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Early Archaic Occupations at the James Farnsley Site, Caesars Archaeological Project, Harrison County, Indiana

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EARLY ARCHAIC OCCUPATONS AT THE JAMES FARNSLEY SITE, CAESARS ARCHAEOLOGICAL PROJECT, HARRISON COUNTY, INDIANA

Caesars Archaeological Project Report Volume 4

edited by

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EARLY ARCHAIC OCCUPATIONS AT THE JAMES FARNSLEY SITE (12Hr520), CAESARS ARCHAEOLOGICAL PROJECT, HARRISON COUNTY, INDIANA

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This volume is dedicated to the memory of Mark Cantin, who passed away suddenly in January 2012. Without his dedication to the project and insights into the Archaic this volume would not have been possible.

C. Russell Stafford, Ph.D.
Principal Investigator

CHAPTER 1

INTRODUCTION TO ARCHAEOLOGICAL INVESTIGATIONS AT THE JAMES FARNSLEY SITE (12HR520)

by

C. Russell Stafford

This report discusses the archaeological investigations conducted by the Indiana State University Archaeology and Quaternary Research Laboratory (formally Anthropology Laboratory—ISUAL) at the James Farnsley site (12Hr520) located in the Caesars Indiana development, Harrison County, Indiana. Phase II testing and Phase III data recovery of the extensive buried Early Archaic deposits were undertaken between October 1997 and September 2000.

The site is located at the southern end of Knob Creek bottom in the lower Ohio River Valley about 16 km south of New Albany, Indiana (Figure 1.1). It is positioned on an early Holocene terrace (335 ft amsl) at the western margins of the bedrock valley (Figure 1.2). Although there is a mix of Middle Archaic through Woodland artifacts in the plowzone the principal deposits of interest are the buried remains dating to the Early Archaic. These stratified deposits are buried from about .40 m to over 5 m below the surface and consist of Kirk, Thebes/St. Charles and Early Side Notched components dating from ca. 8300 rcybp to over 10,000 rcybp. Large scale excavation of the near surface Kirk component yielded tens of thousands of artifacts including over 2100 Kirk corner notched points. The Townsend site (12Hr481) is located nearby on the same early Holocene terrace. The primary component there is a surface Late Archaic rock-filled midden, although late Early Archaic deposits are buried under the midden (see Volume 3).

This chapter discusses the research questions that were the central focus of the data recovery investigations at Hr520, and an overview of the geomorphology (Stafford 2007c) stratigraphy (Stafford 2007a) and radiocarbon dates (Stafford 2007b) that are detailed in CAP Volume 1. A comprehensive review of previous Early Archaic investigations in the Falls of the Ohio Region has been presented in Volume 3 (Mocas and Stafford 2008) but a brief overview of excavated Early Archaic sites in the region is presented here. Archaeobotanical analysis results were presented by M. Schroeder (2007) in Volume 1. The limited faunal remains recovered are listed in Appendix A. A debitage analysis focusing on lithic reduction strategies was also presented in Volume 1 (Stafford 2007d). 12Hr520 feature data are presented in Appendix B.

RESEARCH THEMES

A series of research problems focusing on Early Archaic chronology, settlement function, subsistence, and geomorphology were addressed by the proposed Phase II testing and Phase III data recovery investigations. A data set was generated that allowed comparisons to other sites in the Ohio Valley and the Eastern U.S.

A number of Early Archaic sites have been investigated in this general area including Longworth-Gick in Jefferson County Kentucky, and Swan♣s Landing down river in Harrison County. Hr520 provides data that can be compared to these other early occupations including other Kirk and early Holocene occupations in the project area (e.g., Hr481).

The following research problems were addressed in the Phase II testing and Phase III data recovery fieldwork and subsequent analyses:

1. *Age Determinations and Chronology*. Multiple radiocarbon age determinations were made in contexts where diagnostic artifacts were clearly associated with datable samples. Considerable effort was made to obtain charcoal for dating through bulk sediment sampling for flotation. The lack of charcoal in some areas of the site (e.g., Thebes workshop) required that Optical Stimulated Luminescence (OSL) dating be used, which also provided support for radiocarbon determinations.

2. *Settlement Function.* A key problem is the determination of the function of the occupations in the Early Archaic settlement system. Although lithic reduction appears to be an important activity at the site, were a wider range of tasks carried out in the Kirk occupations compared to the Thebes and Early Side Notched components? What settlement types are represented? How do they fit into the overall Early Archaic settlement system? Enough work has been done at other sites in the region to provide a comparative data base. Further, the principal focus of the hand excavations at the site was on exposing large contiguous areas in the Kirk component in order to study spatial patterning of artifacts, features, and subsistence remains that might relate to site function. Large areas of hand excavation were not practical in the deeper Thebes/St. Charles or Early Side Notched components and spatial analysis is more limited in these components. Mini-blocks in the Thebes lithic workshop did encompass entire activity areas and therefore spatial patterning can be examined in detail.

5. *Subsistence Reconstruction.* Some of the most important data that undisturbed occupations can yield are fragile subsistence remains. Intensive recovery of plant remains through flotation allowed the quantitative reconstruction of prehistoric diet and associated subsistence strategies. Typically, large volumes of sediment were processed in order to recover sufficient quantities of small-scale remains to allow statistically valid conclusions to be reached about paleo-diets. Recovery of botanical remains by necessity focused on the secondary trash area and features

where charcoal was preserved. Faunal remains were poorly preserved and make a very limited contribution to the subsistence reconstruction.

6. *Lithic Reduction Strategies.* It was clear from the Phase II investigations that chert raw material and debitage types as well as concentrations of lithic debris vary across the Early Archaic components. Investigations and analysis are oriented toward identifying differential lithic reduction strategies associated with different chert types (e.g., Muldraugh vs. Wyandotte) and tool types (e.g., end scrapers vs. adzes) and how they are related to differing Early Archaic settlement strategies.

7. *Landform and Site Formation Processes*. Geoarchaeological studies addressed the depositional processes that built the early Holocene Ohio River overbank/point bar in which the archaeological occupations are contained and the nature of the depositional environments present and the integrity of the Early Archaic deposits. A very complex geomorphic and archaeological stratigraphy was identified at the site. This analysis also centers on reconstructing the geoenvironmental setting of the Early Archaic components and how it changed through time.

FALLS OF THE OHIO EARLY ARCHAIC

A comprehensive review of Early Archaic investigations in the Falls of the Ohio region is presented in CAP Volume 3 (Mocas and Stafford 2008) in association with the late Early Archaic component at the Townsend site (12Hr481) and a summary of other Kirk sites is included in Chapter 5. This discussion focuses on excavated sites in the Falls region. Excavations of buried Early Archaic occupations have been conducted at Longworth-Gick (15Jf243) (Collins 1979), Swan's Landing (12Hr304) (Mocas and Smith 1995; Smith 1986) down river from the CAP and at Ashworth rockshelter (15Bu236) (DiBlasi 1981) in Kentucky (Figure 1.1).

At Longworth-Gick there is a stratified sequence of Early Archaic occupations buried in bedded early Holocene Ohio River alluvium. The deeper occupations are associated with Kirk corner notched points and with associated dates of 8440 ±380 rcybp and 8440 ±125 rcybp. An earlier date of 9490 ±230 rcybp was obtained from the deepest cultural zone, although only one unidentified (reworked) point was recovered. Although the sample of points is small, Kirk corner notched Small points were recovered below Kirk corner notched Large forms. Overlying the Kirk component is a bifurcate (Lecroy) zone of occupation that dates to 8420 ±110 rcybp, although Kirk corner notched cluster points are also present in this occupation. Most of the occupations appear to be short term camps with surface hearths. Tool and debitage densities are relatively low.

At Swan's Landing there are stratified Kirk corner notched occupations deeply buried in Ohio River alluvium. Cultural deposits slope from a higher terrace surface toward the current river channel. Reportedly thousands of points have been recovered from the eroding bank (Smith 1995). Those points recovered in professional excavations

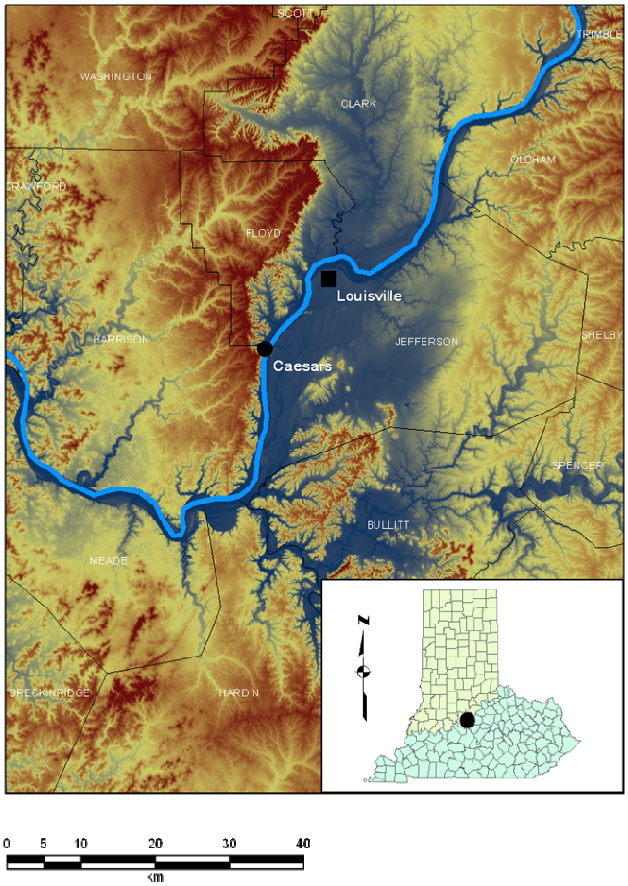

Figure 1.1. Location of the Caesars Archaeological Project and related Early Archaic sites.

are predominately of the Pine Tree variety, a pattern similar to the James Farnsley site. Most were made of Wyandotte chert available nearby. Although there are a number of erroneous radiocarbon dates from the site (see Smith 1995), two samples obtained in the 1994 excavations on the interior alluvial ridge yielded credible AMS ages of 9060 ±70 rcybp and 9090 ±60 rcybp (Mocus and Smith 1995:174). Surface hearths were the primary feature type exposed in the excavations.

Kirk Corner Notched Pine Tree projectile points were also recovered from the basal zone of the stratified Ashworth site, 15Bu236, (DiBlasi 1981), a rockshelter overlooking Floyds Fork, near Shepherdsville, Kentucky. Most points were either made of Muldraugh or Wyandotte cherts. The two features exposed in the Early Archaic stratum C appear to be surface hearths, although they are surrounded by limestone slabs. A human burial (and fragments of a second) was identified in the Early Archaic zone. Overall faunal preservation was good and wide variety of animal taxa were recovered.

As detailed in Mocas and Stafford (2008) Early Archaic points and sites are commonly recovered in surface surveys in the Falls region. Early Archaic points are also very common in southwest Indiana. Systematic survey of over 20,000 ac yielded a large number Early Archaic points, including Kirk and Thebes cluster forms (Cantin 2000;

Stafford 1994). Early Archaic points tended to be found in all parts of drainage basins in this area.

GEOMORPHOLOGY & ARCHAEOLOGICAL STRATIGRAPHY SUMMARY

This is a summary of a more detailed discussion of the geomorphology, stratigraphy, and radiocarbon dates contained in Volume 1. The Caesars development is located at the down river end of Knob Creek bottom at River Mile 616. Knob Creek is a Yazoo-like stream that meanders down the eastern side of the bottom and empties into the Ohio River immediately south of the project area (Figure 1.2). 12Hr520 is located on an early Holocene terrace at an elevation of 435 ft amsl (Figure 1.3). The soil series Weinbach silt loam is mapped on the surface of the terrace. This soil series is a well-developed Alfisol with albic and fragic properties and is commonly found on early Holocene landforms as well as earlier terraces in the central Ohio River valley. Field investigations indicated an Ap-E-Bx-Bt-C horizon sequence at the site. The pedon is 2.25 m thick and exhibits prominent mottling and redox features typical of Early Holocene soils in the region (Stafford 2004)

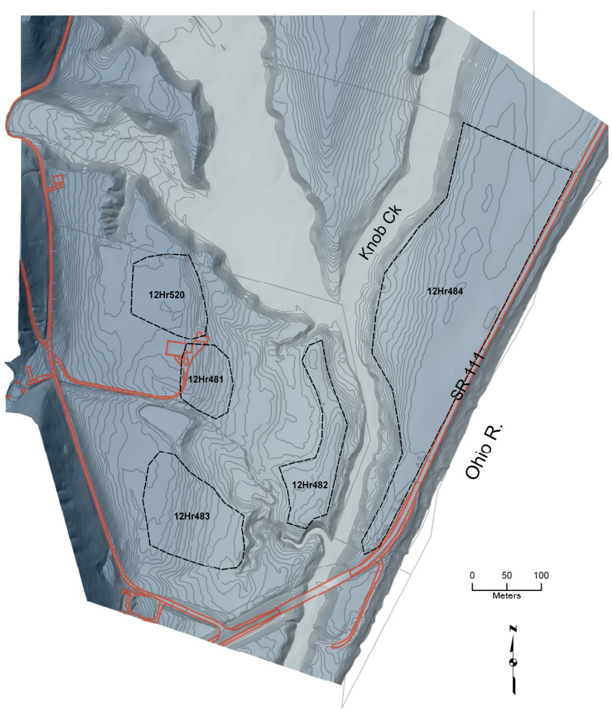

Figure 1.2. Location of 12Hr520 in the CAP study area (1 ft contours).

Underlying the terrace surface is a thick unit of Ohio River alluvium that can be divided into overbank and point bar facies (Figure 1.4). Overall the unit is between 8.4 and 8.7 m thick and overlies gravelly sand outwash deposits. The radiocarbon dates from the archaeological components and diagnostic artifacts in the plowzone indicated that the bar deposits were forming by 10,000 rcybp and that the surface became stable by 8000 rcybp.

The overbank unit, which contains the vast majority of the archaeology, is a massive silt loam to silty clay loam. The lower lateral accretion bar deposit is characterized by a higher sand content and bedding (laminae to medium beds) that slopes to the east toward

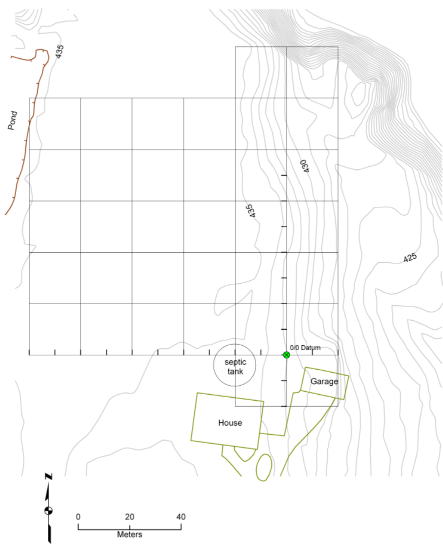

Figure 1.3. 12Hr520 topographic map (1 ft contours) and site grid.

the river channel. Fine sand is the largest clast size in the bar. Both of these facies are low energy depositional units that are conducive to the preservation of artifacts and features. It is also evident that the geometry of the deposits indicates occupation surfaces that slope up from east to west in both the point bar deposits and the overlying overbank unit. This fact is crucial to understanding the stratigraphic structure of the archaeological components at Hr520.

Higher energy environments are also present, however. Tributary streams originating in the uplands cut small scale (ca. 2 m wide) channels through the Ohio River alluvium. These channels are most evident in the western part of the site at depths over one meter. In this area there is a clear cut and fill channel sequence. The sediments are coarser and include pebbles. There is also evidence that features were eroded by these channels in some cases. Evidence of tributary channels is also present in the point bar deposits in the eastern part of the site although they tend to occur at greater depth. Although there was some potential that occupations could have been affected by these high energy channels, there was only infrequent evidence of disturbance and most of that was in the deeper occupations (Early Side Notched zone). By and large occupations are intact and represent primary cultural deposition mostly undisturbed by post-occupation geogenic processes.

In the plowzone (0-30 cm bs) there is a mixture of points from most time periods including Kirk Cluster, Bifurcate Cluster, Late Archaic, Early Woodland, and Late Woodland/Mississippian. Of these the Early Woodland component is the most substantial in that four pits were exposed in the western part of the site (Western Terrace). Early Woodland grit tempered sherds were recovered from two of the pits (F12WT, F17WT). There is also evidence of an Early Woodland component at 12Hr481 including a shelter. Two posts from the shelter were dated to the Early Woodland period (see Mocas, Volume 3).

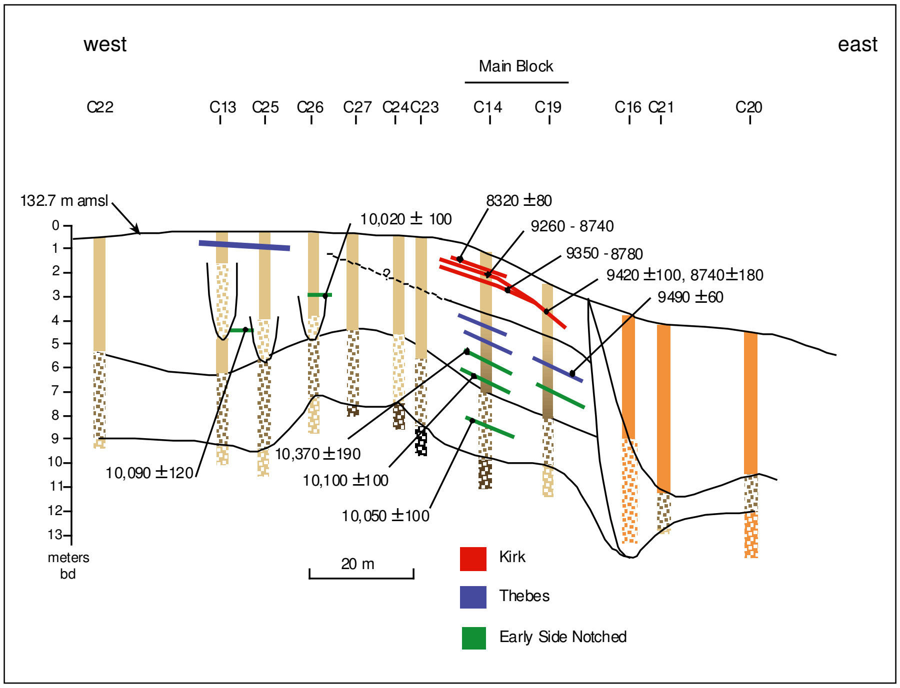

Figure 1.4. Schematic cross-section of deposits at 12Hr520.

The sloping surfaces evident at Hr520 mean that components are more deeply buried on the east side of the site near the terrace escarpment than on the west side of the site. On the eastern side in the main excavation block there is a thick zone of Kirk materials that extends from 0.40 to 1.0 m bs and is found in a rather narrow 40 m wide strip along the terrace edge. This deposit was subdivided into three subzones referred to as Lower Kirk, Middle Kirk and Upper Kirk. There are no sterile deposits separating them. The subzones are based on the vertical distribution of features, debris density, and radiocarbon ages. The most distinctive signature of the Lower Kirk subzone is the presence of what are termed oxidized rings (possibly smudge pits—see Chapter 4). With one exception these features are exclusively found in the lower portion of the Kirk zone.

Four radiocarbon ages are associated with the Lower Kirk subzone (1.8-2.30 m bd). Feature 98, a surface hearth at 2.06 m bs, the deepest of the four samples, produced an age of 9350 ±80 rcybp (ISGS 4834). A date of 8780 ±80 rcybp (ISGS 5035) was obtained from a hearth at 2.00 m bd. Two dates from surface hearths (8900 ±120 [ISGS 5046]; 8810 ±120 [ISGS 5040] rcybp) are slightly higher in the deposit (1.91 m and 1.97 m bd respectively). A Luminescence date was obtained from a sample collected at 1.80 m bd (1.10 bs) at 12N8W in the Main Block. The sample yielded a calendar PIBL age of 11.2 ±0.60 ka yr bp (Feathers 2007).

The Middle Kirk subzone is based on higher debris density in excavation units that occur above the zone in which the oxidized rings are found. This subzone is defined as occurring between 1.50 and 1.80 m bd. Three radiocarbon dates (fewer features in this zone yielded charcoal) were obtained from this stratum. Feature 103, a hearth at a depth of 1.73 m bd, yielded a date of 8740 ±100 rcybp (ISGS 4838). The second sample is an AMS date of 9260 ±40 rcybp (Beta 206921) from a surface hearth (F205) at 1.76 m bd. A third sample was collected from a pit feature (F213) at a depth of 1.88 m bd. An AMS date of 9200 ±60 rcybp (Beta 218528) was obtained from this pit. The radiocarbon dates from the Lower and Middle Kirk zones are within the same age range. It is not possible, therefore, to discriminate chronologically the two occupation zones within the limits of radiocarbon dating.

The Upper Kirk subzone occurs between 0.50 and 1.50 m bd. It is characterized by lower debris density, fewer features and the occurrence of the vast majority of Stilwell points (and Large Kirk corner notched points in general). The Stilwell occupation zone undoubtedly represents an extension of the same occupation exposed below the Late Archaic midden at the nearby Townsend site (12Hr481) (see Volume 3). One radiocarbon date can tentatively be associated with the upper occupation at Hr520. A date of 8320 ±80 (ISGS 5032) was obtained from a hearth (F46) at 1.70 m bd. Although only slightly higher in the deposit than samples that date the Middle zone, ISGS 5032 appears to be on the downslope portion of a higher surface. Since the sample depth falls below the majority of Stilwell points in the Upper Kirk zone it provides an approximate maximum age for those points at Hr520.

In addition to the occupation zone on the levee crest there is also a Kirk secondary deposit located on the paleo-bank to the east. This trash deposit extends at least 50 meters along the terrace escarpment and at least 16 m down the bank slope to the east. It is composed of high densities of debitage, tools, and moderate densities of wood charcoal, and rock. Two dates are associated with the refuse deposit. The first date of 8630 ± 130 rcybp (Beta 115653) was obtained near its base in a Phase II unit. It is substantially earlier that most of the Middle and Lower Kirk subzone dates but has a substantial standard deviation. The second date of 9420 ±100 rcybp (ISGS 4837) is from a hearth on the bank that lies under the trash deposit. This date should predate the formation of the trash deposit.

Underlying the Kirk zone in the Main Block is a Thebes/St. Charles component. On the levee crest the Thebes zone is between 3.0 and 4.0 m bd. It slopes toward the Ohio River paleochannel to the east where it occurred between about 4.8 and 5.3 m bd. It consists of points associated with small lithic scatters and shale scatters. As many as three stratified occupation surfaces may be represented in this zone. A single date of 9490 ±60 (Beta 153512) from a hearth was obtained at a depth of 4.80 m bd.

The Thebes surfaces slope up further to the west where a Thebes lithic workshop is located between 0.76 and 1.36 m bd. It consists of at least three major activity areas with early stage debitage, bifaces, points/drills, cores, hammerstones, and stone material. Only Thebes Cluster points/drills were recovered from this area. Seven Thebes points and one St. Charles point were found between 0.76 and 1.36 m bd. Debitage peaked between 1.10 and 1.30 m bd. More than a single occupation surface may be represented in Block C (see Stafford 2007, Volume 1).

No charcoal was recovered from the workshop area. However, two sediment samples from block C in the workshop were luminescence dated (Feathers 2007, Volume 1). These samples were taken from 1.06 m (U255) and 1.09 m bd (U307) in Block C in the Bx horizon, which corresponds to the depth from which the highest densities of debitage were recovered from the workshop. A lithic feature (F10WT) was adjacent to the U255 sample. The two samples produced calendar ages of 11.1 ± 0.70 ka and 10.4 ±0.75 ka yrs bp. Although the standard error is large, the average of the two PIBL dates (10,750 ±512 bp) is consistent with the calibrated radiocarbon date from the main block of 10,970 CalBP from F298 (see Stafford 2007c, Volume 1).

The deepest component is referred to as Early Side Notched. It is found in both the main block and the western terrace. The Early Side Notched zone is composed of a series of stratified paleosurfaces that slope from west to east in both the bar and overlying overbank units on which features (surface hearths) and artifacts occur. This cultural zone (2.6 m thick) is found between 6.6 and 4.0 m bd at the terrace edge and to the east (Main Block), but on the terrace flat to the west (40 m west) it is at 3.7 to 2.67 m bd. The zone consists primarily of surface hearths and a few isolated tools.

The base of this zone is represented by F313, a large surface hearth at 6.61 m bd in the lowest section of the point bar exposed by trenching. The hearth contained a reworked point, while a hafted drill was recovered adjacent to the feature (at 6.72 m bd). These artifacts are technologically consistent with Thebes Cluster points. The average of two dated samples from the feature is 9955±86 rcybp.

Within this zone there appear to be three potential surfaces represented. The deepest surface is at 5.22-5.24 m bd, as indicated by two features. Three radiocarbon dates are available from features in this northern area of the main block. Two hearths (F300, F306) from the uppermost surface yielded ages of 10,370 ±190 (Beta-152942) and 10,100 ±100 (ISGS-4898) rcybp, respectively. F300 (surface hearth) is at a depth of 4.10 m bd, F306, also a surface hearth, is at a depth of 4.30 m bd. The third sample, from F311 (surface hearth), at 4.77 m bd, yielded an age of 9700 ±100 (ISGS-4897). This age result was found to be an outlier and not a part of the cluster of other Early Side Notched ages (Stafford 2007b).

Two features that are assignable to the Early Side Notched zone were exposed to the west (40W-60W). Although no points were recovered from either hearth feature, both were radiocarbon dated. F15WT at a depth of 3.57 m bd is near a tributary channel. A radiocarbon age of 10,090 ±100 rcybp (ISGS 4835) was obtained from the hearth. F35 also a heating facility with large sandstone/limestone slabs, burned soil, and charcoal flecking. The feature was exposed at a depth of 2.67 m bd (2.19 m bs) and yielded an AMS age of 10,020 ±100 (Beta 13574).

The shallower depth of these features compared to those in the main block, which were at greater depth but had contemporaneous radiocarbon ages, indicate the sloping nature of the surfaces in the overbank unit. The surface rises at least 1.4 m over 40 m from east to west. Although there is a good deal of variation in the radiocarbon ages from this zone and some stratigraphic inconsistencies, the occupations are consistently in the range of 10k rcybp.

VOLUME OUTLINE

In the following chapters the excavation strategies, feature analysis, point and other tool analyses, and the spatial structure of the Early Archaic deposits are presented. In Chapter 2 the Phase II testing procedures and results, which focused primarily on the Kirk deposits, are presented. In Chapter 3 the Phase III data recovery excavation strategies and procedures are discussed. Procedures and sampling strategies were adapted as new information was obtained during the Phase III, especially with regard to the deeply buried occupations. Chapter 4 focuses on the large number of cultural features that were encountered during the data recovery project and how they reflect changing site function through the Early Archaic. The very large sample of Kirk corner-notched cluster points are described and analyzed in detail in Chapter 5. This collection is the largest know sample of Kirk cluster points in the Eastern United States. The Kirk zone lithic tools are discussed in Chapter 6. The non-Kirk (i.e., Thebes/St. Charles, and Early Side Notched) component points and other lithic tools are described in Chapter 7. The spatial structure of the Early Archaic occupations is analyzed in Chapter 8. This was central to the data recovery phase of the project and a particular focus of the large block excavations in the Kirk zone. Chapter 9 is a summary of the James Farnsley site Early Archaic components.

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CHAPTER 2

PHASE II TESTING AT THE JAMES FARNSLEY SITE (12HR520)

by

C. Russell Stafford and Mark Cantin

INTRODUCTION

This chapter discusses the Phase II investigations at 12Hr520 located in the Caesars Indiana development in the floodplain of the Ohio River near Bridgeport in Harrison County, Indiana. Caesars Indiana planned to construct docking facilities, a parking garage, surface parking lots, a pavilion, and hotel, among other facilities in the 200 ac project area. Construction of a ten story hotel and associated facilities were to directly impact 12Hr520. This site was recorded in a combined surface and subsurface reconnaissance (Stafford and Cantin 1996) of the project area (Figure 2.1) by Indiana State University Anthropology Labortory (ISUAL; now Archaeology and Quaternary Research Laboratory). Site 12Hr520 (James Farnsley) was first discovered by a backhoe trenching and shovel testing in the Phase I reconnaissance. Based on these results, Phase II testing was required by the Army Corps of Engineers (COE) in consultation with the Indiana Division of Historic Preservation and Archaeology (DHPA). The Phase II scope of work and procedures are based on an ISUAL Phase II proposal (March 19, 1997), DHPA letters dated May 1 and 29, 1997, and COE letters dated May 12, and 13, 1997. Phase II field work commenced on October 22, 1997 and was completed on July 23, 1998.

PHASE I INVESTIGATIONS SUMMARY

The initial work in the site area was conducted between June 11, and July 23, 1996 as part of a second season of investigations which focused on the western section of the Caesars Project area. When initially discovered the James Farnsley site (12Hr520) was located in a division of the project designated Area A2 (Stafford and Cantin 1996). This Area was located in the center of the project and extended from near the colluvial slope in the west to the east toward the early Holocene terrace.

At the time of survey the area was in pasture with low (>20%) surface visibility, therefore, survey techniques included shovel testing and trenching. Shovel tests were placed in a 10 meter grid over most of Area A2 with one exception being the region adjacent to the caretaker residence which was tested at a 5 meter interval. Trenches were placed at 50 m or less apart. They were regularly spaced except in areas of A2 containing stock pens, buildings, and underground utilities (Figure 2.1).

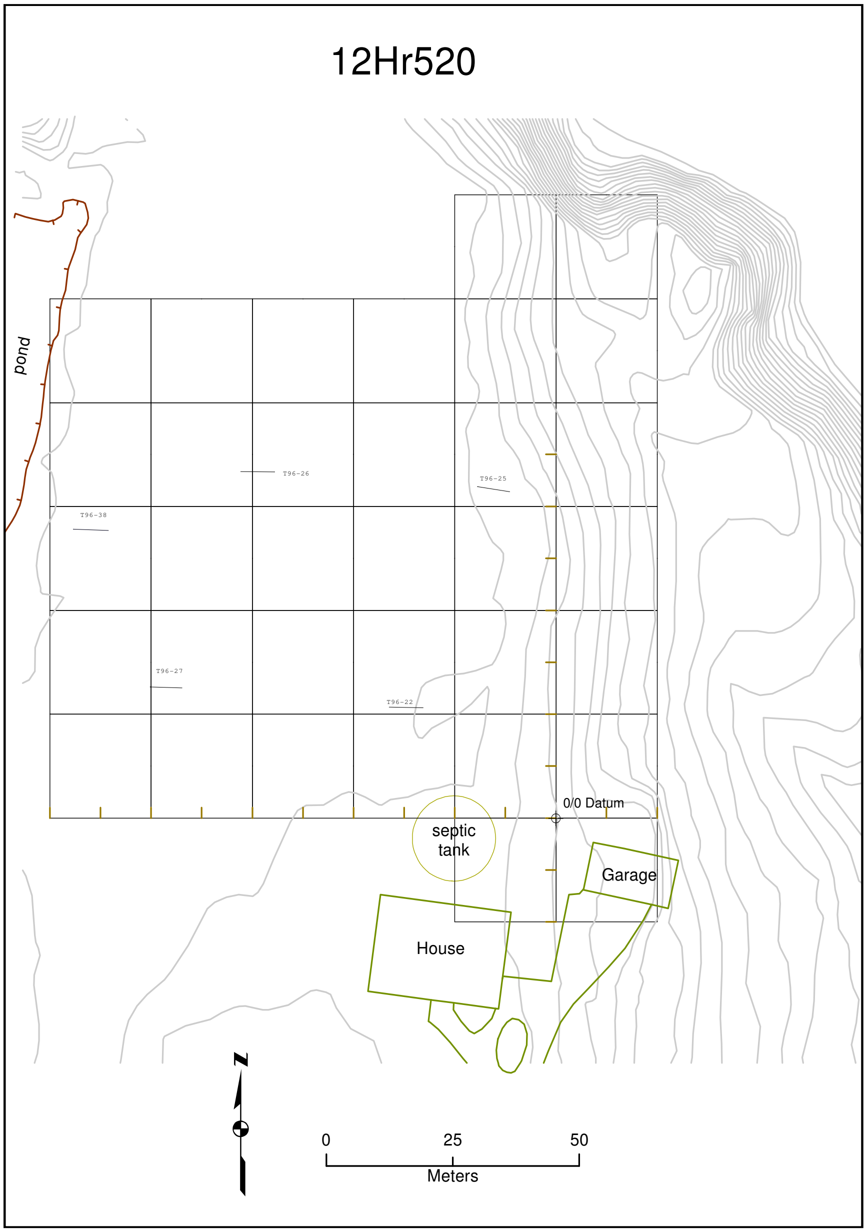

Figure 2.1. 12Hr520 map with Phase I trench locations (1 ft contours).

As a result of this investigation 12Hr520 was defined as a surface site with a buried component located on the 435 ft early Holocene terrace. The plowzone occupation was determined to be of Woodland association based upon the recovery of a single grit/chert tempered sherd within the surface scatter. The buried component was designated a lithic workshop of unknown cultural affiliation. This component was defined as two distinct strata which occurred in trenches T96-25 and T96-26. The upper buried stratum was noted between 40-60 cm below surface while the lower stratum was a very dense zone of debitage between 83-101 cm below surface. This lower strata contained areas of very high Muldraugh chert concentrations with one area of T96-26 exhibiting debitage literally stacked one on top of the other in a zone 20 cm thick.

Several retouched tools were recovered from within this debitage. Based upon the age of the landform and the recovery of Middle/Late Archaic materials from nearby surface deposits, this stratum was estimated to date to the Early Archaic.

Before further work was conducted at Hr520 a discovery was made as part of the archaeological investigations at Hr481 a prehistoric site situated on the early Holocene terrace to the south. In conjunction with Phase II testing at Hr481, a transect of augers was placed from Hr481 north along the terrace crest in an effort to trace a buried Archaic occupation discovered in the northern portion of that site. Although the Hr481 occupation appeared to end, augers at the northern end of the transect detected a very high density occupation buried about a meter below surface at the terrace edge. A Kirk point was also recovered from these investigations, therefore, this occupation was thought to be associated with the workshop to the west and thus part of Hr520.

PHASE II FIELD METHODS

Prior to Phase II work a permanent datum (0N0E) was placed at the southern end of the site and a base line, oriented to magnetic north, was established with other control points established as necessary. All units, trenches, and augers were located relative to this grid system

The first Phase II investigations at the site consisted of auger testing (Figure 2.2). The primary purpose of these tests was to determine both the vertical and horizontal extent of the buried occupations. A total of 91 augers were dug with holes placed in a grid pattern every 10-20 meters (except in the workshop area where augers were clustered to trace debris in that area). Samples (4-in auger) were collected every 10 cm to a depth of 2.0 m. Sediment was bagged in plastic and returned to the field lab for processing. After placement in a fine-mesh nylon bag, the sample was soaked then sprayed with water to remove all or most sediment leaving natural or cultural inclusions. All samples were then scanned for micro-artifacts.

The next stage of the Phase II investigations involved unit excavation (Figure 2.3), which began November 11, 1997. A total of 46 2x2m units were dug (Figure 2.4). In addition, 23 units, either 1x1m or 1x2m in size, were excavated adjacent to existing 2x2m units. These “expansion units” were excavated when either the depth in the main unit exceeded 1.5 m, therefore requiring a “lay-back” to maintain the maximum wall height as mandated by OSHA regulations. Lay-backs were also excavated to gain a full planview of a feature which extended into the profile of the main unit wall. All units were excavated in 10 cm levels, and all sediment was dry screened through ¼ inch (6 mm) mesh. Depths within a unit were measured relative to the surface and flotation samples (8 liter) were taken from levels when carbonized plant remains were observed in moderate to high densities. Main units and expansions equal 227 m^2 of hand excavated area. Units ranged in depth from 100 cm to 260 cm below surface with an average of 154 cm bs. Excavation was discontinued when cultural material ended. To sample below the unit basal depth 3 bucket-auger cores (4 inch) were dug at the base of all but two units to a depth of 300 cm below surface. Fill was screened through ¼ inch mesh screen to recover macro artifacts and other remains. Three augers per unit were extracted to

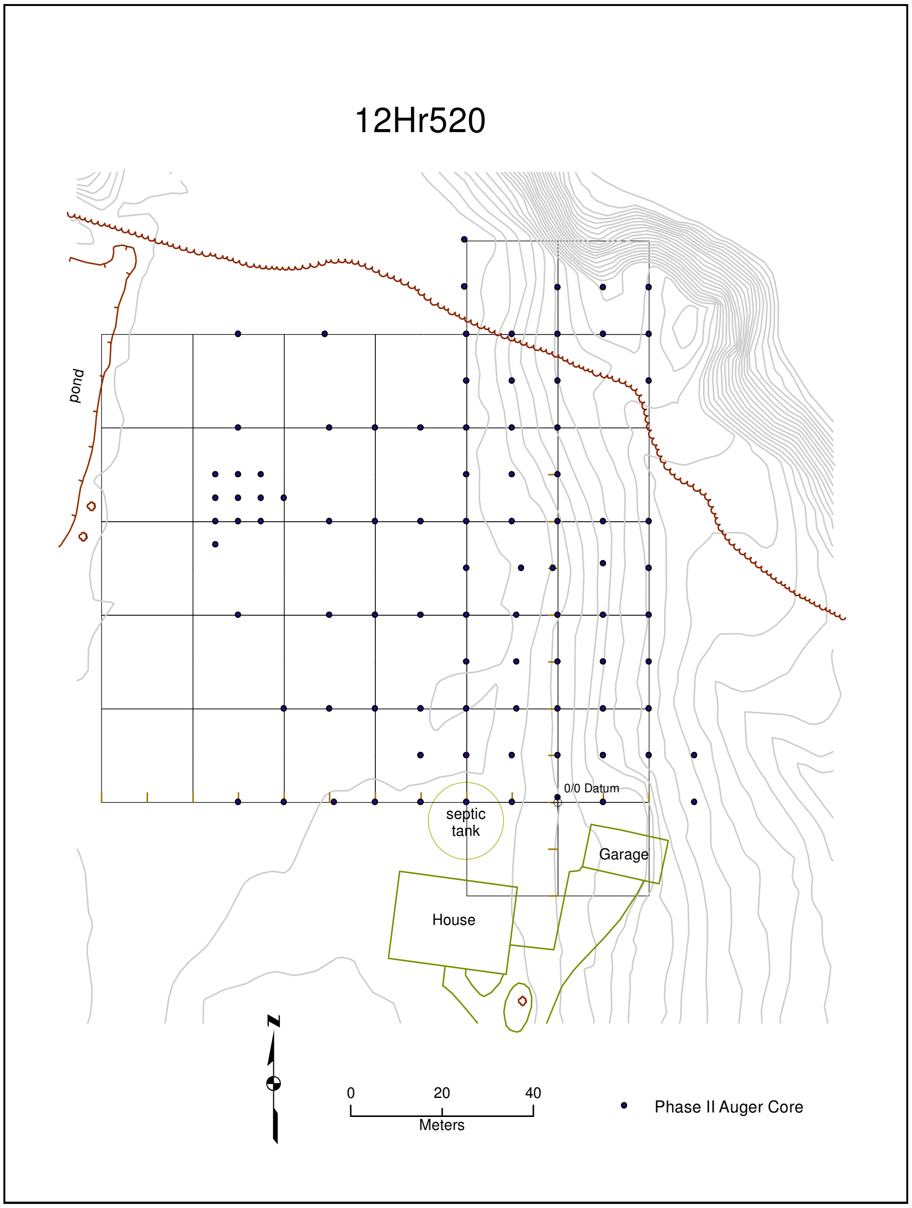

Figure 2.2. 12Hr520 Phase II auger cores.

increase the chances of recovering macro artifacts in the alluvium below the unit excavations.

Units (2x2 m) were checker boarded 10 m apart along the crest of the terrace, with additional units placed in areas where either previous trenching or augering had detected cultural remains. An example of this is a block of four units that were placed in the western portion of the site to explore known lithic concentrations (Thebes workshop). Also, a series of eight units were placed on the terrace crest and escarpment resulting in a 16 m hand excavated trench (referred to as the 10North trench) (Figure 2.5).

Standard procedures for feature excavation were as follows: Features were bisected when possible and fill sifted through ¼ inch mesh screen, profiled, drawn to

Figure 2.3. 12Hr520 Kirk zone at 80 cm bs in Phase II

scale, and photographed. The remainder of the feature was then excavated by depositional zones if present, mapped, and photographed. Multiple flotation samples were routinely taken from feature fill. Macrobotanical samples were collected in some instances for potential radiocarbon dating.

Machine trenching was also conducted as part of the Phase II investigations (Figure 2.5). Three trenches (designated Trench A, B, and 10North) were excavated on the lower part of the terrace escarpment to determine the eastern extent of the occupations and for geomorphological information. Only the eastern 16 meters of the 10 North trench was excavated mechanically. A fourth trench (Trench C) was excavated on the terrace flat. Trench excavation was conducted with a backhoe fitted with a toothless bucket. Trenches were stepped in accordance with OSHA regulations, with no individual walls exceeding 1.5 m in height. All trenches reached a depth of between 2.5 and 3.0 meters. Overburden was gradually removed with the bucket while an archaeologist monitored the excavation. Once a feature or potential feature was exposed, excavation was halted, and the stain was either pedestaled or hand excavated before further trenching commenced. Upon completion of the excavation, one wall of each trench was scraped and all cultural remains were flagged. A measured drawing was then made of each profile.

PHASE II RESULTS

The results presented here are a summary of the Phase II data, more detailed treatment is presented in other chapters where the Phase II data are incorporated into the Phase III data base. The Phase II testing concentrated on sampling the upper 2 meters of the alluvium underlying the early Holocene terrace surface. Augers in the base of test units collected samples to a depth of 3 m bs. It appeared from this work that the Early Archaic occupations were confined to the upper 1.5 meters of the deposit except along the terrace escarpment where remains were found to a depth of more than 3 m bs (Phase III studies revealed Early Archaic deposits to a depth of over 5 m bs). The Early Archaic components investigated in the Phase II are concentrated in two areas of the site with minimal amounts of debris in the intervening zone (see Figure 2.6). Subsequent Phase III investigations demonstrated that deeper Early Archaic components (Thebes/St. Charles and Early Side Notched) were present.

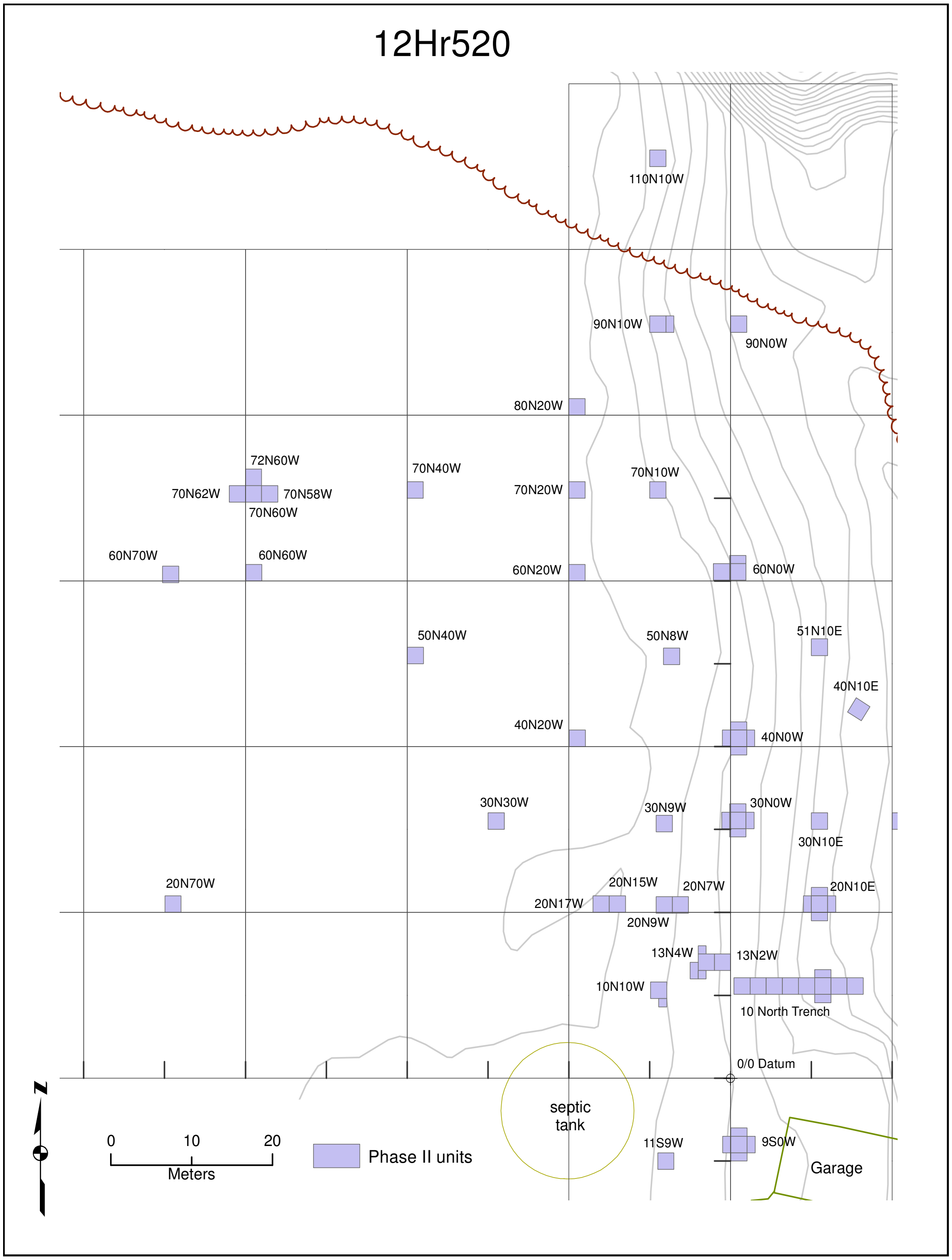

Figure 2.4. 12Hr520 Phase II units.

Horizontal Distribution of Remains

The first concentration is the Thebes lithic workshop, originally discovered in Phase Ib Trench 96-26. The workshop was subsequently detected in several surrounding Phase II units as well. Augering and the original Phase I trenches established that this

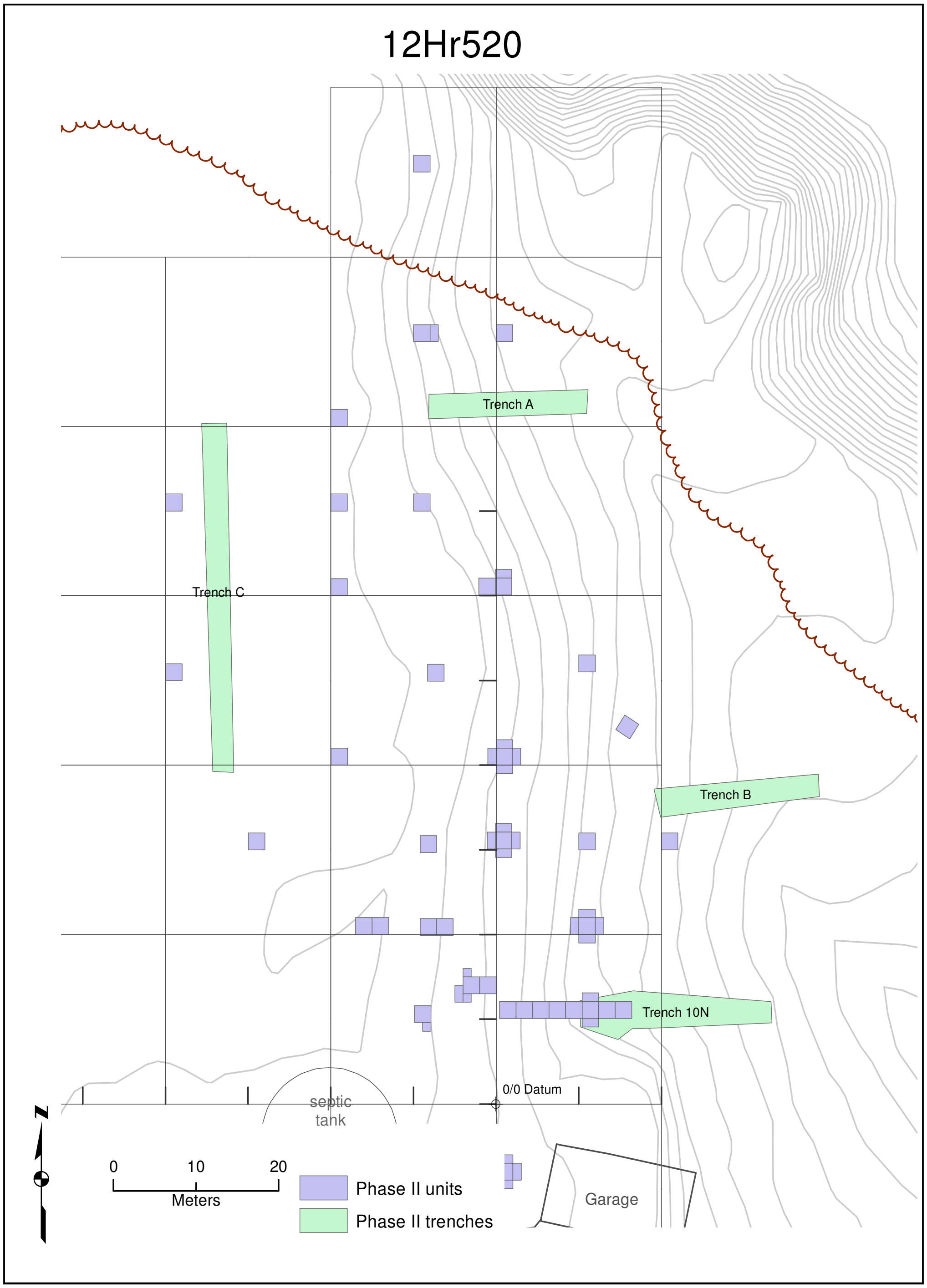

Figure 2.5. 12Hr520 Phase II trenches.

concentration was circumscribed and did not extend the beyond the area defined as the site boundary (Figure 2.7). A single Thebes point was recovered in this area in the Phase II giving it a tentative cultural association (Thebes points were also found in the Kirk component). This affiliation was later verified in the Phase III investigations.

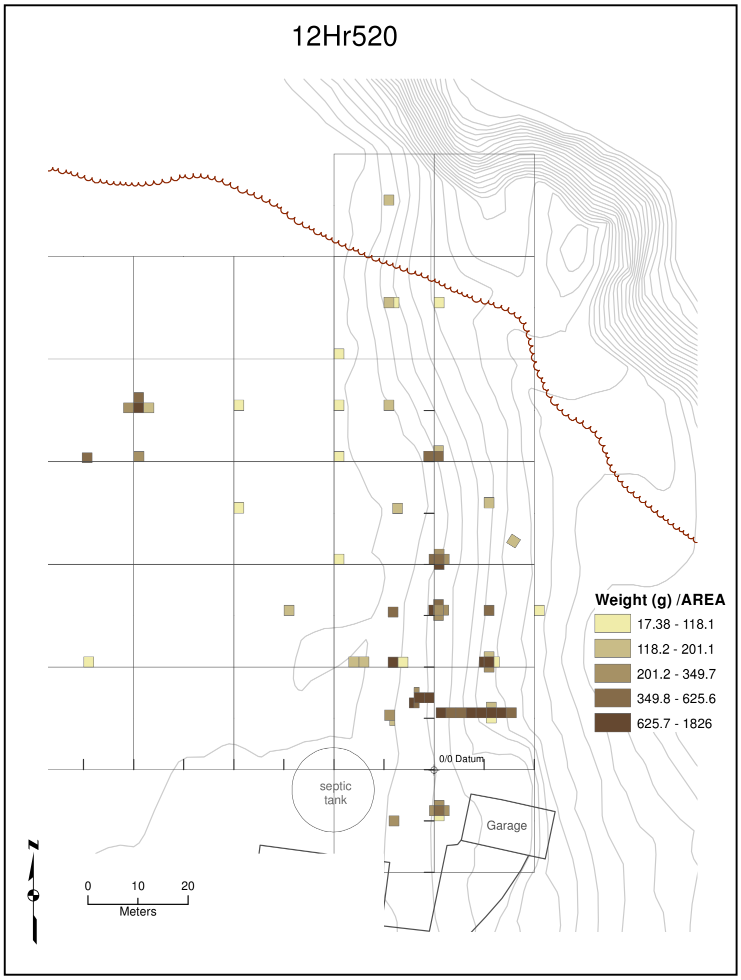

Figure 2.6. 12Hr520 lithic debris density in Phase II units.

The second high density area is the Kirk component which is located along the terrace crest and escarpment. It is generally restricted to between 12E and 10W, although some debris is found further west and hence the boundary reflects this wider distribution. To the east the deposit dips toward an early Holocene Ohio River channel. A core at 30E indicates that the deposit is either absent or was eroded by later tributary stream activity. To the south the presence of the garage, house, and septic tank prevented the establishment of a definitive boundary, although the Kirk deposit *does not* continue at the same density south of the garage as indicated by augers and trenches associated with Hr481 investigations (although the equivalent Early Archaic zone appears to be present). The northern boundary of the second high density area is at about 80N along the terrace edge. Two units at 90N and Trench A recovered very low densities of Early Archaic remains and indicate evidence of erosion and/or redeposition of colluvium on to the lower slope of the terrace escarpment in a shallow swale.

In the vicinity of T96-27 in the southwest portion of the grid very little debris is present. Unit 20N70W produced only seven flakes at the depth of the Kirk occupation. Auger samples in the surrounding area were either sterile or yielded at most one micro flake per sample. Therefore, this area was excluded from the site.

A surface scatter found in the eroded plowzone (Ap), which contains diagnostics ranging from late Early Archaic through Late Woodland, largely coincides with the distribution of the buried Early Archaic component. It is, however, also found further to the north along the terrace edge where a rock filled feature (F20) was encountered in Unit 110N10E just below the Ap. This surface debris scatter does not extend further west in

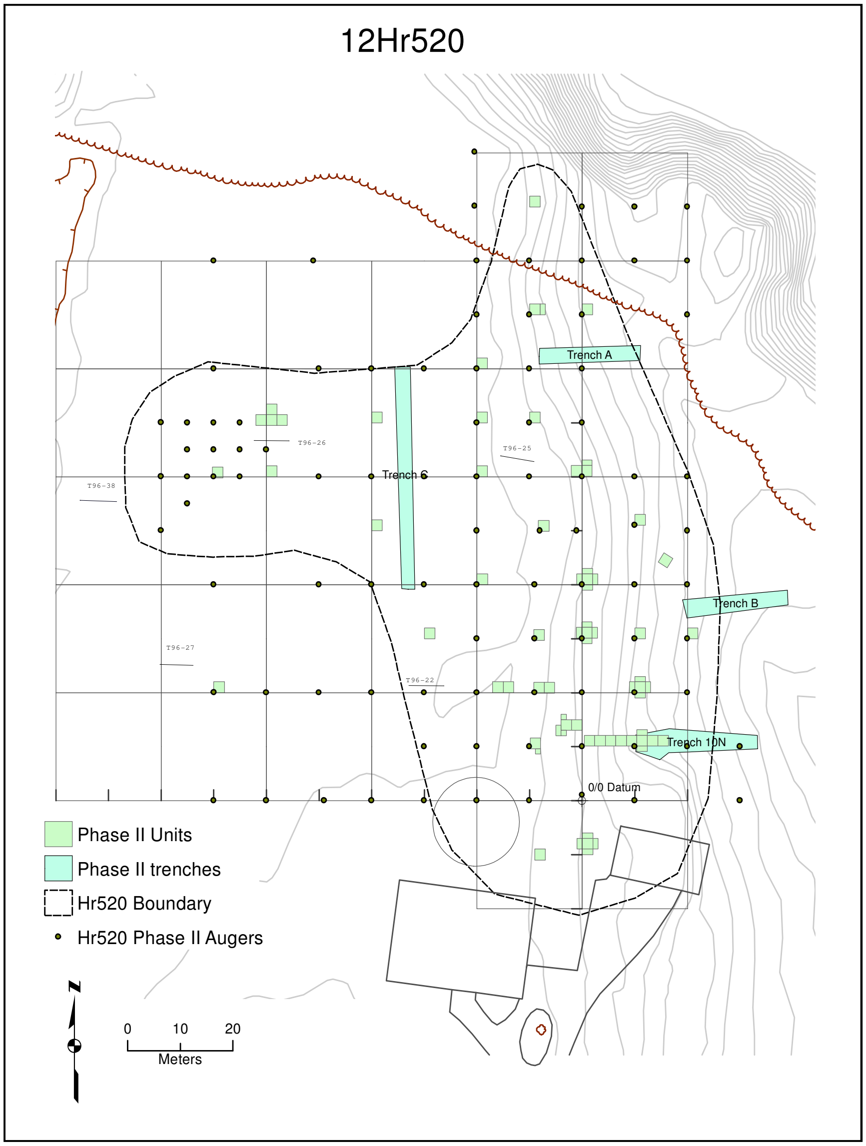

Figure 2.7. 12Hr520 Phase II site boundary.

this area as indicated by Phase I trenches 96-30 through 96-33, which were sterile, or further east as indicated by the absence of materials in Trench 96-34 (Figure 2.1).

Units at the southern end of the site along the terrace crest or edge yielded very high quantities of chert debitage (Figure 2.6). Levels in the .50 to 1.00 depth range produced totals of from 2000 to almost 20,000 flakes. On the terrace slope similar amounts of debris were present in levels in this area. In units west of the terrace crest (15+ m west) debris density drops off suddenly with less than 100 flakes typically recovered from a level compared to 600-3800 flakes in units along the 10 west line. Only in the circumscribed areas of the originally discovered lithic workshop are higher concentrations of debris and tools found on the terrace flat. Units north of 70 north also contain substantially lower debitage densities (typically less than 100 flakes/level).

The overall site area encompasses 7520 m^2, while the higher density areas total 2087 m^2 (Kirk) and 600 (Thebes) m^2. Phase II trench and unit excavation exposed 450 m^2 which constitutes a 6 percent sample of the total site area.

Archaeological Stratigraphy

The archaeological remains recovered from the Phase II investigations 12Hr520 are contained in fine-grain overbank deposits associated with a levee created by the Ohio River during the early Holocene.

Within the upper .40-3.0 meters of the overbank unit are stratified archaeological remains. Since this landform stabilized in the early Holocene some 8000 years of occupation are represented in the plowzone ranging from late Early Archaic through Late Woodland/Mississipian. Based on Phase II testing only one feature was associated with the surface occupation and it is probably Woodland in age. Below the plowzone is a fairly continuous zone of debris to a depth of 1.5 m below surface on the terrace crest and flat to the west. The density of remains varies in this zone but there are no widely traceable sub-strata within it. Kirk cluster points are found from about .40 to 1.5 m below surface in the eastern part of the site. Features, with one exception, are also confined to these depths. In the Kirk zone the highest debris densities are between .50 and 1.00 m below surface (Figure 2.8), with over 19,000 flakes in one level.

Buried in the terrace escarpment, which was the bank of the Ohio River at the time of the occupation, is a very dense cultural deposit composed of debitage, tools, charcoal, and oxidized soil pellets. This 25 to 60 cm thick zone defines a paleosurface that gradually descends the bank of the early Holocene Ohio River channel (Figure 2.9). At the east end of the 10 North Trench it is found as deep as 3 m below surface (Figure 2.10). This zone bifurcates on the bank slope as indicated by a thicker upper stratum of wood charcoal separated by a zone void of charcoal (but not lithic debris) from a lower thinner stratum also defined by a higher concentration of charcoal. These strata are traceable in the 10N Trench over 13 meters to the east. This zone represents a secondary trash deposit, although some primary cultural deposition may also be present. The charcoal strata are confined to the terrace escarpment. On the terrace flat or crest charcoal is found in trace amounts at most, although some features contain light densities of wood charcoal. This distribution is probably due to differential soil weathering and preservation in the micro depositional environments of the terrace. With the exception of calcined bone flecking, bone is rarely preserved in the deposit.

In the western part of the terrace flat near Phase I Trench 95-25 a high density of Muldarugh chert debitage was encountered. In this lithic workshop debris peaked at between 1.10 and 1.30 m bd in Phase II test units (Figure 2.8). Although the Thebes workshop is at approximately the same depth as the Kirk zone to the east, the workshop zone is contained in older alluvium with surfaces sloping to the east under the Kirk component (Stafford 2007a, c).

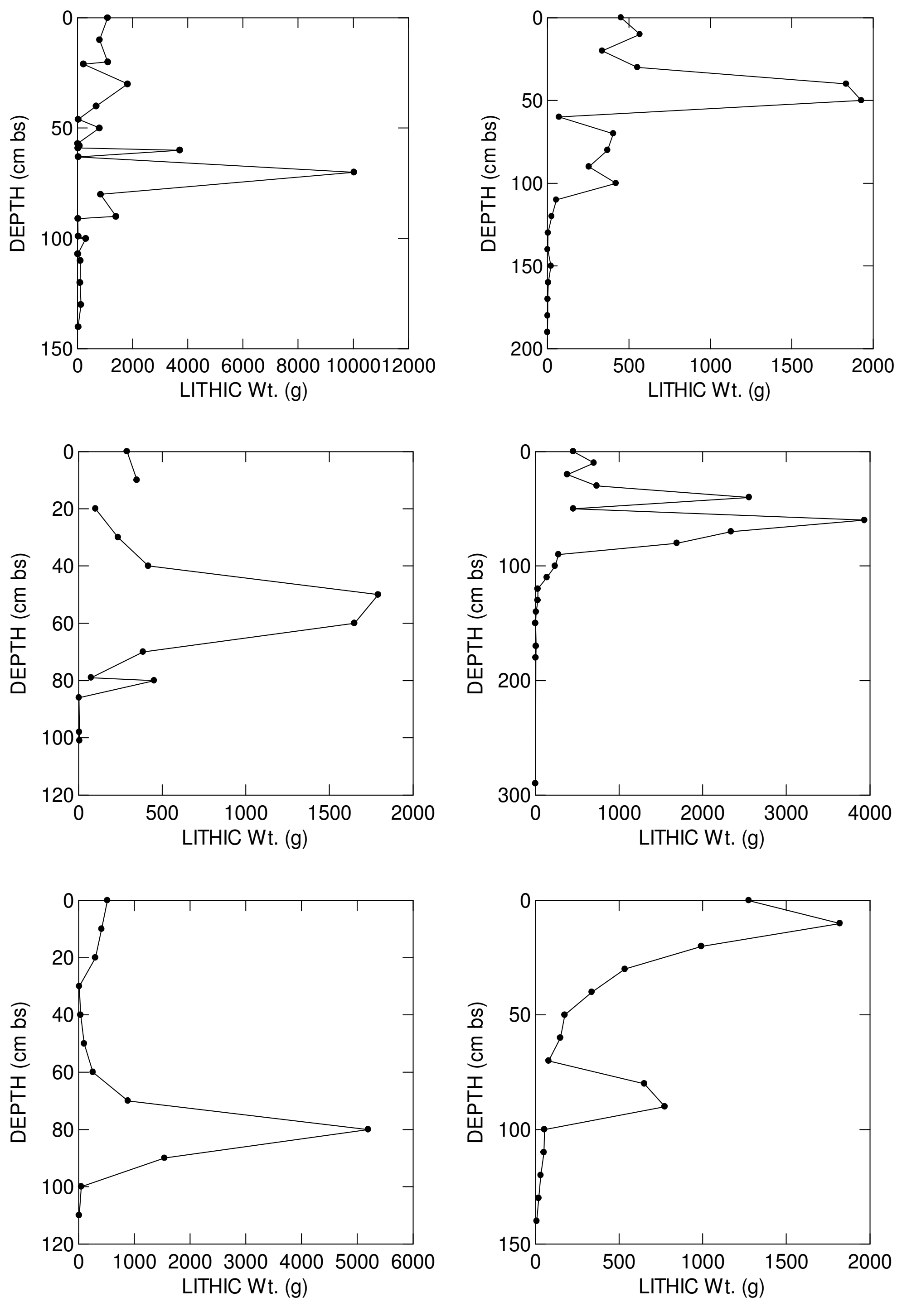

Figure 2.8. Lithic weight (g) by depth (cm bs) in Phase II units (U13N4W, U40N0W, U60N2W, U30N0W, U70N60W, U60N70W).

Radiocarbon Date

A single Phase II sample was submitted for radiocarbon dating. It consisted of wood charcoal (6.43 g) collected from the base of the secondary trash deposit in the 10North Trench (U10N10E) at a depth of 2.0 m bs. The sample returned a date of 8630 ±180 rcybp [Beta 115653]), slightly younger than anticipated (Stafford 2007b).

Features

A total of 36 features were identified in the Phase II testing. They consist primarily of surface hearths; although shallow basin pits, some with oxidized bases (basin hearth), oxidized rings, and lithic scatters are also present (see Table 2.1). Oxidized rings are small pits with in situ oxidation around the rim of the pit and may represent smudge pits (see Chapter 4). Features are also concentrated along the terrace crest in the high debris density area (Figures 2.11, 2.12, 2.13, 2.14, 2.15). Scatters of tools and flakes are often associated with hearths and appear to represent generalized hearth focused activity areas (see Chapter 4).

Artifacts

A very large number of points (n=423) were recovered from the Phase II testing most of which are a part of the Kirk corner notched cluster (Table 2.2). Pine Tree is the most common variety present, although Stilwell, Kirk corner notched Large and Small are also represented as well as Thebes and St. Charles. Points from the Kirk component are almost exclusively from the high density area, with some levels producing as many as seven points. Points were recovered from the slope trash deposit as well as the terrace crest. Only one point (Thebes) was recovered from the workshop area on the terrace flat. The other Thebes cluster points are from the Kirk zone and were recovered from 50 cm to 200 cm bs. The deepest point at 200 cm bs was from the 10N Trench were the Kirk secondary trash deposits dip toward the early Ohio River channel.

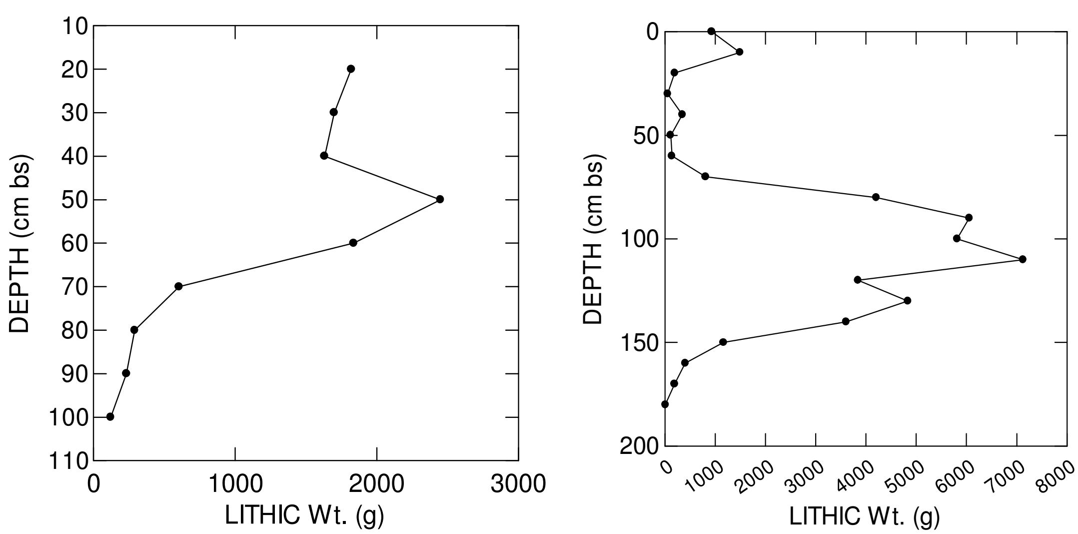

Figure 2.9. Lithic weight (g) by depth (cm bs) in Phase II 10N Trench units (U10N4E, U10N8E).

A few (n=22) non-Kirk or Thebes cluster points were also recovered but these are primarily from the plowzone or the upper 40 cm bs of the deposit. Most time periods that post-date Kirk are represented in the upper levels of the site including Early Archic bifurcate, Middle Archaic Godar, Matanzas, and Early Woodland Adena, Terminal Archic Riverton and Late Woodland/Mississippian Madison points. One bifurcate point was found at 90 cm bs in U20N8E, but that unit is on the terrace slope where the Kirk deposits dip well below this depth. The only anomalous depth for these later points is in U90N0W, where a late Middle Archaic side notched point was recovered at a depth of 100 cm bs.

Figure 2.10. 12Hr520 Kirk secondary trash deposit in 10N Trench.

Other common tools (Table 2.3) from the Kirk component are adzes, scrapers, drills, bifaces, unifacial tools, many of which are made on blades, and cores/tested cobbles. Tool diversity is substantially greater in the high density terrace crest area than in the western Thebes lithic workshop area, where early-stage bifaces predominate.

The quantity of debitage and tools recovered from the Kirk component is exceptional. Few sites of this age are as substantial and as well preserved as the occupations discovered at 12Hr520. It is clear that different activity areas are represented within the site. The western lithic area involves primary lithic reduction where as the terrace crest/slope is more a complex residential occupation. Although lithic reduction is an important activity in the latter area, a wider range of tasks are represented.

Table 2.1. 12Hr520 Phase II Feature Types.

Type	Subtype	Count
Pit	Pit	4
Pit/Hearth	Basin Hearth	3
Pit/Hearth	Oxidized Ring	6
Refuse Scatter	Lithic Scatter	7
Refuse Scatter	Rock Scatter	2
Refuse Scatter	Tool Cache	1
Surface Hearth	Surface Hearth	13
	Total	36

CONCLUSIONS

The large quantities of artifactual remains and features, which contain fragile subsistence remains, along with the age of the cultural deposits indicate that 12Hr520 is eligible for the National Register of Historic Places. The numbers of Kirk cluster points recovered from the site is probably unparalleled in the Eastern U.S. Further investigations at the site were likely to yield important, possibly unique data, crucial to interpreting Early Archaic prehistory of the Falls of the Ohio River region and the greater Ohio River valley. ISU recommended (Stafford and Cantin 1997) that a data recovery project be implemented at the site to mitigate the impacts from planned hotel construction.

In a meeting on January 29, 1999 among the COE Louisville District, DHPA, and ISU it was agreed that data recovery would be carried out primarily in the high density areas indicated on the accompanying site map (Figure 2.16). This is the locality that Phase II testing determined would yield high quality and abundant data concerning the Kirk and Thebes occupations known at that time. During Phase III data recovery investigations more deeply buried (>2 m bs) remains were encountered and the mitigation plan based on the Phase II testing was modified to sample these occupations.

Table 2.2. 12Hr520 Phase II Point Clusters/Types.

Cluster	Type	Count
Bifurcate	Kanawha	2
Bifurcate	St. Albans	2
Early Woodland Contracting Stem	Adena	3
Indeterminate	Indeterminate	16
Kirk CN	KCN Large	53
Kirk CN	Stilwell	10
Kirk CN	KCN Small	31
Kirk CN	Pine Tree	251
Kirk Stemmed	Kirk Stemmed	1
Late Archaic Stemmed	McWhinney	1
Late Middle Archaic Side Notched	Brewerton	2
Late Middle Archaic Side Notched	Godar	2
Late Middle Archaic Side Notched	Matanzas	1
Late Woodland/Miss.	Madison	2
Late Woodland/Miss.	Raccoon Notched	1
Terminal Archaic	Riverton	4
Terminal Archaic	Turkey Tail	1
Thebes	St. Charles	2
Thebes	Thebes	4
	Total	423

Table 2.3. 12Hr520 Phase II Lithic Tools.

Type	Count	Percent
Abrader	2	0.09%
Adze	94	4.35%
Anvil	5	0.23%
Biface	931	43.12%
Bifacial Flake	11	0.51%
Celt	6	0.28%
Chopper	13	0.60%
Core	103	4.77%
Denticulate	1	0.05%
Drill	24	1.11%
Graver	2	0.09%
Hafted Scraper	1	0.05%
Hammerstone	68	3.15%
Hammerstone/Anvil	7	0.32%
Hematite	1	0.05%
Manuport	19	0.88%
Perforator	5	0.23%
Pitted Stone	4	0.19%
Point	423	19.59%
Retouched Flake	134	6.21%
Scraper	94	4.35%
Scraper/Graver	7	0.32%
Scraper/Spokeshave	1	0.05%
Spokeshave	4	0.19%
Tested Cobble	18	0.83%
Uniface	37	1.71%
Utilized Flake	64	2.96%
Wedge	2	0.09%
Total	2159	100.00%

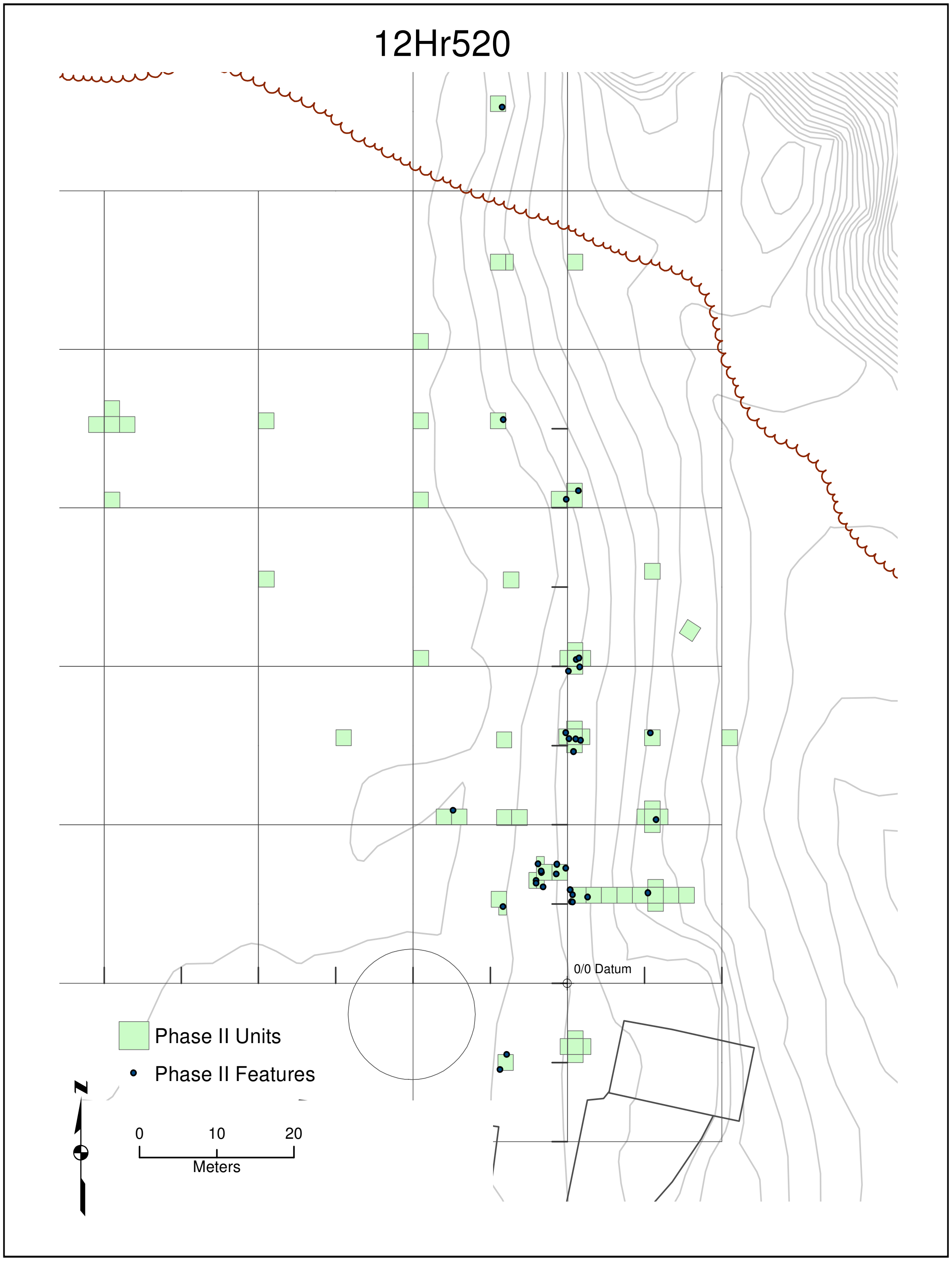

Figure 2.11. 12Hr520 Phase II feature locations.

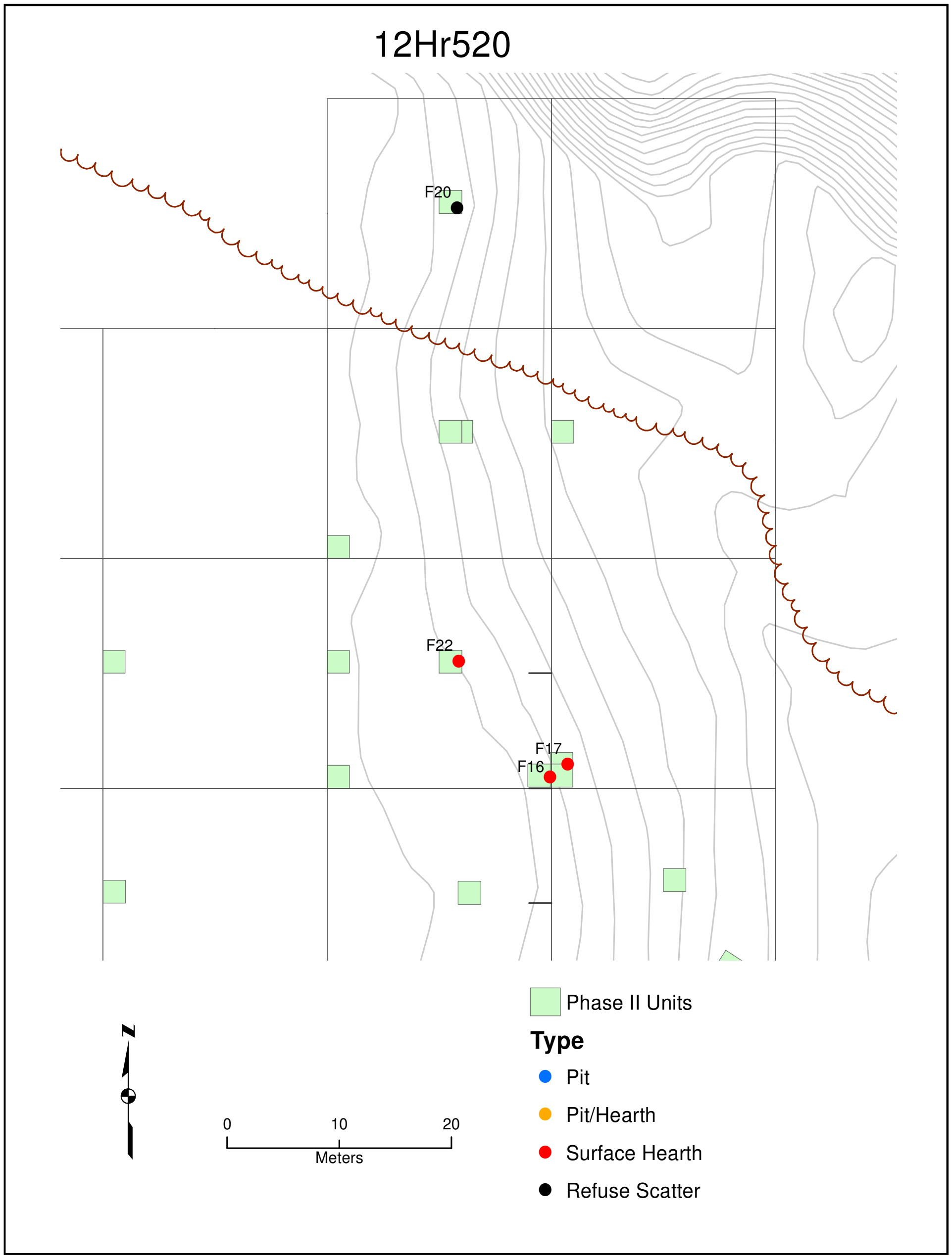

Figure 2.12. 12Hr520 60N-110N Phase II feature types.

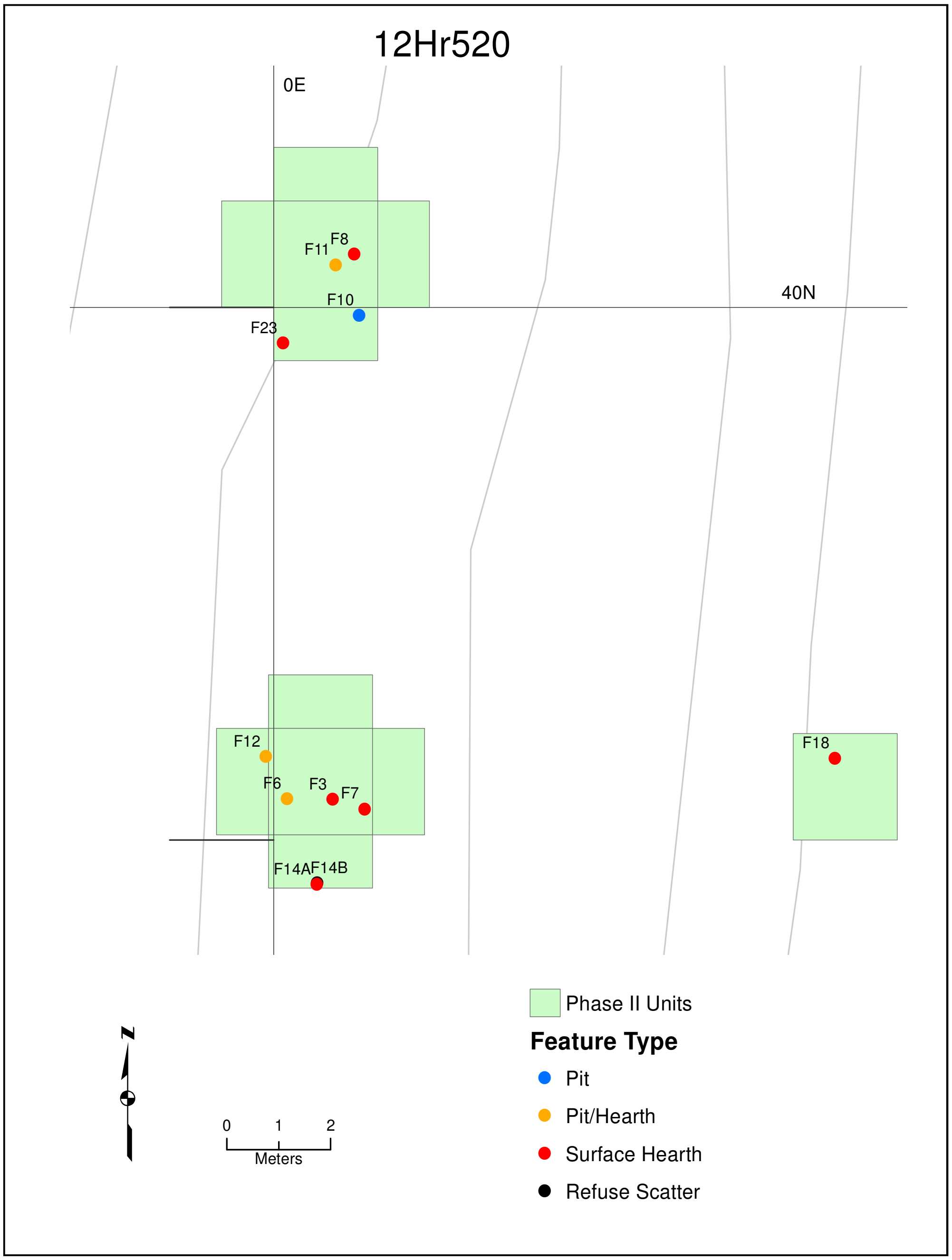

Figure 2.13. 12Hr520 30N-45N Phase II feature types.

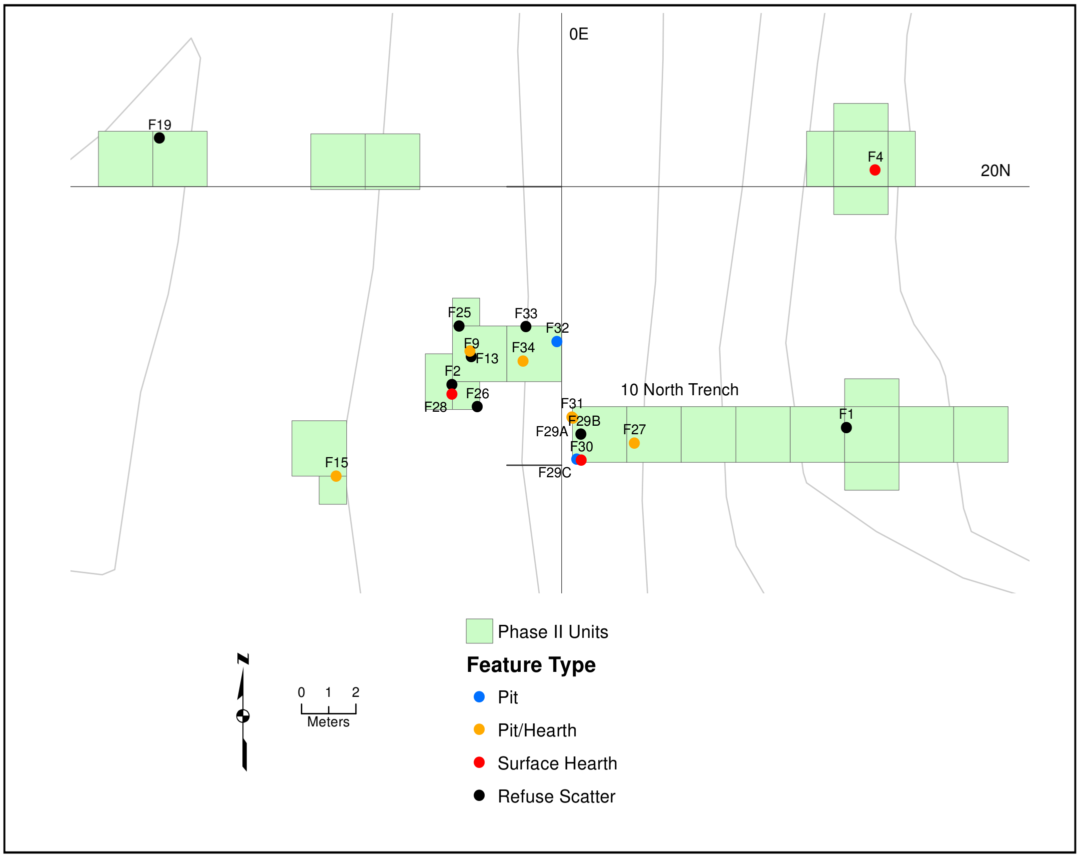

Figure 2.14. 12Hr520 10N-20N Phase II feature types.

Figure 2.15. 12Hr520 20S-0N Phase II feature types.

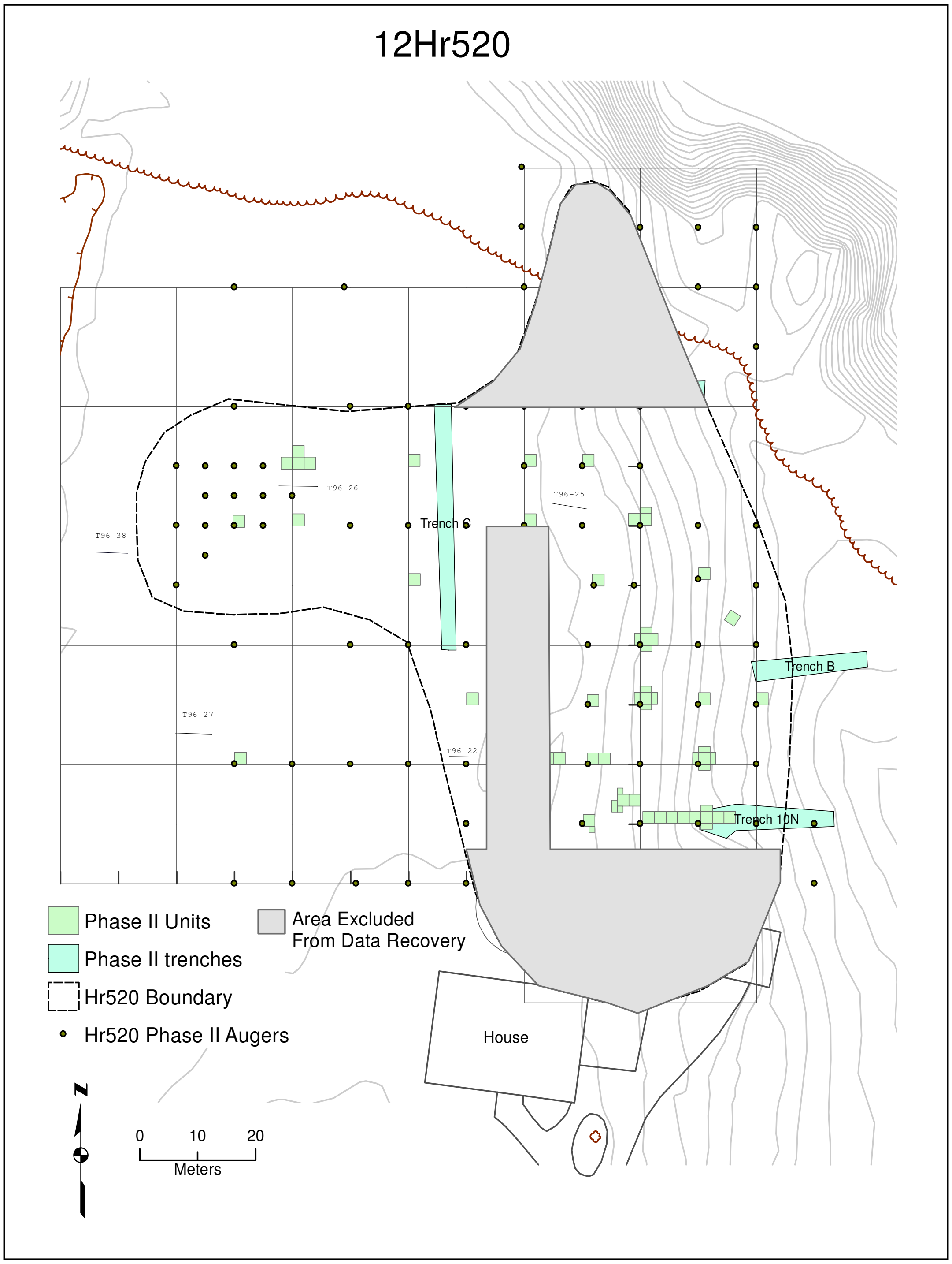

Figure 2.16. 12Hr 520 areas sampled in Phase III Data Recovery.

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CHAPTER 3

PHASE III DATA RECOVERY EXCAVATION PROCEEDURES AND STRATEGIES AT 12HR520

by

C. Russell Stafford, John Schwegman, and Stephen T. Mocas

The James Farnsley site (12Hr520) is a stratigraphically complex site with deeply buried occupations that span most of the Early Archaic period. The following chapter gives a detailed chronology of excavation procedures and strategies for Phase III excavations at 12Hr520. Because of very dense zone of artifacts, features, and other debris in the upper 2 meters of the site and difficulty in accessing deeper alluvial deposits during the Phase II testing the Early Archaic materials buried more deeply went unrecognized until the Phase III investigations were well underway. As a result it was necessary to adapt our excavation sampling procedures and strategies as we gained new information about these deeper remains. Ultimately it was determined that archaeological remains were present over 5 m below surface. Adequately sampling occupations this deep below the surface is extremely challenging. We used a combination of bucket augering to recover macro and micro artifacts, hand excavated units, and track hoe excavation to sample the Early Archaic deposits at the James Farnsley site.

The strategy of the excavations of the Kirk zone and Thebes workshop that occur in the upper 2 meters of the site deposits was to open up large horizontal areas so that we could examine the spatial organization of these Early Archaic occupations. A large Main Block encompassed the Kirk occupations and a series of smaller mini-blocks were used to expose the Thebes lithic workshop to the west (Figure 3.1). Most of these excavations involved contiguous hand excavated 2x2 meter units.

The more deeply buried Thebes/St. Charles and Early Side Notched components, which were very ephemeral, were concentrated in small activity areas, and therefore were difficult to locate. Augering in conjunction with microartifact identification and blading with the track hoe were the primary procedures used to locate these deposits. Hand excavated units were implemented on a more limited basis once archaeological remains had been identified. As we excavated deeper safety issues prevented us from opening up very large areas. The deepest remains at over 5 m bs could only be exposed in a limited area.

To facilitate discussion of the Phase III investigations at the James Farnsley site the chapter is divided into four parts: Kirk excavation block on levee crest and overbank deposits, Thebes workshop on the western terrace, Early Archaic deeper than 2.0 meters below surface, and additional excavations.

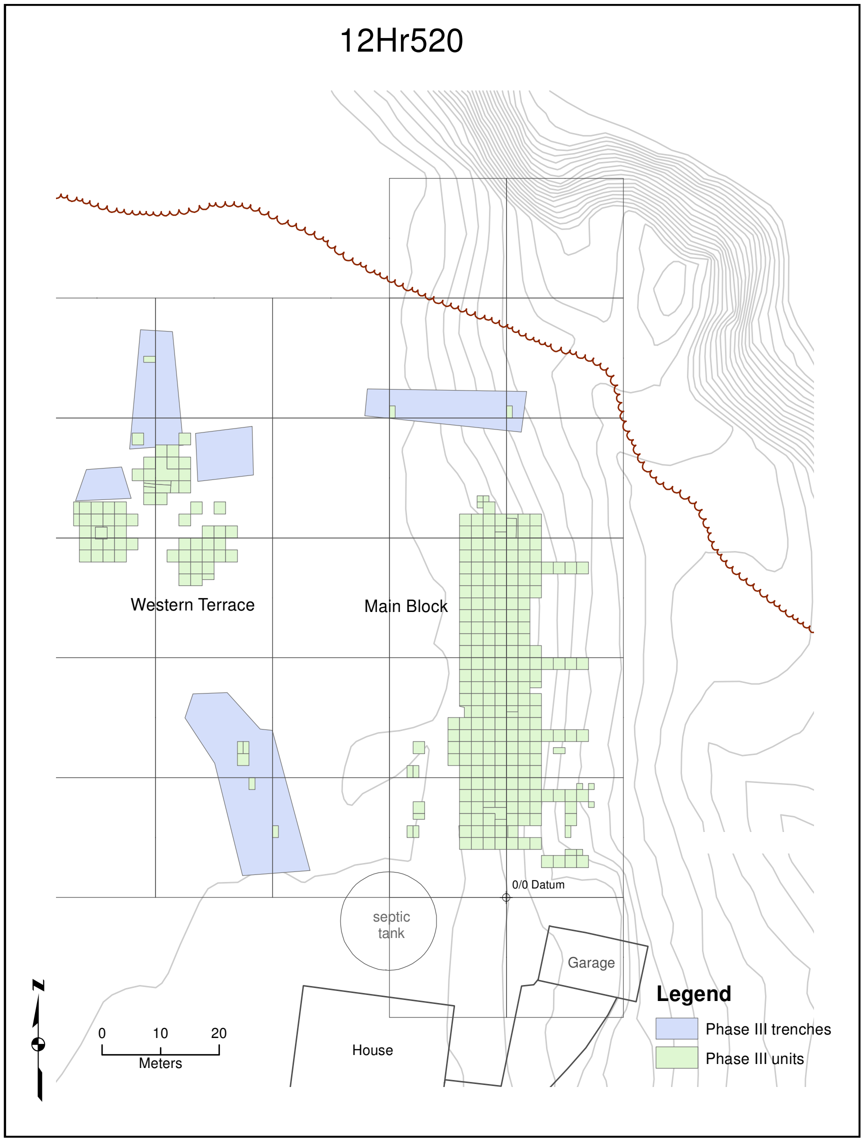

Figure 3.1. 12Hr520 Phase III blocks and trenches (1 ft contours).

KIRK COMPONENT

The Phase III investigation of the Kirk component began on March 18, 1999. These investigations involved work in a 774m^2 block of 2x2m units (roughly measuring 56m N/S and 14m E/W) and in four trenches of four 2x2 m units each extending to the east (Figure 3.1). The main block encompassed the majority of the high density area of the Kirk component on the levee crest. As was seen in the Phase II and verified in the Phase III material density dropped off dramatically to the west and north. A septic tank field associated with the Townsend house was an obstacle on the west side. In addition, five transects of four 2x2m units in a trench configuration cross-cut the bank-side trash deposits on the east side of the main block (this is in addition to the one excavated in Phase II). These were spaced north-south as evenly as possible, although the root system of two large trees interfered somewhat with spacing on the north end. Several units in the main block were also not dug because of disturbance by these root systems. Substitute units were excavated on the west side of the block where material densities were high.

All main block Phase III excavations took place within a large structure (Universal Fabrics Inc.) which completely covered the block and trenches allowing productive work in all weather conditions. The first step in the main block excavation consisted of the removal of 20cm (plowzone) of soil from the surface using a track hoe with a large toothless bucket. Once this soil was removed, the block was gridded into units which matched the orientation of the Phase II grid. During both machine and hand excavation of the main block vertical provenience was maintained by the use of a laser level. Because of the variation in elevation characteristic of the main excavation block this instrument was placed midway down the slope to facilitate measurements. The laser level was given a zero elevation designation and all measurements were recorded in centimeters below datum.

In order to follow the orientation of the Kirk cultural strata as noted in earlier investigations, unit levels were excavated in two manners. East of the 0E line unit levels were measured relative to the ground surface, thus in these "slope" units the surface was measured in each corner of the excavation area with levels extending down 10cm from each measurement thus maintaining the initial landform grade. West of the 0E line, and in the trench units, elevation measurements were made at the unit surface, the highest elevation was determined, and then the subsequent levels extended down 10 cm from this measurement for the whole unit. This resulted in a flat surface at the base of each level which was maintained throughout the excavation.

To fully expose the main occupation surface at one time, and therefore to facilitate determination of intra-site patterning, the main block Kirk component was excavated in three stages. The first stage removed the upper, less culturally dense, levels of occupation thus leaving a contiguous surface at the top of the highest density strata. The second cut excavated through the main occupation levels with the final stage removing the remaining Kirk material.

Units were designated by consecutive Arabic numerals (Figure 3.2). Units were 2x2 m in size but artifacts and all samples were provenienced according to 1x1 m quads that were designated as NW, NE, SE, or SW quad as fine-grained spatial patterning was important to document. All soil from unit and feature excavation was water screened through ¼ inch mesh. Fill was placed in a wheel borrow, labeled with provenience information and transported to a central water screening station for processing. Recovered artifacts were separated into general categories by type (e.g. debitage, or FCR/rock) and bagged. A rough tally of artifact counts was maintained, by level, in each excavator's field notes. These counts were used to determine the stopping level for the various cuts.

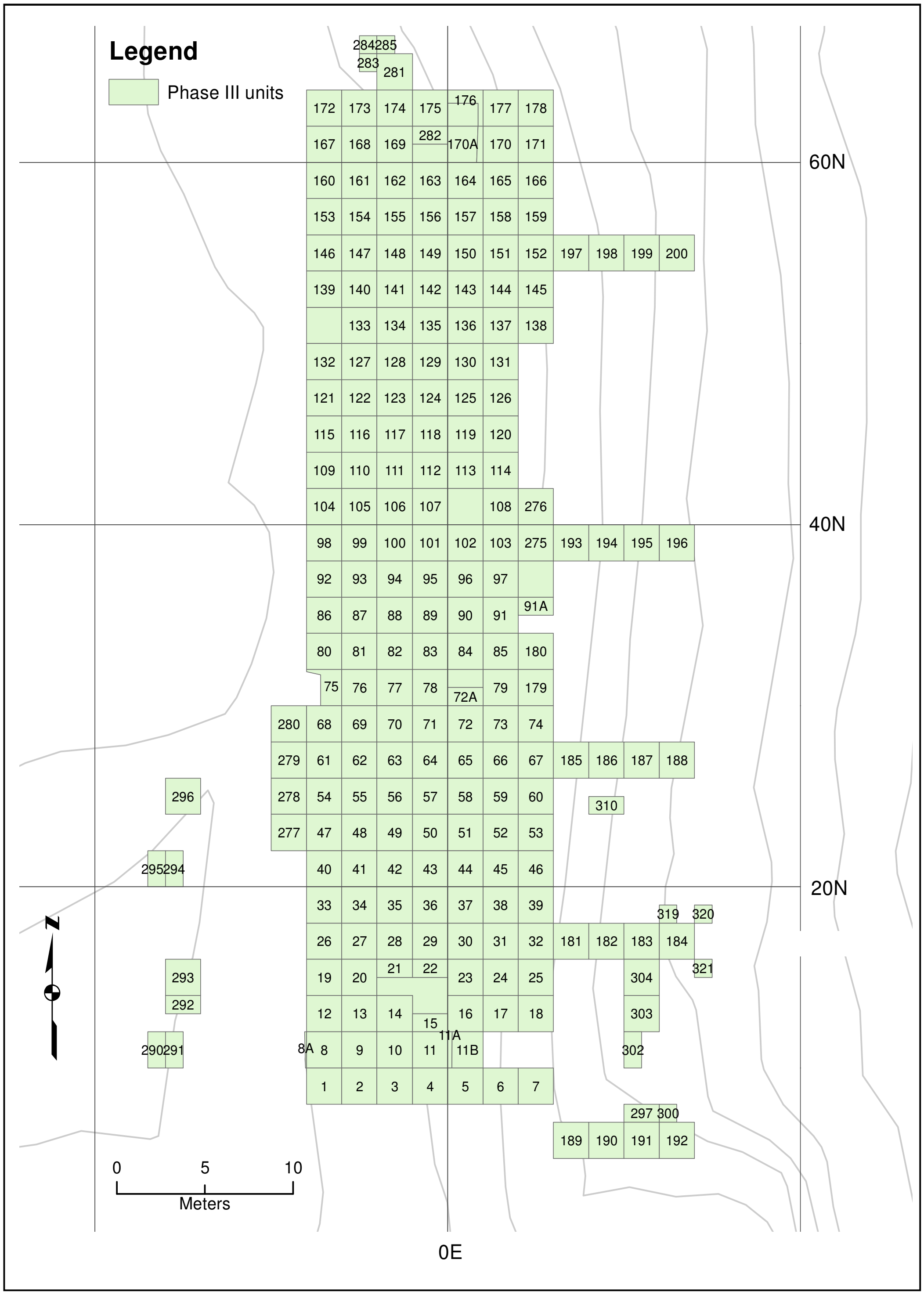

Figure 3.2. 12Hr520 Main Block Phase III unit numbers.

Charcoal was essentially nonexistent in most unit levels and was usually restricted to features and the bank-side trash deposit. Therefore, 8 liter flotation samples were collected from levels with the highest cultural material densities in each unit. In addition a sample of twenty-one units had floats taken from every level.

Two-hundred and sixty-five prehistoric features were exposed and excavated in the Main Block. Two-hundred and thirty-six of these features were found in the Kirk component and included hearths, pits, tool caches, lithic concentrations, and general refuse scatters. Hearth-like features consisted of surface hearths, as well as pit hearths, where the walls of the pit showed in situ oxidation. Pits were small shallow basins. Various lithic tools were identified as caches including scrapers and adzes. Lithic concentrations consisted of tight clusters of debitage and sometimes included other artifacts like hammerstones.

More than 15,000 lithic tools were recovered from the Main Block and most were associated with the Kirk component. Well over a two thousand points were found, with hundreds of bifaces, knives, adzes, drills, end scrapers, other unifaces, retouched flakes, and cores collected. Debitage was very abundant with some levels producing tens-of-thousands of flakes. Preservation of organic remains was somewhat limited. Charcoal (primarily wood) was typically found preserved in features or in the bank secondary trash zone. Little charcoal was present in the general matrix of the deposit, mostly likely because of the highly weathered soil conditions. Very few faunal remains were found in the Kirk component (several features contained calcined bone and one hearth produced potentially identifiable burned bone).

THEBES/ST. CHARLES & EARLY SIDE NOTCHED

In the Main Block excavations in the primary Kirk component were completed on May 3, 2000. During this work various lines of evidence indicated that deeper archaeological deposits were present in the area. The first evidence was discovered in the course of excavating the southern water screening pond prior to Phase III hand excavation. A hearth feature (F35), consisting of several large pieces of burned sandstone, debitage, and charcoal flecking, was exposed and excavated. It was at a depth of 2.45 m below surface. This was the only prehistoric debris observed as the pond was being dug and no other debris or evidence of cultural activity was observed during excavation of the adjacent water screening pond. Feature 35, however, occurred about a meter lower than the deepest Kirk feature on the terrace flat/crest (Main Block) encountered in the Phase II testing. As a consequence, a strategy in which bucket augering and microartifact/macro artifact sampling was used to identify and trace debris associated with this lower occupation. Sampling was conducted in every other unit west of the 0E datum line in the main block with a 4-inch bucket auger at its base of the Kirk excavation (Figure 3.3). Additionally, auger cores were placed outside the Main Block, on a roughly 10 meter grid (Figure 3.3) although obstacles associated with the Phase III excavation (e.g., water screening ponds) prevented this in some cases.

From the main block augers samples were recovered between 2.60 and 3.90 m below surface based on the estimated slope of the cultural deposits at 10 cm intervals. Because of the time consuming nature of microartifacts analysis and the large number of samples that would be generated, samples from the auger were bagged every other 10 cm level while the intervening 10 cm levels were screened through ¼ inch mesh to recover

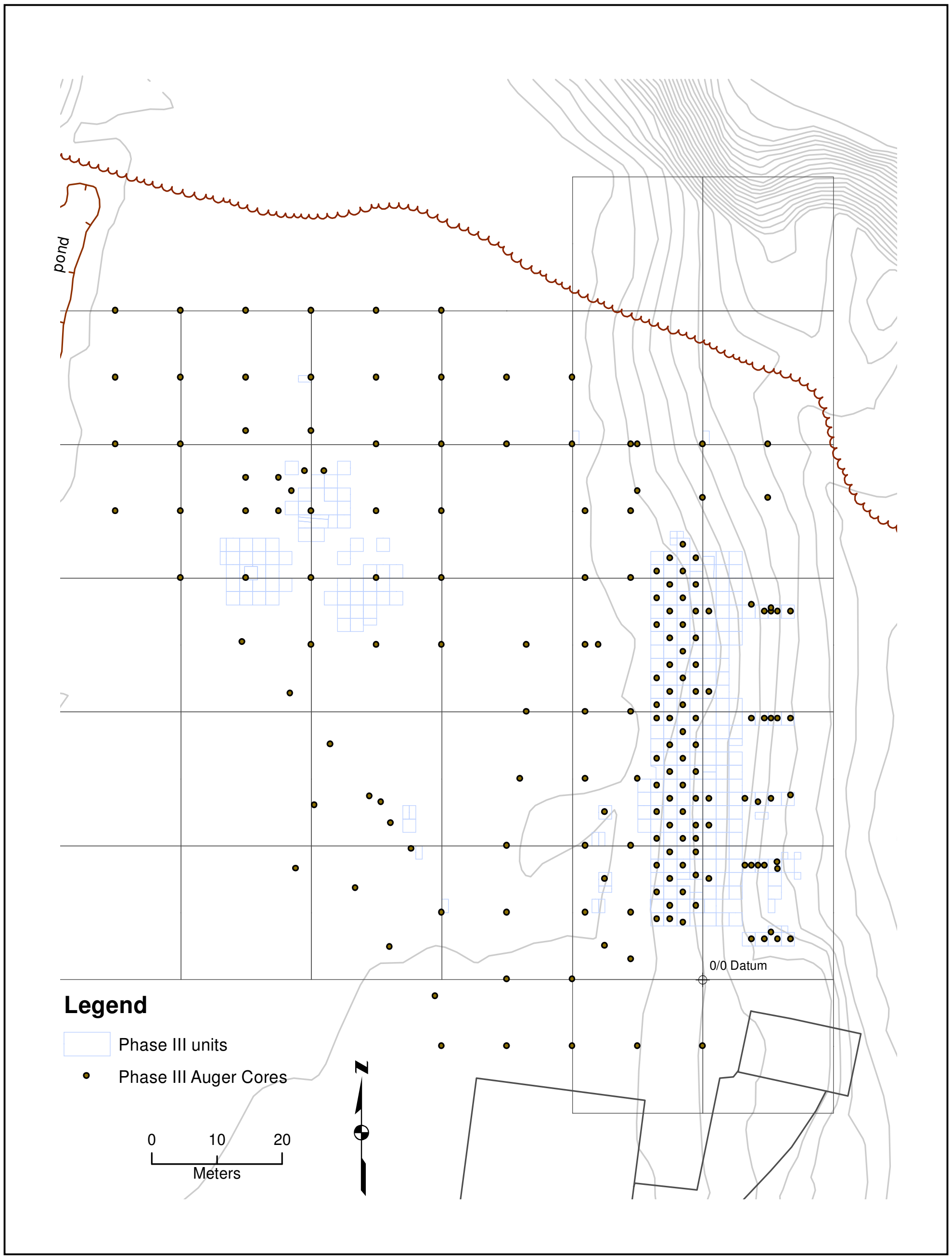

Figure 3.3. 12Hr520 Phase III auger cores.

macro artifacts (all fill extracted above the target zones was also screened). Microartifacts samples and screening levels were alternated in adjacent cores. In the hand excavated unit trenches to the east of the main block the same procedure was used but the depths sampled ranged from 3.00 to 7.00 m bd. In the Universal Shelter but to the west of the Main Block auger sampling occurred from the surface to 300 cm bs (11W) or 400 cm bs (18W). Outside of the shelter augers spanned the depth range of 200 to 400 cm bs with the exception of 8 cores near mini-block B (Thebes workshop) that were sampled from 50 cm to 450 cm bs.

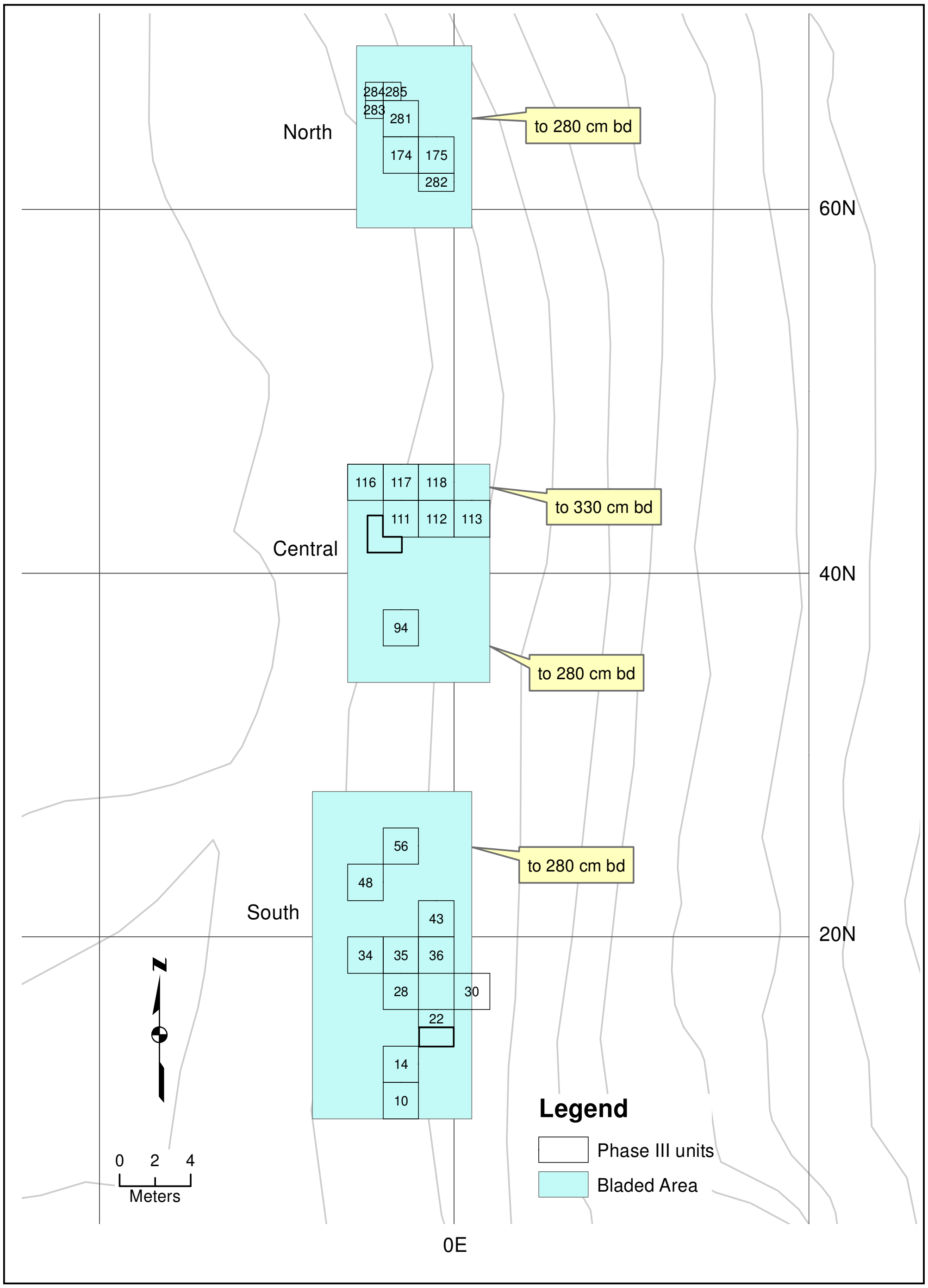

Figure 3.4. 12Hr520 Main Block upper St. Charles units and bladed areas.

In the Main Block guided by auger results five 2x2m exploratory units (Figure 3.4) were excavated into this lower Early Archaic zone. Beyond lithic debitage this work yielded two St. Charles bases, one Thebes base, and two type indeterminate bases indicating that Thebes cluster occupations underlie the Kirk component.

To further investigate these deep deposits, a strategy was used involving first blading to the top of the indicated deposits and then establishing 2x2 m units that were hand excavated through the debris zones. All of the deep units were numbered according to the Kirk main block system with unit and level designations being maintained from the above excavations.

Utilizing both auger and unit data three initial sub-Kirk occupation blocks (north, central, and south block) were designated within the main excavation block (Figure 3.4). The north block covered an area measuring 57.6 m^2 and was machine scraped to 280 cm below datum. This depth was determined by a peak in debitage noted in U175 between 280-290 cm bd. This unit also contained a Pitted Stone at 313 cm bd. Once at 280cm bd six units were designated for a total of 13 m^2 (Figure 3.4).

The central block consisted of a northern section and a southern section (Figure 3.4). The northern half was taken down to 330 cm bd based upon an increase in debitage and the uncovering of a shale scatter between 340-350 cm bd in U175 (Figure 3.4). Unit excavation in this half covered 62.0 m^2 and resulted in the discovery of three large scatters of shale. To fully investigate these features nine hand excavation units were excavated equaling a total of 27 m^2. The southern section had an area of 82.08m^2 that was taken down to 280 cm bd to investigate if the upper occupation from the northern block was present. The unit excavated in this area (U94) showed no peak in debitage at 280 cm below datum but did show a concentration between 330 and 340 cm.

The south sub-block was the largest of the three, covering 162 m^2, and was excavated to 280cm below datum (Figure 3.4). Eleven 2x2m units (44m^2) were excavated within this block to sample a debitage concentration that was noted in the 270-280 cm level of Unit 10.

Following these excavations work continued lower in the northern half of the main block. This work consisted of blading an area 285.88 m^2, between N34 and N68, down to 390 cm bd (Figure 3.5). At this depth nine units were excavated equaling 32 m^2 (Figure 3.5). During this episode of unit excavation a pitted stone was discovered in Unit 93 at 443 cm bd, indicating a yet deeper occupation at the site. To explore this occupation, further machine excavation was conducted in the area with the goal of reaching the occupation at ca.440 cm bd, with later work to reach 550 cm bd. But after just machine scraping down to 416 cm below datum a large surface hearth (F300) was exposed that contained a projectile point. Upon continued stripping at this general elevation it was determined that this hearth was one of a series of features at this depth including eight large surface hearths. To sample the cultural material associated with this occupation, eleven units (36 m^2) were excavated. These excavations began at ca. 420 cm below datum (Figure 3.6) and recovered only scant cultural remains, a few flakes and shale fragments. Upon completion of these hand excavations further track-hoe work in an area measuring 162.56 m^2 was conducted to continue down to 550 cm bd (Figure 3.7). Machine work at this stage was suspended twice. At 470 cm bd an ephemeral occupation was identified by the occurrence of surface hearth, a lithic concentration and a pitted stone. Five units (18m^2) were placed to sample this occupation (Figure 3.7). The second stoppage resulted from the recovery of a projectile point at 526 cm bd at the very

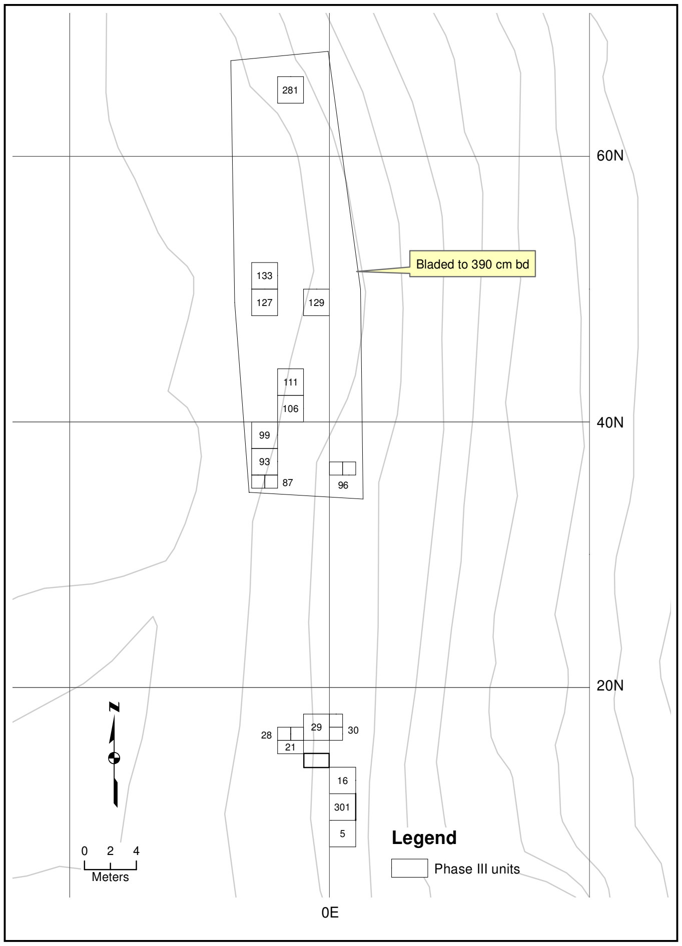

Figure 3.5. 12Hr520 Main Block middle St. Charles units and bladed area.

northern end of the block which was investigated with two units (6 m^2) producing no new material (Figure 3.7).

The final excavations in the northern half of the main block consisted of the machine excavation of a north/south trench approximately 2 m wide down to 750 cm bd (Figure 3.8). This trench followed the W2 line and included a six meter long east/west extension placed at the southern end. Two artifacts were recovered during trench excavation including a fragment of a large biface at 699 cm below datum and a tested cobble at 668 cm. A hand excavation unit, placed in the area of the latter artifact, recovered no new material (Figure 3.8). While the area around the tested cobble was pedestaled a majority of this trench reached 750 cm bd with the very northern end in a small test hole extending down to a layer of gravel at 900 cm bd.

In the southern end of the block, deep excavations were conducted between the N16 and N5 line. The two primary goals of this investigation was to look for deeply buried cultural material and to create a deep east/west profile at the N18 line to get a cross section of the point bar perpendicular to the paleochannel. The actual excavation followed the strategy of the northern area, with the track-hoe being used and monitored

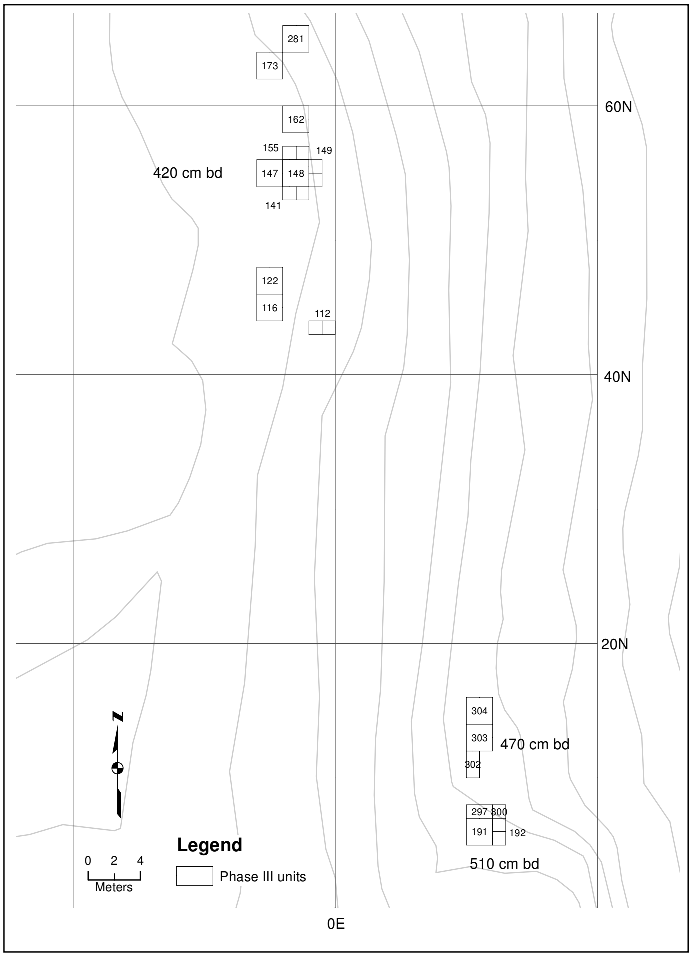

Figure 3.6. 12Hr520 Main Block lower St. Charles units.

by an archaeologist and hand excavation units being placed in areas of perceived material concentrations and/or features. Thus the initial work in this area proceeded to 420 cm bd at which time machine excavation was stopped while three units (10 m^2) were dug to investigate an increase in debitage (Figure 3.5). In addition another three units (12 m^2) were excavated to the southeast of these (Figure 3.5) to test a concentration of Muldraugh debitage at ca 410 cm bd (F304).

In association with the southern main block machine excavations a block south of the N16 north line and east (down slope) of the main ridge was excavated to 480 cm below datum (Figure 3.6). Three units were then laid in at this depth to sample the St. Charles occupation in the area. Little cultural material was found during these hand excavations. In addition, the machine was used south of these excavations to expand the 5N Trench to expose a surface hearth and lithic concentration initially indicated in U191 at ca. 510 cm bd (Figure 3.6).

The southern excavations concluded with the digging of a deep trench parallel to the N16 line (Figure 3.8) and resulted in the discovery of a surface hearth (F313), associated with a Early Side Notched point, at 673 cm bd. Once exposed, three hand

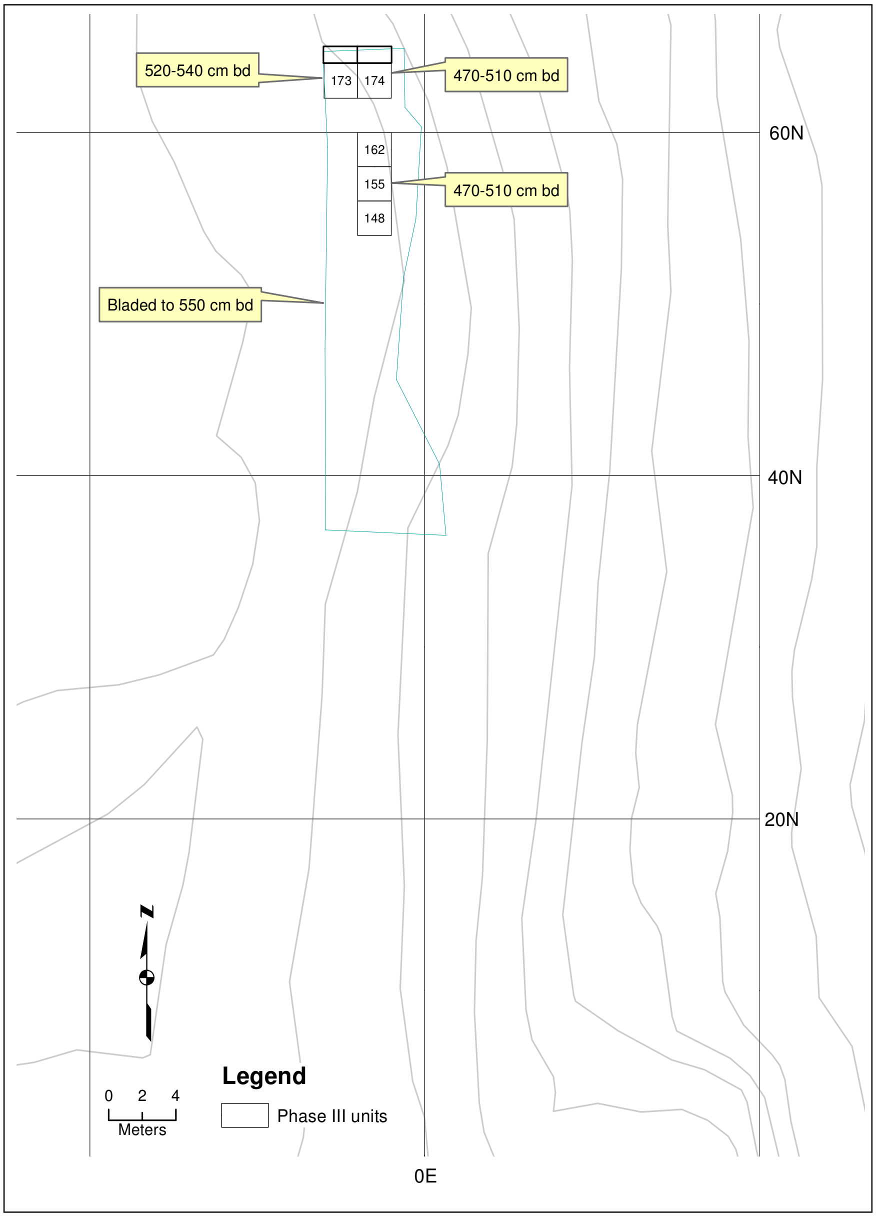

Figure 3.7. 12Hr520 Main Block upper Early Side Notched units and bladed area.

excavated units (10 m^2) were placed surrounding the feature to sample an associated activity area (Figure 3.8). One of the final machine excavations was a deep east/west trench approximately 2x6 meters (Figure 3.8). This trench was off the main ridge and extends to a depth of 900 cm bd. Once all machine excavation was complete, the final step was to map and photograph the N16 profile.

MAIN BLOCK WESTERN EXTENSION

Extending out from the southwest corner of the main block an area covering 92.4m^2, designed the "Western Extension", was bladed to determine the extent of both the Kirk and earlier occupations in this region (Figure 3.9) based on previous augering

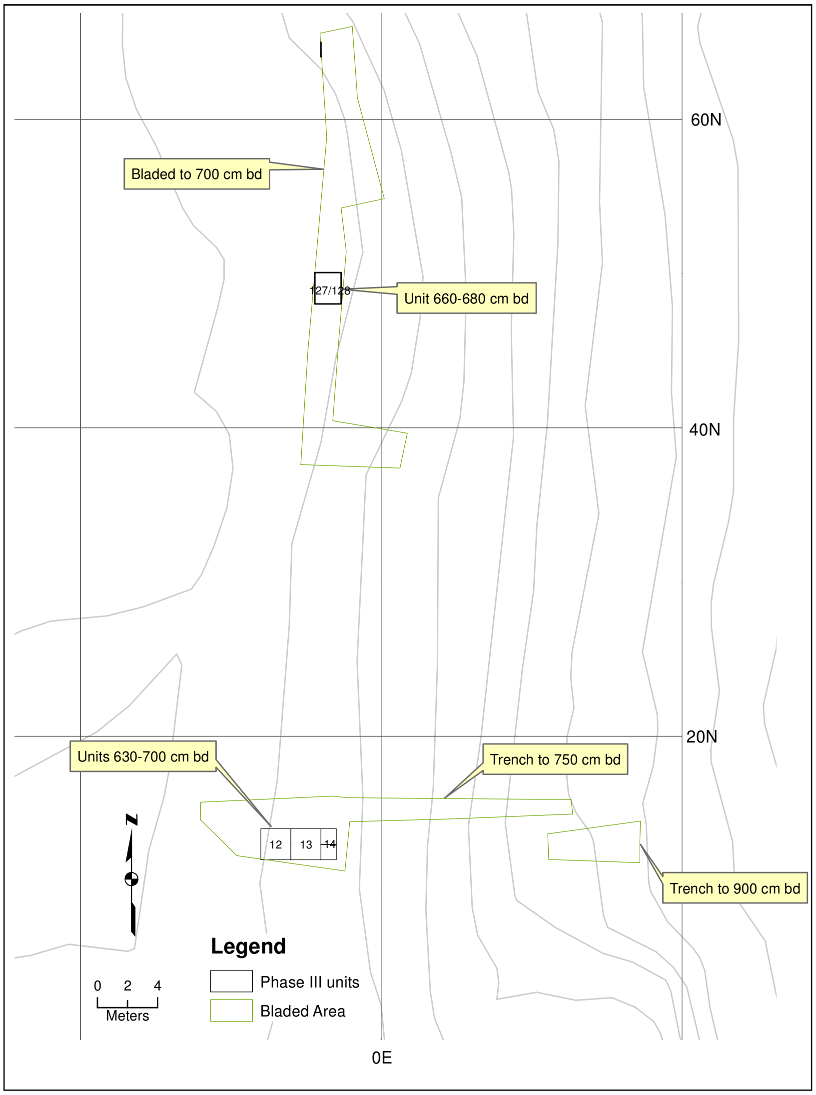

Figure 3.8. 12Hr520 Main Block lower Early Side Notched units and trenches.

and microartifact analysis. Work in this extension began with careful machine scraping down to 250 cm bd at which point four separate hand excavated units were shot in (Figure 3.9). Each of these units was excavated down 2-3 levels and then, depending upon excavation results, the extension was machine scraped an additional 50 cm with more units placed at this elevation. This process continued until 400 cm bd.

