred approximately 21,400 years B.P. (Anderson 2001; Delcourt and Delcourt 1987). By 15,000 B.P., following the Wisconsinan glacial maximum, a general warming trend and concomitant glacial retreat had set in (Anderson 2001; Shane 1994). Towards the end of the Pleistocene and after 14,000 B.P., the boreal forest gave way to a mixed conifer/northern hardwoods forest complex. In the Early Holocene and by 10,000 B.P., southern Indiana was probably on the northern fringes of expanding deciduous forests (Delcourt and Delcourt 1987:92–98). Pollen records from the Gallipolis Lock and Dam on the Ohio River near Putnam County, West Virginia, reveal that all the important arboreal taxa of mixed mesophytic forest had arrived in the region by 9000–8500 B.P. (Fredlund 1989:23). Similarly, Reidhead (1984:421) indicates that the generalized hardwood forests were well established in southeastern Indiana and southwest Ohio by circa 8200 B.P.

Prior to approximately 13,450 B.P., climatic conditions were harsh but capable of supporting human populations (Adovasio et al. 1998; McAvoy and McAvoy 1997). Populations were probably small, scattered, and not reproductively viable (Anderson 2001). The Inter-Allerød Cold Period, circa 13,450–12,900 B.P, brought about the dispersal of Native Americans across the continent. This period was followed by the rapid onset of a cooling event known as the Younger Dryas (circa 12,900–11,650 B.P.), during which megafauna species became extinct, vegetation changed dramatically, and temperature fluctuated markedly. It was also a period of noticeable settlement shift that marked the appearance of a variety of subregional cultures across eastern North America (Anderson 2001).

In a recent review, Meeks and Anderson (2012:111) described the Pleistocene/Holocene transition as “a period of tremendous environmental dynamism coincident with the Younger Dryas event.” The Younger Dryas (circa 12,900 to 11,600 cal. B.P.) represents one of the largest abrupt climate changes that has occurred within the past 100,000 years. The onset of the Younger Dryas appears to have been a relatively rapid event that may have been driven by a freshwater influx into the North Atlantic as a result of catastrophic outbursts of glacial lakes. “The net effect of these outbursts of freshwater was a reduction in sea surface salinity, which altered the thermohaline conveyor belt; effectively slowing ocean circulation of warmer water (heat) to the north and bringing cold conditions” (Meeks and Anderson 2012:111; though see Meltzer and Bar-Yosef 2012:251–252 for a critique of this view). This resulted in significantly lower temperatures during this time. The Younger

Dryas ended approximately 1,300 years later over a several decade period. The onset of the Younger Dryas coincides with the end of Clovis and the advent of more geographically circumscribed cultural traditions.

Pollen records for the Younger Dryas indicate that vegetation shifts were sometimes abrupt and characterized by oscillations. These shifts were not uniform over the entire southeast and indicate that a variety of factors were at play. At Jackson Pond in Kentucky (Wilkins et al. 1991), for example, several pronounced reciprocal oscillations occurred in a large number of spruce and oak. According to Meeks and Anderson, “these oscillations reflect shifts between boreal/deciduous forest ecotones associated with cool/wet and cool/dry conditions, respectively” (2012:113).

Meeks and Anderson (2012:126–130) define five population events for the Paleoindian–Early Holocene transition. Population Event 1 (circa 15,000–13,800 cal. B.P.) is a pre-Clovis occupation that exhibits a slow rise in population. This event may represent the initial colonization of the southeast region and may represent the basis of later Clovis occupation or a failed migration (Meeks and Anderson 2012:129). Population Event 2 represents an apparent 600 year gap between Events 1 and 3. Population Event 3 (circa 13,200–12,800 cal. B.P.) occurred just prior to, and extended into, the Younger Dryas event. This event represents the “first unequivocal evidence for widespread human occupation across the southeastern United States” (Meeks and Anderson 2012:129). Event 3 coincided with the Clovis occupation in the region. A marked decline in the population is posited for Population Event 4 (12,800–11,900 cal. B.P.). This equates with the early to middle Younger Dryas and relates to a post-Clovis occupation of the region. Meeks and Anderson (2012:129) see a fragmentation of the regional Clovis culture at this time along with “the development of geographically circumscribed subregional, cultural traditions in the southeastern United States.” A marked increase in population density is posited between 11,900 and 11,200 cal. B.P. This coincides with the late portion of the Younger Dryas and the early portion of the Holocene. Population Event 5 is represented by this time frame. Early Side Notched and Dalton are seen during this time.

During the Early Holocene, rapid increases in boreal plant species occurred on the Allegheny Plateau in response to the retreat of the Laurentide ice sheet from the continental United States (Maxwell and Davis 1972:517–519; Whitehead 1973:624). At lower elevations, deciduous species were returning after having migrated to southern Mississippi Valley refugia during the Wisconsinan advances (Delcourt and Delcourt 1981:147). The climate during the Early Holocene was still considerably cooler than the modern climate, and based on species extant at that time in upper altitude zones of the Allegheny Plateau, conditions would have been similar to the Canadian boreal forest region of today (Maxwell and Davis 1972:515–516). Conditions at lower elevations were less severe and favored the transition from boreal to mixed mesophytic species. At Cheek Bend Cave in the Nashville Basin, an assemblage of small animals from the Late Pleistocene confirms the environmental changes that took place during the Pleistocene to Holocene transition and the resulting extinction of Pleistocene megafauna and establishment of modern fauna in this area (Klippel and Parmalee 1982).

Traditionally, Middle Holocene (circa 8000–5000 B.P., also referred to as the Hypsithermal) climate conditions were thought to be consistently dryer and warmer than the present (Delcourt 1979:271; Klippel and Parmalee 1982; Wright 1968). The influx of westerly winds contributed to periods of severe moisture stress in the Prairie Peninsula and to an eastward advance of prairie vegetation (Wright 1968). More recent research (Anderson 2001; Shane et al. 2001:32–33) suggests that the Middle Holocene was marked by considerable local climatic variability. Paleoclimatic data indicate that the period was marked by more pronounced seasonality characterized by warmer summers and cooler winters.

The earliest distinguishable Late Holocene climatic episode began circa 5000 B.P. and ended around 2800 B.P. This Sub-Boreal episode is associated with the establishment of essentially modern deciduous forest communities in the southern highlands and increased precipitation across most of the mid-continental United States (Delcourt 1979:271; Maxwell and Davis 1972:517–519; Shane et al. 2001; Warren and O'Brien 1982:73). Changes in local and extra-local forests after approximately 4800 B.P. may also have been the result of anthropogenic influences. Fredlund (1989:23) reports that the Gallipolis pollen record showed increasing local disturbance of the vegetation from circa 4800 B.P. to the present, a disturbance that may have been associated with the development and expansion of horticultural activity. Based on a study of pollen and wood charcoal from the Cliff Palace Pond in Jackson County, Kentucky, Delcourt and Delcourt (1997:35–36) recorded the replacement of a red cedar–dominated forest with a forest dominated by fire-tolerant taxa (oaks and chestnuts) around 3000 B.P. The change is associated with increased local wildfires (both natural and culturally augmented) and coincided with increases in cultural utilization of upland (mountain) forests.

Beginning around 2800 B.P., generally warm conditions, probably similar to those of the twentieth century, prevailed during the Sub-Atlantic and Post–Sub-Atlantic climatic episodes, with the exception of the Neo-Boreal sub-episode, or Little Ice Age (circa 700–100 B.P.), which was coldest from circa 400 until its end. Despite the prevailing trend, brief temperature and moisture variations occurred during this period. Some of these fluctuations have been associated with adaptive shifts in Midwestern prehistoric subsistence and settlement systems (Baerreis et al. 1976; Griffin 1961; Struever and Vickery 1973; Warren and O'Brien 1982).

Studies of historic weather patterns and tree-ring data by Fritts et al. (1979) indicate that twentieth-century climatological averages were "unusually mild" when compared to seventeenth- to nineteenth-century trends (the time period used for comparison represents the coldest period of the Neo-Boreal [400–100 B.P.], or the Little Ice Age) (Fritts et al. 1979:18). The study suggested that winters were generally colder, weather anomalies were more common, and unusually severe winters were more frequent between A.D. 1602 and A.D. 1900 than after A.D. 1900. The effects of the Neo-Boreal sub-episode, which ended during the mid- to late nineteenth century, have not been studied in detail for this region. It appears that the area experienced smaller temperature decreases during the late Neo-Boreal than did the upper Midwest and northern Plains (Fritts et al. 1979), so it follows that related changes in extant vegetation would be more difficult to detect.

Modern Climate

The modern climate of Kentucky is moderate in character and temperature, and precipitation levels fluctuate widely. The prevailing winds are westerly, and most storms cross the state in a west to east pattern. Low pressure storms that originate in the Gulf of Mexico and move in a northeasterly direction across Kentucky contribute the majority of the precipitation received by the state. Warm, moist, tropical air masses from the Gulf predominate during the summer months and contribute to the high humidity levels experienced throughout the state. As storms move through the state, occasional hot and cold periods of short duration may be experienced. During the spring and fall, storm systems tend to be less severe and less frequent, resulting in less radical extremes in temperature and rainfall (Anderson 1975).

Description of the Project Area

The project area is located in Madison County, Kentucky, on the northwest side of KY 3376 and extends from the intersection of KY 3376 and U.S. 421 approximately 195 m to the southwest (Figures 6–9). The proposed replacement bridge spans Hays Fork, a tributary of Silver Creek. The project area occurs at 283 m AMSL. It covers .39 ha and was surveyed in its entirety (see Figure 3).

Figure 6. Standing KY 3376 bridge that spans Hays Fork, facing northeast.

Figure 7. Creek terrace within the project area tested by shovel testing and bucket augering, facing southwest. Cultural material recovered from this area was included in the 15Ma499 site boundary.

Figure 8. Vegetation within the project area southwest of the bridge, facing north. A previously unrecorded archaeological site (15Ma499) was found in the vicinity of the trees alongside the road.

Figure 9. Lawn and surface disturbance related to a commercial development at the KY 3376/U.S. 421 intersection. Photograph facing northeast.

The portion of the project area near the intersection of KY 3376 and U.S. 421 was disturbed by a commercial development and a prepared lawn was observed in this segment. The northeast bank of Hays Creek was also vegetated by lawn grasses, but was apparently undisturbed. The portion of the project area located southwest of the creek was vegetated by a few trees near an old house foundation (15Ma499), tall grasses, briars, and weeds. Due to the vegetation, the ground surface visibility was very limited.

Two soil series have been defined in the project area: Mercer and Newark. The soil series are classified by the amount of time it has taken them to form and the landscape position they are found on (Birkeland 1984; Soil Survey Staff 1999). This information can provide a relative age of the soils and can express the potential for buried archaeological deposits within them (Stafford 2004). The soil order and group classifications for each soil series are used to assist with determining this potential.

The Mercer soil series is classified as an Alfisol. Alfisols are found on landforms that formed during the Late Pleistocene time period (Soil Survey Staff 1999:163–167). These may have deeply buried and intact archaeological deposits, depending upon the landform on which they formed (e.g., sideslope vs. alluvial terrace). The portion of the project area mapped as this soil was disturbed due to a commercial development.

The Newark soil series is classified as an Inceptisol. This soil is found on landforms that formed during the late Pleistocene or Holocene time periods (Soil Survey Staff 1999:489–493). They may have deeply buried and intact archaeological deposits, depending upon the landform on which they formed (e.g., sideslope vs. alluvial terrace). A portion of the project area located on the northeast bank of Hays Fork was undisturbed and required bucket augering at the base of a number of shovel test probes (STPs).

The undisturbed portion of the project area was mapped as Newark series silt loam. Site 15Ma499, which was recorded during the current investigation, was also situated on a landform mapped with this soil. Some of the details of the project area soil description provided in this section will be subsequently repeated in the *Results* section (Site 15Ma499) of this report. On the north terrace of Hays Fork, bucket auger probes were positioned at the base of three STPs that had been excavated to 50 cm bgs. A representative sediment profile encountered in this area consisted of a very dark grayish brown (10YR 3/2) clay loam Zone I to 26 cm bgs, overlying a Zone II that featured the same sediment color and texture, but with a light quantity of rounded pebbles, to 55 cm bgs. Zone III was a yellowish brown (10YR 5/4) silt loam and occurred to 72 cm bgs. It was followed by a dark yellowish brown (10YR 4/4) mottled with light yellowish brown (10YR 6/4) coarse sandy clay loam with rounded pebble content to 95 cm bgs. The underlying subsoil consisted of a yellowish brown (10YR 5/4) mottled with olive yellow (2.5Y 6/6) silt loam to 115 cm bgs. No buried cultural materials or indications of buried, stable sediment horizons were noted from excavation conducted in this area. Shovel testing conducted in the remaining areas of the project area, southwest of Hays Fork bridge, contained sediment profiles that indicated disturbance related to the clearing of a former residence at the location of Site 15Ma499, and undisturbed, but shallow plow zone deposits.

III. PREVIOUS RESEARCH AND CULTURAL OVERVIEW

Prior to initiating fieldwork, a search of records maintained by the NRHP (available online at: http://nrhp.focus.nps.gov/natreghome.do?searchtype=natreghome) and the OSA (FY14_7736) was conducted to: 1) determine if the project area had been previously surveyed for archaeological resources; 2) identify any previously recorded archaeological sites that were situated within the project area; 3) provide information concerning what archaeological resources could be expected within the project area; and 4) provide a context for any archaeological resources recovered within the project area. A search of the NRHP records indicated that no archaeological sites listed on the NRHP were situated within the current project area or within a 2 km radius of the project area. The OSA file search was conducted between August 5 and 13, 2013. The work at OSA consisted of a review of professional survey reports and records of archaeological sites for an area encompassing a 2 km radius of the project footprint. To further characterize the archaeological resources in the general area, the OSA archaeological site database for the county was reviewed and synthesized. The review of professional survey reports and archaeological site data in the county provided basic information on the types of archaeological resources that were likely to occur within the project area and the landforms that were most likely to contain these resources. The results are discussed below.

OSA records revealed that five previous professional archaeological surveys and one archaeological mitigation project have been conducted within a 2 km radius of the project area. Seventeen previously recorded sites (15Ma47, 15Ma66, 15Ma67, 15Ma240, 15Ma242, 15Ma243, 15Ma252, 15Ma306E, 15Ma306F, 15Ma306H, 15Ma312–15Ma317, 15Ma494) have been located in 2 km radius file search area. None of these sites, however, will be affected by the proposed bridge project. The 2 km radius included areas within the Moberly and Richmond South, Kentucky, quadrangles (USGS 1952a and 1965).

Previous Archaeological Surveys

Between May and September 1993, Geo-Marine, Inc., personnel conducted an archaeological survey at the request of the United States Army Corps of Engineers (USACE), Fort Worth District, for the proposed new construction involving a railroad platform and access road at the Blue Grass Army Depot in Madison County, Kentucky (Waite and Ensor 1996). A pedestrian survey, supplemented with shovel testing and backhoe trenching, resulted in the documentation of 39 archaeological sites. Only 3 sites were considered eligible for NRHP inclusion. The remaining sites were not assessed. None of the sites are located within the 2 km radius of the current project area.

On October 4, 1996, CRA personnel conducted an archaeological survey for a 372 sq m (4,000 sq ft) proposed borrow pit in Madison County, Kentucky (Hand 1996). At the request of Gene Waddell of the Bluegrass Contracting Corporation, the project area was investigated with an intensive pedestrian survey supplemented with shovel tests. No archaeological sites were identified during the survey, and project clearance was recommended.

During the winter and spring of 1998, USACE personnel in the Louisville District conducted an archaeological survey of a proposed ammunition training facility at the Blue Grass Army Depot in Madison County, Kentucky (Bader 1998). The first phase of this proposed facility involved the construction of a road network and entrance/exit culverts; an exterior and perimeter road network; an interior road network leading to storage pads; a vehicle holding area; a vehicle assembly area; and a final inspection site. The project area encompassed 24.5 ha (60.0 acres), of which 18.0 ha (44.0 acres) had been previously surveyed. Approximately 6.5 ha (16.0 acres) were investigated by a pedestrian survey supplemented with shovel tests. One prehistoric open habitation without mounds (15Ma277) was documented during the survey. The site was not considered eligible for NRHP listing, and no further work was recommended. Site 15Ma277 is not located within the 2 km radius and is described below.

During the spring and summer of 1998, USACE personnel from the Louisville District conducted an archaeological survey of Phase II and Phase III portions of a proposed ammunition training facility at the Blue Grass

Army Depot in Madison County, Kentucky (Bader 1999). The Phase II portion included the proposed construction of an exterior or perimeter road network; a Class V surveillance and maintenance area; an interior road network leading to storage pads; three storage pads; and a sling-out area. The Phase III portion included the proposed construction of an exterior or perimeter road network; an interior road network leading to modular storage areas; a demolition area; a demil area; a captured ammunition area; permanent security fencing; and area improvement. The Phase II and Phase III areas consisted of approximately 82 ha (202 acres) and were investigated by pedestrian survey, supplemented with previous landowner interviews, screened shovel testing, and metal detection. A total of five archaeological sites (15Ma312–15Ma316) and seven isolated finds were documented during the survey. All five sites are located within a 2 km radius of the current project area.

Site 15Ma312 is a late-nineteenth- and early-twentieth-century farm/residence with an indeterminate prehistoric isolated find. The site contained a moderate density of historic artifacts in a dark midden. Although no features were documented, the presence of large stones and depressions, along with archival research, suggests a nineteenth-century log home once stood on the site. A stone spring house ruin was located on an adjacent sideslope. Based on landowner interviews, the site may have been involved in the Civil War Battle of Richmond. Avoidance of the site or NRHP eligibility evaluation was recommended (Bader 1999).

Site 15Ma313 is a multi-component historic artifact scatter and prehistoric open habitation without mounds of indeterminate cultural/temporal affiliation. The historic artifact assemblage was likely dragged from nearby Site 15Ma316, and the prehistoric artifact density was sparse. The integrity of the site was poor and there was limited potential for intact subsurface features. The site was considered ineligible for NRHP inclusion, and no further work was recommended (Bader 1999).

Sites 15Ma314 and 15Ma315 are multi-component historic artifact scatters dating from the late nineteenth to early twentieth centuries and prehistoric open habitations without mounds of indeterminate cultural/temporal affiliation. Artifact densities for both sites were low and were contained within an eroded, shallow plow zone. The sites were considered ineligible for NRHP inclusion, and no further work was recommended (Bader 1999).

Site 15Ma316 is a small historic farm/residence dating to the early to mid-twentieth century. The majority of the artifact assemblage was metallic and most likely represents the remains of a small barn or shed. The site was considered ineligible for NRHP inclusion, and no further work was recommended (Bader 1999).

