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Early Woodland and Middle Woodland Occupations at the Knob Creek Site (12HR484), Caesars Archaeological Project, Harrison County, Indiana

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EARLY WOODLAND AND MIDDLE WOODLAND OCCUPATIONS AT THE KNOB CREEK SITE (12HR484), CAESARS ARCHAEOLOGICAL PROJECT, HARRISON COUNTY, INDIANA

Caesars Archaeological Project Report Volume 2

by

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with contributions by

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ARCHAEOLOGY IN THE KNOB CREEK BOTTOM

This report describes the testing and excavation of Early Woodland and Middle Woodland components of the Knob Creek site (12HR484) by the Indiana State University Anthropology Laboratory (ISUAL). The site lies in the floodplain between Knob Creek and the Ohio River, near the former town of Bridgeport, in southeastern Harrison County, Indiana (Figure 1.1). Subsurface deposits from both components extended for more than 500 m along two floodplain ridges (Figure 1.2). The dense Middle Woodland deposits yielded one of the largest collections of ceramic and lithic artifacts of that cultural affiliation in the lower Ohio Valley, and the Early Woodland deposits contained a sizable assemblage of lithic tools and some of the earliest pottery in the region.

In August, 1995, Phase I subsurface reconnaissance within the project area (Figure 1.3) prior to the initiation of construction associated with the Caesars World Casino (1996) revealed the presence of a stratified site with cultural resources potentially eligible for the National Register of Historic Places. Phase II testing was required by the U.S. Army Corps of Engineers (COE) in consultation with the Indiana Division of Historic Preservation and Archaeology (IDNR-DHPA), and the scope of work and procedures were based on an ISUAL proposal (Stafford 1997) and DHPA and COE letters. Phase II fieldwork was carried out between June 23, 1997 and December 19, 1997.

Based upon (Stafford, et al. 1998) the results of the test excavations, Phase III excavations were required by the DHPA and COE and were based upon the ISUAL proposal and letters from the supervisory agencies. Phase III mitigation excavations of the Woodland components were carried out between March 10, 1998, and November 10, 1998.

Falls of the Ohio Region

Knob Creek Bottom

The project area lies at the lower end of an extensive bottom on the outside of a gentle meander of the Ohio River (Figure 1.4). The floodplain surface is characterized by ridge and swale topography with floodplain ridges that prograde downstream but also build laterally as the channel shifts (Gray 1984:428-429). Knob Creek is a shallow, tributary stream that enters the valley near the northern end of the Knob Creek Bottom, flows in a deeply incised channel, and empties into the Ohio River about one-half kilometer south of the site. The creek drains the floodplain and the Knobstone Escarpment, which abruptly rises about 120 m above the floodplain at a distance of 500-700 m to the west of the site. The

Knob Creek site is positioned on two alluvial ridges or levees 40-100 m from the present bank of the Ohio River. A slight swale separates the two ridges at the northern portion of the project area, but in the southern portion of the site the two ridges merge. The eastern ridge, which lies closer to the river, contained only minimal occupation debris, possibly because State Road 111 lies on the crest of the ridge. The western ridge presently lies slightly above the two-year flood level, so that the prehistoric surface would have been flooded infrequently.

The position of 12HR484 provides access to a wide variety of natural resources and environmental settings, including riverine, floodplain, and upland ecozones. Muldraugh and Allens Creek cherts (Stafford and Cantin 1996), raw materials of widely varying quality, were readily available in the bluffs above the floodplain and in the beds of the Ohio River, Knob Creek, and its tributaries, and a variety of cherts from upriver were interspersed in the gravels of the Ohio River. Wyandotte chert (Cantin 1994), which begins to outcrop within 20 km of the site, in western Harrison County, and extends into eastern Crawford County and adjacent portions of Kentucky, was most important for the Woodland economies.

Previous Investigations

The Early Woodland and Middle Woodland cultural/temporal periods are poorly known in the Falls of the Ohio region. Although surveys and excavations have been performed intermittently, few comprehensive data sets have been generated that can be used to address research questions. This section of the report examines the previous investigations of Early Woodland and early Middle Woodland components in the Falls area with the goal of assessment of the accuracy of the existent database. A secondary purpose is to compile a revised data set to gain perspective on the Early Woodland and early Middle Woodland occupants of the region and the inhabitants of the Knob Creek site in particular. For the purposes of this report, the Falls region is defined as the area within a 50 km radius of the Falls of the Ohio River.

The survey and site reports on file at the Kentucky Heritage Council and the Indiana Department of Natural Resources-Division of Historic Preservation and Archaeology for all the counties encompassed by the Falls region were intensively examined during this portion of the analysis to evaluate the validity of reported Early Woodland and Middle Woodland components and to ascertain if Early Woodland or Middle Woodland diagnostic tools are present but not recognized. The databases at the Kentucky Office of State Archaeology and the Indiana DHPA were used to compile a list of all the sites in the Falls region with reported Early Woodland or Middle Woodland cultural/temporal affiliations. Photographs and drawings from the appropriate reports were consulted when available to evaluate the validity of the typological assignments. In some instances these illustrations were not available or were not sufficiently clear to allow delineation of the tool types. An effort was made to examine the actual artifacts if possible. In some instances artifact descriptions from the site forms were the only available source of information about the basis for the cultural assignments.

Sites classified as Late Archaic/Early Woodland compose the largest cultural/temporal group in the Falls area. Separation of Late Archaic from Early Woodland sites is generally quite difficult because the primary diagnostic Early Woodland projectile point types, Dickson Cluster projectile points and Turkey-tail points, occur on non-ceramic sites, and some Terminal Archaic points (Terminal Archaic Barbed Cluster and Early Woodland Stemmed Cluster points) were in use during the Early Woodland. The cultural/temporal affiliation assigned to these tools is not consistent from report to report and often varies within the same report, therefore a decision was made to consider Dickson Cluster and Turkey-tail points, which were found in Early Woodland depositional contexts at 12HR484 and dated to the temporal span of the Early Woodland, to be possible Early Woodland tools and examine all the sites on which they occurred. The relationship of Terminal Archaic Barbed Cluster points to Early Woodland sites in the Falls area has yet to be clarified, thus their occurrence was noted but the sites on which they occurred were not included in the study.

Perhaps as a result of the lack of Woodland period research in the region, Middle Woodland projectile points were frequently misidentified in survey and excavation reports, consequently, it has proven necessary to closely scrutinize the primary sources to determine whether the diagnostic tools were correctly identified initially. Early Archaic, Late Archaic, and Middle Woodland expanding stemmed and corner notched projectile points frequently have been confused, and numerous sites require reinterpretation. Where possible, sites with ceramics and projectile points clearly diagnostic of Early Woodland or early Middle Woodland cultural/temporal affiliation are identified.

Known Early Woodland and Middle Woodland components in the Falls area consist predominantly of small, sparse scatters of material from sites that appear to represent seasonal camps or special purpose sites and portions of large multicomponent sites. The site type or function is not discussed herein because sites often have earlier or later components as well as Early Woodland or Middle Woodland components, and attribution of the cultural debris to a particular component generally is not possible without excavation. Inconsistency in description of site locations, particularly the assignment of the rank order of nearby streams and identification of landforms, limits the use of the databases without verification of the site locations on topographic maps.

In contrast to many earlier studies, the focus of the present project is on identification of valid Early Woodland and Middle Woodland sites rather than reiteration of flawed earlier studies or extrapolation from markedly flawed databases. Increased excavation of Woodland sites, improved typological studies, and the publication of an excellent projectile point guide for the Eastern United States (Justice 1987) have provided the basis for greatly enhanced accuracy in identification of diagnostic tools and assignment of cultural/temporal affiliations. Consequently, more stringent standards for assessment and interpretation of Woodland sites in the region are both possible and necessary. The following discussion is intended to scrutinize previous work, illustrate deficiencies in the data sets, and elucidate flaws in earlier synopses of the Early Woodland and Middle Woodland of the Falls of the Ohio region.

Webb and Funkhouser (1932) reported mounds in the Falls area in their original survey of Kentucky archaeological sites, but none of the cultural materials were described sufficiently to allow determination of the cultural affiliations, and this same problem is present in subsequent reports of mound sites; therefore, mounds will not be discussed in detail. A similar situation exists in southern Indiana where mounds and possible stone fortifications have been reported since the nineteenth century. Although these have been attributed to a variety of sources, including Welsh princes, little professional investigation of these purported earthworks has been performed. One possible enclosure (“stone fort”) above Fourteen Mile Creek (Cox 1875) has been informally examined recently by professional archaeologists and Middle Woodland Falls Plain pottery and bladelets were recovered from the surface (P. Harrell, personal communication 2003; C. Baltz, personal communication 2005).

Most of the survey and testing of Early and Middle Woodland sites in the Falls area has been restricted to the floodplain of the Ohio River, and, with a small number of exceptions, recovery of more than a single diagnostic tool or sherd is atypical. The locations of some of the more important Early Woodland and early Middle Woodland sites in the Falls area have been mapped (Figure 1.5) to provide perspective on their locations relative to the Knob Creek site.

Sites downriver from 12HR484

The surveys and excavations for the Southwest Jefferson County Floodwall (Chapman and Granger 1971; M. B. Collins 1979; Dobbs and Dragoo 1976; Mocas 1976) did not encounter sizable Early Woodland settlements along the Ohio River in the vicinity of the Knob Creek site. Although large sites with Dickson Cluster and Turkey-tail points were found, very few sherds were recovered, allowing the possibility that the Early Woodland components were relatively minor.

Early Woodland and Middle Woodland pottery and projectile points were found at the Arrowhead Farm site, 15JF237, (Mocas 1976), directly across the river from the Knob Creek site, and along the ridge on which the site is located and in the adjacent floodplain for more than a kilometer south of the site (Mocas and Brown 1976). The Arrowhead Farm site provided one of the few opportunities to view possible Early Woodland mortuary activity (Mocas 1976-19, 40). A bundle burial composed of a disarticulated partial human skeleton was placed in a pit beneath a limestone slab, and woodchuck and canid tooth jewelry or grave goods were included. A shallow fire pit or surface fire with a burnt Turkey-tail or Dickson Cluster point, possibly a mortuary offering, was located next to the burial pit. Pinched pottery was recovered from directly outside the pit outline and in the plowzone above the burial pit and may be contemporaneous. A radiocarbon date of 2965 +/- 175 RCYBP (Mocas 1976:9-10) was obtained from nearby Feature 1, which contained Zorn Punctate pottery, but this date appears to be inordinately early and it is considered possibly erroneous because of the size of the sample submitted (Mocas 1988:141).

An example of Middle Woodland mortuary activity was uncovered in the floodplain near the Arrowhead Farm site (Mocas and Brown 1976). Earthmoving machinery scraping well below plowzone uncovered and partially destroyed a human burial that had a funerary fire above the abdominal region. A cord-wrapped paddle impressed, grit tempered Middle Woodland sherd was found next to the body, a similar sherd was found in a pit 3 m from the burial, and a Snyders Cluster point was found 5 m from the burial. Other Middle Woodland points, pottery, and possible lamellar bladelets were found elsewhere in the vicinity of the Arrowhead Farm site (Mocas and Brown 1976).

Section II of the Southwest Jefferson County Floodwall received more intensive excavation (M. B. Collins 1979), but none of the sites contained major Early Woodland or Middle Woodland deposits. Excavations at the Spadie, Villier, and Rosenberger sites (M. B. Collins 1979; Dobbs and Dragoo 1976), several kilometers downriver from the Arrowhead Farm site, yielded small amounts of Falls Plain pottery and Middle Woodland projectile points. The Longworth-Gick, Villier, Rosenberger, and Spadie sites had small amounts of Early Woodland pottery and Early Woodland projectile points (M. B. Collins 1979; Dobbs and Dragoo 1976).

A portion of the Longworth-Gick site originally designated 15JF246 (Dobbs and Dragoo 1976:50) contained a pit feature, Feature 3, with an Dickson Cluster point and grit tempered, cordmarked pottery. Dobbs (Dobbs and Dragoo 1976:51-53) formulated five pottery groups from sherds in the pit, but subsequent reanalysis by Mocas (1988:137) concluded that these were more probably portions of the same vessel. This feature yielded a radiocarbon date of 2055 +/- 75 RCYBP, but Dobbs and Dragoo (1976:53) question the validity of the date as a measure of the age of the pottery and point. The Phase III excavations at Longworth-Gick (Michael B. Collins 1979:253, 535) revealed a refuse cluster, Feature 63, with a similar cooccurrence of grit tempered, cordmarked pottery and a Dickson Cluster point. The pottery from both sites was subsequently lost and more detailed analysis could not be performed. Grit tempered, cordmarked pottery also was found at the Villier site (Boisvert, et al. 1979:401-405). Feature 21 (Robinson and Smith 1979:637) contained four Dickson Cluster points, and charcoal from the pit yielded a radiocarbon date of 2390 +/- 70 RCYBP. This feature was reported to have three grit tempered sherds, but subsequent analysis by Mocas (1988:135) ascertained that these were actually pieces of sandstone.