WESTERN TERRACE THEBES WORKSHOP

Original Phase III excavations in the Thebes workshop area (i.e., the Western Terrace) were started in October 1999, but incessant flooding of these outdoor blocks caused the excavation to be delayed until April of 2000. Archaeological investigations consisted of a series of hand excavation blocks and trackhoe excavation blocks in the overbank deposits west of the Main Block (Figure 3.10). Three 10 x 10 m hand

Figure 3.9. 12Hr520 Western Terrace Phase III unit numbers and trenches.

excavation blocks of 25 2 x 2 m units each were originally designated for excavation. Some units were not excavated because adjoining units were nearly sterile and all indications were that cultural debris did not extend into the unexcavated units. Other units were added to gain information about concentrations of cultural debris in adjacent areas. Two hundred and thirty square meters of hand excavation was completed. Ninety-two square meters were excavated in Block A, which encompassed Phase II unit 60N70W. Block B encompassed Phase II units 70N58W, 70N60W, 70N62W, and 72N60W and Phase I Trench 96-26. A total of 68 m^2 were excavated in this block, all of which was removed by hand except Trench 96-26, which was dug with a backhoe. Block C consisted of 17 2 x 2 m hand excavation units (82 m^2). Phase II unit 60N60W (which had only a few flakes in the Thebes levels) was in the middle of the three blocks. During Phase III the plowzone and an additional 20 cm of deposits with an ephemeral mixed component (the top 50 cm of soil) were removed by trackhoe and 50-60 cm of Thebes deposit were excavated by hand, with most units ending at about 120 cm bd (100 cm bs).

Two trackhoe blocks (Blocks D and E) were used to verify that cultural features and debris were not present to the north of Blocks C and A, respectively (Figure 3.10).

These two blocks comprised approximately 125 m^2 and were dug to a depth of 240-256 cm bd (220-230 cm bs).

Block A

Block A levels began four centimeters deeper than all subsequent measurements, because after the block was completed the datum was recalibrated to correlate better with the Main Block datum. Two nearly sterile units (U210 and U220) were excavated along the east side of the block; therefore, the other three units in that line were not excavated. The remainder of the block was excavated and two 1 x 2 m units were added to the northwest corner to explore the spatial extent of a debitage scatter. The debitage concentrations were quite small and often horizontally restricted. It was common for a concentration to extend through parts of two or even three levels, yet it also was common to have dense clusters in one quad and almost no debitage in adjacent quads. In some areas (e.g., the northwest quad of Unit 207 and possibly in Feature 5WT/6WT) there appeared to be early stage manufacture debris at the bottom and a layer of intermediate stage debris on top of it. In other instances (e.g., around Feature 4WT), concentrations or clusters of flakes were predominately from only one stage of manufacture. Debitage was found in moderate amounts in the 120-130 level of several units, and an auger core found microflakes at 180 cm bd (160 cm bs) in Phase II U60N70W.

Block B

A Late Archaic/Early Woodland point and a Late Archaic barbed point were found in the backdirt from the top 50 cm of soil scraped from the block by the trackhoe. Early Woodland Feature 8 was found at 51 cm bd at the south edge of the block and a probable Woodland biface was found near it at 59 cm bd. At 70 cmbd a preform/knife was found in the wall in the southeast corner of the block, and a knife was uncovered at 61-82 cmbd outside the southeast edge of the block during trackhoe scraping.

Variations in the depth of deposits in adjoining units suggest an undulating surface rather than a consistent slope to the landform, and similar conclusions were drawn about deposits in the other two hand excavation blocks. There was little debitage outside of the two concentrations. All of the units showed a marked increase in debitage in the 86-96 cm bd (70-90 cm bs) level, and debitage was densest at 95-110 cmbd.

A dense debitage concentration was recorded within a group of Phase II units (Units 70N58W, 70N60W, 70N62W, and 72N60W), but it was not assigned a feature number. Numerous cores and bifaces were found within and around the periphery of the concentration. Wyandotte flakes occasionally were found in the deposits in small numbers, including a cluster of about 30 non-cortical flakes from reduction of an early or intermediate stage biface. Unit 245, in the northwest corner of the block, was nearly sterile, and the units on the northwestern periphery of the Phase II concentration had very little debitage, so the three intervening units were not excavated. Only scattered flakes were found below 126 cmbd in the hand excavation units, but a Wyandotte flake was found at 210-220 cm bs in an auger core at the western edge of the block.

Block C

Early Woodland Feature 12 was found outside the west wall of the block at 50 cm bd. There was very little debitage found in the first two levels, but a Kirk adze was found a 79 cm bd in Unit 255. There was very little debitage in the Thebes levels except around the features. The Thebes component began in the 86-96 cm bd level, and debitage was scattered in moderate to large amounts throughout several units and around features in the 96-106 cm bd and 106-116 cm bd levels.

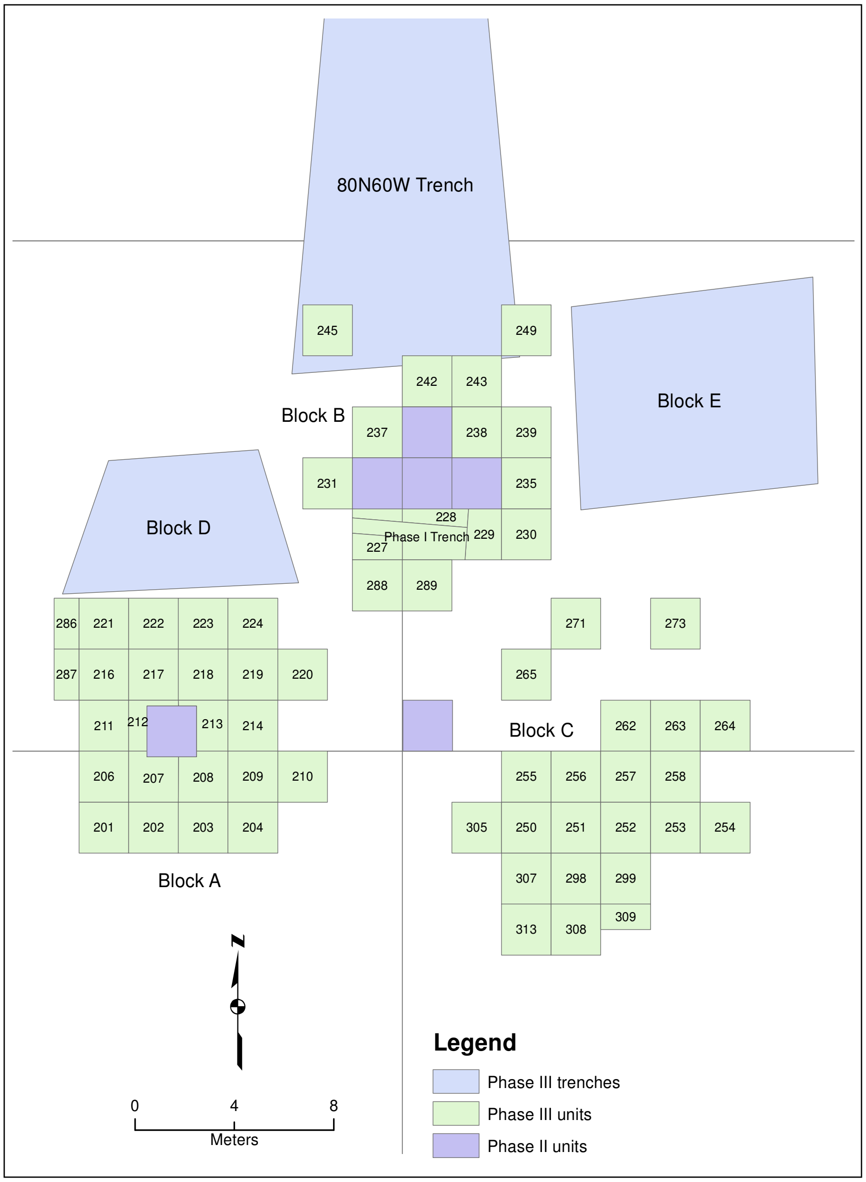

Figure 3.10.12Hr520 Thebes workshop with Phase III unit numbers and bladed blocks.

Block D

A sherd of grit tempered pottery was found at 58 cm bd during trackhoe scraping, and a Late Archaic barbed point was found between 59-87 cm bd. There is evidence of the presence of multiple occupations within the Thebes component. A preform was found at 95 cm bd, an end scraper made of a cortical flake of Wyandotte was found at 113 cmbd, and a Thebes point was found at 129.5 cm bd. The floor of the block was taken to 136 cm bd, and the block was taken to 256 cm bd along the east wall, but no additional clusters of cultural material were encountered. A large primary flake at 235 cm bd suggests that there were deposits considerably deeper than the base of the hand excavations.

Block E

The block was taken to 240 cmbd, but no debitage was seen below the base of hand excavation units in adjacent Block B.

DEEPER WESTERN TERRACE EXCAVATIONS

Concurrent with the ongoing investigation in the Main Block and Western Terrace two other, smaller scale, excavations were conducted at the James Farnsley site. The placement of each block was determined mainly by auger test results with one block placed to further investigate the area associated with Feature 35, which was uncovered during the construction of the water screening ponds.

Block F (10N40W Trench)

The first block was near the location of F35 near the 10N40W Trench (Figure 3.9). One Auger (#174) at 10N40W produced higher than normal quantities of debitage (36 micro/macro flakes) at 220-230 cm bd (ca. 210-220 cm bd) at a depth slightly higher than F35 (there is probably a ± of at least 10 cm in these measurements given difficulties in determining original ground surface). Although little micro debris was found adjacent to F35, we believed it would be prudent, because of the age of F35, to include the area adjacent to the pond in the investigations of this area. Therefore a trackhoe bladed area, which measured 336.60 m^2, was placed adjacent to the screening pond and F35.

No features were identified in the top two meters of deposit, and almost no debitage was seen. Several large flakes were present at 140 cm bd, and between 180-200 cm bd there were several small flake scatters with nothing between them. The middle of the trench had the most material, including a cluster of about a dozen flakes at 190-195 cm bd and another at 195 cm bd. Only one flake was found at the south end at 190-200 cm bd, and the north end was almost as sterile except for a biface in the west wall.

Debitage increased at 200-210 cmbd, especially between the two auger holes in the center of the trench. There was a scatter of Muldraugh intermediate-late stage flakes in an area about 10 m (N-S) by 5 m, between 205-216 cm bd in this area. The largest cluster was about 30 flakes. No cortical flakes or large flakes were encountered. A few small, scattered clusters were seen from 210-220 cmbd. Unit 312, adjacent to Feature 13WT, had a total of about 100 flakes in the 210-230 cm bd levels and one at 236 cm bd. Unit 311, placed over a positive auger test at 10N40W, had about a dozen flakes in the 210-220 cm bd level, but the 220-240 cm bd levels had no flakes despite the recovery of 36 flakes in the auger test within those levels. F13WT had a large number of very small flakes and intermediate stage reduction flakes. This was a lithic concentration similar to those found in the hand excavation area. Several flakes and several pieces of sandstone and limestone were found between 230-270 cm bd.

A large piece of limestone was found in the southeast corner at 273 cm bd, which was about the same depth as Phase II F35. One 2 x 2 m and two 1 x 2 m units were placed adjacent to Phase II F35. Unit 314 yielded an end scraper and an early stage biface, and Unit 317 contained a crescentic side scraper and a small early stage biface fragment, and a few flakes, numerous small pieces of sandstone, and charcoal also were present. The 2 x 2 m unit (Unit 318) to the south contained no debitage, although lots of rock was present. Phase II F35 and F15WT in the 80N60W Trench were surface hearths like those in the Early Side Notched component in the Main Block.

Between 280-294 cmbd, this area contained several flakes, charcoal, and several pieces of sandstone, and a piece of goethite and a cobble that may have had cultural alteration. At 304 cm bd in the southeast corner, a pitted stone was recovered, and a flake was found at 320 cm bd. A piece of Allens Creek chert was present at 394 cm bd and several cobbles were found at 385-395 cm bd. The northernmost four meters of the trench was taken to 400 cm bd, and the southernmost four meters was taken to 400-420 cm bd, and there was still charcoal along the wall in the southeast corner at 400 cm bd. The center of the trench was taken to 270-350 cm bd.

80N60W Trench

The second area investigated was in the northwest corner of the site (Figure 3.9). In general, only small amounts of debris were recovered in augers (1-2 microflakes/sample), but samples in three augers yielded higher than normal quantities (albeit still small numbers) or different types of remains. In Auger 120 at 400 cm bs eight flakes were recovered. In Auger 113 four flakes were found at 380 cm bs and in Auger 116 wood charcoal and oxidized rock were recovered at 320 cm bs. This is in an area, however, where samples also produced unusually large amounts of sand and gravel interstratified with silty deposits. F35 indicated that in situ remains are present in this deposit, however, the debris from Auger 120 and Auger 116 are from samples that also contained significant quantities of coarse sand and gravel putting their context into question. Given the contextual questions that existed about the remains in this area of the site, a geomorphological assessment was conducted first to determine the exact context of these remains. These investigations consisted of excavating a trench, covering an area 142.13m^2, associated with Augers 116 and 120 to provide a cross section of the deposits. This cross section allowed a soil-geomorphic description to be conducted to determine the context of the debris.

During blading of the trench features 16WT and 17WT were found at the base of plowzone, at 34.5 and 28 cm bd, respectively. A fire-shattered LA/EW barbed or contracting stemmed point fragment was found about 80 cm west of the center of Feature 16WT at 32.5 cm bd, and Feature 17WT was identified as Early Woodland on the basis of the pottery within it. A probable St. Charles base was found in the backdirt from the upper two meters of deposit, and river cobbles and other rocks were found from 215-232 cm bd

Feature 15WT was encountered at 357-373 cm bd in the 80N60W trench. It consisted of a surface hearth with sandstone, burnt nut, burnt wood, and one Wyandotte flake. Another flake and several pieces of sandstone were found nearby. Unit 322, a 1 x 2 m unit, was placed one meter to the north of the feature, and debris from the feature extended into the unit. At 347.5-353 cm bd in the unit a Wyandotte flake, a large worked piece of ferric rock, several river cobbles, and sandstone were found. One of the slabs of sandstone refits with a piece in Feature 15WT. Charcoal extended to 360 cm bd in minute amounts.

The floor of the 80N60W Trench was taken to 400 cm bd without additional cultural debris being found. Feature 15WT was only about 10 m to the north of Block D, which had a Thebes point at 129.5 cm bd.

EXCAVATIONS NORTH OF MAIN BLOCK

These excavations began August 22, 2000 and were based upon two augers (Auger 101 & 104) north of the Main Block (80N) which produced more than 10 microflakes in single samples at about 250 cm below surface in the Thebes zone occupations (Figure 3.9). Surrounding augers yielded no more than 1 to 4 microflakes per sample. Similar to the approach taken in the main block, a block (152.0m^2 in area) that encompassed these two cores was opened by trackhoe blading (monitored and directed by a qualified archaeologist) to the top of the artifact zone. This depth was tracked with a laser level. Two1x2 m units were then setup at ca. 340 and 380 cm below datum and hand excavated according to procedures established in the Main Block Phase III mitigation (Figure 13.9). These units only recovered sparse cultural material (U315=4 flakes and U316=2 flakes) from the levels in question.

SUMMARY

There is a very complex stratigraphic record of Early Archaic occupations at the James Farnsley site, some of which are buried more than 5 meters below the surface in Ohio River alluvium. The excavation strategies used were designed to be flexible using new information as it was obtained to adjust sampling to acquire a representative data set from the site. The combination of hand excavation, augering and collecting microartifacts, and machine blading proved to be an efficient means of data recovery were deeply buried archaeological deposits of highly variable density are present.

CHAPTER 4

JAMES FARNSLEY SITE (12HR520) CULTURAL FEATURES

by

John A. Schwegman, C. Russell Stafford, and Stephen T. Mocas

During the field investigation of the James Farnsley site, 317 cultural features were defined. Features were assigned to five components three of which date to the Early Archaic period: Kirk (Upper, Middle. Lower), Thebes/St. Charles, and Early Side Notched. These components span the period from about 10,000 rcybp to 8300 rcybp. An ephemeral Early Woodland component is also present and is represented by at least two features. Based on an attribute analysis scheme, features were divided into four distinct types which were then further divided into nine subtypes (Table 4.1).

The field excavation and laboratory analysis procedures used to characterize the feature assemblage are described first. This section is followed by a discussion of each defined feature type by component, with a detailed description of representative examples from each category.

FEATURE EXCAVATION PROCEDURES

Once a feature was exposed during hand or machine excavation the surface was carefully troweled to determine the dimensions of the stain. Upon definition, the center point coordinates of the feature were determined either by using the total station or by measurement from known grid points, then a plan map was created for the feature and the area was photographed. After the plan map was complete a profile line was designated which bisected the long axis of the feature. The end points of this profile line were assigned a letter designation (A and B) which corresponded to the plan and profile maps. Feature excavation began by the removal of one half of the fill by trowel, and the fill was either dry screened (Phase II) or water screened (Phase III) through ¼ inch mesh. During the excavation of this initial half, two eight liter flotation samples were collected from the general feature fill. Upon complete removal of the fill from the first half, excavation was stopped and the profile was troweled, mapped, and photographed. Part of the profile mapping process involved the definition of internal fill zones which were then given a letter designation. A detailed soil description was then made for each of these zones. During excavation of the second half of the feature, flotation samples were collected from each zone. The final step was a post-excavation photo taken of the feature area to illustrate the feature's form prior to any filling episode.

Part of the feature excavation procedures involved the collection of a variety of quantitative and qualitative information. Quantitative information included the measurement of maximum feature length and width, as well as top and bottom depth. A

Table 4.1. Features by Subtype and Component.

Component	Basin Hearth	Debris Scatter	Lithic Scatter	Oxidized Ring	Pit	Post	Rock Scatter	Surface Hearth	Tool Cache	Total
Early Side Notched	1		4					13		18
Thebes			11		1					12
St Charles			9				3	1		13
Lower Kirk	3	1	31	47	17	1	3	37	4	144
Middle Kirk	1		60		7		3	31	6	108
Upper Kirk			1		1		1	8		11
Secondary Kirk	1	1	3					1		6
Woodland					1		1			2
Early Woodland					2					2
Unknown		1								1
Total	6	3	119	47	29	1	11	91	10	317

general description of the boundary quality was also made in terms of abruptness ranging from very abrupt (<1 cm) to diffuse (>15 cm). Feature shape also was noted on the field forms with this information also present on the plan and profile maps. Both the color and texture of feature fill was noted in the field as well as the occurrence of any fill zones or in situ oxidized/reduced soil. Cultural material within the fill also was noted, with estimates of density being made for charcoal, burned soil/clay, calcined bone, and shell. These field notes formed the basis of the attribute analysis which was conducted later in the laboratory.

ATTRIBUTE ANALYSIS

For descriptive and analytical purposes, the features at 12HR520 were classified based upon metric and non-metric attributes. Metric attributes included surface area and feature volume. Surface area was calculated for features without a prepared facility and was reported in centimeters squared. Volume was used to characterize features exhibiting a prepared facility (i.e., pit). These measurements were reported in cubic decimeters (dm^3) both to reduce the overall size of the number and to facilitate comparison to other Midwestern projects (e.g. FAI-270 Project).

Feature Volume Methods *(by Amit Kesarwani)*

The area of each feature was extracted from the Area column of the ESRI ArcGIS shape-files once the plan of the feature was digitized. Feature volume was calculated based upon its profile morphology. Since features do not exhibit perfect geometrical shapes, a close approximation of its form was considered, resulting in an approximate volume calculation. Below are the formulas utilized for each geometric shape:

Circular or elliptical Basin

$V = 0.48\ a\ h + 0.16\ \pi\ h3$

where:
V = volume
a = area
h = height (depth)

Cylindrical pit

$V = a\ h$

where:
V = volume
a = area
h = height (depth)

Compound Pit (upper half cylindrical and lower half basin)

Volume of cylinder + Volume of Basin

Portion of cone

$V = h/2\ (b + b_1)$

where:
V = volume
b = area of the base
b_1 = area of surface
h = height (depth)

Non-metric attributes taken into consideration included: origin, in situ oxidation, boundary, stratification, zone type, and cross-section shape (Stafford 1985). Feature origin was designated based upon the presence or absence of a prepared feature facility; therefore this attribute was scored as either surface or pit (subsurface). Oxidation was recorded for either its absence or its location within the feature including surface, rim, side, base, or combination. Feature boundaries were designated as either abrupt/clear or diffuse. Stratification was initially scored as present or absent within a pit. Once identified, internal stratified zones were recorded according to their contents including charcoal, rock, shell, and burned soil, or mixed. The overall feature profile form, or cross-section, was described as either basin, steep-sided, expanding, conical, or irregular. The following section describes the results of the attribute analysis.

Defined Feature Types

The attribute analysis resulted in the definition of four distinct feature types including: surface hearths, refuse scatters, pit/hearths, and pits, with further subdivisions defined for the latter three categories. The refuse scatters were subdivided into lithic scatters, tool caches, and rock scatters. The pit/hearths were separated into basin hearths and oxidized rings while the pit type included true pits and posts (Table 4.1).

Surface hearths were defined in the field by the occurrence of a high *in situ* concentration of reddened or oxidized soil. These features exhibit no evidence of a prepared pit (e.g. internal fill zones) and are interpreted as informal camp fires. Refuse scatters are broadly defined as concentrations of cultural material with no evidence of prepared surface areas that exhibit distinct boundaries distinguishable from the general refuse deposit. These scatters were subdivided during analysis on the basis of their associated material. Lithic scatters contained preponderances of chipped stone debitage, while caches were dominated by groups of tools that were deposited simultaneously or stored for future use and rock scatters predominately contained non-chert debris (e.g. fire-cracked rock, rounded cobbles, and shale slabs).

The remaining feature types all were distinguished by the occurrence of a prepared feature surface or pit. Pit/Hearths all exhibited *in situ* evidence of the direct heating. In most instances this evidence took the form of oxidation along the periphery of the pit, but a well defined charcoal lens at the base of a feature, especially when in association with other evidence of burning, such as fire-cracked rock, was considered sufficient. The two subtypes of pit/hearths--basin hearths and oxidized rings--were defined predominately by metric attributes. Basin hearths were relatively large, usually oval shaped basins, while oxidized rings were more formalized, small, circular pits which tended to have steep-sided profiles. Pits and posts exhibited a prepared excavation below a surface but no evidence of *in situ* oxidation. The single post from James Farnsley was distinguished from the other pits by its small size and steep-sided profile.

UPPER KIRK OCCUPATION

The Upper Kirk occupation was very ephemeral compared to the earlier two Kirk occupations (Middle and Lower Kirk). It consisted of a scatter of eleven features ranging in elevation from 115 to 147 cm below datum, all of which were located in the southwest portion of the main excavation block (Figure 4.1). These eleven features consisted of eight surface hearths, one pit, one lithic scatter, and a single rock scatter (Table 4.1). The overall distribution of these features in the main excavation block forms no distinguishable pattern. The following section describes examples of each feature type.

Surface Hearths

Eight of the eleven Upper Kirk features were surface hearths. These areas were interpreted as informal camp fires distinguished by the occurrence of oxidized soil with

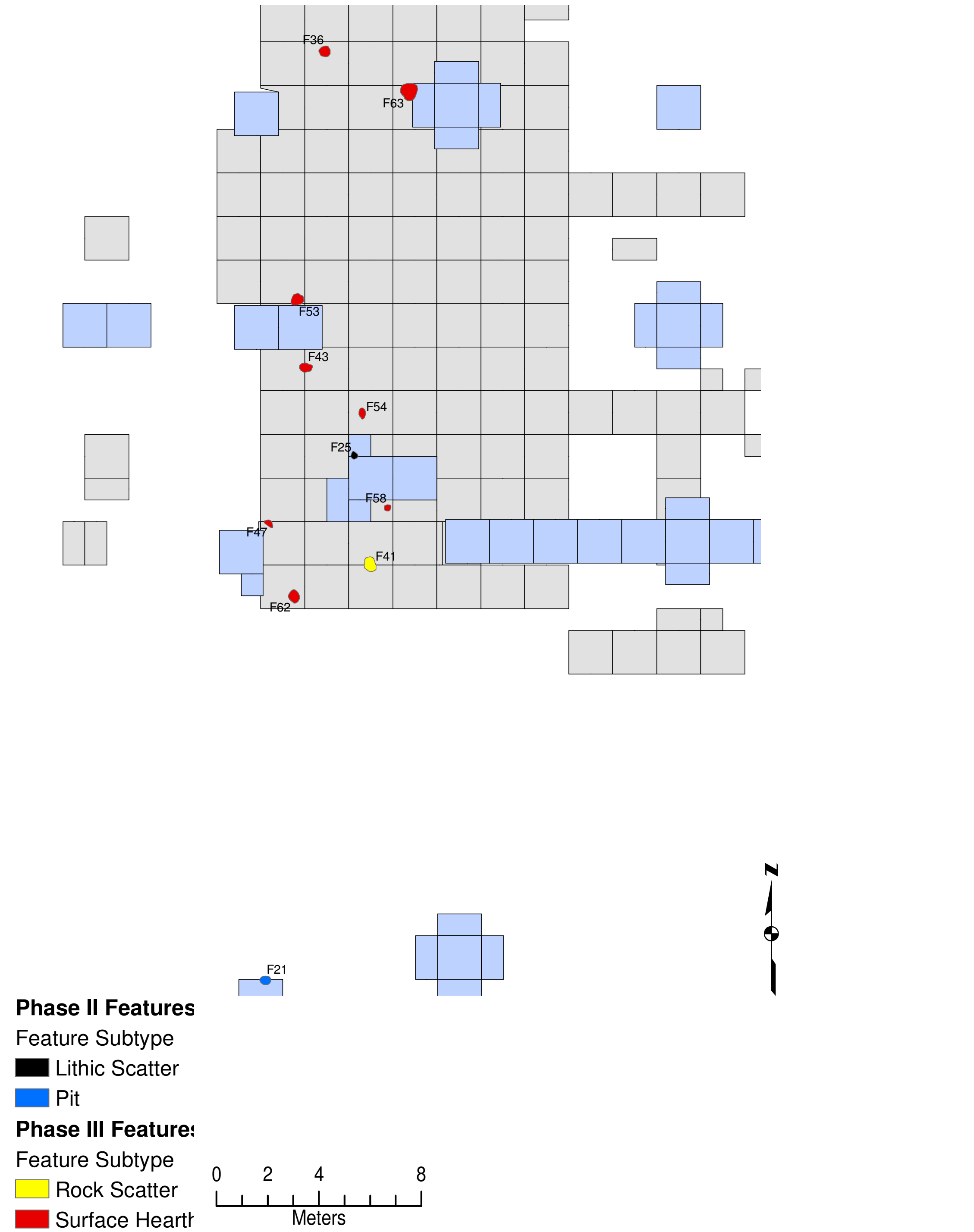

Figure 4.1. 12Hr520 Upper Kirk Features.

no evidence of a prepared pit (e.g., internal fill zones). Oxidation diagnostic of these features occurred as mottles or patches ranging in color from yellowish red (5YR 4/6), to red (2.5YR 4/6, and 2.5YR 4/8), to reddish brown (2.5YR 5/4), usually having a clear boundary (Table 4.3). Soil texture was generally described as silty clay or silt loam. The

Table 4.2. Upper Kirk Feature Lithic Debitage, FCR/Rock, and Tools.

Feature Type	Feature Number	Debitage (g)	FCR/Rock (Kg)	Anvil (Ct.)	Hammerstone (Ct.)	Manuport (Ct.)	Total (Ct.)
Surface Hearth	F36	0.0	0	0	0	0	0
	F43	1.9	0	0	0	0	0
	F47	0.0	0	0	0	0	0
	F53	20.9	0	0	0	0	0
	F54	1.2	0	0	0	0	0
	F58	3.7	0	0	0	0	0
	F62	1.7	0.01	0	0	0	0
	F63	82.0	0.002	0	0	0	0
Pit	F21	0.0	0	0	0	0	0
Rock Scatter	F41	9.0	19.504	1	1	6	8
Lithic Scatter	F25	1860.1	0	0	0	0	0
	Total	1980.5	19.516	1	1	6	8

length of these hearths varied between 30.0 and 71.0 cm, with the average being 55.0 cm. Hearth width ranged from 24.0-65.0 cm, with an average of 44.1 cm. Oxidation from these fires ranged in thickness from 5.0-16.0 cm, with the average feature having 11.1 cm of burned soil. With an average surface area of 2,015 cm^2 (Figure 4.2), these features were small compared to those associated with the underlying Kirk occupations which averaged 3,912 cm^2 (Middle Kirk) and 2,584 cm^2 (Lower Kirk). See Table 4.2 for a summary of cultural material from these features. The following paragraphs give a detailed description of typical surface hearths from this occupation.

F36

Feature 36 was a typical surface hearth from the Upper Kirk levels. This feature was an oval patch of oxidized soil measuring 58 cm long and 36 cm wide which was excavated at 123 cmbd in Unit 81 (Figure 4.1). This location makes it the northern most Upper Kirk feature defined. Feature soil consisted of a yellowish red (5YR 4/6) silt loam mottled with patches of red (2.5YR 4/6) oxidation extending to a depth of 5 cm below surface (Figure 4.3). Irregular leaching resulted in dark yellowish brown (10YR 4/4) areas within the feature which lacked any oxidation. No cultural material was associated with this hearth.

F53

Another typical surface hearth was Feature 53 which was defined at 128.5 cm below datum in Unit 40 and 47 of the main block (Figure 4.1). It consisted of a patch of oxidized silty clay with a clear to gradual boundary, which measured 71 cm in length and

63 cm in width (Figure 4.3), giving the feature a surface area of 2,400 cm^2. The oxidation was yellowish red (5YR 4/6) to red (2.5YR 4/8) in color and extended to a depth of 15 cm in profile. Associated cultural material included chert debitage and 10 pieces of fire-cracked rock. The debitage ranged in size from 1" to less than ¼" in diameter, with most (88.1%) measuring from 1" to ½". indicating a focus on early stage reduction. The majority of the debitage was Muldraugh (50.9% by weight), with indeterminate chert (36.5%) and Wyandotte (12.6%) also present.

Table 4.3. Upper Kirk Surface Hearth Attributes.

Feature	Length	Width	Depth	Area (cm^2)	Boundary
F36	58	36	5	2020	Diffuse
F43	58	61	10	1930	Clear
F53	71	63	15	2400	Diffuse
F54	51	29	12	1160	Clear
F58	30	24	9	710	Clear
F62	68	49	12	2250	Clear
F63	70	65	10	4770	Diffuse
F47	31	29	16	880	Diffuse

F63

Feature 63 was an unusually large surface hearth for the Upper Kirk component. This feature was found in Unit 78 at 140 cm below datum (Figure 4.1) and had an area of 4,770 cm^2 (70 x 65 cm) making it the largest hearth from this occupation. In profile the feature appeared as an area of brown (7.5YR 5/4) clay loam 10 cm thick, with a heavy concentration of reddish brown burned soil (2.5YR 5/4) and charcoal flecking (Figure 4.3). Cultural material associated with the hearth included 39 flakes and 3 fragments of fire-cracked rock. The flakes were predominantly Muldraugh (97.0% by weight) with Wyandotte (3.0%) also present. Most (78.0%) of the debitage was greater than 1" in diameter, indicating early stage lithic production occurred in the area of the feature.

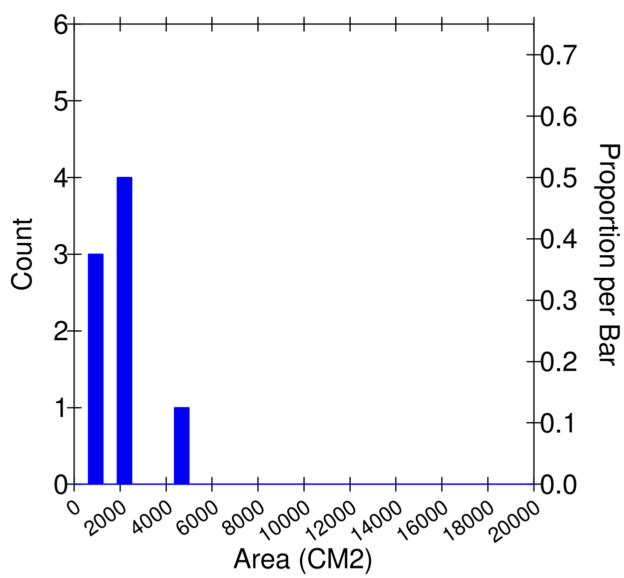

Figure 4.2. Upper Kirk Surface Hearth Area Histogram.

Lithic Scatters

The single lithic scatter in this occupation, Feature 25, was defined at 146 cm below datum during the Phase II investigation (Figure 4.1). It was located in Unit N15 W4, a 1 x 1 m excavation unit situated in the southwest portion of the Phase III main block. It consisted of a small, dense concentration of only Wyandotte debitage, measuring 30 cm long by 25 cm wide, for a surface area of 830 cm^2. This debitage was primarily from early stage tool production, with 79.1% of the debitage ranging in size from ½" to 1" in diameter. No tools of any kind were recovered from the scatter.

Rock Scatters

Feature 41 was the only rock scatter found in the Upper Kirk levels. It was uncovered during the Phase III excavations of Units 10 and 3 at 130 cmbd (Figure 4.1) and consisted of a roughly oval pile of five rock slabs and eight cobbles (manuports) covering an area measuring 71 cm in width and 53 cm wide (Area = 2,910 cm^2) (Figure 4.4). Included among the cobbles were a hammerstone and an anvil. A scatter of small (½-¼ inch) Muldraugh and Wyandotte (9.0g) was also associated with the other material.

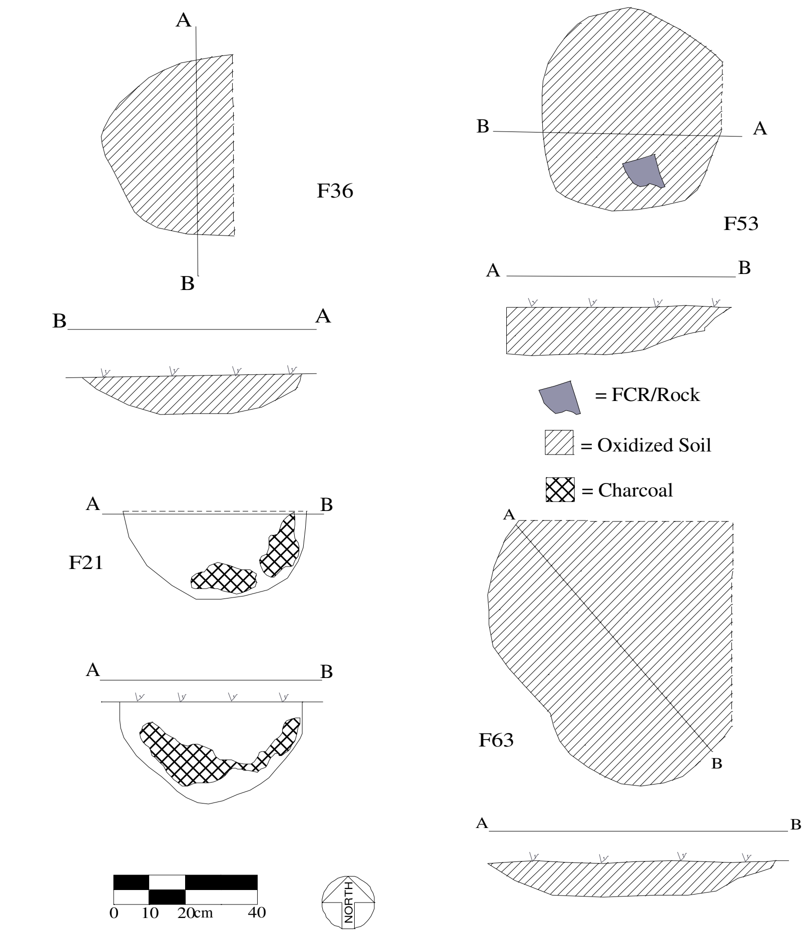

Figure 4.3. Upper Kirk surface hearths and pit (F21).

Pits

Feature 21 was the only pit assigned to the Upper Kirk occupation. This feature was uncovered during the Phase II hand excavations of Unit S11/W9 and was located 16 m south of the main block (Figure 4.1). It occurred at 133 cm below datum and appeared in planview as an oval stain 50 cm long and 24 cm wide (Figure 4.3). Once bisected, the pit exhibited a basin shaped profile 16 cm in depth, giving it a volume of 252.80 dm^3. Interior fill was a yellowish brown (10YR 5/6) silty clay mottled with patches of light brownish gray (10YR 6/2). Charcoal flecking occurred throughout the fill but was concentrated in a zone 4-9 cm thick which extended across the center of the profile. No in situ oxidation or cultural material was present.

Upper Kirk Discussion

The limited number and diversity of features indicate a reduction in on-site activities relative to the earlier Kirk occupations. The prevalence of surface hearths indicates that cooking/heating were probably the primary activities. Debitage recovered from the single lithic scatter (F25) indicates that at least some early stage reduction of Wyandotte occurred, but the relevance of this will have to be viewed in light of the overall lithic assemblage. Lithic production also is indicated in the rock scatter from this occupation (F41), which included knapping tools and cobbles that could have been collected for later use as hammerstones.

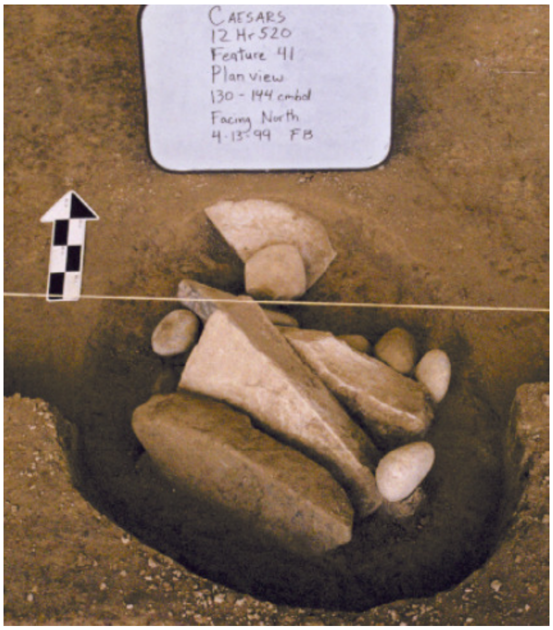

Figure 4.4. F41 rock scatter.

MIDDLE KIRK OCCUPATION

One hundred and eight features were defined as part of the Middle Kirk occupation (Figures 4.5 and 4.6). Features assigned to this component ranged in depth between 148 and 188 cm below datum. Lithic scatters and surface hearths were the dominant feature types (Table 4.1) with other types represented by basin hearths, pits, tool caches, and rock scatters. A notable difference between this occupation and the Lower Kirk is the complete absence of any oxidized ring features, which was the most common feature type in the earlier occupation. The following sections present a detailed discussion of the different feature types found in the Middle Kirk, with detailed examples of each variety.

Surface Hearths

A total of 31 surface hearths were defined as part of the Middle Kirk occupation. These features were identified by the occurrence of oxidized soil, with no evidence of a prepared hearth, and are interpreted as informal camp fires. The oxidation diagnostic of these features ranged from dark reddish brown (2.5YR 3/4), to reddish brown (5YR 4/4 and 2.5YR 4/4), to red (e.g. 2.5YR 5/8, 4/6, 4/8) in color, with an abrupt to diffuse boundary (Table 4.4). Soil texture was generally described as silty clay or silty clay loam. Within the Kirk component, the average hearth surface area was greatest during the Middle Kirk occupation. The length of these features ranged from 30-196 cm with an average of 77.0 cm, and a width range from 11-132 cm averaging 57.8 cm. During this time hearth features averaged 3,912 cm^2 as compared to the Upper and Lower Kirk which averaged 2,015 cm^2 and 2,584 cm^2 respectively (Figure 4.7). Oxidation from these fires ranged in thickness from 7-53 cm, with the average feature having 16.0 cm of burned soil. Totals of 3253.8 g of debitage and 18.971 kg of rock/fire cracked rock were collected during excavation of these features (Table 4.5). Along with this debris, forty tools were collected, of which bifaces (n=16) and projectile points were the most

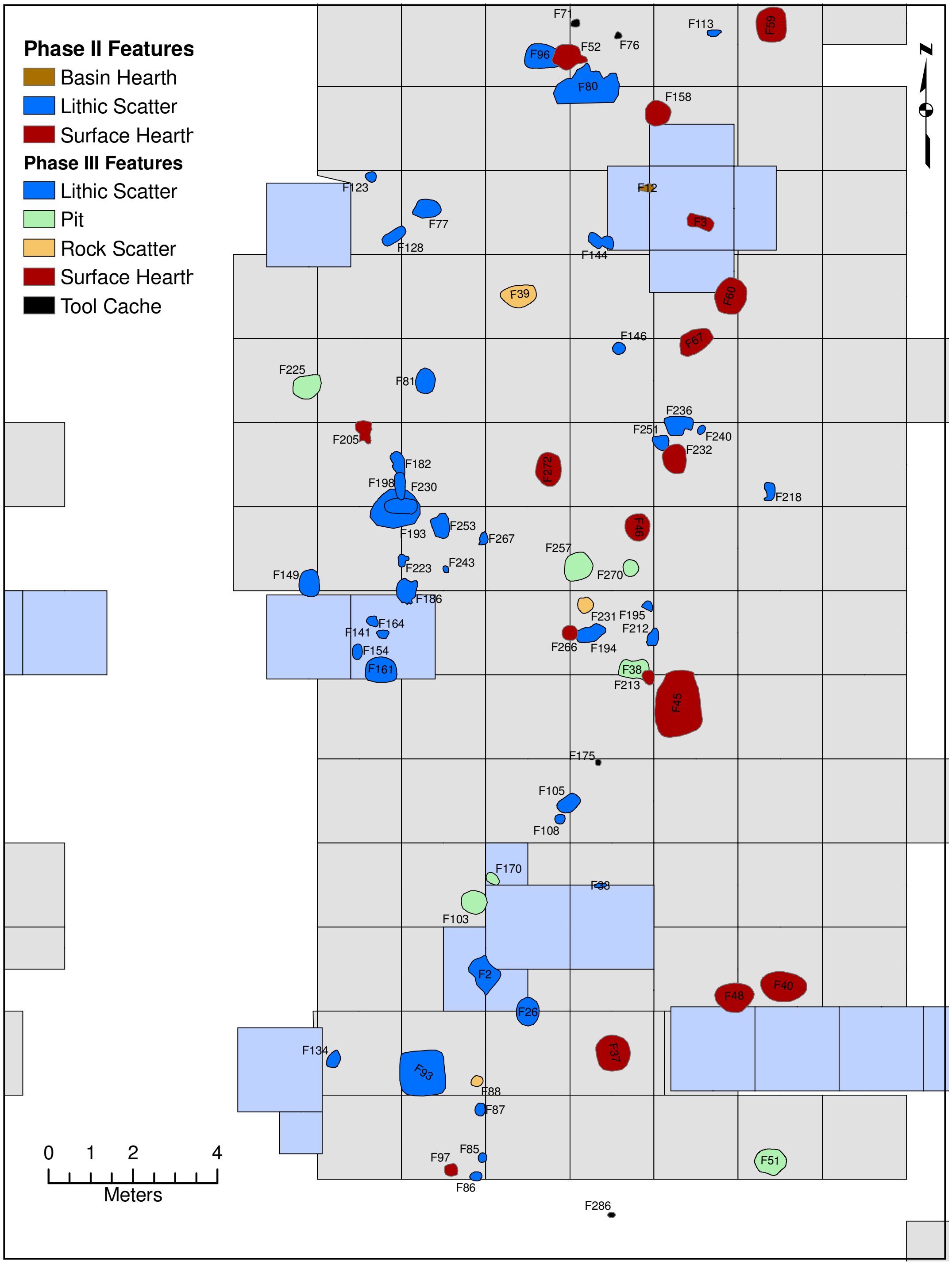

Figure 4.5. Middle Kirk Feature Distribution Map (south half of main block).

common (Table 4.5). Table 4.5 provides a detailed summary of FCR/rock, debitage, and tools from each of the Middle Kirk surface hearths. The following paragraphs describe specific examples of surface hearths from this occupation.

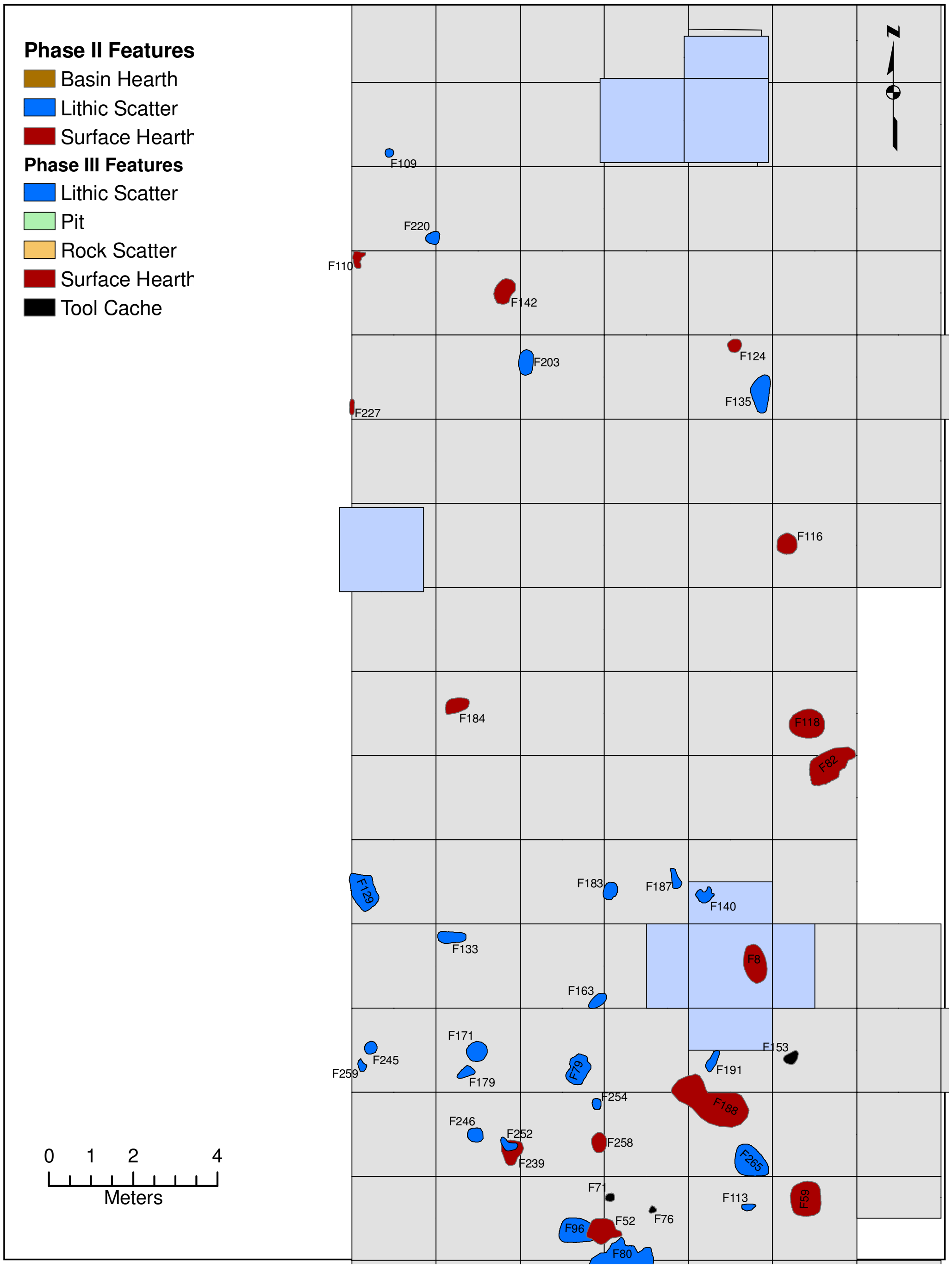

Figure 4.6. Middle Kirk Feature Distribution Map (north half of main block).

F118

Feature 118 was a typical surface hearth from this occupation. It was noted at 178 cm below datum in Unit 126 at the north end of the Phase III excavation block (Figure 4.8). This area consisted of an oval of red (10R 4/6) oxidized soil measuring 86 cm by 83 cm (4,650 cm^2). In profile this oxidation extended to a depth of 14 cm, with the profile disturbed by heavy soil fauna turbation. Light charcoal flecking was noted throughout

Table4.4. Middle Kirk Surface Hearth Attributes.

Feature	Length (cm)	Width (cm)	Depth (cm)	Area (cm^2)	Boundary
F110	42	33	7	790	Diffuse
F116	60	54	19	1940	Diffuse
F118	86	83	14	4650	Diffuse
F124	41	36	13	840	Diffuse
F142	50	47	25	2260	Diffuse
F14a	146	132	53	12290	Clear
F158	61	60	9	2920	Diffuse
F184	60	34	11	1720	Diffuse
F188	185	83	30	12710	Diffuse
F205	50	29	8	1580	Diffuse
F22	43	34	15	1320	Diffuse
F227	38	11	12	390	Diffuse
F232	60	40	11	3230	Clear
F239	57	45	13	2300	Clear
F258	50	36	17	1370	Diffuse
F266	36	20	17	1100	Diffuse
F272	80	60	10	3930	Clear
F3	100	100	10	1860	Diffuse
F37	43	39	7	5700	Clear
F38	84	74	19	840	Diffuse
F40	108	72	16	6200	Diffuse
F45	196	114	22	14700	Diffuse
F46	62	55	12	3080	Diffuse
F48	94	55	12.5	4960	Diffuse
F52	83	63	10	3430	Diffuse
F59	80	70	17	5160	Diffuse
F60	86	76	37	5240	Diffuse
F67	74	50	20	3700	Diffuse
F8	98	70	8	3950	Diffuse
F82	102.5	85	8	6330	Clear
F97	30	32	15	790	Diffuse

the feature fill. Cultural material recovered from the fill included 103 flakes (44.8 g) and 10 pieces of fire-cracked rock (0.011 kg). Debitage was mainly Muldraugh chert (84.1% by weight), with most ranging in size from ¼” to <1” in diameter. Lesser amounts of Wyandotte (13.5%) and unidentified chert (2.4%) debitage also were associated.

F232

Another characteristic surface hearth from this occupation was Feature 232, which was excavated at 175 cm below datum in Unit 58, at the southern end of the Main Block (Figure 4.8). As with all these hearths, this feature was defined as an oval patch of red (10R 4/8) oxidized soil, with an abrupt boundary, which contrasted with the surrounding yellowish brown (10YR 5/6) silt loam matrix. This staining measured 60 cm in length and 40 cm in width, for a calculated area of 3,230 cm^2. Once profiled, the oxidized soil formed a basin shaped stain 8 cm deep. Associated cultural material included 100 flakes (54.5 g) and 20 rocks (0.013 kg).

F38

Feature 38 was a smaller than the usual surface hearth found in the Middle Kirk levels. This oxidized stain appeared at 159 cm below datum in Units 43 and 36 in the southern half of the Main Block (Figure 4.8). It covered an area measuring 84 cm by 74 cm for a total surface area of 840 cm^2. Within the feature limits approximately 75% of the soil was oxidized, red (2.5YR 4/8) silty clay, with the remaining soil being a reddish brown (2.5YR ¾) or yellowish brown (5YR 4/6) color. Artifacts from the fill included debitage (82.1 g) and fire-cracked rock (0.002 g).

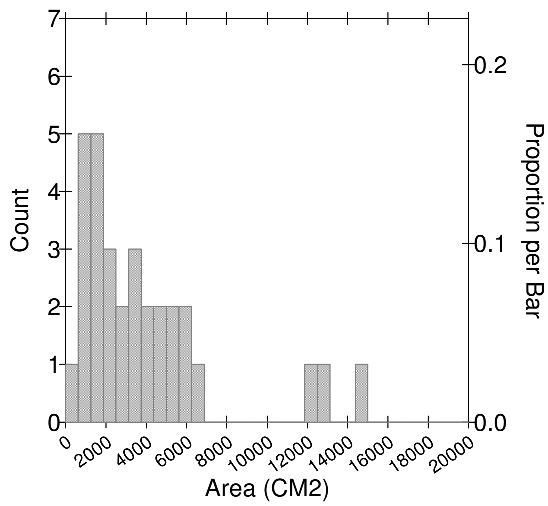

Figure 4.7. Middle Kirk Surface Hearth Area Graph.

F45

Feature 45 was a very large surface hearth, covering an irregular oval region measuring 196 cm by 114 cm, for a surface area of 14,700 cm^2 (Figure 4.8). It was defined in Units 72 and 72A in the south half of the block. Seventy-five percent of the soil within this area was red (2.5YR 4/6) in color, and the remaining fill was strong brown (7.5YR 4/6) in color. In profile the oxidized soil exhibited a gradual boundary which extended 22 cm below the surface and contained light charcoal flecking throughout. A large amount of cultural material was found with the feature including chert debitage (365.3 g), fire-cracked rock (2.867 kg), and three Pine Tree projectile points. The points were made from Muldraugh (n=2) and Wyandotte (n=1) cherts.

Lithic Scatters

Sixty-two lithic scatters were in the Middle Kirk occupation making it the most common feature type in this occupation. These features generally are interpreted to represent the primary deposition of tool production debris resulting from an individual knapping episode. Middle Kirk scatters averaged 1,879 cm^2 in area, which is larger than the Lower Kirk scatters and smaller than similar St. Charles and Early Side-Notched features (Figure 4.9). While possibly significant, given the extremely high density of general debitage at these depths, the boundaries assigned to these features is somewhat subjective. A total of 34,692.6 g of debitage was collected from Middle Kirk lithic scatters. Similar to the Lower Kirk occupation, Muldraugh was the primary chert type, accounting for 79.2% of the assemblage by weight (Table 4.6). Other material types included Wyandotte (4.4%), Allens Creek (3.0%), and Indeterminate (13.4%). The size distribution of flakes was also very similar to that of the Lower Kirk lithic scatter. Most (68.2%) of the debitage was ½ inch in diameter or less, indicating a focus on later stage production. A breakdown of flake size by feature is given in Table 4.7. Tools, including cores and bifaces, were associated with 39 (62.9%) of the lithic scatters, with the average feature having 3.25 artifacts (Table 4.8). Similar to the Lower Kirk lithic scatters, bifaces were the most common, accounting for 41.09% of the associated artifacts. Of these bifaces, 67.3% were fragments, likely indicating the reason for their disposal. The following paragraphs describe examples of Middle Kirk lithic scatters.

F212

Feature 212 was a small lithic scatter uncovered at 184 cm bd in the Middle Kirk occupation. It consisted of a debitage concentration (69.8 g), measuring 30 cm by 14 cm (880 cm^2), and four tools. Associated tools consisted of two end scrapers (both made of

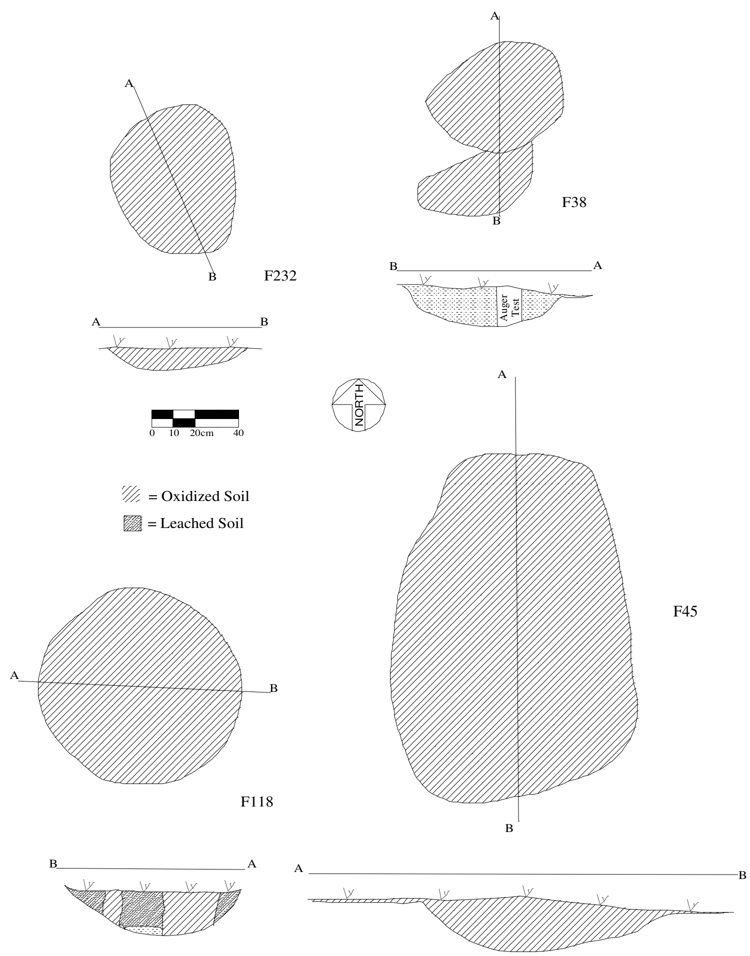

Figure 4.8. Middle Kirk Surface Heaths.

Wyandotte chert), a Stage 3 biface (Allens Creek chert), and a sandstone hammerstone that also functioned as an anvil. The debitage was smaller than usual, with 39.1% being ¼ inch in diameter (compared to the average of 18.1%), indicating that this material was the result of late stage knapping activity. More typical of these features, the material used was predominately the local Muldraugh (77.4% by weight), with other chert types including Allens Creek (13.6%), Wyandotte (7.6%), and Indeterminate (1.4%).

F251

F251 was a lithic scatter uncovered during hand excavation at 184 cm below datum. This feature covered an area measuring 35 cm in length and 35 cm in width (1,150 cm^2) and consisted of debitage (194.4 g) and five tools. The chert flakes were 99.6% Muldraugh by weight, with the remaining debitage (0.4%) being Wyandotte. The Muldraugh flakes were a fairly typical size for these scatters with most being recovered from the ½ inch (74.0%) and 1 inch (13.7%) screens consistent with early stage reduction activity. The tool assemblage consisted of two adzes, a Stage 2 biface, a hammerstone, and an end scraper. Muldraugh was the material used to produce the adzes and the biface, while the end scraper was of Wyandotte.

F194

Feature 194 was representative of a typical Middle Kirk lithic scatter both for the raw material used and size of the debitage. It contained ca. 200 flakes (629.6 g) and seven tools. These artifacts were concentrated in an irregular oval that had a maximum length of 71 cm and width of 45 cm (2,180 cm^2) and was uncovered at 173 cm below datum. Muldraugh was the main chert type, accounting for 88.2% of the flakes by

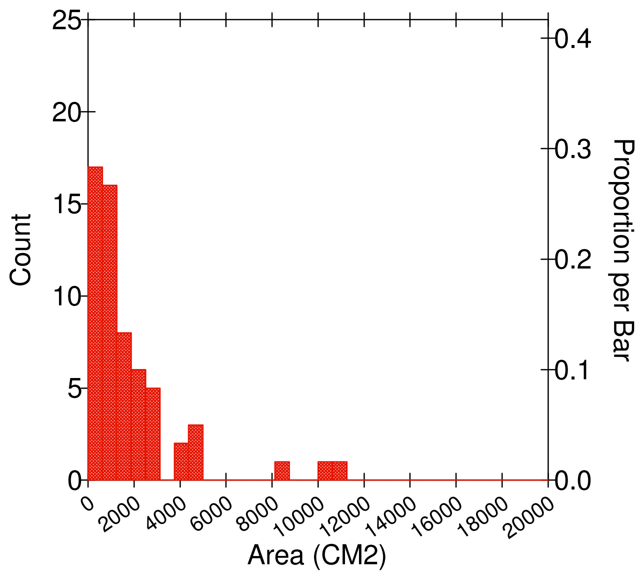

Figure 4.9. Middle Kirk Lithic Scatter Area Graph.

weight. Other chert types in the cluster included Wyandotte (0.9%) and other (10.9%). The Muldraugh debitage was mainly larger, early stage flakes, with 76.8% ranging in size from ½" to <2" in diameter. Both the Wyandotte and unidentified material were small, indicating a focus on late stage lithic reduction. Tools from the scatter included three bifaces, two end scrapers, a Pine Tree projectile point, and an adze. High quality Wyandotte was used to produce both of the scrapers and two of the bifaces, while medium and high quality Muldraugh was used for the adze, a biface and the point.

F265

Feature 265 was an atypical lithic scatter because of the large number (n=12) of associated tools. This feature was found at 180 cm bd within this occupation. In planview the scatter, which included 150 pieces of debitage, covered a region measuring 68 cm by 66 cm or 4630 cm^2. Typical for Middle Kirk lithic scatters, Muldraugh was the primary chert type present, accounting for 77.3% of the debitage by weight. The remaining flakes were Wyandotte (12.0%) and Indeterminate (4.3%). Also, common for scatters in this occupation, the majority of the debitage ranged in size from >½" to >1'' in diameter, indicating a focus on early stage reduction activities. Tools found with the scatter included three adzes, two bifaces, four projectile points, a retouched flake, and an end scraper. Two of the adzes were produced from Wyandotte chert, and the remaining tools were made of Muldraugh. Of the four points, two were of the Pine Tree type, and the other two were classified as Kirk Corner Notched Large.

Caches

A total of 57 tools were recovered in six Middle Kirk caches, with most (89.5%) of these artifacts being in complete condition. Caches were widespread north to south along landform but were all found within the eastern portion of the feature scatter between W2 and E2 (Figures 4.5 and 4.6). Caching activity was more prevalent in this occupation than during the Lower Kirk, with caches being more numerous (n=6) and larger; averaging 9.5 tools per feature. Middle Kirk caches were predominately bifaces (n=24; 42.1%) and scrapers (n=15; 26.3%), with a minor number of other tools (Table 4.9). Interestingly, tool types were segregated between the caches, with three of the features having bifaces and adzes and three having scrapers and other unifaces. No evidence of a prepared pit was noted for any of these features. The following discussion gives a detailed description of each Middle Kirk cache.

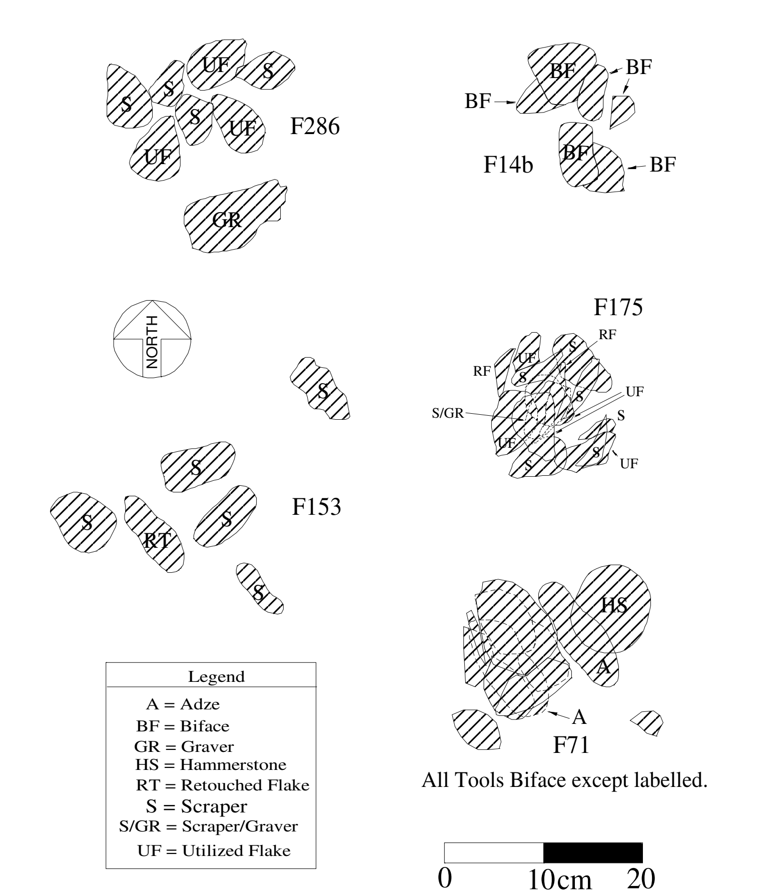

Figure 4.10. Middle Kirk Caches.

F71

Feature 71 was a typical biface/adze cache from this occupation. It was uncovered in the center of the Main Block (Unit 89) at 181.50 cm bd (Figure 4.5) and consisted of 14 tools deposited in a cluster measuring 22 cm long by 20 cm wide, with a range in depth of approximately 7 cm. Bifaces were the main tool type in the cache (n=11), with two adzes and a hammerstone also present. The bifaces were in a late stage of production with six being Stage 2 and five being Stage 3. All but one of the chipped stone tools was produced from medium or high quality Muldraugh chert, and one biface was made of high quality Wyandotte.

F76

Feature 76 was a tight cluster of three overlapping tools found in close association with Feature 71, which was located approximately one meter to the west at the same elevation (Figure 4.5). It consisted of two bifaces, of medium quality Muldraugh chert, and an adze produced from medium quality Allens Creek chert. These artifacts were found in an overlapping pile measuring 4 cm by 2 cm, with a range in elevation of 9 cm (Figure 4.10). The bifaces were at the Stage 1 and Stage 3 levels of reduction.

F286

This cache was exposed by the trackhoe at an elevation of 177 cmbd along the southern edge of the block during grading for a truck ramp (Figure 4.5). It consisted of a cluster of four scrapers and three unifaces, all produced from high quality Wyandotte chert, located in an area measuring 13 cm by 18 cm (Figure 4.10). In addition a graver made from high quality St. Louis chert was recovered just south of the main cluster. This artifact was included in the totals for the cache, but its association is questionable.

F14a/b

Feature 14b was a cluster of eleven bifaces and one retouched flake found in the center of the main block in Unit 72 within Feature 14a which was a debris scatter measuring 146 cm by 132 cm (Figure 4.5). Feature 14a was defined at 178.50 cm below datum, and is characterized by a concentration of lithic production tools (e.g. hammerstones and anvils), patches of debitage, and oxidized soil, along with a number of chert tools (Figure 4.10). Artifacts associated with the cache itself were recovered from an area measuring 18 cm by 20 cm with a variation in depth of only 4.5 cm. The bifaces were produced from Wyandotte (n=6; 54.5%), Muldraugh (n=4; 36.4%), and Laurel chert (n=1; 9.1%), with most of the material considered high quality. Stage 2 bifaces were the most common (n=8; 72.7%), with only two Stage 1 bifaces (18.2%) and one Stage 3 (9.1%) present. The single retouched flake from the cache was produced from high quality Wyandotte chert. The intentional caching of these artifacts is reinforced by their horizontal orientation at the time of recovery, probably indicating there placement in a shallow depression.

F153

This cache was defined in Unit 103, along the eastern edge of the main block, at 172 cmbd (Figure 4.6). It consisted of five end scrapers and a retouched flake, all produced from high quality Wyandotte chert (Figure 4.10). The retouched flake exhibited the typical “tear drop” shape of the scrapers and can be considered a scraper preform. These tools were deposited in a roughly oval area measuring 29 cm by 26 cm with a vertical elevation difference of seven centimeters between the highest and lowest artifacts. Five of the six artifacts exhibited a horizontal orientation with their dorsal surface down, the remaining artifact was oriented vertically.

F175

Feature 175 was a cache consisting of fourteen tools, including seven scrapers, five unifaces, and two retouched flakes, defined at 178 cmbd (Figure 4.10). The five unifaces were all classified as probable scraper preforms. One of the retouched flakes was produced from Muldraugh chert, with the other artifacts being made of high quality Wyandotte chert. These tools were situated in a fairly circular area measuring 15 cm by 16 cm. Artifact placement within the cache was similar to that described for F153, with all but two of the tools horizontally oriented, with the dorsal surface down. The non-horizontally oriented pieces were position on 45^0 and 90^0 angles.

Pits

Seven pit features were defined in the Middle Kirk component. In planview these features ranged in length from 35-94 cm, with an average of 60.6 cm, while their widths ranged from 30-71 cm, with an average of 48.3 cm (Table 4.10). Profile depths ranged from 3-33 cm, with an average of 13.9 cm. All of these features were shallow basins (Figure 4.11), with an average volume of 234.45 dm^3, and only one, F170, exhibiting a distinct interior fill zone of oxidized soil. Fill was typically described as a silty clay ranging in color from yellowish brown (10YR 5/6) to dark yellowish brown (10YR 4/6), with brown (7.5YR 4/4, 5/4) and strong brown (7.5YR 4/5, 4/6) soils also noted. See

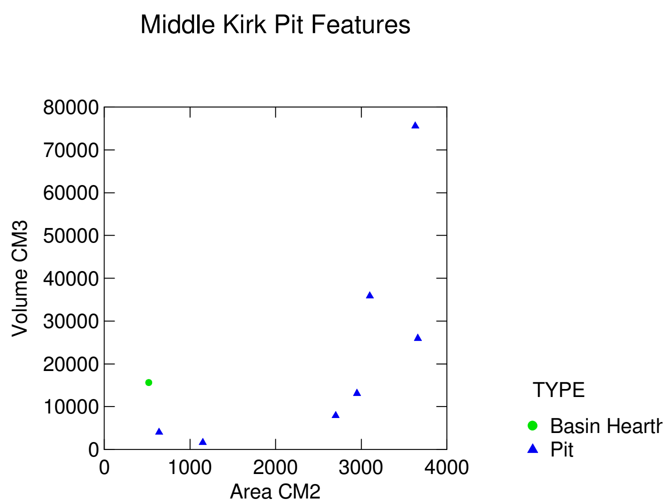

Figure 4.11. Middle Kirk Pit Feature Volume Scatter Plot.

Table 4.11 for cultural material recovered from these features. The following sections give detailed examples of selected Middle Kirk pits.

F103

Feature 103 was a shallow basin shaped pit found at 173 cm bd during the excavation of Unit 20 (Figure 4.5). The feature, as defined, measured 56 cm by 40 cm, but the eastern portion was disturbed by Phase II excavations in the area, therefore its full dimensions are unknown (Figure 4.12). Feature fill extended to a depth of 6 cm and consisted of a yellowish brown (10YR 5/6) silt loam mottled with charcoal and oxidized soil. Both wood and nutshell charcoal occurred throughout the feature, with a sample dating to 8740 ±100 rcybp (ISGS 4838). Red (10R 5/6) oxidized soil mottles were found throughout the fill but were concentrated along the eastern periphery. All oxidation was considered to be the result of secondary deposition. Cultural debris in the fill consisted of two bifaces, flakes, bone, and fire-cracked rock (0.003 kg). The two bifaces (Stage 2 and 3) were both made from Muldraugh chert. A total of 341 Muldraugh flakes (523.1 g) were collected from the feature. This debitage ranged in size from 1 inch to less than ¼ inch in diameter, with most being early stage lithic debris, ½ inch (61.2%) to 1 inch (22.7%) in size.

F257

Feature 257 was a typical pit defined in the Middle Kirk occupation (Figure 4.5). It was defined at 185 cm below datum and appeared on the surface as a diffuse oval stain measuring 53 cm by 68 cm (Figure 4.12). In profile the pit was a basin 14 cm deep, giving the total feature a volume of 259.72 dm^3. Pit fill was characterized as being a strong brown (7.5YR 5/6) silty clay with evenly distributed charcoal mottling. Oxidized soil was present as both small flecks and large patches up to 19 cm by 7 cm in size. No in situ oxidation was found. Cultural material recovered from F257 included 51 flakes (27.0 g), nine pieces of FCR (0.01 kg), two bifaces, and a polyhedral core. The bifaces were both Stage 3, with one made from Muldraugh chert and the other from Allens Creek. The debitage was primarily Muldraugh (79.6%) and tended to be smaller than typical, with a high percentage (32.6%) ¼ inch in diameter.

F51

With an estimated volume of 755.39 dm^3, Feature 51 was over twice as large as the next largest Middle Kirk pit. It also contained much more rock than was typical in other contemporaneous pit features. This feature appeared at 175 cm bd in the southeast portion of the main block (Figure 4.5). In planview it was a slightly darker, oval stain measuring 94 cm long by 71 cm wide. In profile it was basin shaped, with a maximum depth of 33cm. Feature matrix was a strong brown (7.5YR 4/6-5/6) silty clay, with light

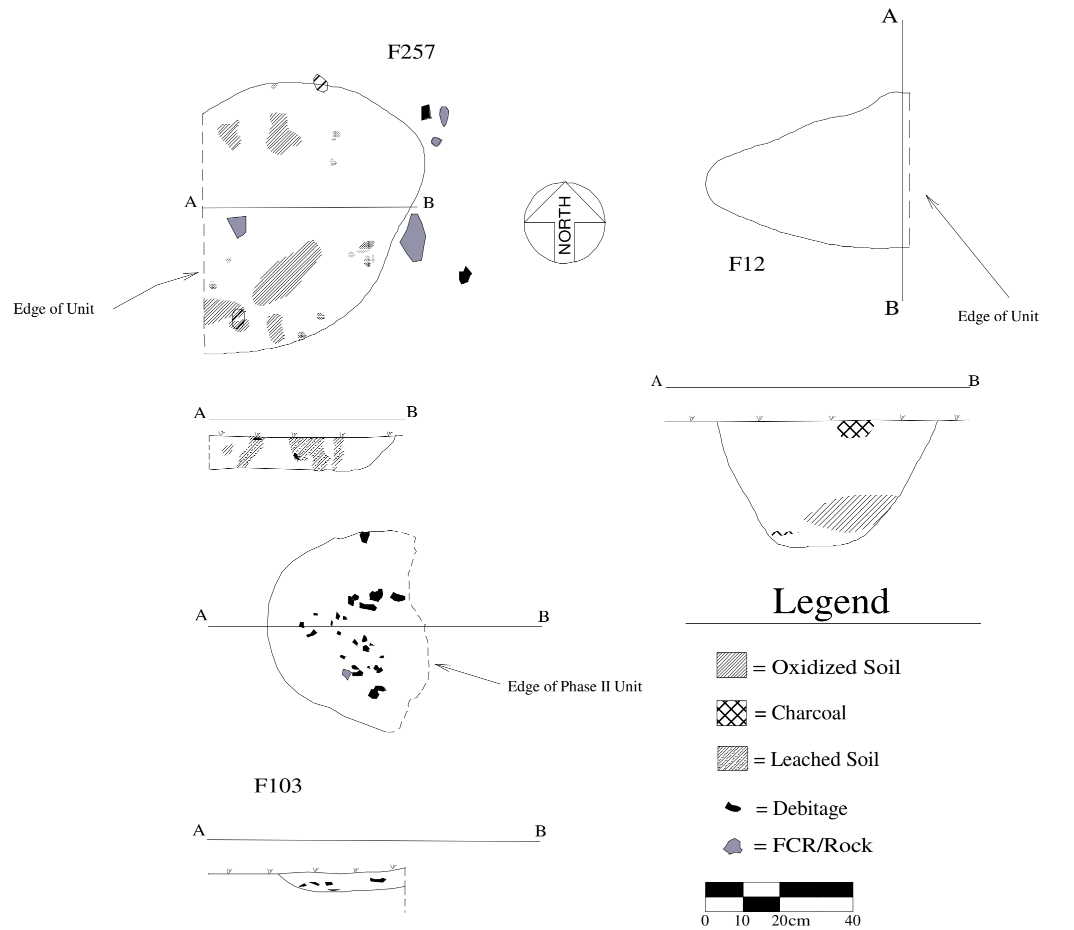

Figure 4.12. Middle Kirk Pit and Basin Hearth Features

charcoal flecking found throughout. Scattered concentrations of oxidized soil mottling occurred near the feature surface. During the initial excavations of Feature 51 it was assumed to be a surface hearth, but the recovery of a large sandstone slab in the western half indicated that it was a prepared pit. Other cultural material found with the feature included 491 flakes (191.7 g), 102 pieces of fire-cracked rock (1.476 kg), three Stage 3 bifaces, a projectile point, and an end scraper. The debitage was predominately Muldraugh (78.4% by weight), with a few Wyandotte flakes (8.0%) and flakes of unknown chert (13.6%) also noted. Debitage ranged in size from 1 in to less than ¼ in, with largest amount (41.5%) ¼ inch in diameter, indicating late stage knapping activity was the most prevalent in the area.

Table 4.5. Middle Kirk Surface Hearth Lithic Debitage, FCR/Rock, and Tools.

Feature	Debitage(grams)	FCR/Rock (Kg)	Adze (Ct.)	Anvil (Ct.)	Biface (Ct.)	Core (Ct.)	Hammerstone (Ct.)	Hammerstone /Anvil (Ct.)	Manuport (Ct.)	Pitted Stone (Ct.)	Point (Ct.)	Retouched Flake (Ct.)	Scraper (Ct.)	Tested Cobble (Ct.)	Utilized Flake (Ct.)	Total Tools (Ct.)
F3	0	2.485	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F8	117.6	0.183	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F14a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F22	2.6	0.063	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F37	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F38	82.1	0.002	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F40	104.6	2.292	0	0	1	0	1	0	0	0	0	0	0	0	0	2
F45	365.3	2.867	0	0	0	0	0	0	0	0	5	0	0	0	0	5
F46	81.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F48	228.5	0.025	1	0	1	0	0	0	0	0	0	0	0	0	1	3
F52	93	0.078	1	0	4	0	0	0	0	0	0	0	1	0	0	6
F59	308.4	0.068	0	0	1	0	0	0	0	0	0	0	0	0	0	1
F60	318.5	0.829	0	0	1	0	0	0	0	0	0	0	0	0	0	1
F67	86.1	0.03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F82	203.4	0.136	0	1	2	0	0	0	0	0	0	0	0	0	0	3
F97	4.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F110	3.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F116	2.9	0.125	0	0	0	0	0	0	0	0	0	0	1	0	0	1
F118	44.8	0.011	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F124	33.2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
F142	7.3	0.164	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F158	123.9	0.042	0	0	2	0	0	0	0	0	0	0	0	0	0	2
F184	43.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F188	92.8	8.93	0	0	2	1	0	1	2	0	1	1	1	1	0	10
F205	2.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F227	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F232	54.5	0.013	0	0	0	0	0	0	0	1	0	0	0	0	0	1
F239	32.5	0.057	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F258	805.7	0.488	1	0	0	0	1	0	1	0	0	0	0	0	0	3
F266	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F272	7.8	0.083	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3253.8	18.971	3	1	16	1	2	1	3	1	6	1	3	1	1	40

Basin Hearths

A single basin hearth, Feature 12, was defined as part of the Middle Kirk occupation. It was excavated at 180 cm below datum in the center of the main block during the Phase II investigation (Figure 4.5). In plan this hearth was an oval measuring

62 cm by 32 cm with a clear to diffuse boundary (Figure 4.12). Upon bisection the pit was determined to be a 9 cm deep basin with a distinct charcoal lens located at the base. The feature fill was a dark yellowish brown (10YR 4/4) silty clay loam mottled with reddish brown (2.5YR 3/4) and charcoal flecking. An increase in oxidized soil was noted immediately above this basal charcoal layer. Large amounts of debitage (712.4 g) and fire-cracked rock (1.476 kg) were collected from the feature fill. Debitage was predominately Muldraugh (82.5% by weight), with Wyandotte (1.3%), Allens Creek (0.4%), and Indeterminate chert (15.8%) also present. In size, the debitage was mainly in the ½ inch (59.8%) to ¼ inch (26.6%) category, indicating the debris was primarily the result of late stage tool production.

Middle Kirk Discussion

The overall pattern of the Middle Kirk feature sample is a reduction in the diversity of feature types compared to the Lower Kirk, along with an increase in the overall size of surface hearths and lithic scatters present. The lack of diversity is the result of the absence of oxidized ring features from this occupation, while the increase in size of the features may indicate a greater focus on tool production and the direct heating of food during this time. Data from the Middle Kirk lithic scatters support the notion that local Muldraugh chert was the main focus of lithic tool production during this occupation. The range in debitage sizes indicates all stages of tool production took place, with the focus being on the initial stages of reduction as indicated by greater amounts of large chipping debris.

Table 4.6. Middle Kirk Lithic Scatter Debitage by Material Type.

Feature	Muldraugh		Wyandotte		Allens Creek		Indeterminate		
	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Total Wt.
F105	3086.9	85.4%	43.8	1.2%	233.4	6.5%	249.8	6.9%	3613.9
F108	99.7	92.1%	0.6	0.6%	0.0	0.0%	7.9	7.3%	108.2
F109	927.6	98.0%	0.0	0.0%	0.0	0.0%	18.8	2.0%	946.4
F113	1645.0	65.9%	153.7	6.2%	370.7	14.9%	326.0	13.1%	2495.4
F123	109.2	93.2%	0.0	0.0%	0.0	0.0%	8.0	6.8%	117.2
F128	122.3	57.8%	0.5	0.2%	0.0	0.0%	88.9	42.0%	211.7
F129	556.8	69.9%	0.0	0.0%	1.2	0.2%	238.5	29.9%	796.5
F133	406.1	63.6%	171.3	26.8%	1.0	0.2%	60.0	9.4%	638.4
F134	0.0	0.0%	399.7	96.0%	0.0	0.0%	16.7	4.0%	416.4
F135	30.5	63.1%	0.0	0.0%	14.4	29.8%	3.4	7.0%	48.3
F140	287.2	71.2%	9.3	2.3%	2.1	0.5%	105.0	26.0%	403.6
F141	404.8	80.0%	77.0	15.2%	3.0	0.6%	21.1	4.2%	505.9
F144	355.8	88.3%	11.4	2.8%	2.7	0.7%	33.2	8.2%	403.1
F146	772.4	90.7%	2.2	0.3%	8.6	1.0%	68.0	8.0%	851.2
F149	1002.1	79.6%	3.1	0.2%	27.3	2.2%	226.8	18.0%	1259.3
F154	346.6	77.2%	0.0	0.0%	0.0	0.0%	102.2	22.8%	448.8
F161	55.7	24.2%	0.0	0.0%	0.0	0.0%	174.8	75.8%	230.5
F163	108.4	73.6%	29.9	20.3%	1.0	0.7%	8.0	5.4%	147.3
F164	31.9	69.5%	9.0	19.6%	0.0	0.0%	5.0	10.9%	45.9
F171	429.8	96.9%	0.6	0.1%	0.0	0.0%	13.3	3.0%	443.7

Feature	Muldraugh		Wyandotte		Allens Creek		Indeterminate		
	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Total Wt.
F179	78.0	52.2%	32.2	21.6%	0.0	0.0%	39.2	26.2%	149.4
F182	535.0	91.9%	30.7	5.3%	0.0	0.0%	16.7	2.9%	582.4
F183	1257.2	90.0%	11.5	0.8%	0.0	0.0%	128.4	9.2%	1397.1
F186	896.0	98.3%	0.3	0.0%	6.3	0.7%	9.0	1.0%	911.6
F191	904.1	81.0%	24.2	2.2%	1.3	0.1%	187.0	16.7%	1116.6
F193	1882.8	56.8%	39.6	1.2%	1.3	0.0%	1393.5	42.0%	3317.2
F194	555.1	88.2%	5.7	0.9%	0.0	0.0%	68.8	10.9%	629.6
F195	22.4	19.6%	79.4	69.6%	0.0	0.0%	12.2	10.7%	114.0
F198	160.7	94.5%	0.0	0.0%	0.0	0.0%	9.4	5.5%	170.1
F2	4531.9	87.7%	79.0	1.5%	54.5	1.1%	503.3	9.7%	5168.7
F203	150.9	72.5%	46.8	22.5%	0.0	0.0%	10.3	5.0%	208.0
F212	54.0	77.4%	5.3	7.6%	9.5	13.6%	1.0	1.4%	69.8
F218	328.9	95.7%	1.3	0.4%	0.0	0.0%	13.6	4.0%	343.8
F220	620.7	87.9%	66.9	9.5%	0.0	0.0%	18.9	2.7%	706.5
F223	140.2	88.2%	3.9	2.5%	0.0	0.0%	14.9	9.4%	159.0
F230	160.7	89.4%	2.4	1.3%	1.6	0.9%	15.1	8.4%	179.8
F236	406.5	82.9%	23.7	4.8%	8.0	1.6%	52.1	10.6%	490.3
F240	22.6	99.1%	0.0	0.0%	0.0	0.0%	0.2	0.9%	22.8
F243	90.0	94.5%	0.0	0.0%	2.2	2.3%	3.0	3.2%	95.2
F245	167.2	90.3%	0.0	0.0%	0.0	0.0%	18.0	9.7%	185.2
F246	135.3	52.7%	34.5	13.4%	76.4	29.8%	10.6	4.1%	256.8
F251	190.6	98.0%	0.8	0.4%	0.0	0.0%	3.0	1.5%	194.4
F252	154.1	93.5%	0.0	0.0%	3.8	2.3%	6.9	4.2%	164.8
F253	749.8	82.8%	17.3	1.9%	1.1	0.1%	137.2	15.2%	905.4
F254	171.4	99.2%	0.0	0.0%	0.0	0.0%	1.4	0.8%	172.8
F259	51.7	20.3%	0.0	0.0%	201.2	79.0%	1.8	0.7%	254.7
F26	261.8	92.2%	1.4	0.5%	0.0	0.0%	20.9	7.4%	284.1
F265	434.6	83.6%	62.4	12.0%	0.1	0.0%	22.6	4.3%	519.7
F267	97.7	95.8%	1.1	1.1%	0.0	0.0%	3.2	3.1%	102.0
F33	55.2	97.5%	0.0	0.0%	0.0	0.0%	1.4	2.5%	56.6
F77	44.3	76.6%	1.1	1.9%	0.5	0.9%	11.9	20.6%	57.8
F85	177.2	85.2%	9.6	4.6%	1.5	0.7%	19.8	9.5%	208.1
F86	305.8	95.9%	2.2	0.7%	0.9	0.3%	10.0	3.1%	318.9
F87	107.7	88.1%	0.6	0.5%	0.0	0.0%	13.9	11.4%	122.2
F93	807.0	87.2%	34.0	3.7%	0.4	0.0%	84.1	9.1%	925.5
Grand Total	27487.9	79.2%	1530.0	4.4%	1036.0	3.0%	4638.7	13.4%	34692.6

The division of the cached tools between biface/adze and scraper/uniface caches suggests separate tool kits were used during this occupation. It is possible that biface and adze features represent tools used primarily in male dominated activities (woodworking etc.) while the scraper and uniface kits related to female activities (hide preparation). Therefore, the separation of these artifacts may be the result of cultural rules against the mixing of these tool types.

Table 4.7. Middle Kirk Lithic Scatter Debitage by Size.

Size	2 inch		1 inch		1/2 inch		1/4 inch		<1/4 inch		
Feature	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Total Wt.(grams)
F105	0	0.0%	920	25.5%	1677.1	46.4%	772.7	21.4%	244.1	6.8%	3613.9
F108	0	0.0%	5.1	4.7%	68.5	63.3%	28.4	26.2%	6.2	5.7%	108.2
F109	0	0.0%	159.8	16.9%	580.2	61.3%	187.6	19.8%	18.8	2.0%	946.4
F113	72.9	2.9%	436.2	17.5%	1273.6	51.0%	515.9	20.7%	196.8	7.9%	2495.4
F123	0	0.0%	30.3	25.9%	73.3	62.5%	10.2	8.7%	3.4	2.9%	117.2
F128	0	0.0%	128.3	60.6%	65	30.7%	15.8	7.5%	2.6	1.2%	211.7
F129	230.2	28.9%	295.7	37.1%	205.2	25.8%	57.1	7.2%	8.3	1.0%	796.5
F133	0	0.0%	310.9	48.7%	232.7	36.5%	75.3	11.8%	19.5	3.1%	638.4
F134	0	0.0%	288.4	69.3%	90.2	21.7%	29.4	7.1%	8.4	2.0%	416.4
F135	0	0.0%	4.9	10.1%	27.8	57.6%	12.9	26.7%	2.7	5.6%	48.3
F140	0	0.0%	15.2	3.8%	207	51.3%	133.7	33.1%	47.7	11.8%	403.6
F141	0	0.0%	97.4	19.3%	313.8	62.0%	74.1	14.6%	20.6	4.1%	505.9
F144	0	0.0%	105.4	26.1%	159.6	39.6%	104.9	26.0%	33.2	8.2%	403.1
F146	0	0.0%	123.2	14.5%	436	51.2%	228.6	26.9%	63.4	7.4%	851.2
F149	0	0.0%	524.3	41.6%	480.6	38.2%	207.9	16.5%	46.5	3.7%	1259.3
F154	0	0.0%	147.3	32.8%	211.6	47.1%	71.4	15.9%	18.5	4.1%	448.8
F161	0	0.0%	91.8	39.8%	90.1	39.1%	41.7	18.1%	6.9	3.0%	230.5
F163	0	0.0%	33.4	22.7%	76.9	52.2%	31	21.0%	6	4.1%	147.3
F164	0	0.0%	0	0.0%	23.4	51.0%	18.2	39.7%	4.3	9.4%	45.9
F171	0	0.0%	106.3	24.0%	244.7	55.1%	79.4	17.9%	13.3	3.0%	443.7
F179	0	0.0%	8.7	5.8%	85.6	57.3%	17.6	11.8%	37.5	25.1%	149.4
F182	140.9	24.2%	185.4	31.8%	156.6	26.9%	82.8	14.2%	16.7	2.9%	582.4
F183	67.3	4.8%	290	20.8%	614	43.9%	327.9	23.5%	97.9	7.0%	1397.1
F186	377.1	41.4%	378.2	41.5%	150.3	16.5%	5	0.5%	1	0.1%	911.6
F191	0	0.0%	182.4	16.3%	510.6	45.7%	316.7	28.4%	106.9	9.6%	1116.6
F193	199.6	6.0%	1135.6	34.2%	1425.8	43.0%	413.9	12.5%	142.3	4.3%	3317.2
F194	0	0.0%	204.3	32.4%	274.5	43.6%	123.3	19.6%	27.5	4.4%	629.6
F195	0	0.0%	0	0.0%	68.2	59.8%	33.6	29.5%	12.2	10.7%	114.0

Size	2 inch		1 inch		1/2 inch		1/4 inch		<1/4 inch		
Feature	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Total Wt.(grams)
F198	0	0.0%	74	43.5%	71.6	42.1%	17.3	10.2%	7.2	4.2%	170.1
F2	0	0.0%	1646.9	31.9%	2350.2	45.5%	974.1	18.8%	197.5	3.8%	5168.7
F203	0	0.0%	5.8	2.8%	142.5	68.5%	52	25.0%	7.7	3.7%	208.0
F212	0	0.0%	4.2	6.0%	38.3	54.9%	27.3	39.1%	0	0.0%	69.8
F218	0	0.0%	29.9	8.7%	254.2	73.9%	46.1	13.4%	13.6	4.0%	343.8
F220	0	0.0%	318.9	45.1%	294	41.6%	77.5	11.0%	16.1	2.3%	706.5
F223	0	0.0%	60.9	38.3%	61.4	38.6%	28	17.6%	8.7	5.5%	159.0
F230	0	0.0%	74.6	41.5%	69.1	38.4%	26.4	14.7%	9.7	5.4%	179.8
F236	0	0.0%	21.8	4.4%	261.9	53.4%	163.4	33.3%	43.2	8.8%	490.3
F240	0	0.0%	0	0.0%	21.7	95.2%	0.9	3.9%	0.2	0.9%	22.8
F243	0	0.0%	36.8	38.7%	44.8	47.1%	11.9	12.5%	1.7	1.8%	95.2
F245	0	0.0%	43.8	23.7%	101.6	54.9%	35.3	19.1%	4.5	2.4%	185.2
F246	57.8	22.5%	110.4	43.0%	50.1	19.5%	29.4	11.4%	9.1	3.5%	256.8
F251	0	0.0%	26.6	13.7%	143.8	74.0%	21	10.8%	3	1.5%	194.4
F252	0	0.0%	40.7	24.7%	93.7	56.9%	23.8	14.4%	6.6	4.0%	164.8
F253	0	0.0%	305.2	33.7%	367.7	40.6%	171	18.9%	61.5	6.8%	905.4
F254	0	0.0%	89.1	51.6%	73.3	42.4%	9	5.2%	1.4	0.8%	172.8
F259	0	0.0%	35.9	14.1%	190	74.6%	27	10.6%	1.8	0.7%	254.7
F26	0	0.0%	56.1	19.7%	140.1	49.3%	67	23.6%	20.9	7.4%	284.1
F265	0	0.0%	138.4	26.6%	277.6	53.4%	81.7	15.7%	22	4.2%	519.7
F267	0	0.0%	34.1	33.4%	50.8	49.8%	13.9	13.6%	3.2	3.1%	102.0
F33	0	0.0%	21.9	38.7%	16.9	29.9%	16.4	29.0%	1.4	2.5%	56.6
F77	0	0.0%	11	19.0%	26.3	45.5%	20.5	35.5%	0	0.0%	57.8
F85	0	0.0%	16.4	7.9%	118.7	57.0%	53.4	25.7%	19.6	9.4%	208.1
F86	0	0.0%	169.7	53.2%	109.9	34.5%	31.7	9.9%	7.6	2.4%	318.9
F87	0	0.0%	18.3	15.0%	54.5	44.6%	36.1	29.5%	13.3	10.9%	122.2
F93	0	0.0%	261.9	28.3%	406.2	43.9%	217.2	23.5%	40.2	4.3%	925.5
Total	1145.8	3.3%	9861.8	28.4%	15653.8	45.1%	6296.3	18.1%	1734.9	5.0%	34692.6

Table 4.8. Middle Kirk Lithic Scatter Tools.

Feature	Adze (Ct.)	Biface (Ct.)	Chopper (Ct.)	Core (Ct.)	Graver (Ct.)	Hammerstone (Ct.)	Hammerstone/ Anvil (Ct.)	Manuport (Ct.)	Point (Ct.)	Retouched Flake (Ct.)	Scraper (Ct.)	Tested Cobble (Ct.)	Total
F105	1	0	0	0	0	0	0	0	0	0	0	0	1
F108	0	1	0	0	0	0	0	0	0	0	0	0	1
F113	0	5	1	1	0	0	0	0	1	0	0	0	8
F128	0	1	0	0	0	0	0	0	0	0	0	0	1
F129	0	2	0	1	0	1	0	0	0	1	0	0	5
F133	1	1	0	0	0	1	0	0	0	0	0	0	3
F135	1	0	0	0	0	0	0	0	3	0	0	0	4
F140	0	1	0	0	0	0	0	0	1	0	0	0	2
F141	0	0	0	0	0	0	0	0	0	0	1	0	1
F144	0	0	0	1	0	0	0	0	0	0	0	0	1
F146	0	0	0	0	0	0	0	0	1	0	0	0	1
F149	0	1	0	1	0	0	0	0	0	0	0	0	2
F161	0	0	1	0	0	0	0	0	0	0	1	0	2
F171	0	0	0	0	0	0	0	0	1	0	0	0	1
F179	0	2	0	0	0	0	0	0	0	0	0	0	2
F182	0	2	0	0	0	0	0	0	0	0	0	1	3
F183	0	3	0	0	0	0	0	0	0	1	0	0	4
F186	0	0	0	0	0	0	0	1	1	0	0	0	2
F187	0	0	0	0	0	0	0	0	1	0	1	0	2
F191	0	1	0	0	0	0	0	0	0	0	0	0	1
F193	0	2	0	0	0	0	0	0	0	0	0	0	2
F194	1	3	0	0	0	0	0	0	1	0	4	0	9
F195	0	0	0	0	0	0	0	0	1	0	0	0	1
F2	0	3	0	0	0	0	0	0	0	0	0	0	3
F212	0	1	0	0	0	0	1	1	0	0	2	0	5
F218	0	1	0	0	0	0	0	0	0	0	0	0	1
F220	0	1	0	1	0	0	0	0	0	0	0	0	2
F223	0	1	0	0	0	0	0	0	1	0	0	0	2
F236	0	4	0	0	0	0	0	0	0	0	0	0	4
F246	0	1	0	0	0	0	0	0	0	0	0	0	1
F251	2	1	0	0	0	1	0	0	0	0	1	0	5
F253	0	0	0	0	0	0	0	0	1	0	0	0	1
F254	0	2	0	0	0	0	0	0	2	0	0	0	4
F265	3	2	0	0	0	0	0	1	5	1	1	0	13
F77	4	2	0	0	0	0	0	0	0	0	1	0	7
F79	0	1	0	0	1	0	0	0	1	0	1	0	4
F81	0	2	0	0	0	1	0	0	1	1	0	0	5
F86	0	1	0	0	0	0	0	0	0	0	0	0	1
F93	0	3	0	0	0	0	0	0	1	1	0	0	5
F96	1	2	1	1	0	0	0	0	1	1	0	0	7
Total	14	53	3	6	1	4	1	3	24	6	13	1	129

Table 4.9. Middle Kirk Cache Tools.

Feature	Adze	Biface	Graver	Hammerstone	Retouched Flake	Scraper	Scraper/Graver	Uniface	Complete	Fragment	Total
F14b	0	11	0	0	1	0	0	0	9	3	12
F71	2	11	0	1	0	0	0	0	13	1	14
F76	1	2	0	0	0	0	0	0	2	1	3
F153	0	0	0	0	1	5	0	0	6	0	6
F175	0	0	0	0	2	6	1	5	13	1	14
F286	0	0	1	0	0	4	0	3	8	0	8
Total	3	24	1	1	4	15	1	8	51	6	57

Table 4.10. Middle Kirk Pit Attributes.

Feature	Length (cm)	Width (cm)	Depth (cm)	Volume (dm3)	Profile	Zone Count	Zone Type
F51	94	71	33	755.39	Basin	0	
F257	68	53	14	259.72	Basin	0	
F270	38	36	3	16.69	Basin	0	
F103	56	42	6	78.84	Basin	0	
F213	75	52	9	131.09	Basin	0	
F225	58	54	21	358.97	Basin	0	
F170	35	30	11	40.47	Basin	1	Burned Soil

Pit features from the Middle Kirk component were smaller than Lower Kirk pit features but shared similar fill color, texture, and mottling. Although no obvious pairs of pit and hearth features are found in the Middle Kirk, as in the Lower Kirk, the high fire-cracked rock content of many of these pits along with the occurrence of charcoal and oxidized soil mottling indicates the likelihood that they functioned for indirect heating of food (e.g., baking or steaming). Middle Kirk features are fairly evenly distributed from north to south along the landform. It is apparent that surface hearths are predominately in the eastern or river side of the landform, while lithic scatters are more common in the western portion of the site (west of the 2W line). This distribution of features may indicate that during this time the occupants of the site conducted lithic production activities in the western site area to leave the eastern portion relatively free of debitage to allow other domestic activities, which are indicated by the surface hearths. An alternative interpretation is that flint knapping occurred in both areas but the eastern areas were more commonly cleaned of lithic production debris, which was deposited over bank, resulting in the secondary deposits. This pattern is not as evident in the Lower Kirk feature distribution.

Table 4.11. Middle Kirk Pit Debitage, FCR/Rock, and Tools.

Feature	Debitage (g)	FCR/Rock (Kg)	Biface (Ct.)	Core (Ct.)	Hammerstone (Ct.)	Point (Ct.)	Scraper (Ct.)	Total Tools (Ct.)
F51	191.7	1.476	3	0	0	1	1	5
F103	523.1	0.003	2	0	0	0	0	2
F170	330	0	1	0	0	1	0	2
F213	110.4	0.077	1	0	1	0	0	2
F225	271.6	0	0	0	0	0	0	0
F257	27	0.01	2	1	0	0	0	3
F270	92.3	0	0	0	1	0	0	1
Total	1354.4	1.566	9	1	2	2	1	15

LOWER KIRK OCCUPATION

The 144 features defined in this occupation occurred between 182 and 254 cm below datum in the main block, and the component was characterized by the occurrence of oxidized ring features, which were not found at any other levels (Figures 4.13 and 4.14). While the elevation of Lower Kirk features varied due to the uneven surface of the landform, a distinct occupation surface was indicated by a concentration of features uncovered between 190 and 200 cm below datum and centered along the 0E line (Figure 4.15).

As with the other occupations, these features initially were divided into the general categories of surface and subsurface features, which were then subdivided, based upon distinctive attributes. Lower Kirk surface features included lithic scatters, tool caches, rock scatters, and surface hearths (Table 4.1). Within this group, surface hearths (n=38) and lithic scatters (n=31) were the most common. Subsurface features included pits, posts, basin hearths, and oxidized rings. The numerous oxidized ring features (n=47) occurred in no other component at the site and were considered a diagnostic attribute of the Lower Kirk. Within the remaining subsurface features, prepared pits (n=17) were the most common. The remainder of this section presents a discussion of each Lower Kirk feature type while giving a detailed example of each.

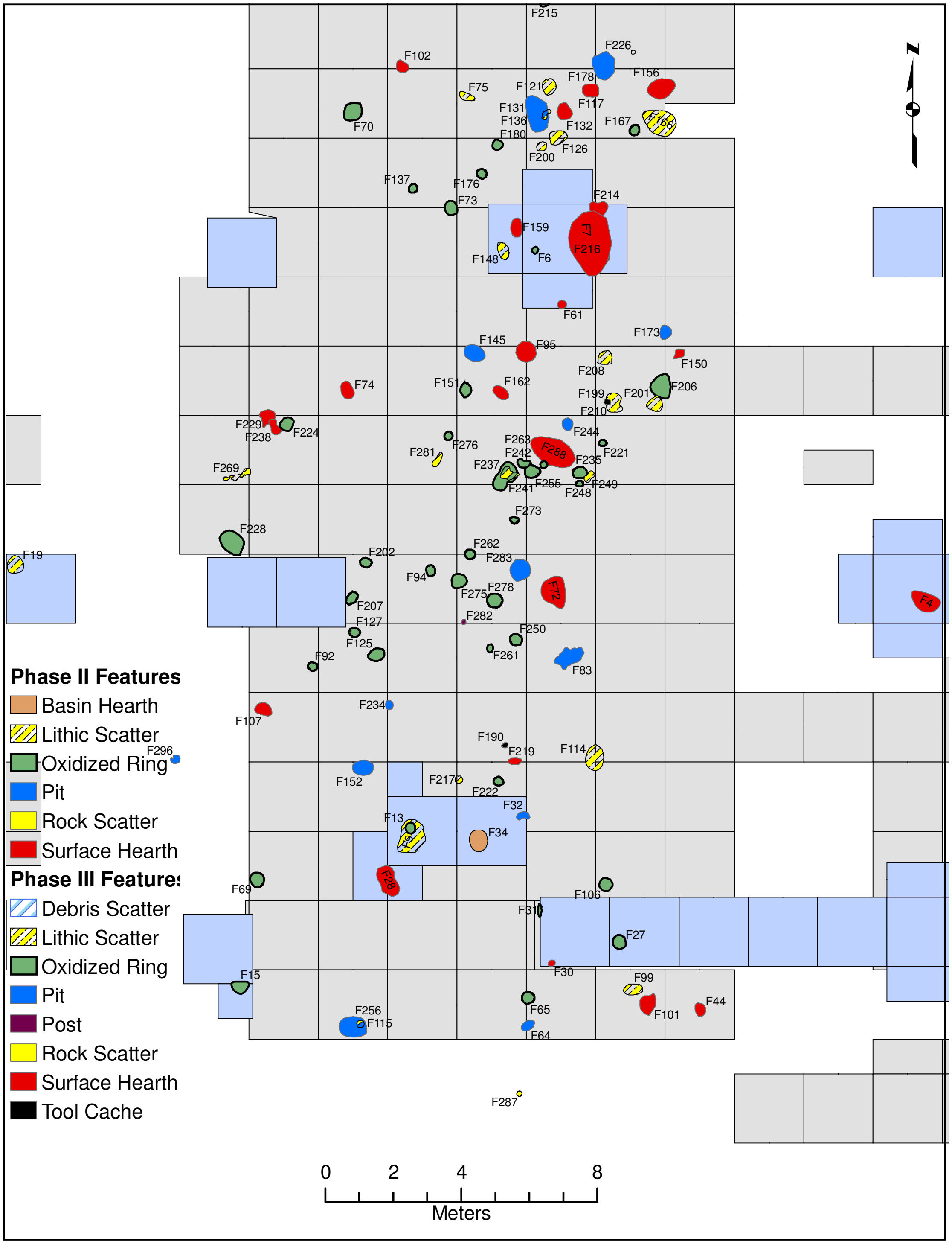

Figure 4.13. Lower Kirk Feature Distribution Map (south half of Main Block).

Surface Hearths

Thirty-six surface hearths were defined as part of the Lower Kirk occupation. These features were distinguished by the occurrence of oxidized soil with no evidence of

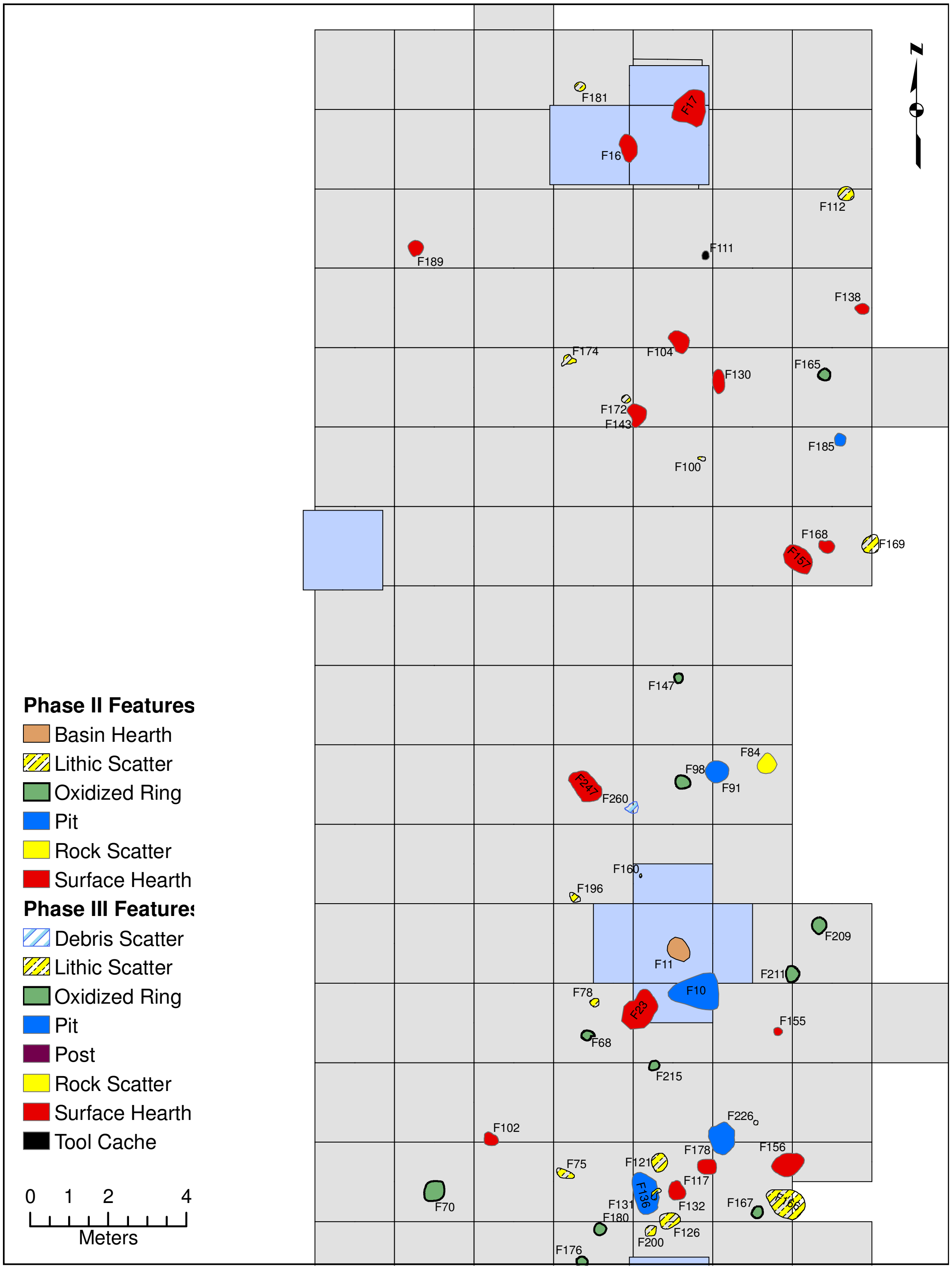

Figure 4.14. Lower Kirk Feature Distribution Map (north half of Main Block).

a prepared hearth and are interpreted as informal camp fires. The associated oxidation was typically dark red (2.5YR 3/6) to red (e.g. 2.5YR 5/8, 5/6, 4/6, 4/8) in color, with a diffuse boundary (Table 4.12). Soil texture was generally described as silty clay. The

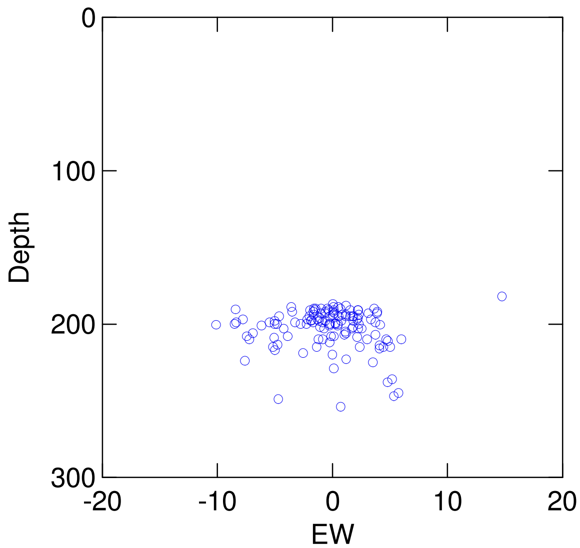

Figure 4.15. Lower Kirk Feature Depth Scatter Plot.

length of the these features ranged from 21-71 cm with the average being 54.6 cm the width ranged from 8-50 cm and the average being 40.2 cm. These figures give them a calculated average area of 2,519 cm^2, which is relatively small compared to similar Middle Kirk features and much smaller that the underlying Early Side Notched surface hearths (Figure 4.16). The oxidation associated with these surface hearths ranged in thickness from 1.5-27 cm with the average feature having 11.6 cm of oxidized soil. A total of 1769.0 g of debitage and 23.358 kg of fire cracked rock were collected during excavation of these features (Table 4.14). Of the associated tools, manuports (n=8) and bifaces (n=5) were the most common. The following paragraphs describe specific examples of surface hearths from this occupation.

F143

Feature 143 was typical of the surface hearths from this occupation (Figure 4.14). It was uncovered at 189 cm below datum in U150, at the northern end of the main excavation block. In planview it appeared as an irregular oval of oxidized soil measuring 67 cm in length and 48 cm in width, giving it a total surface area of 1,990 cm^2 (Figure 4.17). The feature matrix consisted of a heavy concentration of red to light red (2.5YR 4/8-6/8) burned matrix within an area of strong brown (7.5YR 4/6) silt loam. Upon bisection the burned soil extended 11 cm below the surface, with the densest concentration located at the top and diffuss toward the base. Cultural material found within the feature included seven flakes (13.0 g), three rocks (0.263 kg), and an adze produced from medium quality Muldraugh chert.

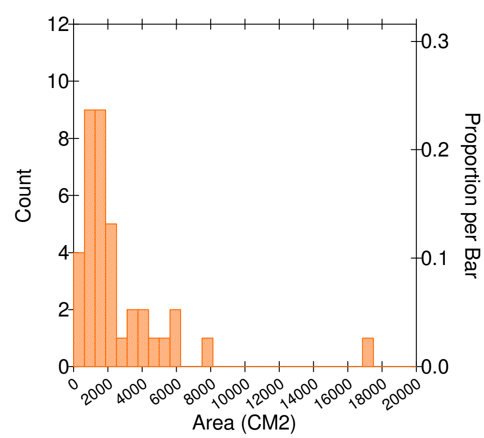

Figure 4.16. Lower Kirk Surface Hearth Area Graph.

Table 4.12. Lower Kirk Surface Hearth Attributes

Feature	Length	Width	Area (cm^2)	Boundary
F95	47	27	2810	Diffuse
F42a	50	47	1490	Diffuse
F24	21	8	250	Diffuse
F247	74	72	4380	Clear
F44	38	28	950	Diffuse
F61	27	26	500	Clear
F7	110	43	17300	Diffuse
F74	52	36	1500	Clear
F28	95	40	3950	Diffuse
F288	134	80	8070	Diffuse
F4	90	65	3650	Diffuse
F30	18	20	300	Diffuse
F159	52	20	1490	Clear
F16	45	25	2320	Diffuse
F162	59	52	1300	Diffuse
F168	32	40	1020	Diffuse
F17	88	88	5950	Diffuse
F143	67	48	1990	Diffuse
F150	24	38	670	Diffuse
F155	21	23	360	Diffuse
F156	82	59	3570	Diffuse
F157	63	49	3820	Diffuse
F130	71	50	1490	Diffuse
F132	55	35	1640	Diffuse
F138	38	32	750	Diffuse
F101	64	48	2100	Clear
F102	36	26	970	Diffuse
F104	43	50	2100	Diffuse
F107	49	38	1430	Diffuse
F238	38	26	1030	Clear
F117	46	37	1590	Diffuse
F229	41	24	1630	Diffuse
F23	90	65	6160	Diffuse
F214	54	36	2110	Clear
F216	33	38	740	Clear
F219	36	7	650	Clear
F189	39	40	1180	Clear

F168

Feature 168 was another characteristic surface hearth from this component (Figure 4.14). It was defined at 211 cm bd and appeared in planview as an indistinct concentration of burned soil in a strong brown matrix (7.5YR 5/6) (Figure 4.17). This area measured 40 cm by 32 cm, giving it a surface area of 1,020 cm^2. In profile the oxidation extended 6 cm below the level of definition and had a gradual transitional boundary. Ten small (½" or less) flakes were the only associated artifacts. These flakes (14.3 g) were of Muldraugh (78.3%), Wyandotte (8.4%), and indeterminate (13.3%) material.

F288

Feature 288 was unusual both for its large size and its stratigraphic location. It was defined at 254 cm below datum in Unit 58 in the central portion of the main block (Figure 4.13). This elevation makes it the deepest Lower Kirk feature uncovered. In plan it appeared as a diffuse patch of oxidized soil measuring 134 cm by 80 cm (8,070 cm^3) (Figure 4.17). The matrix was a yellowish brown (10YR 5/6) silty clay. The burned soil within the feature was primarily a red (10R 5/6) color, with a small patch of light red (2.5YR 6/8) soil present in the southwest quarter. This burnt soil had a maximum depth of 6 cm in profile. During excavation a small patch of fragmentary bone was collected from the south central feature fill. The only other material recovered was 3.3 grams of Wyandotte (51.5%) and Allens Creek (48.5%) debitage.

Lithic Scatters

Thirty-one lithic scatters were associated with the Lower Kirk occupation. These features averaged 1,232 cm^2, which is smaller than those from the Middle Kirk component and much smaller than the St. Charles and Early Side-Notched scatters (Figure 4.18). A total of 19,797.0g of debitage was collected from Lower Kirk lithic scatters. Muldraugh was the primary material, accounting for 80.7% of the assemblage

Table 4.13. Lower Kirk Surface Hearth tool contents.

Feature	Biface	Core	Drill	Graver	Hammerstone	Manuport	Pitted Stone	Point	Retouched Flake	Scraper	Tested Cobble	Uniface	Utilized Flake
F106	1												
F125	1												
F13	1												
F137													1
F15	2											1	1
F167	1						1						
F176											1		
F206					1								
F241	3							2	1	1			
F248	1												
F255		1											
F275			1										
F29A		1			1	1							
F69				1									
F94		1											

by weight (Table 4.14). Other material types included Wyandotte (6.2%), Allens Creek (1.0%), and Indeterminate chert (12.1%). While all sizes of debitage were present in these scatters, most (68.2%) was ½ inch in diameter or smaller, indicating a focus on late stage production activities. A breakdown of flake size by feature is given in Table 4.15. Tools, including cores and bifaces, were associated with 67.7% (n=21) of the lithic scatters, with an average of four artifacts. Of the 84 tools associated with these features bifaces (n=32), projectile points (n=16), and hammerstones (n=10) were the most common. A listing of all the associated tools is given in Table 4.16. The following paragraphs describe examples of Lower Kirk lithic scatters.

F226

Feature 226 was a small, fairly circular scatter, measuring 32 cm long and 31 cm wide, uncovered in the Lower Kirk occupation at 200 cm bd (Figure 4.13). Artifacts associated with this feature include a dense debitage cluster of 330 flakes (568.9g) and six tools. Debitage occurred as distinct clusters of Muldraugh and Wyandotte chert flakes. Muldraugh was the dominate chert type equaling 68.1% of the debitage by weight (Table 4.14). Wyandotte debitage was 25.2% of the total, which was higher than usual. This debris was dominated by smaller, late stage material, with 83.6% of the flakes (by weight) measuring less than ½" in diameter (Table 4.15). This debris also indicated late stage production activity with 70.8% of the flakes measuring less than ½" in diameter. An indeterminate chert accounted for 6.7% of the debitage. Tools were spread throughout

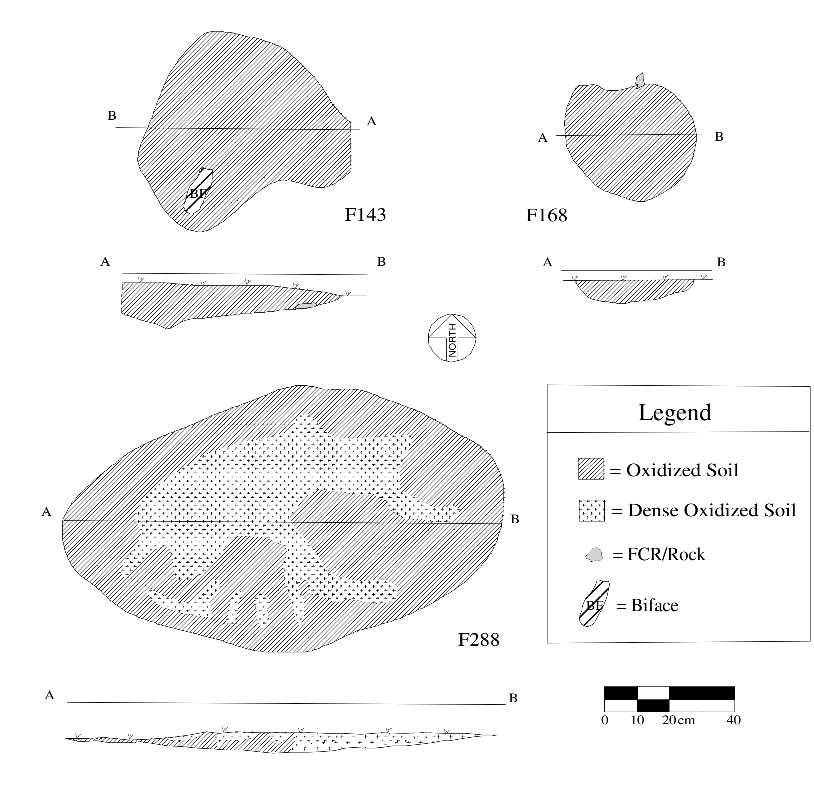

Figure 4.17. Lower Kirk Surface Heaths.

the feature area and included two bifaces, a hammerstone, a Pine Tree projectile point, a retouched flake, and a scraper (Table 4.16). Of the chert tools, Wyandotte was the primary material used (n=3), with Muldraugh artifacts also present (n=2).

F166

Feature 166 was unusually large for a Lower Kirk lithic scatter. It was defined at 193 cm below datum in Unit 91 at the west-central edge of the main excavation block (Figure 4.13). After definition it was determined that the scatter extended beyond the unit boundary to the east, therefore an expansion 1x2 m unit (Unit 91A) was excavated to gain full definition. The scatter covered an area 103.5 cm wide by 73 cm long, for an estimated area of 5,440 cm^2. Associated artifacts included a total of 426 flakes (398.1 g) and five tools. The debitage consisted mainly of Muldraugh (279.0 g; 70.1%) chert with the remaining being Wyandotte (87.5 g; 22.0%) and indeterminate (31.6 g; 7.9%). Tools included three bifaces, a hammerstone, and a scraper. The bifaces included Stage 1 and Stage 3 tools produced from Muldraugh chert, and a third Stage 2 biface made from St. Louis chert. The hammerstone was made of a granitic/metamorphic stone. Four other rounded cobbles were recovered from the feature. While showing no use wear, these manuports were probably intended to be used as hammerstones at a later date. The scraper was a combination scraper made from high qualityWyandotte chert.

F237

Feature 237 was representative of a typical lithic scatter. This feature was defined at the south end of the block in Unit 57 at 192 cm below datum (Figure 4.13) and covered an area measuring 54 cm by 39 cm, giving it an area of 1,190 cm^2. The associated assemblage consisted of 371 flakes (1,264.7g) deposited in a crescent shape along with two Stage 1 bifaces, four polyhedral cores, and a tested cobble, all produced from Muldraugh chert. Debitage from the feature was 93.2% Muldraugh and 0.6% Wyandotte by weight, while 6.2% was of an indeterminate chert type (Table 4.14). The Muldraugh

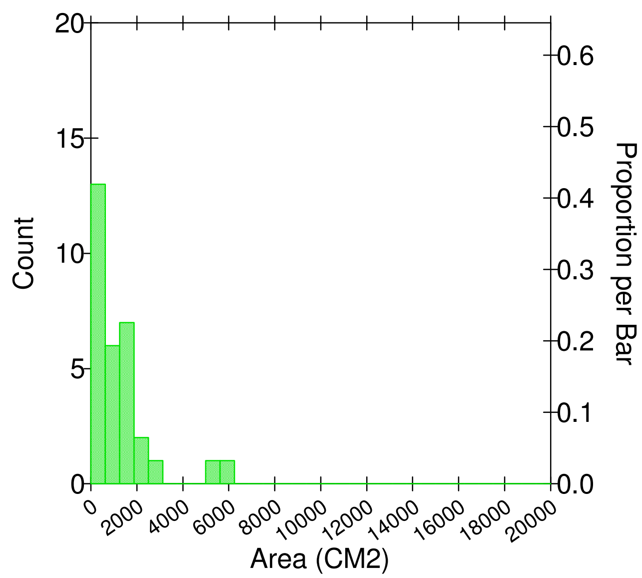

Figure 4.18. Lower Kirk Lithic Scatter Area Graph.

debitage was predominantly from late stage reduction with 75.6% of the assemblage measuring ½" or less in diameter. All of the sparse Wyandotte material was small (<½"), with 59.4% being less than ¼" in diameter. A patch of possibly oxidized soil was present along the northwest edge of the debitage with light charcoal flecking occurring throughout.

F121

Feature 121 was an unusual lithic scatter because of the large number of tools associated with it. This feature was uncovered at 190 cm below datum in Unit 90 at the center of the block (Figure 4.14). It consisted of 509.4g of flakes, 43 pieces of fire-cracked rock, and 21 tools, all recovered in a region measuring 44 cm by 37 cm (1,450 cm^2). Muldraugh was the dominant chert type (79.6% by weight), with Wyandotte (10.0%), Allens Creek (0.7%), and an Indeterminate chert (9.7%) present in lesser amounts. Typical of other Lower Kirk lithic scatters most (71.1%) of the debris was ½" in diameter or less, indicating a focus on late stage reduction. See Tables 4.14 and 4.15 for the complete results of the debitage analysis. The 21 associated tools included seven projectile points, four adzes, three bifaces, two hammerstones, two retouched flakes, one combination hammerstone/anvil, a polyhedral core, and a bifacial flake. All of the projectile points were of the Pine Tree type with the exception of one Kirk Corner-Notched Large. The chipped stone tools of Feature 121 exhibited a wider range of material types than the debitage. While most of the tools were made from Muldraugh (n=11) and Wyandotte (n=4) cherts, other minor chert types included Lead Creek (n=1), St. Louis (n=1), Bryantsville (n=1), and Newman (n=1).

Rock Scatters

Two rock scatters were defined in the Lower Kirk occupation. As noted previously, these features were characterized by discrete refuse scatters dominated by the occurrence of modified or unmodified stones, including rock slabs, cobbles, and fire-cracked rock. Both of these scatters are described in the following paragraphs.

F29a

Feature 29a was a cluster of material measuring 58 cm long by 28 cm wide defined in Unit 10N 0E during the Phase II investigation. This unit was located at the southern end of the main Phase III block. The feature consisted of a central cluster of three river cobbles and a large fragment of fire-cracked rock which was surrounded by a core fragment, a biface, and approximately 250 Muldraugh and Wyandotte flakes.

F84

Feature 84 was a Lower Kirk rock scatter uncovered at 197 cm bd (Figure 4.14). It consisted of a large rock slab which was bordered on the southwest by a concentration of seven cobbles (Figure 4.19). The entire concentration measured 46 cm in length and 44 cm in width. The rock slab was a highly degraded ferric material, rectangular in shape, which measured 34 cm long and 24 cm wide. Associated tools included a hammerstone/anvil which was recovered with the cobbles and a complete Pine Tree projectile point found just southeast of the large slab.

Caches

Four tool caches were found in the Lower Kirk levels. Similar to the Middle Kirk occupation, these caches were distributed widely from north to south on the main landform, but east to west they all were located between W1 and E3 (Figures 4.13 and 4.14). Lower Kirk caches had an average of 4.25 tools which is less than half the average Middle Kirk cache size (Table 4.17). Similar to Middle Kirk caches, the most common artifact in these caches were bifaces (n=4; 23.5%) and scrapers (n=4; 23.5%). Other cached tools included adzes (n=3), unifaces (n=3), retouched flakes (n=2), and a single projectile point. Most of these tools were complete (n=13; 76.5%) and produced from Wyandotte chert (n=12; 70.6%), with remaining tools made from Muldraugh chert (n=5; 29.4%). Two of the caches (F111 and 199) showed the adze/biface vs. scraper/uniface segregation found in the later Middle Kirk occupation, while Features 42b and 190 each contained a single uniface and biface. As was typical of all cache features at the site, no soil discoloration was associated with the artifact clusters to indicate deposition in a prepared pit. The following section describes each Lower Kirk cache.

F111

This cache consisted of three adzes located in an area measuring 20 cm by 16 cm (330 cm^2), with a vertical difference of 4 cm. This cluster was uncovered at 198 cm below datum in Unit 164 at the far north end of the main block (Figure 4.14). The adzes were all complete specimens produced from medium to high quality Muldraugh chert.

F190

This feature consists of a cache of four artifacts recovered from Unit 29 at the south end of the main block (Figure 4.13). It was found at 190 cm below datum and covered a 20 cm by 22 cm area (220 cm^2), with a top elevation difference between the artifacts of 2 cm (Figure 4.19). Tools found in the cluster included two bifaces, a uniface, and a Pine Tree projectile point. One Stage 3 biface was made from medium quality Muldraugh, and the other was too fragmentary for subtype classification but was produced from high quality Wyandotte. The uniface was of medium quality Wyandotte, and the Pine Tree was of Muldraugh.

Table 4.14. Lower Kirk Lithic Scatter Debitage by Material Type.