During the spring and summer of 1999, Kentucky Archaeological Survey personnel conducted an archeological survey of 749 ha (1,850 acres) in an attempt to locate battle lines from the Battle of Richmond (15Ma306) in Madison County, Kentucky (McBride and Stottman 2000). The survey was funded by the American Battlefield Protection Program of the NPS, Department of Interior. In 1995, a book on the battle identified areas in which the Civil War battle took place (Lambert 1995). In 1994, two large tracts of land were nominated to the NRHP. Metal detection of the project area concluded that Lambert's descriptions of the areas were accurate and the NRHP parcels encompassed the battle areas. Three major concentrations of Civil War artifacts were identified, one of which was not included in the NRHP boundaries. Inclusion of the Battle of Richmond (15Ma306) to the NRHP and preservation was recommended, with the boundaries being expanded to include the third concentration.

Areas 15Ma306E, 15Ma306F, and 15Ma306H were located during the McBride and Stottman (2000) survey and are located within a 2 km radius of the current project area. Cultural materials recovered from metal detection of 15Ma306E included 11 bullets; 9 round balls; 19 artillery shell fragments; 6 top or bottom plates from canisters; 1 canister shot; and 1 scabbard shot.

The site form on file at OSA designated 15Ma306F as a historic isolated find consisting of one possible handle from the back of a curry comb and the front of a padlock. Area 15Ma306H, “Pleasant View”, is a multi-component historic farm/residence and prehistoric open habitation without mounds. The cultural materials recovered from this area during the McBride and Stottman (2000) survey consisted of a fragment from the base of a conical artillery shell and a minie bullet.

In 2010 and 2011, the University of Kentucky’s Program for Archaeological Research personnel conducted alternative mitigation on the former slave quarters associated with the Herndon-Gibb House (Pleasant View site, Area 15Ma306H) in Madison County, Kentucky, at the request of the Madison County Fiscal Court (Goodman et al. 2012). The Herndon-Gibb House is located within, and is a contributing element to, the Civil War Battle of Richmond (15Ma306) and is eligible for NRHP inclusion. Architectural restoration activities inadvertently disturbed intact deposits south of the slave quarter building. Field methods consisted of the screening and recovery of material from disturbed backfill piles, geophysical survey, and excavation and documentation of test units. The results of this alternative mitigation were combined with the results of previously unreported fieldwork conduced at Pleasant View as part of public education and Civil War demonstration events. Despite the disturbance, intact archaeological features dating to the early to mid-nineteenth century were documented. It was recommended that future ground disturbing activities should be preceded by archaeological investigations.

Sites 15Ma47, 15Ma66, 15Ma67, 15Ma240, 15Ma242, 15Ma243, 15Ma252, and 15Ma317 did not have associated reports, but the information from the site forms found in the OSA records are summarized in Table 1.

Archaeological Site Data

The OSA records show that prior to this survey, 498 archaeological sites had been recorded in Madison County (Table 2). The site data indicate that the majority of archaeological sites recorded in Madison County consist of open habitations without mounds (n = 324; 65.06 percent) and historic farms/residences (n = 89; 17.87 percent). Other site types in the county include earth mounds (n = 22; 4.42 percent), and cemeteries (n = 10; 2.01 percent). The remaining site types are undetermined or occur in numbers under one percent of the total number of sites for Madison County.

Temporal periods recorded for sites in Madison County consisted of Paleoindian (n = 8; 1.12 percent), Archaic (n = 53; 7.43 percent), Woodland (n = 65; 9.12 percent), Late Prehistoric (n = 60; 8.42 percent), and Historic (n = 191; 26.79 percent). The remaining components were classified as Indeterminate/Unspecified Prehistoric (n = 336; 47.12 percent).

The majority of recorded sites in Madison County are located on dissected uplands (n = 352; 70.68 percent) followed by terraces (n = 45; 9.04 percent), undissected uplands (n = 38; 7.63 percent), floodplains (n = 37; 7.43 percent), and hillsides (n = 15; 3.01 percent). The remaining sites (n = 11; 2.21 percent) are located on unspecified/other landforms.

The current project area is situated on terrace landforms. Most sites found on terraces are open habitations without mounds (n = 28; 62.22 percent) and historic farms/residences (n = 11; 24.44 percent).

Table 1. Sites within the File Search Area without Associated Reports.

Site	Site Name	Note	Site type	Cultural Affiliation	Materials collected	Materials observed but not collected	Surveyed by	Company	Survey Date	Investigation Type	NRHP Status
15Ma47	Moody Site	-	open habitation w/o mounds	Early Archaic	projectile points/base frags (Dalton point, LeCroy-type points), debitage, ground/pecked/battered stone	none	Robert C. Moody and Sandra L. Moody	n/a	July 2, 1981	Volunteered report	inventory site
15Ma66	Moody Site 2	-	open habitation w/o mounds	Paleoindian; Archaic, undefined	thumbnail scrapers, side-notched points, corner side-notched points, stemmed points, flakes, scrapers, knives	none	Robert C. Moody	n/a	July 19, 1982	Volunteered report	inventory site
15Ma67	G.W. Moody Jr. Site	-	open habitation w/o mounds	Paleoindian; Archaic, undefined	trianguloid blades, weak stemmed points, corner and side-notched thumbnail scrapers, ground stone celt fragment, Clovis base, uniface projectile point, local cherts, one corner-notched proj pt (has substance on base – not ochre)	none	Bob Moody	n/a	July 19, 1982	Volunteered report	inventory site
15Ma240	-	located within the NR boundaries of Site 15Ma306	open habitation w/o mounds; historic military; historic refuse midden	unknown prehistoric; (1851-1900)	1 projectile point/frag, 37 flakes/cores/chunks and 56 whiteware, 9 gray stoneware, 62 glass, 33 cut nails, 2 wire nails, glass sew-through button, shotgun shell, 1 screw, 2 cannon ball frags	not specified	Thomas W. Bodor	Greenhorne & O'Mara, Inc.	November 1995	Intensive	Not assessed
15Ma242	-	located within the NR boundaries of Site 15Ma306	open habitation w/o mounds	unknown prehistoric	71 flakes/cores/chunks	not specified	Thomas W. Bodor	Greenhorne & O'Mara, Inc.	November 1995	Intensive	Not assessed
15Ma243	-	located within the NR boundaries of Site 15Ma306	open habitation w/o mounds	unknown prehistoric	1 "other drill", 1 biface/frag, 33 flakes/cores/chunks	not specified	Thomas W. Bodor	Greenhorne & O'Mara, Inc.	November 1995	Intensive	Not assessed
15Ma252	-	located within the NR boundaries of Site 15Ma306	indeterminate prehistoric; historic farm/residence	unknown prehistoric; (1801-1900)	2 flakes/cores/chunks and 1 whiteware, 1 lead-glaze earthenware, 2 glass, 3 nails, coal, 1 bolt	not specified	Thomas W. Bodor	Greenhorne & O'Mara, Inc.	November 1995	Intensive	Not assessed
15Ma317	Moody Site	located within the NR boundaries of Site 15Ma306	open habitation w/o mounds; historic farm/residence	Early Archaic; Late Woodland/Mississippian; Fort Ancient; (1851-1950)	6 projectile points/frags (Ft. Ancient triangular midsection, 1 Lowe Flared base, 1 Steuben, 1 Palmer, 2 Kirk); 7 bifaces/frags; 1 perforator/graver; 54 flakes/cores/chunks; a sample of various domestic and agricultural metal artifacts (including cut nails, spoon, horseshoe nail, horseshoes), ceramics (including flow blue, salt and alkaline glaze stonewares, and 3 marked pieces dating from 1883-1960), and glass artifacts (including amethyst, bottle necks dating from the late nineteenth to early twentieth centuries, canning jar fragments and lid liner, tumbler vases)	lithic knapping debris; various ceramic, glass, and metal artifacts	Kary Stackelbeck, Jenny Taylor, Marsha Franks	KAS	September 21, 1999	Reconnaissance	Not assessed

Table 2. Summary of Selected Information for Previously Recorded Archaeological Sites in Madison County, Kentucky. Data Obtained from OSA and May Contain Coding Errors.

Site Type:	N	%
Cemetery	10	2.01
Earth Mound	22	4.42
Historic Farm/Residence	89	17.87
Industrial	3	0.6
Isolated Find	4	0.8
Military	4	0.8
Mound Complex	2	0.4
Non-mound Earthwork	4	0.8
Open Habitation with Mounds	4	0.8
Open Habitation without Mounds	324	65.06
Other	9	1.81
Other Special Activity Area	3	0.6
Petroglyph/Pictograph	1	0.2
Rockshelter	3	0.6
Stone Mound	1	0.2
Undetermined	13	2.61
Workshop	2	0.4
Total	498	100
Time Periods Represented	**N**	**%**
Paleoindian	8	1.12
Archaic	53	7.43
Woodland	65	9.12
Late Prehistoric	60	8.42
Indeterminate Prehistoric	322	45.16
Historic	191	26.79
Unspecified	14	1.96
Total	713*	100
Landform	**N**	**%**
Dissected Uplands	352	70.68
Floodplain	37	7.43
Hillside	15	3.01
Other	1	0.2
Terrace	45	9.04
Undissected Uplands	38	7.63
Unspecified	10	2.01
Total	498	100

**One site may represent more than one time period.*

Map Data

In addition to the file search, a review of available maps was initiated to help identify potential historic properties (structures) or historic archaeological site locations within the proposed project area. The following maps were reviewed:

Ca. 1800s Topography of Madison County, Kentucky (Kentucky Geological Survey [KGS]);

1876 Map of Madison County, Kentucky (Beers);

1892 Richmond, Kentucky, 30-minute series topographic quadrangle (USGS);

1929 Map of Madison County, Kentucky (KGS);

1942 General Highway Map of Madison County, Kentucky (Kentucky Department of Highways [KDOH]);

1952b Moberly, Kentucky, 7.5-minute series topographic quadrangle (USGS); and

1955 General Highway Map of Madison County, Kentucky (KDOH).

A review of several nineteenth-century maps (Beers 1876; KGS ca. 1800s; USGS 1892) did not indicate the presence of structures within or immediately adjacent to, the project area. One of these maps also featured a detailed, inset depiction of the community of Kingston, in addition to the overall county map (Beers 1876).

A structure location (map structure [MS] 1) was noted on the southwest bank of Hays Fork on the 1929, 1942, 1952, and 1955 maps (KDOH 1942, 1955; KGS 1929; USGS 1952b) (Figures 10 and 11). The scale of the 1942 and 1955 highway maps (KDOH 1942, 1955) made precise placement of MS 1 difficult to determine. MS 2 and MS 3 are depicted within, or immediately adjacent to the project area only on the 1952 map (USGS 1952b), at a location currently occupied by a modern commercial development (see Figure 9 and 11).

Only undisturbed areas within the project area were investigated for archaeological deposits according to accepted methodology, as described in the *Methods* section of the report. The current investigation resulted in the documentation of a historic farm/residence (15Ma499) at the location indicated as MS 1. Site 15Ma499 is discussed in the *Results* section.

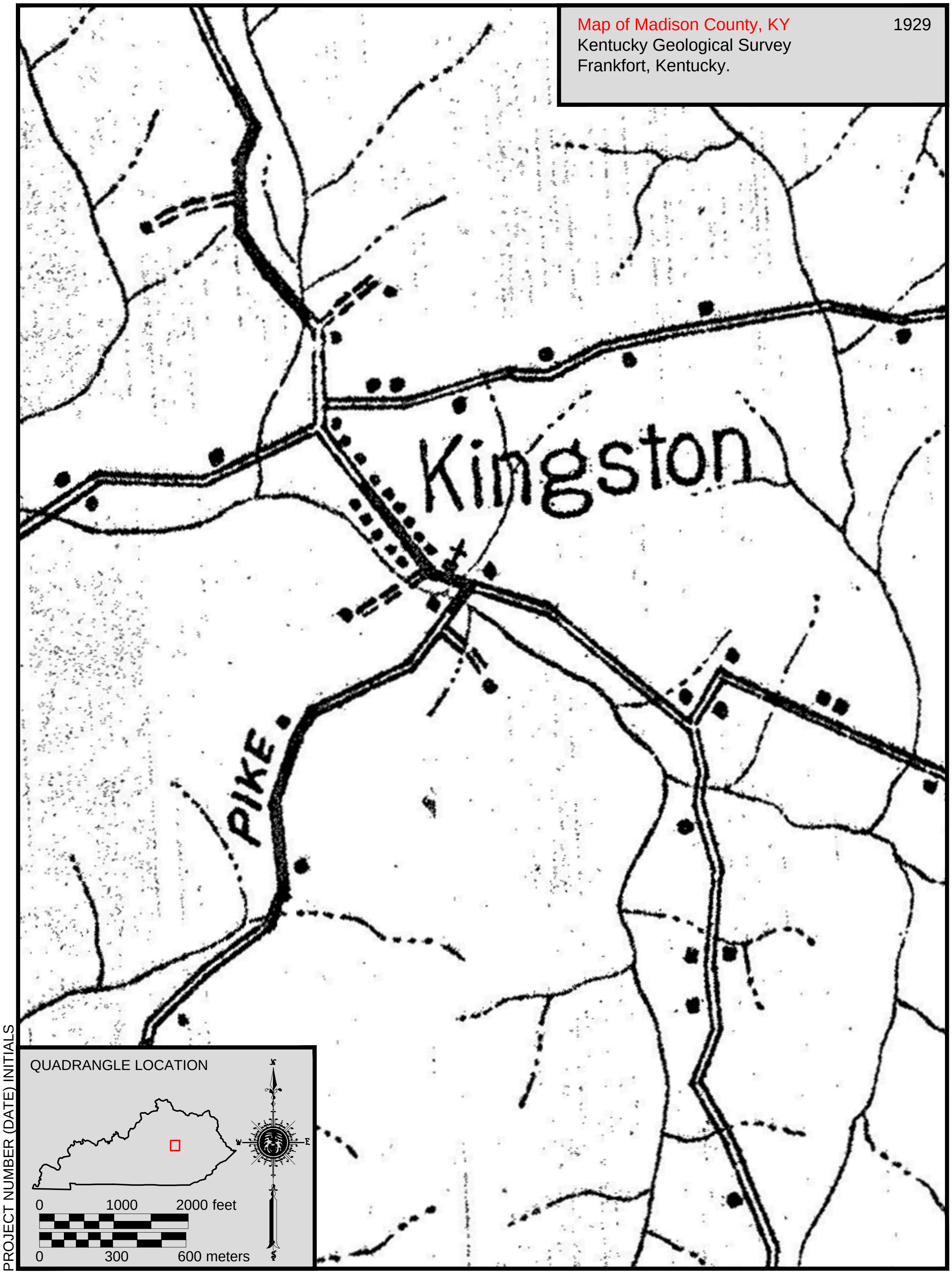

Figure 10. 1929 topographic map depicting MS 1 (KGS 1929).

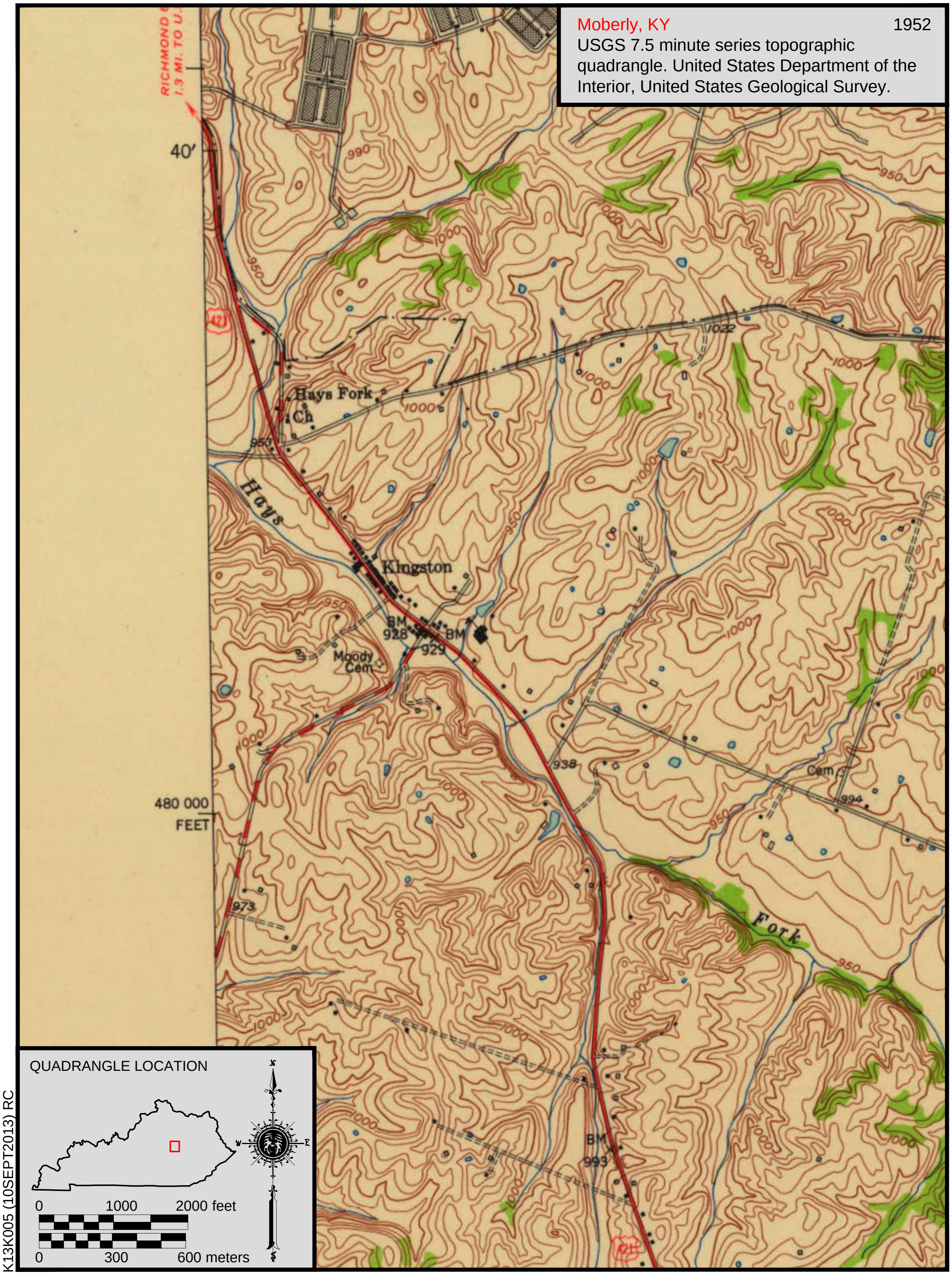

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Figure 11. 1952 topographic quadrangle depicting MS 1, MS 2, and MS 3 (USGS 1952b).

Survey Predictions

Considering the known distribution of sites in the county, the available information on site types recorded, and the nature of the present project area, certain predictions were possible regarding the kinds of sites that might be encountered within the project area. Historic farm/residence sites were the primary site type expected, but prehistoric open habitations and military sites related to nearby Civil War actions were also considered a possibility.