Excavations at the Farnsley-Moorman historic site (15JF569), in the floodplain adjacent to the Southwest Jefferson County Floodwall, have produced Early Woodland pottery and an Early-Middle Woodland sandstone elbow pipe, and an undocumented site next to it produced Early Woodland punctate pottery. Inland from this area, on a ridge above Pond Creek, a Dickson Cluster point was found at 15JF214 (Granger and DiBlasi 1975a). Surveys of the Riverport area adjacent to the floodwall (Bader, et al. 1979; Granger and DiBlasi 1975b; Hale 1980) recorded two sites with Dickson Cluster points on the Pleistocene terrace of the Ohio River, and one of these sites also contained a possible Snyders point. A site in the floodplain yielded a Turkey-tail, and Early-Middle Woodland pottery was recovered from a site on the floodplain, a site on the terrace, and a site on a sand ridge between the terrace and the floodplain.

A large section of the Ohio River floodplain west of the Falls of the Ohio was covered in a records search of reported sites in the Cannelton Impoundment of the Ohio River (Granger and McGraw 1973). The report mentions hundreds of sites, and seven of these sites were visited, but the information is of limited utility. There were no artifact illustrations or discussions and there was no basis provided for the assignment of cultural affiliations to particular sites. Although a large percentage of the sites are multicomponent, none were listed as such. Many of the sites have diagnostic materials but were listed as being of unknown cultural affiliation.

Woodland sites were minimally discussed in the Cannelton report. One site in Harrison County was listed as Early Woodland, but the pottery was not described, and two sites were listed as Woodland, with no basis provided for this assessment. No Middle Woodland sites were listed, despite the presence of Middle Woodland diagnostic material in the collections. Undoubtedly, many more Early Woodland and Middle Woodland sites were present than the survey indicates.

A reconnaissance and evaluation of known sites in the Falls region (Granger, et al. 1973) has proven unreliable. Absence of pottery was considered a criterion for assignment of Archaic cultural affiliation, although Middle Woodland projectile points were recovered from some of these sites (Granger, et al. 1973:12). The dearth of Middle Woodland sites may be partially due to the inability of the authors to distinguish limestone tempered pottery from shell tempered pottery, as exemplified by the identification of the ceramics from one of the type sites for Middle Woodland Falls Plain pottery as shell tempered (Granger, et al. 1973:2-3). The available artifacts were often ignored when assignment of cultural affiliation was made or no affiliation was assigned, as exemplified by the statement, “Although no diagnostic material has been collected, items found on the site include...8 projectile points...” (Granger, et al. 1973:12). Only one Woodland site was assigned a cultural affiliation more precise than “Woodland” (Granger, et al. 1973:11), thus it is not possible to contrast Early Woodland with Middle Woodland sites. Undoubtedly, many Early Woodland and Middle Woodland components were undocumented.

In 1973 the Glenn A. Black Laboratory of Archaeology of Indiana University performed a series of surveys along the Ohio River. Munson, Limp, and Barton (1977) compiled a summary of the sites in the Indiana counties along the Ohio River for the Corps of Engineers. The study provided a guide to the computerized archaeological sites files at the Glenn Black Laboratory of Archaeology at Indiana University and presented a series of tables that categorized the sites by cultural affiliation, habitation type, topographic setting, and other criteria.

Janzen (1977) reported shallow Early Woodland and Middle Woodland deposits on a number of Late Archaic sites along the Ohio River in the Falls area. Early Woodland grit tempered pottery and Falls Plain pottery were present in an amateur collection from another of these sites, the Old Clarksville site (Mocas 1988, 1992). Later work at another of the sites Janzen originally tested, the Reid site (12FL1), documented small amounts of Falls Plain pottery and grit tempered, plain or smoothed pottery in mixed deposits (Angst 1998:45-49), and a nearby site, also in the floodplain of the Ohio River, had a feature with grit tempered, cordmarked Early Woodland pottery (Waters and McCullough 2001:Figure 6).

In the Ohio River floodplain at its confluence with Poffey Creek, about six river miles downstream from 12HR484, Smith (1986) found a Dickson Cluster point and a possible Turkey-tail point. A survey of the Ohio River floodplain in the Rosewood Bottom (Arthur 2001) reported Early Woodland cultural material at three sites, and an Affinis Snyders point at another. On the opposite bank of the Ohio River, near its confluence with the Salt River, Dickson Cluster points and a Turkey-tail point were recovered (Russell 1996:Figure 14a-c; Waters, et al. 2000:41), and Turkey-tail points were found at another site (Waters, et al. 2000:41; Figure 23c-d). DiBlasi and Darnley (1980) investigated a site in the floodplain on the Indiana side of the Ohio River a short distance farther downstream that had Early Woodland grit tempered pottery and Dickson Cluster points and a Middle Woodland component that included a pit feature in which Falls Plain pottery and a reworked Snyders point cooccurred. In the uplands a short distance inland, a site was found that contained possible lamellar blades and blade cores (Baltz 1984:5). About 11 river miles farther downstream on the Kentucky side of the river, Dickson Cluster and Turkey-tail points were found on a terrace above the Ohio River floodplain (King 2003:Figure 5.1), and on the Indiana side of the river at Morvins Landing, 12HR141 was reported to have at least five Dickson Cluster points and at least four Snyders points (site form by Limp and Seeman). Farther downriver, in the Paradise Bottoms, a Dickson Cluster point was found (McGraw 2000:Figure 9), and a Turkey-tail and a possible Dickson Cluster point were found at another site (Granger, et al. 1989:Figure VII-1).

Fowke (1928) made a survey of the chert quarries and village sites of Harrison County, and several later projects expanded on this study. Seeman (1975), in his survey of Harrison County, Indiana, recorded 45 Early Woodland components and 24 Middle Woodland components among the 202 new sites and 20 previously recorded sites he studied. Seeman (1975:55) notes an increase in the emphasis on use of high quality Wyandotte chert during the Woodland. In his southern Harrison County survey area virtually all the Turkey-tail, Dickson Cluster, and Snyders projectile points and the Hopewell cache blades were made of Wyandotte chert. He suggests the dense debitage on rises in the Ohio River floodplain reflects workshops where the chert was brought down to the floodplain for reduction.

Seeman (1975:55, 58) posits specialization for extra-regional distribution and sees an increase in specialized use of Wyandotte chert from Early to Middle Woodland. He bases this observation on the presence of artifacts not related to quarrying or workshop activity on Early Woodland sites, but the absence of such artifacts on the Middle Woodland sites with large amounts of debitage. It might be noted that some of the gorgets and stone tubular pipes he discusses resemble artifacts found in early Middle Woodland contexts at 12HR484. Seeman (1975:58) notes the lack of polyhedral cores and bladelets and further conjectures that limestone temper may be indicative of Middle Woodland to Late Woodland cultural affiliation for ceramics. Another noteworthy aspect of the survey is the rarity of Falls Plain pottery. It is possible that some of the points identified as Bakers Creek (e.g. (Seeman 1975:Figure 5i, k) are closer to Snyders Variant points found at 12HR484, thus increasing the number of early Middle Woodland components.

A survey of the karst uplands of the Mitchell Plain (Smith 1985) examined the mosaic environment of the karst landscape, the subterranean and above ground water resources, and the distribution of chert sources, and focused upon aboriginal use of sinkholes. Among the upland chert extraction/lithic reduction sites discussed were the Haunted Hollow Bluff Top sites, which had Early Woodland deposits. Justice and Smith (1988) surveyed the western and central portions of Harrison County in an attempt to locate and characterize Wyandotte chert quarries and workshops. Eight previously reported sites and 56 previously unrecorded sites were examined. An attempt was made to identify Terminal Archaic through Middle Woodland sites because of the extensive use of Wyandotte chert during these cultural/temporal periods. A discussion of various lithic manufacture strategies and sequences permits identification of culturally diagnostic traits of bifaces and flakes (Justice and Smith 1988:28-30; 39-41; Figures 4-6). Terminal Archaic components were found at five sites and possible components at three other sites. Nine Early Woodland components and one possible Early Woodland component were identified, and four Middle Woodland components and four possible Middle Woodland components were found at other sites (Justice and Smith 1988:42-43). Large scale manufacture for export is indicated by one site from which approximately 1200 cache blades were taken by a collector (Justice and

Smith 1988:25-26). A later survey (Schenian and Mocas 1997) located an additional Early Woodland site next to a sinkhole pond.

The most comprehensive archaeological survey in the Falls region is the University of Kentucky Department of Anthropology Stage I survey of Fort Knox (O'Malley, et al. 1980), which recorded 249 prehistoric sites. Among the 44 components identified on 37 sites (O'Malley, et al. 1980:446; Table VIII-1), ten Late Archaic/Early Woodland components, nine Early Woodland components, and five Early/Middle Woodland components were reported to be present. Based on 28 Late Archaic and Early Woodland sites, it was presumed that the same hunting/collecting strategy was continued from the Late Archaic to the Early Woodland, and it was concluded that Late Archaic/Early Woodland populations established large base camps on the major river systems and small sites on the minor tributaries and ridges (O'Malley, et al. 1980:444). It was proposed that there may be a gradual shift toward more sedentism and more use of the major river systems from Late Archaic to Early Woodland (O'Malley, et al. 1980:445). It also was proposed that there was a decrease in exploitation of karst regions during the Late Archaic to Early Woodland transition (O'Malley, et al. 1980:445). The Middle Woodland sites were considered to adhere to the same patterns as the Early Woodland sites (O'Malley, et al. 1980:446).

The conclusions of this study were limited by the typical difficulty in distinguishing Late Archaic from Early Woodland components when Dickson Cluster or Turkey-tail projectile points were the only diagnostic materials recovered. The results were further compromised by inconsistency in classification of the components with only Dickson Cluster or Turkey-tail points, and by the lack of clear delineation of which sites were assigned to each cultural/temporal period. Because of this inconsistency, the conclusions drawn about the settlement pattern shifts from Late Archaic to Early Woodland cannot be validated. Separation of Early Woodland from Middle Woodland components was impeded by uncertainty about whether cordmarked, grit tempered pottery was of Early Woodland or Middle Woodland cultural affiliation, and subsequent research by Mocas (unpublished but added to the site forms) established that four of the five sites classified as Early Woodland to Middle Woodland would more accurately be considered Middle Woodland to Late Woodland because the diagnostic points are Lowe Cluster types.

Mocas, in unpublished work, re-evaluated this study and used the results of work performed by the Fort Knox archaeology staff between 1993-1996 to identify 115 sites with diagnostic cultural materials that represent 172 components and five sites that could be assigned only tentative cultural affiliations. Extensive use of the Fort Knox area during the Late Archaic/Early Woodland is indicated by the diagnostic projectile points recovered. Thirty-six sites with Dickson Cluster or Turkey-tail points and 15 sites with Terminal Archaic Barbed or Early Woodland Stemmed points are located in a variety of settings.

Three sites, and possibly a fourth, yielded Early Woodland pottery--all on rises in the floodplains of tributaries of the Ohio River, and subsequent to Mocas' study, an additional site was discovered on an upland ridge in the Knobs (Boedy 1999:70). No sites with Falls Plain pottery were found at Fort Knox, but four sites on knolls or ridges above tributary streams had possible Middle Woodland sherdlets. Two sites with early Middle Woodland projectile points are in the floodplains of tributaries of the Ohio River, another site is on the terrace above the floodplain of the Ohio River, and one site with a possible early Middle Woodland point is in the floodplain.

Mocas' study documented Early Woodland diagnostic artifacts at three sites in the floodplain of the Ohio River and 10 sites in the floodplains of streams that dissect the uplands. Seventeen sites with Early Woodland projectile points were found on ridges and along streams in the uplands, and an additional site with a Turkey-tail was found later (Schenian 1998:Figure 1). Seven sites were positioned adjacent to sinkholes. This use of the uplands is similar to that documented by Smith (1985) and Justice and Smith (1988) in comparable settings on the opposite side of the Ohio River. In those studies 10 Early Woodland sites and seven Middle Woodland sites were found in the karst uplands of Harrison County, Indiana. Gaw (1992:4) also recorded a multicomponent site with a Middle Woodland Expanding Stemmed point in the uplands of Harrison County.