	Muldraugh		Wyandotte		Allens Creek		Indeterminate		
Feature	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Perce nt	Wt. (grams)	Percent	Total
F100	63.9	93.1%	0.0	0.0%	0.0	0.0%	3.8	5.5%	68.6
F112	15.3	29.4%	0.0	0.0%	29.9	57.4%	6.9	13.2%	52.1
F114	2910.6	73.5%	132.5	3.3%	7.6	0.2%	910.1	23.0%	3960.8
F115	67.9	88.2%	0.0	0.0%	0.0	0.0%	9.1	11.8%	77.0
F121	405.6	79.6%	50.9	10.0%	3.7	0.7%	49.2	9.7%	509.4
F126	531.2	33.5%	532.1	33.6%	97.8	6.2%	423.2	26.7%	1584.3
F131	427.8	92.1%	0.9	0.2%	0.0	0.0%	35.9	7.7%	464.6
F148	532.1	86.8%	1.2	0.2%	15.5	2.5%	64.5	10.5%	613.3
F160	95.2	88.1%	0.4	0.4%	5.1	4.7%	7.3	6.8%	108.0
F166	279.0	70.1%	87.5	22.0%	0.0	0.0%	31.6	7.9%	398.1
F169	94.0	28.1%	71.2	21.3%	0.0	0.0%	168.8	50.5%	334.0
F172	92.0	98.5%	0.2	0.2%	0.0	0.0%	1.2	1.3%	93.4
F174	122.9	91.3%	7.8	5.8%	0.0	0.0%	3.9	2.9%	134.6
F181	1075.9	83.5%	31.9	2.5%	0.5	0.0%	180.1	14.0%	1288.4
F196	7.9	62.2%	4.8	37.8%	0.0	0.0%	0.0	0.0%	12.7
F200	116.2	87.8%	4.3	3.3%	0.0	0.0%	11.8	8.9%	132.3
F201	603.0	95.6%	8.5	1.3%	0.0	0.0%	19.4	3.1%	630.9
F208	899.8	92.7%	9.0	0.9%	1.3	0.1%	60.1	6.2%	970.2
F210	268.3	88.1%	8.2	2.7%	10.7	3.5%	17.5	5.7%	304.7
F217	68.5	82.7%	3.9	4.7%	0.0	0.0%	10.4	12.6%	82.8
F226	387.7	68.1%	143.2	25.2%	0.0	0.0%	38.0	6.7%	568.9
F237	1178.8	93.2%	7.2	0.6%	0.0	0.0%	78.7	6.2%	1264.7
F249	27.6	92.9%	0.0	0.0%	0.0	0.0%	2.1	7.1%	29.7
F269	166.7	83.7%	8.4	4.2%	0.0	0.0%	24.1	12.1%	199.2
F281	42.6	94.2%	0.0	0.0%	0.0	0.0%	2.6	5.8%	45.2
F287	109.6	100.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	109.6
F9	4624.9	93.3%	105.2	2.1%	19.0	0.4%	210.5	4.2%	4959.6
F99	769.5	96.1%	3.1	0.4%	0.0	0.0%	28.2	3.5%	800.8
Total	15984.5	80.7%	1222.4	6.2%	191.1	1.0%	2399.0	12.1%	19797

F199

Feature 199 was a cache at 194 cmbd, which measured 20 cm by 16 cm in planview and extended 6 cm below the level of initial definition (Figure 4.19). It was located in Unit 66 in the south central portion of the block (Figure 4.13). Cached artifacts included four end scrapers and a uniface (a probable scraper preform) all made from high to medium quality Wyandotte chert. Ten pieces of debitage were recovered from within the cluster, including one large unmodified flake which could have been worked into an additional scraper. Charcoal also was present around the scrapers, and a sample was collected for dating. Of interest was the placement of a large fragment of fire-cracked rock on the feature surface, possibly to function as a marker.

Table 4.15. Lower Kirk Lithic Scatter Debitage by Size.

	2 inch		1 inch		1/2 inch		1/4 inch		<1/4 inch		
Feature	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Wt. (grams)	Percent	Total
F100	0.0	0.0%	0.0	0.0%	41.9	61.9%	22.0	32.5%	3.8	5.6%	67.7
F112	0.0	0.0%	0.0	0.0%	27.3	52.4%	17.9	34.4%	6.9	13.2%	52.1
F114	146.3	3.7%	613.2	15.5%	1999.0	50.5%	999.3	25.2%	203.0	5.1%	3960.8
F115	0.0	0.0%	0.0	0.0%	39.3	51.0%	30.3	39.4%	7.4	9.6%	77.0
F121	0.0	0.0%	149.8	29.4%	236.8	46.5%	110.5	21.7%	12.3	2.4%	509.4
F126	0.0	0.0%	106.7	6.7%	1031.8	65.1%	377.2	23.8%	68.6	4.3%	1584.3
F131	0.0	0.0%	79.5	17.1%	233.6	50.3%	115.6	24.9%	35.9	7.7%	464.6
F148	0.0	0.0%	101.4	16.5%	300.8	49.0%	148.1	24.1%	63.0	10.3%	613.3
F160	0.0	0.0%	13.7	12.7%	52.7	48.8%	35.5	32.9%	6.1	5.6%	108.0
F166	0.0	0.0%	164.6	41.3%	131.2	33.0%	94.1	23.6%	8.2	2.1%	398.1
F169	0.0	0.0%	172.2	51.6%	121.2	36.3%	35.5	10.6%	5.1	1.5%	334.0
F172	0.0	0.0%	37.4	40.0%	47.9	51.3%	6.9	7.4%	1.2	1.3%	93.4
F174	0.0	0.0%	42.6	31.6%	65.2	48.4%	22.9	17.0%	3.9	2.9%	134.6
F181	243.6	18.9%	467.6	36.3%	402.5	31.2%	138.0	10.7%	36.7	2.8%	1288.4
F196	0.0	0.0%	0.0	0.0%	12.7	100.0%	0.0	0.0%	0.0	0.0%	12.7
F200	0.0	0.0%	43.1	32.6%	53.1	40.1%	24.3	18.4%	11.8	8.9%	132.3
F201	83.5	13.2%	276.4	43.8%	209.0	33.1%	52.0	8.2%	10.0	1.6%	630.9
F208	0.0	0.0%	131.2	13.5%	511.2	52.7%	271.8	28.0%	56.0	5.8%	970.2
F210	0.0	0.0%	59.9	19.7%	166.8	54.7%	62.2	20.4%	15.8	5.2%	304.7
F217	0.0	0.0%	0.0	0.0%	56.3	68.0%	22.8	27.5%	3.7	4.5%	82.8
F226	0.0	0.0%	127.6	22.4%	320.6	56.4%	82.7	14.5%	38.0	6.7%	568.9
F237	0.0	0.0%	307.8	24.3%	605.9	47.9%	287.4	22.7%	63.6	5.0%	1264.7
F249	0.0	0.0%	7.8	26.3%	8.6	29.0%	11.2	37.7%	2.1	7.1%	29.7
F269	0.0	0.0%	50.9	25.6%	84.4	42.4%	48.1	24.1%	15.8	7.9%	199.2
F281	0.0	0.0%	0.0	0.0%	23.3	51.5%	19.3	42.7%	2.6	5.8%	45.2
F287	0.0	0.0%	105.3	96.1%	4.3	3.9%	0.0	0.0%	0.0	0.0%	109.6
F9	195.3	3.9%	2150.0	43.4%	1847.0	37.2%	637.7	12.9%	129.6	2.6%	4959.6
F99	96.7	12.1%	325.4	40.6%	277.7	34.7%	86.3	10.8%	14.7	1.8%	800.8
Total	765.4	3.9%	5534.1	28.0%	8912.1	45.0%	3759.6	19.0%	825.8	4.2%	19797.0

F42b

Cache 42b was uncovered from Unit 79 in the central portion of the main block at 187 cm below datum (Figure 4.13). All five artifacts were recovered at the same elevation in an area measuring 16 cm long by 8 cm wide (100 cm^2), as if placed upon a flat surface. Atypical for caches at this site, the associated tools included a uniface, two bifaces, and two retouched flakes. The bifaces were both at Stage 2 of the reduction sequence. The uniface exhibited a tear drop shape typical of the scrapers from this occupation and possibly represents a scraper preform. All these artifacts were produced from high (n=4) to medium (n=1) quality Wyandotte chert. All were complete, with the exception of one retouched flake. Cortex was present on one biface and one retouched flake.

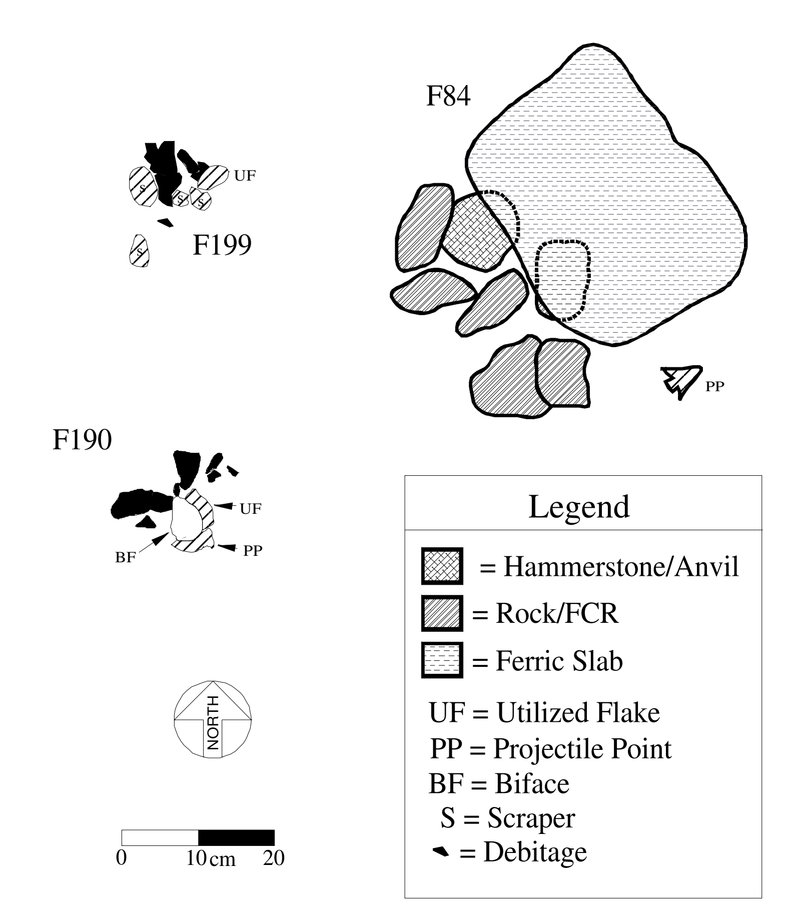

Figure 4.19. Lower Kirk Rock Scatter (F84) and Cache Features.

Pit Features

A total of 17 pit features were defined as part of the Lower Kirk occupation. In planview these features ranged in length from 12-101 cm, with an average of 56.2 cm (Table 4.18). Pit width ranged from 10-78 cm, with the average being 40.5 cm. Profile depths ranged from 6.5-46 cm, with an average of 16.5 cm. These pits had an average volume of 340.12 dm^3, making them larger than similar Middle Kirk features. Three profile shapes were present, including basin (n=11; 64.7%), steep-sided (n=5; 29.4%), and conical (n=1; 5.9%). Fill was typically a silty clay ranging in color from yellowish brown (10YR 5/6, 5/4) to dark yellowish brown (10YR 4/6, 4/4), with brown (7.5YR 3/4) and strong brown (7.5YR 4/6) soils also present. A majority of the pits (n=10) showed no interior fill structure, while seven exhibited one or more fill zones (Table 4.18). Zones consisted of charcoal (n=2), burned soil (n=3), or a mixture of the two (n=3). Cultural material recovered from these features is given in Table 4.19. The following sections give detailed examples of a selected number of Lower Kirk pits.

F64

Feature 64 was a fairly typical pit from this occupation. It was noted at the southern edge of the main excavation block in Units 4 and 5 (Figure 4.13). Defined at 197 cm below datum, the feature originally appeared as an oval soil stain that measured 39 x 29 cm. Feature fill had an abrupt boundary and was characterized as a strong brown (7.5YR 4/6) silty clay mottled with moderate amounts of charcoal and burned soil (Figure 4.20). In profile this mottling was concentrated in the upper half of the fill. The base of the feature was conical shaped and extended to a depth of 23 cm, which yields a feature volume of 157.18 dm^3. Debitage, consisting of Muldraugh (3.9g; 75.0%), Wyandotte (0.2g; 3.8%), Allens Creek (0.8g; 15.4%) and indeterminate chert (0.3g; 5.8%), was the only associated cultural material.

Table 4.16. Lower Kirk Lithic Scatter Tools.

Feature	Abrader (Ct.)	Adze (Ct.)	Biface (Ct.)	Bifacial Flake (Ct.)	Core (Ct.)	Hammerstone (Ct.)	Hammerstone/ Anvil (Ct.)	Manuport (Ct.)	Pitted Stone (Ct.)	Projectile Point (Ct.)	Retouched Flake (Ct.)	Scraper (Ct.)	Tested Cobble (Ct.)	Total
F75	0	0	3	0	0	1	0	0	0	2	0	0	0	6
F78	0	0	0	0	0	0	0	0	0	3	0	0	0	3
F99	0	0	1	0	0	0	0	0	0	0	1	0	1	3
F100	0	0	0	0	0	2	1	0	0	0	0	0	0	3
F112	0	0	1	0	0	0	0	0	0	0	0	0	0	1
F114	0	0	2	1	0	0	0	0	0	0	0	0	0	3
F121	0	4	3	1	1	2	1	0	0	7	2	0	0	21
F126	0	0	2	0	0	0	0	0	0	1	0	0	0	3
F131	0	0	1	0	0	0	0	0	0	0	0	0	0	1
F148	0	0	0	0	0	0	0	0	0	1	0	0	0	1
F160	0	0	1	0	0	0	0	0	0	0	0	0	0	1
F166	0	0	3	0	0	1	0	0	0	0	0	1	0	5
F169	0	0	1	0	0	0	0	0	0	0	0	0	0	1
F196	1	0	3	0	0	1	0	0	0	0	0	0	0	5
F201	0	0	1	0	0	0	0	2	1	0	0	0	0	4
F208	0	0	1	0	0	0	0	0	0	0	0	0	0	1
F210	0	0	2	0	0	0	0	0	0	1	0	0	0	3
F226	0	0	2	0	0	1	0	0	0	1	1	1	0	6
F237	0	0	2	0	4	0	0	0	0	0	0	0	1	7
F249	0	0	0	0	0	0	0	0	0	0	1	0	0	1
F281	0	0	1	0	0	0	0	0	0	0	0	0	0	1
F287	0	0	2	0	0	2	0	0	0	0	0	0	0	4
Total	1	4	32	2	5	10	2	2	1	16	5	2	2	84

F91

Feature 91 was another characteristic pit from this occupation. It was defined in the northern half of the main block (Units 120 and 119) at 208.5 cm below datum (Figure 4.14). At definition it appeared as an irregular yellowish red (5YR 4/6) silty clay oval that measured 54 cm in length and 51 cm in width (Figure 4.20). Within the fill were discontinuous patches of dark red (10R 3/6) oxidized soil, along with pockets of wood charcoal. Burned nutshell was scattered throughout the fill. Feature 91 in profile was a shallow basin 9 cm deep with an abrupt boundary. Cultural material recovered was limited to a small amount of rock/fcr (0.008kg) and 77.3g of debitage. This debitage was small (½ inch or less), resulting from late reduction activity. Wyandotte (56.7%) and Muldraugh (42.0%) were the primary material types, with Allens Creek (1.0%) and indeterminate chert (0.3%) also present.

Table 4.17. Lower Kirk Cache Tools.

Feature	Adze (Ct.)	Biface (Ct.)	Projectile Point (Ct.)	Scraper (Ct.)	Uniface (Ct.)	Retouched Flake (Ct.)	Complete (Ct.)	Fragment (Ct.)	Total
F111	3	0	0	0	0	0	3	0	3
F190	0	2	1	0	1	0	2	2	4
F199	0	0	0	4	1	0	4	1	5
F42b	0	2	0	0	1	2	4	1	5
Total	3	4	1	4	3	2	13	4	17

F152

Feature 152 was unusual in its overall size and internal structure. This pit was defined in the Lower Kirk occupation with a surface elevation of 249 cmbd (Figure 4.13). In planview it was an oval with clearly defined edges, and it measured 39 cm wide and 64 cm long. The profile of the feature was that of a steep-sided and flat-bottomed pit 46 cm deep, with five mixed stratigraphic fill zones (Figure 4.20). Feature volume was calculated to be 979.80 dm^3. In general the fill was a dark yellowish brown (10YR 3/6-4/6) silty clay highly mottled with charcoal and oxidized soil. Internal zones were differentiated by variation in the ratios of mottling. Cultural material recovered from the fill included: debitage (72.9 g), fire cracked rock (0.095 kg), a bifacial flake, and a polyhedral core. Associated debitage was produced from Muldraugh (54.2%), Wyandotte (29.8%), and indeterminate chert (16.0%). This debris was primarily ½ inch (51.4%) and ¼ inch (47.5%) in size, indicating it was from late stage reduction activity. The core from F152 was of high quality Wyandotte chert, while the bifacial flake was made from medium quality Muldraugh.

F178

Feature 178 was an atypical pit associated with the Lower Kirk occupation uncovered at 196 cm below datum (Figure 4.13). Once fully uncovered, this pit appeared as a clearly defined oval stain measuring 66 cm by 32 cm (Figure 4.21). Feature fill was a yellowish brown (10YR 5/6) silty clay mottled with charcoal and oxidized soil. In profile this feature was a basin 15 cm deep, with a lens of burned soil present in the center of the fill. No oxidation occurred along the boundaries of the feature, indicating that it probably was present as the result of secondary deposition. Cultural material from the feature included an adze (Allens Creek), a Stage 2 biface (Wyandotte), a Kirk Corner-Notched Large projectile point (Wyandotte), and two manuports. An unusually large amount of fire-cracked rock (13.8 kg) was also recovered, most of this stone was located in the north half of the feature where it was underlain with oxidized soil. A total of 73.1 g of debitage was collected. This material was mainly Muldraugh (81.4%) with Wyandotte (7.5%) and indeterminate chert (11.1%) present in lesser amounts.

Table 4.18. Lower Kirk Pit Attributes.

Feature	Length (cm)	Width (cm)	Depth (cm)	Volume (dm3)	Profile	Zone Count	Zone Type
F10	78	100	31	1424.76	Basin	0	
F29c	66	53	11	102.77	Basin	0	
F32	12	10	10	37.18	Basin	1	Charcoal
F64	39	29	23	157.18	Conical	0	
F83	60	50	23	418.77	Basin	2	Burned Soil/Charcoal
F91	51	54	9	114.68	Basin	0	
F136	101	64	17	465.30	Basin	0	
F145	60	45	8	90.89	Basin	0	
F152	39	64	46	979.8	Steep-sided	4	Mixed
F173	44	24	7	74.2	Steep-sided	1	Mixed
F178	32	66	15	311.42	Basin	1	Burned Soil
F185	32	28	10	41.02	Basin	1	Burned Soil
F234	48	16	9	23.96	Basin	0	
F244	31	36	14	123.20	Steep-sided	0	
F256	80	60	20	788.00	Steep-sided	0	
F283	67	55	21	611.10	Steep-sided	2	Mixed
F296	26	25	6.5	17.91	Basin	0	

F185

Feature 185 was a relatively small Lower Kirk pit. It was uncovered at 236 cm bd in U145 in the northern half of the block (Figure 4.14) and appeared as a circular stain with a clear boundary that measured 32 x 28 cm. Feature fill was a dark yellowish brown (10YR 4/4) silt loam mottled with charcoal and burned soil. In profile this pit was a 10 cm deep basin, with a linear band of oxidized soil, approximately 0.5 cm thick, located in the middle (Figure 4.21). Below this lens the soil was similar in color and texture to the upper fill but exhibited an increased charcoal content. The volume of F185 was calculated to be 41.02 dm^3. Associated cultural material was limited to two small Muldraugh flakes (6.1g).

Post

A single postmold, F282, was defined at the James Farnsley site (Figure 4.13). This feature was an abruptly defined circular (11 cm x 13 cm) area of yellowish red (5YR 5/6) silty clay, which upon bisection exhibited a straight-sided profile with a rounded base (Figure 4.21). Soil within the postmold was flecked with manganese, burned soil, and charcoal. This mottling was present throughout but increased in the lower 2/3 of the fill. Cultural material from the post includes debitage (16.0g) and a large piece of fire cracked rock (.92kg). This rock was placed in a vertical position along the upper

Table 4.19. Lower Kirk Pit Debitage, FCR/Rock, and Tools.

Feature	FCR/Rock (Kg)	Debitage (g)	Adze (Ct.)	Biface (Ct.)	Bifacial Flake (Ct.)	Core (Ct.)	Manuport (Ct.)	Point (Ct.)	Total (Ct.)
F10	0	26.9	0	0	0	0	0	0	0
F29c	0	0	0	1	0	0	0	0	1
F32	0	83.9	0	0	0	0	0	0	0
F64	0	5.2	0	0	0	0	0	0	0
F83	2.059	313.6	0	0	0	0	0	2	2
F91	0.008	77.3	0	0	0	0	0	0	0
F136	0	295.8	0	4	0	1	0	3	8
F145	0.003	46.8	0	0	0	0	0	0	0
F152	0.095	72.9	0	0	1	1	0	0	2
F173	0	0	0	0	0	0	0	0	0
F178	13.798	73.1	1	1	0	0	4	1	7
F185	0	6.1	0	0	0	0	0	0	0
F234	0.048	33.6	0	0	0	0	0	0	0
F244	0	0	0	0	0	0	0	0	0
F256	0.448	135.3	0	2	0	0	0	0	2
F283	0.018	146.8	0	2	0	0	0	0	2
F296	0	0	0	0	0	0	0	0	0
Total	16.477	1317.3	1	10	1	2	4	6	24

northwest edge of the feature and possibly functioned to wedge the post into place. The debitage was small (½ inch or less) Muldraugh (95.7% by weight), Allens Creek (3.1%), and indeterminate chert (1.3%) flakes.

Basin Hearths

Three basin hearths were defined in the Lower Kirk occupation. Basically, these features exhibited a prepared pit with evidence of direct heating. This evidence of heating usually involved the occurrence of oxidation or a charcoal lens at the base or along the periphery of the fill, providing evidence of fire occurring in the feature. The basin hearths in the level ranged in length from 47-74 cm (average of 60.3 cm) and width from 42-70 cm (average of 53.3 cm). The depth of these features ranged from 9-31 cm with an average of 18.6 cm.

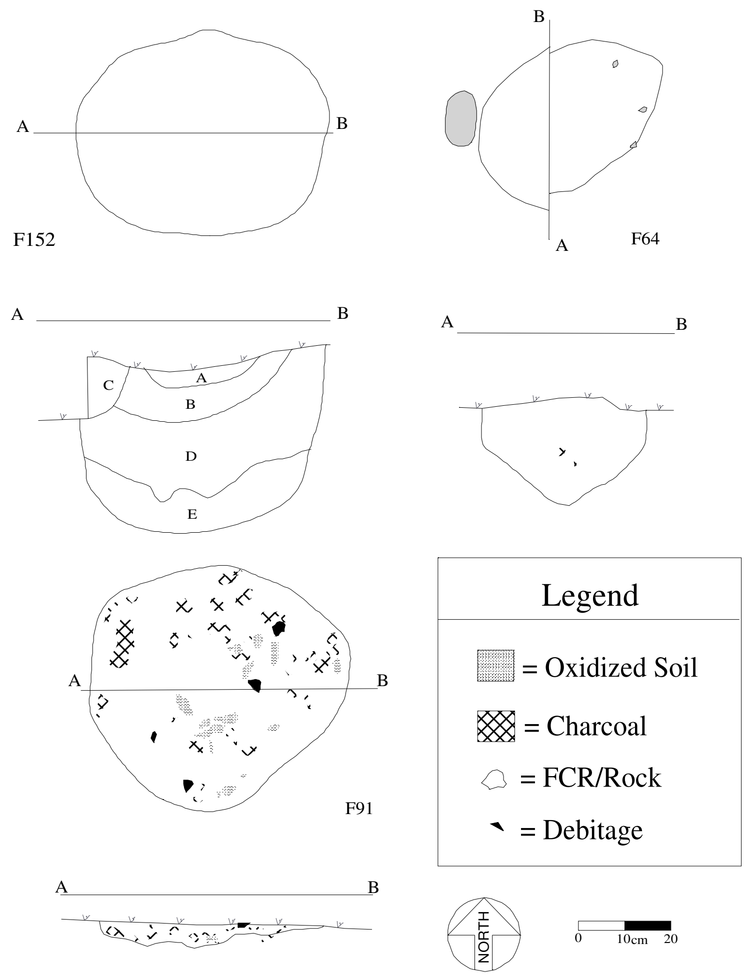

Figure 4.20. Lower Kirk Pit Features.

F11

Feature 11 was defined in the Lower Kirk occupation during the Phase II excavation (Figure 4.14). The planview of this feature was noted as an oval measuring 47 cm by 42 cm with a light brown (7.5YR 6/4) silt loam fill (Figure 4.22). After one half of the feature was removed, the profile revealed a basin shaped pit 16 cm deep with a charcoal lens situated at the base. The total volume of this hearth was calculated to be 212.56 dm^3. Feature fill contained approximately 40% oxidized soil (red; 2.5YR 5/6) and 5% charcoal mixed throughout. Cultural material collected during excavation included 41 small Muldraugh flakes (7.2g) and 12 rocks (0.024kg), some of which showed evidence of thermal alteration (i.e., crazing).

F72

Feature 72 was a basin hearth containing numerous tools and a relatively high concentration of debitage. This feature was defined at 198 cm below datum in Unit 44 at the south end of the block (Figure 4.13). In planview it appeared as a yellowish brown (10YR 5/6), irregular oval stain, which measured 74 cm long and 70 cm wide, which contained light charcoal and red oxidized soil (10R 5/8) flecking throughout (Figure 4.22). Once bisected, the feature in profile was a shallow basin, 11 cm deep, having a basal zone of increased charcoal and burnt soil associated with fire cracked rock. Cultural material from the fill included 306.7 g of debitage, 2.551 kg of fire-cracked rock, and nine tools. The debitage from F72 was predominately Muldraugh (96.0% by weight), with Wyandotte (2.5%), Allens Creek (0.2%), and indeterminate chert (1.4%)

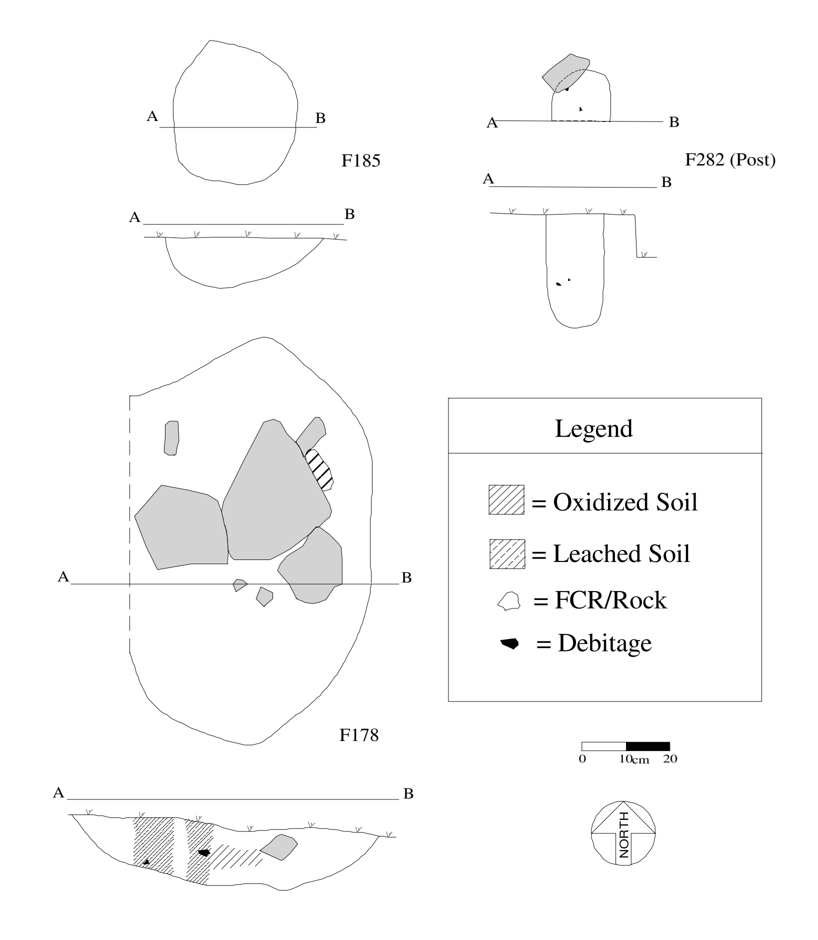

Figure 4.21. Lower Kirk pit feature and Post (F282).

present in minor amounts. The tools included four bifaces, an abrader, an adze, a denticulate, a hammerstone/anvil, and a uniface.

F34

Feature 34 was a Lower Kirk basin hearth feature excavated during the Phase II investigation in a unit located at the southern end of the main block (Figure 4.13). This feature was originally defined as an oval of strong brown soil (7.5YR 5/6) measuring 60 cm by 48 cm. Upon bisection, the pit profile was basin shaped with fill extending 31 cm below the level of definition (Figure 4.22). Using these measurements a volume of 824.60 dm^3 was calculated for the feature. The boundary of the F34 was visible as a diffuse outline of oxidized soil at the surface, with a distinct charcoal lens present along the entire base in profile. Just above this charcoal, in the south-central portion of the basin, a pile of 26 unmodified pebbles (0.833 kg) were recovered. In addition to these cobbles, 55 pieces of debitage (60.8 g) were recovered, many of which were fractured in a manner that indicated thermal alteration. Debitage consisted mainly of smaller (½ inch and less) Muldraugh flakes (64.5% by weight), with Wyandotte (7.2%) and indeterminate chert (28.2%) also present.

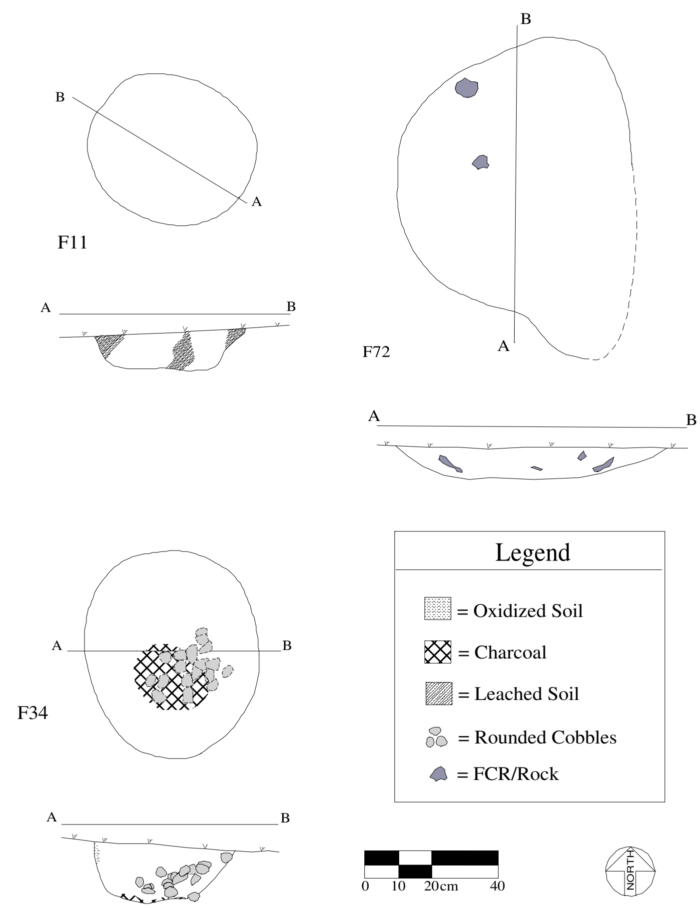

Figure 4.22. Lower Kirk Basin Heaths.

Oxidized Ring Features

A total of 46 oxidized rings were described within the Lower Kirk occupation of 12HR520 (see Figures 4.13 and 4.14). These features were unique to the Lower Kirk occupation and can be described generally as small, circular pit features with oxidation present exclusively along the fill boundary. On average, oxidized rings exhibited a width of 32.7 cm, a length of 35.1 cm, and a depth of 13.2 cm (Table 4.20). The average volume of these features was 137.49 dm^3. In profile a majority of these features had a steep-sided cross section (67.4%; n=31), with the remaining examples exhibiting a basin shape (32.6%; n=15)

Table 4.20. Lower Kirk Oxidized Ring Attributes.

Feature	Length (cm)	Width (cm)	Depth	Volume (dm^3)	Profile	Zone	Zone Type
F106	38	38	12	74.33	Basin	0	
F125	24	44	16	211.20	Steep-sided	0	
F127	27	24	9	59.40	Steep-sided	0	
F13	30	25	25	175.00	Steep-sided	0	
F137	25	24	10	48.00	Steep-sided	0	
F147	25	21	5	10.70	Basin	0	
F15	52	30	15	115.58	Basin	0	
F151	41	34	11	106.70	Steep-sided	0	
F165	34	39	22	149.60	Steep-sided	1	Charcoal
F167	28	27	13	84.50	Steep-sided	0	
F176	29	28	21	126.00	Steep-sided	0	
F180	30	32	7	49.00	Steep-sided	1	Charcoal
F202	28	36	17	124.10	Steep-sided	1	Charcoal
F206	70	50	18	558.00	Steep-sided	0	
F207	36	32	20	174.00	Steep-sided	0	
F209	42	37	15	171.00	Steep-sided	0	
F211	40	18	9	94.50	Steep-sided	1	Charcoal
F215	35	21	24	117.60	Steep-sided	1	Charcoal
F221	25	25	17.5	52.50	Steep-sided	1	Charcoal
F222	25	25	5	28.00	Steep-sided	1	Charcoal
F224	34	31	10	61.18	Basin	0	
F228	74	70	14	250.31	Basin	1	Charcoal
F235	40	34	14	152.60	Steep-sided	0	
F241	87	56	26	917.80	Steep-sided	2	Charcoal
F242	32	27	20	136.00	Steep-sided	1	Charcoal
F248	12	19	8.5	23.80	Steep-sided	0	
F250	41	35	9	42.97	Basin	1	Charcoal
F255	35	35	23	294.40	Steep-sided	1	Charcoal
F261	21	21	6	10.01	Basin	0	
F262	32	28	19	123.50	Steep-sided	1	Charcoal
F263	20	20	8	14.85	Basin	0	
F27	40.5	37	14	94.41	Basin	1	Charcoal
F273	26	20	8	16.77	Basin	0	
F275	41	32	18.5	159.65	Basin	1	Charcoal
F276	24	26	6	14.33	Basin	1	Charcoal
F278	44	40	15	214.50	Steep-sided	1	Charcoal
F29a	178	53	13	276.90	Steep-sided	0	
F31	33	4	5	15.00	Steep-sided	1	Charcoal
F6	20	26	11	20.40	Basin	0	
F65	36	36	20	196.00	Steep-sided	1	Charcoal
F68	33	25	9	27.85	Basin	0	

Table 4.20. Lower Kirk Oxidized Ring Attributes (cont.).

Feature	Length (cm)	Width (cm)	Depth	Volume (dm^3)	Profile	Zone	Zone Type
F69	43	41	5	32.54	Basin	0	
F70	50	47	18.5	401.45	Steep-sided	0	
F73	24	38.5	18	219.60	Steep-sided	0	
F92	26	24	15	79.50	Steep-sided	1	Charcoal
F94	30	26	10	66.00	Steep-sided	1	Charcoal
F98	33	31	7	70.00	Steep-sided	0	

Peripheral oxidation occurred predominately at the rim or the rim/side of the features, with coloration of the oxidized soil ranging from red (10R 4/6, 2.5YR 5/6) to weak red (7.5R 4/3). Feature fill was typically a silty clay and exhibited a range of color that included: dark yellowish brown (10YR 4/4), brown (7.5YR 4/6), and reddish brown (5YR 4/4). In many cases the feature fill was mottled with charcoal, burned soil, and ash. Over half (54.3%; n=25) of the oxidized rings exhibited no internal fill zones. A distinct charcoal lens was present in 43.5% (n=20) of the features, with all but two of these lenses located at the base of the pit. The two exceptions exhibited a charcoal lens located in the center of the fill (F278 and F255). Table 4.20 gives properties for each oxidized ring feature while Table 4.21 summarizes the cultural material recovered from each of these features. The following paragraphs give a description of a few features typical of this type, as well as some atypical examples.

F92

Feature 92 was a typical oxidized ring feature, which was uncovered at 201 cm below datum (Figure 4.13). It was originally noted as a circular stain measuring 26 cm by 24 cm with approximately 70% of the boundary being defined by a rind of oxidation 2-3 cm thick (Figure 4.23). Interior feature fill was a strong brown (7.5YR 4/6) silty clay with heavy charcoal flecking and burned soil mottles. In profile, the pit had steep-sides and a flat base, with oxidation present along the rim and the sides. The feature base was defined by a 1 cm thick charcoal lens. A small amount of debitage (17.6g) was the only associated cultural material. It mainly consisted of Muldraugh chert (14.9g; 84.7% by weight), with minor amounts of Allens Creek (1.4g; 8.0%), Wyandotte (0.5g; 2.8%) and

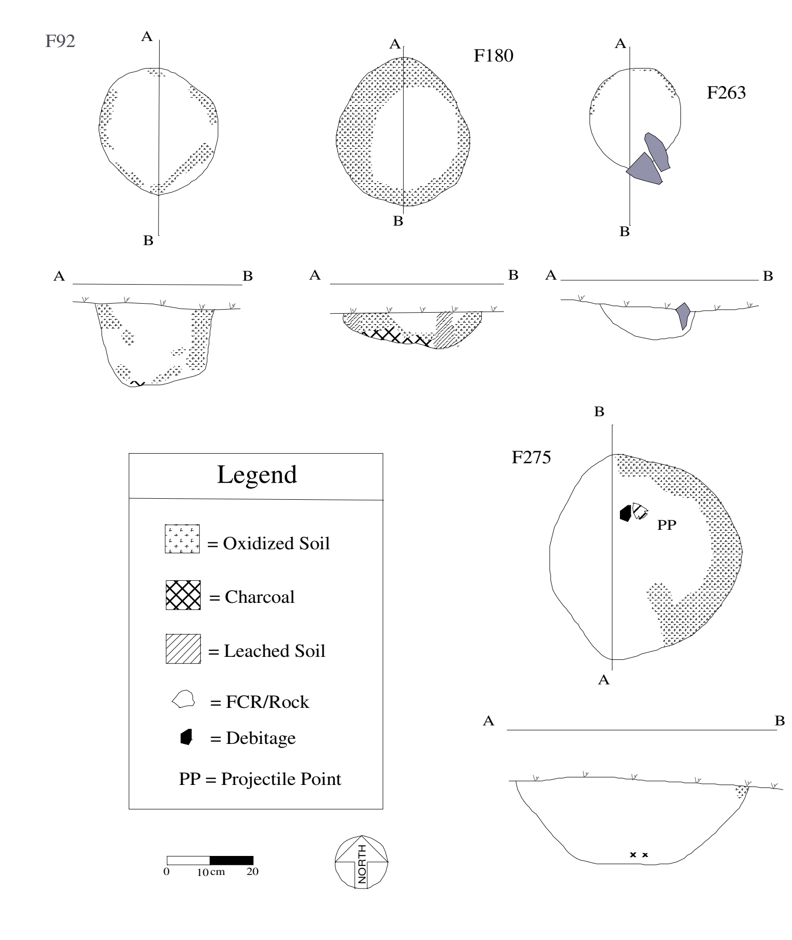

Figure 4.23. Lower Kirk Oxidized Rings.

indeterminate chert (0.8g; 4.5%) present. All the flakes were small, with 81.8% being ½" in diameter and the remainder being ¼" in size.

F180

This feature originally appeared as an obscure area of oxidized soil mottles that was not recognized as being cultural until a few centimeters had been removed (Figure 4.14). Once defined, Feature 180 was a circular stain measuring 30 cm by 32 cm with an abrupt boundary (Figure 4.23). The entire exterior edge was delimited by an oxidized layer 2-8 cm thick. The thickness of the oxidized rind was a result of the plan view being mapped near the feature base, resulting in a horizontal cut being made through the burned soil at the base. Interior feature fill was characterized by a dark yellowish brown (10YR 4/6) silty clay with charcoal mottling that increased with depth. In cross-section the feature outline was steep-sided with a flat base that was defined by the presence of a charcoal zone measuring 1-3 cm thick. Only 4.4 g of debitage was recovered from the feature fill. This debitage was small (½ inch and less) flakes of Muldraugh (3.6g; 81.8%) and Allens Creek (0.8%; 18.2%) chert.

F241

Feature 241 was a unique oxidized ring defined at 198 cm below datum (Figure 4.13). In planview this feature appeared as a band of oxidized soil, 2-4 cm thick, which defined a "bi-lobed" outline, with the lobes being designated Areas "A" and "B" by the excavator (Figure 4.24). The two lobes of the feature had a northeast to southwest orientation with Area A having a diameter of 48 cm and Area B measuring 32 cm. The general feature fill was a strong brown (7.5YR 4/6) with an overall reddish tinge. This fill had small pockets of red (2.5YR 4/6) and reddish yellow (5YR 6/8) burned soil along with small flecks of charcoal and manganese. In profile, Area A exhibited a steep-sided

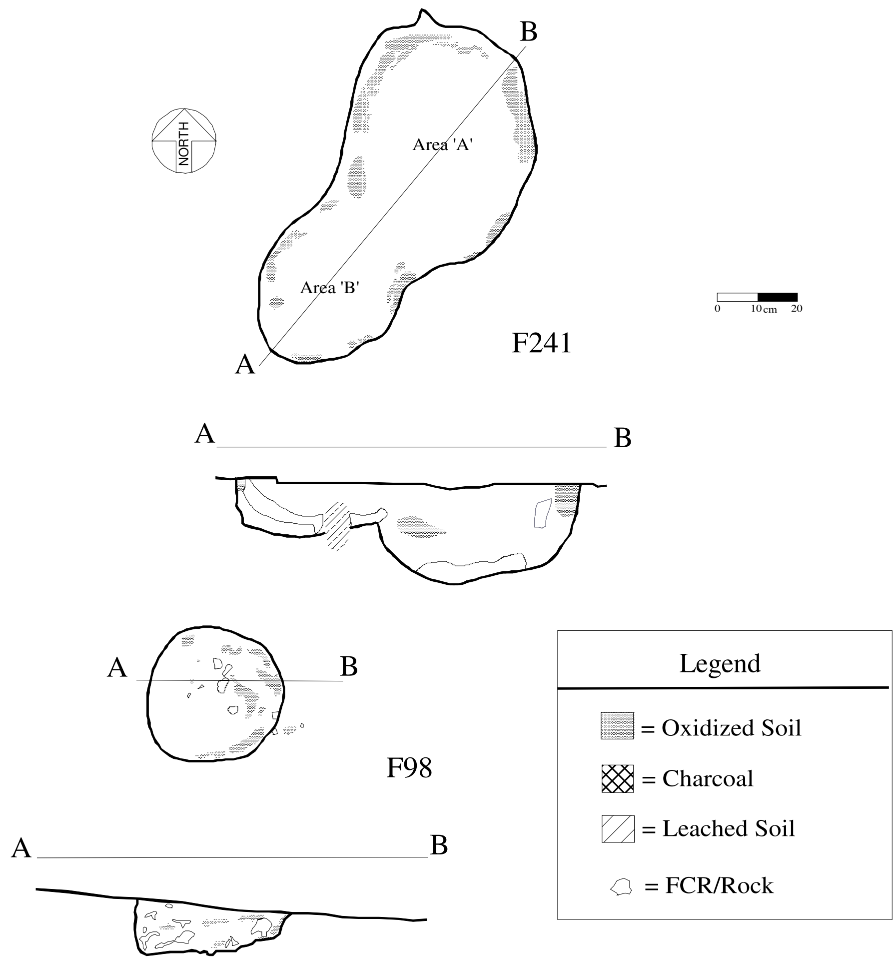

Figure 4.24. Lower Kirk Oxidized Rings.

pit, 43 cm deep, with a charcoal zone at the base which contained heavy concentrations of burned soil and numerous Wyandotte flakes. Area B was a steep-sided pit, 25 cm deep, with thinner charcoal zone at the base. This basal charcoal layer slightly intrudes into the fill of Area "A", indicating that Area "B" was added to the edge of Area A at a later time. In addition, during excavation it was noted that the oxidized band was limited to the exterior edge, with no boundary of burned soil separating the two lobes. Taken together, this evidence suggests that Area B was an oxidized ring that was superimposed over Area A, but, once constructed, both areas were utilized together.

Cultural material recovered from Feature 241 included 0.137 kg fire-cracked rock, 159.9 g chert debitage, and seven tools. Typical for this occupation, a majority of the debitage was Muldraugh (149.5g; 93.5%) with Wyandotte (9.5g; 5.9%) and unidentifiable chert (0.9g; 0.6%) occurring in lesser amounts. The recovered debitage was larger than usual; with 70.7% (113.0 g) being at least 1" in diameter indicating that it was the result of early stage reduction of chipped stone artifacts. Tools from F241

Table 4.21. Lower Kirk Oxidized Ring Lithic Debitage, FCR/Rock,and Tools.

Feature	Debitage (g)	FCR/Rock (Kg)	Biface (Ct.)	Core (Ct.)	Drill (Ct.)	Graver (Ct.)	Hammer-stone (Ct.)	Pitted Stone (Ct.)	Point (Ct.)	Retouched Flake (Ct.)	Scraper (Ct.)	Tested Cobble (Ct.)	Utilized Flake (Ct.)	Total (Ct.)
F106	25.0	0.000	1	0	0	0	0	0	0	0	0	0	0	1
F125	35.1	0.000	1	0	0	0	0	0	0	0	0	0	0	1
F127	1.8	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F13	5.1	0.027	1	0	0	0	0	0	0	0	0	0	0	1
F137	22.5	0.000	0	0	0	0	0	0	0	0	0	0	1	1
F15	158.0	0.082	0	0	0	0	0	0	0	0	0	0	0	0
F151	47.8	0.004	0	0	0	0	0	0	0	0	0	0	0	0
F165	1.3	0.023	0	0	0	0	0	0	0	0	0	0	0	0
F167	9.4	0.000	1	0	0	0	0	1	0	0	0	0	0	2
F176	8.0	0.000	0	0	0	0	0	0	0	0	0	1	0	1
F180	4.4	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F202	15.2	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F206	4.8	0.007	0	0	0	0	1	0	0	0	0	0	0	1
F207	86.1	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F209	15.0	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F211	5.0	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F215	6.4	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F221	84.6	0.005	0	0	0	0	0	0	0	0	0	0	0	0
F222	2.7	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F224	3.1	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F228	2.0	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F235	99.9	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F241	159.9	0.137	3	0	0	0	0	0	2	1	1	0	0	7
F242	14.1	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F248	1.1	0.000	1	0	0	0	0	0	0	0	0	0	0	1
F250	14.7	0.002	0	0	0	0	0	0	0	0	0	0	0	0
F255	80.6	0.000	0	1	0	0	0	0	0	0	0	0	0	1
F261	0.2	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F262	18.0	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F263	0.9	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F27	0.0	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F273	22.3	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F275	69.1	0.000	0	0	1	0	0	0	0	0	0	0	0	1
F276	1.3	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F278	222.4	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F6	2.3	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F65	41.5	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F68	0.9	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F69	3.0	0.000	0	0	0	1	0	0	0	0	0	0	0	1
F73	23.5	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F92	17.6	0.000	0	0	0	0	0	0	0	0	0	0	0	0
F94	6.3	0.001	0	1	0	0	0	0	0	0	0	0	0	1

Table 4.21. Lower Kirk Oxidized Ring Lithic Debitage, FCR/Rock,and Tools.

Feature	Debitage (g)	FCR/Rock (Kg)	Biface (Ct.)	Core (Ct.)	Drill (Ct.)	Graver (Ct.)	Hammer-stone (Ct.)	Pitted Stone (Ct.)	Point (Ct.)	Retouched Flake (Ct.)	Scraper (Ct.)	Tested Cobble (Ct.)	Utilized Flake (Ct.)	Total (Ct.)
Total	1342.9	0.288	8	2	1	1	1	1	2	1	1	1	1	20

included three bifaces, two projectile points, a retouched flake, and a scraper. One of the bifaces was a Stage 2 subtype, while the others were too fragmentary for stage determination. Of the two projectile points one was a Kirk Corner-Notched Large while the other was an indeterminate type. The single scraper from F241 was an end scraper produced from high quality Wyandotte chert.

F263

Feature 263 was a small oxidized ring which was defined at 200 cm bd, and was in close proximity to two other similar features (F255 and F242) (Figure 4.13). This feature initially was noted at 196cmbd but was very diffuse and, therefore, not assigned a feature designation until 4 cm of fill had been removed. In planview F263 appeared as a circular stain, measuring 20 cm by 20 cm, with a thin diffuse oxidized soil lining present along the northern pit boundary (Figure 4.23). This oxidation was, at most, a concentration of flecking or patches. Interior feature fill was a strong brown (7.5YR 5/6) silty clay mottled with flecks of oxidized soil and charcoal. In profile the feature was a basin 8 cm deep with no definable internal zones. If the feature had been bisected from the elevation it had been initially noted then the basin depth would have been 12 cm. Associated cultural material included two fragments of fire-cracked rock, which refit, and five small (¼ inch) Muldraugh flakes (0.9g).

F275

Feature 275 was an oxidized ring feature uncovered at 197.5 cm bd (Figure 4.13). In planview this feature was an oval stain with a maximum length of 41 cm and width of 32 cm (Figure 4.23). Feature fill was a strong brown (7.5YR 4/6) silt loam that was heavily mottled with a mixture of manganese, burned soil, and charcoal. A noncontiguous oxidized rind, ranging in thickness from 3-4 cm, was present along the upper pit boundary and extended down 3 cm along the edge. This oxidized soil ranged in color from red (10R5/8) to yellowish red (5YR 5/8). The feature, in profile, had a basin shape and was 18.5 cm deep. The base of the feature exhibited a 2 cm thick lens of charcoal and ash. Artifacts from feature fill included Muldraugh (63.9g; 92.5%) and Wyandotte (5.3g; 7.5%) debitage (Table 4.20), along with a Pine Tree projectile. This point was produced from St. Louis chert and had been reworked into a drill. Similar to F241, the associated debitage was larger than usual with 62.1% (42.9g) being 1" in diameter.

F98

Feature 98 was an oxidized ring feature defined in U119 at 206 cm below datum (Figure 4.14). In planview this feature measured 33 cm by 31 cm, with the fill, in profile, extending down 7 cm (Figure 4.24). A discontinuous ring of dark red (10R 3/6) oxidized soil, approximately 2 cm thick, was present along the eastern boundary. The interior feature fill was a yellowish red (5YR 4/6) silt loam containing small patches of dark red (10R 3/6) oxidized soil and heavy concentrations of burned nutshell. A sample of this nutshell was collected for radiocarbon assessment resulting in a date of 9,350 ±80 rcybp (ISGS-4834). No cultural material was found in this feature.

Oxidized Ring Discussion

Two studies were conducted to further our understanding of the oxidized ring features. The initial study involved the experimental reconstruction of a typical ring feature along with the re-enactment of a variety of burn episodes. These experiments were conducted during fieldwork immediately adjacent to the main excavation block. The second study involved a literature search. The goals of this search were to determine the presence or absence of similar features in other excavated Kirk components and to gain insight into possible feature function through previous archaeological interpretations as well as ethnographic analogy.

Experimental Oxidized Rings

In order to comprehend the activities that led to the creation of these distinct oxidized ring features, experimental pits were excavated at the edge of the main block with the specific goal of determining the amount and type of firing need to create the characteristic features. To these ends four pits, each being 20 cm in diameter and 15 cm in depth, were excavated and subjected to a variety of firing episodes. During this work, experimenters maintained notes relating to the number and duration of firing events, amount and type of fuel, and any material placed in the feature. Upon completion of each experiment the features were bisected and the resulting soil changes were documented.

Experiment 1. Experiment 1 was conducted to determine the likelihood that oxidized ring features were the result of indirect heating. Twenty-three pieces of rock were heated in a surface fire for three hours and then transferred to the pit and allowed to cool for an hour. The cobbles used ranged in size from 5 to 15 cm in diameter and weighed a total of 1.1 kg (2.43 lb). After the rocks had cooled they were removed and the pit was examined for evidence of oxidation. This experiment resulted in no oxidation of the feature walls or rim.

Experiment 2. The goal of the experiment in Pit 2 was to recreate a feature that had undergone numerous episodes of direct heating. To recreate this activity, a series of fires were set in the pit and allowed to burn for one hour. In each burn episode, 0.37 kg (.82 lb of wood was used to build the fire, which generally was limited to the base of the feature. At the end of the hour the fire was quickly extinguished with soil and allowed to cool. Upon cooling, the coals and ash were removed from the pit and a new fire constructed. This procedure was conducted six times over the course of a single day. This experiment resulted in the creation of peripheral oxidation along the rim and sides of the feature ranging in thickness from 1.5 to 2 cm. This oxidation was thickest on the downwind portion of the profile, indicating that the wind caused more heat to be transferred to that edge. The base of the feature was only covered with soot and showed no evidence of oxidation. In addition, a zone of hard baked earth was noted on the surface that extended 3 to 4 cm beyond the oxidized rind. This zone tapered down toward the base of the feature.

Experiment 3. The goal of Experiment 3 was to recreate a feature that had been subjected to a single continuous firing episode. The fire was initially started with 0.2 kg (0.44 lb) of wood and more fuel was added as the fire burned down to coals. A total of 0.96 kg (2.1 lb) of fuel was added as the fire was maintained in the feature for three hours. This experiment resulted in the feature being quickly filled with coals and the basal fuel being only partially consumed because of a lack of oxygen. The peripheral oxidation created was limited to the upper 6 cm of the profile. This oxidation formed a ring 3 to 4 cm thick at the surface which quickly tapered off. This "conical" shaped oxidation was the result of the level of the fire being raised as more fuel was added.

Experiment 4. Experiment 4 was conducted to determine the utility of using these features as shallow earth ovens. This was conducted by building a fire at the base of the pit using 0.37 kg (.81 lb) fuel. After this fire was allowed to burn down, 72 grams of nut shell and eight grams of shattered bone were placed on the coals and then covered with soil. After 17 minutes the soil was removed and the contents examined. Upon removal, both the bone and the nut shell showed only slight evidence of heat alteration. The feature profile resulting from Experiment 4 exhibited a thin peripheral ring of oxidized soil measuring 2-3 mm in thickness which was only present in the upper 7 cm.

Experiment Summary

The experimental archaeology conducted during the excavation of 12Hr520 yielded some insights into the activities that produced the Lower Kirk occupation oxidized ring features. The likely cause of the amount and location of both oxidation and charcoal was indicated by the experiments. Experiment 1 indicated that indirect heating of the soil would not produce sufficient heat to result in formation of an oxidation ring. Experiment 3 produced a distinct profile that exhibited thickened oxidation at the feature orifice, which quickly tapered off. This type of continuous long term use would also produce a feature with large amounts of charcoal in the fill which is not typical of the oxidized rings. Experiment 4 produced peripheral oxidation in a location similar to the typical feature but not in the quantities observed. Of the four experiments, it appears that Experiment 2 created a profile that most closely resembles the majority of oxidized rings documented at 12Hr520. This profile generally exhibits oxidation on the rim or rim/side of the pit with a thin band of charcoal present at the base. Therefore, it can be suggested that these features were subjected to multiple use episodes in which the charcoal was removed between each firing. Experiment 2 produced peripheral oxidation measuring 1.5 to 2 cm thick after six firing episodes. Using this figure a rough estimate of the use-life of the oxidized ring features at the James Farnsley site can be estimated. As part of the feature analysis, the maximum thickness of the oxidized periphery was measured for 43 oxidized ring features. The results of this analysis are given in Figure 4.25.

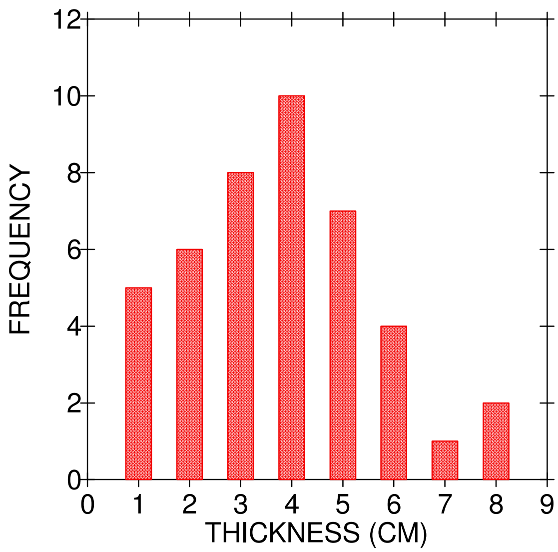

Figure 4.25. Thickness of peripheral oxidation from oxidized rings in Lower Kirk.

As indicated in Figure 4.25, maximum peripheral oxidation ranged in thickness from 1-8 cm, with a majority of the pits exhibiting a ring 4 cm thick. Using the results from Experiment 2, it can be estimated that each firing episode adds an average of .33 cm of oxidation (2 cm/6 episodes=.33 cm) to the rind. Therefore, from these figures it can be estimated that the oxidized ring features were subjected to between 3-24 use episodes with most (23.3%; n=10) being used approximately 12 times. The suggestion of multiple firing episodes is supported by the occurrence of interior oxidized lenses in a number of oxidized rings. These central fill zones were most likely the result of incomplete cleaning of these features between uses. Because of many variables it must be noted that this is a very rough estimation.

The two main unknown factors are the duration and intensity of the open firing episodes. In Experiment 2 a fire was created in the base of the feature and allowed to burn down to coals. Prehistorically, the fire may have been smothered by smoke producing material (e.g. damp bark) prior to burning down to coals, this would reduce the duration of the open burn thus creating less oxidation. Another possibility is that coals from a nearby surface hearth were placed in the smudge pits which were then covered by material. Any open fire resulting from this method would be incidental and not nearly as intense as the process used in Experiment 2.

Early Archaic Site Comparisons

To determine if oxidized ring features have been identified at other previously excavated Early Archaic sites, an archaeological records review was conducted. Four large sites with Kirk components were included in the survey: Rose Island (Chapman 1975), Icehouse Bottom (Chapman 1977), Longworth-Gick (Collins 1979) and St. Albans (Broyles 1971). Within this group, only the St. Albans site reported features sharing all the morphological characteristics of the James Farnsley oxidized rings.

At the St. Albans site (Broyles 1971:18) over 200 features were excavated. Three types of hearths are described for the site, of which the Type 1 hearth is similar to oxidized ring features. Type 1 hearths are characterized as shallow basins with fill containing heavy concentrations of wood and ash. These features had average surface diameters of 30 cm and a depth of 5.1 to 12.8 cm. The soil around the exterior of these features was "burned orange-red from the intense heat of the fires" (Broyles 1971:18). The total number of Type 1 hearths excavated was not reported. Archaeologically, these features were associated with the Kirk occupation (Zone 18 and 20), with the largest number noted in the third Kirk zone (Zone 20).

The other sites reviewed reported features with similar size and fill characteristics but lacking the definite evidence of in-situ heating (i.e. oxidation along the periphery). The Rose Island site (Chapman 1975) contained forty-nine features that were designated globular pits and described as small, bowl shaped pits that were circular or oval in plan view (Chapman 1975:193). They exhibited a mean length of 24.5 cm, a mean width of 21.5 cm, and a mean depth of 12.3 cm**.** Associated feature fill was very dark, but flotation samples revealed only small amounts of charcoal. Chapman offered no functional interpretation for these pits except to suggest that they possibly were postholes. A majority of the globular pits were associated with the St. Albans bifurcate levels of the site, with only four being reported in the Kirk component (Chapman 1975). Of the four Kirk features, one was described as a "fire area with globular pit". As described, it is not certain whether the fire area noted is the result of in-situ firing or secondary deposition of oxidized soil.

Forty-five globular pits were described at the Icehouse Bottom site (Chapman 1977). A majority (30) of these features were defined in the Kirk component of the site, 25 in the upper Kirk zones and five in the lower Kirk. These pits were similar in shape to those described at Rose Island--circular or oval and bowl shaped--and contained fill described as a black, charcoal stained sandy loam with little cultural material (Chapman 1977:103). No oxidized peripheral boundary was noted with any of these features.

At Longworth-Gick, 24 pits, designated "Small Fire Pits A", were defined that seem to fit the description of the oxidized ring features (Collins 1979:520). Fifteen of these pits were associated with the Kirk component of the site, with fourteen being defined in the upper Kirk (Zone V) and one noted in the lower Kirk (Zone VII). Feature morphology was described as small and roughly circular, with most containing reddened soil. These features exhibited mean dimensions of 32 cm (length), 22.5 cm (width), and 7.6 cm (depth). Almost all of the features from the Kirk occupation contained nothing but charcoal, with two flakes being recovered from a pair of the features. As in the instance of the Rose Island site, the depositional nature of the reddened soil is unknown.

Smudge Pits

In his discussion of the proper use of analogy in archaeological interpretation, Lewis Binford (1967) gives a detailed description of the occurrence of smudge pits in the archaeological record of the eastern United States, as well as ethno-historic evidence of their use as facilities for tanning hides.

The archaeological smudge pits described by Binford were 15 features excavated at the Toothsome site in Clinton County, Illinois. All of these pits exhibited similar size, shape, and content characteristics (Binford 1967:3). The features were circular in plan, with a mean length of 30.27 cm and mean width of 27.40 cm. The feature profiles were "generally straight sided, with essentially flat bottoms" and extended an average of 33.53 cm below surface. The fill was described as a grayish loam containing large amounts of burned vegetable matter, including corncobs, twigs (possibly corn stalks), bark, and charcoal from unidentified plants (Binford 1967:3). Binford reports that the charcoal within the smudge pits occurred as a zone at the very bottom and extended up to 7-8 cm from the mouth of the feature. The upper portion of the fill was a grayish loam similar to the surrounding matrix which contained no charcoal. The occurrence of oxidized soil also is noted along the rim of some features.

A comparison between the Toothsome site smudge pits and the previously described oxidized rings reveals striking similarities both quantitatively and qualitatively. The features from both sites exhibit a circular orifice of similar dimensions and similar straight sided profiles. Each also shared the propensity to exhibit charcoal near the base and oxidized soil along the periphery. These similarities strongly suggest that the earlier oxidized ring features shared a similar function to the later Toothsome site smudge pits.

As part of Binford's archaeological description of smudge pits, a review was given of reports from a variety of sites throughout the eastern United States. His review indicated that these features were found almost exclusively at late prehistoric sites (post-dating AD 1000) and restricted geographically to sites in the Lower and Middle Mississippi River Valley, with extensions into the Georgia-Creek area to the east and the Texas-Caddo area to the west. One early occurrence (AD 470) was noted at the Williams site in northwest Georgia.

For interpretive purposes Binford (1967) cites ethnographic and ethno-historic descriptions of hide processing from thirteen Native American groups. These groups range in location from the southeast United States, to the Great Lakes region, to the Plains. To summarize, hide preparation in these groups initially involved the excavation of a pit from 15.25-30.48 cm in diameter and 15.24-60.96 cm in depth. A fire was then started at the base of the feature using material selected to produce an abundance of smoke. Rotten wood was the most common fuel used, being reported in eight of the accounts. Other utilized materials included corncobs (3 accounts), sage (1), dung (1), and tree bark (1). Once the fire was started, a hide, which had been sewn into a bag, was stretched and tacked over the feature orifice. The hide was sewn into a bag in order to hold the smoke in, forcing it to penetrate the material. A tight seal between the feature and the hide also was needed to achieve this goal. In addition, the hide was usually stretched over a frame of sticks to keep it taunt and allow for even smoking. The rationale behind creating the fire in a pit was to prevent the flames from coming in contact with the hides and to create a reduced oxygen environment, beneficial for the production of smoke. Because of a need to create a seal, the orifice dimensions of this pit were limited to the size of an opening in a sewn deer hide.

Features similar to the oxidized ring features from the James Farnsley site have been noted in both the archaeological and the ethno-historic record. Archaeologically, broadly similar facilities have been reported in both Early Archaic Kirk (Chapman 1975, Chapman 1977, Collins 1979, Broyles 1971) and Late Prehistoric components (Binford 1967).

Evidence from other excavated Kirk components in the southeast indicates that oxidized ring-like features were present in many, if not all, of the major excavations. With two exceptions, attributes associated with the ethno-historic smudge pit facilities described by Binford resemble the oxidized ring features from 12HR520. Exceptions to this similarity include features that are too large for a hide to be effectively stretched over them and burned soil that is more oxidized than reduced. The size differences could be related to a minor variation in how the hides were placed over the facility; it is possible they were not sewed into a bag prior to smoking but just stretched over the pit as is. Also, the size variation may indicate that hide tanning was only one focus of oxidized ring usage, with other functions possible. The high incidence of oxidation relative to reduced soil could be the result of the use of an open fire to create coals first, then these were covered with smoke-producing fuel to create the desired effect. This method of creating a smudge pit fire has been described for both the Creek and Choctaw groups. Whatever their use oxidized rings clearly represent a class of features that are functionally different from other pits at 12Hr520.

Lower Kirk Discussion

The 144 features defined in the Lower Kirk occupation represents the most numerous and diverse assemblage of any occupation at the James Farnsley site. This diversity in feature types indicates that a greater range of activities were conducted on the site at this time. These activities included the direct and indirect heating of food, tool production, tool caching, and possibly hide preparation.

Surface hearths were the main evidence to indicate the direct heating of food. These features were fairly evenly distributed across the landform and formed a portion of two, or possibly three, well defined arcs of features (Figure 4.13 and 4.14).

Evidence of indirect heating of food was also noted in certain surface hearths as well as basin hearths and pit features. Four hearths (F23, F72, F132, and F178) were paired with defined pit features, possibly indicating that some hearths also functioned to heat stones for use in indirect cooking. Two basin hearths, F34 and F72, can be interpreted as facilities to heat cobbles for cooking either in an associated pit feature or a basket. In the case of Feature 72, it is probable that the heated stones were removed and used for cooking in F283, a pit located less than a meter to the northwest and at the same elevation. Pit feature morphology also supports the occurrence of this activity. The high concentration of fire-cracked rock, the mixture of charcoal and oxidized soil in the fill, and the association with surface and basin hearths, indicate many of these features likely were used for the indirect heating of food (e.g. baking or steaming).

Debris associated with the Lower Kirk lithic scatters was smaller in size than similar Middle Kirk features, indicating a focus on late stage reduction activities. The spatial distribution of lithic scatters is not random, with concentrations centered on 34N

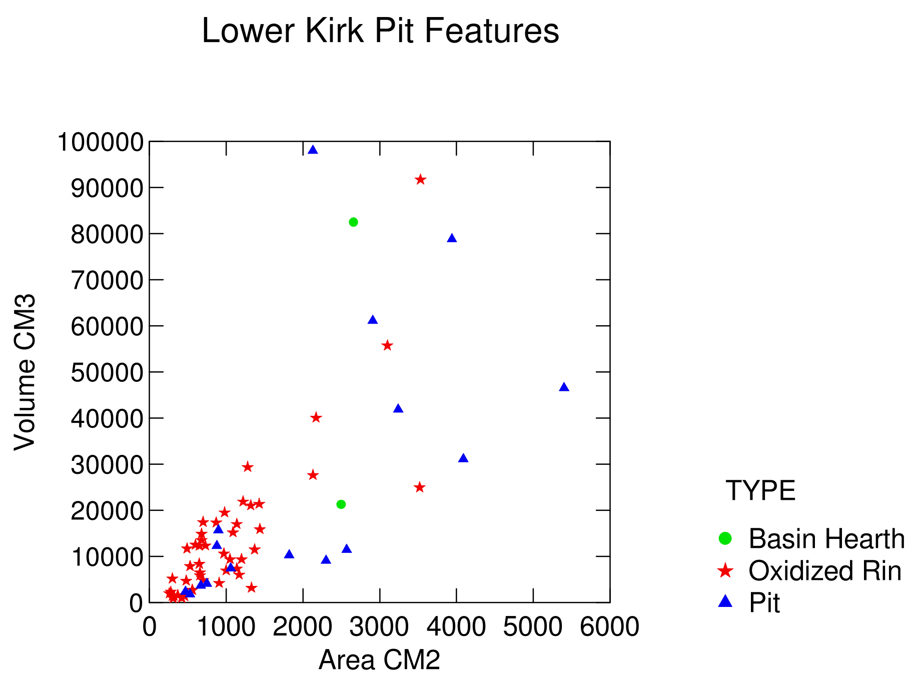

Figure 4.26. Lower Kirk Scatter Plot of Pit Feature Volumes.

2E and 26N 2E (Figure 4.13). There is not the overall east to west segregation of surface hearths and lithic scatters that was evident in the Middle Kirk. The reduction in area of these scatters compared to both the earlier components and the later Middle Kirk occupation may indicate a decrease in this activity or a shift in how this material was deposited.

The four Lower Kirk cache features were widely spread on the landform (Figure 4.13 and 4.14). A pattern of adze/biface versus scraper/uniface tool segregation, similar to that of the Middle Kirk, also is present in this level (Table 4.17). This indicates that similar site use that affected caching activities were present in this initial Kirk occupation.

Hide preparation or at least a distinctive activity not represented in the later Kirk occupations to any degree was very important during this period as oxidized rings are the most numerous features defined. There are small pits that fall within the size (volume and surface area) range of oxidized ring features (Figure 4.26) and share other similarities, such as circular orifices. In addition, many of these features are located in clusters or arcs which contained oxidized rings. These facts suggest that they possibly functioned as oxidized rings as well but could not be positively placed in that type because in-situ oxidation was not observed.

KIRK SECONDARY TRASH FEATURES

A total of six features were defined as part of the Kirk Secondary deposits (Figure 4.27). These features occurred east of the levee crest, underneath the prehistoric trash

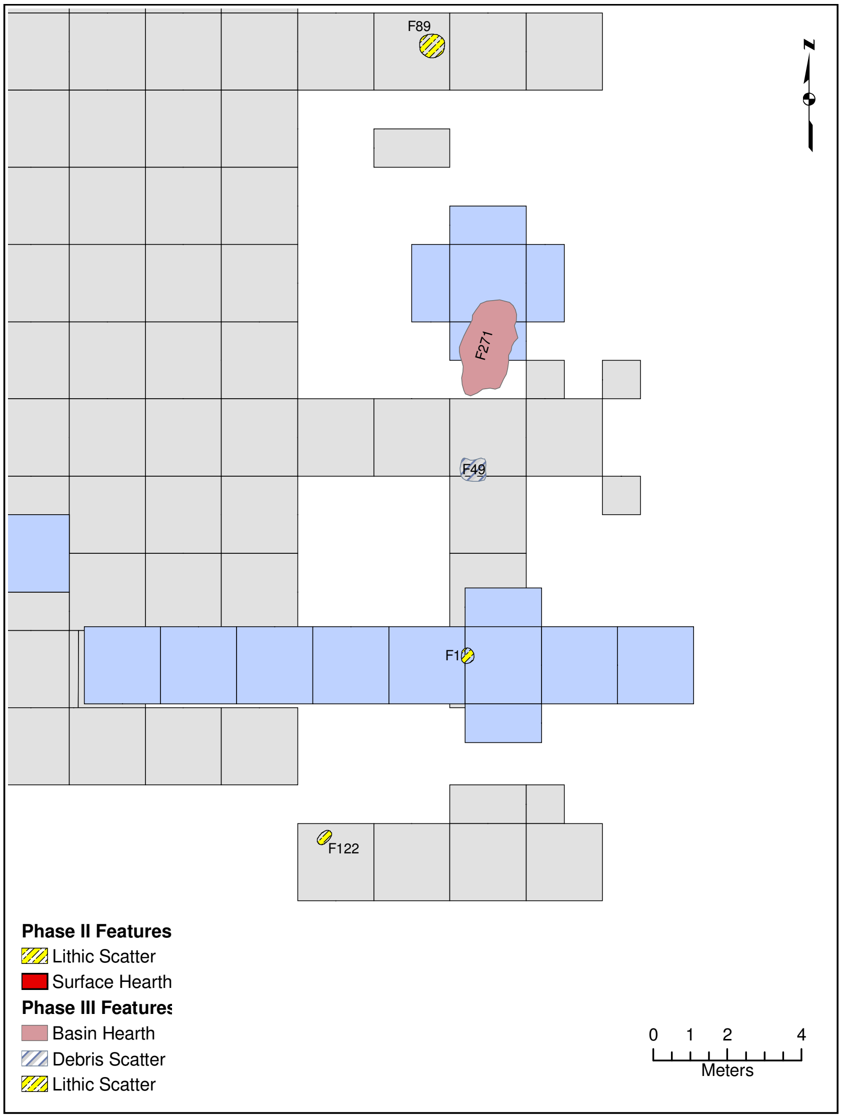

Figure 4.27. Secondary Kirk Feature Distribution Map.

deposited on the bank of the early Holocene Ohio River. Associated features included three lithic scatters, a surface hearth, a debris scatter, and a large basin hearth. Because of the unusual nature of the basin hearth a detailed description of it is given below.

F271

Feature 271 was a basin hearth defined at 365 cm bd during machine excavation associated with the eastern trenches (Figure 4.27). This hearth appeared as a large, oval oxidized stain, measuring 135 cm by 232 cm, which became visible at the base of the Secondary Kirk zone. Upon excavation, the profile was a basin, 60 cm deep, with clear boundaries. The internal fill exhibited a complex internal structure with three distinct internal zones designated Zone 1-3. Zone 1 was at the base of the feature (Figure 4.28). This zone was a brown (7.5YR 4/4) silty clay, lightly mottled with oxidized soil and

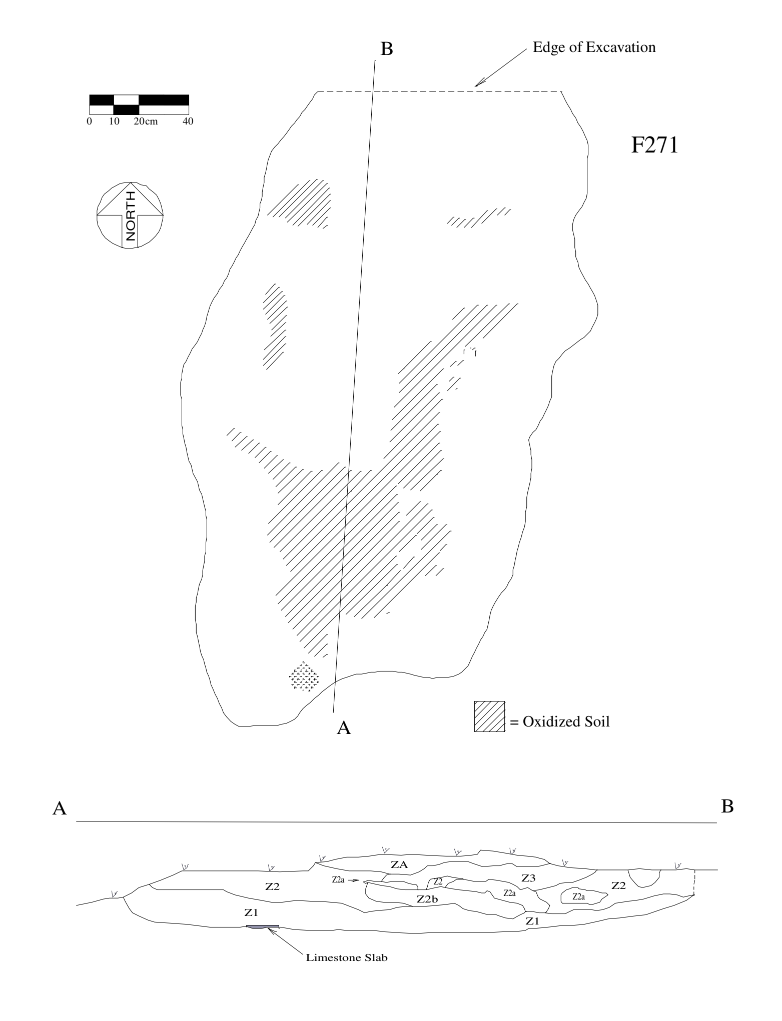

Figure 4.28. Feature 271.

moderate amounts of charcoal. Zone 2 was silty clay which exhibited a general strong brown color (7.5 YR 4/6) and extended across the upper portion of the basin. This zone was extremely mottled with large concentrations of both charcoal and burned soil. Relatively high concentrations of flakes were mixed throughout this stratum. Two distinct sub-zones were defined in the northern half of Zone 2, based upon variations of mottling and concentrations of cultural material. Zone 2A was a more homogenous, orange oxidized soil found in the NE ¼ of Feature 271. This stratum contained little charcoal but exhibited thick patches of calcined bone, including an area with a partial deer mandible. This mandible was recovered as part of a bone concentration that was found in association with two retouched flakes. Patchy lenses of debitage were also present in this zone. Zone 2B was a highly oxidized red color, with dark reddish brown reduced soil (5YR 3/4) also present. This zone contained almost no debitage. Zone 3 capped Zone 2 in the central portion of the hearth and, therefore, represents the final firing episode within Feature 271. This stratum was a 10YR 4/6 silty clay with heavy concentrations of 2.5YR 5/6-4/6 and very high amounts of charcoal. A total of 30 lithic tools were recovered from Feature 271. In general, the ratio of the different tool types matches that for the general site collection with the most prevalent tool types being bifaces (39.02%) and projectile points (19.51%). Scrapers (7.32%), cores (7.32%) and retouched flakes (4.88%) were the next most common artifacts.

ST. CHARLES FEATURES

Eleven features were defined as part of the St. Charles occupation (Figure 4.29). Within the main block these features occurred between 301 and 389 cm below datum, and the three deeper features occurred in the overbank trenches below the secondary Kirk deposits. Only three types of features were present in this occupation—lithic scatters (n=7), rock scatters (n=3), and surface hearths (n=1). On the bank top these feature types occurred in two distinct clusters in the central and southern portion of the main block (Figure 4.29), with the northern cluster consisting of three rock scatters of shale slabs and the southern cluster defined by five scatters of chert debitage.

Rock Scatters

Shale scatters were features distinctive to the St. Charles component. Only three of these features were defined, with all being found in close proximity in the main block (Figure 4.29). In general, these features can be described as concentrations of horizontally placed shale slabs isolated in an area of the site that contained very little other evidence of habitation. A detail description of each feature is given below.

F279

The first shale scatter discovered was Feature 279, which was uncovered during the hand excavation of U112 at 340 cmbd (Figure 4.30). The planview of this scatter consisted of 19 shale slabs in a roughly oval area measuring 135 cm long by 61 cm wide. Most of these pieces were lying horizontally on a surface that varied in depth by only 6.5 cm. The individual slabs ranged in diameter from 4-22 cm with most being 12-15 cm in diameter. No soil discoloration was noted. Besides shale slabs, other material associated with the feature included two flakes and two fragments of hematite.

F284

Trackhoe excavations surrounding F279 uncovered two additional shale scatters, the first of which, Feature 284, was uncovered at 314 cm below datum. It consisted of fifteen shale fragments, also horizontally oriented, in an oval measuring 150 cm long by 75 cm wide (Figure 4.30). These fragments had a maximum length of 8-28cm with most being approximately 16cm long. No other material besides shale was present, but a slight soil difference was noted, with the area around the main concentration being slightly darker (7.5YR 4/4 brown) than the surrounding matrix (7.5YR 4/6 strong brown). This darker area also was compacted somewhat.

F285

The third shale scatter was found during machine scraping. Feature 285 was defined at 320 cmbd and consisted of 170 fragments of shale deposited in an oval measuring 176cm by 164 cm (Figure 4.30). These shale pieces consisted of 60 fragments measuring between 5-24 cm in diameter, 5 pieces between 2-5 cm, and 105 fragments less than 2 cm in diameter. Other material collected during feature excavation included 13 flakes and five small pebbles. No soil discoloration was noted.

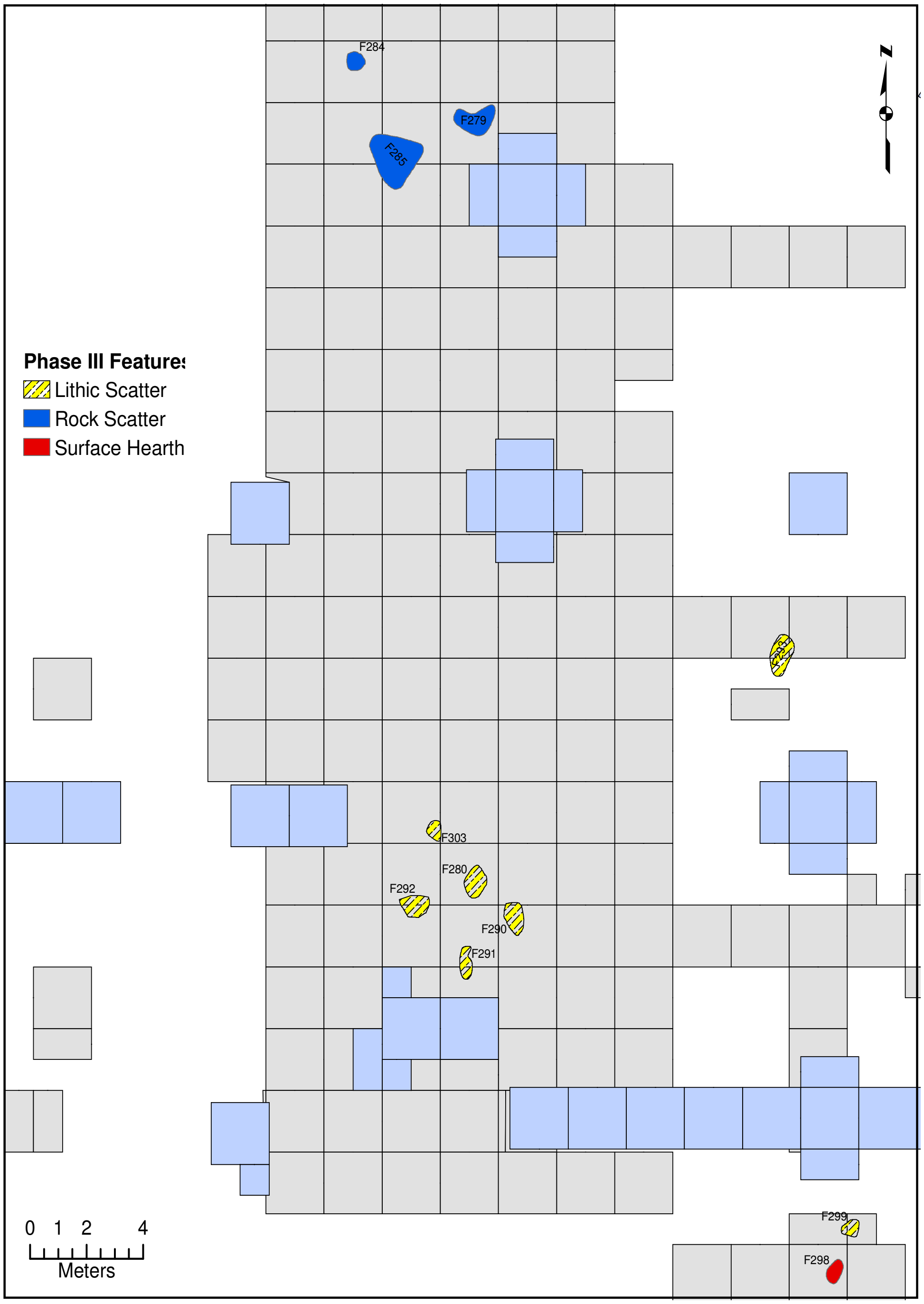

Figure 4.29. St. Charles Feature Distribution Map.

Surface Hearths

One surface hearth, Feature 298, was associated with the St. Charles occupation. This feature was uncovered at 508 cm below datum in U191 of the 5N Trench, down slope from the levee occupations and below the Kirk secondary deposits (Figure 4.29). The feature, in planview, exhibited relatively thin (about 3 cm), discontinuous patches of reddish brown (5YR ¾) oxidized soil spread over an area measuring 100 cm by 110 cm. This morphology is probably the result of bioturbation or erosion and is similar to other pre-Kirk features on the site (i.e., F300). Both charcoal and calcined bone were found

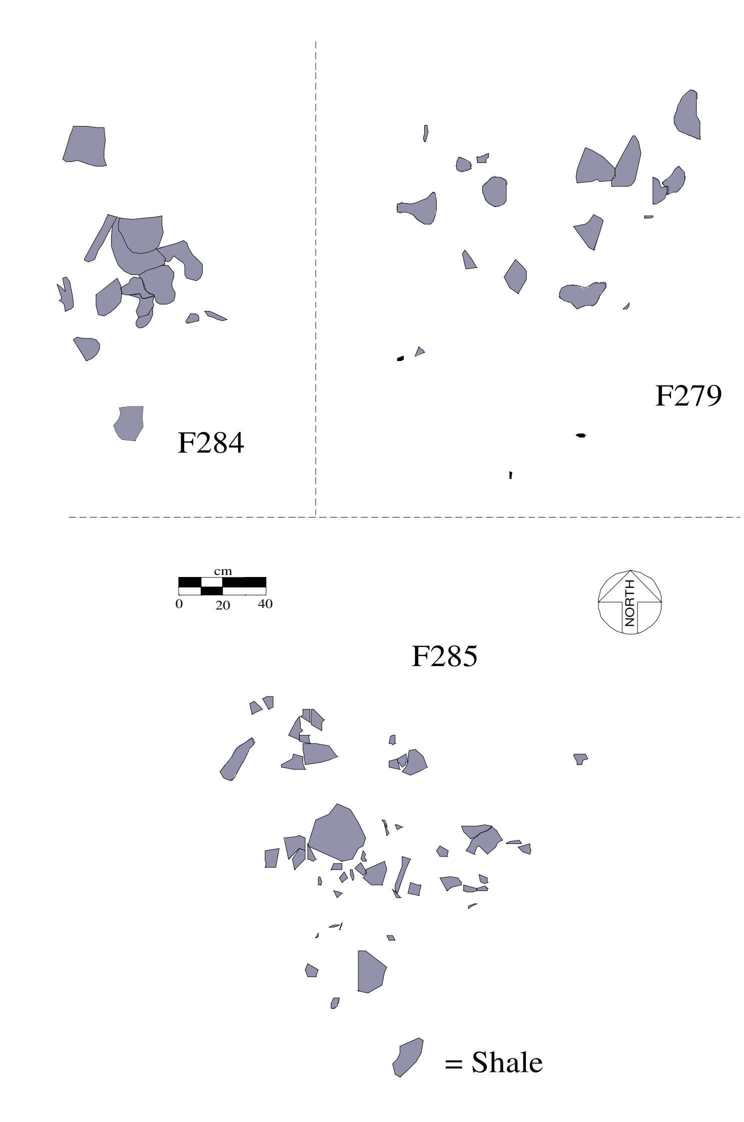

Figure 4.30. St. Charles shale scatters.

within the feature fill, while a hammerstone and biface were recovered from the surrounding matrix. Nearby features included F299 a lithic scatter located at a similar elevation and only 1 m to the north. An AMS date of 9490 ±60 rcybp (Beta 153512) was obtained from F298.

Lithic Scatters

Seven of the eleven defined St. Charles features were lithic scatters. Because of the low density of material in the sub-Kirk levels at the site, these features were relatively easy to define. A typical St. Charles lithic scatter consisted of a concentration of debitage, primarily Muldraugh, in an area averaging 4,750 cm^2, with few, if any, other associated artifacts. Five lithic scatters form a cluster at the south end of the main landform, with the remaining two located downslope beneath the Kirk secondary deposits (Figure 4.29). The following paragraphs describe each of the lithic scatters from the St. Charles occupation.

F280

A typical lithic scatter, Feature 280, was uncovered at 389 cm below datum during the excavation of Unit 36. This concentration consisted of 542.0 grams (about 100 flakes) of primarily high quality Muldraugh flakes (99.7% by weight), with a small amount of Wyandotte (0.3%) also included. While the full feature plan covered an area measuring 104 cm long and 72 cm wide, most of the debitage was recovered from a dense central area which measured 30 x 30 cm. Larger, early stage reduction flakes were the dominate type with 40.9% of the assemblage by weight being greater than 1" and 47.0% being greater than ½" in diameter. No tools of any kind were associated with this feature.

F291

Feature 291 was another typical debitage scatter, covering 3560 cm^2 (105 cm by 40 cm), which was uncovered at 385 cm below datum in the feature cluster at the south end of the main block (Figure 4.29). It consisted of a concentration of 668.3 grams of flakes, mainly Muldraugh (99.8% by weight), with trace amounts of Wyandotte (0.1%) and Indeterminate (0.1%) chert. No tools of any type were associated with this cluster.

F292

Feature 292 was uncovered in close horizontal proximity (U28) to F291 but 22 cm higher in elevation (363 cmbd) (Figure 4.29). This concentration consisted of 236 pieces of debitage which covered an area measuring 82 cm long by 50 cm wide (5650 cm^2). Typical of these scatters, 99.8% of the debitage (by weight) was Muldraugh, with only 0.2% flakes of the flakes being Wyandotte. This debitage was mainly larger, early stage reduction debris, with 35.2% being greater than 1" in diameter and 52.4% having a greater than ½" diameter. The occurrence of oxidized soil mottles and pot lid fractures on some of the flakes indicated some thermal alteration of the material occurred. No tools were recovered from the concentration.

F303

Feature 303 was a smaller-than-average St. Charles lithic scatter (Figure 4.29). This feature was uncovered at 301 cm below datum during track-hoe excavation at the south end of the main block. It consisted of 43 flakes and a core from a 2450cm^2 area (42 x 58 cm). All but five of the flakes and the core were of Muldraugh chert, while the remaining artifacts were from an unidentified material.

Other Lithic Scatters

Two St. Charles lithic scatters were defined under the Kirk secondary deposits in the eastern trenches (Figure 4.29). Feature 293 was uncovered at 483cmbd in Units 186, 187 and 310 in the N26 Trench. It consisted of a single layer of approximately 100 primary and secondary Muldraugh flakes within a boundary measuring 120 cm long by 85 cm wide (7,780 cm^2). No other types of artifacts were present. The other trench feature was Feature 299. This scatter of approximately 150 flakes, covered an area measuring 60 cm by 55 cm (2,600 cm^2), and was located just north of F298, a surface hearth, at 510 cm below datum. Associated debitage was mainly Muldraugh chert (65%) and ranged from primary to tertiary in size. Wyandotte (35%) was the other chert type present. A fragment of a St. Charles point was found in association with this feature.

Another scatter, F290, was uncovered in Unit 30 at 320cm below datum. This concentration of 1762 flakes covered an area 106cm long and 68 wide, for an estimated 5440cm^2, and was unusual because it consisted entirely of Wyandotte debitage. It also differed from other St. Charles scatters in that a larger percentage of the flakes were the result of late stage lithic reduction. Flakes measuring less than ½" in diameter represented 43.5% of the debitage by weight, with 52.0% ranging between ½" and 1" in size. The only tool recovered from the cluster was a graver produced from high quality Wyandotte.

St. Charles Discussion

Chipped stone tool production and the direct heating of food were observable activities that occurred at the James Farnsley site during this occupation. The lithic scatters from this level indicate that tool production mainly involved early stage lithic production utilizing the local Muldraugh chert. The average scatter contained 514.79 grams of chert, with scatters ranging in size from 84.0 grams (F303) to 711.90 grams (F293). Large flakes were the predominate debitage, with flakes ½" or larger accounting for 49.1% of the assemblage, and flakes larger than 1" equaling 31.4% of the debitage. Smaller debitage was present in lesser amounts. Muldraugh was the sole material used in all but three of the lithic scatters. All the debitage in Feature 290 was made of Wyandotte chert.

The function of the shale scatters is more problematic. Theories as to their purpose included the use of the shale as fuel for cooking and the burning of shale in a previously prepared hearth to create smoke for mosquito abatement. To test these theories, a collection of 2.72 kg (6.0 pounds) of shale from north of the project area was subjected to heating in a surface hearth. This sample consisted of two distinct types of shale—New Albany shale which is black (Gley 2.5/N) in color and a gray, unnamed shale (Grey 7/N). During this experiment, it was observed that the New Albany shale would combust for short periods of time when placed in the fire. This combustion lasted approximately seven minutes, at which time an oily film on the surface of the shale was burned off, after this occurred the material would no longer combust. The gray shale was non-flammable and only reacted to the fire by exploding. No appreciable amount of extra smoke resulted from the burning of either material. One positive result of the experiment was a noticeable change in the appearance of the shale after being placed in the fire. Both types of shale exhibited distinct oxidation, with the New Albany shale shifting to red (10R 5/6; 2.5YR 4/8) or light red (10R 6/8), while the gray shale changed to a light reddish brown (2.5YR 6/4). None of the shale recovered from the three defined St. Charles scatters exhibited this coloration. This fact, along with the lack of oxidized soil in the feature areas, indicates that fire was not associated with the function of these features. No conclusion can be made about the function of these shale scatters.

The fact that every one of these features occurred at a slightly different elevation indicates that they were formed over a period of time. A group would have returned to the site over a period of years as part of their seasonal round. The location of the surface hearth, Feature 298, may indicate other activities, such as the direct heating of food, occurred downslope near the river channel.

EARLY SIDE NOTCHED FEATURES

Eighteen Early Side Notched features were defined during the Phase III excavations at the James Farnsley site (Figure 4.31). All but two of these features were uncovered in the main block below the St. Charles deposits. The remaining two, F15-WT and F35, were found below the Thebes workshop in the western terrace. Feature types present in this occupation included surface hearths (n=12), lithic scatters (n=4), and basin hearths (n=2). See Table 4.22 for the debitage, fire-cracked rock, and tools

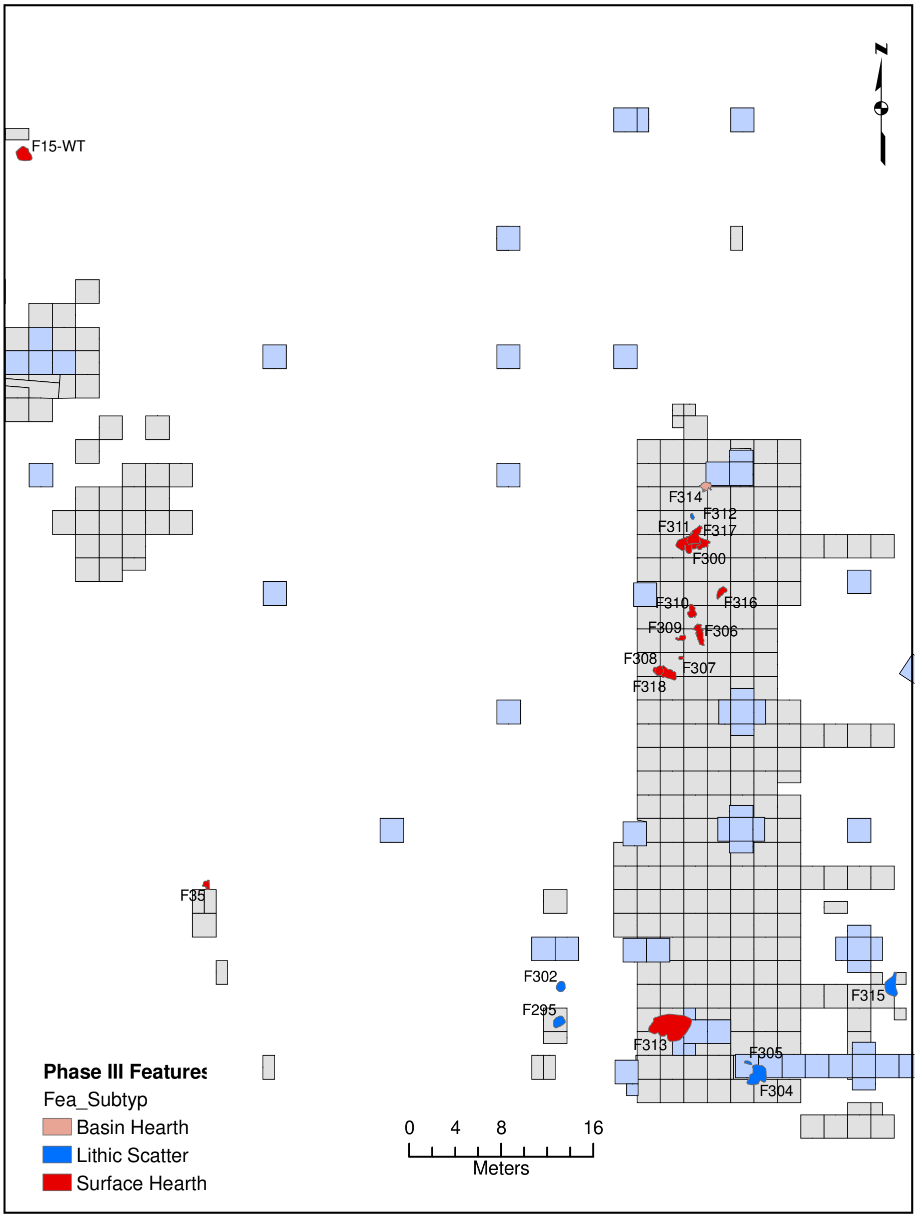

Figure 4.31. Early Side-Notched Feature Distribution Map.

associated with each of these features. Because of the early dates (ca. 10k rcybp) of the Early Side Notched zone each feature is described in detail below.

Surface Hearths

The most distinguishing features of the Early Side-Notched occupation were the large surface hearths. These hearths consisted of thin, irregularly shaped patches of oxidized soil and charcoal flecking. In general, these features occurred in the northern half of the main block between 404 cm and 524 cm below datum. An exception to this was Feature 313, which was defined in the southern portion of the main block at 661 cm below datum (Figure 4.31).

FWT-15

Feature WT-15 was uncovered during the machine stripping northwest of the main block in the 80N 60W Trench (Figure 4.31). Defined at 357 cm bd this feature shared many attributes of the main block early surface hearths. It consisted of a layer of reddish brown (2.5YR 4/4) silt loam, with a thickness of 1-3 cm, which covered an amorphous oval measuring 145 cm long by 100cm wide (11,820cm^2). Two smaller zones were defined within the feature limits. In the center of the fill, an oval area of red soil (2.5YR 4/6) was present. This zone was lightly mottled with reddish brown (2.5YR 4/4) silty loam, similar to the surrounding fill, and with charcoal flecking. Along the northeast edge was dark reddish brown (2.5YR 2.5/4) "reduced" soil heavily mottled with charcoal. Charcoal flecking also was present along the eastern edge, extending out beyond the oxidized soil. Cultural material present included a single flake and four pieces of burned sandstone, including one that measured 15 cm in diameter.

F300

Feature 300 was the first surface hearth to be unearthed in the Early Side-Notched occupation, with its highest point occurring at 410 cm bd (Figure 4.31). This feature was defined as a very large, irregular oval of oxidized soil measuring 280 cm by 132 cm on the surface (Figure 4.32). Using these measurements, a total surface area of 27,740 cm^2 was calculated, making it the second largest surface hearth at the site. The surface of this hearth was very undulating, with the overall surface elevation decreasing dramatically in the east portion of the feature. These characteristics seem to indicate that at the time of use this feature was located on the edge of a distinct landform and once abandoned was subject to heavy erosion. The oxidized soil within this hearth was a silty loam which exhibited a variety of colors including; dark reddish brown (2.5YR 3/4), red (10R 5/8), and light red (10R 6/8). Charcoal flecking occurred throughout the feature, with an increase noted along the outer 30 cm. Intra-feature variation in color was associated with distinct zones within the larger overall feature area. These zones also exhibited variation in density of oxidized soil, amount of charcoal flecking, and presence or absence of reduced soil. In profile the feature exhibited a distinct base that ranged in depth from 6-13 cm. The oxidized soil was patchy in certain regions because of erosional disturbance and krotovina. Tools associated with Feature 300 were recovered to the south and southeast of the feature boundary and included three bifaces, a hammerstone/anvil, a pitted stone, a projectile point, and a retouched flake. Two of the bifaces were of a late stage of production (Stage 3), while the third was a Stage 1. The projectile point was a reworked form of indeterminate type produced from Wyandotte chert. A 3.04 g sample of nutshell and wood charcoal was collected from F300 and dated to 10,320 ±190 rcybp (Beta 152942).

F313

With a maximum length of 343 cm and width of 222 cm, Feature 313 was the largest surface hearth defined at 12HR520 (Figure 4.31). In addition to being the largest, it was also the deepest, with a top depth of 661 cm bd that placed it in the deepest portion of the Early Side-Notched occupation. This feature was identified during trackhoe excavation of a geomorphological trench in the southern portion of the main excavation block. In planview, four distinct zones of feature fill were present, all of which were

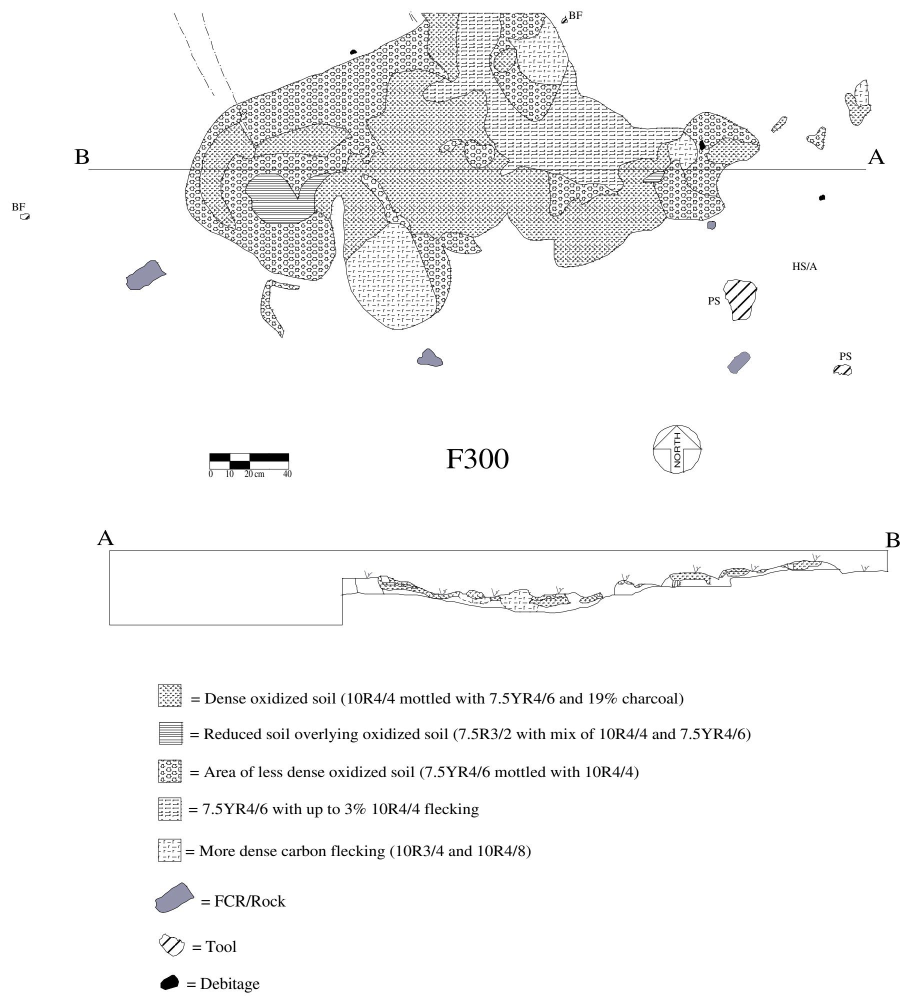

Figure 4.32. Early Side Notched Feature 300.

described as having a sandy loam texture (Figure 4.33). Zone 1 was a red to weak red (10R4/4-5/8) oxidized patch of soil that contained small areas of reduced (dark reddish brown; 5YR3/4) and unburned soils (brown; 10YR 4/3). This soil was mottled with a moderate amount of charcoal, with a small amount of calcined bone also noted. Zone 2 was an area of brown soil (10YR 4/3) heavily mottled with dark reddish brown (5YR 3/4) reduced soil. Other mottling included charcoal and oxidized soil. Zones 3 and 4 were considered areas of debris resulting from the raking of coals from the fire. These zones consisted of a brown (10YR 4/3) fill, similar to the surrounding subsoil, which contained large amounts of charcoal and minor concentrations of oxidized or reduced soil flecking. Cultural material associated with F313 included ten cobbles, flakes, a projectile point and a hafted drill. The hafted tools from the feature are technologically similar to the Thebes cluster. Two radiocarbon determinations were made on a split wood sample from the feature. The average of the two samples is 9955 ±86 rcybp.

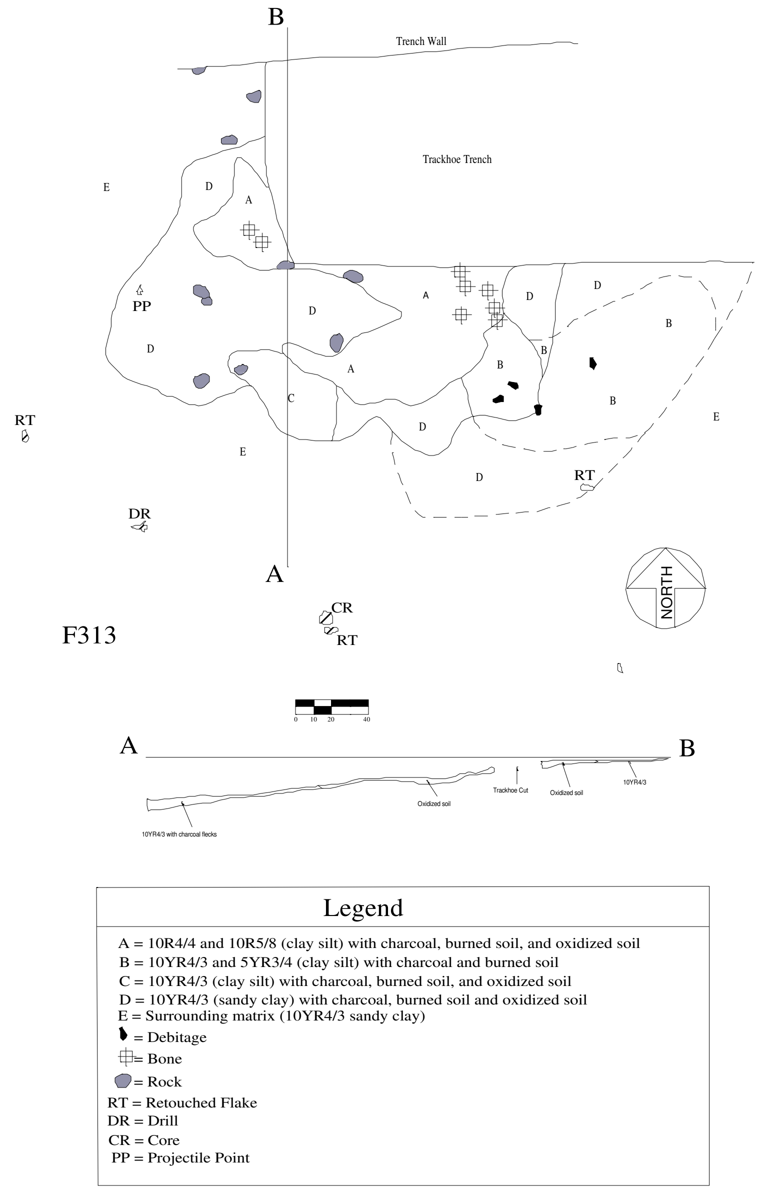

Figure 4.33. Early Side Notched Feature 313.

F306

Typical of the surface hearths from this occupation, Feature 306 has extensive but shallow surface oxidation (Figure 4.31). This feature was uncovered at 430 cm bd and in plan appears as an irregular oxidized stain (Figure 4.34) measuring 200 cm in length and 90 cm in width, with an estimated area of 9310 cm^2. In profile, the feature was a thin layer of oxidized silty loam, 1-4 cm thick, which ranged in color from red (2.5YR 4/8) to dark reddish brown (2.5YR 2.5/4). The amount of charcoal present in individual areas caused the variation in fill color. Typical of many of these large surface hearths, the surface of the fill showed evidence of being placed on an uneven surface. In this case, the oxidation extended down 20 cm lower on the southern edge. Also, as with many of the other large Early Side-Notched hearths, the oxidation was irregular and patchy, probably resulting from the effects of bioturbation and/or erosion. Debitage recovered from F306 was concentrated in the upper fill at the northern end and consisted of 38 flakes. Interestingly, Allens Creek was the dominant chert type found, accounting for 65.8% (n=25) of the collection. The remaining debitage consisted of Muldraugh (21.1%; n=8) and Wyandotte (13.2%; n=5) chert types. Besides these

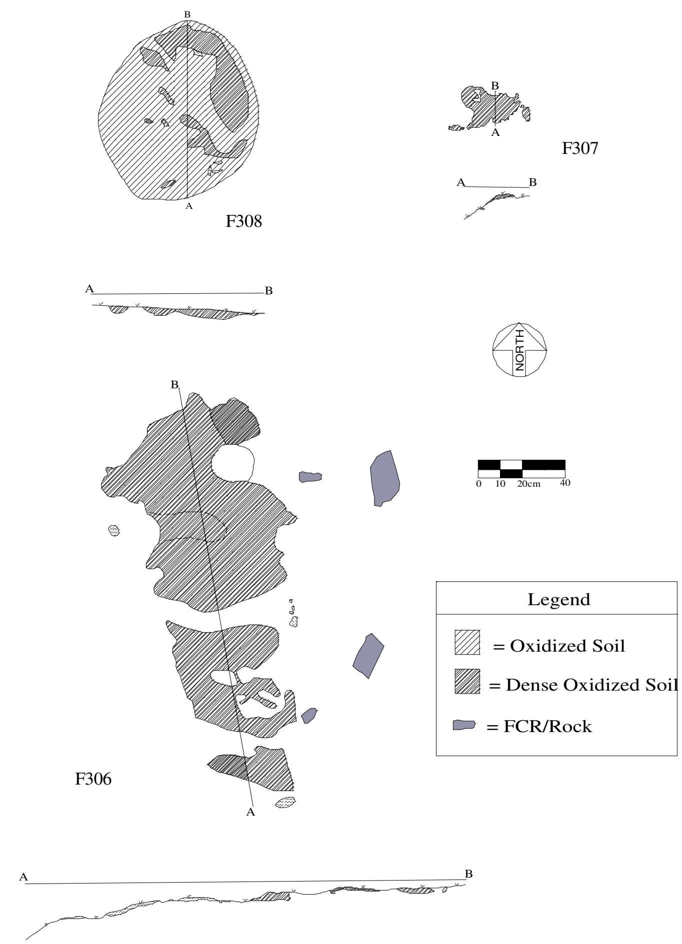

Figure 4.34. Early Side Notched features.

flakes the only other associated material was a manuport and a hematite nodule. This feature was dated to 10,100 ±100 rcybp from a nutshell charcoal sample (ISGS-4898).

F307

Feature 307 was a surface hearth uncovered during track-hoe excavation at 421 cm below datum (Figure 4.31). Covering an area measuring 38 cm long by 20 cm wide (950 cm2), this feature was smaller than the other hearths at this level (Figure 4.34). This small size could be the result of disturbance by the track-hoe during exposure. Once defined, this feature appeared in both plan and profile as irregular patches of oxidized soil mottled with charcoal. The oxidized patches ranged in color from light red (10R 6/8) to red (10R5/8) to dusky red (10R 3/3) and extended 10 cm below the surface. Like many of the other Early Side-Notched hearths, a slope was noted in the feature fill, in this case the feature extended lower to the southeast. A total of seven rocks were recovered within the feature boundary.

F308

Another surface hearth, Feature 308, was excavated at 415 cm below datum in Units 115 and 116 (Figure 4.31). It consisted of irregular patches of oxidized soil and charcoal within an area 80 cm long by 73 cm wide (4470 cm^2) (Figure 4.34) . In profile the oxidized soil was 4 cm thick and yellowish red (5YR 4/6) in color. Unlike many of the other large surface hearths, F308 showed no evidence of a slope to its fill, indicating it was placed on a level surface. Two unheat treated Muldraugh flakes were the only associated cultural material.

F309

Feature 309 was a large hearth discovered during the hand excavation of Unit 122 (Figure 4.31). It appeared at 423 cm bd as a large, semi-circular zone of dark reddish brown (2.5YR ¾) oxidized soil, with an irregular zone of charcoal and oxidized mottles extending to the west (Figure 4.35). The main oxidized area measured 50 cm long by 40 cm wide and 4 cm deep, with the whole feature in planview covering an estimated 2530 cm^2. While no cultural material was recovered within the feature limits a concentration of 114 Allens Creek flakes were recovered immediately to the northwest.

F310

Another surface hearth, Feature 310, was discovered at 424 cm bd during trackhoe excavation in the same region as the previously described hearths (Figure 4.31). This large, irregular oval of oxidized soil was heavily dissected by erosion or bioturbation in its eastern half (Figure 4.35). In plan F310 measured 110 cm by 82 cm, for an area of 5790 cm^2. Within the feature boundary the soil was compact silty clay, with two distinct zones. Zone I was the most extensive and consisted of weak red (10R 4/4) compact silt loam with red (2.5YR 5/6) mottles. In profile this zone extended 8 cm below the surface and contained discontinuous lens near the surface that were composed of red (10R 5/8) silt loam with light charcoal flecking. Zone II consisted of an oval patch of red soil (2.5YR 4/6) at the northern end of the feature. This zone was slightly thicker (9 cm) than Zone I and was distinguished by heavy charcoal flecking and a concentration of debitage. The cultural material from the feature included twelve flakes, consisting of a mixture of Wyandotte (n=7), Allens Creek (n=2), and Muldraugh (n=1) microdebitage, along with a single piece of Allens Creek shatter and a Muldraugh secondary flake.

F311

Another large Early Side-Notched surface hearth was Feature 311, which was uncovered during trackhoe excavation in the northern end of the main block (Figure 4.31). Feature 300 was superimposed upon Feature 311, which was superimposed upon Feature 317. To fully define the stain and sample associated artifacts, two units, U148 and U155, were hand excavated. In planview F311 was an irregular oval shape measuring 189 cm long by 104 cm wide (Figure 4.35), equaling an area of 11,580 cm^2. The feature fill consisted of a highly oxidized interior zone surrounded by darker reduced soil. The highly oxidized interior soil ranged in color from red (2.5YR 4/6 and 5/6) to dark red (10R 3/6), while the darker exterior zone was weak red (10R 4/3), dusky red (10R 3/3), to very dusky red (2.5YR 2.5/2). Charcoal was found throughout the feature but was concentrated in five distinct areas along the feature boundary. The profile of Feature 311 showed a thin lens of reduced soil (as described previously) with a thin cap of highly oxidized soil present in the northern extent. Also, at the southern feature boundary a zone of the reduced soil mixed with mottles of highly oxidized soil is present. Not unusual for one of these hearths, the feature shows a distinct slope, in this case the fill along the northern boundary is 27 cm deeper than the southern oxidation. Cultural material recovered from the feature included ten flakes, one biface and six fragments of calcined bone. Nine of the flakes were Muldraugh secondary flakes, and one Wyandotte flake was found. The biface from the feature was a Stage 3 biface made from high

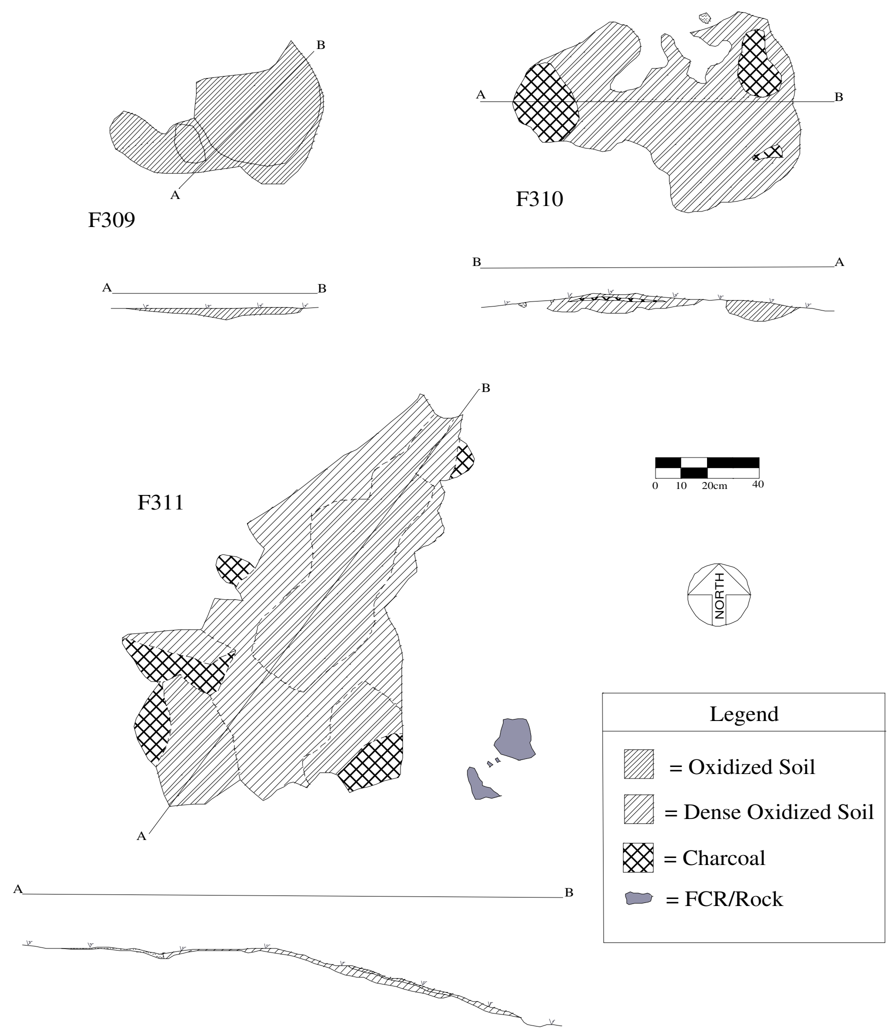

Figure 4.35. Early Side Notched Features

quality Muldraugh chert. This surface hearth was dated to 9,700 ± 100 rcybp (ISGS 4897).

F316

Feature 316 was exposed by mechanical scraping at 522 cm below datum (Figure 4.31). This surface hearth consisted of irregular, discontinuous patches of oxidized soil that occurred in an area measuring 115cm in length and 69cm in width (4700 cm^2). Two main fill areas were defined based upon the presence of charcoal (Figure 4.36). Zone 1 consisted of dark reddish brown (2.5YR 3/4) silt loam with heavy charcoal flecking, while Zone 2 exhibited a lighter red (2.5YR 5/8) fill containing very little charcoal. The feature was composed of thin (0.25-2cm thick) patches of oxidation, with the most intense burning present in the center. No cultural material of any type was found with Feature 316.

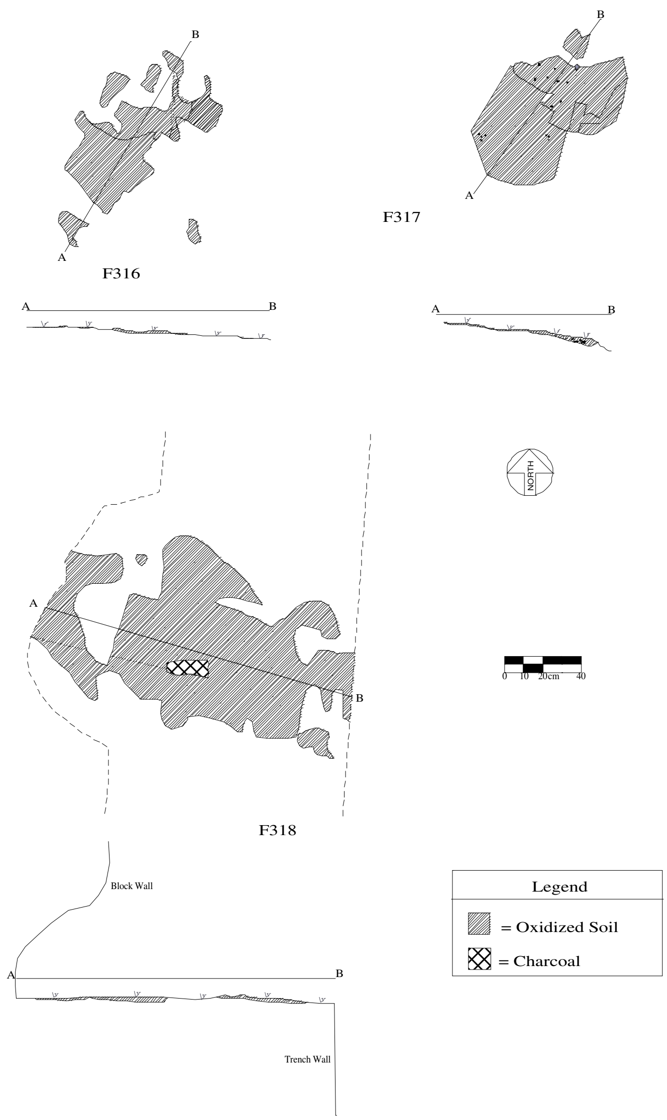

Figure 4.36. Early Side Notched Features.

F317

Feature 317 was another smaller surface hearth associated with the Early Side-Notched occupation (Figure 4.31). When first defined this feature appeared as an irregular oxidized stain with a maximum length of 80 cm and width of 78 cm (Figure 4.36). In planview the feature exhibited an amorphous/undulating surface with two distinct zones. The southwestern portion of the feature was characterized by a brown (10YR 4/3) fill with heavy charcoal flecking that occurred in dense pockets. In the northeast portion of the feature, the hearth exhibited a patch of dark red (10YR3/6) to red (2.5YR 4/6-5/6) oxidized soil surrounded by a ring of very dusky red (2.5YR 2.5/2) reduced soil. In profile the feature extended a maximum of 4cm below the surface and had a clear to diffuse boundary. The only cultural material associated with Feature 317 was a small fragment of burned shale recovered from the north half.

F318

The final surface hearth, Feature 318, was defined at 524 cm bd near the west wall of the main block during the machine scraping of a lay-back related to the final deep excavations (Figure 4.31). As typical with Early Side-Notched surface hearths, this feature was defined as an area of dark reddish brown (2.5YR 3/4) oxidized soil patches (Figure 4.36). Also typical of other hearths at the level, the interior fill was very irregular in shape and characterized by patches of charcoal flecking. Overall, the feature covered an area measuring 168 cm long by 95 cm wide (14,390cm^2), with the oxidation in profile never exceeding 1cm in thickness. This feature did not exhibit a slope in the oxidation like that found in many of the Early Side-Notched surface hearths. The only cultural materials present were two Wyandotte flakes.

Basin Hearths

Two basin hearths were designated in the lowest occupation at the James Farnsley site. Both these features were distinguished from surface hearths on the basis of a prepared feature area, in these cases the presence of sandstone, limestone, or shale slabs along with evidence of an open fire.

F35

Feature 35 was the first feature discovered at the James Farnsley site that was assigned to the Early Side-Notched occupation. It was found during the mechanical excavation of the water screen ponds to the west of the main block prior to the beginning of the Phase III investigations (Figure 4.31). This feature appeared at 367 cm below datum as a concentration of burned sandstone and limestone slabs surrounded by an area of oxidized soil mottling (Figure 4.37). The stone slabs ranged in diameter from 7-50 cm and included two pitted stones. The surrounding soil was a strong brown color (7.5YR 4/6) with heavy reddish brown (5YR 4/4) oxidized mottles. Including the limits of the oxidized soil mottling, F35 had a maximum length of 140 cm and width of 100 cm, for an estimated area of 3330 cm^2. Seven flakes and 13 pieces of fire-cracked rock also were recovered from the feature. The debitage was predominately Muldraugh chert (n=6), including two primary flakes, with the remaining flake being of an indeterminate chert type. A charcoal sample from this feature was dated to 10,020 ±100 rcybp (Beta 13574).

F314

Feature 314 was a basin hearth defined at 487 cm bd during machine excavation of the Early Side Notched occupation (Figure 4.31). In planview this feature had an irregular oval shape with a clear boundary. Much of the irregular shape appears to have been the result of erosion that created "gouges" along the northern edge and a "trough" that was void of fill through the feature's eastern half. The feature fill was a dark reddish brown (2.5YR ¾) stain that was mottled with red (2.5YR 5/8), highly oxidized soil and charcoal flecking (Figure 4.37). The profile revealed a very shallow basin of oxidized soil, 2-5 cm deep, with a single layer of rock near the base. This rock layer consisted of non-overlapping slabs of shale and limestone which were positioned horizontally with a

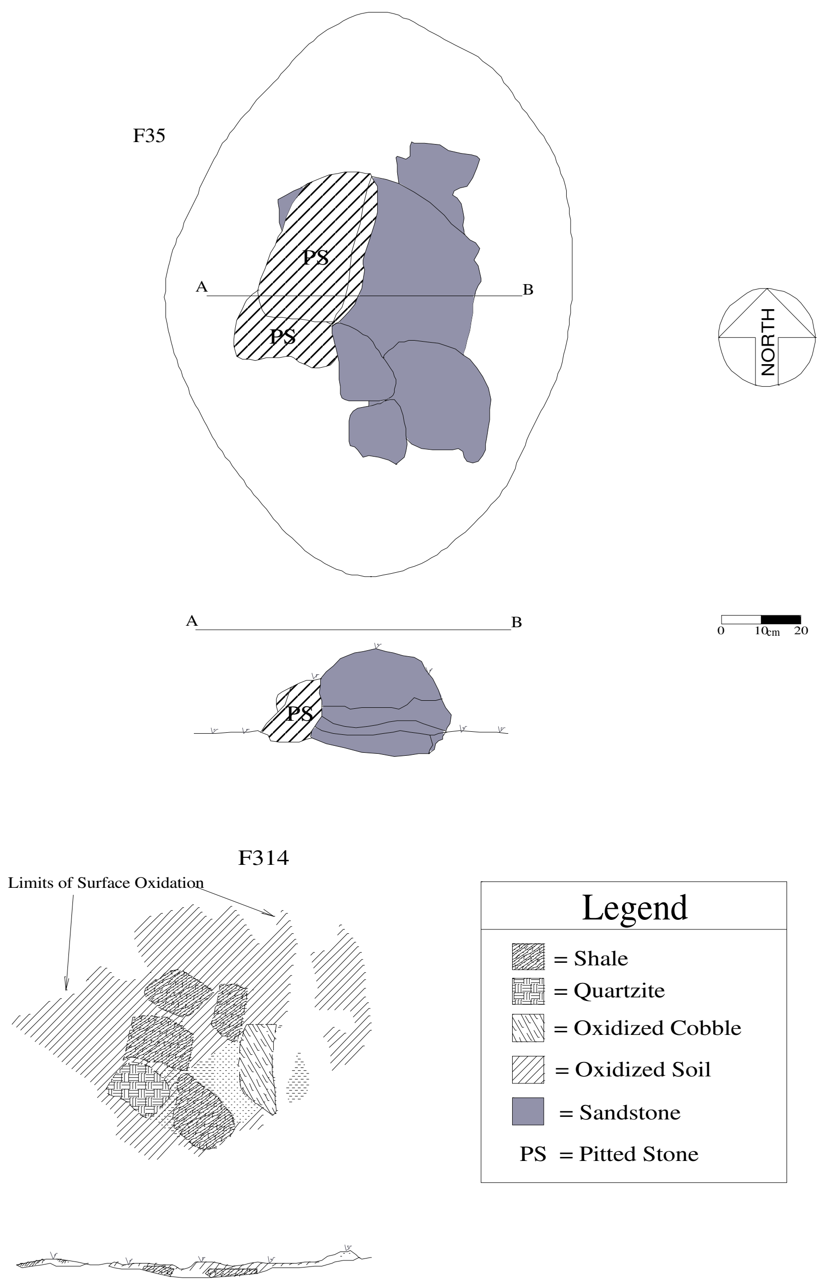

Figure 4.37. Early Side Notched Features.

thin layer of fill located underneath. Besides the rock slabs, no artifacts were recovered from the hearth.

Lithic Concentrations

Five lithic concentrations were found in the Early Side-Notched occupation (Figure 4.31). Most of these (n=4) were located in the southern portion of the main block, and one (F315) was discovered underneath the Kirk secondary deposits during trench excavation.

F304

Feature 304 was the first lithic concentration defined in this occupation and consisted of 616 pieces of unheated Muldraugh debitage scattered over a sloping surface that measured 198 cm long by 196 cm wide (19,370 cm^2). It was located in the southeast corner of the main block (Figure 4.31) on a west to east slope, with the western edge of the scatter at 410 cm bd and the eastern edge at a depth of 448 cm bd. Once this concentration was defined by mechanical stripping, three hand excavation units were established (Units 5, 6, and 301) to maintain provenience control. Within the concentration, the debitage was not evenly distributed. Several clusters of flakes were surrounded by a light scatter of smaller flakes. Besides debitage, F304 contained two cores, a retouched flake, and a tested cobble, all produced from high to medium quality Muldraugh chert.

F305

Feature 305 was just northeast of F304, at 421.5 cm below datum, within Unit 301 (Figure 4.31). This scatter formed a small (53 cm by 24 cm), distinct oval containing 23 Muldraugh flakes. Considering the close horizontal and vertical relationship between this feature and F304, it is probable that they are associated with the same activity episode. No other types of artifacts were present.

F312

Feature 312 is a tool cluster. This feature was uncovered during trackhoe excavations in the northern portion of the main block at 481 cm below datum (Figure 4.31). This tight cluster of artifacts included a tabular slab of sandstone, a hammerstone, and a side scraper. The hammerstone was of granitic/metamorphic material, while the scraper was produced from high quality Wyandotte chert. No soil discoloration was associated with this cluster.