Cultural Overview

Early Human Occupation

The timing and actual entry point of the first humans into North America are still topics for debate. Over the last decade there has been increasing data indicating human occupation in North America circa 15,000 B.P. This data comes from both archaeological and genetic/DNA research (e.g., Gilbert et al. 2008; Goebel et al. 2008; Jenkins et al. 2012; Reich et al. 2012; Waters et al. 2011). While there has been some discussion of eastern routes to North America (e.g., Bradley and Stanford 2004, 2006; Stanford and Bradley 2012), the general consensus remains that humans entered North America from Asia via the Bering Strait. Goebel et al. (2008:1501) summarize much of this data and state that the most parsimonious explanation of the available genetic, archaeological, and environmental evidence is that humans colonized the Americas around 15 ka [15,000 BP], immediately after deglaciation of the Pacific coastal corridor. Monte Verde, Schaefer, and Hebior point to a human presence in the Americas by 14.6 ka [14,600 BP]. Human occupations at Meadowcroft, Page-Ladson, and Paisley Cave also appear to date to this time. Together these sites may represent the new basal stratum of American prehistory, one that could have given rise to Clovis. Most mtDNA and Ychromosome haplogroup coalescence estimates predict a 15-ka migration event.

Based on genetic data, Reich et al. (2012) suggest Native Americans are descended from three migrations of Asian gene flow. The majority of Native Americans share a single ancestral population that they call “First American.” This population is suggested to have migrated into America over 15,000 years ago. A second stream of gene flow from Asia was responsible for speakers of Eskimo-Aleut languages from the Arctic. Approximately half of Eskimo-Aleut gene flow was a result of this second migration. It is suggested that Eskimo-Aleut represents a mix of the First American and the second gene flow. Finally, the Na-Dene-speaking Chipewyan from Canada inherit roughly one-tenth of their ancestry from a third stream. Reich et al. (2012) argue that the initial peopling followed a southward expansion facilitated by the coast, with sequential population splits and little gene flow after divergence, especially in South America.

Genetic studies indicate that the first Americans originated in northeast Asia. However, no fluted Clovis points or other diagnostic characteristics of Clovis have been identified outside North America. Fluted points are also rare in Alaska, are technologically different, and postdate Clovis. These lines of evidence suggest to Waters et al. (2011:1599–1600) that “although the ultimate ancestors of Clovis originated from northeast Asia, important technological developments, including the invention of the Clovis fluted point, took place south of the North American continental ice sheets before 13.1 ka [13,100 BP] from an ancestral pre-Clovis tool assemblage.”

Not only did entry into North America occur across a land bridge, but it may also have happened via northern coastal waterways leading to the western seaboard (Waguespack 2007). According to Maggard and Stackelbeck (2008:110) “these discoveries have seriously challenged the Clovis-first model and force us to reconsider the timing of colonization and the processes that were involved in the initial settlement of the New World.”

One case supporting the pre-Clovis occupation of North America has been documented at Meadowcroft Rockshelter in western Pennsylvania. Excavations at the site have produced radiocarbon dates earlier than 17,000 B.C. through material recovered from the deepest microstrata in Stratum IIa associated with pebble tool artifacts, such as choppers, scrapers, and planes (Adovasio et al. 1978:638–639).

The Monte Verde site in northern Chile in South America has provoked much discussion because of an occupational surface (MV-II) dating to approximately 12,500 years ago that was documented at the site. The Monte Verde occupation includes wooden huts, hearths, and associated stone artifacts. The site dates approximately 1,000 years earlier than the generally accepted dates for Clovis, but it is situated approximately 16,000 km (9,942 mi) south of the Bering Land Bridge (Dillehay 1989, 1997; Meltzer et al. 1997). In fact, the Monte Verde data have compelled Meltzer and other archaeologists to back off from proclamations concerning a "Clovis Barrier" that had not been breached (Meltzer et al. 1997).

Several additional thoroughly investigated sites in the southeastern United States have also been suggested as pre-Clovis candidates. Among these are the Cactus Hill site located in southeast Virginia (McAvoy and McAvoy 1997; Wagner and McAvoy 2004) and the Topper site in South Carolina (Chandler 2001; Goodyear 1999; Goodyear and Steffy 2003). McAvoy and McAvoy (1997) have recovered fairly good data on pre-Clovis activity at the Cactus Hill site. This site has produced evidence that it was used between 11,000 and 15,000 years ago, the most compelling of which was recovered from a thermal feature that contained a few core blade tools and returned a radiocarbon date of 15,070 ± 70 B.P. (McAvoy and McAvoy 1997:179). Two additional dates for this occupation were 16,670 ± 730 B.P., which was associated with a thermal feature and prismatic blade clusters, and 16,940 ± 50 B.P., which was associated with another thermal feature (McAvoy and McAvoy 1997; Wagner and McAvoy 2004). Thin, lanceolate-shaped hafted bifaces, core blades, blade cores, and worked flakes were found in occupation levels at the site below Clovis-aged occupations (McAvoy and McAvoy 1997).

At another southeastern United States site, the Topper site in South Carolina, a number of lithic artifacts, such as burin- and blade-like tools, have been recovered from beneath Clovis period layers. These artifacts have been dated by optically stimulated luminescence to approximately 13,500 ± 1000 B.P. (Goodyear 1999; Marshall 2001:1730) and "the pre-Clovis artifact-bearing alluvial sands …are at least 16,000 to 20,000 years old" (Goodyear 2006:108).

Summary data has recently been reported for the Paisley Cave site in Oregon (Gilbert et al. 2008; Jenkins et al. 2012) and the Debra L. Friedkin site in Texas (Waters et al. 2011). Lithic artifacts from the Debra L. Friedkin site are small in size and lightweight. It is suggested that the tool kit (Buttermilk Creek Complex) was designed for high residential mobility. Waters et al. (2011:1600) state that "the most conservative estimate of the age of the Buttermilk Creek Complex is ~13.2 to 15.5 ka [13,200-15,500 BP), on the basis of the minimum age represented by each of the 18 OSL ages." At Paisley Caves, human coprolites were dated and indicate human occupation of the northern Great Basin by at least 14,000 B.P. (Jenkins et al. 2012).

Despite the evidence of pre-Clovis occupations in many areas, to date, no definitive pre-Clovis occupations or materials have been found in Kentucky (Maggard and Stackelbeck 2008:114).

The Paleoindian Period (before 8000 B.C.)

The Paleoindian period is the earliest cultural period conclusively documented in the Kentucky Bluegrass. Dragoo (1976:5) dated this period in the eastern United States from about 10,500 B.C. to 8000 B.C.; however, Mason (1962:236) has suggested that it may have begun as early as 11,550 B.C.

The arrival of humans in the Bluegrass region was probably linked to the movements of the Pleistocene glaciers. During the Paleoindian period, the last of these glacial advances and retreats, called the Greatlakean Stadial (post-9900 B.C.), occurred. Although the glaciers never actually extended south of the Ohio River, the climatic effects probably did. This cooler, moister climate would affect the composition and distribution of floral and faunal communities (Delcourt and Delcourt 1982; Klippel and Parmalee 1982).

In the Plains area, Paleoindian points recovered from subsurface contexts have been found in direct association with extinct Pleistocene megafauna (Jennings 1978:27). Often these sites have been interpreted as kill sites, leading archaeologists to hypothesize that early Americans were engaged full time in hunting big game Pleistocene mammals, such as mammoth, mastodon, giant beaver, bison, and horse, to the exclusion of plant resource utilization (e.g., Bonnichsen et al. 1987; Kelly and Todd 1988; Stoltman and Baerreis 1983).

An alternative interpretation is supported by the many species of plants and small mammals that have been recovered from Clovis-age sites, including Lubbock Lake (Johnson 1987), Shawnee-Minisink (Dent and Kaufman 1985; Gingerich 2011;), and Aubrey (Ferring 1989). At Dust Cave in northern Alabama, faunal material associated with the Late Paleoindian levels was more highly represented by birds than mammals (Walker 1996). In a review of the topic, Meltzer (1993) concluded that there is no widespread evidence for the specialized hunting of big game species (i.e., megafauna). Several authors (e.g., Davis 1993; Dincauze 1993; Meltzer 1993) now argue that the Paleoindian diet was more generalized and relied on a number of faunal and floral species. Megafauna would have been taken when encountered, but not to the exclusion of other species.

In the eastern United States, few sites have definite associations of fluted points and extinct Pleistocene fauna. Associations of chipped stone tools and mastodon remains have been reported for several regional sites. At the Adams mastodon site in Harrison County, Kentucky, the remains of a single mastodon with cut marks on the bones were found in association with large limestone slabs. The configuration of the skeletal remains, in addition to the above evidence, has been interpreted as representative of a possible butchering site (Duffield and Boisvert 1983; Walters 1988). In opposition to the characterization of Paleoindians hunting megafauna, MacDonald (1985) has proposed that caribou were the preferred game. Evidence to support this suggestion has been found at Holcomb Beach in Michigan (Fitting et al. 1966).

Distinctive lanceolate, often fluted hafted bifaces called “Clovis points” are the hallmark of the early part of the Paleoindian period (Maggard and Stackelbeck 2008). Unifacially and bifacially chipped tools, such as knives, scrapers, spokeshaves, drills, gravers, and endscrapers with spurs, have also been recovered. Archaeologists infer that artifacts and tools of wood, bone, and shell were also used, although they were rarely preserved. One exception is a “carved, incised, and beveled-based osseous point” recovered from the Sheriden Cave site in Wyandot County, Ohio (Tankersley 1997:713). An additional bone point was recovered from the site in 2000. In Florida, where preservation is better, a number of bone and ivory tools associated with Paleoindian remains have been described (Dunbar and Webb 1996). Many of these tools were manufactured from the bones and tusks of now extinct fauna, including megafauna.

Paleoindian sites in the eastern United States where Clovis points have been recovered from subsurface contexts include Bull Brook in Massachusetts (Byers 1954); the Shawnee-Minisink site in Pennsylvania (Marshall 1978); Wells Creek Crater (Dragoo 1973); the Johnson-Hawkins, Johnson, and Carson-Conn-Short sites (Broster and Norton 1992) in Tennessee; the Debert site in Nova Scotia (MacDonald 1985); and Modoc Rockshelter in Illinois (Fowler 1959). At Meadowcroft, despite the lack of diagnostic fluted hafted bifaces, subsurface remains that date to the Paleoindian period were recovered, including Mungai knives, bifaces, flake blades, and flake debris, as well as four fire-pit features (Adovasio et al. 1977). Although the date is far from being universally accepted, the earliest dated Paleoindian component in North America (14,225 ± 975 B.C.) (Adovasio et al. 1977:Table 7) was recovered from Stratum II at this site.

Radiometrically dated Paleoindian material in the Bluegrass region is limited. A date from one Bluegrass site is worth noting, although a direct association between the date and Paleoindian material unfortunately cannot be demonstrated. An alluvial stratum at Big Bone Lick in Boone County that contained sloth, horse, mastodon, and mammoth yielded a date of 8650 ± 250 B.C. (Tankersley 1985:41, 1987:36–37, 1990:Table 1). Clovis points found at the site over the years indicate that the date may be an accurate assessment for Paleoindian use of this locale (Maggard and Stackelbeck 2008).

According to Freeman et al. (1996:402), most Paleoindian sites in Kentucky "represent short, ephemeral occupations that occur in shallow, deflated, or severely disturbed deposits" and larger sites are in "areas that provide high-quality lithic raw material, or topographic features or resources that would have attracted and concentrated game." Away from lithic source areas, for example, larger sites often "occur in association with ponded or slow-moving water, at stream confluences and fords, along major game trails, and at mineral springs" (Freeman et al. 1996:402).

With the retreat of the glaciers the environment began to change, and Pleistocene megafauna became extinct. Regional archaeological complexes began to develop (Dragoo 1976:10), and new hafted bifaces replaced the Clovis point tradition. In the Southeast, Clovis fluted points gave way to Plainview, Agate Basin, Cumberland, Quad, Dalton (Meserve), Beaver Lake, and Hardaway-Dalton hafted bifaces. These hafted biface types are representative of the transition from the Late Paleoindian to the Early Archaic subperiod.

Transitional Paleoindian/Early Archaic sites of the Dalton culture are slightly more numerous than the earlier Paleoindian sites. Sites dating to this period show many resemblances to those with Paleoindian material (i.e., lanceolate projectile point knives, uniface tools) and those reflecting Early Archaic lifeways (i.e., more diverse subsistence, the introduction of many bifacial tool forms, and several types of sites). Hunting remained an important source of subsistence during this time period; however, Dalton peoples probably based their economy around the hunting of animals such as the white-tailed deer instead of large game animals (Morse 1973). This is probably also the case for other Late Paleoindian/Early Archaic groups. According to Williams and Stoltman (1965:678), "available evidence suggests an increasing Dalton concentration into the Tennessee River Valley of northwest Alabama and western Tennessee, and the Green River in Kentucky." With the depletion of the big-game herds, old supplementary subsistence patterns were intensified, signaling the beginning of an Archaic subsistence pattern (Williams and Stoltman 1965). Morse (1973) has described two basic kinds of Dalton sites: base settlements and butchering camps. In addition, the first systematic use of rockshelters is seen during the Dalton period (Walthall 1998).

Many sites that contained Paleoindian material also contained components representative of the transition from the Paleoindian to Archaic periods. There appears to be an increase in the number of sites that may reflect a population increase as part of the transition. Hunting remained important; however, there is evidence for the use of wild plants as a dietary supplement. At the Hester site, Lentz (1986) recovered the remains of wild plum, hickory nut, hackberry, walnut, and acorn in association with Dalton, Big Sandy, Decatur, and Pine Tree horizons. According to Lentz (1986:272) "Most of the foods [recovered in these early horizons] can be consumed fresh without any required grinding, soaking, or cooking." Few food processing artifacts were recovered from the site.

Goodyear (1982:382–392) has argued, based on radiocarbon dates and contexts of Dalton points across the Southeast, that Dalton points consistently date earlier and are not contemporary with later Archaic side-notched and corner-notched forms. Goodyear places this transitional phase between 8500 and 7900 B.C.

The Archaic Period (8000–1000 B.C.)

The Archaic period includes a long span of time during which important cultural changes took place. As Funk states (1978:19) "it is generally agreed that Archaic cultures evolved from Late Paleoindian expressions of the Southeast and Midwest, because there is growing evidence for the existence of transitional cultural manifestations. It is very unlikely that new migrations from Asia were represented." These manifestations probably occurred in response to environmental changes that took place at the close of the Pleistocene epoch. The Archaic period is customarily divided into three subperiods: Early (8000–6000 B.C.), Middle (6000–4000 B.C.), and Late (4000–1000 B.C.). As of 2006, 720 Archaic period sites had been identified in the Bluegrass (Jefferies 2008:260).

During the Early Archaic subperiod, the last glaciers retreated, and the arctic-like boreal forest began developing into the eastern deciduous forest. By the Middle Archaic subperiod, the environment had become warmer and drier than it is today. In response to the changing environment, with its associated changes in plant and animal life, Late Archaic peoples developed a more diversified subsistence strategy based on local choices from a variety of subsistence options that included hunting, plant gathering, fishing, and, in some areas, the beginnings of plant domestication in a planned seasonal round exploitation strategy (Winters 1967:32, 1969). Caldwell (1958:6–18) has called this Archaic subsistence approach "primary forest efficiency." This strategy appears to have continued well into the Woodland period.

Early Archaic (8000–6000 B.C.)

Except for the adoption of new hafted biface styles, Early Archaic tool kits are nearly identical to Paleoindian. The fact that these hafted biface styles are found over a very large area suggests that little regional subsistence diversity occurred during the Early Archaic subperiod. Subsistence strategies are believed to have been similar to those employed by Paleoindian peoples, although a greater variety of game was hunted. The scarcity of tools associated with the preparation of plant foods and fishing in the early part of the Archaic period indicates that hunting was probably still the major subsistence activity (Dragoo 1976:11). Archaeological investigations at a number of deeply buried sites in the Southeast, such as the Longworth-Gick site near Louisville, Kentucky (Collins 1979), have provided important information about Archaic lifeways and their changes through time.

Middle Archaic (6000–4000 B.C.)

The climate during the Middle Archaic subperiod was dryer and warmer than the modern environment. Increasing regionalization of artifact assemblages, with the addition of new artifact classes and hafted biface styles, implies the development of extensive resource exploitation strategies. The Middle Archaic is marked by the introduction of groundstone artifacts manufactured through pecking, grinding, and polishing. A number of these groundstone tools (e.g., manos, mortars and pestles, and nutting stones) are interpreted as plant food processing artifacts and indicate an increasing utilization of plant foods during the Middle Archaic subperiod (Jefferies 2008:203–206).

New hafted biface styles appeared during this subperiod. Stemmed and corner-notched points and a variety of bone tools, including antler hafted bifaces, fishhooks, and gouges, suggest an improved efficiency in exploiting local resources. Middle Archaic sites tend to contain larger accumulations of materials than those of earlier periods, "suggesting increasing group size and either increased sedentism or carefully scheduled seasonal reoccupation of selected locations" (Cohen 1977:191). Chapman (1975) has suggested that hafted bifaces were probably used in conjunction with the atlatl, a device that increases the distance and accuracy of a spear throw. The recovery in Middle Archaic contexts of bone and groundstone objects (bannerstones) interpreted as atlatl weights tends to support his suggestion (cf., Neuman 1967:36–53). Certain classes of chipped stone tool artifacts, such as scrapers, unifaces, drills, and gouges, indicate a continuation of their importance from the Paleoindian period.

In the middle Ohio Valley there appear to be at least two Middle Archaic horizons, although the second is not particularly well documented. The first is the North Carolina sequence, first defined by Coe (1964). The second manifestation is represented by corner-notched and side-notched Brewerton-like points that are typically thought of as Late Archaic points, although they may well have first appeared during the Middle Archaic subperiod (Hemmings 1977, 1985; USACE 1980; Wilkins 1978).

Late Archaic (4000–1000 B.C.)

The Late Archaic subperiod was a time of continued cultural expansion and growing complexity. Dragoo (1976:12–15) has discussed several Late Archaic traditions for the Eastern Woodlands. Their distinctiveness stems from varied regional responses reflected in material culture. Straight-stemmed, basal-notched, or contracted-base hafted bifaces characterize the Late Archaic subperiod. Judging from the greater number of Late Archaic sites that have been recorded, an increase in population can be postulated. In some cases, evidence of longer and more intensive site occupation suggests extended habitation within an area.

A series of related Late Archaic sites that define the Skidmore phase have been investigated in Rowan and Powell Counties adjacent to the Bluegrass. These sites include the Bluestone site complex (15Ro35-36) (Brooks et al. 1979) and the Skidmore (15Po17) (Cowan 1976) and Zilpo sites (Rolingson and Rodeffer 1968). Diagnostic hafted bifaces have been described in a variety of ways but are generally broad bladed with stubby, contracting stems. Turnbow and Jobe (1981) suggest a maximum age range of 2400 to 1650 B.C. for the Skidmore phase.