There are records of two mounds and a mound cluster on Fort Knox and one mound directly outside the military installation, but the cultural affiliations cannot be posited for the sites.

Additional sites were found in the floodplains of streams cutting through the Knobs and on the bluffs overlooking the streams outside the boundaries of Fort Knox. An isolated find of a Turkey-tail was discovered on a bluff above Clear Creek (Schock 1989:Figure 4m), and a site on a knoll in the floodplain of the Rolling Fork River contained a Dickson Cluster point (Henderson 1990:Figure 4d). Falls Plain pottery and a possible blade core were recovered from a site adjacent to a small tributary of Brooks Run, and two other sites with possible blade cores and a site with a possible Dickson Cluster point were near other tributaries (Stallings and Stallings 1994:72-77).

Hale (1981) surveyed Otter Creek Park, which lies between the northwest edge of Fort Knox and the Ohio River, and recorded Early Woodland components at three sites on the bank of the Ohio, and a Middle Woodland component was found on one of the sites. One of these sites is across Otter Creek from 15MD11, the mound Webb and Funkhouser (1932:279-281) reported.

Baltz et al. (1992) performed a surface reconnaissance, machine-assisted trenching and plowzone stripping, and limited subsurface excavation of a dense Early and Middle Woodland midden at 12HR101, in the Mauckport Bottoms. The site contained Early

Woodland Dickson Cluster points, Turkey-tail points, and grit tempered pottery, and Middle Woodland Snyders points, lamellar bladelets, and Falls Plain pottery. A nearby site, 12HR36, (Baltz, et al. 1992) also contained Dickson Cluster and Turkey-tail points and Falls Plain pottery. Also in the Mauckport Bottoms were a site with Falls Plain pottery and possibly Early Woodland pottery (Natt and O'Brien 1998) and a site that yielded possible Early Woodland pottery and three bladelets (McCord and Cochran 1994) A short distance downriver, a site with a large amount of grit tempered pottery and Dickson Cluster points was partially salvaged (Wappenstein and Plunkett 1998), and an amateur reported a site with Adena and Snyders points along a tributary of French Creek (Rick Brown, personal communication to the author, 2005). In the Titus Bottoms, Early and Middle Woodland lithic manufacture and habitation sites were recorded and tested (Cantin 1996; Cantin and Stafford 1997). Many of the sites were multi-component, and possible Early Woodland tools were found on a minor workshop site and on a dense lithic manufacture site that also contained Middle Woodland bifaces. An Early-Middle Woodland sherd was found on a small habitation site and another on a dense lithic manufacture site. Diagnostic Middle Woodland projectile points and bifaces were found on two dense lithic workshops. Subsequent work in this area (Martin 2003) revealed a site with a Snyders point (Martin 2003:Figure 6a) and two sherds of Falls Plain pottery, a site with a Snyders Cluster point (Martin 2003:Figure 6c) and Early-Middle Woodland pottery, and two other sites with Early-Middle Woodland pottery.

Early Woodland projectile points and pottery and Middle Woodland cultural materials were reported from the Breeden site, at the confluence of Indian Creek and the Ohio River (Bellis 1982). The Mary Ann Cole site (Myers 1981), at the periphery of the Falls project area, in the floodplain of the Ohio River at its confluence with the Blue River, contained buried deposits from a lithic manufacture site with Early Woodland and Middle Woodland components.

Sites upriver from 12HR484

Salvage excavations at the Paddy’s West site complex (Smith and Mocas 1995), located in the floodplain of the Ohio River four river miles upstream from the Knob Creek site, uncovered small numbers of Early and Middle Woodland artifacts. Less than ten sherds of Early Woodland or early Middle Woodland pottery, several Dickson Cluster points (12FL48), and several possible Snyders points (12FL46) were found. These components were more substantial than the artifact counts reflect, but the upper levels of all three sites (12FL46, 12FL47, 12FL48) were destroyed prior to archaeological investigation. In the Ohio River floodplain directly north of the Paddy’s West project area, Kearney and Bailey (1993) report possible Middle Woodland lamellar blades and unidentified Early Woodland material from 12FL56, and a possible lamellar blade at 12FL57. A site with Snyders points and Falls Plain pottery (12FL92) and another site with Snyders points (12FL91) were located on a terrace above Middle Creek as it entered the Ohio River floodplain (A. Bader, personal communication 2005). A deeply buried Early Woodland component with interior cordmarked pottery, Dickson Cluster points, Early Woodland Straight Stemmed, and Terminal Archaic Barbed points (15JF702) was found on Shippingport Island at the Falls of the Ohio River (M. French, personal communication 2005 and 2006). A site (12CL406) with Falls Plain pottery, on the bluff above the Falls of the Ohio, was tested prior to construction of the Falls of the Ohio Interpretive Center (Doershuk and Fassler 1991).

The Clark Maritime Centre Archaeological District (CMCAD) (Sieber and Ottesen 1986), located 20 river miles upstream from the Knob Creek site, contained major and minor Early Woodland and Middle Woodland components, in an alluvial setting comparable to that of 12HR484. A site with a Snyders point and a probable lamellar blade and two sites with possible lamellar blades were identified during an initial study (Munson 1975:13-14). Phase II (Reidhead 1976) and Phase III (Sieber and Ottesen 1986) excavations in the CMCAD yielded more than 70 cultural features with Falls Plain pottery and more than 10 features with Early Woodland grit tempered, cordmarked or plain pottery. Projectile points associated with these ceramics are comparable to those recovered from the Knob Creek site. Geomorphological studies of the project area were performed and extensive botanical remains were processed. These sites form the primary data set to which the Knob Creek site, its material remains, and cultural manifestations can be compared, and they are discussed throughout the following report. A Dickson Cluster projectile point indicates an Early Woodland component on the Bates Island site,15JF258, (Henderson 1989) which may have been separated from the CMCAD by an active channel cut-off during the Early Woodland.

A survey of the potential right-of ways for a bridge over the Ohio River to the north of the CMCAD and extending inland (Striker, et al. 2000) encountered small amounts of grit tempered pottery on one site in the floodplain of the Ohio River, on four sites on the broad terrace above the Ohio, and on one site on the upland above the floodplain. One site in the floodplain of the Ohio River is considered Middle Woodland on the basis of an unidentified sherd (Beard 1992). In the upland to the north of this area, a site with a grit tempered sherd was recorded (Adams et al. 2004), and, according to site forms, three additional sites (12CL150, 12CL307, and 12CL190) in this area had Dickson Cluster points, and the latter site also contained grit tempered pottery. An additional site (12CL184) in the area may be a mound, and two other sites (12CL194 and 12CL220) are considered Early Woodland, but the basis for this appraisal is not given. According to the site forms, six sites (12CL150, 12CL189, 12CL194, 12CL220, 12CL310, and 12CL311) in this area yielded Snyders points, although the first site is not listed as having a Middle Woodland component. One site (12CL209) is reported to have a lamellar blade.

The largest and best documented Early Woodland and Middle Woodland components outside of the floodplain of the Ohio River were present at the Zorn Avenue Village site (15JF250), which was located on a bluff above the Ohio River floodplain approximately four river miles upstream from the Falls of the Ohio. This site was collected and the materials catalogued by avocational archaeologist James Matthews from 1954-1956 (Matthews 1958).

The collection was studied and the site documented in consultation with Matthews, and the results formed the basis of articles on the Zorn Punctate and Falls Plain ceramics from the site (Mocas 1988, 1992). Early Woodland grit tempered, cordmarked pottery and Zorn Punctate pottery were abundant and associated with Dickson Cluster points, and Falls Plain pottery also was abundant and associated with Snyders Cluster points at the site. A Middle Woodland pit feature at the site provided the only documented occurrence of mica on a Woodland site in the Falls region.

Two other Middle Woodland sites outside the Ohio River floodplain were minimally excavated. A small Middle Woodland component was found on an upland ridge above Hunting Creek, a tributary of the Ohio River, at the Hunting Creek site,15JF268 (Mocas 1992). Griffin (1942:351; Plate XXXII) reports a Falls Plain vessel fragment from beneath a portion of the Prather Mound (12CL4). Mocas (1988) in his analysis of Zorn Punctate pottery discusses a number of other Falls area sites that have pinched and punctate pottery and other Early Woodland pottery. The analysis of Falls Plain pottery (Mocas 1992) lists a number of Falls area sites with Falls Plain pottery and discusses several of these in more detail.

Four sites in the Ohio River floodplain south of the confluence of Beargrass Creek and the Ohio River (15JF592, 15JF594, 15JF597, 15JF598) yielded Early Woodland pottery (McKelway 1995). 15Jf597 also yielded a Dickson Cluster point, a Snyders Cluster point, and a ceramic pipe fragment, and site 15JF598 also contained two pieces of Falls Plain pottery and a sherd of Zorn Punctate pottery. Zorn Punctate pottery also was found at the Eva Bandman site, 15JF668, north of the confluence of Beargrass Creek and the Ohio River (A. Gwynn Henderson, personal communication 2004).

Granger and Bader (1991) reported Early Woodland artifacts in the floodplain of the Ohio River at the mouth of the Harrods Creek at the Habich site (15JF550), and they labeled several isolated features and minute chert scatters Woodland sites without any artifactual basis for doing so. Although numerous theories and statements were propounded in the article, none were based upon accurate data. Several sherds of Early Woodland pottery were found at 15JF679, which is on a terrace above the Ohio River floodplain near its confluence with Harrods Creek (Reynolds, et al. 2001:69). Granger et al. (1981) report several Early-Middle Woodland sherds from the Whittaker site, 15JF417, on the Ohio River floodplain approximately 2.5 km north of the mouth of Harrods Creek.

There is little information about sites in the Ohio River valley upriver from Harrods Creek. On the floodplain of the Ohio River at its confluence with Eighteen Mile Creek, three Dickson Cluster points were found at 15OL3 (Hemberger and Ball 1987). An amateur collection from Eighteen Mile Island contained Dickson Cluster points and Snyders Cluster points.

A series of surveys and testing projects in the Bethlehem Bottoms of Clark County, Indiana, 40 river miles upstream from the Knob Creek site, located or revisited 47 sites and yielded information about eight Early Woodland sites and 11 possible Middle Woodland sites (Mocas and Smith 1996). The Woodland sites were in a variety of locations within the floodplain and on the terraces above the floodplain of the Ohio River and its tributaries, and some were as far as 700 m from the river. Most of the Early and Middle Woodland components were situated along streams, drainages, and springs on terraces above the floodplain. Much of the cultural material along the bank may have been lost into the Ohio River because artificially raised water levels have caused extensive erosion of the river banks. Despite relatively similar landforms within the two project areas, which were separated by 500 m, one area had no Early or Middle Woodland sites, while in the other area identifiable Early Woodland components represented 22 percent of the identified components and Middle Woodland components formed 31 percent of the identified components. Subsequent work in the Bethlehem Bottoms (White 1999) resulted in acquisition of Early Woodland material during the revisitation of 12CL157 and location of small Middle Woodland sites on the high (12CL470) and low terraces (12CL472) of the Ohio River.

Near the northeastern periphery of the Falls study area, at the confluence of Corn Creek and the Ohio River, a Snyders point was found at 15TM14 (Wilson and Janzen 1975:Plate 1), and a huge amateur collection from multicomponent site 15TM26 included Dickson Cluster points (Janzen 1987:30-31).

Inland Sites in the Scottsburg Lowland and Outer Bluegrass

A small survey was conducted in the uplands near the headwaters of the Middle Fork of Beargrass Creek, approximately 7 km southeast of the Zorn Avenue Village site. Five small sites contained Dickson Cluster points (15JF32; 15JF34;15JF112; 15JF120; 15JF133), one also had a Snyders point (15JF32), and a sixth site (15JF113) had a sherd of Falls Plain pottery (Mocas 1974). Several kilometers closer to the Ohio River, at the confluence of the Middle Fork of Beargrass Creek and Weicher Creek, a Turkey-tail point was found at 15JF543 (Janzen 1988:41), and a Turkey-tail point was found at the headwaters of Wolf Pen Branch, about 6.5 km inland from the Ohio River (Smith, et al. 2004:Plate 1a).