F315

The final lithic scatter defined in the Early Side-Notched occupation was Feature 315 (Figure 4.31). This concentration of debris was defined at 650 cm bd in U184 in the 16N Trench . This depth places it well below the Kirk deposits and approximately 125 cm below the St. Charles occupation in the area. Once defined, it was noted that the feature extended outside the unit, therefore three 1 x 1 meter units (U319, U320, and U321) were excavated to fully expose the scatter. After full definition, F315 consisted of 500+ pieces of debitage in an area measuring approximately 200cm by 100cm (13,650cm^2). Similar to Feature 304, the feature was characterized by clusters of large flakes surrounded by a light scatter of tertiary flakes and micro-debitage. Atypical of other scatters in this occupation, all the debitage was Wyandotte chert and it included four tools—three Stage 3 bifaces and a tested cobble, all made from high quality Wyandotte. The surface of this feature follows the slight downward slope of the landform to the east, and the elevation drops approximately 22 cm.

Table 4.22. Early Side Notched Feature Debitage, FCR/Rock, and Tools.

Feature Type	FeatureNumber	Debitage (g)	FCR/Rock (Kg)	Biface (Ct.)	Core (Ct.)	Hammerstone (Ct.)	Hammerstone/Anvil (Ct.)	Manuport (Ct.)	Pitted Stone (Ct.)	Point (Ct.)	Retouched Flake (Ct.)	Scraper (Ct.)	Tested Cobble (Ct.)	Total (Ct.)
Surface Hearth	F15-WT	0.0	0.000	0	0	0	0	0	0	0	0	0	0	0
	F300	0.0	0.197	3	0	0	1	1	1	1	1	0	0	8
	F306	65.5	0.000	0	0	0	0	2	0	0	0	0	0	2
	F307	914.4	0.014	0	0	0	0	0	0	0	0	0	0	0
	F308	0.6	0.000	0	0	0	0	0	0	0	0	0	0	0
	F309	0.0	0.000	0	0	0	0	0	0	0	0	0	0	0
	F310	21.4	0.000	0	0	0	0	0	0	0	0	0	0	0
	F311	81.7	0.067	1	0	0	0	2	0	0	0	0	0	3
	F313	0.0	3.498	0	0	0	0	0	0	1	0	0	0	1
	F316	0.0	0.000	0	0	0	0	0	0	0	0	0	0	0
	F317	2.5	0.000	0	0	0	0	1	0	0	0	0	0	1
	F318	0.0	0.000	0	0	0	0	0	0	0	0	0	0	0
Lithic Scatter	F295	512.2	0.003	1	0	0	0	0	0	0	0	0	0	1
	F302	353.1	0.003	0	0	0	0	0	0	0	0	0	0	0
	F304	4194.0	0.024	0	2	0	0	0	0	0	1	0	1	4
	F305	118.9	0.000	0	0	0	0	0	0	0	0	0	0	0
	F312	0.0	0.002	0	0	1	0	1	0	0	0	1	0	3
	F315	404.2	0.508	3	0	0	0	0	0	0	0	0	1	4
Basin Hearth	F35	55.9	21.300	0	0	0	0	0	2	0	0	0	0	2
	F314	4.8	0.000	0	0	0	0	4	0	0	0	0	0	4
	Total	6729.2	25.416	8	2	1	1	11	3	2	2	1	2	33

Early Side Notched Discussion

Based upon the feature types associated with this occupation, the direct heating of food and tool production were the primary on-site activities. When comparing all occupations, by far the largest hearths were associated with the Early Side Notched levels, where they had an average area of 12,238 cm^2. The occurrence of multiple zones within many of the Early Side-Notched hearths (e.g., F300) seems to indicate that they were created as a result of multiple use episodes within the same boundary with differences in coloration resulting from environmental variations during each heating episode. The irregular shape of these features was the result of the thinness of the oxidized soil layer that was subjected to erosion and bioturbation, which resulted in gaps in the fill. The superimposition of F300, F311, and F317 indicates that the same area was used to construct open fires over a long period.

THEBES LITHIC WORKSHOP FEATURES

There were twelve features defined in the Phase II/III investigations in the Western Terrace area of 12Hr520 designated as part of the Thebes component. Two other lithic concentrations recorded during the Phase II are also described that were not labeled features during the field work. All of the features are lithic scatters with the exception of one small pit.

Lithic Concentrations

F1WT

This feature was a large pile of early stage manufacturing debris of Muldraugh chert—1,400+ flakes, 3 hammerstones, 4 cores, 29 bifaces and biface fragments (Figure 4.38). The main concentration is composed of numerous pieces of raw material. Some cores were well worked, some were relatively unaltered, and some were essentially tested tabular pieces. The bifaces are primarily early stage, but several intermediate stage bifaces were found close together, and at least two late stage bifaces were encountered. Bagged separately were 373 early stage flakes within 30 cm of a hammerstone and core, of which 114 were large—many were cortical or blocky, angular chunks. Another 155 flakes were bagged from within 30 cm of another hammerstone. These flakes were more evenly distributed in size. Many were large, angular, cortical, thick flakes, but some were smaller, although they still appeared to be trim flakes primarily related to early stage manufacture. The flakes in Feature 1WT are generally thicker than those in Feature 5WT and Feature 4WT. Most of the debitage is at 110 cm bd or above. The debitage concentration in adjacent Phase II Unit 60N70W did not have as many flakes as Feature 1WT. It reached its maximum density in the 110-120 cmbd level but barely intersected Feature 1WT.

F2WT

This feature was composed of clusters of Muldraugh flakes removed with hard hammer percussion (Figure 4.39). One cluster of large, early stage flakes and four small clusters of intermediate stage flakes were apparent. In general, there were few angular and cortical flakes, and the debitage appeared to derive from the reduction of early stage bifaces rather than tabular raw material. There was no evidence of late stage manufacture. Two cores, four hammerstones, a biface, a utilized flake, and nearly 1,000 flakes were recovered.

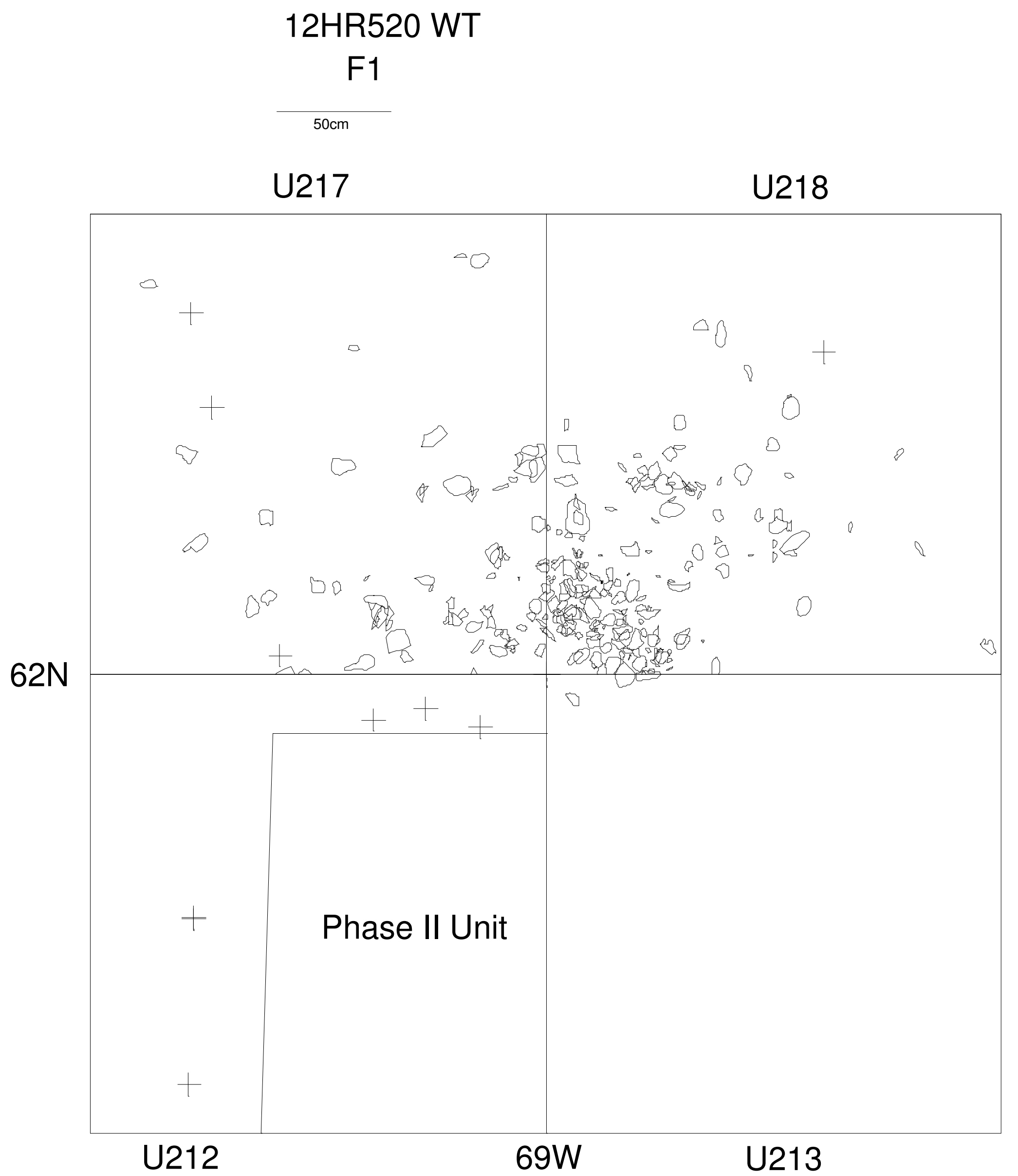

Figure 4.38. Thebes Lithic Scatter (F1WT); (+) plotted tool.

The clusters displayed different compositions. In the northwest quad of Unit 209 the lowest debitage included large, thick, angular, early flakes and medium to large, thin flakes and many small trim flakes from early to intermediate stage reduction. Intermediate stage flakes and trim flakes were positioned above this layer. This typifies a situation where one or more pieces of raw material were worked into intermediate stage bifaces at the same spot. In the southwest quad of the unit there was a different sequence of flake types. In this quad the lowest debitage was mostly small to medium sized trim flakes from intermediate stage reduction and few early flakes. The level above had a higher number of large, thick, cortical flakes in addition to the intermediate stage debitage. The deposits in this quad may derive from multiple knapping episodes. The flakes in this feature generally are blockier than those of Feature(s) 5WT/6WT. The concentration began lower than the other concentrations in the block and extended lower. The units around the concentration had relatively few flakes, except directly north of the feature boundary were hundreds of small, intermediate to late stage flakes were recovered.

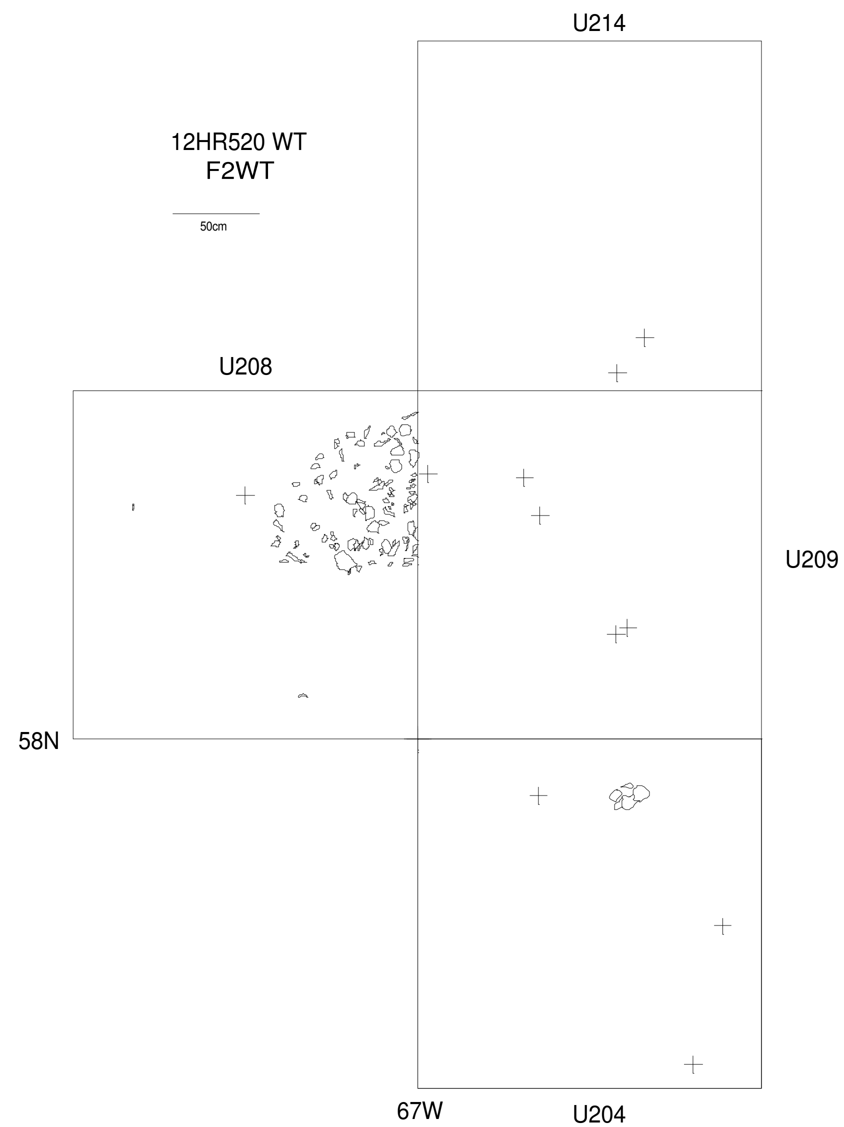

Figure 4.39. Thebes Lithic Concentration (F2WT); (+) plotted tool.

F3WT

The feature was severely impacted by Phase I Trench 96-26. The concentration within the trench was described as a very dense mass of early stage Muldraugh flakes that extended from 83-101 cm bs (99-117 cm bd). Based upon the remnants in the Phase III units, it was the largest and among the densest concentrations of flakes on the site. The portion of the feature that remained was confined primarily to south side of the trench. The thickest part was 97-105 cm bd, and below 105 cm bd there are several small clusters that dipped to 111 cm bd. More than 4000 flakes were recovered from the remaining portions during Phase III, these were predominately early stage Muldraugh flakes, but there were hundreds of smaller flakes. One intermediate stage biface, three early stage bifaces, three biface fragments, and a core were recovered

The greatest concentration was in the southeast quadrant of Unit 227 where it began at 90 cm bd and formed a dense layer at 98 cm bd. At least six early stage bifaces were found between 100-110 cm bd and more than 2,000 flakes were recovered from the unit. Almost all debitage was Muldraugh. An early stage Wyandotte biface was found within the densest part of the concentration. Wyandotte debitage was slightly more common around the western periphery of the feature, and there was evidence of the reduction of several Wyandotte nodules. The small intact area in Unit 228 contained very large numbers of trim flakes and intermediate to late stage reduction flakes from one or two blocks of chert. This is the only portion of the feature with significant quantities of debitage not from early stage reduction.

The feature dissipated into the northeast quad of Unit 288, which yielded seven early to intermediate stage bifaces, a core and a large number of early stage flakes within the feature, and there were a very large number of small bifacial retouch flakes scattered around the periphery of the feature. The portion of the feature in the north half of Unit 289 contained a cluster of early and intermediate stage flakes and one dense concentration of short, thick, blocky early stage flakes. This reiterates the idea that the feature is composed of debris from individual knapping episodes. The smaller debitage from the water screen showed predominately intermediate stage flakes—few dorsal flake scars, few narrow flakes, few prepared striking platforms or thin bulbs of percussion. No evidence of intensive manufacture of late stage tools was seen.

F4WT

This feature was a small, dense concentration of Muldraugh debitage (n=651) from all stages of manufacture. There was very little cortical debris and few blocky pieces, but very large, thin soft hammer flakes, probably from the same piece of raw material, and microflakes were present. About 60 percent of the others flakes were thinning flakes with multiple flake scars on the dorsal surface, and 40 percent were small, very thin flakes. A possible preform, an early stage biface and a late stage biface fragment were found. Individual clusters ranged from 10 cm thick to 3 cm thick. Much of the debitage was stacked with no dirt between the flakes and practically cemented together with soil rich in manganese, and there was a layer about two flakes thick around the periphery. There was no evidence of ground slope. Most of the concentration rested on the surface at 114 cm bd and continued upward to 104 cm bd as a single mass.

A hammerstone, three cores and a biface fragment were found in the immediate vicinity and could be associated. In the 100-110 cm bd level there was a smaller cluster of intermediate stage flakes in Unit 286 to the west of Feature 4WT and a scatter of flakes between them. These appear to represent two piles of flakes from the same knapping episode. There was a cluster of very small thinning flakes in the 110-120 cm bd level of Unit 222 to the east of Feature 4WT. These contrast with the intermediate stage flakes in the feature and represent a later stage of reduction, but it is not known if the concentrations are related.

F5WT

This feature was composed of intermediate stage reduction debitage. There were few angular or cortical flakes—most flakes were of intermediate size and there were sizable volumes of thinning flakes and microdebitage (Figure 4.40). The flakes were smaller and thinner than those in Feature 1WT. Much of the debitage appeared to have come from a single piece of Muldraugh. A core, a large, elongated biface fragment, two utilized flakes, and 134 flakes were found. Feature 6WT began at the south end of the concentration at a depth of 104 cm bd and sloped to the south. There was about six centimeters of soil with few flakes above Feature 6WT, but it could be a lower portion of Feature 5WT. If the two are one feature the total depth of the combined features would be considerable. The debitage resembles that of Feature 6WT in color, heating, thinness, and flake size. Several bifaces and broken bifaces may have been discarded into adjacent Unit 201, because the chert of the tools was similar to that of the flakes in Feature 5WT/6WT and there were very few flakes in Unit 201.

F6WT

This feature (Figure 4.40) was a very compact concentration of intermediate stage reduction debris, but had larger flakes, some relatively angular, and less microdebitage than Feature 5WT. This feature could be a lower portion of Feature 5WT. It is plausible that this debitage represents flakes earlier in the reduction process of the same pieces of raw material. Three hammerstones, three bifaces, a Thebes drill, and 136 flakes were found in the cluster, and another biface was found outside the cluster.

F9WT

This feature consisted of a small, dense concentration of more than a thousand early, intermediate, and late stage Muldraugh flakes. The debitage was largely confined to a single unit, although a scatter of flakes and many early stage bifaces were found around the periphery of the concentration. Few thick, angular, blocky flakes were present. At least six early–intermediate stage bifaces and a core were recovered. There was ample evidence of intermediate stage reduction, and large flakes were mainly in the lower portion of the concentration. There were many large and medium sized, thin flakes with multiple dorsal scars, and some appear to be soft hammer flakes. Many of these were made from inordinately high quality Muldraugh chert. This feature had the most evidence of late stage manufacture seen on the site, and pressure flakes and a small, thin, circular late stage biface were recovered. Thousands of microflakes were above, around, within, and at the base of the feature. The main concentration was about 10 cm thick and appeared to be in a slight natural depression. There was some disturbance from a rodent burrow at the base of the feature.

This feature and Feature 11WT began at about the depth that Feature 10WT ended but ended at the depth at which Feature 14WT began; thus, this may represent the middle one of three occupations in Block C.

F10WT

The feature was a concentration with over 1300 flakes, several hundred microflakes, and four hammerstones, three cores, three bifaces and two biface fragments. Much of the debitage appears to have come from a few pieces of raw material. Many of the flakes were medium to large but derived from intermediate stage reduction. The small flakes were primarily trim and shatter rather than biface reduction flakes. There was an arc of dense debitage in the southwest quad of U250 and the southeast quad of U305 that certainly looks as if a knapper sat within it. This area included a broken but refit biface and a refit core next to one another.

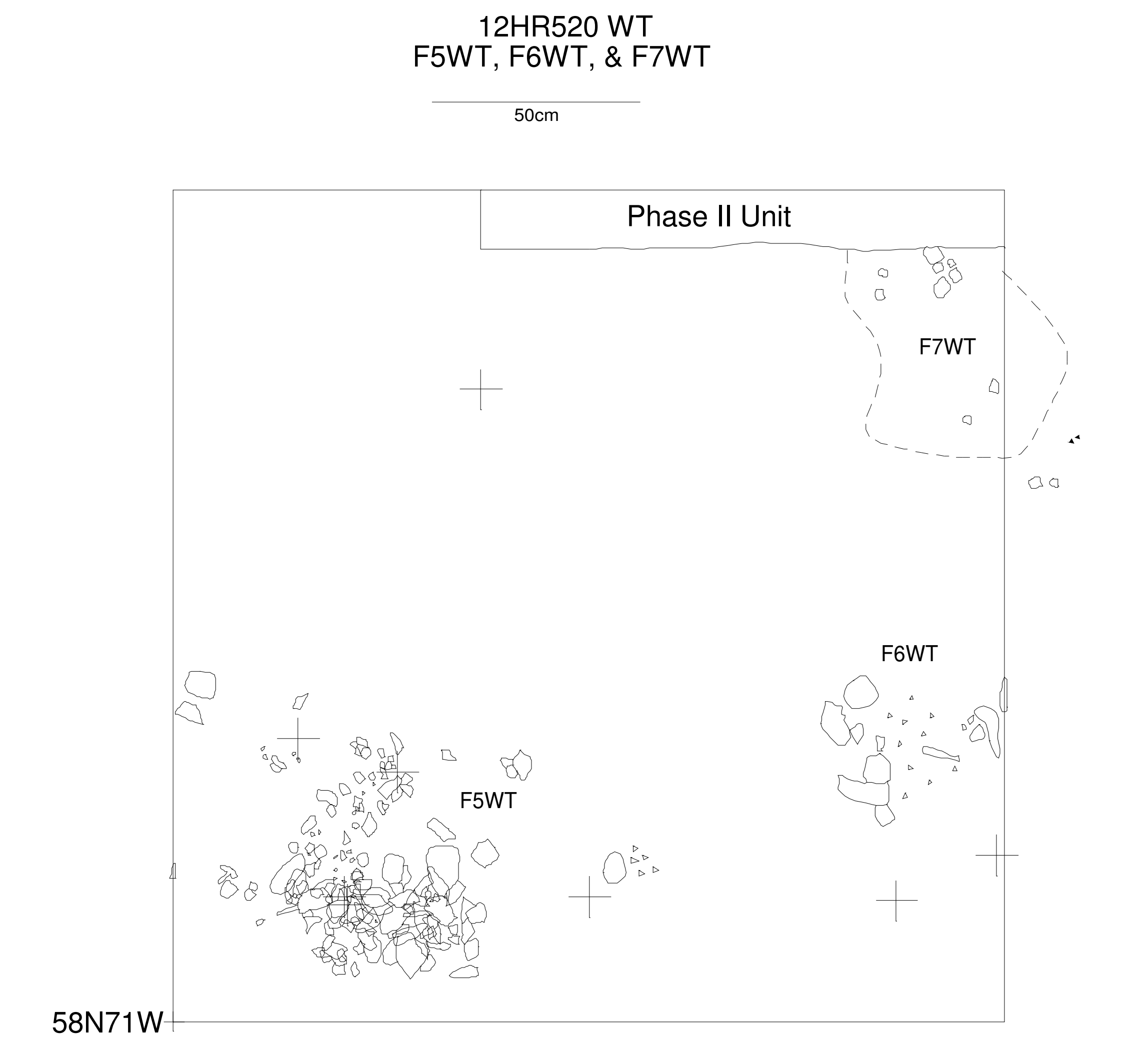

Figure 4.40. Thebes Lithic Scatters (F5WT, F6WT) and Pit (F7WT); (+) plotted tool.

More than 3,000 flakes were found above, below, and around the feature and may be associated with it. A Thebes drill found at 110 cm bd about 50 cm east of the feature, a preform at 111-116 cm bd, several bifaces, and a very large amount of intermediate stage debitage in the north half of Unit 250 also probably were associated with the feature. This feature ended at about the same depth that Feature 9WT began and may represent the youngest of three occupations in Block C.

F11WT

This feature was composed of a small concentration of about 1,000 flakes of all sizes and stages, but most were from early stage manufacture. Several hundred more flakes around the periphery may have been part of the feature. A possible core was the only tool recovered in the concentration, but 13 cores, bifaces, and biface fragments and a hammerstone were within less than a meter of the concentration.

F13WT

The feature had a large preform lying atop a dense cluster of microflakes, very small flakes, and intermediate stage reduction flakes of Muldraugh chert, and a core was found near the concentration. A few flakes of Wyandotte chert were encountered. The cluster had been disturbed by a rodent burrow and perhaps other disturbance as well. This was a lithic concentration similar to those found in the Thebes hand excavation area to the north.

F14WT

This was a small, extremely dense concentration of intermediate to late stage debitage (n=791) and microflakes of Muldraugh chert. Some large flakes were found but no cortical flakes. A biface fragment was at the top of the concentration, and many bifaces were directly outside the concentration. The feature began below the termination depth of the other concentrations in the block. It appears that this feature is the earliest of three occupations in this block.

Block A Phase II Unit 60N70W debitage concentration

There are two lithic concentrations exposed in the Phase II investigations that were not designated as features but are similar to the lithic scatters defined in the Phase III block excavations. A concentration with more than 1,000 flakes flakes began in the 100-110 cm bd (80-90 cm bs) level, which contained three bifaces and three biface fragments (two of which refit), and a hammerstone. The flake concentration continued into the 110-120 cm bd level where two biface fragments also were found, and a Thebes point was recovered at 100 cm bs. Most of the debitage was intermediate stage Muldraugh flakes, but late stage Wyandotte flakes also were present. The concentration did not extend beyond the unit and was distinct from Feature 1WT to the north, although these features may have been interrelated.

Block B Phase II Units 70N58W, 70N60W, 72N60W debitage concentration

In Unit 70N58W the concentration of intermediate stage debitage was densest from 99-116 cm bd (83-100 cm bs). In Unit 70N60W a dense concentration of intermediate stage flakes began at 104 cm bd and ended above 116 cm bd. Ten bifaces and biface fragments were found in the 96-106 cm bd level, and five more were found in the next level. The debitage extended into the southwest quadrant of Unit 72N60W but did not extend into the northwest quad. The concentration in this unit was composed of large early stage flakes, and it began in the lower portion of the 96-106 cm bd level and continued down to nearly 116 cm bd. A large amount of debitage extended into the eastern half of the unit, but there were many late stage Wyandotte flakes in this level and the next. The debitage was not assigned a feature designation, but over 4,500 flakes were recovered from 96-116 cm bd within the three units. The concentration did not extend as far west as Unit 70N62W, but five early stage bifaces made of the same heated Muldraugh chert were present at 104-106 cm bd and may have been discarded from the knapping area. The southern edge of the concentration intersected the north edge of Feature 3WT, but the features were distinct, although they could be interrelated.

Pit

F7WT

This was a small pit with dark soil, a small amount of debitage, light charcoal, and sandstone but little else in it (Figure 4.40). It was not completely rock lined but there was rock on the bottom and lower sides. A hammerstone and a utilized flake were within the pit and other tools were found outside the periphery.

WOODLAND FEATURES

Four Woodland features (Figure 4.41) were excavated in the Western Terrace area of 12Hr520. Two of these pits contained Early Woodland grit tempered sherds.

Pits

F8WT

This was a Woodland basin pit with dark soil, fire-cracked rock, wood charcoal, 39 very small flakes, and a concentration of rocks in the center and a layer of rock across the bottom.

F12WT

This was a steep-sided, flat bottomed Early Woodland basin pit. The feature was encountered directly outside Unit 305 as it was being added to Block C. Probably less than two centimeters of the top of the pit was removed by the trackhoe. The pit fill consisted of dark soil, burned nut shell, a moderate amount of wood, including several burned sticks at the bottom, many moderately large pieces of charcoal, and several charcoal concentrations, but there was no *in situ* burning. A cordmarked, grit tempered sherd, 24 pieces of chert, most of which was blocky and heat fractured, and heated sandstone were scattered through the fill.

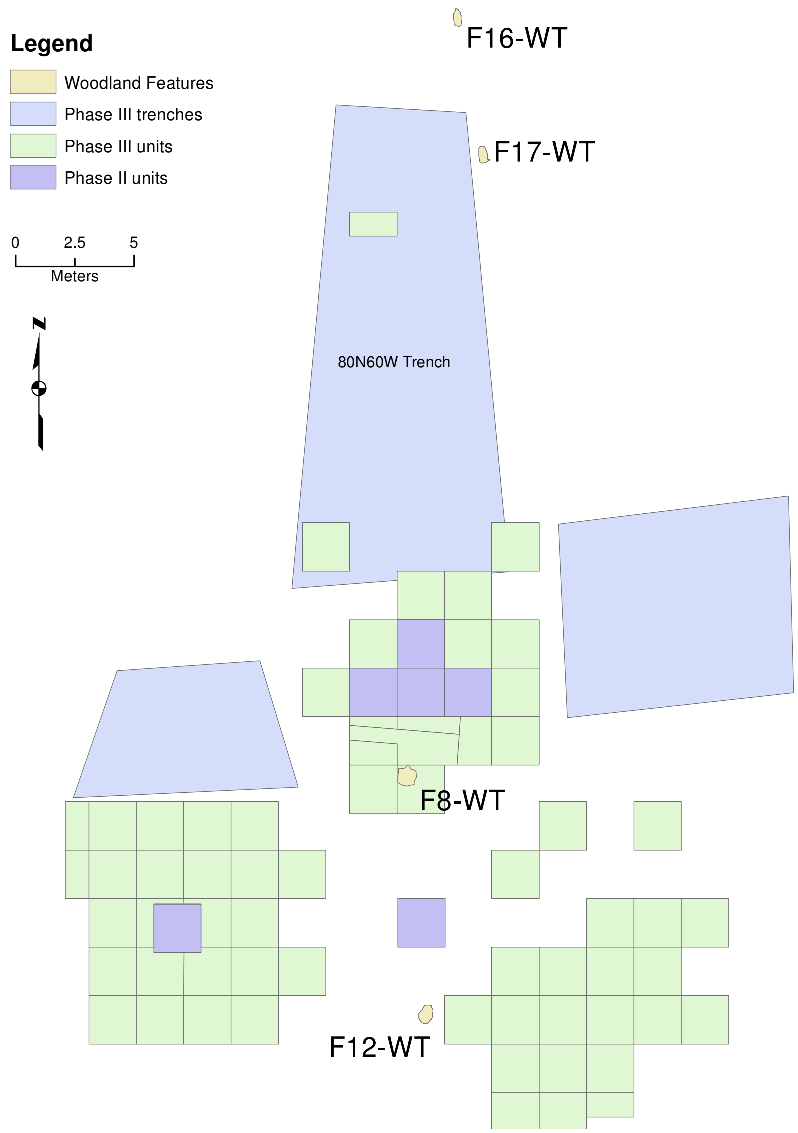

Figure 4.41. Location of Woodland Features.

F16WT

This probable Woodland feature consisted of moderate sized pieces of burned sandstone within lightly oxidized soil and one flake. Charcoal and several flakes were directly outside the periphery. A burned LA/EW point fragment was found at 32.5 cm bd about 80 cm west of the center of this feature.

F17WT

This Early Woodland feature was uncovered by the trackhoe while cutting a ramp. When first exposed the highest point of the feature surface was 28 cm bd and the lowest was 41.5 cm bd. Dark soil, burned sandstone, six small, grit tempered sherds, and six flakes were found. This is a basin pit with a rock lining and a light charcoal scatter.

SUMMARY

The archaeological deposits at the James Farnsley site exhibit a significant record of Early Archaic occupation between 10k and 8.3k rcybp. Over 300 features were excavated with the vast majority attributable to the Kirk, Thebes/St. Charles, and Early Side Notched components. The types and frequency of features present in each component clearly indicates functional differences in the occupations through time.

The largest numbers of features are in the Lower and Middle Kirk zones with much smaller totals in the other occupations (Table 4.1). Despite the similarities in the density of features between the Lower and Middle Kirk the types of features vary substantially between the two. In the Lower Kirk oxidized rings are the most common type followed by surface hearths. Pits are also fairly common. In the Middle Kirk zone surface hearths and lithic scatters are the most common feature types. The abundance of lithic scatters along with the quantity of debitage in general indicates the importance of lithic reduction in this occupation. The exclusive presence of oxidized rings in the Lower Kirk occupation and higher frequency of pits suggests a functionally different kind of occupation compared to the Middle Kirk zone. Whether oxidized rings are smudge pits for curing hides or not they clearly represent a different functional class of feature. The heating associated with surface hearths is typical of both of these Kirk occupations.

A few Kirk features are present on the sloping bank of the river. In at least one case a feature pre-dates the initial Kirk secondary deposits thrown down the embankment. These features reflect short term use of areas close to the river channel. Lithic reduction or tool repair is the most common activity as reflected in the lithic scatters exposed in this area. But an intensively used hearth (an atypically complex series of deposits compared to most surface hearths found in the Kirk component) was also present on the bank as well as a surface hearth.

The Upper Kirk zone is a much more ephemeral occupation and similar to the earlier Thebes/St. Charles and Early Side Notched components with very few features and most of these are surface hearths.

The other components reflect more ephemeral short-term occupations compared to the Lower and Middle Kirk zones. The Thebes occupation on the western terrace is a fundamentally different type of occupation with the presence of only lithic scatters for all intense and purpose. No hearths were found in this area. The lithic scatters represent different stages in the reduction process but primary reduction was an important activity as reflected in the presence of hammerstones, raw material, early stage bifaces, and piles of debitage. Muldraugh chert is by far the most common stone material in this area. The Thebes workshop represents a series of short-term knapping episodes where Muldraugh chert was procured from the nearby bluffs and tools were roughed out on the then bank of the Ohio River. The lack of heating facilities suggests either a warm weather occupation or the location was not occupied overnight.

The St. Charles zone which underlies the Kirk zone is characterized primarily by either small lithic scatters or scatters of shale. One surface hearth is also present. Again these features reflect a series of short-term occupations involving late stage lithic reduction perhaps tool repair. The function of the shale scatters is unknown.

In contrast the Early Side Notch zone is characterized by heating facilities. The hearths appear to reflect more complex deposition than the largely simple surface hearths in the Kirk zone. Again, however, the small numbers of features scattered over various paleosurfaces suggest short-term ephemeral visits to this location. One hearth is contained in the point bar unit indicating that it was constructed very close to the channel of the Ohio River.

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CHAPTER 5

PROJECTILE POINT TECHNOLOGY OF A KIRK CLUSTER ASSEMBLAGE FROM THE JAMES FARNSLEY SITE (12HR520)

by

Mark Cantin

Over 2100 Kirk Cluster points were recovered from the James Farnsley site, making it by far the largest collection recovered from any single site in the Eastern U.S. The advantage of such a large collection, of course, is the presence of the full spectrum of variability which allows for refinement of typologies within the cluster. An attempt was made to reconcile the points recovered from Farnsley in terms of form and technology within existing Kirk typologies as developed by Coe (1964; also Daniel 1998), Broyles (1971), Chapman (1977; also Kimball 1996), and Justice (1987). These earlier analyses built upon and borrowed from one another in an effort to reach a typological consensus, as certain point types or attributes seemed to be common between sites. While morphological and technological variability was recognized within and between defined types in these earlier studies, the range of variability combined with relatively small assemblages rendered the placement of dissimilar stylistic forms within a point type continuum difficult. As such, components of typologies from individual Kirk sites are sometimes not directly comparable, and at worse, conflicting. In short, a comprehensive, standardized Kirk typology has yet to be developed. Regional variation and quality of lithic resources may be at least partially responsible.

However, only four Kirk subtypes defined by morphology and technology seem to consistently occur at Farnsley. We designate them as Kirk Corner Notched Large (Kirk Large), Kirk Corner Notched Small (Kirk Small), Stilwell, and Pine Tree. The overwhelming majority of Kirk Cluster points recovered were of the Pine Tree form (n=1415, 75% of those identifiable to type). Justice (1987) and Smith (1986) posit that Pine Tree is a resharpening morphological *variant* of Kirk Corner Notched large type. While we classify a certain subset of larger Kirk points that through resharpening approach a Pine Tree morphology, we contend that Pine Tree is a legitimate and unique stylistic and technological *type* autochthonous to south-central Indiana. Kirk Small, Kirk Large, and Pine Tree co-occur in levels at Farnsley, though Stilwell seems to occur later in the temporal sequence.

KIRK TYPOLOGIES

The term "Kirk" as used in reference to a prehistoric culture, projectile point form, and a lithic tradition, was first defined by Coe (1964) from data recovered at the Hardaway site (31St4) in North Carolina (Coe 1964). The Kirk Corner Notched Cluster represents an Early Archaic lithic tradition with radiocarbon dates that generally fall between 9500-8900 rcybp. (Justice 1987:71), though outliers are recognized. Kirk Cluster material is found through much of the eastern U.S, especially in the Midsouth and Southestern regions (North Carolina, South Carolina, Virginia, West Virginia, Tennessee, Kentucky, Ohio, and Indiana). Significant Kirk-dominated sites, with carbon dates, include:

- Hardaway, 31St4, Stanly County, North Carolina (Coe 1964; Daniel 1998)
- St. Albans, 46Ka47, Kanawha County, West Virginia, 9850 ± 500 BP to 8850 ± 320 BP (Broyles 1971)
- Icehouse Bottoms, 40Mr23, Monroe County, Tennessee, 9450-8850 BP (Chapman 1973, 1977)
- Rose Island, 40Mr44, Monroe County, Tennessee (Chapman 1975)
- Bacon Farm, 40Ld24, Loudon County, Tennessee (Chapman 1978)
- Pine Tree, Limestone County, Alabama (Cambron 1956)
- Longworth-Gick, 15Jf243, Jefferson County, Kentucky, 9490-8440 BP (Collins 1979; French 1998)
- Swans Landing, 12Hr304, Harrison County, Indiana (Smith 1986; Cantin 1986; Mocas & Smith 1995)

The Kirk Cluster, as organized by Justice (1987), encompasses several defined types, including Kirk Corner Notched, Palmer, Pine Tree, Charleston, Stilwell, and Decatur. In the grossest of definitions, the common attributes of specimens are: corner notching; barbed blades; mucronate or acuminate tips (Cambron & Hulse 1983); and are typically basally ground and very often serrated. Blade shapes range from excurvate (Kirk Corner Notched) to parallel, incurvate, or recurvate (Pine Tree) to straight (Palmer). Individual point blade shape is dependent on the stage of reworking within different trajectories. In chronological terms, most analysts agree that early forms included Palmer and Charleston, with a trend toward larger forms through time.

Not all of these types are present at the Farnsley site, and some of the lines between types tend to blur within the continuum of variation as expressed within the 2100+ point assemblage. In this chapter, a revised Kirk Cluster typology is presented, though it is recognized that the typology may only be germane to the middle Ohio Valley of Indiana and Kentucky. Most of the distinctions are technological and a few are stylistically based, and only one type—Stilwell—appears to be chronostratigraphically distinct from the others. Pine Tree, a minor Kirk variant elsewhere in the Southeast, is the dominant form. Though Justice (1987) and Smith (1986) posit this variety as a Kirk resharpening variant, we propose that it is a stylistically and technologically unique and valid type, and perhaps may be autochthonous to Indiana and the Mid Ohio Valley. This typological development will be framed within the context of the history of Kirk investigations.

HISTORY OF KIRK SITE INVESTIGATIONS

Hardaway Site (31St4)

The Hardaway site is located in Stanly County, North Carolina, on a blufftop overlooking the Narrows region of the Yadkin River valley (Coe 1964). Surface collections began as early as 1937. Small test excavations were conducted in 1948 and 1951, while larger data recovery projects were performed in the late 1950s and late 1970s to 1980. Amongst numerous point types recovered (notably Dalton and Hardaway), Coe defined two point types: Palmer (n=24) and Kirk Corner Notched (n=72).

Palmer points, named after the nearby Palmer Mountains (Coe 1964:57), have small triangular blades, diminutive barbs, and "pointed" (non-mucronate/acuminate) tips. They are corner notched forms, and notches are often rounded and "open"—that is, the barbs do not extend the length of the haft element. Perhaps the most diagnostic technological attribute, according to Coe, is the omnipresence of basal grinding.

Kirk Corner Notched points, the name taken from a nearby historic colonial homestead (Coe 1964:57), are larger, with broad excurvate to triangular blades. Notches are broad and open, resulting in a planform that almost appears more stemmed than corner notched. Blade rejuvenation is readily apparent in the more stemmed specimens, and results in the exaggerated isolation of the shoulders to form stubby barbs that flare out as opposed to down the length of the haft. The true corner notched examples have very short, pointed barbs. More narrow points exhibit quasi-collateral flaking across the face. Significantly, Coe noted that this form was not basally ground, distinguishing it from Palmer. Coe saw these as very distinct point "clusters", which was reinforced by site stratigraphy.

Identified at Hardaway were four cultural zones through 28 stratigraphic inches, designated Zones I through IV, from top to bottom. From this stratigraphy, Coe posited an early Holocene point seriation. The plowzone, Zone I, contained post-Early Archaic materials, including ceramics as well as points such as Kirk Stemmed/Serrated, Stanly, and Morrow Mountain. Kirk Corner Notched points were predominant in a particularly dense and discrete deposit designated as Zone II. While a few Palmer points were found in the Zone II deposit as well, Palmer points were more prevalent in the underlying Zone III, which was a lighter-density, ephemeral deposit (which also contained a few Kirk Corner Notched examples). Coe suggested an age of ca. 8000 years for this type. Zone IV was a Hardaway-Dalton occupation that Coe speculated to be on the order of 10,000 years old. Coe suggests that Palmers are earlier than Kirk Corner Notched points, and notes a trend toward an increase in size through time.

I. R. Daniel, Jr. (1998) conducted a reanalysis of Hardaway materials. He found that the presence/absence of basal grinding was not an absolute temporal indicator. Like Chapman would do for the Tellico sites (see below), Daniel also used the incidence of basal grinding in conjunction with basal shape, defined by him as straight or excurvate. He made the distinction between Palmer and Kirk Corner Notched on a ratio between basal height and basal width, and found that Palmer was "stubbier"—a shorter haft height relative to the wider base. In general, he established that Palmer points had a basal width twice that of the haft height.

It should be noted that the Pine Tree form *as defined in this study* was not identified by name in the Hardaway assemblage by Coe (1964) or by I.R. Daniel, Jr. (1998), who would later reanalyze and reinterpret Coe's data (see below). The current analyst re-examined photographic plates provided in both reports in order to detect Pine Tree forms of the mid-Ohio River valley that may have been classified as another type. However, no Pine Tree points were represented in either study by name, or in form or technology.

Pine Tree Site

The Pine Tree site, located in Limestone County, Alabama (Cambron 1956), was named after a distinctive Christmas tree-like point form that was recovered in abundance in collections and excavations. Its association within the Kirk Cluster was not immediate as it is not an overly common Kirk form in the Southeast. For example, apparently no Pine Tree points were identified in Coe's (1964) Hardaway site study. Indeed, the Pine Tree form appears to have a patchy distribution.

The Pine Tree forms described by Cambron (1956; also see Cambron 1964, Perino 1968) are similar to those found in Indiana, but not likely identical in terms of morphology or technology. Cambron (1964:104-105) describes two forms of Pine Tree: Pine Tree and Pine Tree Corner Notched. The former (Cambron 1964:104) is characterized as a medium-sized, side notched, serrated point. The shoulders are narrow, tapered, and expanded. The broadest part of the point is along the base. Side notching of the haft results in an expanding stem, and notches are broad and "open". The base is thinned and concave. The blade is recurvate and shows evidence of initial broad, random percussion flaking which was finished/shaped by refined pressure flaking to form a medial ridge and installation of a serrated edge.

The corner notched form (Cambron 1964:105) is similar other than the obvious notching reference. This is a barbed form with incurvate (rarely straight) blade edges (the lone illustrated example shows very stubby, outswept barbs). Stem edges are usually straight, and the base can be straight to convex. The base is usually thinned and light basal grinding "may be present". The blade face shows random flaking initially, followed by collateral flaking which resulted in "regular serrations".

St. Albans Site

The St. Albans site (46Ka47) is a buried/stratified site exposed in the bank of the Kanawha River, Kanawha County, West Virginia (Broyles 1971). Excavations of this site by Bettye Broyles resulted in the first real structuring of the Kirk Cluster typology, as over 200 Kirk Cluster points were recovered (10 Charleston, 25 Kirk Corner Notched Small, and 179 Kirk Corner Notched Large). Perhaps most significantly, from the stratified sequences, Broyles proffered a Kirk sequence from Charleston (earliest) to Palmer to Kirk Corner Notched. She also noted that many St. Albans' Palmers were *not* basally ground, contrary to Coe (1964).

Broyles (1971:56-57) defines Charleston points and illustrates eight in her report. Only three are from St. Albans proper, the others being from Boone County, West Virginia. She accredits them as being small to medium corner notched points with oblique flaking and serrated edges. The blade is recurvate largely due to expanded barbs which in her estimation are generated by blade reworking. Initial flaking is random over which an oblique patterning is applied, which meets to form a medial ridge and the blade is heavily serrated. The stem is expanding, and the edges are usually straight or slightly convex, and the basal margin is flat or convex. Bases are thinned and "smoothed" or only lightly ground, with smoothing limited to the very basal margin. Most characteristically, the blade axis is off-center, resulting in an asymmetric "lopsided" planform. Broyles acknowledges the similarity between the Charleston form and Pine Tree, but remarks that the former are wider and shorter, though thickness is comparable. Though Broyles does not expressly state this, from her illustrated forms, it is evident that the widest part of many of the Pine Trees is across the barbs, not across the base as in Cambron's Pine Tree points. Broyles (1971:26) reports a radiocarbon date of some 9850 ±500 rcybp (M-1827) for the Charleston deposit, Zone 36.

The Charleston points illustrated by Broyles (1971:56) would fit in nicely with the James Farnsley assemblage. However, we have declined to use that term and would classify each of these as Pine Tree points. Furthermore, the three points represented from St. Albans would be marginal Pine Trees in our definition. The other five—*not* from St. Albans—appear to be classic Pine Tree points by our definition. All are in advanced stages of reworking, and this may be significant as explained later.

Broyles (1971:28) chose not to adopt Coe's (1964) term "Palmer" for a smaller Kirk variant recovered at St. Albans (n=25) in the "Lower Kirk" horizon, Zone 20. Instead, she chose to designate these as Kirk Corner Notched Small variety (Broyles 1971:62-63). These points were metrically and morphologically similar to Coe's Palmer type, but lacked the basal grinding, which appears to be the only major distinction. Otherwise, Coe's Palmer and Broyles' Kirk Small each have: generally triangular blades with straight to slightly excurvate edges; initial random flaking over which finer chevron pressure flaking was applied; fine regularly spaced serrations; open corner notches with short but pointed downswept barbs; with the widest portion of the point across the base, which is usually straight, but from photo plates can be slightly concave or convex. From the Zone 20 deposit bearing this form, Broyles reports a carbon date of 8930 ±160 BP (Y-1538; Other unpublished Zone 20 dates: M-1824, 8520 ±300 BP; M-2291, 9330 ±330 BP).

A third major Kirk variant was identified by Broyles (1971:64-65), which she designated Kirk Corner Notched Large Variety. Stratigraphically, they were recovered from Zones 18 and 16, the "Middle Kirk" and "Upper Kirk" horizons. This was the most commonly recovered of the Kirk Cluster points, as Broyles had 179 available for analysis. This point type has a large triangular blade that shows broad, random percussion flaking over the face, with considerable pressure flaking restricted to the blade margin to both shape the point and install a rugged series of serration. The blade face is flat and there is no medial ridge. It is corner notched and slightly barbed (many were more “shouldered”), and as such, these notches tend to be broad and open, almost appearing more as an expanded stem form. Bases are usually straight to occasionally slightly concave, and usually smoothed or lightly ground. The widest part of the point is often across the base. Two dates are represented for this type, one from Zone 18 at 8850 ±320 BP (M-2294), and the other from Zone 16 at 8800 ±320 rcybp (M-2289).

Broyles (1971:64) presents 13 Kirk Large points in a photo plate. At least five and as many as nine of these we would designate as Stilwell (Perino 1970:119-121, 1971:94-95; Justice 1987:72-77), which are described in a later section. Another of her Kirk Large points (extreme lower right) would possibly qualify as a Pine Tree in our definition. Several show asymmetry in the blade axis as well.

Of course, Kirk Cluster points were not the only types recovered at the St. Albans site. Above the Kirk were sundry bifurcate horizons as well (from bottom to top: St. Albans, LeCroy, and Kanawha). Few bifurcates were recovered at the Farnsley site, and they were confined to the upper 30 cm of the deposit.

The Tellico Sites

Several Little Tennessee Valley sites with significant Kirk deposits were excavated by Jefferson Chapman in the 1970s, including Rose Island, Icehouse Bottoms, and Bacon Farm (Chapman 1975, 1977, 1978, respectively). Chapman made a considerable effort in reconciling the various point types from the Tellico sites—as well as those of earlier-published literature (e.g., Coe 1964 and Broyles 1971—within a technological framework, trying to elucidate the temporal and technological relationships of each. Chapman (1975:114), then, is credited with the initial construct of the Kirk “Cluster”, which recognized variation and similarity of genetically related types through time and space.

Rose Island (40Mr44)

At Rose Island Monroe County, Chapman (1975:114-118, 120-123) defined five Kirk “variants” amongst the 28 points and conceptualized these within a “cluster”. Many of these were smaller forms, and were for the most part distinguished by basal morphologies (convex, concave, and straight). Significantly, presence or absence of discrete traits such as basal grinding or serration were *not* used as diagnostic criteria for assignation of the variants; that is, within a single variant, some forms may be basally ground while others are not.

Chapman (1975) generally followed Broyles’ Kirk Corner Notched Large/Small nomenclature, though he retained Palmer (n=10) as an analytical unit, though did not expressly attach this type to the Kirk Cluster. One Decatur point was recovered as well. Most of the Rose Island Kirk points were smaller varieties. The majority of these points were straight-to-excurvate bladed and were often serrated. They were broadly corner notched with short-but-pointed barbs, giving more an expanded stem appearance to some specimens. These are quite similar to the Farnsley Kirk Corner Notched Small variety. However, his Variant 3 (of which all four representatives were broken) could be *similar* to the Pine Tree type recovered at Farnsley. It should be noted that no reference is made to Pine Tree points as being recovered from Rose Island. Points from his Variant 4 are similar to what is defined as Kirk Corner Notched Large at Farnsley. Short descriptions are as follows:

Variant 1 (n=7). Triangular blade, excurvate edges, over half are serrated, slightly excurvate base, and two were basally ground.

Variant 2 (n=7). Triangular blade, excurvate and serrated edges, incurvate base, and three were basally ground.

Variant 3 (n=4). Would be large points, but all were broken. All have excurvate bases, and three were basally ground.

Variant 4 (n=8). Blade is triangular with straight to excurvate edges, one was incurvate, and two were serrated. Bases are straight to incurvate, and two were basally ground.

Variant 5 (n=2). Triangular blades with excurvate edges, side notched with unfinished bases.

Palmer points are described by Chapman as having a narrow triangular blade with deep serrations. Bases are straight to incurvate, and are heavily ground, with maximum point width along the base. Ironically, though Palmer is cited as the ancestral Kirk form (Coe 1964), only one of the ten Palmers recovered at Rose Island were contained within the Kirk horizon. The remaining points were distributed in the overlying Bifurcate levels. Chapman (1975:121) parries this by noting while there were 19 Palmer points and nine Kirk Corner Notched points recovered from Level III at Hardaway, this level was an arbitrarily defined analytical unit, and that Coe's published work does not include data from 1958 onward—implying that Palmer points are not necessarily earlier.

Ultimately, Chapman (1975:122-123) asserts that a short temporal span covers all the attribute changes between Charleston, Palmer, and Kirk Corner Notched forms, and that the Palmer-to-Kirk transition should be viewed as a continuum. Chapman (1975:122) also notes that the Rose Island Kirk horizon (Strata VIII and XI) radiocarbon date of 9330 ±250 BP is temporally close to St. Albans Zone 20, when all sigmas are taken into consideration.

Icehouse Bottoms (40Mr23)

For the Icehouse Bottoms assemblage of Monroe County, Chapman (1977:25, 52-53) intentionally "split" the numerous morphological and technological point forms to shake out any temporal and spatial trends. This would enable him to later "lump" seemingly disparate types, and to dispense with (or perhaps more accurately, to readdress) a host of type names clogging the literature.

The initial sorting was done on the presence/absence of basal grinding. In all, some 181 points were examined from the Kirk horizons. Chapman (1977:41-51) designated 14 "categories" of Kirk Cluster points sharing different arrays of attributes. Categories 24 through 35 were designated as "Upper Kirk". Categories 37 and 38 were designated as "Lower Kirk" (the intervening Category 36 was Hardaway). Only in the Lower Kirk was basal grinding considered to be stratigraphically diagnostic. Points of the Lower Kirk were virtually limited to deeply corner notched, straight-to-excurvate ground-based forms. There was considerably more variety in forms and the presence/absence of basal grinding in the Upper Kirk levels (Chapman 1977:123-124).

Of the fourteen categories designated within the Kirk Cluster, only six are overtly labeled as Kirk variants, which accounts for 101 of the 181 points. These are: Category 24, Kirk Corner Notched, Large (n=30); Category 25, Kirk Corner Notched, Small (n=21); Category 26, Kirk Corner Notched, Narrow variety (n=1); Category 31, Kirk Corner Notched, small to medium variety, basally ground (n=28); Category 33, Kirk Corner Notched, Small variety, basally ground; and Category 35, Decatur (n=8).

Table 5.1 displays the various categories and the incidence of the discrete traits of serration and basal grinding, along with Chapman's comments as to similarity to other types within the Kirk Cluster.

Ultimately, Chapman concluded that there was considerable variation within the Kirk continuum. While he formally did not reorder the nomenclature within the Kirk Cluster, he successfully streamlined it with this recognition, setting the table for future investigators.

Like Broyles (1971), Chapman (1977:51) found that Charleston and other deeply corner notched points such as Plevna (DeJarnette et al. 1962:66; Cambron and Hulse 1969:97) and Lost Lake (Cambron and Hulse 1969:46) came first in the Kirk sequence. In our experience, the latter two types would be classified within the Thebes Cluster (Justice 1987:54-60).

Chapman (1977) has no explicit Pine Tree category, though he makes historical references to the type. His Categories 24 and 25 show some similarity in form, though the illustrated types generally lack deep corner notching. His Category 38 forms do have deep corner notching, but lack other Pine Tree stylistic elements. Several of the Ice House Kirks, regardless of category, reflect some Pine Tree-like reworking, but few—if any—appear to have true Pine Tree technology. In total, he illustrates no forms that are identical to the Pine Tree type recovered in abundance from the Farnsley site.

Bacon Farm (40Ld24)

Chapman (1978) excavated yet a third significant stratified Kirk-bearing site, the Bacon Farm site (40Ld35), located on the first and second terraces of the south bank of the Little Tennessee River, in Loudon County. Chapman (1978:37) divided the 98 Kirk points into two populations, Large (n=54) and Small (n=44). This distinction was made on basal width as it was thought to be immutable, whereas blade metrics were subject to

Table 5.1. Summary of Chapman's Icehouse Bottom Kirk Cluster classification.

Category	Name	N	Serrated %	Basal Grind %	Comments
24	Kirk CN Large	30	80	40	Similar to Pine Tree
25	Kirk CN Small	21	86	0	Similar to Palmer but unground
26	Kirk CN Narrow	1	100	0	Reworked Cat. 25
27	Small corner notch, excurvate base	8	62.5	0	Similar to Cat 32 but unground
28	Deep CN, excurv unground base	6	100	0	Similar to Cat 38 but unground
29	Deep CN, straight & unground base	8	87.5	0	Similar to Cat 28 & 38
30	Corner Notched, small excurv base	9	66.7	33.3	
31	Kirk CN small-medium	28	78	100	Similar to Palmer
32	Small CN, excurv & ground	5	100	100	Similar to Cat 27, but ground
33	Kirk CN Small, ground	13	100	100	Similar to Cat 25, Palmer
34	Corner Notched, asymmetrical flake	5	20	Unspecified	Unfinished?
35	Decatur	8	Unspecified	NA	Burinated bases, but ground notches present
37	Pseudo-Side Notched, Squared Basal Tangs	4	100	100	Related to Cat 38
38	Deep CN, straight-excurv ground base	35	60	100	

CN=corner notched; Excurv=excurvate

change due to rejuvenation. As with Rose Island and Icehouse Bottoms, Chapman wanted to test the hypothesis that smaller Kirk forms tended to be earlier than larger forms.

Once the Large/Small dichotomy was established, Chapman (1978:37, 50-54) subdivided the points into three basal-treatment categories, also designed as a potential diachronic test. The categories were unground base, abraded base (likely a vestige of edge preparation only), and ground base (displaying intentional grinding beyond that expected in simple edge preparation). Table 5.2 is a breakdown of the Bacon Farm forms.

Chapman (1978:54) concluded that (1) there was some stratigraphic evidence that larger forms came temporally later than earlier forms and (2) the incidence of grinding was not a temporal marker. In fact, the higher incidence of grinding on supposedly later Kirk Large forms flies in the face of Coe's (1964) hypothesis that all early Palmer forms are ground, with this attribute tailing off in subsequent assemblages.

Table 5.1. Basal treatment of Kirk cluster points at Bacon Farm.

Form	Treatment	N	% of Form
Kirk Corner Notched Small		*44*	*100.0*
	Unabraded	13	29.5
	Abraded	17	38.6
	Ground	14	31.8
Kirk Corner Notched Large		*54*	*100.0*
	Unabraded	12	22.2
	Abraded	18	33.3
	Ground	24	44.4

Once again, no forms identical to that defined as Pine Tree at Farnsley were represented in illustrations of points recovered at Bacon Farm. Those forms with Pine Tree-like resharpening and serration are not deeply corner notched, and rather have short, stubby barbs. Though resharpening processes obviously skew the original shapes of the points, it may be that Chapman's Kirk large forms are widest at the base, while the Kirk Small examples appear to be widest at the shoulder.

Kimball's Tellico Reanalysis

Larry Kimball (1996:157-159) conducted a cluster analysis of Kirk point metrics, and verified a continuum of haft size used to differentiate between sundry Kirk forms, and indicated there was no real temporal progression from Palmer to Kirk Corner Notched, at least at the Tellico sites. As others had noted, he found that while virtually all earlier Kirk forms were basally ground, some, though not all, of the later Kirk points were ground, thus dispensing with grinding as a diagnostic temporal property.

At Icehouse Bottoms, Kimball (1996) defined the lowest levels as Lower Kirk which contain Lost Lake, Plevna, and Charleston points. All are characterized as large-haft points with excurvate bases which were always ground. The Upper Kirk consisted of two successive sequences from Kirk Corner Notched Small/Palmer (Pine Tree too) to Kirk Corner Notched Large varieties, all of which could be basally ground or not.

Kimball (1996) correlated Kirk sequences from Hardaway and St. Albans to the pattern documented at Tellico to form a regional Kirk model. Small-haft Kirks were more common in the earlier part of the Upper Kirk at Bacon Farm. At Icehouse Bottoms, larger Kirks prevail in late Kirk zones (i.e., Lower Kirk to Upper Kirk small variety to Upper Kirk large variety). Kimball argues that Tellico Lower Kirk is equivalent to Broyles' (1971) Charleston levels. The Tellico Upper Kirk small variety would correlate to Broyles' Kirk Corner Notched Small variety, while the Large Upper Kirk would correspond to her Kirk Corner Notched Large variety. He also acknowledged a problem with the temporal relationship between the Kirk Cluster and Early Side Notched Cluster forms.

Longworth-Gick

The Longworth-Gick site (Collins 1979; French 1998), 15Jf243, is a stratified site located on an Ohio River floodplain ridge within a few kilometers of the James Farnsley site, near Louisville, Kentucky. Thirty nine Kirk Cluster points were recovered (seven Palmer, 32 Kirk Corner Notched Large). Collins documents a general trend from small to large Kirk forms through time.

In Collins (1979) analysis, six categories of aggregate point attributes were designated, though some of these categories consist of single specimens, at times fragments at that. Summarized descriptions of his first three forms are provided below. The remaining classes consisted of single items of broken or heavily reworked specimens.

Expanding Stem 1 (n=7). This form is similar to Chapman's (1975) Variant 4 from Rose Island. It has small but prominent barbs that slightly flare, and represent the widest part of the point. The blade is straight-triangular to recurvate. Illustrated examples show collateral flaking along the margins. The bases tend to be incurvate, and notches are narrow, parallel, and deep. It is similar to Coe's (1964) Palmer and even his Kirk Corner Notched, though Coe's Kirks are larger and his Palmers have straight bases. This form occurs below large Kirk horizons, like St. Albans (Broyles 1971). This form is also common at Farnsley, a form we would designate as Kirk Corner Notched Small.

Expanding Stem 2 (n=7). Collins simply calls them Kirks, though at Farnsley they would be called Kirk Corner Notched Large. Blades are straight-triangular to recurvate. Blade length is about twice that of blade width. Edges are bifacially serrated, and the serration preparation flakes share a common point for their platform. They have well-defined short downswept barbs which flare from the blade. Serration extends along the length of the barb. Percussion flaking is preserved on the blade face. Bases are straight to slightly incurvate, and the stems are straight. All were basally ground. Notches are broad and open. They are similar to the Kirk Corner Notched form described by Coe (1964:70-71) and Chapman (1977:42).

Expanding Stem 3 (n=13). This form is similar to Expanding Stem 2 described above, though larger. Blades are long, almost lanceolate. Broad percussion flakes are preserved on the face, though the margins show considerable pressure flaking and serration. The shoulders are barbed and can flare out, or can be downswept essentially serving as part of the blade. The notches are broad and open. The base is usually incurvate. Collins equates these to Kirk Corner Notched as defined by Coe (1964:69-70) and Chapman (1977:42). At Farnsley, these would be classified as Kirk Corner Notched Large or Stilwell.

Any of the points illustrated would fit well into the James Farnsley site assemblage. It is interesting to note that no Pine Tree forms as defined within this report or any other were illustrated, described, or otherwise referred to.

Haw River

Claggett and Cable (1982; Cable 1982) report on the Haw River site (31Ch29) in North Carolina, which contained three Kirk strata in a Holocene alluvial terrace. The lowest of these was dominated by Palmer points; the upper two were Kirk Corner Notched. As originally identified by Coe (1964) and Chapman (1977), an increase in the breadth of the Kirk blade and haft is recorded through time, as well as a reduction in the incidence of basal grinding. However, as this was viewed as a continuum on a single stylistic theme, Cable (1996:112) suggested dropping the term "Kirk", especially since it was a term also related to much later stemmed/serrated forms.

While Cable (1996:112) advocates a Palmer-to-Kirk continuum, he argues that Kirk Corner Notched Small is a form disparate from Palmer in terms of metrics and morphology, and represents something of a "size reversal" in the general trend toward larger forms through time in the Kirk Cluster. Relative to Palmer, Kirk Corner Notched Small is characterized by an axial shortening of the blade, narrower shoulders, broader notches, and a higher incidence of excurvate bases, with less frequency and intensity of basal grinding. Cable counters the proposal by Chapman (1975) and Anderson and Sassaman (1990) for the elimination of the Palmer taxon stating that this does not resolve the stratigraphic and typological variability at Haw River. In lieu, Cable (1996:112) proposes to call "Kirk" for the smaller Kirk forms at Haw River, and retains "Palmer" for the small and large varieties of long-bladed, wide-shouldered, squat-hafted straight-based forms.

Taylor Site

The Taylor Site (Michie 1996) is located on the surface of a terrace along the Congaree River of the Coastal Plain of South Carolina. Excavations recovered 56 Palmer points. These are small points with broad and shallow notches, though they appear in a photo plate (Michie 1996:252, Plate 12.2) as being more side notched than corner notched. The bases are concave, and are almost auriculate. The blades are short, relatively broad, triangular (all from reworking?) and serrated. This form is dissimilar to other Palmer representations known to the author, and unlike any Kirk forms that occur in the Midwest. No radiocarbon dates were provided.

Nettling Site

The Nettling Site is located near London, Ontario, on the modern Lake Erie shoreline (Wortner et al. 1990; Ellis et al. 1991). Approximately 150 Kirk Cluster points have been recovered from surface collections and limited test excavations. They appear to be predominantly Kirk Large and Small variants; no Pine Tree forms were discernible.

Ashworth Site

The Ashworth Site (15Bu236) is a rockshelter occupation located on Floyd's Fork of the Salt River in Bullitt County, Kentucky, about 20km southeast of the Farnsley site (DiBlasi 1981). It contained a stratified sequence of cultural deposits. Stratum C was an Early Archaic horizon which yielded fifteen points termed "Ashworth" by Diblasi (1981:48-54). Upon review of line drawings furnished in Diblasi's thesis, the Ashworth points appear to be technologically indistinguishable from Pine Tree points as defined in the present study. Being a rare Kirk rockshelter site, it is significant in reconstruction of Kirk landuse patterns, and very possibly could have been occupied by Farnsley populations. Two features were identified, both small unprepared surface hearths with associated rock and lithic reduction debris. A radiocarbon date of 6970 ±300 BP (RL 1552) was obtained, and clearly too recent to be a Kirk date.

Swan's Landing

The Swans Landing site (Tomak 1982; Smith 1986; Cantin 1986; Mocas and Smith 1995), 12Hr304, is a stratified Kirk site situated within the caving bank of the Ohio River in Harrison County, Indiana, downstream from Farnsley. The site was first brought to the attention of the professional archaeological community by avocationals whom collected hundreds if not thousands of Kirk points which were eroding from the bank. The predominant form was of the Pine Tree style.

From the 1986 excavation, Smith (1986) describes three Kirk forms: Kirk Corner Notched Small (n=10), Pine Tree (n=11), and Charleston (n=1). In the Farnsley typology, these might be reclassified as 11 Pine Tree, ~8 Kirk Corner Notched Large, and ~3 Kirk Corner Notched Small. The 1995 excavations (Mocas and Smith 1995) were directed at another portion of the site, but seven Pine Trees and one generic Kirk point (small?) were recovered. It is often difficult to tell from illustrations if they are "true" Pine Tree *types* (that is, in the technological sense), or resharpened Pine Tree forms.

Mocas and Smith (1995:101-105) state that Pine Tree may be a "style" more so than a true "type", given the range of variation within the Kirk Corner Notched Cluster. Subscribing to Justice's (1987) analysis, they perceived Pine Tree to be a resharpening variant of both Kirk Corner Notched and Charleston, with the resultant Pine Tree form reflecting efforts at maintaining blade length. In the Farnsley analysis, we believe that certain Pine Tree forms reflect a stylistic type, though we agree that the Pine Tree morphology can be arrived at by reworking of originally non-Pine Tree forms.

Summary

Point forms broadly classified within the Kirk Cluster are common throughout the eastern United States, especially in the Southeast. However, there appears to be a broad range in morphological types, and specific forms may be regionally based. While several significant attempts have been made to establish a unifying Kirk Cluster typology, consensus on what constitutes an individual type (e.g. Palmer or Pine Tree) has yet to be achieved. While Coe (1964) proposed basal grinding as a diagnostic discrete trait for Palmer at Hardaway, other Palmers or Palmer-like forms lack this attribute at other sites. As inferred from stratigraphically defined occurrences at Hardaway, Palmer was purportedly ancestral to later Kirk forms—yet Palmer types are known to occur in or even *above* some Kirk-bearing levels elsewhere. The same temporal paradox is true for Charleston points throughout the Southeast. Indeed, as will be shown, it is uncertain what actually defines a Charleston, and for that matter, Palmer as well. Palmers as defined in the Southeast do not appear to be the same form as what is loosely called Palmer in the Midwest. Indeed, there seems to be a trend through time to stray from the Palmer taxon altogether, supplanting it with the more generic and "lumped" Kirk Corner

Notched Small variety. All attempts at lumping and splitting and redefining have yet to reconcile the Kirk Cluster nomenclatural problem. The problem may be that it is not a resolvable issue. There is tremendous regional variability, compounded by temporal incongruities/perturbation.

With over 2100 Kirk Cluster points recovered, the Farnsley assemblage appears to be *three times larger* than all the Kirk points from all of the major sites *combined*. One obvious advantage to this assemblage is that all stages of a point type's lifespan should be represented, as well, as the range of variability that may be expressed within a particular regional subset of Kirk types. As will be established in later discussions, point forms recovered from the Farnsley site show great variation within designated types which can occur in compressed amounts of time.

JAMES FARNSLEY SITE KIRK CLUSTER TYPOLOGY

With over 2100 Kirk Cluster points in the Farnsley assemblage and no firm consensus as to typological issues, one goal of this analysis was to reconcile the Farnsley types within existing parameters of the Kirk Cluster while simultaneously developing other criteria to distinguish diagnostic aspects not previously considered, aspects which were unique to the Farnsley assemblage (Figure 5.1).

In the Farnsley Kirk typology, only four types are recognized/defined: Kirk Corner Notched Large ("Kirk Large"; n=264, 14% of total assemblage identifiable by type), Kirk Corner Notched Small ("Kirk Small"; n=183, 10%), Pine Tree, and Stilwell (n=35, 2%). Definitions of each are technologically based. Defining these types strictly on the basis of morphology can be misleading as will be discussed. We do not acknowledge the Charleston forms as a valid type, at least at Farnsley. Rather, we see this as a broken and reworked Kirk Small or Pine Tree form, as the asymmetric Charleston style seems to cut across the two technologically defined types. Furthermore, so few Decatur-like forms were recovered that their numbers are virtually insignificant. The term "Palmer" was not used in this analysis. Palmer is a term used loosely in the Middle Ohio Valley for a smallish Kirk form. However, these forms are dissimilar to those called Palmer elsewhere in the Southeast. It also appears that the taxon and stylistic concept are not always evenly applied across Southeastern sites, with conflicting classification criteria regarding the presence or absence of basal grinding.

Attribute Analysis

Nineteen attributes from each of the 2100+ points were scored and entered into a database. Attributes included:

- Point condition (complete/base broken/blade broken)
- Haft type (corner notched, side notched, stemmed)
- Notch morphology (deep 'u' shape, rounded, squared)

Figure 5.1. All Kirk Cluster points from the James Farnsley site.

- Notch type (permutations of width and depth; broad/shallow, broad/deep, parallel/narrow/deep, parallel/narrow/shallow)
- Stem morphology (if applicable)
- Blade shape (recurvate, incurvate, straight, compound)
- Blade cross section (bi-convex, plano-convex, hexagonal, rhomboidal)
- Distal tip shape (acuminate/mucronate, pointed, rounded, absent)
- Distal fracture type (if applicable; straight/snap, impact, end shock, spiral, lateral/burinated, combination, other, shovel damage, not applicable)
- Blade serration (present/absent)
- Serration type ("notched", serial)
- Blade flaking type (parallel, random, parallel-over-random)
- Number of barbs present (0/1/2)
- Basal grinding (present/absent)
- Base shape (straight, incurvate, excurvate)
- Chert type
- Chert quality (relative to the particular chert type)
- Thermal alteration (present/absent)
- Point type

Most of these categories had "indeterminate", "other", or "not applicable" choices as well. A Comments section was also included to register any observations unique to a specimen. The Indeterminate category usually involved cases in which a point was fragmented and data could not be recorded. This category is factored out of ensuing discussions.

A large subset of points was subjected to low power microscopy (10X-45X; Zeiss Stemi 2000 binocular microscope). Microscopy was useful in the determination of chert type and usewear/polish patterns, but was principally used in the determination of serration type.

It should be noted that only relatively complete points were utilized in this analysis. There were a number of basal fragments that were not used as they could not be assigned to point type. In a similar manner, blade fragments lacking haft elements were not used as they could not definitively be ascribed as points.

Pine Tree Technology

The discussion in this section will be limited to those defined in a technological sense as Pine Tree points; that is, points where the technology used defines a stylistic type. The Pine Tree style as found at the Farnsley site involves a very specific technology derived from Dalton technology (Morse 1971; Bradley 1997). This is in contrast to the usual characterization of Pine Tree as a resharpened form. For example, Pine Tree has been defined by Justice (1987:79-80) as a resharpening variant of Kirk Corner Notched and Charleston forms. Resharpening is geared toward the preservation of blade length.

This discussion does not include various Kirk forms that have been reshaped to *resemble* the morphology of a Pine Tree. This analysis concludes that there are two different Pine Tree forms. The first is the technologically "true" Pine Tree, a particular form that is developed from an initial template through a very specific technological process discussed below. The second mode involves reshaping of a Kirk Large form to rejuvenate it. While the latter *resembles* a Pine Tree in planform, it is not *technologically/stylistically* a true Pine Tree. The following section addresses "true" Pine Trees only.

Pine Tree points are fashioned from a blade-like blank (Figure 5.2 and 5.3). The cross-section of a finished point would technically be biconvex, but upon closer scrutiny, it is asymmetrically biconvex. The ventral side has a shallow, flat radius and is broadly arcuate, whereas the dorsal side is more steeply pitched and approaches triangular in cross section, accentuated in further reduction by a medial ridge formed by serration preparation as discussed below. Pressure flakes detached on the flatter ventral face tend to carry across the entirety of the blade face more often, and are shallow in cross section. Pressure flakes detached from the dorsal face tend to terminate to form a medial ridge, as stated, and are deeper and more trough-like in cross section. It is possible in the early stages of reduction, the blade face was shaped and thinned through random percussion flaking. However, upon completion, any random percussion flake scars are obliterated by the parallel/chevron pressure flaking. The only regular exception to this is that the broad percussion flake scars are oft-times preserved in the area just above and lateral to the notch termini, above the basal thinning scars. This is typically the thickest part of the point as well.

The basal thinning scars usually extend to the top of the notches, with the longest of these flakes centrally located, and the shortest to the outside, for an arcuate planview. This thinning is usually confined to the central half of the base. The auriculate portions of the base are not thinned, but are often ground. They appear to have been basally thinned prior to notching, as the notches seem to cross-cut the thinning flakes. This thinning may be directly or indirectly responsible for the incurvate configuration of many

Figure 5.2. Pine Tree points (line=1 cm).

Kirk bases, rather than a set template designed to intentionally impart an incurvate base on the point form. Basal margins (n=1328 measurable) are most often straight (46%), but are also commonly excurvate (38%) and infrequently incurvate (15%). A few more than six percent are indeterminate.

Pine Tree points are almost always basally ground (93% of those determinable), with grinding extending to the tips of the barbs and within the notches. No distinction was made as to degree of grinding (heavy or light), or between grinding and abrading (sensu Chapman 1977). The tops of the barbs on some points show polish/wear/grinding as well. It is uncertain at present if this reflects actual grinding or usewear, and could represent binding materials that were strapped *over* the barbs. Bruce Bradley (personal communication 2003) noted that the Pine Tree haft element may have been too fragile to have supported a knife/saw function. However, if haft bindings were strapped over a portion of the barbs, this may serve to reinforce the haft and allow the function. Obviously, the bindings would have to stop short of the serrations which commonly extend along most of the length of the barb; otherwise, the serrations would shred those bindings.

Of those with measurable notches (n=718; 20% are indeterminate), almost all (92%) have parallel-narrow-deep notches. Other configurations include: broad-open-shallow 2% +; broad-deep-“rounded” 4% +; and parallel-narrow-shallow 2%.

Related to notches are barbs. The number of barbs *present* on Pine Tree points (n=1412): none, 29%; one, 43%; and both, 27%. Seventy-three percent, therefore, have some barb breakage. This is not that surprising, giving their gracile nature. The barbs could be multifunctional, serving as a blade extension for cutting/sawing activities or as a mechanism to keep a point engaged within the body of impaled game. However, as stated earlier, there is evidence on some Pine Tree points that a significant portion of the

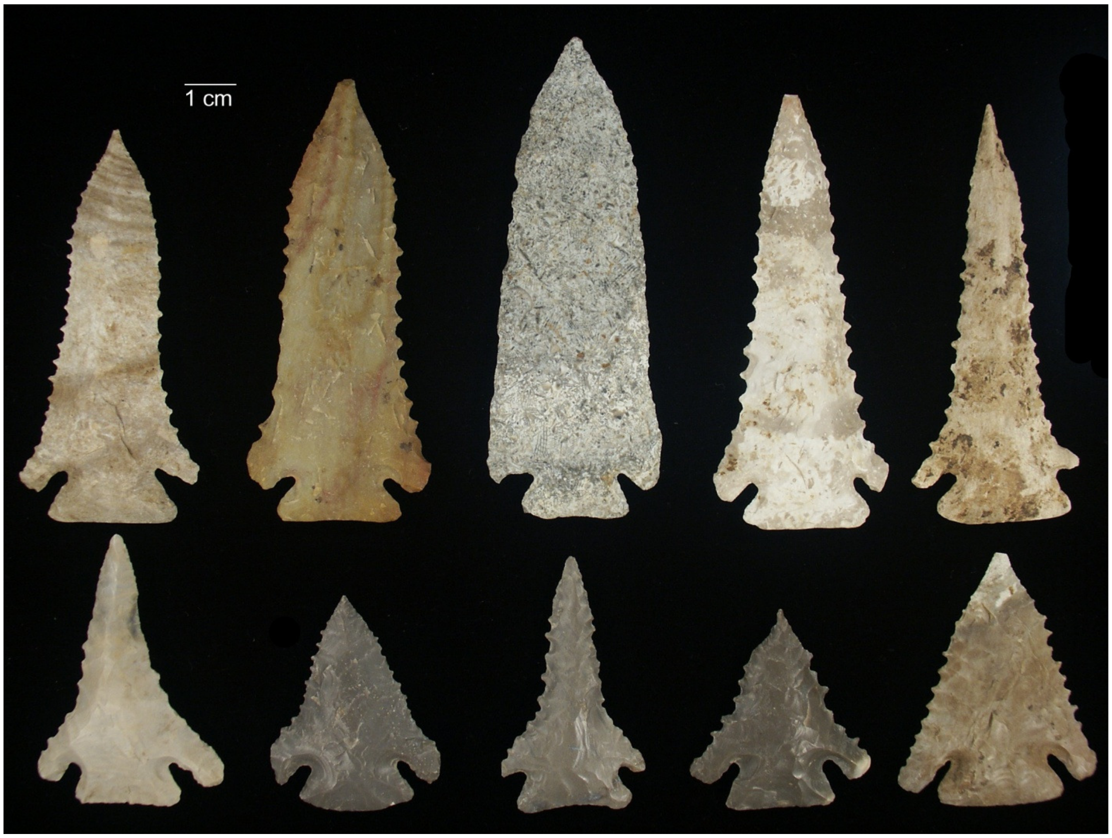

Figure 5.3. Pine Tree points

barb was covered by haft bindings, thus eliminating the potential for the functions just described. This would certainly be one attribute to investigate more fully in the future.

The barbs are further overstated due to deep corner notching, deeper than is seen in most of the Southeast Kirk examples. The barb length functions as a blade extension, and is usually serrated for the entire length. The widest part of the point is usually across the barb tips.

Technologically "true" Pine Tree point blades are relatively long and narrow, and are usually very well made. Blade shape, though, can show considerable variation. Of those points complete enough to determine (n=1158), the typical blade shape in pristine forms is recurvate (65%). This form is expressed as the barbs tend to flair considerably from the body of the point, to merge into a long medial section which is parallel-bladed or somewhat triangular, which curves again toward the distal end and then dramatically again to form the acuminate/mucronate tip. Often, the narrowest part of the blade is just above the barb/blade juncture, and the blade will widen to a somewhat bulbous morphology just before it recurves to form the acuminate/mucronate tip. The long, parallel medial portion of the blade is often diminished through reworking, and the point planview assumes a more dramatic S-shape curve. While length attrition inexorably happens, it is apparent that Pine Tree technology is oriented to maintaining blade length throughout the lifespan of the tool. Other planforms include incurvate (16%), straight/triangular (12%), excurvate (4%), and compound (3%). Incurvate forms are usually near exhaustion and frequently have a drill-like morphology, and are often associated with conventional "pointed" tips as relative to the acuminate/mucronate type. The outswept barbs are further accentuated through blade maintenance as well. The compound blade shape refers to blade asymmetry. For example, a blade may have one recurvate edge while the other is straight. This could be the result of a broken blade which has been reworked to fashion a new tip. When the blade axis is appreciably off-center, reworking of a broken blade is presumed as well. It is strongly suspected that many points typed as Charleston elsewhere derived their shape from this process.

Another distinctive stylistic feature of the Pine Tree (and other Kirk forms) is the exaggerated needle-like tip. Those with intact tips most often display extreme mucronate or acuminate (see Cambron and Hulse 1983) forms (76%) or to a much lesser extent conventional pointed tips (21%), though 41% have broken tips. Occasionally these tips are polished as viewed under low power microscopy. At present, it is uncertain if the tips functioned as a piercing device to amplify penetration if used as a projectile, or as a drill/punch/perforator/graver, or more likely all the above. Though not common, the presence of polish was a bit of a surprise given their fragile nature.

The blade margins and faces of Pine Tree points are serrated almost 84% of the time, in a very specific way that makes them unique as a point form within the Kirk Cluster. This will be discussed in more detail below.

A subset of 891 Pine Tree points was scored for type of blade breakage. Of that, 63% were unbroken. The leading break type was a simple straight-snap at 23%. Impact fractures were found in less than nine percent. Various other fractures such as end shock, spiral, lateral/burinated, and "combination" (of any two types) each registered around the one-half percent frequency. Shovel damage accounted for about two percent. This damage very often resembled burination or impact damage.

Pine Tree Serial Serration

Perhaps the most striking attribute of Pine Tree points is the use of tightly controlled pressure flaking on the blade which results in a parallel to chevron flaking pattern (Crabtree 1972). This pattern is present in 86% of all Pine Tree points. This is related to the preparation of a serrated blade in which the blade margin is carefully prepared to set up a platform for what Bruce Bradley refers to as "serial flaking" and "serial serration" in Dalton points (Bradley 1997:53-57). These serial flakes, regimented in their lateral spacing, carry across the face of the blade, and usually terminally intersect to form a medial ridge. Serration is installed from the point tip to along the entire barb. Some form of blade serration is present in 81% of all Pine Trees. Of this total, *serial* serration is recorded for 97% (the remainder displaying different serration technologies). Actually, it is likely that *all* Pine Trees are serrated; those that were recorded as "serration absent" were probably serrated initially as the parallel flaking would suggest, only having the serrations worn down through use. This would signal a need for rejuvenation or discard. Even forms that appear to be at a near-discard point in the trajectory are serrated in great frequency, which differs from Dalton technology as Bradley posits that serial serration is installed only on initial forms.

While serial serration of Kirk points is similar to Dalton technology, it is different as well. In Kirk technology, a *very* narrow bevel, or "microbevel" of a millimeter or two, is prepared on the blade margin (burinated?). This microbevel is virtually always on the edges of the same face, and almost exclusively on the dorsal face, or at least on the face that the medial ridge is developed. This differs from Dalton beveling, which is done on alternate faces (Bradley 1997), and tends to be much broader and obvious. Furthermore, this bevel is not a reworking or rejuvenation technique like it is in Dalton, Thebes, or Hardin. The Pine Tree bevel was created for two technological purposes: (1) to set up the serial flakes removed from the dorsal face, and (2) to set up the serial serrations but it was not used as the serration *platform*; rather, serration flaking is initiated from the ventral (non-beveled) face. The purpose of the bevel instead is to serve as the axis or "spine" of the serration, developed on a *de facto* thickened blade edge. At very regulated intervals, a minute section of the bevel is selected for preservation from pressure reduction strategies. The preserved bevel is visible as a small triangular facet at the serration terminus which points "up" to the dorsal/medial-ridged face. If a Pine Tree point were laid on its ventral face and the edge were magnified greatly and then viewed edge-on, the series of facets would appear as "flatiron" mountains. This bevel in effect thickens the total blade margin. This spine, created from the thickened blade edge, serves to thicken or reinforce the serrated tooth, giving it a more durable triangular cross section. The serration "spine" is coincident with and accentuated by the arrises between pressure flakes which are serially emplaced in a parallel orientation. It may be argued that serial serration *may* be accomplished without preparation of the bevel, or that the preserved triangular facet is a natural result of flake spacing. However, it is felt that beveling was intentionally installed, as the preserved facets are all canted at the same angle, and that angle differs substantially (steeper) from the radius of the blade face. That the facets virtually always point up to the medial ridge indicates this is not a coincidence. If the bevel were used as the actual platform, then the facets should point down to the flatter ventral face, opposite of the medial ridge.

While the pressure flakes are obviously bifacially placed, at least the very last series of flakes are almost always initiated from the ventral face in a final effort to isolate the teeth and accentuate the arris/serration spine. This process is evident from micro-crushing and deep negative bulbs visible within the dorsal flake scars proximal to the margin. This type of crushing is virtually never seen on the margins of both faces, and is only *very rarely* evident in an alternate fashion. Negative bulbs and crushing were probably present on the opposite side, but were obliterated when the final series of pressure flakes were detached. The negative bulbs could represent a final and separate series of specialized pressure flakes designed to accentuate the serration spine/flake arris, as the angle along the "channel" of a serial flake, from the medial ridge and across the face, dives precipitously within these bulbs. The detail of this process is only visible through microscopy.

Serial serration contrasts with a "notched" serration strategy. In this case, a series of flakes are detached at intervals along a blade edge with no real preparation. The serration flakes themselves are short crescent "nibbles" on the margin and do not carry across the face, or any appreciable distance onto it. Whereas the cross section of a serial serration is triangular, it is more lenticular or rectangular in a notched serrated form, as the original bifacial edge is preserved.

It may be argued that the whole face of a Pine Tree point serves as a vehicle or platform designed to support reinforced serrations. In essence, the serration capabilities are overdesigned for maximum efficiency (Bamforth 1986; Bleed 1986; Kelly 1988; Kuhn 1994), which is more a characteristic of highly mobile groups looking to minimize risk (Bousman 1993). However, other aspects of the lithic dimension of the Farnsley Kirk occupation suggest a reduction in mobility combined with extremely low replacement costs which puts the overdesigned aspect of their technology at odds with the perceived level of mobility. With the Pine Tree points then, an argument could be made that the serration is as much a stylistic property as it is a functional development.

This serial serration technology is *not* a resharpening mechanism routinely applied to Kirk Corner Notched Large forms. However, there is a subset of Kirk Large that has a similar *morphology* or planform to Pine Tree (i.e., "shape"), but they lack the serial serration *technology*. In essence, a Kirk Large can "become" a Pine Tree in shape. Shape, then, cannot be solely used to differentiate Pine Tree from Kirk Large. There are other metric attributes and nominal variables that will distinguish the types as well, discussed below.

Kirk Corner Notched Large Technology

Kirk Corner Notched Large points are usually large and broad ovate to triangular barbed points (Figure 5.4). All Kirk Large points co-occur in the same deposit with all other Kirk variants with no distinct stratigraphic separation. A total of 264 Kirk Corner Notched Large points were recorded from Farnsley, or about 14% of the total Kirk population.

Kirk Large points are routinely manufactured from large flake blanks. Very often the curvature of the original flake is well-preserved in the finished point as flaking can be minimally bifacial, at times approaching unifacial. The dorsal face may be completely shaped and thinned, but preparation of the ventral side is at times limited to simple retouch on the margins and haft area. Broad, random percussion flakes dominate the face which lacks a medial ridge. Pressure flaking is non-invasive and limited to margin and haft shaping. These flakes are very short and not intended to thin the faces such as seen in Pine Tree technology. On the whole, there is less technological effort invested in Kirk Large points relative to Pine Tree. By comparison, they seem to be a very expedient form.

Of those with determinable blades (n=234), an excurvate planform is overwhelmingly most common (63%), followed by recurvate and triangular blades (each about 13%). Six percent were of compound shape, and only two points were incurvate. Recurvate forms are thought to represent reworked specimens. While these approach a Pine Tree morphology/shape, they lack other Pine Tree technological elements, such as parallel flaking. These forms would likely be classified as Pine Tree outside of the study area.

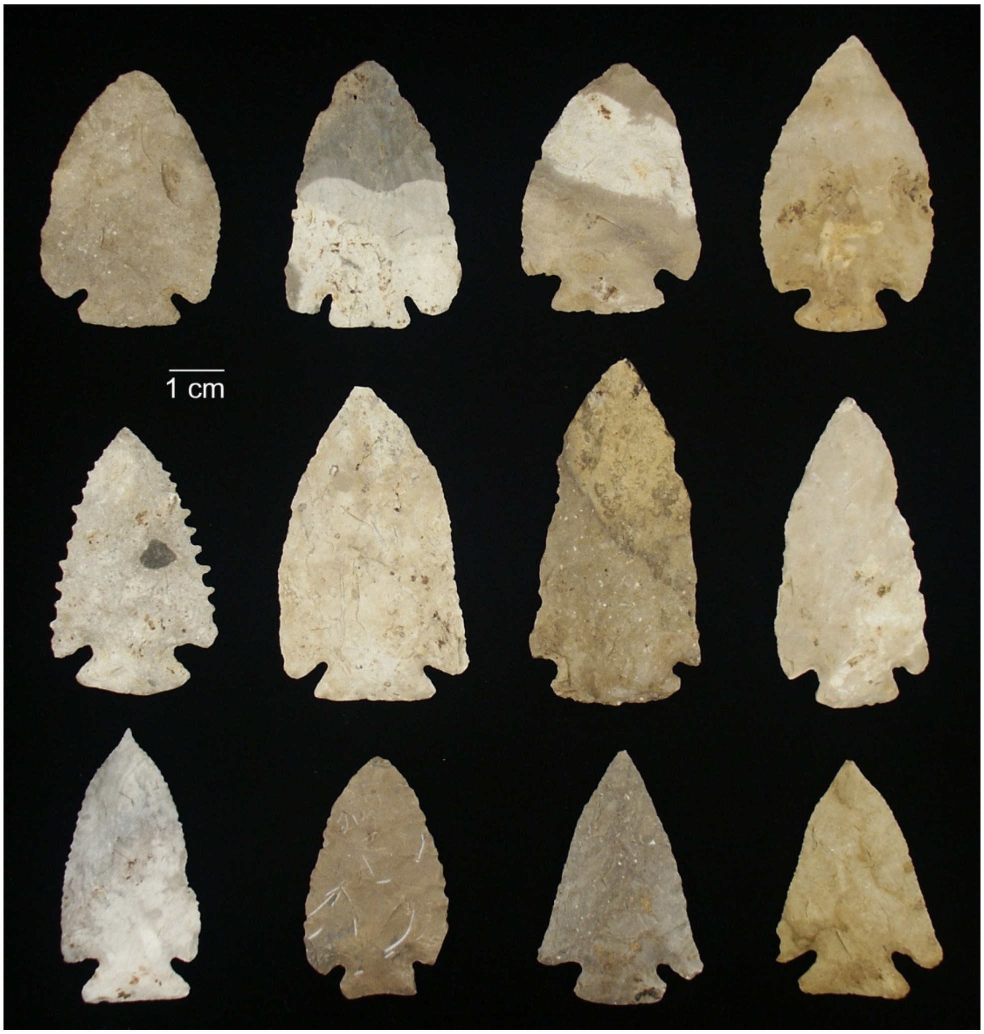

Figure 5.4. Kirk Corner Notched Large points.

As for flaking patterns within Kirk Large (sample n=174), “parallel-over-random”–that is, non-invasive parallel pressure flaking of the margins over an otherwise percussively randomly-flaked face–is most common at 72%. Absolute random flaking is present in 24%. True Pine Tree-like parallel flaking, the type which carries across the face to make a medial ridge, is observed in fewer than three percent of Kirk Large.

Less than half of all Kirk Large points are serrated (43%), in stark contrast with Pine Tree prevalence. A form of serial serration is recorded for 78% of those which are serrated (37% of grand total), though the procedure differs somewhat from Pine Tree. In Kirk Large technology, serial serration is accomplished by preparing only the blade margin rather than the entire blade face. Serration/pressure flake scars do not carry across the face, and are seldom more than a few millimeters from the margin. “Notched” serration makes up the remainder (9 %).

Nearly two-thirds of all Kirk Larges have unbroken blades (66%). Reflected in those broken, though, is the greatest array in the types of breaks of all Kirk variants. Break types and frequencies were: 17% simple snap; 9% impact; 3% lateral; 1% end shock; <1% spiral; and 2% shovel damage. Of the 263 total Kirk Large points available, 35% were missing the very distal tips. Of those that had intact tips, 49% had conventional "pointed" tips, while 39% and 9% were acuminate/mucronate and "rounded", respectively.

A sample of 168 Kirk Large points was amenable to notch-type scoring. Though 40% of Kirk Large points possess parallel-narrow-deep notches similar to Pine Tree, some type of broad, "open" notch type was recorded for exactly half of the Kirk Large sample. Broad-shallow-open notches are present in 18%, while broad-deep-"rounded" notches are found in 32%. The remaining 10% have parallel-narrow-shallow notches which appear quite diminutive relative to the blade. The thickest portion of the point tends to be immediately distal from the haft element, and the widest axis is often above the notches.

Regardless of notch type, the notch placement and blade shape results in characteristically stubby downswept barbs and a short but broad haft element. The Kirk Large barbs will seldom flair from the point blade as they do in Pine Tree, even in reworked conditions. The barbs do not get isolated from the corpus of the blade in reworking. Over half of the sample of 264—53%--retain both barbs. Single barbs are present in about 40% of the population, while fewer than seven percent have had both barbs detached. Given that the barbs are tucked in so close to the body, they function more as part of the blade than as a grappling mechanism associated with game impalement.

Basal shapes were obtainable for a sample of 233 Kirk Large points. Excurvate (45%) and straight (41%) were the most common basal morphologies, and over 12% were incurvate. Over 72% were basally ground of 232 amenable points.

While not quantified, the widest part of Kirk large points often tends to be farther up the blade above the barb tips due to the excurvate morphology. Not unusually, the widest part will be across the barb tips, or less often, across the base on heavily reworked examples. As with other Kirk variants, the thickest portion tends to occur above the basal thinning flakes, just above the notch juncture.

Kirk Corner Notched Small Technology

The Kirk Corner Notched Small sample consisted of 183 points (Figure 5.5). While Kirk Corner Notched Large and Pine Tree points appear to have very specific well-defined parameters, Kirk Corner Notched Small is more difficult to define as technological elements of each are seemingly incorporated into Kirk Small points. In some regards, Kirk Small is morphologically a diminutive Kirk Large analog, while at the same time, has Pine Tree-like flaking technology. In other ways, they are very reminiscent of Coe's (1964) Palmer type. Kirk Corner Notched Small points are generally well-made

Figure 5.5. Kirk Corner Notched Small points. (line=1 cm).

triangular-bladed points. While they may be made on flake blanks like Kirk Large and Pine Tree, subsequent flaking has left no overwhelming evidence for this.

The vast majority of Kirk Small points were found mixed with all other Kirk types in the primary Kirk component. This component has a range of dates which fall between 9400-8600 rcybp. However, there is some weak evidence that the Kirk Small form may have been established as a type early in the Kirk sequence. A point with Kirk Small affinities was found below the Thebes/St. Charles occupation, in a zone contemporary with Early Side Notched Cluster forms, which have a radiocarbon range of 9700-10,000 BP. This sequence, if not the dates, generally conforms with observations from Hardaway (Coe 1964; Daniel 1998), St. Albans (Broyles 1971), and Tellico (Chapman 1975, 1977, 1979). Regardless, this is a single point, and we are cautious about a temporal interpretation.

Over half of Kirk Small points have straight bases (54%), which is twice as high as the next most common form, excurvate (28%), followed by an incurvate (18%) morphology. Like all Kirks, it is basally thinned to the top of the notches, in an arcuate pattern with the longest flakes centrally placed, with length tapering laterally. Basal grinding is standard (83%).

Notch type frequencies are perhaps the most variable of all Kirk forms. Well over half (56%) have parallel-narrow-deep notches like Pine Tree. However, over a quarter (26%) has broad-open-shallow notches like Kirk Large. An additional 13% have parallel-narrow-shallow notches, while five percent have broad-deep-"round" notches. Barbs tend to be stubby and downswept in virtually all forms and more closely resemble the structure of Kirk Large in this regard. They seldom flare from the body, even in reworked forms, as they do in Pine Tree. As for barb "retention", 40% have both barbs intact, 49% are missing a single barb, and both barbs are absent in ten percent of the population.

The blades are most often excurvate (36%) or triangular (30%) and 19% have recurvate planforms, while only six percent have incurvate blades. They are usually serrated (69%) which is in greater frequency than Kirk Large but less than Pine Tree. Of those that are serrated, they are typically serially serrated (82%), though "notched serration" and "other" are present in six and twelve percent of the sample, respectively. Pine Tree-like parallel flaking of the blade is scored for 68% of the variant. The majority of the remainder fall within the parallel-over-random class (26%), while less than four percent are randomly flaked.

Distal tips are missing in about 25% of the sample. Of those with intact tips, tip configurations are evenly distributed amongst mucronate/acuminate (48%) or acutely pointed (49%), while "rounded" comprises less than four percent. A sample of 80 was examined for types of blade breaks. Of that, 73% were complete. Of the broken specimens, 50% had simple straight snaps and 41% had impact fractures. A lone point with a lateral/burinated fractured was identified as well.

The thickest part of the point is just above the basal thinning, just above the notch juncture. The wide axis tends to be across the barb tips on triangular bladed specimens, and more distally above the notches on more excurvate forms.

Stilwell Technology

The Stilwell variety is a large, heavy point. It is the only Kirk variant from the Farnsley site that may be stratigraphically distinct (Figure 5.6). Significantly, while Pine Tree, Kirk Large, and Kirk Small are seemingly coeval with radiocarbon dates between 9420 ± 100 rcybp to 8630 ± 180 rcybp and occur in virtually all occupational levels, Stilwell points are isolated within the upper levels of the cultural deposits and loosely associated with a radiocarbon date of 8320 ± 80 rcybp (ISGS 5032). A similar date more directly associated with a Stilwell deposit was obtained at the neighboring site, 12Hr481.

Stilwell may be a Kirk Corner Notched Large subtype, or at least a derivative of it. Stilwell points could be mistaken for a reworked Large form upon which some elements of Pine Tree technology were applied, as it is a large, open-notched/weakly barbed point with well-ordered serial serration along the margin. However, the 8300 rcybp dates place it in an otherwise chronological void in the Kirk sequence, distancing it from established types.

Stilwell points are generally triangular in planform, with the widest axis across the base. Basal morphology is typically incurvate (66%), though straight-based forms are common (26%). Excurvate forms are rare at nine percent. The prevalence of incurvate forms may be an unintentional consequence associated with basal thinning. However, other incurvate forms are so extreme that the haft element approaches auriculate or bi-lobate. The antecedents of the Bifurcate/MacCorkle Cluster may be rooted within

Figure 5.6. Stilwell points.

Stilwell technology. About 71% of Stilwell points are basally ground, which is the lowest of all Kirk forms. This may be indicative of the decline of this technological preparation through time.

Virtually all Stilwell points (97%) have broad-open-shallow corner notches, with the remainder possessing broad-deep-rounded notches. As the barbs tend to be short and stubby and tucked close to the body/blade, Stilwell points could arguably described as an expanded stem form. The compact barbs are damage-resistant: 66% of all Stilwells retain both, 23% have one barb remaining, while only 11% have lost both. Whether this is due to the morphology of the barbs themselves or the function of the point is uncertain.

A wide variety of blade shapes were scored for Stilwell. Recurvate and straight morphologies are each present in 34% of the sample. An excurvate shape is recorded for 19%, while compound shapes are noted in nine percent. Only one point (ca. 3%) was incurvate.

While shape was variable, the flaking pattern was not: 94% were registered as parallel-over-random reflecting serial serration confined to the margin (the parallel and random classes were 3% each). Serration was observed in 94% of the Stilwell group, and the type of serration was always of the serial procedure. The accomplishment of serial serration in Stilwell is somewhat different than it is for Pine Tree. For Stilwell, beveling of each edge on each face is performed to set up the serration platforms, creating a point with a somewhat hexagonal cross section. This bevel is not to the extreme as is seen in Thebes or Dalton technology, but rather is on the order of a few millimeters, much like Pine Tree, but bifacial. The blade face itself still shows broad random percussion scars, and no medial ridge is present as serial flaking is restricted to the margin only.

Just over half (53%) of all Stilwells are unbroken, which is the lowest amongst the Kirk variants. Of those which are broken, straight snaps and impact fractures account for 60% and 33%, respectively. One lateral snap was also recorded. Distal tips were missing in 37% of the sample. Of those with intact tips, one third were of the acuminate/mucronate variety, while the two-thirds majority were of the conventional pointed type.

COMPARATIVE DISCUSSION

The frequencies of the nominal variables described per point type earlier will be compared in this section. This is done to illuminate the differences used to justify our view of a restructured Kirk Cluster, at least as relevant to this portion of the Ohio valley. Please note that in the following tables, percentages may not add up to 100%—only the major variables will be discussed. The tables exclude "indeterminate" categories.

It is important to note that there are very few "absolutes" in variables scored per point type. That is, rarely is there any deviation *not* noted in a technological category, so no single attribute within variables can be deemed diagnostic. For example, though "most" Pine Tree points have parallel-narrow-deep notches, it is not exclusively so. Furthermore, parallel-narrow-deep notches are not particularly diagnostic of Pine Tree points—other Kirk variants possess this attribute as well, in varying frequencies. Therefore, a point style can only be defined as having "most often" one type of variable per technological attribute.

Discrete Traits/Nominal Variables

Basal Shape

With Pine Tree, Kirk Large, and Kirk Small, all show high incidences of excurvate and straight base configurations which add up to around 80-85% each (Table 5.3). Pine Tree slightly favors straight bases; more Kirk Large points are a bit more frequently excurvate (a figure which is the highest amongst all Kirk forms); and Kirk Small favors straight bases 2:1 over excurvate forms. Incurvate forms occur in low frequencies for each of those point types, though are not rare. Stilwell is unique within the Kirk Cluster in that the most common basal configuration is overwhelmingly incurvate, a frequency which is three or four times that of the other point types.

Basal Grinding

The difference in the frequency of basal grinding between Pine Tree and the other Kirk classes is striking (Table 5.4). Virtually all Pine Tree points are basally ground, while the others are "very commonly" ground. This is a situation very similar to that documented by Coe (1964) at the Hardaway site, where all Palmer points were basally ground, with that attribute being diagnostic to that point type.

Notch Type

As with basal grinding, there are some extreme differences between point types in notch type frequencies (Table 5.5). Two types demonstrate limited deviation: virtually all Pine Tree points are notched in a parallel-narrow-deep manner, and Stilwell is rarely notched in a form other than broad-open-shallow. Interestingly, very few Pine Trees are notched in a manner similar to Stilwell, and vice versa. Conversely, Kirk Small and Kirk Large have wide arrays, especially the latter where the numbers are greatly diffused amongst three styles. Kirk Large has less than half the frequency of parallel-narrow-deep notches than Pine Tree, and some type of broad notch accounts for half of the population, which is quite rare in Pine Tree. The differences in frequency distributions between Kirk Large and Kirk Small also tend to support their existence as separate point types.

Barbs Present

Pine Tree leads the way by a large margin in points with no barbs retained. This could be one of two reasons, or both (Table 5.6). The first is that the point may function differently than the others. The other is that Pine Tree barbs have a far greater length-to-width ratio and more gracile than barbs constructed on other forms, and are more susceptible to breakage. In the Stilwell technology, and even Kirk Large to a degree, the barbs are very short and compact and are drawn into the blade, and in cases are more shoulder-like than actual barbs. Therefore, they may be more resistant to any kind of damage. Again, differences in function could account for this, but the stubbier morphology is likely to be more responsible.

Blade Shape

Blade shape may be the attribute with the potential for greatest variability, even within a single point type, due to resharpening and rejuvenation (Table 5.7). In almost every case, incurvate forms are suspected to be terminal forms in which further resharpening is not practicable. This may also be an expression of length maintenance even to the point of discard, or transference of function from a projectile/knife form to a drill form. This is apparently more common in Pine Tree than it is in the other Kirk forms. Excurvate shape is the least common for Pine Tree but the most common for Kirk Large and Small, as is assumed to be the initial/pristine form for the latter types. Conversely, while the recurvate morphology is most typical for Pine Tree, it is unusual for Kirk Large, and only a bit more common in Kirk Small. Kirk Small and Stilwell are interesting for their wide, trimodal distributions, while Kirk Large and Pine Tree are more unimodal.

As indicated above, blade shapes are likely to be expressions or degree of reworking. Certain resharpening sequences are posited below.

Analysis of the Kirk assemblage identified several distinct technomorphological types, though there was some overlap in stylistic characteristics between and within types. Some of the difference within types is likely attributable to varying stages of use

Table 5.3. Basal Shape.

	N	Incurvate %	Excurvate %	Straight %
Pine Tree	1328	14.98	38.25	46.46
Kirk Large	233	12.45	45.06	41.63
Kirk Small	180	17.78	27.78	54.44
Stilwell	35	65.71	8.57	25.71

Table 5.4. Basal Grinding.

	N	Present %	Absent %
Pine Tree	1322	93.27	6.73
Kirk Large	232	71.55	28.45
Kirk Small	180	82.78	17.22
Stilwell	34	70.59	29.41

Table 5.5. Notch Type.

	N	Broad-open-shallow %	Broad-deep-rounded %	Parallel-narrow-deep %	Parallel-narrow-shallow %
Pine Tree	718	2.23	3.76	91.78	2.09
Kirk Large	168	18.45	31.55	40.48	9.50
Kirk Small	78	25.64	5.13	56.41	12.82
Stilwell	33	96.97	3.03	0	0

Table 5.6. Barbs Present.

	N	0 Present, %	1 present, %	2 Present, %
Pine Tree	1412	29.39	43.41	27.20
Kirk Large	263	6.84	39.92	53.23
Kirk Small	182	10.44	48.90	40.66
Stilwell	35	11.43	22.86	65.71

and resharpening/rejuvenation. Thus, conceptual resharpening models developed for Dalton points by Morse (1971) and Goodyear (1974) were adapted to the Farnsley Kirk assemblage.

In general, Pine Tree is oriented toward the maintenance of blade length. While some effort is made to maintain blade length in Kirk Large, its technology is moreso predicated on retention of width or mass. While each variety as defined here is technologically unique, there is a degree of morphological convergence. Within each of the Kirk Large and Pine Tree resharpening sequences, there appear to be two trajectories.

Pine Tree I: In this sequence, the original morphology of the large parallel-bladed Pine Tree is preserved throughout the sequence (Figure 5.7). The terminal form is drill-like. Retouch is confined to portions of the blade above the barb, which accentuates the barb in terminal forms.

Figure 5.7. Pine Tree I resharpening sequence.

Pine Tree II: The initial form illustrated is recurvate, which progresses through a resharpening sequence which exaggerates the recurvate planview until an incurvate form is achieved (Figure 5.8). Eventually, narrowness of the blade precludes further resharpening without significant length attrition. Terminal forms are either stubby and expended, beyond rejuvenation, or reworked into a needle-like tip.

Kirk Large I: This sequence shows that blade width is maintained at the expense of length (Figure 5.9). Retouch is equally applied to all portions of the blade margin including the barbs thus maintaining the excurvate planview. Resharpening may be accomplished by pressure, but is not invasive enough to obscure the original percussion flake scars of the blade face.

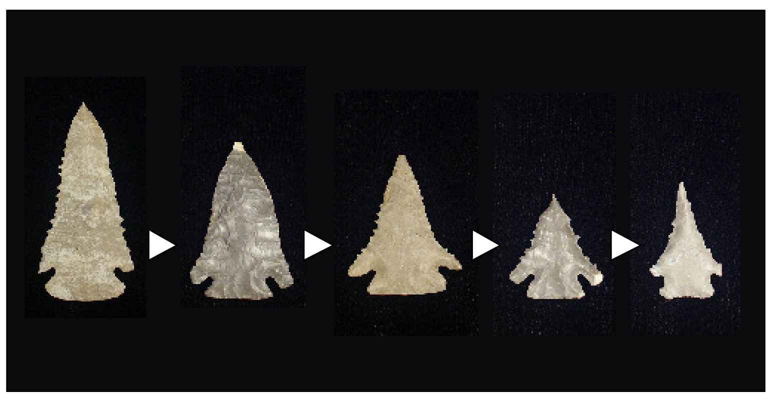

Figure 5.8. Pine Tree II resharpening sequence.

Kirk Large II: This trajectory finds a typical broad Kirk Large reworked into a Pine Tree-like configuration (Figure 5.10). Though still defined as Kirk Large in terms of technology, morphologically they appear as Pine Tree, or colloquially, "pseudo-Pine Tree". Retouch is applied only to those portions of the blade above the barbs, thus accentuating them. Again, retouch is confined to the margin and does not carry across the blade face, which preserves the original random percussion scars. Length is thus maintained, and a recurvate (or even parallel-bladed) planform is created. This form is quite common at Farnsley, and indeed seems to constitute what is called Pine Tree at most Southeastern Kirk sites (e.g., Broyles 1971; Chapman 1973). About one-quarter (n=46, 26%) of all Kirk Larges are reworked into morphological Pine Trees.

Kirk Small: Kirk Small resharpening strategies appear to be similar to Pine Tree in that there seems to be an attempt to maintain blade length (Figure 5.11). Blades typically

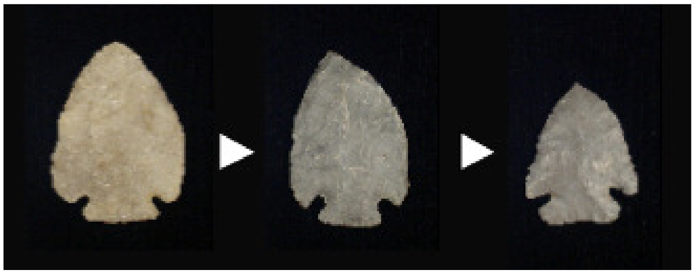

Figure 5.9. Kirk Large I resharpening sequence.

Figure 5.10. Kirk Large II resharpening sequence.

progress from excurvate or/to triangular to recurvate, though retouch infrequently encroaches over the entirety of the blade face to form a collateral flaking pattern.

Blade Flaking

Again, trends are very visible in blade flaking (Table 5.8). Both Kirk Large and Small show a bimodal distribution, with about seventy percent being one type, and a quarter being another. However, the predominant and lesser flaking types are juxtaposed between point types: Kirk Large being more often parallel-over-random followed by parallel, with the reverse displayed for Kirk Small. This would validate their existence as distinct types. Unless randomly flaked KCNL "become" KCNS with subsequent p-o-r flaking. Pine Tree and Stilwell are overwhelmingly unimodal.

Blade Serration Frequency

Once more, differences between point types are striking (Table 5.9). Pine Tree points in which serration is absent or not overtly displayed are still suspected of having been serrated at one point, given the prevalence of serial/parallel blade flaking in which serration is directly associated; serrations are suspected to be worn down, thus signaling the need for rejuvenation or discard. Stilwell points are also habitually serrated. About two-thirds of Kirk Small are serrated, but it is less clear if there is a situation analogous to Pine Tree. The majority of Kirk Large points are not serrated; this is believed to reflect reality, as many forms interpreted as "fresh" Kirk Larges are not serrated. When they are serrated, it is seldom that they are serially serrated as in Pine Tree. This is one of the more compelling arguments for functional differences between the two types.

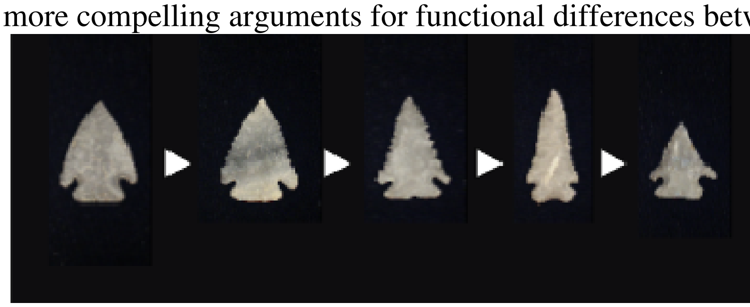

Figure 5.11. Kirk small resharpening sequence.

Table 5.7. Blade Shape.

Type	N	Straight %	Incurvate %	Excurvate %	Recurvate %	Compound %
Pine Tree	1158	12.35	16.23	3.71	64.68	3.02
Kirk Large	234	11.54	0.85	68.38	12.82	6.41
Kirk Small	170	30.00	5.88	36.47	19.41	8.24
Stilwell	32	34.38	3.13	18.75	31.43	9.38

Table 5.8. Blade Flaking.

Type	N	Parallel %	Random %	Parallel-over-Random %
Pine Tree	855	90.53	0	9.12
Kirk Large	173	2.89	24.28	72.25
Kirk Small	78	69.23	3.85	26.92
Stilwell	33	3.03	3.03	93.94

Table 5.9. Blade Serration Frequency

Type	N	Present %	Absent %
Pine Tree	1356	84.14	15.86
Kirk Large	252	42.86	57.14
Kirk Small	180	65.56	34.44
Stilwell	35	94.29	5.71

Blade Serration Type

This takes into account only those points which are serrated, not the total population (Table 5.10). All have very high incidences of serial serration, especially relative to points of non-Kirk assemblages. Pine Tree and Stilwell are generally always serially serrated. Of interest is Kirk Large. It has the lowest incidence of serial serration and the highest incidence of the casually notched type of serration. This type is almost never recorded for Pine Tree and this is thought to be significant, and reflects the generally expedient type of technology relative to Pine Tree.

Distal Tip Present/Absent Frequency

Pine Tree leads the way in absent distal tips (Table 5.11). While this may be a reflection of function, it should also be stressed that the typical hyper-acuminate/mucronate tips found on Pine Tree points would be easily broken regardless of function, and perhaps even in post-depositional and recovery contexts.

Table 5.10. Blake Serration Type.

Type	N	Serial %	Notched %	Other %
Pine Tree	801	97.38	1.12	1.50
Kirk Large	164	78.21	19.23	2.56
Kirk Small	51	82.35	5.88	11.76
Stilwell	31	100.00	0	0

Table 5.11. Distal Tip Present/Absent Frequency.

Type	N	Present %	Absent %
Pine Tree	1415	58.94	41.06
Kirk Large	263	65.02	34.98
Kirk Small	183	75.41	24.59
Stilwell	35	62.86	37.14

Table 5.12. Distal Tip Type Frequency

Type	N	Acuminate/Mucronate %	Pointed %	Rounded %
Pine Tree	834	76.38	21.82	0.48
Kirk Large	171	39.18	49.12	9.36
Kirk Small	132	48.48	49.24	3.79
Stilwell	18	33.33	66.67	0

Table 5.13. Distal Fracture Presence/Absence Frequency

Type	N	Distal Present %	Distal Absent %
Pine Tree	895	62.68	37.32
Kirk Large	176	66.47	33.53
Kirk Small	80	72.50	27.5
Stilwell	32	53.15	46.85

Distal Tip Type Frequency

Only points with tips assignable to type were recorded here (Table 5.12). Disparities readily distinguish point types. Like other technological attributes, no single tip morphology resolutely defines a given point; that is, Pine Tree points do not *always* have acuminate/mucronate tips, though more than three-quarters possess this form. The Pine Tree frequency, however, is almost twice that of Kirk Large which is significant. Both Kirk Large and Small show wide spreads amongst differing morphologies. Though Kirk Small resembles Pine Tree in many technological aspects, the blade shape, which is usually triangular/straight to excurvate, may predicate a conventional pointed tip. It may be that a recurvate planform more common to Pine Tree is directly associated with the acuminate/mucronate tip form.

Distal Fracture Frequency

Counter to many technological categories, the category which measures the incidence of broken blades is quite similar across all point types (Table 5.13). This may suggest similar functions amongst the types. This may be somewhat unexpected, given that all but Stilwell are quite contemporaneous; difference in function therefore may be expected.

Distal Fracture Type Frequency

This table represents only those points with broken blades (whole points factored out), and displays the frequencies of types of breaks within that subset (Table 5.14). Additionally, break types were scored for only a subset of points from the total population of a given point type; that is to say, break types were not recorded for *all* broken Kirk Large points, for example. After whole points were factored out, some of the *n*'s were quite small, so it is uncertain if these resultant frequencies are statistically valid. The Pine Tree frequencies *are* likely to be valid, however, with a large population still available for examination (n=329 broken blade points).

Metric Data

Maximum Length

On average, Stilwell is the longest point in the Kirk Cluster, and as expected, Kirk Small is the shortest (Table 5.15). Pine Tree has the second-smallest mean. Kirk Small is consistently the smallest variety in both the minimum and maximum length variables, and Stilwell is the longest in both variables. Stilwell appears to be substantially larger than Kirk Large, which justifies the division between the two, rather than making the former a subordinate variant of the latter. Likewise, the difference is considerable between Kirk Large and Small. However, Pine Tree shows the greatest range, likely due to resharpening strategies. The Pine Tree population contains specimens that are both shorter and longer than Kirk Large. Kirk Small shows the least amount of variability.

Blade Length

Virtually all of the observations valid for total point length are replicated in blade length (Table 5.16). Pine Tree shows the greatest amount of variation and the absolute longest blade length. However, differences are minimal between Kirk Large and Stilwell in blade length metrics.

Maximum Thickness

Stilwell is consistently the thickest point type, and also shows the second-least range, only to the diminutive Kirk Small (Table 5.17). Pine Tree once again shows the greatest variability, though the value is virtually identical for the thickest Pine Tree and Kirk Large points. Kirk Small registers as the most gracile form.

Neck Width

Neck width metrics reveal some unexpected results (Table 5.18). The Kirk Small minimum is second-highest. However, its maximum is lowest, as is the Kirk Small range and mean. While Stilwell has the greatest mean, it has one of the smaller ranges that indicate a consistently wide neck is necessary for its function.

Table 5.14. Distal Fracture Type Frequency.

Type	N	Straight %	Impact %	End shock %	Spiral %	Lateral %	Combo %	Shovel %	Other %
Pine Tree	329	62.31	24.01	1.82	1.22	1.52	0.91	5.17	3.09
Kirk Large	59	50.85	25.92	3.39	1.69	8.47	0	5.08	5.08
Kirk Small	22	50.00	40.91	0	0	4.55	0	0	4.55
Stilwell	15	60.00	33.33	0	0	0	0	6.67	0

Table 5.15. Maximum Length.

Type	N	Mean	Range	Min	Max
Pine Tree	633	53.67	67.95	26.84	94.79
KCN Large	131	58.59	58.8	34.03	92.83
KCN Small	120	43.67	37.32	23.16	60.48
Stilwell	15	64.36	57.97	44.61	102.58

Table 5.16. Blade length.

Type	N	Mean	Range	Min	Max
Pine Tree	438	46.89	70.00	18.54	88.54
KCN Large	119	50.52	60.91	24.94	85.85
KCN Small	109	36.38	38.88	15.35	54.23
Stilwell	13	49.78	55.94	31.43	87.37

Basal Width

Kirk Large and Pine Tree mean basal widths are virtually identical though their ranges, minimums and maximums are different (Table 5.19). In fact, the Pine Tree minimum is greater than the Kirk Large minimum. Then again, it is likely that these are outliers to which little significance should be attached. The identical means present a tantalizing possibility that Kirk technology may utilize a standardized-sized foreshaft into which these points could be interchangeably fitted. Once again, Stilwell metrics are appreciably greater than the others with the exception of the maximum, which is actually smaller than Kirk Large. Kirk Small metrics are consistently the most diminutive again, as expected.

Table 5.17. Maximum thickness.

Type	N	Mean	Range	Min	Max
Pine Tree	1313	6.90	8.14	2.00	10.14
KCN Large	237	7.26	5.02	5.11	10.13
KCN Small	173	6.18	3.39	4.41	7.8
Stilwell	35	8.22	3.96	6.66	10.62

Table 5.18. Neck width.

Type	N	Mean	Range	Min	Max
Pine Tree	1155	17.68	17.14	7.46	24.6
KCN Large	211	18.60	18.42	9.09	27.51
KCN Small	159	16.21	9.17	12.4	21.57
Stilwell	34	21.48	9.99	17.17	27.16

Table 5.19. Basal width.

Type	N	Mean	Range	Min	Max
Pine Tree	1113	23.56	14.35	16.38	30.73
KCN Large	182	23.56	19.26	13.48	32.74
KCN Small	151	21.00	14.73	12.8	27.53
Stilwell	29	28.12	9.05	23.19	32.24

Table 5.20. Stem haft length.

Type	N	Mean	Range	Min	Max
Pine Tree	1153	9.42	6.79	6.22	13.01
KCN Large	201	9.53	9.8	4.78	14.58
KCN Small	164	8.58	8.01	4.53	12.54
Stilwell	33	11.94	6.11	9.66	15.77

Table 5.21. Basal depth.

Type	N	Mean	Range	Min	Max
Pine Tree	1225	0.0227	2.51	0	2.51
KCN Large	205	0.0112	2.31	0	2.31
KCN Small	163	0.0129	2.1	0	2.1
Stilwell	27	0.6626	3.5	0	3.5

Stem Haft Length

As with basal width, the Pine Tree and Kirk Large means are very close in dimension which bolsters the plausibility that both points are designed to fit in a common foreshaft (Table 5.20). This could be used as the basis of a functional argument. However tempting it is to come to this conclusion on the basis of haft dimension similarities, the disparity in notch and basal morphologies must be considered. Conversely, differences in notch and basal configurations may not necessarily obviate the potential. As to be expected, Kirk Small and Stilwell bring up the large and small values within the cluster.

Basal Depth

The only substantial difference in base depth is between Stilwell and the other three types (Table 5.21).

Table 5.22. Shoulder width.

Type	N	Mean	Range	Min	Max
Pine Tree	358	32.76	44.14	7.14	51.28
KCN Large	124	35.65	17.79	27.24	45.03
KCN Small	86	29.66	16.83	20.92	37.75
Stilwell	20	33.17	9.44	27.59	37.03

Table 5.23. Kirk Cluster morphological summary.

Attribute	Pine Tree	Kirk Large	Kirk Small	Stilwell
Basal Shape	Straight	Excurvate	Straight	Incurvate
Notch Type	Parallel/narrow	Broad	Parallel/narrow	Broad
Blade Shape	Recurvate	Excurvate	Excurvate	Straight
Blade Flaking	Parallel	Par-over-random	Parallel	Par-over-random
Point Tip Type	Acuminate	Pointed	Pointed	Pointed
Basal Grinding	Virtually all	Common	Very common	Very common
Blade Serration	Very common	Occasional	Common	Virtually all

Virtually all = >90%; Very Common = 75%-90%; Common = 50%-75%; Occasional = <50%

Shoulder Width

Shoulder width is a good proxy for maximum width in all Kirk varieties but Stilwell, which tends to be broadest across the base. Kirk Large and Stilwell tend to be the widest points (Table 5.22). However, Pine Tree has by far the widest range and the absolute broadest—and most narrow—specimens. This is likely due to the effort put into accentuating and maintaining the barbs, a critical stylistic and potentially functional element of Pine Tree technology.

Summary

As stated, there are seldom any “absolutes” when describing different qualitative variables per given point type. For instance, while most the basal edge shapes of “most” Pine Tree points are straight, many are excurvate. However, the most common configurations per variable per point type tend to distinguish them from other point types. Metrics tend to support the differences. Table 5.23 lists the most common configurations per technological attribute per point type.

RECONCILING TYPOLOGIES

With over 2100 Kirk Cluster points, the Farnsley assemblage is by far the largest of its kind. One would be inclined to think that all typological issues should be resolved. In one sense, they are, and in another sense, they are not. While there are remarkable similarities between the Kirk assemblages from the various Carolina, Tennessee, West Virginia, and Indiana sites, there are marked differences as well. While concerted efforts have been made to reconcile the various assemblages under one Kirk umbrella, it is becoming apparent that Kirk projectile point technology has many regional expressions, or unique technological features that are geographically circumscribed.

In this section of the Ohio River valley, and particularly in southern Indiana, this unique expression is the Pine Tree point. While this form has been long-documented (Cambron 1956), and with Deep South roots at that, the Pine Tree *form* as defined there differs significantly from the mid-Ohio Valley *type*. It is our conclusion from the literature review that when Pine Tree is referenced from Southeast sites, it is not only rare but seemingly refers to a *shape*, a strictly morphological form, perhaps as a reworked variant of some other type (i.e., Kirk Corner Notched Large reworked into a Pine Tree shape [Justice 1987:79-80]). In Indiana, Pine Tree is much more than a shape; rather, Pine Tree reflects an entire technology which is predicated on Dalton-like serial flaking of the face and serial serration of the blade, imposed on a very specific Pine Tree shape. The entirety of this technology package is almost virtually exclusive to Pine Tree and only very rarely applied to other forms. Furthermore, the mid-Ohio valley Pine Tree appears to be a pristine, templated form, rather than a reworked derivative (though those occur as well). In our view, this makes Pine Tree, as defined in this area, a legitimate point *type*, though one that is a limited regional expression within the Kirk canon.

The Kirk assemblages from all of the major sites reflect some type of large/small dichotomy. Type names can be arbitrary, and technological and nomenclatural issues can be debatable, but this duality seems to be a Kirk norm. This is a primary reason we have opted to adopt Chapman's (1978) "safe", and in our view accurate, classification. The cognizance, interpretation, and application of terms such as Charleston, Palmer, and even more generic applications of "Kirk" or "Kirk Corner Notched" by different investigators at sites across the breadth of the eastern U.S. have muddied the waters of what appears to be a fairly clear bipartite system.

Function

Certainly, Kirk Large, Kirk Small, and Pine Tree points were synchronic; they co-occur in all excavation levels, and are associated in discrete clusters thought to represent single depositional episodes. At this time, no analyses have been undertaken to distinguish function or functional differences between Kirk Cluster point types. The omnipresent blade serration immediately insinuates a knife function. However, Bruce Bradley (personal communication 2003) posits that the Kirk haft element would be undersized for such a function. While a formal "Kirk knife" has been defined, the relatively low frequency of this form would seemingly under-represent cutting/sawing activities. Therefore, a potential knife function associated with Kirk points cannot be discounted.

All Kirk varieties reveal the points to have low incidences of definitive impact fractures, the hallmark of projectile function. Both Kirk Large and Pine Tree suffer an approximate 9% incidence of such damage. Kirk Small and Stilwell register at 11% and 16% respectively. While impact fracture frequencies are relatively low, all types have a high incidence of straight-snap fractures. About 23% of Pine Trees and 17% of Kirk Larges exhibit such breaks, as do 14% and 28% for Kirk Small and Stilwell respectively (though the latter could be a sampling error). It is uncertain how this type of break is generated; it may or may not be related to projectile function, and could just as easily result from cutting/prying activities or any other function in which flexing of the blade would surpass its elastic limit. As a note, many of the asymmetrically bladed points (Charleston) are probably the result of a reworked impact or snap fractures.

Chert Selection Analysis

In the Farnsley Kirk assemblage, a large array of some 24 different chert types were utilized in Kirk Cluster point manufacture, which is a typical southern Indiana Archaic pattern (Cantin 1988; chert descriptions in Cantin 1994), even in Early Archaic assemblages (Cantin 2000). However, only two chert types—Muldraugh and Wyandotte—account for at least 76% of all chert types utilized among the various Kirk types. An additional four local to semi-local types–Allens Creek, St. Louis (grey fossiliferous and green varieties), Laurel, and Jeffersonville—roundout the cherts of each point type to at least 93%.

Distinctive chert selection patterns exist amongst the four Kirk varieties. Kirk Large favored the use of Muldraugh (55%) at well over twice the frequency of Wyandotte (21%), and made the greatest use of St. Louis (12%) relative to the others. Conversely, Kirk Small utilized about twice as much Wyandotte (54%) as Muldraugh (29%), with the least relative use of Allens Creek, St. Louis, and “Other” cherts. Holland usage is the greatest as well (<3%), a trend which continues through the Wabash Lowland (Cantin 2000). Over half of Stilwell points were of Wyandotte (54%), with the balance largely of Muldraugh (34%), almost to the virtual exclusion of all other types, with those limited to single examples of chert types. Pine Tree selection favored Muldraugh (45%) over Wyandotte (34%), though the disparity was the least of the four technologies. Pine Tree chert selection also showed the greatest use of Allens Creek (4%) and “Other” types, though this may be an artifact of the large sample. Significant use was also made of St. Louis varieties (11%).

Muldraugh and its variant Allens Creek outcrop in the bluffs a few hundred meters from Farnsley. Wyandotte outcrops some 30 km to the west; Jeffersonville and Laurel some 40 km to the east; and the St. Louis varieties occur in a belt that stretches from 30 km west into south-central Kentucky. “Exotics” which occur in minor numbers include Newman from northeast Kentucky, Ste. Genevieve from south-central Kentucky, Flint Ridge of central Ohio, and Fort Payne/Dover from north-central Tennessee. The general Kirk chert consumption pattern of dependence on local and semi-local materials, which was something of a surprise given a presumed pattern of high residential mobility marked by frequent and distant moves. The exotics are not thought to necessarily represent events of direct acquisition. Holland chert, which outcrops 95 km northwest of Farnsley in Dubois County, Indiana, was not substantially exploited by Farnsley Kirk populations. This is significant as it is of higher quality and outcrops closer to Farnsley than many of the other cherts represented. This may reflect limits in the home range. The general chert acquisition pattern implies that the Farnsley population home range included parts of south-central Kentucky, with the Farnsley site itself representing the northern apex of a home range, as few other more northern Indiana cherts aside from those that outcrop along the Ohio River are represented. An alternative model would posit that cherts such as Holland (and the general area in which such cherts occur) *are* exploited by Farnsley Kirk groups, and are deposited in discarded form at distant retooling stations such as those St. Louis outcrops in Kentucky (*sensu* Ingbar 1994). This has not been reported to date.