The Grayson site, also outside the Bluegrass, covered about 6.00 ha (14.82 acres) of a broad second terrace overlooking the Little Sandy River near Grayson, Kentucky (Ledbetter and O'Steen 1991, 1992). Machine stripping and block excavation revealed a relatively discrete Maple Creek base camp that was occupied during the fall and winter. The site was far less substantial than the Maple Creek site described by Vickery (1976) at the Ohio River near Cincinnati. Diagnostic artifacts recovered included small Merom-Trimble points, and absolute dates spanned the period from 1700 to 1250 B.C. Two rectangular pit houses with rounded corners, one 6.00-x-7.00 m (19.68-x-22.97 ft) and the other 10.00-x-11.00 m (32.81-x-36.09 ft) in size, had been constructed with unevenly spaced posts around an open area. In each was a single large pit containing a small central hearth. The houses were surrounded by medium-size to large pits. Similar structures occur at Late Archaic sites (9Wr4 and 9Wr11) in Warren County, Georgia (Ledbetter 1990).

Population increase and, in some parts of Kentucky, evidence of an increase in mortuary ceremonialism have led some to suggest that a more complex social organization was developing in some areas of the eastern United States. Along the Green River in west-central Kentucky, large shell-mound sites, such as Chiggerville (Webb and Haag 1939), Indian Knoll (Webb 1946), and Carlson Annis (Webb 1950), contain hundreds of human burials and evidence of complex mortuary practices and a rich ceremonial life. The development of interregional trading networks is indicated by the recovery of copper, marine shell, and other nonlocal artifacts from Late Archaic burials (Winters 1968), which testify to the growing complexity of burial ritual and the interaction of many groups (Dragoo 1976:17).

The appearance of cultigens in Late Archaic contexts has been interpreted as evidence of early plant domestication and use of these plants as subsistence resources. Early cultigens have been documented at such sites as Koster in central Illinois (Brown 1977:168), the Carlson Annis and Bowles sites along the Green River in west-central Kentucky (Marquardt and Watson 1976:17), and Cloudsplitter shelter in Menifee County (Cowan et al. 1981).

Struever and Vickery (1973) have defined two plant complexes domesticated at the close of the Archaic period that continued to be used into the Woodland period. One consisted of non-native plants, such as gourd and squash, occurring sporadically but early, and corn, which did not become important in the Ohio Valley until circa A.D. 1000. The other was a group of native plants, including chenopodium, marsh elder, and sunflower. Recent research in Missouri, Kentucky, and Tennessee suggests that squash was under cultivation in the mid-South by the late third millennium B.C., and that by the second half of the second millennium B.C., evidence from Illinois, Kentucky, and Tennessee demonstrates that squash, gourd, and sunflower were well established (Adovasio and Johnson 1981:74). Watson (1985) views these plants as two different groups of cultigens—the East Mexican Agricultural Complex and the Eastern United States Agricultural Complex. The first includes squash (*Cucurbita pepo*), bottle gourd (*Legenaria siceraria*), and maize (*Zea mays*). The latter includes sunflower (*Helianthus annus*), sumpweed (*Iva annua*), chenopod (*Chenopodium* sp.), maygrass (*Phalaris* sp.), and knotweed (*Polygonum* sp.). Watson, like Struever and Vickery (1973), suggests that corn, squash, and bottle gourd were domesticated in Mexico and imported into the eastern United States by way of the Gulf of Mexico, and then were transported up the Mississippi River and its tributaries. The native cultigens consist of local species whose seeds, recovered from archaeological contexts, are much larger than those that grow in a natural state; thus, cultivation is inferred.

Plant domestication became an important factor in Late Archaic cultural development. Recent research at Cloudsplitter shelter in the Knobs region has documented early plant domestication. Desiccated squash rind was found in a Late Archaic deposit associated with a radiocarbon date of 1778 ± 80 B.C. (Cowan et al. 1981:71, Table 1). Seeds of the Eastern Agricultural Complex (sunflower, sumpweed, maygrass, and erect knotweed) are sparse in the Late Archaic levels at the site. According to Cowan et al. (1981:71), after 1050 B.C., however, “all members of the Eastern [Agricultural] Complex undergo a sudden and dramatic increase in the rate at which they were being deposited in the site,” perhaps “indicative of a wholesale introduction of the complex into the region at this time.” They (Cowan et al. 1981:71) go on to say “the Late Archaic and Early Woodland inhabitants of Cloudsplitter seem to have followed a similar trajectory in cultivated plant usage experienced in several other river drainages in the East.”

The Cloudsplitter data suggest that squash may not have diffused into the East or Southwest from Mexico as previously thought (Struever and Vickery 1973), but that it may “have evolved in situ from some distinctive North American stock” (Cowan et al. 1981:71). This interpretation seems to be substantiated by more recent investigations conducted throughout the Southeast and Midwest.

A number of hafted biface styles are considered terminal Late Archaic and appear in the Early Woodland subperiod (i.e., from approximately 2000–500 B.C. [see below]). They usually have been found in contexts without Woodland pottery, a situation that leads archaeologists to place them in the Late Archaic rather than the Early Woodland subperiod, which may not be the case.

The Woodland Period (1000 B.C.–A.D. 1000)

Over the two millennia of the Woodland period, cultures in the Ohio Valley sharply diverged from their Archaic beginnings. The

Kentucky Bluegrass and the adjacent Knobs region shared in this development that produced, in burial mounds and earthwork enclosures, some of the more notable prehistoric monuments in the Ohio Valley of Kentucky. Alongside this development came the intensification of plant domestication, the introduction and spread of pottery—first used as specialized containers and later used more widely—and the intensification of trade with distant regions of the Midwest for exotic materials used in personal life, including burial offerings (Applegate 2008).

The Woodland period is customarily divided into Early (1000–300 B.C.), Middle (300 B.C.–A.D. 400), and Late (A.D. 400–1000) subperiods. Of these, the Early Woodland is the least known. Burial mound and earthwork complexes termed "Adena," which have counterparts north of the Ohio River, characterized the Bluegrass region at the time of the Middle Woodland subperiod. Toward the end of this subperiod a few sites reflect the subsequent Hopewellian cultural fluorescence, best known from Ohio in the major earthworks of the Scioto and Little Miami Valleys. In the Late Woodland, a distinctive cultural adaptation developed with similar variants throughout the middle Ohio River valley (Railey 1996). As of 2006, 780 sites with Woodland period components had been recorded for the Bluegrass (Applegate 2008:454).

Early Woodland (1000–300 B.C.)

Some of the earliest known Early Woodland sites in the Bluegrass and adjoining Outer Bluegrass Ohio Valley to the north include Peter Village in Fayette County (Clay 1984, 1985, 1987) and the West Runway site in Boone County (Duerksen et al. 1995). The two sites were quite different. Peter Village was an enclosure first surrounded by a post stockade and later by a ditch and internal bank; the West Runway site was a campsite with multiple hearths, suggesting a series of short-term occupations. Radiocarbon dates place the occupation at West Runway possibly as early as 600 B.C. and Peter Village at about 350–400 B.C. Subsequent dates from the Argosy Casino project across the river in southeastern Indiana confirm that the type of pottery that occurs at West Runway does indeed date as early as 700 B.C. (Clay 2002a). Such early dates have not yet been obtained for the Inner Bluegrass. Although West Runway, in the types of features and their clustering, is not that much different from a Late Archaic site, the site does occur in uplands as opposed to a bank-side location. The Peter Village enclosure, however, marks a sharp break with Archaic settlement systems.

At both sites, thick and relatively crude pottery representing large containers appears. First called Fayette Thick (Griffin 1943) from its occurrence at the Peter Village site, the pottery occurs widely, though sparsely, across the Bluegrass (cf. Clay 1980), with some variation suggesting different pottery-making groups. It even occurs in small and early burial mounds, for example the Hartman Mound in Boone County (Webb 1943), where it may date to around 400 B.C., although the association is not definite. It is hypothesized (Clay 1987) that groups gathered at the Peter Village enclosure to mine barite and galena, which was then fashioned into pigments and artifacts (atlatl weights and cone-shaped barite "buttons") for personal use and for intergroup trading. The large pots may have been "feast containers" made as needed to serve specific work crews. As a result, they may have been difficult to transport between sites and abandoned at the conclusion of a particular project.

Outside of the few sites that have been excavated, artifacts belonging to the Early Woodland subperiod occur widely in the Bluegrass. Chipped chert bifaces are large and of a type known as "Adena Stemmed." Polished, ungrooved stone axes were widely used in woodworking—for example, for cutting stockade posts at the Peter Village enclosure. Finally, the existence of worked weights made from barite/galena suggests the use of improved atlatl or throwing sticks (Clay 1985, 1987).

Middle Woodland (300 B.C.–A.D. 400)

The Bluegrass Middle Woodland subperiod is known by its burial mounds, which have been called Adena after a site excavated in the early twentieth century (Mills 1902) in southern Ohio (Dragoo 1963; Webb and Baby 1957; Webb and Snow 1945). Major mound excavations of the Fischer, Drake, Mt. Horeb, Morgan Stone, Wright, Ricketts, Camargo Mounds, and many others, have given archaeologists a detailed picture of burial customs during this period (Clay 1986, 1998). Excavations at the small Auvergne mound in Bourbon County (Clay 1983) suggest that Native Americans from a larger area came together at the time of a death to feast at the graveside. Some of the large mounds containing multiple burials suggest that these groups often returned to the same mound to add further burials to the structure. At times, the burial mound could, like the Wright Mound in Montgomery County (Webb 1940), grow to imposing size.

Although we have considerable excavated evidence for burial customs, the settlement system is not well understood (Clay 1998:13–19). Those responsible for the mounds may have been widely dispersed throughout the Bluegrass in relatively small groups. Seen in this light, the elaborate burial sites (the burial mounds) offered essential foci for scattered groups to meet and interact. There were also small, circular enclosures, called ceremonial circles, of which the Mount Horeb site in Fayette County (Webb 1941) is an excavated example. Late in the Middle Woodland subperiod, hilltop enclosures, such as Indian Fort Hill near Berea in Madison County, Kentucky, were constructed. Still, daily domestic sites are very poorly understood, although examples dating to the time period have been found to the south on the Cumberland Plateau (Kerr and Creasman 1995), and off-mound domestic areas have been identified adjacent to the mounds (Clay 1983). Although hunting was important in the Middle Woodland subperiod, finds from rockshelters in the adjoining Knobs region suggest that manipulation of native plants, by this time domesticated, intensified. Despite this change, the additional food supply did not create significant changes in the way people lived (Railey 1996).

Late Woodland (A.D. 400–1000)

After circa A.D. 400, earthen burial mounds went out of style in the Bluegrass. Some of the latest examples are the Auvergne mound in Bourbon County (Clay 1983), dating circa A.D. 200, and the Wright Mound in Montgomery County (Webb 1940), with a single date after A.D. 200. Simpler communal burial sites, generally involving stone constructions or coverings, became widespread, perhaps as a replacement for the mounds (Brown 1981; Clay 1984). The nature of human settlement also changed. Sites such as Rodgers in Boone County (Kreinbrink 1992) and Pyles in Mason County (Railey 1984) indicate that Native-American groups often returned repeatedly to the same location or congregated in larger groups. However, the possible lack of permanent shelter at these sites suggests that the use of these places was sporadic, possibly seasonal, perhaps still related to certain group ceremonies (Clay 2002b:174–182). The economy continued to emphasize hunting, gathering, and the utilization of a variety of locally domesticated plants. Corn was not an economic resource until the very end of the Late Woodland subperiod but would become a hallmark of the following Late Prehistoric period, with significant consequences for human cultures in the Bluegrass.

Late Prehistoric Period (A.D. 1000–1700)

The Late Prehistoric archaeological complex of the middle Ohio Valley, dating from approximately A.D. 1000 through circa A.D. 1700, is called Fort Ancient, again after a site in southern Ohio. Fort Ancient extends from western West Virginia to southeastern Indiana, and from south-central Ohio to north-central and northeastern Kentucky (Griffin 1978:551). In the Bluegrass, Fort Ancient is divided into Early (circa A.D. 1000–1200), Middle (A.D. 1200–1400), and Late (A.D. 1400–1700) subperiods (Applegate 2008). In the central Bluegrass, the Early Fort Ancient is defined as the Osborne Phase, known from the Muir (Turnbow and Sharp 1988) and Dry Run sites (Sharp 1984) in Jessamine and Scott Counties. Middle Fort Ancient sites include Buckner, Gilfoil (Fassler 1987), and Florence. In this area, the Late Fort Ancient is also referred to as the Madisonville Horizon, observed at the Larkin site in Bourbon County and the Goolman site in Clark County. In the eastern Bluegrass, the Manion Phase has been defined as a Middle Fort Ancient component at the Fox Farm site, and the Late Fort Ancient or Madisonville Horizon has been subdivided into the Gist (A.D. 1400–1550) and Montour (A.D. 1550–1750) Phases (Applegate 2008; Henderson 1990; Henderson and Turnbow 1987).

The development of Fort Ancient culture and its relationship to Late Woodland cultures has been a debated issue. Two hypotheses have been offered for the relationship between Fort Ancient and Late Woodland cultures. One suggests that Fort Ancient represents the fluorescence of an indigenous Late Woodland culture (Graybill 1980:55–56; Rafferty 1974). Others suggest that Fort Ancient represents an influx of Mississippian peoples from the lower Ohio River Valley (Essenpries 1978:154–155). Although the question has yet to be resolved, it is possible that both of these hypotheses may be correct, depending upon the data set and region one employs to address the problem. Essenpries (1978), for example, has suggested that these two hypotheses are appropriate for explaining Fort Ancient manifestations at different times during the Late Prehistoric period. In this scenario, Fort Ancient is viewed as a fluorescence of Mississippian-influenced Late Woodland culture during the early (Baum, Anderson, and Feurt) phases and as an influx of Mississippian peoples during the later Madisonville Phase (Essenpries 1978:164).

Other archaeologists argue that not all local Late Woodland groups chose to participate in, or accepted, the Mississippian cultural complex (i.e., horticulture and sedentism), and instead they continued to follow their essentially Woodland (Late Archaic) way of life. The very few absolute dates from Fort Ancient sites and the almost complete lack of stratigraphic data and intersite comparative studies contribute to the confusion (Griffin 1978:557).

Regardless of the causal factors, Fort Ancient does reflect an elaboration of Late Woodland subsistence activities and social organization. Settlements were much more nucleated, as evidenced by large village sites (Mayer-Oakes 1955) usually situated in valley bottoms along the main stems of the region's larger drainages. On the other hand, smaller sites tend to be located throughout tributary drainages and are thought to represent seasonal camps and resource procurement activity stations (Graybill 1978, 1979). A number of sites along the Ohio River, or close to it, were fortified, and many have central courtyards or plaza areas (Griffin 1978:552).

Fort Ancient subsistence is characterized by a reliance on the cultivation of maize, coupled with beans and squash. Despite the increased importance of horticulture, hunting provided an important source of food. Deer was the main source of meat; at some sites, up to 80 percent of the game consumed was deer (Griffin 1978:552). The cultural material assemblage, including elaborately decorated pottery vessels (usually tempered with crushed mussel shell, although limestone and grit tempered ceramics also occurred), triangular arrow points, mussel shell tools (e.g., knives, scrapers, and hoes), and bone tools (e.g., bone beamers), also serves to distinguish Fort Ancient cultures from Late Woodland occupations (Griffin 1978; Sharp 1996).

Although Fort Ancient subsistence, like that of Mississippian populations, was based on the cultivation of corn and other cultigens, other aspects of Fort Ancient culture clearly distinguish it from the contemporary Mississippian occupations (i.e., Fort Ancient sites lack large ceremonial centers and earthworks, although some Early and Middle Fort Ancient sites [through circa A.D. 1250] had burial mounds). The Rowena site, for example, which was flooded by Lake Cumberland, was described as a small

Mississippian regional center, possibly occupied from A.D. 1300 to 1400 (Weinland 1980:133). The artifact assemblage indicated that the site was strongly influenced by eastern Tennessee cultures, especially the Dallas cultures (Weinland 1980:131), throughout most of its history. Other Mississippian sites along the Cumberland River, such as Crowley-Evans (Jefferies 1995; Jefferies and Flood 1996), were built around a low platform/mound on which stood the house of a local chief. However, the complex settlement hierarchy found in Mississippian cultures does not seem as prevalent in Fort Ancient culture. Very few Fort Ancient settlements have mounds (n = 12)—the overwhelming majority (n = 476) of them do not—and few other site types (e.g. workshops, cemeteries, rockshelters) are known in the Bluegrass (Henderson 2008:808).

Protohistoric and Historic Period (A.D. 1700)

The Protohistoric period begins with the first indications of contact between Native-American groups and expanding western European populations after A.D. 1492. The evidence for this contact exists principally in the form of glass beads of European manufacture and metal artifacts (first brass, and later iron) of both European (e.g., bells) and Native-American (e.g., tinklers) manufacture (Drooker 1997).

In the middle Ohio Valley and the neighboring Cumberland Plateau, these artifacts appear in the Late Prehistoric, Madisonville Horizon of the Fort Ancient culture (Drooker 1997). They occur at the Madisonville site near Cincinnati and then widely at other Fort Ancient sites of the phase, some of which occur on the plateau. They reflect indirect contact between Native-American groups and the French via their occupation of the St. Lawrence Valley to the north and the Spanish to the south. In other words, the European goods were obtained by trade where Native Americans were living in direct contact with Europeans (Drooker 1997).

An exhaustive analysis of Madisonville Horizon Fort Ancient culture suggests that this final Fort Ancient occupation of the region may have been on the decline by the end of the first quarter of the seventeenth century, reflecting the movement of its Native-American peoples both west and east in order to maintain closer contact with the French settlements of the Mississippi Valley and the Dutch and English settlements of the east coast, both being developing points of European trade. As a result, this portion of the Ohio Valley may have been largely vacated by Native Americans before the onset of the Iroquois depredations after A.D. 1640, themselves a product of intensifying commercial links between the tribes of the Iroquois Confederacy and the French (Drooker 1997:336–337).

After A.D. 1724, Native-American tribes, who we can identify as the Shawnee, were present in the region, having been pushed westward from the east (i.e., from the Susquehanna drainage of Pennsylvania) by the expansion of European settlement (McConnell 1992:21). The origins of the Shawnee are not clear, but they can be identified on the Ohio River by A.D. 1750 or later at sites such as Bentley and Old Fort Earthworks (named for the nearby Middle Woodland earthworks) (Henderson et al. 1986:131–137, 1992:270–278; Pollack and Henderson 1984). By this time, like their European competitors, the native residents possessed a full range of iron tools and arms. Currently, there is little good evidence to indicate that these Shawnee were the cultural descendants of the last Fort Ancient Native Americans of the Madisonville Horizon (Drooker 1997:104–105).

