APPENDIX K

AN ARCHAEOLOGICAL SURVEY OF PORTIONS OF WAR FORK/STEER FORK AND STURGEON CREEK IN JACKSON COUNTY, KENTUCKY

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Contract Publication Series 99-97

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by

Andrew P. Bradbury

With Contributions by:

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MANAGEMENT SUMMARY

Between August 19 and September 3, 1999, archaeologists from Cultural Resource Analysts, Inc. conducted an archaeological survey in portions of the War Fork/Steer Fork and Sturgeon Creek drainages in Jackson County, Kentucky. The survey was conducted in conjunction with proposed alternate locations for construction of a single Jackson County reservoir. Archaeological investigations within these two areas were designed to sample approximately 25 percent of each of the two proposed reservoir alternates to: 1) identify historic properties within the portion surveyed; 2) allow for predictions of relative impacts the proposed reservoir projects would have on historic properties in these two areas; and, 3) determine the potential for significant historic properties to be located in both project areas.

As a result of the survey, no archaeological sites were identified within the War Fork/Steer Fork project area. The only cultural material recovered from the War Fork/Steer Fork project area consisted of machine made glass from a non-site locality. None of this material could be identified as being greater than 50 years in age. No sites eligible for or included in the National Register were identified in the portion of the proposed project area that was surveyed. Based on the results of the survey, it is determined that the War Fork/Steer Fork project area has a low potential for affecting historic properties.

Eight sites (15Ja473-480), six isolated finds and one non-site locality was documented in the Sturgeon Creek project area. All of the sites and isolated finds contained prehistoric materials. A few historic artifacts were recovered from several of the sites; however, none of the historic material could be identified conclusively as being greater than 50 years in age.

Seven sites (15Ja474-480) offered only very limited research potential due to 1) the poor archaeological and geologic context of the sites; 2) the lack of features or midden deposits which would provide subsistence and radiometric data; and, 3) the paucity and low diversity of artifacts. All these sites were situated in cultivated fields and have experienced erosion and other post depositional disturbances. All cultural materials at these sites were restricted to surface or plowzone contexts. No intact cultural deposits or sub-plowzone features were identified. Additional archaeological work at these sties (15Ja474-480) would not produce significant information beyond that which has been collected. Therefore, no further work is recommended for sites 15Ja474-480.

The remaining site (15Ja473) requires additional work to evaluate its significance. The site is situated on a low terrace overlooking Sturgeon Creek. The site has the potential to contain features, midden deposits and intact cultural bearing soils that could provide important information concerning prehistoric lifeways in this region of Kentucky. The site cannot be considered eligible for the National Register until the nature, extent and integrity of the cultural remains are assessed, and this is our recommendation for the site if Sturgeon Creek is selected as the preferred alternate.

Based on the results of the survey, it was determined that, unlike the War Fork/Steer Fork alternate, the Sturgeon Creek project area does have the potential to contain significant historic properties. Sediments on the floodplain represent low energy depositional environments. Therefore, there is a high probability that sites located in such areas will contain undisturbed, intact cultural deposits. If the Sturgeon Creek project area is selected as the location of the new reservoir, it is recommended that, in addition to completing a surface survey of the study area, a buried site reconnaissance be conducted to identify buried archaeological remains situated on the floodplain.

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Chapter 1. Introduction

Between August 19 and September 3, 1999, archaeologists from Cultural Resource Analysts, Inc. conducted an archaeological survey in portions of the War Fork/Steer Fork and Sturgeon Creek drainages in Jackson County, Kentucky. The survey was conducted in conjunction with the proposed Jackson County reservoir. At this time, it has not been determined whether the War Fork/Steer Fork area or the Sturgeon Creek area will be the location of a new reservoir. Archaeological investigations within these two areas were designed to sample approximately 25 percent of each of the two proposed project areas to: 1) identify historic properties within the portion surveyed; 2) allow for predictions of what impact the proposed reservoir projects would have on historic properties in these two areas; and, 3) determine the potential for significant historic properties to be located in both project areas. The fieldwork was conducted by the author, Matt Reynolds and Russ Hartley. Approximately 288 person hours were expended during the fieldwork portion of the project.

The purpose of this assessment was to 1) locate, describe, evaluate and to make appropriate recommendations for the future treatment of any historic or prehistoric archaeological properties which may have been threatened by proposed construction activities, and 2) to assess the potential for archaeological sites requiring preservation in place. 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" (Kentucky Heritage Council 1991:8). Cultural deposits meeting this definition but less than 50 years of age were not considered to be sites as per the guidance provided in the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (Federal Register September 29, l983). Field notes, records and site photographs will be curated with the University of Kentucky Museum of Anthropology.

A description of the study area, the field methods used and the results of this investigation follow. The report is intended to conform to the "Specifications for Archaeological Fieldwork and Assessment Reports" (Kentucky Heritage Council, March 1991).

Because 60-70% of the War Fork/Steer Fork study area was located on USDA Forest Service lands, a Special Use Permit was required. Cultural Resource Analysts, Inc. holds a blanket permit (User # 5591) to complete such survey work on the Daniel Boone National Forest. Moreover, fieldwork in this area was coordinated with the Forest Archaeologist, Mr. Cecil Ison, in Winchester, Kentucky, and with his counterpart in the Berea Ranger District, Mr. Bill Sharp.

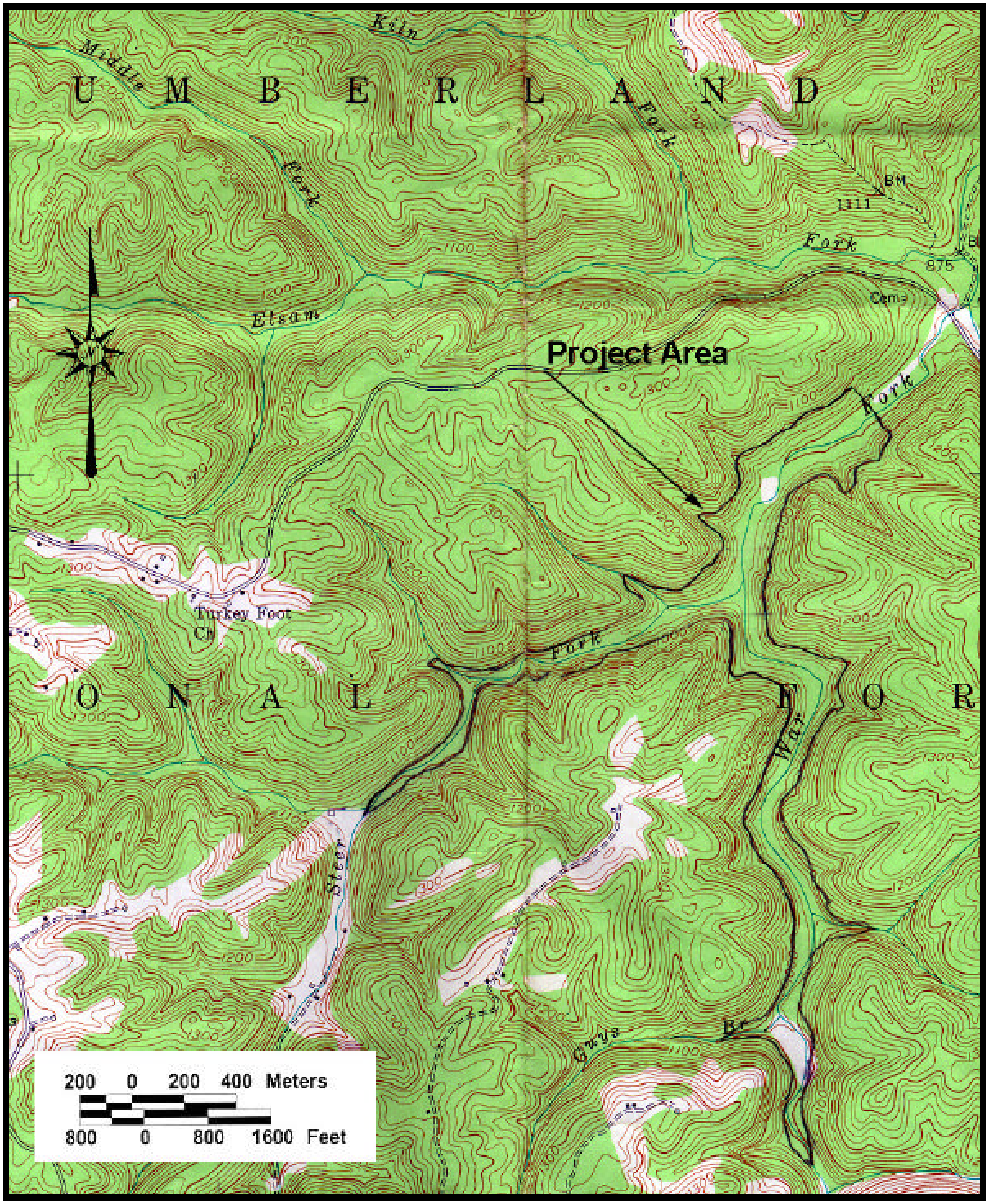

Figure 1. Location of the War Fork/Steer Fork study area. Adapted from the McKee, KY (1953, photoinspected 1976) USGS 7.5 minute series topographic quadrangle.

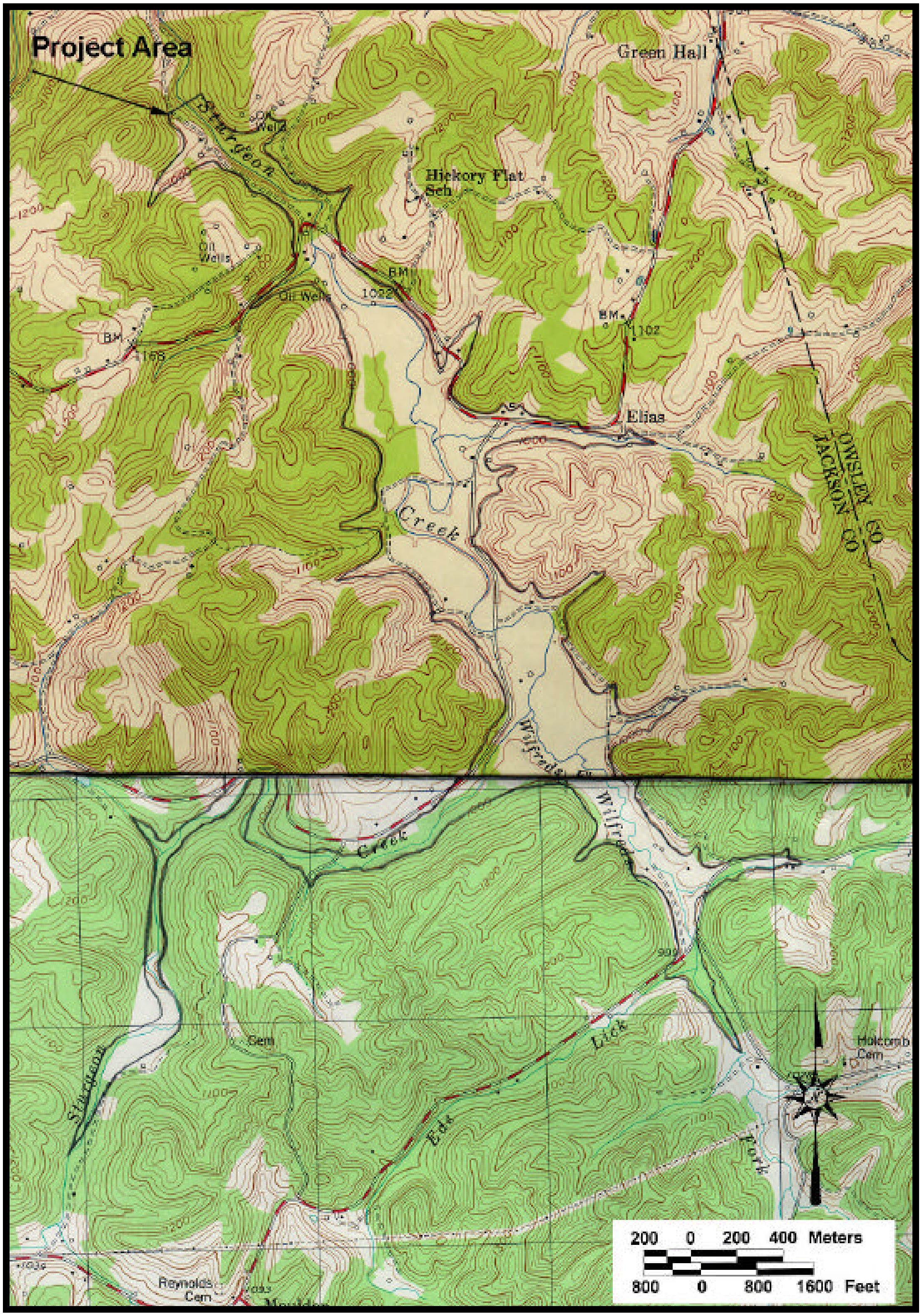

Figure 2. Location of the Sturgeon Creek study area. Adapted from the Sturgeon, KY (1953, photoinspected 1976) and Mauldin, KY (1979) USGS 7.5 minute series topographic quadrangles

Chapter 2. Affected Environment

Most of Jackson County lies within the Eastern Coalfields physiographic region, with a small part of the western edge of lying within the Eastern Pennyroyal physiographic region (Hayes 1989). The project area is located within the Eastern Coalfields physiographic region of Jackson County. This area is characterized by deeply entrenched streams and cliff lined valleys (McGrain and Currens 1978:40-41). Slightly lower elevations and terrain that is more subdued can be found in the southeastern portion of the county (McGrain and Currens 1978:41). The Sturgeon Creek project area is situated within the latter.

Soils within the War Fork/Steer Fork project area were mapped within the Gilpin-Shelocta-Rayne soil unit (Hayes 1989). These soils are described as moderately deep and deep, well drained, steep to gently sloping soils that have a loamy subsoil and can be found on hillsides and ridges. Two soil series were situated within the project area, the Shelocta-Giplin channery silt loams and the Grigsby fine sandy loams. The Grigsby series was only found in the area at the confluence of War Fork and Steer Fork creeks. This series is characterized as fine sandy loams found in areas with 0-3% slope that are frequently flooded. The Shelocta-Giplin channery silt loams are characterized as silt loams and are situated in areas with steep terrain (Hayes 1989).

Soils within the Sturgeon Creek project area were mapped within the Shelocta-Gilpin soil unit (Hayes 1989). These soils are described as deep and moderately deep, well drained, steep to gently sloping soils that have loamy subsoil that is found on hillsides and ridgetops (Hayes 1989). The Shelocta-Giplin channery silt loams was the only soil series represented in the Sturgeon Creek project area.

Description of the Study Area

Both project areas were located in the eastern portion of Jackson County, Kentucky near the Jackson County/Owsley County line. The following section provides detailed descriptions of the two project areas.

War Fork/Steer Fork Project Area

The War Fork/Steer Fork project area was situated approximately 3 km east of the community of Macedonia and 3.5 km southwest of the community of New Zion. The project area consisted of 162 acres along portions of War Fork and Steer Fork creeks (Figure 3a, in Back Jacket). Most of this project area was located within the Daniel Boone National Forest. The project area extended from the base of the two creeks (approximately 820 feet AMSL) to the 1000 foot contour elevation. At the time of the survey, both War Fork and Steer Fork creeks were dry. The only water in either creek consisted of small isolated puddles. A total of 57 acres was fully examined during the current survey representing a 35 % sample.

Vegetation in the War Fork/Steer Fork project area consisted of secondary growth timber, scrub brush and briars. This vegetation obscured all surface visibility within the project area.

Topography in this area consisted of steep side slopes and a narrow floodplain. A number of geological overhangs were situated within, and above, the project area. Most of these overhangs exhibited shallow (< 5 cm) soils and/or extensive roof fall on the floor. Shovel tests were excavated whenever possible in overhangs within the project area. Cultural material was not observed in any of the overhangs investigated during the project.

A few relatively flat areas were situated adjacent to both War Fork and Steer Fork creeks. Shovel testing in these areas suggested that much of the floodplain was still active (i.e., coarse grained sands, rounded gravels). A number of dry, braided streambeds were also observed in these areas.

The remains of an old road were documented in portions of the project area along the east bank of War Fork creek. This road was represented by a linear depression with dirt mounded on either side. The road was observed in several areas within the project area. GPS points were taken when possible along visible portions of the road to facilitate mapping the location on the quadrangle map (see Figure 3a in back jacket).

During the early 1900s, the Turkeyfoot Railroad operated a logging operation in the Turkeyfoot area (Cecil Ison, personal communication 1999). Turkeyfoot is located approximately 0.5 km north of the current project area. This operation employed oxen to skid logs down slope. There were no indications that the old road identified during the survey was associated with the Turkeyfoot Railroad. A primitive road is depicted on the 1937 Jackson County Highway and Transportation map that may correspond to the old road identified during the survey.

No sites were identified in association with the road. Non-site locality 1 (see discussion in the *Site Description* section of this report) represented the only cultural material in possible association with this feature. All of this material consisted of machine made glass. None could be positively identified as being greater than 50 years old.

Sturgeon Creek Project Area

The Sturgeon Creek project area was situated approximately 0.75 km west of the community of Elias and 2.4 km east of the community of Mummie. The project area consisted of 523 acres along a portion of Sturgeon Creek south of State Route 30 (Figure 3b, in back jacket). The project area extended from the base of Sturgeon Creek (approximately 960 feet AMSL) to the 1010 foot contour elevation. A total of 122 acres was fully examined during the current survey representing a 23% sample.

Topography in the project area consisted of a relatively wide bottomland associated with Sturgeon Creek and portions of the adjacent side slope. The bottom land areas consisted of the floodplain and terrace areas and exhibited little relief. The terraces were generally less than 10 feet higher in elevation than the adjacent floodplain. Side slopes were steep. No overhangs were observed in the surveyed portion of the Sturgeon Creek project area.

Sturgeon Creek was entrenched within 2-3 meters of alluvial deposits. Auger testing in such areas revealed up to 2.7 meters of alluvial deposition in floodplain areas (see *Chapter 7. Deep Testing Results* of this report for more detailed information). Shovel testing in terrace areas indicated that soil deposition was relatively shallow. Subsoil and/or bedrock floaters (sandstone) were observed at the surface in many terrace areas. This suggested that all archaeological remains in such areas would be limited to the plowzone.

Vegetation in the project area varied greatly from area to area. Much of the project area was situated in farmland, especially in the floodplain and terrace areas. A variety of crops was being grown in these areas: corn, tobacco, soybeans, and clover. In addition, a number of other areas were situated in pasture with grasses and weeds as the only vegetation. Side slopes were generally occupied by secondary growth timber and scrub brush. Ground surface visibility was good to excellent for much of the project area that was under cultivation. Tobacco was being harvested during the time of the survey. This increased the surface visibility in these areas.

Climate

The climate in this area of Kentucky is continental in character and temperature and precipitation levels fluctuate widely. The prevailing winds are westerly and therefore, most of the 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 greater proportion of precipitation received by the state. Warm, moist, tropical air masses from the Gulf predominate during the summer months when humidity levels also remain quite high. 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 have a smaller frequency, thus resulting in a less radical extremes in temperature and rainfall. The fall is generally the driest season, and spring the wettest.

In Jackson County, the mean maximum temperature in January is 46.9 degrees F, and the mean minimum for the month is 24.3 degrees F. July, the warmest month has a mean maximum temperature of 87.6 degrees F and a mean minimum of 63.3 degrees F. Jackson County receives an annual yearly precipitation of 46.6 inches with half occurring between April and September (Hayes 1989).

As discussed by Niquette and Donham (1985:6-8), climatic conditions during the Holocene age represent a series of transitions in temperature, rainfall and seasonal patterns. These transitions created a seemingly infinite range of ecological variation across time and space. This variation both limited and expanded survival strategies of human populations.

The beginning of the Holocene Age, dated between 11,300 and 12,700 BP, is associated with major and fairly rapid warming temperatures, decreases in cloud cover and generalized landscape instability (Delcourt 1979:270; Webb and Bryson 1972:107). Estimated temperature increases during this period are three times greater than later Holocene fluctations (Webb and Bryson 1972:107). 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 Wisconsin advances (Delcourt and Delcourt 1981:147). The climate during the early Holocene was considerably cooler than modern climate and extant species in upper altitude zones of the Allegheny Plateau reflect conditions most similar to the Canadian boreal forest region (Maxwell and Davis 1973:515-516). Conditions at lower elevations were less severe and favored the transition from boreal to mixed mesophytic species. Paleo-Indian sites in the eastern United States are generally associated with the Early Holocene or Pleistocene-Holocene interface; Late Pleistocene sites are also known.

Middle Holocene (8000 - 4000 BP) climate conditions appear to have been consistently dryer and warmer than 20th century conditions (Delcourt 1979:271; Wright 1968). The influx of westerly winds during this Hypsithermal climatic episode contributed to periods of severe moisture stress in the Prairie Peninsula and to an eastward advance of prairie vegetation (Wright 1968). Delcourt has identified Middle Holocene moisture stress along the Cumberland Plateau in Tennessee, but indicates that upland barrens did not expand appreciably as did the midwestern prairies (Delcourt 1979:274). Changes in Archaic settlement patterns in both central and northern Missouri have been associated with possible decreases in upland resource availability during the episode (Joyer and Roper 1980; Warren 1982:349-350).

The earliest distinguishable Late Holocene climatic episode began circa 4000 - 5000 BP and ended around 2800 BP. This 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 1979:270; Maxwell and Davis 1972:517-519; Warren and O'Brien 1982:73). Beginning around 2800 BP, generally warm conditions, probably similar to the 20th century, prevailed until the onset of the Neo-Boreal episode around 700 BP. Fluctuations in this Late Holocene Pacific episode appear to have varied locally, with either increased or decreased temperatures and precipitation (Baerris, Bryson and Kutzbach 1976:50-52; Warren and O'Brien 1982:73). Certain of these fluctuations have been associated with adaptive shifts in midwestern prehistoric subsistence and settlement systems. An example is Struever and Vickery's (1973) suggestion of a possible correlation between the onset of a cooler, moister period circa 1600 BP and increased use of polygonum by Late Woodland groups in the Midwest (Struever and Vickery 1973:1215-1216). During this same period (1600-1300 BP) warmer temperatures have been inferred for the Great Plains and dryer conditions for the Upper Great Lakes (Baerreis et al. 1976; Warren and O'Brien 1982). Other fluctuations during the Pacific episode are similarly non-uniform across the midcontinental United States; however, the interfaces of all fluctuations are generally consistent. Local paleoecological evidence is required in order to determine the kinds of climatic fluctuations Woodland populations experienced during the Pacific episode. Given evidence of fluctuations elsewhere, it is most likely that changes occurred circa 1700 BP, 1300 BP, and 900 BP, with a possible fourth change around 2300 BP.

Recent studies of historic weather patterns and tree ring data by Fritts, Lofgren, and Gordon (1979) have indicated that climatological averages are "unusually mild" when compared with 17th - 19th century trends (Fritts et al. 1979:18). Their study suggests that winters were generally colder, weather anomalies were more common and unusually severe winters were more frequent between 1602 and 1899 than after 1900. These cooler, moister conditions are associated with the Neo-Boreal episode, or Little Ice Age, which began around 700 BP and coincided with minor glacial advances in the northwest and Europe (Denton and Karlan 1973; Warren and O'Brien 1982:73). This episode is viewed by Warren and O'Brien as a causal factor in vegetation pattern shifts in northeast Missouri (Warren and O'Brien 1982:74- 76).

The effects of the Neo-Boreal episode, which ended during the mid to late nineteenth century, have not been studied in detail for this region. Despite this, it appears that the area experienced less radical temperature decreases during the late Neo-Boreal than did the upper Midwest and northern Plains (Fritts et al. 1979). Related changes in extant vegetation should therefore be more difficult to detect. It is probably safe to assume, however, that average temperatures were at least a few degrees cooler during the late Prehistoric and early Historic periods. The frequency of severe winters and average winter precipitation were probably greater as well.

Chapter 3. Previous Research and Cultural Overview

Previous Research in Jackson County

Prior to initiating the field work, a search of records maintained by the National Register of Historic Places, the Kentucky Heritage Council and the Office of State Archeology was conducted for both project areas. In addition, because much of the War Fork/Steer Fork project area was situated on Forest Service land, the Forest Service was also contacted concerning sites on record with them in the project area. These records searches revealed that no previously recorded sites were situated in either project area.

Additionally, a survey of available maps of the area was initiated to help identify areas that might contain historic properties. The following maps were examined:

- 1937 Jackson County Highway and Transportation Map
- 1953 Sturgeon Creek quadrangle
- 1953 McKee Quadrangle

No historic properties were depicted any of these maps within the War Fork/Steer Fork project area. A structure was depicted on the 1953 Sturgeon quadrangle map within the boundaries of the Sturgeon Creek project area. This structure was investigated during the survey and is referred to as Non-site locality 2 (see the *Chapter 6. Site Descriptions* in this report) as no artifacts were recovered that could confidently suggest a date greater than 50 years. One other structure is depicted on both the 1953 Sturgeon quadrangle and 1937 Jackson County Highway and Transportation map that is within the Sturgeon Creek project area. This is discussed more fully in *Chapter 8. Archival Records Search* section of this report.

Prior to the initiation of the present study, there were 262 previously recorded archaeological sites in Jackson County on file with the Office of State Archeology. Table 1 provides a summary of selected information for previously recorded sites in Jackson County. Only one site was listed for the Sturgeon quadrangle and none for the Mauldin quadrangle. The Sturgeon Creek project area is located on these two quadrangles. Twenty-five sites were listed for the McKee quadrangle. This is the location of the War Fork/Steer Fork project area.

Based on the known distribution of sites in Jackson County, coupled with the information on site types recorded and the topographic nature of the study area, certain predictions were possible regarding the kinds of sites thought likely to be encountered by this investigation. Open air habitation and/or lithic workshops were the primary site type expected followed by historic sites. Rockshelters on the side slopes were also thought to be possibly present. The latter is especially true for the War Fork/Steer Fork project area as there are steep side slopes situated in this area. In addition, the field crew was cognizant of the Turkey Foot Railroad and logging history of the area. As a result, they expected to find features and evidence of both in the War Fork/Steer Fork reservoir alternate.

Table 1. Summary of selected information for previously recorded sites in Jackson County.

Site Type:	N	%
Rockshelters	152	58%
Open w/out mounds	60	23%
Open w/out mounds/Historic	1	0%
Open with mounds	2	1%
Historic house/farm	17	7%
Stone Mound	2	1%
Cemetery	1	0%
Caves	4	2%
Isolated Find	2	1%
Spec. Act. Area	2	1%
Industrial	6	2%
Workshop	2	1%
Indeterminate	3	1%
Petroglyph	4	2%
Quarry	1	0%
Other	3	1%
Total:	262	100%

Quadrangle:	N	%
Alcorn	11	4%
Johnetta	2	1%
Leighton	19	7%
McKee	25	10%
Parrot	40	15%
Sandgap	142	54%
Sturgeon	1	0%
Tyner	19	7%
Unlisted	3	1%
Total:	262	100%

Reporting Institution:	N	%
Arrow Enterprises	4	2%
Carnegie Museum	3	1%
Cultural Resource Analysts, Inc.	3	1%
Environmental Consultants, Inc.	5	2%
Indiana University	1	0%
RAI	6	2%
Univ. of Cincinnati	9	3%
Univ. of Tennessee	1	0%
Univ. of Kentucky	35	13%
USDA Forest Service	195	74%
Total:	262	100%

Time Periods Represented:	N
Paleo Indian	1
Archaic	20
Woodland	23
Late Prehistoric	27
Historic	62
Indeterminate	137

Cultural Overview

The cultural overview is broken down into several main stages (e.g., Paleoindian, Archaic, Woodland, and Mississippian) that represent the traditional view of cultural development in the southeastern United States. While it is recognized that these "stages" represent somewhat arbitrary subdivisions imposed on a continuum of cultural development, this cultural historic approach is still useful in that it provides a general descriptive background for the area and allows for general communication purposes. This section will discuss the main criteria that have traditionally been used to distinguish the different stages of cultural development. These "stages" are used here for general descriptive purposes and to allow for a frame of reference for further discussions relating to excavations at the sites under investigation.

Early Man

There is general agreement that man arrived in North America *via* the land bridge that once joined Siberia and Alaska, where they are now separated by the Bering Strait (Dragoo 1976:4). These earliest Americans probably followed the Pleistocene megafauna to this continent, thereafter populating both North and South America. Muller-Beck (1966) notes that this may have occurred as early as 40,000 B.C. Nevertheless, there is precious little evidence to support this view.

At Meadowcroft Rockshelter in western Pennsylvania dates exceeding 17,000 B.C. have been assayed from the material recovered from the deepest microstrata in Stratum IIa (Adovasio et al. 1978:638-639). Additional but controversial evidence of a pre-projectile point horizon has been found in the Lively Complex in Alabama (Lively 1965) and at Wells Creek Site in Tennessee (Dragoo 1973). Despite this evidence, Early Man's existence on the North American continent remains open to question because pebble tool artifacts (e.g., choppers, scrapers and planes) persisted into Paleo-Indian and later periods. Despite repeated claims of new finds that might suggest a pre-12,000 B.P. human population in North America (e.g., Simpson et al. 1986; Bryan 1986; Fladmark 1979, 1983), nearly all of these have been re-examined and rejected for one reason or another. Meltzer has summed up the situation by stating:

> the net result, so far, is that the Clovis "barrier" remains intact. A pre-12,000 B.P. human occupation of North America does not now exist publicly" (Meltzer 1989:471).

While most archaeologists accept Clovis as the first peoples in America, this is far from universally excepted. For years, the most controversial site has been Meadowcroft Rockshelter in Pennsylvania (Adovasio et al. 1977, 1978). More recently, the site of Monte Verde in northern Chile (Dillehay 1989, 1997) has provoked much discussion (e.g., Meltzer et al. 1997). An occupational surface (MV-II) dating to approximately 12,500 B.P. was documented at the site (Dillehay 1989, 1997). It is suggested that this occupation includes wooden huts, hearths and associated stone artifacts. Radiocarbon dates suggest that this occupation was approximately 1000 years older than the generally accepted dates for Clovis, but is situated some 16,000 km south of the Bering Land Bridge. Several other sites in the United States also have been suggested as candidates for pre-Clovis occupations, however, Monte Verde remains the best documented. No such claims of pre-Clovis materials have been made in the Jackson County area.

The Paleo-Indian Period

The earliest cultural period conclusively documented in the middle Ohio Valley is Paleo-Indian. Dragoo (1976:5) has dated this period in the eastern United States from about 10,500 B.C. to 8,000 B.C. However, Mason (1962:236) has suggested that this period may have begun as early as 13,500 B.P. (11,550 B.C.), based on what is known about North American glacial history at the close of the Pleistocene.

The arrival of humans in the middle Ohio Valley was likely associated with the movements of the Pleistocene glaciers. During the Paleo- Indian period, the last of these glacial advances and retreats, called Greatlakean Stadial (post 9,900 B.C.), occurred. Although the glaciers never actually extended south of the Ohio River, the climatic effects of the glacier were probably felt. A cooler, moister climate affected the composition and distribution of floral and faunal communities (Delcourt and Delcourt 1982; Klippel and Parmalee 1982), although the specific effect in the Middle Ohio Valley is not well understood.

Distinctive lanceolate-shaped, often fluted, hafted bifaces called Clovis are the artifactual hallmarks of the early part of the Paleo-Indian period. Unifacially and bifacially chipped tools such as knives, scrapers, and spokeshaves, endscrapers with spurs, drills and gravers have also been recovered. Artifacts and tools of wood, bone and shell are inferred to have also been used, but poor preservation of these artifact types have prevented recovery. However, in Florida where preservation is better, a number of bone and ivory tools have been described that are associated with Paleo-Indian remains (Dunbar and Webb 1996). A number of these tools were manufactured on extinct fauna, including megafauna.

In the Plains area, Paleo-Indian 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. This has led archaeologists to hypothesize that these early Americans were engaged full-time in hunting big-game Pleistocene mammals, such as mammoth, mastodon, giant beaver, bison and Pleistocene horse, to the exclusion of plant resource utilization (e.g., Bonnichsen et. al. 1987; Kelly and Todd 1988; Stoltman and Baerreis 1983).

In opposition to this view of Paleo-Indians as big game hunters, many species of plants and small mammals have been recovered from Clovis-aged sites such as Lubbock Lake

(Johnson 1987), Shawnee-Minisink (Dent and Kaufman 1985), and Aubrey (Ferring 1989). The latter indicate that, at least in some cases, a wide variety of plant and animal species were being exploited by early groups. At Dust Cave in Northern Alabama, for example, faunal material associated with the late Paleo-Indian levels were more highly represented by avian species than mammals (Walker 1996). The apparent specialization on big game hunting may have more to do with biases of the archaeological record (e.g., preservation, site discovery) than is real. As Grayson (1988:44) has noted, if Paleo-Indian groups "spent most of their time hunting mice and gathering berries, we probably would not know it." In a recent 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) have now argued that the Paleo-Indian diet was likely more generalized. A number of faunal and floral species would have been utilized. Megafauna would have been taken when encountered, but not to the exclusion of other species. The Coats-Hines site in Williamson County, Tennessee provides such an example. The remains of a mastodon were found with associated chipped stone tools (Breitburg and Broster 1995). Cut marks on the bones further evidenced this association. No hafted bifaces were recovered in association with the mastodon and it is believed to have been scavenged rather than killed by a Paleo-Indian group (Broster 1996). Blood residue analysis has been conducted by Loy and Dixon (1998) on a sample of fluted points to determine the what species the points were used on. Blood residues of several species, including mammoth, bison, caribou and musk ox were identified on these materials. These latter examples show that at least some megafauna were being exploited by these early hunters.

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 sites in the region. The previously mentioned Coats-Hines site is one such occurrence. At the Adams Mastodon site in Harrison County, Kentucky, the remains of a single mastodon were found in association with large limestone slabs and cut marks on the bones. The configuration of the skeletal remains in addition to the above evidence has been interpreted as possible butchering by humans (Duffield and Boisvert 1983; Walters 1988). In opposition to the characterization of Paleo-Indians hunting megafauna, MacDonald (1968) has proposed that perhaps caribou were the preferred game. Evidence to support this suggestion has been found at Holcomb Beach in Michigan (Fitting et al. 1966), where caribou remains were found in a hearth associated with Paleo-Indian fluted points. The blood residue analysis by Loy and Dixon (1998) also indicated that caribou were being exploited by Paleoindian groups.

The traditional picture of Paleo-Indian lifeways consisting of big-game hunting almost exclusively is currently viewed as too simplistic. Even though the site dates to the latter portion of the Paleo-Indian period, floral and faunal materials recovered from the Shawnee Minisink Site in Monroe County, Pennsylvania, reflected a much different picture. Dent (1981:79) reported that the Paleo-Indian levels of this site included carbonized seeds such as acalypha, blackberry, chenopod, hawthorn plum, hackberry and grape. In addition, the faunal assemblage suggested that these people were heavily dependent upon fish.

Although Paleo-Indian type sites are located in the western Plains area, more fluted points have been found in the Midwest and Southeast than in the Plains (Jennings 1978:27). In a recent examination of the distribution of fluted points in the lower 48 states, Anderson et. al. (1998) found that over 70% had been recovered from sites east of the Mississippi River. Early Paleo-Indian Clovis points occur abundantly below the glacial margin around the Ohio River, and are particularly common in Kentucky, Tennessee, Alabama and Georgia (Dragoo 1976:9).

Paleo-Indian sites in the eastern United States where Clovis points have been recovered from subsurface contexts include Bull Brook in Massachusetts (Byers 1954), Shawnee-Minisink Site in Pennsylvania (Marshall 1978), Wells Creek Crater (Dragoo 1973), Johnson-Hawkins, Johnson, and Carson-Conn-Short sites (Broster and Norton 1992) in Tennessee, Debert Site in Nova Scotia (MacDonald 1968), and Modoc Rockshelter in Illinois (Fowler 1959). At Meadowcroft, despite the lack of diagnostic fluted hafted bifaces, subsurface remains which date to the Paleo-Indian period were recovered. These include Mungai knives, bifaces, flake blades, and debitage, as well as four firepit features (Adovasio et al. 1977). Although far from being universally accepted, the earliest dated Paleo-Indian component in North America (14,225 +/- 975 B.C.) (SI-2354) was recovered from Stratum II at this site.

Dated Paleo-Indian material in the Ohio Valley is rather limited. In fact, Tankersley (1990:80) states that there are only 22 dated Paleo-Indian sites in the entire United States and that 17 of these are located west of the Mississippi River. Three dates, from two Kentucky sites, are worthy of note. Unfortunately, the association between the dates and Paleo-Indian material cannot be demonstrated. An alluvial stratum at Big Bone Lick, containing sloth, horse, mastodon and mammoth, yielded a date of 8,650 ± 250 B.C. (W-1358). Clovis points were also found at the site and the date may be an accurate assessment for Paleo-Indian use of this locale. Enoch Fork Rockshelter (15PE50) yielded two early dates: 9,010 ± 240 B.C. (Beta-15424) and 11,530 ± 350 B.C. (Beta-27769). Both of the samples used to generate these dates were obtained from a stratum underlying an Early Archaic Kirk zone at the site (Cecil Ison, personal communication 1991). More recently, Broster and Norton (1992; also see Broster et. al. 1991) have reported dates of 11,700+/- 980 B.P., 12,660+/-970 B.P., and 11,980+/-110 B.P. associated with fluted material from the Johnson-Hawkins site along the Cumberland River in the Nashville Basin of Tennessee.