There is also a significant difference in the chert *quality* selection; even amongst the types routinely used (Muldraugh and Wyandotte). Muldraugh, on the whole, is a medium-quality chert, while Wyandotte is a high-quality type in general. Selection for quality *between* or dependent on types is of course significant in and of itself, though other patterns emerge when considering selection based on quality variation *within* the types. As such, the highest quality material within the quality continuum of given types was selected for 57% of Pine Tree points, as opposed to 45% of Kirk Large. Medium quality toolstone was utilized for 36% of Pine Tree, but over 45% of Kirk Large. Similarly, 7% of Pine Tree but 13% of Kirk Large points were manufactured by low quality materials within any given chert type. It is evident that a far more concerted effort to select higher quality material was practiced within Pine Tree technology as opposed to Kirk Large. In fact, as the numbers illuminate, medium quality stone was utilized more frequently than high quality analogs in Kirk Large technology, reflecting an indifference to quality in regard to their technology.

In stark contrast, Both Stilwell and Kirk Small show dogmatic quality selection within given chert types–both register at about 75% for high quality material, with less that a quarter being of medium quality, and 3-4% low quality. Clearly, more stringent “quality control” is operative relative to Pine Tree and Kirk Large.

That the chert assemblage was overwhelmingly of relatively local material was somewhat unexpected. This pattern suggests dramatic reduction in group mobility relative to preceding Paleoindian cultures, a kind of “settling in” the Ohio valley in a manner analogous to Dalton in the Mississippi valley (Koldehoff and Walthall 2004). There are other lines of evidence in the lithic dimension to support a hypothesis of reduced mobility. While residentially mobile Paleoindian groups certainly had large, intensive workshop quarry sites in which volumes of debris were generated similar to that component of the Farnsley site, these sites seldom contain significant evidence of generalized domestic behavior manifested in relatively high frequencies of tools and features. Furthermore, highly mobile groups are compelled by technological necessity to utilize cryptocrystalline materials to compensate for unpredictable distribution of lithic deposits over the landscape (Goodyear 1979). Muldraugh chert, the chert of choice at Farnsley, does not meet the cryptocrystalline criteria. While it is certainly a serviceable material, its selection was more predicated on its proximity to the site. Wyandotte, on the other hand, *is* a cryptocrystalline material. However, it is also somewhat local which may account for its preponderance. Very few examples of cryptocrystalline extralocal cherts are present in the assemblage. That, in turn, suggests that (a) they were seldom traveling great distances and (b) since they were not, the acquisition of cryptocrystalline materials was not a crucial concern (Andrefsky 1994). Muldraugh satisfied their technological demands, and since it was ultralocal, replacement costs were minimal (Binford 1980; Luedtke 1984; Andefsky 1994). It should be noted that there was a modicum of quality selectivity operational. Several lower-grade cherts such as Lost

River were virtually excluded from the assemblage, though it occurs nearer to Farnsley than other cherts that were utilized.

The Farnsley profile contrasts with the Kirk chert consumption pattern recorded in the adjacent Wabash Lowland of southwestern Indiana (Cantin 2000). Kirk groups exploiting this area *do* seem to be more mobile–large, intensively occupied sites like Farnsley are absent, and are limited to low densities of points scattered over the landscape. Virtually no artifactual Muldraugh chert is recovered. One of two scenarios is plausible: either groups originating from the Farnsley area expended all Muldraugh tools before entering the Wabash Lowland, or more likely, the Wabash Lowland was not a part of their home range. The Kirk points that are recovered are more typically of high quality cryptocrystalline materials, namely Wyandotte and Holland which account for 63% of all Kirk points recovered. This conforms to Goodyear's (1979) model of cryptocrystalline dependence by highly mobile groups. Interestingly, Holland is transported throughout the entirety of the Wabash Lowland, to distances of 150 km or more—or substantially more than the distance between the Holland deposits and Farnsley. That Wyandotte occurs in high frequencies in both the Wabash Lowland and Farnsley, in conjunction with Holland exploitation limited to the former area and Muldraugh the latter area, may be indicative of home range boundaries. That is, the Wyandotte outcrop belt may serve as a mutual resource for both, reflecting an overlap along the edges of two disparate home range areas.

SUMMARY

We have concluded that Pine Tree is a valid morphological and technological type. While it may be argued that Pine Trees are resharpened Kirk Large derivatives–and some of them do appear to be just that on a morphological level–other Pine Trees appear to be crafted in such a morphology, using a specific technology, as an original form. Many of the "pristine" Pine Trees are actually longer than the biggest Kirk Larges. The fact that the Pine Tree form is the overwhelmingly predominant variant at Farnsley puts this assemblage at odds with Kirk assemblages from Southeastern sites, in which Pine Trees are usually a minor if not insignificant form relative to Kirk Large or Small points. The prevalence of the Pine Tree form may indicate that this is a regional expression of Kirk limited to this portion of the Ohio valley.

Pine Tree point blades are relatively long and narrow, and usually very well made. Typical blade shape in pristine forms is recurvate, often with a long medial section that is parallel-bladed. A prominent feature is the outswept, flaring barbs, which are isolated from the blade in pristine forms and even more accentuated through blade maintenance which can lead to a strongly incurvate blade. The tips are habitually mucronate or acuminate, typically in an extreme manner. Perhaps the most striking attribute is the use of pressure flaking on the blade. This is related to the prevalence of serration, in which the blade margin is carefully prepared to set up a platform for what Bruce Bradley refers to as "serial serration" in Dalton points (Bradley 1997). These serration flakes carry across the face of the blade, and often laterally intersect to form a medial ridge in a collateral/transverse flaking pattern. Serration is installed from the tip to along the entire barb. The maximum width is usually across the barb tips. The thickest part of the point is very often just below the notch juncture. Notches are long and narrow. Basal margins are most often straight, but are also commonly convex and infrequently concave. They are almost always basally ground, with grinding extending to the tips of the barbs and within the notches.

Kirk Corner Notched Large points are usually broad points with excurvate (or less often, triangular) blades. Very often the curvature of the original flake is well-preserved, and flaking can be minimally bifacial, at times approaching unifacial. Broad, random percussion flakes dominate the face which lacks a medial ridge. Minimal pressure flaking is present, and is typically restricted to shaping of the blade margins, not to thin the face. Notches can be relatively broad and "open", which results in stubby downswept barbs and a short but broad haft element. The thickest portion of the point tends to be immediately distal from the haft element, and the widest axis is often above the notches. Serration is not as common as it is in the Pine Tree form, and is usually accomplished by simply notching the blade margin with minimal preparation. Basal shapes are typically convex or straight and rarely incurvate, and nearly three-quarters are basally ground. Tips are often mucronate, though not as exaggerated as they are in Pine Tree forms. The Stilwell subvariety is usually excurvate-bladed with an incurvate base, with a hexagonal cross section and is virtually always serrated.

While Kirk Corner Notched Small appear to be diminutive analogs to the Large form, other technological aspects render them as similar to Pine Tree. The blades are most often triangular or excurvate, with stubby downswept barbs. They are routinely serrated and basally ground, both in greater frequency than Kirk Large but less than Pine Tree. They may be serially serrated, but the pressure flakes seldom carry across the entire blade face, thus the original random percussion scars are still evident. Tips are either mucronate on excurvate forms or acutely pointed in triangular examples. Like Pine Trees, maximum width is across the barb tips. Over half have straight bases, followed by convex and then concave morphologies.

In summary, there are quite distinctive and significant morphological and technological differences between each of the three types. This is further accentuated in the three variety's chert selection patterns.

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CHAPTER 6

KIRK COMPONENT LITHIC TOOLS

by

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This chapter describes the large quantities of lithic tools recovered from the Kirk zone in the Main Block at the James Farnsley site (12Hr520). The Kirk zone is divided into three subzones: Upper Kirk, Middle Kirk, and Lower Kirk. In addition on the paleobank of the early Holocene Ohio River is a secondary trash deposit that is considered separately. Each major tool category is treated in turn in the following sections. Thebes/St. Charles and Early Side Notched component tools are described in Chapter 7.

BIFACES

One of the top functional priorities at the Farnsley site was tool manufacture which is particularly evident through debitage volume and biface abundance. Some 4347 bifaces were recovered in Phase III proceedings at Farnsley (*n* = 4143 in units [95.3%], and 204 from features [4.7%]), representing all stages of manufacture. Most are made of the locally available Muldraugh chert, though other cherts are well-represented. Relative frequencies between various stages as well as chert selection frequencies changed through time as well.

Conceptually, the term "biface" is reserved for those chipped stone items that are bifacially reduced, have no definable bit end, and are not referable to any other formal type. The bifacial chipping is surficial or invasive for the most part, rather than restricted to the margins of the piece. There must be evidence of the intentional shaping of at least one of the edges, and the invasive chipping must cover at least half of the surface of the piece on one side. With the understanding that biface reduction is a continuum, the scheme employed for subdividing bifaces follows the extensive experimentation of Errett Callahan (1979), who reproduced 1000 bifacial objects in replicating the Paleo-Indian fluted point. Callahan recognizes four stages, but since his initial stage is *procurement*, his stages 2-4 equate with our stages 1-3. Manufacture stage was determined from properties such as symmetry, thickness/width ratios, degree of edge sinuosity; cross section, flake patterning, and edge retouch (percussion/pressure). Chert type was also scored. Definitions of each bifacial reduction stage are described below.

Many of the bifaces were likely to be rejected forms, broken or flawed in some way. These aspects were not systematically scored. Some were complete but potentially too thick or too narrow for further reduction, though many flawed/broken bifaces appeared to be "salvageable". It is likely that low replacement costs, facilitated by local chert outcrops, made feasible the quick abandonment of less-than-optimal forms.

Biface Stage Definitions

S*tage 1* reduction is the first phase in the production of a finished bifacial form, though the tool maker may have terminated production at this point either because material flaws or texture prevented carrying the piece to a more refined shape, or because it was already suitable for a particular task. As the name suggests, the purpose of this stage is to provide an edge that is roughly symmetrical and in the middle of the lateral cross-section. Scars along the margin are relatively widely spaced, producing a very denticulated or curvy outline. The surfaces of the biface when viewed in lateral section are offset substantially from this edge, meaning that the biface itself is rather thick. Callahan (1979:10) suggests that the width: thickness ratio of a complete initial stage biface is 2:1 or greater.

- *Width-to thickness ratio*: 2-3:1
- *Edge angle*: 55^{o}-75^{o}
- *Cross section*: thick, lenticular-irregular
- *Edge sinuosity*: highly sinuous
- *Planview*: Irregular
- *Major reduction mode*: heavy percussion
- *Objective*: trimming

Stage 2 reduction involves thinning the piece to a width: thickness ratio of 3:1 or 4:1, so that edge angles are restricted to the 40°-60° range. Major projections and irregularities are eliminated, and the centered edge becomes less sinuous. Flakes usually do not travel past the center line from the lateral margins, and the two major surfaces are not offset from the center line as much as in the initial edging stage.

- *Width-to thickness ratio*: 3-4:1
- *Edge angle*: 40^{o}-60^{o}
- *Cross section*: lenticular
- *Edge sinuosity*: moderately sinuous
- *Planview*: semi-regular
- *Major reduction mode*: light percussion
- *Objective*: thinning and shaping

Stage 3 reduction continues the trends of the previous stage. The width: thickness ratio usually exceeds 4:1, and the edge angles are consistently in the 25°-45° range. The edge is now quite straight, scars are close together, and the thinness of the biface results in surfaces that are offset very little from that edge. One of the principal features distinguishing this stage from the previous one is that flakes frequently travel past the center of the piece and undercut previously produced flake scars from the opposite margin. Most projectile points and drills possess this characteristic but, of course they would be categorized in their respective formal classes.

- *Width-to thickness ratio*: 4-5:1
- *Edge angle*: 25^{o}-45^{o}
- *Cross section*: flattened-thin lenticular
- *Edge sinuosity*: straight
- *Planview*: regular, patterned

- *Major reduction mode*: light percussion and pressure
- *Objective*: shaping and finishing

A Biface Fragment is a piece so fragmentary that stage distinctions cannot be made with confidence. This is often the case when the object consists of only one side or end, not enough to ascertain how far the removals carried toward the opposite edge. The biface fragment must exhibit at least one break surface, a surface that does not bear characteristics typical of the ventral surface of a flake. Since experience has shown that it is virtually impossible in many cases to distinguish between the tips of projectile points and other pointed bifaces when the remainder of the object is missing, classify them as Stage 3 bifaces.

Unit Discussion

There are three distinct Kirk horizons represented at the Farnsley site, designated as Lower, Middle, and Upper, as well as refuse deposit draped over the paleobank referred to as Secondary Kirk. For clarification, Lower Kirk and Middle Kirk are technologically similar in that they are represented by various Kirk Corner Notched forms, notably the Pine Tree type. The Secondary Kirk is associated with both the Middle Kirk and Lower Kirk. Each of these cultural units are characterized by abundant lithic reduction debris and tools, particularly the Middle Kirk. Upper Kirk differs in that Stilwell points become more abundant (though not to the exclusion of other types). Relative to the earlier Kirk deposits, Upper Kirk material density is lower, features are fewer, and overall appears to be a more ephemeral occupation. It may be expected that other aspects of the occupation may be different as well, including chert selection

In a general discussion of biface frequencies in the various Kirk deposits, several commonalities are identified between all components. From most to least frequent are bifaces of Stage 3 (Figure 6.3), Stage 2 (Figure 6.2), to Stage 1 (Figure 6.1). Furthermore, in each case, there are roughly twice as many Stage 3 as Stage 2 bifaces, and twice as many Stage 2 forms as Stage 1. Knives and fragments occur in minor frequencies, a combined total of four percent or less in every case. It should be noted that any technological interpretations derived from biface frequencies need to be tempered with debitage data (Stafford 2007).

The relative biface stage frequencies are virtually identical between the Lower and Middle Kirk assemblages (Table 6.1). The Secondary Kirk differs slightly in that there were proportionately more Stage 1 and 2 bifaces and fewer Stage 3 forms, though the differences are only on the order of five percent. In the general middens of these occupations, Stafford (2007:337) documents debitage suggestive of mixed-stage reduction. Since the Secondary Kirk is a refuse deposit rather than a midden deposit, the discrepancy reflects minor differences in discard behavior. Being a refuse deposit, it may be expected that a greater proportion of failed or rejected earlier-stage forms would populate this deposit while later-stage forms survived the reduction process to become curated, functional tools. Stafford (2007:337) reports a greater frequency of earlier-stage debitage in this deposit as well.

Figure 6.1. Kirk zone stage I bifaces.

Figure 6.2. Kirk zone stage 2 bifaces.

The Upper Kirk biface collection, though smaller than its predecessors, differs from the earlier assemblages. Relative to earlier Kirk, the Upper Kirk Stage 1 biface frequency is appreciably smaller, and the Stage 3 frequency is considerably higher. The Stage 2 frequency was consistent with earlier Kirks. The fragment and knife frequencies are smaller as well. The Stage 1/Stage 3 relationship is arguably correlated.   Multiple scenarios could be posited, such as a greater success rate converting earlier biface forms to later forms, a perception which could be supported by the reduced fragment category. However, it could be that fewer Stage 1 forms were prepared onsite. Much of the early reduction could have been performed offsite—perhaps at the locus of chert procurement—with the reduced forms brought to Farnsley in a more nearly-finished state. However, a debitage analysis from this component reflects mixed reduction stages that is indicative of onsite early-stage reduction (Stafford 2007:338). This could possibly indicate differential site function through time, in that Lower and Middle Kirk more intensively utilized the site as a residential base with a focus on tool fabrication, as opposed to more casual use and retooling by Upper Kirk groups.

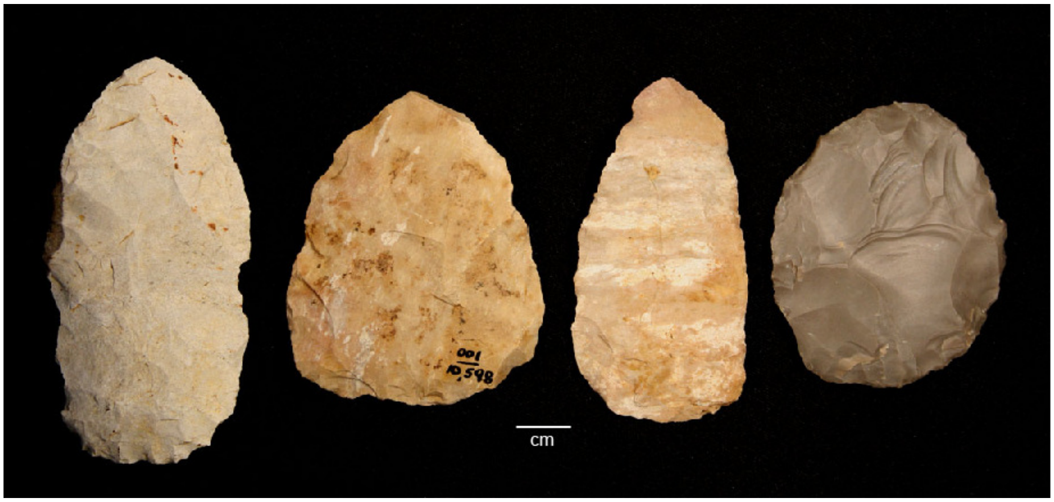

Figure 6.3. Kirk zone stage 3 bifaces.

Features

From all components, a total of 204 bifaces or fragments (Table 6.2) were recovered in feature context (4.7% of all bifaces). This diminutive figure may be due in part to the virtual non-existence of refuse pits on the site. Most of the bifaces defined in feature context were those that lay in proximity to thermal features (campfires), in what generally constitutes small activity areas around those feature types. Biface disposal patterns differ between general unit/midden context and features, as well as between different Kirk components.

A small but noticeable elevation in the frequency of biface *fragments* within features is documented in all components. Knives were only recovered in Middle Kirk features. Of all Upper Kirk bifacial forms, only a single biface fragment was recovered in feature context. The virtual absence of bifacial forms in Upper Kirk features may be indicative of a site function which differs from earlier Kirk occupations, perhaps reflecting a more ephemeral occupation.

As with general midden frequencies, the Middle Kirk and Secondary Kirk stage frequencies within features are similar. Relative to those components, Lower Kirk shows a substantially depressed frequency of Stage 3 forms. Stage 2 forms are much more prevalent in Lower Kirk as compared to Secondary Kirk.

Unit Bifaces & Chert

It is presumed that the majority of bifaces represent a point along a continuum leading to a finished-tool form. A biface has the potential to become any number of finished, formal tools. As such, chert selection patterns represented in an assemblage of bifaces more likely represents the full spectrum of chert types exploited by a group to satisfy a range of technological demands, as opposed to certain tool forms (i.e., points) which can have very stringent material demands requiring very selective procurement

Table 6.1. Phase III units Number/Frequency of bifaces per stage per component.

Stage/Frequency	Lower Kirk (*n*=809)	Middle Kirk (*n*=2500)	Secondary Kirk (*n*=600)	Upper Kirk (*n*=233)
Biface Fragment	2.5	2.3	2.0	1.3
Stage 1	15.7	15.4	20.0	11.6
Stage 2	26.7	27.0	29.2	25.8
Stage 3	53.6	54.4	48.2	60.1
Stage 3-Knife	1.5	0.9	0.7	1.3
Total	*100.0%*	*100.0%*	*100.1%*	*100.1%*

Table 6.2. Phase III features Number/Frequency of bifaces per stage per component.

Stage/Frequency	Lower Kirk (*n*=64)	Middle Kirk (*n*=111)	Secondary Kirk (*n*=28)	Upper Kirk (*n*=1)
Biface Fragment	7.8	2.7	3.6	100.0
Stage 1	20.3	15.3	17.9	0
Stage 2	37.5	30.6	25.0	0
Stage 3	34.4	50.5	53.6	0
Stage 3-Knife	0	0.9	0	0
Total	*100.0%*	*100.0%*	*100.1%*	*100.0%*

efforts. Table 6.3 displays the number of bifaces per chert per component—but does not break this down into reduction stages.

The general biface/chert pattern from Farnsley Kirk deposits shows a reliance on local to semi-local materials. The Farnsley biface assemblage is dominated by Muldraugh, Wyandotte, St. Louis, and Allens Creek cherts; the former three occur within three kilometers of CAP, while Wyandotte occurs inside of 30 km. Collectively, these four cherts account for nearly 95% of the total. Overall, eighteen known chert types were recovered as bifaces from Phase II and III units within the various Kirk deposits.

Muldraugh is by far the most prevalent raw material represented in the biface assemblage. It never accounts for less than 61% in any given Kirk occupation, and tallies for nearly two-thirds of bifaces from all occupations. It is an ultra-local resource, with outcrops documented immediately to the west in the bluffs bounding CAP and in the rivulets draining it. Its ubiquity and medium-to-high quality made it an attractive toolstone. In frequency, it is lowest in Upper Kirk (in which Wyandotte sees a corresponding increase), and highest in Secondary Kirk (69.2%). The higher incidence in the refuse may reflect less intensive curational behavior or willingness to complete a less-than-perfect form because of low replacement costs.

Table 6.3. Phase III units biface frequency by chert per component.

Component	Upper Kirk	Middle Kirk	Secondary Kirk	Lower Kirk	Total *N*	% of TOTAL *N*
	234	2500	600	809	4143	
Chert	%	%	%	%	*N*	
Allens Creek	3.8	2.8	4.0	4.1	137	3.3
Boyle	0.4	0.3	0.3	0	10	0.2
Derby	0	.04	0	0.1	2	<0.1
Dover	0.4	0.5	0.5	0.4	20	0.5
Holland	0.9	0.1	0.2	0	6	0.1
Indian Creek	0.9	0.2	0	0.4	6	0.1
Indeterminate	1.7	0.9	0.7	0.6	33	0.8
Jeffersonville	0	1.1	1.3	1.1	44	1.1
Laurel	0.9	0.8	0.3	1.2	33	0.8
Lead Creek	0	0.5	0.7	0.5	19	0.5
Lost River	0	0.1	0.2	0.2	5	0.1
Muldraugh	61.1	66.0	69.2	64.4	2725	65.8
Newman	0	0.2	0	0	6	0.1
Salem	0	0.4	0.8	0.4	19	0.5
Stanford	0	0	0.3	0.4	5	0.1
St. Louis	7.3	9.8	6.7	9.4	377	9.1
Upper Mercer	0	0	0.2	0	1	<0.1
West Franklin	0	.04	0	0	1	<0.1
Wyandotte	22.2	16.2	14.7	16.8	682	16.5

Allens Creek chert, a Muldraugh variant, co-occurs in the same blufftop outcrops and drainages. It is represented consistently in the 3%-4% range through the various occupations. Though it is local, geologically abundant (though not as much so as Muldraugh), and of medium tractable quality, it is clear that Muldraugh was selected over it. While Allens Creek occurs in usable tabular form, the slabs are often thin and brittle and prone to shatter. Raw, knappable Allens Creek would have to be carefully inspected prior to reduction. This process would preclude much of its use given the ubiquity of usable Muldraugh.

St. Louis chert is the third-most frequent chert represented as bifaces at Farnsley, behind Muldraugh and Wyandotte. St. Louis deposits occur in various tributaries of the Buck Creek system atop the bluffs just a few kilometers from CAP, and thus would be classified as a "local" chert (0-3km) (Munson and Munson 1984). Though "local", St. Louis chert occurs at a greater distance than Allens Creek chert (which virtually outcrops onsite), and is documented in biface frequencies of two to three times greater than Allens Creek through the various Kirk occupations, hovering in the seven-to-ten percent range.

Wyandotte biface frequency was second-greatest amongst all bifaces in general, though it occurs at the greatest distance from CAP of the four primary cherts utilized in biface production. Though second-greatest in the Farnsley assemblage, its incidence varies appreciably between individual Kirk occupations. It is greatest in Upper Kirk (22.2%), which is characterized by Stilwell points. (54% of Stilwell points, it should be noted, are made of Wyandotte, the highest amongst all Kirk Cluster points). The Lower Kirk and Middle Kirk frequencies are virtually identical, registering at a bit more than sixteen percent. It is slightly lower in the Secondary Kirk, which might suggest a slight increase in curational behavior, in that a smaller proportion was discarded in an obvious refuse deposit.

Fourteen other cherts of known geological provenance were represented in minor frequencies as bifaces from Farnsley Phase II and III units. Only one of these, Jeffersonville, registered at more than one percent. Jeffersonville is a semi-local resource, with outcrops documented at a 30 km distance east in the Utica-Watson area (Clark County). A low frequency of Lost River chert was recorded, a semi-local resource that outcrops in western Harrison County and neighboring counties to the north and west. Other cherts that occur to the south in the Louisville area include Salem and Boyle. Several other cherts were noted with provenance along or near the Ohio River. These include: Derby (Perry County, IN), Lead Creek (Spencer/Perry County, IN), and West Franklin (near Evansville, Vanderburgh/Posey County, IN). A minor but intriguing presence of cherts from the Bloomington, Indiana area was also documented with the recovery of bifaces of Indian Creek and Stanford cherts. This indicates movement into the interior of the State, away from major drainages, along the Mitchell Plateau (Gray 2000). The small number of bifaces of these cherts may represent deposition of the last representatives of a chert source earlier exploited and utilized within a subsistence round, in a model as explicated by Ingbar (1994). Alternately, it may reflect down-the-line trade with neighboring Kirk groups. Cantin (2000) notes a similar tenuous relationship between Kirk groups of Harrison County and more extreme southwest Indiana as reflected in cherts as well.

There are two cherts which represent super-foreign sources (100+ km). Dover, from north-central Tennessee is represented by a surprising twenty specimens. Dover is a geologic equivalent to Muldraugh, and it is possible that the material identified as Dover is a much more local Muldraugh variant. One biface of Upper Mercer chert from central Ohio was recovered as well. Again, this may represent some down-the-line trade or macroband exchange (Anderson and Hanson 1988).

Feature Bifaces & Chert

Table 6.4 displays the number of bifaces per chert per component—but does not break this down into reduction stages. The overall chert composition of feature-associated bifaces is not extremely different than unit-recovered bifaces. From most to least frequent are Muldraugh, Wyandotte, St. Louis, and Allens Creek cherts. There is about a 10% increase in Muldraugh associated with features relative to units. The Wyandotte frequency remains virtually unchanged, as does Allens Creek. However, St. Louis drops from 9.1% in units to 3.4% in features.

Individual Kirk occupations show some fluctuation of relative chert frequencies, but this is probably more a matter of small sample size of bifaces with feature provenience. Upper Kirk, for instance, is marked by a single feature-associated biface,

Table 6.4. Phase III features biface frequency by chert per component.

Component	Upper Kirk	Middle Kirk	Secondary Kirk	Lower Kirk	Total *N*	**% of TOTAL *N***
	1	111	28	64	204	
Chert	%	%	%	%	*N*	
Allens Creek	0	4.5	3.6	0	6	2.9
Dover	0	0	0	1.6	1	0.5
Jeffersonville	0	0	0	3.1	2	1.0
Laurel	0	0.9	0	0	1	0.5
Lead Creek	0	0	0	1.6	1	0.5
Lost River	0	0.9	0	0	1	0.5
Muldraugh	0	73.9	78.6	67.2	147	72.1
Salem	0	0.9	0	1.6	2	1.0
St. Louis	0	3.6	17.9	4.7	7	3.4
Wyandotte	100	15.3	0	20.3	36	17.6

that being of Wyandotte. Secondary Kirk features have *no* Wyandotte bifaces. With the exception of Upper Kirk, the fewest number of cherts are represented as feature-associated bifaces in the Secondary Kirk, as it is populated by only the three most local materials—Muldraugh, St. Louis, and Allens Creek, in that order. The Secondary Kirk is an unusual deposit, though, in that it is a refuse deposit draped over the paleobank. Features are rare and functions are speculative. It is uncertain how to interpret lithic assemblages potentially associated with Secondary Kirk features, especially with only 28 specimens.

The Middle Kirk (n=111) and Lower Kirk (n=64) have substantially larger assemblages. In the Middle Kirk, bifaces recovered in feature context have chert frequencies somewhat dissimilar to that documented from unit provenience. From Middle Kirk features, Allens Creek is relatively higher than from units (though still very low overall); St. Louis is very depressed; Muldraugh is appreciably higher; but the Wyandotte frequency is about the same between features and units.

Features of the Lower Kirk deposit show a wider range of more exotic materials, though usually in small amounts. Represented are Jeffersonville, Salem, Lead Creek, and Dover. However, no bifaces of Allens Creek were recovered from Lower Kirk features. Muldraugh occurs in a frequency similar to that documented in units. St. Louis is found half as frequently in features than units. Wyandotte is recorded approximately 25% more frequently in Lower Kirk features than units.

Unit Biface Stage & Chert

This section will analyze chert type frequencies per bifacial reduction stage per Kirk component. This analysis identifies distinct technological patterns in each component. In the following discussion and tables, bifaces of each reduction stage are scored per chert type and then compared by frequency within that reduction stage.

Bifacial fragments and "knives" are also analyzed, though absolute numbers are so small as to make their analysis very generalized.

In almost every case—in every reduction stage in every component—Muldraugh chert is the predominant material represented in both absolute numbers and in frequency. Its co-variance with other materials is the focus of this analysis. Muldraugh is especially prevalent in earlier reduction forms as it outcrops in the bluffs adjacent to Farnsley, and is also found in the bedload of rivulets draining the bluffs.

As an exercise to determine variability in how local cherts are utilized per component, local chert type frequencies are compiled from nearest to farthest in each reduction stage. As such, Muldraugh and Allens Creek are first added together, then St. Louis, and finally Wyandotte.

Lower Kirk

Lower Kirk is represented by 809 bifacial forms (Table 6.5), 32 of which are either fragments or "knives". Thirteen cherts were identified in the total Lower Kirk biface assemblage, not including "indeterminate" specimens. Only five were present in all three stages, three of which are "local" resources: Muldraugh, Allens Creek, and St. Louis. The other two were Wyandotte and Laurel which are "semi-local", each represented by a lone Stage 1 form.

A total of seven chert types are represented as Stage 1 bifaces in the Lower Kirk occupation. Stage 1 forms are dominated by Muldraugh, which accounts for over 86% of this stage. Though Allens Creek co-occurs with Muldraugh in the bluffs (though in much lesser volume), it ranks as third-most common at just over two percent. St. Louis chert, the third-closest occurring chert outcropping at a distance of 2 km-3 km, is second-most frequent at over six percent. Only a lone Wyandotte specimen was recovered. Perhaps a bit of a surprise was the presence of a Derby Stage 1 biface which outcrops 55 km west in Perry County. Otherwise, cherts represented tend to be semi-local (occurring within a 30 km radius)

Those cherts considered "local" (Muldraugh, Allens Creek, and St. Louis) constitute 95.3% of the total of Stage 1 bifaces. If the semi-local Wyandotte is added, the total is 96.1%. These figures will be compared to frequencies in later stages below.

While St. Louis is a "local" material as it occurs within three kilometers, its presence is still enigmatic. It does not occur in the drainages flowing from the bluffs onto the Farnsley landscape, but rather is found in Buck Creek tributaries which flow southwesterly. Though fairly local, transporting bulky quantities over several kilometers of rugged terrain to a site adjacent to abundant outcrops of tractable material is puzzling. It is not a material superior to Muldraugh, nor does it seem to be selected for certain tool classes. It is thought to have been opportunistically collected in the course of routine subsistence activities which brought Farnsley occupants into those drainages (Binford 1979).

Table 6.5. Lower Kirk biface stage by chert type.

Chert	N	Biface Frag		Stage 1		Stage 2		Stage 3		Knife	
		N	*Class %*	N	*Class %*	N	*Class %*	N	*Class %*	N	*Class %*
Allens Creek	33			3	*2.4*	11	*5.1*	19	*4.4*		
Derby	1			1	*0.8*						
Dover	3					2	*0.9*	1	*0.2*		
Indeterminate	5			2	*1.6*			3	*0.7*		
Indian Creek	3							3	*0.7*		
Jeffersonville	9					6	*2.8*	3	*0.7*		
Laurel	10			1	*0.8*	3	*1.4*	6	*1.4*		
Lead Creek	4					3	*1.4*	1	*0.2*		
Lost River	2					1	*0.4*	1	*0.2*		
Muldraugh	521	14	*70.0*	110	*86.6*	143	*66.2*	245	*56.5*	9	*75.0*
St. Louis	76			8	*6.3*	23	*10.6*	45	*10.4*		
Salem	3			1	*0.8*			2	*0.5*		
Stanford	3					1	*0.4*	2	*0.5*		
Wyandotte	136	6	*30.0*	1	*0.8*	23	*10.6*	103	*23.7*	3	*25.0*
Total	809	20	*100.0*	127	*100.1*	216	*99.8*	434	*99.9*	12	*100.0*

Relative to Stage 1, the Stage 2 biface assemblage shows a precipitous drop of over 20% in Muldraugh frequency (although the actual Muldraugh count rises 30% from Stage 1). This drop is largely due to escalated use of Wyandotte which rises to over 10%, as well as moderate increases in St. Louis and Allens Creek. Ten cherts are represented as Stage 2 bifaces, with minor frequencies recorded of Jeffersonville, Laurel, Lead Creek, and Lost River, as well as the "foreign" Stanford and two bifaces of the Tennessee Dover type.

While the overall trend is still the use of local and semi-local materials, the frequencies vary enough from the Stage 1 profile to suggest a potentially significant different pattern in chert procurement. Muldraugh frequencies combined with Allens Creek totals for just over 71%, which contrasts with the 89% frequency of Stage 1. Adding St. Louis brings the total to about 82%, compared to the analogous Stage 1 frequency of 95%. The addition of Wyandotte brings the collective frequency up to 92.5% compared to the Stage 1 frequency of 96%.

Continuing the trend recorded earlier, Muldraugh frequency drops another 10% in the Stage 3 biface assemblage (though again increasing in absolute numbers), while Wyandotte spikes to nearly a quarter of the population (23.6%). Allens Creek and St. Louis frequencies remain relatively stable. Muldraugh and Allens Creek combine for about 61%; with St. Louis added, around 71%. These figures are considerably below their corresponding Stage 2 frequencies, though absolute numbers increased in each case. However, as noted, when the burgeoning Wyandotte frequency is factored in, these four cherts account for 95% of the population.

The other five percent of Stage 3 bifaces are split amongst eight other chert types, each generally represented by six or fewer specimens, on the order of one percent or less.

These include the semi-local Jeffersonville, Laurel, Lost River, and Salem, as well as foreign types such as Lead Creek, Indian Creek, and Stanford, in addition to a single Dover specimen from Tennessee. These cherts are likely brought to the site in near-finished states.

Though occurring in diminishing frequency through reduction stages relative to other chert types, Muldraugh remains the predominant raw material for biface production. (Its actual count rises through each subsequent reduction stage, however.) There is a correlation between the decline of Muldraugh frequency and the increasing incidence of Wyandotte through reduction stages. As Wyandotte is poorly represented in earlier stages, its substantial proportion of Stage 3 forms suggests that it was brought to the site in near-finished form, which is supported by Stafford's (2007) debitage analysis. Muldraugh, on the other hand, was apparently brought to Farnsley in a raw state or in minimally-trimmed condition, again supported by Stafford's debitage analysis.

Middle Kirk

Twenty five hundred bifaces were recovered in the Middle Kirk occupation (Table 6.6). Of those, 79 were biface fragments or knives. A total of 16 chert types were identified, excluding "indeterminate" types (n=22). While there is some difference in the frequencies between Middle Kirk and Lower Kirk, they are not particularly significant, especially between the "big four" of Muldraugh, Allens Creek, St. Louis, and Wyandotte. Many of these differences may be a function of the larger Middle Kirk assemblage size.

Nine cherts were recorded in Stage 1, twelve cherts in Stage 2, and fifteen cherts in Stage 3. Nine cherts were utilized in all reduction stages—Allens Creek, Dover, Jeffersonville, Laurel, Lead Creek, Muldraugh, St. Louis, Salem, and Wyandotte. Most are local or semi-local with the exception of Lead Creek and Dover. The Stage 1 Lead Creek form is odd in that this material is not particularly of high quality, and distant transport of such material does not seem feasible. The Stage 1 Dover specimen is odd simply for the distance transported, from north-central Tennessee. It is possible that both were utilized more as "traveling cores", a source of exigently-needed flakes, rather than as semi-finished tools.

As with Lower Kirk, the Middle Kirk Stage 1 chert profile is dominated by Muldraugh (86.6%), followed by a minor occurrence of St. Louis (6%), a smattering of Allens Creek (2%), and a mere trace of Wyandotte (<1%). Collectively, the four cherts account for 96.6% of Stage 1 forms, which is only a half-percent more than the analogous figure in Lower Kirk. Only Jeffersonville (n=5) occurs as more than a lone specimen amongst the remaining cherts.

Again, a reliance on fairly local cherts is prevalent in Middle Kirk, in a virtually identical pattern to that of Lower Kirk. However, the Middle Kirk Stage 1 assemblage is three times as large as Lower Kirk, reflecting a much more intensive or sustained/repeated occupation(s).

Table 6.6. Middle Kirk biface stage by chert type.

Chert	N	Biface Frag		Stage 1		Stage 2		Stage 3		Knife	
		N	*Class %*	N	*Class %*	N	*Class %*	N	*Class %*	N	*Class %*
Allens Creek	71	1	*1.8*	8	*2.1*	19	*2.8*	43	*3.2*	0	*0*
Boyle	7	0	*0*	0	*0*	2	*0.3*	5	*0.4*	0	*0*
Derby	3	0	*0*	0	*0*	0	*0*	3	*0.2*	0	*0*
Dover	13	0	*0*	1	*0.3*	1	*0.1*	11	*0.8*	0	*0*
Holland	3	0	*0*	0	*0*	0	*0*	3	*0.2*	0	*0*
Indeterminate	22	1	*1.8*	4	*1.0*	10	*1.5*	7	*0.5*	0	*0*
Indian Creek	4	0	*0*	0	*0*	0	*0*	4	*0.3*	0	*0*
Jeffersonville	27	1	*1.8*	5	*1.3*	8	*1.2*	13	*1.0*	0	*0*
Laurel	19	0	*0*	1	*0.3*	9	*1.3*	9	*0.7*	0	*0*
Lead Creek	11	0	*0*	1	*0.3*	5	*0.7*	5	*0.4*	0	*0*
Lost River	2	0	*0*	0	*0*	0	*0*	2	*0.1*	0	*0*
Muldraugh	1651	33	*57.9*	314	*82.2*	469	*69.4*	824	*60.5*	11	*50.0*
Newman	6	1	*1.8*	0	*0*	2	*0.3*	3	*0.2*	0	*0*
St. Louis	244	8	*14.0*	34	*8.9*	78	*11.5*	120	*8.8*	4	*18.2*
Salem	10	0	*0*	1	*0.3*	5	*0.7*	4	*0.3*	0	*0*
Stanford	0	0	*0*	0	*0*	0	*0*	0	*0*	0	*0*
West Franklin	1	0	*0*	0	*0*	1	*0.1*	0	*0*	0	*0*
Wyandotte	406	12	*21.0*	13	*3.4*	67	*9.9*	307	*22.5*	7	*31.8*
Total	2500	57	*100.1*	382	*100.1*	676	*99.8*	1363	*100.1*	22	*100.0*

A reliance on relatively local materials has been established. When Muldraugh and Allens Creek Stage 1 forms are combined, the frequency is 84.3% (compared to the corresponding Lower Kirk 89.0%); adding St. Louis brings the total to 93.2% (Lower Kirk: 95.3); factoring in Wyandotte reaches a sum of 96.6% (Lower Kirk: 96.1%). As can be determined from these figures, some variance is noted, but the general trend in Stage 1 chert selection is fairly similar between Lower and Middle Kirk.

As in the Lower Kirk Stage 2 chert profile, Muldraugh frequency drops considerably from Stage 1 though actual count increases. However, the drop in Middle Kirk between stages is 12.8%, compared to the corresponding drop in Lower Kirk of over 20%. A few possibilities may account for the disparity: either a greater reliance on Muldraugh is accountable in Middle Kirk, or a greater success rate transforming Muldraugh Stage 1 to Stage 2 forms could be indicated. Just as likely, the discrepancy may simply be a function of a larger Middle Kirk biface population which more accurately reflects chert selection patterns.

Twelve cherts are represented as Stage 2 bifaces, and most are local and semi-local varieties. Though of minor significance in count, a few foreign varieties are notable in their presence. These include West Franklin (from the Evansville, Indiana area), Dover (north-central Tennessee), and Newman, a fine-grained tea-colored translucent material of high quality from eastern Kentucky.

As in Lower Kirk, much of the ground lost by Muldraugh from Stage 1 to Stage 2 in terms of frequency is made up by increases in St. Louis and particularly Wyandotte. The former, though fairly local, possibly could have been transported back to Farnsley in a trimmed state to eliminate unusable corticated mass and excess weight. Allens Creek occurs in an appreciably smaller frequency in Middle Kirk than it does in Lower Kirk. In terms of all Stage 2 Allens Creek forms from all Kirk occupations, it occurs in its lowest frequency in Middle Kirk.

Compiling local chert type frequencies from sources nearest to farthest as forms results in the following figures. Muldraugh and Allens Creek collectively tally 72.2% of the total Stage 2 assemblage (compared to the analogous Lower Kirk figure of 71.3%). Adding St. Louis results in 83.7% of all Stage 2 forms (compared to Lower Kirk, 81.9%). Integrating Wyandotte accounts for 93.6% of all cherts used in Middle Kirk Stage 2 forms (Lower Kirk: 92.5%). Again, the general pattern of local chert selection is very similar for Stage 2 reduction in both Lower and Middle Kirk, though a small degree of variability is identified.

Secondary Kirk

The Secondary Kirk occupation is a refuse deposit associated with Middle Kirk and Lower Kirk zones (Table 6.7). On one hand, chert type frequencies may be expected to be similar, but on the other hand, differential discard behavior as reflected in chert type frequencies may be expected given the fact that it is specifically a refuse deposit. Nearly six hundred bifaces were recovered in the Secondary Kirk deposit (n=594). Many bifaces, particularly later-stage forms, were broken though still assignable to reduction stage. Others were exhausted or had flaws which precluded further reduction or rejuvenation. Twelve were unclassifiable fragments and four were "knives".

Seven chert types were identified amongst the 120 Stage 1 bifaces from Secondary Kirk deposits. Four types were expected (Muldraugh, Allens Creek, St. Louis, and Wyandotte) and accounted for all but three Stage 1 bifaces. Lone specimens were recovered of the semi-local Salem and Jeffersonville types, as well as the foreign type, Dover.

Muldraugh registered at over 88% within this secondary deposit. This is the highest frequency for any chert of any reduction stage within any component. This frequency is six percent higher than the Middle Kirk zone. This over-representation reflects the virtual on-site proximity of Muldraugh outcrops which allows for casual discard behavior due to bare-minimum replacement costs. Though geologically co-occurring with Muldraugh, only five Allens Creek bifaces were recorded. St. Louis and Wyandotte accounted for three apiece. Collectively, these local and semi-local materials account for 97.5% of all Stage 1 bifaces in this secondary deposit.

Of *all* Stage 2 bifaces recovered from Farnsley Kirk components, Muldraugh chert is at its highest in Secondary Kirk deposit (71.4%). While a 17% decline is marked between Stage 1 and Stage 2 relative frequencies, the actual count rises modestly. As in other components' Stage 2 chert frequencies, the decline in Muldraugh is correlated with a rise in St. Louis and Wyandotte frequencies which seemingly arrive at the site most typically in semi-finished form. Additionally, it is suspected that low replacement costs allow for casual discard of Muldraugh forms.

Table 6.7. Kirk Secondary Trash biface stage by chert type

Chert	N	Biface Frag		Stage 1		Stage 2		Stage 3		Knife	
		N	*Class %*	N	*Class %*	N	*Class %*	N	*Class %*	N	*Class %*
Allens Creek	24			5	*4.2*	8	*4.6*	11	*3.9*		
Boyle	2							2	*0.7*		
Dover	3			1	*0.8*			2	*0.7*		
Holland	1							1	*0.4*		
Indeterminate	4	1	*8.3*			2	*1.1*	1	*0.4*		
Jeffersonville	8			1	*0.8*	5	*2.9*	2	*0.7*		
Laurel	2							2	*0.7*		
Lead Creek	4	1	*8.3*					3	*1.1*		
Lost River	1							1	*0.4*		
Muldraugh	410	6	*50.0*	106	*88.3*	125	*71.4*	170	*60.1*	3	*75.0*
St. Louis	40			3	*2.5*	15	*8.6*	21	*7.4*	1	*25.0*
Salem	5			1	*0.8*	1	*0.6*	3	*1.1*		
Stanford	2					2	*1.1*				
Upper Mercer	1							1	*0.4*		
Wyandotte	87	4	*33.3*	3	*2.5*	17	*9.7*	63	*22.3*		
Total	594	12	*99.9*	120	*99.9*	175	*100.0*	283	*100.3*	4	*100.0*

Seven cherts are represented as Secondary Kirk Stage 2 forms, but only one type (two specimens) is unusual. This type is Stanford chert from the Bloomington, Indiana area, about 110km to the northwest. Stanford is not represented by Stage 1 or Stage 3 forms in Secondary Kirk. The Wyandotte frequency, at just less than ten percent, is very consistent between Secondary Kirk and Middle Kirk, and both are appreciably below that of Lower Kirk. The St. Louis frequency was slightly higher in Middle Kirk and Lower Kirk, though not so much greater as to evoke interpretation of greater curation practices of St. Louis forms.

By analyzing collective frequencies of local forms, low replacement costs due to outcrop proximity becomes more apparent in this refuse deposit as opposed to the primary deposits of Lower and Middle Kirk. Added together, Muldraugh and Allens Creek account for 76% of Stage 2 forms (compared to LK=71.3%, MK=72.2%). The addition of St. Louis brings the composite frequency to 84.6% (LK=81.9%; MK=83.7%). Finally, when Wyandotte is factored in, the frequency is 94.3% of the total Stage 2 assemblage (LK=92.5%; MK=93.6%).

Thirteen cherts are represented in the 283 Stage 3 bifaces recovered in the Secondary Kirk deposit. Several "unusual" cherts were identified, types usually foreign in terms of transport distance (>30 km). All were represented by one to three specimens, and include Boyle, Dover, Holland, Lead Creek, Lost River, Salem, and Upper Mercer from central Ohio. Most of the thirteen total cherts outcrop in areas along the Ohio

River, or a short distance inland from the river. Obvious exceptions would be Dover and Upper Mercer, as well as Holland. These cherts likely arrived at the site in nearly-finished bifacial forms. The Upper Mercer specimen could reflect down-the-line trade, though direct procurement is not out of the question.

Muldraugh is again the leading chert in terms of absolute count and percentage, though its frequency declines through reduction stages due to the influx of other cherts later-trajectory form. Consistent with other Kirk occupation Stage 3 assemblages, Wyandotte frequency markedly increases to become the second ranked chert at over 22% of the total. While this may suggest that Wyandotte was not held in preferential regard, many of the bifaces in this refuse deposit were broken. St. Louis and Allens Creek frequencies drop (though increase in actual count).

For the composite of local and semi-local cherts recovered in Stage 3 form, Muldraugh and Allens Creek comprise 64.0% (compared to Lower Kirk: 60.9%; and Middle Kirk: 63.7%). Adding St. Louis, the next-nearest material to outcrop to Farnsley, the composite is 71.4% (LK: 71.3%; MK: 72.5%). With Wyandotte factored, the local/semi-local composite frequency is 93.7% (LK: 95.0%; MK: 95.0%). This may be interpreted to mean that the ultra-local Muldraugh and Allens Creek cherts are more frequently represented in the Secondary Kirk relative to Lower Kirk, though it is very similar to Middle Kirk, and only minor disparity is recognized between Secondary Kirk and the other Kirk occupations when adding in St. Louis and Wyandotte. Therefore, the overall Stage 3 chert selection pattern observed is very similar in all occupations.

Upper Kirk

Relative to the earlier Kirk occupations, Upper Kirk chert selection as reflected in bifaces differs markedly (Table 6.8). Very few Stage 1 and Stage 2 bifaces were recovered; the assemblage is predominantly composed of Stage 3 forms. Additionally, it is the smallest biface assemblage (n=233) of the various Kirk deposits, about a tenth of that of the Middle Kirk.

The entirety of the Stage 1 biface assemblage was of Muldraugh chert. However, only 27 specimens were recovered. An obvious reliance upon the local material is indicated.

Only sixty Stage 2 forms were recovered. Again, Muldraugh predominates at over 63%, which is the lowest Stage 2 Muldraugh frequency of the various Kirk deposits. St. Louis and Wyandotte cherts account for over thirteen percent each, and Allens Creek registered at over eight percent, which is the highest for these three cherts in all Stage 2 Kirk assemblages. However, the absolute counts for all cherts are very low. The composite frequency of the four chert types is 98.2%, which is the highest for this same aggregation of Stage 2 forms in all Kirk deposits (LK 92.5%; MK 93.6%; SK 94.3%) Only one other chert type was present, Laurel, as a single specimen.

Eight cherts are represented as Upper Kirk Stage 3 forms, excluding a few indeterminate types. The majority cherts are the predictable Muldraugh-Allens Creek-St.

Table 6.8. Upper Kirk biface stage by chert type

Chert	N	Biface Frag		Stage 1		Stage 2		Stage 3		Knife	
		N	*Class %*	N	*Class %*	N	*Class %*	N	*Class %*	N	*Class %*
Allens Creek	8					5	*8.3*	3	*2.1*		
Boyle	1	1	*33.3*								
Dover	1							1	*0.7*		
Holland	2							2	*1.4*		
Indeterminate	4							4	*2.9*		
Indian Creek	2							2	*1.4*		
Jeffersonville											
Laurel	2					1	*1.7*	1	*0.7*		
Muldraugh	143	2	*66.7*	27	*100.0*	38	*63.3*	75	*53.6*	1	*33.3*
St. Louis	17					8	*13.3*	9	*6.4*		
Wyandotte	53					8	*13.3*	43	*30.7*	2	*66.7*
Total	233	3	*100.0*	27	*100.0*	60	*99.9*	140	*99.9*	3	*100.0*

Louis-Wyandotte types and account for 92.8% of all Stage 3 forms. This is the lowest Stage 3 composite of the four cherts compared to the same collections from other Kirk deposits, but not by a substantial amount (95.0% was highest, both in Lower and Middle Kirk). Beyond the four primary cherts, Dover, Holland, Indian Creek, and Laurel were present.

KNIVES

Several tool forms would have functioned as knives in the Farnsley assemblage, ranging from simple flakes to various bifaces to points. However, a highly stylized formal knife form was identified in the Kirk toolkit. As a tool class, it has very distinctive physical attributes, though a range of variability is recognized. Initially, these appear to be late stage bifaces or preforms, but upon analysis, these were clearly very functional items. In total, some fifty knives were recovered and analyzed. In this analysis, several attribute types were delineated. These included morphological, metric, and technological attributes.

Morphological Attributes

In the early examination of the knives from the Farnsley site, several distinct and repetitive morphological forms were noted. Shape, then, served as the initial basis of sorting these forms into analytical units. These forms were subjected to various metric and technological attribute analyses to verify this sorting.

Though a range of variability is recognized (and later discussed), the "typical" Kirk knife—termed as "Standard" in this chapter—has a long blade relative to its basal width. The blade is either parallel or recurvate with either an acute, broad, or apiculate tip, virtually never mucronate or acuminate as they are with Kirk points (definitions from Cambron 1983). The proximal element flares along the lateral margins, and the base is usually excurvate, occasionally straight. In essence, the form is usually that of an elongated, narrow bell. Flaking is usually non-patterned, with broad, shallow percussion flakes dominating the faces. The margins, though, oft-times show very fine pressure retouch and serration. This serration is *not* similar to that typified on Pine Tree points, which reflects a highly specialized procedure. Blade beveling is not uncommon, and is often associated with serrated forms. Very often, different kinds of wear or retouch are noted on the different margins. Symmetry was tabulated, as it becomes important in functional interpretation.

Completeness

More than two-thirds of all knives are complete (Table 6.9). Proximal elements are found in much greater abundance than distal elements. However, this is likely due to the fact that the proximal elements are very distinctive, and readily sorted from other biface fragments. Distal elements are more difficult to distinguish as belonging to the knife form. Additionally, impact fractures were identified on six knives.

Planview Symmetry

Most Kirk knives (78.0%) are generally symmetric in planview (Table 6.10). In many regards, the planview—with an expanding, bulbous base and long parallel-sided blade—is suggestive of Pine Tree point or drill preforms, though edgewear indicates they are fully functional tools. Varying degrees of asymmetry are not uncommon, either (20.0%), as shown in Table 6.10. The asymmetry is credited to differential blade margin reworking, which verifies these as functional forms. The asymmetry itself may reflect functional specialization. Several knives which are thought to be near exhaustion retain symmetry, so it is hypothesized that asymmetric forms result from very specialized functional applications. The ability to create a specialized form from an otherwise very generalized template shows the plasticity and flexibility of this form. This will be elucidated through this chapter.

Form

Form, or shape, is quite variable in the Farnsley knife assemblage as recorded in Table 6.11. Specialized functions cannot be ascribed to certain forms at this point. As of this writing, it is assumed that all forms are functionally equivalent, and that all differences in planview represent different points along a shape-continuum. The “classes”, as such, are largely arbitrary. However, it is tempting to qualify Triangular forms as different, with the Lunate class possibly representing reworked Trianguloid forms. Lunates, by definition, are asymmetric in planview, thus accounting for the majority of asymmetric forms discussed above (eight of the ten). Definitions of each are found below. Metrics are found in Table 6.12.

Standard: This is the most typical knife form, and was described in the *Attributes* introductory paragraphs above. Figure 6.4 is a display of a number of specimens. Other forms as described below could conceivably represent rework variations of this Standard form.

Trianguloid: The name is largely descriptive (Figure 6.5). The planview is distinctly three-sided, with straight blade margins and an excurvate base. Trianguloid forms tend to

Table 6.9. Knife completeness.

Type	N	%
Complete	34	68.0
Proximal	10	20.0
Distal	6	12.0
Total	50	100.0

Table 6.10. Knife symmetry

Type	N	%
Symmetric	39	78.0
Asymmetric	10	20.0
NA	1	2.0
Total	50	100.0

Table 6.11. Knife form.

Type	N	%
Triangular	7	14.0
Lunate	8	16.0
Blunt	2	4.0
Unifacial	1	2.0
Standard	31	62.0
Unknown	1	2.0
Total	50	100.0

be relatively broader than Standard types, and lack the near-parallel blade margins of the medial section as Standard forms do. Like the Standard type, the tool displays large, shallow, and unpatterned flake scars over the face with some pressure retouch. Serration and/or beveling are not unusual.

Lunate: This term, too, is obviously descriptive (Figure 6.6). In many regards, Lunates resemble the Triangular variety, and in fact may be a reworked Triangular form. This form could also be attained from reworking a margin of a Standard form as well. One margin is usually excurvate, while the other is either straight or somewhat incurvate. Lunates are very often beveled and serrated on the straight/incurvate edge. Very often, the proximal end of the reworked edge is squared or has a very acute angle, like a "beak". The opposite side is broadly rounded. If oriented with the distal element directed "up", the reworked or beveled edge is almost always on the left side. While the reworked (beveled and/or serrated) edge usually displays finer retouch, the opposite margin (with the broad-radius, bulbous proximal element) is usually "ragged", in that it lacks fine retouch and is often shaped only by coarse percussion. The two edges will often show very different degrees—and presumably, types—of utilization. This would be difficult to establish without more sophisticated usewear analysis as conducted by replication and experimentation, or scanning electron microscopy.

Blunt: This is very likely to be a Standard variant in which the tip was broken and reworked (Figure 6.7). At this time it is not certain if that blunted tip was functionally specialized, such as a prying instrument, wedge, or plane. With a population of only two, it is not pragmatic to speculate. However, nothing otherwise "special" is attributed to them, such as heavy polish on the distal portion. One specimen was little more than a unifacially worked blade. One other was fragmentary and unassignable.

Metric Data

Table 6.12 presents metric data for the composite of all knives as well as for each of the major hypothesized forms (Standard, Trianguloid, and Lunate). Measurements are in millimeters and weight is in grams.

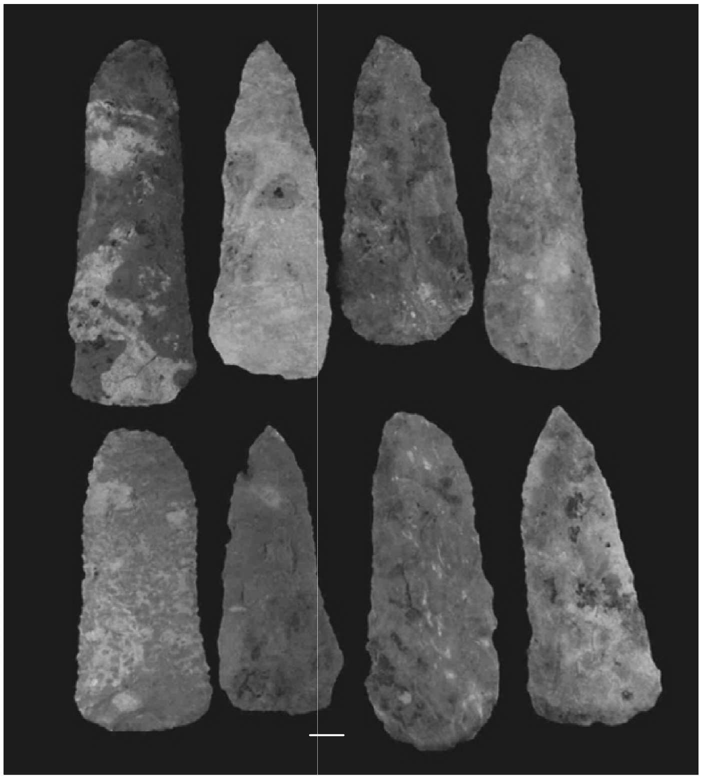
Figure 6.4. Kirk zone standard knife form (line=1 cm).

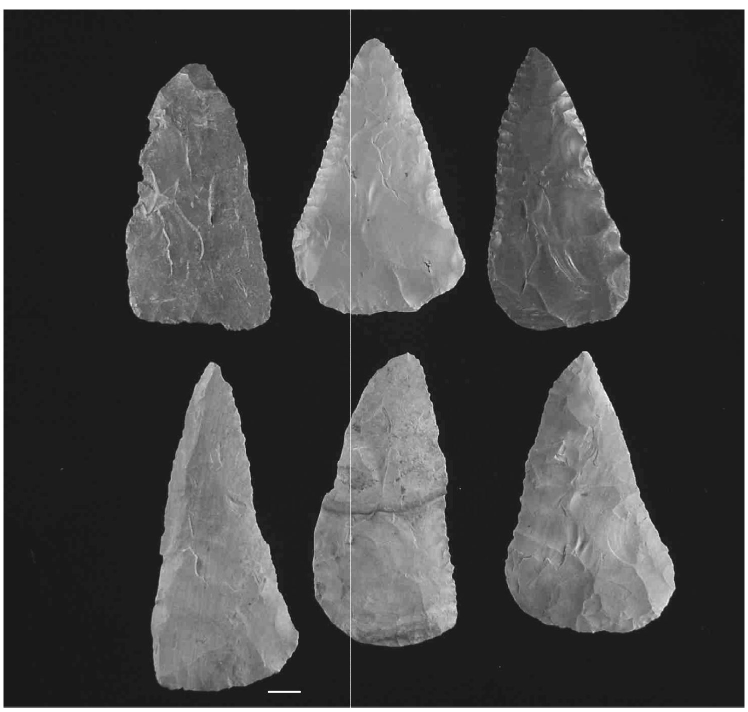
Figure 6.5. Kirk zone triaguloid knife from (line=1 cm).

A strict metric analysis did not conclusively establish a reduction continuum or genetic relationship between any of the three major knife forms proposed. However, population samples of the Trianguloid (*n*=7) and Lunate (*n*=8) are also very small which could influence range and standard deviation quotients which factor into interpretations.

The Standard class had the highest mean length, thickness, and weight. The Standard class also had the greatest range and standard deviation recorded in each variable by considerable margins. This was not unexpected as some early-stage forms (preforms?) are thought to be represented, in addition to the large population (*n*=31). Conversely, the Trianguloid class showed the least amount of diversity per variable and consistently had the lowest standard deviations. They also tended to be the widest, with the highest minimum and maximum widths. Lunates, on the whole, were metrically the most gracile form, with the lowest mean length, width, thickness, and

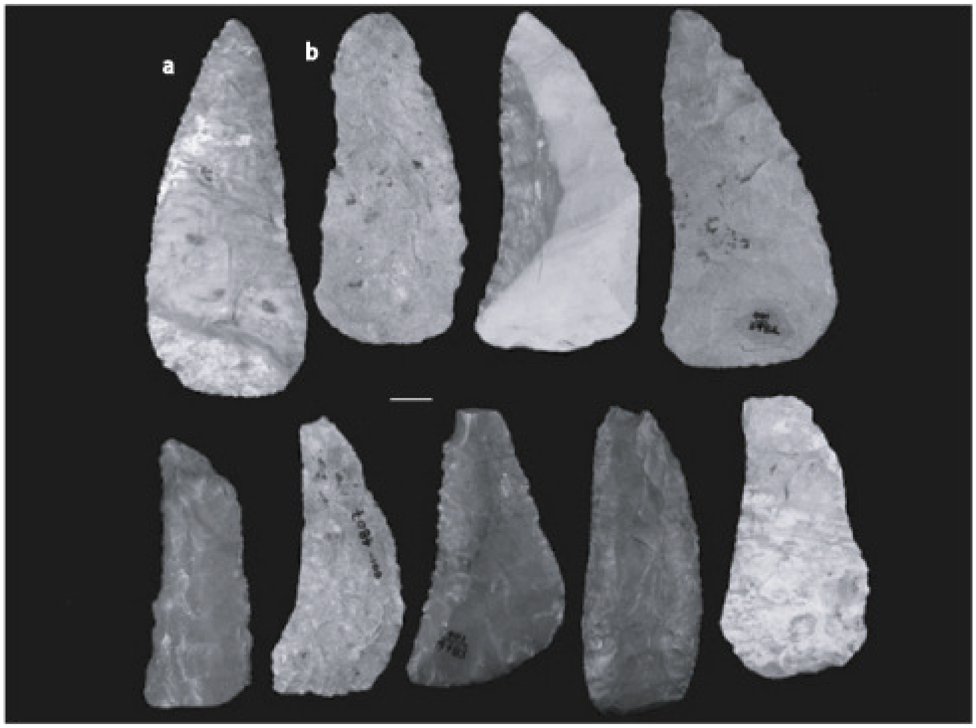

Figure 6.6. Kirk zone lunate knife form (line=1 cm).

especially weight. The mean Lunate width was closer to that of the Standard, though the mean thickness was more similar to Trianguloid. The mean thickness of both the Trianguloids and Lunates were substantially below that of Standards, though the Trianguloid mean weight was similar to Standard. That is due to their greater typical width.

One interpretation of this statistical aggregate is that Lunates are derivative of Trianguloids. Similarity in mean thickness suggests a relationship between the two classes. The drastic disparity in widths can be explicated by reworking of the blade margin of a Trianguloid form to "create" a Lunate. Trianguloids, as a class, may represent a pristine form that is tightly "templated" or regulated in dimension which would account for low standard deviations. Blade margin reworking would result in a loss of mass in the Lunate class, thus addressing that difference.

Technological Attribute Data

While certain relationships between knife forms were inferred through the metric analysis, it is believed that more firm conclusions were reached through an analysis of technological attributes. These included blade margin treatments such as beveling and serration, basal and lateral grinding, as well as chert types utilized.

Technological traits common to Early Holocene bifacial assemblages were tabulated. These traits include serration, beveling, and margin grinding. Edgewear was also documented by microscopic examination (10X to 45X) via a Zeiss Stemi 2000 binocular microscope.

Figure 6.7. Kirk zone blunt knife form (line=1 cm).

Beveling

Some form of beveling is present in forty-four percent of the total knife population. However, there are several different forms of beveling. Table 6.13 below is a composite of all knife forms and the beveling type represented.

There are three types of unifacial beveling: with the bevel installed on the left margin (specimen's point oriented up), right margin, or both margins (though by definition, on the same face). Nearly one-quarter of all knives have unifacial-left beveling, while other forms of unifacial beveling are rare, observed in only single instances. Forms of alternate beveling are not all-too-common, but do exist in significant frequencies (16%). Left-hand alternate beveling is most prevalent, recorded in seven of the fifty specimens, while only one item displayed right-hand alternate beveling.

The knife population of fifty is not large, and only twenty-two are beveled, so any conclusions are tenetive. However, it may be of interest to examine the incidence of beveling per knife morphological form (Table 6.14).

Standard forms show an array of various beveling types. Forty percent of the Standard forms were beveled, which is slightly below the average for the total knife category. Only single instances were recorded of unifacial-right and unifacial-both beveling, and none were found to have alternate-right beveling. However, ten knives were found to have some type of left-side beveling, divided equally between unifacial-left and alternate-left installations.

Both Lunates and Trianguloid knife forms are predominantly left-side beveled as well, though a single instance of alternate-right was noted in one Lunate. Only two of the seven Trianguloid forms were not beveled. Of the five that were beveled, four were unifacial-left and one was alternate-left beveled. Half of the Lunates were *not* beveled, though two appeared to have an "incipiently beveled" margin, the potential initial series of bevel flakes. Otherwise, three Lunates show some type of left-side beveling, two of which are unifacial-left and one being alternate-left. Both the "incipiently beveled" types were unifacial-left as well. When Lunates are unifacially beveled, it is always upon the reworked incurvate or straight edge.

Table 6.12. Metric measurements of knife forms.

All Kives	Length	Width	Thick	Wt
N of cases	50	50	50	50
Minimum	51.77	25.37	6.35	11.30
Maximum	125.51	50.65	14.78	82.50
Range	73.74	25.28	8.43	71.20
Mean	84.84	37.28	8.98	28.81
Standard Dev	17.33	6.16	1.73	12.99
Standard	Length	Width	Thick	Wt
N of cases	31	31	31	31
Minimum	51.77	26.22	6.35	14.70
Maximum	125.51	49.51	14.78	82.50
Range	73.74	23.29	8.43	67.80
Mean	89.28	36.88	9.44	31.64
Standard Dev	18.78	5.54	1.87	15.11
Trianguloid	Length	Width	Thick	Wt
N of cases	7	7	7	7
Minimum	53.26	42.16	6.90	21.10
Maximum	98.51	50.65	8.84	34.30
Range	45.25	8.49	1.94	13.20
Mean	81.69	45.27	8.09	29.30
Standard Dev	13.87	3.76	0.79	4.21
Lunate	Length	Width	Thick	Wt
N of cases	8	8	8	8
Minimum	62.23	25.37	6.45	11.30
Maximum	91.08	40.78	9.90	29.30
Range	28.85	15.41	3.45	18.00
Mean	74.84	34.77	7.85	20.31
Standard Dev	11.62	5.27	1.16	6.84

If Lunates and Trianguloids are collapsed as a single analytical entity (*n*=15), then forty percent each would be either non-beveled (*n*=6) or would show unifacial left-side beveling (*n*=6). This is a substantially higher frequency than the Standard forms. It may be argued that these frequencies are indicative of reworking of the Standard form which results in Lunate or Trianguloid forms. In that scenario, beveling would only be installed in forms in need of resharpening, with Standards representing something of a pristine form. Analyses of other technological components ultimately suggests otherwise, however.

Regardless of form, beveling is apparently not an uncommon resharpening strategy amongst the knife class. This particularly contrasts with resharpening strategies of various Kirk points which are also thought to have functioned as knives (at least occasionally). Kirk points, including Pine Tree and the Large and Small variants, have a negligible incidence of beveling. The higher incidence amongst Kirk knives is more analogous to that of Thebes points/knives.

Serration

Just over half (n=27, 54%) of all Kirk knives are serrated (Table 6.15). Serration is accomplished by removal of a contiguous series of small pressure flakes along one or both margins. Upon low-power microscopic examination (ca. 10X), it is apparent that

Table 6.13. Knife beveling.

Type	N	%
Uni L	12	24.0
Uni R	1	2.0
Uni 2	1	2.0
Alt L	7	14.0
Alt R	1	2.0
Absent	28	56.0
Total	50	100.0

Table 6.14. Knife beveling by form.

Type	N	Uni L %	Uni R %	Uni 2 %	Alt L %	Alt R %	Absent %
Standard	31	16.13	3.22	3.22	16.13		61.29
Trianguloid	7	57.14			14.29		28.57
Lunate	8	25.00			12.50	12.50	50.00
Blunt	2	50.00					50.00
Unifacial	1						100.00
Unknown	1						100.00
Total	50	12	1	1	7	1	28

Table 6.15. Knife serration.

Type	N	%
Unimarginal	16	32.0
Bimarginal	11	22.0
Absent	23	46.0
Total	50	100.0

the serration technology is not the same as it is for Pine Tree points in which complex multi-staged preparation of the margin is involved (see Chapter 5). Rather, serration in knives is little more than simple notching of the margin.

Serration can be either unimarginal or bimarginal. Unimarginal refers to those with serration only along a single margin. In some of these specimens, it is possible that the knife was originally serrated on both edges (bimarginal), though through use, those serrations have been obliterated. However, in other specimens, it appears that the serration along a single margin was quite intentional. Given that a serrated edge can be destroyed, it may not be useful to attach significance to relative frequencies of serration type. In fact, it is possible that forms in which serration is scored as "absent" may have once been serrated either unimarginally or bimarginally, only to have the serrations worn off. Vestiges of eradicated serrations may be detectable under much higher magnification, though at present, this has not been conducted.

Serration by Form

As noted, twenty-seven Kirk knives were serrated. Nineteen of those (70.3%) were of the Standard knife form (Table 6.16). Put another way, 63.3% (19 of 30) of all Standard forms were serrated. Five serrated knives were of the Trianguloid variety, which is 18.5% of the serrated total, but 71.4% of all Trianguloids. Three Lunates were serrated, which amounts to 11.1% of the serrated total and 37.5% of Lunates. As demonstrated then, though with a limited population, Standards and Trianguloids as a form are very often serrated while Lunates are markedly less frequently so.

Within the Standard form, serration is generally equally divided between the unimarginal and bimarginal applications. The Trianguloid and Lunate populations are very small with eight total, so it is difficult to interpret the ramifications of serration type. However, both forms show distinct preference to unimarginal application, as three-quarters of the combined forms register unimarginal serration.

Serration and Beveling

Fifteen Kirk knives (30%) are both serrated *and* beveled (Table 6.17). This is approximately half of the knives that are either beveled (n=32) or serrated (n=27).

Grinding

Grinding of the basal and lateral margins was examined, and scored as heavy, light, or absent (Table 6.18, 6.19). About two-thirds were basally ground, fairly evenly split between heavy and light. Almost a quarter were not basally ground at all which markedly contrasts with Pine Tree points, but is similar to Kirk Large forms. When viewed from another perspective, only a bit more than a third were heavily ground, while the remainder were only lightly ground to non-ground. In other words, heavy grinding does not appear to be that crucial of a technological attribute to ensure successful function of this form.

Lateral grinding appears to be even less critical (Table 6.19). Only about one in five forms display any degree of lateral grinding. Given the normal stresses inflicted upon the haft element of a knife form from its presumed function, grinding (and perhaps polish) would be expected. In fact, even routine haft polish of the proximal faces is rare. The lack of grinding and polish may indicate that this form was hafted in some other manner, if it was hafted at all.

There are two beveled knives of particular interest in regard to lateral grinding, however. One is a Lunate (Acc. No. 001-3708) and the other is a Trianguloid (Acc. No. 001-3974), which appears to be on a Lunate trajectory. Each shows relatively heavy lateral grinding (both are basally ground as well). However, this grinding is confined to the side opposite of the bevel. The grinding on the first specimen (Figure 6.6a) does not continue distally along the entirety of the margin, but only about halfway from the base. Interestingly, there is a noticeable "nick point" where the grinding curtails and the blade "begins". Ordinarily, in virtually all knife forms, the proximal element is bulbous which is particularly emphasized on the non-reworked side of Lunate and Trianguloid forms. On this particular specimen, however, this bulbous margin has been worked to a straight

Table 6.16. Knife serration by form.

Type	N	Unimarg	Bimarg
Standard	19	10	9
Trianguloid	5	4	1
Lunate	3	2	1
Total	27	16	11

Table 6.17. Knife serration by beveling.

	Beveling			
Serration	Uni-L	Uni-R	Alt-L	N
Unimarginal	7		1	8
Bimarginal	1	1	5	7
Total	8	1	6	15

Table 6.18. Knife basal grinding.

Type	N	%
Heavy	18	36
Light	15	30
Absent	12	24
NA	5	10
Total	50	100

Table 6.19. Knife lateral grinding.

Type	N	%
Heavy	4	8
Light	5	10
Absent	36	72
Indeterminate	5	10
Total	50	100

edge, and this edge has been heavily ground. On the second specimen (Figure 6.6b), the *entire* edge opposite of the bevel has been ground (or less likely, as determined from micro-analysis, worn from use). These two specimens in particular raise perplexing questions on exactly how they were hafted.

Chert

Table 6.20 presents the distribution of knives per chert type. On the whole, the pattern largely conforms to the generalized Kirk point chert utilization pattern in that the local Muldraugh is the primary chert utilized, followed by significant presence of Wyandotte with appreciable representation of St. Louis and other local/semi-local cherts such as Allens Creek and Jeffersonville. Muldraugh is utilized for over half of all knives, and almost twice the frequency of Wyandotte.

In an analysis of chert type distribution by knife form (Table 6.21), some striking trends are noted regardless of the small sample size. The Standard form shows the greatest range in chert types with five, including the only instances of Allens Creek and Jeffersonville. Over seventy percent of Standards are of Muldraugh chert. Only about thirteen percent are Wyandotte, and St. Louis is nearly equal to that at about ten percent. In contrast, Wyandotte accounts for 57% of Trianguloids and half of the Lunates. Muldraugh is present in less than thirty and forty percent of Trianguloids and Lunates respectively, in stark contrast to the Standard chert pattern.

This may suggest one or more things:

- Standards may be functionally different than Trianguloids and Lunates, perhaps entirely independent forms.

Table 6.20. Knife chert types.

Chert	N	Percent
Allens Creek	1	2.0
Jeffersonville	1	2.0
Muldraugh	28	56.0
St. Louis	5	10.0
Wyandotte	15	30.0
Total	50	100.0

Table 6.21. Knife form by chert type.

Form	N	AlCr	Jeff	Muld	StLo	Wyan
Standard	31	1	1	22	3	4
Trianguloid	7			2	1	4
Lunate	8			3	1	4
Blunt	2			1		1
Unifacial	1					1
Unknown	1					1
Total	50	1	1	28	5	15

Table 6.22. Knives by component.

Component	N	Percent
Lower Kirk	12	29.3
Middle Kirk	21	51.2
Sec Kirk	4	9.8
Unknown	1	2.4
Upper Kirk	3	7.3
Total	41	100.0

- The latter two may represent a subset of Standards in which only Wyandotte specimens are redesigned to fulfill a specialized function or curation trajectory.
- Perhaps Wyandotte specimens in general (all forms) represent more tightly curated tools with the asymmetric shape reflecting that, given Goodyear's (Goodyear 1979) hypothesis of the necessity of cryptocrystalline materials in a curated assemblage.

Component

This analysis is limited to 41 knives from Phase III excavations which had tight stratigraphic/component control. About fifty percent of all knives are from the heavy Middle Kirk deposit (Table 6.22). This figure is only slightly lower than the frequencies of other formal tool types (points, adzes, scrapers, and drills) in the Middle Kirk relative to other components. The other knife component frequencies are in general keeping with their other tool/component counterparts as well. Knives, then, do not seem to be appreciably over- or under-represented in any individual component, and seem to occupy the same functional niche in each component. It should be noted that of the fifty total, only one was recovered in feature context (F51), in the Middle Kirk component.

Kirk Knives at Other Sites

The knife form defined here does not appear to be unique to the Farnsley site, though it certainly was recovered in greater numbers than at other sites—though this is likely due to volume of excavated matrix.

The Kirk knife was present at Longworth-Gick (Boisvert 1979:291), just across the Ohio River from Farnsley. It was termed as Lanceolate Biface 2. Only three were recovered, and all were of Muldraugh chert. Farther up the Ohio River in West Virginia, comparable knife forms were found at St. Albans. Broyles (Broyles 1966:39, Figure 31j & 31k) refers to these as Type VI blades which were "well made with fine secondary chipping". They were few in number (*n*=4), though a roughly similar form, Type V, was somewhat more common (*n*=25).

Forms comparable to Kirk knives were recovered at Icehouse Bottoms in Tennessee (Chapman 1977:72-74, Fig. 23b). However, only three were recovered, one from the Upper Kirk deposit, and two from the bifurcate level. Similar forms were reported in Middle Archaic levels as well. Significantly, Chapman noted that these forms were worked on one margin only.

One site in which the Kirk knife is conspicuously absent is the Hardaway site (Coe 1964; Daniel 1998). Intractable raw material may be responsible for the lack of this patterned form. Functionally analogous tools of course exist.

Discussion

It is uncertain if there is a continuum between the Standard knife form and the Lunate type. In fact, it is not certain if they are related at all, but there is a remote likelihood that at least *some* Standard forms proceed through a rejuvenation sequence or specialized trajectory that ultimately results in Trianguloid and Lunate forms. Shape alone may not be an accurate basis to establish this continuum.

Metric data indicate affinity between Lunate and Trianguloid forms. The same data seemingly support distinction of that grouping from the Standard form.

Other types of data more strongly indicate differences between Standard knife forms and Trianguloids and Lunates. Chert utilization patterns differ markedly between Standard forms and Trianguloid and Lunate specimens which suggest they may be independent forms which may have functioned differently as well. Additionally, it may represent differences in curational patterns.

When individual specimens are considered, the significance of asymmetry, unimarginal beveling, and unimarginal serration can be dismissed. Collectively, though, the repetitive occurrence of such attributes argues that individual edges in certain specimens were functionally specific, or at least not equably used and rejuvenated. That such forms seemingly had one primary functional edge may suggest that the tool was hafted in a manner other than the conventional proximal-socketed way where the tool long axis is directly in line with shaft. It may be that the tool was seated at some angle to the shaft axis in order to perform its function efficiently. It may be that the haft wrapped around one of the lateral edges just leaving the one functional edge exposed—one tool margin may have been fitted into a longitudinal/lateral slot on the shaft, as opposed to seating the proximal tool end into a distal shaft notch. Potential functions for the asymmetric tool have yet to be identified, and can only be determined through high-power usewear analysis. The fact that other knife forms exist and that this form has consistently inequitable margin utilization is the basis for an interpretation of functional specificity.

ADZES

Chipped stone adzes were recovered in abundance from the Farnsley site (n=611) and are considered a fairly common tool form**.** Functionally, these are thought to be woodworking tools (Semenov 1964). Given their ubiquity, the location of the site alongside the Ohio River paleochannel and the presence of dense, stratified wood charcoal deposits draped over the paleobank, it is believed that one possible functional scenario represented at the Farnsley site would be the manufacture of wooden dugout canoes.

Given their late debut in Old World Neolithic assemblages, adze technology was not anticipated in North American toolkits until later cultural/developmental stages. In North America, the purportedly earliest chipped stone adzes are documented by Gramly (Gramly 1994) in Paleoindian Clovis assemblages. Generally, though, the introduction of the adze—or at least its efflorescence—is ascribed to the proto Archaic Dalton culture (Morse and Goodyear 1973) dating to 10,500-9,900 rcybp (Goodyear 1982).

Many elements of Dalton behavior were retained in Kirk culture, including technology. Kirk cluster projectile points are developed from Dalton-like technology as established earlier in this report. The Kirk unifacial tool inventory, which largely consists of various scraper forms, is also Daltonesque, which in turn is adapted from Paleoindian precursors. The Kirk adzes recovered at the Farnsley site are technologically, morphologically, and functionally similar to Dalton adzes which are clearly a direct antecedent. A discussion of Dalton adzes may be beneficial to understand the Kirk counterparts.

The Dalton adze

Adzes are a celt-like form with a gouge-like bit (Semenov 1964:126-134; Morse and Goodyear 1973). The adze is hafted, with the bit edge oriented perpendicular to the long axis, and oriented at an acute angle (*not* at a right angle) to the haft axis. It may have been socketed into a sort of wood/bone/antler foreshaft which was fitted on the handle (Semenov 1964:127) or seated and lashed onto an **L**-shaped (Semenov 1964; Yerkes and Gaertner 1997). Adzes are most frequently associated with woodworking as replicative studies and high-magnification usewear studies have demonstrated (Semenov 1964; Yerkes and Gaertner 1997). This will be discussed below.

Dalton adzes, as well as Kirk adzes, are bifacially flaked stone forms as opposed to the pecked-and-ground hardstone forms common in the later assemblages. In planview, Dalton adzes are ovoid to triangular, tapering to the poll, with a convex bit. Ideally (though rarely in practice), the cross-section should be plano-convex, with the haft-seated or “ventral” face being planar (*sensu* Yerkes and Gaertner 1997 and Morse 1997, which is counter to the orientation used by Morse and Goodyear 1973), and with the convex “working” or “dorsal” face beveled at the bit as viewed from the lateral margin. When viewed in cross-section toward the distal (working) edge, the beveled bit margin is arcuate, with the apex directed “downward” to the ventral face. Morse (1997:23) believes that the bits were initially pointed to facilitate penetration, though this point was lost through wear and resharpening. The bits often exhibit fine retouching via pressure flaking. The lateral margins and poll are typically heavily ground, as are the faces occasionally. Hide polish from leather haft lashings is often present on the faces (Semenov 1964; Yerkes and Gaertner 1997:65-66).

Semenov (1964; see also Morse and Goodyear 1973) distinguishes adzes from celts or axes on the basis of the bit orientation relative to its haft. The bits of the latter two are typically oriented parallel to the haft handle. Adzes are thought to have been hafted in a short handle (Morse and Morse 1983:75) like a modern cooper’s adze. The composite tool is swung downward in an arc so that the bit planes through the medium (almost always wood), gouging it, rather than chopping it. The asymmetric bit shape, beveled on the dorsal face, allows the bit to bite into the medium, with the follow-through motion planing or scooping along the length of the medium.

This series of motions results in diagnostic use wear as determined in replicative studies and high-power magnification (Semenov 1964; Yerkes and Gaertner 1997; also Morse and Goodyear 1973). Though the bit and exposed portions of the ventral face make initial contact, the follow-through imparts more damage, wear, and polish on the dorsal face. Usually the scarring and polish are more prevalent on and extend farther up the dorsal face (Semenov 1964:130; Yerkes and Gaertner 1997:59-63). This activity results in distinctive wear patterns in which striations are oriented parallel to the long axis. In axes, striations are usually oriented diagonally to the bit. Diagonal striations are not rare on adzes; they likely result from initial chops into the media in which force is intentionally directed through a corner of the tool to create a “platform” for the bit to grab subsequently. Bits of wood charcoal are occasionally found on the adze faces (usually dorsal), and the polish and damage are characteristic of desiccated, charred wood or, not unusually, unburnt dried/seasoned wood (Semenov 1964:130; Yerkes and Gaertner 1997:63-64).

At the St. Albans site, Broyles (1971:39-40) describes “grubbing tools” or hoes from Kirk deposits, noting polish on the faces. Microwear analysis of these tools and others from Dalton sites (Yerkes and Gaertner 1997) conclusively show that such a function was not performed by the adze form. Morse and Goodyear (1973:316) correctly inferred that even with the steeply beveled, near-unifacial working edge that adzes were not hide-scraping tools, especially given the presence of formal scrapers and bone “beamers” in the Dalton inventory.

Various woodworking functions have been ascribed to Dalton adzes. The charred wood usewear has been linked to dugout canoe manufacture (Morse and Goodyear 1973:320). Morse and Morse (1983:7) posit their use in the preparation of permanent house timbers. In fact, they state that the presence of adzes is indicative of sites of permanent residence (see also Kimball 1996:162). However, Yerkes and Gaertner (1997:59) note that no house postmold patterns or other structural features have ever been identified at any Dalton site. Other possibilities include the making of carvings and grave markers (Morse & Morse 1983:78), food bowls (Yerkes and Gaertner 1997:59), fish weirs (Gramly 2002:22), and tableware and stools (Gramly 2002:58). Given the lack of wood preservation, none of these can be verified.

Adzes on Dalton Sites

While adzes are a component of the Dalton assemblage, they do not occur at all site types, nor do they apparently occur in all geographic areas that otherwise support Dalton occupations. Morse and Goodyear (1973:319) state that Dalton adzes are generally confined to southeastern Missouri and northeastern Arkansas, though Dalton points and unifaces are ubiquitous throughout the southeastern U.S. This is an odd phenomenon, but is repeated later in time and elsewhere in space as will be discussed. It is evident that Dalton adzes only occur in substantial numbers at residential sites and cemeteries.

Seemingly, when adzes are present on Dalton sites, they tend to occur in relative abundance. These sites are seemingly few, though. One such site is the Lace site (Morse and Morse 1983:82-84), on the L'Anguille River in northeastern Arkansas, which is interpreted as a Dalton residential site. A 1961-62 surface survey of Lace conducted by James Ford and John Redfield resulted in the recovery of 74 adzes.

Seventy-two adze *fragments* were recovered from the Brand site (Goodyear 1974), a hunting/butchering camp located very near the Lace residential camp. The adzes were not used in woodworking or as butchery tools *per se* (i.e., scraper, deflesher), but rather were intentionally smashed with the fragments used as sources of blade material necessary to complete the task at hand.

Excavations were conducted at the Sloan site (Morse 1997), a Dalton cemetery on the Cache River of extreme northern Arkansas. A total of 448 total Dalton artifacts were recovered, including 144 Dalton points, 31 adzes, and 11 adze preforms. Through quantitative analysis of the material spatial distribution, 29 discrete concentrations were revealed. These are thought to be individual burial loci with associated grave goods. Metrics of 42 adzes are summarized in Table 6.23 below (from Morse 1997:33, Table 3).

The famed Hawkins cache (Morse 1971) contained 40 Dalton tools, including 18 Dalton points, three adzes, four "rejected adzes", and two adze preforms. The tools are thought to represent a burial cache. Metrics for the three complete adzes are provided below in Table 6.24 (Morse 1971:16, Table 3).

Table 6.23. Sloan site adze measurements.

	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
Mean	78.0	42.4	16.9	62.4
Range	110.7-52.3	53.5-32.7	20.7-13.7	108.1-27.6

Table 6.24. Hawkins site adze measurements.

Specimen No.	Length (mm)	Width (mm)	Thickness (mm)
H-29	64.5	39.2	15.5
H-30	61.8	36.7	16.4
H-36	91.7	42.8	19.4
Average	72.66	39.57	17.10

Table 6.25. Olive Branch site adz measurements.

Subtype	N	Length (mm)		Width (mm)		Thickness (mm)	
Pointed	19	66.3		31.4		12.2	
Flat/Rounded	53	72.3	±12.8	38.1	±6.9	15.4	±3.8

The Olive Branch site (Gramly 2002) is a major Dalton site located on the Mississippi River, just above the confluence of the Ohio River, in Illinois. Over 350 Dalton points were recovered, as well as 223 adzes (Gramly 2002:116). Of this figure, 84 adzes were unanalyzed broken forms, while 73 were "uncompleted unbroken" forms. A total of 73 adzes were deemed complete. From this population, Gramly (2002:122, Plates 70-72) defined three distinct adze forms: 20 "pointed end", 33 single-bladed, and 20 double-bladed "flat or rounded" types. Mean metrics are provided below in Table 6.25.

Dalton adzes are rare outside of the area delineated by Morse and Goodyear (1973:319), and, apparently, even *within* the area they reference they are rare amongst non-residential or cemetery sites. When they are encountered, it is usually in very small numbers. One potential Dalton adze was recovered from Campbell Hollow (Stafford 1985) in the lower Illinois River valley. No other Dalton materials were associated with it, however. Two Dalton adzes were recorded from the Rodgers Shelter in Missouri (Ahler and McMillan 1976). At Graham Cave, in Missouri (Klippel 1971), only one ground hematite adze was noted in the Dalton levels, though Logan (1952) depicts two possible examples. Single adzes were collected from the Taylor site, in South Carolina (Michie 1996) and the Joe Powell site, in Alabama (Futato 1996). Cable (1996) reports a unifacial adze from Dalton strata at the Haw River site.

As interesting as the quantities and locations of Dalton adzes, is where they are *not* found. At the Stanfield-Worley Bluff Shelter, in Alabama (DeJarnette, et al. 1962), no "celts" (adzes) were found in Dalton horizons. Nor were they mentioned in excavations of Dalton deposits from Dust Cave, in Alabama (Driskell 1996).

Adzes in Thebes Tradition

To date, adzes have been recovered from only one excavated Thebes site, the Twin Ditch site (Morrow 1996) located in the lower Illinois River valley. Some 25 adzes were recovered from this site, which is interpreted as a longer-term residential site or a shorter-term habitation base. This is the only Thebes site known to possess significant numbers of adzes, though it is noted that not many Thebes sites have been excavated. Therefore, the actual frequency or association of the tools with different site functional types is not fully known.

The Kirk Adze

Adzes recovered from Kirk deposits at the Farnsley site are similar to Dalton adzes in terms of general metrics, morphology, and presumably function. This will be discussed below. Much like adze distribution amongst Dalton sites, the presence of adzes on Kirk sites tend to be restricted to certain site types in the Kirk settlement system. They also appear to have a confined geographic distribution as well, much like their Dalton counterparts. In addition to the Farnsley site, at which adzes are common, two other relatively local sites have yielded this form, though in limited numbers. The first site, Swan's Landing (Mocas and Smith 1995; Smith 1986) is located in western Harrison County, Indiana. Dense, stratified Kirk deposits were excavated by Indiana University, though most of the site was illicitly looted for a number of years. One Kirk adze was recovered in the 1986 IU excavations, though many more were observed in private collections—enough to perceive them as not being rare. Interestingly, most were made of low-quality Wyandotte chert, which is locally available. That most of the adzes from Farnsley were made of low grades of the locally available Muldraugh chert infers a pattern in which poorer quality materials were intentionally selected. This is likely due to the fact that more cryptocrystalline materials would chip and wear through use too readily, whereas the poorer grades are more resistant to this type of damage and attrition.

French (1998:123) reports only six "chipped and polished bifaces" or adzes from the Longworth-Gick site, almost immediately across the Ohio River from Farnsley, in Kentucky. However, Collins' report illustrates two biface types in pen-and-ink renderings, "ovate biface 2" (Collins 1979:121) and "ovate biface 4" (Collins 1979:124), with populations of 48 and 33, respectively, which look remarkably similar to Kirk adzes from Farnsley. If those are indeed adzes, they would be considered as fairly common tools.

From Kirk levels at the St. Albans site, in West Virginia, Broyles (1971:39-40) reports the recovery of four chipped stone "grubbing tools" or "hoes" that are actually adzes (Kimball 1996:162). If four is the actual total, then this would be an uncommon tool. It may be possible that other adzes were present and classified in other biface or tool classes. C. Michael Anslinger (personal communication 2005), who is currently overseeing a reanalysis of that assemblage believes the figure to be correct or close.

Adzes are rare at the Tellico sites as well (J. Chapman, personal communication, 2005). Only one adze is reported from Bacon Farm (Chapman 1978), two from Rose Island (Chapman 1975), and, apparently, none were found at Icehouse Bottom (Chapman

1977). One ground stone celt was recovered from Tellico (Kimball 1996:162). It is a true celt in the Semenov (1964) definition, with a biconvex bit, as opposed to the planoconvex bit of the adze. It had been partially flaked into shape, and then ground for final shaping. While adzes and celts are rare at Tellico, Chapman (personal communication, 2005) cites the presence of ten cobble spall chopper/scrapers from Icehouse which may be the functional analog to the adze. Even these forms are seemingly rare.

Adzes and/or celts were not originally reported from Hardaway by Coe (1964). However, reanalyisis by Daniel (1998:63-66) has identified such forms, including one complete specimen, one adze bit, and a few preforms which had been classified as Type II bifaces. The adzes, like the Dalton adzes and Kirk adzes described here, are wider at the bit, taper to the poll, have a heavily ground poll and lateral edges, and have a beveled bit. The bits, though, were apparently ground and showed polish and striations.

One chipped stone adze and a polished adze were recovered from Kirk deposits at the G.S. Lewis East site in South Carolina (Anderson and Hanson 1988:275). Relative to the other materials, the adzes were infrequent.

In addition to the unifacial adze recovered from the Hardaway-Dalton zone at Haw River, Cable (1996:112) reports unifacial adzes, chisels, and axes from Palmer (Kirk) deposits. Apparently, both the Dalton and Palmer forms at the Haw River site were expediently made on flakes, with minimal shaping and retouch and no visible haft preparation. Most had "natural edges modified only by use" (Cable 1996:126). No maintenance of this tool is noted, and it was readily discarded. A total of six curated chopping tools, which includes axes and adzes, and five flake adzes were recovered from all levels at the Haw River site (Cable 1996:130). Again, this shows the rarity of this tool type in Early Holocene assemblages of the Southeast.

Summary

Like Dalton adzes, adzes occur on Kirk sites throughout the Southeast, though adze-bearing sites are rare, and very few of those sites tend to have substantial quantities of them. Where they tend to be most prevalent is in the Falls of the Ohio region of Indiana and Kentucky. As with Dalton sites, Kirk adzes occur in greatest frequency at more sedentary residential camps. Factors responsible for this patchy distribution are poorly understood. Given that adze-bearing Kirk deposits from Farnsley date to 9300 rcybp, it is clear that this technology was firmly ensconced in Kirk technology from the beginning, which would nullify arguments that the adze was developed independently of Dalton adzes as a late addition to the Kirk assemblage. In fact, the Kirk adze is likely a direct holdover from Dalton, as other aspects of Kirk technology likely are. It is difficult to believe that woodworking, as signified by adze presence, is rare in either Dalton or Kirk contexts and that only in certain circumscribed areas was it practiced. A tool functionally analogous to the adze may exist in other Kirk (or Dalton) assemblages, such as the forms at Haw River. Conversely, it may be that adzes were not recognized as such in assemblages and were perhaps classified as biface or scraper forms.

Farnsley Site Adzes

Adzes are rare on Kirk sites, seemingly more rare than Dalton adzes, and as a tool class tend to occur in a geographically circumscribed area of the Ohio Valley. They are infrequent tools even within that area. However, they were abundant at the Farnsley site, where 611 specimens were recovered. Of that figure, 417 were complete or complete enough for subcategorization, while the remaining 194 were unclassifiable fragments.

Only complete specimens were measured. Length, width, thickness, and weight were the variables measured. Ratios between the former three variables were calculated. Collectively as a class, adzes tend to be about twice as long as wide, 4.5 times as long as thick, and a bit more than twice as wide as thick. These figures vary somewhat amongst a number of subtypes defined below.

As a gross generalization, most of the adzes are somewhat oval in planform. Very commonly, the adzes have virtually straight, parallel sides, while others slightly bulge toward the center. The bits and polls are almost always rounded, unless battered from use, which tends to square off the bit. In practically all forms, there is at least a slight taper toward the poll.

On many adzes, very subtle but perceptible "waisting" is noted. This refers to slight indentations along the medial lateral margins, and often even the faces will be thinned in conjunction with the lateral indentations to complete the waisting. This "waisting" is accomplished by broad, shallow percussion flakes. In essence, a very shallow groove is developed, ostensibly to facilitate hafting—perhaps presaging the three-quarter and full-grooved axes of the Middle and Late Archaic. Polls and margins are virtually always heavily ground, right up to the bit margins. In lateral view, the edge is oft-times sinuous; a straight edge does not seem to be critical to its function. Many adzes appear to be thick, unfinished preforms. However, examination under low-power microscopy indicates that virtually all adzes were utilized to some degree. The bits almost always show rounding, and in some cases extreme battering is evident, with stacked step fractures and ragged margins readily visible. Very often some degree of polish is evident to the naked eye, from faint to visibly glossy. Low-power microscopy almost always shows some degree of polish and even some pitting and striations in more extreme examples. Polish is also not unusual in the hafting area, across the face. This would suggest lashing of the implement onto a platform-like haft, as opposed to socketing it in a type of foreshaft.

Muldraugh chert was overwhelmingly selected for adze manufacture at the Farnsley site. Even within the Muldraugh raw material, selection is observed. Lower-grade materials are generally used, perhaps because this is a more resilient medium for this function. Bits show battering and crushing, though seldom do large flakes detach from use (such as in the case of Mississippian hoe flakes). Finer-grained materials, such as high-quality Wyandotte chert, would suffer severe edge attrition through incidental flaking and were rarely utilized

Morphological Subtypes

Through the course of analysis, eight distinct morphological subtypes were defined, and are seemingly consistent in their occurrence and design. However, variability is not discounted, and it is possible that a larger continuum is represented. Length, width, thickness, and weight were the variables scored.

In addition to the general Adze category (n=413), the remaining subtypes consist of: Dorsal Keeled (n=53), Ventral Keeled (n=45), Platform Poll (n=34), Small (n=33), Celt (n=11), Stemmed (n=10), and Bi-bitted (n=2). The Adze subtype also includes 194 fragments that are not assignable to any other specific subgrouping. Each subgrouping will be described below, and metric analyses are provided. Only complete specimens were measured. Please note that in this analysis, dorsal refers to the face upon which the bit is developed (i.e., the "top" of the tool).

Adze (n=413). The generic adze subtype (Figure 6.8) tends to be the third largest in terms of mean length, width, thickness, and weight (Table 6.26). The largest *individual* specimens for each of these variables are within the generic adze subtype. This subtype also has the greatest mean length-to-thickness ratio, meaning they are relatively long compared to their width. Included within this subtype are likely preforms which could account for the significant disparity. Interestingly, if the "Minimum" row is compared, some of the smallest specimens are incorporated within this subtype also, generally second only to the Small subtype. Therefore, a great range of variability is represented in this subtype, as expressed in standard deviations as well. The generic adze subtype has the largest standard deviations within the width, thickness, and weight variables, and is second to Dorsal Keeled in length standard deviation.

Dorsal Keeled (n=53). This form (Figure 6.9) has a medial spine that runs the length of the dorsal face (Table 6.27). The cross section approaches triangular in extreme examples. Broad percussion flakes often shape the flanks of the steeply pitched medial ridge, though the bit is retouched via pressure flaking. The keel is tentatively considered a mechanism by which mass and weight are retained for more heavy-duty woodworking. The sheer mass would likely make it a more efficient tool, and its design, with the mass concentrated immediately behind the center of the bit, possibly would serve to reinforce the bit, extend its uselife, and serve as a platform to produce a new bit when the tool was in need of rejuvenation. This subtype has the largest mean length, thickness, and weight metrics. It also has by far the greatest length-to-width ratio (much longer relative to width) and, as a result of the dorsal spine, the smallest mean width-to-thickness ratio (thickness relative to width).

Ventral Keeled (n=45). This form (Figure 6.10) is virtually identical to the dorsal keeled subtype except that the medial spine is on the ventral face, opposite the bit (Table 6.28). Functionally, this seems counterintuitive. Though analogous to the Dorsal Keeled subtype, the Ventral Keeled forms tend to be substantially smaller than their counterparts. Oddly, this subtype has the lowest mean length-to-thickness ratio other than the two Bi-bitted specimens. This suggests that the keeling is not as pronounced as it is in the Dorsal Keeled subtype.

Figure 6.8. Kirk zone standard adze.

Figure 6.9. Kirk zone dorsal keeled adze.

Small (n=33). This subtype (Figure 6.11) is on the whole more diminutive than the others. It does not represent a reworked or exhausted type. As shown in Table 6.29, the dimensions of this subtype are substantially smaller than those of any of the other forms. Small adzes had the lowest mean length, width, thickness, and length-to-width ratio and had the largest mean width-to-thickness ratio of all the subtypes. Rather than functioning as a heavy duty adzing/planing tool, this form may have been utilized for lighter duty, close-quarters, or finishing work.

Stemmed (n=10). This is a form (Figure 6.12) which in planview has a perceptible constriction toward the proximal third that is suggestive of a "beaver-tail" stem. This would indicate that this subtype is socketed directly into the haft or foreshaft.

Figure 6.10. Kirk zone ventral keeled adze.

Figure 6.11. Kirk zone small adze.

It may also suggest a different function or application from the standard adze, or perhaps different media being worked. Otherwise, it closely approximates the generic adze in other attributes (Table 6.30).

Bi-Bitted (n=2). This numerically small subgroup consists of two adzes which seem to have two bits, on alternate faces and ends (Figure 6.13). In a sagittal view, the cross section would be rhomboidal. Gramly (2002) noted a similar variation in Dalton adzes from the Olive Branch site. It may be that the adze was rotated after the bit was dulled, with a new bit manufactured on the poll end. This subtype has one of the smallest mean width-to-thickness ratios, though the population is very, very small (Table 6.31).

Celt (n=11). The bit of this tool form is symmetrical on each side of the sagittal plane; there is no beveling of a single face to form a bit (Figure 6.14). These tend to be smaller and thinner than most adze subtypes (Table 6.32). It also may be indicative of a

Figure 6.12. Kirk zone stemmed adze.

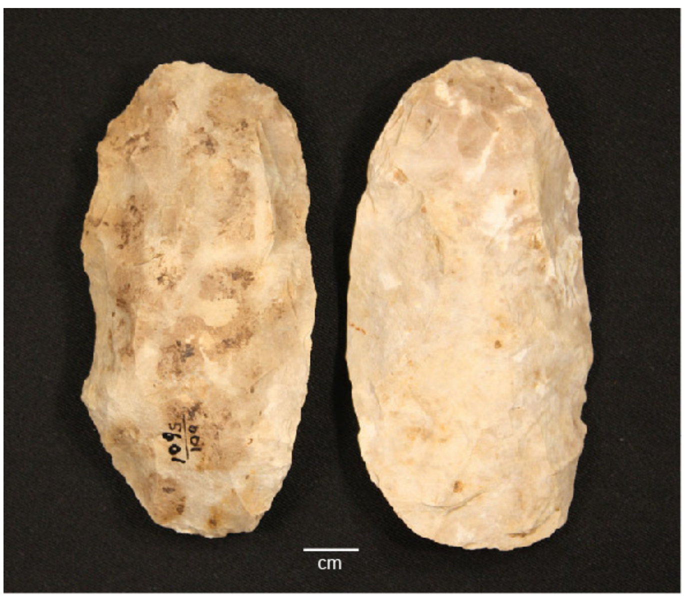

Figure 6.13. Kirk zone bi-bitted adze.

different function or application from the standard adze (chopping versus planing, respectively), or perhaps different media were being worked.

Platform Poll (n=34). For all intent and purpose, this subtype (Table 6.33) is virtually identical to other standard adzes with one exception (Figure 6.15). This form possesses a distinct facet or platform on the poll end that appears to be intentional rather than fortuitous or a vestige of manufacture. This facet shows much battering and crushing, and stacked step fractures are common. This damage could be derived in one of two ways. It may result from energy that is reflected back into the tool in almost a bipolar manner if the poll end is abutted against an element of the haft. The more likely

Figure 6.14. Kirk zone celt form.

Figure 6.15. Kirk zone platform poll adze.

way is that the poll end is directly struck by a billet or hammerstone. This subtype may have been unhafted and functioned more like a chisel.

Metric Summary

Table 6.34 is a summary of mean metric values per attribute per subtype. Immediately discernible are generally larger or smaller types. Generalized Adzes and Dorsal Keeled subtypes are the larger subtypes, while the Small and Celt forms are smaller. Perhaps the most unexpected result was the comparatively small size of the Ventral Keeled subtype.

Table 6.26. Generic adze subtype measurements.

	Length	Width	Thick	Weight	L:W	L:T	W:T
N	221	221	221	221	221	221	221
Min	59.360	33.210	9.890	32.000	1.342	2.617	1.294
Max	153.700	65.370	43.830	271.200	2.966	9.550	4.108
Range	94.340	32.160	33.940	239.200	1.624	6.933	2.815
Median	88.070	43.270	19.280	65.500	2.035	4.531	2.227
Mean	91.274	44.566	20.445	77.012	2.057	4.619	2.261
StdDev	14.557	5.865	5.149	38.081	0.265	0.926	0.424

Table 6.27. Dorsal keeled adze subtype measurements.

	Length	Width	Thick	Weight	L:W	L:T	W:T
N	45	45	45	45	45	45	45
Min	72.380	34.110	14.900	45.500	1.504	3.073	1.312
Max	151.740	61.280	33.690	200.200	3.239	6.427	3.203
Range	79.360	27.170	18.790	154.700	1.736	3.354	1.891
Median	93.470	42.600	22.430	73.600	2.229	4.167	1.925
Mean	96.684	43.353	22.890	81.236	2.246	4.273	1.934
StdDev	17.724	5.440	3.869	28.982	0.383	0.711	0.335

Table 6.28. Ventral Keeled adze subtype measurements.

	Length	Width	Thick	Weight	L:W	L:T	W:T
N	36	36	36	36	36	36	36
Min	71.090	34.100	16.190	37.500	1.641	3.323	1.614
Max	106.790	50.050	26.780	91.000	2.644	5.025	2.558
Range	35.700	15.950	10.590	53.500	1.003	1.702	0.944
Median	84.750	41.885	20.150	62.750	2.007	4.268	2.109
Mean	86.263	42.326	20.537	64.356	2.043	4.241	2.090
StdDev	9.063	3.271	2.849	14.513	0.208	0.456	0.258

On the whole, Kirk adzes—virtually of any subtype—are significantly larger than their Dalton counterparts. Of course, there is some metric overlap, with some individual Dalton adzes falling within the Kirk ranges for any given attribute. This overlap is generally minimal though, with only the largest Dalton adzes falling within the lowest portion of the Kirk distribution. The mean size of Dalton adzes falls within the Kirk Small and Celt ranges. This Dalton-Kirk adze size comparison is difficult to fully address given that only the Farnsley site has yielded Kirk adzes in significant numbers. The disparity in size could result from the immediate proximity of the Farnsley site to Muldraugh chert outcrops where the raw material can be obtained in fairly large blocks. The proximity and abundance of this chert, available literally only a few hundred meters away, could account for the exorbitant number of adzes. The minimal expenditure of effort to acquire the raw material could have acted to nullify replacement costs and permitted discard at an earlier stage of exhaustion. Adzes in this context could be perceived as an expedient tool. This locale may have been selected specifically because of the relative proximity of lithic resources to the Ohio River, which made this a prime

Table 6.29. Small adze subtype measurements.

	Length	Width	Thick	Weight	L:W	L:T	W:T
N	28	28	28	28	28	28	28
Min	53.120	27.160	11.100	18.100	1.353	2.894	1.787
Max	90.520	44.900	19.080	52.500	2.674	5.987	3.043
Range	37.310	17.740	7.980	34.400	1.320	3.093	1.256
Median	67.815	37.230	15.350	34.600	1.762	4.318	2.364
Mean	68.494	36.876	15.556	35.633	1.887	4.490	2.399
StdDev	8.371	4.097	2.146	8.102	0.357	0.835	0.320

Table 6.30. Stemmed adze subtype measurements.

	Length	Width	Thick	Weight	L:W	L:T	W:T
N	8	8	8	8	8	8	8
Min	70.000	33.810	11.660	27.700	1.834	3.272	1.736
Max	91.270	45.010	21.900	56.900	2.460	6.051	2.967
Range	21.270	11.200	10.240	29.200	0.626	2.780	1.230
Median	75.950	38.095	16.830	42.300	2.021	4.644	2.196
Mean	78.379	38.404	17.155	42.762	2.046	4.705	2.302
StdDev	8.370	3.575	3.302	9.871	0.192	0.923	0.424

Table 6.31. Bi-bitted adze subtype measurements.

	Length	Width	Thick	Weight	L:W	L:T	W:T
N	2	2	2	2	2	2	2
Min	85.120	40.820	21.230	66.300	2.057	3.599	1.726
Max	88.900	43.220	43.220	72.300	2.085	4.187	2.036
Range	3.780	2.400	2.400	6.000	0.028	0.588	0.310
Median	87.010	42.020	22.440	69.300	2.071	3.893	1.881
Mean	87.010	42.020	22.440	69.300	2.071	3.893	1.881
StdDev	2.673	1.697	1.711	4.243	0.020	0.416	0.219

industrial locus for dugout canoe manufacture. Farnsley may be a fairly atypical site in Kirk settlement systems in that regard.

In Dalton, adze presence implies a residential camp function. If this reasoning is applied to Kirk culture, then Farnsley should be a residential camp as well. Multiple lines of evidence support that function at Farnsley. Large Kirk sites at Tellico also are interpreted as residential sites. In fact, those sites apparently are larger and more internally complex and diverse than Farnsley. However, very few adzes were recovered from the Tellico sites and other southeastern sites, which suggest that activities that necessitated the use of adzes were not performed at these sites. This is improbable, unless morphologically different yet functionally analogous forms were used—though even those forms, such as Chapman's "cobble spall chopper/scraper", occur in low frequencies. Perhaps the articles being manufactured with adzes at Farnsley were made of materials that did not require the use of an adze at the Tellico sites. Wooden bowl manufacture is one possible item for which adzes were utilized. Perhaps at Tellico,

Table 6.32. Celt subtype measurements.

	Length	Width	Thick	Weight	L:W	L:T	W:T
N	4	4	4	4	4	4	4
Min	75.610	39.490	17.650	52.900	1.724	4.033	1.951
Max	98.850	46.570	20.470	78.000	2.197	4.829	2.639
Range	23.240	7.080	2.820	25.100	0.472	0.796	0.687
Median	81.745	44.175	19.495	61.850	1.925	4.330	2.255
Mean	84.487	43.603	19.277	63.650	1.943	4.380	2.275
StdDev	10.072	3.041	1.326	12.015	0.244	0.376	0.285

Table 6.33. Platform poll adze subtype measurements.

	Length	Width	Thick	Weight	L:W	L:T	W:T
N	27	27	27	27	27	27	27
Min	65.610	31.720	12.400	37.800	1.467	3.037	1.482
Max	130.500	54.260	29.380	137.400	2.790	6.482	3.160
Range	64.890	22.540	16.980	99.600	1.323	3.445	1.677
Median	92.000	44.820	20.700	71.300	1.994	4.380	2.219
Mean	91.832	45.111	20.575	79.170	2.047	4.611	2.256
StdDev	12.379	5.410	4.300	27.065	0.251	0.923	0.384

woven baskets were substituted for bowls. The absence of adzes—or more correctly, their erratic presence—is simply confounding given their abundance at Farnsley.

Table 6.35 shows the relative frequency of adzes within the "formal tool" assemblage of various sites (formal tools defined as points, adzes, scrapers, and drills). While the total of 611 adzes greatly exceeds the number of known Kirk adzes excavated elsewhere, the vast volume of matrix excavated at Farnsley may be partially responsible for this extraordinary number. When adzes are considered as a percentage of the formal tools represented, they compose about seventeen percent of the formal tool total at Farnsley. This is a vastly greater frequency than observed at other Kirk sites. However, the percentage is generally similar to that at the Dalton sites—Olive Branch, Sloan, and Brand—where adzes range between eighteen and twenty-five percent of the formal tool assemblage. Interestingly, the Farnsley figure is only about half of that of Thebes at the Twin Ditch site. Clearly, relative to other Kirk sites, adzes perform a critical function at the Farnsley site.

The ratio of adzes to projectile points may provide a comparable perspective. With over 2100 Kirk points recovered from Farnsley, the adze-to-point ratio is 1:3.5. The minimal number of Kirk adzes recovered elsewhere suggests that no other Kirk site is comparable to Farnsley or has a similar ratio, or has reliable figures from which a ratio can be calculated. The closest comparisons derive from Dalton sites such as Olive Branch, with a 1:1.6 adze/point ratio; Lace, with a 1:1.4 ratio; and Sloan, with a 1:3.4 ratio; as well as the Thebes Twin Ditch site, at which the ratio is virtually 1:1. All are residential sites except Sloan, which is interpreted as a cemetery.

Table 6.34. Summary of mean metric measurements of adze subtypes.

Type	Length	Width	Thick	Weight	L:W	L:T	W:T
Adze	91.274	44.566	20.445	77.012	2.057	4.619	2.261
Dorsal	96.684	43.353	22.890	81.236	2.246	4.273	1.934
Ventral	86.263	42.326	20.537	64.356	2.043	4.241	2.090
Platform	91.832	45.111	20.575	79.170	2.047	4.611	2.256
Celt	84.487	43.603	19.277	63.650	1.943	4.380	2.275
Small	68.494	36.876	15.556	35.633	1.887	4.490	2.399
Stemmed	78.379	38.404	17.155	42.762	2.046	4.705	2.302

Table 6.35. Adze frequencies at Kirk component sites.

Site	Total Formal Tools	Adze N	% FT
Farnsley	3512	611	17.4
Swans	55	1	1.82
Longworth-Gick	66	6	9.09
Icehouse	241	0	0
Bacon	143	0	0
Hardaway	935	2	0.21
St Albans	283	4	1.41
GS Lewis East	39	2	5.13
Olive	865	223	25.8
Sloan	219	42	19.2
Brand	401	72	18
Twin Ditch	78	25	32.1

Table 6.36. Percentage of selected tool types by 12Hr520 component.

Type	Upper Kirk	Middle Kirk	Lower Kirk	Sec Kirk		St Charles	Thebes	Early SN	Total
Point	4.40	60.47	22.74	11.48		0.56	0.05	0.28	99.98
Scraper	2.73	60.92	24.91	11.09		0.00	0.00	0.34	99.99
Adze	**2.79**	**61.26**	**24.95**	**10.43**		**0.56**	**0.00**	**0.00**	**99.99**
Drill	5.51	55.11	22.83	15.75		0.00	0.00	0.79	99.99

Component Analysis

The following discussion is limited to 535 adzes recovered in Phase III excavations, as stratigraphic control was not refined enough in Phase II excavations to distinguish subdivisions within the Kirk deposits.

At Farnsley, adzes were found in abundance through all Kirk horizons (Table 6.36) but were concentrated in the heavy Middle Kirk occupation. About sixty percent of all adzes were recovered from the Middle Kirk units and features. Other Middle Kirk tool classes average about the same proportion compared to their respective tool classes in other components. Slightly more than one-tenth of the adze sample came from the Secondary Kirk deposit. About one-quarter of the adze sample had provenance in the Lower Kirk, and less than three percent were from the Upper Kirk.

Adzes were only infrequently associated with features. Just over six percent of adzes (all components) were from feature provenience. There were very minor deviations in adze/feature frequencies between the individual components: Middle Kirk 6.75 percent; Lower Kirk 7.46 percent; Secondary Kirk 1.75 percent. The Secondary Kirk is low because it is primarily an overbank refuse deposit with only one feature.

Three adzes were found in the St. Charles/Thebes component. All were from unit context and none from features. The tools were made from local Muldraugh and St. Louis cherts. Table 6.37 shows the frequency of adzes amongst formal tool types (which also includes points, scrapers, and drills) through the various components. Pre-Kirk samples are small and must be viewed with caution. The Lower and Middle Kirk, as well as the Secondary Kirk, show a consistent representation of adzes. Adzes drop in relative frequency in the Upper Kirk.

Chert

Muldraugh chert was decisively the most frequently utilized chert in adze production. Over 94 percent of all adzes, from units (Table 6.38) and features (Table 6.39) and from all components, were made of Muldraugh chert. The overwhelming trend is toward the use of local materials—in addition to Muldraugh, Allens Creek and St. Louis cherts, available in the immediate vicinity, as well as semi-local Wyandotte and Jeffersonville, and less accessible Indian Creek and Lead Creek cherts were utilized. The Middle Kirk component shows the greatest array of cherts, with six types represented.

Saliently evident is the minimal usage of Wyandotte chert, which was utilized in less than one percent of the adzes. All five Wyandotte adzes were from the Middle Kirk levels, three from units and two from features. Apparently, the cryptocrystalline properties of Wyandotte were considered maladaptive for this function.

Allens Creek chert was the second-most routinely utilized raw material, used to make just under three percent of the adzes from units. This material was used for 2.3 percent of the tools in the Middle Kirk component and for over four percent of the adzes in the Lower Kirk units. The greatest proportion of Allens Creek, 6.67 percent, was recorded in units of the Upper Kirk, though only a total of fifteen adzes were recovered. Allens Creek was used for 3.57 percent of the Secondary Kirk component tools. Allens Creek is not as refined a chert as Wyandotte. It probably was utilized because it is available in the bluffs and stream beds directly adjacent to the site. Though it is local and abundant, the diminutive frequencies suggest that it was not specifically selected, and thus may not be as suitable for the tasks as Muldraugh.

Table 6.37. Percentage of formal tools by 12Hr520 component.

Type	Upper Kirk	Middle Kirk	Lower Kirk	Sec Kirk
Point	67.52	58.94	57.10	59.37
Scraper	13.68	19.39	20.11	18.73
Adze	**12.82**	**17.87**	**18.71**	**16.14**
Drill	5.98	3.80	4.08	5.76
Total	100.00	100.00	100.00	100.00

Table 6.38. Phase III Units Adze chert type by component*.

Comp.	AC	Inck	Inde	Jeff	Lecr	Muld	Stlo	Wyan	Total
UK	1		1			13			15
MK	7	1		1		290	2	3	304
LK	5					118	1		124
SK	2				1	52	1		56
SC						2	1		3
Total	15	1	1	1	1	475	5	3	502

*Chert abbreviations used in tables:
AC (Allens Ck), Atti (Attica), Fopa (Ft. Payne), Grav (Gravel), Hard (Harrodsburg), Holl (Holland), Inck (Indian Ck), Inde (Inderterminate), Jeff (Jeffersonville), Knox (Knox), Laur (Laural), Lecr (Lead Ck), Muld (Muldraugh), Ncha (New Chaple), Sale (Salem), StLo (St. Louis), Wyan (Wyandotte)

Table 6.39. Phase III Features Adze chert type by component.

Comp	Alcr	Muld	Stlo	Wyan	Total
MK	1	18	1	2	22
LK	1	9			10
SK		1			1
Total	2	28	1	2	33

St. Louis chert is recorded for just over one percent of adzes recovered in units, and the single tool represents about three percent of the adzes in features. There is no obvious trend in its selection, as single St. Louis adzes are present in the Lower Kirk, Secondary Kirk, and St. Charles components, and two tools were found in the Middle Kirk. Single specimens of Jeffersonville, Lead Creek, and Indian Creek also were recovered.

Table 6.40. Chert Quality by Component (percentage)

Comp	High	Low	Medium	Total
Upper Kirk	40.00	6.67	53.33	100.00
Middle Kirk	25.73	10.75	63.52	100.00
Lower Kirk	25.20	11.38	63.41	99.99
Sec Kirk	21.82	10.91	67.27	100.00

The Muldraugh chert frequency ranges around 93-95 percent (units and features combined) in the Lower Kirk, Middle Kirk, and Secondary Kirk deposits. Perhaps significantly, the Upper Kirk has a Muldraugh frequency of about 87 percent. However, the total number of adzes in that component is only about five percent of that of the Middle Kirk, so any small deviation could skew the frequency more readily. Because only three adzes were recovered in the St. Charles component, caution is required in any sort of raw material utilization interpretation.

Muldraugh frequencies associated with features are somewhat lower: around ninety percent in the Lower Kirk component and just over eighty percent for the Middle Kirk component. The relatively small quantities of tools may not accurately reflect the greater trend in chert usage, though the differences are not so great as to refute the trend. It may be significant that two of the five Wyandotte adzes were associated with features, both in the Middle Kirk. Perhaps this reflects a specialized use of this tool in which cryptocrystalline material satisfies demands of the task, a task which is more appropriately conducted near a hearth.

Given that Muldraugh is the near-exclusive choice for adze manufacture, the added dimension of chert *quality* is also of interest (Table 6.40). There appears to be a concerted effort in selecting medium-quality Muldraugh in the Lower, Middle, and Secondary Kirk components, the three components with the largest numbers of tools. In these deposits, the chert of almost two-thirds of the adzes—again, primarily Muldraugh—is of medium quality. Ten to twelve percent are of low quality, and about one-quarter are of high quality. On the whole, Muldraugh is generally a “lesser quality” chert than Wyandotte in terms of texture and tractability, so its predominance underscores rigid selection of non-cryptocrystalline material. There is weak evidence of a trend toward higher-quality material in the Upper Kirk, though the sample is small.

SCRAPERS

Scrapers of various forms constitute a significant tool class from the Farnsley site. In total, 669 scrapers were recovered: 623 from general midden provenience and 46 from feature contexts. The tool class can be further broken down into formal scrapers (n=605) and simple flake scrapers (n=64). The groups share steep working-edge angles, and the distinction between the types will be discussed in the text. Throughout the body of this discussion, “scrapers” will refer to formal, patterned types, of which a number of subtypes are recognized. The more expedient flake scrapers will be clearly identified as a separate entity with its own technology. Within the formal scraper tool class from the Farnsley site, 589 were classified as types of end scrapers, while twenty were designated as side scrapers.

Most lithic analysts would define scrapers on the basis of the presence of a contiguous set of steeply pitched flakes that form a bit or working edge, which can be on a distal or lateral portion of a tool blank. This blank can be a flake, blade, or broken tool such as a snapped point. When the bit is oriented perpendicular to the long axis of the tool, it is designated as an end scraper. Side scrapers would be defined as those with the working edge positioned along the long axis of the tool, on the lateral margin. In Paleoindian, Dalton, and Kirk technologies, this form is typically unifacial and tear-drop shaped. Large side scrapers are characteristic as well.

The function of scrapers is fairly well-understood and will not be dwelt upon here. It is clear that they were used for hide processing (Hayden 1979; Keeley 1980; Semenov 1964), as well as for alteration of other media such as wood and bone (Goodyear 1974; Wilmsen 1970).

A number of scraper analyses (Semenov 1964:85-87; Wilmsen 1970:75-82; Goodyear 1974:44-45 Hayden 1979:226; Keeley 1980; Cable 1996:131-133) have shown that only minimal damage is inflicted on scraper edges when applied to “wet” (freshly killed/butchered) tissue. However, to make the leather more pliable, additional scraping of the dry hide is required. It is at this stage that heavy usewear is inflicted on the scraping edge, as dry hide is very abrasive. Margins are rapidly dulled, and polish develops at an accelerated rate on the scraper face and even atop the dorsal surface. Resharpening is required so often that a flaking tool is usually kept nearby, as ethnographic evidence shows, to rejuvenate the bit. This results in removal of polish along the bit, as well as steepening of the edge angle—though Goodyear (1974) and Wilmsen (1979) posit that very steep edge angles reflect scraping of wood and bone. Though a curated tool, end scraper discard/exhaustion rates are high when used in conjunction with dry hides.

It has been noted throughout this text that in general, Kirk technology is strikingly similar to Dalton technology, which in turn is akin to Paleoindian technology (Frison and Stanford 1982:46; Hester 1972:102; Morse 1997:31). Kirk scraper forms at the Farnsley site are in keeping with this pattern as they are at other Kirk sites, such as Icehouse Bottoms (Chapman 1977:61), Bacon Farm (Chapman 1978:63), and Hardaway (Coe 1964; Daniel 1998:67). Each of these analysts developed different typologies for scraper assemblages at their respective sites. While seemingly the same forms appeared at each site, the criteria used in the typological constructs varied from site to site and analyst to analyst.

Regional Typologies

Tellico

Kimball and Chapman (1977) developed a scraper typology (Table 6.41) in their analysis of the Icehouse Bottoms site (Chapman 1977) and also applied it to the scraper assemblage from the Bacon Farm site (Chapman 1978). From Icehouse Bottoms, 79 end scrapers were recovered and segregated into eight categories (Types A-H). Four of these, Types A-D, are directly comparable to those from Farnsley (the others are generally reworked points from Middle Archaic and later contexts). Type A is the archetypical unifacial teardrop shaped form common to Paleoindian, Dalton, and Early Archaic technologies. Kimball and Chapman (1977:61-62) note that some specimens, in this case three of sixteen (18.75 percent), had graver spurs projecting from the bit. The analysts also posit that the tools were hafted on the basis of notches “on a few examples” (p. 61). The illustrated forms (Chapman 1977:58, Figure 22a) are virtually identical to those recovered at Farnsley.

Table 6.41. Tellico scraper types.

Type	Description	Icehouse		Bacon Farm	
		N	%	N	%
A	Teardrop, "humped", thick nosed	16	32.0	9	20.9
B	On blade, thin	22	44.0	28	65.1
C	Thick flake	11	22.0	6	14.0
D	End & side combo	1	2.0	-	
	Total	50	100.0	43	100.0

The Icehouse Bottoms Types B and C (n=22 and 11, respectively) were end scrapers made on unifacial flakes or blades (see Chapman 1977:58, Figures 22b, c). Kimball and Chapman (1977:62) describe the Type B variant as a poorly executed Type A form and note that Type C (p.63) lacks the regularized retouch of Types A and B. Both Types B and C are recognized at Farnsley, but not as formal subtypes and they were usually incorporated into the standard end scraper grouping. Type D from Icehouse Bottoms, which consists of a single specimen, is a combination end/side scraper. The illustrated example (Chapman 1977:58, Figure 22d) strongly resembles double-notched forms from Farnsley.

Hardaway Site

Another extensive scraper typological synthesis was conducted by Daniel (1998:66-101) in a reanalysis of Hardaway site (Coe 1964) materials. Approximately 425 end scrapers were recovered and distributed amongst seven types. The typology was largely based on bit size and tool shape as related to hafting. Type Ia scrapers (n=136) are the classic Paleoindian/Early Archaic type with a triangular to trapezoidal planview and a trapezoidal or offset triangular cross section. Type Ib (n=41) is worked across dorsal face to produce a plano-convex cross section. From their small size, tapering lateral edges, and thinned proximal element, it is suspected that Type I scrapers are a hafted form. Lateral edge retouch was designed to taper and reduce the width of the proximal element for hafting (Daniel 1998:69). Morse (1973:27) also saw this form of retouch as hafting evidence, and suggested the scrapers were socketed in bone and antler handles. Breakage patterns suggest socketing within the bone or antler handle would create leverage capable of transversally snapping the tool. Graver spurs are generally limited to Type I forms, though only in low incidence (ca. 14 of 177, 7.91 percent).

Type II end scrapers are made on flakes twice as long as wide. Thick irregular flakes serve as the blanks for Type IIa end scrapers, while Type IIb forms are fashioned on thin, narrow prismatic flakes. Daniel (1998:73) admits there is little difference between Type Ia and IIb forms except for length, which could be affected by resharpening. That Type IIa forms are of large, block-derived blanks indicates they were probably hafted differently—not socketed in a bone/antler handle, but perhaps inserted in a wood shaft. Daniel posits that the socketed forms may be curated, while the Type IIa forms may be more expedient.

Also discussed by Coe (1964:76) and Daniel (1998:75) are Type III scrapers (n=9), which Coe considers a rougher Type I variant. Type IV (n=25) is a newer type defined by Daniel (1998), who notes that only the bit is worked and is otherwise variable in form and actual bit placement, with almost half made on corticated flakes. Type V scrapers (n=79) are block-derived. This form possesses a narrow bit which is asymmetrically placed on the corner of the blank and has a slightly-incurvate, retouched lateral edge.

While 425 end scrapers were recovered from Hardaway, nearly the same number of side scrapers were recovered (n=409).

St. Albans

Broyles (1966) reports the recovery of "about 50" scrapers in excavations from the St. Albans site, and divides them into nine types based on shape. Types I-III are end scrapers. Type I is the archetypical teardrop form, made on a thick flake. Type II is "cruder" but similar to Type I and has a concave or convex ventral face, but never a flat face. Type III is thinner and laterally reworked as well, but apparently is only reworked if needed to flatten its profile. Types V-VII are side scrapers that are few in number (n=6 total) and varied. Type VIII tools are retouched flake scrapers, and Type IX tools are scrapers made from projectile points, most of which post-date Kirk points.

Other Southeastern Sites

Cable (1996) reports the recovery of a total of 47 end scrapers from the collective Palmer through Kirk/bifurcate floors at the Haw River site in North Carolina. He notes (Cable 1996:110, 124) their characteristic "teardrop" shape as being similar to those described by Coe (1964) at the Hardaway site. Similar forms are documented in illustrations of end scrapers recovered from the G.L. Lewis East site in South Carolina (Sassaman 1996). The site is probably better-known for its "Edgefield scrapers", which appear to be reworked points.

Swan's Landing

Two professional excavations of the Swan's Landing site were conducted—one in 1986 (Smith 1986, 1995) and one in 1994 (Mocas and Smith 1995). From the first investigation, Smith (1995:43, Figure 11) reports the recovery of 14 end scrapers. All were made on flakes or blade-like flakes. Lateral retouch was not uncommon, and Smith (1995) attributes this to an additional side scraper-like function. Graver spurs were absent in the excavated sample, and were rare in private collections.