The conflicts between the Shawnee and other groups of the middle Ohio (i.e., Delaware, Miami, Piankashaw, and Wyandot) lasted through the War of 1812. They were a part of the conflict between the French and British and later the British and the new American colonies (Hammack 1992:928–929; McBride and McBride 2008; O'Donnell 1992:815).

The first Europeans to visit Kentucky included explorers, trappers, traders, and surveyors. It was in the 1750s, when the English Crown attempted to colonize the Ohio Valley, that the first organized attempt to settle Kentucky occurred. This attempt stimulated the formation of land companies that sent surveyors into the area (McBride and McBride 2008:909). One of these, the Ohio Land Company, sent a surveyor into Kentucky in 1751. The French and Indian War that erupted in 1754 disrupted this early exploration (Talbert 1992:689).

In 1763, England's King George III set aside the land west of the Appalachians for Indians and English fur traders and closed the area to permanent settlement. His decree was ignored, however, and further colonial exploration and development could not be stopped. One man who took advantage of the commercial expansion westward was Daniel Boone. Boone first explored Kentucky in 1767, and by 1769, he had explored much of the Red and Kentucky River valleys. Harrodsburg was established soon after in 1774, followed by Boonesboro in 1775. The western movement of the American frontier pushed the Native Americans further and further west, and Kentucky was one of the places where they decided to take a stand. In response, Governor Dunmore (of Virginia) waged two large campaigns in the Ohio Valley (later known as Dunmore's War), and the Native Americans were defeated. Dunmore's War opened Kentucky for settlement, although some hostilities continued after this time (Nickell 1992:96–98; Stone 1992:571).

Kentucky was originally a part of Virginia called the Kentucky District. The Kentucky District contained three counties, Fayette, Lincoln, and Jefferson, which became the Commonwealth of Kentucky on June 1, 1792 (Clark 1992). These three counties were later divided and subdivided into the 120 counties that presently make up the Commonwealth of Kentucky.

A History of Madison County, Kentucky

In 1776, before Kentucky had attained statehood, the Virginia General Assembly had created Kentucky County from its western lands, and that county would exist more or less within the same boundaries as the current state. This county was divided in 1780 into three counties, Fayette, Lincoln, and Jefferson, which would collectively become the District of Kentucky in 1783 (Hammon 1992:495; Kleber 1992:267). The Kentucky District would in 1792 disappear in favor of the Commonwealth of Kentucky, and the counties that then comprised this district would over the years be divided and subdivided into the 120 counties that presently make up Kentucky.

Situated in the Inner Bluegrass cultural landscape, Madison County was created in 1785 by the Virginia Assembly with land appropriated from Lincoln County. It was named for James Madison, the fourth president of the United States, and it originally encompassed 8,288 sq km (3,200 sq mi). By 1858, the county had been reduced to 1,165 sq km (450 sq mi) (Collins 1882:493; Long 1995:302–311; Rennick 1987:185). Today, Madison County is bordered by seven separate counties: Fayette and Clark to the north, Estill to the east, Jackson and Rockcastle to the south, and Garrard and Jessamine to the west. The city of Richmond is the county seat (Collins 1882:493; Long 1995:302–311; Rennick 1987:185).

Daniel Boone established a settlement on the Kentucky River at the mouth of Otter Creek in 1775. He and a group of settlers cut a portion of the Wilderness Road into modern day Madison County in an effort to improve access to the land of Richard Henderson’s Transylvania Company (a failed effort to monopolize land sales in Kentucky). The settlement was later known as Boonesborough and played a significant role in the settlement and defense of the Kentucky frontier (Ellis et al. 1985:6–9; Harrison and Klotter 1997:26–27).

After Boonesborough's successful defense of a Native-American siege in 1778, other stations were established in the area, including Irvine's, Estill's, Turner's, Hoy's, and Crew's (Ellis et al. 1985:10). Early settlers started growing crops and making improvements to the land. By 1790, there were already 5,772 residents in Madison County, and the number had grown to over 10,000 by 1800 (Collins 1882:259).

Early farmers grew corn as their primary crop and usually distilled the excess into whiskey, which was more easily marketed on the frontier than whole corn. With the construction of several grist mills in the 1790s, settlers were able to use their corn as livestock fodder, and the county emerged as a leader in the production of cattle, hogs, and mules in the antebellum period (Kubiak 1992:602).

Nevertheless, tobacco became the most important crop for Madison County farmers. Very early, the county court used tobacco as an exchange, and by 1789, it had appointed two inspectors at John Collier's warehouse in Boonesborough to monitor the quality and amount of tobacco being stored and shipped. Area farmers continued to increase production of the crop, and in 1809, 803 hogsheads of tobacco were shipped from Madison County (Ellis et al. 1985:24–30).

Enslaved African Americans were vital to the county's crop production. In 1790, there were 737 enslaved African Americans in the county, and by 1800, 16 percent (1,729) of the population consisted of enslaved African Americans (Ellis et al. 1985:39–40; Lucas 1992:xx).

Ferry rights were first granted in Kentucky in 1779, which allowed for transportation across the Kentucky River (Kubiak 1992:602). The Kentucky River played an essential role in the development of Madison County. It provided an avenue to move products out of the county to the Ohio River, which provided access to markets in New Orleans and later to Louisville. Hundreds of hogsheads of tobacco were shipped downstream by flatboats, and tobacco warehouses and inspection stations were established near the river, indicating the commercial importance of the transportation route (Dorris and Dorris 1955:52; Ellis et al. 1985:25).

Roads developed slowly in Madison County. Early roads were only slightly improved, followed old buffalo and Native-American paths, and usually afforded access to the river. Between 1793 and 1797, the Wilderness Road was improved as part of a state project, and a road was constructed to link it to Richmond. In 1852, Madison County still only claimed one turnpike, the Lexington to Richmond Pike (Dorris and Dorris 1955:53).

By 1830, Madison County had 18,751 residents, and 947 of those lived in Richmond. Over the next two decades the population decreased to 15,727. By 1860 the population of Madison County had increased to 17,207 (United States Bureau of the Census [USBC], 1830–1860, Washington, D.C.). In 1850, there were 5,393 enslaved African Americans in the county, and by 1860 they made up almost 36 percent of the population, which is consistent with other Bluegrass counties during the same time period (Ellis et al. 1985:39–40; Lucas 1992:xx).

Like many other counties in Kentucky, Madison was sharply divided by the Civil War. It is difficult to ascertain the ratio of the division, but it is likely that the county had a similar pro-Union to Confederate ratio—four to one—to that which was common throughout Kentucky (Harrison 1975:94–95).

General Edmund Kirby-Smith arrived in Madison County on August 23, 1862, as part of the Confederate army's overall invasion of Kentucky. A week later, Kirby-Smith's force of approximately 19,000 Confederate soldiers fought Mahlon D. Manson's and Charles Cruft's 6,500 Union troops near Mount Zion Church, just south of Richmond. The Union forces were routed and retreated into Richmond, despite the efforts of General William "Bull" Nelson to rally the shattered force (Ellis et al. 1985:181–208; Engle 1992:772–773). The casualty records indicate that the Battle of Richmond claimed 206 of Nelson's men and 98 of Kirby-Smith's. This battle was one of the most complete victories by the confederacy of the entire war (Lambert 1992:773).

Following the Civil War, Richmond increased in both size and population. Although numerous fires and two smallpox epidemics threatened the well-being of this city throughout the mid- to late nineteenth century, numerous industries and institutions were growing. Coinciding with this industrial growth, Richmond had installed modern public utilities such as gas mains and street lamps as early as 1874. By 1879, the town had the only telephone system in the state south of Louisville, and a water plant and public electricity were available by 1890. A baseball club, cheese factory, and railroad expansion all helped to enhance the city of Richmond as well (Engle 1992:772).

The second largest city in Madison County is Berea. This community in the southeastern portion of the county was established by Rev. John Gregg Fee. Fee developed a church for nonslaveholders and a school that became Berea College in 1858. Forced out of Berea in 1859, Fee returned to Kentucky during the Civil War to work as a Union army chaplain, teacher, and advocate for African-American soldiers. After the Civil War, Fee invited African Americans to settle in his community dedicated to an interracial brotherhood. Berea became known in the African-American community as “Freetown” (Burnside 1992:71).

In 1869, after receiving approval from its citizens, Madison County contributed $350,000 to the Louisville and Nashville Railroad in exchange for stock and the construction of a rail line connecting Richmond to Stanford, Kentucky. This line started operation in 1871. The Central Kentucky Railroad constructed a line through the county connecting Richmond with Winchester and Paris in 1884. Later, the Richmond, Irvine, Nicholasville, and Beattyville Railway (the Riney-B) also had a line in Madison County (Dorris and Dorris 1955:55–58; Ellis et al. 1985:236). Many small communities in Madison County grew as a result of the railroad expansion, including Red House, Valley View, and Baldwin (Kubiak 1992:602).

The establishment of the Central Kentucky Railroad in 1883 allowed Berea to become a transit station for hauled mountain timber. The railroad expansion coincided with a boom in the housing industry and growth in the town’s economy, both of which were encouraged by the expansion of Berea College (Burnside 1992:71).

After the Civil War, agriculture continued to dominate the Madison County economy. Between 1850 and 1900, the number of farms increased from 1,185 to 2,741, and the amount of improved acreage increased from 60,360 to 92,750 ha (149,164 to 229,185 acres). The county continued to be among the state’s leaders in production of cattle, hogs, milk, cheese, and eggs (Ellis et al. 1985:233–234). The total value of crops in the county in 1900 was $2,083,036 (USBC, Agricultural Schedule, 1900). Based on these statistics, one might conclude that the railroad created better opportunities for more farmers to market their produce.

In the latter half of the nineteenth century, the population was growing county wide. In 1870, the population of Madison County was 19,543 and the city of Richmond had 1,629 residents (Collins 1882:259, 264). By 1900 the population of the county had again increased to 25,607 (USBC 1900).

Madison County had two institutes of higher learning in the latter half of the nineteenth century: Berea College and Central University. Until 1889, Berea College was primarily an African-American college with a mission for integration and social equality of the races. In 1892, the school shifted its emphasis toward educating poor Appalachian European Americans. Then in 1904, the Kentucky General Assembly outlawed biracial education with the passage of the Day Law. Berea College did not reintegrate until 1950 (Burnside 1992:71–72).

Central University was established in 1874 by the Southern faction of the

Presbyterian Church. Citizens of Richmond contributed $101,000 to the school's original endowment. However, by 1901 the school had merged with Centre College in Danville (Lee and Nystrom 1992:177). The abandoned buildings were eventually used by the Eastern Kentucky State Normal School, which was started in 1906 and later became Eastern Kentucky University (Engle 1992:772). Berea College and Eastern Kentucky University are still providing higher education today.

Other schools in Madison County include 10 elementary schools, 3 middle schools, and 2 high schools. The Madison County school district also offers 1 alternative school, 1 day treatment center, and preschool programs (Madison County Schools 2008). Berea offers an independent school program including 1 elementary school, 1 middle school, and 1 high school (Berea Independent Schools 2008).

For the first three decades of the twentieth century, Madison County was still largely agricultural. In 1941, the United States Army created the Bluegrass Ordnance Depot on 5,929 ha (14,650 acres) of land just south of Richmond. Seven years later, in 1948, Westinghouse built a light bulb manufacturing facility in Richmond. In the following decades, Richmond and Berea expanded their manufacturing base with the addition of several light industries (Kubiak 1992:602–603).

During the decades of the first half of the twentieth century, the population trend in the county was toward growth. In 1910 the population was documented at 26,951. This number had grown to 27,621 by 1930, to 31,179 by 1950, and to 33,482 by 1960 (USBC). The completion of I-75 through Madison County in 1963 helped to fuel the commercial and residential growth in the county, as high property costs in Lexington coupled with the quick commute via I-75 prompted many to establish residence in Richmond (Engle 1992:772).

Tourism and recreation opportunities abound in Madison County. Fort Boonesboro, a historic site associated with Daniel Boone, and White Hall State Historic Site, former home of Cassius Marcellus Clay, are both located in Madison County. The historic Bybee Pottery, the oldest pottery west of the Allegheny Mountains, has been located in Richmond since 1809. The Lake Reba Recreational Complex offers county residents and tourists many outdoor activities. Five golf courses are also located in Madison County. The Boone Tavern, located in Berea, has been in operation since the beginning of the twentieth century and now offers hotel accommodations as well as a restaurant (Berea Tourism Center 2008; Richmond Tourism 2008).

The trend toward population growth in the county continues to this day. From the years 1970 to 1990 the population of the county expanded from 42,730 to 57,508 (Kubiak 1992:602–603). The city of Berea grew from 6,956 in 1970 to 9,126 in 1990 (Burnside 1992:71). Richmond grew from 16,861 in 1970 to 21,155 in 1990 (Engle 1992:772). In the twenty-first century, the population of Madison County continued to grow. In 2000, the population of Madison County was 70,872, and it had increased to 79,015 by 2006 (USBC 2000–2006).

IV. METHODS

This section describes the general methods used during the survey. Site-specific field methods are discussed in further detail in the Results section of this report. Laboratory methods specific to the analysis are subsequently discussed in the *Materials Recovered* section.

Field Methods

Prior to the survey, CRA was provided with mapping of the project area (see Figure 3). This mapping depicted the project boundary, contours, and other natural and cultural topographic features. While in the field, the limits of the survey area were determined by using a Magellan MobileMapper global positioning system (GPS) unit and the project map. The project area measures .39 ha and was surveyed in its entirety.

The project area was visually inspected for surface cultural remains. It was generally flat (less than 15 percent slope) and exhibited limited ground surface visibility, and was subjected to screened shovel testing at 20 m intervals. When artifacts were recovered, the shovel test interval was decreased to 10 m. Each STP was no less than 35 cm in diameter and extended well into the subsoil. The fill from each STP was screened through .64 cm (.25 in) mesh hardware cloth. The walls and bottom of each STP were cleaned with a trowel to examine the stratigraphy and to note any evidence of historic or prehistoric activity. Soil profile data were observed and recorded.

Stafford (1995) notes the usefulness of bucket augering in the examination of site sediments and determination of buried cultural materials. Bucket augers are useful because they: 1) allow access to areas that might not be accessible for trenching with a backhoe; 2) are capable of obtaining samples to a considerable depth (greater than 3 m); 3) are less destructive than backhoe trenching; 4) extract measurable intervals of sediment; 5) are useful for examining the strata; and 6) allow for the recovery of artifacts, especially in areas with low artifact density (Stafford 1995:86–87). One problem Stafford notes with bucket augers, however, is that they are less useful in evaluating some sediment and soil characteristics because they extract disturbed samples (Stafford 1995:87). For the current project, this was not a major concern. The main objectives of bucket augering for the current project were to identify major soil horizons, determine the extent of preservation of sub-Ap horizons, and determine whether buried surface soils were present.

Online soil survey data (Soil Survey Geographic Database 2013) was analyzed in order to assess the distribution of soils within the project area. In total, three bucket augers were conducted at the bases of STPs situated on a terrace northeast of Hays Fork. Surface soils in this location were mapped as Inceptisols. Based on the available information, there was a potential for encountering buried soil horizons, although none were identified. A hand-operated bucket auger with a 10 cm (4 in) opening was used to excavate to depths that terminated between 93 and 115 cm bgs. Sediments were removed in approximately 10 cm levels. All soil was screened through .64 cm (.25 in) mesh hardware cloth.

Laboratory Methods

All cultural material recovered during the project was transported to CRA for processing and analysis. Initial processing of the recovered artifacts involved washing all artifacts, sorting the artifacts into the major material classes (i.e., historic) for further analysis, and assigning catalog numbers. Catalog numbers consisted of the site number and a unique number for each provenience lot or diagnostic specimen. Artifacts received a unique catalog number for each material group and class by provenience.

The methods, specifics, and results of subsequent analysis will be further discussed. All cultural materials, field notes, records, and site photographs will be curated at the University of Kentucky's, William S. Webb Museum of Anthropology.

V. MATERIALS RECOVERED

One previously unrecorded archaeological site was identified during the current survey (15Ma499). Site 15Ma499 is a historic farm/residence dating from the late nineteenth through twentieth centuries. The artifact assemblage is described in detail below.

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The historic assemblage includes artifacts classified and grouped according to a scheme originally developed by Stanley South (1977). South believed that his classification scheme would present patterns in historic site artifact assemblages that would provide cultural insights. Questions of historic site function, the cultural background of a site's occupants, and regional behavior patterns were topics to be addressed using this system.

South's system was widely accepted and adopted by historical archaeologists. However, some have criticized South's model on theoretical and organizational grounds (Orser 1988; Wesler 1984). One criticism is that the organization of artifacts is too simplistic. Swann (2002) observed that South's groups have the potential to be insufficiently detailed. She suggested the use of sub-groups to distinguish between, for example, candleholders used for religious purposes and those used for general lighting. Others, such as Sprague (1981), have criticized South's classification scheme for its limited usefulness on late nineteenth- and early-twentieth-century sites, sites which include an array of material culture—such as automobile parts—not considered by South. Despite its shortcomings, most archaeologists recognize the usefulness of South's classification system to present data.

Stewart-Abernathy (1986), Orser (1988), and Wagner and McCorvie (1992) have subsequently revised this classification scheme. In this report, artifacts were grouped into the following categories: domestic, architecture, clothing, communication and education, and unidentified. The artifacts recovered during this project are summarized in Table 3.

Table 3. Historic Artifacts Recovered According to Functional Group.

Group	Total	Percent
Architecture	19	48.72
Clothing	1	2.56
Domestic	16	41.03
Comm/Edu	1	2.56
Unidentified	2	5.13
Totals	39	100

Grouping artifacts into these specific categories makes it more efficient to associate artifact assemblages with historic activities or site types. One primary change associated with the refinement of these categories is reassigning artifacts associated with the "Miscellaneous and Activities" under South's (1977) original system. Considering the potential variety of historic dwellings and outbuildings within the project area, a refinement of the artifact groupings was considered important to perhaps observe whether the distribution of specific artifact groups would produce interpretable patterns related to activity areas or structure types. Each one of these groups and associated artifacts is discussed in turn.

Information on the age of artifacts as described in the artifact tables is derived from a variety of sources cited in the discussion of the materials recovered. The beginning and ending dates cited need some clarification. Usually, an artifact has specific attributes that represent a technological change, an invention in the manufacturing process, or simple stylistic changes in decoration. These attribute changes usually have associated dates derived from historical and archaeological research. For example, bottles may have seams that indicate a specific manufacturing process patented in a certain year. The bottle then can be assigned a "beginning," or incept, date for the same year of the patent. New technology may eliminate the need for the same patent and the bottle would no longer be produced. The "ending," or terminal, date will be the approximate time when the new technology took hold and the older manufacturing processes are no longer in use.