Taylorsville Lake, a man-made lake formed by the impounded waters of the Salt River, lies in the Outer Bluegrass at the southeast periphery of the Falls study area, approximately 50 km inland from the Falls of the Ohio River. A series of projects (Ball and Bogan 1978; Driskell, et al. 1984; Robinson, et al. 1979; Sorensen, et al. 1980) performed over a period of 13 years recorded 210 sites, and 55 of them were tested. Ball (Ball and Bogan 1978) compiled and illustrated a variety of projectile point groups and listed their proposed cultural/temporal affiliations. Late Archaic/Early Woodland components were attributed to eleven sites with Dickson Cluster projectile points. The assigned cultural affiliations generally were accurate; however, inaccuracies in a number of projectile point groups greatly limited the validity of subsequent analyses. The illustrated examples of the main Middle-Late Woodland projectile point type, PP/K#194 (Ball 1978:215-216; Plate 26), consisted of one Middle Woodland Snyders point and several Late Archaic points, and individual illustrated points were not attributed to specific sites. Thus, none of the sites with points in the PP/K#194 group can be confidently assigned a Middle Woodland cultural affiliation.

Robinson et al. (1979) attributed Early Woodland or Middle Woodland components to twelve sites, but three were actually Late Archaic, and three others were Late Woodland or Late Archaic. Three sites had Early-Middle Woodland points, two had Early-Middle Woodland pottery, and one yielded a Dickson Cluster point. Several other Dickson Cluster points were illustrated, but the sites from which they came were not indicated, and no other sites were listed as Early Woodland.

In a later volume, Sorensen et al. (1980) considered Expanded Stem 26 points (Sorensen, et al. 1980:Figure 111-8C) and Expanded Stem 40 points (Sorensen, et al. 1980:Figure 111-9C) Middle/Late Woodland and Woodland, respectively, but the illustrated example of the former is Early Archaic and the illustrated examples of the latter are Early Archaic and Late Archaic. The illustrated examples of Expanded Stem 43 points, identified as Steuben points (Sorensen, et al. 1980:Figure 111-9E), included at least one point that is not Woodland. Nine sites with possible Middle Woodland cultural remains were reported, but based upon the above revisions at least five sites were misidentified. Fifteen sites were assigned Late Archaic/Early Woodland cultural affiliations, but there is uncertainty about the validity of the assessments. Late Archaic Brewerton Eared (Side Notched 8) and Brewerton Side Notched (Side Notched 10) points were considered Late Archaic/Early Woodland; Late Archaic Riverton points (Side Notched 7) were assigned to the Early Woodland; Turkey-tail points were attributed solely to the Late Archaic; and Contracted Stemmed variants of Dickson Cluster points were sometimes considered Late Archaic/Early Woodland and sometimes only Late Archaic.

In a summary of the diagnostic materials of the project, Driskell et al. (1984:40) have a temporal affiliation category for “Late Archaic or Early Woodland” sites, but all subsequent cultural/temporal periods, including Middle Woodland, are subsumed into the “Later prehistoric” group. The Late Archaic/Early Woodland temporal group is defined by five projectile point groups, three of the groups (Merom [all illustrated examples are actually Matanzas points], McWhinney, and Salt River) are Late Archaic, and the other two groups (Round Base and Late Archaic/Early Woodland) are composed primarily of Late Archaic points with some Early Woodland point types. The “Round Base” projectile point group (Driskell, et al. 1984:49, 57, 65, Figure I-13) is composed of a variety of Late Archaic points (e.g., Karnak, McWhinney) as well as Late Archaic/Early Woodland Dickson Cluster points. The illustrated examples of this category are Late Archaic, but not Terminal Archaic, points and one Terminal Archaic/Early Woodland type, and at least one of the illustrated examples (Driskell, et al. 1984:61) is clearly an Early Archaic Kirk Corner Notched point (Driskell, et al. 1984:Figure I-17 top, center). These combinations of projectile point groups from earlier studies encompass a wide cultural/temporal span, and there is uncertainty about the unillustrated tools, thus they cannot be used to support the conclusions Driskell et al. posit. Because Early Woodland and Middle Woodland components were not identified adequately, most of observations in the various reports are of minimal utility to the present study.

Leedecker (1978:243-246) calculated indices for functional tool categories and applied them to sites from the first season of the Taylorsville Lake project. Comparison of sites in various physiographic settings led him to the conclusion that the Salt River bottomland sites showed a stronger emphasis on lithic manufacture, while the sites on tributary streams and upland sites showed more use of completed tools. Driskell et al. (1984:267) noted that these results should be qualified because of the lack of consideration of temporal variability and inconsistent ground visibility. They suggested that the results are more consistent with very limited functional variability within the Taylorsville Lake sites and resultant poor physiographic segregation based on functional characteristics. Robinson et al. (1979) tried to distinguish site types by use of an Index of Diversity to categorize 48 upland sites from the 1978 season at Taylorsville Lake, but found no significant differences when site function was compared to topographic/environmental variables such as physiographic zone, soil type, and distance to water.

Sorensen et al. (1980:356-372) used reductive stage, morphology, and condition of tools from the 45 sites tested in 1978 and 1979 to infer the function of artifacts then grouped the tool categories into functional classes. Twelve of the functional classes were examined to determine significant combinations, and larger groups (General Maintenance, Lithic Manufacture, and Hunting) were formulated. When combined with environmental characteristics, the only strong correlation was between lithic workshops and larger, permanent streams. The sites chosen for this analysis were overwhelmingly (76 percent) those identified as Late Archaic/Early Woodland.

Driskell et al. (1984:272) suggested that the debitage on the “lithic manufacturing” sites that Leedecker and Sorensen identified actually derived from incidental preparation and maintenance of tools related to other functions, and they questioned the presence of any lithic manufacturing sites. Driskell et al. did not state the bases for reassessment of the stage of manufacture of the debitage discussed in the other reports. Driskell et al. (1984:272-273)272-273) suggested that the V-shaped valleys of the Salt River drainage have narrow floodplains that are relatively free of flooding and allow access to resources of the slopes and uplands. The researchers then proposed that site location is based on a variety of intangible or no longer preserved factors, none of which can be tested.

Sorensen et al. (1980) suggested that hunting was the primary use of the Salt River valley and adjacent upland throughout prehistory, and Driskell et al. (1984:266) generally supported this conclusion in the summary of the project and hypothesized that the sites in that project area represent only one or a small number of site types in more complex settlement/subsistence systems.

During the present project, examination of the diagnostic tools that could be attributed to particular sites from the Taylorsville Lake project area led to the observation that Early Woodland Contracting Stemmed points were recovered from sites in the floodplain of the Salt River (15SP201; 15AN34) and its tributaries (15AN24) and on a ridgetop above the floodplain of the Salt River (15SP330; 15SP340; 15SP363; 15SP412). Turkey-tail points were found in the floodplain of the Salt River (15AN27), on a toeslope protruding into the floodplain (15SP340), and on a ridgetop above the floodplain (15SP412). At least one site in the floodplain of the Salt River (15SP201) contained a Snyders point.

There is little data from other portions of the Outer Bluegrass within the Falls study area. To the north of the Taylorsville Lake, a Turkey-tail point was found on a slight rise above Brashears Creek on 15SP247 (DiBlasi 1976:49, 59), and a Dickson Cluster point was recovered from a knoll above the Clear Creek floodplain at 15SH43 (Schock 1986).

Boisvert (1977) reports 22 Early to Late Woodland sites in his survey of Hardin County, Kentucky, outside of Fort Knox, but these sites are beyond the Falls study area. Small numbers of sites with Dickson Cluster and Turkey-tail points were found around sinkholes and in and above the floodplains of small streams and rivers. Sites with Snyders Cluster points were found in these locations and on a low bluff above a creek. A Dickson Cluster point was found at 15MD440 next to a spring in the karst upland (King 2002:Figure 10). Kryst and Weinland (1980) report only two Early Woodland or early Middle Woodland sites in their Bullitt County survey.

Few sites have been reported in the marshy interior lowland in central Jefferson County, Kentucky, primarily because this area has been urbanized for most of the twentieth century. Excavations at the KYANG site, 15JF267, (Bader and Granger 1989) yielded Dickson Cluster projectile points, and a Turkey-tail and a Dickson Cluster point were recovered on another rise in the wetland at 15JF571 (Stottman, et al. 1992:Figure B-3g, h).

A number of rockshelter sites at the intersection of the Outer Bluegrass and the Knobs regions yielded Early Woodland and Middle Woodland cultural materials (Granger 1985; Mocas 1992; Society 1972). In the Outer Bluegrass, the Durrett rockshelter, 15JF201, (Society 1972) contained two Snyders points, and the McNeeley Lake rockshelter, 15JF200, yielded a Dickson Cluster point, Falls Plain pottery, and a possible Middle Woodland point (Granger 1985:Figure VII-1d). Another nearby rockshelter, 15JF671, yielded two sherds of pottery (Bader, et al. 1998:51).

DiBlasi (1981) re-examined the Ashworth site,15BU236, a rockshelter overlooking Floyds Fork in the Knobs near Shepherdsville, Kentucky, which was one of a number of sites that had been inadequately tested and reported and badly misinterpreted by McGraw (1974). Early Woodland projectile points and pottery and Middle Woodland projectile points were recovered from buried contexts from the site ((DiBlasi 1981:Figure 8E-H).

Early Woodland pottery also was found in the Riverwood Rockshelter (Janzen 1971), one of a number of rockshelters grouped under the same name and assigned a single site number, 15BU265. Janzen (1977:138) cited a date of 2870 +/- 150 RCYBP from one level and a date of 2450 +/- 140 RCYBP (Janzen 1971:377) for another sample from the site and attributed these to the Early Woodland component. Unfortunately, the shallow deposits of the multicomponent site had been badly disturbed and artifact proveniences and associations could not be accepted confidently (Janzen, personal communication 1987), as demonstrated by the presence of Late Woodland castellated rims in the level with the earlier date, and it is uncertain where the dating samples originated (Janzen 1971:377; 1977:138; Turnbow 1981:12). A site report was never written and no fieldnotes are curated with the cultural remains, thus the contexts of the dated samples and associated materials are best viewed with skepticism.

Summary

The primary observation elicited by the study of previous research on the Early Woodland and early Middle Woodland in the Falls of the Ohio region is that the database is in need of considerable revision before it is suitable for comparative studies and syntheses. In the present study, the reports available to researchers in the Falls area have been given an initial reappraisal that consists simply of identification of valid diagnostic tools. No attempt has been made to ascertain the quantity of material attributable to a particular component or the function of the site, nor has an effort been made to discuss survey areas of comparable size. General observations are made about the location of sites relative to physiographic zones, landforms, and water sources, but the categories and definitions are not sufficiently standardized to allow more detailed comparison.

Examination of diagnostic artifacts from the aforementioned sites within the Falls of the Ohio region led to the identification of approximately 225 probable Early Woodland and early Middle Woodland components. Numerous other sites, particularly those reported outside of CRM projects, have no doubt been recorded and must be considered prior to synthesis of the Early and Middle Woodland occupation of the Falls area. Although the majority of the surveys and collections were made within the floodplain of the Ohio River, sites from all the physiographic zones in the study area were examined to verify the presence or absence of Woodland components.

Because of the number of surveys related to commercial development along the Ohio River, about 45 percent of the identified components are in the floodplain of the Ohio River. The number of Early Woodland components in the floodplain exceeds that of the Middle Woodland by about 25 percent. Sites on the terraces above the floodplain compose about 10 percent of the identified components and are evenly distributed between Early Woodland and Middle Woodland components. Sites along the Salt River and its tributaries at the base of the Knobs within and around Fort Knox account for about 10 percent of the components identified. Most of these sites are slightly above flood level on the Pleistocene alluvial and lacustrine deposits through which the Salt River and its tributaries are incised. Early Woodland components are about four times as numerous as Middle Woodland components in these settings.

Systematic survey throughout the Fort Knox Military Reservation (O'Malley, et al. 1980), Mocas' unpublished research, and numerous widely-dispersed subsequent projects have provided insight into the western portion of the Falls region. The Mississippian Plateau and the Knobs zones of Fort Knox were sampled, and Justice and Smith (1988) provided a less comprehensive, but important, survey of a portion of the corresponding Norman Upland of Harrison County, Indiana, on the opposite side of the Ohio River. Sites on rises above upland streams in these zones yielded about five percent of the components in the present study, and sites on ridges high above the more deeply incised downstream portions of these tributaries of the Ohio and Salt Rivers yielded about five percent of the components. Eighty-eight percent of the components adjacent to these tributaries are Early Woodland, and the others are Middle Woodland. About four percent of the components were on sites next to sinkholes in the karst upland. None of these were Middle Woodland. It is possible that some of the upland sites were in the vicinity of sinkholes that were not recorded.