Paleo-Indian hafted biface types (e.g., Clovis and Cumberland) occur widely in the Tennessee and Kentucky region. While they clearly indicate a significant Paleo-Indian occupation, as elsewhere in the eastern United States, they are generally limited to surface finds. There is a limit to what can be done with surface or out-of-context collections of distinctive hafted bifaces or other tools; however, this data can be used to make inferences about settlement patterns, subsistence, and tool assemblages of Paleo-Indian groups. A discussion of these inferences will follow a description of some of the better known Paleo-Indian sites in middle Tennessee and Kentucky. Future excavations at Paleo-Indian sites with buried components (e.g., Carson-Conn-Short, Johnson, Johnson-Hawkins, Puckett) should provide additional information concerning early populations in the area.

In a study of Paleo-Indian sites in Kentucky, Rolingson (1964) found that the majority of Paleo-Indian hafted bifaces were found in the Mississippian Plateaus and the Bluegrass sections. Rolingson and Schwartz (1966) discussed Paleo-Indian components at four sites in the Purchase area in western Kentucky (Henderson, Roach, Morris and Parrish). Clovis, Cumberland, lanceolate fluted points, and uniface tools were recovered at the sites. All four sites lacked intact stratigraphy and contained later Archaic material in addition to the Paleo-Indian assemblage. Additional Paleo-Indian sites have been recorded in the counties bordering Kentucky Lake (Tankersley 1990:100-102).

More recent work in the Nashville and Kentucky Lake areas by Broster and co-workers (Broster and Barker 1992; Broster and Norton 1992, 1993, 1996; Broster et al. 1991; Norton and Broster 1993) has demonstrated the existence of sites with intact Paleo-Indian deposits. The latter area is situated just south of the current study area. Preliminary excavations at the Johnson site (Broster and Barker 1992; Broster et al. 1991) along the Cumberland River in Davidson County, Tennessee, have demonstrated the existence of buried, stratigraphically separated Paleo-Indian through Early Archaic components. A date of 12,660 ± 970 B.P. was obtained from a sample of charcoal associated with the Paleo-Indian occupation (Broster and Barker 1992). Excavations Puckett Site have documented the presence of intact Paleo-Indian components (Norton and Broster 1993). An intact midden was encountered approximately 1.7 meters below surface at this location. A radiocarbon date of 9,790 ± 160 B.P. was obtained from the Dalton level at the site (Norton and Broster 1993:49).

Another important Paleo-Indian site in the lower Cumberland River valley is the Wells Creek Crater site (Dragoo 1973). The Wells Creek Crater site is one of the largest and best known Paleo-Indian sites excavated in Tennessee. The site is located on Central Hill in the Wells Creek Structure, Stewart County, Tennessee. Clovis hafted bifaces, preforms, bifacial knives, drills, and many uniface tools were recovered from this site. Twenty-two artifact concentrations were observed on the southern and southeastern slopes of Central Hill. The intensity of occupation and variety of tool types present led Dragoo (1973) to determine that the site was a habitation and workshop site.

Several major Paleo-Indian sites are located along the Tennessee River in western Tennessee. The Nuckolls site (Lewis and Kneberg 1958) is located on an elevated swell in the bottomland of the Tennessee River. A few fluted points and uniface blade tools were recovered along with other later Archaic material. The Wells Creek Crater, Sims, and Nuckolls sites are within a 50 mile circle of each other in the Lower Tennessee River drainage.

The Sims site (Adair 1976) had a small assemblage of Paleo-Indian tools. Five Clovis hafted bifaces, fluted blanks, flake knives, and uniface scrapers were recovered from this site as well as later transitional Paleo-Indian and Early Archaic material.

Several researchers with specific interests on the early habitations of Tennessee have recently recorded a large number of sites with Paleo-Indian components within the immediate Kentucky Lake area (Broster et al. 1991; Broster and Norton 1992, 1996). Much of their contributions were accomplished by a survey of amateur collections recovered from sites in the reservoir. Several of the sites they recorded exhibited major Paleo-Indian occupations.

One of these sites was the subject of more intensive work. Excavations at the Carson-Conn-Short site along Kentucky Lake in Benton County, Tennessee documented the presence of a number of deflated hearths associated with a Paleo-Indian occupation of the site (Broster and Norton 1993, 1996; Broster et al. 1994). Seven distinct areas of the site have been identified, one of which has been tested. To date, nine units have been excavated at the site. Numerous fluted points and fragments along with other chipped stone tools have been recovered from buried deposits at the site.

In Christian County, Kentucky, a series of lithic workshop-habitation sites and isolated spot finds have been referred to as the “Little River Paleoindian Site Complex” (Freeman et al. 1996:396-402). This area is located approximately 25 km from the Wells Creek Crater site. Two sites in this area may contain buried Paleo-Indian components. The sites associated with this complex are interpreted as primary retooling loci for the manufacture-replacement of chipped stone implements (Freeman et al. 1996:401).

Based on recent work in Kentucky and Tennessee, several generalizations can be made concerning the location and extent of Paleo-Indian sites in the region. In the Kentucky Lake region, sites containing fluted points are located at the mouths of tributary streams on well drained terrace remnants adjacent to the Tennessee River channel (Broster and Norton 1996:294). Before inundation of the lake, maintenance/manufacturing sites would have been situated a short distance from low swampy areas. A similar distribution of sites is seen along the Cumberland River in the area. The main differences between these river drainages is the lack of large numbers of uniface tools per site along the Cumberland River (Broster and Norton 1996:294-295). In addition, along the Cumberland River, sites appear to be small in extent and exhibit a lower density of artifacts (Broster and Norton 1996:295). In Kentucky, most sites appear to represent short, ephemeral occupations that occur in shallow, deflated, or severely disturbed deposits. Larger sites are more common in areas that provide high quality lithic raw material, or topographic features or resources that would have attracted and concentrated game (Freeman et al. 1996:402). Away from lithic source areas, larger sites are often associated 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 the Pleistocene megafauna became extinct. Regional archaeological complexes began to develop (Dragoo 1976:10) as 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 Paleo-Indian to the Early Archaic period (c. 8,500 to 8,000 B.C).

Transitional Paleo-Indian/Early Archaic sites are slightly more numerous than the earlier Paleo-Indian sites. Sites dating to this period show many resemblances with Paleo-Indian material (lanceolate PPks, uniface tools) and also with an Early Archaic lifeway (more diverse subsistence, and the introduction of many bifacial tool forms and several types of sites). Hunting remains an important source of subsistence. However, Dalton peoples probably based their economy around the hunting of small game animals such as the white-tailed deer instead of the large game animals (Morse 1973). This is probably also the case for other late Paleo-Indian/Early Archaic groups. "Available evidence suggests an increasing Dalton concentration into the Tennessee River Valley of northwest Alabama and western Tennessee, and the Green River in Kentucky" (Williams and Stoltman 1965:678). With depletion of the big game herds old supplementary subsistence patterns were intensified. This is the beginnings of an Archaic subsistence pattern (Williams and Stoltman 1965). Two basic kinds of Dalton sites have been described by Morse (1973): base settlements and butchering camps. It is also during the Dalton period that the first systematic use of rockshelters is seen (Walthall 1998).

Many sites that contained Paleo-Indian material also contained transitional Paleo-Indian components. There appears to be an increase in the number of sites which may reflect a population increase during this period. Hunting remained important, however there is evidence for the use of wild plant foods 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. "Most of the foods [recovered in these early horizons] can be consumed fresh without any required grinding, soaking, or cooking" (Lentz 1986:272). 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 side notched and corner notched forms. Goodyear places this transitional phase between 8500 and 7900 B.C.

The Archaic Period

The Archaic period includes a long span of time during which important cultural changes took place. It is generally agreed that Archaic cultures evolved from late Paleo-Indian expressions of the Southeast and Midwest, since there is growing evidence for the existence of transitional cultural manifestations (Funk 1978:19). These manifestations probably occurred in response to environmental changes which took place at the close of the Pleistocene.

The Archaic is customarily divided into three sub-periods: Early (8,000-6,000 B.C.), Middle (6,000-4,000 B.C.), and Late (4,000-1,000 B.C.). In order to accommodate an unconventional view of the Woodland period (discussed below), we have selected 1,500 B.C. as the end of the Late Archaic.

During the Early Archaic, the last glaciers retreated, and the arctic-like boreal forest began developing into the eastern deciduous forest. By the Middle Archaic, the environment was 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 food gathering, fishing, and, in some areas, the beginnings of plant domestication in a planned seasonal round exploitation strategy. Caldwell (1958:6-18) has called this Archaic subsistence approach "primary forest efficiency." This strategy appears to have continued well into the Woodland period.

The Early Archaic Period

Except for the adoption of new projectile point styles Early Archaic tool kits are nearly identical to those associated with the Paleo-Indian period. The fact that these projectile point styles are found over a very large area suggests that little regional subsistence diversity occurred during the Early Archaic. Rather, subsistence strategies are believed to have been similar to those employed by Paleo-Indian 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 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 have served to outline cultural developments that occurred during the Archaic: the St. Albans Site in West Virginia (Broyles 1971), the Longworth-Gick Site near Louisville, Kentucky (Collins 1979), three sites in the North Carolina Piedmont (Coe 1964) and Modoc Rockshelter in Illinois (Fowler 1959).

According to data obtained from Dixon and Rohr (Mayer-Oakes 1955; Dragoo 1958), Early Archaic peoples inhabited rockshelters, which were apparently used as short-term, temporary camps, as well as the large riverine base camps mentioned above.

The Middle Archaic Period

The environment during the Middle Archaic sub-period was dryer and warmer than modern conditions. Increasing regionalization of artifact inventories and the addition of new artifact classes and projectile point styles imply the development of extensive exploitation strategies. The Middle Archaic is marked by the introduction of groundstone artifacts manufactured through pecking, grinding, and polishing: adzes, axes, bannerstones, and pendants. A number of these groundstone tools such as manos, mortars and pestles, and nutting stones interpreted as plant food processing artifacts, indicate an increasing utilization of plant food resources during the Middle Archaic.

Greater regionalization is also noted in new projectile point styles during this sub-period. Stemmed and corner notched points appear. A variety of bone tools including antler projectile points, fish hooks 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 an increased group size and/or longer periods of occupation (Cohen 1977:191). Important sites in the Southeast with Middle Archaic components include sites in the Little Tennessee such as Icehouse Bottom (Chapman 1977), Eva in west Tennessee (Lewis and Lewis 1961), North Carolina Piedmont sites (Coe 1964), and Modoc Rockshelter (Fowler 1959).

Although it has yet to be excavated, the Glasgow site (46KA229) may be one of the more important Middle Archaic sites to be identified in the Middle Ohio River Valley (Hand and Hughes 1990; Redmond and Niquette 1991). It contains a buried Stanly component which is characterized by a 15 m x 40 m, 20 cm thick midden zone. Testing of the site suggests that the Stanly zone at this site may produce over one million artifacts. The Stanly zone at Glasgow produced three features encountered in a single 2 m x 2m unit and an uncorrected date of 5,610 B.C. ±70 (Beta-44416).

Chapman (1975) has suggested that Archaic projectile points were probably used in conjunction with the atlatl, a device which increases the distance and accuracy of a thrown spear. The recovery of bone and groundstone objects (bannerstones) in Middle Archaic contexts interpreted as atlatl weights tends to support Chapman's 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 Paleo-Indian 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 Middle Archaic manifestation is represented by corner notched and side notched Brewerton-like points. Brewertons are typically thought of as Late Archaic points but they may well have first appeared during the Middle Archaic (Hemmings 1977, 1985; Wilkins 1978; U.S. Army Corps of Engineers 1980).

The Late Archaic Period

The Late Archaic was a time of continued cultural expansion and complexity which grew out of the previous periods. Dragoo (1976:12-15) has discussed several Late Archaic traditions for the Eastern Woodlands. Their distinctiveness stems from varied responses to each regional environment reflected in their material culture. Straight-stemmed, basal-notched or contracted-base projectile points types characterize this subperiod. Judging from the greater number of sites that have been noted for the Late Archaic, an increase in population can be postulated. Evidence of longer and more intensive site occupation suggests in some cases extended habitation within an area.

Archaeologists have inferred from ethnographic analogy drawn from surviving hunter-gatherer groups in remote areas of the world that Late Archaic groups were probably organized in nomadic or semi-sedentary bands, with scheduled seasonal movements in response to the available faunal and floral resources. Late Archaic settlement generally reflects a series of camps located to take advantage of seasonal environmental resources. Artifact inventories for the Late Archaic reflect these diversified responses to a wide variety of environmental conditions.

The population increase and an inferred increase in mortuary ceremonialism have led some investigators to postulate 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 illustrative of complex mortuary practices and a rich ceremonial life. The development of inter-regional trading networks is indicated by the recovery of copper, marine shell and other non-local artifacts from Late Archaic burials (Winters 1968). These foreign materials testify to the growing complexity of the ritualism connected with the burial of the dead, but also to the interaction of many groups which would have facilitated the exchange of not only goods but also ideas (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. Evidence of early cultigens has been documented at such sites as Koster in central Illinois (Brown 1977:168), at the Carlson Annis and Bowles sites along the Green River in west-central Kentucky (Marquardt and

Watson 1976:17), and at Cloudsplitter Rockshelter in eastern Kentucky (Cowan et al. 1981).

Struever and Vickery (1973) have defined two plant complexes domesticated at the close of the Archaic, which continued in use into the Woodland period. One group consisted of non-native plants such as gourd, squash and corn. The other was a group of native plants such as chenopodium, marsh elder and sunflower. Struever and Vickery (1973) suggested that the native cultigens were cultivated first, and that the non-native, tropical cultigens were introduced later. Recent research in Missouri, Kentucky and Tennessee, however, suggests that squash was under cultivation in the mid-south by the late 3rd millennium B.C. (Adovasio and Johnson 1981:74), and that by the second half of the 2nd millennium B.C., evidence from Illinois, Kentucky and Tennessee demonstrates that squash, gourd and sunflower were well established (Adovasio and Johnson 1981:74). This more recent evidence contradicts Struever and Vickery's scenario (Chomko and Crawford 1978). According to the most recent research, (Watson n.d.) has outlined two different groups of cultigens, the East Mexican Agricultural Complex and the Eastern United States Agricultural Complex. The latter includes sunflower (*Helianthus annus*), sumpweed (Iva annua), chenopod (*Chenopodium sp.*), maygrass (*Phalaris sp.*), and knotweed (*Polygonum sp.*). The East Mexican Agricultural complex includes squash (*Curcurbita pepo*), bottle gourd (*Legenaria siceraria*) and maize (*Zea mays.* 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 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 which grow in a natural state; hence, cultivation is inferred.

Plant domestication was an important factor in Late Archaic cultural development. Recent research at Cloudsplitter Rockshelter has documented early plant domestication. Dessicated squash rind was found in a Late Archaic deposit at Cloudsplitter associated with a radiocarbon date of 3728 +/-80 B.P. (1778 +/-80 B.C.)(UCLA 2313-K)(Cowan et al. 1981:71). Seeds of the Eastern Agricultural complex (sunflower, sumpweed, maygrass and erect knotweed) are sparse in the Late Archaic levels in the site, but after 3000 B.P. (1050 B.C.), all members of the Eastern Agricultural complex underwent 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. 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 (Cowan et al. 1981:71).

The data from Cloudsplitter Rockshelter suggest that squash may not have diffused into the East or Southwest from Mexico as previously postulated by Struever and Vickery (1973), but that it may have evolved in situ from North American stock (Cowan et al. 1981:71). This interpretation seems to be substantiated by more recent investigations conducted throughout southeastern and mid-western United States.

During the Archaic, cultures became more varied, as each group tailored its own brand of subsistence strategy for maximum exploitation of locally available resources. Hunting, fishing, and plant food processing activities carried out in a seasonal round pattern of exploitation appears to characterize Late Archaic subsistence strategies in the Ohio Valley. This strategy appears to have continued into the Woodland period.

There are a number of projectile point styles which are considered terminal Late Archaic and which extend into the Early Woodland period, i.e., from about 2000- 1500 B.C. to about 500 B.C. (see below). By and large, these points have been found in aceramic contexts, a situation which by default leads archaeologists to place them in the Late Archaic rather than Early Woodland. This doesn't necessarily have the be the case. What do non-Adena Early Woodland sites look like? What are the projectile point styles which mark the transition between Late Archaic and Early Woodland? In an attempt to answer these questions, we have truncated the temporal boundaries of the Late Archaic so that the period ends ca. 1500 B.C. This division, and those of the Woodland period discussed below, represents a departure from current use and both reflect shifting conceptions concerning the nature of culture development during the terminal Late Archaic and Woodland as a whole.

The Woodland Period (1500 B.C.- A.D. 1000)

Traditionally, archaeologists distinguish the Woodland period from the preceding Archaic by the appearance of cord-marked or fabric-marked pottery, the construction of burial mounds and other earthworks, and the rudimentary practice of agriculture (Willey 1966:267).

The Woodland period can be viewed as a developmental period with continuity, as well as dramatic differences, from the Archaic. It is apparent, however, that all regions of the eastern United States did not march hand-in-hand through time toward increasing social and cultural complexity; neighboring regions changed at quite different rates. For example, the high social and cultural elaboration expressed in the earthworks and mortuary structures along the Scioto in Southern Ohio in the Middle Woodland period are paralleled elsewhere only in scattered locations, if at all.

Peaks of cultural complexity were not necessarily followed by a continuing elaboration of society and culture. The end of the Woodland period in many ways marked a decline from heights attained 100-200 years earlier in many parts of the Ohio Valley. The Woodland period, there and elsewhere, is the first point in prehistoric time that the archeologist encounters the truth of Caldwell’s observation (1958) that cultural development in the Eastern Woodlands was not leading inexorably toward civilization. Rather, departing from an Archaic base, cultural evolution in the Eastern United States proceeded by fits and starts with local advances and backsliding.

The following material discusses the chronological history of the Woodland period and examines various interpretations of the data relating to subsistence, technology, mortuary practices, and domestic settlements.

The Woodland period is customarily divided into three periods: Early, Middle, and Late. The absolute chronology is open to question, however, and many “Woodland” sites contain components that cannot be placed in time with any degree of precision. For the purposes of this report, Early Woodland is between 1000 B.C. and 400 B.C., Middle Woodland between 400 B.C. and A.D. 400 and Late Woodland between A.D. 400 and A.D. 1100. As discussed in the following subsections, these divisions to some extent represent departures from current uses and reflect shifting conceptions of the nature of culture development during the era as a whole.

The Early Woodland Period

The Early Woodland period is an ill-defined boundary between the Late Archaic and Woodland periods. In the Ohio Valley, the period is largely a data gap and its temporal boundaries tend to change as we gather more data and develop an understanding of the culture historical relationship to the preceding and following periods.

Traditionally, Ohio Valley archaeologists have set the beginning of the Woodland period at about 1000 B.C., in the belief that a ceramic technology began throughout the region then. But new data, such as those discussed below, suggest that there are problems with this early dateline. The contexts for some early ceramic dates are quite ambiguous (cf., Rais-Swartz Shelter discussed below). And finally, it is becoming clear that pottery may have been introduced over as much as 500 years in the Ohio Valley (Seeman 1986), reflecting diffusion into the area from outside (possibly the Northeast) as opposed to local invention.

The establishment of the 1000 B.C. boundary, therefore, needs rethinking.

True ceramics were preceded by the use of steatite and sandstone bowls in the Ohio Valley. Although poorly dated in the region, they may have been in use as early as ca. 1200 B.C. and probably continued in use and overlapped with the introduction of a true ceramic technology. For example, a sandstone bowl was used as a mortuary offering at the Willow Island Mound, a site which dates perhaps as early as 400 B.C. (Hemmings 1978:33-34).

Subsequent research has demonstrated that ceramics did not occur suddenly or widely over the Eastern United States. The introduction of pottery occurred before 2,000 B.C. in the deep Southeast, while other parts of the East began using ceramics as late as ca. 500 B.C. Because of this simple reality, the occurrence of ceramics is generally not considered here as a mark for the beginning of the Woodland period.

The local introduction of ceramics in the Ohio Valley occurred late, relative to the rest of the Eastern United States. While the absolute dating is not clear, it is probable that the earliest ceramics in the valley post-date 1,000 B.C. and are derived from mid-Atlantic antecedents (Custer 1987:100-102). By this time, in the fiber-tempered ceramic producing areas of the Deep South, ceramics had been in use for over 1,000 years.

One of the earliest radiocarbon dates advanced for ceramics for the central Ohio Valley is 1560 B.C. ± 130 (GX-1248), from the Rais-Swartz Shelter (33JA4) in Jackson County, Ohio (Shane, 1970; Lafferty 1981:501). There are problems with this date, however, and they are exacerbated by the fact that the original data have not been published in detail. The date and an even earlier one come from Stratum V. Eight plain-surfaced pottery sherds were recovered from the surface of this stratum and from a feature within it.

Setting aside the confused evidence from Rais-Swartz, the earliest ceramics in the Ohio Valley—occurring well into the Early Woodland as it has been defined here, and not at its beginning—are generally thick and cordmarked. One of the first of these early ceramic types to be defined was Fayette Thick (Griffin 1943, 1945). Recent work at the type site (Clay 1984, 1985, 1987) suggests that the type may be considerably later (ca. 350 B.C.) than first supposed, in fact marking the end point in the local development of early ceramics, not the beginning.

Ceramics similar to Fayette Thick, but lacking the distinctive pinched decoration, occur elsewhere in the central Ohio Valley. One of these is Half Moon Cordmarked (Mayer-Oakes 1955:184190), which has been found generally in Southern Ohio. The type is known best from a series of rockshelter sites (Griffin 1945). So far, the type is not well dated, although recent dates from the Crawford-Gist site near Pittsburgh suggest that Half-Moon Cord-Marked was in existence by 500 B.C. (Grantz 1986). In addition, Johnson (1982:142) reported two dates for the Half Moon Cordmarked level, Stratum III, at Meadowcroft: 2815 ± 85 B.P. and 3065 ± 80 B.P. The corrected dates suggest a maximum range of 800 B.C. to 1500 B.C. for this pottery type in western Pennsylvania. The corrected average of the two dates produced a maximum date range of 1003 to 1320 B.C.

Another early ceramic type, Graham Roughened, was defined at the Graham site (15LA222) in Lawrence County, Kentucky (Niquette ed. 1989). Tempered with sandstone, this flat-bottomed, cylindrical shaped caldron did not exhibit any evidence of lugs and the direct rim was generally undecorated, but well smoothed. In contrast, body sherds were very rough and uneven, as if an attempt had been made to smooth the vessel after it had been partially dried. Feature 20 at the Graham site produced a quantity of Graham Roughened sherds and an uncorrected date of 240 ± 80 B.C. (Beta-28861). The correction calibrations for this date are 350, 317, 312, 300, 229, 221 and 210 B.C. A much earlier date of 670 ± 60 B.C. (Beta-3095) was obtained from Feature 28, producing a corrected date of 801 B.C. This date was rejected as being too early.

In the area of lithic technology, the division between Late Archaic and Early Woodland is again nebulous. Ohio Valley Early Woodland sites are most easily recognized by a collection of related, stemmed projectile points. These have been subsumed by the Cogswell phase as defined by Ledbetter and O'Steen (1991). Excavations at the Grayson site (15CR73) suggest that the phase dates from circa 1250 to 800 B.C. A variety of thermal features were excavated at Grayson including large charcoal-filled and fire-cracked rock-lined pits (earth ovens?). In addition, chert-filled cache pits were attributed to the Cogswell phase. Structure 3 at Grayson was associated with the Early Woodland use of the site. Open on one side, the structure consisted of an arc of well defined postmolds enclosing an area of about 10 meters in diameter. Along the wall was a cluster of thermal and cache pits. Elsewhere on the site an earth oven containing a Buck Creek Barbed point produced a radiocarbon date of 831 ± 67 B.C. (UGA-6098D).

Another important Cogswell phase site, the Cold Oak Shelter (15LE50) was partially excavated by Ison (1988). Here Cogswell and Wade (Buck Creek Barbed) points also were found to be associated point types. Wood charcoal from a Cogswell phase hearth at Cold Oak produced a radiocarbon date of 880 ± 80 B.C.

Sheldon and Hughes (1990) reported a rockshelter in Breathitt County (15BR118) that portended to hold extremely valuable information relating to this time period. The site was tested subsequently by Betty McGraw (McGraw et al. 1991) who found an extended burial. A fragment of beaten native copper was found in the pelvic region. In addition, two Cogswell and a Buck Creek Barbed point were found under the skeleton's right ulna. A bone sample for dating yielded an uncorrected date of 1020 ± 130 B.C. (GX-16825). This date has a corrected date range of 900-1510 B.C. at two sigmas. The burial at the site demonstrates that Cogswell phase sites witnessed increased mortuary ritualism over the preceding Late Archaic and probably led to the florescence of mortuary ceremonialism that is so diagnostic of the Middle Woodland period.

The Middle Woodland Period

The decision to establish 400 B.C. as the end of the Early Woodland reflects a recognition of the close relationship between the Adena and Hopewell branches of the Woodland culture. The temporal limits of the Middle Woodland period, as they are established in this report, are highly controversial. They are selected not to be disputatious, but to side-step the classificatory problem of defining that which is "Adena" versus that which is "Hopewell" and to avoid the more vexing question of the relationship between the two.

The concepts of Adena and Hopewell (developed over a span of nearly 90 years) reflect attempts by Ohio Valley prehistorians to provide order to the cultural traits observed largely from burial mounds, and from these to create "cultural" entities. While there is a general recognition that the traits, regarded respectively as Adena or Hopewell, are sequentially distributed in time, analysis of cultural material from excavated contexts has not resulted in the recognition of distinctive cultural entities.

Few would argue against the general proposition that Adena and Hopewell represent a Central Ohio Valley continuum in cultural development, as expressed in burial mounds and earthworks. The initial complexity of an "Adena culture" leads directly into the florescence of a "Hopewellian culture."

This lack of a neat chronological sequence between the Adena and Hopewell is supported by distributional studies. The arguments over whether a particular local sequence is more "Adena" than "Hopewell", or more influenced by one than another (cf., McMichael and Mairs 1969; Wilkins 1979), are not convincing. Moreover, altogether too much interpretive power is lost by individual archeologist's efforts to distinguish between the two. The approach taken in this report is to include both manifestations in the same temporal unit (the Middle Woodland Period) and, in so doing, to emphasize the continuity from one to the other. Within the period, the degree to which Adena and Hopewell break down in time or space is another matter. The answers to such questions must be addressed on a local basis depending upon the nature of the data.

To establish a Middle Woodland period between ca. 400 B.C. and A.D. 400 does not deny Adena and Hopewell; it serves as an attempt to make them more relevant to each other than they have been in the past. Moreover, it serves to avoid a line of discussion which has become sterile over the years.

Customarily, Adena has been considered "Early Woodland" and Hopewellian has been considered "Middle Woodland." If Early Woodland is to begin at ca. 1000 B.C. with the introduction of ceramics, then the beginning of the period clearly predates the Adena phenomenon (Seeman 1986). Adena is the critical bridge between the simplicity of the Late Archaic and the complexity of the Middle Woodland period.

The Middle Woodland period, as its temporal boundaries have been established in this report, has always been the substantive heart of "Woodland" as a whole. The sites of this time period have been used to a great extent to characterize the period and its development. Thus the problems of Middle Woodland development have become by extension and without substantial reason the problems of the Woodland period as a whole.

The very archaeological features which have so long been the conceptual centerpiece of Ohio Valley Woodland—mounds—quite often appear as an aberrant development in time. If a professional consensus has developed, it is that there is regional diversity in the Middle Woodland period, not the homogeneity naively expressed in concepts such as "Moundbuilders", "Burial Mound I and II", or even "Hopewellian" (Griffin 1979:278). This consensus lacks a reinterpretation of "Woodland," one that emphasizes interacting regional sequences based on local data.

In regard to ceramics, the latter part of the Middle Woodland period sees the appearance of ceramics in certain sites regarded as "Hopewellian" in inspiration. Commonly, these exhibit stamped, decorated surfaces that include the stylistic treatments of dentate, rocker, check, zone, and simple stamping. In part, these pots are viewed as imports from other regions, such as the South (Prufer 1968:10), but for the most part reflect local developments.

This decorated Middle Woodland pottery is always limited in its distribution. It occurs at the larger mound and earthwork complexes, but not generally throughout the Valley. In fact, the discontinuous distribution of classic Hopewellian pottery is a convenient indication of a parallel discontinuity in the distribution of many of the major features of Hopewell.

The distinctive decorative motifs of Hopewellian pottery tend to link the Hopewellian manifestations of the Eastern United States together by their generic similarity (e.g., Scioto Valley Hopewell, Illinois Havana, Mississippi Valley Marksville). On occasion, they have been suggested as evidence for culture historical interpretations involving the movement of peoples through space (cf., McMichael and Mairs 1969).

Such reconstructions involving migration are generally discounted today (cf., Wilkins 1979). In most cases, they do not point to movement of potteries, or even an interregional trade in pots; they do emphasize that interregional exchange occurred that included other materials of the Hopewellian Interaction Sphere (e.g., copper, mica, shell, and obsidian) and more general stylistic canons in ceramic production.

The Late Woodland Period

Around A.D. 400, the Hopewellian ceremonial centers and extensive trade network collapsed in the Ohio Valley, and burial practices became less complex. The decline of Hopewell marked the beginning of the Late Woodland sub-period. In areas such as Illinois or Ohio where Hopewellian influence was greatest, Late Woodland marks a return to a less complex way of life. In other areas where Hopewellian influence was minimal, Late Woodland witnessed the continuation of a generalized Woodland lifestyle of an increasing dependence on domesticated plants, coupled with hunting and gathering.

Late Woodland projectile point forms include early Late Woodland (ca. A.D. 400 to A.D. 750) Chesser and Lowe point varieties These are followed by late Late Woodland forms such as Jack's Reef Corner Notched, Raccoon Notched and Levanna points. During the late Late Woodland (after about A.D. 800), small triangular projectile points appear in artifact assemblages. The presence of triangular points is frequently used to infer that the bow and arrow came into use at this time.

While regional ceramic sequences have not been developed, most Late Woodland ceramics are generally cordmarked. Variability in ceramic tempering agents is thought to reflect regional and not temporal developments (Purrington 1967b:124). A number of Late Woodland phases have been defined in the middle Ohio Valley: Newtown (Griffin 1952), Peters (Prufer and McKenzie 1966), Chesser (Prufer 1967), Watson Farm (Mayer-Oakes 1955), Buck Garden (McMichael 1965), Childers and Woods (Shott 1990).

It may be possible to recognize cultural differences between Late Woodland groups in the region. According to Maslowski (1984, 1985), cordage twist preference is a culturally learned attribute and can reflect culturally related populations (cf., Croes 1989). He postulates that the "study of cordage twist patterns, <u>along with their other culture specific attributes</u> (emphasis added), may eventually lead to the identification and correlation of prehistoric ethnic groups with historic tribes (1984). He states further that "cordage twist patterns have greater temporal continuity than decorative or environmentally influenced attributes" (1985:3).

There seems to be some basis to his arguments. For example, the Childers site (Shott 1990) in Mason County is an early Late Woodland occupational loci whose ceramic assemblage is dominated by S-twist cordage impressed pottery. This fact alone is unremarkable except for the fact that the majority of other sites in the region of the same time period are dominated by Z-twist pottery. In addition, Childers exhibits a much different settlement pattern than that which is recognized as the norm. Childers is a compact nucleated village located on the bank of the Ohio River, and there is some evidence to suggest that it was surrounded by a ditch. This settlement pattern is nearly identical to Newtown (Griffin 1952:187) sites that have been excavated further downriver, in the Great Miami, Little Miami, Scioto, Kentucky and Licking river drainages. Summarized by Seeman (1980:2), Newtown sites in these areas:

> consist primarily of circular to oval sheet middens which cover approximately 3 - 5 acres (1 - 2 ha.). There is an overwhelming locational preference for elevated situations, often on high terraces adjacent to floodplains. Shallow basin-shaped oven features commonly extend below the midden. Deep bell-shaped storage features are present at some sites. Pits rarely overlap. Burials are present, but infrequent relative to the size of sites. A post mold pattern outlining a rectangular house with rounded corners was discovered at the Turpin site, and the numerous post molds present at the Haag and Harness-28 also document the presence of domestic struc-

> tures...Chesser Notched projectile points are present at all Newtown sites. Triangular arrow points are not...Chipped flint celts, chipped shale or limestone discs, thin rectangular slate gorgets and ground stone celts are also present...Newtown ceramic forms include both bowls and jars and the paucity of surface decoration is a clear pattern.

This pattern contrasts strongly with sites such as the Niebert site (Clay and Niquette 1989), the Woods site (Shott 1990) and several sites in the Greenbottom area such as 46CB41 and 46CB100 (Hughes and Niquette 1989; Hughes and Kerr 1990). This group of sites exhibit what is more typical for Late Woodland sites in this area. They reflect dispersed settlement patterns where a series of houses or domestic loci are distributed down the length of levee and point bar deposits. Perhaps most importantly for Maslowski's arguments, these sites produced ceramic collections which are dominated by Z-twist cordage impressions.

Seeman (1980:17) correctly points out that Newtown, and related phase names such as Peters in southeast Ohio, "suffer from rather imprecise definitions, a problem that becomes compounded as related sites are found over a wider geographic area." To some degree, however, Seeman misses the mark by proposing to lump Newtown, Peters and other apparently related archaeological phases into a "Central Ohio Valley Early Late Woodland." To do so might serve to "emphasize the structural similarity between" many of these sites, but it merely becomes a chronological tool without regard for cultural differences between the populations inhabiting these sites.

Maslowski (1984, 1985) has amassed a body of data on the distribution of cordage twist preferences for Middle and Late Woodland and Late Prehistoric pottery-bearing sites in the greater Middle Ohio Valley. His data suggest that indigenous populations during this time period may have evidenced a decided preference for Z-twist; whereas immigrants from elsewhere (probably from the North or West) can be recognized by the dominance of S-twist pottery. His data also suggest that the two, culturally unrelated populations may have coexisted for a time in the region. Good examples of a "northern" tradition lie with Intrusive Mound Culture and perhaps Buck Garden.

The Intrusive Mound Culture has been described most definitively by Morgan (1952). Diagnostic artifacts include Jacks Reef (Mayer-Oakes 1955:86-87) and Raccoon Notched (Lantz 1989) arrow points and keeled-base, steatite platform pipes; although, only data from three excavated sites have been used as the basis for the definition. Seeman is currently investigating a fourth Intrusive Mound Culture site on the Harness property in Ross County, Ohio. Intrusive Mound artifacts have been found in association with Mahoning ware ceramics in the upper Ohio Valley (Johnson 1976:62-63). Johnson (personal communication 1990) suggests that the Intrusive Mound artifacts were associated with one variety of Mahoning ware. This pottery exhibited horizontal bands of cordwrapped paddle edge impressions placed obliquely to the rims of uncollared vessels. Further west, Winters (1967:68) reports the occurrence of Jacks Reef points with Albee materials. According to convincing evidence presented by Seeman (1989), Intrusive Mound sites in the Middle Ohio Valley date to about A.D. 750 - A.D. 800 and the diagnostic projectile points for the phase represent the first true arrow points in the region. These evolve very rapidly into the more traditional triangular arrow points which were manufactured by native groups well into the 18th century. Yerkes and Pecora (1990) completed an exhaustive analysis of Jacks Reef materials recovered from the Parkline site in Putnam County, West Virginia. These researchers suggest that Seeman may be wrong, and that Jacks Reef points were used as dart points and were part of a multiple weapons tool assemblage that also included the bow and arrow. Intrusive Mound Culture sites in the Kanawha River Valley have been defined by

Niquette and Hughes (1990) as Parkline Phase. In eastern Kentucky, these are assigned to the Everman Phase (Ledbetter and O'Steen 1991).

Many sites contain "Woodland" components that cannot be placed in time with any degree of precision. Only a few broad statements can be made regarding the "generalized" Woodland sites identified from survey. They are located in rockshelter (Kuhn et al. 1978) and open bottomland contexts. Cordmarked and plain ceramics predominate. A variety of tempering materials used throughout the period and in different regions dispels the notion that tempering materials underwent a unilineal replacement through time. A variety of projectile point styles have also been noted. The recovery of triangular projectile points in association with non-shell tempered ceramics indicates that the bow and arrow came into use for hunting during the Woodland period.

The Late Prehistoric Period

The Late Prehistoric archaeological complex of the middle Ohio Valley is Fort Ancient, which spans the time period from approximately A.D. 1150 to about A.D. 1700. Geographically, Fort Ancient extends from western West Virginia to south-eastern Indiana and from south-central Ohio to north-central and northeastern Kentucky (Griffin 1978:551).