Specific styles in ceramic decorations are also known to have changed. Archaeological and archival researchers have defined time periods when specific ceramic decorations were manufactured and subsequently went out of favor (e.g., Lofstrom et al. 1982; Majewski and O'Brien 1987). South's (1977) mean ceramic dating technique uses this information. The dates presented here should not be considered absolute but are the best estimates of an artifact's age available at this time. A blank space indicates that the artifact could not be dated or, alternately, that the period of manufacture was so prolonged that the artifact was being manufactured before

America was colonized. An open-ended terminal date was assigned for artifacts that may be acquired today. The rationale for presenting dates for the artifacts recovered is to allow a more precise estimate of the time span the site was occupied, rather than the mean occupation date of a site.

A summary of the artifacts recovered follows. A complete inventory of the historic artifacts can be found in Appendix A.

Materials Recovered by Functional Group

There were 39 historic artifacts recovered during the current survey. The following provides a descriptive discussion of the types and ages of artifacts recovered from Site 15Ma499.

Architecture Group (N = 19)

The architecture group is comprised of artifacts directly related to buildings, as well as those artifacts used to enhance the interior or exterior of buildings. These artifacts primarily consisted of window glass, plate glass, nails, and construction materials, such as brick. The architecture group items are discussed below.

Construction Materials (n = 4)

Construction materials refer to all elements of building construction. For this project, the building materials collected consisted entirely of brick fragments (Table 4). When possible, bricks (n = 4) were separated into hand-made (n = 3) and machine-made fragments (n = 1).

Hand-made or early machine-made bricks often have a glaze, resulting from the sand in the clay turning to glass in the kiln. The paste is usually more porous, and the shape of the early bricks is more irregular. The later machine-made bricks have a harder, more consistent paste and are uniform in shape. Machine-made bricks will often have marks in the clay related to the machine manufacturing process (Greene 1992; Gurcke 1987). Since no research has been conducted regarding the local history of brick-making facilities near the project area, the brick fragments recovered were not assigned specific dates.

Table 4. Summary of Historic Materials Recovered.

Class	Type	Total
Construction material		
	Brick	4
Flat glass		
	Plate glass	1
	Window glass	3
Nails		
	Late cut	10
	Unspecified cut	1
Buttons		
	Riveted overall	1
Ceramics		
	Ironstone	5
Cont closures		
	Home canning	1
Cont glass		
	ABM	1
	BIM	7
Metal food cont		
	Round food cans	2
Writing implement		
	Pencil ferrule	1
Metal		
	Iron/steel	2
	Total	39

Flat Glass (n = 4)

Cylinder glass was developed in the late eighteenth century to enable the inexpensive production of window glass. With this method, glass was blown into a cylinder and then cut flat (Roenke 1978:7). This method of producing window glass replaced that of crown glass production, which dates back to the Medieval period and was capable of fabricating only very small, usually diamond-shaped, panes (Roenke 1978:5). Cylinder glass was the primary method of window glass production from the late eighteenth century through the early twentieth century, at which time cylinder glass windows were slowly replaced by plate glass windows. Plate glass window production became mechanized after 1900 but did not become a commercial success in the United States until around 1917 (Roenke 1978:11).

Cylinder window glass has been shown to gradually increase in thickness through time and can be a useful tool for dating historic sites. Several dating schemes and formulas have been devised that use average glass thickness to calculate building construction or modification dates. These include Ball (1984), Roenke (1978), and Chance and Chance (1976) to name a few. Like previously derived formulas, Moir (1987) developed a window glass dating formula to estimate the initial construction dates for structures built primarily during the nineteenth century. Although Moir (1987:80) warns that analysis on structures built prior to 1810 or later than 1915 have shown poor results, most research in this area shows the regression line extending back beyond 1810 (Moir 1977; Roenke 1978). Hence, dates calculated back to 1785 were considered plausible. Sample size is also a consideration when using the Moir window glass regression formula. According to Moir (1987:78), sample sizes also need to be "reasonable and not collected from a point or two" in order to accurately date the construction of a building. For the purposes of this investigation, a "reasonable" sample size is considered 25 window glass sherds.

Each fragment of flat glass was measured for thickness and recorded to the nearest hundredth of a millimeter using digital calipers. The differences between cylinder window glass, mirror glass, and plate glass were in part determined by the thickness and wear of each flat glass fragment. Although Moir (1987:80) states that dating window glass after 1915 is not as reliable for dating sites, for our purposes, window glass that measured 2.41 mm (dating to 1916) was included in the calculations because according to Roenke (1978:11), plate glass does not become widely or successfully produced in the United States until 1917. Four flat glass sherds were recovered during the current survey (Table 4). Moir's window glass technique, which relies on statistically meaningful samples from discreet contexts for accuracy, was not used to determine the approximate site date since so few sherds were found. Three window glass sherds were recovered tentatively dated from 1884 to 1907. One plate glass sherd also was recovered, dating from 1917 to the present.

Nails (n = 11)

There are three stages recognized in the technological chronology of nails: wrought nails, cut nails, and wire-drawn nails. Wrought nails were handmade and were the primary type of construction fastener in the eighteenth and early-nineteenth centuries. Their use ended around 1810 with the widespread use of square cut or machine cut nails (Nelson 1968:8).

The cut nail, introduced in approximately 1800, originally had a machine-cut body with a hand-made head. Around 1815, crude machine-made heads replaced hand-made heads on cut nails, and overall, cut nails replaced wrought nails in the construction industry. Early fully machine-cut nails exhibit a "rounded shank under the head," and therefore, often appear pinched below the head of the nail (Nelson 1968:8). By the late 1830s, these "early" fully machine-cut nails were replaced with "late" fully, or modern, machine-cut nails.

The first wire-drawn nails were introduced into the United States from Europe by the mid-nineteenth century. These early wire nails were primarily used for box construction and were not well adapted for the building industry until the 1870s. Although the cut nail can still be purchased today, the wire nail nearly universally replaced it by the turn of the twentieth century (Nelson 1968:8).

A total of 11 nails were recovered from the project area (Table 4). Of the nails recovered, 10 were late fully machine-cut nails and 1 was an unspecified cut nail (Figure 12a). These nail fragments dated from the beginning of the nineteenth century through the late nineteenth century (Nelson 1968).

Figure 12. Historic materials recovered: (a) late fully machine-cut nail fragment from STP 3; (b) riveted overall button from STP 2; (c) copper alloy wooden pencil ferrule from STP 2; (d) decal-decorated ironstone saucer sherd from STP 2.

Clothing Group (N = 1)

The clothing group includes buttons, clothing fasteners, footwear, and other clothing related items, such as belts, hats, and fabric (Table 4). One button was recovered from the project area (Figure 12b). This item was further identified as a riveted overall button dating after 1780 (Psota 2002).

Communication and Education (N = 1)

Artifacts included in this group consist of materials and equipment used in areas such as classrooms, offices, and residences to improve the quality of communication between people. Some of these items include pencils, pens, magazines, and communication electronics, such as radios and televisions. During the current survey one item from this group was recovered (Table 4). This item was identified as a copper alloy wooden pencil ferrule dating after 1800 (Figure 12c) (Petroski 1992:29).

Domestic Group (N = 16)

Artifacts included in the domestic group consisted of ceramics (n = 5), container glass (n = 8), container closures (n = 1), and metal food containers (n = 2). The ceramic inventory consisted entirely of ironstone dating from the early nineteenth century through the twentieth century. A full description of this ceramic type recovered from the project area is listed below, followed by descriptions of other domestic group artifacts.

Ceramics (n = 5)

Ironstone is a white or gray-bodied, refined stoneware with a clear glaze. It is often indistinguishable from whiteware. Ironstone differs from whiteware in that the body is more vitreous and dense. In addition, a bluish tinge or a pale blue-gray cast often covers the body. In some cases, a fine crackle can be seen in the glaze; however, this condition is not as common as it is in whiteware (Denker and Denker 1982:138).

Confusion in the classification of white-bodied wares is further compounded by the use of the term as a ware type or trade name in advertising of the nineteenth century. Both ironstones and whitewares were marketed with names such as “Patent Stone China,” “Pearl Stone China,” “White English Stone,” Royal Ironstone,” “Imperial Ironstone,” “Genuine Ironstone,” “White Granite,” and “Granite Ware” (Cameron 1986:170; Gates and Ormerod 1982:8). These names do not imply that true ironstone was being manufactured. Some investigators avoid the distinctions entirely by including ironstones as a variety of whiteware. Others, however, such as Wetherbee (1980), refer to all nineteenth-century white-bodied earthenwares as ironstone. For this analysis, the primary determining factor in classification of a sherd as ironstone was the hardness and porosity of the ceramic paste. Sherds with a hard vitreous paste were classified as ironstone.

Charles James Mason is usually credited with the introduction of ironstone (referred to as Mason’s Ironstone China) in 1813 (Dodd 1964:176). Others, including the Turners and Josiah Spode, produced similar wares as early as 1800 (Godden 1964). As a competitive response to the highly popular oriental porcelain, British potters initiated this early phase of ironstone production. The ironstone of this early phase bears a faint blue-gray tint and oriental motifs, much like Chinese porcelain. A second phase of ironstone began after 1850 in response to the popularity of hard paste porcelains produced in France. This variety of ironstone had a harder paste and reflected the gray-white color of French porcelains.

While some ironstones continued to use oriental design motifs after 1850, the general trend was toward undecorated or molded ironstones (Collard 1967:125–130; Lofstrom et al. 1982:10). Ironstone continued to be produced in England, and after 1870, it was also manufactured by numerous American companies. For many years, classic ironstone—the heavy, often undecorated ware—had been frequently advertised as being affordable and suitable for “country trade” (Majewski and O’Brien 1987:121). By the late 1800s, these thick, heavy ironstones began losing popularity and were often equated with lower socio economic status (Collard 1967:13). At the same time, ironstone manufacturers began shifting to thinner, lighter weight ironstones. As a result, this type of ironstone became popular tableware in American homes during most of the twentieth century (Majewski and O’Brien 1987:124–125). In spite of the shift towards thinner and lighter ironstones, heavy ironstone remained on the market and continues to be popular in hotel/restaurant service (hence, this heavy, twentieth-century ironstone is sometimes called “hotelware”). However, its production for home use all but ceased by the second decade of the twentieth century (Lehner 1980:11).

Five ironstone sherds were recovered from the project area (Table 4). Two plain ironstone sherds were recovered dating from 1830 to the present (Majewski and O'Brien 1987:122). One decal-decorated ironstone sherd was recovered dating from 1890 to 1940 (Figure 12d) (Blaszczyk 2000:155; Majewski and O'Brien 1987:147; Wegars and Carley 1982). One yellow chromatic-glazed sherd was recovered dating from 1920 to 1970 (Blaszczyk 2000:121). Finally, one airbrushed sherd was identified dating from 1900 to 1960 (Blaszczyk 1994:122, 1995:874).

Container Glass (n = 8)

A variety of container glass was recovered during the current survey. Research by Baugher-Perlin (1982), Jones and Sullivan (1985), and Toulouse (1972) was used to date glass containers. Glass color was the only attribute that could be used for dating those fragments that were not identifiable as to type of manufacture.

The approximate date of manufacture for bottles and bottle fragments recovered from the project area was established by determining the manufacturing process associated with the bottle (i.e., creation of the base and lip of the container) and using any patent or company manufacturing dates embossed on the bottle.

The lip on a bottle can be informative. A lipping tool, patented in the United States in 1856, smoothes and shapes the glass rim into a more uniform edge than a hand-smoothed lip or “laid-on ring.” Certain types or styles of lips were associated with specific contents; for example, medicines were often contained in bottles with prescription lips (Jones and Sullivan 1985). A “sheared,” or unfinished, bottle lip typically dates before 1880.

Lipping tools were used throughout the middle and end of the nineteenth century until the advent of the fully automatic bottle machine (ABM) in 1903. It should be noted, however, that as automated bottle manufacture became available after the turn of the twentieth century (see below), tooled finishes continued to be produced—albeit in steadily decreasing numbers. That is, there is a lag time between tooled finishes and ABM finishes, and although ABM glass is given an incept date of 1903, most tooled-glass vessel sherds will be given a terminal date around the 1920s due to this lag time, unless other diagnostic characteristics are observed enabling one to give it an earlier terminal date.

The manufacturing process can be roughly divided into three basic groups including free blown, blown in mold (BIM), and machine manufactured (ABM) vessels (Baugher-Perlin 1982:262–265). Only BIM and ABM glass was recovered from the current project. Each process will be discussed separately.

Blown in Mold (BIM) (n = 7)

Most molded bottles are constructed in pieces and have distinctive seams. The dip mold was used from the late seventeenth through the mid-nineteenth century (Baugher-Perlin 1982:262). It leaves no seams, unless glass adhered to the edges of the bottle mold as it was attached to the free blown shoulder and bottle neck. The key mold, on the other hand, was a type of two-piece mold that was used from about 1750 to 1880 (Jones and Sullivan 1985:27). Key mold seams cross the base and are concealed in the corners of a flat-sided body.

The turn paste mold was used from circa 1870 to the early twentieth century and does not contain seams because the glass is blown into a container that is spun. The glass conforms to the mold from the centrifugal force produced. Vessels formed from this process usually have faint horizontal lines from the spinning process. The three-part mold has seams running around the shoulder of the vessel and partially up the neck of the vessel. This style of mold lost popularity around 1870. The blow back mold was another mold type, and this was used in the manufacture of jars such as the distinctive Mason jar, which was patented in 1858.

Embossing on container glass vessels was made possible by engraving the mold the glass was blown into. This was first conducted in the mid-eighteenth century and continued into the twentieth century. The panel bottle came into popular existence around 1860, and the shape of this vessel was useful because the name of the commodity or the manufacturing company could be changed on the bottle form by substituting a different “slug-plate” into the mold. This process can be identified through the distinctive seams, since they follow the rectangular shape of the nameplate. The date of the manufacturer’s patent on the bottle and the name of the company, when present, can often be utilized to determine a date of manufacture for the container.

The finish is the top part of the neck of a bottle or jar made to fit the cork or other closure used to seal the vessel. The finish is often simply referred to as either the lip or rim. Glass factories in the late nineteenth and early twentieth centuries produced a wide variety of finishes for their containers (Jones and Sullivan 1985:78). Finishes were formed by manipulating the glass at the end of the bottle neck, by shaping glass added to the end of the neck, by the lipping tool, or by being blown into a mold (Jones and Sullivan

1985:79). The term “finish” originated with the mouth-blown bottle manufacturing process where the last step in the completion of a finished bottle was to “finish the lip.”

Mouth-blown bottles were removed from the blowpipe by two primary methods: either through the cracking-off process or by shearing the neck off of the blowpipe. Once this was completed the bottle was reheated in a furnace to smooth out the sharp edges where the blowpipe was detached (Lindsey 2008). This method, referred to as fire polishing, was completed even if no specific finish was to be formed. Once this method was complete a finish could be either added or formed on the top of the bottle neck. These finish types included a laid-on ring, a rolled finish, a flared or flanged finish, an applied finish, and a tooled finish. The most commonly found finish types are the applied finish and the tooled finish. An applied finish was created when applied hot glass is added at the point where the blowpipe was removed. This applied hot glass was manipulated with various tools in order to form a wide variety of finish styles (Lindsey 2008). A tooled finish was created by reheating the severed end of the bottle near the neck. Once reheating or refiring the end of the neck was accomplished, a lipping tool was inserted into the neck of the bottle and rotated while squeezing the jaws to form the finish desired.

Seven BIM glass fragments were recovered from the project area (Table 4). One clear indeterminate mold fragment was identified in the BIM assemblage. This sherd dated after 1864 based solely on the glass color. The remaining BIM fragments included aqua (n = 1), amethyst (n = 2), and clear (n = 3) colored glass.

Jones and Sullivan (1985) observed that chemicals color glass, either as natural inclusions or additions by the manufacturer. According to Lockhart (2006), amethyst glass began to be manufactured around 1870, when manganese was being added to the glass recipe. Although initially colorless, the glass will turn a distinctive purplish color when exposed to sunlight over time. It was previously thought that amethyst glass production ceased by 1914 due to a shortage of manganese from Germany during World War I; however, the change was actually a result of technological advancements in the glass industry, mainly the conversion to automatic bottle machines (Lockhart 2006:53). Although manganese was more difficult to obtain after World War I, and selenium was often less expensive, the improvement in technology was the major reason for the change. The use of selenium proved to be an inexpensive decolorant in glass production and ultimately displaced manganese as a decolorizer by 1920 (Lockhart 2006:53). With the growing public desire to see the contents of the bottles, clear glass came into demand and was popular beginning in the 1860s (Baugher-Perlin 1982:261). However, it should be noted that clear glass was available to a limited degree before this time. Aqua colored glass was also used for many different containers, but it cannot be assigned a specific date due to its long period of use over the last several centuries and continuing popularity.

Automatic Bottle Machine (ABM) (n = 1)

The Owens automatic bottle-making machine was patented in 1903 and creates suction scars and distinctive seams that run up the length of the bottle neck and onto the lip. This ABM mold provides a firm manufacturing date at the beginning of the twentieth century. Another automatic bottle machine called the Individual Section was also used in the commercial production of bottles. This machine was widely used starting in 1925 and by 1940 became the most widely used bottle manufacturing device (Jones and Sullivan 1985:39). This bottle machine was more cost effective than the Owen’s machine, which was no longer used after 1955.

One glass fragment was assigned to the ABM category during the current project (Table 4). This fragment was a clear Owens mold base fragment dating from 1903 to 1955 (Jones and Sullivan 1985:39; Lindsey 2008; Miller and Sullivan 1984:85-93).

Closures (n = 1)

Bottle closures serve both to prevent the spilling of a bottle's contents and to protect a bottle's contents from contamination and evaporation (Berge 1980). Closures have been used almost as long as animal skins and bottles have been employed to contain liquids. Closures range from a utilitarian piece of paper or cloth stuffed into the mouth of a bottle to a delicately crafted crystal stopper for a decanter. There are three primary closure types: caps, stoppers, and seals (Berge 1980).

Caps are secured to a bottle by overlapping the outside edge of the finish or mouth. Common cap types include external screw, lugs, crown, and snap-on. External screw caps were first introduced in the mid-nineteenth century (Jones and Sullivan 1985; Toulouse 1977). External thread caps were attached to bottles by means of grooves in the cap that screwed down on continuous glass threads on the finished exterior of a bottle. External thread caps were first produced using metal in 1858 (Jones and Sullivan 1985; Toulouse 1977). Advances in technology led to the introduction of a Bakelite external thread cap around 1922 (Berge 1980; Meikle 1995), an aluminum shell roll-on cap in 1924 (Berge 1980; Rock 1980), and modern plastic caps in the mid-1930s (Meikle 1995). Examples of the external thread cap include canning jar, mayonnaise jar, and pickle jar lids.