The interior lowland of the Scottsburg Lowland has not been extensively surveyed, but both Early Woodland and Middle Woodland sites are comparatively well represented. About seven percent of the components in the current study are adjacent to small streams in this zone. Early Woodland sites were twice as common as Middle Woodland sites. Early Woodland components were present on two sites in a small wetland area within the interior lowland, but no Middle Woodland components were encountered. As mentioned earlier, this portion of Louisville was urbanized before archaeological surveys were performed and there is little data about the prehistoric settlement of the area.

Most of the Falls region does not have bedrock conducive to formation of rockshelters, but the narrow band of suitable exposures at the intersection of the Outer Bluegrass and Knobs zones contains numerous shelters. The few shelters that have been professionally investigated, which contain about three percent of the Woodland components identified in the present study, have equal numbers of Early Woodland and Middle Woodland components.

The Taylorsville Lake survey provided an intensive look at the middle portion of the Salt River and its tributaries at a distance from the Ohio River in the Outer Bluegrass zone, and the corresponding Muscatatuck Regional Slope physiographic zone was studied by several surveys close to the Ohio River in Indiana. About 10 percent of the components identified in the Falls area survey were found in the Muscatatuck Regional Slope/Outer Bluegrass zone. About two-thirds of the components were Early Woodland, and these were nearly evenly divided between sites in the floodplains, sites on rises above the streams, and sites on ridges above the streams. Among the Middle Woodland sites, floodplain sites were slightly more common than sites on ridges, and only one site was on a rise above a stream.

Research Design

Prior to investigations at the Knob Creek site little was known about the Early Woodland and Middle Woodland of the Falls of the Ohio region. Only one major project excavation project to study these cultural/temporal periods was carried out prior to the Caesars World Archaeological Project. The Clark Maritime Centre Archaeological District (CMCAD) report (Sieber and Ottesen 1986) discusses one major Early Woodland site and one major and one minor Middle Woodland site in the floodplain of the Ohio River 20 river miles upstream from the Knob Creek site. The Early Woodland component at 12CL109 is represented by at least nine pottery bearing features, over 50 diagnostic projectile points, and over 700 sherds that derive from an undetermined number of occupations. The large Middle Woodland component of 12Cl103 and the smaller component at 12CL92 contain at least 71 pottery bearing features, several dozen Middle Woodland projectile points, and nearly 3000 sherds of Falls Plain pottery. These sites offer considerable potential for comparison with components from the Knob Creek site. Analysis of the Knob Creek site also provides the opportunity to examine some of the apparent incongruities in the absolute and relative dating of the deposits from the CMCAD.

No other sites in the region have yielded more than a few Early or Middle Woodland cultural features. The only other studies of these cultural/temporal periods are a survey of chert quarries and related sites in Harrison County, Indiana, (Seeman 1975) and analyses Zorn Punctate and Falls Plain pottery from the Falls area (Mocas 1988, 1992). In large part, the Caesars World Project, supplemented by data from the CMCAD, will provide the first intensive look at the Early Woodland and Middle Woodland in the Falls region.

Phase I testing (Stafford and Cantin 1996) uncovered buried, stratified deposits to a depth of more than 2 m at 12HR484 and led to the conclusion that the deposits were potentially eligible for the National Register of Historic Places. The Phase II testing was designed to verify the importance of the site. These investigations were intended to clarify the stratigraphy within the site and potentially within the Woodland midden. The lateral boundaries of occupation strata and areas of highest density also were to be ascertained. Evidence was sought to determine if the two ceramic types recovered were from separate components and if datable associated samples could be recovered. Samples suitable for radiocarbon dating, luminescence dating, and Oxidizable Carbon Ratio dating, and diagnostic artifact samples for relative dating were to be acquired.

The Phase II research plan also involved evaluation of the varieties and quantities of artifacts, features, and small-scale subsistence remains and the capacity of each occupation to yield significant information about the prehistory of the region. Of particular interest were the various seeds and other botanical remains from the Woodland components and their potential for elucidation of the advent of horticulture in the lower Ohio Valley. Preservation of faunal remains also was to be evaluated. Geoarchaeological studies were to allow placement of the deposits in their geomorphic contexts. The uppermost alluvium was to be examined to verify that it was a relatively sterile historic layer that capped prehistoric deposits, the thickness of the stratigraphic units was to be established, and the absolute ages of the various landforms were to be determined.

Phase II testing showed that virtually the entire area between State Road 111 and Knob Creek had at least a sparse scatter of cultural debris and that the area of most intense Woodland activity was along the crest of the western ridge and the combined ridges. Phase III excavations later were focused upon this high density area. Although the relative stability of the land surface on the ridges during the Late Archaic, Early Woodland and Middle Woodland led to intermingled deposits and precluded vertical separation of the Woodland components, there was marked horizontal segregation of the components in some portions of the site.

The large quantities of artifactual materials and features from the Woodland components and the long stratigraphic sequence for the site (Stafford, et al. 1998) assured that 12HR484 was eligible for the National Register of Historic Places. Testing established that there was a high potential that further investigations would yield data critical to understanding the Early and Middle Woodland periods in the Falls of the Ohio region and the Ohio Valley.

A series of research problems related to chronology, settlement function, community patterning, subsistence, and environmental reconstruction were addressed by the research design. One goal was to construct a dependable absolute and relative chronology for the Early and Middle Woodland periods in the Falls of the Ohio region by acquisition of radiocarbon determinations from samples obtained in clear association with diagnostic materials in cultural features. The combination of abundant and diverse diagnostic materials and numerous cultural features offered the opportunity to establish specifically which tool types were associated with which component. The absolute ages, as well as the technological and morphological ranges of the Early Woodland grit tempered, cordmarked pottery and the Middle Woodland limestone tempered, plain surfaced (Falls Plain) pottery were to be derived. The radiocarbon dates were further intended to establish depositional rates and clarify the degree to which individual zones were palimpsests.

A fundamental problem addressed by the research design was determination of the function of each occupation within its respective settlement system. The principal focus of the hand excavation at the site was exposure of large, contiguous areas in order to study spatial patterning of artifacts, features, and subsistence remains that might relate to site function. The presence of structures, horizontally circumscribed occupations, and distinctive activity areas provided an opportunity to focus on large scale spatial patterning of facilities and artifactual remains within settlements. Comparison of the differential arrangement of activities and facilities in the Early Woodland and Middle Woodland components offered the opportunity to detect possible differences in occupation functions and ultimately settlement and subsistence strategies.

An intensive program for the recovery of plant remains was an integral part of the research plan. Extensive use of flotation was intended to provide botanical samples for quantitative reconstruction of the prehistoric diet and identification of associated subsistence strategies. A high volume of sediment was to be processed for plant remains in order to acquire samples of sufficient size to draw statistically valid conclusions about aboriginal diets and to compile data suitable for comparison with substantial data sets from other regions of the Midwest and MidSouth. Determination of the extent of nut utilization and identification of cultigens and native seed plants were particularly emphasized to enhance recognition of shifts in economic bases, subsistence strategies, and land use based on dietary changes.

Differential lithic reduction strategies, the use of a variety of chert types, the strong preference for Wyandotte chert, and discrete intensive lithic reduction areas found during Phase II were more thoroughly studied during the Phase III excavations. These studies were intended to trace movement and interaction, identify technological and economic decisions, elucidate spatial structure, and distinguish foraging from logistic strategies.

Geomorphological studies of the evolution of the floodplain of the Ohio River at the site offered the opportunity to formulate more precise predictive models about buried site potential and the estimated age of buried occupations. Geoarchaeological studies were used to delineate the depositional processes that built the Ohio River channel side bars in which the archaeological occupations are contained. This analysis is crucial for understanding how the distal portion of these bars formed and for tracing the undulating paleosurfaces that were occupied prehistorically.

Fieldwork Strategies

Fieldwork was conducted in three phases between 1995 and 1998. The first phase involved documentation of the presence of the site and its approximate boundaries and depth. The second phase consisted of determination of the depositional processes at work and the cultural and natural settings of the components, refinement of the boundaries and identification of areas of intensive activity and concentrations of cultural materials, and assessment of the types and quantities of cultural remains available for formulation of research questions. The third phase focused on intensive examination of particular aspects of individual components, clarification of interrelationships and patterns, acquisition of artifactual and environmental samples, and problem oriented specialized investigations.

Because the project area is located in the Ohio River floodplain and significant buried cultural resources are known to exist in comparable loci in the region, subsurface investigations were an integral part of the Phase I investigations. Backhoe trenching and hand auger coring were used to locate prehistoric debris, which lay below a mantle of historic alluvium. Cultural remains were initially located by placement of a total of seventeen backhoe trenches at roughly 100 m intervals along both ridges (Figure 1.6), and these were supplemented by five bucket auger cores. On the higher, western ridge dense Woodland deposits began between .35-1.10 m below the present surface. A sparse layer of deposits on the eastern ridge began at .80-1.5 m below the surface.

Because strategies and sampling intensities appropriate for plowzone sites are typically unsuitable for the types of buried deposits located by the Phase I testing, the Phase II testing focused on hand excavated units, but was extensively supplemented by backhoe trenches and bucket augers to delimit occupations and locate concentrations of artifacts and features. The emphasis of the investigations was on obtaining a sample of site deposits sufficient to address the problems outlined in the research design as integral to assessment of National Register eligibility.

Units were excavated in 10 cm levels and all sediment screened through 1/4 inch mesh screen. Flotation samples of 8 liters were taken from all occupation zones, unless carbonized plant remains were not observed. Unit walls were profiled and photographed as necessary. All features were bisected when possible and the fill sifted, and then they were profiled, drawn to scale, and photographed. The remaining portion of the feature was excavated by depositional zones, if present, mapped and photographed. Multiple flotation samples were routinely taken from feature fill. Additional macrobotanical and archaeofaunal samples were collected in some instances to assist the analyses. A total of 91 hand excavated 2-x-2 m units were placed at approximately 25 m intervals on the crests of both ridges or were staggered east-west to thoroughly sample the width of the west ridge. Extensions were added to some initial units to fully expose features or activity areas. Additional units were positioned to either fill gaps or determine boundaries of high density areas or specific components.

Standard procedures for unit excavation during Phase III were comparable to those of Phase II, except that the excavated soil was water screened through 1/4 inch mesh screen. Flotation samples were taken from the second Woodland level of each hand excavation unit. The reason for choosing the second level was that it provided the highest potential for deposits associated with the main occupation and a diminished likelihood of introduction of material from underlying Archaic deposits that might be present in the basal Woodland level.

A total of 214 auger cores were used to trace the distribution of cultural deposits. A four inch or larger auger core was taken with the fill from each 10 cm interval screened through 1/4 inch mesh and all material bagged by level. The cores were placed at 20-m (N–S) x-10 m intervals between the ridges and to the west of the western ridge to trace the limits of the deposits. Cultural deposits appeared to diminish at the narrow south end of the site, so two transects with 10 m spacing between the cores were placed in this area. Cores were excavated to a depth of 3m. Selected cores were taken to a depth of 6 m to evaluate the possible presence of deeper occupations when geomorphological coring indicated the presence of depositional environments conducive to cultural deposits at greater depths. Shallow (50 cm) cores were positioned on a 5-x-5 m grid around the historic barn, and 60 shovel probes were dug at 5 m intervals in the vicinity of a historic privy in a fruitless effort to locate a possible associated structure.

Backhoe trenches, which ranged in length from 10-100 m, were used to examine the western slope of the main ridge to clarify information obtained by augering. The swale area between the two ridges and portions of the eastern ridge were examined with backhoe trenches because test units had indicated there were low material densities and few cultural features. Several trenches were placed at the extreme south end of the site to evaluate ephemeral occupations encountered during hand excavation. The longer trenches were used to obtain continuous profiles of cultural deposits and thus eliminate distributional ambiguities that arise with short, discontinuous trenches. Trenches were excavated in layers several centimeters thick with the toothless bucket of a backhoe or trackhoe while being monitored by an archaeologist. Once a feature or potential feature was exposed, excavation was halted and the feature excavated or pedestaled before further trenching was commenced. At least one trench wall was scraped and all materials were flagged, and measured drawings were made of at least one wall if artifacts were present. Seventeen trenches, which totaled 765 linear meters, were dug.