Eight end scrapers were retrieved in the second excavation (Mocas and Smith 1995:136-143), conducted on a landform distinct from the first. While each scraper was described, no formal typology was designated, though Mocas and Smith did distinguish specimens that were more likely to be curated than others. At least four were discarded but not out of "obvious necessity", as they appeared to have been utilized yet were serviceable (Mocas and Smith 1995:140-141). Three were interpreted as curated types, two were deemed expedient, and two were unknown. The curated and indeterminate types showed lateral retouching for hafting. All scrapers were made of the local Wyandotte chert. Side scrapers were rare, with only two specimens recovered.

Tomak (1994:185-186) reports that a "large number" of scrapers were observed in private collections from Swan's Landing. The illustrated types are identical to those from Farnsley, and include both single- and double-notched forms, as well as spurred types.

Longworth-Gick

Boisvert et al. (1979:102-113) report both unifacial (n=93) and bifacially flaked (n=21) scrapers from excavations of four sites (including Longworth-Gick) in the Southwest Jefferson County Floodwall Project near Louisville, Kentucky (Collins 1979). The extent of bifacial flaking appears to be minimal in the latter population, seemingly confined to lateral margins and perhaps thinning of the bulb. As this appears to be fairly common in Paleoindian, Dalton, and Kirk scraper technologies, there is no need to maintain this distinction for the purposes of this report. As it is inconsequential, unifacial and bifacial types are "lumped".

Boisvert et al. (1979:102-119) utilized a typology predicated to some extent on flake shape ("bladelike" or not) and size. The primary distinction, however, is the morphology of the working edge, categorized as "steep nosed" or "shallow retouch". "Steep nosed" refers to those tools with a "humpbacked" dorsal surface and prominent bulbous working edge, while the "shallow retouched" form has a more beveled/faceted dorsal surface just above the bit and only a short working edge to function as the bit.

Available for analysis were 71 end scrapers and 43 side scrapers. End scrapers were distributed amongst six variants; side scrapers were placed into three variants. Many of these were considered to be Early Holocene types or to be visually similar to them. Table 6.42 shows the subtype distribution as well as the chert type of the tools. This is of interest as these sites are located with a few kilometers of Farnsley and chert utilization will be compared in a separate section.

Graver spurs were present on only six scrapers (5.26 percent). All were on unifacial end scrapers, five of those being the standard steep nosed variant and the last a bladelike steep nosed variant.

French (1998:123-124) reports six side scrapers and ten end scrapers (rather than the eight reported in Collins 1979) from Kirk levels at Longworth-Gick. Of the nine end scrapers available for examination, eight were of Wyandotte and one was of Muldraugh. Boisvert et al. (1979:107) report spurs on "several" end scrapers, while French (1998:124) more specifically reports two spurred scrapers (20 percent). Of the side scrapers, four were made of Wyandotte and two were of Muldraugh.

Table 6.42. Longworth-Gick scraper types by chert type.

Type	Variant	N	MU	WY	AC	SG	IN
End	Steep nosed	43	20	20			3
	Shallow retouch	11	2	6	1		2
	Bladelike/steep nosed	9	3	4			2
	Bladelike/steep nosed/diminutive	3		2			1
	Bladelike/shallow retouch	4	3	1			
	Bladelike/shallow retouch/diminutive	1		1			
Side	Trianguloid	18	10	6			2
	Ovoid	10	6	3	1		
	Ovoid/elongate	15	7	6		1	1

Dalton and Thebes Scrapers

Morse (1997:31) notes the presence of “fan-shaped, transverse-edged unifaces” at the Sloan site in Arkansas. These were likened to the Paleoindian toolkit, which he states is inherited from Upper Paleolithic of Europe. Morse describes 33 scrapers from Sloan. Seventeen were made on flakes detached in regular biface reduction, and twelve were manufactured on core flakes. No evidence of a specialized blade/flake blank industry was identified (Morse 1997:34). The scrapers were triangular in planview, triangular to trapezoidal in cross section, and had a “distinct dorsal downcurve opposite the bulbar end” in the lateral view (Morse 1997: 34-38), and, of course, had steep retouch on the functional end. Bulbs of percussion had been removed, and all showed lateral retouch and/or grinding to facilitate hafting.

Goodyear (1974:43-50) distinguishes two main types of scrapers amongst the 190 specimens recovered from the Brand site: regular steep retouch (n=36) and wear and shear retouch (n=150). Shear retouch is created when a flake is utilized unidirectionally over wood, bone, or antler, and this process imparts the steep scraper edge. “Regular steep retouch” is the classic teardrop form, shaped by lateral chipping and with a tapered stem for hafting. The flake blanks are always curved, with the greatest curvature toward the working end. The flake blanks can be generated in many ways: prismatic/trapezoidal flakes from specialized cores (true blades), primary or secondary decortication flakes, large core trimming flakes with an “uncomplicated dorsal surface”, or from adze flakes.

As with other Dalton sites, the Olive Branch site (Gramly 2002:118-122) produced an array of classic end scrapers (n=152 measured) and side scrapers (n=92 measured). Hafting notches were rare on end scrapers, though some tools were stemmed, and many appeared to have lateral retouch. Thinning of the ventral surface was recorded in nine percent of the sample, which Gramly (2002:122) thought to be significantly higher than in Paleoindian assemblages. Spurs were noted on only three specimens. The end scrapers depicted in photographic plates (Plates 73 and 74) are virtually identical in form and variability to those recovered at other Dalton and Kirk sites, including Farnsley. Gramly invested more analysis into his side scraper assemblage. Given the paucity of this form at Farnsley, no meaningful comparison can be made.

Prior to the excavation of the Twin Ditch site (Morrow 1996) the Thebes lithic inventory could not be adequately documented with certainty. Morrow (1989:8) reports 18 scrapers from the site: one end scraper on a reworked Thebes point, 14 end scrapers on flakes, and four side scrapers. The end scrapers are made on large thinning flakes but are considered as formal unifaces given the extensive retouch to shape them.

Farnsley Typology

The previous discussions have elucidated a number of typologies utilized in analyses of scrapers from various Early Holocene sites in the eastern U.S. In this report, it is acknowledged that the same *forms* appear at Farnsley. However, none of the previous typologies were adopted for this analysis, aside from recognition of the overarching end scraper and side scraper categories. Simply said, no "unifying theory" of scraper typology has ever been established. It is felt that the individual "types" are based on morphology alone. In some typologies, many types or subtypes are populated by so few specimens as to render them analytically marginal. Never has it been demonstrated that individual shapes or "types" relate to some functional difference or media specialization. Without such data, it is tenable that technological variations on the same theme represent little beyond variability within a continuum. It is our opinion that scrapers as a tool class have very generalized applications toward this function with little regard to the shape outside of the bit placement (end or side). While scrapers may be considered a formal tool, they do not appear to be as regimented in their patterning as projectile points.

We do recognize some formal and significant variability in haft element modification and preparation (i.e., notching, stemming) and in retouch designed to impart a multifunctional dimension to the tool (i.e., graver spurs). These are the criteria we use to construct the Farnsley typology. We feel these attributes represent intentional technological efforts that can be distinguished from the variation concomitant with a continuum of manufacture—unlike the divergence seen in the blade shape or bit form. In essence, we believe that more insights can be gained by observation of the haft rather than the bit.

Given this approach, five major scraper types are recognized from the 669 specimens recovered through Phase II and III excavations of the Farnsley site (Table 6.43). These are: end scrapers (n=583; 87.1 percent of the total); side scrapers (n=14; 2.1 percent); combination end/side scrapers (n=6; .9 percent); flake scrapers (n=60; 9.0 percent); and combination end scraper/other tool (n=6; .9 percent).

End Scraper

As a general description, Kirk end scrapers are made on large blade-like flakes and unifacially worked into teardrop or almond-shaped (amygdaloid) forms (Figure 6.16). In planview, the working edge is developed on the broader distal end (opposite the bulb of percussion) and tapers to the proximal end. In sagittal view, the distal end is often bulbous or at least the thickest part of the flake and, again, shows tapering toward the proximal end. Very often, the original curvature of the flake is preserved if shaping of the tool is unifacial and the ventral surface is unaltered. Not unusually, a pronounced

Table 6.43. Kirk scraper types at 12Hr520.

Type	Subtype	N	% OF TYPE
End Scraper		583	
	Standard end scraper	457	78.4
	Spurred end scraper	71	12.2
	Single notched end scraper	26	4.5
	Double notched end scraper	16	2.7
	Stemmed end scraper	9	1.5
	Spurred & notched end scraper	4	.7
Side Scraper		14	100.0
End/Side Scraper		6	100.0
Flake Scraper		60	
	Flake Scraper	57	95.0
	Discoidal	3	5.0
Scraper/Tool		6	
	Scraper/Denticulate	3	50.0
	Scraper/Spokeshave	2	33.3
	Scraper/Graver	1	16.7
Total		669	

"lipping" of the functional edge, which reflects an abrupt curvature change along the ventral face, is noted in the sagittal view. This tends to accentuate the bulbous morphology of the distal portion. Virtually no flaking of the ventral face is conducted, with the exception of the routine removal or reduction of the bulb of percussion.

Cross sections vary according to flake scar patterning on the original blade core as well as subsequent working of the detached blade. Many are trapezoidal, with lower-angled flanks truncated by a flat dorsal surface to create a ribbon-like effect. This form has a great width-to-thickness ratio. Others are nearly triangular in cross section because of steeply pitched flanks that coalesce to form a medial ridge and a width-thickness ratio that approaches unity. Many have a more gently rounded dorsal surface and a plano-convex cross section.

There are two predominant morphologies associated with the dorsal face of the distal end just above the actual working edge. The first is the characteristic bulbous "humpback" form, which places the thickest part of the tool toward the distal end. The actual working edge, as defined by the series of pressure flakes used to shape the face, is quite "tall and steep". This form would be equivalent to Kimball and Chapman's (1977) Type A, Coe (1964) and Daniel's (1998) Type Ib, Broyles' (1966) Type I, Boisvert et al. (1979) "steep nosed", and Goodyear's (1995) "regular steep retouched" forms. The second major form seemingly has this distal bulbous prominence removed in a planar beveled facet above the working edge, though it is uncertain at what point in the reduction continuum this may have happened. The actual working edge, while still characteristically steep, is rather "short-faced". The thickest part of the tool is not at the distal end, but is located more toward the center in sagittal view. This form is equivalent

Figure 6.16. Kirk zone End Scrapers.

to Kimball and Chapman's (1977) Type B, Coe (1964) and Daniel's (1998) Type Ib, Broyles' (1966) Type II, and the "shallow retouch" type of Boisvert et al. (1979).

Low-level microscopy usewear analysis shows no functional distinction between the two forms ("bulbous or beveled") described above. Both forms routinely show polish and bit margin rounding. In fact, it is odd if a specimen does *not* show some level of bit polish. Both morphotypes display various forms of damage interpreted as the result of working hard or soft materials. These include small, thin scalar flake scars clustered on the working edge and stacked stepfractures and hinge fractures that are evidence of crushing from heavy pressure. Since there is no correlation of damage type to particular forms, the general tool corpus may be more fortuitous than intentional, with the morphology predicated more on flake scars previously accrued on the original blade core than any subsequent formulated shaping of the tool.

In planview, the most common distal/working edge morphology is rounded/convex. Occasionally this edge is virtually straight. This may result from resharpening of the scraper margin, or may represent reworking of a snapped form. Functional specialization of the straight-edged form cannot be ruled out, though like the others, they were apparently used on both hard and soft media as determined from low-power microscopy.

Often the bit ends of the end scrapers are asymmetric in planview, with one side more broadly arcuate and the other having a shorter curvature radius. The axis across the bit may not be perpendicular to the long axis of the tool. The side with the shorter radius tends to project laterally from the corpus of the tool as well. This asymmetry may result from casual resharpening, or it may represent a more functionally specific protuberance intended for finer work.

Several morphological variants of scrapers have been recorded. While end scrapers represent the vast majority of the scraper class, side scrapers and combination end/side scrapers also are noted, and spurred scrapers are common. A subset of end scrapers has different forms of modification to the proximal end that indicate hafting. Such modifications have been alluded to but not quantified at other Kirk sites such as Icehouse Bottoms (Chapman 1977) and Hardaway (Coe 1964).

The "notched" and "stemmed" end scraper types are fairly self-explanatory in terms of morphology and represent the strongest evidence for hafting of this tool form. Notches were defined on the basis of multiple contiguous flake scars that were clearly intentionally emplaced to form an arcuate indentation in the lateral margin. Notches tend to be broad and shallow. Grinding was only occasionally noted within the notches or along the proximal (hafting) element. Grinding was not as routinely performed as it was with points and adzes. Often, the butts of the stemmed subtype were polished, faceted, and/or showed bipolar-like crushing or other types of haft damage. These types of damage are taken as evidence of extreme stress to the tool as initially inflicted on the bit end and transferred proximally. This stress, in concert with incomplete seating of the tool, results in abrasion from the haft onto the tool.

Various kinds of evidence indicate that many end scraper forms were hafted. Some end scrapers have long tapering "tails" or proximal elements. Of those, some have steeply-pitched flanks that rise to form a medial spine. Often these flanks are unifacially worked and give the appearance of a functional edge comparable to that of a side scraper. A small side scraper category is recognized from Farnsley, as well as a combination side scraper/end scraper subtype; however, low-power microscopic examination of these long-shanked/steep flanked forms shows little scraper-like damage on the flanks. It is felt that the flank modification reflects haft preparation rather than a functional edge, thus disqualifying them as side scrapers.

The morphological or functional significance of the single notched form is unknown. While the bit end is technologically "formal", the hafting area appears to be less so; therefore, hafting treatment could be technologically more expedient as long as it was functional.

Spurred Scrapers

Other scrapers have a pronounced spur located at the interface of the bit and shank (Figure 6.17). Under low-power microscopy, it is apparent that this is not a fortuitous, random appendage. Rather, this spur shows more concentration of damage, intensity of use, and polish than other parts along the bit. Stacked hinge fractures are common and suggest more focused use of the spur, which was very likely applied to harder materials such as wood or bone in a graver-like function.

Just over 12 percent of all Farnsley end scrapers incorporate a spur on the working edge. The corresponding figures for other sites were: Icehouse 18.75 percent (though from a small assemblage); Hardaway 7.9 percent; Longworth-Gick 20 percent (using French's [1998] data; or 5.26 percent of all end scrapers using Boisvert et al. [1979] data); Olive Branch 1.97 percent; and Swan's Landing 0 percent (again from a small sample, but examples appear to be present in amateur collections from the site

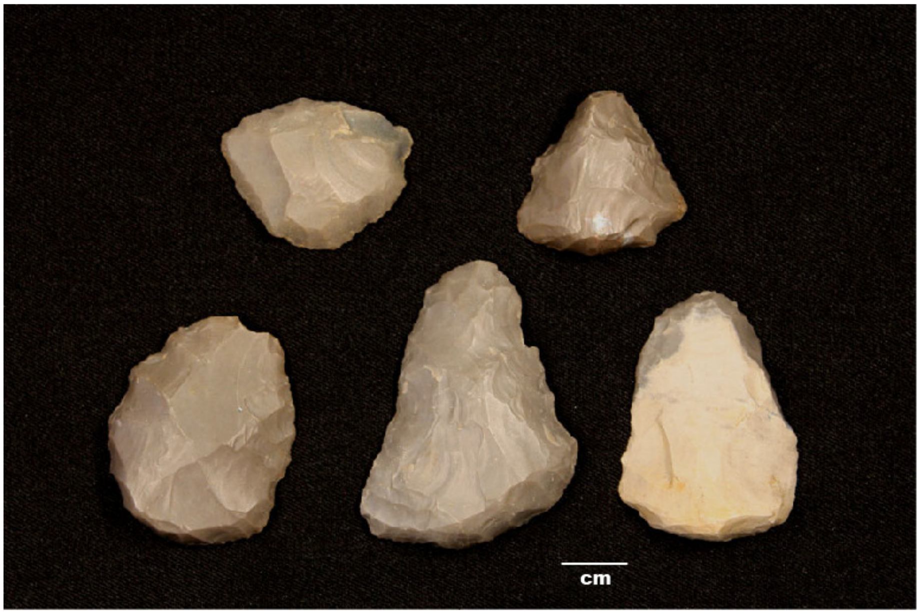

Figure 6.17. Kirk zone spurred scrapers.

(Tomak 1994:Figure 7). Certainly, other sites discussed earlier in this chapter yielded spurred scrapers, but these were not distinguished in the analyses.

Combination Scraper/Tool

Six scrapers had other functional tool types fabricated on the lateral margins. These consisted of three denticulates, two arcuate spokeshaves, and one distinct graver. Clearly, these secondary tools were not hafted; they are more likely exhausted scrapers recycled into other tool types. The placement of each secondary working edge was obviously intentional; these were intentionally fabricated rather than shaped through use. Regardless, these secondary forms were likely to be expedient in nature.

Discoidal Scrapers

Another presumably unhafted scraper type was the discoidal form (Figure 6.18). These were about the size and shape of a U.S. quarter, with steep, closely-spaced retouch flakes around the margin. The technology was rather expedient, yielding little more than a retouched flake. Sixty-four simple flake scrapers also were tabulated, a minority of which could have been hafted. Most of these were fabricated on very small, irregularly-shaped, thin flakes with little durability and would have been quickly exhausted.

Flake Scrapers

As shown in Table 6.43, a significant number of flake scrapers were recovered (n=57). These scrapers were not likely hafted and could be considered expedient tools. It is possible, if not likely, that the bit flaking could have been generated through use rather than actual preparation. Other flakes undoubtedly were employed in a similar manner but did not accrue enough damage to be recognized as scrapers. These would be classified "utilized flakes".

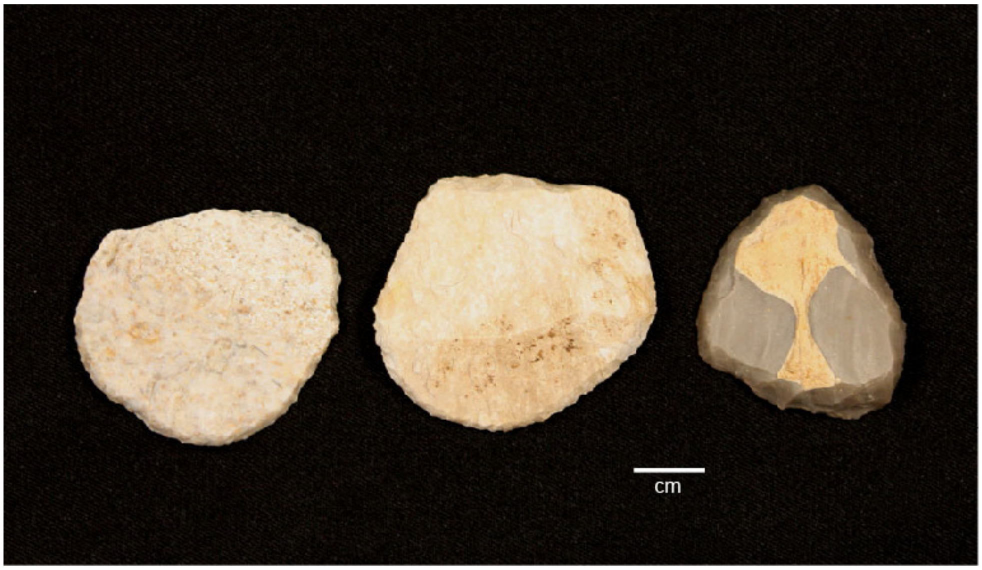

Figure 6.18. Kirk zone discoidal scrapers.

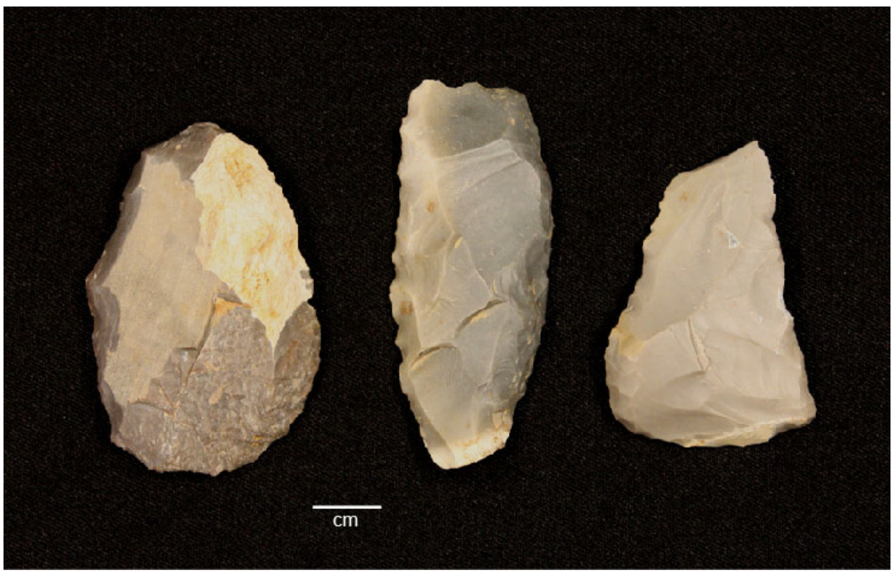

Figure 6.19. Kirk zone side scrapers.

Side Scrapers

Only fourteen side scrapers and six combination end/side scrapers were recovered at Farnsley (Figure 6.19). These twenty tools represent less than three percent of the total scraper population. This dramatically contrasts with some of the significant Southeastern Kirk sites.

At Hardaway (Coe 1964; Daniel 1998), scrapers were apparently a very common tool, as 834 were recovered, 409 of which (49 percent) were side scrapers. The composite scraper data from Section Two of the Southwest Jefferson County Floodwall Project (Collins 1979) shows that 43 of 114 scrapers (38 percent) were side scrapers. The Dalton tradition Olive Branch site (Gramly 2002) produced 244 scrapers, 92 of which (38 percent) were side scrapers. Six side scrapers composed 12 percent of the sample of 50 scrapers from St. Albans (Broyles 1966).

Other Early Holocene sites, like Farnsley, produced low numbers of side scrapers. At Icehouse Bottoms (Chapman 1977), only one of fifty scrapers (2 percent) was a side scraper, and at Bacon Farm (Chapman 1978), no side scrapers were reported. The two combined excavations of Swan's Landing (Smith 1986; Mocas and Smith 1995) yielded two side scrapers out of a sample of 24 scrapers (8.3 percent). No side scrapers were reported from the Dalton phase Brand (Goodyear 1995) or Sloan (Morse 1997) sites.

The causality of this variability in scraper assemblage composition is difficult to deduce. Side scrapers seem either to be rare or common at sites. The answer may lie in the complexities of specific-form function and tasks at hand at a given site, or could reflect a polarized situation within the curated-expedient tool continuum (where end scrapers are the more formal, curated tool, as opposed to more expedient side scrapers). Conversely, the answer could be as simple as different typological interpretations used by individual analysts.

Scrapers and Chert Selection

Table 6.44 below shows the distribution of chert types selected per scraper form. Ten chert types are represented: Allens Creek, Holland, Jeffersonville, Laurel, Lead Creek, Muldraugh, New Chapel, various St. Louis varieties, Salem, and Wyandotte, along with a few indeterminate types. Virtually all occur within a 40 km radius, so no "exotic" cherts are represented. However, Wyandotte accounts for over 79 percent of the total assemblage. Only two other cherts occur in any significant quantity: Muldraugh (12 percent) and St. Louis (4.6 percent). Collectively, the other chert types account for less than five percent of the total.

The three predominant chert types also are amongst the most local. Muldraugh outcrops in the bluffs only a few hundred meters away. St. Louis varieties occur in lag deposits in the Buck Creek headwater system about two kilometers west of that same bluffline. Wyandotte outcrops occur on the opposite side of Harrison County. Absolute proximity to lithic sources is not the only controlling factor in selection, however.

Obviously, there is a large disparity between the use of Wyandotte and Muldraugh, with the former occurring in a frequency of six times that of the latter. It is believed that purposeful selection of Wyandotte is operative; much like it is for projectile points. Kirk scraper manufacturing, like its Paleoindian and Dalton predecessors, is based on a blade-like technology. Relative to Muldraugh, Wyandotte generally is a more amenable material for this type of technology, given its occurrence in large, fine-grained, homogeneous masses. While Muldraugh does occur in large blocks in primary deposits near the site, it is generally not of the same quality, nor does it flake as predictably, as Wyandotte. In addition to the need for precision in blade manufacture, the advantage of Wyandotte over Muldraugh would be that the fine grained nature of the former would allow for better maintenance and material conservation in resharpening strategies, which is critical for highly mobile populations (Goodyear 1979). Given that scrapers are seemingly a hafted, curated tool type, it behooves Kirk flintknappers to obtain the best material reasonably available. While Wyandotte deposits occur some thirty linear

Table 6.44. Kirk Scraper types by chert type.

Type	N	Alcr	Holl	Jeff	Laur	Lecr	Mul	Ncha	Stlo	Sale	Wyan	Inde
STAN	457	4		2	1	4	48		13	1	377	7
SPUR	71		1				5	1	7	2	55	
SNOT	26								1		25	
DNOT	16										16	
STEM	8										7	1
SP&NO	4						1				3	
E&S	6								2		4	
SIDE	14						3				11	
DENT	3										3	
SPOK	2										2	
GRAV	1										1	
FLAK	57			2			23		8	3	21	
DISC	3	1					1				1	
TOTAL	669	5	1	4	1	4	81	1	31	6	526	8

kilometers away, it apparently was economically viable to put in the extra effort to procure this material. This effort would probably be minimal given the expansive Kirk home range. It may have been opportunistically acquired or *embedded* in procurement (Binford 1979) or easily obtained by a task group based at Farnsley.

The end scraper forms in which an overt, specialized effort was made in haft preparation show an even greater Wyandotte affinity. The single-notched, double-notched, and stemmed subtypes show a Wyandotte frequency of 96 percent, 100 percent, and 88 percent, respectively.

Though the side scraper population was small, it shows about the same frequency of Wyandotte use as the overall end scraper trend (79 percent). The combination end/side scraper subtype also is small and shows a lesser Wyandotte frequency of 67 percent, though it is not certain how meaningful this figure is.

The formal, curated end scraper forms require cryptocrystalline material to satisfy the demands of technology predicated on high group mobility. However, the flake scraper class is dramatically different in two aspects: (1) their expedient form, derived from a simple, non-specialized flake as opposed to a prepared blade, and (2) the minor frequency of Wyandotte in production of this form. In fact, Muldraugh is utilized more often than Wyandotte, and well over half of the flake scrapers are made of non-Wyandotte materials. These were likely expedient and disposable forms. In all probability, the discoidal subtype was a similar expedient form, though the small population does not allow for certainty. That each of the three were made of different and yet local chert would suggest expediency, however.

One of the tenets of Goodyear's (1979) "cryptocrystalline hypothesis" is that such materials are utilized for curated tools to accommodate the need for flexibility—to refabricate an exhausted tool into a new form. This may be operative in the few scrapers recovered for which secondary functions were identified: the denticulate, spokeshave, and graver forms fashioned on the shanks of end scrapers. This may reflect specific instances of expedient need for such tools.

Other Local Sites

The Swan's Landing site is most likely to be similar to Farnsley in terms of function and occupational intensity. However, excavations were limited, as is the data set, which may make direct comparisons specious. Though few in number, all of the scrapers recovered at Swan's Landing were of Wyandotte chert, much like this tool class was at Farnsley. However, the former site is located in the midst of Wyandotte outcrops which could conceivably alter the system in which it is procured and utilized, given low replacement costs.

Perhaps the better comparative site would be Longworth-Gick (Collins 1979; French 1998). It is the major Early Archaic site located nearest to Farnsley, and it also is very near to Muldraugh chert deposits. Wyandotte deposits (which also exist on the Kentucky side of the Ohio River) are found at about the same distance from Longworth-Gick as they are from Farnsley, so access and distance to both major chert types are about equal. As can be determined from textual descriptions and pen-and-ink illustrations, the Longworth-Gick scraper assemblage appears to be very similar to Farnsley. French (1998:124) reports Wyandotte and Muldraugh use at 67 percent and 33 percent, respectively, for side scrapers, and 89 percent and 11 percent, respectively, for end scrapers. The total numbers are small, but the frequencies reflect a preponderance of Wyandotte chert for scrapers, as is seen at Farnsley.

Discussion

Throughout this section, an emphasis has been placed on the continuity of the unifacial end scraper form from Paleoindian through Dalton and Kirk technology. This highly stylized, hafted form, often made of higher-quality chert, is used as evidence of a curated technology necessary for highly mobile populations to overcome lithic access problems. This form persisted through these various cultures for around 2000 years with little technological change. Scraper forms of the Middle Archaic onward tend to be reworked points and simpler flake-tool types.

The presence and relative frequency of scrapers are often used as indicators of site function as well (Binford 1980; Cable 1996). Certainly, 669 scrapers from the Farnsley site is not a trivial number. In fact, as far as absolute numbers go, this is the second-highest total known to the author from an Early Archaic site, the highest being the 834 recovered from Hardaway. While scrapers account for about twenty percent of the Farnsley assemblage, the Hardaway figure represents about *ninety percent* of the formal tool assemblage (*Formal Tool* assemblage defined as point, scraper, adze, and drill tool classes.) On the basis of the scraper frequencies, the two sites seemingly would have functioned very differently, with the inferred level of hide processing to be more intensive at Hardaway.

It may be difficult to compare the Farnsley scraper frequency to the other local Kirk sites, Longworth-Gick and Swan's. Significantly smaller assemblages were recovered from each of these, and less volume was systematically excavated, so an element of assemblage bias cannot be entirely discounted. However, assuming there is no bias, the Farnsley scraper frequency is comparable to the former site but only half of that of the latter. The Farnsley frequency is also similar to other major regional Kirk sites, such as GS Lewis East, Icehouse Bottoms, and St. Albans. The Thebes Twin Ditch site also has a comparable scraper frequency. The Brand site and Dalton Olive Branch site have frequencies at least twice as great as Farnsley. In general, it seems that within Early Holocene residential sites between 20 percent-30 percent is the norm for representation of scrapers amongst "formal tools" as defined here. Farnsley seems unique amongst this same set of sites because of the few side scrapers that were recovered.

Indeed, the scraper frequency at Hardaway seems over-represented relative to each of the sites presented in Table 6.45, much as adzes seem over-represented at Farnsley. Perhaps that "inflated" frequency represents an occupation at a particular time of year. The numbers of other tools at Hardaway indicate that it still functioned as a generalized residential site, not as a specialized hide processing facility.

Table 6.45. Scrapers and other tools from Kirk component sites.

Site	Point	%	E&S Scraper	%	Adze	%	Drill	%	N
Farnsley Phase III Kirk	1778	58.84	584	19.32	534	17.67	126	4.17	3022
Swan's	30	57.69	22	40	1	1.82	2	3.64	55
Longworth-Gick	39	59.09	16	24.2	6	9.09	5	7.58	66
Icehouse	181	75.1	50	20.8	0	0	10	4.15	241
Bacon	98	68.53	43	30.1	0	0	2	1.4	143
Hardaway	96	10.27	834	89.2	2	.21	3	.32	935
St Albans	214	75.62	50	17.7	4	1.41	15	5.3	283
Olive	352	26.41	562	42.2	223	16.7	196	14.7	1333
Sloan	144	*65.75*	33	15.1	42	19.2			219
Brand	139	34.66	190	47.4	72	18	0	0	401
Twin Ditch	25	*32.05*	19	24.4	25	32.1	9	11.54	78
GS Lewis East	29	74.36	8	20.5	2	5.13	0	0	39
Haw River			47		11				

Scrapers by Component

Phase III excavations of units and features of the Farnsley site yielded 586 scrapers (Table 6.46). Scrapers were, then, a common tool at the site. They were present in all Kirk components as well as the Early Side Notched horizon, but absent in the St. Charles and Thebes deposits (Table 6.47). Around 7.5 percent of all scrapers were found in feature association.

Table 6.46. Scrapers by12Hr520 component.

Scraper	UK	MK	LK	SK	Total
Unit	16	325	136	61	541
Feature		32	7	4	43
Total	16	357	143	65	584

Table 6.47. Percentage of scrapers and other tools by component.

Type	Upper Kirk	Middle Kirk	Lower Kirk	Sec Kirk	Total
Point	4.40	60.47	22.74	11.48	99.98
Scraper	**2.73**	**60.92**	**24.91**	**11.09**	**99.99**
Adze	2.79	61.26	24.95	10.43	99.99
Drill	5.51	55.11	22.83	15.75	99.99

Over sixty percent (357/586) of all scrapers recovered in Phase III excavations of units and features were from the Middle Kirk component, which is about the average for all formal tools given the large volume of material in this horizon (Table 6.47). About a quarter of all scrapers are assignable to the Lower Kirk (n=143), which, again, is about the average frequency for other formal tools in this component. The Upper Kirk component had only 16 scrapers which represent less than three percent of the sample.

Table 6.48. Percentage of tools by component.

Type	Upper Kirk	Middle Kirk	Lower Kirk	Sec Kirk
Point	67.52	58.94	57.10	59.37
Scraper	**13.68**	**19.39**	**20.11**	**18.73**
Adze	12.82	17.87	18.71	16.14
Drill	5.98	3.80	4.08	5.76
Total	100.00	100.00	100.00	100.00

The frequency of scrapers relative to other formal tools within an individual component, as compared to other components, shows some minor differences as well as potentially significant differences (Table 6.48). Scraper frequency within the Middle and Lower Kirk components range between 18 percent and 20 percent. However, the frequency is less than 14 percent in the Upper Kirk, showing a relative decline in associated activities or greater curation of those forms.

About one-tenth of all scrapers in the Middle Kirk deposits were recovered in feature contexts (Table 6.46). Less than five percent of all scrapers are in feature context in the Lower Kirk component. This is unexpected because numerous features are interpreted to be smudge pits, which are associated with hide processing.

DRILLS

Drills are one of four "formal" tool categories defined in this report, along with points, adzes, and scrapers (Table 6.49). "Formal" refers to the fact that these are hafted/curated/bifacially-flaked tools (unifacially flaked in the case of scrapers) with obvious patterned mental templates and potentially culturally-diagnostic attributes such as the bases. In analyses of other tool types, specimens were limited to those recovered in Phase III procedures. However, relatively few drills were recovered from the Farnsley site. To enhance the drill data set for technological discussion, specimens from both Phase II and Phase III were included in the analysis. In cultural component analysis, the data set was limited to Phase III specimens because their provenience information provided more stringent stratigraphic control.

Table 6.49. Frequency of Kirk drills and other tools.

Formal Tool	N	Percent
Point	2100	61.37
Scraper	669	19.55
Adze	611	17.85
Drill	42	1.23
Total	3422	100.00

Table 6.50. Drill fragment type.

Element	N	Percent
Tip	56	42.42
Shank	34	25.76
Proximal	35	26.52
Complete	7	5.30
Total	132	100.00

Excavation of Phase II and III units and features within the Kirk deposits at the Farnsley site yielded 132 drills and fragments. Only seven of the tools were complete, and an additional 35 were represented by proximal elements. These 42 drills and stem fragments are used for intersite and intrasite comparisons (Table 6.49). The complete drills and all the fragments constitute slightly less than four percent (3.86 percent) of the formal tools recovered from Farnsley. However, the drill frequency is only 1.23 percent of all formal tools when restricted to those with proximal elements.

Drill function is somewhat obvious and taken for granted. It is assumed they are used to bore through wood, bone, antler, shell, and stone. However, little hard data is available concerning their actual function. Little exists in the literature in regard to usewear or replicative/experimental studies. In archaeological reports, drills are usually given short shrift, with discussion typically limited to raw numbers recovered and perhaps some metric data.

Farnsley Drills

Table 6.50 shows that only seven of 132 specimens were complete (5.30 percent of drill class), and 42 (31.82 percent of drill class) possessed basal/proximal elements (combined Proximal and Complete groupings).

Proximal Elements

Thirty four of the 42 specimens with proximal elements are very distinctive and are very likely to be culturally/temporally diagnostic (Figure 6.20). The bulbous base is, at best, an uncommon form on sites of other cultures and is not known to occur in numbers on any other site. The 34 drills with bulbous bases are distributed amongst four informal subtypes as described below (Table 6.51). The remaining eight specimens are reworked/recycled tools of various proximal configurations divided amongst two informal subtypes.

Figure 6.20. Kirk zone drills.

The thirty four specimens cited above have distinctive, “bulbous” bases. These bases can vary somewhat in morphology which originally prompted subdivision into four subtypes during the analysis. However, upon inspection of the aggregate, it appears that a continuum is very likely to be represented, with the subtypes representing little more than variations on a theme. This “bulbous” base usually has one axis longer than the other. The long axis can be oriented perpendicular to the shank (Subtype 1; n=11) and appear as an oblate oval. The longer axis can be in line with the shank axis (Subtype 2; n=12). This second subtype often has a length:width ratio closer to 1:1, so the proximal element is more circular or square compared to Subtype 1 examples. A third subtype (n=4) is much like the first (Subtype 1), only more diminutive, thinner, and “refined” in flaking and probably has a greater length-to-width ratio than the first subtype described.

The fourth subtype is more an expanding base form that is more triangular than “bulbous”, though it readily fits within the continuum.

The composite of breadth, thickness, and overall mass of the typical drill’s proximal element is much more massive than the average Kirk point base. The range of thickness for the 34 specimens (Subtypes 1-4) with proximal elements is 5.65 mm-15.78 mm, with a mean of 10.09 mm, compared to the average of 7.26 mm for the Kirk base. In fact, the mean thickness for the drill class is virtually identical to the upper end of the Kirk range, with a maximum of 10.62 mm (minimum: 5.11 mm). The thickness/mass may even make conventional hafting impracticable. It is entirely possible that these were *unhafted* hand-held implements, turned by direct manual gripping and torque. Clearly, this is a tool form in need of replicative/experimental study.

Table 6.51. Drill subtype measurements.

Haft		Length (mm)			Width (mm)			Thickness (mm)		
	N	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Subtype 1	12	25.34	39.46	29.46	33.30	46.56	39.79	7.72	15.78	10.65
Subtype 2	13	18.49	43.06	33.95	24.72	39.85	34.50	8.25	14.71	11.87
Subtype 3	4	19.27	21.81	20.14	33.28	37.86	35.06	6.57	8.19	7.33
Subtype 4	5	10.98	22.75	17.88	20.53	33.05	25.40	5.65	10.26	7.28
Total	34			28.60			35.07			10.09

The remaining two subtypes are likely to be reworked bifaces or bifacial tools. The fifth subtype identified (n=2) are reworked “Kirk knives”. In fact, the Kirk knife form has the shape and metric dimensions to potentially be a drill preform. However, the knives show knife-like edgewear, which seems to discount the drill preform likelihood. The sixth group (n=6) is composed of a variety of forms. One specimen (001-3732) has a discoidal base the margin of which has been unifacially worked to form a combination drill/end scraper. Another tool may be a reworked knife (001-5093), though the blade is strongly beveled and tapers quickly to a drill bit morphology. Microscopic examination of this tool revealed polish and margin rounding much like that found on side scrapers. The tapering distal element suggests drilling functions, and the left-side blade bevel would have necessitated a counter-clockwise motion to make the drilling function effective. Rather than a drill, it may have functioned more as an awl or perforator. The other drills in this group are made from bifaces or biface fragments. Given the reworked/recycled nature of the fifth and sixth subtypes, their measurements are not comparable to those of the first four subtypes described as formal drills and are not included in Table 6.51.

Shanks and Tips

The shanks of formal drills are generally long and relatively narrow and have a great length to width ratio. Shank cross sections range from strongly biconvex to rhomboidal or diamond-shaped. Quadrilateral, steeply-pitched pressure flaking on the shank creates sharp lateral and medial edges, with a width:thickness ratio that approaches 1:1. The longer shanks are virtually parallel-sided in planview. A few shorter specimens have more triangular, tapering shanks which have lenticular cross sections.

The shanks of many drills from the Farnsley site are exceptionally long. Some proximal fragments with broken shafts are still between 38 mm-64 mm in length. Two complete specimens have lengths of 69 mm and 76 mm. There were six shank segments over 50 mm long, including four over 60 mm and two over 70 mm. Two distinctive fragments (accession no. 001/6457 and 001/1400) that are thought to conjoin (there is a central missing piece) would be 127 mm in length. Two other conjoined fragments are around 90 mm in length.

An obvious research question would be why the drill shanks are made so long. Are two (or more) thick pieces of wood being pinned/lashed together to form a compound tool? Are the drills associated with adzes and the paleobank-slope charcoal deposits somehow integral to the hypothesized dugout canoe manufacture? The shafts are longer than needed to drill through shell or bore through bone, and there is no evidence of drilling through stone. Kimball's (1996:163) microwear analysis of drills from the Main site in Bell County, Kentucky concluded a function of reaming out the cancellous material in antler when fashioning these into spear tips. Antler tine points from the Late Archaic Bluegrass site (12W162) in southwestern Indiana (Anslinger 1988) are 10 cm-12 cm long—it would take a long drill shank to ream the cancellous material. Perhaps this would explain the length of some of the Kirk drills. The poor organic preservation at the Farnsley site prevents identification of particular materials that were being drilled without the benefit of microwear studies on the drills.

It is noteworthy that virtually all of the 42 specimens with the proximal element present retained significant, reworkable lengths of shank; almost none of those specimens have the shank break right at the juncture with the stem/base. It may be posited that long shanks were intentionally designed—or "overdesigned" (Bleed 1986)—in anticipation of breakage which would leave a serviceable stump to be re-tipped. In a similar scenario, they may have been made long intentionally with another form of rejuvenation in mind. As the tools are utilized, the tips and edges of the shafts may have become so rounded as to not be functional. Therefore, the rounded portion of the shank may have been intentionally snapped off and a new tip formed on a pristine shank segment. Both modes may be viewed as a form of curation—an attempt at extending tool uselife.

While both scenarios are plausible and even practicable, only seven of the forty-two drills were complete and retained a functional tip. The others remained in their damaged state and ostensibly were discarded. This would suggest that they were *not* curated tools. However, it may be that a certain length was requisite for re-tipping and that these did not satisfy that technological requirement. If this is the case, these arguably may be exhausted, thus prompting their discard, which would yet retain them within the curated tools category. Though a significant amount of time was required for their manufacture, the local presence of Muldraugh chert would have reduced replacement costs. If gearing-up was a focal point of activity at the Farnsley site, it may have been more pragmatic to discard tools at a midlife point while replacement costs were low, even though these forms could still be rejuvenated.

Of the seven complete tools, the shanks of four were very short and may be exhausted forms. The presence of a tip and usewear suggest the drill form *is* curated, used, and rejuvenated to exhaustion.

Low-Power Usewear Analysis

A sample of 20 drills was selected for low-power microscopic analysis. Each specimen was complete or had the tip and a substantial portion of the shank intact in order to assess the types and location of usewear. It should be noted that no replicative experiments were conducted to verify (or refute) any interpretations made here. Therefore, interpretations are at this point little more than conjecture but should be considered potential avenues of future research. Such controlled experiments are very clearly needed.

Drill Bit Damage

Drill bit damage was recorded for 17 of the examples. This damage almost always consisted of rounding of the tip and shaft margins, stacked step fractures, and varying degrees of polish. The step fractures may be of the most interest.

With one exception the step fractures always occur on the same margin of opposite faces. As the tip is oriented "up", these fractures are either on the left side or the right and are on that same side as the opposite face of the drill is viewed. The atypical drill shows stacked step fractures on both sides of both faces. There are at least two major possibilities of how the steps were generated: (1) they are resultant from manufacture, or (2) they are resultant from use.

Low-power microscopy showed that polish and rounding extended over some of the steps. This may suggest the steps accrued during manufacture and were impacted through usewear. However, other step fractures showed no polish, even when polish was present on other parts of the tool. This may indicate the creation of such features through edge-crushing during use. Higher-power microscopy would be needed to identify striations and other features that would more accurately indicate the origin. However, the occurrence of steps on alternate edges could be taken as evidence that use was responsible, if it is assumed that the tool is operated in a unidirectional manner. That is to say, if the tool were rotated only clockwise or only counterclockwise, one might expect to find resultant damage consistently on a set of alternate edges. If it were rotated in both directions, damage may be expected on both margins of both faces. If the step fractures are from manufacture, this would conflict with the Pine Tree technology in that manufacture damage is usually located on both margins *of the same face* as described in

Chapter 5. The realization is, of course, that drill manufacture would not necessarily follow Pine Tree point technology.

Of the 20 drills examined, damage that was potentially accrued by clockwise-only rotation was recorded for seven specimens. If the tip of the tool is oriented "up", this damage (step fractures and margin rounding) should be seen on the right side of the bit, which in effect would be the "trailing edge" in that sort of motion. What is perceived as counterclockwise-only motion was recorded in nine instances. In these cases, damage was apparent on the left side of the blade when oriented "tip-up". In only one case was damage recorded on both margins of both faces, which may be indicative of rotary motions in both directions. This specific tool was so worn that even the arrises between flake scars were virtually worn away and polished over. No damage was observed in three examples, all of which were broken tips and shanks. Apparently these failed before any significant usewear could be inflicted, at least as detectable at this level of microscopy. Varying degrees of polish were identified on the 17 with noted damage, but polish seemingly was not confined to any one face/margin. Polish was particularly evident upon the immediate edge of margins and on the non-cutting medial ridges, especially on those shanks that approach a width to thickness ratio of 1:1.

That sixteen of the twenty drills examined seemingly display damage on alternating edges (combined with three that show no damage) suggests that the drills were operated in a unidirectional rotary motion. This would apparently rule out the use of a bow drill or pump drill or "alternate rotation" as used by hand, as described in Semenov (1964:74-83), which are bidirectional in functional vector. Whether they were hafted or used directly by hand as the oversized proximal element would suggest is still in need of research.

The lack of drilled materials precludes any investigation of drilling techniques. For example, a slate gorget with a biconical hourglass-shaped hole would indicate that drilling was performed on both faces of the gorget. Examination of the striations within such a hole may reveal that drilling was done in a unidirectional or bidirectional vector.

Proximal Grinding

Grinding of the proximal element was recorded in order to gain some understanding of their function, whether used hafted or non-hafted. Grinding would be beneficial on hafted tools, as it would reduce damage and stress on the haft material and bindings. If used as a manual, non-hafted tool, grinding would prevent injury to the user. Only Subtypes 1-4 were examined, as the remaining two subtypes are reworked tool forms. Grinding was tabulated as light, heavy, absent, or non-applicable (broken proximal elements). Table 6.52 displays the results.

Of the 34 eligible tools, 28 (82.35 percent) showed some degree of grinding. Nearly half of the population was heavily ground. Only three (8.82 percent) were not ground. Subtype 1 has twice as many heavily ground as lightly ground specimens. Subtypes 2 and 4 show more specimens to be lightly ground than heavily ground and are the only categories with examples with no evidence of grinding. It is not certain if these figures are significant as the concept of "subtype" in drills may not be valid, as it is thought that they more likely are forms strung along a continuum. However, the frequency and intensity of grinding could be used as criteria in validating the subtype concept.

In general, drill forms are more heavily ground on the basal margin, or the "butt" of the tool. Grinding is perceptibly lighter on the lateral margins. This was unexpected, because, if the tool were hafted, the lighter grinding might allow for rapid damage to the bindings. Though not quantified, polish did not seem to be concentrated at this juncture, either. At least four drills had the butt sheared off and one was still corticated, and, collectively, all were quite broad, flat, and thick. It is difficult to conceive that these were hafted forms. One of the Subtype 6 forms was a combination tool—drill and discoidal scraper—that almost certainly was not hafted.

Proximal Crushing

Crushing on the basal margin was also tabulated. It is felt that crushing may be evidence of tool hafting, as force applied to the tool to bore might result in some rebounded energy that would be manifested by crushing of the butt end. Only slightly more than one-fifth (20.89 percent) of the tools displayed any evidence of crushing. While it is understood that low frequencies do not necessarily indicate that such tools were *not* hafted, large frequencies *would* arguably indicate hafting.

Table 6.52. Drill subtype grinding, breaks, and crushing.

Grinding						Break					Crushing	
Subtype	N	Light	Heavy	Ab	NA	Snap	Bend	Twist	B/T	NA	Present	Absent
1	12	4	8			5	1	3	2	1	3	9
2	13	5	4	2	2	6	4			3	2	11
3	4		4				3	1			1	3
4	5	3		1	1	2	1	1		1	1	4
Total	34	12	16	3	3	13	9	5	2	5	7	27

Shank Breaks

An attempt was made to score the types and frequencies of breaks on the shanks attached to proximal elements. Breaks were classified as snaps (straight breaks), bend breaks (angled, often with lipping), and twist breaks (spiral fractures). A combination bend/twist grouping was recognized as well.

Twenty nine of the 34 specimens examined (85.29 percent) were broken in some way. Snap fractures were recorded for 38.24 percent; bend breaks for 26.47 percent, and 14.71 percent were classified as twist fractures (Table 6.52). Perhaps torque generated in the drilling procedure can result in straight, planar fractures. Replicative experiments would be needed to generate comparative data. Regardless, the low frequency of twist fractures was unexpected. It is tantalizing to posit that the higher frequencies of snaps and bends are indicative of intentional severing of bit shanks that are too worn for resharpening or rejuvenation, with the remaining proximal "stump" reworked into a functional bit after the worn bit is snapped off This might be expected if drill bits were originally made exceedingly long to extend longevity.

The subtypes show different patterns of distribution in the type of breaks. However, it is uncertain if this is statistically significant or valid, as again, the drill forms more than likely exist in a continuum rather than in specific groupings. It is, however, possible that the subtypes are valid and that they were used differently or on dissimilar materials that could result in different types and frequencies of breaks.

Refitted Elements

A total of eight drill proximal elements were refitted to shank/tip fragments. Of the eight, four refits were made from elements found 1-3 m apart in adjacent excavation units. Three tools had elements recovered at much greater distances and in more complex contexts. Fragments of one tool were separated by a distance of about 16 m, due north to south. Two other drills had distal elements recovered in the main excavation block, and their refitted proximal elements were recovered in the secondary refuse deposits dispersed to the east over the paleobank. Fragments were separated by 12 m southwest-northeast and about 23 m northwest-southeast. This clearly ties the refuse deposit to the main occupation.

Chert Utilization

Table 6.53 shows the distribution of chert types per drill element. Again, multiple fragments could actually be portions of a single tool, so caution is necessary in interpretation. Given that proviso, no comparative discussion of frequencies will be tendered, but certain patterns are readily identified.

Muldraugh was overwhelmingly chosen, with Wyandotte a distant but solid second choice. Only thirteen other specimens were not made of these two cherts, and only four known chert types beyond Wyandotte and Muldraugh were documented. While those other chert types are few in number, their appearance is significant. St. Louis is a predictable type, given its fairly local provenience, including sources only two kilometers away in the upland drainages. Allens Creek chert co-occurs in the local Muldraugh outcrops, yet was only represented by one drill. Laurel sporadically occurs within the general region, but also outcrops 60 km-70 km (and farther) to the northeast in Jefferson County, Indiana. The presence of the high quality Newman chert was something of a surprise, given its “foreign” status, outcropping far to the east in Kentucky. This gives some insight to areas traversed by this Kirk population and lends credibility to speculation that this Kirk group routinely moved through more southern areas. The lone example of Holland was unexpected as well. Sources of this material also occur at a distance of 70 km, and though it is a high quality material similar to Newman, it is seldom represented in the tool assemblage from Farnsley. This paucity may indicate that this Kirk group rarely moved through that source area, and it indirectly corroborates the southerly inference.

Table 6.53. Drill chert types.

Element	N	Alcr	Holl	Laur	Muld	Newm	Stlo	Wyan	Inde
Tip	55				38	1	4	11	2
Shank	34		1	1	24		1	7	
Base	35				22	1	3	9	
Complete	4	1			3			2	1
Total	132	1	1	1	87	2	8	29	3

Over 88 percent of the drill sample is made of the combined Muldraugh and Wyandotte chert types, and the preponderance of the two chert types is fairly typical amongst tools in the Farnsley assemblage. A significantly larger proportion of Muldraugh was used in drill manufacture, which is similar to the adze class. In contrast, scrapers were made predominantly of Wyandotte chert. Muldraugh was more often selected for projectile points, but the margin of difference between Muldraugh and Wyandotte is appreciably smaller than it is for drills.

Other Sites

In reports from other sites, it is uncertain if drill tabulations refer to complete items or fragments. In Table 6.54 below, two entries are made for the Farnsley drills: one for complete specimens and those with proximal elements, and the second which includes *all* fragments as well as complete forms. These figures are compared to other Kirk and early Holocene sites.

Table 6.54. Drills from Kirk component sites.

Site	N	% Formal Tools	Formal Tools N
Farnsley (basal elements)	42	1.23	3380
Farnsley (all drill frags)	132	3.76	3508
Swan's	2	3.64	55
Longworth	5	7.58	66
Icehouse	10	4.15	241
Bacon	2	1.4	143
Hardaway	3	0.32	935
St Albans	15	5.3	283
GS Lewis East	0	0	39
Olive Branch (Dalton)	196	14.7	1333
Twin Ditch (Thebes)	9	11.54	78

When restricted to those tool fragments with basal elements, the proportion of drills to other formal tools at the Farnsley site (1.23 percent) is amongst the absolutely lowest of several regional Kirk and Dalton sites. If all drill fragments from the Farnsley site are included, the larger frequency of 3.76 percent would be similar to other Kirk sites, including Icehouse Bottoms, identical to Swan's Landing, and a bit less than the St. Albans and Longworth-Gick sites. The larger figure from the Farnsley site is greater than the percentages from the Hardaway and Bacon Farm sites but significantly less than the Dalton Olive Branch and Thebes Twin

Ditch sites. Table 6.54 seems to indicate that drills typically constitute three to seven percent of the artifacts defined as "formal tools" in this analysis.

Very few drill forms are illustrated in the various Kirk, Dalton, and Paleoindian reports. From what can be gathered, the form of the proximal element as well as the *consistency* in the form seems to be unique to Farnsley. Other Kirk sites may yield a specimen that is similar to those recovered at Farnsley, but also incorporate other distinct forms not within the continuum recognized at Farnsley.

Those sites that do yield similar drill forms tend to be the sites closest to Farnsley. Tomak (1994:188, Figure 8) illustrates three very similar drills from Swan's Landing, on the opposite side of Harrison County. The other Swan's Landing references (i.e., Smith 1986) show no drills, and only two fragments were recovered. At Longworth-Gick (Boisvert 1979:273, Fig. 4.151), across the Ohio River from Farnsley, only the Type 5 expanding stem variety is vaguely similar. However, Broyles (1966:Figure 27) illustrates three drills (Figure 27b, c, and g is somewhat comparable) that are very similar to Farnsley forms.

Chapman (1977:75-78, Figure 24) illustrates a number of drills from Icehouse Bottoms. The Type B "square base" drill (Chapman 1977:Figure 24b) is similar, but the Type A "expanding base" drill (Chapman 1977:Figure 24a) is only remotely analogous. The Type C "straight base" drill is not represented at Farnsley. Seemingly, only two drills were recovered from Kirk contexts at Bacon Farm (Chapman 1978), but they are not illustrated. Kimball (1996:Figure 8.2h) illustrates a drill form similar to the drills at the Farnsley site but with a more diminutive proximal element with only general Tellico provenience.

The drill forms represented in the Hardaway report (Coe 1964; Daniel 1998:104-105) are not even close in form to those from Farnsley. Cable (1996:125) states that drills were rare at Haw River and were made from reworked points.

It appears that many Dalton drills are fashioned from reworked Dalton points (Gramly 2002) and retain their diagnostic base. Ironically, one of the closest matches found in the literature came from Paleoindian contexts in Ohio. Forms similar to those defined as Farnsley Subtypes 2 and 3 are illustrated in Prufer and Baby (1964:34, Figure 22b,c).

Component Analysis

The following analyses are based on frequencies of "formal tools" recovered from Phase III excavations of units and features within individual components. "Formal tools" consist of points, scrapers, adzes, and drills (Table 6.55). Drills and fragments thereof were recovered in all Kirk components as well as the Early Side Notched component. Phase III excavations of units and features yielded 127 whole or fragmentary specimens. With the exception of one drill from the Secondary Kirk deposits and one from the Early Side Notched components, all drills were recovered from unit context.

Table 6.56 shows the percentage of the drill sample from the various components. Over half of all drills/drill fragments recovered in Phase III excavations of units and features were from the Middle Kirk component. This percentage is about the average for all formal tools given the large volume of material in this horizon relative to other components. Close to one-quarter of all drills/fragments are assignable to the Lower Kirk, which, again, is about the average frequency for other formal tools in this component. The Upper Kirk has about six percent of all the drills/fragments recovered, which is the greatest proportion of any given tool type within this component

Table 6.57 shows the frequency of drills relative to other formal tools *within* an individual component and relative to other components. Drill frequencies within the Middle and Lower Kirk components register about four percent, but the percentage in the Secondary Kirk approaches six percent. It would seem that drills were slightly more likely to be disposed of over-bank than in general midden contexts. The highest drill frequency within a component from which appreciable material quantities were recovered is that of the Upper Kirk, in which drills compose nearly six percent of the formal tool sample. This may suggest either that drilling was slightly more routine, or that drills were more highly fragmented.

FLAKE TOOLS

This section will focus on the less-formal flake tools recovered at the Farnsley site. Formal tools include points, adzes, scrapers, and drills. Such tools usually have a great deal of time invested in their manufacture, and they generally are highly stylized forms. Often specific chert types are selected that are best suited for the manufacture and use of these particular tools. Formal tools typically are curated and may show evidence of rejuvenation, reworking, recycling, or repair. Many formal tools are likely to be hafted, although nonformal or expedient tools may be hafted as well.

The properties described for formal tools are *not* characteristic of populations within these nonformal flake tool classes. Flake tools are not necessarily unifacial, but bifacial technology may not be requisite for their function either. Minimal technological investment is evident in many of these forms, and usually this investment is limited to the actual functional element of the tool (e.g., the “beak” of a graver). Tools may not necessarily follow a strict template or even be symmetrical, so a variety of morphological forms may accomplish the same task. Many flake tool classes are unhafted.

Table 6.55. Drills by Kirk subzone.

Type	Upper Kirk	Middle Kirk	Lower Kirk	Sec Kirk	Early SN	Total N
Unit	7	70	28	19	1	125
Feature			1	1		2
Total	7	70	29	20	1	127

Table 6.56. Percentage of drills by component.

Type	Upper Kirk	Middle Kirk	Lower Kirk	Sec Kirk	St Charles	Thebes	Early SN	Total
Point	4.40	60.47	22.63	11.48	0.56	0.05	0.28	99.98
Scraper	2.73	60.92	24.40	11.09	0.00	0.00	0.34	99.99
Adze	2.79	61.26	24.76	10.43	0.56	0.00	0.00	99.99
Drill	**5.51**	**55.11**	**22.83**	**15.75**	**0.00**	**0.00**	**0.79**	**99.99**

Table 6.57. Percentage drills by tool type within Early Archaic components.

Type	Upper Kirk	Middle Kirk	Lower Kirk	Sec Kirk	North Kirk S
Point	67.52	58.94	57.10	59.37	33.33
Scraper	13.68	19.39	20.11	18.73	50.00
Adze	12.82	17.87	18.71	16.14	16.67
Drill	**5.98**	**3.80**	**4.08**	**5.76**	**0.00**
Total	100.00	100.00	100.00	100.00	100.00

While formal tools are virtually synonymous with curated tools, flake tools are not necessarily equivalent to expedient tools, though they often are. It would be difficult to ascribe curated status to certain flake tools, though specific tools may be transported over time and distances and utilized in more than one episode. That is to say, a simple flake graver or a spokeshave, while being a technologically unsophisticated form, could be maintained in the toolkit for some time. Expedient tools may be identified more readily by their lack of stylized form, function, and context. Utilized flakes are perhaps the best example of tools that are likely to have been created, utilized, and discarded in a single exigent circumstance and whose function is often nebulous. It is acknowledged that continua between formal and nonformal tools and curated tools and expedient tools exist (Binford 1979).

Given that the vast majority of flake tools reflect minimal expenditure of effort in manufacture and that Muldraugh was available in the immediate proximity, replacement costs were negligible. With literally hundreds of thousands of flakes strewn about the site, there was an inexhaustible source of material for these expedient flake tools. As such, it is very doubtful that any of the tools described in this chapter would be considered "curated", at least in the Binfordian sense.

In this section, tool types to be discussed are spurred forms (graver and perforator classes), worked-margin forms (spokeshave, denticulate, and chopper classes, as well as utilized flake and retouched flake classes) and the wedge classes. In total, 1185 tools fall into these categories.

Graver

The functional portion of a graver is a pointed spur which projects from the tool corpus, which is often an otherwise minimally modified flake. The original spur can be a retouched natural projection or protuberance developed through reworking of the margins of a flake to create a spur. This spur will often show facets and polish from use and is typically short and stubby for strength. Gravers are used in the incising, or scoring of another medium such as bone, wood, stone, or shell. For instance, they may be used to cut a blank from a long bone segment that may be shaped into a needle or fish hook.

Burins are similar to gravers in general shape. A chisel-shaped edge is formed on a spur by a "tranchet" or "burin" blow which is oriented parallel to that projection. It can also be formed on a pre-existing tool edge (or flake edge) or upon a recycled tool form (i.e., broken point, biface, etc). The resulting burin edge is frequently dihedral, but can also be trihedral with a chisel-like edge. The striking platform on which the burin blow is delivered is almost always flat or concave, since a convex surface offers very little purchase for the percussor.

Phase III excavations at the Farnsley site yielded 42 gravers from general unit contexts and four were associated with features, for a total of 46 specimens (Figure 6.21). Tables 6.58 and 6.59 show their distribution amongst the various components. Nearly half (n=22, 46.81 percent) of all gravers are from the Middle Kirk component, not unexpectedly, given the sheer volume of material in those deposits. However, only two gravers were associated with features. This suggests that graving was not typically a campfire activity. Only two gravers were recovered in the Upper Kirk component, and neither was found in conjunction with a feature. Fourteen gravers (29.79 percent) originated in the Lower Kirk occupation, and, again, a relatively low number were related to features (n=1). Eight more gravers (17.02 percent) were from the Secondary Kirk deposit, and one of these was from feature association.

Five chert types (plus one "indeterminate" chert) are represented in the graver sample, and all are local to semi-local. Wyandotte chert accounts for nearly half of all gravers (n=23; 48.94 percent), and Muldraugh usage was significant as well (n=16; 34.04 percent). St. Louis (n=4), Allens Creek (n=2), and Jeffersonville (n=1) cherts also were utilized. The general pattern indicates a preference for Wyandotte, which infers that high-quality cryptocrystalline material may be better-suited for graving tasks. An analysis of unit and component data shows a fairly even split between Muldraugh and Wyandotte in the Lower Kirk (n=13) and single appearances of Allens Creek and Jeffersonville. However, in the Middle Kirk deposits (n=20), Wyandotte outranks Muldraugh chert by a 3:2 ratio, and there were three St. Louis tools and single specimens of Allens Creek and "indeterminate" cherts. Both Upper Kirk gravers are of Wyandotte chert.

Figure 6.21. Kirk zone gravers.

Perforator

A perforator has a short, pointed spur shaped partially or wholly by retouch. It may be used in a rotary motion like a drill, or perhaps as a punch. A total of 21 perforators were recovered—20 from units (Table 6.60) and only one from feature context (Figure 6.22). The lone perforator from feature context was incorporated within the Lower Kirk occupation. The majority (n=11) were found in the Middle Kirk occupation, and four each were recovered in the Lower and Secondary Kirk deposits. Only one perforator was associated with the Upper Kirk horizon.

Table 6.58. Kirk gravers in Phase III Units.

Comp	AC	Inde	Jeff	Muld	Stlo	Wyan	Total
UK						2	2
MK	1	1		6	3	9	20
LK	1		1	6		5	13
SK				2		5	7
Total	2	1	1	14	3	21	42

Table 6.59. Kirk gravers in Phase III Features.

Comp	Muld	Stlo	Wyan	Total
MK	1	1		2
LK			1	1
SK	1			1
SC			1	1
Total	2	1	2	5

A limited variety of chert types were used for perforators. Muldraugh (n=10; 47.62 percent) and Wyandotte (n=9; 42.86 percent) were the preferred cherts. The lone feature perforator was of Wyandotte as well. Single specimens of semi-local Jeffersonville chert and an unusual appearance of nonlocal Lead Creek chert account for the remainder. There were no significant differences in chert usage patterns between the various Kirk occupations. They tended to mirror the overall trend of a nearly 50/50 split between Muldraugh and Wyandotte. The lone exception could be the presence of the tool made of Jeffersonville

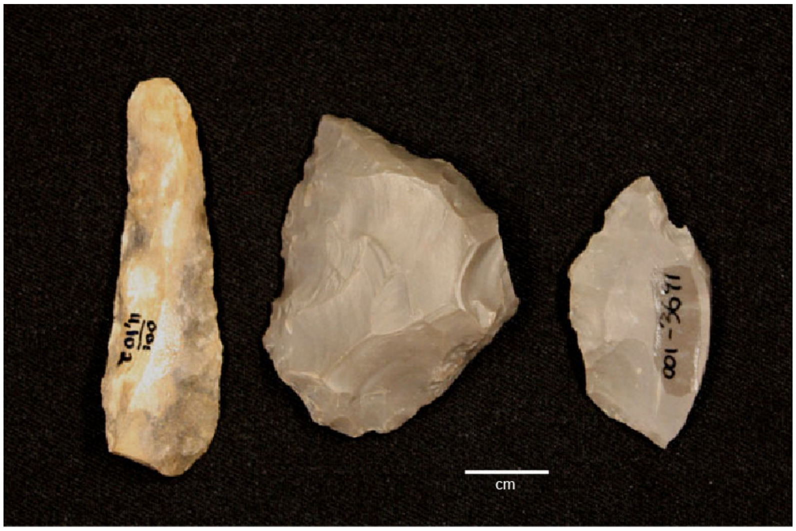

Figure 6.22. Kirk zone perforators.

Figure 6.23. Kirk zone spokeshaves.

chert in the Upper Kirk deposit, though with a limited population, it is difficult to assess the significance of the occurrence of this raw material, which may have been available in the Ohio River gravels near the site.

Spokeshave

A spokeshave is typically a uniface or flake tool with a substantial arcuate notch along one edge. Several contiguous and intentional unifacial flake scars must be present. Presumably, this notch was used to shave wooden shafts. The radii of these tools suggest use on cylindrical media of less than 2 cm in diameter. These are generally non-stylized forms with little technological investment and probably fall more often toward the expedient end of the continuum.

All of the 17 spokeshaves (Figure 6.23) recovered from Farnsley were from unit contexts (Table 6.61); none with features. Spokeshaves were restricted to various Kirk deposits. By component, five were from the Lower Kirk, nine were from the Middle Kirk, one was from the Upper Kirk, and two were from the Secondary Kirk deposit.

Local cherts were preferred for spokeshave production as well. Of the 17 tools recovered, Muldraugh (n=9; 52.94 percent) and Wyandotte (n=5; 29.41 percent) were favored, and single specimens of St. Louis, a gravel chert type, and an indeterminate type were represented. Apparently, there was little operative preference for chert type for this functional category.

Retouched flake

A retouched flake can be a flake or blocky fragment, but some part of its periphery must be modified by human agency. Three or more contiguous flake scars, each greater than 2 mm in size, are needed to qualify as a retouched flake. All or part of the retouch may be invasive, but if more than half of the surface area of the object is covered with retouch scars, the tool is classified as a biface or uniface. Most retouched flakes will be unifacially worked, though not exclusively so. Typically, retouched flakes are not highly stylized, but are very functional. A working edge can be quickly installed, and cutting or scraping functions are perhaps the most common. Most retouched flakes would be classified as expedient tools.

Nearly 600 retouched flakes were recovered (n=578) from the Phase III investigations from units and features of the Kirk component (Table 6.62 and 6.63). The rarity of retouched flakes associated with features is somewhat unexpected. This suggests that activities in which a flake may be utilized casually did not occur routinely around features such as hearths and smudge pit-like features even though chert flakes occur as a virtual pavement in some areas of the site. The abundant waste flakes apparently were not often recycled into casually functional forms; formal tools, those dedicated to particular functions, were utilized instead. The association of formal tools and features attests to general material abundance and low replacement costs at the Farnsley site. The occupants were willing to expend uselife of formal tools in instances in which minimally modified or non-modified flakes would have been entirely serviceable. In essence, this is a very wasteful strategy that is only practicable when super-abundant lithic resources are at hand. At sites distant from chert sources, frequent use of unprepared flakes around hearths or kill sites may be expected to conserve formal tool uselife and to make optimal and complete use of valued lithic material when replacement costs would be high. At Farnsley, replacement costs would be so incredibly low that it would make little sense to use a waste flake when a functionally more efficient formal tool was at hand. When that tool was exhausted, it would be no great concern to simply make a replacement. A similar distribution was noted for the utilized flake class as discussed below. Retouched flakes are over three times more frequent than utilized flakes, which suggest that for most functions in which these expedient tools would be applied, a modicum of flake modification and preparation were involved.

Retouched flakes were recovered in all cultural components. Over half of all retouched flakes from Phase III units and features were recovered in the Middle Kirk occupation (n=344; 58.01 percent). Substantial quantities also were recovered in the Lower Kirk (n=125; 21.08 percent), as well as the Upper Kirk (n=44; 7.42 percent) and Secondary Kirk deposits (n=63; 10.62 percent

Table 6.60. Phase III Unit perforators.

Comp	Jeff	Lecr	Muld	Wyan	Total
UK	1				1
MK			6	5	11
LK			2	2	4
SK		1	2	1	4
Total	1	1	10	8	20

Table 6.61. Phase III Unit spokeshaves.

Comp	Grav	Inde	Muld	Stlo	Wyan	Total
UK			1			1
MK	1		4	1	3	9
LK		1	2		2	5
SK			2			2
Total	1	1	9	1	5	17

The retouched flake class, composed of Phase III unit and feature specimens from all components, included twelve identified chert types as well as a few of indeterminate cherts and one specimen of hardstone. Ten lithic types (including hardstone and indeterminate chert types) were represented in the Middle Kirk deposits alone, and eight types were found in the Lower Kirk. The greater range of types is possibly due to the great sample size. While local and semi-local types dominated in each component, the Kirk components yielded retouched flakes of several "exotic" cherts from more distant sources, which included single items of Fort Payne (Middle Kirk) and Knox cherts (Lower Kirk) from Tennessee, Lead Creek (Middle, Lower, and Secondary Kirk; n=8) from some distance in Indiana, and Laurel (Upper Kirk; n=1), which outcrops at a moderate distance but may be available in the gravels of the Ohio River. Wyandotte (n=281; 47.39 percent) and Muldraugh (n=236; 39.80 percent) are the most prevalent once again, and St. Louis (n=45; 7.59 percent) occurs in a significant quantity. Salem (n=9) and Jeffersonville (n=1) are represented as well. That the more "exotic" Wyandotte was utilized suggests a functional advantage that was selected for, as this cryptocrystalline material yields a sharper and more durable edge and is more predictably worked into the desired form.

There are interesting fluctuations in the utilization patterns of Muldraugh and Wyandotte cherts throughout the four Kirk zones represented in Phase III unit data. First, the combined total of Wyandotte and Muldraugh hovers around 85 percent in all zones except the Upper Kirk, in which this total is nearer to 100%. In Lower Kirk, the Muldraugh-to-Wyandotte ratio is about 7:10. In Middle Kirk, this same ratio is 8:9, and with Secondary Kirk it is about 9:7. The Upper Kirk, shows a distinct reversal in the pattern, with a 2:5 ratio. It seems that Wyandotte was more frequently selected through time. Feature data is sparse, but it seems that Wyandotte was utilized more typically when in conjunction with features.

Utilized flake

Utilized flakes were not systematically sorted in this analysis; they were problematic. Items initially classified as utilized flakes were entered into the field catalog and later subjected to further laboratory analysis. There, they were either accepted as utilized flakes, or were reassigned to a proper class (usually as retouched flakes), or rejected as a tool and properly reclassified (usually as debitage). Similarly, many utilized flakes were culled from items originally listed in the field catalog as retouched flakes or some other tool form. General debitage lots were not systematically inspected for the

Table 6.62. Phase III Unit retouched flakes.

Comp	Alcr	Fopa	Hard	Inde	Jeff	Knox	Laur	Lecr	Muld	Sale	Stlo	Wyan	Total
UK							1		12			31	44
MK	1	1	1	1	1			4	136	7	30	150	332
LK	2			3		1		2	42	1	8	60	119
SK	1			1				2	30	1	5	23	63
SC									1			3	4
TH									5			1	6
ESN									2			1	3
Tot	4	1	1	5	1	1	1	8	228	9	43	269	571

Table 6.63. Phase III Feature retouched flakes.

Comp	Muld	Stlo	Wyan	Total
MK	6		6	12
LK		1	5	6
SK	2		1	2
ESN	2			2
Total	10	1	12	22

Table 6.64. Phase III Unit utilized flakes.

Comp.	Alcr	Hard	Lecr	Muld	Stlo	Sale	Wyan	Total
UK				3			10	13
MK		1	1	41	5	4	40	92
LK	1			10			12	23
SK	1			3			4	8
SC					1		1	2
TH				1				1
Total	2	1	1	58	6	4	67	139

presence of utilized flakes; the volume was simply too great, and confirmation of an item as a utilized flake could only be verified by microscopic examination. Therefore, the 154 items classified as utilized flakes from Phase III investigations are recognized as a minimum number rather than an accurate accounting. Undoubtedly, many more exist. However, if viewed as a sample, this class can still be useful in identifying general trends of chert usage through the various components.

A flake demonstrating damage by three or more scars, each less than 2 mm in size along an unprepared margin, is classified as a utilized flake. Wear may *resemble* intentional retouching, as edges will crush and chip in both utilization and manufacture. Resultant flake patterns can be dispersed, however, and are not necessarily contiguous. Damage that occurs on or near the platform is considered manufacturing damage. Unless higher-power microscopy is utilized, function may not be assignable. However,

Table 6.65. Phase III Feature utilized flakes.

Comp	Muld	Wyan	Total
MK	1		1
LK	1		1
SK		1	1
Total	2	1	3

macroscopic inspection and low-power microscopy frequently identify edge damage likely generated in cutting or scraping activities. Low power microscopy often shows these forms to have rounded and polished margins. As a class, utilized flakes have a broad range of application and probably represent the most expedient and disposable of tools within an assemblage.

All but three of the 139 utilized flakes identified from Farnsley were from general unit provenience (Table 6.64). The discussion presented above for retouched flakes would be generally applicable to the patterns of utilization for utilized flakes as well.

Over 65 percent of all utilized flakes were recovered within the Middle Kirk occupation, and one flake was in feature association (Table 6.65). Thirteen were from Upper Kirk, and 24 were in Lower Kirk (including one in feature provenience). Nine more were found in the Secondary Kirk (including one in a feature

As stated above, while utilized flakes were not systematically sorted, the relative data should still be representative and broad enough to identify trends of chert usage through time. The general trend is to use local and semi-local materials. Middle Kirk and Lower Kirk show an approximately even split between Wyandotte and Muldraugh. Middle Kirk shows an array of cherts, but most are local to semi-local, including St. Louis and Salem, as well as an "exotic" of Lead Creek chert. The Upper Kirk shows a more distinct pattern of Wyandotte selection. The high frequency of Wyandotte suggests selection for this non-local chert because it offered a functional advantage. This cryptocrystalline material yields a sharper and more durable edge.

Chopper

Choppers are blocks (not flakes) with one or two invasively-chipped edges with flake scars that cover less than half the surface, so they cannot be classified as bifaces. The resultant flake scars are usually large and broad. Edges are often heavily battered, and such tools can be heavy and cumbersome. The "quality" of the tool reflects quick and crude modification. Both hardstone and chert are suitable raw materials. While not strictly "curated" in the Binfordian sense (1979, 1980), these may be maintained at sites in caches or as "site furniture". Potential uses would include butchery, woodworking, and vegetal processing.

Fifty-eight choppers (Figure 6.24) were recovered in Phase III excavations at the Farnsley site (Tables 6.66 and 6.67). Four of the tools were found in feature context, and 54 were from units. That four choppers (6.9 percent) were found in feature association suggests that associated activities were performed near campfires more often than tasks that involved utilized and retouched flakes and comparable tools, although this still represents an infrequent association.

Figure 6.24. Kirk zone choppers.

Table 6.66. Phase III unit choppers

Comp.	AC	Jeff	Muld	Stlo	Total
UK			1		1
MK	1	1	35	3	40
LK	1		6	1	8
SK			4		4
Total	2	1	46	4	53

Muldraugh was overwhelmingly selected (n=49; 84.48 percent), and Allens Creek and St. Louis account for a combined 10.34 percent of the sample. The remainder is composed of the semi-local Jeffersonville and Salem cherts, the latter tool was found in the St. Charles deposit and is the only non-Kirk chopper. Significantly, no choppers were made of Wyandotte, likely for the same reasons that adzes were rarely made of it—that is, cryptocrystalline materials are not amenable to this type of gross pounding function.

Denticulate

Denticulates are serrated tools. Technologically, these can be little more than a specialized retouched flake. The tool is defined as a flake or block which has been retouched along the margin so that a series of at least three teeth or serrations are formed. Cutting, sawing, and shredding are inferred functions.

Table 6.67. Phase III feature choppers.

Comp	Jeff	Muld	Total
MK	1	2	3
SK		1	1
Total	1	3	4

Table 6.68. Phase III unit denticulates.

Comp.	Muld	Wyan	Total
MK	4	9	13
LK	1	1	2
SK		3	3
Total	5	13	18

Table 6.69. Phase III unit wedges.

Comp	Inck	Jeff	Muld	Stlo	Wyan	Total
MK	1	1	1		3	6
LK			6	1	3	10
Total	1	1	7	1	6	16

Only nineteen denticulates were recovered from Phase III excavations (Table 6.68). Only one denticulate, made of Muldraugh chert, was found in feature association, that being in the Lower Kirk. The remaining forms were confined to general unit contexts from various Kirk deposits, primarily in the large Middle Kirk assemblage. Significantly, no denticulates were recovered in the Upper Kirk occupation.

As with other forms in the flake tool classes, Muldraugh (n=6, including one from feature context; 31.58 percent) and Wyandotte (n=13; 68.42 percent) cherts predominate, in an approximate 1:2 ratio, respectively. Wyandotte is semi-local, while Muldraugh is found in very close proximity. Millions of Muldraugh flakes litter the Farnsley living floor, but Wyandotte actually occurs twice as frequently, which suggests that cryptocrystalline materials are better-suited for this function.

Wedge

Wedges show much crushing on the working edges and can be very similar morphologically to bipolar cores (and, arguably, some may be). Step fractures are likely to be more common than on bipolar cores, and the shape is more likely to be variable, and the interpretation is more subjective. Wedges generally have a great length-to-width ratio, a polyhedral cross section, and a tapering, plane-like bit. Wood and bone splitting are the most likely applications, and the tool is used in conjunction with some type of percussor.

Sixteen wedges were recovered in Phase III excavations, all of which were from unit provenience (Table 6.69) and none from feature contexts. Wedges were present in only two components, the Middle and Lower Kirk (n=6 and 10, respectively). As with other tools in the general flake tool class, wedges were fairly evenly divided between Muldraugh (n=7; 43.75 percent) and Wyandotte (n=6; 37.50 percent) cherts. Single specimens of Jeffersonville and St. Louis cherts were tabulated, as well as a rare appearance of Indian Creek chert, which occurs nearest at a distance of about 90 km to the northwest. Cherts that outcrop north of the Ohio River that are not local to semi-local relative to Farnsley are rare in general.

Table 6.70. Phase II combination tools.

Tool	UK	MK	LK	SK	Total
Scr/Grav	2	33	14	7	56
Scr/Dent		1	1		2
Scr/Perf		1			1
Scr/Spok	1	4		1	6
Scr/Wedg		1			1
Perf/Spok			1		1
Total	3	40	16	8	67

Table 6.71. Combination tools by chert type.

Tool	Atti	Muld	Sale	Stlo	Wyan	Total
Scr/Grav	1	5	1	1	48	56
Scr/Dent		1			1	2
Scr/Perf				1		1
Scr/Spok		1			5	6
Scr/Wedg		1				1
Perf/Spok					1	1
Total	1	8	1	2	55	67

Combination Tools

Sixty-seven specimens were found to be combination tools (Table 6.70). Each was a permutation of some tool type—graver, denticulate, etc.—and a scraper, with one exception. Only one tool, a scraper/graver from the Middle Kirk occupation, was found in feature context. About 60 percent of the tools were found in the Middle Kirk stratum; about a quarter of the total came from the Lower Kirk.

Flake scrapers were most commonly combined with gravers (n=56; 83.58 percent of all combination tools), and, not unexpectedly, they most frequently occurred in the heavy Middle (n=33) and Lower Kirk (n=14) deposits. Other combination tools occurred in low frequencies throughout the Kirk units. Other scraper hybrids included spokeshaves (n=6), denticulates (n=2), and single instances of a wedge and a perforator combined with a scraper. The lone tool without a scraper edge was a hybrid perforator/spokeshave from the Lower Kirk.

Other than scraper/gravers, there are so few of these combination flake tools distributed through the Kirk deposits as to render meaningless any type of temporal chert-usage analysis (Table 6.71). Furthermore, in the scraper/graver class, the preponderance of Wyandotte is such that a chert-usage analysis is virtually unnecessary. Wyandotte was utilized for over 85 percent of this class, clearly indicating purposeful selection of this material. Just fewer than 10 percent of the scraper/gravers were of Muldraugh. However, an interesting appearance of the very distant Attica chert was noted for one tool. Attica outcrops about 250 km to the northwest, along the Wabash River near Attica, Indiana. This is one of the more distant chert sources noted in the Farnsley assemblage, and also one of the few pieces of potential evidence of movement of the Farnsley population any great distance to the north of the Ohio River. Of course, trade or some other mechanism may be responsible for its presence.

CORES

Over three hundred and fifty cores were recovered from the four Kirk proveniences (Table 6.72). The Middle Kirk zone produced more than twice as many as the next most abundant Kirk provenience (Lower Kirk) in keeping with the emphasis in

Figure 6.25. Kirk zone cores.

this occupation on lithic manufacture. The overall abundance of cores, however, is not great relative to the quantity of bifaces that were recovered indicating the emphasis placed on core tool rather than flake tool production. The cores are generally amorphous polyhedral forms (Figure 6.25). No blade cores were found. As might be expected Muldraugh chert is by far the most common chert type represented in this category. In terms of percentage it is most common in the Lower Kirk at 80.4 percent followed by the Upper Kirk, Middle Kirk, and Kirk Secondary Trash (see Table 6.72). The number of chert types occurring in each provenience is similar with the exception of the Upper Kirk where the sample size is small. The Lower Kirk and Kirk Secondary Trash have somewhat elevated percentage of Wyandotte cores (7.6% and 8.0% respectively). Jeffersonville chert is slightly more abundant in the Middle Kirk zone at 10.7 percent.

HARDSTONE

As in other tool categories hardstone tools are common in the Kirk zone (Table 6.73). About half of the hardstone artifacts recovered come from the Middle Kirk zone followed by the Lower Kirk, Kirk Secondary Trash, and the Upper Kirk zones respectively. Hammerstones (and hammerstone/anvils) are by far the most abundant type in the hardstone catagory (see Table 6.73). Somewhat surprisingly hammerstones are relatively more abundant in the Lower Kirk zone (78.8%) than in the Middle Kirk (69.5%) where lithic processing appears to be more important (although the absolute number is large [n=153] in the latter zone). Pitted stones (Figure 6.26) are considerably more common in the Middle Kirk (11.4%) than in the Lower Kirk (3.4%) zone. Most of this hardstone type has 1-3 pits but two larger specimens have as many as 11 and 12 pits (one each from the Lower and Middle Kirk zones).

Table 6.72. 12Hr520 unit & feature cores.

Component	Chert	Count	Percentage
Lower Kirk	Allens Creek	3	3.3%
	Jeffersonville	4	4.3%
	Muldraugh	74	80.4%
	Salem	1	1.1%
	St. Louis	3	3.3%
	Wyandotte	7	7.6%
	Total	92	100.0%
Middle Kirk	Allens Creek	8	4.1%
	Indeterminate	2	1.0%
	Jeffersonville	21	10.7%
	Muldraugh	148	75.5%
	St. Louis	10	5.1%
	Wyandotte	7	3.6%
	Total	196	100.0%
Kirk Secondary	Allens Creek	4	8.0%
	Indeterminate	1	2.0%
	Jeffersonville	4	8.0%
	Lead Creek	1	2.0%
	Lost River	1	2.0%
	Muldraugh	33	66.0%
	St. Louis	4	8.0%
	Wyandotte	2	4.0%
	Total	50	100.0%
Upper Kirk	Allens Creek	1	7.1%
	Muldraugh	11	78.6%
	St. Louis	1	7.1%
	Wyandotte	1	7.1%
	Total	14	100.0%
	Grand Total	352	

Table 6.73. Unit & feature hardstone types.

Component	Type	Count	Percentage
Lower Kirk	Abrader	4	2.7%
	Anvil	4	2.7%
	Hammerstone	95	65.1%
	Hammerstone/Anvil	20	13.7%
	Manuport	18	12.3%
	Pitted Stone	5	3.4%
	Total	146	100.0%
Middle Kirk	Abrader	9	4.1%
	Anvil	12	5.5%
	Chopper	1	0.5%
	Hammerstone	132	60.0%
	Hammerstone/Anvil	21	9.5%
	Manuport	18	8.2%
	Metate	1	0.5%
	Pitted Stone	25	11.4%
	Pitted Stone/Abrader	1	0.5%
	Total	220	100.0%
Kirk Secondary Trash	Abrader	1	1.9%
	Anvil	2	3.8%
	Hammerstone	33	63.5%
	Hammerstone/Anvil	4	7.7%
	Manuport	8	15.4%
	Pitted Stone	4	7.7%
	Total	52	100.0%
Upper Kirk	Abrader	2	8.0%
	Anvil	2	8.0%
	Hammerstone	11	44.0%
	Hammerstone/Anvil	2	8.0%
	Manuport	2	8.0%
	Pitted Stone	6	24.0%
	Total	25	100.0%
	Grand Total	443	

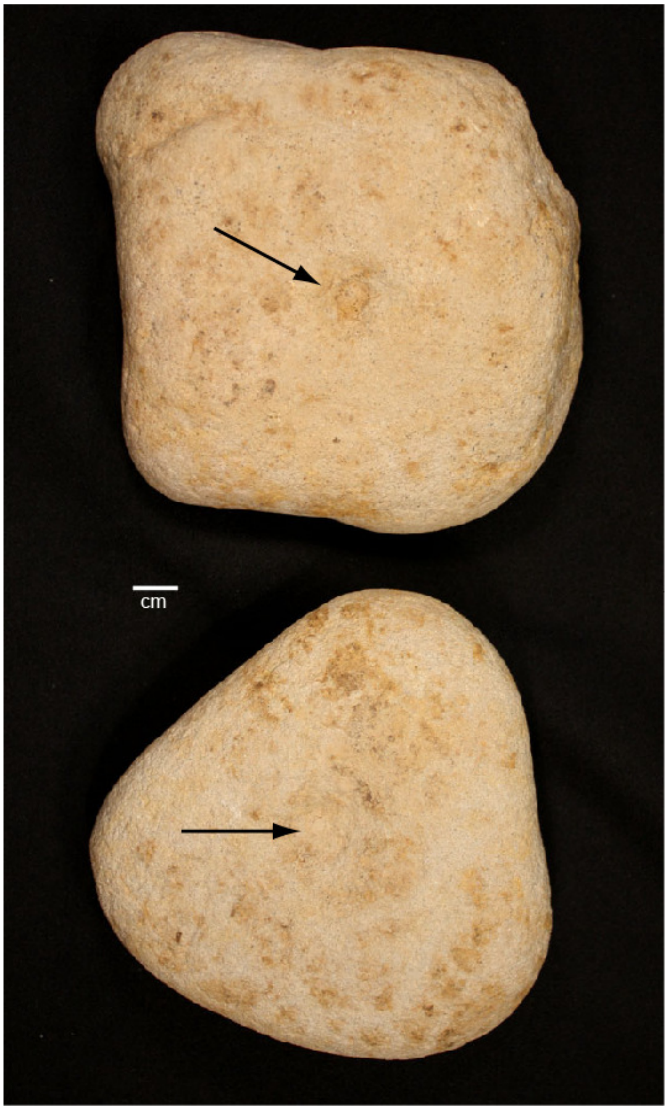

Figure 6.26. Kirk zone pitted stones.

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CHAPTER 7

LITHIC TOOLS FROM THE THEBES/ST. CHARLES AND EARLY SIDE NOTCHED COMPONENTS AT THE JAMES FARNSLEY SITE

by

C. Russell Stafford

The vast majority of the tools and other debris recovered from the James Farnsley site are attributable to the Kirk component. The sample of artifacts collected from the Thebes/St. Charles and Early Side Notched occupations are very small by comparison. These earlier components, however, have rarely been investigated in buried and largely undisturbed contexts in the Midwest or Midsouth. These components pre-date and are stratigraphically below or are in older alluvium to the west of the Kirk zone. These pre-Kirk occupations date from about 9400 rcybp to just over 10,000 rcybp. Although the two artifact zones are clearly related, the term Thebes is used here to refer to the occupations associated with the workshop located in the Western Terrace area of the site, while St. Charles refers to occupations in the Main block that fall stratigraphically between the Kirk and Early Side Notched zones. Points and other lithic tools are discussed for each of the non-Kirk components at the site. In addition, at the end of this chapter there is a brief consideration of points recovered in the plowzone and other non-Kirk Early Archaic and Paleoindian points found in the Kirk zone.

THEBES

The Thebes occupations are represented by a series of lithic scatters and associated debris and tools that reflect a short-term tool knapping area to the west of the Main Block Kirk deposits. Although at about the same depth as the Kirk material, the Thebes debris is contained in older overbank alluvium. A total of 343 chipped stone and hardstone tools were recovered from this area (Table 7.1). This is the largest of the non-Kirk assemblages.

Points

Nine diagnostic points, hafted drills, or base fragments were recovered from the Western Terrace. Seven of these are from units or features in good context, while the remaining three were recovered during mechanical blading and have less secure proveniencing, but are undoubtedly associated with the Western Terrace Thebes component (upper 2 m of the deposit).

Three of the points are typical Thebes side notched points with triangular or excurvate blades (Figure 7.1a, b, c). Two of these tools (Figure 7.1a, b) have alternately beveled blades and keyhole notches on at least one side. Both points are characterized by heavy basal grinding, are made from Wyandotte chert, and exhibit evidence of reworking

Table 7.1 Thebes Unit and Feature Artifacts.

Class	Type	Subtype	Count	Percent
Lithic	Adze		2	0.6%
	Biface	Biface Fragment	2	0.6%
		Stage 1	132	38.5%
		Stage 2	40	11.7%
		Stage 3	27	7.9%
	Core	Polyhedral	54	15.7%
	Drill		1	0.3%
	Graver		2	0.6%
	Hafted Drill		2	0.6%
	Point		5	1.5%
	Retouched Flake		13	3.8%
	Scraper	End Scraper	1	0.3%
	Tested Cobble		2	0.6%
	Uniface		4	1.2%
	Utilized Flake		10	2.9%
Hardstone	Hammerstone		38	11.1%
	Hammerstone/Anvil		5	1.5%
	Manuport		1	0.3%
	Pittedstone/Hammerstone		1	0.3%
	Hardstone	Abrader	1	0.3%
Total			343	100.0%

of the blade. Specimen 001-11 (Figure 7.1b) has an acuminate tip with some fine serration and pressure flaking on one side of the blade. It is also large (52.8 mm) relative to the other point (45.7 mm). Specimen 001-12833 (Figure 7.1a) has a blunt tip and evidence of an impact fracture. In both cases one basal ear is broken off. The third point (Figure 7.1c) does not show any evidence of reworking as the ovate blade exhibits shallow invasive scares and a finely serrated blade edge. It has a keyhole side notch and is made from Wyandotte chert. An impact fracture has sheared off the tip and left side of the blade and base, undoubtedly leading to discard.

A Thebes point base, made from Wyandotte chert, was also recovered from unit context (Figure 7.1d). The base is heavily ground up into the lower notch area. The base is clearly from a side notched point.

Two Thebes hafted drills were recovered from unit and feature context (Figure 7.2a,b). The complete drill (Figure 7.1b) is made from Wyandotte and has a blunt and rounded tip and a narrow shaft. The base and ears of the drill are heavily ground. The second drill (Figure 7.2a) is broken mid-shaft and is made from Muldraugh chert. The shaft is thicker and the drill shaft is parallel sided. Again the base and ears are heavily ground.

Figure 7.1. Western Terrace Thebes Cluster points.

Specimen 001-12828 is a Wyandotte point fragment (Figure 7.3a) with narrow side notches compared to the previous points. The surviving portion of the base and ear are heavily ground. The point broke at mid-blade (bend break), but there is evidence of a probable impact fracture on the blade. Also, the blade is parallel sided compared to the triangular or excurvate shapes of the other Thebes component points. Large percussion flake scars cover the blade. This point was recovered in Area D at 129 cm bd during blading.

Two St. Charles points were also recovered from this general area (Figure 7.3b,c). Specimen 001-12829 (Figure 7.3b), made of Allens Creek chert, was found during excavation of an extension of the water screening pond. It is a relatively large (60.2 mm) thin (5.7 mm) point with small narrow corner notches. The base is not ground, but there are a series of small basal thinning flake scars on the base with some grinding on the ears of the base. The second St. Charles point (Figure 7.3c) although a fragment is similar. It is made from Wyandotte chert and has basal thinning scars on the base and no evidence of having been ground. There is a probable impact fracture on the blade. This point was found in the back dirt of the 80N60N Trench during its excavation and is believed to have come from a depth of less than 2 meters below surface.

The final artifact recovered from a unit is probably an unfinished point (Figure 7.3d). The excurvate shaped blade is thin (8.1 mm) with shallow invasive flake scars across the face and blade edge. The haft, however, is unfinished but suggestive of a side notched form. The biface is made of Mauldraugh chert.

Other Tools

As would be expected in a knapping area bifaces (58.1%), cores (15.7%), and hammerstones (12.9%) are the most common artifacts (Table 7.1). Of the bifaces 66 percent were classified as Stage 1 bifaces (Figure 7.4), followed by Stage 2 (20%) (Figure 7.5) and Stage 3 (14%) (Figure 7.6). Other tools are limited but include adzes, a graver, a drill fragment (bit), end scraper, other unifaces and retouched flakes (see Figure 7.7-7.9). The adzes (7.9b,c), made of Muldrugh chert, are indistinguishable from those recovered in the Kirk component. The small flake end scraper is made from Wyandotte (again also typical of the Kirk occupations). The large unifaces (Figure 7.7) are characterized by domed dorsal surfaces with hinge/step fracture scars. They are minimally retouched along the flake margin on the ventral site. These unifaces may have been discarded because they could not be thinned further. Three of the retouched flakes are large blades or blade-like flakes (Figure 7.8) with minimal unifacial retouch. All of the unifaces and retouched flakes are Muldraugh chert with the exception of two Wyandotte retouched flakes. Other hardstone tools include an abrader and a multifunctional hammerstone also classified as a pitted stone.

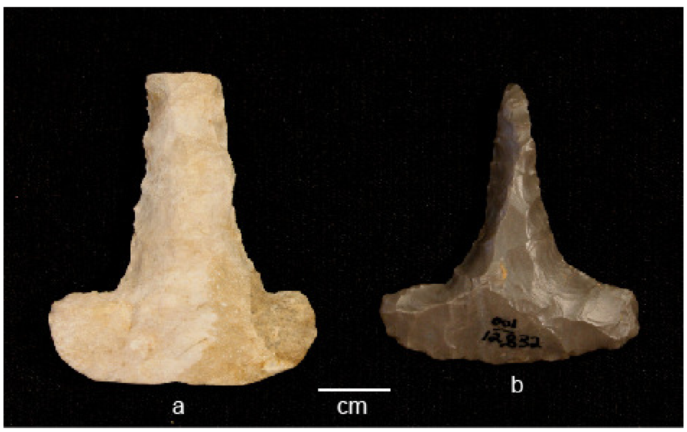

Figure 7.2. Western Terrace Thebes Cluster hafted drills.

All but three of the cores are Muldraugh chert (Figure 7.10). Of the three exceptions, two are St. Louis and one is Allen's Creek chert. All of the cores are polyhedral and show no real pattern of platform orientation and often reflect the tabular nature of Muldraugh chert. In most cases only a few flakes have been removed. The vast majority (70%) of the Muldraugh cores were scored as high quality material based on overall textural properties of the chert, but bedding-like planes, micro-fractures, geode-like pockets, and vugs are common (see Cantin et al. 2007 for a description) in these artifacts. It appears that raw material is being tested to determine if pieces are appropriate for further knapping into bifacial tools. Imperfections observed in the chert probably led to the discard of these cores. The St. Louis chert was considered high quality but the Allen's Creek was low quality.

As with the cores, the vast majority of the bifaces are made of Muldraugh chert (93%). Allen's Creek (n=4), St. Louis (n=5), and Wyandotte (n=3) bifaces are also present in small numbers.

Again internal flaws in the Muldraugh chert may have led to the discard of roughed out tools that broke during manufacture. In fact a number of bifaces and cores were exposed in situ fractured into multiple pieces but still conjoined. Although the majority of Muldraugh Stage 1 bifaces are broken (53%) a substantial proportion are

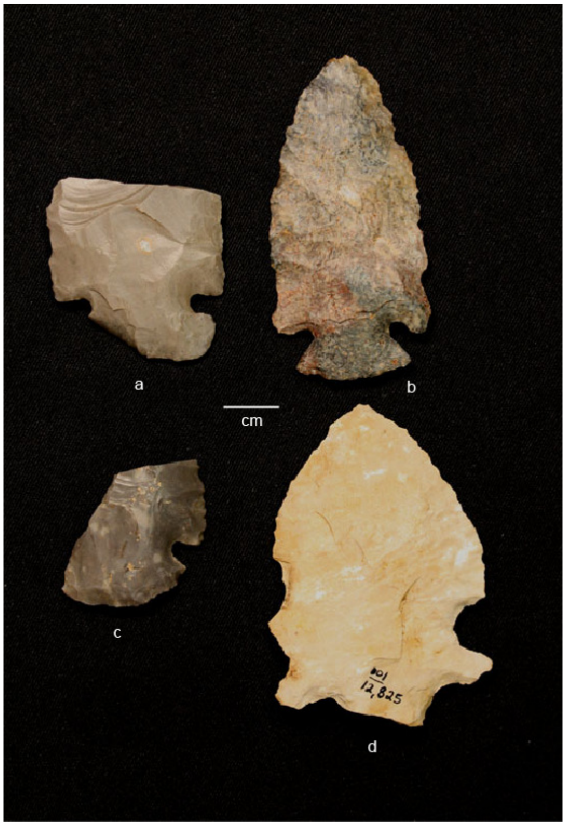

Figure 7.3. Western Terrace Thebes Cluster points.

Figure 7.4. Western Terrace Thebes Stage 1 bifaces.

complete. On the other hand, a large majority of Stage 2 (87%) and 3 (90%) bifaces are fragments.

The predominance of Stage 1 bifaces and haphazard flaking on cores indicates that bifacial core tools rather than flake tool production was the primary focus of Thebes knappers who occupied the western terrace portion of the site.

Figure 7.5. Western Terrace Thebes Stage 2 bifaces.

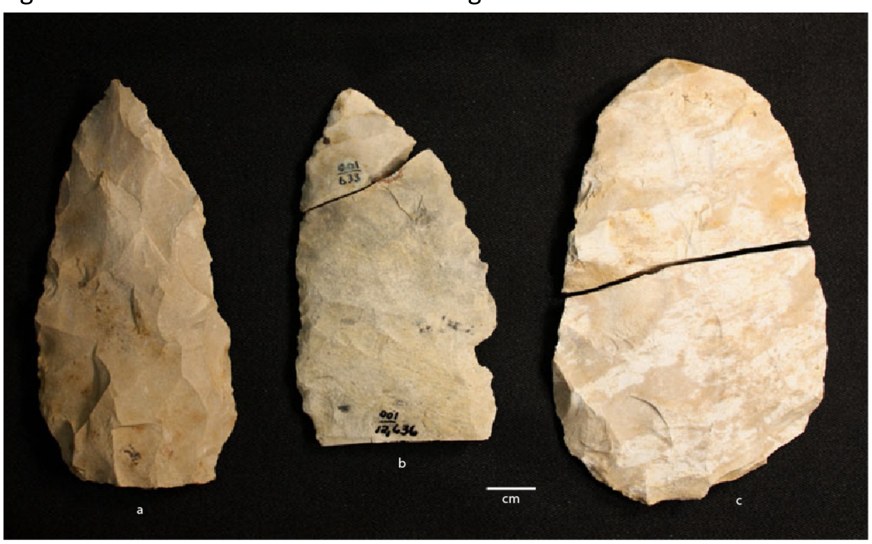

Figure 7.6. Western Terrace Thebes Stage 3 bifaces.

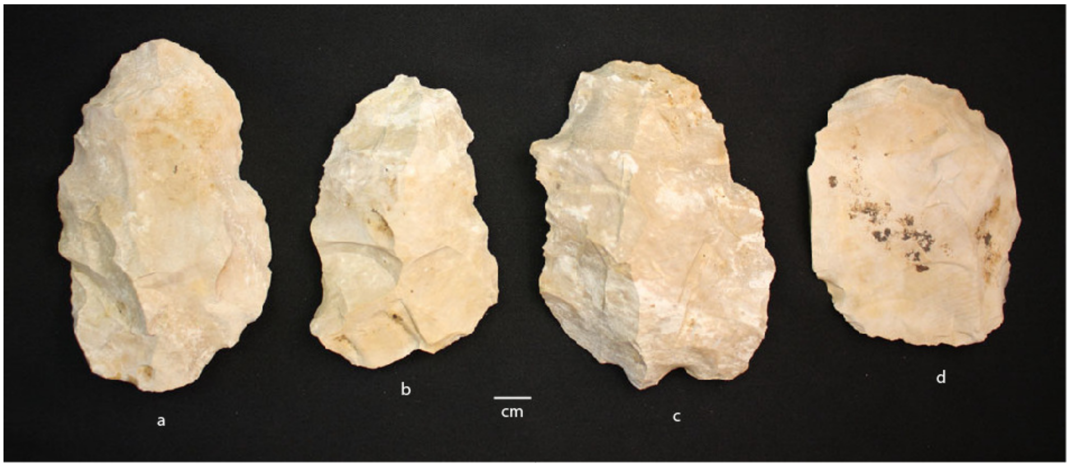

Figure 7.7. Western Terrace Thebes unifaces.

Figure 7.8. Western Terrace Thebes retouched flakes.

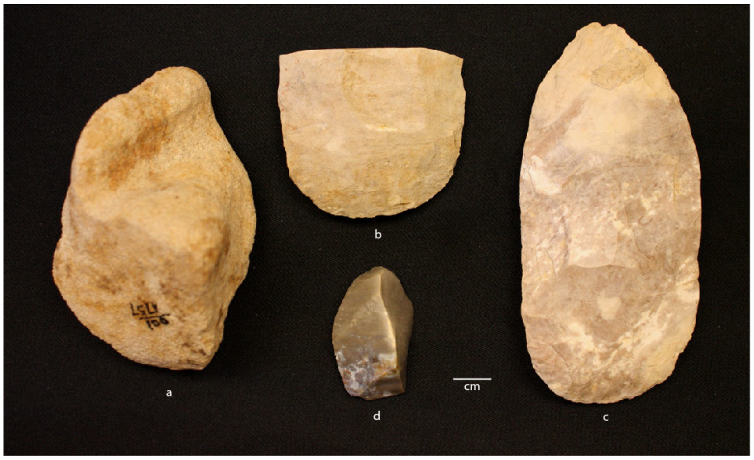

Figure 7.9. Western Terrace Thebes tools.

Figure 7.10. Western Terrace Thebes cores.

ST. CHARLES

Only 38 tools were recovered from the St Charles zone (Table 7.2). This zone lies under the Kirk zone and above the Early Side Notched zone in the Main Block between 300 and 400 cm bd and at greater depth on the bank to the east (>500 m bd). The St. Charles zone is associated with the same depositional unit that contains the Thebes workshop to the west.

Points

Nine points were recovered from the St. Charles zone but only four of these are temporally diagnostic. The other five are unidentifiable point fragments. Three of the diagnostic points (Figure 7.11b,c,d) were recovered from secure contexts (unit/levels) while the fourth (Figure 7.11a) was found while blading on the southwest side of the Main Block.

The only complete point is a St. Charles (Figure 7.11b) from U192 at 534 cm bd. It is a narrow deep corner notched point with an angular convex base. The medium sized (56.1 mm) point is made from Muldraugh chert. The blade is excurvate with a biconvex cross-section and oblique parallel invasive flaking. The blade is alternatly beveled. The base and notches are heavily ground.

Two St. Charles bases were also recovered from units at 529 cm bd (Figure 7.11c) on the paleobank slope and at 347 cm bd (Figure 7.11d) in the central portion of the Main Block. Both bases are classic angular convex base forms. In both cases the base and remaining portion of the notch are heavily ground. They are also both biconvex in cross section. One is made from Muldraugh (Figure 7.11c) and the other from Wyandotte

Figure 7.11. Main Block St. Charles points.

(Figure 7.11d). Both bases are wider (34.3 mm, 29.6 mm) than the complete St. Charles described previously.

The final diagnostic point (Figure 7.11a) was recovered while blading an areas immediately southeast of the Main Block. It was estimated to be from a depth interval of 300-340 cm bd. This point is a very large St. Charles made from Wyandotte. It has a rhomboid cross section resulting from steep beveling of the blade. There are large percussion flake scars on the flattened blade. The blade exhibits a bend hinge fracture. It has deep u-shaped diagonal notches and the base is an extreme example of the angular convex form and extends in width beyond the barbs. The base width is 40.9 mm. This blade/base difference is probably because the blade has been resharpened and thus lost width relative to the base.

Four of the five remaining Wyandotte artifacts are undiagnostic point or point-like fragments. The first (Figure 7.12a) is a recycled piece of chert that appears to have been a point. Retouch is limited to notching that forms a stem which is heavily rounded and crushed with multiple step fractures originating from the base. There is some evidence of wear (microflaking) on one unretoched edge and on a spur formed by two breaks intersecting at right angles and forming a chisel-like edge. The remaining three artifacts are small base fragments, all of which are heavily ground on the basal margin.

The final artifact (Figure 7.12b) is a Wyandotte flake that has been notched at the proximal end. There is minor retouching evident on the base, the notches, and on the lower third of the flake edge. The distal end of the flake is broken.

Other Tools

As indicated previously the sample of tools from this zone is small (n=38). Bifaces were the most common tool category (26.3%) followed by points or point fragments (23.7%). Bifaces were distributed fairly evenly between the three stage

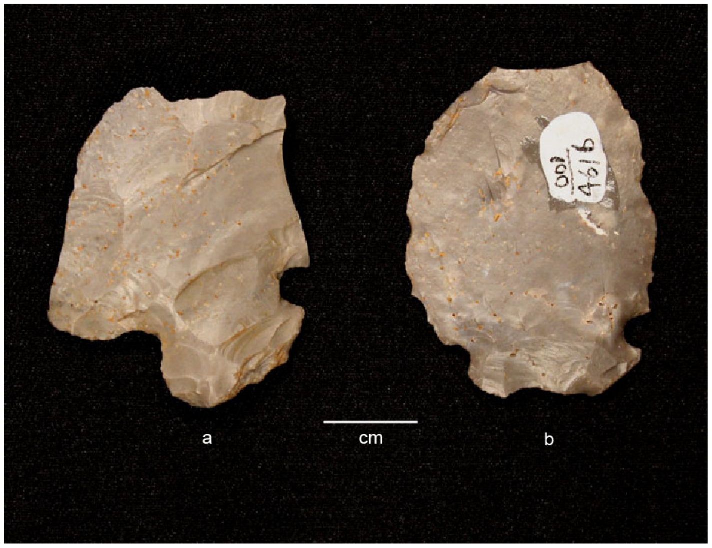

Figure 7.12. Non-diagnostic hafted bifaces.

categories. The complete or nearly complete bifaces (Figure 7.13) are all Stage I or II bifaces made of Muldraugh chert. One (Figure 7.13a) is a large (129.2 mm) ovate biface, while the other Stage II biface (Figure 7.13b) is triangular in shape. Both exhibit large percussion flake scars. The Stage III bifaces are all small fragments. One of these (Figure 7.13e) appears to be a biface fragment that has been recycled. The artifact is made of Brassfield chert and is retouched to create two or possibly three spurs that exhibit use-wear damage (indicated in Figure 7.13). All of the Stage 3 fragments are made of either Wyandotte (n=3) or St. Louis (n=2).

Only three cores were recovered (Figure 7.14). One is an patinated cobble of an unidentified black chert. The second is an amorphous polyhedral piece of Allens Creek chert and the third appears to be a small spent Wyandotte core with a conical shape. Two Muldraugh tested cobbles were also present. A chopper (Figure 7.15), adze, side scraper fragment (Figure 7.16d), and several retouched flakes (Figure 7.16a,b,c) are also present. All of these tools, with the exception of the large chopper (Muldraugh), are made either of Wyandotte (n=4) or St. Louis (n=1). Hardstone artifacts are limited to three hammerstones and a pitted stone. The pitted stone is large (24.0 by 13.7 cm) with five conical shaped pits in it.

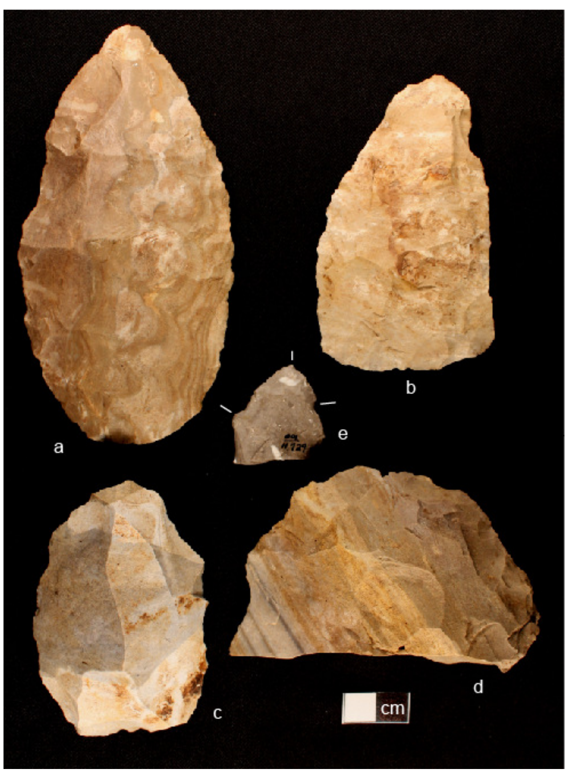

Figure 7.13. Main Block St. Charles bifaces.

Figure 7.14. Main Block St. Charles cores.

EARLY SIDE NOTCHED

The Early Side Notched zone underlies the St. Charles (Main Block) and Thebes (Western Terrace) occupations in point bar and overbank sediments. A total of 35 chipped and hardstone artifacts were recovered from this zone (Table 7.3). The majority of the recovered tools were from feature context (66%).

Points

Three diagnostic tools, an unidentifiable point, and two base fragments were recovered from the Early Side Notched zone. A point and a hafted drill were found either in or in close association with a surface hearth (F313) in point bar sediments between 668 and 672 cm bd in the Main Block. The average of two radiocarbon dates from the hearth is 9,950 ±90 rcybp. The first point, made of Wyandotte, from the feature (Figure 7.17a) is a recycled tool. It has one deep diagonal notch and a squared ear. The other ear is broken off. The surviving and unmodified part of the base is ground as is the ear. There is some evidence of basal thinning at the base. The blade on this relatively large point (57.0 mm) has a lenticular cross-section and is heavily reworked. There are large percussion scars on both edges. One of these helps form a spur with use-wear evident. At the tip is a burin-like scar that may be an impact fracture but given the use wear present suggests that is was a purposeful modification of the tip. Some of the original parallel invasive

Figure 7.15. Main Block St. Charles chopper.

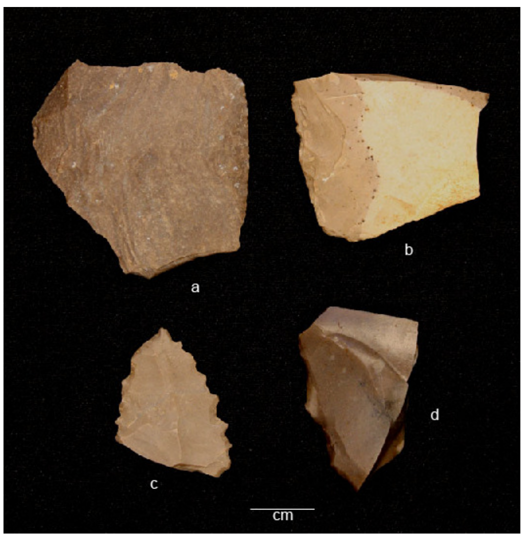

Figure 7.16. Main Block St. Charles retouched flakes.

retouch on the blade is still evident despite the extensive reworking. Overall this point has technological and stylistic characteristics that place it in the Thebes Cluster.

Although the second tool (Figure 7.17b) is a hafted drill it has similar technological/stylistic characteristics to the first and was recovered near the feature in unit excavation. It is made of Wyandotte. Deep diagonal notches are present with squared ears and a straight base. There is evidence of light grinding on the base and a few basal thinning flake scares are present. It is overall a large tool (81.0 mm) with a long bit. The bit is heavily rounded along the shaft. It may have been originally a point that was shaped into a drill but there is no direct evidence of this process. Again the tool is consistent with the characteristics of the Thebes Cluster, but very different from Thebes recovered in the lithic workshop.

The third point (Figure 7.18a) was recovered from F300 a surface hearth. A radiocarbon sample yielded a date of 10,370 ±190 rcybp the oldest age from the site. The base of this Wyandotte point appears to have been repaired after a break. Thus even though it is has a stemmed haft morphology there is evidence of a notching flake scar below the barb on the right side that seems to indicate that it was previously a notched point. There is also a steep bevel on the base that suggests that a broken base has been repaired to facilitate re-hafting of the tool. The base is also heavily ground. The overall length of the point is 52.9 mm with a blade length of 44.8 mm. The base is very short relative to the size of the blade another indication that it may have been broken and repaired. The blade exhibits oblique parallel retouch that extends to the mid-line. The blade is plano-convex in cross-section, but slightly alternately beveled. The tip appears to be broken, perhaps from use. The morphology (particularly the haft) of the point does not reflect any know types from this time period (i.e., 10.5k-9k rcybp). The blade is consistent with the shape and flaking of St. Charles forms (Justice 1987:57) but is smaller than normal perhaps due to extensive resharpening.

Table 0.1. St. Charles Feature & Unit Artifacts.

Class	Type	Subtype	Count	Percent
Lithic	Adze		1	2.6%
	Biface	Biface Fragment	2	5.3%
	Biface	Stage 1	3	7.9%
	Biface	Stage 2	2	5.3%
	Biface	Stage 3	3	7.9%
	Core	Polyhedral	3	7.9%
	Sidescraper		1	2.6%
	Point		9	23.7%
	Retouched Flake		4	10.5%
	Tested Cobble		2	5.3%
	Utilized Flake		2	5.3%
Hardstone	Hammerstone		3	7.9%
	Manuport		2	5.3%
	Pitted Stone		1	2.6%
Total			38	100.0%

The final complete point is very different morphologically from the first three (Figure 7.18b). It was recovered in unit excavation at 526 cm bd at the north end of the Main block. It is a small point (length: 33.1 mm) made of Wyandotte. It is a corner notched form with rounded ears and a triangular shaped blade. The base is not ground and the blade is not beveled. The point cross-section is plano-convex and the base is concave. There is oblique parallel retouch on the blade. This point does not fall within the Thebes technological/stylistic cluster but is rather more similar to small Kirk corner-notched forms.

Two base fragments were also recovered from the Early Side Notched zone (Figure 7.18). The first base (7.18c), made of St. Louis chert, has a concave basal margin and is slightly ground. Some thinning is evident on the base. Morphologically and in size it is consistent with the bases of the Thebes-like points in Figure 7.18a & b. It was recovered from the northern portion of the Main Block at 410-420 cm bd The second base (Figure 7.18d) made of Wyandotte, is probably from a corner-notched form. The base is not ground but the notch area is slightly rounded or ground. It is similar in size and shape to St. Charles points recovered from the Western Terrace (Figure 7.3b,c), but is within the range of small Kirk Corner Notched as well. This point fragment is from the middle of the Main Block at 440-450 cm bd.

Other Tools

Bifaces are the fourth most common tool type in the Early Side Notched zone (Table 7.3) at 11.5 percent. Stage 3 bifaces are most common and no Stage I bifaces were recovered (Figure 7.19). The chert types represented in this tool class are quite diverse consisting of Wyandotte (n=4), St. Louis (n=1), Muldraugh (n=1), and Jeffersonville (n=1). Four biface fragments refit making two tools. One of these artifacts is a very thin medium sized ovate Wyandotte biface broken near the middle into two pieces (Figure 7.19a). Figure 7.19c, also made of Wyandotte and in two pieces, is a thin triangular form. Large percussion scars are evident on the base and one of these may have lead to the break. Figure 7.19d is the distal end of a thin Stage 3 Wyandotte biface. Figure 7.19b is a thick Stage 2 biface made of St. Louis chert.

Cores (28.6%) are amorphous polyhedral forms predominantly of Muldraugh chert (Figure 7.20). A large Wyandotte nodular core with cortex still present and a Wyandotte core fragment along with a St. Louis core fragment are also present. The Muldraugh cores are minimally flaked and some have rounded weathered edges suggesting that they may have been collected in nearby streambeds rather than from exposures in the bluffs.

Figure 7.17. Early Side Notched zone points.

Flake tools consisting of retouched flakes and unifaces are distinctive in the Early Side Notched lithic assemblage and make up a combined 21.0 percent of the assemblage. They consist of large mostly blade-like unifacially retouched flakes (Figure 7.21). One of the unifaces is an end scraper made from St. Louis chert (Figure 7.21e) with cortex on the dorsal side. The bit exhibits minimal edge rounding and may have been rejuvenated just before discard. A large (83.3 mm) Wyandotte crescent shaped side scraper was also recovered (7.21a). It has cortex opposite the unifacially retouched working edge in an "orange peel" like morphology. A second Wyandotte side scraper has unifacial retouch on two lateral margins of a large (53.9mm) flake (Figure 7.21b). Two Muldraugh blade-like flakes

Figure 7.18. Early Side Notched zone points.

exhibit minimal unifacial retouch on one lateral edge (Figure 7.21c,d). On Figure 7.21d the retouch produced a serriated edge while on Figure 7.21c the damage may be a combination of retouch and microflaking from use. The final two retouched flakes are also made of Muldraugh chert. Both show minimal modification in the form of unifacial retouch and some of the damage may be microflaking from use. Other formal tools are limited to the diagnostic hafted drill described earlier

Hardstone tools are limited primarily to large pitted stones (7.8%) (see Figure 7.22). All of the pitted stones have multiple pits ranging from two to as many as seven. In two cases pits are on opposite surfaces (4 and 2 and 2 and 7). The two recovered from F35 exhibit evidence of heating. These artifacts are large heavy sandstone or goethite pieces ranging in length from 23 cm to 37 cm and as such represent "site furniture" probably procured from the bluffs. One of the anvils appears to have a small area of red ochre residue on one surface.

Several manuports were recovered mostly from hearth features. They are made of sandstone, limestone, or goethite and show no obvious modification, but are large pieces (15.5 to 23 cm long) that were transported to the site. Some evidence of exposure to heat is evident. One piece is a very porous fossiliferous limestone that has probably been heated for a lengthy period of time. Unmodified pieces of shale were also recovered from three different features. All appear to be functionally related to the use of the large surface hearths in the Early Side Notched zone.

MISCELLANEOUS POINTS

This section describes the non-Kirk points recovered from the upper portion of the site (see Table 7.4). Most of these points were recovered from the plowzone or upper sub-plowzone levels during the Phase II investigations. The post-Kirk point types represented a wide range of time periods reflecting the long-term stability of this landform during much of the Holocene (since ca. 8000 rcybp). Time periods represented

Figure 7.19. Early Side Notched zone bifaces.

include the late Early Archaic (bifurcates), early Middle Archaic (Kirk Stemmed), late Middle Archaic/Late Archaic (Godar, Brewerton, Matanzas, McWhinney) Terminal Archaic/Early Woodland (Riverton, Buck Creek Barbed, Turkey Tail, Adena), and Late Woodland (Raccoon Notched, Madison).

Several non-Kirk Early Archaic and Paleoindian points were also recovered from the Kirk zone in the Main Block. Two Wyandotte Clovis points were recovered from the Kirk component. One (Figure 7.23a) was found in U16 at a depth of 145 cm bd (Level 1) toward the top of the Kirk zone (Upper Kirk). Many Kirk corner notched points were recovered from this level and at depths to 204 cm bd where the unit was terminated. The second (Figure 7.24b) Clovis point was found in U183 at a depth of 347 cm bd. This unit is on the terrace slope. Kirk corner notched points were found to a depth of 420 cm bd in this unit and a St. Charles point was recovered at a depth of 520 cm bd. These points were clearly scavenged from other locations and deposited here during the Kirk occupation of the site.

Nine Early Archaic non-Kirk points (all Wyandotte) were also recovered from the Kirk zone (Figure 7.24). Three St. Charles (e.g., Figure7.24a), a Lost Lake (Figure 7.24c), and a Graham Cave (Figure 7.22d) point were recovered at depths well within the Kirk zone in association with Kirk Corner Notched forms. Four Thebes points were also recovered (three in the Phase II and one in the Phase III). All but one of these points are clearly in the Kirk zone. One Thebes point (Figure 7.24b) was found at 215 cm bd in Unit 77 at the base of the Kirk zone. All Kirk Corner Notched points from this unit were recovered in levels above the Thebes point and none in the same 10 cm level. The top of the St. Charles zone is estimated to be at 300 cm in the Main Block. Given their ephemeral character, however, it is possible that this point is associated with the St.

Figure 7.20. Early Side Notched zone cores.

Charles occupations expressed at greater depth. Although the Thebes/St. Charles component is stratigraphically below the Kirk zone (or in older alluvium to the west) there is every reason to believe that Thebes cluster and Kirk cluster points overlap in time based on Thebes dates from other sites (and the one radiocarbon dates from Hr520). This could also be the case with the Lost Lake and Graham Cave points since neither of these styles are precisely dated and may easily overlap with Kirk component in age. Therefore the deposition of these points might be the result of scavenging, group exchange, or direct deposition by non-Kirk groups.

SUMMARY

The Thebes occupation in the Western Terrace area is a very specialized activity area focused on lithic reduction. The dominate types of tools recovered (cores, early stage bifaces, hammerstones) and limited tool diversity along with the discreet debitage scatters indicate a briefly occupied camp where Muldraugh tool stone was procured from the nearby bluff and tool production was carried out at the site. Raw material was tested, bifacial tools were roughed out, and worn out tools were discarded. Lithic reduction appears to have been oriented toward bifacial core tools rather than unifacial flake tools. The temporally diagnostic tools (points/hafted drills) from the workshop area proper are all typed as Thebes, although two points from less secure proveniences in the Western Terrace are classified as St. Charles.

The lithic tool sample from the St. Charles zone in the Main block is much smaller. Bifaces and Points make up the majority of the tools in this small assemblage. Unifaces or other flake tools are not well represented but on the other hand there is a fair amount of diversity given the small sample. A few hardstone tools consisting of hammerstones and a single multi-pit pitted stone are also present. All of the Thebes cluster diagnostics recovered in this zone are St. Charles points. Overall the tools and

Figure 7.21. Early Side Notched zone unifaces and retouched flakes.

primarily lithic scatters present in the St. Charles zone suggest a series of very ephemeral short-term occupations.

The Early Side Notched tool sample is also limited. Despite this it appears to be more oriented to large unifacial flake tools in the form of scrapers and retouched flakes. Many of the flakes are blade-like in morphology. The bifaces present are broken late stage tools. Large pitted stones (all with multiple pits) are also over represented in this assemblage. These two assemblage characteristics make the Early Side Notched zone look very different from the later Thebes workshop or St. Charles occupations. Overall the assemblage exhibits a Paleoindian-like technology and given the 10k rcybp age of the collection this is not unexpected. The diagnostic points/drills are variable stylistically. At least two of them recovered in or near the deepest feature encountered at the site are well within the techno-morphology of the Thebes Cluster though not identical to either Thebes or St. Charles points. In some ways they seem to be “hybrids” of those two point types. A third smaller corner-notch form from another part of the Main Block is much more consistent with the Kirk corner-notched small type.

Figure 7.22. Early Side Notched zone pitted stone (arrows indicate pits).

Table 7.3. Early Side Notched Feature & Unit Artifacts.

Class	Type	Subtype	Count	Percent
Lithic	Biface	Stage 1	2	3.7%
		Stage 2	7	13.0%
		Stage 3	6	11.1%
	Core	Polyhedral	7	13.0%
	Hafted Drill		1	1.9%
	Point		5	9.3%
	Retouched Flake		6	11.1%
	Scraper	End Scraper	1	1.9%
		Side Scraper	1	1.9%
	Tested Cobble		2	3.7%
Hardstone	Anvil		1	1.9%
	Hammerstone		1	1.9%
	Hammerstone/Anvil		1	1.9%
	Manuport		12	22.2%
	Pitted Stone		1	1.9%
Total			54	100.0%

Figure 7.23. Kirk zone Clovis points.

Figure 7.24. Kirk zone non-Kirk points.

Table 7.4. Kirk zone and Plowzone Phase II & Phase III Non-Kirk Points.

Type	Count
Adena	3
Brewerton	2
Buck Creek barbed	2
Elk River	1
Godar	3
Indeterminate	8
Kanawha	2
Kirk Stemmed	1
Ledbetter	1
Madison	2
Matanzas	3
McWhinney	2
Raccoon Notched	1
Riverton	5
St. Albans	2
St. Charles	2
Thebes	3
Turkey Tail	1
Total	44

CHAPTER 8

SPATIAL STRUCTURE OF THE EARLY ARCHAIC OCCUPATIONS AT THE JAMES FARNSLEY SITE

by

C. Russell Stafford

This chapter examines the spatial structure of the Early Archaic components at the James Farnsley site (12Hr520). A central objective of the data recovery project at the site was to excavate large contiguous blocks of units by hand, so that the intra-site structure of the hunter-gatherer deposits could be analyzed. This goal was accomplished in the Kirk occupations and in the Western Terrace area where the Thebes lithic workshop is located but less so in the more deeply buried ephemeral cultural deposits.

In the area of the site where the Kirk component was concentrated an almost 800 m^2 block of units was hand excavated (Figure 8.1). The rectangular block (Main Block) was oriented north-south along the edge of the early Holocene Ohio River terrace. This block encompassed about 80 percent of the Kirk deposits at the site. The Kirk deposits, which are about 1.0 m thick, were subdivided into three zones based on the vertical distribution of debris, features, and radiocarbon dates. These three zones from deepest to shallowest are: Lower Kirk, Middle Kirk, and Upper Kirk. In addition, a series of hand excavated trenches were dug down the terrace escarpment to sample the secondary trash deposits on the slope of the river paleobank (Figure 8.1).

To the west of the Main Block a series of three mini-blocks (A, B, and C) of units were hand excavated to encompass clusters of lithic debris associated with a Thebes component workshop (Figure 8.1). A total of 250.8 m^2 were exposed in this area of the Western Terrace including both the Phase II and Phase III units.

Both of these occupation zones were extensively sampled in the Phase II testing portion of the investigations. More deeply buried Early Archaic occupations went largely undetected until the Phase III investigations began. In addition, these occupations were more ephemeral as reflected in isolated features and debris scatters. In conjunction with the depth of the deposits and time constraints it was not feasible to expose large areas by hand. Machine blading with a track hoe and hand excavation of small areas were used to sample the deeper Early Archaic deposits. As a result the degree of detailed spatial information is more limited. Below the Kirk zone in the Main Block were St. Charles and Early Side Notched occupations. The Early Side Notched occupations extended into the Western Terrace area of the site, but at a shallower depth because of the general east to west slope up onto the levee or overbank deposits.

The focus of this chapter analysis is on the Phase III data from the site. Artifactual debris was provenienced to 1x1 meter quads within 2x2 meter units. The assumption was that spatial patterns reflecting activity areas in early hunter-gatherer sites would be small scale. Most maps were generated with ArcMap 9.0. The Quartile function with four class intervals was used for density maps. Use of quartiles tends to emphasize low density areas of the site where variation in patterning would be masked and the few high density areas would be over emphasized using equal intervals. The use of four intervals means that 25 percent of the units/quads are allocated to each class. Since all sampling was at the quad level no area correction was used in the density maps (and no volumetric correction was attempted). In the Thebes workshop Phase II data was integrated into the maps and an area correction was made to make the two data sets comparable (i.e., artifact numbers or weight per unit area).