The development of Fort Ancient and its relationship to Late Woodland cultures has been, and continues to be, a hotly debated issue. Two hypotheses have been offered in explanation for the relationship between Fort Ancient and Late Woodland cultures. One hypothesis suggests that Fort Ancient represents the fluorescence of an indigenous Late Woodland culture (Graybill 1980:55-56; Rafferty 1974). Others (e.g. Essenpries 1978:154-155) suggest that Fort Ancient represents an influx of Mississippian peoples from the lower Ohio River Valley. Although the question has yet to be resolved, it is entirely possible that each 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. In this scenario, Fort Ancient is viewed as a fluorescence of Mississippian-influenced Late Woodland culture during the early phases (Baum, Anderson and Feurt phases) and as an influx of Mississippian peoples during the later Madisonville phase (Essenpries 1978:164).

Other investigators 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, the almost complete lack of stratigraphic data and intersite comparative studies contributes 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). Village sites tend to be situated in valley bottoms along the main stems of the region's larger drainages (Graybill 1978, 1979). 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. 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 peoples subsistence is characterized by an increased 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 meat source; at some sites it made up to 80% of the game consumed (Griffin 1978:552). The cultural material assemblage including elaborate ceramic styles (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) also serve to distinguish Fort Ancient cultures from Late Woodland occupations.

Although Fort Ancient subsistence, like that of Mississippian populations, was based on the cultivation of corn and other cultigens, other aspects of Fort Ancient clearly distinguish it from the contemporary Mississippian occupations at such sites as Angel (Black 1967) and Kincaid (Cole et al. 1951). Fort Ancient sites lack large ceremonial centers and earthworks. A complex settlement hierarchy, such as that found in the Mississippian culture, does not occur in Fort Ancient. Villages and hunting camps have been the only Fort Ancient site types defined thus far.

A recent publication by Henderson, Pollack and Turnbow (1992) provides an in-depth look at the chronology and cultural patterns of the Fort Ancient period. These researchers developed a four phase chronology for northeastern Kentucky.

Protohistoric and Historic Aboriginal Period

By the beginning of the sixteenth century A.D., the Ohio River valley was populated by a number of sedentary cultural groups (Schwartz 1967). All of this changed when the Iroquois Confederacy, or the Five Nations, engaged in a series of wars, starting in 1625 and continuing until the mid-1700's, in response to controlling the fur trade (Morgan 1904:14). By 1680, the cultural fabric of the sedentary groups in the Ohio River valley was severely stressed and reshaped in the wake of these wars and shifting fur trade patterns (Hunt 1940). The consequence of this change was an increasing displacement of resident aboriginal groups by newly arriving Indian groups (Hunter 1978:588). The wars also had the affect of depopulating Ohio and Kentucky of Indian groups (Morgan 1904:14). Most of the native inhabitants of this area retreated to west of the Mississippi River or deeper into the southeast. The Shawnee of the Kentucky region reportedly retreated to south of the Cumberland River.

The first Europeans to visit Kentucky included explorers, trappers, traders, and surveyors. After these initial explorations, the first organized attempt to settle Kentucky occurred, when the English Crown attempted to colonize the Ohio Valley. This attempt stimulated the formation of land companies and sent surveyors into the area. These early attempts at settlement were disrupted by the French and Indian War which erupted in 1754.

In 1763, England's King George III set aside the land west of the Appalachians for Indians and English fur traders, but closed the area to permanent settlement. His decree fell on deaf ears, however, and further colonial exploration and developed could not be stopped. The western movement of the American frontier pushed the Indians further and further west until the Indians had been pushed to their limits. Kentucky was one of the places in which the Indians decided to take a stand. In response, Governor Dunmore waged two large campaigns in the Ohio Valley (later known as Dunmore's War) and the Indians were defeated. Dunmore's War and the Treaty of Pittsburgh (1775) opened Kentucky for settlement although some hostilities continued after this time.

Chapter 4. Field and Laboratory Methods

In conducting the survey of the two proposed reservoirs, approximately 25% of each area was fully surveyed. This was accomplished by selecting large tracts of the project area and conducting a 100% survey of each of these tracts. The areas to be surveyed were selected so that a representative sample of all topographic features (i.e., floodplain, terrace, side slope) within the respective project area were selected for survey. These areas were determined by an examination of the topographic quadrangle maps in conjunction with field checking the entire project area for each reservoir prior to the conduct of the survey.

During the survey of both project areas, each survey tract was subjected to intensive pedestrian survey (30 acres in the Sturgeon Creek project area and 41 acres in the War Fork/Steer Fork project area) supplemented with shovel testing. This was accomplished by walking parallel transects along natural contours. Steep sideslopes were inspected for natural benches and overhangs. Due to differences in topographic positions and surface visibility, several different survey methods were employed during the current survey to identify cultural resources within the respective project areas. These are discussed in turn below.

Surface Collection

A number of areas within the Sturgeon Creek project area (approximately 31 acres) were situated in cultivated fields at the time of the survey. Because surface visibility in these areas was good to excellent, surface collection was used as a site discovery method. In areas that exhibited large portions of exposed surfaces, an initial walk over of the cultivated area was made by walking parallel transects at 10 meter intervals. All observed cultural material was then pin flagged for later collection. After materials had been pin flagged, a decision was made to either collect all material as one collection unit (i.e., entire site) or to further subdivide the field into smaller units for collection. This decision was based on several factors: 1) the density of materials; 2) the size area involved; 3) evidence of differential artifact distribution; and, 4) amount of disturbance to the materials (i.e., extensive erosion or plowing on multicomponent sites). In cases where there was a low density of materials over a small area or where it appeared that the site was multicomponent with no obvious artifact distributions, all material was collected as a single unit. In cases where there appeared to be differential artifact distributions, the site area was further subdivided and collected in smaller units. In the latter case, the site area was gridded into 10 m x 10 m collection units and all material was collected by collection unit. In either case, all observed cultural material (flagged and unflagged) was then collected and bagged by collection unit. Surface collection was not used in the War Fork/Steer Fork project area due to the lack of surface visibility.

Shovel Testing

In areas of poor surface visibility, shovel testing was employed as a site discovery method in both project areas. Shovel testing is an often used method for 'discovering' sites at the survey level of investigation. There has been much discussion in recent years on the reliability and usefulness of shovel testing as a site discovery method (e.g. Krakker et al. 1983; Lightfoot 1986, 1989; Kintigh 1988; Nance and Ball 1986; Shott 1985, 1989). Problems and biases aside, shovel testing still appears to be the "most efficient discovery technique now available for detecting buried cultural remains on a regional scale" (Lightfoot 1989:413).

In their evaluation of shovel testing, Krakker et al. (1983) discuss several methods of increasing the probability of intersecting a site. Simply increasing the number of shovel tests excavated and decreasing the interval between the tests quickly reaches a point of diminishing returns. An increase in the probability of site detection can be achieved by staggering transects of shovel tests (Krakker et al. 1983:472, 474-475). Using this system, the distance between transects is equal to the interval between the shovel tests in a transect, but with tests in adjacent transects offset one half this interval. A slight increase in this efficiency can be achieved by using a hexagonal grid pattern (Krakker et al. 1983:472). In this form of grid, the distance between transects is slightly less than that of shovel tests of a transect, and the transects are staggered.

For the current survey, a hexagonal grid system was used. In undisturbed areas with low surface visibility, transects were set at 20 meter intervals with the spacing between transects set at 20 meters and the starting points of each transect staggered (Figure 4). In some instances, additional tests were excavated at 5 and/or 10 meter intervals in all cardinal directions—the "iron cross" technique (Lightfoot 1986:495), to better define the limits of cultural remains.

In all cases, shovel tests measured not less than 35 cm in diameter and extended well into subsoil. All soil removed from shovel tests in both project areas was screened through 1/4 inch mesh hardware cloth and the sidewalls and bottoms examined for the presence of cultural material and/or features. Approximately 60 acres in the Sturgeon Creek project area and 16 acres in the War Fork/Steer Fork project area were subjected to shovel testing.

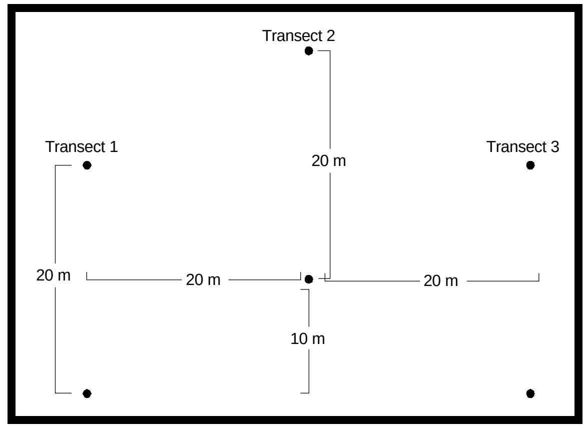

Figure 4. Hexagonal grid pattern used for shovel testing.

Bucket Augering

Due to the presence of alluvial deposits in the Sturgeon Creek project area, it was necessary to determine the potential for buried archaeological deposits. This determination is not possible with near surface reconnaissance methods (i.e., surface collection and shovel testing); therefore, bucket augers were employed. Stafford (1995) has noted the usefulness of bucket augering in the examination of site sediments and determination of buried cultural materials. In summary, bucket augers are useful because they: 1) extract measurable intervals of sediment; 2) allow access to areas that might not be accessible for trenching with a backhoe; 3) are capable of obtaining samples to a considerable depth (greater than 3 meters); 4) are less destructive than backhoe trenching; and, 5) are useful for examining the strata in addition to the recovery of artifacts, especially in areas with a low density of artifacts (Stafford 1995:86-87). Stein (1986) has advocated the use of Oakfield probes on sites to examine subsurface sediments. The small size of the probe (1.6 cm) precludes its usefulness in extracting sufficient quantities of artifactual material. In this regard, bucket augering is a more appropriate method, with respect to the current study, than Oakfield cores. One problem, however, that Stafford notes with bucket augers is that they are not so 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 concern was to be able to identify major soil horizons and determine the potential for buried archaeological remains. Bucket augering was used during the current survey to determine the possibility of buried archaeological remains that were not accessible using surface and near surface methods (i.e., surface collection and shovel testing).

Bucket augering during the current survey was conducted with a hand operated bucket auger exhibiting a four inch opening. Bucket augering was conducted by excavating augers on transects with 20 meter intervals between tests. The bucket auger allowed sediments to be removed in approximately 10 cm levels. All soil was screened through ¼ inch mesh hardware cloth. Records of the presence of charcoal and general soil characteristics (texture, Munsell colors, etc.) were recorded by individual level. Bucket augering was conducted primarily in alluvial soils to determine the possibility of buried deposits, not as a site discovery method.

Once an area was determined to contain cultural materials, a reasonable attempt was made to 1) determine the age and cultural affiliation of the site, 2) establish the horizontal and vertical limits of the site, 3) assess its physical integrity and potential for intact cultural deposits to be present, and 4) make a preliminary assessment of its National Register significance. To better determine the location of each site on project and topographic maps, distances to prominent features such as roads and creeks were measured for each site. In addition, GPS points were taken for the center of each site and site boundaries (see discussion under GPS).

Global Positioning System

The Global Positioning System (or GPS) is a collection of satellites owned by the U.S. Government that provides highly accurate, worldwide positioning and navigation information, 24 hours a day. It is made up of twenty-four NAVSTAR GPS satellites that orbit 12,000 miles above the earth, constantly transmitting the precise time and their position in space. GPS receivers on (or near) the earth's surface, listen in on the information received from three to twelve satellites. From this information, the precise location of the receiver, as well as how fast and in what direction it is moving is determined. GPS uses the triangulation of signals from the satellites to determine locations on earth. GPS satellites know their location in space and receivers can determine their distance from a satellite by using the travel time of a radio message from the satellite to the receiver. After calculating its relative position to at least three or four satellites, a GPS receiver can calculate its position using triangulation. GPS satellites have four highly accurate atomic clocks on board. They also have a database (or almanac) of the current and expected positions for all of the satellites that is frequently updated from earth. That way when a GPS receiver locates one satellite, it can download all satellite location information, and find the remaining needed satellites much more quickly. Even with highly accurate atomic clocks, certain errors do creep into the process of determining your position. Selective Availability (S/A) is the program implemented by the U.S. Department of Defense that makes GPS less accurate for non-military users for security reasons. With S/A in effect, the accuracy of your position may be within 30 to 100 meters. Even without S/A, other errors will be encountered. The most significant of these errors is due to variations in the earth's ionosphere, which effects the speed of GPS radio signals. Another source of error is from water vapor in the troposphere. Both of these errors are fairly small. The accuracy of GPS can be improved with the use of differential correction data. Community base stations maintained by MapSync, Inc. and the University of Kentucky Geometronics Laboratory consist of a GPS receiver located at a known latitude and longitude. These base station receivers constantly log points as broadcast by the GPS. The recorded positions are compared with the known location to determine the amount of error introduced by S/A at any particular time. These base station files are made available on the internet. This data can then be used to correct the points taken in the field, allowing accuracy to within two meters horizontal positioning.

Cultural Resource Analysts' crews employed a Trimble GeoExplorer II as a GPS rover during the surveys of the two proposed reservoirs. A data dictionary allows the creation of project and feature specific data entry logs making it easier to store and retrieve GPS position data. The creation of point and area data features within the data dictionary provided the collection of data for point locations such as the site datum and individual shovel tests and to record the site boundary. Recording of survey areas was performed using the area function of the data dictionary. In general, altitude readings from GPS units are two to five times less accurate than the horizontal readings. For this reason, altitude figures were taken from the USGS quadrangles rather than the GPS unit.

In addition to sites and survey areas, points were taken on landmarks visible on the USGS topographic quads in order to establish the accuracy of the points being taken. These points included major intersections, structures, and USGS benchmarks. In the case of the Jackson County survey, a discrepancy was found between the points taken in the field and the Sturgeon, KY 7.5' quadrangle map. The GPS points were approximately 10 meters east of their locations as mapped by the USGS. This may have been introduced through user error or inherent inaccuracies in the USGS map.

Laboratory Methods

Cultural material recovered from the current survey was transported to Cultural Resources Analysts, Inc. for processing and analysis. Initial processing of the recovered artifacts involved washing all artifacts, sorting the artifacts into the major material classes (i.e., ceramics, faunal, historic, and lithic) for further analysis, and assigning catalog numbers for each specimen. Catalog numbers consisted of the site number and a unique number for each specimen recovered. Each modified implement (e.g., biface, uniface) received its own unique artifact number. Flake debris was cataloged by provenience and all flakes received the same number.

All project maps were created using ESRI’s *ArcView*â (version 3.1). Digital raster graphics of the topographic quadrangle maps associated with each project area were used as the background for both project areas. Themes were created to represent each of the various aspects of the project (i.e., project area, survey areas, site locations, etc.). The maps were all geo-referenced to the UTM coordinate system. The various themes were created directly using data obtained from the GPS points taken in the field and from field notes. UTM coordinates, site area, distance to water and elevation for each of the sites identified were taken directly from the ArcView map.

Following the initial processing of artifacts, subsequent analysis was undertaken. The methods, specifics of analysis, and results are discussed in each of the specific analysis sections of this report. All field notes, records, artifacts and site photographs will be curated at the University of Kentucky Museum of Anthropology.

Chapter 5. Materials Recovered

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Lithic Analysis

Matthew D. Reynolds

During the current survey a total of 536 (2462.7g) prehistoric lithic materials was recovered. This section provides a description of the lithic artifacts recovered during the survey. The main purpose of the analysis was to provide an inventory of the recovered lithic artifacts and provide a basic analysis based on the recovered materials. Lithic artifacts were recovered from sites 15Ja473 through 15Ja480 and from Isolated Finds 1 and 3-7.

Laboratory Methods

Lithic material recovered during the survey was processed in three steps prior to analysis. The first step was to sort material into several general artifact categories (i.e. flake debris, cores, modified implements). The second step consisted of recording attributes of these artifacts into a computer coding format. The final step was to enter all artifact codes into a *Paradox* database. After being entered into *Paradox* tables the data could be manipulated. Coding formats used for the analysis of the recovered lithic artifacts utilized a paradigmatic classification system (Dunnell 1971:70-76). In this form of classification, dimensions, or mutually exclusive features, are recorded for each artifact. Within each dimension are several possible attribute states. Artifact classes can then be formed by the intersection of these attribute states (Dunnell 1971:73). The scale of investigation and the determination of the classes examined is guided by the questions being asked of the data. This form of analysis is preferred over typological formats for several reasons; 1) lithic reduction is a dynamic process, therefore, the forcing of lithic material into static 'types' is counter productive to the actual understanding of prehistoric lithic technologies; 2) no *a priori* assumptions concerning the meaning of the classes, as is common in typological formats, are necessary; 3) mutually exclusive classes are formed; 4) analysis is possible at various levels of detail; 5) classification does not obscure artifact variability (i.e., functional, stylistic, technological, and morphological) to the extent that typologies do; and 6) classification allows for several different analytical techniques to be used, thus allowing multiple lines of evidence to support or reject hypotheses generated of the data.

Flake Debris Analysis

Flake debris is defined here as lithic waste flakes that exhibit evidence of intentional removal from a parent piece and exhibit no evidence of further modification or use. Flake debris is a useful indicator of prehistoric site activities because: 1) it occurs in large number on most sites, 2) it exhibits evidence of the stage of manufacture in which it was produced, and, 3) unlike modified implements, it is usually deposited where it was generated. The analysis of flake debris provides information concerning prehistoric lithic technology and, in conjunction with other analyses, aids in determining site use. The manufacture, maintenance, use, and discard of lithic implements are all part of dynamic processes that produce variation within an assemblage. These dynamic processes begin with the acquisition of raw material and continue through the manufacture, resharpening, and final discard of the implement (e.g., Collins 1975). Numerous approaches have been proposed for the analysis of flake debris. The determination of the appropriate method or methods to be used depends on the goals and scope of the research and the questions being asked of the data. The main focus of this analysis was to:

1) provide an inventory of the flake debris represented at the site and 2) provide a basic summary of the portions of the reduction continuum and technologies that were present. While flake typologies are still used in many archeological investigations, there are a number of potential problems that make the use of these typologies questionable at best. These problems include: 1) inconstancies in the definition of each type; 2) flake types are only reliable for complete flakes; 3) type names are often very subjectively defined or not defined at all; and 4) flake types are not always technologically specific and can be produced by several different modes of reduction (Ahler 1989a; Bradbury and Carr 1995; Ingbar et. al. 1989; Sullivan and Rozen 1985). Bradbury and Carr (1995; also see Patterson 1981) demonstrated that the use of a common flake typology that uses such types as primary, secondary and tertiary types produced results that were not significantly different than a random guess when assessing reduction mode. In addition, comparisons based on these forms of analysis were likely to be inaccurate (Bradbury and Carr 1995).

For the flake debris analysis presented here, six attribute dimensions were recorded for each flake (see Appendix A). These dimensions were: size grade, weight, portion, platform configuration, cortex cover, and reduction stage. Within each dimension were several possible attribute states. In addition, flakes were assigned to a reduction stage. The reduction stage determination is based on the work of Magne (1985; Magne and Pokotylo 1981). Size grade was determined by passing the flakes through a series of nested wire screens ranging in size from 1 inch, 3/4 inch, 1/2 inch, 1/4 inch, to 1/8 inch. All flakes greater than 1/4 inch were examined using the above attributes. For flake debris less than 1/4 inch, only count, weight and cortex were recorded. Raw material type was determined as to parent geological formation when possible. An indeterminate category was also employed for flakes that could not be confidently assigned to a parent geological source. Determination of raw material type was made using published descriptions and by comparisons with a sample collection of locally occurring housed at Cultural Resource Analysts, Inc.

The examination of raw materials used in chipped stone manufacture is important for several reasons. As Binford (1979:260) notes, variability in the proportions of raw material at a site are a function of the scale of the habitat exploited from that location. Given the differential quality and distribution of available raw materials, there is potential for overall differences in the use of these raw materials. A number of raw materials may be sufficient for chipped stone tool production, however, “certain materials may be chosen over others because of differences in mechanical efficiency at hand” (Beck and Jones 1990:284). The area within and surrounding the proposed reservoir areas consisted mainly of sandstones and shales of the Breathitt and Lee formations. Chert bearing strata were not present within either of the project areas. Newman limestones, especially the chert bearing St. Louis and Ste. Genevieve members were present near the project area. Raw materials noted within the assemblage from the survey included Ste. Genevieve, St. Louis, St. Louis Green, indeterminate Newman Formation cherts, as well as small amounts of Fort Payne, Chalcedony, Breathitt, Tyrone, and Boyle.

For the reduction stage determination, flakes were assigned to four reduction stages based on the presence of certain attributes. Magne (1985; also see Magne and Pokotylo 1981), building on the work of Collins (1975), used discriminant function analyses to determine the best variable for separating flakes produced by experimental reduction into four stages. In Magne’s (1985) scheme, early stage reduction is viewed as all core reduction, middle stage reduction is viewed as the first part of the manufacture of tools, and late stage reduction is viewed as the completion and maintenance of tools. Biface thinning is considered a special form of late stage reduction. For platform bearing flakes, platform facet count was determined to be the best single attribute. Dorsal scar count was determined to be the best single attribute for non-platform bearing flakes. Magne (1985:120) determined that for platform bearing flakes 0-1 facets indicated early stage, 2 facets middle stage, and 3 or more facets late stage. In addition, flakes with lipped platforms and 3 or more facets were the result of biface thinning. For non-platform flakes, 0-1 scars indicated early stage reduction, 2 scars middle stage, and 3 or more scars late stage.

The difference between Magne's approach and typological approaches is that Magne's stage classes are explicitly defined and represent mutually exclusive classes. An independent assessment of Magne's stage classification scheme (Bradbury and Carr 1995) produced similar results to those reported by Magne. Several additional attributes beyond that need for Magne's reduction classes were also recorded. These additional attributes allow for the use of several different forms of analysis as other lines of evidence for the development and testing of hypotheses (e.g., Bradbury 1998; Carr 1994; Shott 1994). In addition, flakes produced from specific technological methods (i.e., blade, bipolar) were also noted. Characteristics of bipolar flakes include "shattered or pointed platforms with little or no surface area; evidence of force having been applied at opposite ends of the flake, and angular, polyhedral transverse cross section with steep lateral edge angles; the lack of a definite positive bulb of force; very pronounced ripple marks; and the lack of distinction between dorsal and ventral faces" (Ahler 1989b:210). It is recognized that not all bipolar flakes will exhibit all, or even some, of these characteristics. The author has conducted a number of flintknapping experiments, which included bipolar methods. Samples of flakes removed using bipolar methods were kept for comparative purposes. A single bipolar flake was identified from the surface of site SC3.

Modified Implements and Cores

Modified implements are defined as chipped stone artifacts that have evidence of further modification and/or use. Cores are defined as nodules or blocks of cherts that have negative flake scars (previous flake removals) across at least one face. Eight attribute dimensions were recorded for all modified implements and cores. In addition, seven additional dimensions and cluster associations were recorded for all hafted bifaces (e.g., classes 204-3.2, 204-4.2, 204-5.2, 204-4.5). Metric attributes were recorded for all artifacts that were complete enough to do so. Modified implement and core classes were formed by the intersection of attribute states (e.g. Dunnell 1971). For these analyses, generalized modified classes are defined by the intersection of attributes from dimensions 1-3. For example, class 204-1.1 is defined as all modified implements that exhibit bifacial modification that was produced with a hard hammer. The coding format used for this analysis is presented in Appendix A. General descriptions of the recovered classes are provided below.

Retouched Flakes (class 201)

Retouched flakes are flakes that exhibit the removal of one or more uniform retouch flakes along one or more edges, or a ground or crushed edge. These specimens are generally amorphous shaped and show few, if any systematic flake removals. For these specimens, basic data concerning the form of retouch is recorded. This is: unifacial only (201-1), mostly unifacial (201-2), bifacial (201-3), or alternate unifacial (201-4). While the term "utilized flake" is still used by some analysts, it is not employed here. This is due to problems in identifying a used edge without the aid of magnification (see Young and Bamforth 1990; Odell 1996 for a more in depth discussion of this problem). Simply stated: 1) trampling and other post depositional processes can mimic use wear; 2) implements used on soft resistance materials (i.e., meat, hides, etc.) exhibit damage that can only be seen under higher magnifications (often in excess of 40x); 3) with retouched flakes, the used edge is often not the edge that was retouched; and 4) without the aid of magnification, the identification of used edges will likely be biased towards those implements used on harder resistance materials (i.e., bone, antler). The identification of use wear should not be conducted without the aid of a microscope. A single possible retouched flake was recovered from the surface of site 15Ja480.

Thermally Altered Rock (class 202)

Included in this class are cobbles, pebbles, and gravels that have been thermally altered. This alteration typically takes the form of reddening and fracturing of the stone. Eleven fragments of thermally altered sandstone (965.9g) were recovered from site 15Ja473. A small sample was retained after analysis, and the remainder discarded.

Bifacial Implements (class 204)

Biface reduction is viewed as a continuous process of reduction. A biface may be taken out of the reduction sequence at any stage to be utilized for a specific task, then, after use, re-enter the continuum and further reduced. Bifacial reduction usually starts with hard hammer percussion followed by soft hammer percussion. Pressure flaking is used for final shaping and haft modification (Johnson 1981) and to prepare striking platforms for the removal of large flakes during biface thinning.

The terms hard and soft hammer percussion are utilized in this analysis to reflect the form of flake scars present, and not necessarily to determine the type of percussor used to detach the flake. Hard hammer scars are defined as flake scars that exhibit prominent negative bulbs of percussion, usually circular in shape, and are relatively narrow and deep. The biface exhibits high intersecting ridges between flake scars and an irregular bifacial margin. Soft hammer scars are defined as flake scars that have a small negative bulb of percussion, are relatively shallow and broad, and often leave ripple marks in the negative flake scar. The biface usually has a regular bifacial margin and the ridges between flake scars are not as pronounced as on bifaces with hard hammer scars. Retouch scars are defined as flake scars that have a small negative bulb of percussion and are usually small, shallow scars that are restricted to the edge of the implement. Hard hammer flakes are associated with early stage reduction. Soft hammer flakes and retouch flakes are associated with late stage reduction. Also note that in some cases, bifaces (especially class 204-1.1) may have also been used as cores (e.g., Kelly 1988).

The type of flake scars present defines generalized biface classes. These general classes are: 204-1 (hard hammer scars only), 204-2 (hard hammer and soft hammer scars), 204-3 (soft hammer scars only), 204-4 (soft hammer and pressure scars), 204-5 (pressure scars only). An indeterminate class, 204-6, is used for those implements that can not be assigned to one of the above classes. These are typically small fragments.

In addition to these generalized classes, a further break down describes the general morphology of the specimen. These correspond to traditional typological designations. The morphological classes are: .1 (biface), .2 (hafted biface), .3 (drill), .4 (hafted biface reworked into a drill, .5 (hafted biface reworked into a hafted scraper), and .6 (hafted biface reworked into a boring implement).

Using the above designations allows for finer descriptions of the implement. For example: class 204-4.5 defines a hafted bifacial implement that has been worked into a scraper. This implement was manufactured using soft hammer and pressure flaking techniques. Likewise, class 204-3.1 defines a generalized bifacial implement manufactured using soft hammer percussion techniques. A summary of bifacial implements recovered during the survey is presented in Table 2.

Table 2. Bifacial implements recovered during the survey.

Site	Provenience	Class	Definition	Count	Weight (g)
15Ja474	General Surface	204-3.1	Soft Hammer Biface	1	3.1
15Ja474	General Surface	204-4.1	Soft Hammer/Retouch Biface	1	6.2
15Ja475	General Surface	204-2.1	Hard Hammer/Soft Hammer Biface	1	3.2
15Ja475	General Surface	204-3.1	Soft Hammer Biface	2	4.8
15Ja476	General Surface, Art#1	204-3.2	Soft Hammer Biface	1	18.6
15Ja476	General Surface, Art#4	204-4.2	Soft hammer/Retouch PPK	1	8.4
15Ja478	General Surface	204-2.1	Hard/Soft Hammer Biface	1	6.6
15Ja478	General Surface	204-3.1	Soft Hammer Biface	2	5.3
15Ja478	General Surface	204-4.1	Soft hammer/Retouch biface	2	1.8
15Ja478	General Surface	204-4.2	Soft hammer/Retouch PPk	2	3.8
15Ja478	General Surface	204-4.5	Soft hammer/Retouch PPk/Scraper	1	6.7
15Ja478	General Surface	204-5.1	Pressure Flaked Biface	1	0.2
15Ja478	General Surface	204-6.1	Indeterminate Manufacture Biface	1	0.6
15Ja479	General Surface	204-4.1	Soft Hammer/Retouch Biface	2	4.5
15Ja480	General Surface	204-3.1	Soft Hammer Biface	9	55.9
15Ja480	General Surface	204-4.1	Soft Hammer/Retouch Biface	2	1.6
15Ja480	General Surface	204-4.2	Soft Hammer/Retouch PPk	1	1.2
15Ja480	General Surface	204-4.5	Soft Hammer/Retouch PPk/Scraper	1	3.3
15Ja480	General Surface	204-6.1	Indeterminate Manufacture Biface	3	12.8
IF1	General Surface	204-4.2	Hafted Biface	1	2.4
IF3	General Surface	204-4.1	Soft hammer/Retouch biface	1	1.3
15Ja473	Collection Unit 8	204-4.2	Soft Hammer/Retouch PPk	1	1

Cobble Tools (Class 205)

This class of tools consists of cobbles that exhibit evidence of use, but that were not manufactured. Use-wear on these implements ranges from battering around the edges to pits on one or more face. A single sandstone pitted cobble (1007.8g) was recovered from the surface of site 15Ja473. Pitting occurred in two locations; one face, and one edge.

Temporally Diagnostic Artifacts

The following section provides a description of all temporally sensitive lithic artifacts recovered during the project. All hafted bifaces (classes 204-3.2, 204-4.2 and 204-5.2) were identified as to traditional cluster names when possible. In most cases, no attempt was made to separate any of these implements into individual type names within the defined cluster. It is the opinion of this author that defining individual types within a cluster does not provide any additional information beyond that of the cluster definitions. Many traditional 'types' have been shown to be the result of resharpening and reuse of a general morphological "type" (e.g., Goodyear 1974; Hoffman 1985). In addition, several researchers (e.g., Flenniken 1985; Flenniken and Raymond 1986; Titmus and Woods 1986; Towner and Warbarton 1990) have demonstrated how hafted biface morphology can change with use and subsequent resharpening. Cluster names are used here only as a general means of description and relative temporal placement.

LeCroy Cluster (N = 2), Figure 5a and b.

A) Metrics (mm):

Weight	1.0g
Length	18.9
Blade Width	17.5
Thickness	4.9
Shoulder	17.5
Stem	6.4
Neck	9.8
Base	12.0

B) Metrics (mm):*

Weight	1.2g

Too fragmentary to measure

Raw Material: A) Indeterminate Chert

B) Newman Formation Chert

Distribution: A) Surface of Site 15Ja473

B) Surface of Site 15Ja480

Description: The LeCroy Cluster includes the types LeCroy Bifurcated Stem, Lake Erie Bifurcated Stem, Kanawha Stemmed, and Fox Valley Truncated Barb. Specimen A was confidently assigned to the LeCroy Bifurcated Base type. These hafted bifaces have deeply bifurcated bases, triangular blades, and lack basal grinding. Specimen B was too fragmentary to identify to a specific type. This cluster is associated with the Early Archaic period (6500 to 5800 BC) (Justice 1987).

Late Archaic Stemmed Cluster (N = 1), Figure 5c.

Metrics (mm):

Weight	8.4g
Blade Width	25.0
Thickness	8.3
Shoulder	25.0

Raw Material: Boyle Chert

Distribution: Surface of Site 15Ja476

Description: This cluster includes both Karnak Unstemmed, Karnak Stemmed and McWhinney Heavy Stemmed typed. The specimen recovered from the surface of site 15Ja476 could not be confidently placed into either of these types. hafted bifaces of this cluster are typically thick, crudely made, stemmed points with little to no basal grinding. This cluster is associated with the Late Archaic period, and dates ranging from 4000 BC to 1000 BC (Justice 1987).

Matanzas Cluster (N = 1), Figure 5d.

Metrics (mm):

Weight	2.4g
Length	23.8
Blade Width	15.5
Thickness	5.7
Shoulder	15.4
Stem	5.3
Neck	12.6
Base	13.2

Raw Material: St. Louis Chert

Distribution: Isolated Find 1

Description: This specimen was identified to the Matanzas Side Notched type of the Matanzas cluster. Matanzas Side Notched are small and have straight bases. Side notching typically occurs low on the biface, and is shallow. These Late Archaic period hafted bifaces are associated with a date range of 3700 to 2000 BC (Justice 1987).

Saratoga Cluster (N = 1), Figure 5e.

Metrics (mm):

Weight	6.7g
Length	26.7
Blade Width	26.9
Thickness	9.8
Shoulder	26.9
Stem	11.8
Neck	16.9
Base	16.4

Raw Material: St. Louis Chert

Distribution: Surface of Site 15Ja478

Description: This cluster is diagnostic of the Late Archaic to Early Woodland transition period (Justice 1987). Saratoga cluster hafted bifaces are wide and thick, with large stems. Blade shaped range from lanceolate to triangular with short, straight sides. The specimen recovered from the surface of site 15Ja478 had been worked into a scraper.

Early Woodland Stemmed Cluster (N = 1), Figure 5f.

Metrics (mm):

Weight	18.6g
Length	66.7
Blade Width	25.1
Thickness	12.8
Shoulder	21.8
Stem	8.0
Neck	14.2
Base	13.9

Raw Material: Fort Payne Chert

Distribution: Surface of Site 15Ja476

Description: This cluster includes the types Kramer, Cresap, and Robbins Stemmed. The specimen recovered from site 15Ja476 could not confidently be placed into one of these types. As the name implies, this cluster is associated with the Early Woodland period, with dates ranging from 1000 BC to AD 200 (Justice 1987).

Results

A total of 340 (310.3g) flake debris larger than 1/4 inch, 142 (14.2g) flake debris smaller than 1/4 inch, and 54 (2138.2g) modified implements were recovered from the eight sites and six isolated finds sites investigated during the survey. These are summarized in Table 3. A full listing of the lithic database can be found in Appendix B.

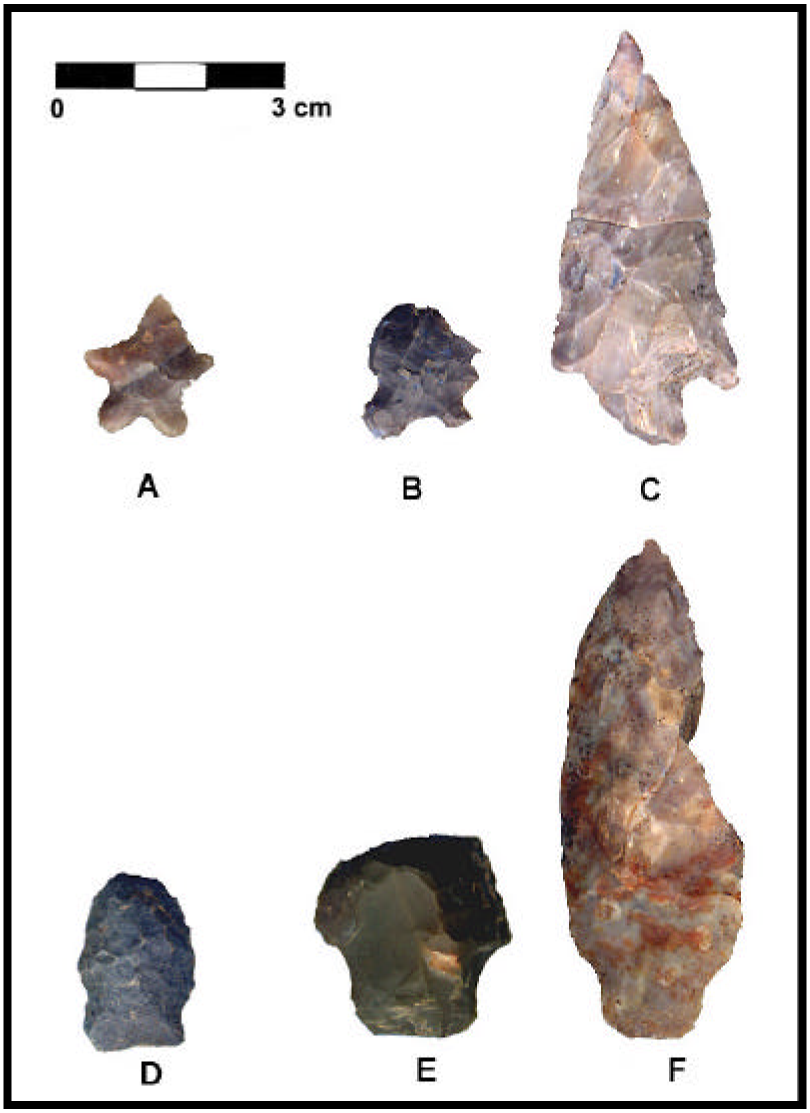


Figure 5. Temporally diagnostic hafted bifaces recovered during the survey. A) LeCroy bifurcate, surface of 15Ja473; B) LeCroy cluster, surface of 15Ja480; C) Late Archaic Stemmed cluster, surface of 15Ja476. D) Matanzas side notched, isolated find 1; E) Saratoga cluster, surface of 15Ja478. F) Early Woodland Stemmed cluster, surface of 15Ja476.