During Phase II backhoe trenching an extremely dense concentration of debitage was uncovered at the south end of the site. A hand excavation unit was placed adjacent to the debitage, and it revealed extensive deposits that continued beyond the unit. Because of the presence of abundant cultural debris, the Phase II South Block was positioned to the north and east of this unit (Figure 1.7). A total of 40 hand excavation units were placed within a 16 m (north-south) by 12 m area and revealed a huge (5 x 7 m) baked soil area ringed by features and debris. Subsequently, the area to the north of the Phase II block was surveyed with a flux-gate gradiometer and a magnetometer in an effort to determine if additional thermal features and other features were present.

In April, 1998, R. Berle Clay of Cultural Resource Analysts, Inc., performed geophysical surveys of an area 60 m north-south by 20 m east-west to the north of the Phase II South Block (Clay 1998). The survey used a combination of magnetic and electromagnetic techniques, separately and in combination. A Geonics EM38 soil conductivity meter, with the transmitter and receiver of the instrument spaced one meter apart, was used to take a series of readings (2461) every 50 cm on transects one meter apart. This yielded an effective ground penetration of approximately 1.5 m. The instrument collected both earth conductivity and magnetic susceptibility values. A Geoscan FM36 fluxgate gradiometer was used to take a series of readings (9586) every .125 m on the same transects. This instrument measured variations in the magnetic field to a depth of not more than 2 m. The gradiometer recorded four anomalies that were considered to potentially indicate prehistoric features.

In October and November, 1998, a backhoe was used to scrape the plowzone from an area slightly larger than the southernmost 20 x 20 meter geophysical survey block to expose the Woodland deposits in preparation for placement of hand excavation units. Nine contiguous 2 x 2 meter hand excavation units were positioned along the west side of the geophysical survey area beginning in the southwest corner, and another unit was placed in the center of the south edge, directly north of the Phase II South Block. Another unit was positioned within an area of generalized anomalous conductivity 20 m to the north. Four features and a post mold were discovered in the southwest corner. A slit trench one meter wide and 11 m long was extended to the north from the center of the scraped block to bisect the area with anomalous conductivity and to obtain a vertical profile of the deposits and establish that cultural deposits had dissipated, as indicated by Phase II testing and geophysical survey. It was determined that much of the area was disturbed by recent activity.

One anomaly with low conductivity, Area 4, was excavated and determined to be an Early Woodland pit/hearth, Phase III South Block Feature 1. A less distinctive area with loci of elevated conductivity and lower conductivity (Area 2) surrounded Area 4, and may have reflected some of the features and associated midden to the east of Feature 1. Area 5, an area of generally lower conductivity to the north and northeast of Feature 1, did not yield any cultural features when transected by a narrow trench and tested with a hand excavation unit. Area 1, which also was evident in the magnetic survey, was determined to be Phase II Unit 28S8W. The other magnetometer anomalies were considered to be metallic materials related to construction activity.

A letter from the Corps of Engineers on December 4, 1998, mandated further mechanical stripping and feature excavation in an additional 220 m^2 of the area from which the plowzone had been removed. Seventeen features were excavated in this area, but most were small and shallow and lacked diagnostic cultural materials.

The principal focus of the Phase III data recovery project for 12HR484 was the hand excavation of contiguous areas of the site and mechanical stripping of deposits with heavy equipment to expose features and associated activity areas. A 20 percent sample of the high density midden area was examined in this manner to observe the large scale community patterning of the Woodland components. The Early Woodland component was studied primarily by exposure of a block of deposits approximately 1000 m^2 in size in the 200 Block (Figures 1.8 and 1.9), and a similar sized area was exposed in the 100 Block to examine the Middle Woodland deposits (Figure 1.10). Within these two blocks a total of 1500 Woodland levels, 10 cm in depth and 4 m^2 in size, a combined total of 600 cubic meters, were hand excavated after the historic alluvium was removed by a trackhoe with a toothless bucket while an archaeologist monitored. Areas of lower midden densities were sampled by excavation of features exposed by trackhoe scraping. Two other large blocks (300 and 400 Blocks) to the north of the Woodland blocks (Figures 1.11 and 1.12), two smaller trenches to the south of this area (63N47W and 15N27W Trenches), and smaller trenches to the north (253N80W Trench) and south (148N49W Trench) of the 200 Block, and a Phase III extension (64S12W) of the Phase II South Block (Figure 1.13) were studied in this manner.

Chapter 2

DISTRIBUTION OF CULTURAL DEPOSITS

Horizontal Distribution of Components

The stratigraphy and geomorphology of the Knob Creek site are discussed in detail in a separate report that deals with the entire Caesars World Archaeological Project area. A synopsis of the distribution of cultural materials is provided herein to provide the reader with basic background about the deposits and to provide some context for the discussion that follows.

Both the Early Woodland and the Middle Woodland components are present intermittently along the entirety of the main alluvial ridge of the Knob Creek site. The Early Woodland deposits generally are relatively circumscribed, characterized by dense concentrations of cultural debris with distinct boundaries, outside which there is little evidence of the component. It is feasible that some of these sharply delineated areas represent distinct occupations separated by varied temporal spans. The number of minor occupations during the Early Woodland is not evident, but the likelihood of a single settlement that extends for more than 500 meters along the ridge is not great. This is supported by the radiocarbon dates.

The Phase II South Block, at the south end of the site (Figure 2.1), represents a spatially restricted but intensive Early Woodland activity area, but the relatively dense Early Woodland midden only extends a short distance into the Phase III South Block, which adjoins it to the north. There is little evidence of the Early Woodland component for more than 100 m to the north of the South Block. One Phase II Early Woodland feature and five projectile points indicate slight activity around the 63N47W Trench. The 100 Block bears evidence of several Early Woodland activity areas and short-term habitation, but there does not appear to have been long-term or intensive use. A moderate number of Early Woodland artifacts were recovered, but only one feature was identified. Very little Early Woodland cultural debris and no features were found in the 148N49W Trench, which suggests discontinuity of the Early Woodland deposits between the 100 Block and the 200 Block. The 200 Block represents the largest concentration of Early Woodland midden, although in some areas it is intermingled with debris from other occupations. Early Woodland tools and features are abundant in the block and a wide variety of domestic, maintenance, manufacture, and specialized tasks appear to have been performed during one or more occupations.

To the north of the 200 Block, there are small Early Woodland feature clusters and scatters of cultural debris in the 253N80W Trench, the 300 Block, and the 400 Block, but the distribution of the features and tools and the associated dates suggest these may derive from multiple brief uses of these areas.

The Middle Woodland component is sparsely represented at the south end of the site. There are few identified Middle Woodland features in the South Block and the 15N27W Trench, and there is little cultural material in the features. The 63N47W Trench has more Middle Woodland features, but there is little cultural material in them or in the general midden. This area appears to be a special activity or processing area peripheral to the intensive 100 Block Middle Woodland occupation(s). The 100 Block contains the largest concentration of Middle Woodland features, a dense midden, and one structure. The Middle Woodland component of this block may comprise debris from multiple occupations, but at least one major occupation is represented. Middle Woodland tools, pottery, and features are abundant in the block and a wide variety of domestic, maintenance, manufacture, and specialized tasks appear to have been performed during one or more occupations. The 148N49W Trench has a series of feature clusters that may represent an extension of one of the occupations from the 100 Block, and this occupation or another from the 100 Block may extend as far as the south end of the 200 Block, where a moderate sized cluster of Middle Woodland features and cultural debris are present. A Middle Woodland structure and several features indicate that Middle Woodland activity extends to at least the central portion of the block.

The Middle Woodland component appears to dissipate between the 200 Block and 300 Block. In the 253N80W Trench there are no features and only a few projectile points attributable to the component. The Middle Woodland features in the 300 Block may derive from more than one occupation. Some of the pits have nearly equal quantities of pottery considered Early Woodland and Middle Woodland, and the radiocarbon date from one such feature suggests the possibility of an occupation temporally intermediate between the other Middle Woodland features and the Early Woodland features. Although there were more Woodland features in the 400 Block, few could be attributed specifically to the Middle Woodland. Like the 300 Block features, these pits were widely dispersed and generally had few tools, irrespective of size. The features in the 400 Block had more pottery and more evidence of use as hearths. These appear to be more closely associated with domestic activities than those of the 300 Block. The date from one of the pits correlates well with dates from the 100 Block and could indicate contemporaneity.

Vertical Distribution of Components

The primary alluvial ridge upon which the Early Woodland and Middle Woodland deposits of the Knob Creek site are located reached a state of near stability in elevation by approximately 3500 years ago. Consequently, the dense Late Archaic Riverton midden that extends along the entire ridge was not buried thoroughly by subsequent alluviation, nor was the small Terminal Archaic Buck Creek component that followed about 500 years later.

These deposits grade almost imperceptibly into the subsequent Early and Middle Woodland deposits that overlie them. More than 200 Woodland features are present in the 100 and 200 Blocks, the two main hand excavation blocks chosen for examination of the Woodland components, and most of the pits extend deep enough to potentially penetrate the Late Archaic and Terminal Archaic deposits.

As indicated above, there is some horizontal separation of the two Woodland components, but there is considerable overlap as well, and in those areas there often are intermingled deposits. Aboriginal excavation of the prolific Middle Woodland pits frequently resulted in disturbance of earlier deposits and resulted in earlier materials being displaced and commingled with the Middle Woodland materials or placed on the Middle Woodland occupation surface, essentially reversing the stratigraphy. Partially because of extensive pit excavation and partially due to the marked slope, the Early Woodland and Middle Woodland materials in the midden deposits on the eastern slope of the ridge are intermingled. Vertically stratified Woodland deposits are atypical.

Chapter 3

PHASE II EXCAVATIONS OF WOODLAND COMPONENTS

The Phase II testing of the Knob Creek Site focused upon refinement of the boundaries of the Woodland components, identification of areas of intensive activity, and assessment of the types and quantities of cultural materials and features. A total of 17 backhoe trenches were excavated during Phase II testing of the site. Forty-eight hand excavated 2-x-2 m units, some of which were expanded subsequently, were placed at approximately 25 m intervals on the crests of both ridges or were staggered east-west to thoroughly sample the horizontal extent of deposits on the western ridge. Additional units, totaling 178 m^2, were positioned to either fill gaps or determine boundaries of high density areas or specific components.

Phase II testing showed that virtually the entire area between State Road 111 and Knob Creek had at least a sparse scatter of cultural debris, and there were areas of high density deposits along the crest of the western ridge and the combined ridges. The site encompassed an area of 60,600 m^2, and the high density area comprised 24,100 m^2. Phase I and Phase II testing exposed an area of 3958 m^2 and constituted a 6.5 percent sample of the site.

Fifty-three Woodland features were distinguished. Fifteen of these features were from the Middle Woodland component, 21 were of Early Woodland cultural affiliation, and 17 were not attributable to a specific Woodland component. The areas where the Phase II hand excavation units encountered the highest concentrations of Early Woodland and Middle Woodland cultural materials were investigated further during Phase III. The 200 Block was placed around an area with dense Early Woodland midden and possible Middle Woodland structural remains, and the 100 Block was positioned around the units with the most concentrated Middle Woodland debris. Units outside the Phase III excavation areas are discussed herein to provide a more comprehensive view of the distribution of cultural materials and components, and the Phase II units inside the Phase III blocks and trenches are included in the discussion of those excavation areas.

The Phase II trenches along the west side of the west ridge showed high rock density on the ridge crest but little pottery, charcoal, or debitage, and there were few features on the slope toward Knob Creek. The trenches to the east of the main ridge showed very little debris of any kind and very few features. Most of the features were small and shallow and devoid of tools. Based upon the distribution of cultural materials on the east ridge, it is concluded that the ephemeral activity in this area was peripheral to, but associated with, the main occupations to the west.

Early Woodland Deposits

An initial view of pottery, projectile points, other cultural materials, and debris associated with the Early Woodland component was provided by a cluster of four Early Woodland pit features at the north end of the project area in Unit 425N90W and the three adjoining units. A radiocarbon sample from Feature 39 yielded a date of 2320 +/- 80 RCYBP, which dated both the Early Woodland component and grit tempered pottery within the pit. Two Turkey-tail points in Trench B showed additional Early Woodland activity directly west of the ridge crest, and Trench J, which extended downward into the slough and across to the east ridge, provided the only identified Early Woodland feature and two of the three Early Woodland Contracting Stem points on the east ridge. A short distance south of the feature was the only unit (U375N25W) on the east ridge to contain more than 100 grams of grit tempered pottery. Feature 2 in Unit 375N90W and several Early Woodland Contracting Stemmed points showed that Early Woodland activity on the west ridge continued for more than 100 m south of U425N90W. Early Woodland materials dissipated in the units farther south, but the presence of more than 100 g of grit tempered pottery in U275N60W indicated light Early Woodland activity in that area.