UPPER KIRK

The Kirk deposit was subdivided into three zones the upper most of which is referred to as the Upper Kirk zone. There are no sterile layers between the zones and the deposit as a whole slopes slightly (ca. 1.3 cm/m) toward the paleochannel of the Ohio near the terrace escarpement. This slope was recognized in the Phase II testing and thus during Phase III excavations units were dug with the slope on the eastern site of the Main block (east of 0West).

The Upper Kirk is defined as Phase III unit/quad levels less than 150 cm bd. Nine features, all in the southern half of the Main Block, were assigned to this occupation zone (Figure 8.2). Eight of the features are surface hearths which form three clusters. A rock scatter is associated with the southern most cluster. The hearths are spaced about 3-5 meters apart within each cluster.

Figure 8.2 shows the density of debitage within the Upper Kirk zone. Higher densities generally occur in association with the features at the south end of the block. There are two large concentrations of debris indicated on the map that are about 8 meters in length and 4-5 meters in width. These concentrations probably represent lithic knapping activity areas. The overall amounts of debitage, however, are far less than in the Middle or Lower Kirk zones. The average Middle Kirk debitage density is almost six times that of the Upper zone and the Lower Kirk is has almost twice the debitage density of the Upper zone.

Lithic tools (chipped stone) show a similar spatial pattern (Figure 8.3), with most of them concentrated in the south half of the block with the features. The main concentrations of tools coincide with the two high density debitage areas. In the northern portion of the block a few tools are sporadically scattered across this area. Overall, about four times and eleven times as many tools were recovered in the Lower and Middle Kirk zones in comparison to the Upper Kirk.

Figure 8.4 illustrates the distribution of Stilwell points which are strongly associated with the Upper Kirk zone. Again they mainly occur in the southern portion of the block with the higher concentrations of debitage and other tools.

The spatial patterning in the Upper Kirk may be partially a function of mixing through bioturbation from the Middle Kirk below in as much as the concentrations of artifacts in the Middle Kirk correlate with the Upper Kirk. There is no clear stratigraphic separation between the two and the major defining factor is the change in debris density with depth in the Kirk deposit. On the other hand the concentrations do coincide with the feature clusters, which are clearly stratigraphically higher than those associated with the Middle Kirk. The presence of Stilwell point forms suggests that this zone is related to the late Early Archaic occupation at nearby 12Hr481.

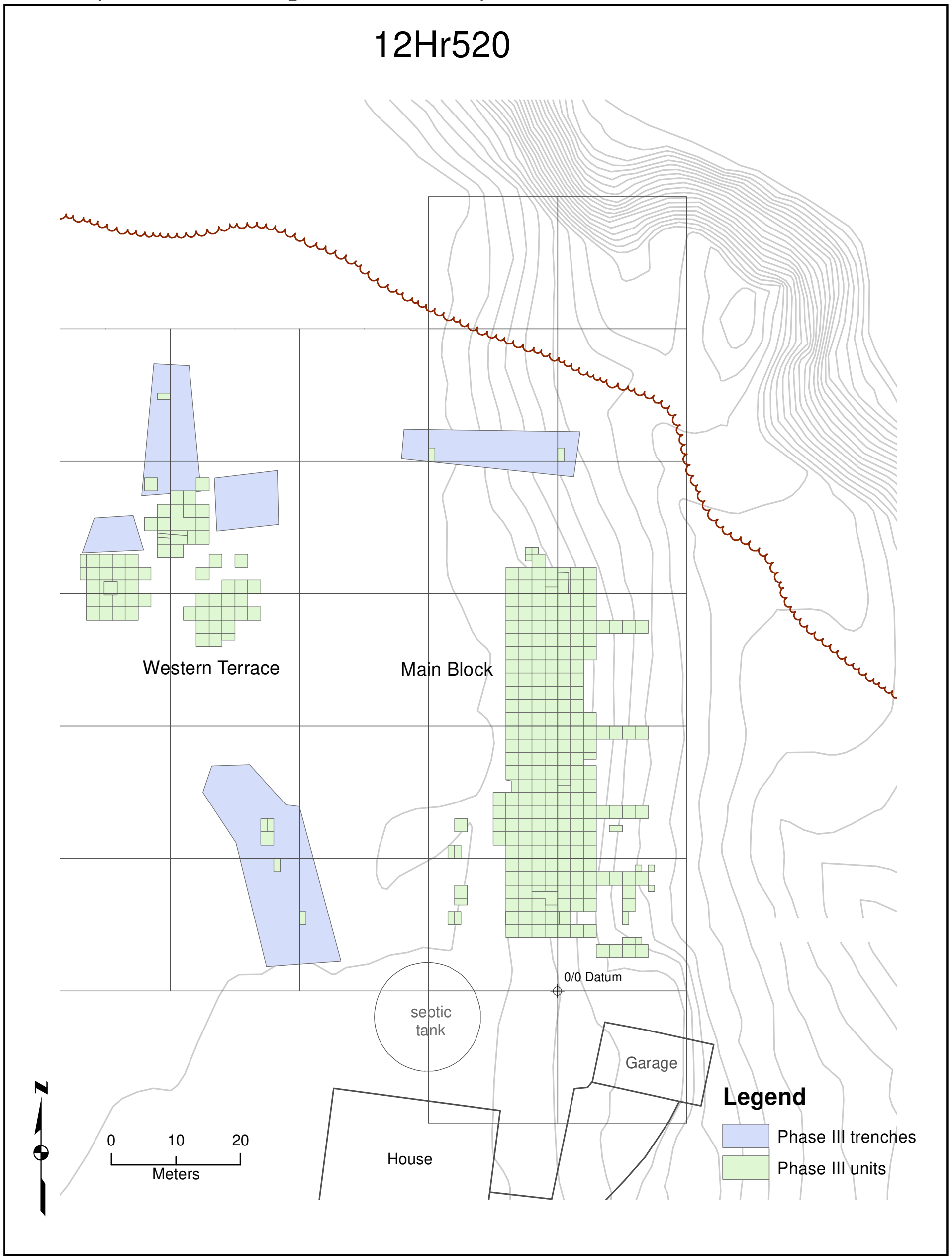

Figure 8.1. Location of Phase III excavation blocks and units.

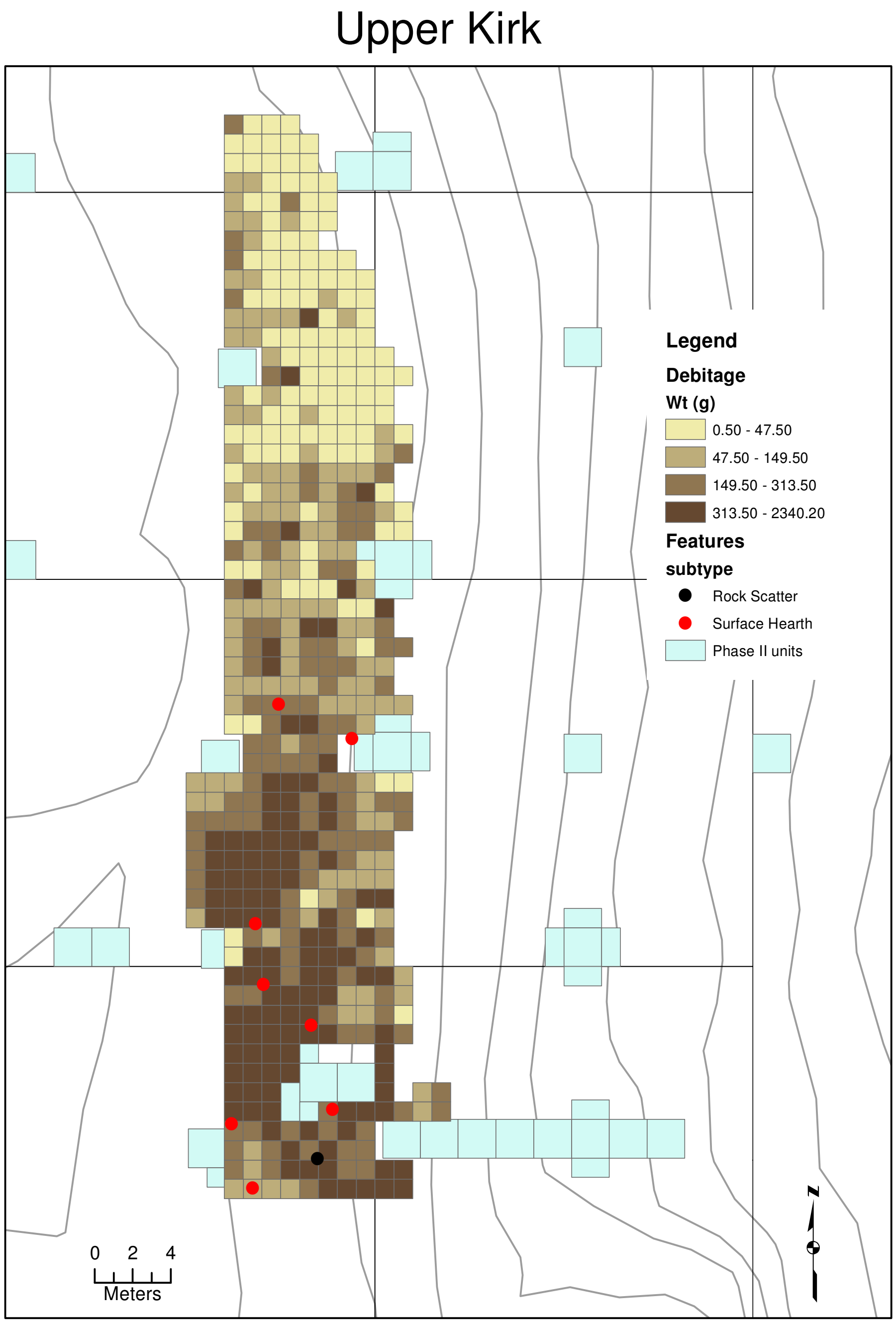

Figure 8.2. Upper Kirk debitage density map.

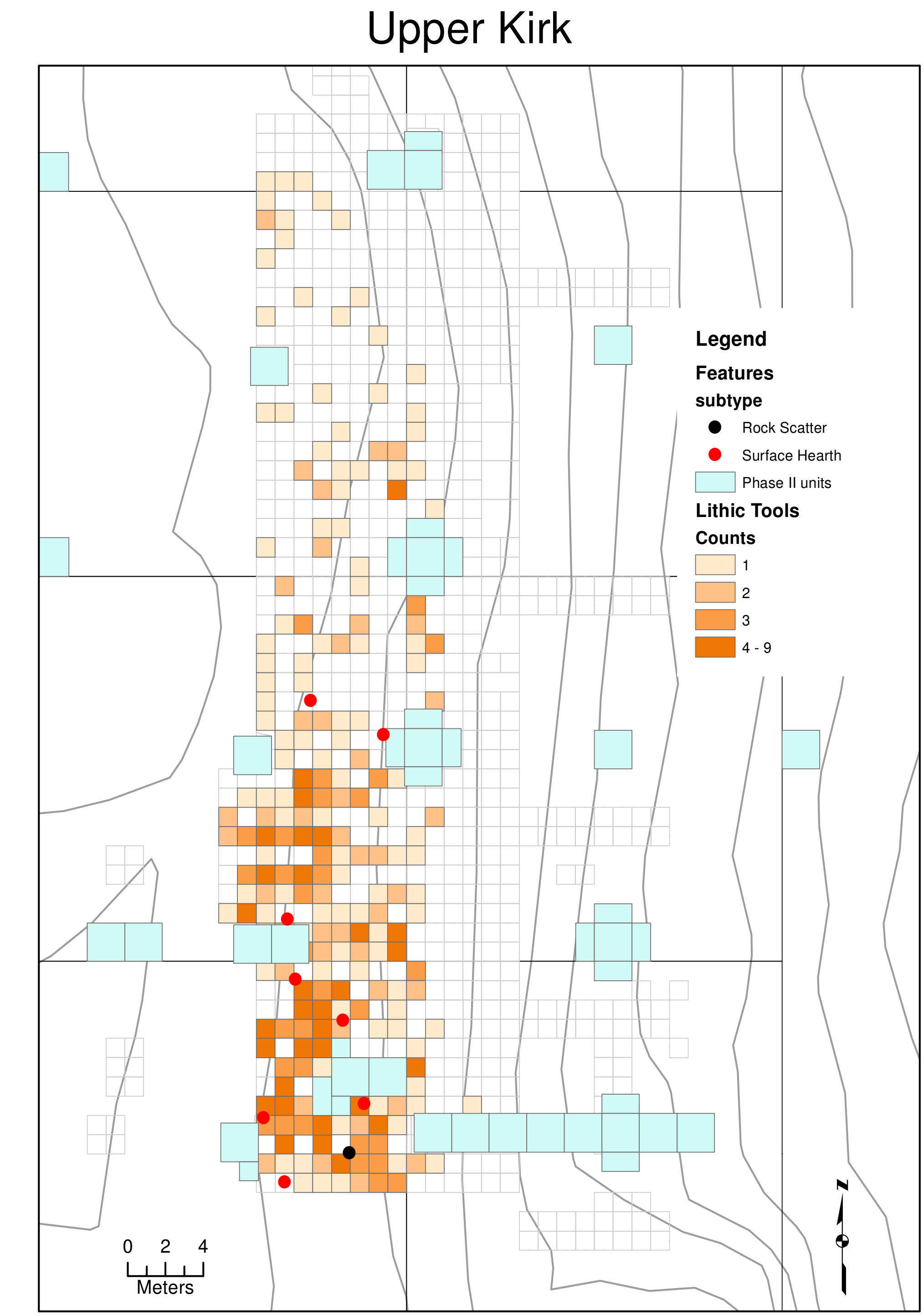

Figure 8.3. Upper Kirk tool density map.

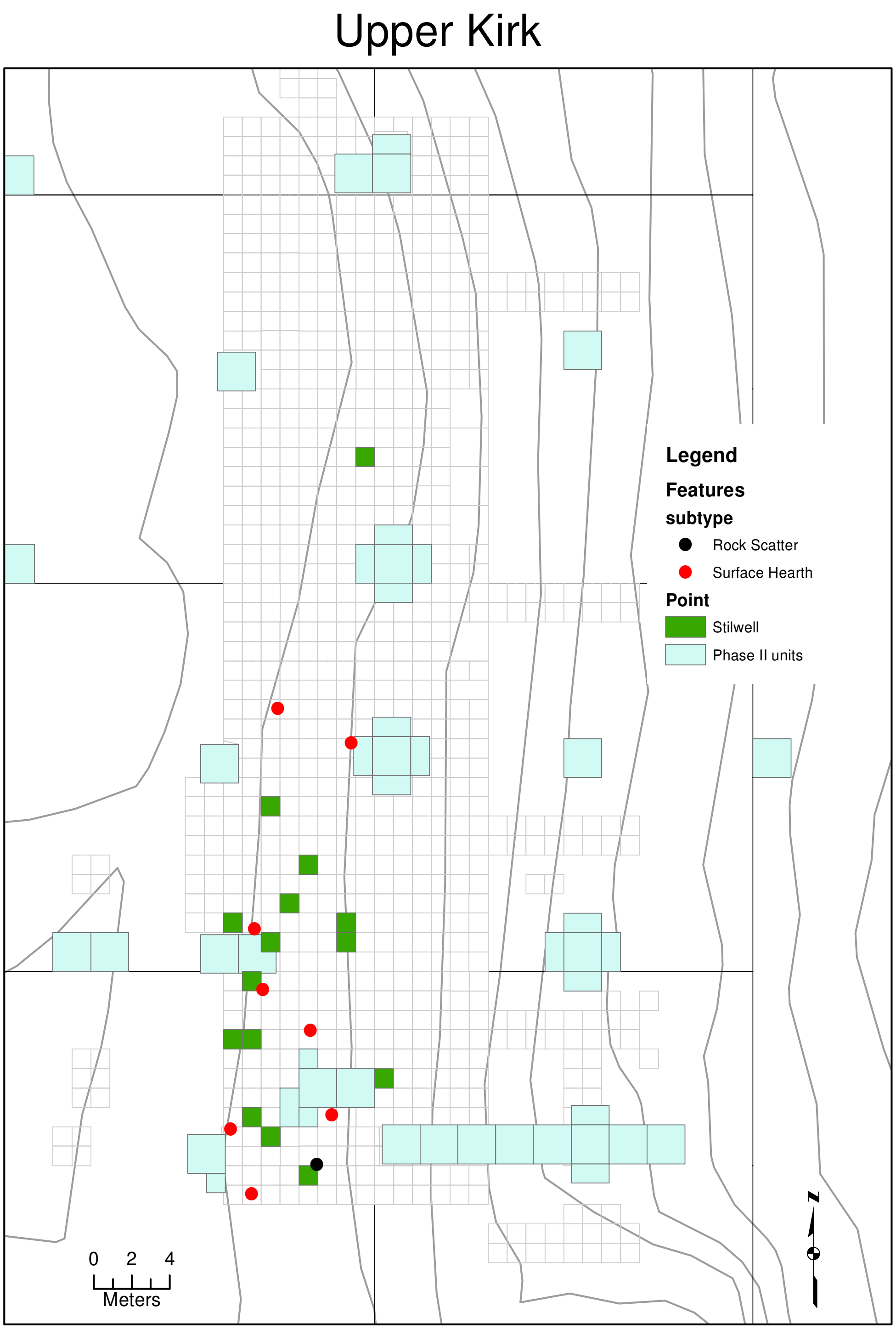

Figure 8.4. Upper Kirk Stilwell point distribution.

MIDDLE KIRK

The Middle Kirk is defined as a zone of unit/quad levels between 150 and 180 cm bd. Debitage and tool numbers increase dramatically in this zone. A large number of features are represented in the Middle Kirk zone and are distributed along the entire length of the Main Block (Figure 8.5). Far fewer features occur in the far northern portion of the block, however. Compared to the Upper Kirk there are a much wider variety of feature types including a large number of lithic scatters and several tool caches. Although lithic scatters are found over the entire block they tend to be concentrated in the center and southern third of the Main Block. At the north end of the block surface hearths (A) are widely spaced in a circular pattern of eight features at roughly the same depth suggesting they may be contemporaneous. Further south there are three more feature clusters located toward the eastern side of the block. These clusters from north to south are composed of six, eight and three hearths (two features were eliminated from the cluster as they are seemingly at too shallow a depth to be regarded as contemporaneous with the other hearths in the cluster). The center two clusters (B,C) show no recognizable arrangement, while the southern most cluster (D) is made up of a paired set of hearths and a third hearth some 15 m away. It appears that these four clusters occur on the same geomorphic surface. Most other features appear to be associated with this surface including the lithic scatters, although there are a few exceptions on the west side of the block that are at greater depths (ca 180+ cm bd) and may be stratigraphically too deep to a part of this surface.

Very high concentrations of debitage are scattered across the southern two-thirds of the block (Figure 8.6). One very large concentration is located between grid 20N and 25N. It measures at least 10 by 6 meters in size. Far lower densities are found in the northern portion of the block. The maximum quad density is 11,648 g of debitage which is almost two and a half times the maximum density in the Lower Kirk zone. Even including the lower amounts in the northern portion of the block the average quad density is 1,369 g compared to the 571 g average in the Lower Kirk. Debitage tends to be distributed around the edges of the northern most cluster of hearths (A), while very high debitage density is associated with hearth cluster B. Hearth cluster C is in a generally high density area but the large concentration mentioned before is to the west of this cluster. Hearth cluster D is also within a high density area. Most of the lithic scatters tend to in or very near high density areas in the southern two-thirds of the block.

Lithic tools have a very similar distribution in the block (Figure 8.7). Again there is a heavy concentration of tools in the same area as the large concentration of debitage. There are two other concentrations to the north and south of the main cluster of tools. There is more than 2.8 times the number of tools in the Middle Kirk zone as in the Lower Kirk with a mean density of 9 compared to 4 tools per quad. The maximum tool count in a single quad is 54 in the Middle Kirk zone.

Bifaces are the most numerous tool type and have a spatial distribution that correlates well with the concentrations of all tools and debitage (Figure 8.8). Far fewer bifaces are distributed across the northern portion of the block. Over 2400 bifaces were recovered in this zone, with an average of 5 bifaces per quad and a maximum of 24.

Points were also very common with over 1000 recovered in this zone (Figure 8.9). Again points are concentrated in three major clusters coinciding with the previous tool and debitage concentrations.

Cores follow a similar spatial pattern with the greatest concentrations in the largest central cluster of debitage and tools (Figure 8.10). More than twice as many cores were recovered from the Middle Kirk as the Lower Kirk zone.

Scrapers are more widely scattered but are also more than 1.5 times as common as cores. These tools are again concentrated in the three main clusters noted previously (Figure 8.11). There is one additional concentration of scrapers that occur on the south edge of the northern cluster of surface hearths (A). The maximum number of scrapers in one quad is six.

Adzes have a similar distribution with a comparable abundance (Figure 8.12). The largest number of adzes is in the center of the three main concentrations where as many as four adzes were recovered in a single quad. As with scrapers there is a small cluster in the northern part of the block just offset from the scraper concentration on the south side of the feature circle (A). Other adzes are on the northern side of the feature circle.

Drills were recovered from all parts of the Main Block, but their highest concentration is somewhat offset to the east slightly from the main central concentration (Figure 8.13). In general, drills tend to cluster around the perimeter of all of the hearth clusters.

The distributions of three other rarer tool classes (Chopper, Graver, and Perforator) are illustrated in Figures 8.14, 8.15, and 8.16. Choppers are the most common of the three (n=39) and are present across most of the block but are most abundant in the central large concentration. Gravers and perforators are widely scattered, although no perforators were recovered in the northern portion of the block.

In summary, in the Middle Kirk zone there are four clusters of surface hearths distributed north to south in the Main Block. Heavy concentrations of debitage and tools are present in the southern two-thirds of the block. Two of the heaviest concentrations are to the west of the hearth clusters where unusually large quantities of the most abundant tool classes (bifaces and points) were recovered. Lithic scatters are particularly common in the large concentration between 20N and 25N in the block.

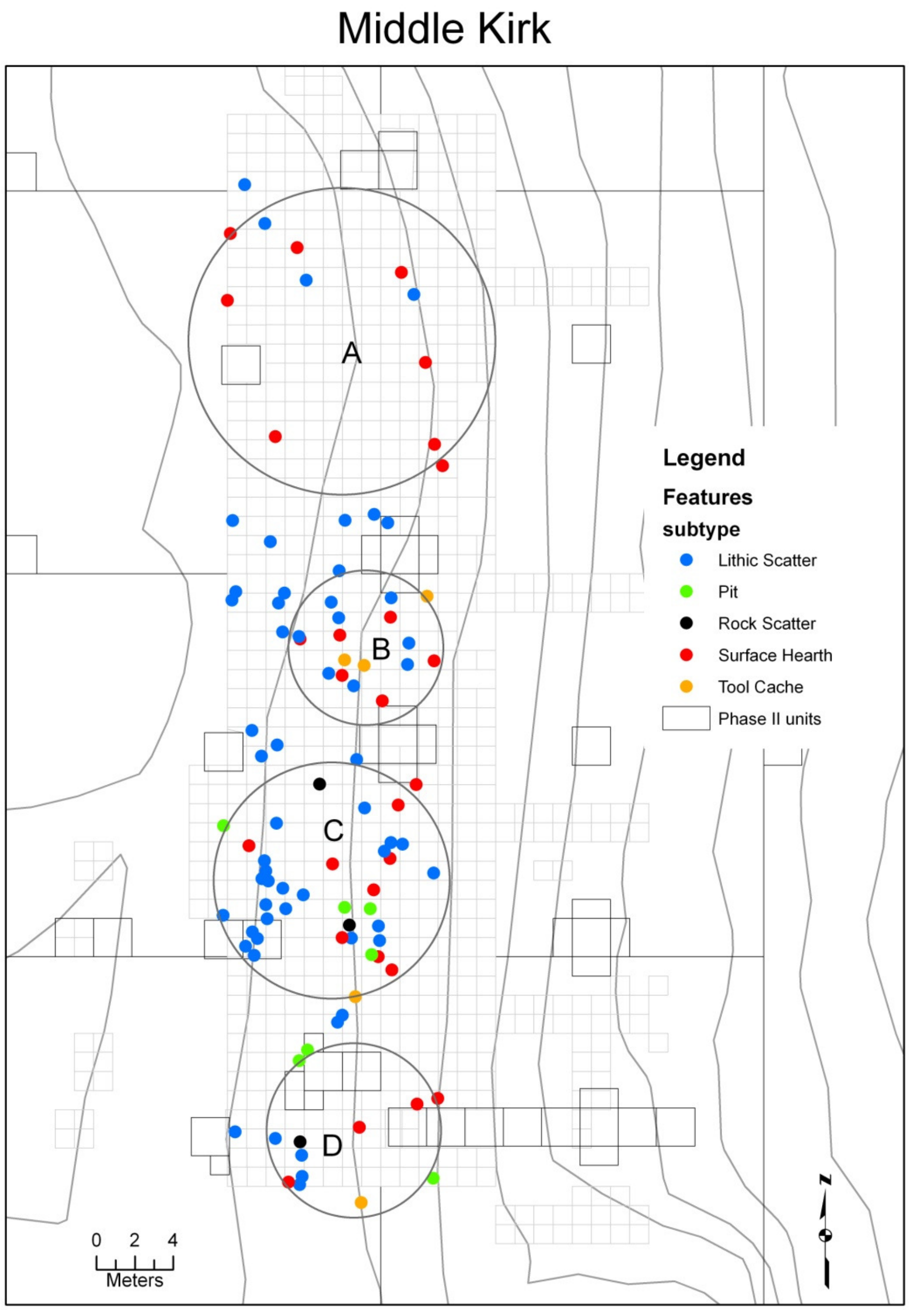

Figure 8.5. Middle Kirk feature distribution by type.

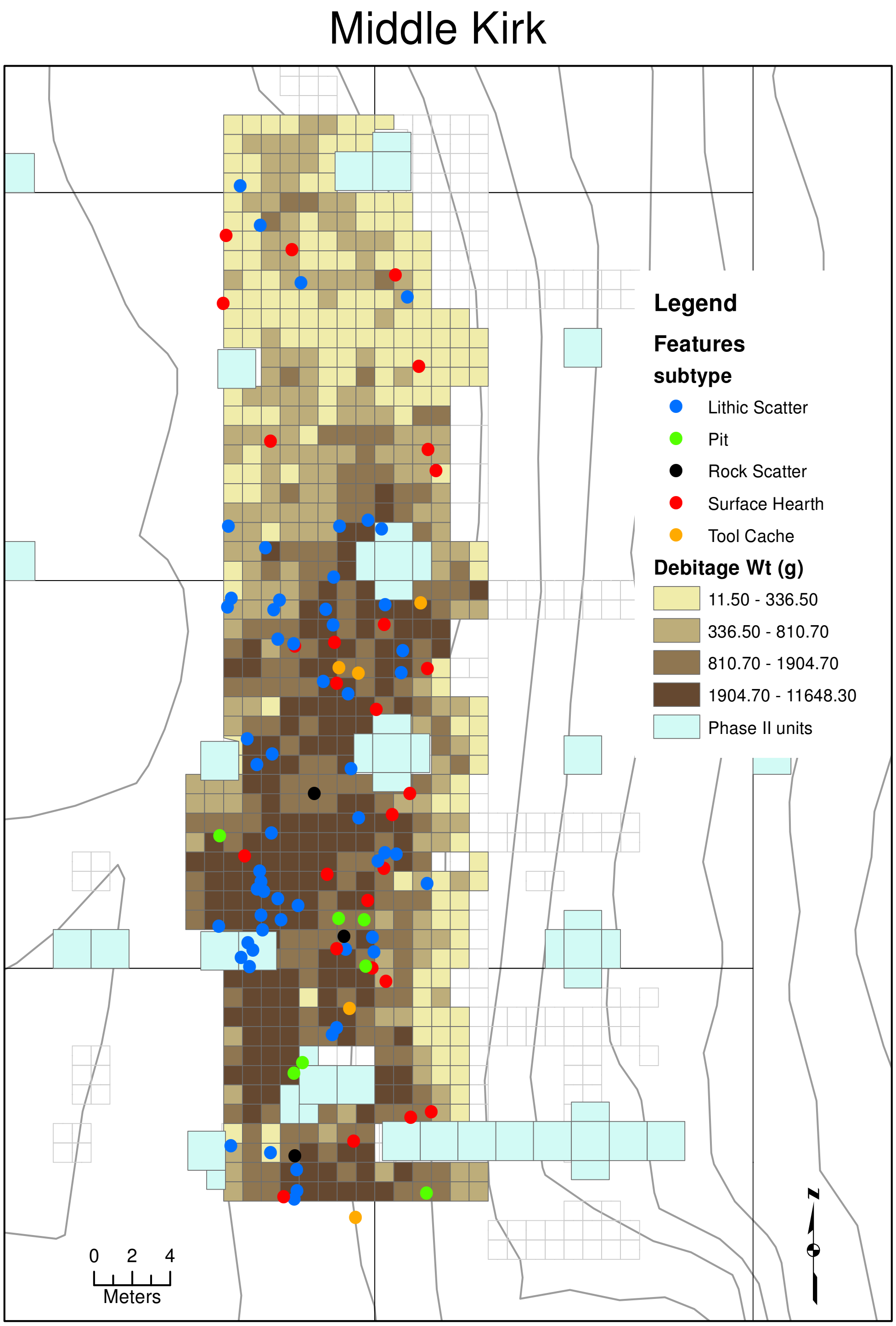

Figure 8.6. Middle Kirk debitage density map.

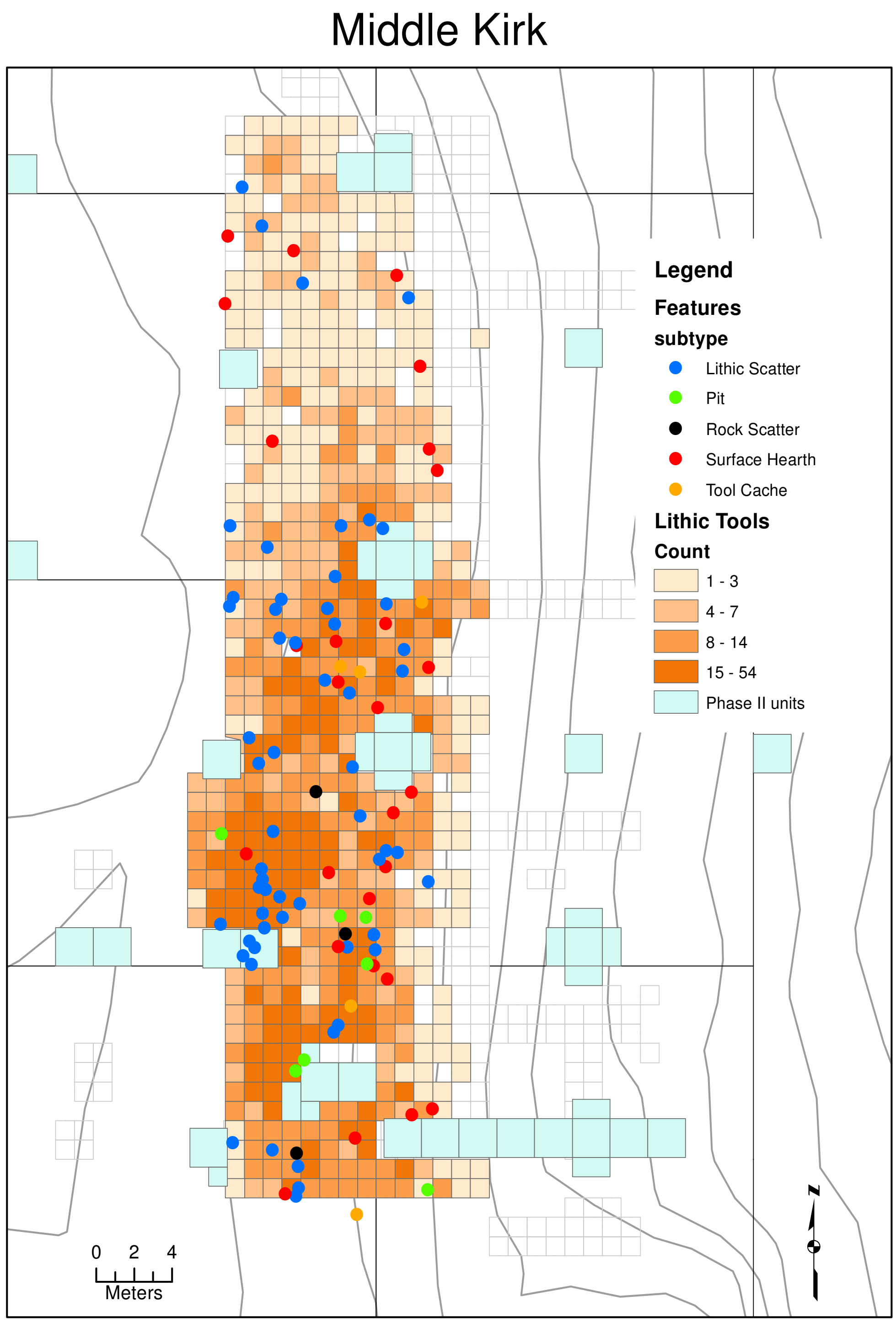

Figure 8.7. Middle Kirk tool density map.

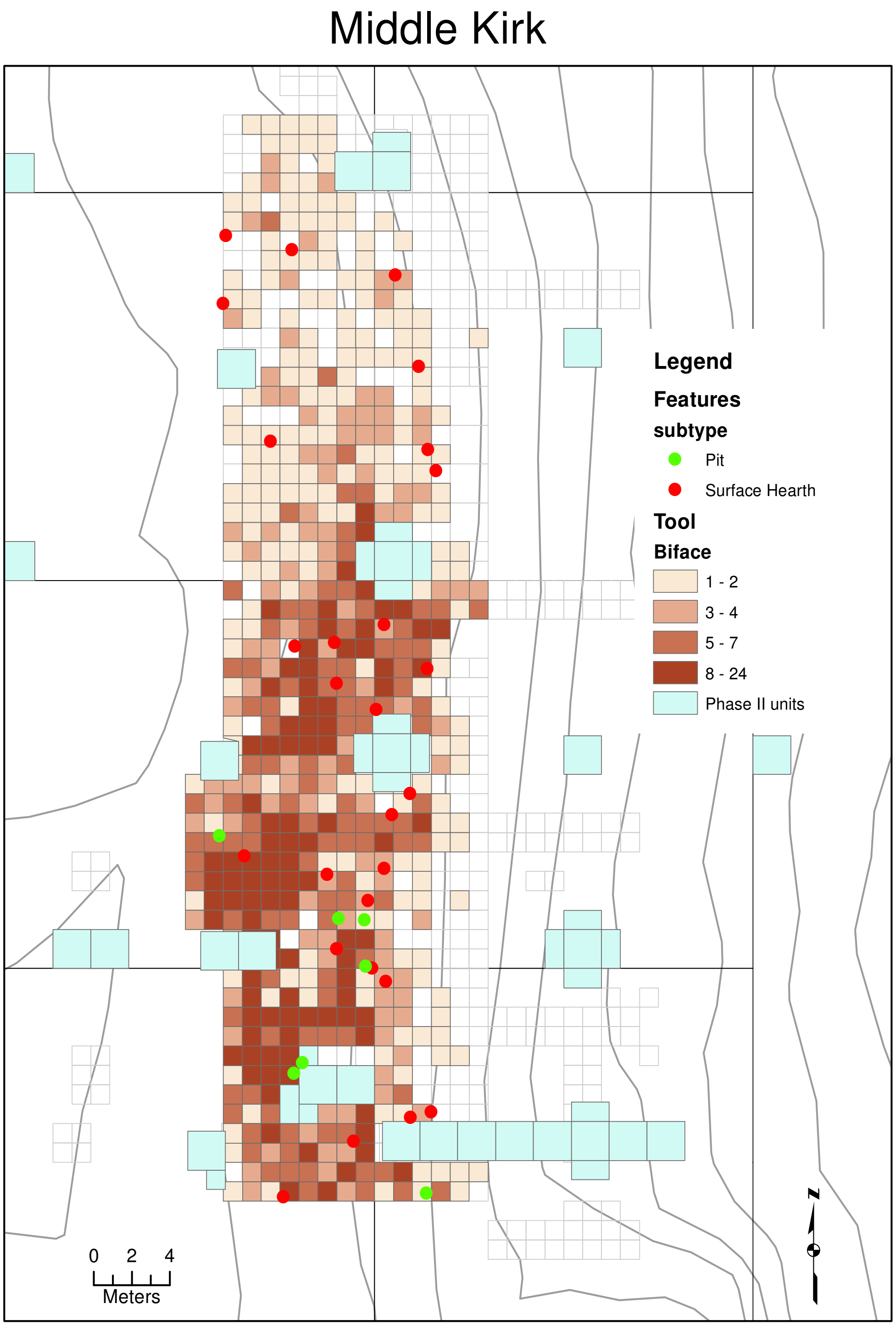

Figure 8.8. Middle Kirk biface density map.

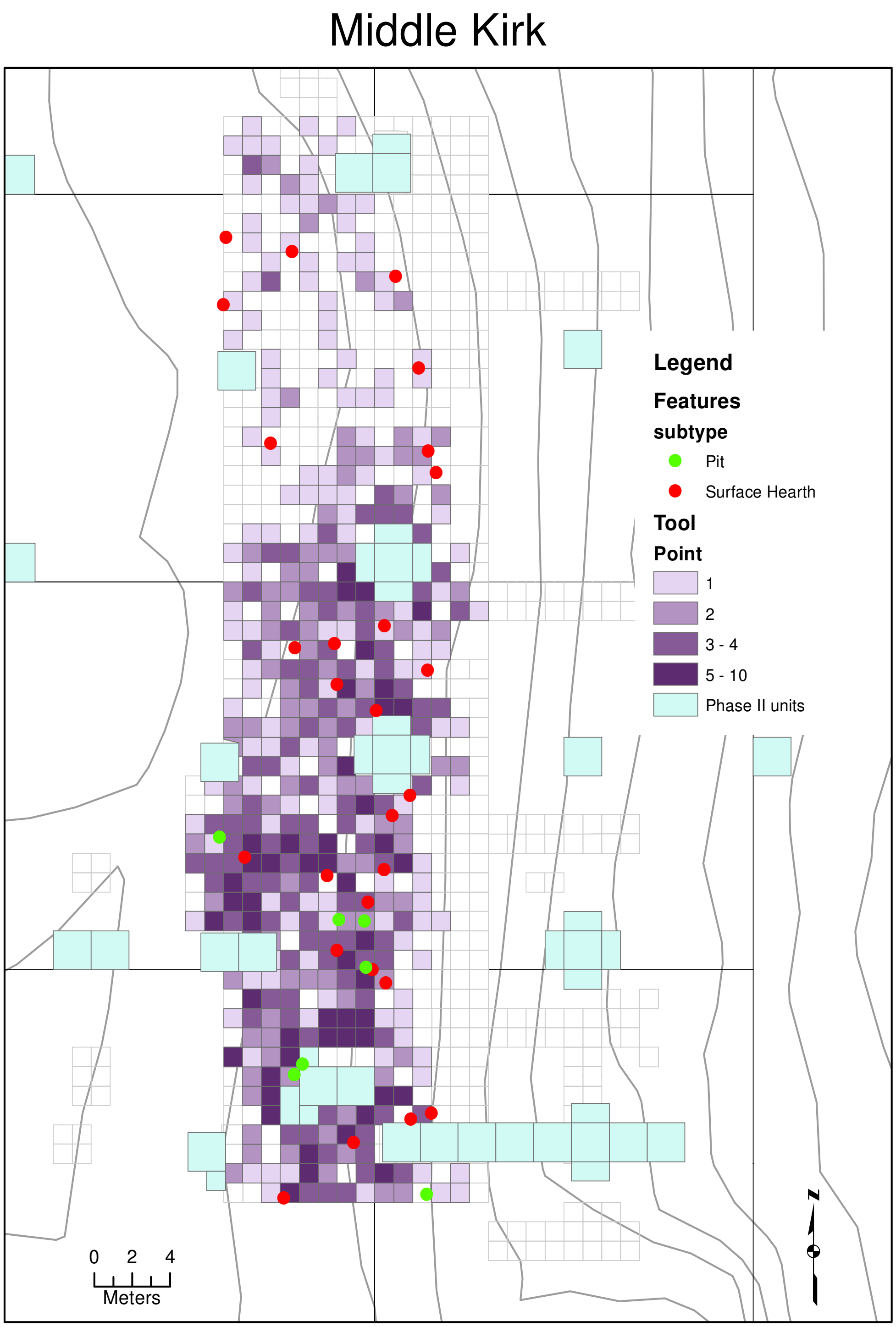

Figure 8.9. Middle Kirk point density map.

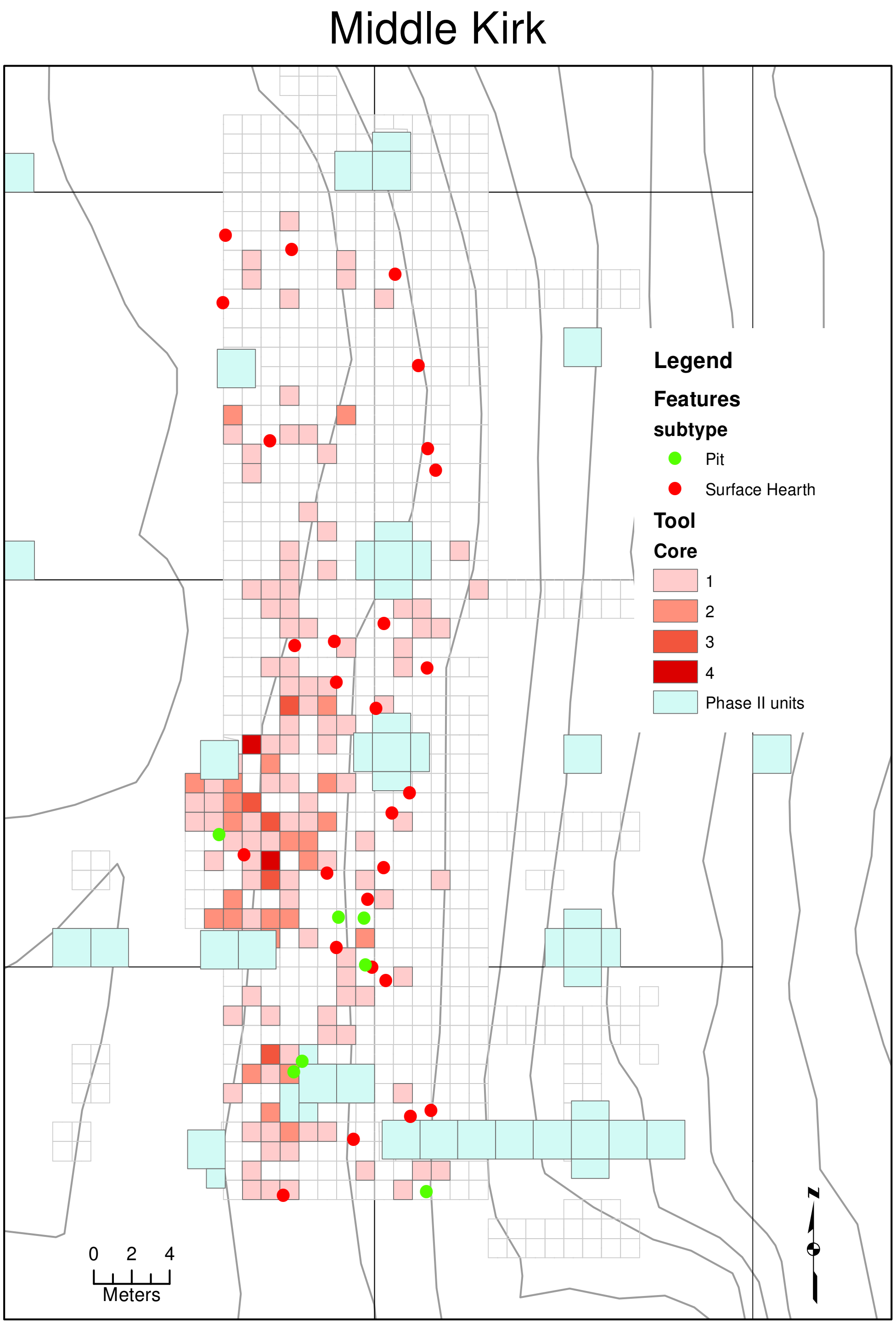

Figure 8.10. Middle Kirk core density map.

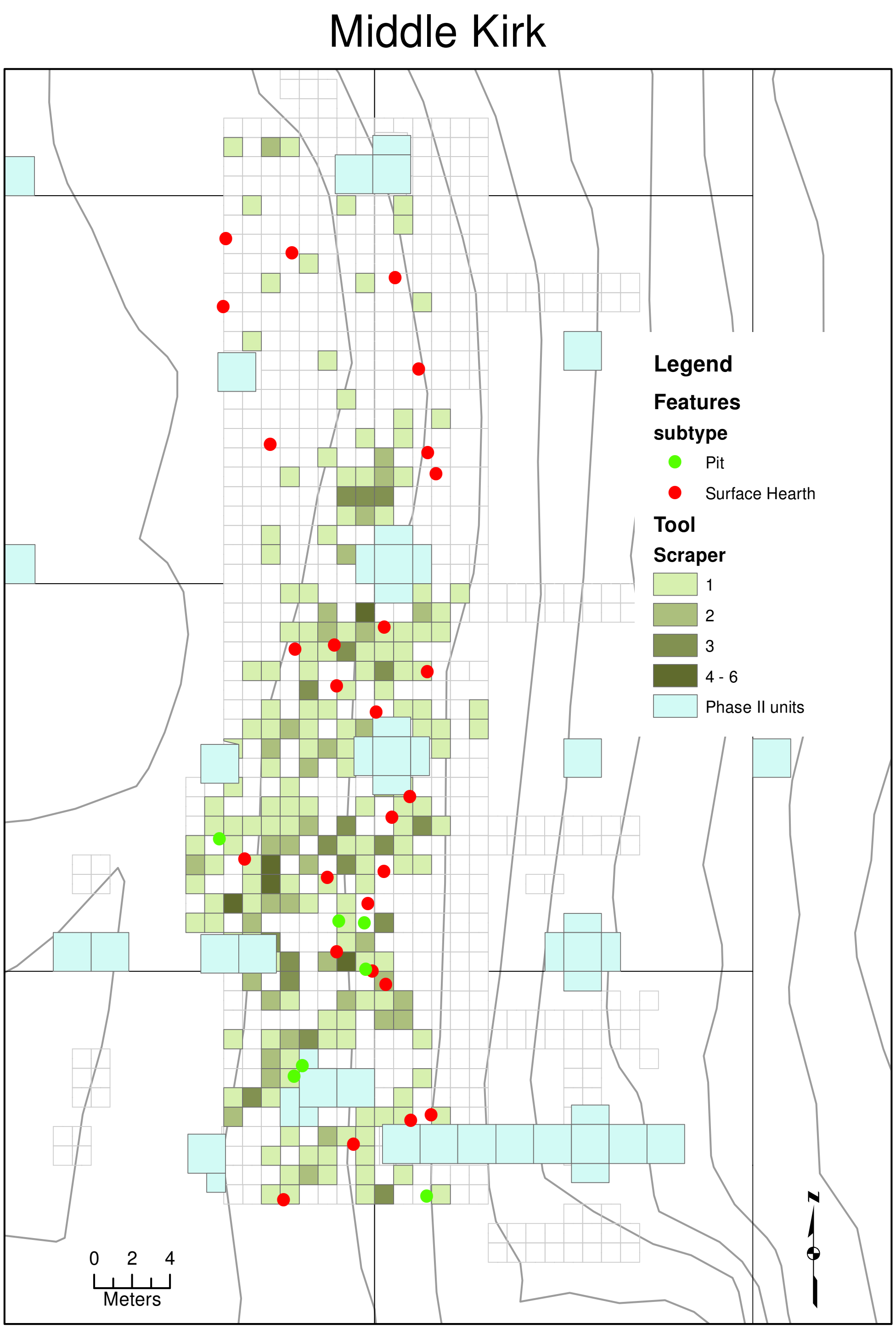

Figure 8.11. Middle Kirk scraper density map.

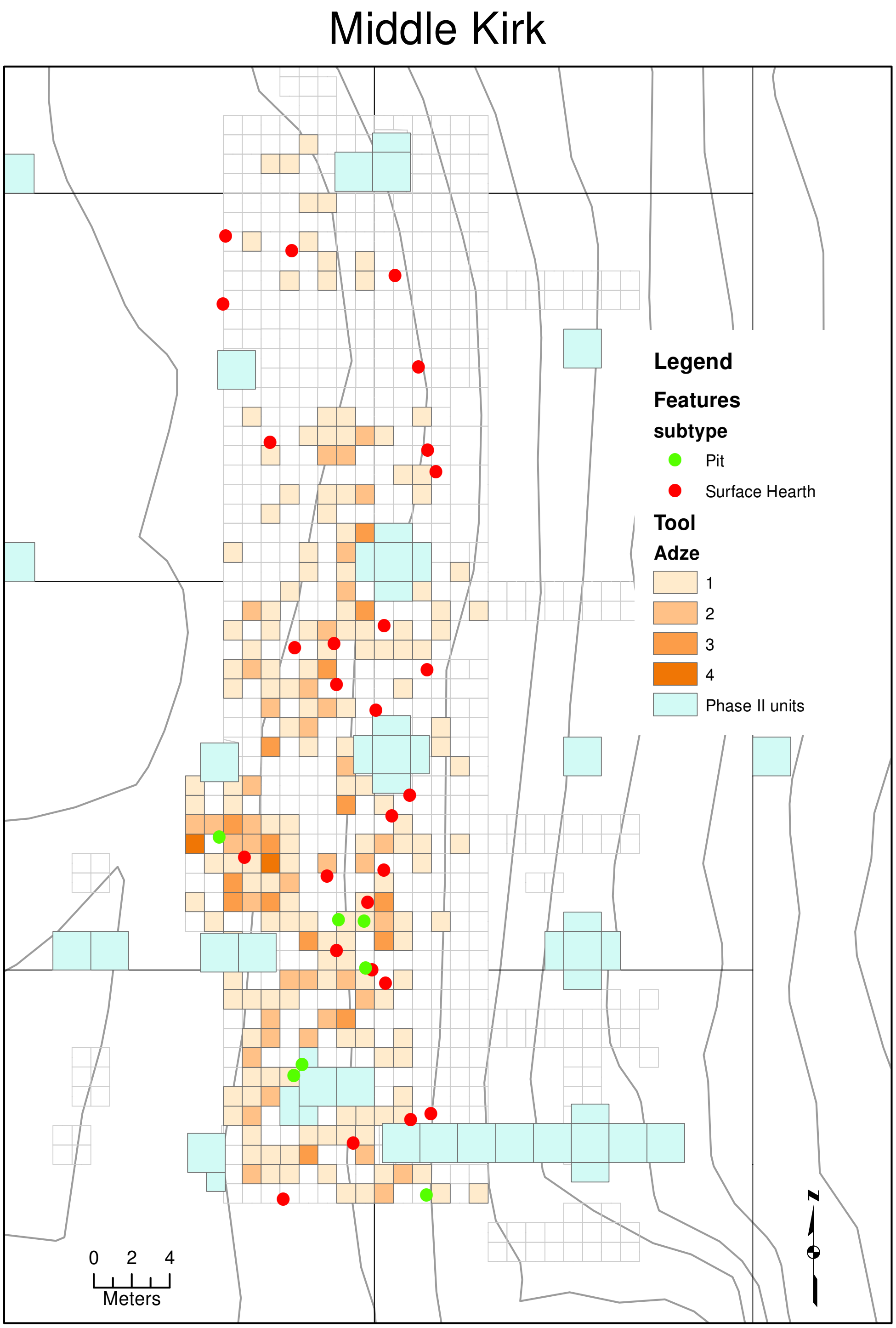

Figure 8.12. Middle Kirk adze density map.

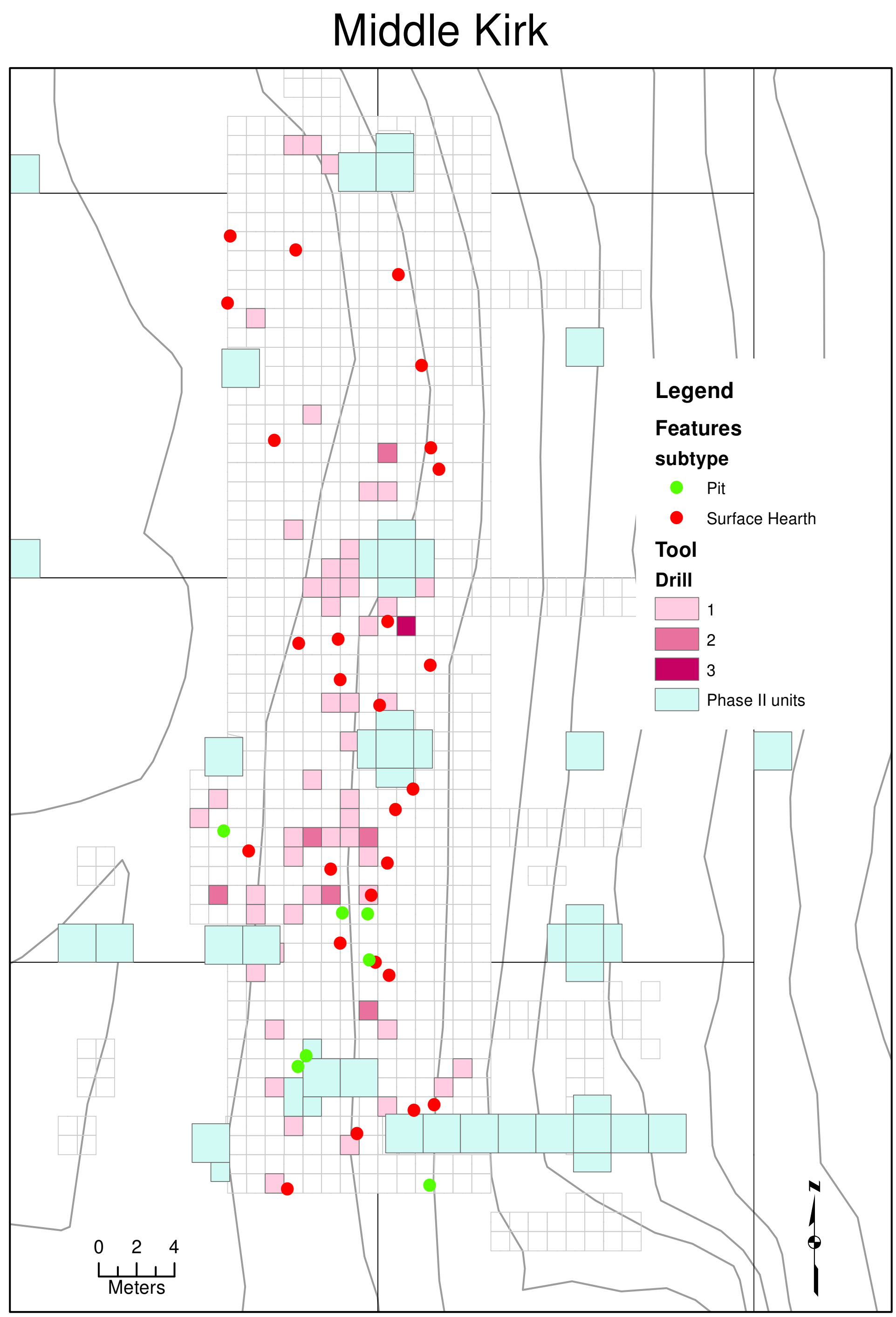

Figure 8.13. Middle Kirk drill density map.

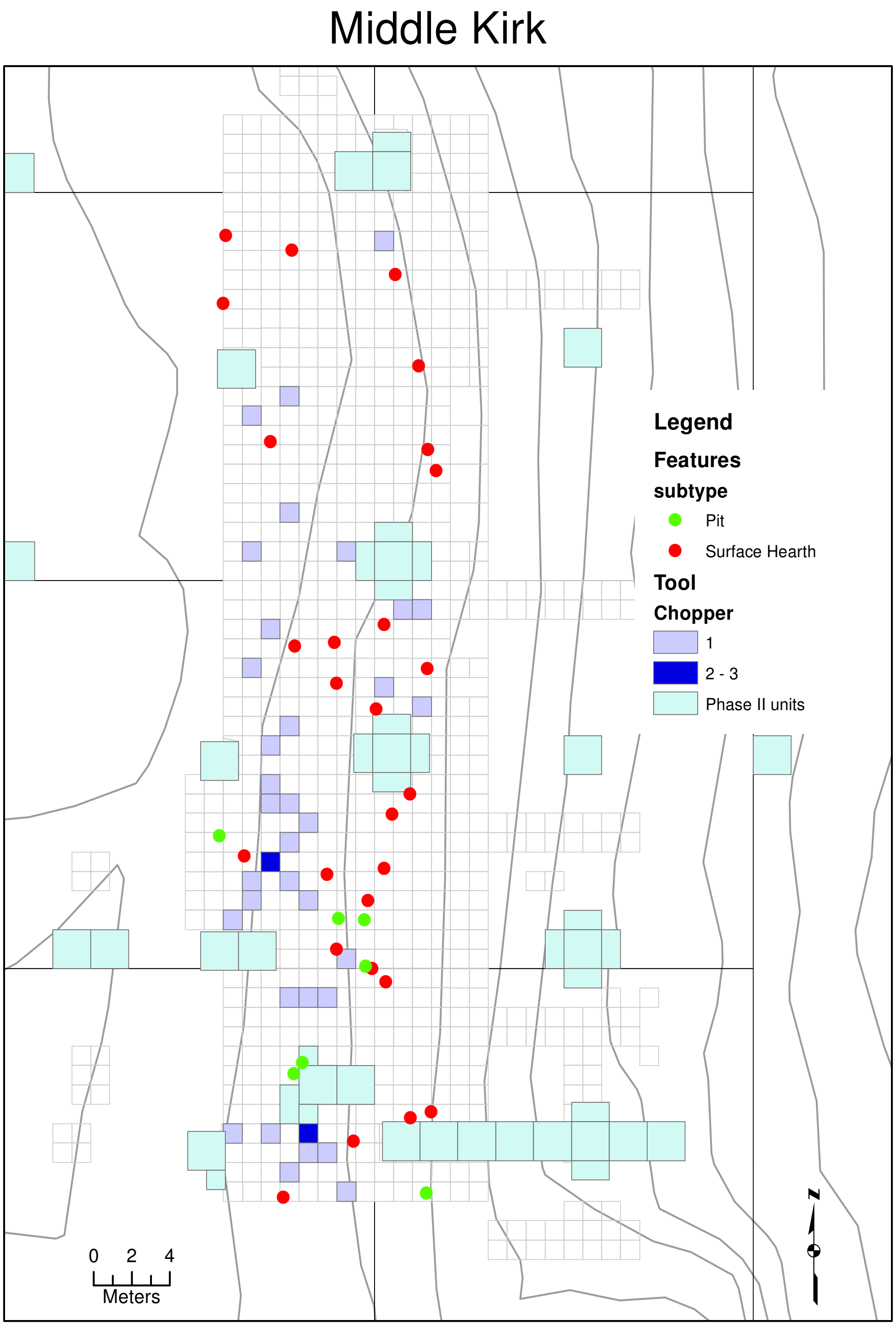

Figure 8.14. Middle Kirk chopper density map.

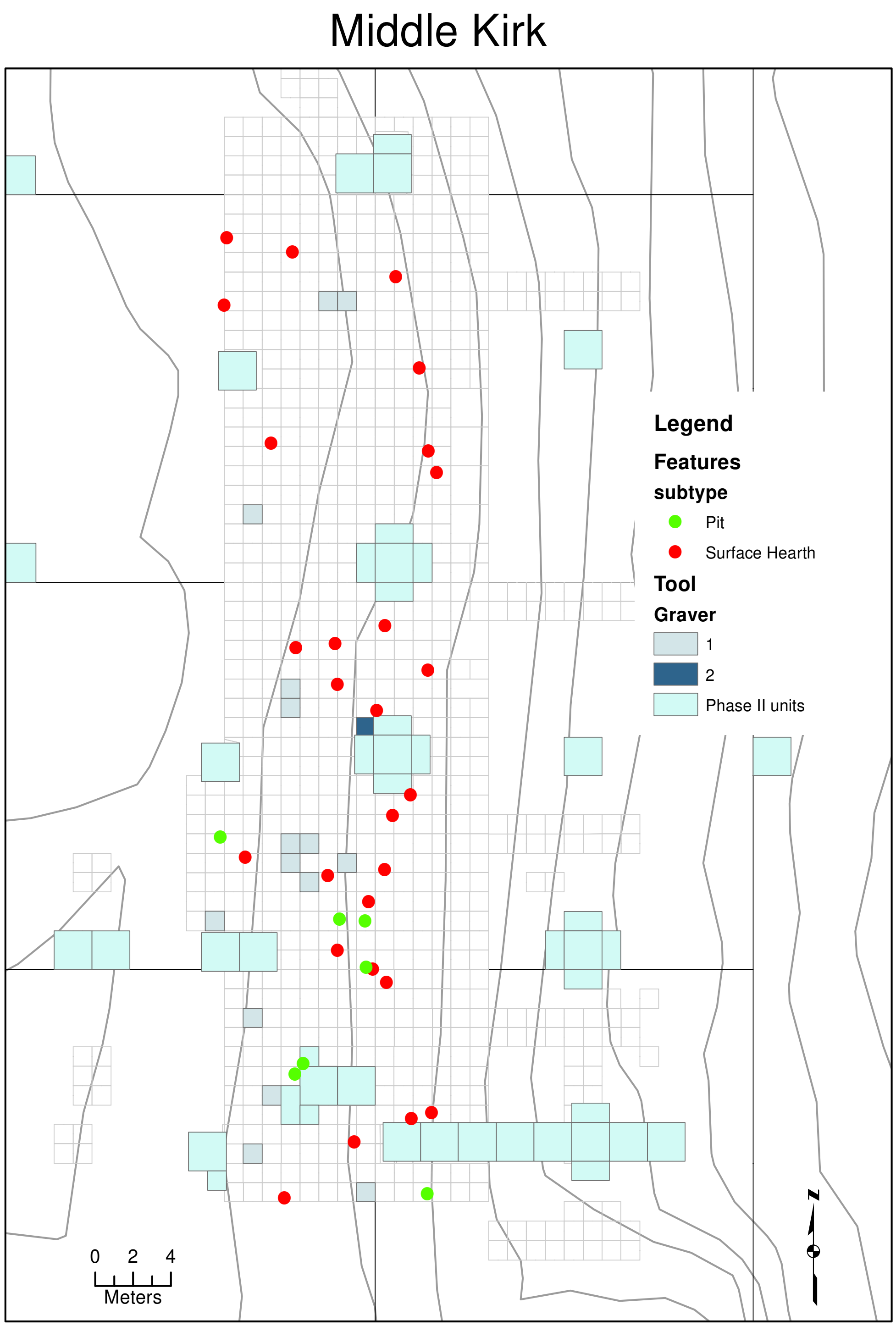

Figure 8.15. Middle Kirk graver density map.

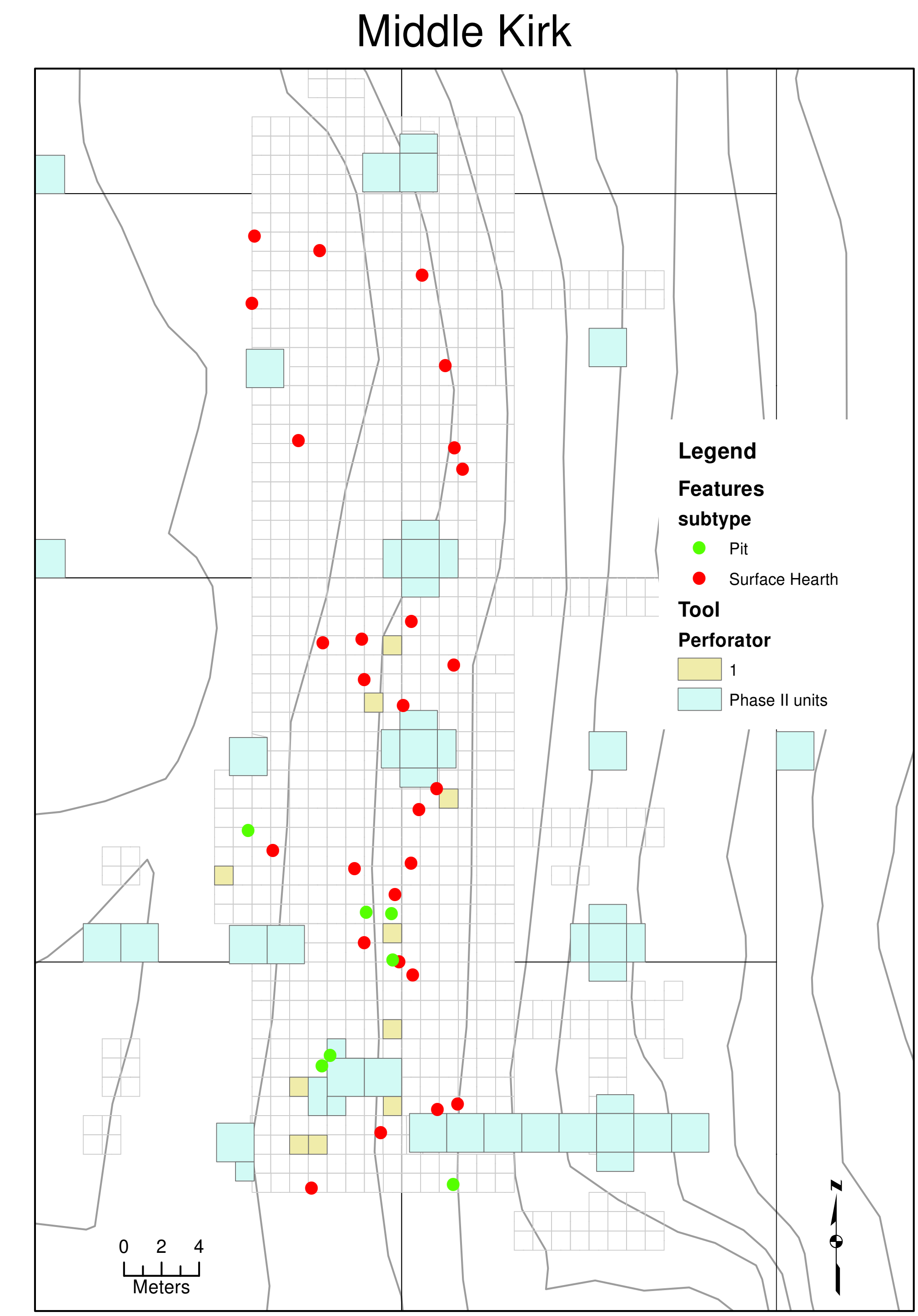

Figure 8.16. Middle Kirk perforator density map.

LOWER KIRK

The Lower Kirk is defined as a zone of unit/quad levels between 181 and 222 cm bd. The amount of total debris drops off in the Lower Kirk zone, although the number of features is greater (n=119). Lithic scatters are less common, but a new class of feature—oxidized rings—that are unique to this zone become the most abundant feature type. Twice as many pits are also present in the Middle Kirk zone. In addition, features are more evenly distributed north to south in the Main Block. There are three main clusters of surface hearths (Figure 8.17). The northern most cluster (A) is composed of five hearths plus two isolated features 6-7 meters away from the cluster. In the central portion of the block are two hearth clusters (B, C) composed of five and six hearths respectively. There are several other isolated hearths or hearth pairs further south. The hearths in the three clusters appear to be on the same geomorphic surface but there are a few features of this type that are at a greater depth (>220 cm bd) that are probably on an earlier surface.

Most of the oxidized rings appear to be on the same surface as the three surface hearth clusters. There are five clusters of features. The northern most two (1, 2) clusters and southern most (5) are loosely associated in a rough arc 4-6 meters across. Clusters 3 and 4, which are adjacent to one another, form tight arcs of 8 and 9 features respectively. Each arc is about 4 meters across.

The distribution of debitage by weight (g) is shown in Figure 8.18. Debitage tends to be more evenly distributed through the Main Block, with significant concentrations in the north that were absent in the Middle Kirk zone. One of the heaviest concentrations is in the far south of the block, southeast of a cluster of oxidized rings. This concentration is 8-10 meters across both north to south and east to west. Most of the other surface hearth or oxidized ring clusters are associated with higher densities of debitage. The average quad density is 571.5 g, which is far less than the Middle Kirk zone of 1369 g.

Tools (Figure 8.19) have a similar wide spread spatial distribution in the block. There is a heavy concentration of tools that coincides with the debitage concentration in the south, but equally heavy concentrations are present in the northern portion of the block. Again tool density in the Lower Kirk is substantially less than in the Middle Kirk zone with an average of four tools per quad versus nine tools in the Middle Kirk.

As in the Middle Kirk zone, bifaces are the most numerous tool type and their distribution coincides with the overall pattern of all tools as would be expected. So unlike in the Middle Archaic bifaces are distributed along the entire length of the block and are associated with each of the major feature clusters described previously (Figure 8.20). Although the total number of bifaces recovered is only a third of that from the Middle Kirk zone there are still more than 800 bifaces present. The maximum number recovered from a quad is 11 while the average is two bifaces compared to five in the Middle Kirk zone.

Again about a third fewer points were recovered from the Lower Kirk than in the Middle Kirk zone (n=360). As illustrated in Figure 8.21 there are four to five areas with point concentrations distributed north to south in the Main block. These concentrations are generally correlated with the high density areas of other tools and debitage.

As with other tool types, cores are less numerous in the Lower Kirk compared to the Middle Kirk zone. They are fairly evenly distributed in the Main Block (Figure 8.22).

Scrapers are almost twice as numerous as cores but have a similar spatial distribution (Figure 8.23). They are again evenly distributed among the feature clusters and along the entire north-south length of the block.

Adzes follow a strikingly similar spatial pattern to scrapers and cores (Figure 8.24) with an even north to south distribution. Drills (Figure 8.25), although far less numerous (n=28) are again evenly distributed throughout the block. Rarer tools like choppers (Figure 8.26) or gravers (Figure 8.27) are more evenly distributed as might be expected. Choppers were not recovered in the far north of the block or the far south. Gravers were mostly found in the highest debitage and tool density areas in the central part of the site, only one was recovered from the north and none were found in the far south of the block.

KIRK SECONDARY TRASH

A significant deposit of Kirk age debris is present on the slope of the early Holocene bank of the Ohio River to the east of the main Kirk habitation areas. This deposit was sampled using a series of five hand excavated trenches composed of four 2x2 meter units (Figure 8.28). A similar trench was also excavated in the Phase II (10N trench).

Only four features were exposed in this area of the site. These features consist of two lithic scatters, a generalized debris scatter and a basin hearth. The hearth underlies the Kirk trash deposits and was dated to 9420 ±100 rcybp indicating that trash deposition was initiated sometime after that point. The trash deposit cannot be linked stratigraphically to any of the Kirk zones on the crest of the levee. The charcoal flecking that visually identifies the deposit in trench walls cannot be traced to the top of the bank. Refitted biface fragments indicate, however, that artifacts were discarded on the bank during both the Middle and Lower Kirk occupations.

Figure 8.28 illustrates the variation in debitage density in both the Phase III and Phase II trenches. The heaviest debitage density occurs in the Phase II 10N trench and in the Phase III 16N and 26N trenches. Debris density drops off significantly in the far northern trench (44N). Substantial amounts of debris are still present down slope in the southern most of the trenches (5N) and in the 38N trench as well. The amount of debitage on the bank in the highest density trenches is the same order of magnitude as that recovered in the Middle Kirk zone.

Tools follow a similar distributional pattern (Figure 8.29). The greatest density of tools is associated with the 10N, 16N and 26N trenches, with slightly lower numbers in the 5N and 38 N trenches. As with debitage, far fewer tools were recovered in the

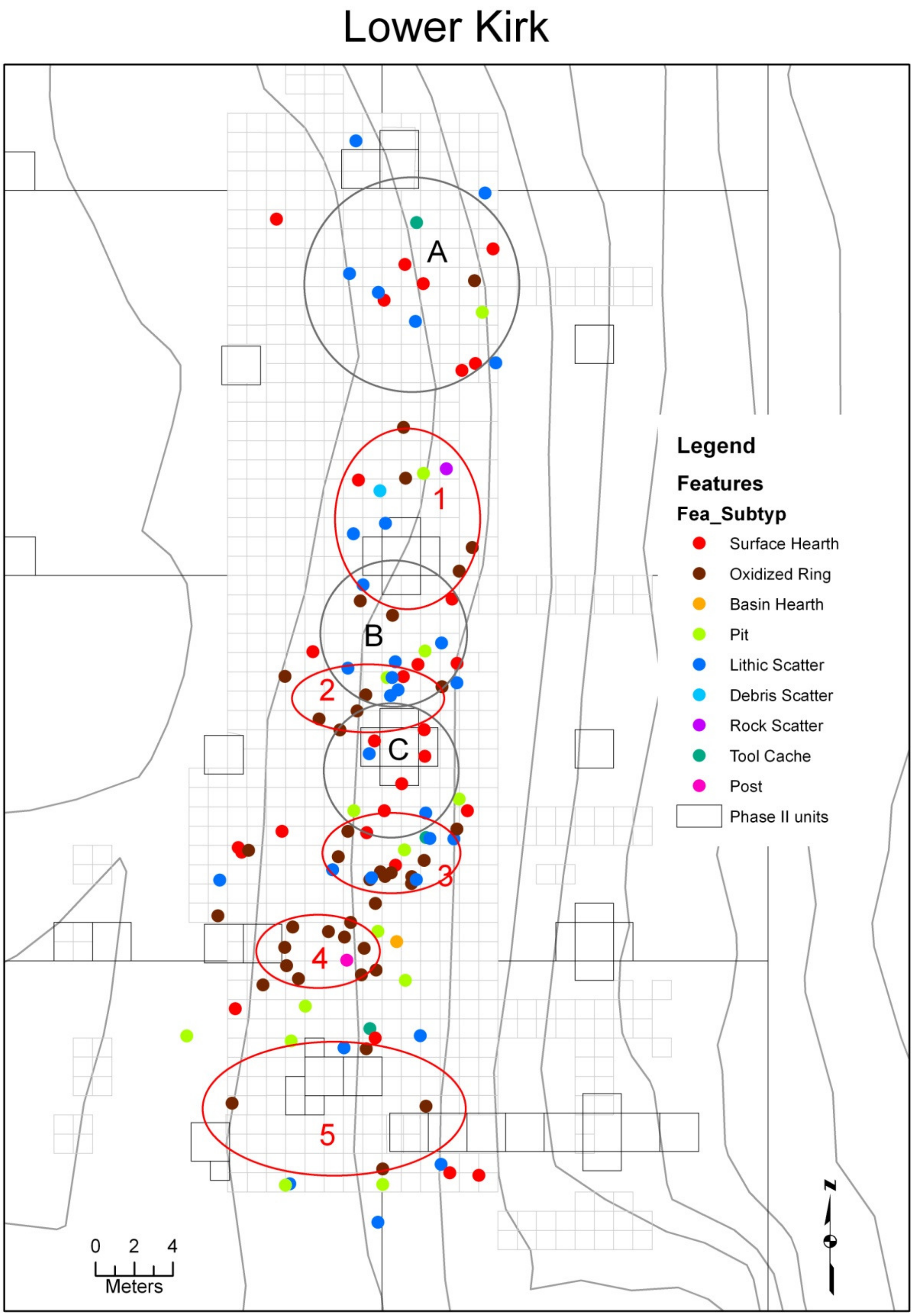

Figure 8.17. Lower Kirk feature distribution map with surface hearth clusters (A-C) & oxidized ring clusters (1-5).

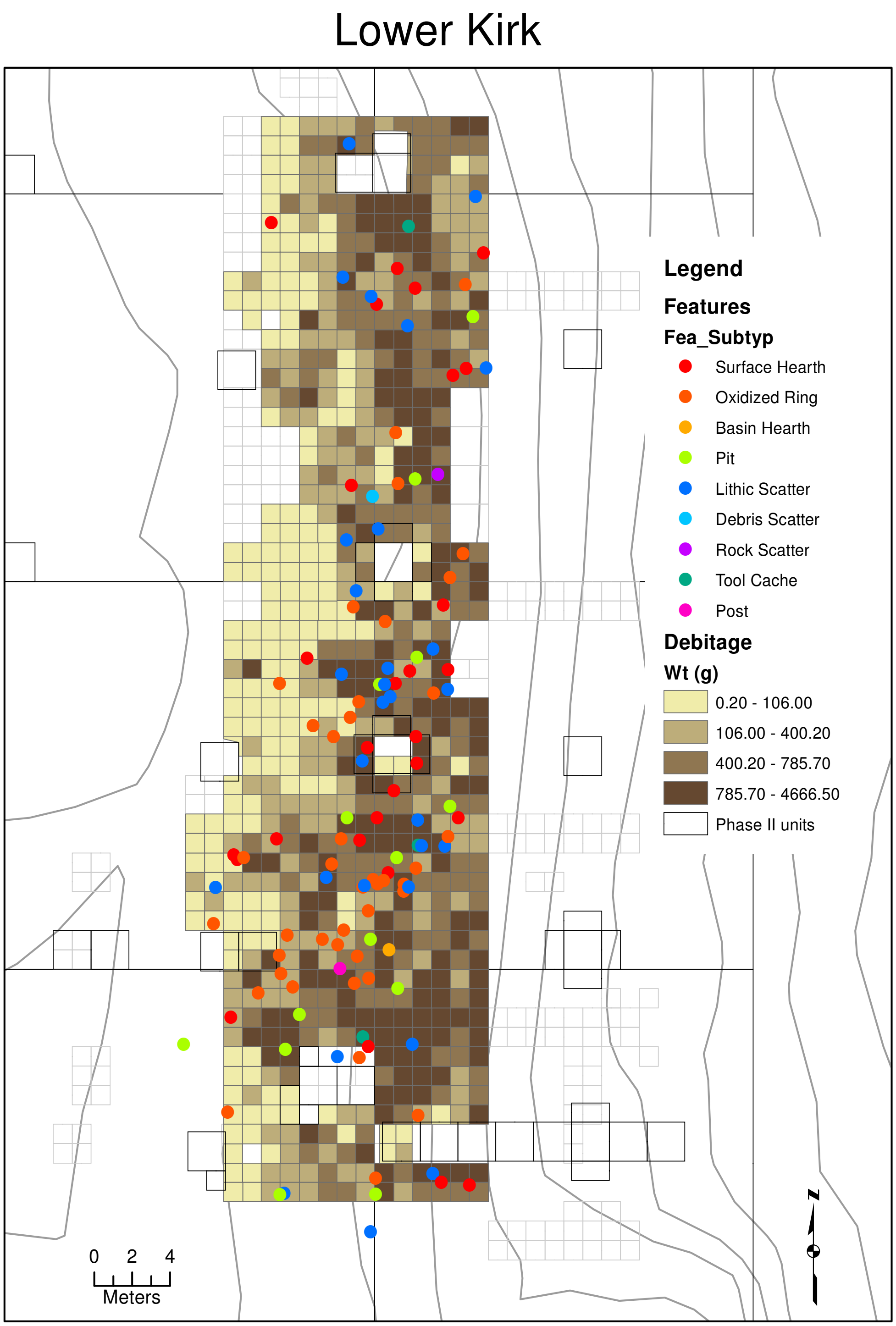

Figure 8.18. Lower Kirk debitage density map.

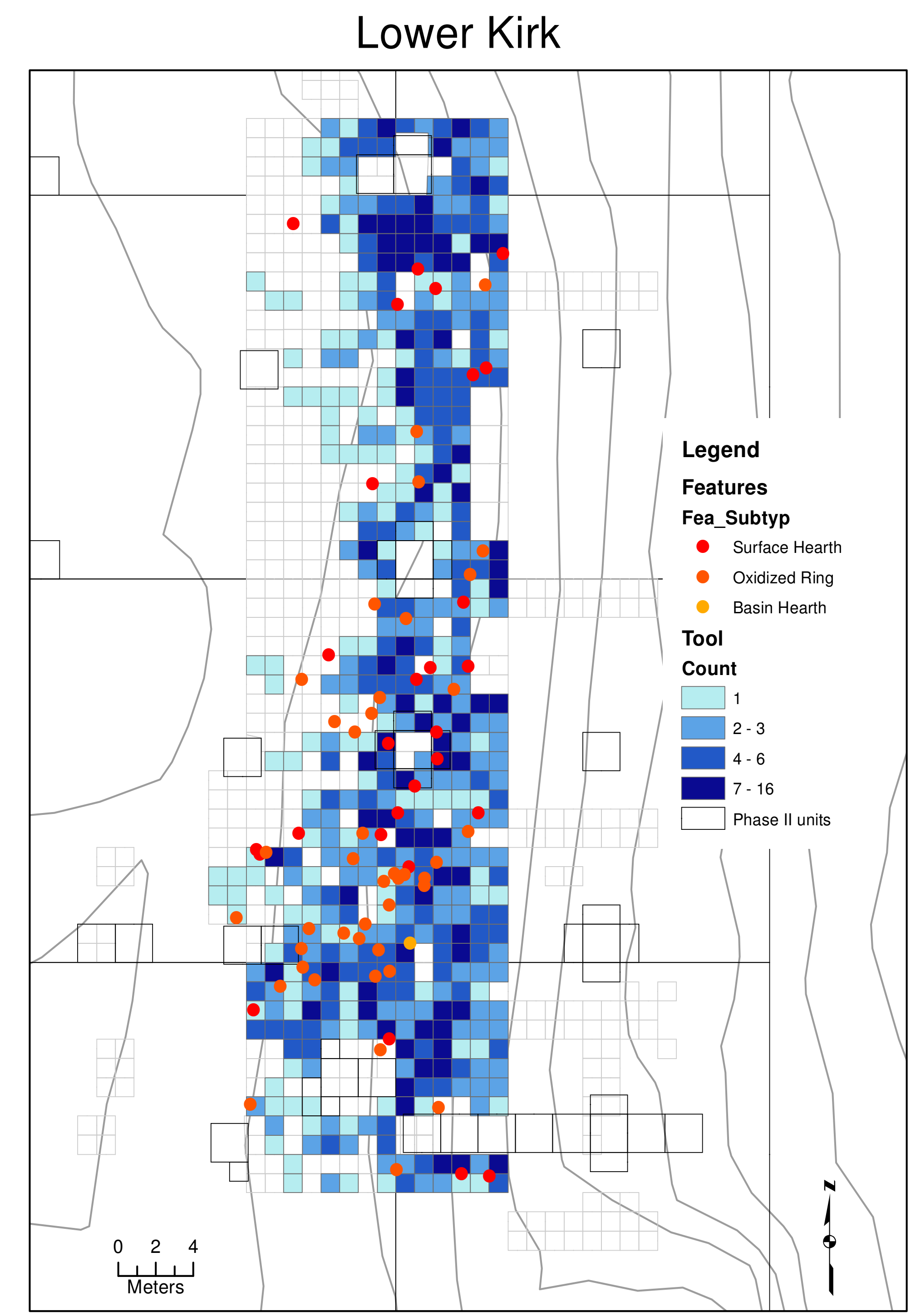

Figure 8.19. Lower Kirk tool density map.

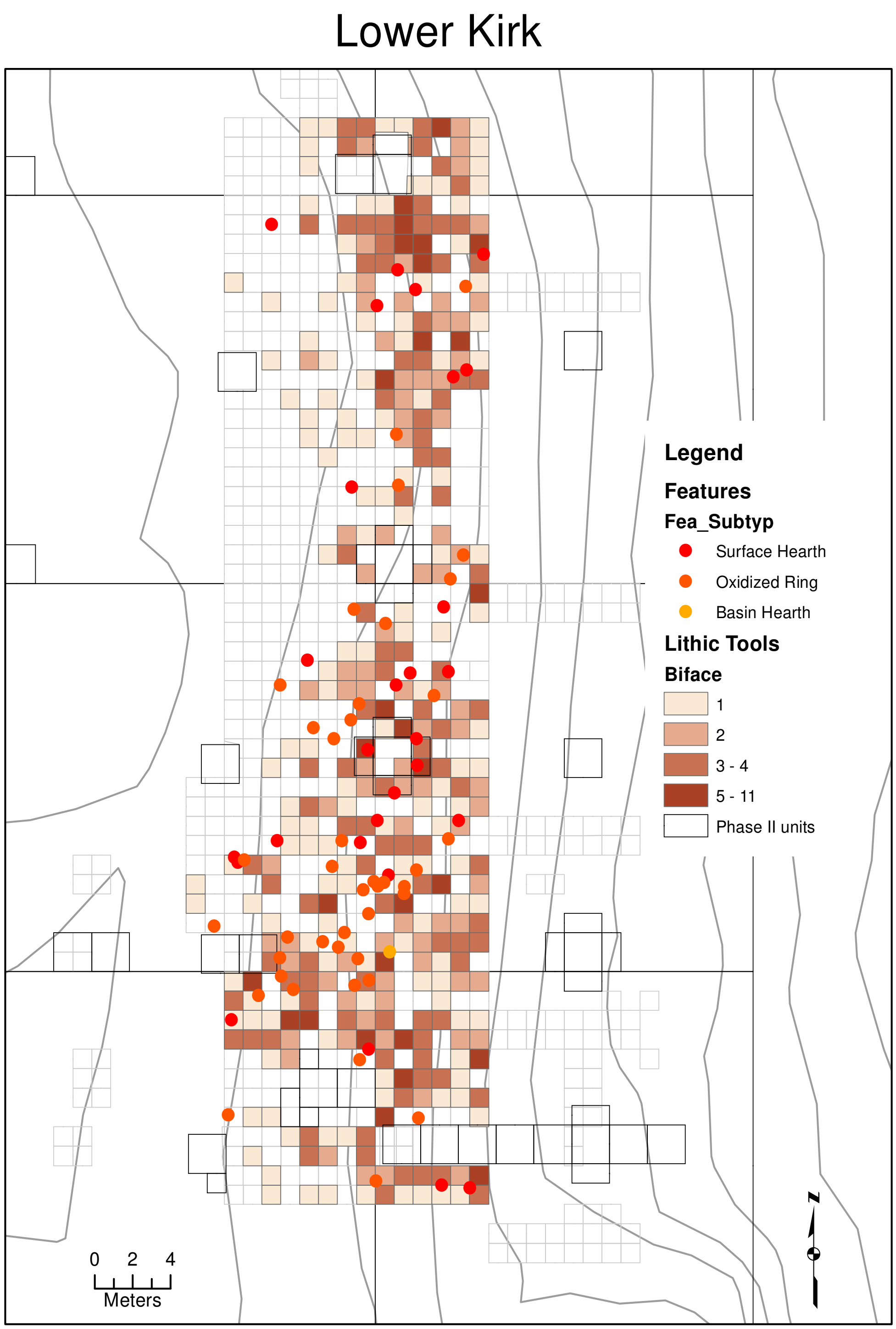

Figure 8.20. Lower Kirk biface density map.

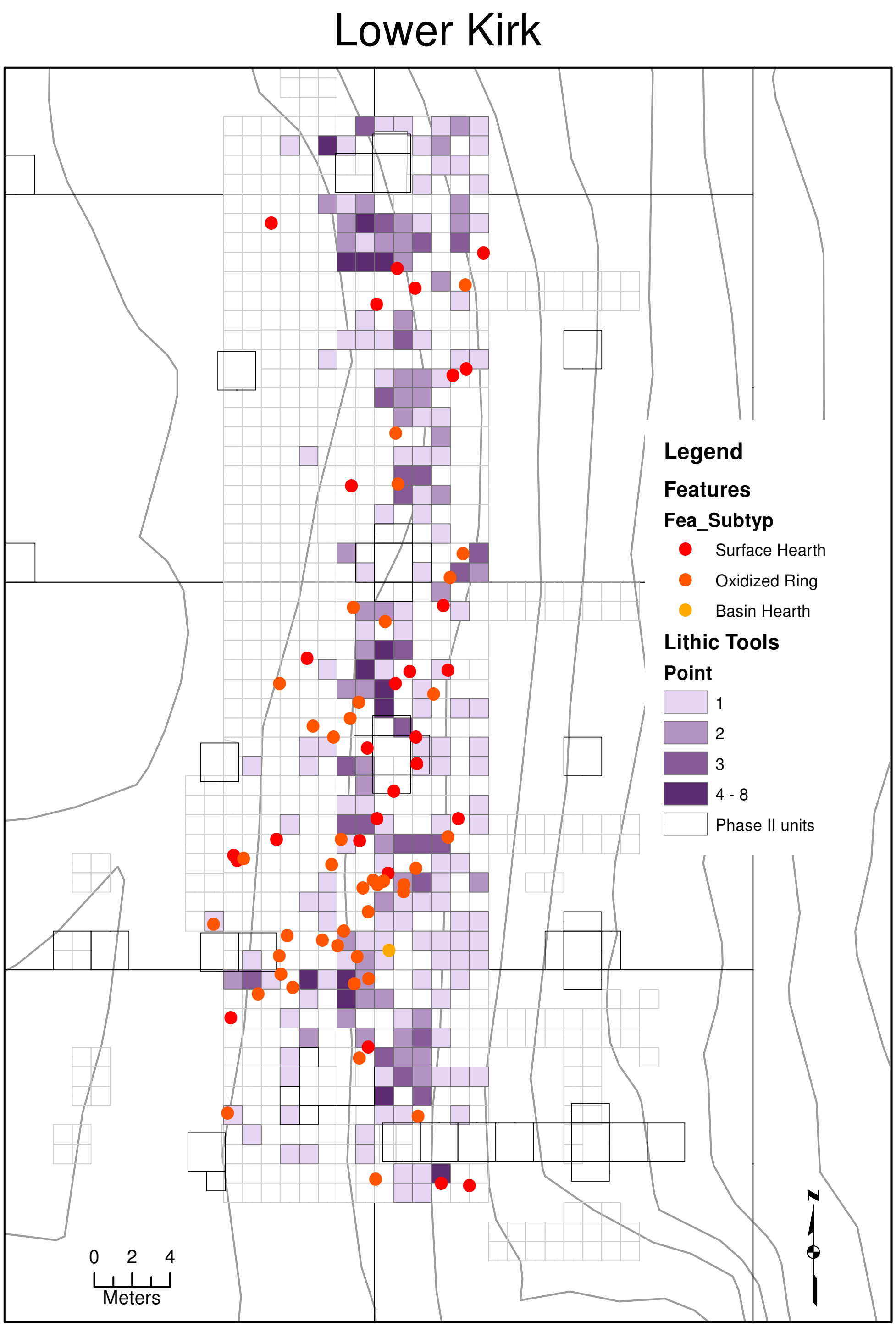

Figure 8.21. Lower Kirk point density map.

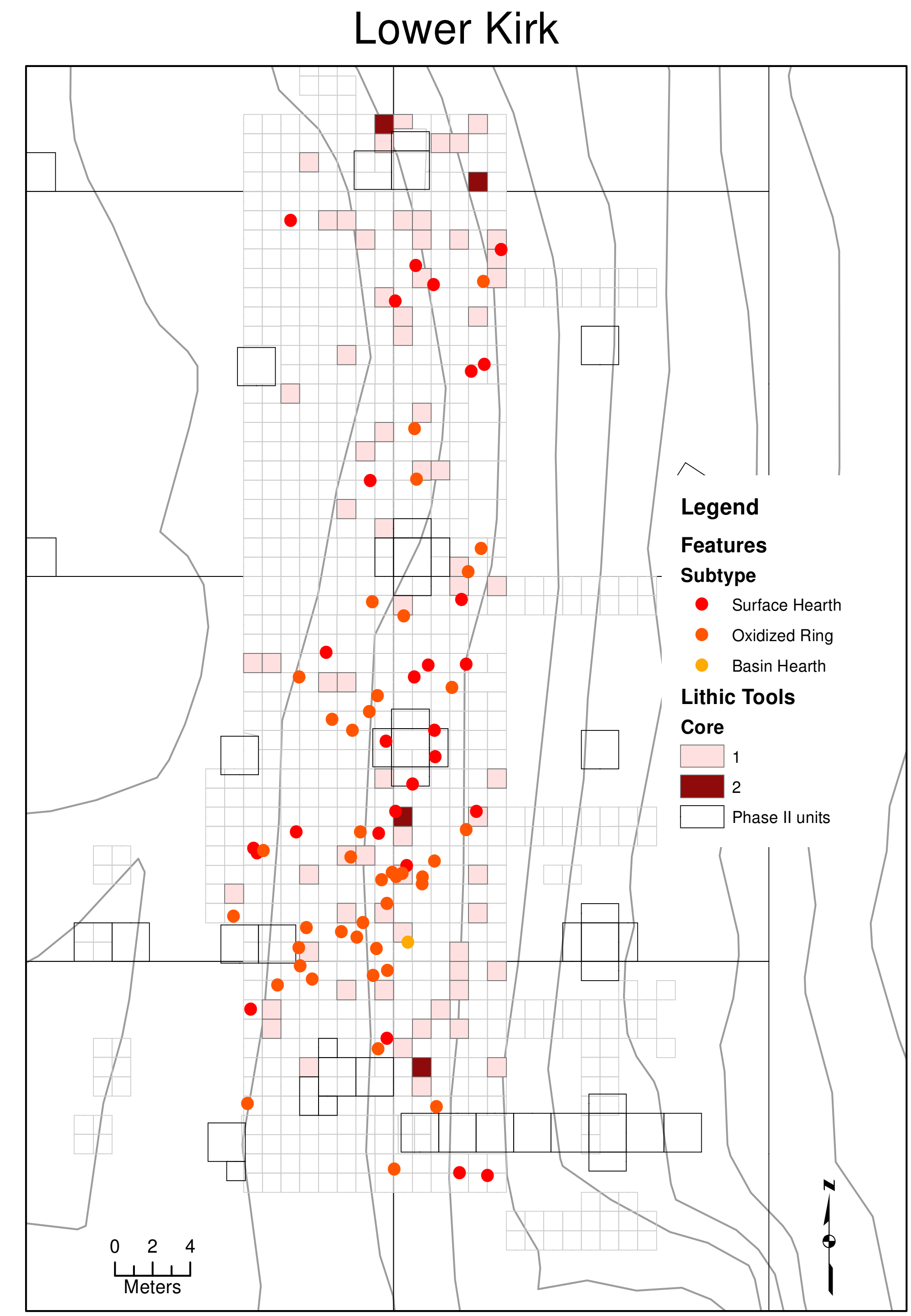

Figure 8.22. Lower Kirk core density map.

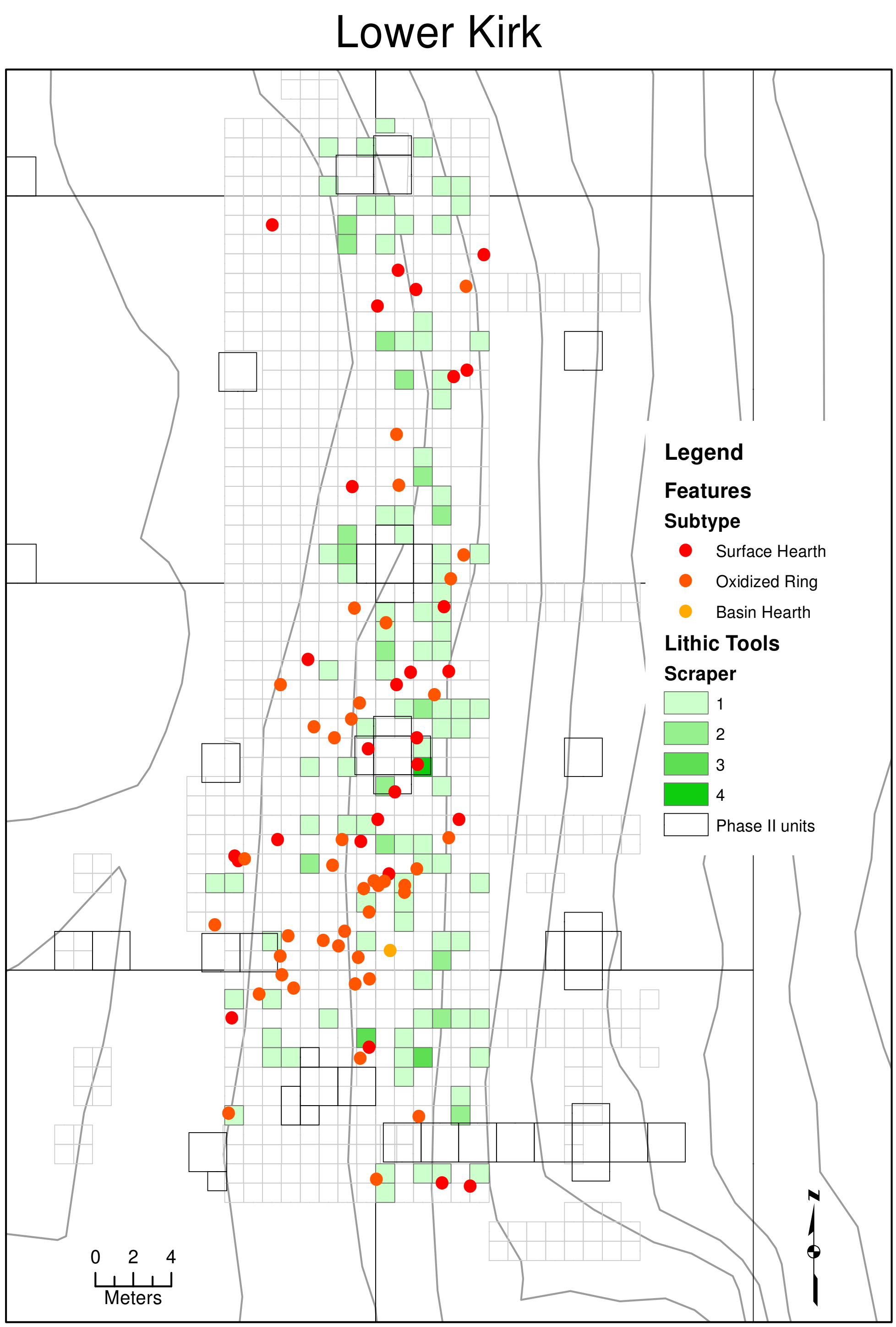

Figure 8.23. Lower Kirk scraper density map.

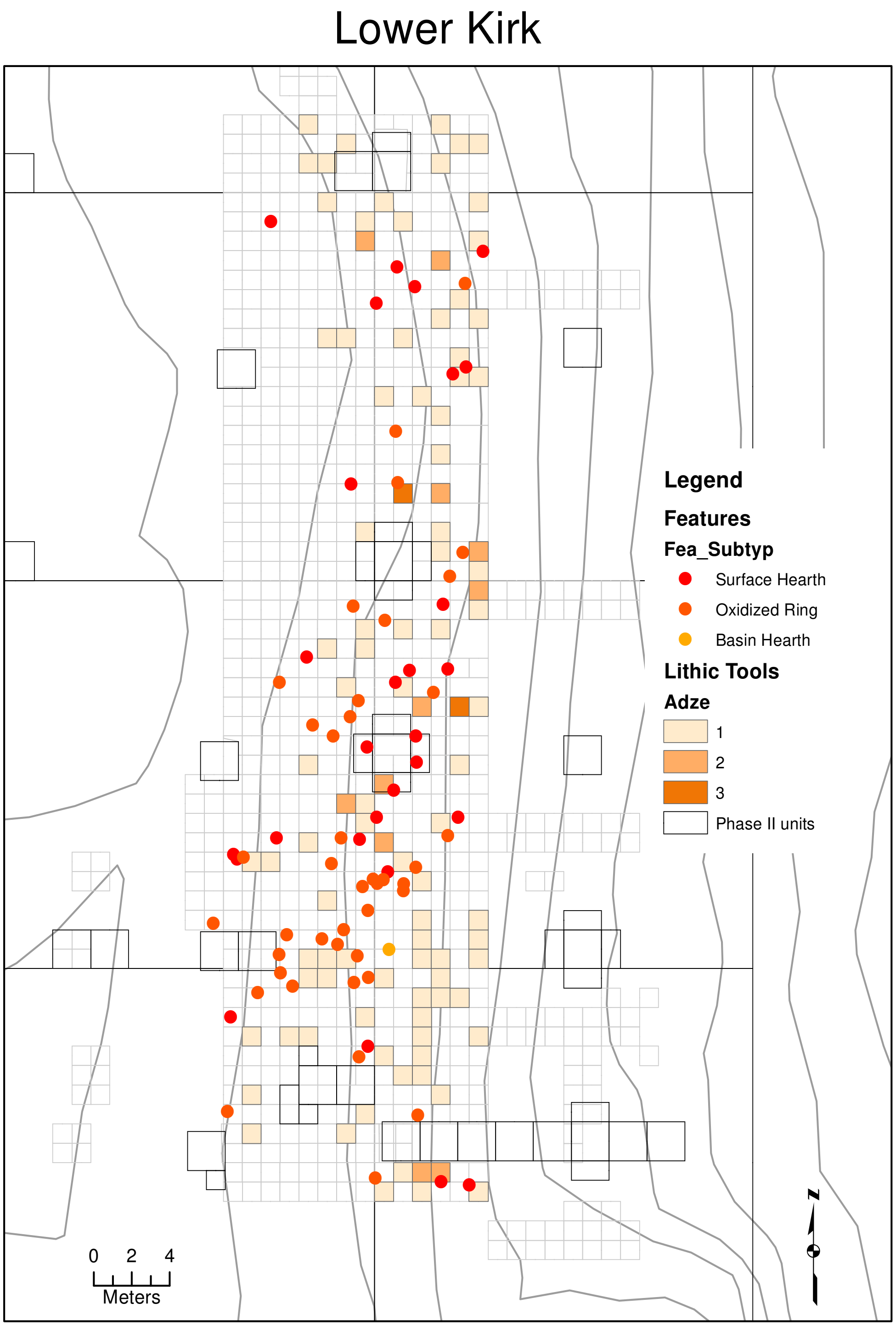

Figure 8.24. Lower Kirk adze density map.

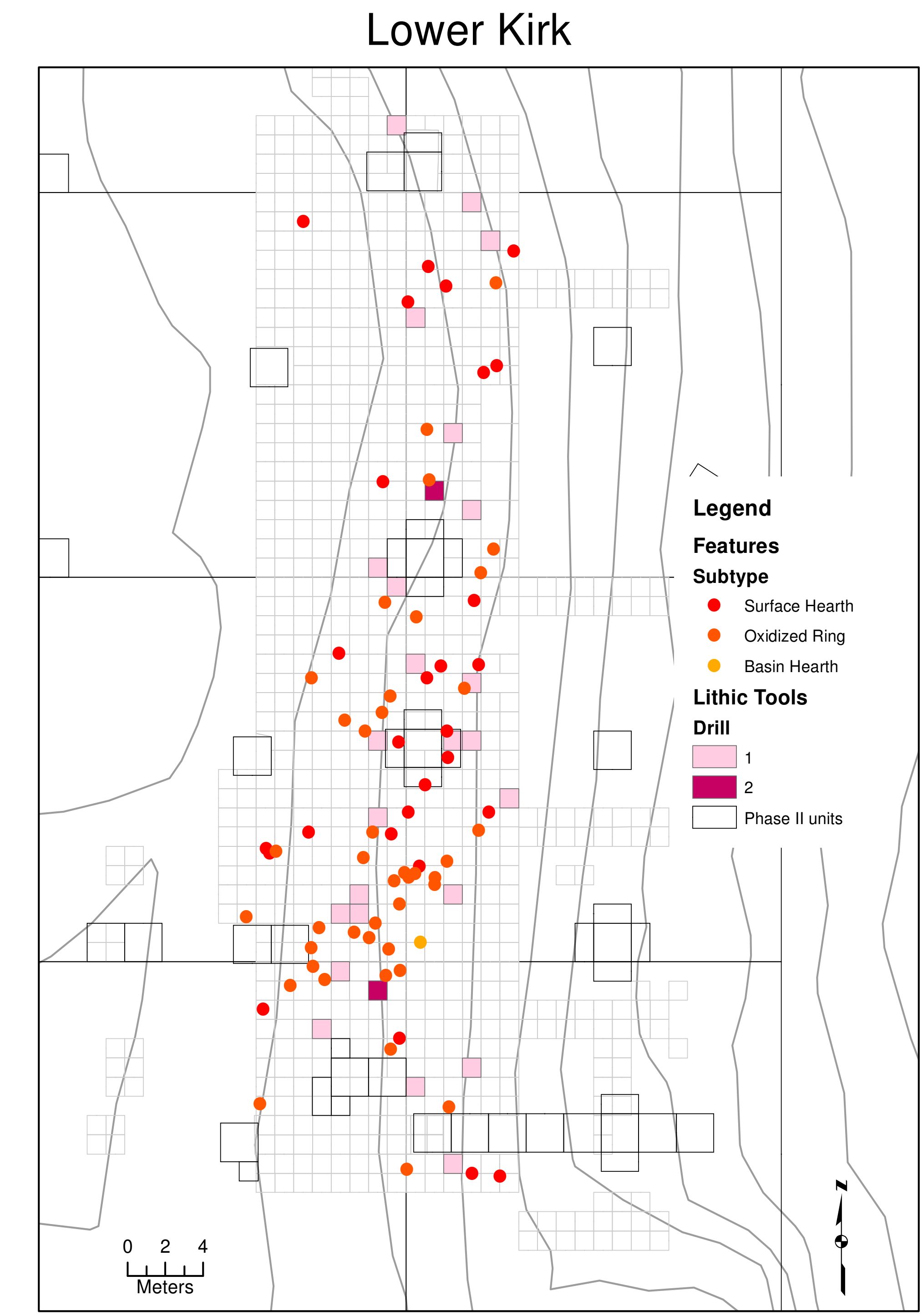

Figure 8.25. Lower Kirk drill density map.

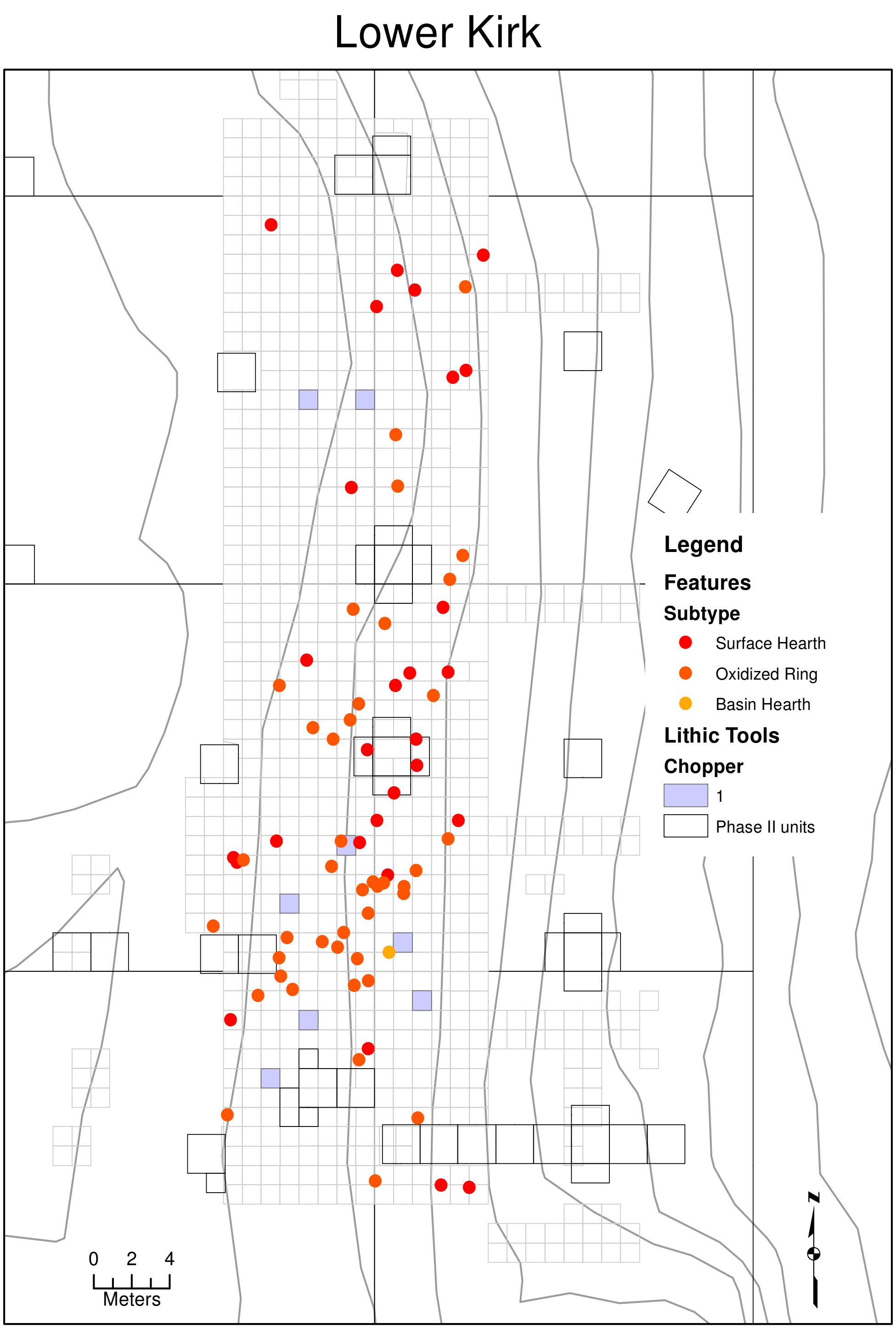

Figure 8.26. Lower Kirk chopper density map.

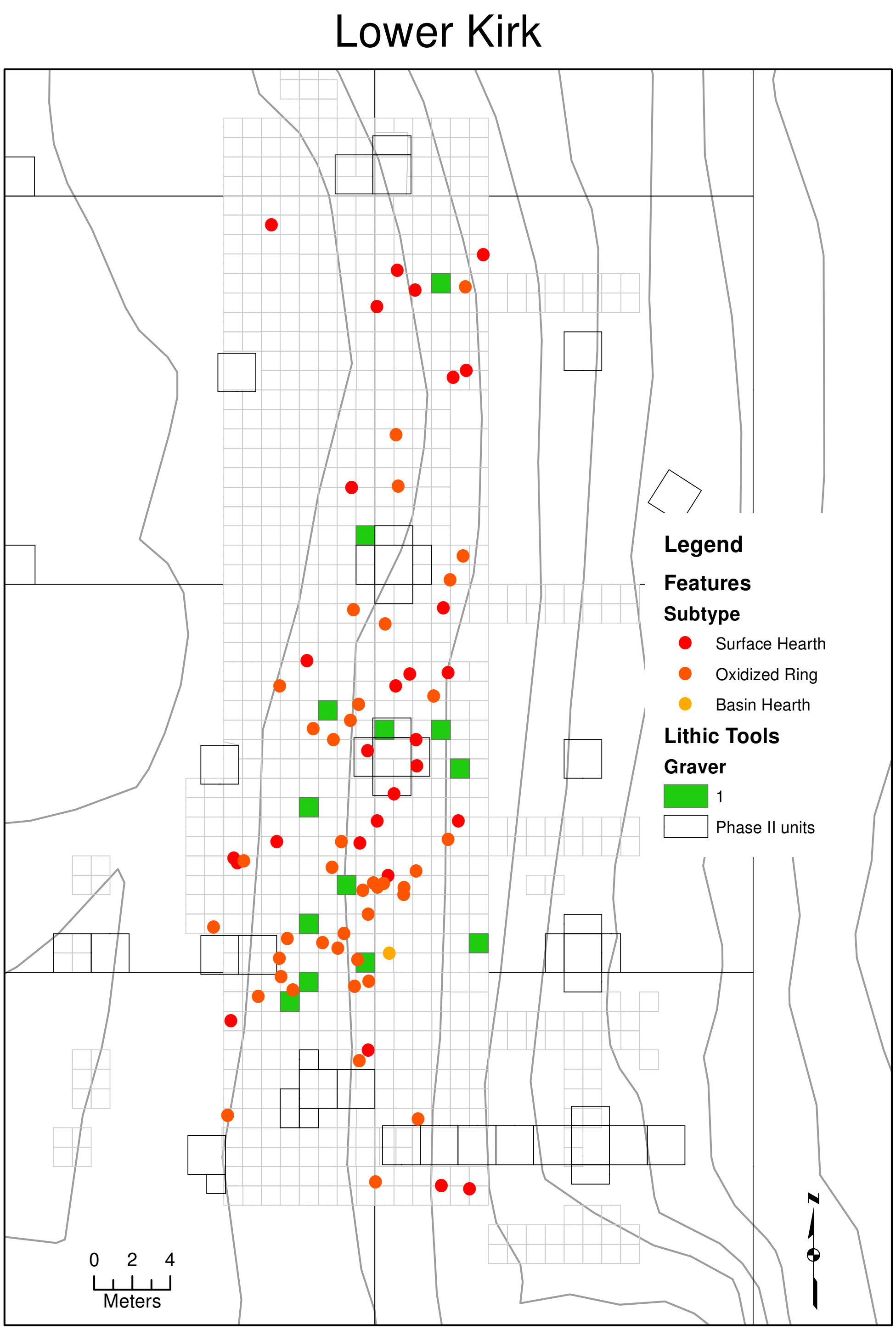

Figure 8.27. Lower Kirk graver density map.

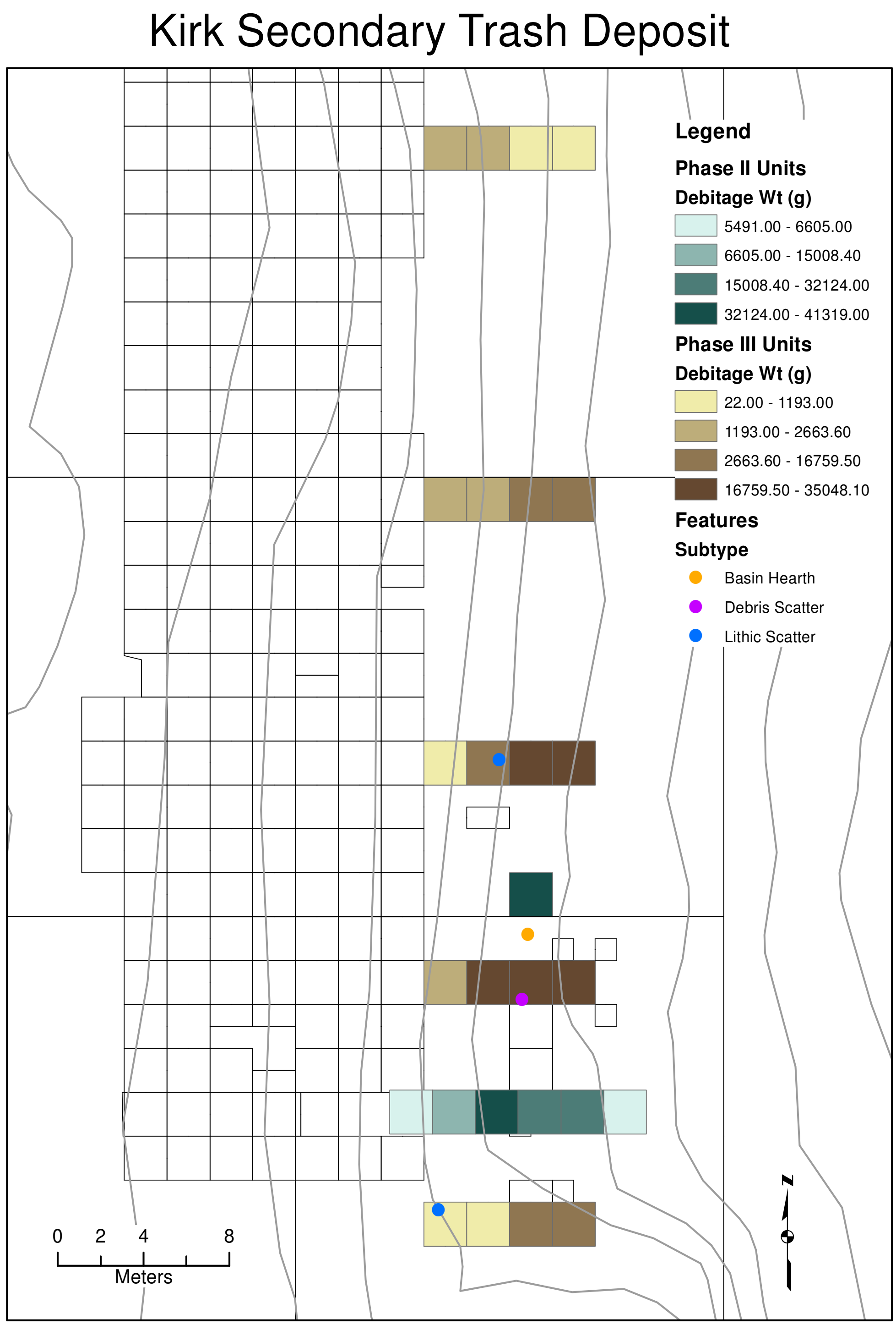

Figure 8.28. Kirk secondary trash debitage density map.

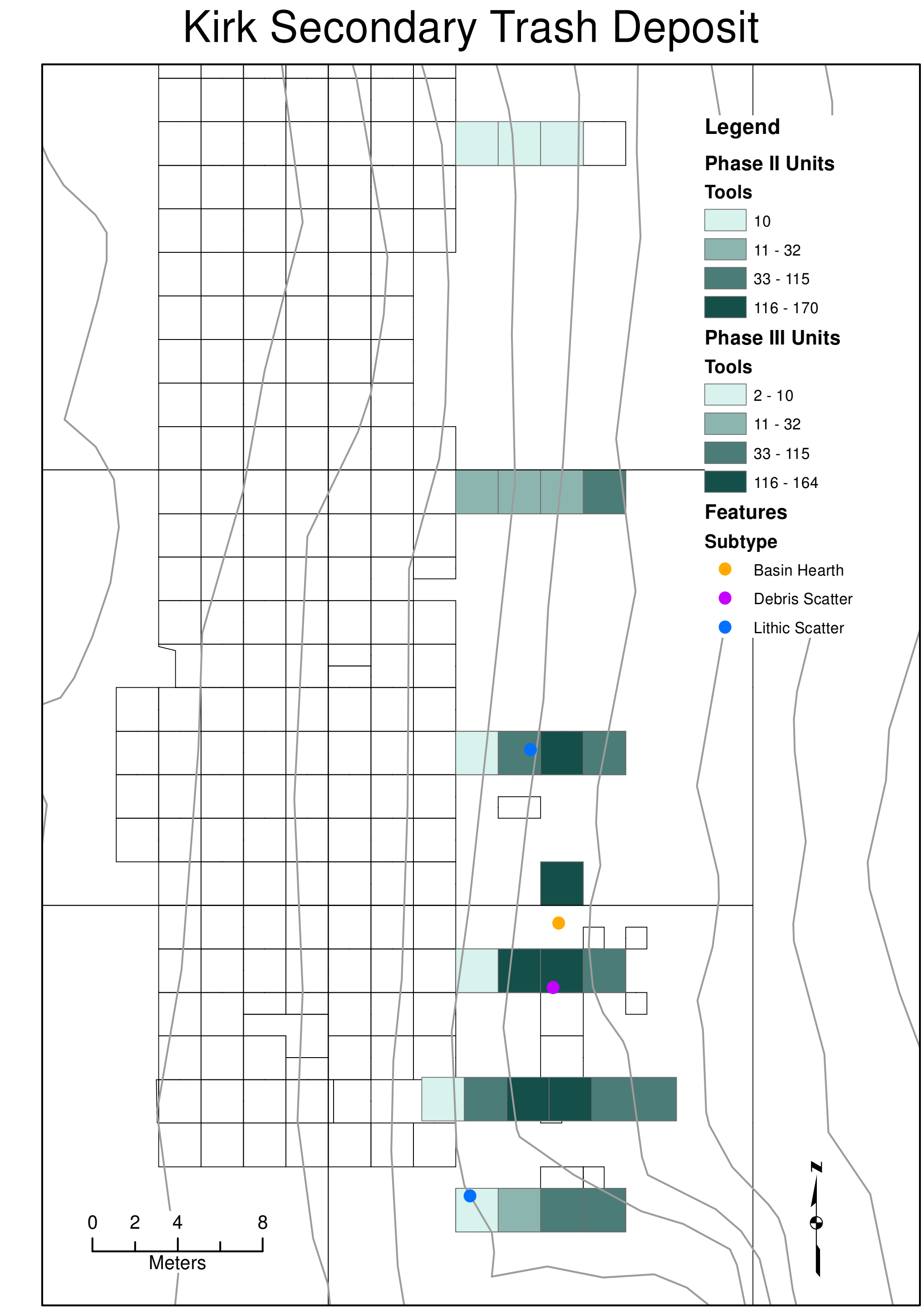

Figure 8.29. Kirk secondary trash tool density map.

northern trench (44N). Tool density is again the same order of magnitude as found in the Middle Kirk zone, where the largest numbers of tools were recovered on the bank crest.

If absolute debris numbers are any indication it would appear that much of the secondary trash deposit on the paleobank is the result of refuse disposal during the Middle Kirk occupation (at least in the southern two-thirds of the block). Lithic reduction and retooling appear to have been a primary activity during this occupation and much of the refuse generated was picked up and cast down the bank slope. The charcoal observed in the secondary deposit, however, might be the result of charcoal disposal from features like the oxidized rings in the Lower Kirk zone. As noted previously, biface fragments from the bank were refitted with other fragments located in both the Middle and Lower Kirk zones, therefore refuse disposal on the bank was occurring during both occupations. It appears that trash in the 44N trench likely resulted from the Lower Kirk zone since there was considerable evidence of use in the northern part of the Main Block during the Lower Kirk occupation (and not for the Middle Kirk) and the debitage and tool densities in the Main block and in the trench are comparable.

THEBES

Three mini-blocks were hand excavated in the Thebes area that encompassed the lithic concentrations associated with the workshop areas to the west of the Main Block. A Phase Ic trench impacted one of the lithic scatters. Four Phase II units had partially exposed this occupation and are incorporated into the analysis by standardizing the debitage density by area (m^2). Figure 8.30 is a plot of the ten lithic scatters that were defined as features in the Phase III excavations. One small shallow pit was also identified. All but two of the features are potentially contemporaneous. F-WT6 underlies F-WT5 and F-WT14 is substantially deeper (20 cm) than the other scatters in the same block (Figure 8.30). These features appear to represent discreet knapping events preserved in the low energy overbank sediments. The three largest of the features are oval to circular in shape and about one and a half to two meters in diameter.

Figure 8.31 maps the density of debitage by weight (g) in the Phase III quads and Phase II units. In block A unit/quad debris density is highest around F-WT13, but very high densities are in the two Phase II units to the north (these may represent other lithic scatters that were not defined as features in the Phase II—see Chapter 4). In Block B debitage density is highest near features and tails-off as one moves away from them. Roughly the same pattern is seen in Block C, although there are very high density quads to the south of the F-WT9, a very small scatter of flakes. Very little debitage is present in isolated quads or units between the blocks. Overall the average density is slightly less than the Lower Kirk zone (405 vs 571 respectively), but the maximum is slightly larger (4969 vs. 4666 respectively).

Hardstone artifacts recovered from both unit/quads and features are shown in Figure 8.32. For the most part these tools cluster in and around the lithic scatters. A couple of exceptions are in the northeast corner of Block C. Figure 8.33 maps the distribution of hammerstones. They are most common in the lithic features, but are also nearby features.

Chipped stone lithic artifacts (including cores) are much more abundant (Figure 8.34) and have a wider spatial distribution. In general these artifacts are more likely to be found in or near a feature than away from one. The distribution of cores is illustrated in Figure 8.35. Again, features generally contain the largest numbers along with a few units/quads. Isolated cores (i.e., n=1) are somewhat more scattered but are also more than likely to be located near the lithic scatters. Bifaces (Figure 8.36), although more abundant, follow a similar spatial pattern of association with lithic scatters.

In summary, the Thebes workshop is characterized by a series of lithic scatters that represent discreet knapping episodes. The vast majority of the debiatge and lithic tools are Muldraugh chert, which outcrops in the nearby bluffs. In general the debitage, hardstone tools including hammerstones, and bifaces are closely associated with the lithic scatters identified.

ST. CHARLES

In the Main Block the St Charles occupations underlies the Kirk zone between about 200 to 400 cm bd. On the plaeobank of the Ohio River this component is found between about 400 and slightly over 500 cm bd. The St. Charles was discovered during the Phase III investigations through bucket augering and micro artifact identification. Hand excavated units dug in quads were primarily used to expose this component. Thirteen features were identified consisting on nine lithic scatters, three shale rock scatters, and one surface hearth (Figure 8.37). The rock scatters are in the central portion of the Main Block and probably lie on the same sloping geomorphic surface. Three of the clusters of five lithic scatters at the south end of the block are probably on the same surface. One is much higher and one is too deep to be associated. It is difficult to determine the relationship of the two lithic scatters to the west of the Main Block to the feature cluster. A surface hearth and lithic scatter are clearly associated with one anther in the 5N Trench.

Debitage density is shown in Figure 8.37. The highest densities are near the lithic scatters and hearth/lithic scatter pair. High densities are also present in the 16N Trench and associated units to the south, but no features were identified in this area. Moderate to low debitage densities are associated with the shale scatters and in other units in the central portion of the block. At the north end of the Main Block several higher density quads are present but again no features were identified. The average quad density was 72.06 g with a maximum at 2602 g. The average is even far less than the Upper Kirk zone (234.85), but the maximum value is actually somewhat larger.

Tools are fairly rare compared to debitage (Figure 8.38). Most of the tools are associated with the hearth/lithic scatter pair in the 5N Trench. Very few tools were recovered in association with the lithic scatter cluster and no tools were found at the far north end of the block. Bifaces are mapped in Figure 8.39. Most of these tools are in the 5N Trench and a few are associated with the rock scatters. None are present in association with the lithic scatter cluster, although one graver and one core were found in these features. Points are rare (Figure 8.40) but most are in the 5N Trench or associated with the rock scatters.

In summary, the St. Charles occupations are very ephemeral and probably reflect very short term occupations. The function of the shale scatters are unknown. The shale does not appear to have been heated. With one exception the other features are lithic scatters that reflect tool maintenance but limited tool discard. The surface hearth and lithic scatter in the 5N trench would have been near the river channel on a bar. The higher debitage density and number of tools along with a heating facility suggest a somewhat longer occupation (i.e., days vs. hours)

EARLY SIDE NOTCHED

The Early Side Notch component was primarily exposed by machine blading. A few units were established once features had been exposed or artifacts were observed, but the degree of hand excavation is much more limited compared to the other components. A total of 18 features were identified between 400 and 600 cm bd in the Main Block and 300 to 400 cm bd in the Western Terrace area of the site.

The vast majority of the features are surface hearths (n= 13) clustered in the northern half of the Main Block (8.41). Differences in depth and some superpositioning of features indicates a number of geomorphic surfaces are represented in this area. All are sloping quite dramatically toward the river channel and erosional rilling is evident. Features in other parts of the block are at depths up to 661 cm bd.

Debitage is mapped in Figure 8.41. The hearth at the far south end of the block and two lithic scatters have relatively high debitage densities. This is also the case in the middle of the block and at the far north end. No features are in association with these units. Overall, the average lithic density by weight is the lowest of all of the components at 44.11 (not quite half of that in the St. Charles). The maximum density of 1775 g is comparable to the St. Charles (2602 g) component. Tools (Figure 8.42) are generally correlated with the high debitage units. Tools in association with the deepest hearth at the south end of the block include retouched flakes, a core, a hafted drill and point. Ten tools including points, bifaces, hammerstone, scraper, and pitted stone are associated with the northern most feature cluster, while the hearth cluster just to the south produced only a point and core and two manuports. In the western terrace a surface hearth to the south contained two pitted stones and in the units nearby two bifaces, an end scraper and a retouched flake were recovered.

In summary, the Early Side Notched component is the most ephemeral of all of the occupations at the James Farnsley site. Unlike the St. Charles and Thebes components heating facilities are the dominate feature type, although several lithic scatters are also present. As in the other components debitage and tool densities tend to be correlated with one another, but debris density was quite low compared to all of the other components at the site. With only a few hand excavated units any detailed conclusions about the spatial structure are difficult to make.