Table 3. Summary of lithic materials recovered during the survey.

Site	FDL	FDS	Modified Implements	FCR	Total
15Ja473	24	2	2	11	39
15Ja474	8	0	2	0	10
15Ja475	22	7	3	0	32
15Ja476	2	0	2	0	4
15Ja477	5	0	0	0	5
15Ja478	125	64	10	0	199
15Ja479	9	1	2	0	12
15Ja480	140	68	17	0	225
IF1	0	0	1	0	1
IF3	0	0	1	0	1
SC4	2	0	0	0	2
SC5	1	0	0	0	1
SC6	1	0	0	0	1
SC8	1	0	0	0	1
Total	340	142	40	11	533

Individual Sites

Eight sites and six isolated finds were investigated in the course of this project, all of which contained prehistoric material. The results of analysis of the lithic material is presented below. In several cases the small sample size prevented detailed analysis. In these cases, the material is simply described.

Site 15Ja473

Investigations at site 15Ja473 recovered twenty-six (39.4g) pieces of flake debris, eleven (965.9g) FCR, one hafted biface (1.0g), and one pitted cobble (1007.8g). Of these, two flake debris (0.2g) were smaller than 1/4 inch. A single flake was recovered from shovel testing. The remainder of the assemblage was recovered from a controlled surface collection of the site.

A single temporally diagnostic artifact, a LeCroy Bifurcate hafted biface, was recovered from the surface collection. This biface had been resharpened to the point of exhaustion. LeCroy Bifurcate type hafted bifaces are associated with the Early Archaic period.

The recovered flake debris is summarized in Tables 4 and 5. The reduction stage profile of the assemblage indicates an emphasis on both early and late stage lithic debris. Mass analysis and size grade data indicate an emphasis on the larger and heavier early stage flake debris. The assemblage from 15Ja473 was primarily from surface collection, which is typically biased toward the early stage flake debris. The large proportion of late stage debris in the assemblage indicates that late stage reduction was a significant portion of the on-site activities.

Table 4. Reduction stage profile of flake debris recovered from site 15Ja473.

Stage	Count	Weight(g)
Ind.	6	14.3
Early	8	14.6
Middle	1	1.4
Late	9	8.9

Table 5. Flake debris recovered from site 15Ja473 sorted by size grade.

Size	Count	Weight(g)	Avg. Wt.
1	2	0.2	0.10
2	14	7.9	0.56
3	10	31.3	3.13

The presence of a pitted cobble, or "nutting stone," suggests that nut processing was one of the activities on the site. The recovery of a single bipolar flake from the site surface suggests that bipolar lithic reduction was also an activity at the site. Bipolar reduction typically results in the production of large quantities of blocky shatter, (Kuijt et al.

1995). Fourteen percent (n=3) of the flake debris assemblage was blocky shatter, which suggests that while bipolar reduction occurred at the site, it was not the major activity.

Analysis of the lithic assemblage from 15Ja473 indicates that late stage reduction and bipolar reduction were activities on this site. The presence of the exhausted LeCroy Bifurcate PPk indicates a replacement activity. Eleven pieces of fire-cracked (FCR) or thermally altered sandstone were also collected from this site, indicating the presence at one time of thermal features such as roasting pits. Taken as a whole, this site appears to have been a combination of a tool replacement locale and a nut processing locale. This may have been an Early Archaic logistical camp, the location of which was selected based on proximity to mast resources. The fact that the full reduction sequence is not present in the flake debris assemblage, coupled with the low diversity of tool types present, indicates a temporary camp. The presence of FCR also suggests the possibility of sub-plowzone features.

Site 15Ja474

Investigations of site 15Ja474 recovered eight (10.0g) pieces of flake debris and two biface fragments. All flake debris recovered from this site was larger than 1/4 inch. This total included one piece of blocky shatter (0.2g), two (3.5g) early stage flakes, three (3.1g) middle stage flakes, and two (3.2g) late stage flakes. Bifaces recovered from this site included one (6.2g) soft hammer and pressure flaked biface (class 204-4.1), and one (4.4g) soft hammer (class 204-3.1) biface. Due to the paucity of lithic material recovered from this site, no in depth analysis was attempted.

Site 15Ja475

Investigations at site 15Ja475 recovered 22 (21.7g) flake debris larger than 1/4 inch, 7 (0.5g) flake debris smaller than 1/4 inch, and 3 biface fragments. No temporally diagnostic artifacts were recovered from this site. All recovered artifacts came from the surface of the site.

The reduction stage data and size grade data for flake debris recovered from 15Ja475 are summarized in Tables 6 and 7. The reduction stage profile of the assemblage indicates a concentration of both early and late stage flake debris. As noted by Bradbury and Carr (1995), core reduction is more accurately determined by platform facets than by dorsal scars. Tool production, on the other hand, is better determined using dorsal scars. Mass analysis indicates an emphasis on smaller flake debris (90% of the assemblage by count retained in the size grade 2 screen).

Table 6. Reduction stage profile of flake debris recovered from site 15Ja475.

Stage	Count	Weight (g)
Ind.	1	0.4
Early	12	12.1
Middle	1	0.2
Late	8	9.0

Table 7. Flake debris recovered from site 15Ja475 sorted by size grade.

Size	Count	Weight(g)	Avg. Wt.
2	19	12.4	0.65g
3	3	9.3	3.10g

Bifacial implements recovered from site 15Ja475 included two soft hammer biface fragments (class 204-3.1) and a single hard and soft hammer biface fragment (class 204-2.1). These three biface fragments had been discarded in the middle to late stages of the bifacial reduction continuum, suggesting production or use related discard. Due to the fragmentary nature of the specimens, no specific failures could be identified.

The 15Ja475 assemblage, taken as a whole, appears to represent a locus of biface manufacture. Nevertheless, late stage reduction and finishing of these bifaces likely took place off site.

Site 15Ja476

The assemblage from site 15Ja476 included two hafted bifaces (27.0g) and two flake debris (4.8g). Cluster associations for the two hafted bifaces were Late Archaic Stemmed and Early Woodland Stemmed. The flake debris recovered from 15Ja476 included an early stage flake (0.2g) and a middle stage flake (4.6g). While this assemblage is too small to make any concrete statements regarding on-site activities, 15Ja476 may have been a hunting stand or kill site.

Site 15Ja477

The lithic assemblage from site 15Ja477 consisted of five pieces of flake debris (14.2g) recovered from the surface of the site. One piece each of early (1.3g), one middle (0.3g), and two late stage (5.3g), and one blocky shatter (7.3g) were recovered. All lithic material recovered from this site was of Newman Formation cherts. No modified implements or temporally diagnostic artifacts were recovered from this site. No further analysis was attempted.

Site 15Ja478

Surface investigations of site 15Ja478 recovered a total of 199 (105.4) lithic artifacts. Of these, 64 (6.7g) were smaller than 1/4 inch, and 125 (73.7g) were larger than 1/4 inch. Ten bifaces (25.0g) were also recovered from the surface of this site. Of these, three had haft elements, but only one of these could be identified to a traditional cluster. This was a Late Archaic to Early Woodland period Saratoga Cluster hafted biface that had been worked into a hafted scraper.

Reduction stage and size grade data for the flake debris assemblage from 15Ja478 is summarized in Tables 8 and 9.

Table 8. Reduction stage profile of flake debris recovered from site 15Ja478.

Stage	Count	Weight (g)
Ind.	17	26.3
Early	45	25.2
Middle	20	9.9
Late	43	15.0

Table 9. Flake debris recovered from site 15Ja478 sorted by size grade.

Size	Count	Weight (g)	Avg. Wt.
2	113	47.9	0.42
3	12	25.8	2.15

Bifacial implements recovered from site 15Ja478 are summarized in Table 10. Ten bifaces, ranging from early/middle stage (class 204-2.1) to late stage (class 204-5.1), were recovered.

Table 10. Bifacial implements recovered from site 15Ja478.

Class	Definition	Weight (g)
204-2.1	Hard/Soft Hammer Biface	6.6
204-3.1	Soft Hammer Biface	1.2
204-3.1	Soft Hammer Biface	4.1
204-4.1	Soft Hammer/Pressure Flake Biface	0.3
204-4.1	Soft Hammer/Pressure Flake Biface	1.5
204-4.2	Soft Hammer/Pressure Flake PPk	1.5
204-4.2	Soft Hammer/Pressure Flake PPk	2.3
204-4.5	Soft Hammer/Pressure Flake Hafted Scraper	6.7
204-5.1	Pressure Flaked Biface	0.2
204-6.1	Biface of Indeterminate Manufacture	0.6

Reduction stage analysis of flake debris recovered from 15Ja478 indicates an emphasis on both early and late stage lithic reduction. The assemblage from 15Ja478 was recovered entirely from surface collection. This technique is biased by visibility and artifact size. The larger, more visible early stage debris is more likely to be seen by the field archaeologists. This would lead to a bias in the data toward the early stage reduction. This is not, in fact, the case at 15Ja478 where late stage debris makes up a significant proportion of the assemblage. This indicates that late stage lithic reduction was a significant part of the on-site activities. Mass analysis bolsters the assertion, with 90.4% of the assemblage by count retained in the size grade 2 screen. Thus the emphasis on late stage lithic reduction is a real one, and not an error in the analysis. The modified implement data support this. The majority of bifacial tools recovered from the surface of the site are later stage (204-3.x, 4.x, or 5.x). This indicates that exhausted or broken tools were being discarded and replaced.

Taken as a whole, the assemblage from 15Ja478 indicates site activities included late stage biface production, and tool replacement. This assemblage, though large, does not point specifically to a residential site. There is a low diversity of tool types present in the assemblage, suggesting a limited set of on-site activities. 15Ja478 was most likely a logistical camp that was repeatedly occupied for the same purpose.

Site 15Ja479

The lithic assemblage from site 15Ja479 included two late stage biface fragments (4.5g, class 204-4.1). Neither of these had a haft element, and they could not be assigned a cluster association. In addition, one (0.1g) flake smaller than 1/4 inch and nine (5.7g) flakes larger than 1/4 inch were recovered. All artifacts were recovered from the surface of site 15Ja479. The flake debris assemblage included three (0.4g) early stage flakes, three (1.2g) middle stage flakes, and one (1.9g) late stage flake. In addition, one thermal shatter (2.0g) and one blocky shatter (0.2g) were recovered. Mass analysis and size grade data indicate that late stage lithic reduction was likely the main on-site activity. The 1/4 inch screen retained 77% percent (n=7) of the flake debris recovered. The size grade 2 portion of the assemblage had an average weight of 0.26g per flake. While the assemblage size for this site is small, it appears that this was a locale where exhausted or broken bifacial tools were discarded and new ones manufactured. Due to its small size, this site may represent a single use logistical camp.

Site 15Ja480

Two hundred and twenty-five (220.5g) lithic artifacts were recovered from site 15Ja480. Of these, 68 (6.7g) were flake debris smaller than 1/4 inch, and 140 (136.6g) were flake debris larger than 1/4 inch. Modified implements recovered from site 15Ja480 included 16 (74.8g) bifaces and one (2.4g) modified debitage. A single temporally diagnostic hafted biface was recovered. This was a LeCroy Cluster hafted biface, which is diagnostic of the Early Archaic period. All artifacts were recovered from a general surface collection of site 15Ja480.

Recovered lithic debris is summarized in tables 11 and 12. The recovered modified implements are presented in Table 13. Reduction stage analysis of flake debris recovered from 15Ja480 indicates an emphasis on both early and late stage lithic reduction. The assemblage from 15Ja480 was recovered entirely from surface collection. Visibility and artifact size bias this technique. The larger early stage debris is more likely to be seen and recovered by the field archaeologists. This would lead to a bias in the data toward the early stage reduction. This is not, in fact, the case at 15Ja480 where late stage debris makes up a significant proportion of the assemblage. This indicates that late stage lithic reduction was a significant part of the on-site activities. The mass analysis data also back this up, with 80.7% of the assemblage retained by the size grade 2 screen. This portion of the assemblage had an average weight of 0.49g per flake. Thus the emphasis on late stage lithic reduction is a real one and not an error in the analysis. The modified implement data support this. The bifacial tools (n=13) recovered from the surface of the site are later stage (204-3.x, or 4.x). This indicates that exhausted or broken tools were being discarded and replaced.

Table 11. Reduction stage profile of flake debris recovered from site 15Ja480.

Stage	Count	Weight (g)
Ind.	19	38.5
Early	43	46.4
Middle	24	17.3
Late	54	34.4

Table 12. Flake debris recovered from site 15Ja480 sorted by size grade.

Size	Count	Weight (g)	Avg. Wt.
2	113	55.6	0.49g
3	26	65.4	2.52g
4	1	15.6	15.60g

Table 13. Bifacial implements recovered from site 15Ja480.

Class	Definition	Ct	Weight (g)
201-1.0	Unifacially Retouched Flake	1	2.4
204-3.1	Soft Hammer Biface	9	55.9
204-4.1	Soft Hammer/Pressure Flake Biface	2	1.6
204-4.2	Soft Hammer/Pressure Flake PPk	1	1.2
204-4.5	Soft Hammer/Pressure Flake Hafted Scraper	1	3.3
204-6.1	Biface of Indeterminate Manufacture	3	12.8

The lithic assemblage from 15Ja480 displays a low diversity of tool types and an emphasis on both early and late stage flake debris. An assemblage of this type would be expected from a site that served as a locus of tool replacement, as well as a limited range of other activities. The large size of the assemblage might indicate a residential site, but the low diversity of tools and lack of middle stage flake debris do not support this. This site was likely a short-term logistical camp that was inhabited repeatedly.

Isolated Finds

Six prehistoric isolated finds were recorded during the project. Isolated finds represent locations where artifacts were recovered that could not be defined as a site using the criteria defined by the Kentucky Heritage Council. This material consisted generally of a single artifact recovered from surface context or a single positive shovel test. These are discussed individually below.

Isolated Find 1

IF1 consisted of a Matanzas Side Notched hafted biface (2.4g) recovered from the surface of a tobacco field. This hafted biface type is diagnostic of the Late Archaic period (Justice 1987). It was produced from St. Louis chert.

Isolated Find 3

IF3 consisted of a biface fragment produced of Fort Payne chert (1.3g) recovered from the ground surface. The biface was found on the surface of land which, according to the landowner, had been filled with topsoil brought in from outside the project area. The exact provenience of this biface, therefore, is not known.

Isolated Find 4

Investigations of IF4 recovered two pieces of lithic flake debris. One was a piece of water rolled blocky shatter (0.4g). The second was a middle stage flake (0.7g) with no signs of water rolling. This artifact occurrence is in close proximity to site 15Ja473 (70 meters southeast) and may be simply a continuation of the site's deposits.

Isolated Find 5

A single piece of lithic flake debris (0.5g) was recovered from IF5. This was an early stage fragment of Newman Formation chert recovered from a screened shovel test.

Isolated Find 6

Investigations of site IF6 recovered a single flake of St. Louis chert (2.2g). This was a complete early stage flake. This flake was recovered from a screened shovel test excavated on the Sturgeon Creek floodplain. The artifact was recovered from between 10 and 40 centimeters below ground surface. Bucket auguring in the vicinity of the find indicated the potential for deeply buried stable soil surfaces, which may contain archaeological deposits.

Isolated Find 7

Site IF7 consisted of a single flake recovered in a shovel test at a depth of 25 to 30 centimeters below surface. This was a late stage St. Louis chert flake. This flake was recovered from a screened shovel test excavated on the Sturgeon Creek floodplain. The artifact was recovered from between 25 and 30 centimeters below ground surface. Bucket auguring in the vicinity of the find indicated the potential for deeply buried stable soil surfaces, which may contain archaeological deposits.

Summary and Conclusions

Lithic materials were recovered from eight sites and six isolated finds. In general, material density was light. Sites within the survey area can be roughly divided into two different classes based on what appears to have been the primary on-site activity. These include logistical camps or small hunting related sites.

The first group contains the largest number of sites. Logistical camps within the survey area included sites 15Ja473, 474, 475, 478, 479, and 480. Activities at these sites included replacement of exhausted or worn bifacial tools. The higher density of lithic debris at Ja478 and Ja480, when compared with the other four logistical sites suggests that these sites were revisited more often than the others, perhaps because of topographic setting. The reduction stage, mass analysis data, and tool type data indicate a low diversity of activities at all six of these sites. The presence of discarded hafted scrapers on two of these sites (15Ja478, and 480) may indicate a separate set of activities, such as hide preparation, which did not occur on the other four sites. The presence of a pitted cobble and fire-cracked rock at site 15Ja473 indicates a set of activities associated with nut processing in addition to the logistical activities.

The second class of sites includes 15Ja476, 477, and IF1. These sites represent small, specialized activity sites related to hunting. These sites represent finds of a single hafted biface or small assemblage of flake debris. Activities at these sites included dispatching or initial butchery of game and/or replacement of broken tools.

Isolated Finds 6 and 7 were both single flake finds from deep shovel testing in soils formed in alluvial sediments. They may be portions of larger, as yet undiscovered, sites. IF5 represents an isolated find of a single flake from a screened shovel test.

Lithic data suggests that the Sturgeon Creek area was not the location of intense settlement, but rather the locus of organized resource extraction forays. Knappable stone is absent in the area of Sturgeon Creek under consideration. Thus lithic materials had to be transported into the area. The proportion of the flake debris assemblage that bears cortex is low (9.8% by count), which indicates that initial reduction of the raw material was occurring outside of the sites investigated. Assuming that the users of the sites were mobile, they would want to keep the weight carried to a minimum. This placed an emphasis on maximizing the tool to weight carried ratio. Kelly (1988) argues that bifacial cores, which maximize cutting edge to weight carried, would be seen in a situation of low raw material availability and high logistical mobility. The use of bifacial cores cannot be shown from the current Sturgeon Creek data; however, the conditions seem to be appropriate. No bifacial cores were recovered from the survey area, but these tools are more likely to be curated, or if necessary, reduced to make formal bifacial tools. Some of the early and middle stage flake debris recovered from the Sturgeon Creek sites might be explained by the use of bifacial core technology.

Historic Artifacts

Alexandra D. Bybee

This section provides a description of the historic artifacts recovered from sites 15JA475, 15JA476, 15JA478 and Non-site locality 1 and 2. A comprehensive list of historic artifacts collected during this survey is provided in Table 14.

Historic materials recovered during this survey were processed and analyzed using a standardized computer database system developed by Cultural Resource Analysts, Inc. Prior to classification and analysis, the artifacts were cleaned and sorted into gross categories (bone, glass, metal, ceramics, etc.) by site and provenience. The materials were then assessed by the historic artifact analyst. The analyst created a record and entered pertinent data for each artifact into the Historic Materials Analytic Program (created in Paradox). Through a series of preset attribute fields and pull-down menus, the analyst recorded appropriate observations, both nominal and metric, that lead to the assignment of the artifact to a specific artifact category and type designation. The Paradox database was then used to generate data tables and extract specific data for further analysis. Incorporated within the Paradox Historic Materials Analytic Program are analytic modules. One module can calculate minimum and maximum dates of selected artifact types (e.g., window glass) by site and/or specific provenience (unit and features).

Cultural Resource Analysts, Inc. Historic Materials Analytic Program classification system follows the scheme developed by South (1977). South (1977) 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 site occupants or regional behavior patterns were topics to be addressed through the use of this system.

South's system was widely accepted by historic archaeologists at first, although the system has been criticized on theoretical and organizational grounds (Orser 1988, Wesler 1984). One criticism of South's pattern recognition system is that the organization of artifacts is too simplistic. Most archaeologists, however, recognize the usefulness of his classification system to present data.

The classification scheme that was originally developed by South (1977) has subsequently been revised by numerous authors including Stewart-Abernathy (1986), Orser (1988) and Wagner and McCorvie (1992). The current scheme groups artifacts into the following categories: Architecture, Arms, Clothing, Communication and Education, Domestic, Floral and Faunal, Furnishings, Maintenance and Subsistence, Manufacturing, Personal and Unidentified.

Grouping artifacts into these specific categories is more efficient in associating artifact assemblages with historic activities or site types. The primary changes associated with the refinement of these categories include reassigning artifacts previously associated with the Miscellaneous and Activities categories under South's (1977) original system. Each of the groups represented by the assemblages, and the 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 that are cited in the materials recovered discussions. 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 can then be assigned a "beginning 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 date" will be the approximate time when the new technology takes hold and the old bottles are no longer produced.

Specific styles in ceramic decorations are known to have changed. Archaeological and archival research have defined time periods when specific ceramic decorations were manufactured and subsequently went out of favor. South's (1977) mean ceramic dating technique uses this information. The dates presented here should not be considered absolute, but are the best estimate of an artifact's age that is available at this time. A blank space indicates the artifact could not be dated or that the period of manufacture was so prolonged that the artifact was being manufactured before America was colonized. 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. The presentation of historic artifacts follows, and artifact counts by group are noted in Table 14.

Table 14. Historic artifacts recovered in field investigations.

Artifact Group	Count
Clothing	1
Domestic	24
Furnishings	1
Unidentified	1
Total	27

Clothing Group (N=1)

The clothing group includes buttons, clothing fasteners, footwear and other clothing related items such as belts, hats, hosiery and fabric. One item from this group was recovered during this survey. Site Non-site locality 1 produced one unidentified piece of footwear leather.

Domestic Group (N=24)

Artifacts included in the domestic group consisted of ceramics (N=10), container closures (N=1) and glass containers (N=13). Domestic group artifacts recovered by site are summarized in Table 15. The ceramic inventory consisted of three varieties of refined earthenwares dating throughout the nineteenth century. A description of ceramic types recovered is provided below, followed by descriptions of other domestic group artifacts.

Table 15. Domestic artifact types recovered by site.

Site #	Artifact Type	Ct
15JA475	Ceramics	1
	Container Closures	1
Non-site locality 1	Ceramics	2
	Glass Containers	7
15JA476	Ceramics	7
Non-site locality 2	Glass Containers	6

Ceramics (N=10)

Recovered ceramics were grouped into three major ware types: ironstone (N=4), stoneware (N=1) and whiteware (N=5). Each of these ware groups is reviewed below, followed by discussions of associated decorative types where applicable. Ceramic materials are summarized by count in Table 16.

Table 16. Ceramic ware types recovered.

Site #	Ware Type	Count
15JA475	Whiteware	1
Non-site locality 1	Stoneware	1
	Whiteware	1
15JA476	Ironstone	4
	Whiteware	3

Ironstone (N=4)

Ironstone, a highly refined, vitreous, opaque earthenware with a clear glaze, is often indistinguishable from whiteware, Ironstone differs from whiteware in that the body is more vitreous and dense and a bluish tinge or a pale blue-gray cast covers the body. In some cases, a fine crackle can be seen in the glaze (Denker and Denker

1982:138) although this condition is not restricted to ironstones. Confusion in the classification of white bodied earthenwares 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" (Gates and Ormerod 1982:8; Cameron 1986:170). 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, while Wetherbee (1980) adopted the opposite course, referring to all nineteenth century white bodied earthenwares as ironstone. For this analysis, the primary determining factor in the 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), although others, including the Turners and Josiah Spode, produced similar wares as early as 1800 (Godden 1965:xxiii). This early phase of ironstone production was instigated by British potters as a competitive response to the highly popular oriental porcelain. The ironstone of this early phase bears a faint blue-gray tint and oriental motifs much like Chinese porcelain.

A second phase of ironstone production was prompted after 1850 in response to the popularity of hard paste porcelain being produced in France. This variety of ironstone had a harder paste and reflected the gray- white color of French porcelains.

While some ironstone saw continued use of oriental design motifs, the general trend was toward undecorated or molded ironstones (Collard 1967:125-130; Lofstram et al. 1982:10 in Majewski and O'Brien 1987). Ironstone continued to be produced in England, and, after 1870, numerous American companies manufactured it. Majewski and O'Brien (1987) report that by the late 1800s thick, heavy ironstones were losing popularity and began to be equated with lower status (Collard 1967:135 in Majewski and O'Brien 1987). Ironstone production all but ceased by the second decade of the twentieth century (Lehner 1980:11).

There was a shift to thinner, lighter weight ironstone between 1870-1880. This ironstone was popular in American homes during most of the twentieth century (Majewski and O'Brien 1987:124-125). Heavy ironstone remained on the market, however, and was popular in both hotel/restaurant service as well as household use.

All materials categorized as ironstone in the current study were from the early phase of production, exhibiting the "classic" or heavy and thick characteristics. These materials dated from 1840 to 1885 and were collected from site 15JA476. One sherd from site 15JA476 exhibited a molded design and was identified as a portion of a plate.

Stoneware (N=1)

Stoneware served as the "daily use" pottery of America, particularly rural America, after its introduction during the last decade of the eighteenth century. Stoneware is a vitreous opaque ware manufactured of naturally vitrifying fine dense clay. The pottery was fired longer and to a higher temperature than earthenwares; a kiln temperature of at least 1200 to 1250 degrees centigrade must be obtained (Dodd 1964:274-275; Cameron 1986:319). As a result, stoneware exhibits a hard body and a very homogeneous texture. Its body is nonporous and well suited to liquid storage. Stoneware is not refined and was typically used for utilitarian purposes. Stoneware vessels include jars, churns, crocks, tubs, jugs, mugs, pots and pans. The paste may vary from grays to browns, depending on the clay source and length and intensity of the firing. Vessels were typically glazed, with salt and slip glazing the most common.

Although salt glazing was practiced in England during the eighteenth century, it was not introduced to the United States until the early nineteenth century. By 1780, the production of English salt glaze had been virtually supplanted by the manufacture of cream colored earthenwares (Lewis 1950:29). Salt glazing was accomplished by introducing sodium chloride into the kiln, where it quickly volatilized. The vapor reacted with the clay to form a sodium aluminum silicate glaze (see Billington 1962:210; Dodd 1964:239). The surface of this glaze type is usually pitted.

Stoneware may also be coated with a colored slip, a suspension of fine clay and a pigment. The Albany slip, named after the rich brown clay found near Albany, New York first appeared in the 1820s. At first it was mainly used for the interior of stoneware vessels. By the 1850s, Albany slip was also used as an exterior glaze. Bristol slip, an opaque white slip was introduced late in the nineteenth century. Bristol slip was often used in combination with Albany slip (Ketchum 1983:19).

A third glaze often used on stoneware was the alkaline glaze. Like the Albany slip it was developed in the 1820s. The basic alkaline glaze is made up of wood ash, clay and sand. Other additions may be slaked lime, ground glass, iron foundry cinders or salt. These additions affected the color and texture of the glaze. Colors vary from olive to brown to a gray-green or yellowish hue, depending on adjustments in proportion of ingredients (Ketchum 1991:9).

One stoneware sherd was collected during this survey from Non-site locality 1. This sherd exhibited a salt glaze interior and salt glaze exterior and dated from 1800 to 1850.

Whiteware (N=5)

As a ware group, whiteware includes all refined earthenware exhibiting a dense, relatively non-porous, white to grayish-white clay body. Undecorated areas on dishes exhibit a white finish under clear glaze. This glaze is usually a variant combination of feldspar, borax, sand, nitre, soda and china clay (Wetherbee 1980:32). Small amounts of cobalt were added to some glazes, particularly during the period of transition from pearlware to whiteware and during early ironstone manufacture. Some areas of thick glaze on whiteware may therefore exhibit bluish or greenish-blue tinting. Weathered paste surfaces are often buff or off-white and vary considerably in color from freshly exposed paste.

Most whiteware produced before 1840 exhibited colored decorations. These decorations are often used to designate ware groups, i.e., edgeware, polychrome and colored transfer print. Most of the decorative types are not, however, confined to whiteware and, taken alone, are not particularly accurate temporal indicators or actual ware group designators (cf., Price 1981).

The most frequently used name for undecorated whiteware is the generic “ironstone,” which derives from an “Ironstone China” patented by Charles Mason in 1813 (Mankowitz and Hagger 1957). For purposes of clarification, however, “ironstone” will not be used when referring to whiteware. Ironstone is theoretically harder and more dense than whiteware produced prior to about 1840. However, manufacturer variability is considerable and mitigates against using paste as a definite ironstone identifier or as a temporal indicator. Consequently, without independent temporal control, whiteware that is not ironstone is difficult to identify, as is early versus later ironstone. For our analysis, the primary determining factor in classification of a sherd as whiteware was the hardness and porosity of the ceramic paste. Whiteware sherds were recovered from sites 15JA475, Non-site locality 1 and 15JA476 and are summarized in Table 17.

Table 17. Whiteware recovered by site.

Site #	Count
15JA475	1
Non-site locality 1	1
15JA476	3

All whiteware recovered during this survey was plain. Plain whiteware includes dishes with no colored decoration or solid glaze and this ware type can frequently exhibit some form of molding or embossing. While some researchers (Lofstrom 1982:10 and Wetherbee 1980) include molded designs with "plain" whiteware, we agree with Majewski and O'Brien (1987:153) that molded vessels should be grouped on their own. It is possible that the plain sherds recovered are from undecorated portions of decorated vessels. The suggested age range for plain whiteware is 1830-1890 (Lofstrom 1982:10).

Container Closures (N=1)

Bottle closures serve both to prevent the spilling of a bottle's contents and to protect contents from contamination and evaporation (Berge 1980). 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 on the outside 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 (Toulouse 1977; Jones and Sullivan 1985). 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 introduced as metal in 1858 (Toulouse 1977; Jones and Sullivan 1985). 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 plastic caps in the mid-1930's (Meikle 1995). Examples of the external thread cap include canning, mayonnaise 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, 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 (Riley 1958, Rock 1980, IMACS Users Guide 1990). Crown caps with composition liners appeared in 1912 and both cork and composition liners were gradually phased out in the decade following the introduction of the plastic liner in 1955 (Riley 1958, IMACS Users Guide 1984). Most 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 finished inside to seal bottles. Loose blown-glass stoppers date to circa 1500 B.C., and tapered glass stoppers date to A.D. 500 (Holscher 1965). The "modern" ground and tapered glass stopper was developed around 1725 in Europe (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 1920's 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 cooling of the contents of the bottle created the vacuum. Seal closures, although dating back to 1810, did not become popular until the mid twentieth century. The closures were most often used in food jars (Berge 1980). There were several types of seal closures, which included 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's patented fruit jar used this type of closure 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 developed and added to the disc around 1869 by Lewis R. Boyd (Toulouse 1969 and 1977). These liners prevented the zinc from reacting with the contents of the jar. Mr. Boyd added a handle to the disc, to aid in its opening, around 1900 (Toulouse 1977). Both disc seal types were used until around 1950 (Toulouse 1969 and 1977, Jones and Sullivan 1985). 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.

One container closure was recovered during this survey. This item was a home canning jar liner collected from site 15JA475 and dates from 1869 to 1950.

Glass Containers (N=13)

Research by Baugher-Perlin (1982), Jones and Sullivan (1985) and Toulouse (1972) was used to date glass containers. Glass color was the only attribute used for dating fragments that could not be identified as to type of manufacture.

Glass containers were recovered from two sites during this survey (Non-site locality 1 and Non-site locality 2). The only glass manufacturing process distinguished for materials recovered during this survey was ABM. The Owens automatic bottle making machine was patented in 1903. Bottles of this sort had distinctive seams running up the length of the bottle neck and exhibited valve marks and suction scars. The automatic bottle machine (ABM) mold provides a firm manufacturing date at the beginning of the twentieth century.

Five glass fragments were assigned to the ABM category. Glass assigned to this category dates from 1903 to the present and was recovered from site Non-site locality 1 only. All other glass fragments were indeterminate as to manufacturing technique. Glass containers recovered by site are summarized in Table 18.

Table 18. Glass containers recovered by site.

Site #	Machine Made Commercial	Indeterminate Manufacture	Count
NSL 1	5	2	7
NSL 2	0	6	6

Glass Color

Glass color was recorded, although there is some subjectivity inherent in this classification. As Jones and Sullivan (1985) remark, glass is colored by chemicals, either as natural inclusions or added by the manufacturer. The concern here was primarily to note the presence of purple or "amethyst" glass and "milk" glass.

Amethyst glass began to be manufactured around 1880 according to Munsey (1970:55), when magnesium was added to the glass recipe. Glass with magnesium present will turn a purplish color when exposed to sunlight. Milk or white glass has been manufactured as long as glass has been made, but milk glass became common as it was used in "containers, tablewares and lighting devices" in the late nineteenth through twentieth centuries (Jones and Sullivan 1985:14). Blue glass is another color that had great popularity in the later nineteenth century. Clear glass came into demand with the growing public desire to see the contents of bottles and was more popular in the late nineteenth century (Baugher-Perlin 1982:261).

The materials collected during this survey represented three glass colors. Manufacturing dates of these materials spanned the nineteenth and twentieth centuries. The most common color was clear (N=11), followed by amethyst (N=1) and aqua (N=1). Table 19 provides a summary of glass container colors recovered by site.

Table 19. Recovered glass container colors by site.

Site #	Glass Color	Count
Non-site locality 1	Clear	7
Non-site locality 2	Clear	4
	Amethyst	1
	Aqua	1

Furnishings (N=1)

The furnishings category includes artifacts usually associated with the home but are not elements of construction. Examples of furnishings include decorative pieces, furniture, heating and lighting.

One decorative element was recovered from site Non-site locality 1 during this survey. This artifact was a ceramic (porcelain) figurine. The age of this artifact could not be established.

Unidentified Group (N=1)

This category includes artifacts that cannot be identified beyond the material from which they are made. Only one item, a piece of amorphous plastic recovered from site 15JA478, was included in this category. This item is likely recent in age.

Chapter 6. Site Descriptions

Andrew P. Bradbury

This chapter provides a general description of the sites identified during the current survey. As a result of the survey, a total of eight previously unrecorded sites, seven isolated finds, and two non-site localities were documented. Only one non-site locality was documented in the War Fork/Steer Fork project area. The remaining archaeological resources were documented in the Sturgeon Creek project area.

In each site description, the degree and type of previous disturbance has been considered. The assessment of the amount of disturbance at any given site is subjective, especially when determining the degree of subsurface disturbance. The degree to which soils have been disturbed varies and is not always easily assessed based on limited shovel testing. In some cases the destruction of the topsoil to the subsoil was readily apparent as C horizon soils were exposed at the surface. A description of the individual sites is provided below. Site locations are depicted on Figure 6 below and on Figure 3 in the Back Jacket.

Site 15Ja473

Field Site Number: SC3
UTMs: 4140745 Northing, 248800 Easting
Elevation: 960 feet AMSL
Component: Early Archaic
Size: 5240 m^2
Distance to nearest water: 25 m
Topography: Terrace
Vegetation: Corn
Ground visibility: 90%

Site Description: Site 15Ja473 was situated on a low terrace in a bend of Sturgeon Creek overlooking a narrow floodplain (Figures 7 and 8). Sturgeon Creek is located approximately 25 m to the south and 75 m to the west of the site. A small paved road is located to the east of the site area.

At the time of the survey, the site was situated in a cultivated field. Crops had been harvested prior to the survey, which provided excellent surface visibility. Artifacts were flagged during a quick, initial walkover. Subsequently, 10 m x 10 m collection squares were established and all observed material was collected and bagged by collection unit. In addition, three screened shovel tests were excavated along the eastern portion of the site just outside the limits of the cultivated field. A single flake was recovered from plowzone context in one of these tests.

Cultural material recovered from 15Ja473 consisted of flake debris (N=26), FCR (N=11), a hafted biface and one pitted cobble. A single flake was recovered from Shovel Test 1, the remainder of the assemblage was recovered from a controlled surface collection of the site (Table 20). The hafted biface was a LeCroy Bifurcate, which is indicative of an Early Archaic period association.

Table 20. Cultural material by collection unit, 15Ja473.