Dense midden was evident in the units (U250N60W, U238N60W, U225N60W, U220N40W, U200N50W) on the crest of the west ridge in the center of the site, and extensive debitage concentrations were found in the three northernmost units. Feature 40, in U250N60W and 1-x-2 m units along its south and east sides, contained a massive concentration of debitage, and grit tempered pottery, an Early Woodland Contracting Stemmed point, and other refuse from the Early Woodland component were present and signaled the reappearance of the component. Unit 200N50W contained grit tempered pottery in moderate amounts and Early Woodland Feature 59 and Woodland Feature 13. These five units and their extensions demarcated the main Early Woodland habitation area. Adena and Turkey-tail points in units (100N60W, 125N60W, 125N75W, and 225N75W) showed that the main Early Woodland occupation continued to the west and south but dissipated farther to the south, with only one feature (Feature 63 in U77N40W) north of the South Block.

Three units south of the ON line and north of the South Block yielded minimal amounts of Early Woodland and Middle Woodland cultural materials and indicated only ephemeral activity in the area. A small, intensive Early Woodland occupation was studied with a block of hand-excavation units in the Phase II South Block. Trench I, the southernmost excavation area of the site, contained a scatter of Early Woodland debris, and Feature 46, within it, was nearly sterile, thus it was determined that neither component was represented by more than diffuse deposits and that the intensive Early Woodland activity seen in the South Block did not extend this far south.

Middle Woodland Deposits

At the north end of the project area the Middle Woodland component was sparse. A pit/hearth and a refuse pit (Features 36 and 99) to the west and east of the ridge indicated that light Middle Woodland activity extended across the entire crest of the west ridge in this area. On the east ridge, Unit 400N8W, which had more than 100 g of Falls Plain pottery, appeared to represent a peripheral area of the Middle Woodland component. Feature 3, in U350N75W, and a very light scatter of cultural debris indicated that the ephemeral Middle Woodland component continued to the south.

A dense Middle Woodland midden was present in the center of the site. The presence of more than 100 g of Falls Plain pottery in four units to the west (200N75W, 125N75W, 125N60W, 100N60W) and three units to the east (197N8W, 173N23W, 147N8W, 125N25W) of the ridge crest, and one unit (U97N8W) with more than 1000 g of pottery, demonstrated the existence of a continuous sheet midden. Unit 220N40W and the adjoining units yielded a large amount of Falls Plain pottery, many Snyders Cluster points, and a large amount of daub, which indicated considerable Middle Woodland activity and possible structural remains. Units 200N50W, 175N40W, 165N50W, and 150N40W showed a pattern of increasing amounts of Middle Woodland cultural debris to the south. U124N40W and the adjoining units and Unit 100N25W and the adjacent units produced extremely large quantities of pottery and other cultural debris and demonstrated that this was the area of most concentrated Middle Woodland occupation. Feature 20, which was part of a cluster of pits around U100N25W, provided a temporal position for the Middle Woodland component and the Falls Plain pottery within it. A radiocarbon sample from the feature provided a date of 2000 +/- 50 RCYBP. The Phase III 100 Block was subsequently placed over these units to investigate the Middle Woodland component.

Units in the southern part of the site did not contain the continuous middens seen in the northern and central portions of the site. Feature 108, a small, shallow Middle Woodland refuse pit in U48N25W, and U47N8W, which contained more than 100 g of Falls Plain pottery, represented an ephemeral eastward and southern continuation of the midden, but south of these units little Middle Woodland material was found. The Middle Woodland was only minimally represented in the South Block.

Summary

A wide range of feature types were encountered during Phase II testing, including hearths, pits, post holes, and refuse scatters, and there was evidence of structural remains.

Excavations revealed that burned wood and nut shell for radiocarbon dating and botanical analysis were abundant, but bone preservation was very poor, with preservation of unburned bone quite rare.

There was a light scatter of Early and Middle Woodland cultural material across most of the area between State Road 111 and Knob Creek, but the area of most intense activity was along the crest of the western ridge and on the combined ridges in the central portion of the site. Units on the crest and the western slope of the east ridge contained light to moderate amounts of Woodland debris and two Woodland features. Units on the west slope of the west ridge contained light scatters of Woodland debris.

The Early Woodland and Middle Woodland components were delineated and traced across the site. Although the near stasis of alluvial deposition on the ridges during the Late Archaic through Middle Woodland led to compression and mixture of deposits and precluded vertical separation of the components in some areas, there was marked horizontal segregation of the components in some portions of the site.

Early Woodland cultural materials were sparsely dispersed over most of the site, with areas of spatially restricted but intensive activity evident. A variety of feature types were encountered in the Early Woodland component, but the general dearth of pottery suggests that much of the midden may have derived from specialized exploitative activities rather than extended habitation. The Early Woodland component, typified by grit tempered pottery and Early Woodland Contracting Stemmed and Turkey-tail projectile points, was most evident between 200N and 275N and from 40W to 60W. This area also contained four features and several dense concentrations of debitage, and pottery amounts were greatest therein. The consistent presence of Early Woodland projectile points in units as far south as 100N and as far west as 75W indicated that these areas had been used, but perhaps not extensively inhabited.

A few features, a high density of fire cracked rock, and small but consistent quantities of Early Woodland material were found in the units on the ridge crest at the north end of the site, especially in the feature cluster at the northern periphery. Large quantities of fire cracked rock were present in the trenches and units throughout this area, but the debris could not be attributed confidently to the Early Woodland component rather than the Middle Woodland component. Projectile points recovered from Trench B and Trench J indicated that the Early Woodland component at the northern end of the site extended across the crest of the west ridge and onto the east ridge. The extension of Early Woodland activity onto the east ridge was further indicated by the presence of a moderate amount of grit tempered pottery in U375N25W and U400N8W.

The Early Woodland component also was represented prominently at the south end of the site in the South Block. Excavation of 37 units in the South Block demonstrated use of the area for a variety of purposes and at least short-term habitation. Evidence of extensive lithic reduction was found, and feature clusters with a variety of feature types encircled a huge thermal feature.

The Middle Woodland component, characterized by limestone tempered, plain (Falls Plain) pottery and variants of Snyders points, was most prominent between 100N and 220N and between 0E and 60W. Eight of the eleven Middle Woodland features found in hand excavation units came from this area. One cluster of features in this area contained enough pottery and other refuse to suggest intensive activity in the vicinity, and other nearby pits had moderate amounts of cultural debris. Moderate to large amounts of pottery in nearly every unit within the main concentration indicated that the component encompassed the entire ridge crest in this portion of the site. At the northern end of this main habitation area, evidence of a possible structure was encountered. The features outside this area were shallow pits with little cultural material, and little Middle Woodland refuse was found south of the area.

In the northern portion of the site relatively dense Woodland midden was present, particularly dense layers of fire cracked rock, but it could not be reliably attributed to the Middle Woodland component rather than the Early Woodland component. Middle Woodland features in these two trenches showed that this component extended across the west ridge and onto the east ridge. Further evidence of this is provided by the presence of a moderate amount of pottery in U400N8W.

Testing established that there was a high potential that further investigations would yield important data critical to understanding the Early and Middle Woodland periods in the Falls of the Ohio region and the Ohio Valley. Phase III excavations were outlined based upon the results of the testing, and a program of hand excavation and mechanical excavation was subsequently carried out.

Chapter 4

RADIOCARBON DATES AND CHRONOLOGY

As many as 16 radiocarbon dates may be attributable to the Early Woodland and Middle Woodland components of the Knob Creek site. Six samples date the Middle Woodland component, and one date may reflect a transitional period between the Early Woodland and Middle Woodland components. Radiocarbon assessments were made of six samples from features that contained Early Woodland diagnostic materials and one sample from a feature without diagnostic material but within a cluster of Early Woodland pits. Samples from two additional features without Early Woodland diagnostic materials yielded dates suggestive of Early Woodland cultural affiliation. Tables 4.1 and 4.2 provide the C-14 dates, their proveniences, component associations, one and two sigma calibrated age range probabilities, and other data. Figures 4.1 and 4.2 graph the calibrated ages ranges and probability distributions of the Early Woodland and Middle Woodland dates, respectively.

Few radiocarbon determinations were obtained from Early Woodland and Middle Woodland components in the Falls of the Ohio region prior to excavation of the Knob Creek site, and the validity of many of the assessments is seriously in question (Mocas 1988:141; Mocas 1992:70-72). Although there is some question about the accuracy of several of the dates, in general, the radiocarbon dates from 12HR484 represent the first suite of dates that confidently can be considered to reflect the chronological placement of the ceramics, projectile points, structures, personal items, and technological and subsistence activities of these cultural/temporal periods in the Falls area. The dates reflect only the chronology at one site, but they are from well documented, buried contexts and provide a framework upon which other chronologies can be built and against which previous dates can be contrasted.

By use of high-precision calibration time scales, dendro-corrected ages of the samples are derived, and the fluctuations of corrected ages relative to the radiocarbon ages are discussed. This is particularly relevant during the Early Woodland period, when substantial radiocarbon/calendrical fluctuations occur.

The chapter is divided into an exposition of the cultural contexts of the samples, a discussion of the Early Woodland and Middle Woodland chronologies, and an examination of the effect of the calibrated dates upon the chronologies. The radiocarbon samples were chosen to answer specific research questions and, where possible, to provide temporal positions for certain culturally diagnostic material remains and habitation facilities. The charcoal was derived from samples taken specifically for dating, from hand-excavated botanical remains, and from flotation samples. Dating samples were chosen on the bases of what were deemed to be the best combinations of suitable dating material, adequate sample size, and depositional integrity of the sample. When samples were sufficiently large, only nutshell fragments were used for dating. After preparation by hand sorting and water flotation to wash the sample and remove the dense contaminants, the charcoal was submitted by the staff of the Indiana State University Anthropology Laboratory to the Illinois State Museum. The botanical remains were identified by Marjorie B. Schroeder of the Illinois State Museum, and the samples subsequently were forwarded to the Illinois State Geological Survey for dating. One sample was forwarded to Oxford University for AMS dating. The two Phase II radiocarbon assessments were performed by Beta Analytic, Inc..

Sample Contexts

The charcoal samples were obtained from a variety of activity loci to gain insight into the absolute ages of various spatial and cultural segments of the Early Woodland and Middle Woodland components. Information was sought about the horizontal distribution of cultural materials in each component, the number of occupations present, and the focal areas of activity and habitation of each component.

A series of dates were obtained from the dense deposits of the Middle Woodland component in the 100 Block in an effort to discern whether the midden represented an intensive occupation or a number of small visits to the same locale. Feature 100-7 (ISGS-4904), a large, steep-sided, flat bottomed refuse pit, contained a very large rim of Falls Plain pottery, three Snyders points, and an Adena Stemmed point that could be intrusive. This pit is the main interior feature of Structure X, and the sample is considered to date this circular, single post structure. A nearly identical date was obtained for Phase II Feature 20 (Beta-113981), a large refuse pit with much Falls Plain pottery, which was part of a cluster of features in the southeastern portion of 100 Block.

Feature 100-37 (ISGS-4901) was a large, deep, flat bottomed refuse pit. Large rims and a base of Falls Plain pottery, a possible Snyders Variant point, and an Adena Stemmed point that could be intrusive were recovered from the pit. Feature 100-112 (ISGS-4903) was a huge, stratified storage/refuse pit, approximately 2 m in diameter and 1.5 m deep, that is unique on the site and in the region. The pit contained large rims and bases of Falls Plain pottery and a Snyders Variant point, as well as a huge volume of refuse.

These dates from the 100 Block sample the main feature concentrations, and the tight cluster of ages suggests one or more intensive occupations during a relatively short temporal span. Feature 400-7 (ISGS-4972), a deep, flat-bottomed, stratified, pit/hearth, contained a large rim of Falls Plain pottery and a Snyders point. The date correlates well with the assessments from the 100 Block and shows general contemporaneity of deposits at the northern end of the site with those in the main occupation area.

A small charcoal sample was obtained from burned Post mold 200-1 (Oxford A-0224) of Structure A--a burned structure in an area with numerous Early Woodland Contracting Stemmed points and much Falls Plain pottery. This sample was forwarded to Oxford University for an AMS date.