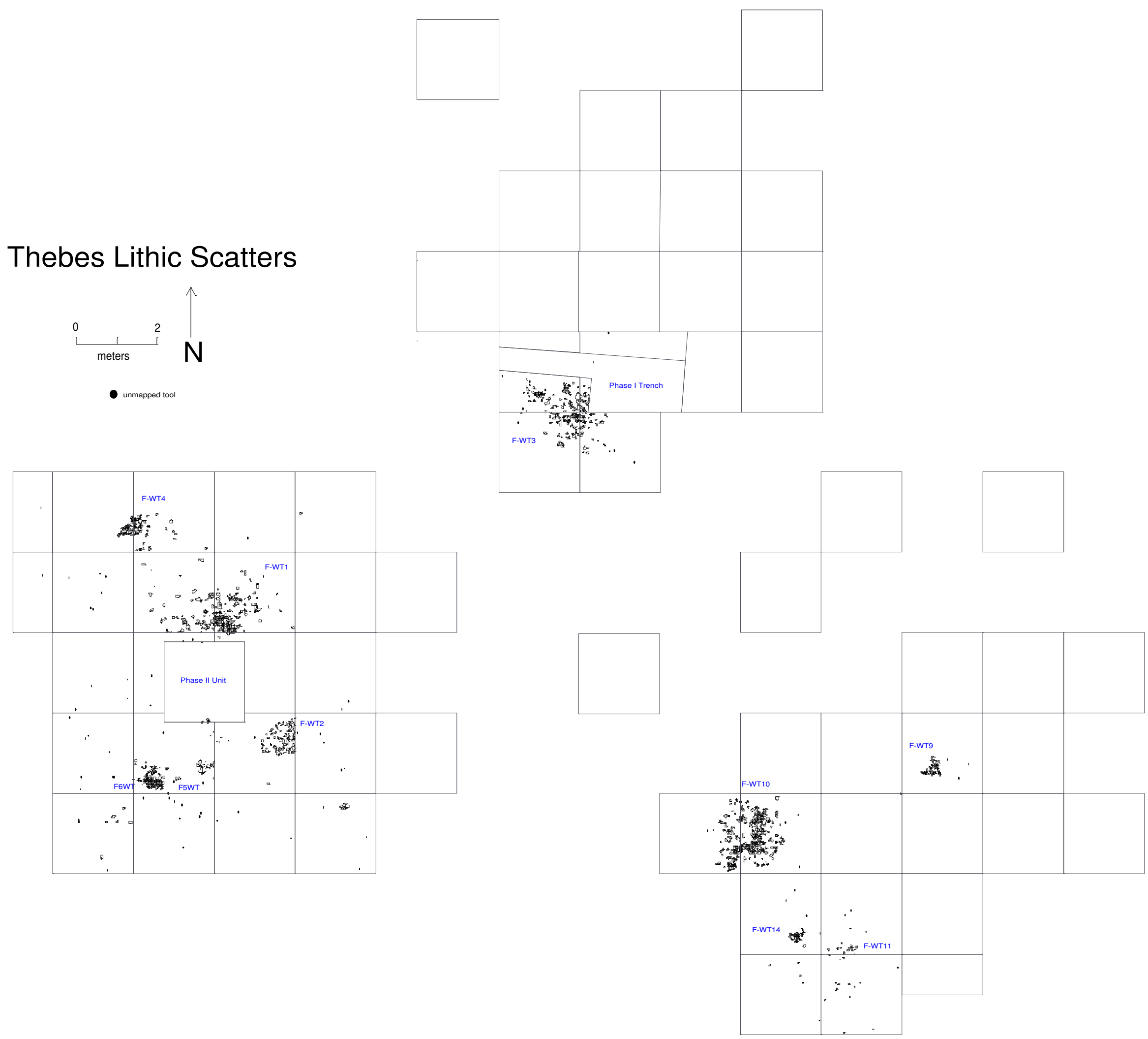

Figure 8.30. Map of Thebes lithic scatters in Western Terrace area.

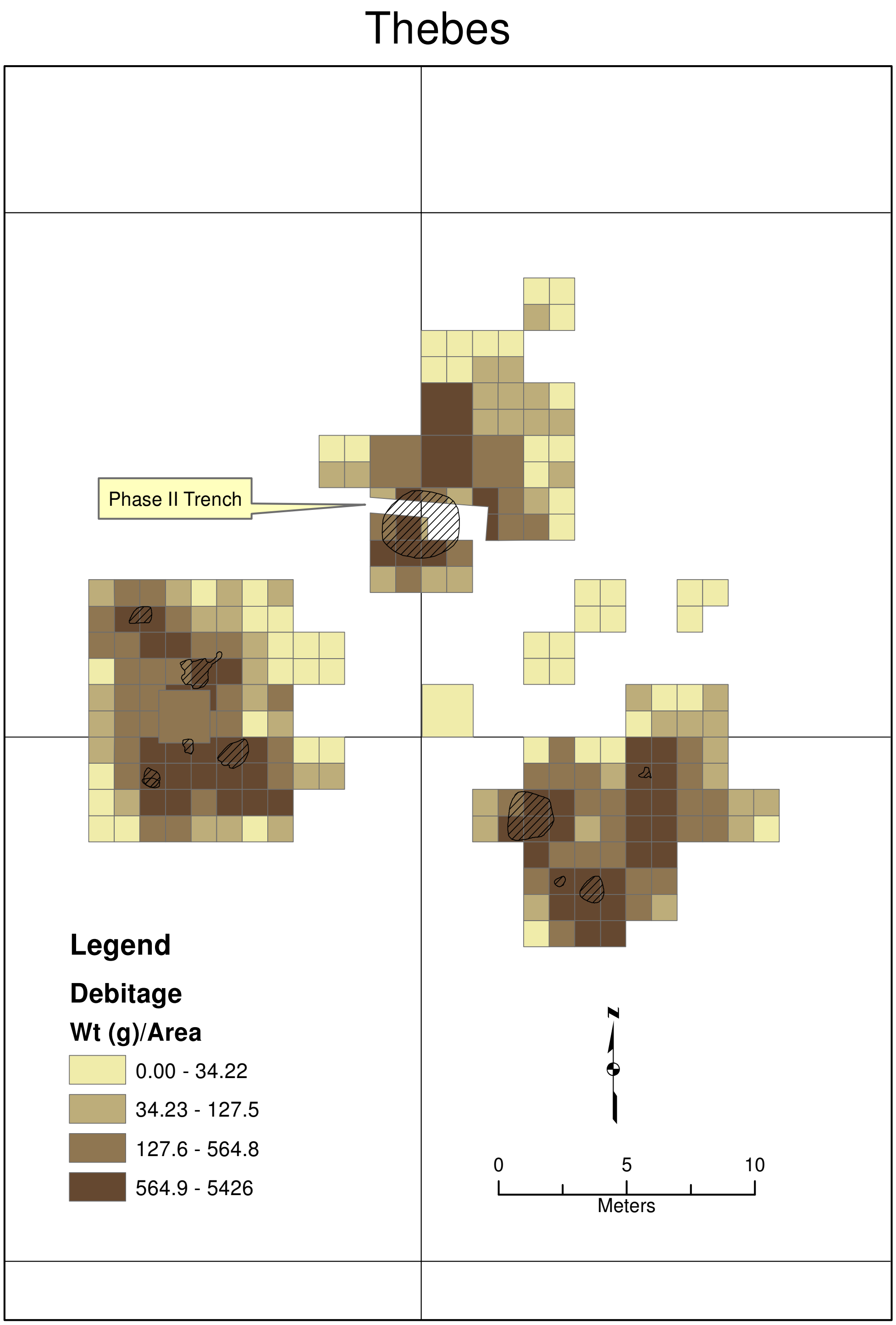

Figure 8.31. Thebes debitage density map.

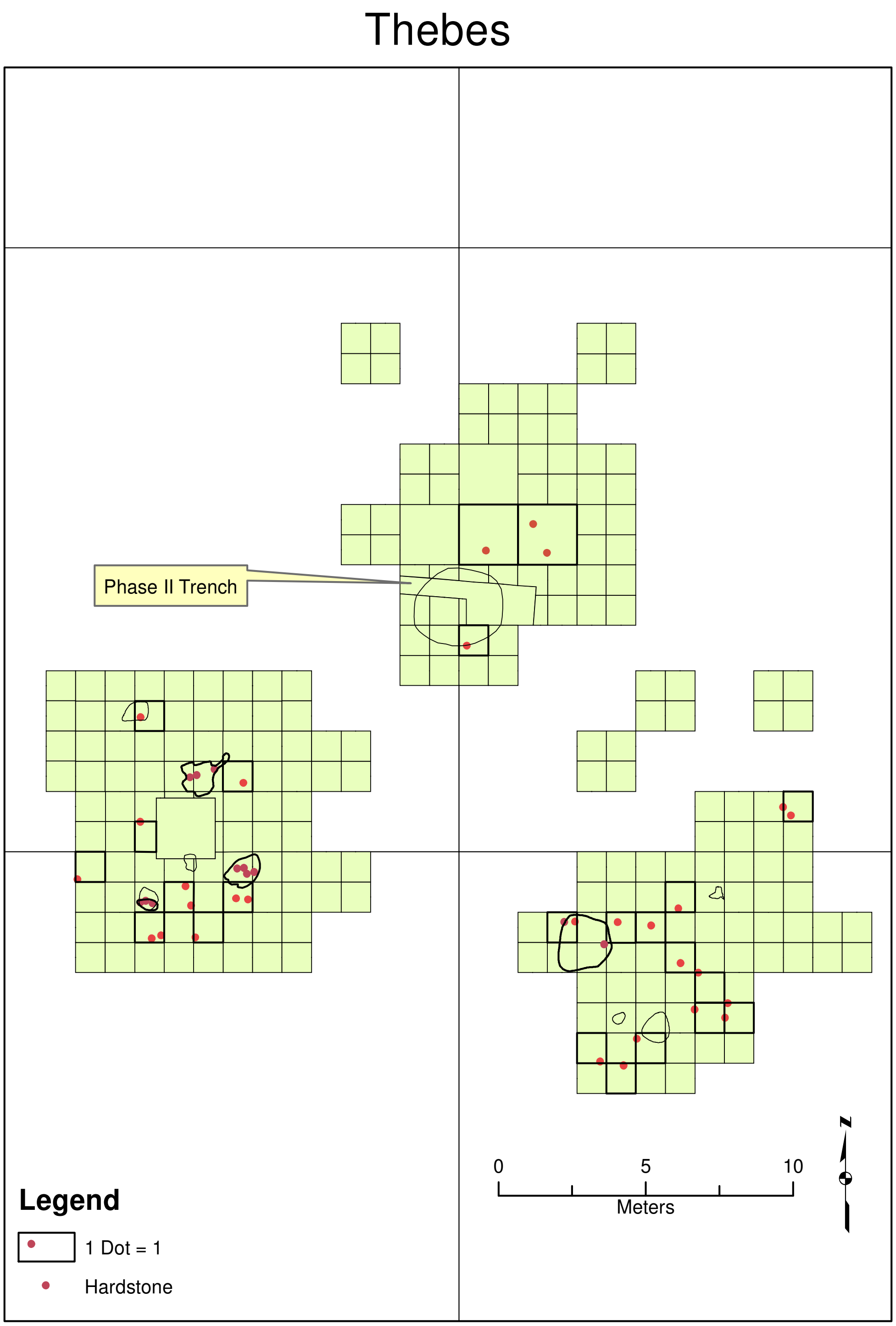

Figure 8.32. Thebes hardstone density distribution map.

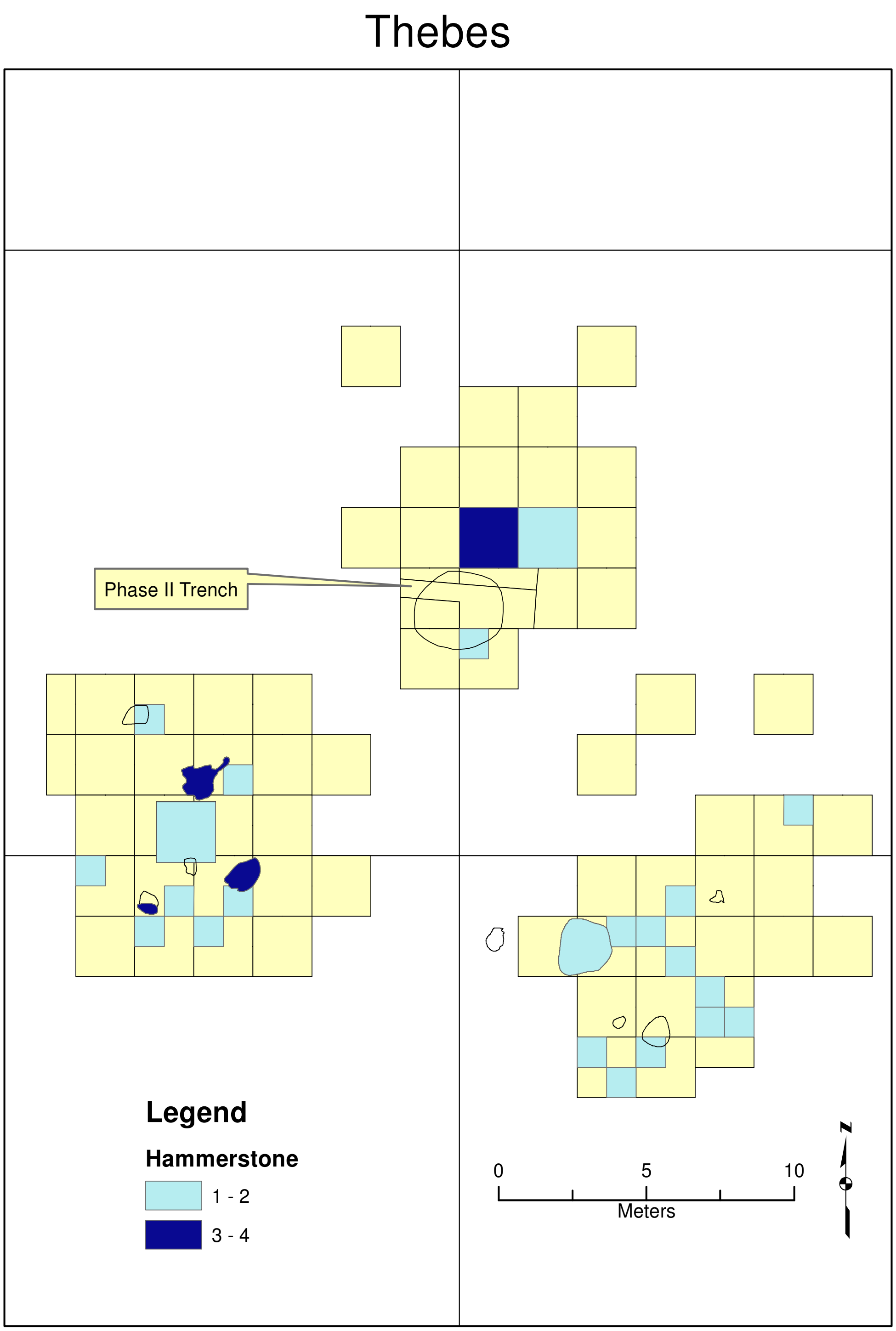

Figure 8.33. Thebes hammerstone density map.

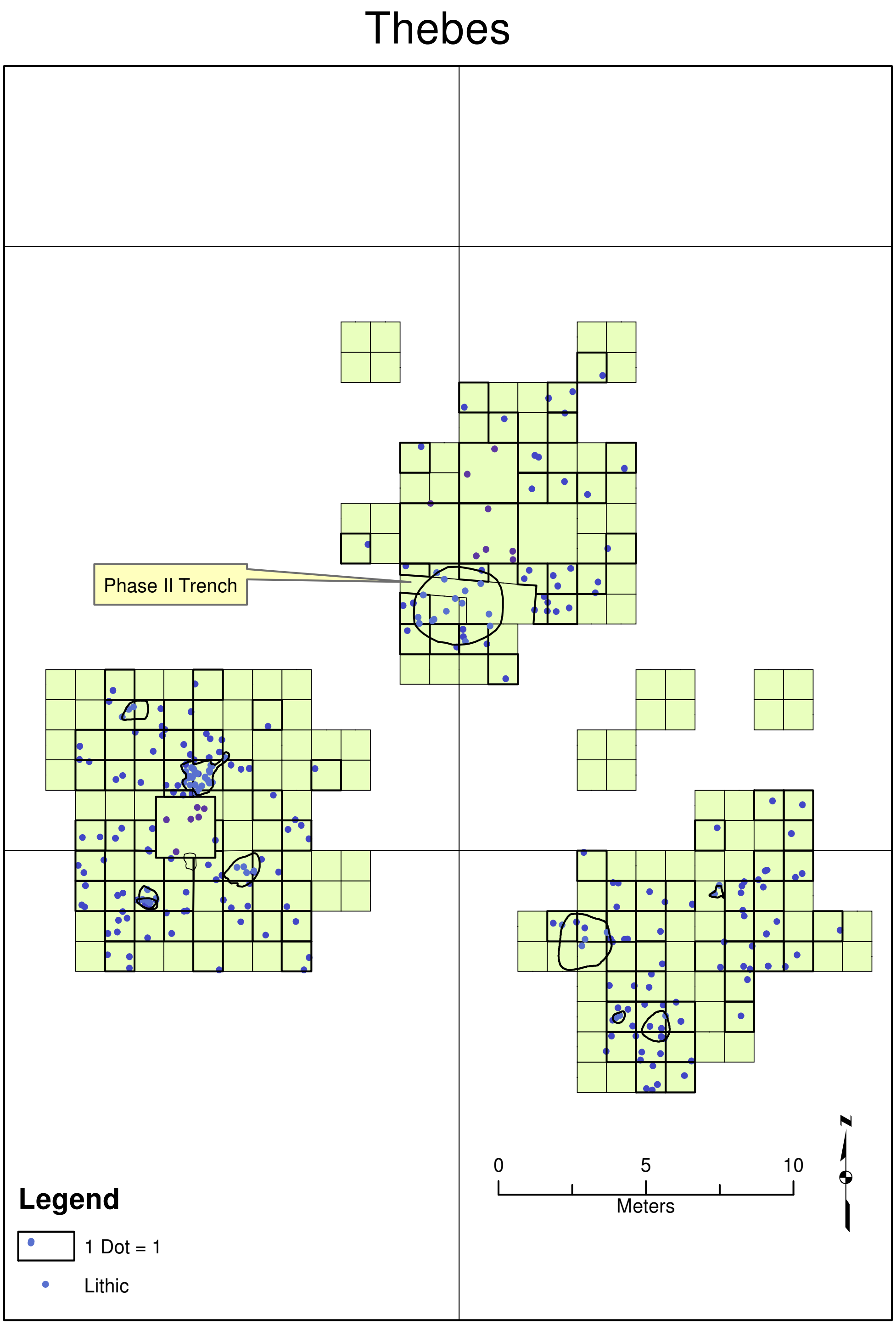

Figure 8.34. Thebes lithic tool density map.

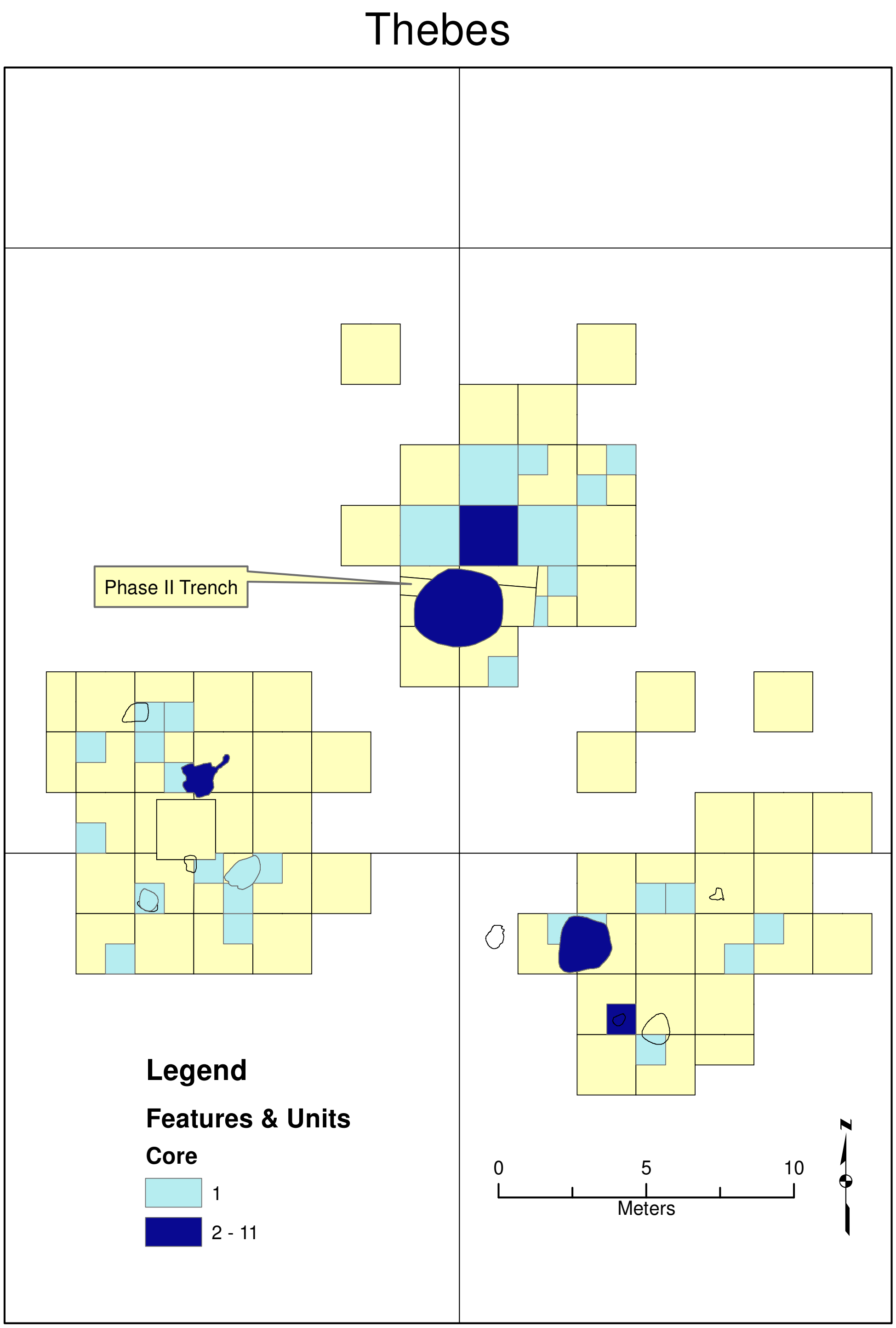

Figure 8.35. Thebes core density map.

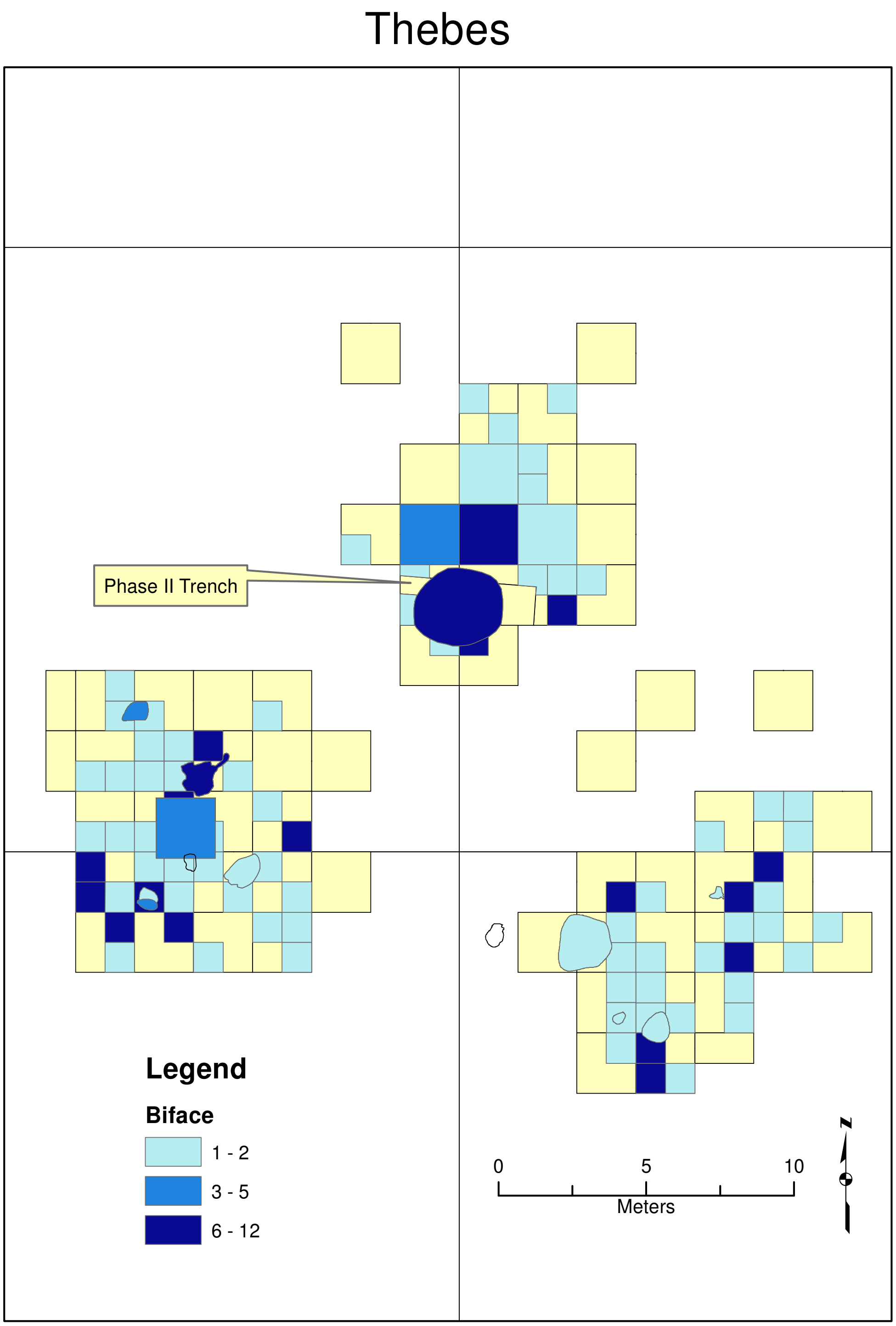

Figure 8.36. Thebes biface density map.

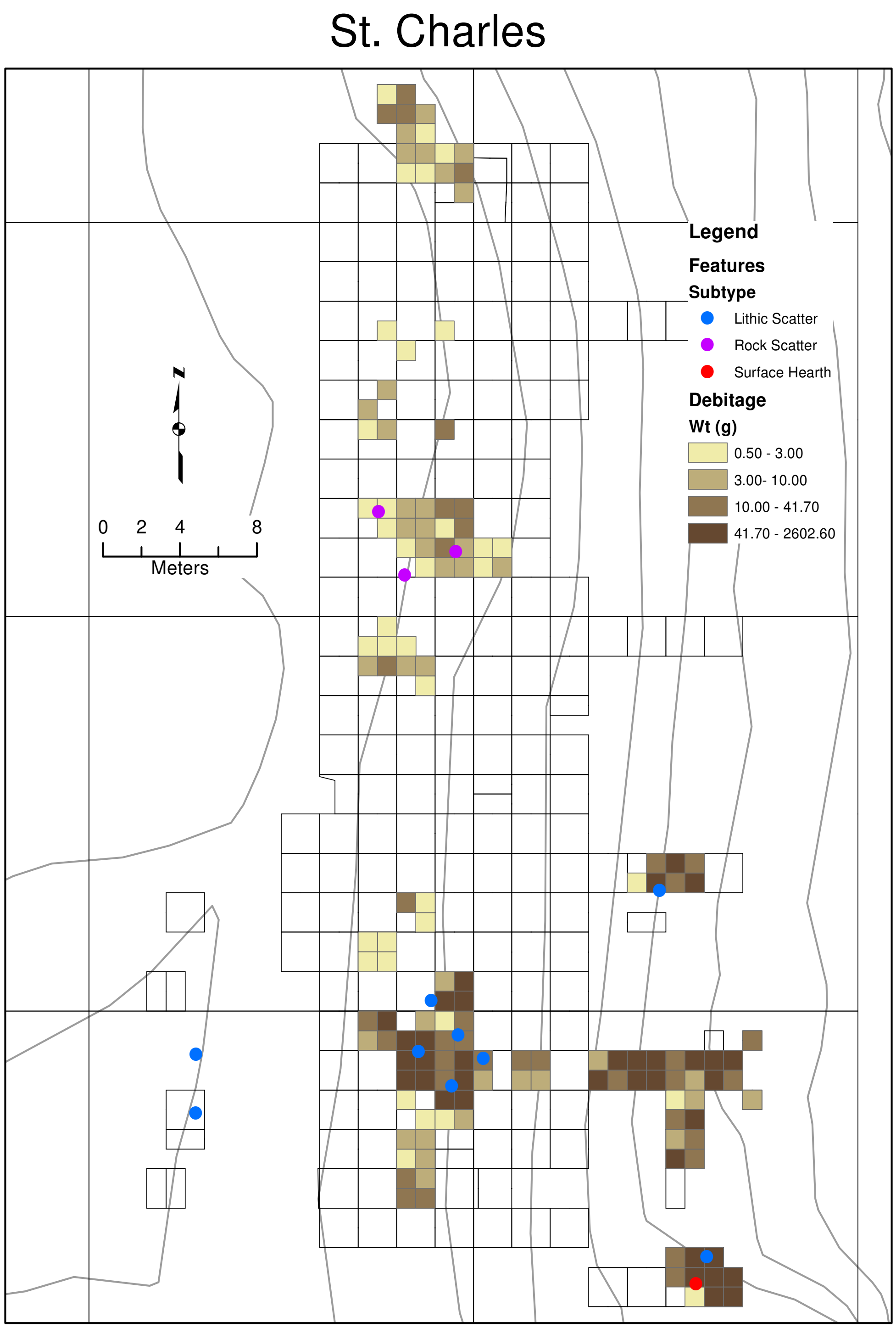

Figure 8.37. St. Charles debitage density map.

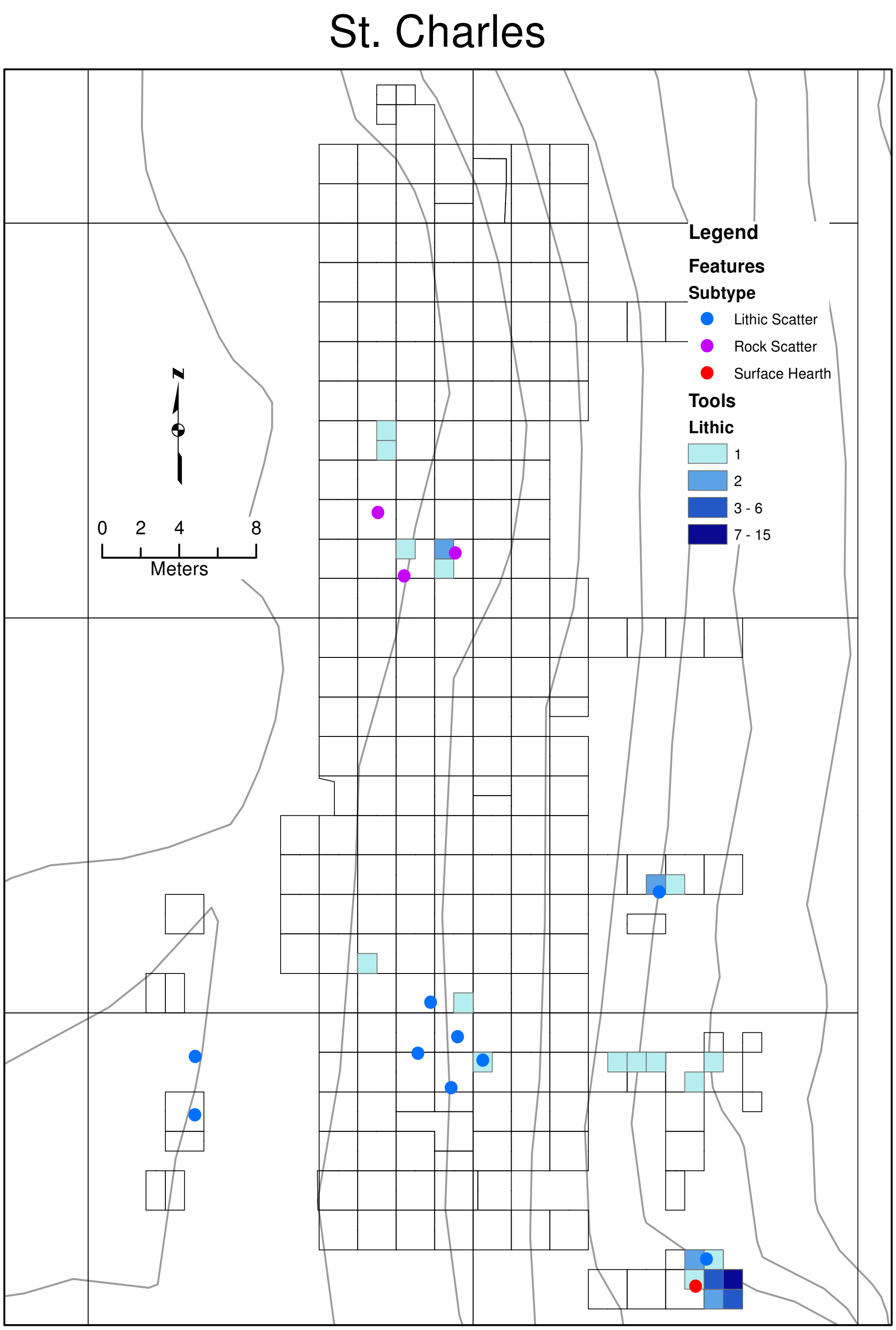

Figure 8.38. St. Charles tool density map.

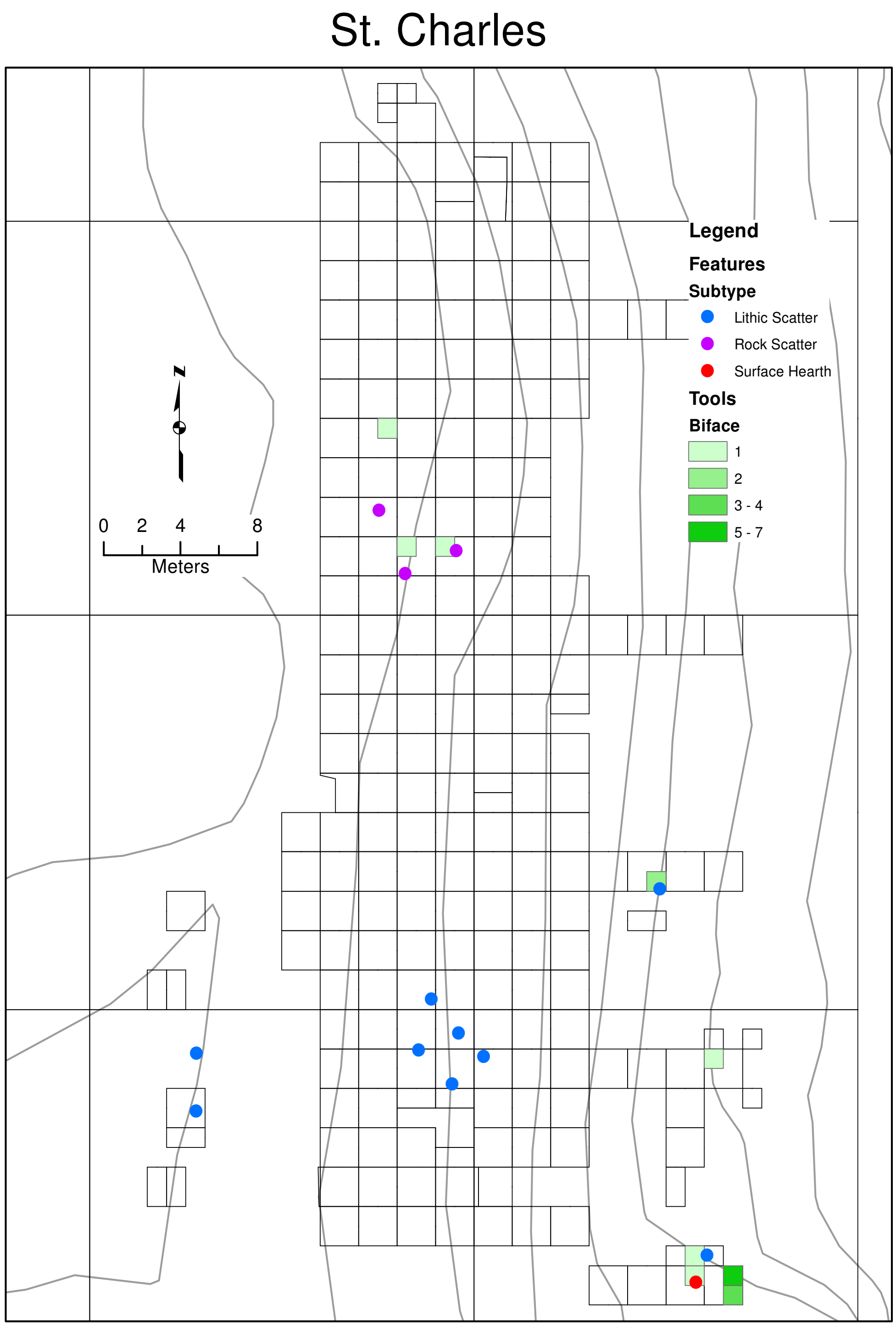

Figure 8.39. St. Charles biface density map.

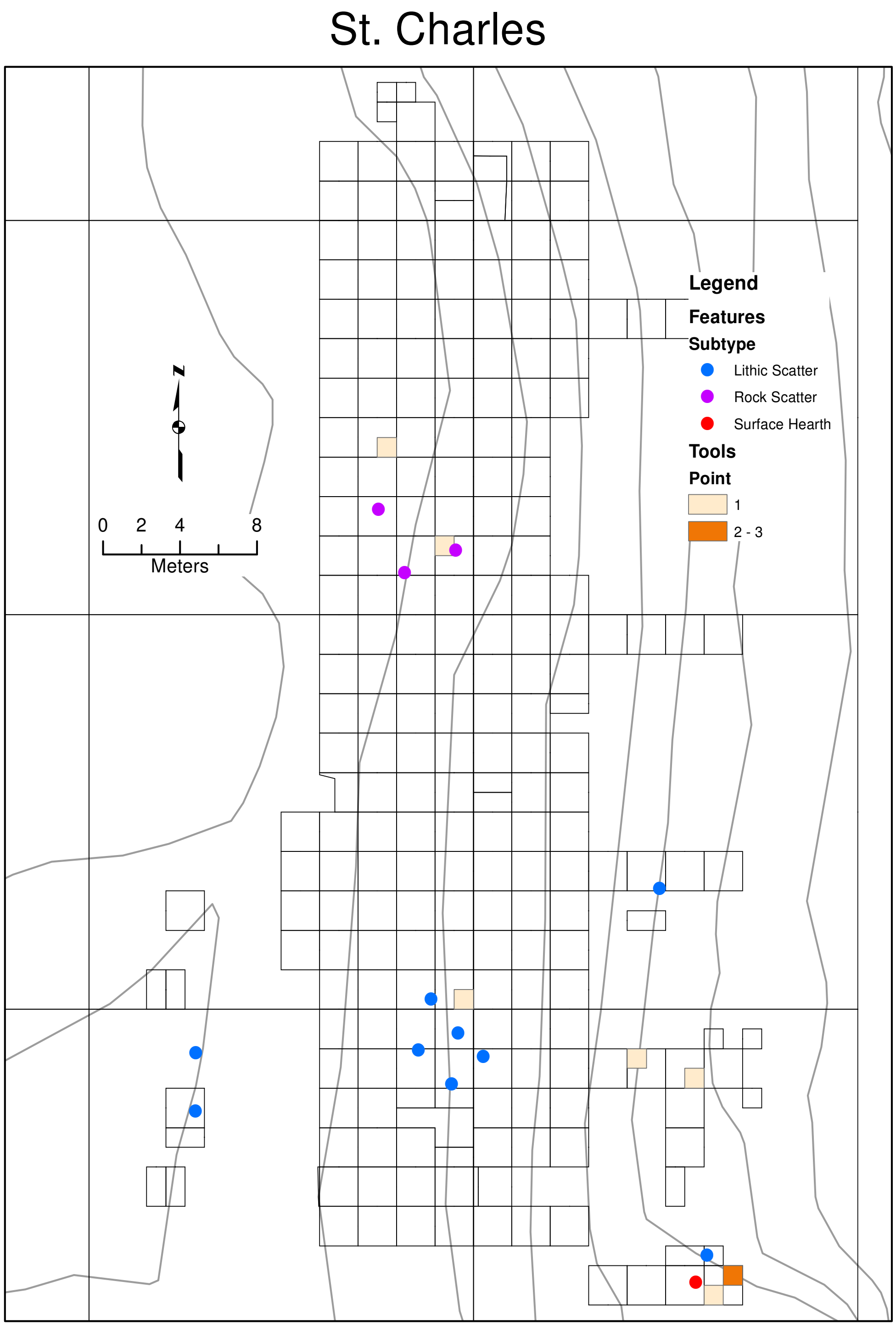

Figure 8.40. St. Charles point density map.

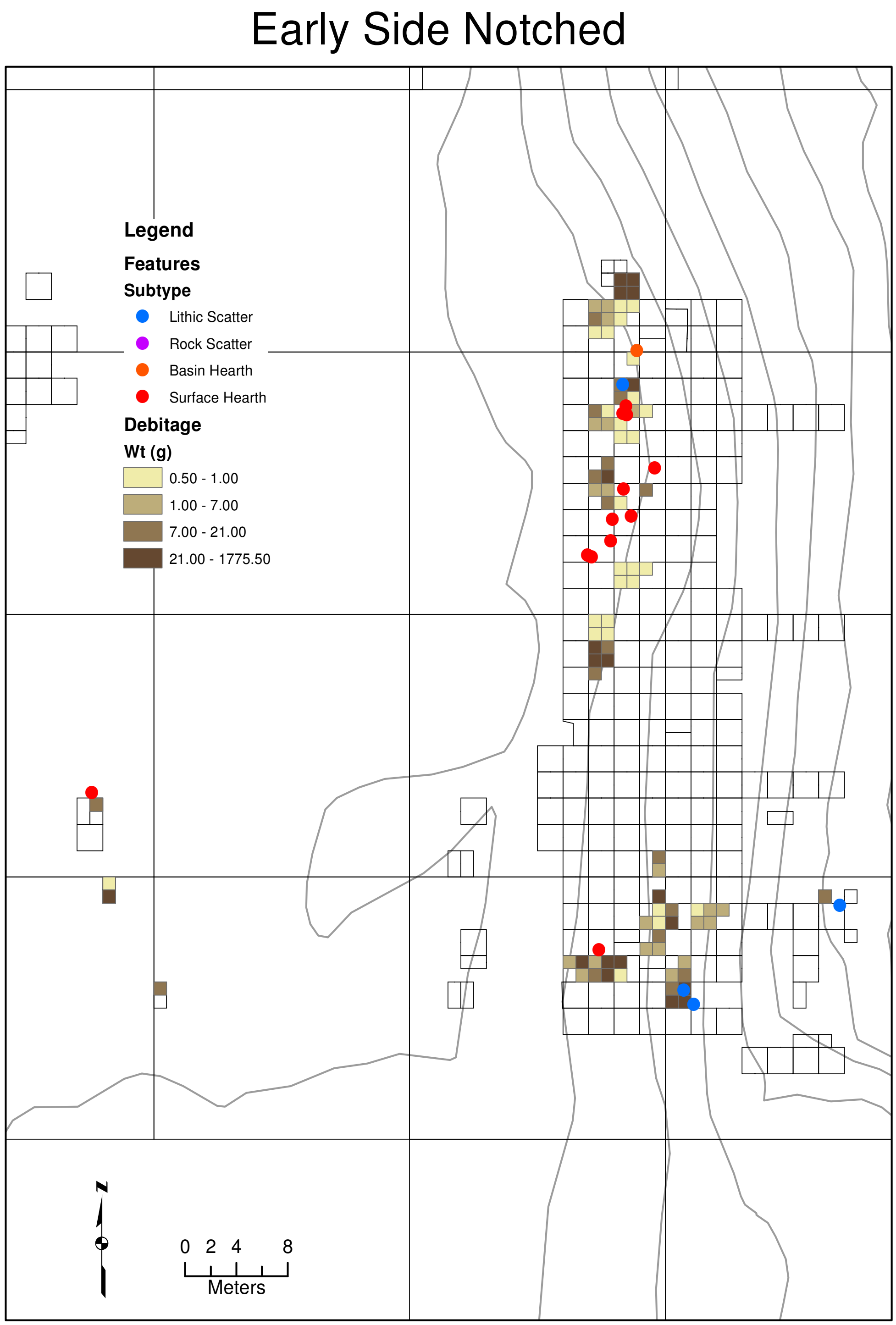

Figure 8.41. Early Side Notched debitage density map.

Figure 8.42. Early Side Notched chippedstone and hardstone tool density.

SUMMARY

There are substantial differences in the spatial structure of the Early Archaic components/occupations at the James Farnsley site. These differences correlate with changes in the functional use of this location on the landscape. Undoubtedly the occupations reflect high mobility hunter-gatherer groups, but how this landscape position was not utilized uniformly through time.

In terms of spatial structure the Early Side Notched and St. Charles occupations reflect discreet very short-term events mostly near the Ohio River channel. During the Early Side notched occupation heating facilities were prevalent with small amounts of general debris scattered around them, while in St. Charles this type of feature is rare (n=1) and small discreet lithic scatters composed mostly of debitage and lacking tools are present. There is also the larger scatter of shale that is associated with small amounts of other debris but these features are of unknown function. They do not, however, occur in any of the other occupations/components at the site.

The Thebes occupation in the western terrace is a very specialized activity area. Again there are a number of very discreet lithic scatters but these include not only debitage but tools including hammerstones and initial stage bifaces and biface fragments. No heating facilities are present and only one small pit. This pattern strongly suggests a short-term lithic knapping area where Muldraugh tool stone was being procured from the nearby bluffs and tools were being roughed out and taken elsewhere for further reduction.

Two of the three Kirk occupations represent dramatically different spatial patterns as well as shear quantities of debris. The Lower Kirk occupation is distributed relatively evenly along the length of the levee sampled by the Main Block. Clusters of surface hearths are found from north to south, although oxidized rings are most prevalent in the central and southern portions of the block. Heavy concentrations of debitage and tools are also distributed through the entire block, although the concentrations are larger than in the earlier occupations at some 8-10 m across compared to 2 meters in the St. Charles. Based on artifact refits, trash was also being disposed of on the bank.

The Middle Kirk has the heaviest densities of debitage and tools by far. Lithic scatters representing discreet depositional events are also well represented compared to the Lower Kirk zone. Debris tends to be concentrated at the southern portion of the Main Block in comparison to the Lower Kirk's more even distribution. Surface hearths are common but oxidized rings are absent. Again, trash was being disposed of on the banks of the early Holocene Ohio River. Lithic reduction is clearly an important activity although the range of features and tools reflects a residential camp as well.

The Upper Kirk zone reflects the more expected Early Archaic pattern in that a much lighter density of debris is represented and only a few surface hearths. It is mostly distributed in the southern portion of the block. The main concentration of debris coincides with the one identified in the Middle Kirk so there may be some pedo and/or bioturbtion that is mixing the two zones. Stilwell points are fairly common in this zone and are consistent with the late age of this Early Archaic deposit. This occupation is undoubtedly related to the late Early Archaic occupation underlying the Late Archaic midden at the nearby Townsend site (12Hr481).

CHAPTER 9

JAMES FARNSLEY (12HR520) SITE SUMMARY

by

C. Russell Stafford and Mark Cantin

The James Farnsley site (12Hr520) contains an extensive record of Early Archaic occupation. The stratified early Holocene cultural sequence encompasses most of the Early Archaic period with occupations stratified to a maximum depth of more than 5 meters below the surface of the terrace (Figure 9.1). The unique deposits at the site include an inordinately dense concentration of Kirk corner notched debris, rarely recovered Thebes/St. Charles occupations including a lithic workshop, as well as an enigmatic Early Side Notched zone that dates as early as 10k rcybp.

Figure 9.1. Main Block at the James Farnsley site (12Hr520).

A series of research problems dealing with Early Archaic chronology, settlement function, subsistence, lithic reduction strategies, and geomorphology were a central focus of the fieldwork and subsequent analyses. Investigations were designed to obtain temporally diagnostic artifacts and associated radiometrically datable materials, the latter primarily through flotation sampling. Optically Stimulated Luminescence (OSL) was also employed in cases were carbonized remains were absent or corroboration of radiocarbon ages were required.

In order to have a clear understanding of the context of the Early Archaic occupations it was necessary to examine the geomorphic processes responsible for the formation of the deposits at the site. Soil-geomorphic data were collected from unit/trench profiles as well as solid cores extracted from the site. It was clear from this analysis that the deposits underlying the early Holocene terrace were not formed like a layer cake, but were much more complex.

A key question was how the Early Archaic occupations reflected regional patterns of hunter-gatherer landuse during the early Holocene. It is clear from the data recovered that settlement and mobility strategies were not constant during the Early Archaic with significant differences among the Kirk, Thebes/St. Charles, and Early Side Notched occupations. In the Kirk zone an emphasis was placed on hand excavating a large contiguous block so that intra-site spatial patterning could be examined.

Subsistence reconstruction was also an important goal of the CAP, although fragile botanical and faunal remains were differentially or poorly preserved in the deposit. Carbonized remains were largely preserved either in features or in the bank side Kirk secondary trash. Little charcoal was present in the general midden deposits. Faunal remains were very rare and those present were heavily calcined, so subsistence reconstruction is limited to archaeobotanical data.

The vast quantities of tools and debitage in the Kirk occupations and the proximity of outcrops of Muldraugh chert in the nearby bluffs indicate the importance of lithic reduction at the site. Tool manufacture is more variable in the non-Kirk components. Research has therefore centered on lithic reduction strategies and their relationship to settlement function and landuse changes through the Early Archaic period.

In the remainder of this chapter the stratigraphy, radiocarbon dates, diagnostic tools, overall lithic assemblages, features and associated artifact spatial structure, subsistence, and site function are summarized for the site. Finally, changing hunter-gatherer mobility strategies through the Early Archaic period are considered.

SOIL-GEOMORPHOLOGY & STRATIGRAPHY

Underlying the low early Holocene terrace surface is a thick unit of Ohio River alluvium that can be divided into overbank and point bar facies. Overall the unit is between 8.4 and 8.7 m thick and overlies gravelly sand outwash deposits. The radiocarbon dates from the archaeological components and diagnostic artifacts in the plowzone indicated that the bar deposits were forming by 10,000 rcybp and that the surface became stable by 8000 rcybp. Once stable a 2.25 m thick pedon developed that exhibits prominent mottling and redox features; typical characteristics of early Holocene soils in the region. Field investigations indicated an Ap-E-Bx-Bt-C horizon sequence at the site.

The overbank unit, which contains the vast majority of the archaeology, is a massive silt loam to silty clay loam. The lower lateral accretion bar deposit is characterized by a higher sand content and bedding (laminae to medium beds) that slopes to the east toward the river channel. Fine sand is the largest clast size in the bar. Both of these facies are low energy depositional units that are conducive to the preservation of artifacts and features. It is also evident that the geometry of the deposits indicates occupation surfaces that slope up from east to west in both the point bar deposit and the overlying overbank unit. This in fact is crucial to understanding the stratigraphic structure of the archaeological components at Hr520.

Higher energy environments are also present, however. Tributary streams originating in the uplands cut small scale (ca. 2 m wide) channels through the Ohio River alluvium. These channels are most evident in the western part of the site at depths over one meter. In this area there is a clear cut and fill channel sequence. The sediments are coarser and include pebbles. There is also evidence that features were eroded by these channels in some cases. Evidence of tributary channels is also present in the point bar deposits in the eastern part of the site although they tend to occur at greater depth. Although there was some potential that occupations could be affected by these high energy channels there was only infrequent evidence of disturbance and most of that was in the deeper occupations (Early Side Notched zone). By and large occupations are intact and represent primary cultural deposition mostly undisturbed by post-occupation geogenic processes.

In the plowzone (0-30 cm bs) there is a mixture of points from most time periods including Kirk Cluster, Bifurcate Cluster, Late Archaic, Early Woodland, and Late Woodland/Mississippian. Of these the Early Woodland component is the most substantial in that four pits were exposed in the western part of the site (Western Terrace). Early Woodland grit tempered sherds were recovered from two of the pits (F12WT, F17WT). There is also evidence of an Early Woodland component at 12Hr481 including a shelter (see Volume 3).

The sloping surfaces evident at Hr520 mean that components are more deeply buried on the east side of the site near the terrace escarpment than on the west side. On the eastern side in the Main excavation block there is a thick zone of Kirk materials that extends from 0.40 to 1.0+ m bs and is found in a rather narrow 40 m wide strip along the terrace edge. This deposit was subdivided into three subzones referred to a Lower Kirk, Middle Kirk and Upper Kirk. There are no sterile deposits separating them. The subzones are based on the vertical distribution of features, debris density, and radiocarbon ages. The most distinctive signature of the Lower Kirk subzone is the presence of what are termed oxidized rings (possibly smudge pits—see Chapter 4). With one exception these are exclusively found in the lower portion of the Kirk zone.

In addition to the occupation zone on the levee crest there is also a Kirk secondary deposit located on the paleo-bank to the east. This trash deposit extends at least 50 meters along the terrace escarpment and at least 16 m down the bank slope to the east. It is composed of high densities of debitage, tools, and moderate densities of wood charcoal, and rock.

Underlying the Kirk zone in the Main Block is a Thebes/St. Charles component. On the levee crest this zone is between 3.0 and 4.0 m bd. It slopes toward the Ohio River paleochannel to the east where it occurred between 4.8 and 5.3 m bd. It consists of points associated with small lithic and shale scatters. As many as three stratified occupation surfaces may be represented in this zone.

The Thebes/St. Charles surfaces slope up further to the west where a Thebes lithic workshop is located between 0.76 and 1.36 m bd. It consists of at least three major activity areas with early stage debitage, bifaces, points/drills, cores, hammerstones, and stone material. Only Thebes Cluster points/drills were recovered from this area. Seven Thebes points and one St. Charles point were found between 0.76 and 1.36 m bd. Debitage peaked between 1.10 and 1.30 m bd.

The deepest component is referred to as Early Side Notched. It is found in both the main block and the western terrace. The Early Side Notched zone is composed of a series of stratified paleosurfaces that slope from west to east in both the bar and overlying overbank units on which features (surface hearths) and artifacts occur. This cultural zone (2.6 m thick) is found between 6.6 and 4.0 m bd at the terrace edge and to the east (Main Block), but on the terrace flat to the west (40 m west) it is at 3.7 to 2.67 m bd. The zone consists primarily of surface hearths and a few isolated tools.

The base of this zone is represented by F313, a large surface hearth at 6.61 m bd in the lowest section of the point bar exposed by trenching. The hearth contained a reworked point, while a hafted drill was recovered adjacent to the feature (at 6.72 m bd). These artifacts are technologically consistent with Thebes Cluster points.

In sum, the Early Archaic sequence at the James Farnsley site is unique to the central Ohio River valley as well as the Mid-South and Midwest in that it spans most of the Early Archaic period and shows the stratigraphic relationship between Kirk, Thebes/St. Charles, and Early Side Notched components.

RADIOCARBON DATES

A total of 19 samples collected from 12Hr520 were submitted for radiocarbon dating. In addition three Luminescence dates were run. The radiocarbon dated samples were derived from flotation samples from either features or the bank side trash deposit.

Four radiocarbon ages are associated with the Lower Kirk subzone (1.8-2.30 m bd). Feature 98, a surface hearth at 2.06 m bd, the deepest of the four samples, produced an age of 9350 ±80 rcybp (ISGS 4834). A date of 8780 ±80 rcybp (ISGS 5035) was obtained from a hearth at 2.00 m bd. Two dates from surface hearths (8900 ±120 [ISGS 5046]; 8810 ±120 [ISGS 5040] rcybp) are slightly higher in the deposit (1.91 m and 1.97 m bd respectively). A Luminescence date was obtained from a sample collected at 1.80 m bd (1.10 bs) at 12N8W in the Main Block. The sample yielded a calendar PIBL age of 11.2 ±0.60 ka yr bp (Feathers 2007).

The Middle Kirk subzone is based on higher debris density in excavation units which occurs above the zone in which the oxidized rings are found. This subzone is defined as occurring between 1.50 and 1.80 m bd. Three radiocarbon dates (fewer features in this zone yielded charcoal) were obtained from this stratum. Feature 103, a hearth at a depth of 1.73 m bd, yielded a date of 8740 ±100 rcybp (ISGS 4838). The second sample is an AMS date of 9260 ±40 rcybp (Beta 206921) from a surface hearth (F205) at 1.76 m bd. A third sample was collected from a pit feature (F213) at a depth of 1.88 m bd. An AMS date of 9200 ±60 rcybp (Beta 218528) was obtained from a pit at 1.88 m bd. The radiocarbon dates from the Lower and Middle Kirk zones are within the same age range. It is not possible, therefore, to discriminate chronologically the two occupation zones within the limits of radiocarbon dating.

The Upper Kirk subzone occurs between 0.50 and 1.50 m bd. It is characterized by lower debris density, fewer features and the occurrence of the vast majority of Stilwell points (and Large Kirk corner notched points in general). The Stilwell occupation zone undoubtedly represents an extension of the same occupation exposed below the Late Archaic midden at the nearby Townsend site (12Hr481) (see Volume 3). One radiocarbon date can tentatively be associated with the upper occupation at Hr520. A date of 8320 ±80 (ISGS 5032) was obtained from a hearth (F46) at 1.70 m bd. Although only slightly higher in the deposit than samples that date the Middle zone, ISGS 5032 appears to be on the downslope portion of a higher surface. Since the sample depth falls below the majority of Stilwell points in the Upper Kirk zone it provides an approximate maximum age for those points at Hr520.

Two dates are associated with the Kirk secondary refuse deposit on the paleo-bank of the Ohio River. The first date of 8630 ± 130 rcybp (Beta 115653) was obtained near its base in a Phase II unit. It is substantially earlier that most of the Middle and Lower Kirk subzone dates but has a substantial standard deviation. The second date of 9420 ±100 rcybp (ISGS 4837) is from a hearth on the bank that lies under the trash deposit. This date should predate the formation of the trash.

A single date of 9490 ±60 (Beta 153512) from a hearth was obtained at a depth of 4.80 m bd in the Thebes/St. Charles component that underlies the Kirk zone in the Main Block. None of the other features in this component yield enough charred remains for dating. No charcoal was recovered from the Thebes workshop area. However, two sediment samples from block C in the workshop were luminescence dated (Feathers 2007, Volume 1). These samples were taken from 1.06 m (U255) and 1.09 m bd (U307) in Block C in the Bx horizon, which corresponds to the depth from which the highest densities of debitage were recovered from the workshop. A lithic feature (F10WT) was adjacent to the U255 sample. The two samples produced calendar ages of 11.1 ± 0.70 ka and 10.4 ±0.75 ka yrs bp. Although the standard error is large, the average of the two PIBL dates (10,750 ±512 bp) is consistent with the calibrated radiocarbon date from the Main Block of 10,970 CalBP from F298 (see Stafford 2007c, Volume 1).

In the Early Side Notched zone three radiocarbon dates are available from features in the northern area of the main block. Two hearths (F300, F306) from the uppermost surface yielded ages of 10,370 ±190 (Beta-152942) and 10,100 ±100 (ISGS-4898) rcybp, respectively. F300 (surface hearth) is at a depth of 4.10 m bd, F306, also a surface hearth, at a depth of 4.30 m bd. The third sample, from F311 (surface hearth), at 4.77 m bd, yielded an age of 9700 ±100 (ISGS-4897). This age result was found to be an outlier and not a part of the cluster of other Early Side Notched ages (Stafford 2007).

Two features that are assignable to the Early Side Notched zone were exposed in the Western Terrace area of the site (40W-60W). Although no points were recovered from either hearth feature, both were radiocarbon dated. F15WT at a depth of 3.57 m bd is near a tributary channel. A radiocarbon age of 10,090 ±100 rcybp (ISGS 4835) was obtained from the hearth. F35 is also a heating facility with large sandstone/limestone slabs, burned soil, and charcoal flecking. The feature was exposed at a depth of 2.67 m bd (2.19 m bs) and yielded an AMS age of 10,020 ±100 (Beta 13574).

In sum, multiple radiocarbon dates were obtained from two of the three zones in the Kirk component (lower and middle Kirk) that represent the bulk of the occupation at the site during this period. These dates indicate that the site was occupied between about 9400 and 8700 rcybp. The upper Kirk, which represents a more ephemeral series of occupations, is more tentatively dated at about 8320 rcybp. This later date is supported by a second date obtained from nearby 12Hr481 Early Archaic component also at 8360 rcybp. The dating of the Thebes/St. Charles component is more tentative in that only one radiocarbon date was obtained and the OSL dates although consistent with the radiocarbon date have large standard errors. The series of dates from the Early Side Notched zone, with one exception, consistently date to about 10,000 rcybp making it currently the earliest radiometrically dated site in the central Ohio River valley.

DIAGNOSTIC ARTIFACTS

A very large sample of Kirk corner notched cluster points were recovered from the Kirk zone at the James Farnsley site. This number is some ten times or more the number recovered from other Kirk sites in the Southeastern U.S. where this point style is common. As might be expected, the full range of forms of Kirk corner notched types were found at the site (e.g., Justice 1987) including Kirk Large, Kirk Small, Pine Tree, and Stilwell. Other minor type names used elsewhere were subsumed under these general types (e.g., Palmer, Charleston corner notched). The most prevalent type in the Farnsley collection is Pine Tree corner notched. This type is usually considered to be a resharpened Kirk corner notched, where repeated reworking of the blade results in an incurvate blade shape. Some of the points that were classified as Pine Tree are due to blade resharpening but the majority were intentionally manufactured with a Pine Tree blade shape. In addition the haft form is typically different from the Kirk Large type in that it tends to exhibit a narrow deep parallel sided notch compared to the latter's more open notch. The knapping technology used to form the serrated blade edge also differs substantially between the two types. The Pine Tree technology is clearly related to that used on Dalton points and described by Bradley (1997) as serial serration. This type of retouch is common on Pine Tree forms from the Kirk zone at the site.

The Pine Tree style is found at other regional sites like Swan's Landing and Ashworth sites (but not Longworth-Gick), although it is not a common type at other Kirk sites in the Southeast U.S. This suggests a style zone is present in the central Ohio River Valley that is distinctive from Kirk corner notched types or styles that predominate elsewhere.

Pine Tree is the most common of the four types indentified at the Farnsley site followed by Kirk Large, Kirk Small, and Stilwell. The first three types are found in each of the Kirk subzones (Lower Kirk, Middle Kirk, and Upper Kirk) and there are no trends in the percentages of these types that correlate with the stratigraphy indentified within the Kirk zone (except Stilwell). This is unlike other Kirk sites, like Longworth-Gick, where Kirk Small were found stratigraphically below Kirk Large points. Stilwell points, however, do show a stratigraphic trend in that they are by far most common in the Upper Kirk subzone at the site. In addition, they occur in the upper Early Archaic zone at the nearby Townsend site in association with McKorkle points. A single radiocarbon date of 8320 ±80 rcybp is associated with the Upper Kirk zone. Most of the Stilwell points were recovered above the depth of this sample but not in direct association. A more secure association of Stilwell with a comparably young date (8360 ±60 rcybp) occurs at the Townsend site (12Hr481).

The bulk of the Pine Tree, Kirk Large, and Kirk Small points were recovered from the Lower and Middle Kirk subzones which date between 9400 and 8700 rcybp. This range is consistent with other Kirk corner notched sites in the central Ohio River Valley and the Midsouth and Southeast in general.

Another potentially temporally diagnostic type is the Kirk knife. It is characterized by an elongated, narrow bell form. The margins commonly show very fine pressure retouch and serration. This serration is *not* similar to that typified on Pine Tree points. The knife form defined here does not appear to be unique to the Farnsley site.

Far fewer points were recovered from the Thebes/St. Charles and Early Side Notched components at the site. In the Western Terrace lithic workshop area Thebes and St. Charles points were recovered. Three of the points are typical Thebes side notched points with triangular or excurvate blades. Two of these tools have alternately beveled blades and keyhole notches. Two Thebes hafted drills were also recovered from unit and feature contexts in the workshop. Two St. Charles points were recovered from this general area during blading. In the Main Block nine points or point fragments were recovered in the Thebes/St. Charles zone that underlies the Kirk zone. Only four of these are diagnostic. They are all St. Charles points or point bases with classic angular convex bases.

Only four points were recovered from the Early Side Notched zone. Two of these are associated with the deepest hearth (6.61 m bd) exposed at the site and have clear affinities to Thebes technologically and in overall form, although they do not fit into classic Thebes side notched or St. Charles corner notched type descriptions. In someways they appear to be hybrids of the two styles. The third point recovered from this zone is more similar in form to the Kirk Small type, while the fourth has a reworked base that appears to have been either a side notched or corner notched haft originally. The small number of points yet considerable diversity makes it difficult to characterize this early period (10k rcybp) stylistically.

LITHIC ASSEMBLAGES

As with the point collection there were tremendous numbers of chipped stone tools recovered from the Kirk zone and far fewer from the Thebes/St. Charles and Early Side Notched zones. Over 4300 bifaces were recovered in Phase III mitigation at Farnsley representing all stages of manufacture. Most are made of the locally available Muldraugh chert, though other cherts are well-represented. Relative frequencies between various stages as well as chert selection frequencies changed through time as well. In the Kirk zone there are roughly twice as many Stage 3 as Stage 2 bifaces, and twice as many Stage 2 forms as Stage 1. The relative biface stage frequencies are virtually identical between the Lower and Middle Kirk assemblages. The Secondary Kirk differs slightly in that there were proportionately more Stage 1 and 2 bifaces and fewer Stage 3 forms, though the differences are small. Relative to earlier Kirk, the Upper Kirk Stage 1 biface frequency is appreciably smaller, and the Stage 3 frequency is considerably higher. The general biface/chert pattern from Farnsley Kirk deposits shows a reliance on local to semi-local materials. The Kirk biface assemblage is dominated by Muldraugh, Wyandotte, St. Louis, and Allens Creek cherts; three of which occur within three kilometers of CAP, while Wyandotte occurs inside of 30 km. Collectively, these four cherts account for nearly 95% of the total. Muldraugh never accounts for less than 61% in any given Kirk occupation. It is an ultra-local resource, with outcrops documented immediately to the west in the bluffs bounding CAP and in the rivulets draining it. Its ubiquity and medium-to-high quality made it an attractive toolstone. Wyandotte biface frequency was second-greatest amongst all bifaces in general, though it occurs at the greatest distance from CAP of the four primary cherts utilized in biface production. Fourteen other cherts of known geological provenance were represented in minor frequencies as bifaces from Farnsley Phase II and III units. Only one of these, Jeffersonville, registered at more than one percent.

As mentioned above a highly stylized formal knife form was identified in the Kirk toolkit. As a tool class, it has very distinctive physical attributes, though a range of variability is recognized. The standard form has a long blade relative to its basal width. The blade is either parallel or recurvate with either an acute, broad, or apiculate tip, virtually never mucronate or acuminate as they are with Kirk points. There are also lunate, trianguloid, and blunt forms (see Chapter 6). Muldraugh is the primary chert utilized, followed by a significant presence of Wyandotte with appreciable representation of St. Louis and other local/semi-local cherts such as Allens Creek and Jeffersonville. Muldraugh is utilized for over half of all knives, and almost twice the frequency of Wyandotte.

Chipped stone adzes were recovered in abundance from the Farnsley site. Adzes recovered from Kirk deposits are similar to Dalton adzes in terms of general metrics, morphology, and presumably function. Very commonly, the adzes have virtually straight, parallel sides, while others slightly bulge toward the center. The bits and polls are almost always rounded, unless battered from use, which tends to square off the bit. Muldraugh chert was overwhelmingly selected for adze manufacture, although lower quality material was usually used. Several subtypes were identified: Dorsal Keeled Ventral Keeled Platform Poll, Celt, Stemmed and Bi-bitted.

Scrapers of various forms constitute a significant tool class in the Kirk zone. End scrapers are by far the most prominent scraper type recovered from the site with side scrapers making up an unusually small percentage. Kirk end scrapers are made on large blade-like flakes and unifacially worked into teardrop or almond-shaped forms. There are two predominant morphologies associated with the dorsal face of the distal end just above the actual working edge. The first is the characteristic bulbous "humpback" form, which places the thickest part of the tool toward the distal end. The second major form seemingly has this distal bulbous prominence removed in a planar beveled facet above the working edge. Only fourteen side scrapers and six combination end/side scrapers were recovered in the Kirk zone, representing less than three percent of the total scraper population. This dramatically contrasts with some of the significant Southeastern Kirk sites. Wyandotte accounts for almost 80 percent of the total assemblage. Only two other cherts occur in any significant quantity: Muldraugh and St. Louis. This is in stark contrast to other tools where Muldraugh is by far the most common chert selected.

Relatively few drills were recovered from the Farnsley site. The bulbous base is very distinctive. Shank cross sections range from strongly biconvex to rhomboidal or diamond-shaped. In terms of chert selection Muldraugh was overwhelmingly chosen, with Wyandotte a distant but solid second choice. Small numbers of flake tools were recovered including gravers, perforators, choppers, denticulates, and spokeshaves, and some 600 generic retouched flakes are also present.

Over three hundred and fifty cores were recovered from the four Kirk proveniences. The overall abundance of cores, however, is not great relative to the quantity of bifaces that were recovered indicating the emphasis placed on core tool rather than flake tool production. The cores are generally amorphous polyhedral forms. No blade cores were found. As might be expected Muldraugh chert is by far the most common chert type represented in this category.

As in other tool categories hardstone tools are common in the Kirk zone. Hammerstones (and hammerstone/anvils) are by far the most abundant type in the hardstone category. Most pitted stones are small and have 1-3 pits but two larger specimens have as many as 11 and 12 pits.

In the Thebes workshop as would be expected bifaces, cores, and hammerstones, are the most common artifacts. Of the bifaces the majority were classified as Stage 1 bifaces, followed by Stage 2, and Stage 3 and most are made from Muldraugh chert. Other tools are limited but include adzes, a graver, a drill fragment (bit), end scraper, other unifaces and retouched flakes. Hardstone tools also include an abrader and a multifunctional hammerstone also used as a pitted stone. All of the cores are polyhedral and show no real pattern of platform orientation and often reflect the tabular nature of Muldraugh chert. In most cases only a few flakes have been removed. All but three of the cores are Muldraugh chert.

Only 57 tools were recovered from the Thebes/St Charles zone in the Main Block. Bifaces were the most common tool category followed by points or point fragments. Bifaces were distributed fairly evenly between the three stage categories. All Stage 1 or 2 bifaces are made of Muldraugh chert. All of the Stage 3 fragments are made of either Wyandotte or St. Louis. Only three cores were recovered (Allens Creek, St. Louis, and unidentified). A chopper, adze, side scraper fragment, and several retouched flakes are also present. Hardstone artifacts are limited to three hammerstones and a pitted stone. The pitted stone is large with five conical shaped pits.

A total of 35 chipped and hardstone artifacts were recovered from the Early Side Notched zone. Bifaces are the fourth most common tool type in this zone. Stage 3 bifaces are most common and no Stage 1 bifaces were recovered. The chert types represented in this tool class are quite diverse consisting of Wyandotte, St. Louis, Muldraugh, and Jeffersonville. Cores are amorphous polyhedral forms predominantly of Muldraugh chert. A large Wyandotte nodular core with the cortex still present and a Wyandotte core fragment along with a St. Louis core fragment are also present. The Muldraugh cores are minimally flaked. Flake tools consisting of retouched flakes and unifaces are distinctive in the Early Side Notched lithic assemblage and make a combined percentage of just over 20 percent. They consist of large mostly blade-like unifacially retouched flakes. Hardstone tools are limited primarily to large pitted stones. All of the pitted stones have multiple pits ranging from two to as many as seven.

FEATURES AND SPATIAL STRUCTURE

Among the five components/occupations 317 cultural features were defined. The Upper Kirk consisted of a scatter of eleven features all of which were located in the southwest portion of the main excavation block. These eleven features consisted of eight surface hearths, one pit, one lithic scatter, and a single rock scatter. The surface hearths form three clusters. Higher densities of debitage generally occur in association with the features at the south end of the Main Block. Lithic tools (chipped stone) show a similar spatial pattern.

One hundred and eight features were defined as part of the Middle Kirk occupation. Lithic scatters and surface hearths were the dominant feature types, but basin hearths, pits, tool caches, and rock scatters were also present. Lithic scatters, the most common feature type, are interpreted to represent the primary deposition of tool production debris resulting from individual knapping episodes. Their abundance reflects the overall high density of debitage in the Middle Kirk zone and indicates the importance of lithic reduction. The large numbers of features in the Middle Kirk zone are distributed along the entire length of the Main Block. Far fewer features occur in the far northern portion of the block, however. There are three clusters of surface hearths composed of from three to eight features. Very high concentrations of debitage are scattered across the southern two-thirds of the block. Most of the lithic scatters tend to be in or very near high density areas in the same area. Lithic tools have a very similar distribution in the block including high densities of bifaces and points.

The 144 features defined in the Lower Kirk occupation represents the most numerous and diverse assemblage of any occupation at the James Farnsley site. This diversity in feature types indicates that a greater range of activities were conducted on the site at this time. These activities included the direct and indirect heating of food, tool production, tool caching, and possibly hide preparation. Surface hearths were the main evidence to indicate the direct heating of food. Features identified as oxidized rings are exclusively found in this subzone. Hide preparation or at least a distinctive activity not represented in the later Kirk occupations was very important during this period as oxidized rings are the most numerous features defined. Twice as many pits are also present in the Lower Kirk zone. In addition, features are more evenly distributed north to south in the Main Block. There are three main clusters of surface hearths. Most of the oxidized rings appear to be on the same surface as the three surface hearth clusters. Debitage tends to be more evenly distributed through the Main Block, with significant concentrations in the north that were absent in the Middle Kirk zone. One of the heaviest concentrations is in the far south of the block, southeast of a cluster of oxidized rings. There is a heavy concentration of tools that coincides with the debitage concentration in the south, but equally heavy concentrations are present in the northern portion of the block. Tool density in the Lower Kirk is substantially less than in the Middle Kirk zone.

A total of six features were defined as part of the Kirk Secondary deposits. These features occurred east of the levee crest, underneath the prehistoric trash deposited on the bank of the early Holocene Ohio River. Associated features included three lithic scatters, a surface hearth, a debris scatter, and a large basin hearth. The heaviest debitage density occurs in the southern three trenches. Debris density drops off significantly in the far northern trench. Substantial amounts of debris are still present down slope in the southern most trenches. The amount of debitage on the bank in the highest density trenches is the same order of magnitude as that recovered in the Middle Kirk zone. Tools follow a similar distributional pattern.

In the Thebes workshop ten lithic scatters were defined as features in the Phase III excavations. One small shallow pit was also identified. All but two of the features are potentially contemporaneous. These features appear to represent discreet knapping events preserved in the low energy overbank sediments. As noted before, the vast majority of the debitage and lithic tools are Muldraugh chert, which outcrops in the nearby bluffs. In general the debitage, hardstone tools including hammerstones, and early stage bifaces are closely associated with the lithic scatters identified.

Thirteen features were identified in the Thebes/St. Charles zone in the Main Block consisting on nine lithic scatters, three shale rock scatters, and one surface hearth. The rock scatters are in the central portion of the Main Block and probably lie on the same sloping geomorphic surface. Three of five lithic scatters at the south end of the block are probably on the same surface. The St. Charles occupations are very ephemeral and probably reflect very short term occupations. The function of the shale scatters is unknown. The shale does not appear to have been heated. With one exception the other features are lithic scatters that reflect tool maintenance but limited tool discard.

In the Early Side Notched zone the vast majority of the features are surface hearths clustered in the northern half of the Main Block. Differences in depth and some superpositioning of features indicates a number of geomorphic surfaces are represented in this area. All are sloping quite dramatically toward the river channel. The Early Side Notched component is the most ephemeral of all of the occupations at the James Farnsley site. Unlike the St. Charles and Thebes components heating facilities are the dominate feature type, although several lithic scatters are also present. As in the other components debitage and tool densities tend to be correlated with one another, but debris density was quite low compared to all of the other components at the site.

SUBSISTENCE REMAINS

Charred botanical remains were derived from features in all but the Thebes workshop occupation. Little charcoal was present in unit contexts except in the Kirk secondary deposit on the channel bank. Faunal remains were rare and consisted mostly of heavily calcined bone fragments. Therefore, subsistence data is largely confined to the archaeobotanical sample analyzed by Schroeder (Volume 1) which is summarized here.

Wood charcoal makes up the majority of the charcoal in the Lower Kirk subzone. Wood of elm/hackberry was the most ubiquitous taxon and highest frequency followed by oak. Bark was plentiful in two oxidized rings analyzed and may support their use as smudge pits given that bark is a smoke producing material. Wood is less common in the Middle Kirk zone at 48% of the tabulated specimens. Oaks predominate followed by elm/hackberry. Wood from the secondary trash deposit is dominated by elm/hackberry similar to the Lower Kirk zone. Only one Upper Kirk feature was sampled and ash was the only wood identified.

Nutshell is an important component of the Lower Kirk archeobotanical sample at just under one-third of the tabulated charcoal and is present in just over 90 percent of the features. Black walnut is the highest frequency nut type. Hazelnut also commonly occurs in features but in low frequency. Hickory is less common and acorn is present in trace amounts.

The nutshell/wood ratio is higher in the Middle Kirk subzone at nearly twice that of the Lower Kirk occupation. Black walnut is still the taxon with the highest frequency, but hazelnut is also common. Hickory is again third in abundance and ubiquity.

In the Kirk secondary deposit there is half as much nutshell as in the Middle Kirk and hickory was recovered in greater frequency than black walnut. Hazelnut has the second highest frequency and is the greatest ubiquity.

Seeds are a rare component of the botanical sample. Grape seed is the most common taxa. Other fruit seeds consist of sumac and pokeweed. Wild chenopod and barnyard grass were recovered from the Lower Kirk subzone and are probably apart of the natural seed rain. Grape and persimmon were identified in the Kirk secondary trash samples.

No charcoal was recovered from the Thebes workshop occupation and the archaeobotanical sample from the Thebes/St. Charles zone in the Main Block is very limited. Charcoal density is very low and wood makes up 99.8 percent of all charcoal. According to Schroeder this is not likely a preservation bias. All of the wood is ring-porous with elm/hackberry, Kentucky coffeetree, and honeylocust present; and they are all mesic bottoms or slope taxa. Only black walnut was present in the nutshell and no carbonized seeds were recovered.

Charcoal density is also very low in the Early Side Notched zone. The charcoal is composed of about twice as much wood as nutshell. Nonresinous coniferous wood was found in every feature from this zone. The taxa represented could be red cedar, eastern hemlock, or bald cypress. All of these species were found in Southern Indiana historically. The next most ubiquitous wood is oak with cottonwood or bigtooth aspen, elm/hackberry, and a coniferous wood (with resin ducts that might be white or scrub pine) also present. The coniferous wood is not present in any of the later Early Archaic occupations at Farnsley or the nearby Townsend site.

Nutshell comprises about one-third of all charcoal and is present in 85% of the features. Black walnut is the most common nut type, followed by hazelnut. Atypically, Butternut is present in two features. Thick-shelled hickory is low in frequency but moderately ubiquitous (23%). Acorn was found in only one feature. Only three unidentifiable charred seeds were recovered.

Faunal identifications (see Appendix C) are limited to White tailed deer from one Kirk basin hearth on the bank slope (F271; indeterminate mammal bone was also recovered) and indeterminate turtle from a second feature (F39) also in the Kirk zone.

Overall there appears to be an emphasis in all of the components on black walnut and hazelnut exploitation in contrast to the late Middle and Late Archaic focus on the bulk processing of hickory nuts as at the Townsend site. The large amounts of wood charcoal compared to nutshell further indicates the low rank of nuts in the diet during this period compared to later in the Archaic. The CAP archaeobotanical Archaic data tend to mirror subsistence trends elsewhere in the Midwest.

SITE FUNCTION AND SETTLEMENT STRATEGIES

Site function clearly changes during the Early Archaic period occupation of the James Farnsley site. A series of Early Side Notched occupations took place as the point bar and overbank deposits were initially forming. Lithic debris and charcoal density are very low indicating a series of brief visits by mobile hunter-gatherers. Large intensely oxidized cooking/heating facilities are characteristic of this zone. A few tools were discarded probably in the process of repairing gear during these brief occupations.

In the subsequent Thebes/St. Charles component, located in the Main Block, the occupations continue to be ephemeral as they are characterized by low debris and charcoal densities. There is less focus on heating/cooking facilities as only one small surface hearth was identified. Features tend to be small lithic scatters of debitage and a small number of tools. The function of the shale scatters is unknown as there is no evidence of burning of the shale or surrounding sediment. On the other hand it is not a feature type seen in the other occupations so it suggests different activities are taking place during this period. Never the less, the occupations appear very short term and at least partially oriented toward reharpening/repair of tools but limited disposal.

The Thebes lithic workshop indicates an entirely different set of activities. The features in the Western Terrace area are almost exclusively lithic scatters of various sizes. These features appear to represent discreet knapping episodes where Muldraugh tool stone was procured from the nearby bluffs and blocks of material were reduced into rough tools probably mostly early stage bifaces. Some of the features are composed of Muldraugh chert debitage, blocks of raw material, hammerstones, and broken early stage bifaces as well as fragments of finished but spent tools. No heating/cooking facilities are associated with this occupation. The knapping activities appear to represent a series very short term visits perhaps only for a day or less. This component does indicate that during the Thebes occupations stone material procurement at least in this case was not embedded in regular subsistence resource procurement but was obtained by a logistical task group that was specifically seeking raw material for tool manufacture. The residential camp was based elsewhere.

The Lower and Middle Kirk occupations reflect yet a different type of site function. In some ways these two occupation zones are similar in that very high densities of debitage and tools are present that are several orders of magnitude greater than the earlier occupations of the site. And yet they are also different from one another (perhaps seasonal). They both appear to represent residential camps but the range of activities differ between them. The Lower Kirk is characterized by surface hearths and lithic scatters but most significant is the presence exclusively of a specialized feature type—the oxidized ring. The attributes that define oxidized rings (small pits with in situ oxidation at the rim and commonly containing a layer of wood charcoal) indicate a unique function not reflected in other features at the site. Whether these are smudge pits are not may be debatable but they do clearly represent a different functional type of feature that sets this occupation apart from the later Middle Kirk zone in which they do not occur.

Lithic reduction is of greater importance in the Middle Archaic zone as indicated by the larger quantities of debitage, tools, tool caches, and lithic scatters with the latter representing discrete knapping episodes. These activities appear to be more concentrated in the southern part of the block in contrast to the Lower Kirk were activities (as represented by features, debris, and tools) are more evenly distributed across the entire block. A wide range of activities are represented in this zone but lithic biface reduction appears to be of particular importance in this residential camp.

The Upper Kirk zone appears to represent a return to the more ephemeral use of this location. Debris and tool density are low and only a few surface hearths are represented in the southern portion of the block. A similar pattern is evident in the Early Archaic occupation that is contemporaneous at the nearby Townsend site.

SETTLEMENT MOBILITY AND LANDSCAPE USE

All of the Archaic components described here are contained within bar/levee deposits laid down by the Ohio River. These landforms tend to be long linear features that extend continuously for several kilometers (Stafford 2004). They are relatively well-drained locations on the landscape that provide immediate access to the river channel and its associated resources. There are many places on these landforms that are virtually identical so that camp relocations over time by mobile hunter-gatherers should not be constrained to particular places and necessarily result in re-use of previous locations.

The Lower and Middle Kirk spatial distribution is noticeably different. Exceptionally high densities of lithic debris in association with features are concentrated in a spatially restricted area of the levee. One-hundred and forty-four and 108 features in the Lower and Middle Kirk occupations respectively are concentrated in a 60 m long area of the early Holocene levee. Undoubtedly this record represents repeated occupation of this precise location over time. Although many locations on the levee would seem suitable, this place is a point on the landscape much like a rock-shelter.

The spatial patterns noted on landforms in this study are argued to be a proxy for the movement of Archaic hunter-gatherers across the landscape. The Early Side Notched and Thebes/St. Charles appear to reflect a strategy of movement as originally hypothesized for the Early Archaic in general (Stafford 1994), where highly mobile foragers take resources as a function of their abundance in the environment. Residential camps are moved frequently in a pattern described (Binford 1982:9) as half-radius continuous or complete-radius leap frog patterns of movement.

The Lower and Middle Kirk occupations on the other hand are reminiscent of point-to-point movement whereby hunter-gatherers move from one relatively rare location to another. Such moves may be many times the foraging radius (Binford 1982:10). Binford (1982) argues that point-to-point movement may be found among foragers or collectors.

The frequency of lithic debitage in the Lower and Middle Kirk occupations indicates the importance of tool production and maintenance. More than 86 per cent of the debitage is Muldraugh. Muldraugh chert is available in the bedrock formations in the bluff within 300 m of the site. It is found in the Mississippian Muldraugh Formation along a 30 km reach of the Ohio River valley (Cantin 1994). Although Muldraugh chert can be procured from many locations adjacent to the early Holocene Ohio River levee in Knob Creek bottom it varies in quality from poor to high. A high quality source of material is known in the bluffs at this location (Stafford and Cantin 1996).

Although there may have been other unknown resources concentrated at this place, availability of high quality chert at a *rare point source* appears to be a factor in the long-term re-use of this place on the landscape during the Kirk period of occupation. Chert procurement and lithic reduction are major activities at the site, but the range of tools and features indicate a more general residential function.

Debitage chert type is also a clue to the use of locations on landforms prior to and after the Kirk period. In the Thebes occupation on the levee Muldraugh is even more prevalent at 98 percent of all debitage. A limited function camp is indicated by the lack of heating facilities or pits, the limited diversity of tools, and fine grain spatial structure associated circumscribed lithic scatters. The Thebes occupation is consistent with a logistical camp designed to specifically acquire stone tool material and initially reduce the stone for transport to a residential camp located elsewhere.

Do the Kirk occupations represent more than re-occupied residential camps? The secondary trash deposit composed of debitage, tools, and wood charcoal and some nutshell indicates that enough trash was being generated by the occupants to require its removal from the primary camp area with disposal on the river bank. A number of factors could account for the high debris depositional rate. If this is an aggregation site then higher amounts of debris would likely be produced within a short period of time necessitating trash cleanup. However, the limited size of the site could not have accommodated a very large group. The proposed size of macroband aggregation camps (Anderson and Hanson 1988) is presumably much larger (hectares in size) than the space used at the Farnsley site (ca. 1200 m^2 maximum).

More likely, the Lower and Middle Kirk occupations represent frequently reoccupied residential camps where “gearing up” activities were predominant resulting in the discard of significant numbers of tools and generation of large quantities of lithic debris. The Lower and Upper occupations are not identical, however. Lithic reduction is more significant in the Middle Kirk than in the Lower (the density of debitage in the Middle Kirk is roughly twice that of the Lower Kirk). Perhaps more importantly a specialized class of features is represented exclusively in the Lower occupation. Small circular features that are oxidized at the pit rim and often containing zones of wood charcoal resembling smudge pits (Chapter 4) are common. If these pits are associated with hide preparation then the Lower Kirk maybe functionally distinct from the Middle occupation. In any case, the level of activity and/or the short interval of reoccupation in both occupations resulted in the generation of levels of refuse that required removal, whether it was lithic debris or charcoal waste.

Tool production and repair or refurbishing in the Lower and Middle Kirk occupations was probably carried out in a specific season when these activities were not competing with subsistence tasks (fall/winter) (Binford 1979). Overall the Lower and Middle Kirk appear to represent greater residential stability than in the earlier Thebes/St. Charles or Early Side Notched periods. This stability, however, is not at the level where resource storage is a component of multisesason base camps seen in the late Middle and Late Archaic (e.g., at the nearby Townsend site).

The Farnsley site Early Archaic data represents mobility patterns at a single locality. To what degree do these data reflect regional patterns of variablility during the Early Archaic in the lower Ohio River valley or Midwest in general? Excavations of Kirk occupations at Swan's Landing (Smith 1986) suggests that the Farnsley site is not wholly unique. Although professional investigations have been limited, there is evidence that nearby Wyandotte chert outcrops were heavily exploited much like Muldraugh chert at Farnsley. Very large numbers of points are known from local collections. Swan's Landing may be another example of point to point movement during the Kirk period.

What seems clear is that the pattern of mobility and landscape use is not uniform during the Early Archaic period. Two strategies of landscape use appear to be present. The Thebes/St. Charles and Early Side Notched components reflect a leapfrog pattern of movement where residential camps are occupied for short periods, while the Kirk occupations appear to represent, at least in part, point-to-point movement across the landscape and perhaps longer term occupations. Tool stone appears to be an important determinant of this latter type of movement. The shift in the pattern of movement, however, is not linear through time and indicates the complexity of Early Holocene hunter-gatherer landscape use.

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Appendix A: 12HR520 FAUNA

Bonnie Styles (Illinois State Musuem)

Table A1. James Farnsley Site (12HR520), animal taxa identified in screened samples from Archaic features and test units. The Number of Identified Specimens and Minimum Number of Individuals in parentheses are presented.

Feature/Unit		F 311	***Total for Early Side Notched***	U 303	***Thebes/ St.Charles***	F 231	F 271	U 39	U 46	U 49	U 20N10E	U 30N10E	U 13N4W	U 30N24W	F 193	Unit 20 F 103	***Total for Kirk***
Cultural Component	Early Side Notched	Early Side Notched		Thebes/ St.Charles		Kirk	Kirk	Kirk	Kirk	Kirk	Kirk	Kirk	Kirk	Kirk	Kirk	Kirk	
Taxa																	
Reptile																	
Indeterminate turtle					***0***			1 (1)									***1 (1)***
Total Reptile	**0**	**0**	***0***	**0**	***0***	**0**	**0**	**1 (1)**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	***1 (1)***
Mammal																	
Odocoileus virginianus					***0***		1 (1)										***1(1)***
Indeterminate mammal				1 (1)	***1 (1)***	1	55(1)		1	3	1	8	1	1	1 (1)	2	***72 (2)***
Total Mammal	**0**	**0**	***0***	**1 (1)**	***1 (1)***	**1**	**56(2)**	**0**	**1**	**3**	**1**	**8**	**1**	**1**	**1 (1)**	**2**	***73 (3)***
Indeterminate Vertabrate	1 (1)	4	***5 (1)***	0	***0***	0	18	0	0	0	0	1	0	0	0	0	***19***
Total Bone	**1 (1)**	**4**	***5 (1)***	**1 (1)**	***1(1)***	**1**	**74 (2)**	**1 (1)**	**1**	**3**	**1**	**9**	**1**	**1**	**1 (1)**	**2**	***95 (4)***

Table A2. James Farnsley Site (12HR520), Modifications to bone in screened samples from Archaic features and test units. The Number of Identified Specimens (NISP) is presented. V=indeterminate vertebrate, M=mammal, R=reptile.

Feature (or other) provenience	Class	NISP	Burning			Weathering	Gnawing			Ingested	Human		Staining		Pitted
			Calcined	Black	Red		Rodent	Carnivore	Unknown		Cut	Artifact	Brown	Black	
	V	*1*	1			1									
F 311	*V*	*4*	4			4									
Total for Early Side Notched		5	**5**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Feature (or other) provenience	*Class*	*NISP*	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
			Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
Unit 303	*M*	*1*	1			1									
Total for Thebes/St. Charles		1	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Feature (or other) **provenience**	*Class*	*NISP*	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
			Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		Cut	Artifact	**Brown**	**Black**	
F 231	*M*	*1*		1		1									
F 271	*M*	*56*	53	2		56									
	V	*18*	17	1		18									
Unit 39	*R*	*1*			1	1								1	
Unit 46	*M*	*1*				1				1					1
Unit 49	*M*	*3*	3			3									
Unit 2ON10E	*M*	*1*	1			1									
Unit 13N4W	*M*	*1*		1		1									

Unit 30N10E	***M***	***8***	8			8									
	V	***1***	1			1									
Unit 30N24W	***M***	***1***	1			1									
Total for Kirk		*92*	**84**	**5**	**1**	**92**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**
F 193	***M***	***1***	1			1									
Unit 20	***M***	***2***	2			2									
Total for Upper Kirk	*3*	**3**		**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total Bone	*101*	**93**		**5**	**1**	**101**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**1**

APPENDIX B

12HR520 FEATURE ATTRIBUTES & CONTENTS

APPENDIX B: 12Hr520 Feature Dimensions by Component

Component	Feature	Type	Volume (dm^3)	Area (m^2)	Depth (cm)
Woodland	F-WT16	Rock Scatter	0.0	0.195	15
Woodland	F-WT8	Pit	519.3	0.515	19.5
Upper Kirk	F21	Pit	252.8	0.158	16
Upper Kirk	F25	Lithic Scatter	0.0	0.083	13
Upper Kirk	F36	Surface Hearth	0.0	0.202	5
Upper Kirk	F41	Rock Scatter	0.0	0.291	15
Upper Kirk	F43	Surface Hearth	0.0	0.193	10
Upper Kirk	F47	Surface Hearth	0.0	0.088	16
Upper Kirk	F53	Surface Hearth	0.0	0.24	15
Upper Kirk	F54	Surface Hearth	0.0	0.116	12
Upper Kirk	F58	Surface Hearth	0.0	0.071	9
Upper Kirk	F62	Surface Hearth	0.0	0.225	12
Upper Kirk	F63	Surface Hearth	0.0	0.477	10
Unknown	F319	Debris Scatter	0.0	0.235	6
Thebes	F-WT1	Lithic Scatter	0.0	1.085	9
Thebes	F-WT10	Lithic Scatter	0.0	2.676	10
Thebes	F-WT11	Lithic Scatter	0.0	0.698	9
Thebes	F-WT13	Lithic Scatter	0.0	0.069	17.5
Thebes	F-WT14	Lithic Scatter	0.0	0.116	5
Thebes	F-WT2	Lithic Scatter	0.0	0.872	10
Thebes	F-WT3	Lithic Scatter	0.0	6.277	21
Thebes	F-WT4	Lithic Scatter	0.0	0.442	13
Thebes	F-WT5	Lithic Scatter	0.0	0.347	10
Thebes	F-WT6	Lithic Scatter	0.0	0.188	10
Thebes	F-WT7	Pit	353.4	0.186	19
Thebes	F-WT9	Lithic Scatter	0.0	0.109	17
St Charles	F279	Rock Scatter	0.0	0.912	6.5
St Charles	F280	Lithic Scatter	0.0	0.573	11
St Charles	F284	Rock Scatter	0.0	0.31	6
St Charles	F285	Rock Scatter	0.0	2.153	19
St Charles	F290	Lithic Scatter	0.0	0.544	13
St Charles	F291	Lithic Scatter	0.0	0.356	9
St Charles	F292	Lithic Scatter	0.0	0.565	20
St Charles	F293	Lithic Scatter	0.0	0.778	12
St Charles	F295	Lithic Scatter	0.0	0.701	8
St Charles	F298	Surface Hearth	0.0	0.316	12
St Charles	F299	Lithic Scatter	0.0	0.26	10
St Charles	F302	Lithic Scatter	0.0	0.52	5

Component	Feature	Type	Volume (dm^3)	Area (m^2)	Depth (cm)
St Charles	F303	Lithic Scatter	0.0	0.249	10
Sec Kirk	F1	Lithic Scatter	0.0	0.107	10
Sec Kirk	F122	Lithic Scatter	0.0	0.092	7
Sec Kirk	F18	Surface Hearth	0.0	0.126	14
Sec Kirk	F271	Basin Hearth	8981.3	2.742	60
Sec Kirk	F49	Debris Scatter	0.0	0.362	23
Sec Kirk	F89	Lithic Scatter	0.0	0.328	20
Middle Kirk	F103	Pit	78.8	0.27	6
Middle Kirk	F105	Lithic Scatter	0.0	0.176	12
Middle Kirk	F108	Lithic Scatter	0.0	0.044	2
Middle Kirk	F109	Lithic Scatter	0.0	0.033	11
Middle Kirk	F110	Surface Hearth	0.0	0.079	7
Middle Kirk	F113	Lithic Scatter	0.0	0.041	17
Middle Kirk	F116	Surface Hearth	0.0	0.194	19
Middle Kirk	F118	Surface Hearth	0.0	0.465	14
Middle Kirk	F12	Basin Hearth	156.0	0.052	30
Middle Kirk	F123	Lithic Scatter	0.0	0.052	4
Middle Kirk	F124	Surface Hearth	0.0	0.084	13
Middle Kirk	F128	Lithic Scatter	0.0	0.15	5
Middle Kirk	F129	Lithic Scatter	0.0	0.44	11
Middle Kirk	F133	Lithic Scatter	0.0	0.159	4
Middle Kirk	F134	Lithic Scatter	0.0	0.098	4
Middle Kirk	F135	Lithic Scatter	0.0	0.308	11
Middle Kirk	F140	Lithic Scatter	0.0	0.102	7
Middle Kirk	F141	Lithic Scatter	0.0	0.053	7
Middle Kirk	F142	Surface Hearth	0.0	0.226	25
Middle Kirk	F144	Lithic Scatter	0.0	0.161	10.5
Middle Kirk	F146	Lithic Scatter	0.0	0.069	7
Middle Kirk	F149	Lithic Scatter	0.0	0.26	7
Middle Kirk	F14A	Surface Hearth	0.0	1.229	53
Middle Kirk	F14B	Tool Cache	0.0	0.021	4.5
Middle Kirk	F153	Tool Cache	0.0	0.079	7
Middle Kirk	F154	Lithic Scatter	0.0	0.071	10
Middle Kirk	F158	Surface Hearth	0.0	0.292	9
Middle Kirk	F161	Lithic Scatter	0.0	0.386	3
Middle Kirk	F163	Lithic Scatter	0.0	0.101	4
Middle Kirk	F164	Lithic Scatter	0.0	0.046	3
Middle Kirk	F170	Pit	40.5	0.064	11
Middle Kirk	F171	Lithic Scatter	0.0	0.184	15
Middle Kirk	F175	Tool Cache	0.0	0.019	6

Component	Feature	Type	Volume (dm^3)	Area (m^2)	Depth (cm)
Middle Kirk	F179	Lithic Scatter	0.0	0.077	5
Middle Kirk	F182	Lithic Scatter	0.0	0.155	10
Middle Kirk	F183	Lithic Scatter	0.0	0.113	7
Middle Kirk	F184	Surface Hearth	0.0	0.172	11
Middle Kirk	F186	Lithic Scatter	0.0	0.225	6
Middle Kirk	F187	Lithic Scatter	0.0	0.079	4
Middle Kirk	F188	Surface Hearth	0.0	1.271	30
Middle Kirk	F191	Lithic Scatter	0.0	0.089	18
Middle Kirk	F193	Lithic Scatter	0.0	0.852	10.5
Middle Kirk	F194	Lithic Scatter	0.0	0.218	8
Middle Kirk	F195	Lithic Scatter	0.0	0.044	8
Middle Kirk	F198	Lithic Scatter	0.0	0.138	5
Middle Kirk	F2	Lithic Scatter	0.0	0.4	10
Middle Kirk	F203	Lithic Scatter	0.0	0.175	4
Middle Kirk	F205	Surface Hearth	0.0	0.158	8
Middle Kirk	F212	Lithic Scatter	0.0	0.088	10.5
Middle Kirk	F213	Pit	131.1	0.295	9
Middle Kirk	F218	Lithic Scatter	0.0	0.087	6
Middle Kirk	F22	Surface Hearth	0.0	0.132	15
Middle Kirk	F220	Lithic Scatter	0.0	0.081	10
Middle Kirk	F223	Lithic Scatter	0.0	0.052	6
Middle Kirk	F225	Pit	359.0	0.31	21
Middle Kirk	F227	Surface Hearth	0.0	0.039	12
Middle Kirk	F230	Lithic Scatter	0.0	0.25	5
Middle Kirk	F231	Rock Scatter	0.0	0.11	12
Middle Kirk	F232	Surface Hearth	0.0	0.323	11
Middle Kirk	F236	Lithic Scatter	0.0	0.244	5
Middle Kirk	F239	Surface Hearth	0.0	0.23	13
Middle Kirk	F240	Lithic Scatter	0.0	0.03	2
Middle Kirk	F243	Lithic Scatter	0.0	0.018	4
Middle Kirk	F245	Lithic Scatter	0.0	0.071	7
Middle Kirk	F246	Lithic Scatter	0.0	0.104	8
Middle Kirk	F251	Lithic Scatter	0.0	0.112	6
Middle Kirk	F252	Lithic Scatter	0.0	0.076	2
Middle Kirk	F253	Lithic Scatter	0.0	0.202	12
Middle Kirk	F254	Lithic Scatter	0.0	0.046	8
Middle Kirk	F257	Pit	259.7	0.366	14
Middle Kirk	F258	Surface Hearth	0.0	0.137	17
Middle Kirk	F259	Lithic Scatter	0.0	0.04	4
Middle Kirk	F26	Lithic Scatter	0.0	0.291	3.5

Component	Feature	Type	Volume (dm^3)	Area (m^2)	Depth (cm)
Middle Kirk	F265	Lithic Scatter	0.0	0.463	7
Middle Kirk	F266	Surface Hearth	0.0	0.11	17
Middle Kirk	F267	Lithic Scatter	0.0	0.05	4
Middle Kirk	F270	Pit	16.7	0.115	3
Middle Kirk	F272	Surface Hearth	0.0	0.393	10
Middle Kirk	F286	Tool Cache	0.0	0.019	10
Middle Kirk	F3	Surface Hearth	0.0	0.186	10
Middle Kirk	F33	Lithic Scatter	0.0	0.024	5
Middle Kirk	F37	Surface Hearth	0.0	0.57	7
Middle Kirk	F38	Surface Hearth	0.0	0.084	19
Middle Kirk	F39	Rock Scatter	0.0	0.353	3.5
Middle Kirk	F40	Surface Hearth	0.0	0.62	16
Middle Kirk	F45	Surface Hearth	0.0	1.47	22
Middle Kirk	F46	Surface Hearth	0.0	0.308	12
Middle Kirk	F48	Surface Hearth	0.0	0.496	12.5
Middle Kirk	F51	Pit	755.4	0.363	33
Middle Kirk	F52	Surface Hearth	0.0	0.343	10
Middle Kirk	F59	Surface Hearth	0.0	0.516	17
Middle Kirk	F60	Surface Hearth	0.0	0.524	37
Middle Kirk	F67	Surface Hearth	0.0	0.37	20
Middle Kirk	F71	Tool Cache	0.0	0.036	6.5
Middle Kirk	F76	Tool Cache	0.0	0.022	9
Middle Kirk	F77	Lithic Scatter	0.0	0.23	10
Middle Kirk	F79	Lithic Scatter	0.0	0.298	8
Middle Kirk	F8	Surface Hearth	0.0	0.395	8
Middle Kirk	F80	Lithic Scatter	0.0	1.016	7
Middle Kirk	F81	Lithic Scatter	0.0	0.22	10
Middle Kirk	F82	Surface Hearth	0.0	0.633	8
Middle Kirk	F85	Lithic Scatter	0.0	0.037	6
Middle Kirk	F86	Lithic Scatter	0.0	0.049	5
Middle Kirk	F87	Lithic Scatter	0.0	0.06	4
Middle Kirk	F88	Rock Scatter	0.0	0.057	17
Middle Kirk	F93	Lithic Scatter	0.0	1.076	6
Middle Kirk	F96	Lithic Scatter	0.0	0.462	3
Middle Kirk	F97	Surface Hearth	0.0	0.079	15
Lower Kirk	F10	Pit	1424.8	0.857	31
Lower Kirk	F100	Lithic Scatter	0.0	0.016	5
Lower Kirk	F101	Surface Hearth	0.0	0.21	8
Lower Kirk	F102	Surface Hearth	0.0	0.097	19
Lower Kirk	F104	Surface Hearth	0.0	0.21	17

Component	Feature	Type	Volume (dm^3)	Area (m^2)	Depth (cm)
Lower Kirk	F106	Oxidized Ring	74.3	0.114	12
Lower Kirk	F107	Surface Hearth	0.0	0.143	6
Lower Kirk	F11	Basin Hearth	212.6	0.25	16
Lower Kirk	F111	Tool Cache	0.0	0.033	4
Lower Kirk	F112	Lithic Scatter	0.0	0.112	5
Lower Kirk	F114	Lithic Scatter	0.0	0.3	13
Lower Kirk	F115	Lithic Scatter	0.0	0.036	9.5
Lower Kirk	F117	Surface Hearth	0.0	0.159	20
Lower Kirk	F121	Lithic Scatter	0.0	0.145	10
Lower Kirk	F125	Oxidized Ring	211.2	0.132	16
Lower Kirk	F126	Lithic Scatter	0.0	0.164	5
Lower Kirk	F127	Oxidized Ring	59.4	0.066	9
Lower Kirk	F13	Oxidized Ring	175.0	0.07	25
Lower Kirk	F130	Surface Hearth	0.0	0.149	27
Lower Kirk	F131	Lithic Scatter	0.0	0.041	7
Lower Kirk	F132	Surface Hearth	0.0	0.164	12
Lower Kirk	F136	Pit	465.3	0.54	17
Lower Kirk	F137	Oxidized Ring	48.0	0.048	10
Lower Kirk	F138	Surface Hearth	0.0	0.075	8
Lower Kirk	F143	Surface Hearth	0.0	0.199	11
Lower Kirk	F145	Pit	90.9	0.23	8
Lower Kirk	F147	Oxidized Ring	10.7	0.042	5
Lower Kirk	F148	Lithic Scatter	0.0	0.125	9
Lower Kirk	F15	Oxidized Ring	115.6	0.137	15
Lower Kirk	F150	Surface Hearth	0.0	0.067	13
Lower Kirk	F151	Oxidized Ring	106.7	0.097	11
Lower Kirk	F152	Pit	979.8	0.213	46
Lower Kirk	F155	Surface Hearth	0.0	0.036	4.5
Lower Kirk	F156	Surface Hearth	0.0	0.357	17
Lower Kirk	F157	Surface Hearth	0.0	0.382	9.5
Lower Kirk	F159	Surface Hearth	0.0	0.149	6
Lower Kirk	F16	Surface Hearth	0.0	0.232	21
Lower Kirk	F160	Lithic Scatter	0.0	0.004	10
Lower Kirk	F162	Surface Hearth	0.0	0.13	12
Lower Kirk	F165	Oxidized Ring	149.6	0.068	22
Lower Kirk	F166	Lithic Scatter	0.0	0.544	15
Lower Kirk	F167	Oxidized Ring	84.5	0.065	13
Lower Kirk	F168	Surface Hearth	0.0	0.102	6
Lower Kirk	F169	Lithic Scatter	0.0	0.156	13
Lower Kirk	F17	Surface Hearth	0.0	0.595	16

Component	Feature	Type	Volume (dm^3)	Area (m^2)	Depth (cm)
Lower Kirk	F172	Lithic Scatter	0.0	0.036	3
Lower Kirk	F173	Pit	74.2	0.106	7
Lower Kirk	F174	Lithic Scatter	0.0	0.06	4
Lower Kirk	F176	Oxidized Ring	126.0	0.06	21
Lower Kirk	F178	Pit	311.4	0.409	15
Lower Kirk	F180	Oxidized Ring	49.0	0.07	7
Lower Kirk	F181	Lithic Scatter	0.0	0.05	10
Lower Kirk	F185	Pit	41.0	0.075	10
Lower Kirk	F189	Surface Hearth	0.0	0.118	9
Lower Kirk	F19	Lithic Scatter	0.0	0.189	2
Lower Kirk	F190	Tool Cache	0.0	0.022	2
Lower Kirk	F196	Lithic Scatter	0.0	0.046	6
Lower Kirk	F199	Tool Cache	0.0	0.028	8
Lower Kirk	F20	Rock Scatter	0.0	2.019	9
Lower Kirk	F200	Lithic Scatter	0.0	0.063	8.5
Lower Kirk	F201	Lithic Scatter	0.0	0.15	19.5
Lower Kirk	F202	Oxidized Ring	124.1	0.073	17
Lower Kirk	F206	Oxidized Ring	558.0	0.31	18
Lower Kirk	F207	Oxidized Ring	174.0	0.087	20
Lower Kirk	F208	Lithic Scatter	0.0	0.137	10
Lower Kirk	F209	Oxidized Ring	171.0	0.114	15
Lower Kirk	F210	Lithic Scatter	0.0	0.214	4
Lower Kirk	F211	Oxidized Ring	94.5	0.105	9
Lower Kirk	F214	Surface Hearth	0.0	0.211	12
Lower Kirk	F215	Oxidized Ring	117.6	0.049	24
Lower Kirk	F216	Surface Hearth	0.0	0.074	8
Lower Kirk	F217	Lithic Scatter	0.0	0.037	4
Lower Kirk	F219	Surface Hearth	0.0	0.065	17
Lower Kirk	F221	Oxidized Ring	52.5	0.03	17.5
Lower Kirk	F222	Oxidized Ring	28.0	0.056	5
Lower Kirk	F224	Oxidized Ring	61.2	0.117	10
Lower Kirk	F226	Lithic Scatter	0.0	0.011	13
Lower Kirk	F228	Oxidized Ring	250.3	0.352	14
Lower Kirk	F229	Surface Hearth	0.0	0.163	8
Lower Kirk	F23	Surface Hearth	0.0	0.616	19.5
Lower Kirk	F234	Pit	24.0	0.047	9
Lower Kirk	F235	Oxidized Ring	152.6	0.109	14
Lower Kirk	F237	Lithic Scatter	0.0	0.119	7
Lower Kirk	F238	Surface Hearth	0.0	0.103	4
Lower Kirk	F24	Surface Hearth	0.0	0.025	1.5

Component	Feature	Type	Volume (dm^3)	Area (m^2)	Depth (cm)
Lower Kirk	F241	Oxidized Ring	917.8	0.353	26
Lower Kirk	F242	Oxidized Ring	136.0	0.068	20
Lower Kirk	F244	Pit	123.2	0.088	14
Lower Kirk	F247	Surface Hearth	0.0	0.438	17
Lower Kirk	F248	Oxidized Ring	23.8	0.028	8.5
Lower Kirk	F249	Lithic Scatter	0.0	0.058	3
Lower Kirk	F250	Oxidized Ring	43.0	0.091	9
Lower Kirk	F255	Oxidized Ring	294.4	0.128	23
Lower Kirk	F256	Pit	788.0	0.394	20
Lower Kirk	F260	Debris Scatter	0.0	0.064	5
Lower Kirk	F261	Oxidized Ring	10.0	0.031	6
Lower Kirk	F262	Oxidized Ring	123.5	0.065	19
Lower Kirk	F263	Oxidized Ring	14.9	0.032	8
Lower Kirk	F269	Lithic Scatter	0.0	0.091	18
Lower Kirk	F27	Oxidized Ring	94.4	0.12	14
Lower Kirk	F273	Oxidized Ring	16.8	0.037	8
Lower Kirk	F275	Oxidized Ring	159.7	0.144	18.5
Lower Kirk	F276	Oxidized Ring	14.3	0.046	6
Lower Kirk	F278	Oxidized Ring	214.5	0.143	15
Lower Kirk	F28	Surface Hearth	0.0	0.395	24
Lower Kirk	F281	Lithic Scatter	0.0	0.063	2
Lower Kirk	F282	Post	0.0	0.017	22
Lower Kirk	F283	Pit	611.1	0.291	21
Lower Kirk	F287	Lithic Scatter	0.0	0.02	7
Lower Kirk	F288	Surface Hearth	0.0	0.807	6
Lower Kirk	F296	Pit	17.9	0.053	6.5
Lower Kirk	F29A	Oxidized Ring	276.9	0.213	13
Lower Kirk	F29B	Rock Scatter	0.0	0.128	13
Lower Kirk	F29C	Pit	102.8	0.182	11
Lower Kirk	F30	Surface Hearth	0.0	0.03	7
Lower Kirk	F31	Oxidized Ring	15.0	0.03	5
Lower Kirk	F32	Pit	37.2	0.067	10
Lower Kirk	F34	Basin Hearth	824.6	0.266	31
Lower Kirk	F4	Surface Hearth	0.0	0.365	9
Lower Kirk	F42a	Surface Hearth	0.0	0.149	9
Lower Kirk	F42b	Tool Cache	0.0	0.01	2
Lower Kirk	F44	Surface Hearth	0.0	0.095	9
Lower Kirk	F6	Oxidized Ring	20.4	0.026	11
Lower Kirk	F61	Surface Hearth	0.0	0.05	5
Lower Kirk	F64	Pit	157.2	0.09	23

Component	Feature	Type	Volume (dm^3)	Area (m^2)	Depth (cm)
Lower Kirk	F65	Oxidized Ring	196.0	0.098	20
Lower Kirk	F68	Oxidized Ring	27.9	0.056	9
Lower Kirk	F69	Oxidized Ring	32.5	0.133	5
Lower Kirk	F7	Surface Hearth	0.0	1.73	17
Lower Kirk	F70	Oxidized Ring	401.5	0.217	18.5
Lower Kirk	F72	Basin Hearth	0.0	0.5	9
Lower Kirk	F73	Oxidized Ring	219.6	0.122	18
Lower Kirk	F74	Surface Hearth	0.0	0.15	12
Lower Kirk	F75	Lithic Scatter	0.0	0.078	7
Lower Kirk	F78	Lithic Scatter	0.0	0.039	5
Lower Kirk	F83	Pit	418.8	0.324	23
Lower Kirk	F84	Rock Scatter	0.0	0.182	5
Lower Kirk	F9	Lithic Scatter	0.0	0.574	14
Lower Kirk	F91	Pit	114.7	0.257	9
Lower Kirk	F92	Oxidized Ring	79.5	0.053	15
Lower Kirk	F94	Oxidized Ring	66.0	0.066	10
Lower Kirk	F95	Surface Hearth	0.0	0.281	5
Lower Kirk	F98	Oxidized Ring	70.0	0.1	7
Lower Kirk	F99	Lithic Scatter	0.0	0.143	10
Early Woodland	F-WT12	Pit	756.8	0.344	22
Early Woodland	F-WT17	Pit	86.7	0.219	8
Early SN	F300	Surface Hearth	0.0	2.774	36
Early SN	F304	Lithic Scatter	0.0	1.937	38
Early SN	F305	Lithic Scatter	0.0	0.126	8.5
Early SN	F306	Surface Hearth	0.0	0.931	27
Early SN	F307	Surface Hearth	0.0	0.095	10.5
Early SN	F308	Surface Hearth	0.0	0.447	7
Early SN	F309	Surface Hearth	0.0	0.253	11
Early SN	F310	Surface Hearth	0.0	0.579	12
Early SN	F311	Surface Hearth	0.0	1.158	32
Early SN	F312	Lithic Scatter	0.0	0.119	1
Early SN	F313	Surface Hearth	0.0	5.839	27.5
Early SN	F314	Basin Hearth	197.6	0.508	8
Early SN	F315	Lithic Scatter	0.0	1.365	22
Early SN	F316	Surface Hearth	0.0	0.47	6
Early SN	F317	Surface Hearth	0.0	0.41	33
Early SN	F318	Surface Hearth	0.0	1.439	8
Early SN	F35	Surface Hearth	0.0	0.333	10
Early SN	F-WT15	Surface Hearth	0.0	1.182	16

APPENDIX B: 12Hr520 Feature Tools

Feature	Class	Type	Count
F1	Hardstone	Manuport	1
F10	Hardstone	Hammerstone	1
F100	Hardstone	Hammerstone	2
F100	Hardstone	Hammerstone/Anvil	1
F121	Hardstone	Hammerstone	2
F121	Hardstone	Hammerstone/Anvil	1
F129	Hardstone	Hammerstone	1
F132	Hardstone	Pitted Stone	1
F133	Hardstone	Hammerstone	1
F14A	Hardstone	Anvil	1
F14A	Hardstone	Pitted Stone	1
F166	Hardstone	Hammerstone	1
F167	Hardstone	Pitted Stone	1
F17	Hardstone	Hammerstone	1
F178	Hardstone	Manuport	4
F186	Hardstone	Manuport	1
F188	Hardstone	Hammerstone/Anvil	1
F188	Hardstone	Manuport	2
F196	Hardstone	Abrader	1
F196	Hardstone	Hammerstone	1
F201	Hardstone	Manuport	2
F201	Hardstone	Pitted Stone	1
F206	Hardstone	Hammerstone	1
F212	Hardstone	Hammerstone/Anvil	1
F212	Hardstone	Manuport	1
F213	Hardstone	Hammerstone	1
F226	Hardstone	Hammerstone	1
F231	Hardstone	Hammerstone	2
F232	Hardstone	Pitted Stone	1
F251	Hardstone	Hammerstone	1
F258	Hardstone	Hammerstone	1
F258	Hardstone	Manuport	1
F265	Hardstone	Manuport	1
F270	Hardstone	Hammerstone	1
F271	Hardstone	Hammerstone	1
F271	Hardstone	Manuport	1
F287	Hardstone	Hammerstone	2
F29A	Hardstone	Hammerstone	1
F29A	Hardstone	Manuport	1

Feature	Class	Type	Count
F300	Hardstone	Hammerstone/Anvil	1
F300	Hardstone	Manuport	1
F300	Hardstone	Pitted Stone	1
F306	Hardstone	Manuport	2
F311	Hardstone	Manuport	2
F312	Hardstone	Hammerstone	1
F312	Hardstone	Manuport	1
F314	Hardstone	Manuport	4
F317	Hardstone	Manuport	1
F35	Hardstone	Pitted Stone	2
F39	Hardstone	Hammerstone	1
F40	Hardstone	Hammerstone	1
F41	Hardstone	Anvil	1
F41	Hardstone	Hammerstone	1
F41	Hardstone	Manuport	1
F71	Hardstone	Hammerstone	1
F72	Hardstone	Abrader	1
F72	Hardstone	Hammerstone/Anvil	1
F75	Hardstone	Hammerstone	1
F8	Hardstone	Abrader	1
F81	Hardstone	Hammerstone	1
F82	Hardstone	Anvil	1
F84	Hardstone	Hammerstone/Anvil	1
F84	Hardstone	Manuport	1
F88	Hardstone	Manuport	1
F89	Hardstone	Hammerstone	1
F-WT1	Hardstone	Hammerstone	2
F-WT1	Hardstone	Hammerstone/Anvil	1
F-WT10	Hardstone	Hammerstone	2
F-WT2	Hardstone	Hammerstone	3
F-WT2	Hardstone	Pitted Stone/Hammerstone	1
F-WT6	Hardstone	Hammerstone	3
F-WT8	Hardstone	Hammerstone	1
F1	Lithic	Adze	1
F1	Lithic	Biface	6
F1	Lithic	Point	3
F1	Lithic	Utilized Flake	1
F10	Lithic	Point	1
F103	Lithic	Biface	2

Feature	Class	Type	Count
F105	Lithic	Adze	1
F106	Lithic	Biface	1
F108	Lithic	Biface	1
F111	Lithic	Adze	3
F112	Lithic	Biface	1
F113	Lithic	Biface	5
F113	Lithic	Chopper	1
F113	Lithic	Core	1
F113	Lithic	Point	1
F114	Lithic	Biface	2
F114	Lithic	Bifacial Flake	1
F116	Lithic	Scraper	1
F121	Lithic	Adze	4
F121	Lithic	Biface	3
F121	Lithic	Bifacial Flake	1
F121	Lithic	Core	1
F121	Lithic	Point	7
F121	Lithic	Retouched Flake	2
F124	Lithic	Biface	2
F125	Lithic	Biface	1
F126	Lithic	Biface	2
F126	Lithic	Point	1
F128	Lithic	Biface	1
F129	Lithic	Biface	2
F129	Lithic	Core	1
F129	Lithic	Retouched Flake	1
F13	Lithic	Biface	1
F131	Lithic	Biface	1
F132	Lithic	Biface	1
F133	Lithic	Adze	1
F133	Lithic	Biface	1
F135	Lithic	Adze	1
F135	Lithic	Point	3
F136	Lithic	Biface	4
F136	Lithic	Core	1
F136	Lithic	Point	3
F137	Lithic	Utilized Flake	1
F140	Lithic	Biface	1
F140	Lithic	Point	1
F141	Lithic	Scraper	1

Feature	Class	Type	Count
F143	Lithic	Adze	1
F144	Lithic	Core	1
F146	Lithic	Point	1
F148	Lithic	Point	1
F149	Lithic	Biface	1
F149	Lithic	Core	1
F14A	Lithic	Adze	2
F14A	Lithic	Biface	6
F14A	Lithic	Core	1
F14A	Lithic	Point	4
F14A	Lithic	Utilized Flake	1
F14B	Lithic	Biface	11
F14B	Lithic	Retouched Flake	1
F15	Lithic	Biface	2
F15	Lithic	Uniface	1
F15	Lithic	Utilized Flake	1
F152	Lithic	Bifacial Flake	1
F152	Lithic	Core	1
F153	Lithic	Retouched Flake	1
F153	Lithic	Scraper	5
F156	Lithic	Biface	1
F156	Lithic	Perforator	1
F157	Lithic	Biface	1
F157	Lithic	Uniface	1
F158	Lithic	Biface	2
F159	Lithic	Point	1
F16	Lithic	Point	1
F160	Lithic	Biface	1
F161	Lithic	Chopper	1
F161	Lithic	Scraper	1
F166	Lithic	Biface	3
F166	Lithic	Scraper	1
F167	Lithic	Biface	1
F169	Lithic	Biface	1
F17	Lithic	Biface	1
F17	Lithic	Scraper	1
F170	Lithic	Biface	1
F170	Lithic	Point	1
F171	Lithic	Point	1
F175	Lithic	Retouched Flake	2

Feature	Class	Type	Count
F175	Lithic	Scraper	6
F175	Lithic	Scraper/Graver	1
F175	Lithic	Uniface	5
F176	Lithic	Tested Cobble	1
F178	Lithic	Adze	1
F178	Lithic	Biface	1
F178	Lithic	Point	1
F179	Lithic	Biface	2
F182	Lithic	Biface	2
F182	Lithic	Tested Cobble	1
F183	Lithic	Biface	3
F183	Lithic	Retouched Flake	1
F186	Lithic	Point	1
F187	Lithic	Point	1
F187	Lithic	Scraper	1
F188	Lithic	Biface	2
F188	Lithic	Core	1
F188	Lithic	Point	1
F188	Lithic	Retouched Flake	1
F188	Lithic	Scraper	1
F188	Lithic	Tested Cobble	1
F19	Lithic	Core	6
F19	Lithic	Tested Cobble	1
F190	Lithic	Biface	2
F190	Lithic	Point	1
F190	Lithic	Uniface	1
F191	Lithic	Biface	1
F193	Lithic	Biface	2
F194	Lithic	Adze	1
F194	Lithic	Biface	3
F194	Lithic	Point	1
F194	Lithic	Scraper	4
F195	Lithic	Point	1
F196	Lithic	Biface	3
F197	Lithic	Core	1
F199	Lithic	Scraper	4
F199	Lithic	Uniface	1
F2	Lithic	Biface	3
F2	Lithic	Core	1
F2	Lithic	Tested Cobble	1

Feature	Class	Type	Count
F201	Lithic	Biface	1
F208	Lithic	Biface	1
F210	Lithic	Biface	2
F210	Lithic	Point	1
F212	Lithic	Biface	1
F212	Lithic	Scraper	2
F213	Lithic	Biface	1
F218	Lithic	Biface	1
F220	Lithic	Biface	1
F220	Lithic	Core	1
F223	Lithic	Biface	1
F223	Lithic	Point	1
F226	Lithic	Biface	2
F226	Lithic	Point	1
F226	Lithic	Retouched Flake	1
F226	Lithic	Scraper	1
F23	Lithic	Biface	1
F231	Lithic	Adze	2
F231	Lithic	Point	1
F231	Lithic	Retouched Flake	1
F231	Lithic	Uniface	1
F236	Lithic	Biface	4
F237	Lithic	Biface	2
F237	Lithic	Core	4
F237	Lithic	Tested Cobble	1
F241	Lithic	Biface	3
F241	Lithic	Point	2
F241	Lithic	Retouched Flake	1
F241	Lithic	Scraper	1
F246	Lithic	Biface	1
F248	Lithic	Biface	1
F249	Lithic	Retouched Flake	1
F25	Lithic	Biface	1
F251	Lithic	Adze	2
F251	Lithic	Biface	1
F251	Lithic	Scraper	1
F253	Lithic	Point	1
F254	Lithic	Biface	2
F254	Lithic	Point	2
F255	Lithic	Core	1

Feature	Class	Type	Count
F256	Lithic	Biface	2
F257	Lithic	Biface	2
F257	Lithic	Core	1
F258	Lithic	Adze	1
F265	Lithic	Adze	3
F265	Lithic	Biface	2
F265	Lithic	Point	5
F265	Lithic	Retouched Flake	1
F265	Lithic	Scraper	1
F271	Lithic	Adze	1
F271	Lithic	Biface	16
F271	Lithic	Bifacial Flake	1
F271	Lithic	Chopper	1
F271	Lithic	Core	3
F271	Lithic	Drill	1
F271	Lithic	Graver	1
F271	Lithic	Point	8
F271	Lithic	Retouched Flake	2
F271	Lithic	Scraper	3
F271	Lithic	Uniface	1
F271	Lithic	Utilized Flake	1
F275	Lithic	Drill	1
F281	Lithic	Biface	1
F283	Lithic	Biface	2
F286	Lithic	Graver	1
F286	Lithic	Scraper	4
F286	Lithic	Uniface	3
F287	Lithic	Biface	2
F290	Lithic	Scraper	1
F295	Lithic	Biface	1
F299	Lithic	Point	1
F29A	Lithic	Core	1
F29B	Lithic	Biface	1
F29B	Lithic	Chopper	1
F29C	Lithic	Biface	1
F3	Lithic	Adze	1
F3	Lithic	Core	1
F3	Lithic	Point	1
F3	Lithic	Scraper	1
F300	Lithic	Biface	2

Feature	Class	Type	Count
F300	Lithic	Point	1
F300	Lithic	Retouched Flake	1
F303	Lithic	Core	1
F304	Lithic	Core	2
F304	Lithic	Retouched Flake	1
F304	Lithic	Tested Cobble	1
F311	Lithic	Biface	1
F312	Lithic	Scraper	1
F313	Lithic	Point	1
F315	Lithic	Biface	3
F315	Lithic	Tested Cobble	1
F40	Lithic	Biface	1
F45	Lithic	Point	5
F48	Lithic	Adze	1
F48	Lithic	Biface	1
F48	Lithic	Utilized Flake	1
F49	Lithic	Biface	2
F49	Lithic	Core	1
F49	Lithic	Point	1
F49	Lithic	Scraper/Graver	1
F50	Lithic	Biface	2
F50	Lithic	Tested Cobble	1
F51	Lithic	Biface	3
F51	Lithic	Point	1
F51	Lithic	Scraper	1
F52	Lithic	Adze	1
F52	Lithic	Biface	4
F52	Lithic	Scraper	1
F55	Lithic	Point	1
F55	Lithic	Utilized Flake	1
F56	Lithic	Adze	1
F56	Lithic	Biface	1
F56	Lithic	Retouched Flake	1
F60	Lithic	Biface	1
F66	Lithic	Retouched Flake	1
F67	Lithic	Biface	1
F69	Lithic	Graver	1
F71	Lithic	Adze	2
F71	Lithic	Biface	11
F72	Lithic	Adze	1

Feature	Class	Type	Count
F72	Lithic	Biface	4
F72	Lithic	Denticulate	1
F72	Lithic	Uniface	1
F75	Lithic	Biface	3
F75	Lithic	Point	2
F76	Lithic	Adze	1
F76	Lithic	Biface	2
F77	Lithic	Adze	4
F77	Lithic	Biface	2
F77	Lithic	Scraper	1
F78	Lithic	Point	3
F79	Lithic	Biface	1
F79	Lithic	Graver	1
F79	Lithic	Point	1
F79	Lithic	Scraper	1
F81	Lithic	Biface	2
F81	Lithic	Point	1
F81	Lithic	Retouched Flake	1
F82	Lithic	Biface	2
F83	Lithic	Point	2
F84	Lithic	Point	1
F86	Lithic	Biface	1
F88	Lithic	Biface	3
F88	Lithic	Point	1
F89	Lithic	Biface	4
F89	Lithic	Point	2
F89	Lithic	Retouched Flake	1
F89	Lithic	Scraper	1
F9	Lithic	Point	1
F9	Lithic	Tested Cobble	1
F93	Lithic	Biface	3
F93	Lithic	Point	1
F93	Lithic	Retouched Flake	1
F94	Lithic	Core	1
F96	Lithic	Adze	1
F96	Lithic	Biface	2
F96	Lithic	Chopper	1
F96	Lithic	Core	1
F96	Lithic	Point	1
F96	Lithic	Retouched Flake	1

Feature	Class	Type	Count
F99	Lithic	Biface	1
F99	Lithic	Retouched Flake	1
F99	Lithic	Tested Cobble	1
F-WT1	Lithic	Biface	11
F-WT1	Lithic	Core	11
F-WT1	Lithic	Retouched Flake	1
F-WT1	Lithic	Tested Cobble	1
F-WT10	Lithic	Biface	2
F-WT10	Lithic	Core	2
F-WT11	Lithic	Biface	1
F-WT13	Lithic	Biface	1
F-WT14	Lithic	Biface	2
F-WT2	Lithic	Biface	2
F-WT2	Lithic	Core	1
F-WT2	Lithic	Utilized Flake	1
F-WT3	Lithic	Biface	12
F-WT3	Lithic	Core	3
F-WT4	Lithic	Biface	3
F-WT5	Lithic	Biface	1
F-WT5	Lithic	Core	1
F-WT5	Lithic	Utilized Flake	2
F-WT6	Lithic	Biface	3
F-WT6	Lithic	Hafted Drill	1
F-WT9	Lithic	Biface	2