Unit	Flakes	Thermal Shatter	FCR	Hafted Biface	Pitted Cobble
1	1	0	2	0	0
2	2	1	1	0	0
3	0	0	2	0	0
4	0	0	2	0	0
5	3	0	1	0	0
6	1	1	1	0	0
7	2	0	1	0	0
8	4	0	1	1	0
9	1	0	0	0	0
10	2	0	0	0	0
11	6	0	0	0	0
12	0	0	0	0	1
STP 1	1	0	0	0	0
Total	23	2	11	1	1

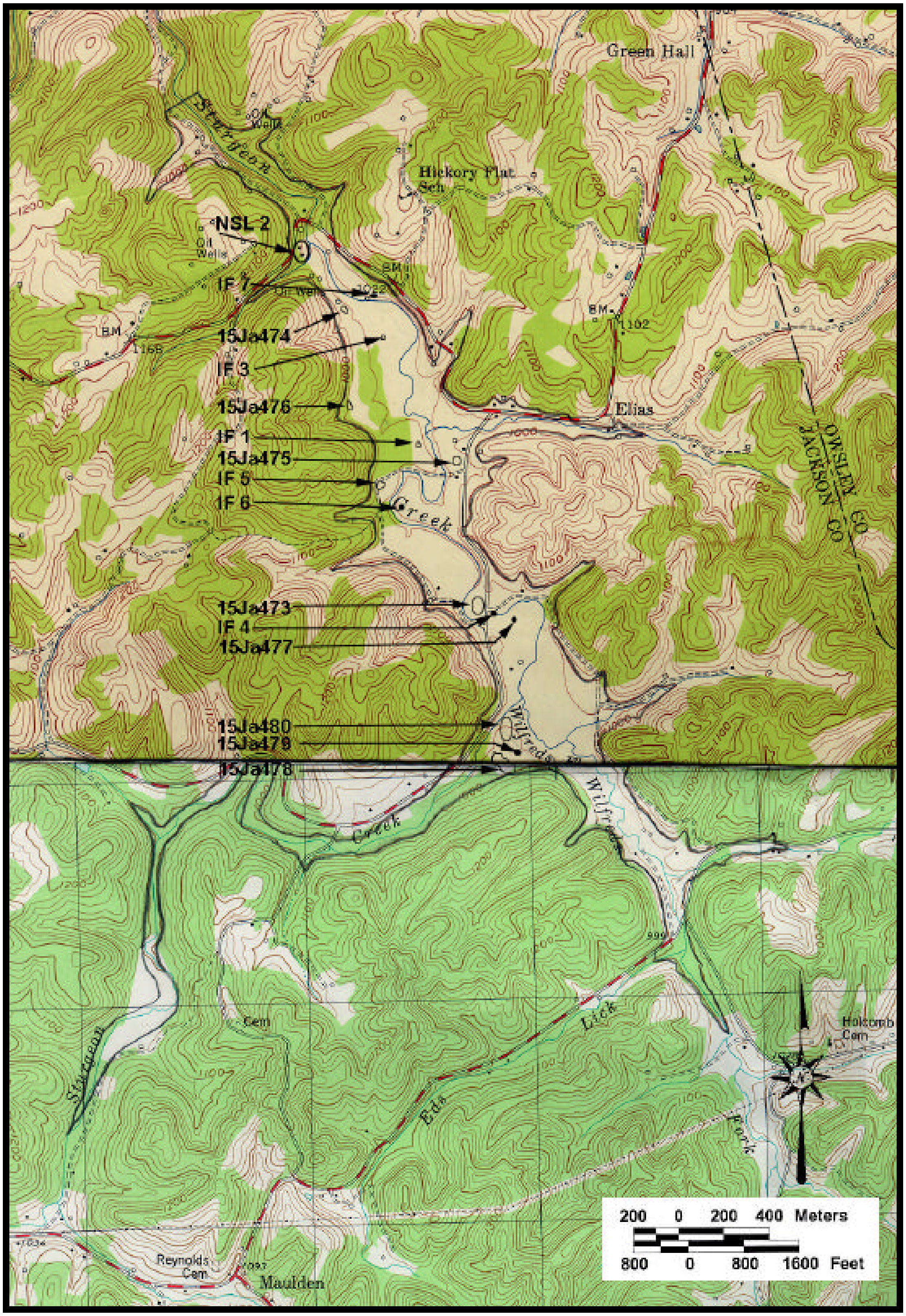


Figure 6. Portion of the Sturgeon, KY quadrangle map showing the location of sites identified during the current survey.

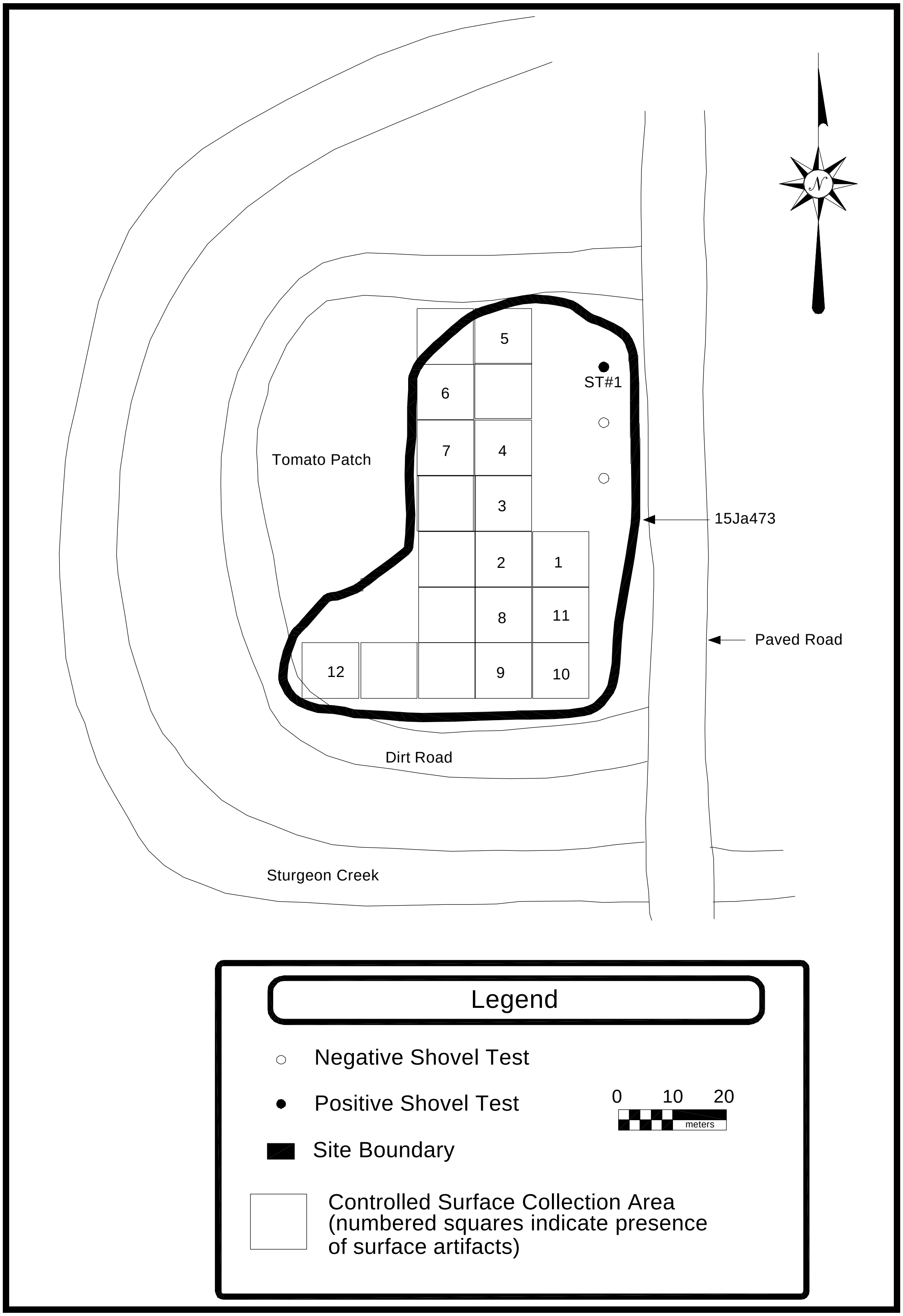


Figure 7. Schematic plan map of 15Ja473.

Figure 8. General site photograph of 15Ja473, looking north.

Bucket augering at the edge of 15Ja473 indicated that bedrock was located approximately 40-80 cm below current ground surface (see discussion in *Chapter 7. Deep Testing Results* section of this report). In addition, subsoil was noted on the surface of several plow strips within the site boundaries. While it is unlikely that buried deposits occur on the terrace area (where 15Ja473 is defined), there is the possibility of such deposits in the floodplain area outside the current site boundaries. Bucket augering in this area indicated at least 140 cm of fine alluvial deposits (sandy loam). Closer to Sturgeon Creek, these deposits were approximately 185 cm deep.

Analysis of the lithic materials recovered from 15Ja473 indicates that late stage reduction and bipolar reduction were conducted on site. The presence of the exhausted LeCroy Bifurcate hafted biface indicates a replacement activity. Eleven pieces of fire-cracked or thermally altered sandstone were also collected, which suggest the presence of thermal features. It is suggested that 15Ja473 may represent an Early Archaic logistical camp. Given the recovery of FCR and the pitted cobble, there is the possibility of sub-plowzone features to be located at the site. National Register eligibility could not be assessed based on the information derived from the phase I investigations. Therefore, further archaeological work is recommended. Further excavations should determine the nature of the adjacent floodplain deposits and whether sub-plowzone features do exist on the site.

Site 15Ja474

Field Site Number: SC7
UTMs: 4142305 Northing, 248110 Easting
Elevation: 960 feet AMSL
Component: Undefined Prehistoric
Size: 295 m^2
Distance to nearest water: 55 m
Topography: Hillside
Vegetation: Tobacco
Ground visibility: 90%

Site Description: Site 15Ja474 was situated in a tobacco field on a hillside overlooking the floodplain of Sturgeon Creek (Figures 9 and 10). Sturgeon Creek is located approximately 55 meter to the west of the site.

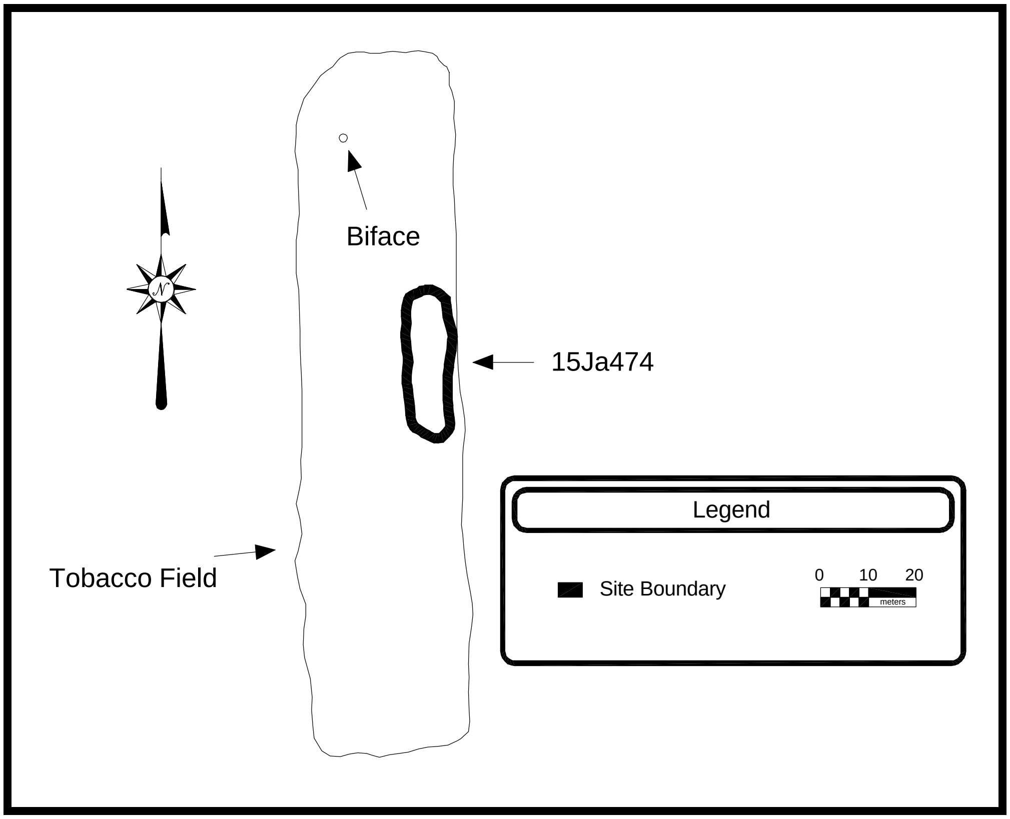


Figure 9. Schematic plan map of 15Ja474.

Figure 10. General site photograph of 15Ja474, looking south.

A light density of lithic material was recovered from a general surface collection of the site. This material consisted of eight flakes and two biface fragments. The site was situated completely within a tobacco field; therefore, no subsurface testing was conducted (i.e., excavation of shovel tests). Subsoil was observed at the surface in several areas of the site, which suggests that the presence of subsurface deposits is unlikely.

Investigations at 15Ja474 revealed a light density of lithic materials recovered from surface context. Subsoil observed at the surface suggests that buried deposits are unlikely at this location. Continued plowing and erosion have had a negative impact on the integrity of the cultural deposits represented. All cultural material at the site is restricted to surface or near surface context. Due to the lack of integrity, the undiagnostic nature of the remains, and paucity of materials recovered, the site does not meet the requirements for inclusion on the National Register of Historic Places. Therefore, no additional archaeological work is recommended.

Site 15Ja475

Field Site Number: SC9
UTMs: 4141430 Northing, 248710 Easting
Elevation: 970 feet AMSL
Component: Undefined Prehistoric
Size: 150 m^2
Distance to nearest water: 80 m
Topography: Terrace
Vegetation: Tobacco
Ground visibility: 90%

Site Description: Site 15Ja475 was situated on a terrace approximately 6 m above Sturgeon Creek (Figures 11 and 12). Sturgeon Creek is located approximately 80 m west of the site. There was a paved road to the east and a farm road to the south of the site.

At the time of the survey, the area was situated in a tobacco field. Tobacco had been cut the day before the surface collection resulting in excellent surface visibility. A light density of lithic material was scattered across the site area. Two historic artifacts (whiteware and a canning jar lid fragment) were also recovered. No structures were depicted at this location on any of the maps reviewed (see *Chapter 3. Previous Research*). During the surface collection, subsoil was noted at the surface in several areas across the site. Given the site's elevated position in relation to Sturgeon Creek, this is not surprising.

Prehistoric materials recovered from 15Ja475 consisted of flake debris (N=29) and biface fragments (N=3). No diagnostic artifacts were recovered. All artifacts were recovered from a general surface collection of the area. The site likely served as a short term, limited activity location during the prehistoric period.

Investigations at 15Ja475 revealed a light density of lithic materials recovered from surface context. Subsoil observed at the surface suggests that buried deposits are unlikely at this location. Continued plowing and erosion have had a negative impact on the integrity of the cultural deposits represented. All cultural material at the site is restricted to surface or near surface context. Due to the lack of integrity and the undiagnostic nature of the remains, the site does not meet the requirements for inclusion on the National Register of Historic Places. Therefore, no additional archaeological work is recommended.

Site 15Ja476

Field Site Number: SC11
UTMs: 4142045 Northing, 248255 Easting
Elevation: 960 feet AMSL
Components: Late Archaic, Early Woodland, Historic
Size: 760 m^2
Distance to nearest water: 235 m
Topography: Terrace
Vegetation: Corn
Ground visibility: 90%

Site Description: Site 15Ja476 was situated in a cornfield on a terrace overlooking the floodplain of Sturgeon Creek (Figures 13 and 14). Sturgeon creek is located approximately 235 meters to the east of the site.

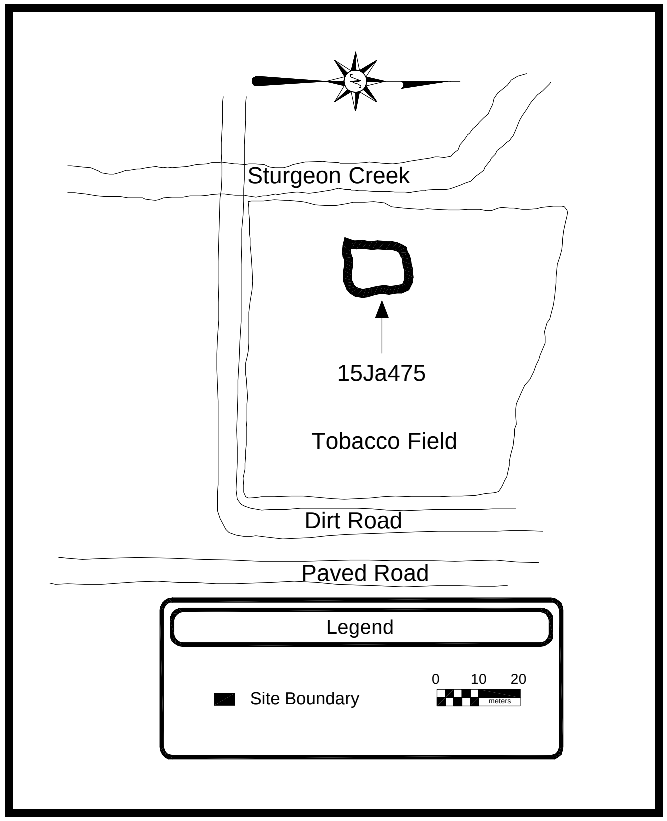


Figure 11. Schematic plan map of 15Ja475.

Figure 12. General site photograph of 15Ja475, looking west.

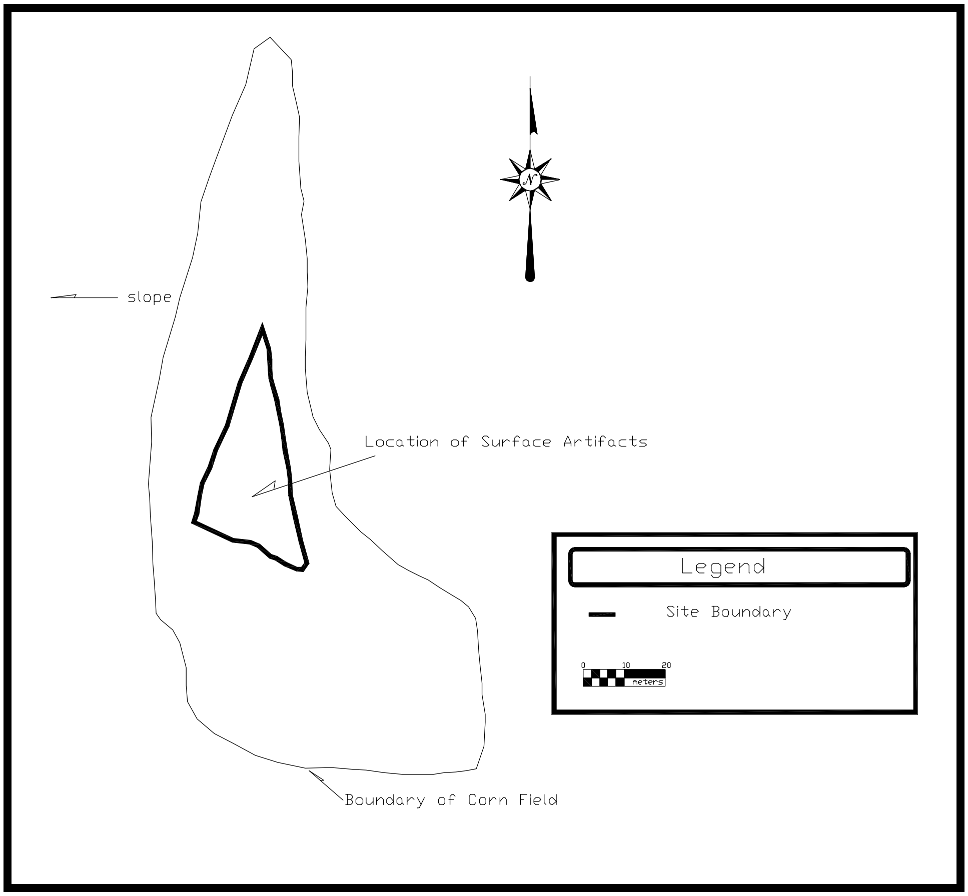


Figure 13. Schematic plan map of 15Ja476.

Figure 14. General site photograph of 15Ja476, looking west.

Surface visibility was good between the rows of corn. Due to the height of the corn and the fact that the corn rows were not straight, the surface collection and mapping of the site was accomplished by piece plotting all artifacts using GPS. Site area and location were determined from this data.

The surface collection yielded a light density of prehistoric and historic materials. Prehistoric materials consisted of flakes (N=2) and hafted bifaces (N=2). The hafted bifaces consisted of a Late Archaic stemmed cluster and an Early Woodland Stemmed cluster, which indicate a Late Archaic to Early Woodland association for the prehistoric component. While the low density of artifacts precludes any detailed analysis, it is suggested that 15Ja476 may have been a hunting stand or kill site.

Historic materials recovered from 15Ja476 consisted of plain whiteware (N=3) and ironstone (N=4). These materials were non-diagnostic and could be more recent than 50 years. No structures were depicted at this location on any of the maps consulted during the project.

Investigations at 15Ja476 revealed a light density of lithic and historic materials recovered from surface context. Subsoil observed at the surface suggests that buried deposits are unlikely at this location. Continued plowing and erosion have had a negative impact on the integrity of the cultural deposits represented. All cultural material at the site was restricted to surface, or near surface, context. Due to the lack of integrity, the paucity of materials, and the multicomponent nature of the recovered materials, the site does not meet the requirements for inclusion on the National Register of Historic Places. Therefore, no additional archaeological work is recommended.

Site 15Ja477

Field Site Number: SC12
UTMs: 4140735 Northing, 248950 Easting
Elevation: 980 feet AMSL
Component: Undefined Prehistoric
Size: 50 m^2
Distance to nearest water: 25 m
Topography: Terrace
Vegetation: Grass
Ground visibility: 25-95%

Site Description: Site 15Ja477 was situated on a low terrace overlooking the floodplain of Sturgeon Creek (Figures 15 and 16). Sturgeon Creek was located approximately 25 meters to the north of the site. A paved road was located to the west and a dirt road was located to the north of the site.

At the time of the survey, the site area was situated in a plowed field with no crops were The area adjacent to the plowed field was situated in pasture grass. Grass cover in this area was patchy and provided 25% ground visibility. Landowner permission to shovel test this area was denied; therefore, a depth of deposit determination was not possible. However, it is unlikely that buried archaeological remains exist given the topographic position of the site (i.e., terrace) and the lack of buried deposits on such landforms elsewhere in the project area.

A light density of flake debris was recovered during a general surface collection of the plowed area. One flake was also recovered from the grass area. No artifacts were observed in the dirt road. Artifacts recovered from 15Ja477 consisted of 5 flakes. No diagnostic artifacts or modified implements were recovered.

Due to the lack of integrity, low density of materials and undiagnostic nature of the remains, the site does not meet the requirements for inclusion on the National Register of Historic Places. Therefore, no additional archaeological work is recommended.

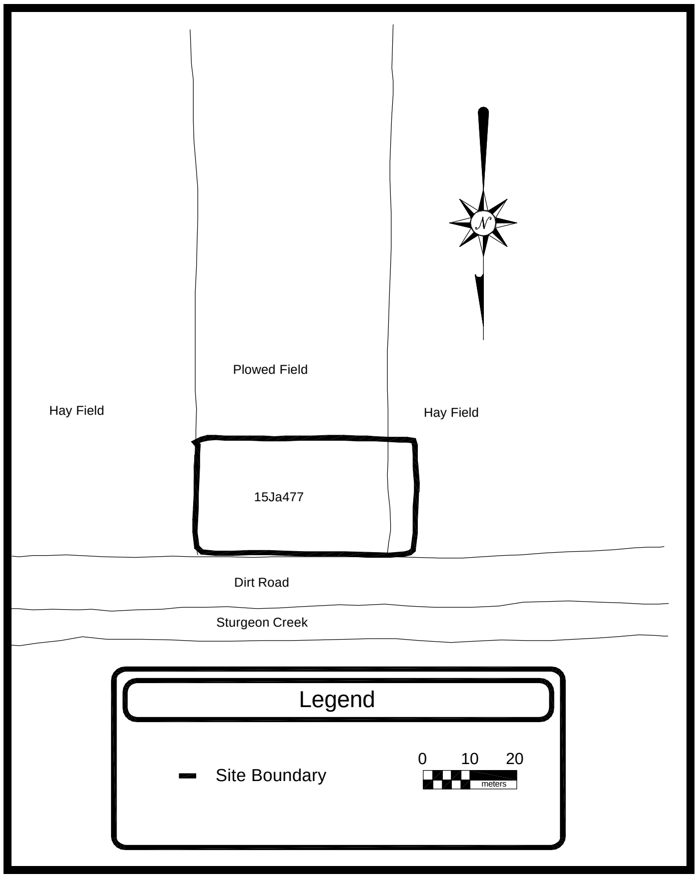


Figure 15. Schematic plan map of 15Ja477.

Figure 16. General site photograph of 15Ja477, looking south.

Site 15Ja478

Field Site Number: SC13
UTMs: 4140075 Northing, 248840 Easting
Elevation: 960 feet AMSL
Component: Late Archaic
Size: 4460 m^2
Distance to nearest water: 70 m
Topography: Terrace
Vegetation: grass, corn
Ground visibility: 90%

Site Description: Site 15Ja478 was situated on a low rise of a high terrace overlooking Sturgeon Creek (Figures 17 and 18). Sturgeon Creek was located approximately 70 meters to the west of the site.

At the time of the survey, the site area was situated mostly in a corn field, but it also extended to the north into an uncultivated area with scattered grass and weeds. Surface visibility was good in both the corn field and in the uncultivated portion of the field.

Sites 15Ja478-480 were all situated on the same terrace. The three sites were separated due to topographic features (three low rises) and the distribution of surface artifacts. Material density was greatest at the highest point on each of the three rises and tapered towards the edge of the rises. There was an area of no surface artifacts between the three sites.

A general surface collection of 15Ja478 revealed a moderate density of lithic materials scattered across the site area. Material density was greatest at the highest point on this rise. Sandstone (unburned) was observed at the surface, which suggests that there are no buried deposits at the site. Materials recovered from the surface collection consisted of flake debris (N=189), bifaces (N=8) and one hafted biface. The hafted biface was a Saratoga cluster form, which suggests a Late Archaic association for the site. However, the current landowner reported numerous people have collected from the site in the past. In addition, a couple of local collectors told the field crew that this area was the place to go to find “arrowheads.” This can often result in a bias in terms of time periods represented because these types of artifacts are more likely to be removed. It is highly probable that the site is multicomponent.

Lithic analysis of the recovered materials suggests that site activities included late stage biface production and tool replacement. This assemblage, though large, does not point specifically to a residential site. The low diversity of tool types and the lack of FCR suggest a limited set of on-site activities. Site 15Ja478 most likely served as a logistical camp that was repeatedly occupied for the same purpose.

Investigations at 15Ja478 revealed a moderate density of lithic materials recovered from surface context. Sandstone and subsoil observed at the surface suggests that buried deposits are unlikely at this location. Continued plowing and erosion have had a negative impact on the integrity of the cultural deposits represented. All cultural material at the site was restricted to surface, or near surface, context. Due to the lack of integrity and the probable multicomponent nature of the remains, the site does not meet the requirements for inclusion on the National Register of Historic Places. Therefore, no additional archaeological work is recommended.

Site 15Ja479

Field Site Number: SC14
UTMs: 4140120 Northing, 248700 Easting
Elevation: 960 feet AMSL
Component: Undefined Prehistoric
Size: 200 m^2
Distance to nearest water: 135 m
Topography: Terrace
Vegetation: grass
Ground visibility: 90%

Site Description: Site 15Ja479 was situated on a low rise on a high terrace overlooking Sturgeon Creek (Figures 19 and 20). Sturgeon Creek was situated approximately 135 meters to the west of the site. As noted above, site 15Ja479 is situated on the same terrace as 15Ja478 and 15Ja480. Three low rises occur in this area, all of which have cultural material associated with them.

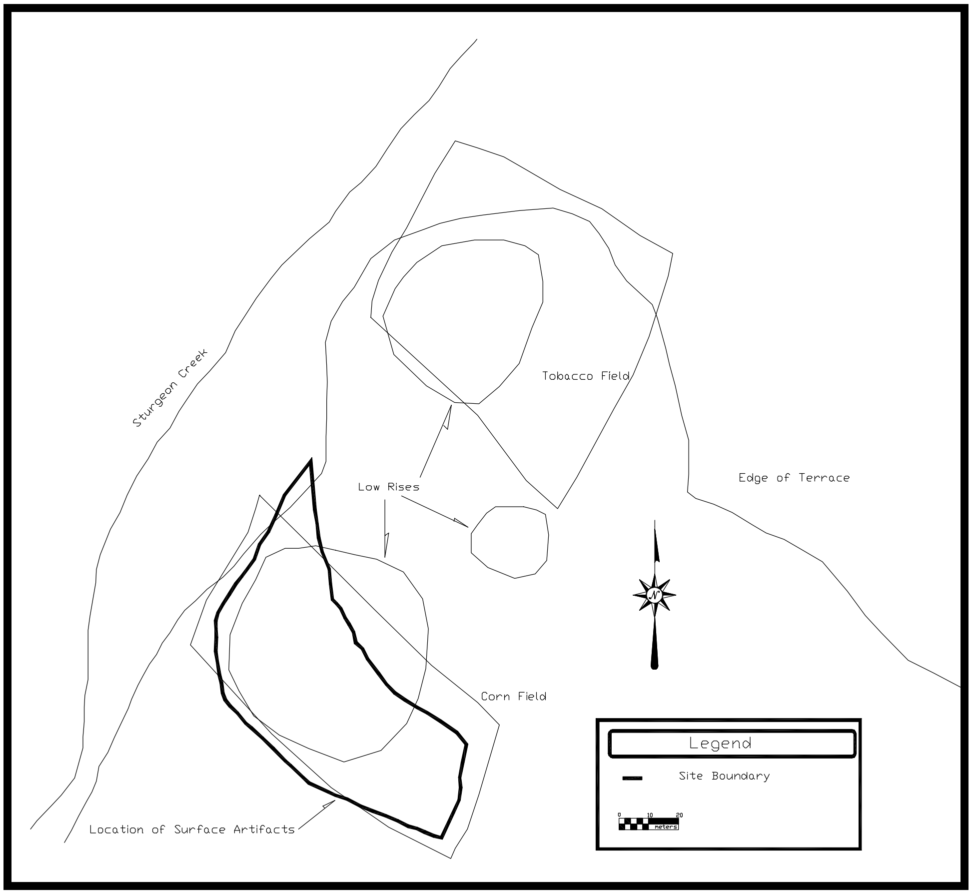


Figure 17. Schematic plan map of 15Ja478.

Figure 18. General site photograph of 15Ja478, looking south.

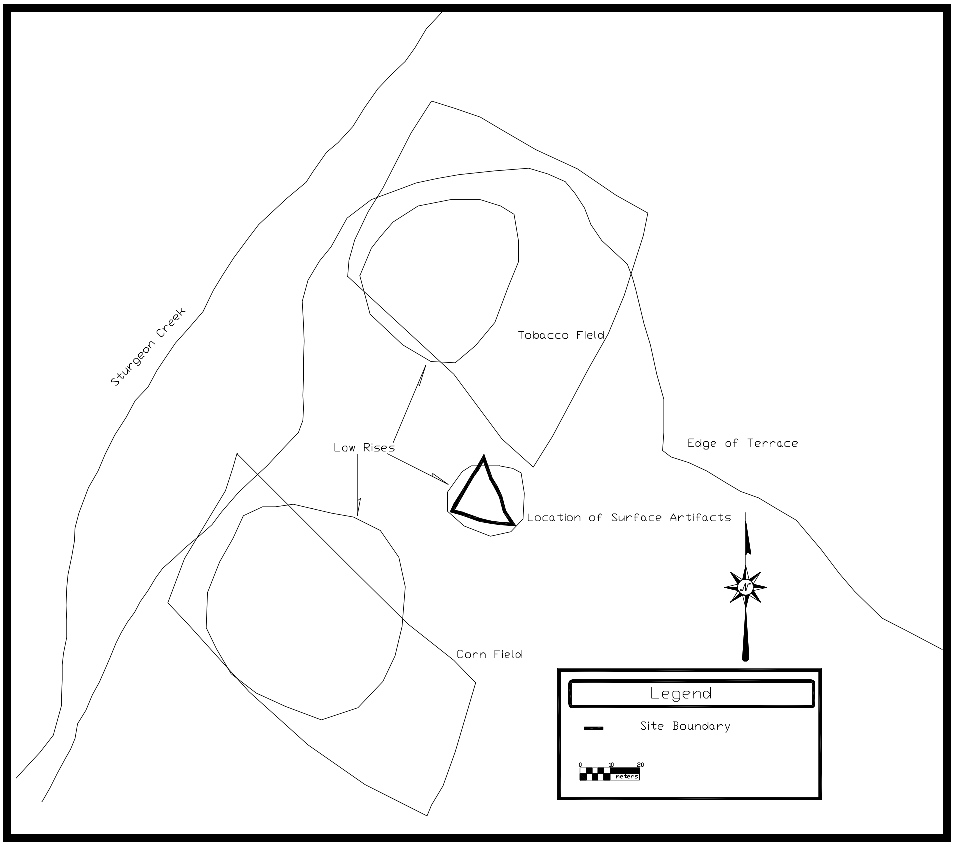


Figure 19. Schematic plan map of 15Ja479.

Figure 20. General site photograph of 15Ja479, looking east.

A light density lithic scatter observed in cultivated field represented site 15Ja479. At the time of the survey, the majority of the site was situated in an uncultivated area of the field; however, the northern portion of the site extended into a tobacco field. Surface visibility in both areas was good.

Cultural material recovered from 15Ja479 consisted of flake debris (N=10) and bifaces (N=2). No diagnostic artifacts were recovered; however, as noted for 15Ja478, local collectors have known about this area for some time. If diagnostic artifacts were once at the site, they may have been removed prior to the survey. In addition, sandstone (unburned) was observed on the surface of the site suggesting that sub surface deposits do not exist at the site.

Based on the analysis of the recovered material, it is suggested that 15Ja479 was a locale where exhausted or broken bifacial tools were discarded and new ones manufactured. Due to its small size and low diversity of artifacts represented, this site may represent a single use logistical camp.

Investigations at 15Ja479 revealed a light density of lithic materials recovered from surface context. Subsoil observed at the surface suggests that buried deposits are unlikely at this location. Continued plowing and has had a negative impact on the integrity of the cultural deposits represented. All cultural material at the site is now restricted to surface, or near surface, context. Due to the lack of integrity, low density of materials and the undiagnostic nature of these materials, the site does not meet the requirements for inclusion on the National Register of Historic Places. Therefore, no additional archaeological work is recommended.

Site 15Ja480

Field Site Number: SC15
UTMs: 4140215 Northing, 248885 Easting
Elevation: 960 feet AMSL
Component: Early Archaic
Size: 2790 m^2
Distance to nearest water: 50 m
Topography: Terrace
Vegetation: Tobacco
Ground visibility: 90%

Site Description: Site 15Ja480 was situated on a low rise on a high terrace overlooking Sturgeon Creek (Figures 21 and 22). Sturgeon Creek was situated 50 meters to the west of the site. As noted above, sites 15Ja478 and 479 are also located on this same landform.

At the time of the survey, the site was situated mostly in a tobacco field; however, a portion at the southern end was in recently plowed field devoid of crops. Some patchy grasses and weeds were observed in that area. Sandstone was also observed at numerous places across this area suggesting that buried deposits are absent at the site.

The recovered cultural material represented a moderate density lithic scatter. This material consisted of flake debris (N=208), bifaces (N=15) and hafted bifaces (N=1). The latter artifact was a LeCroy Bifurcate Base indicating an Early Archaic association for the site. As noted above, however, the site area was long known to local collectors as a good place to find “arrowheads.” It is likely that the site is multicomponent.

Analysis of the recovered material showed a low diversity of tool types and an emphasis on early and late stage flake debris. Such would be expected from a site that served as a locus of tool replacement as well as a limited range of other activities. The relatively larger size of the assemblage is likely a function of repeated visits to the site throughout prehistory. The site likely served as a short-term logistical camp that was occupied repeatedly.

Investigations at 15Ja480 revealed a moderate density of lithic materials recovered from surface context. Subsoil observed at the surface suggests that buried deposits are unlikely at this location. Continued plowing has compromised the integrity of the cultural deposits represented. All cultural material at the site is restricted to surface or near surface context. Due to the lack of integrity and probable multicomponent nature, the site does not meet the requirements for inclusion on the National Register of Historic Places. Therefore, no additional archaeological work is recommended.

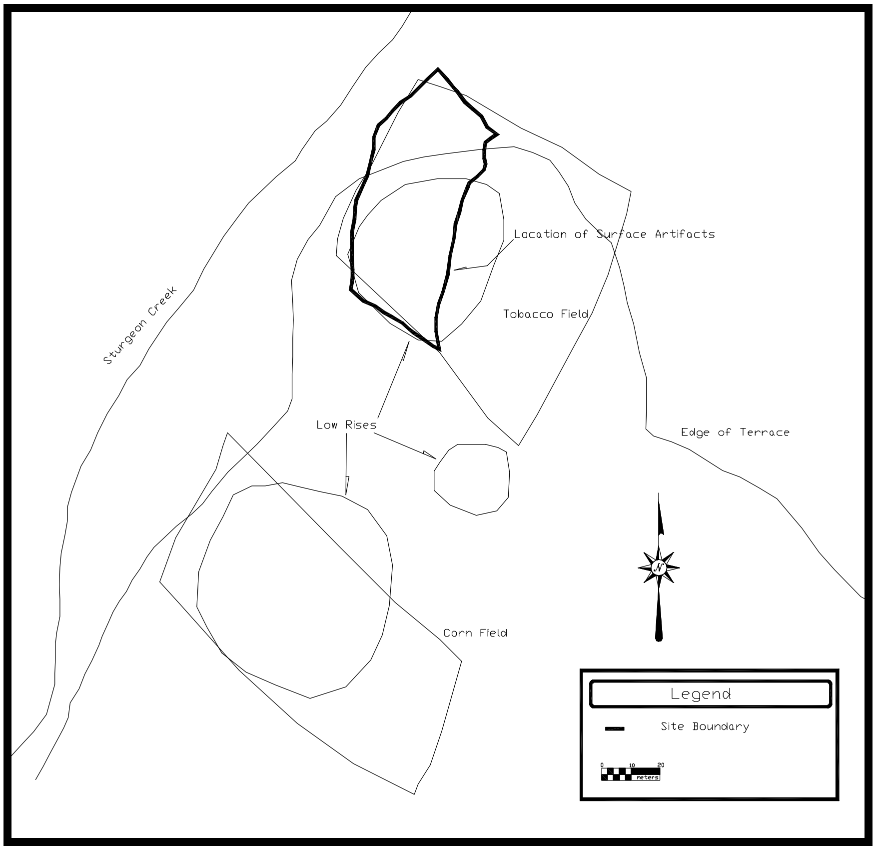


Figure 21. Schematic plan map of 15Ja480.