The crown cap was patented on February 2, 1892, by William Painter of Baltimore, Maryland (Rock 1980). The crown cap was placed over the finish, and then crimped around a lip or groove in the finish to seal the container. This closure was lined with cork from 1892 until circa 1965 (IMACS 2001; Riley 1958; Rock 1980). Crown caps with composition liners appeared in 1912, and both cork and composition liners were gradually phased out following the introduction of the plastic liner in 1955 (IMACS 2001; Riley 1958). The majority of commercially produced glass soda bottles have crown cap closures.

Stoppers, the second major closure type, are secured to the finish interior of bottles, usually by forcing a portion of the stopper into the bore of the finish. Stopper types include cork, glass, inside screw, porcelain-top, Hutchinson Spring, Electric, Pittsburgh, and Lightning. Cork stoppers were the most common historic closure type.

Most glass stoppers use ground or roughened tapered stems along with a roughened finish inside to seal bottles. The "modern" ground and tapered glass stopper was developed in Europe around 1725 (Holscher 1965). Glass stoppers came in many shapes, sizes, and styles and were used as closures in many different types of bottles. As with the cork stopper, the glass stopper was phased out in the 1920s with the advent of the crown cap closure (Berge 1980; Jones and Sullivan 1985).

Seal closures utilized the vacuum on the interior of the glass container. The heating and then cooling of the bottle's contents created the vacuum. Seal closures, although dating back to 1810, did not become popular until the mid-twentieth century. These closures were most often used in food jars (Berge 1980). There were several types of seal closures including Phoenix, Sure Seal, Giles, spring seal, and disc seal.

The disc seal was used as early as 1810 by Nicholas Appert (Berge 1980). John L. Mason used this type of closure on his patented fruit jar in 1858 (Berge 1980). Mason's closure was made of zinc and was held in place with an exterior screw cap ring. Unfortunately, the zinc reacted with the contents of the jars, giving the contents an unpleasant metal taste (Jones and Sullivan 1985). Glass liners were then developed and added to the disc around 1869 by Lewis R. Boyd (Toulouse 1969, 1977). These liners prevented the zinc from reacting with the contents of the jar. To aid in opening, Boyd added a handle to the disc circa 1900 (Toulouse 1977). Both of these disc seal types were used until around 1950 (Jones and Sullivan 1985; Toulouse 1969, 1977). In 1865, the Kerr two piece seal was patented. This system utilized a metal seal disc held in place by an exterior screw cap with no center. This seal and cap type system is still in use today.

One closure artifact was recovered from the project area (Table 4). This item was a glass Mason zinc canning jar lid liner dating from the 1860s through the first half of the twentieth century.

Metal Food Containers (n = 2)

The first tinned goods were packaged in hand-cut, shaped, and soldered can bodies made of tin or iron plate. These “tin canisters” were patented in England in 1810 and in the United States in 1818 (Clark 1977; Rock 1984). The cans often swelled, burst, and then reacted with goods they held.

Another can type, termed “hole-and-cap can(s)” because of the filling process, either had flush or hand-crimped ends (Rock 1984). The cans’ side seams, either a lap side seam or a plumb joint, were soldered, fusing the gaps closed. The cans were filled through an orifice in the center of one end of the can. After the can was filled, a cap was soldered over the hole, sealing the can, hence the name “hole-and-cap” (Rock 1984). The hole-and-cap can came into use about the same time as the tin canister, but was quickly improved upon. These cans were likewise plagued by swelling and bursting incidents.

The first improvement was the addition of a small hole in the center of the soldered cap, implemented around 1820. This small hole allowed moisture to escape from the cans when heated, after the cans were filled and sealed. This process reduced the number of cans that swelled or burst. After heating, the hole was sealed with solder. Hole-in-cap cans were still handmade, and a good tinsmith could produce 60 per day (Sacharow and Griffin 1970). These cans were the first cans used for commercially produced foods in the United States (Rock 1984).

In 1847, Allen Taylor invented a machine that converted flat metal disks into stamped or flanged can ends. This machine was improved upon over the next two years, yielding a machine that stamped both can ends and cut a filler hole in the cap (Rock 1984). Most canneries in the United States used these stamped-end cans until the 1880s.

The key-wind can was introduced in 1866. The opening system consisted of a scored band on either the side or top of the can, which could be removed by rolling it back with a key. The sardine can is a familiar example of this can type.

The tapered tin was patented in 1875 by two Chicago entrepreneurs for their processed meat products. These tins were either rectangular or had a base larger than the top. Another Chicago manufacturer combined and perfected the tapered tin and key-wind cans in 1895.

As the demand for canned goods rose, a separate can producing industry evolved. Max Ams, a New York machine-made can company owner, developed a “double-side seam” in 1888 that locked the parts of the cans together (Collins 1924; May 1937). By 1898, the company had perfected this technique with the introduction of the “Ams Can” (Collins 1924; May 1937). This can eliminated the need for interior seam soldering by closing the top, bottom, and side seams with double seams. These innovations reduced the manufacture time of the cans and significantly reduced can failure (i.e., swelling and bursting) due to the superior strength of the seam.

The hole-in-top can, an improvement of the hole-in-cap can, used a small pinhole, no larger than 0.125 inch in diameter. The hole was sealed with solder. By 1920, evaporated milk was found almost exclusively in hole-in-top cans (Rock 1984).

In 1904, the Sanitary Can Company of New York developed the first airtight solderless can (Rock 1984). The cans were completely machine made and were produced at a rate of almost 25,000 cans a day (May 1937). By the early 1960s, the tin can was replaced by a steel body, which was stronger and more durable than tin. Aluminum tops were added to beverage cans in order to make opening the cans easier. Modern cans are steel or alloys, usually lined with plastic on the interior to prevent chemical reactions between the contents of the can and the can itself.

Two round food can fragments were recovered from the project area (Table 4). One of these exhibited a double seam without solder dating after 1904 (Busch 1981; Rock 1980, 1984, 1987). The remaining fragment was an indeterminate round food can fragment. This item was not assigned a specific date.

Unidentified (N = 2)

This category contains artifacts that could not be identified beyond the material from which the artifact was made. Both of the unidentified items recovered from the project area were iron/steel fragments (Table 4). The function of these metal pieces was difficult to ascertain so the metal was grouped into the unidentified category. It is possible that these pieces may have been nails, tools, decorative items, or other hardware, but excessive rust and corrosion prevented a definite identification.

Discussion

15Ma499: There were 39 historic artifacts recovered from this site during the current survey. The material collected is described in detail above, and summarized below.

Nineteen architecture group items were recovered from this site. These included 3 hand-made brick fragments, 1 machine-made brick fragment, 1 plate glass fragment, 3 window glass fragments, 10 late fully machine-cut nails, and 1 unspecified cut nail. The plate glass dated after 1917. The window glass was tentatively dated from 1884 to 1907. The late fully machine-cut nails dated from 1830 to 1890, and the unspecified cut nail dated from 1800 to 1890. The brick fragments were not assigned specific dates.

The domestic group consisted of ceramics (n = 5), container glass (n = 8), a container closure (n = 1), and metal food containers (n = 2). The ceramic inventory consisted entirely of ironstone. The ironstone included one airbrushed sherd dating from 1900 to 1960, one chromatic-glazed sherd dating from 1920 to 1970, one decal-decorated sherd dating from 1890 to 1940, and two undecorated sherds dating after 1830. The ironstone assemblage contained one cup, one plate, and one saucer. The container glass was identified as ABM (n = 1) and BIM (n = 7). The ABM was a clear Owens mold base fragment dating from 1903 to 1955. The BIM was aqua, amethyst, and clear glass. One indeterminate base fragment was identified as BIM glass. One canning jar and one miscellaneous jar were identified in the BIM assemblage. The BIM glass dated prior to 1920. One container closure was recovered from this site. It was a glass Mason zinc canning jar lid liner fragment dating from 1869 to 1950. Two metal food container fragments also were recovered. One of these was a double-seam round food can fragment dating after 1904. The remaining metal food container was an indeterminate round food can fragment. No specific date was assigned to this item.

One clothing group item was recovered from this site. This artifact was a riveted overall button dating after 1780. One communication and education item also was recovered. This item was a copper alloy wooden pencil ferrule dating after 1800. Two unidentified group items were recovered from this site. These were both iron/steel fragments. No specific date was assigned to these artifacts.

The artifacts recovered from this site were manufactured from the early nineteenth century through the twentieth century. The majority of these were most popular from the late nineteenth century through the first half of the twentieth century. A historic residence was present at this site on the 1929, 1942, 1952, and 1955 historic maps of the project area (KDOH 1942, 1955; KGS 1929; USGS 1952b). The items recovered were likely associated with the former historic residence located at the site. It is possible that this residence was occupied by the second half of the nineteenth century due to the presence of cut nails and nineteenth-century domestic artifacts. Due to the paucity of artifacts recovered, a further site interpretation based solely on the historic materials cannot be made.

VI. RESULTS

One previously unrecorded archaeological site (15Ma499) was identified during the current survey. A description of the site is presented below, and its location is depicted in Figures 2 and 3.

15Ma499

Elevation: xxx m (xxx ft) AMSL
Component(s): Historic
Site type(s): Farm/residence
Size: 2,400 sq m (25,833 sq ft)
Distance to nearest water:
Direction to nearest water:
Type and extent of previous disturbance: Minimal disturbance related to past clearing of former structure
Topography: Terrace
Vegetation: Trees, shrubs, tall grasses, briars
Ground surface visibility: Less than 10 percent
Aspect: Flat
Recommended NRHP status: Not eligible

Site Description

Site 15Ma499 is a historic farm/ residence located on Hays Fork, southwest of the intersection of KY 3376 and U.S. 421 (see Figures 7 and 8). Hays Fork is generally west trending and merges with Silver Creek approximately 5.5 km (3.4 mi) west of the site. Silver Creek leads generally northwest and joins the Kentucky River near the intersection of Garrard, Jessamine, and Madison Counties.

The site boundary was defined by structural remains at the location of the former residence, cultural material recovered from STPs, and the project boundary. The vicinity surrounding the structure remains was vegetated with a few trees, some briars and other secondary growth, as well as tall grasses and weeds (see Figure 8). The northeast bank of the site was a recently mowed lawn that surrounded a commercial development found on a large corner lot (see Figure 7). Due to the observed vegetation, the ground surface at the site was less than 10 percent. The disturbance was minimal, and was primarily due to the effects of clearing the former residence. As defined, Site 15Ma499 measures approximately 80 m (262 ft) northeast–southwest, 30 m (98 ft) northwest–southeast, and covers 2,400 sq m (Figure 13).

Investigation Methods

The positioning of STPs was affected by the width of the project area in the site boundary, as well a ditch that followed KY 3376. Two transects spaced at 10 m apart were oriented in the project area along the road. STPs were conducted at 20 m in each transect, though additional testing at 10 m intervals served to refine the site boundary. In total, 13 STPs were conducted within, and adjacent to, the site boundary (see Figure 13). Bucket auger excavation was conducted at the base of three STPs on a terrace northeast of Hays Fork. The fill from each STP was screened through .25-inch mesh hardware cloth. Cultural material was recovered from four STPs. A sample of artifacts observed on the ground surface was collected as a general surface collection (GSC) cell. A site datum was established, and its UTM coordinates were recorded using a Magellan MobileMapper 6 handheld GPS unit.

Depositional Context

Newark series soils are mapped for the site. The sediment profile of STP 2, which was located in the vicinity of the former residence, revealed a Zone Ia that consisted of a very dark grayish brown (10YR 3/2) loam to 7 cm bgs, followed by a Zone Ib that was a very dark gray (10YR 3/1) silt loam to 9 cm bgs. Zone II was a dark yellowish brown (10YR 4/4) loam with a light coal content that extended to 30 cm bgs. It was overlying Zone III, which was a brown (10YR 4/3) mottled with yellowish brown (10YR 5/6) sandy clay

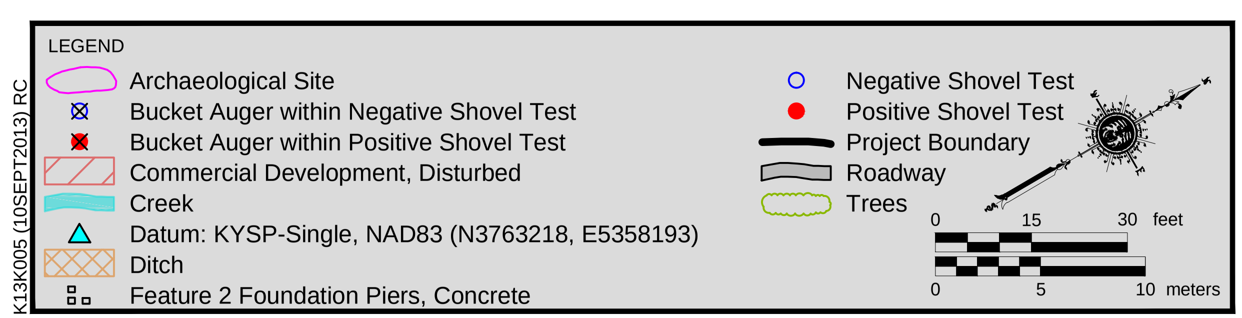

Figure 13. Schematic plan map of Site 15Ma499.

loam encountered to 38 cm bgs. The underlying subsoil was a yellowish brown (10YR 5/6) mottled with brown (10YR 4/3) sandy clay loam. On the north terrace of Hays Fork, bucket auger probes were positioned at the base of three STPs that were excavated to 50 cm bgs. The sediment profile of STP 3/bucket auger was considered representative. Historic cultural material was recovered from between 30 and 48 cm bgs, during its excavation as an STP. It consisted of a very dark grayish brown (10YR 3/2) clay loam Zone I to 26 cm bgs, overlying a Zone II that featured the same sediment color and texture, but with a light quantity of rounded pebbles, to 55 cm bgs. Zone III was a yellowish brown (10YR 5/4) silt loam and occurred to 72 cm bgs. It was followed by a dark yellowish brown (10YR 4/4) mottled with light yellowish brown (10YR 6/4) coarse sandy clay loam with rounded pebble content to 95 cm bgs. The underlying subsoil consisted of a yellowish brown (10YR 5/4) mottled with olive yellow (2.5Y 6/6) silt loam to 115 cm bgs. Figure 14 depicts both sediment profiles. Overall, the site maintained poor stratigraphic integrity, likely due to impacts related to the clearing of the former residence.

Artifacts

The assemblage from Site 15Ma499 consisted of 39 historic artifacts. A description of the collected artifacts sorted by provenience is provided in Table 5. The location of each positive STP is shown in Figure 13.

Architectural group artifacts consisted of hand-made brick fragments (n = 3), machine-made brick (n = 1), plate glass (n = 1), window glass (n = 3), late-period machine-cut nail fragments (n = 10), and unspecified cut nail (n = 1). Domestic group items included ironstone ceramics (n = 5), ABM container glass (n = 1), BIM container glass (n = 7), zinc canning jar lid liner (n = 1), and metal can fragments (n = 2). A riveted overall button (n = 1) comprised the clothing group. The communication and education group consisted of a copper alloy wooden pencil ferrule (n = 1). Unidentified group artifacts included iron/steel fragments (n = 2). As previously discussed in the *Materials Recovered* section, the artifacts from the site were manufactured between the early nineteenth and the twentieth centuries, although they were most popular from the late nineteenth century through the first half of the twentieth century.

Features

Feature 1 was a capped, concrete well that measured 128 cm (50 in) northeast–southwest by 102 cm (40 in) northwest–southeast, and 54 cm (21 in) above the ground surface (Figure 15). Although the concrete did not have the appearance of great age, very little about the internal construction or depth could be determined. The former residence possibly stood just xx of the well, closer to the road, though no foundation remains were found in this area. Several types of foundation remains were found behind the former house. These remains were recorded as a single feature and may signify a garage or shed addition to the house. Feature 2 included an L-shaped foundation outline remnant, four foundation piers, and a concrete foundation pad. The L-shaped foundation outline was constructed of hollow, concrete blocks and measured approximately 6.5 m (21.3 ft) southeast–northwest (Figure 16). It was three block courses in height and appeared to be only partially intact. Four concrete, foundation piers were immediately north of the foundation outline (Figure 17). These square piers measured 20 cm (8 in) across and were 23 cm (9 in) above the ground surface. A foundation pad was low to the ground and positioned immediately northeast of the foundation piers (Figure 18). It measured 406 cm (160 in) northwest–southeast by 185 cm (73 in) northeast–southwest. A field stone foundation wall was exposed under a small area of the foundation pad, possibly indicating a renovation or addition to the former residence.

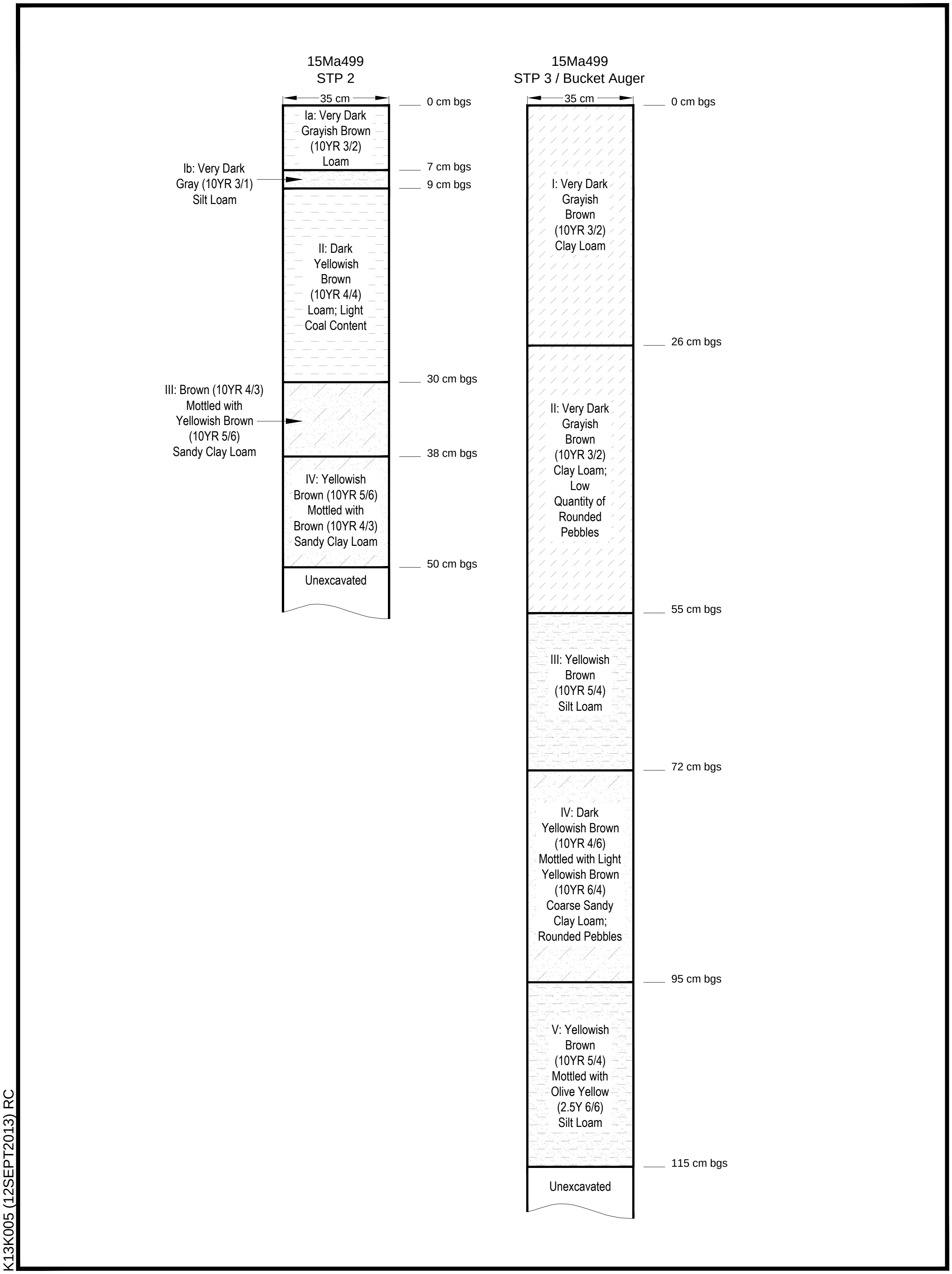

Figure 14. Representative soil profiles from Site 15Ma499.