Figure 22. General site photograph of 15Ja480, looking west.

Isolated Finds

Cultural material was recovered from a number of locations that could not be defined as a site using the criteria defined by the Kentucky Heritage Council. This material generally consisted of a single artifact recovered from surface context or a single positive shovel test. A description of the isolated finds identified during the current survey is provided below. In most cases, isolated finds were treated as sites during the field work portion of the survey. After analysis, several of these were given the designation “isolated find.”

Isolated Find # 1

Field Site Number: IF1
UTMs: 4141535 Northing, 248545 Easting
Elevation: 960 feet AMSL
Components: Late Archaic
Distance to nearest water: 30 m
Topography: Floodplain
Vegetation: Tobacco
Ground visibility: 90%

Description: A single Matanzas hafted biface was recovered during a surface collection of a tobacco field situated on the floodplain of Sturgeon Creek. No additional artifacts were recovered from this field. Shovel testing in this area indicated that the alluvial deposits were in excess of 50 cm in depth. Bucket augers were excavated on this same landform approximately 100 meters to the southwest in the area of IF#6. The augers indicated up to 2 meters of alluvial deposition on this landform. It is possible that more deeply buried materials are associated with IF#1 (see *Chapter 7. Deep Testing Results*).

Isolated Find # 3

Field Site Number: IF3
UTMs: 4141930 Northing, 248405 Easting
Elevation: 960 feet AMSL
Component: Undefined Prehistoric
Distance to nearest water: 75 m
Topography: Terrace
Vegetation: none
Ground visibility: 100%

Description: A single biface fragment recovered from a bulldozed area represents Isolated Find #3. The biface was recovered from a terrace overlooking Sturgeon Creek, located approximately 100 meters to the east of IF#3.

The area surrounding IF#3 had been bulldozed in conjunction with providing drainage for several tobacco and corn fields. No vegetation was present in this area. A surface collection of the area failed to produce any additional artifacts. The closest site recorded during the survey, 15Ja476, was located approximately 255 meters to the southwest of IF#3.

Isolated Find # 4

Field Site Number: SC4
UTMs: 4140745 Northing, 248840 Easting
Elevation: 960 feet AMSL
Component: Undefined Prehistoric
Distance to nearest water: 25 m
Topography: Terrace
Vegetation: pasture grass
Ground visibility: 0%

Description: IF #4 was represented by two flakes recovered from two separate screened shovel tests (Figure 23). IF #4 was situated on a low rise overlooking Sturgeon Creek, which was located approximately 25 meters to the south. A paved road was situated to the west and a gravel drive was situated to the north of this area.

Shovel tests to the north of the site suggested that there had been some disturbance to the site. Soils in this area were a mix of topsoil and subsoil. The two flakes recovered were both within the upper 15 cm of soil (i.e., plowzone). Additional shovel tests at 10 meter intervals in all cardinal directions from these positive shovel tests failed to produce additional artifacts.

Site 15Ja473 was located across the paved road approximately 45 meters from IF #4. However, IF #4 does not appear to be a continuation of 15Ja473. A transect of negative shovel tests was excavated on the east side of the road. This transect was 20 meters from the transect that produced the two positive shovel

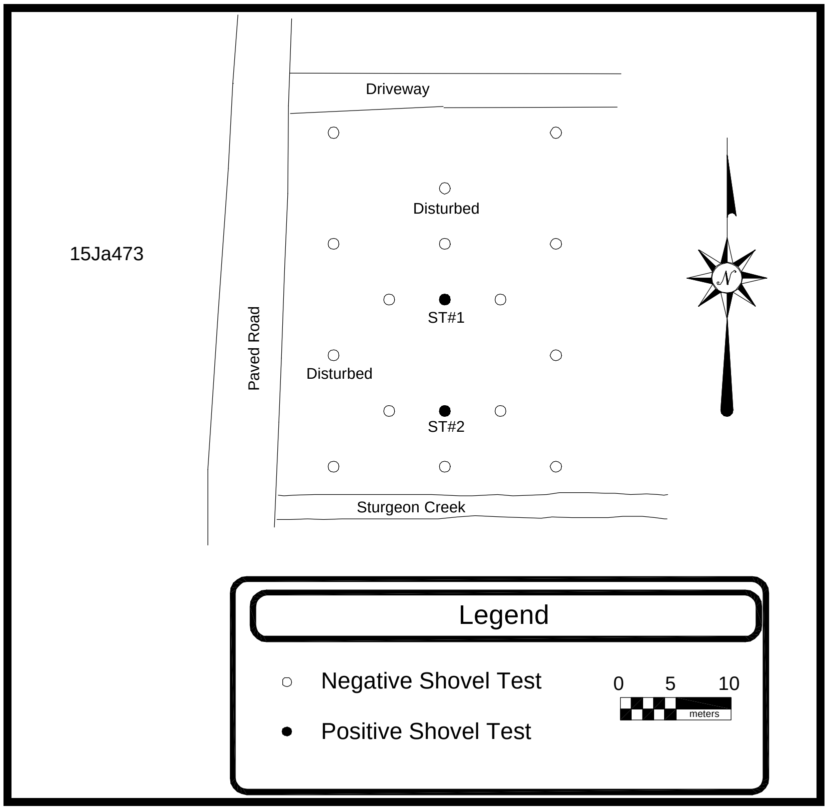


Figure 23. Schematic plan map of Isolated Find #4.

tests. In addition, a row of shovel tests was excavated along the eastern border of 15Ja473 and, only one test was positive for cultural material (N=1 flake).

Isolated Find # 5

Field Site Number: SC5
UTMs: 4141340 Northing, 248370 Easting
Elevation: 980 feet AMSL
Component: Undefined Prehistoric
Distance to nearest water: 85 m
Topography: Terrace
Vegetation: Pasture grass
Ground visibility: 0%

Description: IF #5 was represented by a single flake recovered from a shovel test. The shovel test was located at the edge of a pasture on a terrace of Sturgeon Creek, which was situated 85 meters to the southeast of IF #5. Additional shovel tests were excavated at 10 m, then 5 m intervals, in all cardinal directions from the positive shovel test. No additional artifacts were recovered. Soil deposition was very shallow (5-10 cm) in this area. It is highly unlikely that additional cultural material is associated with this flake. No other archaeological sites were located in close proximity to IF #5.

Isolated Find # 6

Field Site Number: SC6
UTMs: 4141225 Northing, 248450 Easting
Elevation: 960 feet AMSL
Component: Undefined prehistoric
Distance to nearest water: 31 m
Topography: Floodplain
Vegetation: pasture grass
Ground visibility: 0%

Description: IF #6 was represented by a single flake recovered from a shovel test. The shovel test was excavated on the floodplain of Sturgeon Creek (Figure 24). Sturgeon Creek was situated approximately 30 meters to the west of IF #6. Additional shovel tests were excavated

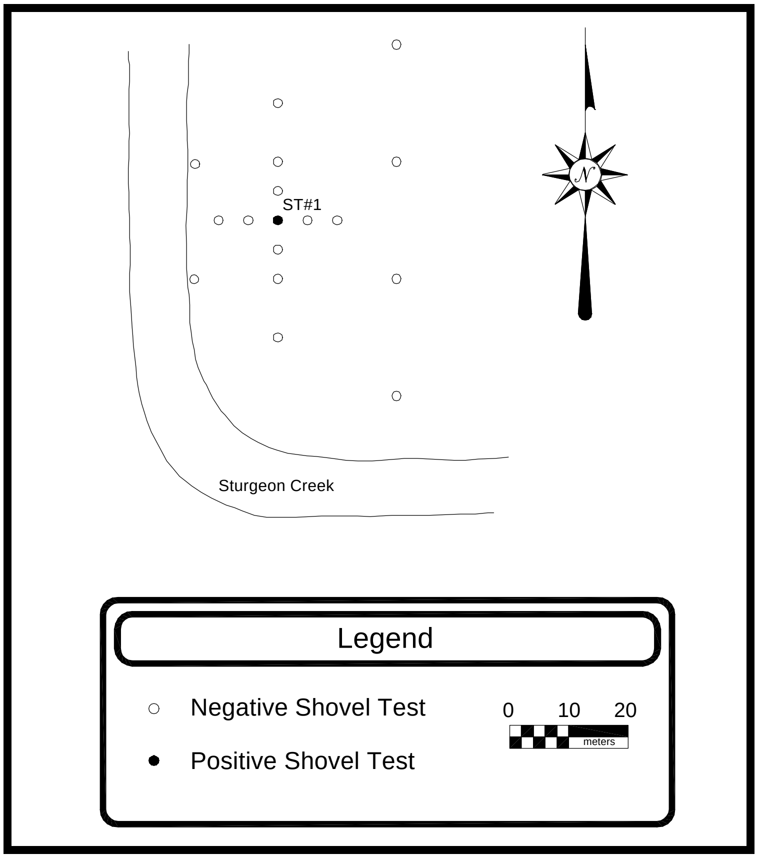


Figure 24. Schematic plan map of Isolated Find #5.

at 10 m, then 5 m intervals, in all cardinal directions from the positive shovel test. No additional artifacts were recovered.

Bucket augering in the area of IF #6 indicated that alluvial deposits extend some 2 meters below current ground surface. The flake from the shovel test was recovered between 25 and 30 cm below ground surface. There is the possibility of additional cultural material to be recovered at this location from within the buried deposits.

Isolated Find # 7

Field Site Number: SC8
UTMs: 4142185 Northing, 248345 Easting
Elevation: 960 feet AMSL
Component: Undefined prehistoric
Distance to nearest water: 15 m
Topography: Floodplain
Vegetation: pasture grass
Ground visibility: 0%

Description: IF #7 was represented by a single flake recovered from a shovel test (Figure 25). The shovel test was excavated on the floodplain of Sturgeon Creek, which was situated approximately 30 meters to the south of IF #7. Additional shovel tests were excavated at 10 m, then 5 m intervals, in all cardinal directions from the positive shovel test. No additional artifacts were recovered.

Bucket augering in the area of IF #7 indicated that alluvial deposits in this area extend some 2 meters below current ground surface. The flake from the shovel test was recovered between 10 and 40 cm below ground surface. There is the potential for additional cultural material to be recovered at this location from within the buried deposits.

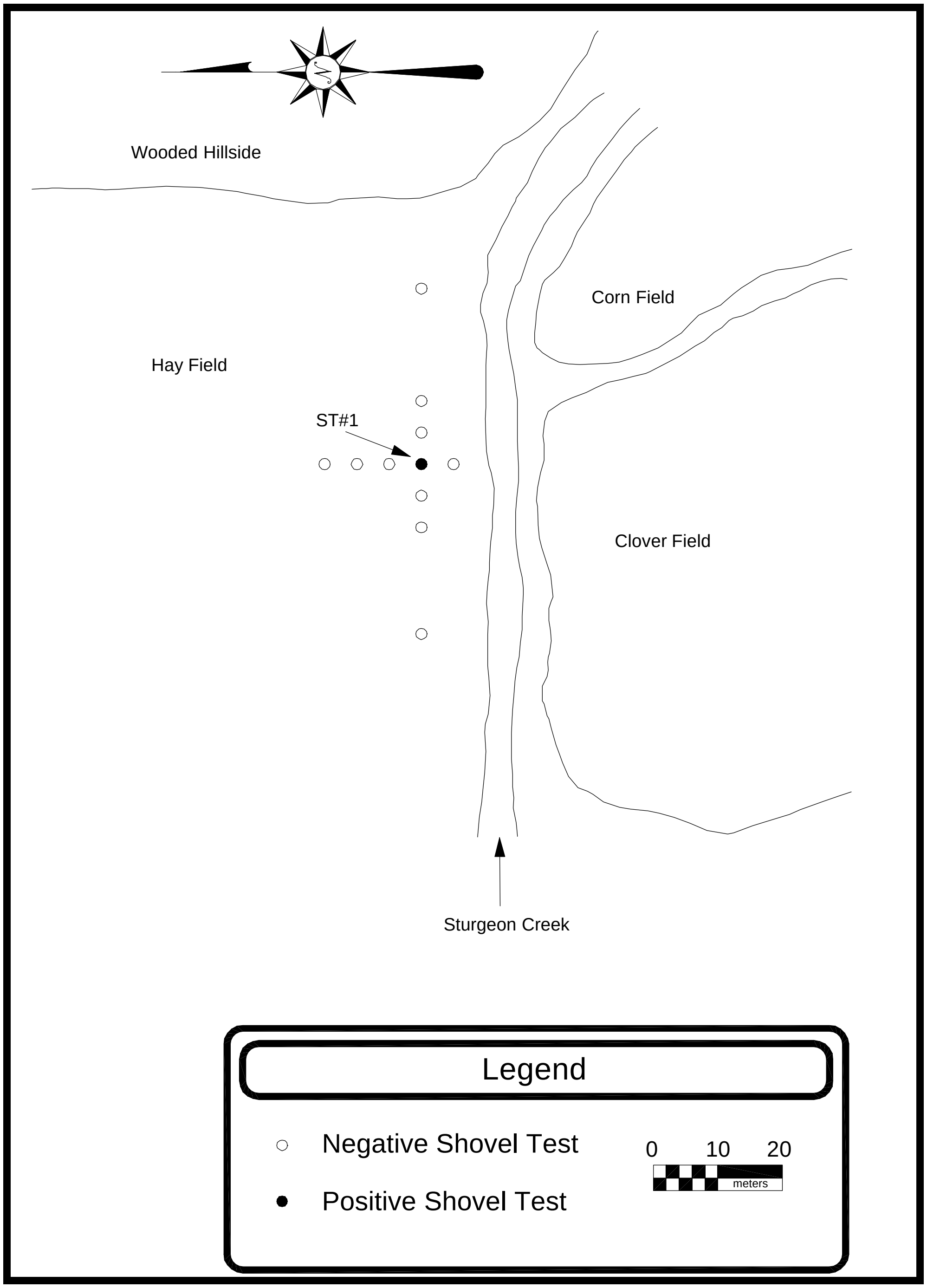


Figure 25. Schematic plan map of Isolated Find #7.

Non-Site Localities

Two non-site localities were documented during the current survey, one in the War Fork/Steer Fork project area and one in the Sturgeon Creek project area. Cultural material was recovered from both locations, but the materials were not old enough (fifty years or older) to be considered a site. These localities are discussed in detail below.

Non-Site Locality 1

Field Site Number: WF1
UTMs: 4148370 Northing, 241250 Easting
Elevation: 980 feet AMSL
Components: Recent Historic
Size: 100 m^2
Distance to nearest water: 30 m
Topography: Hill slope
Vegetation: Secondary Growth Timber
Ground visibility: 0%

Description: Non-site locality 1 was situated on a small, flat portion of a hill slope (Figure 26). War Fork was located approximately 80 meters to the west. The remnants of an old road were visible just to the west of the non-site area. No structures were depicted in this area on any of the maps consulted as part of this investigation.

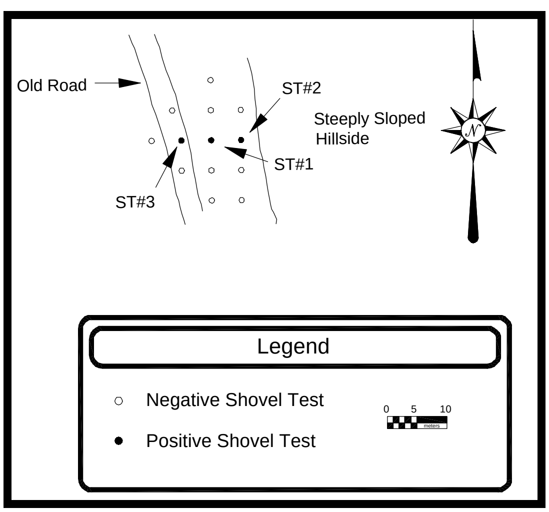


Figure 26. Schematic plan map of Non-Site Locality 1.

A series of screened shovel tests was excavated in this area, three of which were positive for cultural material. Material recovered from these shovel tests consisted of six pieces of undiagnostic container glass. Of these fragments, four were clear, one was aqua and one was amethyst. None of this material could be assigned confidently to an age greater than 50 years. There was no evidence of a structure at this location, and, it appears that the artifacts represent a roadside dump incident. Therefore, non-site locality 1 was not given a site designation.

Non-Site Locality 2

Field Site Number: SC10
UTMs: 4142410 Northing, 248035 Easting
Elevation: 980 feet AMSL
Component: Recent Historic
Size: 6910 m^2
Distance to nearest water: 45 m
Topography: Terrace
Vegetation: Grass, Secondary growth timber, scrub brush
Ground visibility: 5-10%

Description: Non-site locality 2 was situated on a low terrace above the floodplain of Sturgeon Creek (Figure 27). Sturgeon Creek was situated approximately 45 m to the east. The locality consisted of a series of six structures; the ruins of a frame house (Figure 28), and five associated outbuildings. All buildings were in a state of disrepair. State Route 30 was situated just to the north of non-site locality 2, which can be seen from the road.

A structure was depicted on Sturgeon, KY 1953 quadrangle map at this location. The current landowner reported that the house was constructed in the late 1940s or early 1950s. Shovel tests were excavated around each of the structures. Artifacts recovered from these shovel tests consisted of machine made container glass (clear, N=7), stoneware (N=1), whiteware (N=1) and a ceramic figurine (N=2 fragments refit). None of this material could be dated confidently to greater than 50 years. Due to the recent nature of the deposits, non-site locality 2 was not given a site designation.

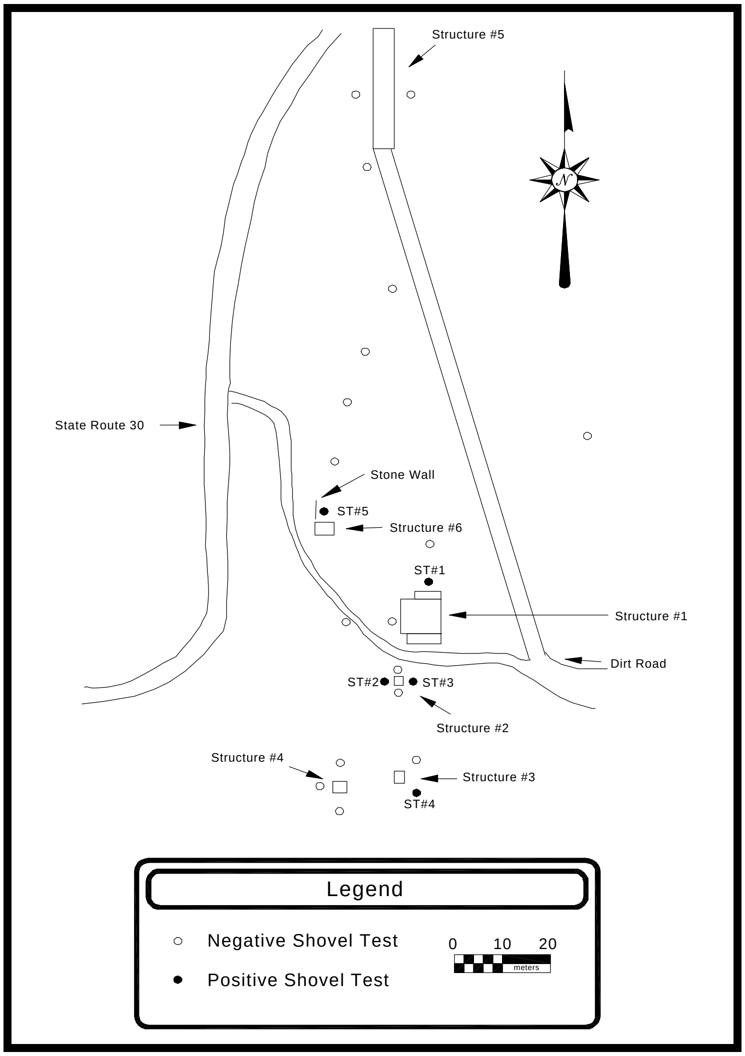


Figure 27. Schematic plan map of Non-site Locality #2.

Figure 28. Photograph of house at Non-site Locality #2.

Chapter 7. Deep Testing Results

Andrew P. Bradbury

Deep Testing

An examination of the deposits along Sturgeon Creek suggested the potential for buried archaeological materials to be located within the Sturgeon Creek project area. This hypothesis was based on the current depth of Sturgeon Creek below present ground surface (2-3 meters) and the recovery of recent historic materials (plastic wrappers, McDonald's coffee cup lid) in shovel tests excavated in the floodplain zone. These factors suggested the possibility that prehistoric materials, if they exist, would likely be buried below what could be examined using near surface survey methods (i.e., shovel testing and surface collection). Additional support for this hypothesis came in the form of isolated flakes recovered from shovel tests in floodplain areas at depths of 30-40 cm below current ground surface (e.g., Isolated Finds #6 and 7, see discussion below) and the recovery of Early Archaic diagnostic artifacts from surface collections on terrace areas (sites 15Ja473 and 15Ja480). As a means of testing this hypothesis, several bucket auger transects were excavated in areas thought likely to contain buried materials.

The bucket auger transects were not designed as a site discovery method for the current study. Rather, these transects were excavated as a means of characterizing the nature of the alluvial sediments (i.e., fine grained versus coarse grained) and as a cursory assessment of the potential for these deposits to contain buried archaeological materials. While this examination is, admittedly, extremely limited, a detailed sub-surface reconnaissance survey was well beyond the scope of work of the current project. Nevertheless, this examination does provide at least a cursory glimpse of the potential for buried deposits to be located within the project area.

As discussed in *Chapter 4. Field Methods* section of this report, these tests were excavated using a bucket auger with a 4 inch diameter opening. Sediment was removed in 10 cm levels and all removed soil was screened through ¼ inch mesh hardware cloth. Notes were taken concerning the sediment horizons encountered and any cultural materials recovered or observed. No artifacts were recovered from any of the auger tests; however, charcoal flecks were observed in several of the tests. Three areas were selected for examination and the results are discussed below.

Site 15Ja473 Locality

Site 15Ja473 was situated on a low terrace overlooking a narrow floodplain of Sturgeon Creek. Investigations at the site revealed a light density of surface artifacts. Shovel testing at the site did not indicate the presence of buried materials. All shovel tests were excavated on the terrace area. Subsoil was observed at the surface on the terrace within the site area. A south-north bucket auger transect was excavated from the floodplain of Sturgeon Creek to the top of the terrace to obtain a cross sectional view of this landform. A generalized profile of this landform is shown in Figure 29. In addition, a section of the Sturgeon Creek bank was profiled. Seven bucket augers were excavated along this transect. Representative samples of these, along with the bank profile, are shown in Figure 30. Similar stratigraphic profiles were seen in all bucket augers excavated along this transect. The main difference between the auger tests was in the depth and thickness of each stratum. These are discussed below with differences noted.

The upper stratum of all profiles consisted of a silt loam ranging from a minimum thickness of 20 cm on the terrace to a maximum thickness of 60 cm at the creek bank. This most likely represents recent alluvium. Below this horizon was a fine sandy loam, 20 to 120 cm thick. This stratum was thinnest on the terrace and thickest at the creek bank. Bucket Auger 7 hit refusal (probably the underlying bedrock) below this zone. Bucket auger 4 exhibited small amounts of charcoal flecking within this zone and suggests a potential for buried archaeological materials. The present level of Sturgeon Creek is within this zone. Below this stratum, the horizons noted for Bucket Auger 1 were different than the remaining augers excavated on this transect.

The lower stratum in Bucket Auger 1 (below 140 cm) consisted of 1) a sandy loam with a few rounded gravels, 2) a lens of creek gravels, and 3) sand. The lens of creek gravels could be an indication that Sturgeon Creek did not always occupy its current position. The stratum above this contained rounded gravels, which suggest a higher energy environment than that observed on the remaining auger tests.

The lower stratum represented in the remaining auger tests consisted of fine grained sand. Refusal was hit in all auger tests except for Bucket Auger 5. Approximately 25 cm into the sand stratum in this auger test, additional sediment could not be removed as the sand simply fell out of the auger before it could be removed. Refusal in the remaining auger tests was most likely the underlying bedrock or bedrock floaters.

Based on the auger tests excavated in the area of 15Ja473, it is suggested that there is a potential for buried archaeological materials to be contained within the floodplain deposits. These buried materials will most likely be contained within the sandy loam deposits, which were 110 cm thick, on the floodplain. The fine-grained nature of these sediments suggests a low energy depositional environment. Such deposition is often the result of over bank deposition. This form of site burial tends to preserve sites rather than disturb them.

Isolated Find #6 Locality

IF #6 was represented by a single flake recovered from a shovel test on the floodplain of Sturgeon Creek. Sturgeon Creek is located approximately 30 meters to the west of IF #6. Due to the fact that Sturgeon Creek is situated approximately 2.7 meters below current ground surface, the possibility of buried archaeological materials was considered high. To investigate this possibility further, a series of bucket augers was excavated in addition to profiling a section of the Sturgeon Creek bank adjacent to IF #6. A west-east transect was excavated perpendicular to the creek, and a north-south transect was excavated parallel to the creek. A representative sample of the profile for these bucket auger tests is presented in Figure 31. Profiles on the north-south transect were virtually identical; therefore, only the west-east transect is discussed here.

The topography in the area of IF #6 was relatively flat with a gradual slope to the terrace. The closest terrace was situated approximately 240 meters to the east (Figure 29). Due to the width of the floodplain in this area, a full cross section of the floodplain to the terrace was not possible. Therefore, both an east-west and a north-south transect were excavated in the immediate area of IF #6 with the transects crossing at the location of the positive shovel test.

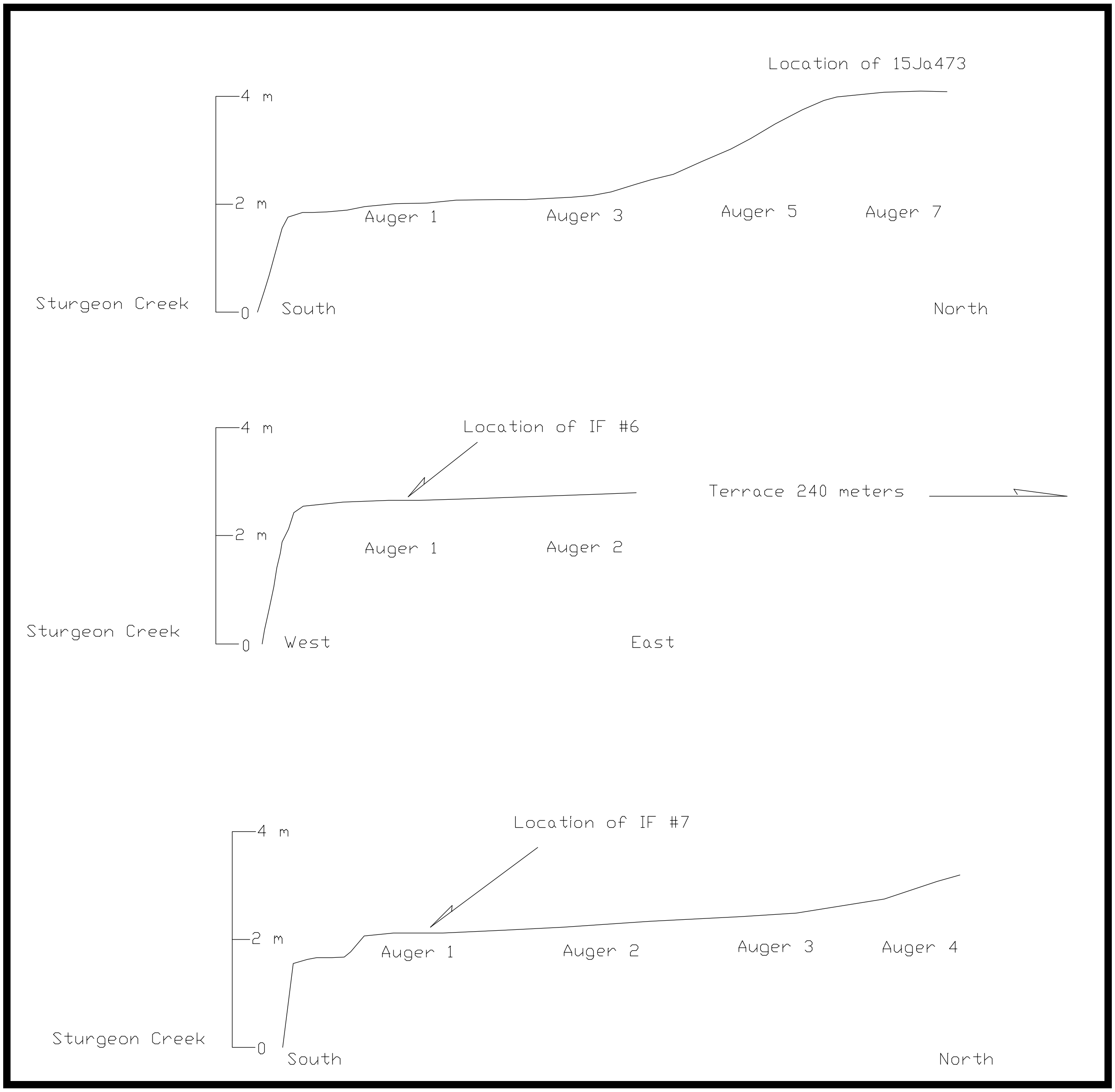


Figure 29. Generalized cross section map showing relative locations of bucket auger tests.

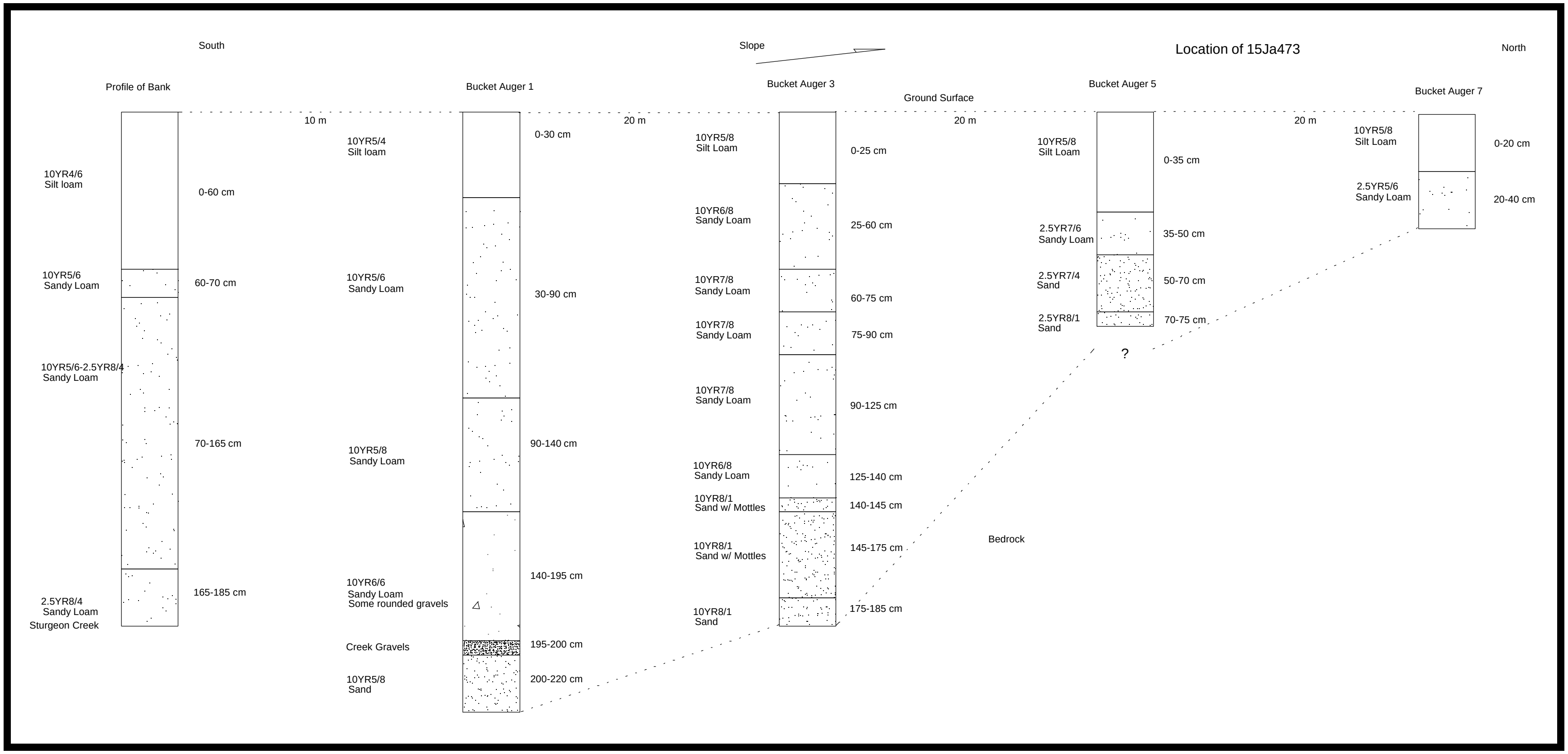


Figure 30. Soil profiles of bucket augers excavated at 15Ja473.

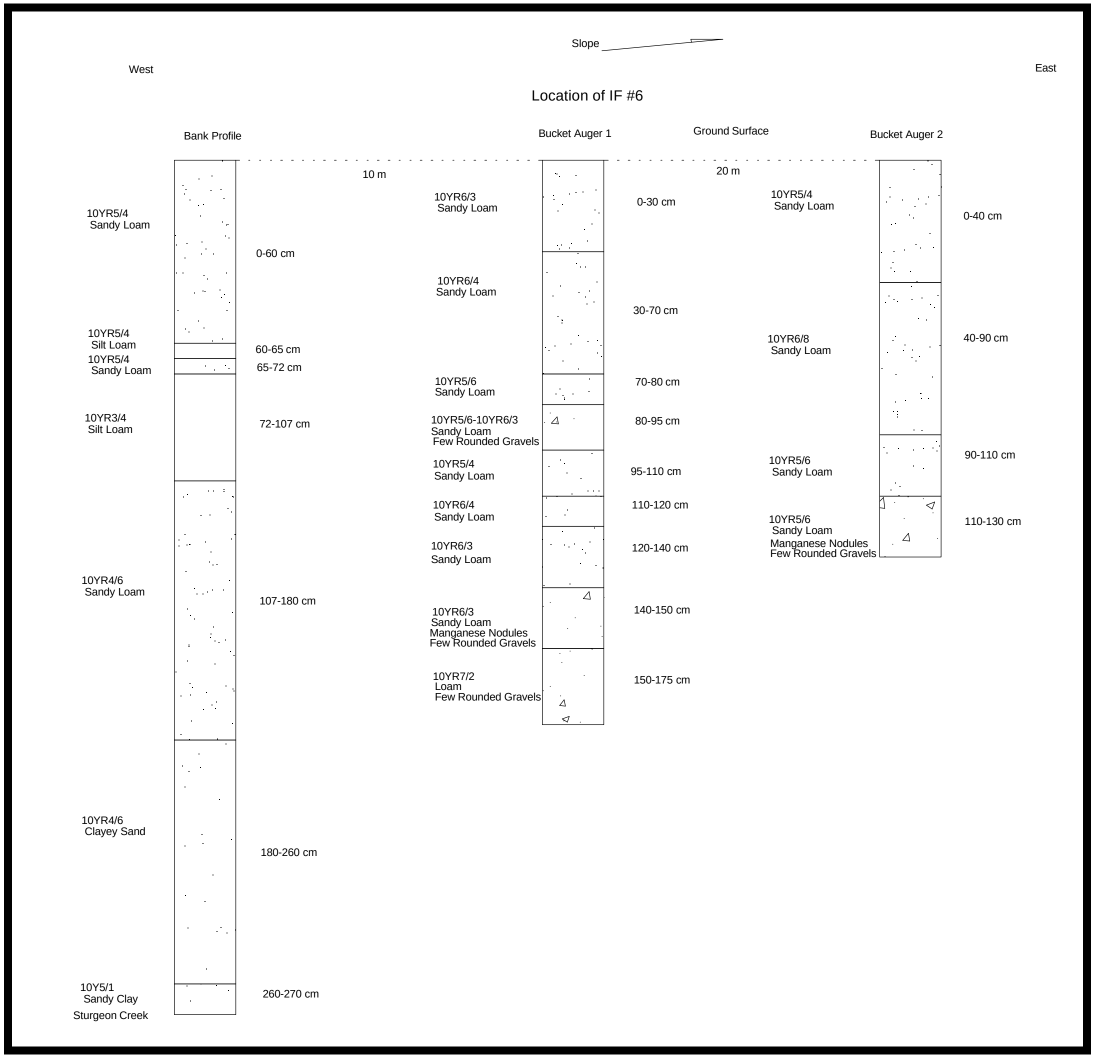


Figure 31. Soil profiles of bucket augers excavated at IF #6.

The profile of the Sturgeon Creek bank revealed a mix of sandy and silt loams. Coal cinders were observed in the upper 72 cm of sediments suggesting that this equates with recent (i.e., historic period) alluvium. In addition, this upper 72 cm consisted of alternating thin lenses (3-4 cm thick) of sandy loam and silt loam suggesting deposition during episodic flooding. Due to the frequency of these lenses, only the main soil data for these upper strata is shown in Figure 31. Around 72 cm, these lenses stop, and the profile becomes a silt loam.

Below these upper strata is a stratum of sandy loam that extends from approximately 107 to 180 cm below current ground surface. Small flecks of charcoal were observed scattered throughout this stratum. In addition, mineral staining was also observed and increased with depth. The strata terminated in a wavy boundary where mineral staining and mottling increased markedly. The charcoal observed within this stratum may be of cultural origin.

Two additional strata were documented below these strata. Both exhibited high degrees of mottling. Gley soils were noted occurring as mottles with the matrix of the strata. The amount of gley soils increased with depth.

The west-east transect of auger tests revealed predominately sandy loams. The base of these profiles also contained rounded gravels suggesting a higher energy deposition environment for these basal strata. Of note concerning the strata observed in these auger tests was a lens between 80 and 95 cm within Auger Test 1. It was composed of a sandy lens with rounded gravels. This may represent a discontinuity associated with a higher energy depositional environment. Charcoal was observed in this same test in the stratum (95-110 cm) immediately below this discontinuity and from a stratum occurring between 120 and 140 cm below current ground surface. The other auger tests on the north-south transect also show similar profiles and charcoal is present at approximately the same depths. No charcoal was observed in Auger Test 2.

Based on the auger tests excavated in the area of IF #6, it is suggested that there is a potential for buried archaeological materials to be contained within these floodplain deposits. These buried materials are most likely to be contained within the fine-grained sandy loam deposits of the floodplain. Two of the strata observed contained charcoal: the first occurred between 95 and 110 cm below surface, and the second was between 120 and 140 cm below surface. The fine-grained nature of these sediments suggests a low energy depositional environment, such as over bank deposition. It is likely that the surface soils of the floodplain are the result of recent (i.e., historic period) deposition.

Isolated Find #7 Locality

IF #7 was represented by a single flake recovered from a shovel test. The shovel test was excavated on the floodplain of Sturgeon Creek. Sturgeon Creek is located approximately 30 meters to the south of IF #7. Additional shovel tests were excavated at 10 m, then 5 m intervals, in all cardinal directions from the positive shovel test. No additional artifacts were recovered.

Topography in this area consisted of the floodplain and a low terrace (Figure 29). Sturgeon Creek is currently situated approximately 1.5 meters below current ground surface in this area. IF # 7 was situated on the floodplain. Two bucket auger transects were excavate in this location: one extended south-north from Sturgeon Creek to the terrace and, the other extended east-west along the floodplain. These transects intersected at Auger Test 1, which was adjacent to the positive shovel test. A section of the creek bank adjacent to IF #7 was also profiled. As the profiles of the augers were virtually identical, only the south-north transect is discussed further.

The auger tests excavated at IF #7 revealed predominantly sandy loam strata (Figure 32). Small coal fragments were observed in the upper 40 cm of the bank profile. In addition, a strand of wire was exposed in the creek bank at approximately 55 cm below ground surface. Several pieces of plastic wrappers and a McDonald's coffee cup lid were also recovered in shovel tests (0-30 cm below surface) elsewhere along this landform. These data suggest that at least the upper 55 cm of alluvial deposit can be attributed to historic period deposition.

Lenses of alternating sand and silt loams, 3-4 cm thick, were observed in the third strata (40-120 cm below surface) in the bank profile. These are suggestive of episodic flooding.

Of note in Auger Test 2 was the presence of oil saturated sediments at approximately 100 cm below ground surface. An old oil well is depicted on the Sturgeon quadrangle map at this location. The auger test was halted at this depth.

Charcoal flecks were observed in Auger Test 1 from the surface to 130 cm below surface and between 140 and 165 cm below surface. The other auger tests excavated on the east-west transect also contained charcoal flecking in the middle strata. Charcoal flecks were observed in Auger Test 3 from 70 to 100 cm below surface.

Rounded gravels were observed in Auger Test 1 beginning at 190 cm below current ground surface. The density of these gravels increased with depth. Such deposits are associated with channel or near channel deposits. These types of deposits are formed in high energy environments and, therefore, have only limited potential to contain intact archaeological remains.

Based on the auger tests excavated in the area of IF #7, it is suggested that there is a potential for buried archaeological materials to be contained within these floodplain deposits. These buried materials will most likely be contained within the sandy loam deposits on the floodplain. Charcoal flecking was observed between 70 and 165 cm below surface in several of the auger tests excavated in this area. The fine-grained nature of these sediments suggests a low energy depositional environment, such as over bank deposition.

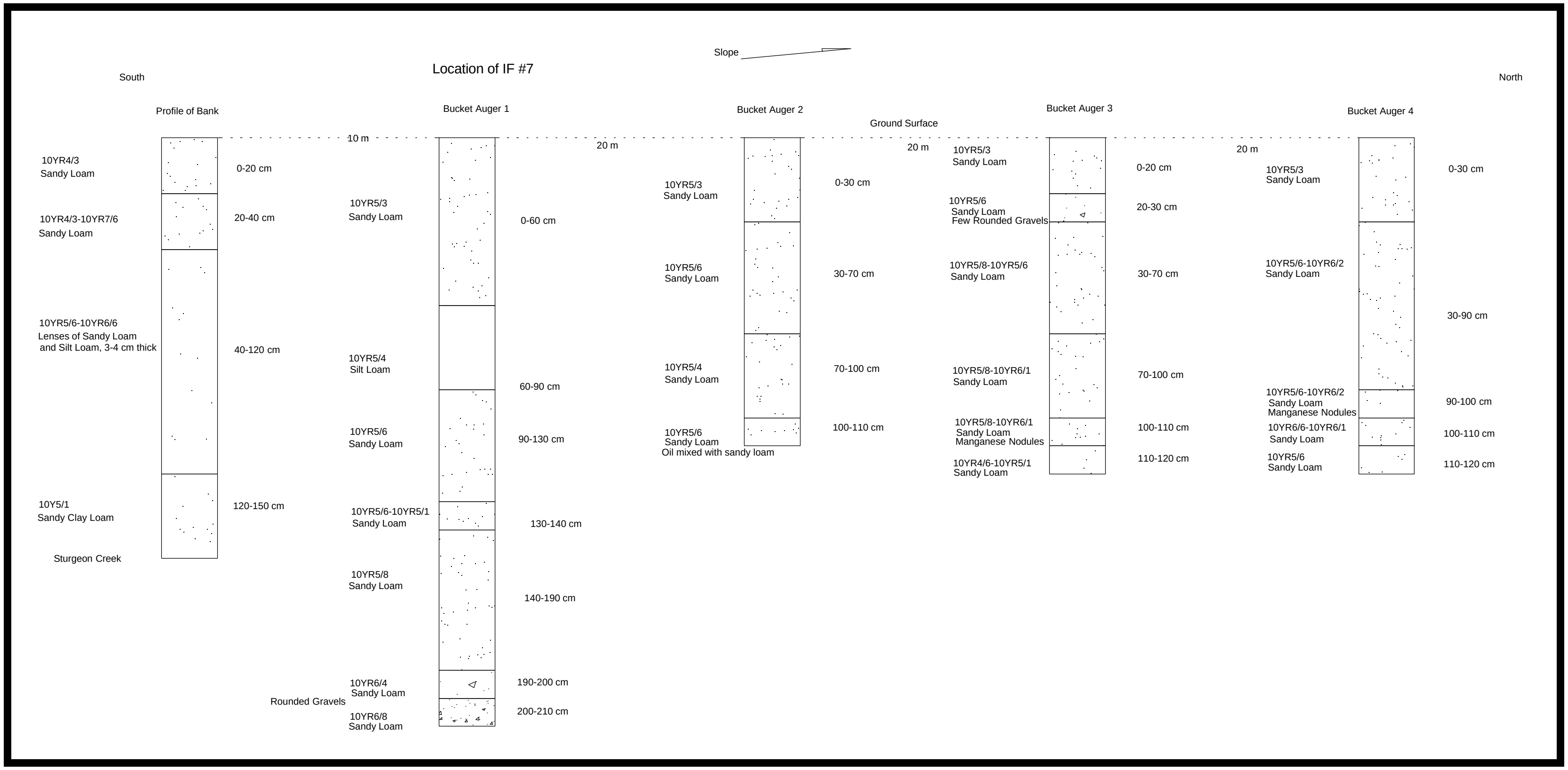


Figure 32. Soil profiles of bucket augers excavated at IF #7

Chapter 8. Archival Records Search

James T. Kirkwood

As a means of further determining the age of Non-site locality 2 (Flannery Tract), an archival records search was conducted. In addition, the field crew reported to the historian that an additional house within the Sturgeon Creek project area appeared to be of sufficient age to warrant further investigation (Madden Tract). The field crew was unable to secure permission to conduct test excavations around the latter house area. All relevant information concerning this property would have to come from an archival records search. The following provides the methods and results of the search.

Methods

The historian researched the historic deeds to establish a chain of ownership of the property, which was in the Property Valuation Administrator's office and the County Clerk's office at the Jackson County Courthouse in McKee, Kentucky. Census information regarding the Flannery and the Brummett families was compiled through files at the Jackson County Public Library in McKee and the Kentucky Historical Society in Frankfort. Information from the tax assessment books for Owsley and Jackson counties and agricultural census information was compiled at the Kentucky Department for Libraries and Archives in Frankfort, Kentucky.

Flannery Tract

A deed search conducted on the property owned by Walker Flannery demonstrated that the same family has owned the property at least since before the Civil War. Non-site locality 2 was located on this tract. No information concerning the age of the structure could be obtained through the deed search. However, the current landowner told the field crew that the house was built in the late 1940s or very early 1950s. At the start of the 20th century much of the Flannery land was held by a large number of family members, but Robert M. Flannery purchased many of the tracts and consolidated the family's holdings. The land was then passed down through the hands of his heirs. He was the son of James Flannery, the family member who originally owned the land.

Jackson County was not created until 1858, so prior to that year it was part of Clay, Estill, Owsley, Madison, Laurel, and Rockcastle counties. The Flannery farm was located in Owsley County prior to the creation of Jackson County. Unfortunately, the Owsley County courthouse burned in 1929 destroying most of the records for the county prior to that date. Any transactions for the Flannery land that were handled by the Owsley County Clerk are forever lost. However, a deed dated March 31, 1900 in the Jackson County Clerk's office described the property as having once belonged to James A. McGuire (Jackson County Clerk [JCC] Deed Book [DB] 13; 496; Kleber 1992: 460).

According to the Owsley County Tax Assessment Book, 1850-1867 (one of the few records to survive the 1929 fire), James A McGuire owned 500 acres of land along Sturgeon Creek in 1850, and the following year he owned 300 acres worth $2,300, 3 horses, and 15 cattle worth $100. He had five children. Throughout the first half of the 1850s McGuire continued to add to his herd of cattle. By 1854 he owned 55 cattle worth $500 and 65 hogs. He also owned 370 acres worth $2,700 and a carriage worth $100 (Owsley County Tax Assessment Book, 1850-1867).

It is not clear when James McGuire sold or transferred the land to James Flannery, but it occurred between 1855 and 1857. Flannery appears on the 1858 Jackson County tax roll as owning 360 acres of land on Sturgeon Creek that was worth $3,000. He owned 4 horses worth $170, 8 cattle worth $25, and 10 hogs. In 1859 he owned 7 cattle worth $125 and 10 hogs, and he raised 900 bushels of corn and 33 bushels of wheat. He owned no slaves (Jackson County Tax Assessment Books).

James Flannery (Flanery) appeared on the 1860 U.S. Census as a 47 year-old native of Virginia and married to a 50 year-old Virginian named Mary. They had four children, all of whom were natives of the Old Dominion. Robert M. was the oldest at 21, and he was followed by Rebecca, 14, John, 12, and Silas, 10. The Census in Jackson County also showed that Hampton Flannery, a 26 year old native of Virginia, and Elhannon Flannery, a 19 year old Virginian, had families in nearby households. Perhaps they were also children of James Flannery (Cunagin 1990: 158-160).

The 1860 U.S. Census of Agriculture provided a clearer portrayal of the agricultural practices of James Flannery. He owned 125 improved acres and 205 that were unimproved, and he owned $15 worth of farm implements. He owned $280 worth of livestock, including 2 horses, 3 dairy cows, 2 oxen, 5 cattle, 16 sheep, and 30 hogs. He raised 100 bushels of wheat, 15 bushels of rye, 300 bushels of corn, and 20 bushels of Irish potatoes. The farm produced 25 pounds of wool and 100 pounds of butter (U.S. Census of Agriculture: 1860).

James Flannery's farm continued to produce the same amount of crops and livestock throughout the 1860s, although he started raising small crops of tobacco of about 10 pounds annually. In 1870, according to the U.S. Census of Agriculture, Flannery owned 150 improved and 160 unimproved acres worth $3,000, and he owned $25 worth of farm implements. He owned 2 horses, 3 dairy cows, 14 sheep, and 15 hogs worth $300. He raised 13 bushels of wheat, 150 bushels of corn, 13 bushels of Irish potatoes, 10 bushels of sweet potatoes, and 25 pounds of tobacco. The farm also produced 3 tons of hay, 50 pounds of butter, and 5 gallons of wine (Jackson County Tax Assessment Books; U.S. Census of Agriculture: 1870).

A deed dated August 19, 1895 between Preston Flannery and Robert M. Flannery refers to one of the tracts of the Flannery land as the "mill tract" containing 33 acres along Sturgeon Creek. The U.S. Censuses of Manufacturers do not indicate that the any member of the Flannery family or any of the neighboring families operated any type of mill (DB 13: 579).

Madden Tract

During the course of the survey, the field crew noted the presence of a possible historic structure on the Madden Tract. A structure is depicted on the 1953 Sturgeon quadrangle map and the 1937 Jackson County Highway and Transportation map at this location. As permission was not granted to the field crew to excavate around the house area, all information regarding this structure had to be obtained from archival records.

The Jackson County Property Valuation Administrator's office did not have the deed information for the tract of land owned by Mr. Dale Madden. Mr. Madden revealed that he purchased the tract in 1967 from Everett Wilson, another landowner in the area. Mr. Madden also informed the historian that the house was constructed about 100 years ago by the Creech family. A deed search was commenced using the information provided by Mr. Madden.

During the 20th century the land passed through the hands of several owners, including the Creech family and Lilburn J. Peters. Peters purchased the 272 acres of land in 1888 from William Rader for $1,500. Rader purchased the land from Benjamin and Elizabeth Brummett on January 7, 1881. John Rader purchased 104 acres of land from Benjamin Brummett for an undetermined amount of money (DB 72: 273; 37: 444; 8: 296, 298; 4: 39; 2: 158).

Apparently, Benjamin H. Brumett owned the land when the General Assembly created Jackson County. The land was part of Owsley

County prior to 1858; therefore, any information about the Brummett's ownership of it is scant and sketchy. No Brummetts appeared on the Owsley County tax lists, and the Jackson County deed indexes did not reveal any transfers related to this property to Benjamin H. Brummett.

According to the 1860 U.S. Census Benjamin Hawkins Brummett was a 53 year old native of South Carolina and was married to Elizabeth Rader, a 54 year old native of Virginia. They had seven children between the ages of 13 and 28. William Brummett, who was 24 years old, lived in a nearby household (Cunagin: 83, 88).

In 1863 Brummett owned 650 acres of land on Sturgeon Creek worth $1,000, and he owned 1 horse. He raised 50 bushels of corn. In 1866 he owned only 300 acres worth $600, and he owned 2 horses and 4 head of cattle. His farm produced a half ton of hay and 100 bushels of corn (Jackson County Tax Assessment Books). In 1870 Brummett owned 40 improved acres and 300 unimproved and $25 worth of farm implements. He owned $200 worth of livestock, including 2 dairy cows, 1 mule, 3 sheep, and 12 hogs. He raised 50 bushels of corn, 40 bushels of oats, 10 bushels of Irish potatoes, and 100 pounds of tobacco (U.S. Census of Agriculture: 1870).

Chapter 9. Assessment of Archaeological Potential

Andrew Bradbury

In addition to identifying archaeological remains within the two project areas, one of goals of the current survey was to assess the potential for historic properties to be located in each of the proposed reservoirs. To accomplish this goal, portions of the various landforms within each of the two project areas were sampled during the survey. This allows for some level of prediction of the types and numbers of sites within each project area and specific landforms. Each of the two areas is considered separately below followed by a summary of the findings of the survey.

War Fork/Steer Fork Project Area

The War Fork/Steer Fork project area consisted of 162 acres, of which 57 acres (35.2%) were surveyed during the current project. Shovel testing and pedestrian survey methods were used as site discovery techniques during the survey. The amount of acreage covered by each method is shown in Table 21.

Two basic topographic zones existed in this project area—valley bottoms and side slopes. The survey targeted a representative sample of both these zones. The valley bottoms were narrow, relatively flat areas situated adjacent to War Fork and Steer Fork creeks. Much of this area appeared to be active floodplain. Side slopes were situated adjacent to the valley bottoms and were steep. Numerous geological overhangs were observed on the side slopes; however, most exhibited extensive and intensive roof fall on the floor. Despite shovel testing efforts, no cultural material was recovered from these overhangs.

Only one non-site locality was identified in this project area; otherwise no other cultural material was located. The lack of sites may be a reflection of the topography of the project area. The floors of the overhangs situated in the project area were generally characterized by a heavy covering of roof fall and were relatively small. These characteristics would make such overhangs less attractive to people using the area. Given the active nature of the valley bottoms, it is likely that any site situated in such a zone would be severely disturbed if not completely destroyed.

Of the two project areas, the War Fork/Steer Fork has the lowest potential to contain historic properties. No archaeological prehistoric or historic sites were identified within the sample area surveyed for this project area. The landform most likely to contain archaeological sites in this study area is the side slope (i.e., the location of overhangs); however, as noted above, the overhangs sampled during this survey suggest that most shelters in the area are not conducive to habitation. Although none of these had associated cultural materials, there is a potential, although the probability is considered low, that overhangs situated in portions of the project area not sampled will contain archaeological sites.

Table 21. Acreage examined by method for each survey area.

Project Area	Pedestrian	STP	Surface	Total
Sturgeon Creek	30.388	60.208	31.177	121.773
War Fork/ Steer Fork	41.374	15.631	0	57.005

Sturgeon Creek Project Area

The Sturgeon Creek project area consisted of 523 acres, of which approximately 121 (23.3 %) acres were surveyed during the current project (Table 21). Field methods used to identify sites consisted of pedestrian survey, shovel testing and surface collection. Eight sites and six isolated finds were identified during the current survey. Two of the isolated finds were identified in areas that were thought to have a high potential for buried archaeological remains.

The Sturgeon Creek project area was confined to the valley floor and the lower portion of the flanking side slopes. Several landforms were present with the Sturgeon Creek project area—floodplain, low terrace, high terrace and side slopes. The relation of these landforms is depicted in Figure 33. Sturgeon Creek has cut a trench into the floor of the valley some 1.5 to 2 meters below the present day land surface. The floodplain was situated directly adjacent to the creek. The width of the floodplain varied throughout the project area. In some areas, a low terrace was situated directly behind the floodplain. This topographic feature was generally 2-3 meters higher in elevation than the floodplain. In other areas, Sturgeon Creek had cut into the bluff face leaving a high terrace some 6-8 meters above the present creek level. Side slopes were situated directly behind the terraces.

Based on diagnostic artifacts recovered from sites in the project area, both the low and high terraces likely represent Early Holocene or late Pleistocene landforms. Early Archaic (Bifurcate cluster) hafted bifaces were recovered from sites on these landforms. Given that Early Archaic materials were recovered from surface context at two of these sites and that subsoil and/or sandstone was observed at the surface, it is suggested that these sites are highly eroded. There is a low potential for intact deposits to be found on such landforms. Intact deposits are most likely to be represented by pit features occurring at the base of the plowzone.

Bucket augering and shovel testing on the floodplain indicated that recent alluvium, approximately 40-50 cm thick, likely has covered archaeological remains in this area.

Of the sites identified, seven were discovered by surface collection on terrace areas and one was identified on a hillside by surface collection (Table 22). While no sites were identified based on shovel testing, four of the six isolated finds were identified using this method. The seeming bias of the survey methods to "discover" sites is more a reflection of the conditions within the survey area than of the individual methods. Shovel testing was mostly conducted in the bottom land areas. As has been demonstrated elsewhere in this report (see *Chapter 7. Deep Testing*), the bottomland areas were covered with 40-50 cm of recent alluvial deposition. Surface collection in these areas also failed to identify sites. Surface collection was used to a much higher degree on cultivated terrace areas. It is highly likely that, had these terraces been situated in areas of low surface visibility, shovel testing would have identified the sites.

Table 22. Sites identified by topography and method, Sturgeon Creek project area.

Topography	Method	Sites	Isolated Finds
Terrace	Surface Collection	7	1
Terrace	Shovel Testing	0	2
Floodplain	Surface Collection	0	1
Floodplain	Shovel Testing	0	2
Hill slope	Surface Collection	1	0
Total		8	6

Roughly 122 acres were sampled during the survey, which suggests a site density of 0.07 sites/acre and an isolated find density of 0.05 isolated finds/acre. Working under the assumption that the survey was a representative sample of the total project universe, this would suggest that a total of 34 sites and 26 isolated finds exist within the whole project area. As eight sites and six isolated finds were identified, this leaves a total of 26 sites and 20 isolated finds yet to be discovered. In addition, the potential for buried

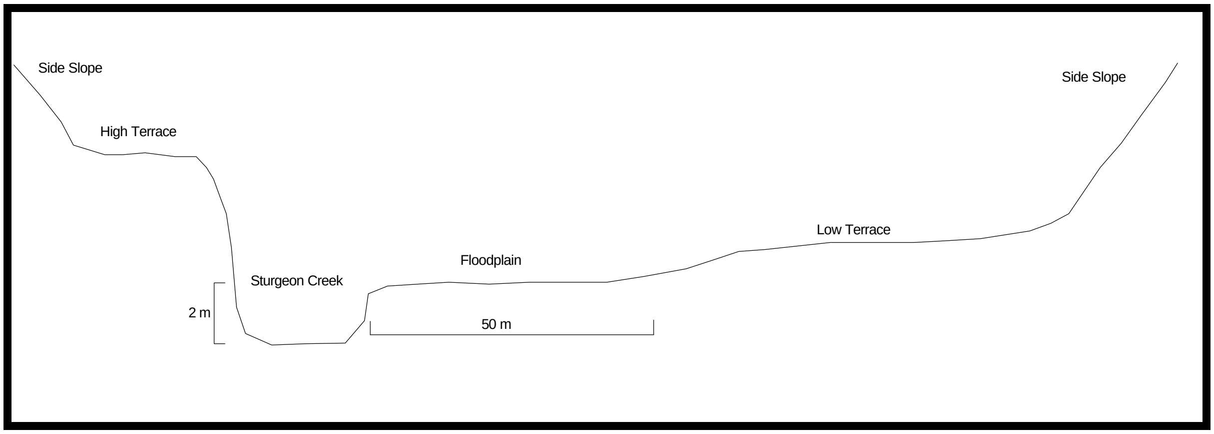


Figure 33. Generalized cross section of Sturgeon Creek valley showing location of topographic features.

archaeological remains to be located within floodplain deposits is high. A subsurface survey would be needed to accurately predict the numbers of these sites that have yet to be identified.

While the above figures are accurate, they may be biased to some degree by conditions in the survey area. This is most pronounced in the lack of sites identified on the floodplain of Sturgeon Creek. Such topographic features have long been recognized as prime locations for sites. Shovel testing and bucket augering conducted during the current survey suggested that the upper 40-50 cm of the floodplain deposits were the result of recent alluvium (e.g., historic period deposition). Recent materials, such as plastic and wire, recovered from the upper levels provided evidence of this. Recent alluvium has effectively covered Late Prehistoric and earlier, materials. It is very likely that prehistoric sites exist on the floodplain; however, they cannot be effectively identified using near surface survey techniques because they are too deeply buried.

An estimate of the floodplain and terrace areas was necessary to adequately address the question of the number of sites to be affected if the Sturgeon Creek project area was inundated. Unfortunately, the 20 foot contour interval of the quadrangle maps does not allow for detailed assessments of the various landforms, particularly separating terrace and floodplain areas. A reasonable estimate of these areas was, therefore, determined based on the quadrangle maps and field observations. Specifically, the boundary between the floodplain and terrace areas occurred between the 980 and 960 foot contour intervals. A new theme was created in the project GIS that represented the area estimated to be associated with the floodplain and terrace. The estimated total floodplain/terrace area was determined to be 224.119 acres, of which 73.499 acres (32.8%) were surveyed. Field estimates suggest that of the total floodplain/terrace area, 2/3 is floodplain while the remaining 1/3 is terrace area. Using these figures, it is estimated that 24.99 acres of terrace and 48.51 acres of floodplain were surveyed. It can also be estimated that 298.88 acres of the project area are situated on side slopes, of which 47.501 acres (15.9%) were surveyed.

These figures can be used to provide an estimate of the number of sites expected in the total project area on various landforms. Using the estimated figures, it can be predicted that within the Sturgeon Creek project area there are 24 additional sites located on terrace areas (0.403 sites/acre) and 6 additional sites on slopes (0.023 sites/acre). Additional sites are likely located on the floodplain and will have to be identified through subsurface techniques.

Determining estimates for the numbers of floodplain sites was not as straight forward. This was due to the fact that at least 40 cm of recent alluvium likely covers these sites. Bucket augers excavated in three such areas indicated a high potential for buried sites (charcoal flecking in buried contexts). Given the relatively narrow width of the floodplain, similar resources could have been exploited prehistorically from both the terrace and floodplain areas. Therefore, an estimate of the number of sites located on the floodplain can be made using the figures derived from the terrace estimates. Based on the estimate of 0.403 sites/acre for the terrace area and an estimated total floodplain acreage of 147 acres, it is estimated that 59 sites may be located on the floodplain in the Sturgeon Creek project area. This total, when combined with that of the terrace and side slope estimates, indicates the possibility of locating 89 additional sites within the 523 acre project area beyond those already identified.

The ratio of potentially significant to non-significant sites (based on the current survey data) was used to estimate the number of potential significant sites in the study area. Only one (14.3%) of the seven sites identified on the terrace was recommended for additional archaeological work (i.e., considered potentially significant). If these same percentages hold, then of the estimated 24 sites on terrace areas, 3.5, or roughly 4 sites, would be potentially significant. Only one site was identified on a slope. Given the low sample size, predictions for estimated number of potential sites are likely to be highly inaccurate. Given general archaeological knowledge, it is suggested that there is a low potential for significant historic properties to be located on the slopes. The only exception is rockshelters. No overhangs were observed within the project area; however, several local collectors noted that they had "excavated" in several rockshelters in the local area. It could not be determined where these rockshelters were located. However, an examination of the Sturgeon Creek quadrangle map shows more extensive slope areas to the north of the current project area.

Estimates of the numbers of sites situated in floodplain zones were made using estimates derived from the terrace area. The main difference between sites on the terrace and on the floodplain is that it is expected that floodplain sites will have a much higher potential to be significant. This is due to the fact that the alluvial deposits are fine grained in nature, which suggests a low energy depositional environment. Such depositional environments tend to preserve sites. It is expected that, unlike the terrace sites, floodplain sites should be intact and undisturbed. Therefore, we would suspect that the floodplain would exhibit a greater ratio of potentially significant cultural resources.

Summary

Based on the survey results of the two areas, it is suggested that the War Fork/Steer Fork project area would have the least potential to effect significant historic properties. In contrast, there is the potential for significant historic properties to be located in the Sturgeon Creek project area. Based on the survey results, in conjunction with estimates of terrace and floodplain areas, it is suggested that 24 additional sites may be located on terrace areas, 59 in floodplain areas and 6 on side slopes. In addition, it is suggested that four of the terrace sites would have the potential to be significant historic properties and that a higher percentage of those identified on the floodplain have the potential to be significant historic properties.

The current survey was somewhat biased because it targeted prehistoric sites to a greater extent than historic sites. This was due, in part, to the fact that people were currently living in the houses within the project area. Permission was not given to excavate in yard areas, therefore, assessing the effect of the project on historic sites was difficult. One non-site locality (#2) was examined in more detail in the Sturgeon Creek project area as it was thought (at the time) to be borderline in age between being considered a site and being too recent. The house at this location was abandoned and in ruins at the time of the survey. Artifacts recovered were not of sufficient age (50 years or greater) to list the site as a historic farmstead. There does remain a low probability that historic sites could be documented in the project areas.

Chapter 10. Conclusions and Recommendations

Andrew P. Bradbury

The cultural resource inventory of a portion of the Sturgeon Creek project area resulted in the discovery of eight previously unrecorded archaeological sites. The evaluation of each site with regard to the National Register of Historic Places as well as recommendations for future treatment was presented in *Chapter 6. Site Descriptions* section of this report. No archaeological sites were documented in the War Fork project area.

Only one site (15Ja473) was considered potentially eligible for the National Register of Historic Places. The remaining sites (15Ja474-480) were not considered significant because of their limited research potential. The lack of research potential is reflected by one or more of the following reasons: 1) the paucity and low diversity of artifacts; 2) the lack of features or midden deposits which would provide subsistence and radiometric data; and 3) the poor archaeological and geologic context of the sites. Most of these sites were situated on terrace areas where continued plowing, erosion and deflation of the soils has caused mixing of the various components represented. All cultural material is now restricted to plowzone context. Additional archaeological work would not produce significant information beyond that which has been collected. No further archaeological work is recommended for these seven sites.

The remaining site (15Ja473) was considered to be potentially significant. The site does have the potential to contain features, midden deposits and/or intact cultural bearing soils, which could provide important information concerning prehistoric lifeways in this region of Kentucky. The site can not be considered eligible for the National Register until the nature, extent and integrity of the cultural remains can be assessed. Phase II testing is, therefore, recommended for 15Ja473.

Bucket auger testing at Isolated Finds #6 and 7 on the floodplain of Sturgeon Creek indicated the possibility of buried archaeological deposits. Such deposits are likely to be located in other floodplain areas within the project area. Because of this potential, it is recommended that a sub-surface reconnaissance survey be conducted of such areas. This survey should be conducted as a two-stage process done in conjunction with a geomorphologist. The first step would be a geomorphological analysis of the various landforms to identify those areas that have the potential for buried archaeological remains. The second stage would be a buried site reconnaissance of such landforms. This could include limited backhoe trenching and/or additional bucket augering as warranted.

Based on the results of the survey and analysis of the recovered materials, it is suggested that if the proposed reservoir is constructed in the War Fork/Steer Fork project area there will be little to no effect on any historic properties.

The opposite is the case for the Sturgeon Creek project area. Based on the amount of area surveyed and the number of sites identified, it is estimated that approximately 89 sites, in addition to the 8 identified during the survey, will be located within the 523 acre project area. In addition, it is also suggested that there is the possibility for intact, buried historic properties to be located within this same area. The latter are likely to be found in alluvial deposits associated with the floodplain areas. While it is likely that sites identified on terrace areas will have a low potential to be eligible for inclusion on the National Register, the same can not be said of buried sites, if they exist. If buried sites are identified in this project area, it is likely that they will be eligible for inclusion on the National Register. This is due to the undisturbed nature of the deposits. Limited bucket augering demonstrated that much of the alluvial deposits on the floodplain were the result of low energy depositional environments. Archaeological materials contained within these deposits are likely to be intact and undisturbed.

While only one potential historic site was identified in the project area (through the archival search), there is the potential (although low) that additional historic sites will be located in the Sturgeon Creek project area. The archival search indicated that people first settled in this area around the time of the Civil War. It is possible that historic sites associated with these early setters could be present in the project area.

The current survey was designed to examine only a portion of each project area. Once a final project location is selected (War Fork/Steer Fork or Sturgeon Creek), the remaining areas will need to be surveyed. In our opinion, the level and intensity of survey coverage for the War Fork/Steer Fork reservoir alternate will be far more superficial than that required for the Sturgeon Creek alternate. Under the new regulations of the Advisory Council on Historic Preservation (36CFR Part 800) it might even be possible to argue that no further identification efforts are required if the War Fork/Steer Fork alternate is selected. Such a decision would need to be negotiated between the consultation parties, particularly the USDA Forest Service and the Kentucky SHPO.

In contrast, selection of the Sturgeon Creek alternate will involve a substantial commitment of time and money to complete historic property identification efforts if this alternate is selected. Moreover, it seems likely that an unknown number of sites located within this study area will require additional work to evaluate the significance of each, and some of these may require some level of data recovery to mitigate adverse effects.