Table 5. Historic Artifacts from Site 15Ma499.

Unit	Depth	Group	Type/Description	Count	Wt (g)	Historic Date Range
STP 1	0-16 cm bgs	Domestic	Ironstone rim sherd	2		1830–
STP 1	0-16 cm bgs	Domestic	BIM clear container glass body fragment	1		1864–1920
STP 1	16-25 cm bgs	Unidentified	Indeterminate iron/steel	1		
STP 2	0-9 cm bgs	Domestic	BIM aqua container glass canning jar body fragment	1		1920
STP 2	0-9 cm bgs	Domestic	BIM clear container glass body fragments	2		1864–1920
STP 2	0-9 cm bgs	Domestic	BIM clear container glass base fragment	1		1864–1920
STP 2	0-9 cm bgs	Architectural	Window glass	1		1884
STP 2	0-9 cm bgs	Architectural	Plate glass	1		1917–
STP 2	9-30 cm bgs	Domestic	Ironstone saucer rim with body sherd, decal decoration, molded	1		1890–1940
STP 2	9-30 cm bgs	Domestic	BIM amethyst container glass body fragment	1		1870–1920
STP 2	9-30 cm bgs	Domestic	Indeterminate food can fragment	1		
STP 2	9-30 cm bgs	Architectural	Handmade brick	1	11.2	
STP 2	9-30 cm bgs	Architectural	Late period machine cut nail fragments	9		1830–1890
STP 2	9-30 cm bgs	Architectural	Window glass	1		1886
STP 2	9-30 cm bgs	Clothing	Riveted overall button	1		1780–
STP 2	9-30 cm bgs	Communication and Education	Wooden pencil ferrule	1		1800–
STP 3	30-40 cm bgs	Architectural	Late period machine cut nail fragment	1		1830–1890
STP 3	40-48 cm bgs	Architectural	Indeterminate machine cut nail fragment	1		1800–1890
STP 4	0-20 cm bgs	Unidentified	Indeterminate iron/steel	1		
STP 4	20-30 cm bgs	Domestic	BIM amethyst container glass body fragment	1		1870–1920
GSC 1	Surface	Domestic	Ironstone plate rim sherd, air brush	1		1900–1960
GSC 1	Surface	Domestic	Ironstone cup rim with body sherd, yellow glaze	1		1920–1970
GSC 1	Surface	Domestic	ABM clear container glass base fragment, owens mold	1		1903–1955
GSC 1	Surface	Domestic	Mason zinc canning jar lid liner	1		1869–1950
GSC 1	Surface	Domestic	Food can fragment, double/crimped seam	1		1904–
GSC 1	Surface	Architectural	Handmade brick	1	702.5	
GSC 1	Surface	Architectural	Handmade brick	1	564.1	
GSC 1	Surface	Architectural	Machine-made brick	1	576.2	
GSC 1	Surface	Architectural	Window glass	1		1907
			Total	39		

Figure 15. Feature 1: a capped well, facing southeast.

Figure 16. Feature 2: L-shaped foundation outline, facing north.

Figure 17. Feature 2: foundation piers.

Figure 18. Feature 2: foundation pad, facing north.

Archival Data

Lisa Kelley

The earliest known landowner of the property containing Site 15Ma499 was Whitfield S. Moody (Table 6). Whitfield Moody was born in 1810 in Virginia and moved to Madison County, Kentucky, in 1824 (Johnson 1912; Smith 2007). He married Lucinda Clements at her home state of Georgia in 1833, and then went back to Kentucky, leaving his wife and youngest daughter, Elizabeth Jane, in Georgia until returning for them in 1837 (Smith 2007). In the years between 1838 and 1861, Whitfield and Lucinda had 10 additional children: Margaret A.; William H.; Thomas J.; James K.P.; Cassisus M.C.; Sarah B.; John C.B.; Whitfield Jr.; Lucinda; and George W. (Smith 2007). The family became prominent in the Kingston and Big Hill (Bobtown) area of Madison County, and Whitfield Moody acquired no fewer than 28 parcels of property in Madison County between 1839 and 1888 (Madison County Clerk's Office [MCCO], Richmond, Kentucky, General Index to Grantees, 1797–1899). Some accounts indicate that the Whitfield Moody homeplace was called Moody's Tavern and was the locale of many community events, such as weddings (Smith 2007). In 1863, the General Assembly of Kentucky granted Whitfield Moody the right to operate a tavern house in Kingston with a bar disconnected from the tavern house (Bradford 1863).

The 1860 census indicates that Whitfield was a farmer and merchant with $16,000.00 worth of real estate and an additional $11,000.00 in personal assets (USBC 1860). The slave schedule from the same year lists seven enslaved African-Americans under Whitfield Moody, and indicates he owned two slave houses (USBC Slave Schedule [SS], 1860). The 1870 census notes the value of his Madison County land holdings increased slightly while his personal estate value had decreased significantly (USBC 1870). This was likely due to the effects of the Civil War and abolition of slavery. In 1876, a map of the county indicates that he owned a large expanse of land between the approximately 12 km (7 mi) that spans Crooksville Road and Big Hill Road (Beers 1876). At least five residences are attributed to him on the same map. It should be noted that none of the houses are depicted at or near the site boundaries for Site 15Ma499 on the 1876 map.

Whitfield Moody died in 1891 and his large estate was divided among his many heirs. The portion of his property containing Site 15Ma499 was inherited by his son, Cassius Marcus Clay (Cash) (MCCO Deed Book [DB] 43:274). A map dating to this time period does not depict any structures on the property at or near Site 15Ma499 (USGS 1892). Cash Moody was born in 1847, the sixth child to Whitfield and Lucinda Moody (Smith 2007). He lived with his father's household until circa 1877, when he married Martha Fannin, after which he moved into a large log cabin in the village of Kingston (Ancestry.com 2007; USBC 1880; Vonderbrink 2004). Between 1878 and 1888, Cash and Martha Moody had four children: Walter, Earnest, Dolly (Lucy), and Edna (USBC 1900). Both Cash and Martha died on November 12, 1909, and oral histories indicate Cash killed both himself and his wife (Vonderbrink 2004).

Table 6. Chain of Deeds for Site 15Ma499.

Date	Owner	Reference
1996–present	Robert C. Moody	MCCO DB 580:144; 492:542
1995–1996	Robert C. Moody and Margaret Sue Marquardt (Moody)	MCCO DB 459:163
1974–1995	George W. Moody Jr.	MCCO DB 276:635
1966–1974	Margaret Moody and heirs of George W. Moody	MCCO DB 276:635
1910 (A), 1920 (B) –1966	George W. (Sr.) and Margaret Moody	MCCO DB 69:569; 94:470
1912–1920 (B)	William Morris	MCCO DB 76:14
1911–1912 (B)	John Campbell	MCCO DB 72:442
1909–1910 (A), 1911 (B)	Heirs of Cash Moody	MCCO DB 69:93
1895–1909	Cash M. Moody	MCCO DB 43:274
pre-1895	Whitfield S. Moody	MCCO DB 43:274

After their parent's deaths, the Moody heirs owned the property containing Site 15Ma499 for a short period of time. An unknown area on the west half (A) of Hays Creek was sold in 1910 to George W. Moody, who was Cash's nephew and son of his older brother, Thomas J. (MCCO DB 69:569; USBC 1880). The portion of the property on the east half (B) of Hays Creek was sold to John Campbell in 1911, and then to William Morris in 1912 (MCCO DB 72:442; 76:14). No records were found to indicate that John Campbell or William Morris lived in Madison County, and it is not thought that they lived at or near the east half of the property containing Site 15Ma499. In 1920, William Morris sold the east half (B) of the property to George W. Moody (MCCO DB 94:470). This sale put the entire ownership of the property in the holdings of George W. Moody. From 1910 to 1966, George W. Moody acquired numerous tracts of land, much of which had once been part the large landholdings owned by his grandfather, Whitfield Moody.

George W. Moody was born in 1875 and lived much of his life in Kingston, Madison County (USBC 1880). He married a woman named Margaret in 1899 and they lived for a short time in Garrard County (USBC 1900). By 1910, the family had moved back to the Kingston area and lived on a farm on Big Hill Pike, which is located approximately 10.6 km (6.6 mi) south of the project area. George and Margaret Moody had six children: Dwight; Salem; Carlyle; Virginia; and George W., Jr. All of the children lived with their parents in 1920, and Dwight and Salem worked with their father on their family farm (USBC 1920). In 1920 and 1930, the family lived at what the census called the Dixie Highway, also known as Old Highway 25 and the Kingston-Berea Road (Connelly 2005; USBC 1920, 1930). The first structure depicted at Site 15Ma499 is found on the 1929 geological map of the area (KGS 1929). George W. Moody, Sr., acquired the portion of Site 15Ma499 containing the historic structure in 1910. He likely constructed the residence at some point between 1910 and 1929. By 1940, George, Sr., Margaret, and their son, Carlyle, had moved back to Big Hill Road (USBC 1940). George W. Moody, Sr., owned the farm property until his death in 1966 (Ancestry.com 2000).

Margaret Moody and her children jointly owned the large farm containing multiple tracts of property until 1974 when the family sold all of the property to their youngest son and brother, George W. Moody, Jr. (MCCO DB 276:635). Margaret died 4 years later in 1978 (Ancestry.com 2000). George W. Moody, Jr., married Elizabeth Wines shortly before 1940 and they had at least two children, Robert and Margaret (USBC 1940). In 1995, George W. Moody Jr., bequeathed the large family farm in whole to his children, Robert C. Moody and Margaret Sue (nee Moody) Marquardt (MCCO DB 459:163). Margaret later gave her half of the property to her brother, who retains trusteeship of the property to the current day (MCCO DB 492:542; 580:144).

Summary

The property containing Site 15Ma499 was owned for much of the nineteenth century by Whitfield Moody, although it is not averred that he lived at or near the site. An 1876 map of the area does not depict a structure at or near Site 15Ma499, and indicates that Whitfield Moody lived elsewhere in the area. Whitfield Moody's son, Cash Moody, acquired the property containing Site 15Ma499 in 1891 and lived in Kingston until 1909. Although it is ultimately unknown where his residence was located, it is unlikely that his large log cabin was located within the site boundaries. Rather, it is likely that the residence on-site was built by George W. Moody, Sr., who owned the property from 1910–1966. The artifacts recovered also suggest they were for the most part deposited during this time. He may have lived at the site in the 1920s and 1930s, but later moved elsewhere in the area. One of his children or grandchildren may have lived at or near Site 15Ma499 in the mid- to late twentieth century, although the house also may have been occupied by tenants. George W. Moody, Sr.'s grandson, Robert C. Moody, is the current owner of the large family farm.

Summary and National Register Evaluation

Site 15Ma499 is a historic farm/residence dating from the late nineteenth through the twentieth centuries. The site area was defined by a well and structural remains at the location of a former residence, and cultural material recovered from STPs. There was no evidence for the presence of intact, buried historic structural remains, features, deposits, or midden. A residence is indicated at the site on the 1929, 1942, 1952, and 1955 maps (KDOH 1942, 1955; KGS circa 1800s, 1929; USGS 1952b) (see Figures 10 and 11). According to the available information, the residence was associated with the Moody family beginning in the early twentieth century.

The portion of the site within the project boundary is not considered to have the potential to provide important information about local or regional history, and Site 15Ma499 is recommended as not eligible for the NRHP under Criterion D. No further work is recommended. Portions of the site outside of the current project area were not investigated or evaluated for the current project. If future developments extend outside of the current project boundaries, further investigation may be needed. However, as the well, residence, and most of the yard area was recorded during the current investigation, only a limited area beyond the current site boundary could be potentially impacted by future developments and may not require additional work beyond that considered for the proposed bridge project.

Project Impacts

Site 15Ma499 is located within the proposed KY 3376 bridge replacement over Hays Fork project. Additional archaeological work would not produce significant information beyond what has been collected, and no further work is recommended for this site. The proposed construction will have no effect on Site 15Ma499 because it is not listed in, or eligible for, the NRHP.

VII. CONCLUSIONS, RECOMMENDATIONS, AND TREATMENT

CRA personnel completed an archaeological survey of a proposed bridge replacement and approach modification along KY 3376 over Hays Fork Creek in Madison County, Kentucky. One previously unrecorded cultural resource, 15Ma499, was documented within the project area during the survey.

Site 15Ma499 is a historic farm/residence dating from the late nineteenth through the twentieth centuries, and the site boundary may extend outside of the project area to a minimal degree. The portion of the site within the project area is recommended as not eligible for listing in the NRHP, and no further archaeological work for this portion of the site is recommended. No cultural resources eligible for listing on the NRHP will be affected by the proposed project, and archaeological clearance is recommended.

Note that a principal investigator or field archaeologist cannot grant clearance to a project. Although the decision to grant or withhold clearance is reached, at least in part, on the recommendations made by the field investigator, clearance may be obtained only through an administrative decision made by the Federal Highway Administration and KYTC, Division of Environmental Analysis, in consultation with the State Historic Preservation Office (the Kentucky Heritage Council [KHC]).

If any previously unrecorded archaeological materials are encountered during construction activities, the KHC should be notified immediately at (502) 564-6662. If human skeletal material is discovered, construction activities should cease, and the KHC, the local coroner, and the local law enforcement agency must be notified, as described in KRS 72.020.

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APPENDIX A. HISTORIC ARTIFACT INVENTORY

Table A-1. Historic Artifacts Recovered.

Bag	Site	Unit #	Dep	Cat #	Group	Class	Type	Attr 1a	Attr 1b	Attr 2c	N	Wt	Dia	UM	Vessel Part	Vessel Type	MinDate	MaxDate
01	15Ma499	STP 1	0-16 cm bgs	1	D	Ceramics	Ironstone	Undecorated			2				Rim		1830	
01	15Ma499	STP 1	0-16 cm bgs	2	D	Container Glass	BIM		Clear glass		1				Body		1864	1920
02	15Ma499	STP 1	16-25 cm bgs	3	U	Metal	Iron / Steel		Flat: thin		1							
03	15Ma499	STP 2	0-9 cm bgs	4	D	Container Glass	BIM		Aqua glass		1				Body	Canning jar		1920
03	15Ma499	STP 2	0-9 cm bgs	4	D	Container Glass	BIM		Clear glass		2				Body		1864	1920
03	15Ma499	STP 2	0-9 cm bgs	4	D	Container Glass	BIM	Indeterminate	Clear glass		1				Base		1864	1920
03	15Ma499	STP 2	0-9 cm bgs	5	A	Flat Glass	Window Glass				1		2.03	mm			1884	1884
03	15Ma499	STP 2	0-9 cm bgs	6	A	Flat Glass	Plate Glass				1						1917	
04	15Ma499	STP 2	9-30 cm bgs	7	D	Ceramics	Ironstone	Decal		Molded	1				Rim with body	Saucer	1890	1940
04	15Ma499	STP 2	9-30 cm bgs	8	D	Container Glass	BIM		Amethyst glass		1				Body	Misc bottle	1870	1920
04	15Ma499	STP 2	9-30 cm bgs	9	D	Metal Food Containers	Cylindrical Food Can	Indeterminate			1							
04	15Ma499	STP 2	9-30 cm bgs	10	A	Construction Material	Brick	Handmade brick:non-vit			1	11.2						
04	15Ma499	STP 2	9-30 cm bgs	11	A	Nails	Cut Nail: late machine	Fragment			9						1830	1890
04	15Ma499	STP 2	9-30 cm bgs	12	A	Flat Glass	Window Glass				1		2.06	mm			1886	1886
04	15Ma499	STP 2	9-30 cm bgs	13	C	Buttons	Riveted overall	Button			1						1780	
04	15Ma499	STP 2	9-30 cm bgs	14	E	Writing Implements	Pencil	Wooden pencil ferrule			1						1800	
05	15Ma499	STP 3	30-40 cm bgs	15	A	Nails	Cut Nail: late machine	Fragment			1						1830	1890
06	15Ma499	STP 3	40-48 cm bgs	16	A	Nails	Cut Nail: unspecified	Fragment			1						1800	1890
07	15Ma499	STP 4	0-20 cm bgs	17	U	Metal	Iron / Steel		Item / part		1							
08	15Ma499	STP 4	20-30 cm bgs	18	D	Container Glass	BIM		Amethyst glass		1				Body		1870	1920
09	15Ma499	GSC 1	- Surface	19	D	Ceramics	Ironstone	Air brush			1				Rim, body, base	Plate	1900	1960
09	15Ma499	GSC 1	- Surface	19	D	Ceramics	Ironstone	Chromatic glaze	Yellow		1				Rim with body	Cup	1920	1970
09	15Ma499	GSC 1	- Surface	20	D	Container Glass	ABM	Owens mold	Clear glass		1				Base		1903	1955
09	15Ma499	GSC 1	- Surface	21	D	Container Closures	Home Canning Jars	Liner for Mason zinc: flat			1						1869	1950
09	15Ma499	GSC 1	- Surface	22	D	Metal Food Containers	Cylindrical Food Can	Double/crimped seam			1						1904	
09	15Ma499	GSC 1	- Surface	23	A	Construction Material	Brick	Handmade brick:non-vit			1	702.5						
09	15Ma499	GSC 1	- Surface	23	A	Construction Material	Brick	Handmade brick:non-vit			1	564.1						
09	15Ma499	GSC 1	- Surface	24	A	Construction Material	Brick	Machine made brick: non-vit			1	576.2						
09	15Ma499	GSC 1	- Surface	25	A	Flat Glass	Window Glass				1		2.31	mm			1907	1907