Appendix A. Lithic Analysis Coding Formats

Flake Debris Analysis Codes

1) Size Grade:
   - 1: 1/8 inch
   - 2: ¼ inch
   - 3: ½ inch
   - 4: ¾ inch
   - 5: 1 inch

2) Count

3) Weight (to nearest 0.1 gram)

4) Portion
   - 1: Complete
   - 2: Platform Remnant Bearing Flake
   - 3: Fragment
   - 4: Blocky
   - 5: Thermal Shatter

5) Platform
   - 0: not present
   - 1: lipped
   - 2: cortical
   - 3: non lipped, non cortical
   - 4: broken

6) Stage
   - 0: NA (blocky)
   - 1: Early
   - 2: Middle
   - 3: Late
   - 4: Biface thinning

7) Cortex
   - 0: none
   - 1: dorsal only
   - 2: platform only
   - 3: dorsal and platform

8) Raw Material:
   - 000: < 1/4 inch
   - 015: Fort Payne
   - 022: Tyrone
   - 026: St Louis
   - 028: Ste Genevieve
   - 029: Indeterminate Local
   - 046: Newman
   - 040: Chalcedony
   - 055: Boyle
   - 056: Breathitt
   - 090: Burned
   - 095: Sandstone

Morphological and Technological Attributes (Modified Implements and Cores)

Dimension 1: (Material Class)

1: Unmodified lithic
2: Modified lithic

Dimension 2: (Lithic Class)

01: debitage	05: cobble tool
02: fire cracked rock	06: cores
03: ground and pecked stone	07: micro-tool
04: biface	08: uniface

Dimension 3: (Technological/Morphological Class)

Classes 201, 207, 208	Class 204		Class 106, 205 and 206	
0: no retouch	1: hard hammer	.1: biface	1: indeterminate	.1: Tested Cobble
1: unifacial only	2: hard/soft hammer	.2: PPk	2: unidirectional	.2: Core Fragment
2: some bifacial	3: soft hammer	.3: drill	3: bifacial	.3: Core
3: bifacial	4: soft hammer/retouch	.4: drill/PPk	4: bipolar	
4: alternate unifacial	5: retouch	.5: scraper/PPk	5: unidirectional subconical	
	6: indeterminate	.6: boring/PPK	6: multidirectional	
			7: bidirectional	

Dimension 4: (Raw Material)

Same codes as Flake Debris

Dimension 5: (Thermal Alteration)

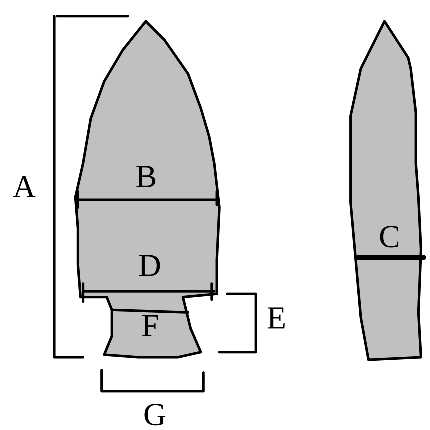
01: no evidence
02: dull both faces
03: partial dull, partial gloss
04: gloss both faces
05: possible alteration
06: Incipient pot lids
07: pot lids
08: crenulations, crazing
09: partial alteration

Dimension 6: (Cortex Type)

0: none present
1: matrix/residual
2: waterworn cobble
3: patination

Measurements: (Use Length, blade width and thickness for all classes, rest for class 204-4.2, 204-3.2 only)

A: Maximum length
B: Maximum blade width
C: Maximum blade thickness
D: Maximum shoulder width
E: Maximum stem length
F: Maximum neck width
G: Maximum basal width



Groundstone Implements and Cobble Tools

Dimension 1: (Material Class)

1: Unmodified lithic
2: Modified lithic

Dimension 2: (Lithic Class)

01: debitage
02: fire cracked rock
03: ground and pecked stone
04: biface
05: cobble tool
06: cores
07: microtool
08: uniface

Dimension 3: (Modification)

0: Unmodified
1: Pitted, V-Shaped
2: Pitted, U-Shaped
3: Battered
4: Ground
5: Notched

Dimension 4: (Raw Material)

070: Quartz
071: Quartzite
080: Hematite
095: Sandstone

Dimension 5: (Location of Modification)

0: no modification
1: 1 face
2: both faces
3: 1 end
4: both ends
5: 1 edge
6: more than one edge

Dimension 6: (Number of Pits or Notches, classes 203-1, 203-2, 203-5)

Dimension 7: (Burning)

0: not burned
1: Burned

Appendix B. Lithic Database

Flake Debris

Site	Map Unit	Shovel Test	Depth cmbs	Size	Count	Weight	Portion	Platform	Stage	Cortex	Raw Material	Comments
15Ja473	5			2	1	0.2	1	2	1	3	046	
15Ja473	5			2	1	0.2	4	0	0	1	055	
15Ja473	5			2	1	0.5	1	3	3	0	028	
15Ja473	6			2	1	0.4	5	0	0	1	090	
15Ja473	6			3	1	1.4	1	3	2	0	055	
15Ja473	7			2	1	0.2	1	3	1	0	026	
15Ja473	7			2	1	0.6	3	0	3	0	026	
15Ja473	8			1	1	0.1	0	0	0	0	000	
15Ja473	8			2	1	0.4	3	0	3	0	046	
15Ja473	8			3	1	3.1	4	0	0	0	026	
15Ja473	8			3	1	5.5	4	0	0	1	046	
15Ja473	9			2	1	0.9	3	0	1	0	026	WR
15Ja473	10			2	1	0.4	2	3	3	1	055	
15Ja473	10			3	1	3.9	1	3	0	0	026	bipolar flake
15Ja473	11			2	1	0.3	3	0	1	0	046	
15Ja473	11			2	1	0.8	3	0	3	0	029	
15Ja473	11			2	1	1.7	2	3	3	0	028	
15Ja473	11			3	1	3.4	2	3	3	0	027	
15Ja473	11			3	1	5.3	2	3	1	0	015	
15Ja473	11			3	1	5.9	1	3	1	1	029	
15Ja473		1	0-10	3	1	1	3	0	1	1	015	
15Ja473	1			3	1	0.6	3	0	3	0	026	
15Ja473	2			1	1	0.1	0	0	0	0	000	
15Ja473	2			2	1	0.5	2	3	3	0	046	
15Ja473	2			3	1	1.2	5	0	0	0	090	
15Ja473	3			2	1	0.8	2	2	1	3	046	
15Ja474			GSC	2	1	0.1	3	0	2	0	046	
15Ja474			GSC	2	1	0.2	3	4	2	0	046	
15Ja474			GSC	2	1	0.2	4	0	0	0	026	
15Ja474			GSC	2	1	0.4	3	0	3	0	028	
15Ja474			GSC	3	1	0.8	1	3	1	0	046	
15Ja474			GSC	3	1	2.7	3	0	1	0	026	
15Ja474			GSC	3	1	2.8	2	3	3	0	026	
15Ja474			GSC	3	1	2.8	3	0	2	0	029	
15Ja475			GSC	1	7	0.5	0	0	0	0	000	
15Ja475			GSC	2	1	0.2	1	3	2	0	026	
15Ja475			GSC	2	1	0.2	2	3	1	0	046	
15Ja475			GSC	2	1	0.2	3	0	1	0	029	
15Ja475			GSC	2	1	0.3	1	2	1	2	029	
15Ja475			GSC	2	1	0.3	2	3	1	0	026	
15Ja475			GSC	2	1	0.3	3	0	3	0	026	
15Ja475			GSC	2	1	0.4	3	0	1	0	029	
15Ja475			GSC	2	1	0.4	3	0	3	0	055	

Site	Map Unit	Shovel Test	Depth cmbs	Size	Count	Weight	Portion	Platform	Stage	Cortex	Raw Material	Comments
15Ja475			GSC	2	1	0.4	4	0	0	0	046	
15Ja475			GSC	2	1	0.5	1	1	4	0	046	
15Ja475			GSC	2	1	0.5	1	3	3	0	026	
15Ja475			GSC	2	1	0.5	2	2	1	3	046	
15Ja475			GSC	2	1	0.5	3	0	3	0	028	
15Ja475			GSC	2	1	0.8	3	0	3	0	055	
15Ja475			GSC	2	1	0.9	2	3	1	0	046	
15Ja475			GSC	2	1	1	1	3	1	0	026	
15Ja475			GSC	2	1	1.4	2	3	1	0	055	
15Ja475			GSC	2	1	1.4	2	4	1	0	046	
15Ja475			GSC	2	1	2.2	2	3	1	0	029	
15Ja475			GSC	3	1	1.2	1	3	3	0	046	
15Ja475			GSC	3	1	3.3	2	3	1	0	026	
15Ja475			GSC	3	1	4.8	3	0	3	0	026	
15Ja476				4	1	4.6	3	0	2	1	046	
15Ja476				2	1	0.2	1	2	1	2	046	
15Ja477			GSC	2	1	0.3	1	3	2	0	046	
15Ja477			GSC	2	1	1.3	1	2	1	2	027	
15Ja477			GSC	3	1	1.5	2	1	4	0	046	
15Ja477			GSC	3	1	3.8	1	3	3	0	028	
15Ja477			GSC	3	1	7.3	4	0	0	1	026	
15Ja478			GSC	1	64	6.7	0	0	0	0	000	
15Ja478			GSC	2	1	0.1	1	1	4	0	046	
15Ja478			GSC	2	1	0.1	1	3	1	0	026	
15Ja478			GSC	2	1	0.1	1	3	2	0	046	
15Ja478			GSC	2	1	0.1	1	3	3	0	026	
15Ja478			GSC	2	1	0.1	2	1	4	0	022	
15Ja478			GSC	2	1	0.1	2	3	1	0	046	
15Ja478			GSC	2	1	0.1	2	3	3	0	015	
15Ja478			GSC	2	1	0.1	2	3	3	0	028	
15Ja478			GSC	2	1	0.1	2	3	3	0	046	
15Ja478			GSC	2	1	0.1	2	3	3	0	046	
15Ja478			GSC	2	1	0.1	3	0	1	0	029	
15Ja478			GSC	2	1	0.1	3	0	1	0	046	
15Ja478			GSC	2	1	0.1	3	0	1	0	046	
15Ja478			GSC	2	1	0.1	3	0	2	0	026	
15Ja478			GSC	2	1	0.1	3	0	2	0	029	
15Ja478			GSC	2	1	0.1	3	0	2	0	046	
15Ja478			GSC	2	1	0.1	3	0	3	0	026	
15Ja478			GSC	2	1	0.1	3	0	3	0	029	
15Ja478			GSC	2	1	0.1	3	0	3	0	046	
15Ja478			GSC	2	1	0.1	3	0	3	0	046	
15Ja478			GSC	2	1	0.1	3	0	3	0	055	
15Ja478			GSC	2	1	0.2	1	1	1	0	046	
15Ja478			GSC	2	1	0.2	1	2	1	2	046	
15Ja478			GSC	2	1	0.2	1	3	1	0	026	
15Ja478			GSC	2	1	0.2	1	3	1	0	029	
15Ja478			GSC	2	1	0.2	1	3	1	0	046	
15Ja478			GSC	2	1	0.2	1	3	3	0	055	
15Ja478			GSC	2	1	0.2	2	0	1	0	046	
15Ja478			GSC	2	1	0.2	2	1	1	0	055	

Site	Map Unit	Shovel Test	Depth cmbs	Size	Count	Weight	Portion	Platform	Stage	Cortex	Raw Material	Comments
15Ja478			GSC	2	1	0.2	2	2	1	2	046	
15Ja478			GSC	2	1	0.2	2	3	1	0	011	
15Ja478			GSC	2	1	0.2	2	3	1	0	026	
15Ja478			GSC	2	1	0.2	2	3	1	0	026	
15Ja478			GSC	2	1	0.2	2	3	1	0	029	
15Ja478			GSC	2	1	0.2	2	3	1	0	046	
15Ja478			GSC	2	1	0.2	2	3	2	0	026	
15Ja478			GSC	2	1	0.2	2	3	2	0	029	
15Ja478			GSC	2	1	0.2	2	3	3	0	015	
15Ja478			GSC	2	1	0.2	2	3	3	0	015	
15Ja478			GSC	2	1	0.2	3	0	1	0	028	
15Ja478			GSC	2	1	0.2	3	0	1	0	046	
15Ja478			GSC	2	1	0.2	3	0	2	0	029	
15Ja478			GSC	2	1	0.2	3	0	2	0	046	
15Ja478			GSC	2	1	0.2	3	0	2	0	055	
15Ja478			GSC	2	1	0.2	3	0	3	0	015	
15Ja478			GSC	2	1	0.2	3	0	3	0	015	
15Ja478			GSC	2	1	0.2	3	0	3	0	026	
15Ja478			GSC	2	1	0.2	3	0	3	0	027	
15Ja478			GSC	2	1	0.2	3	0	3	0	029	
15Ja478			GSC	2	1	0.2	3	0	3	0	046	
15Ja478			GSC	2	1	0.2	4	0	0	0	029	
15Ja478			GSC	2	1	0.3	1	3	1	0	046	
15Ja478			GSC	2	1	0.3	1	3	1	0	055	
15Ja478			GSC	2	1	0.3	1	3	3	0	055	
15Ja478			GSC	2	1	0.3	1	3	3	0	055	
15Ja478			GSC	2	1	0.3	2	1	4	0	046	
15Ja478			GSC	2	1	0.3	2	2	1	3	046	
15Ja478			GSC	2	1	0.3	2	3	2	0	029	
15Ja478			GSC	2	1	0.3	2	3	2	0	046	
15Ja478			GSC	2	1	0.3	2	3	3	0	026	
15Ja478			GSC	2	1	0.3	2	3	3	0	046	
15Ja478			GSC	2	1	0.3	3	0	2	0	026	
15Ja478			GSC	2	1	0.3	3	0	2	0	026	
15Ja478			GSC	2	1	0.3	3	0	2	0	029	
15Ja478			GSC	2	1	0.3	3	0	2	1	046	
15Ja478			GSC	2	1	0.3	3	0	3	0	015	
15Ja478			GSC	2	1	0.3	3	0	3	0	026	
15Ja478			GSC	2	1	0.3	3	0	3	0	028	
15Ja478			GSC	2	1	0.3	4	0	0	0	029	
15Ja478			GSC	2	1	0.3	4	0	0	0	029	
15Ja478			GSC	2	1	0.3	4	0	0	0	046	
15Ja478			GSC	2	1	0.3	4	0	0	0	055	
15Ja478			GSC	2	1	0.3	5	0	0	0	090	
15Ja478			GSC	2	1	0.4	1	3	1	0	015	
15Ja478			GSC	2	1	0.4	1	3	1	0	028	
15Ja478			GSC	2	1	0.4	1	3	1	0	046	
15Ja478			GSC	2	1	0.4	2	3	3	0	028	
15Ja478			GSC	2	1	0.4	5	0	0	0	090	
15Ja478			GSC	2	1	0.5	1	3	3	1	026	
15Ja478			GSC	2	1	0.5	2	3	1	0	028	

Site	Map Unit	Shovel Test	Depth cmbs	Size	Count	Weight	Portion	Platform	Stage	Cortex	Raw Material	Comments
15Ja478			GSC	2	1	0.5	2	3	1	0	055	
15Ja478			GSC	2	1	0.5	2	3	3	0	046	
15Ja478			GSC	2	1	0.5	3	0	1	0	026	
15Ja478			GSC	2	1	0.5	3	0	3	0	046	
15Ja478			GSC	2	1	0.5	3	4	3	0	026	
15Ja478			GSC	2	1	0.6	1	1	4	0	046	
15Ja478			GSC	2	1	0.6	3	0	1	0	046	
15Ja478			GSC	2	1	0.6	3	0	3	0	046	
15Ja478			GSC	2	1	0.6	4	0	0	0	028	
15Ja478			GSC	2	1	0.7	1	1	4	0	046	
15Ja478			GSC	2	1	0.7	1	3	1	1	090	
15Ja478			GSC	2	1	0.7	3	0	3	0	026	
15Ja478			GSC	2	1	0.8	1	3	3	0	046	
15Ja478			GSC	2	1	0.8	2	4	1	1	027	
15Ja478			GSC	2	1	0.8	3	0	2	0	015	
15Ja478			GSC	2	1	0.8	3	0	3	0	046	
15Ja478			GSC	2	1	0.8	3	4	3	0	046	
15Ja478			GSC	2	1	0.8	4	0	0	1	046	
15Ja478			GSC	2	1	0.9	1	3	1	0	046	
15Ja478			GSC	2	1	0.9	2	3	1	0	026	
15Ja478			GSC	2	1	0.9	3	0	3	0	028	
15Ja478			GSC	2	1	1	1	3	1	0	015	
15Ja478			GSC	2	1	1	3	0	2	0	055	
15Ja478			GSC	2	1	1.1	2	3	1	0	046	
15Ja478			GSC	2	1	1.1	3	0	2	0	028	
15Ja478			GSC	2	1	1.4	4	0	0	0	028	
15Ja478			GSC	2	1	1.4	5	0	0	0	090	
15Ja478			GSC	2	1	1.5	1	3	1	0	046	
15Ja478			GSC	2	1	1.6	1	3	2	0	055	
15Ja478			GSC	2	1	1.7	1	3	1	0	026	
15Ja478			GSC	2	1	1.8	1	3	1	0	015	
15Ja478			GSC	2	1	1.9	4	0	0	0	029	
15Ja478			GSC	3	1	0.8	5	0	0	0	090	
15Ja478			GSC	3	1	1.1	2	3	1	0	046	
15Ja478			GSC	3	1	1.3	1	2	1	2	028	
15Ja478			GSC	3	1	1.3	3	0	3	0	029	
15Ja478			GSC	3	1	1.4	1	3	1	0	029	
15Ja478			GSC	3	1	1.4	2	3	1	0	046	
15Ja478			GSC	3	1	1.7	3	0	1	0	026	
15Ja478			GSC	3	1	2.2	3	0	2	0	046	
15Ja478			GSC	3	1	2.6	4	0	0	1	029	
15Ja478			GSC	3	1	2.9	4	0	0	1	029	
15Ja478			GSC	3	1	3.1	4	0	0	0	026	
15Ja478			GSC	3	1	6	4	0	0	1	046	
15Ja478			GSC	2	1	0.2	2	3	1	0	029	notching flake
15Ja479			GSC	1	1	0.1	0	0	0	0	000	
15Ja479			GSC	2	1	0.1	2	3	1	0	046	
15Ja479			GSC	2	1	0.1	3	0	1	0	046	
15Ja479			GSC	2	1	0.1	3	0	2	0	026	
15Ja479			GSC	2	1	0.1	3	0	2	0	026	
15Ja479			GSC	2	1	0.2	3	0	1	0	029	

Site	Map Unit	Shovel Test	Depth cmbs	Size	Count	Weight	Portion	Platform	Stage	Cortex	Raw Material	Comments
15Ja479			GSC	2	1	0.2	4	0	0	1	029	
15Ja479			GSC	2	1	1	3	0	2	0	046	
15Ja479			GSC	3	1	1.9	2	1	3	0	026	
15Ja479			GSC	3	1	2	5	0	0	0	090	
15Ja480			GSC	1	68	6.7	0	0	0	0	000	
15Ja480			GSC	2	1	0.1	1	1	4	0	055	
15Ja480			GSC	2	1	0.1	2	1	4	0	046	
15Ja480			GSC	2	1	0.1	2	2	1	2	046	
15Ja480			GSC	2	1	0.1	2	3	1	0	055	
15Ja480			GSC	2	1	0.1	2	3	3	0	055	
15Ja480			GSC	2	1	0.1	3	0	3	0	026	
15Ja480			GSC	2	1	0.1	4	0	0	0	046	
15Ja480			GSC	2	1	0.1	4	0	0	0	046	
15Ja480			GSC	2	1	0.2	1	1	2	0	026	
15Ja480			GSC	2	1	0.2	1	1	4	0	026	
15Ja480			GSC	2	1	0.2	1	3	3	0	026	
15Ja480			GSC	2	1	0.2	1	3	3	0	026	
15Ja480			GSC	2	1	0.2	1	3	3	0	046	
15Ja480			GSC	2	1	0.2	2	1	1	1	028	
15Ja480			GSC	2	1	0.2	2	1	4	0	046	
15Ja480			GSC	2	1	0.2	2	1	4	0	046	
15Ja480			GSC	2	1	0.2	2	2	1	3	026	
15Ja480			GSC	2	1	0.2	2	3	2	0	029	
15Ja480			GSC	2	1	0.2	2	3	2	0	046	
15Ja480			GSC	2	1	0.2	2	3	3	0	046	
15Ja480			GSC	2	1	0.2	2	3	3	0	055	
15Ja480			GSC	2	1	0.2	3	0	1	0	046	
15Ja480			GSC	2	1	0.2	3	0	1	0	046	
15Ja480			GSC	2	1	0.2	3	0	1	1	046	
15Ja480			GSC	2	1	0.2	3	0	2	0	026	
15Ja480			GSC	2	1	0.2	3	0	2	0	029	
15Ja480			GSC	2	1	0.2	3	0	2	0	046	
15Ja480			GSC	2	1	0.2	3	0	3	0	026	
15Ja480			GSC	2	1	0.2	3	0	3	0	046	
15Ja480			GSC	2	1	0.2	3	0	3	0	046	
15Ja480			GSC	2	1	0.2	3	0	3	0	046	
15Ja480			GSC	2	1	0.2	3	0	3	0	046	
15Ja480			GSC	2	1	0.2	3	0	3	0	046	
15Ja480			GSC	2	1	0.2	3	0	3	0	055	
15Ja480			GSC	2	1	0.2	4	0	0	0	055	
15Ja480			GSC	2	1	0.2	5	0	0	0	090	
15Ja480			GSC	2	1	0.3	1	2	1	2	029	
15Ja480			GSC	2	1	0.3	1	3	1	0	026	
15Ja480			GSC	2	1	0.3	1	3	1	0	046	
15Ja480			GSC	2	1	0.3	1	3	3	0	046	
15Ja480			GSC	2	1	0.3	1	3	3	0	046	
15Ja480			GSC	2	1	0.3	2	1	1	3	026	
15Ja480			GSC	2	1	0.3	2	3	1	0	046	
15Ja480			GSC	2	1	0.3	2	3	2	0	026	
15Ja480			GSC	2	1	0.3	2	3	2	0	055	
15Ja480			GSC	2	1	0.3	2	3	3	0	055	

Site	Map Unit	Shovel Test	Depth cmbs	Size	Count	Weight	Portion	Platform	Stage	Cortex	Raw Material	Comments
15Ja480			GSC	2	1	0.3	3	0	1	0	046	
15Ja480			GSC	2	1	0.3	3	0	1	0	046	
15Ja480			GSC	2	1	0.3	3	0	1	0	046	
15Ja480			GSC	2	1	0.3	3	0	2	0	040	
15Ja480			GSC	2	1	0.3	3	0	2	0	046	
15Ja480			GSC	2	1	0.3	3	0	2	0	046	
15Ja480			GSC	2	1	0.3	3	0	2	0	046	
15Ja480			GSC	2	1	0.3	3	0	3	0	029	
15Ja480			GSC	2	1	0.3	3	0	3	0	046	
15Ja480			GSC	2	1	0.3	3	0	3	0	055	
15Ja480			GSC	2	1	0.3	5	0	0	0	090	
15Ja480			GSC	2	1	0.4	1	1	4	0	046	
15Ja480			GSC	2	1	0.4	1	3	3	0	040	
15Ja480			GSC	2	1	0.4	2	3	1	0	022	
15Ja480			GSC	2	1	0.4	2	3	3	0	046	
15Ja480			GSC	2	1	0.4	2	3	3	0	055	
15Ja480			GSC	2	1	0.4	3	0	1	0	029	
15Ja480			GSC	2	1	0.4	3	0	2	0	046	
15Ja480			GSC	2	1	0.4	3	0	2	0	055	
15Ja480			GSC	2	1	0.4	3	0	3	0	046	
15Ja480			GSC	2	1	0.4	4	0	0	0	046	
15Ja480			GSC	2	1	0.4	5	0	0	0	090	
15Ja480			GSC	2	1	0.5	1	1	4	0	046	
15Ja480			GSC	2	1	0.5	1	3	1	0	046	
15Ja480			GSC	2	1	0.5	1	3	3	0	046	
15Ja480			GSC	2	1	0.5	1	3	3	0	055	
15Ja480			GSC	2	1	0.5	2	3	1	0	046	
15Ja480			GSC	2	1	0.5	2	3	2	0	046	
15Ja480			GSC	2	1	0.5	2	3	3	0	055	
15Ja480			GSC	2	1	0.5	3	0	2	0	026	
15Ja480			GSC	2	1	0.5	3	0	2	0	046	
15Ja480			GSC	2	1	0.6	1	3	1	0	046	
15Ja480			GSC	2	1	0.6	1	3	2	0	046	
15Ja480			GSC	2	1	0.6	1	3	3	0	055	
15Ja480			GSC	2	1	0.6	3	0	1	0	046	
15Ja480			GSC	2	1	0.6	3	0	1	1	046	
15Ja480			GSC	2	1	0.6	3	0	3	0	026	
15Ja480			GSC	2	1	0.6	3	0	3	0	046	
15Ja480			GSC	2	1	0.6	3	0	3	0	046	
15Ja480			GSC	2	1	0.6	4	0	0	0	029	
15Ja480			GSC	2	1	0.6	4	0	0	0	046	
15Ja480			GSC	2	1	0.7	1	3	1	0	026	
15Ja480			GSC	2	1	0.7	2	2	1	1	028	
15Ja480			GSC	2	1	0.7	2	3	3	0	028	
15Ja480			GSC	2	1	0.8	1	4	2	0	026	
15Ja480			GSC	2	1	0.8	2	3	1	0	028	
15Ja480			GSC	2	1	0.8	2	3	1	0	046	
15Ja480			GSC	2	1	0.8	3	0	2	0	046	
15Ja480			GSC	2	1	0.8	3	0	3	0	029	
15Ja480			GSC	2	1	0.8	5	0	0	0	090	
15Ja480			GSC	2	1	0.9	1	3	1	0	015	

Site	Map Unit	Shovel Test	Depth cmbs	Size	Count	Weight	Portion	Platform	Stage	Cortex	Raw Material	Comments
15Ja480			GSC	2	1	0.9	3	0	3	0	028	
15Ja480			GSC	2	1	0.9	3	0	3	0	046	
15Ja480			GSC	2	1	0.9	4	0	0	0	029	
15Ja480			GSC	2	1	1	3	0	1	1	046	
15Ja480			GSC	2	1	1	3	0	2	0	046	
15Ja480			GSC	2	1	1	3	0	3	0	026	
15Ja480			GSC	2	1	1.1	1	3	1	1	026	
15Ja480			GSC	2	1	1.1	1	3	3	0	046	
15Ja480			GSC	2	1	1.1	5	0	0	0	090	
15Ja480			GSC	2	1	1.2	3	0	1	0	046	
15Ja480			GSC	2	1	1.3	3	0	3	0	015	
15Ja480			GSC	2	1	1.5	1	3	3	1	046	
15Ja480			GSC	2	1	2	3	0	3	0	029	
15Ja480			GSC	2	1	2	4	0	0	1	046	
15Ja480			GSC	2	1	3	1	3	1	1	046	
15Ja480			GSC	3	1	0.7	1	3	1	0	026	
15Ja480			GSC	3	1	0.8	3	0	3	0	046	
15Ja480			GSC	3	1	0.9	3	0	1	0	046	
15Ja480			GSC	3	1	0.9	3	0	3	0	015	
15Ja480			GSC	3	1	1	3	0	3	0	046	
15Ja480			GSC	3	1	1.4	2	3	1	0	046	
15Ja480			GSC	3	1	1.5	1	3	3	0	046	
15Ja480			GSC	3	1	1.5	3	0	3	0	046	
15Ja480			GSC	3	1	1.6	1	1	3	0	046	
15Ja480			GSC	3	1	1.7	5	0	0	0	090	
15Ja480			GSC	3	1	1.9	2	3	1	0	046	
15Ja480			GSC	3	1	1.9	4	0	0	0	029	
15Ja480			GSC	3	1	2	1	3	1	0	026	
15Ja480			GSC	3	1	2.1	2	3	1	0	046	
15Ja480			GSC	3	1	2.3	4	0	0	0	029	
15Ja480			GSC	3	1	2.4	1	3	2	1	046	
15Ja480			GSC	3	1	2.4	2	1	1	0	026	
15Ja480			GSC	3	1	2.7	3	0	2	0	055	
15Ja480			GSC	3	1	2.9	2	3	1	0	026	
15Ja480			GSC	3	1	3	1	3	1	0	046	
15Ja480			GSC	3	1	3.2	4	0	0	0	026	
15Ja480			GSC	3	1	3.7	2	2	2	2	046	
15Ja480			GSC	3	1	5.1	1	3	1	1	026	
15Ja480			GSC	3	1	5.3	1	3	3	0	046	
15Ja480			GSC	3	1	6.1	4	0	0	1	055	
15Ja480			GSC	3	1	6.4	1	2	1	3	046	
15Ja480			GSC	4	1	15.6	4	0	0	1	046	
15Ja480			GSC	2	1	0.2	1	3	1	0	055	notching flake
IF 4		1	0-25	2	1	0.7	2	3	2	0	015	
IF 4		2	0-10	2	1	0.4	4	0	0	0	029	WR
IF 5		1		2	1	0.5	3	0	1	0	046	
IF 6		1	10-40	3	1	2.2	1	3	1	1	026	
IF 7		1	25-30	2	1	0.6	3	0	3	0	026	

Modified Implements

Artifact #	Site	Map Unit	Field Artifact #	Depth	N	Weight	Dim1	Dim2	Dim3	Dim4	Dim5	Dim6	Comments
JC001	15Ja473	1			2	83.5	2	02					
JC002	15Ja473	2			1	15.7	2	02					
JC003	15Ja473	3			2	101.3	2	02					
JC004	15Ja473	4			2	123.3	2	02					
JC005	15Ja473	5			1	483.6	2	02					
JC006	15Ja473	6			1	25.4	2	02					
JC007	15Ja473	8			1	95.6	2	02					
JC008	15Ja473	7			1	37.5	2	02					
JC013	15Ja473	8			1	1	2	04	4.2	029	01	0	Resharpened
JC014	15Ja476		1	GSC	1	18.6	2	04	3.2	015	01	0	Incipient Fracture
JC015	15Ja474			GSC	1	6.2	2	04	4.1	015	01	0	
JC016	15Ja474			GSC	1	4.4	2	04	3.1	055	01	0	
JC017	IF3			GSC	1	1.3	2	04	4.1	015	01	0	Too Frag To Measure
JC018	IF1			GSC	1	2.4	2	04	4.2	026	01	0	
JC020	15Ja475			GSC	1	1.2	2	04	3.1	026	06	0	
JC021	15Ja475			GSC	1	3.6	2	04	3.1	026	01	0	Too Frag To Measure
JC022	15Ja475			GSC	1	3.2	2	04	2.1	046	01	0	
JC023	15Ja479			GSC	1	1.5	2	04	4.1	055	01	0	Too Frag To Measure
JC024	15Ja479			GSC	1	3	2	04	4.1	046	01	0	Too Frag To Measure
JC025	15Ja478			GSC	1	4.1	2	04	3.1	090	08	0	
JC026	15Ja478			GSC	1	6.7	2	04	4.5	026	01	0	
JC027	15Ja478			GSC	1	1.5	2	04	4.1	029	01	0	Too Frag To Measure
JC028	15Ja478			GSC	1	0.2	2	04	5.1	029	01	0	
JC029	15Ja478			GSC	1	6.6	2	04	2.1	029	01	1	
JC030	15Ja478			GSC	1	1.2	2	04	3.1	029	01	0	Too Frag To Measure
JC031	15Ja478			GSC	1	0.6	2	04	6.1	026	08	0	Too Frag To Measure
JC032	15Ja478			GSC	1	1.5	2	04	4.2	029	01	0	Too Frag To Measure
JC033	15Ja478			GSC	1	0.3	2	04	4.1	046	01	0	Too Frag To Measure
JC034	15Ja478			GSC	1	2.3	2	04	4.2	026	01	1	Too Frag To Measure
JC035	15Ja476		4	GSC	1	8.4	2	04	4.2	055	01	0	Haft Snap
JC036	15Ja480			GSC	1	5.4	2	04	3.1	028	01	0	
JC037	15Ja480			GSC	1	1.2	2	04	4.1	055	01	0	Too Frag To Measure
JC038	15Ja480			GSC	1	8.8	2	04	6.1	090	08	0	Too Frag To Measure
JC039	15Ja480			GSC	1	7.1	2	04	3.1	046	01	1	
JC040	15Ja480			GSC	1	3.3	2	04	4.5	015	01	0	
JC041	15Ja480			GSC	1	1.2	2	04	4.2	046	01	0	Too Frag To Measure
JC042	15Ja480			GSC	1	14.8	2	04	3.1	046	06	0	
JC043	15Ja480			GSC	1	2.4	2	01	1.0	015	01	0	
JC044	15Ja480			GSC	1	8.3	2	04	3.1	046	01	0	
JC045	15Ja480			GSC	1	3.3	2	04	3.1	026	01	0	Too Frag To Measure
JC045	15Ja480			GSC	1	5.3	2	04	3.1	055	01	0	
JC046	15Ja480			GSC	1	2	2	04	3.1	026	01	0	Too Frag To Measure
JC047	15Ja480			GSC	1	2	2	04	3.1	028	01	0	Too Frag To Measure
JC048	15Ja480			GSC	1	7.7	2	04	3.1	046	01	0	Too Frag To Measure
JC049	15Ja480			GSC	1	1	2	04	6.1	055	01	0	Too Frag To Measure
JC050	15Ja480			GSC	1	3	2	04	6.1	046	01	0	Too Frag To Measure
JC051	15Ja480			GSC	1	0.4	2	04	4.1	028	01	0	Too Frag To Measure
JC052	15Ja473	12			1	1007.8	2	05	2.0	095	6	2	Pitted Cobble

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Figure 3A. War Fork/Steer Fork Project Area.

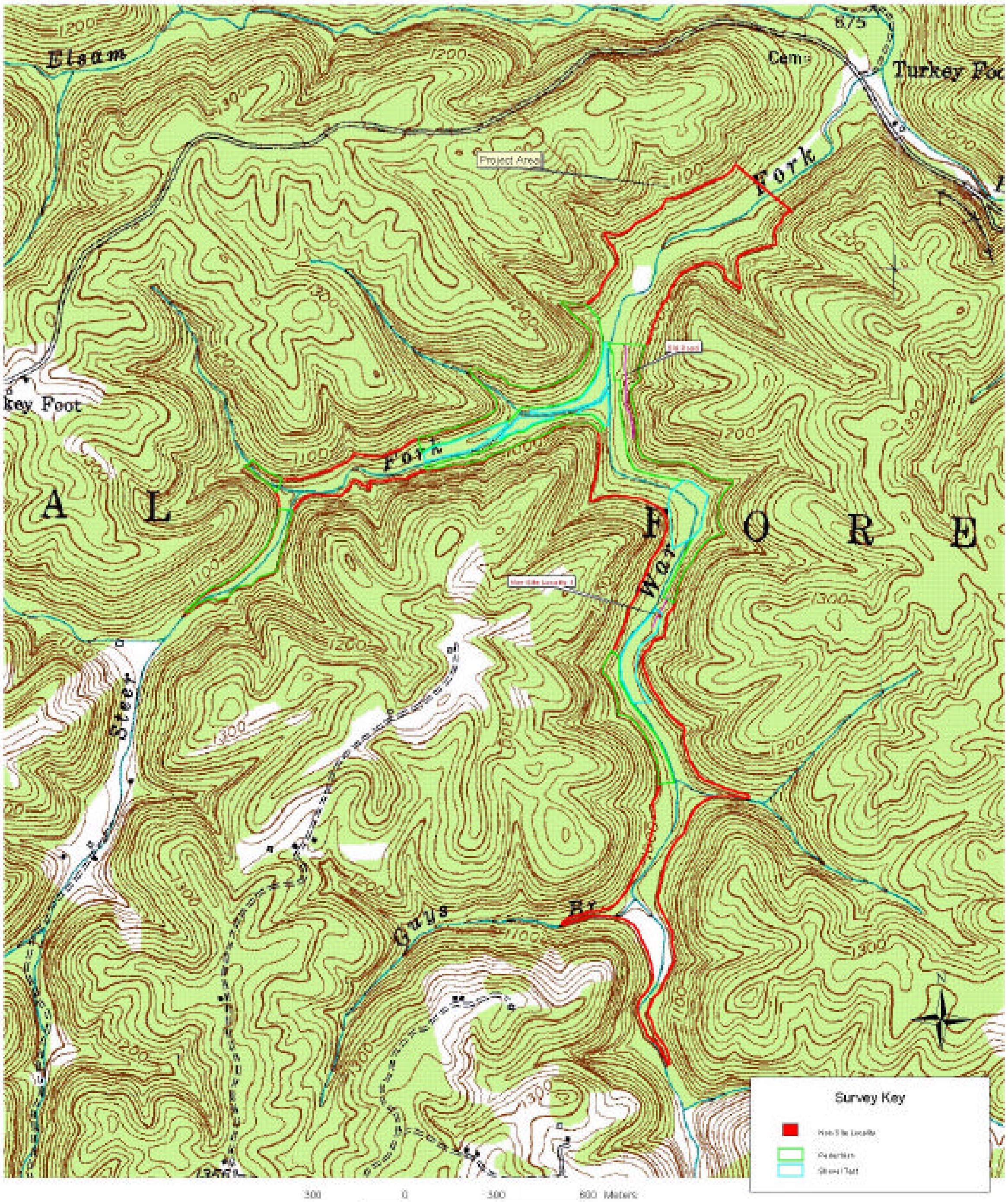
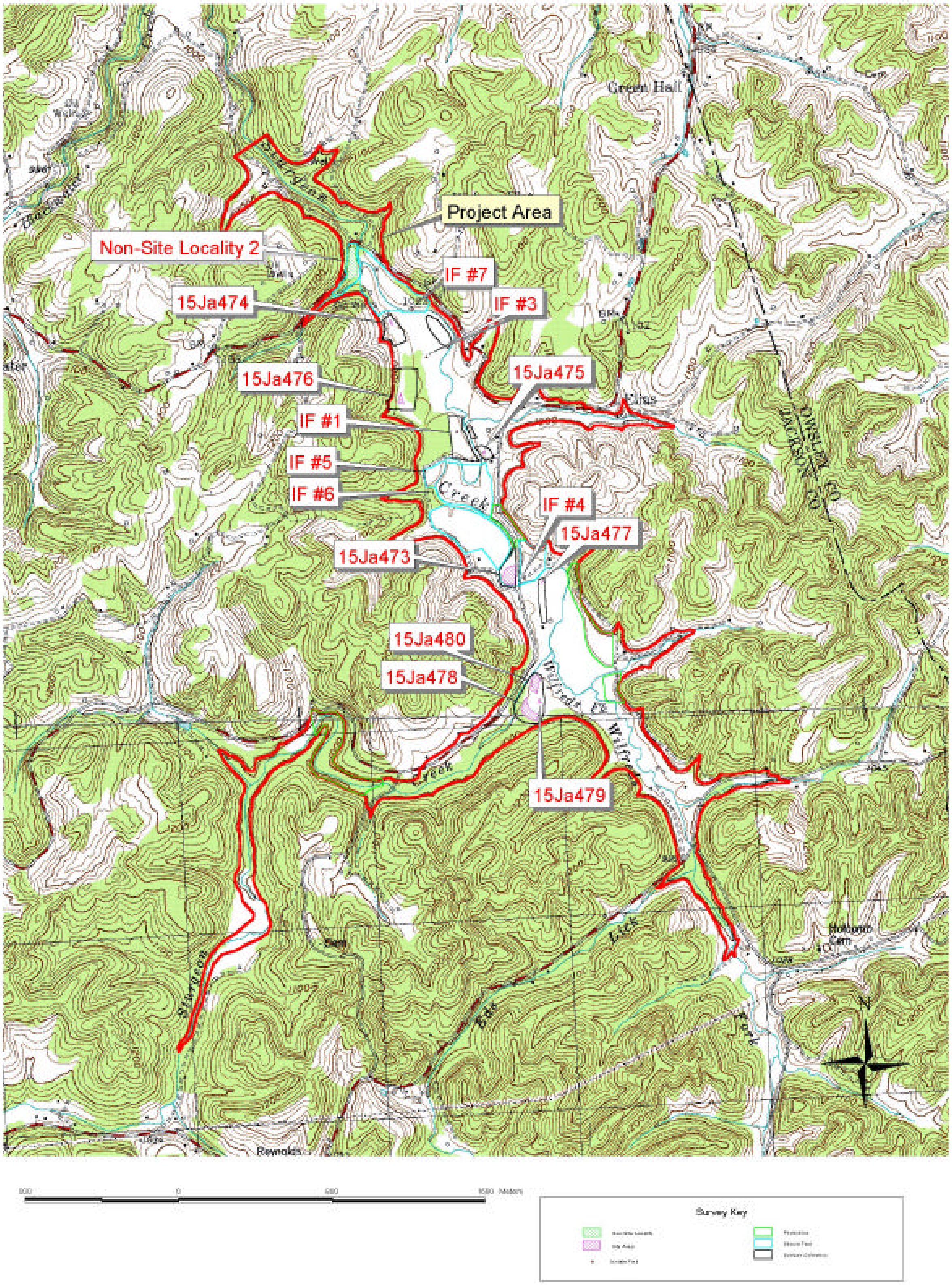


Figure 3B. Sturgeon Creek Project Area.



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