Feature 300-60 (ISGS-4971) was a large, deep, flat bottomed, stratified refuse pit. In addition to an Adena Stemmed point, the pit contained approximately equal amounts of grit tempered, cordmarked pottery and Falls Plain pottery. It is plausible that the sample dates an occupation at the time of a transition between the popularity of grit tempered, cordmarked pottery and the preference for Falls Plain pottery, and the calibrated radiocarbon age range overlaps with both the Early Woodland and Middle Woodland ranges.

Trench Feature 154 (ISGS 4984) was a large refuse pit in the 253N80W Trench that contained an Adena Stemmed point and grit tempered pottery. The sample was taken from a dense charcoal layer that lined the bottom and sides of the pit. A roughly comparable date was obtained from Phase II Feature 39 (Beta-113984), a large refuse pit with grit tempered pottery within the 400 Block. These dates provide an approximate age for Early Woodland occupations during which grit tempered pottery without interior cordmarking was used. There is evidence of Early Woodland activity elsewhere in the Caesars Archaeological Project area at approximately this same time. Charcoal from a refuse pit at 12HR482, on the opposite side of Knob Creek, and charcoal from a post mold at site 12HR481, several hundred meters to the west, produced dates nearly identical to Trench Feature 154. These four dates have calibrated age range probabilities that coincide at the one sigma level.

Phase II Feature 104 (ISGS 4902) and Phase II Feature 78A (ISGS 4905) provide nearly identical dates for the unique special activity area in the South Block of the site. The sample from Feature 104 was taken from a dense concentration of nut and burned wood at the bottom of this pit/hearth that lay outside of the southern edge of Phase II Feature 78, the huge baked soil area. The projectile point from the pit fits the description of Harrison Turkey-tail points (Justice 1987:173-175). Feature 78A was a refuse pit in the center of the baked soil area, and it contained a large sherd of grit tempered, interior/exterior cordmarked pottery. The radiocarbon dates for the South Block features correlate well with regional dates for early pottery and Turkey-tail projectile points and confirm their cooccurrence. The dates from the South Block are not significantly different from those of the 200 Block and suggest general contemporaneity.

The dates from the 200 Block sample the main feature concentrations, and suggest the possibility of at least one very early Early Woodland occupation. Feature 200-32 (ISGS 4900) was a refuse pit at the edge of Structure C, which was in the midst of an activity area in the northwest corner of the 200 Block. The pit contained grit tempered, interior/exterior cordmarked pottery, and sherds of interior/exterior cordmarked pottery were recovered from a feature within the structure and scattered throughout the surrounding units and the northwest portion of the 200 Block. The radiocarbon age correlates well with dates for interior/exterior cordmarked pottery elsewhere in the Midwest.

Two other features on the site have radiocarbon determinations that overlap at the one sigma level with the date from Feature 200-32. Feature 300-37 (ISGS 4958) was a refuse pit with no ceramics or Early Woodland diagnostic material. A Riverton point was found at the base of the pit, but it could be intrusive from the underlying Riverton component. This feature could not confidently be attributed to a particular component, but the radiocarbon assessment is quite close to the date from Feature 200-32 and may indicate Early Woodland cultural affiliation. Phase II Feature 83 (ISGS 5186), a refuse pit isolated on a low terrace above Knob Creek, was without diagnostic cultural material. A charcoal sample yielded a date that also overlaps at the one sigma level with the dates from Feature 200-32 and Feature 300-37.

Feature 200-25 (ISGS 5680), a medium-sized, shallow, steep sided pit, held moderate amounts of grit tempered pottery, debitage, and fire cracked rock, and a biface fragment. This pit is within the outline of Structure B, and the sample was intended to date this circular, single post structure. The radiocarbon date is markedly earlier than the other radiocarbon assessments associated with pottery at the site, but the pottery is not noticeably different. Comparable early dates from sites with pottery have been reported in Ohio (Matthew Purtill, personal communication 2006) and Indiana (R. B. Clay, personal communication 2004), but a comprehensive study of these collections and dates has not been undertaken. Although the feature appears to date inordinately early in radiocarbon years, the two sigma range of the calibrated date overlaps with that of the other early pottery-bearing pit (Feature 200-32) in the block. The lack of interior cordmarking on the sherds may be an indication that the pottery postdates Feature 200-32, and that the date does not accurately reflect the actual age of Feature 200-25, but the pottery of the region is not sufficiently well known to allow such a statement.

Feature 200-26 (ISGS 5634) was a very large, shallow, refuse pit with a very large amount of fire cracked rock, a large amount of debitage, and a Stage 2 biface but no diagnostic cultural materials. A Turkey-tail projectile point was found above the feature outline before the pit was identified and may be part of the feature fill. The pit was in a cluster of Early Woodland features about 16 m east of Feature 200-25. The date overlaps at the one sigma level with that of Feature 200-25 and at the two sigma level with other pottery-bearing pits. It also is possible that the pit is from a preceramic or non-ceramic occupation.

Feature 200-108 was a large, deep, refuse pit with a moderate amount of debitage, a large amount of pottery, and a very large amount of fire cracked rock that was located about four meters from Feature 200-26 and considered to potentially be contemporaneous. It also was about 10 m from Feature 200-25 and contained comparable pottery. A small sample (1.4

g) of burned nut shell from Feature 200-108 yielded a radiocarbon date (ISGS-5784) that was hundreds of years more recent than would correlate with the large Early Woodland pottery sample in the pit. A second date (ISGS-5839) was obtained from a sample of wood from the feature, and this date was even more askew from the expected date. The most likely explanation is that the burned material was accidentally introduced by rodent disturbance or similar non-cultural means.

C-14 Calibration Scale

Fluctuation in atmospheric carbon has resulted in deviation in radiocarbon ages from true calendric ages. Low-frequency fluctuations increase the uncertainty associated with any given radiocarbon determination beyond that of the laboratory error typically reported with C-14 dates. Typically in the Midwest, C-14 dates have not been routinely corrected, therefore, B.C./A.D. chronologies do not represent calendrical dates. All C-14 dates from the Knob Creek site were corrected (Stuiver and Reimer 1993) using the software CALIB 5.0 (Stuiver, et al. 2005) .

The radiocarbon ages obtained from charcoal samples confidently attributable to Early Woodland and Middle Woodland components at 12HR484 span the interval 2000-2550 rcybp. During some portions of this span there was substantial short-term fluctuation in the atmospheric carbon levels. A marked reversal is evident around 2200 rcybp, and a particularly large plateau with fluctuations is present from 2400-2550 rcybp. These result in multiple potential ages for single samples and larger and sometimes discontinuous intervals at one or two standard deviations. The differential changes and reversals in the curve affect our ability to temporally discriminate between and within occupations. Further, the systematic deviations from the solar calendar at this time push the early portion of the Early Woodland chronology back considerably.

Calib 5.0 was used to calibrate radiocarbon ages (Stuiver and Reimer 1993)using the Intcal04 atmospheric calibration data set (Reimer, et al. 2004). One sigma (68.3 percent confidence interval) and two sigma (95.4 percent) age ranges are reported for each sample along with the relative area under the probability distribution curve (see Table 4.2). The two sigma range forms the basis of the chronological interpretations in this chapter, and overlap or lack thereof at the one sigma level is occasionally mentioned as a tentative means of identification of more precise interrelationships. Figures 4.1 and 4.2 graphically depict the calibrated A.D./B.C. ranges of the radiocarbon dates and indicate the relative area beneath the probability curve.

The error due to laboratory counting statistics is generally 70 years, but after calibration 1 sigma, in some instances, encompasses 300-400 years; 2 sigma in most cases does not increase the interval substantially. Pearson and Stuiver (1986 :808) indicate that the nonlinear transformation of the Gausian standard deviation of the C-14 age to a calendar age results in a complex probability distribution. The probability is higher that the true age is near the intercept span, with low to zero probabilities when the calibration curve is outside of the error interval (Pearson and Stuiver 1986:808).

Eight samples are associated with predominately Early Woodland diagnostic material, and three additional features have stratigraphic positions suggestive of possible Early Woodland cultural affiliation. There are rapid changes in the plot of radiocarbon years against calendar years (Figure 4.1) between 2780 and 2740 rcybp, but the two dates are relatively close in calendar years. These may form a subset of the Early Woodland dates, although they do overlap with other Early Woodland dates at the two sigma level and appear to date the same interval of the occupation as Feature 200-32 and Feature 300-37 The interval of 2550-2400 rcybp, between Feature 200-32 and the South Block dates, shows a plateau with significant reversals that results in a platykurtic probability distribution and suggests possible general contemporaneity of the calendrical dates.

The ranges of the calibrated dates do not provide definitive indications of the interrelationships of some dates, and the probability distributions graphed in Figure 4.1 show intervals of slightly higher probabilities but provide no clear indications of the whether particular radiocarbon assessments date the same event as other assessments. Even at 1 sigma the calibrated A.D./B.C. maximum range of the date from Feature 200-32 and dates from Phase II Feature 104 and Phase II Feature 78A overlap considerably. At the 2 sigma level the two youngest Early Woodland dates, from Trench Feature 154 and Phase II Feature 39, have ranges that overlap the other dates, and the intervals of highest probability for the younger dates are slightly more prominent at the earlier end of their ranges, which allows the possibility that they may date the same occupation as the other dates.

The uncorrected radiocarbon age of the feature with equal amounts of grit tempered and Falls Plain pottery (Feature 300-60) is intermediate between Early Woodland and Middle Woodland dates, and the calibrated age has a broad range that overlaps both the Early Woodland and Middle Woodland clusters at the 1 sigma level. There are multiple marked reversals in the calibration curve at the approximate radiocarbon age of the sample, which complicates comparison of relative ages.

The calibration curve during the period that encompasses the Middle Woodland dates begins with a marked reversal and has minor oscillations around the intercepts of most of the dates, but it reflects relatively even change in the radiocarbon and calendrical ages. In addition to the aforementioned possible intermediate feature, six samples are associated with the Middle Woodland component.

The aforementioned reversal in the calibration curve coincides with the interval of the radiocarbon age of PM 200-1, thus determination of a precise temporal span is not feasible. The two sigma range of the date overlaps with that of the other structure (Feature

100-7), which may indicate that the main Middle Woodland deposits of the 100 and 200 Block are relatively contemporaneous. However, the one sigma ranges of the dates from the structures are slightly significantly different, which allows the possibility that the two represent distinct, sequential structures rather than contemporaneous ones and that some of the deposits in the 200 Block predate those of the 100 Block.

The calibrated ranges of the four dates from the 100 Block, the locus of the main Middle Woodland occupation, overlap greatly at the two sigma level and form a range of 356 calBC-201 calAD. The high probability portions of the distributions are even more restricted: 230 calBC-70 calAD for Feature 100-37 (p=.93) and Feature 100-112 (p=.91); 200 calBC-140 calAD for Feature 100-7 (p=.99); and 120 calBC-90 calAD for Phase II Feature 20 (p=.95); and Feature 400-7 has a comparable range of 260 calBC-30 calAD.

Chronology

Fluctuations in atmospheric carbon and deviation in radiocarbon ages from true calendrical ages require use of calibrated dates for a full understanding of their significance of the radiocarbon assessments. While the oscillations in the calibration curve result in differential success in compilation of a refined chronology during the various periods, these restrictions need to be recognized. The availability of a high-precision calibration curve necessitates that an Early and Middle Woodland chronology for the Falls area be developed within that context.

The Early Woodland period in the Falls of the Ohio area, as typified by the presence of grit tempered, interior/exterior cordmarked pottery and Turkey-tail and Early Woodland Contracting Stemmed projectile points, begins by 800 calBC. This is substantiated by dates from the Shippingport site (15Jf702) (Michael French, personal communication 2006) and the Villier site (Mocas 1988). Early Woodland settlements with other ceramics or without ceramics may be present earlier, but their existence cannot be confidently posited. The popularity of grit tempered pottery and Early Woodland Contracting Stemmed points continues until a period of transition to Middle Woodland diagnostics after 400 calBC at the Knob Creek site. By 230 calBC the Middle Woodland, as typified by Falls Plain pottery and Snyders Cluster projectile points, is prominent at 12HR484, and it continues for at least 100 years at 12HR484. Although the radiocarbon dates from the Clark Maritime Centre Archaeological District are suspect, the one potentially accurate date (12CL103 Feature 55) may extend evidence of the Middle Woodland in the area into the first century A.D.

Chapter 5

FEATURES

The Knob Creek site, 12HR484, yielded a total of 420 possible Woodland features (Tables 5.1 and 5.2). One hundred nine of these are considered Early Woodland, 192 features are attributed to the Middle Woodland component, though one pottery scatter is believed to postdate the main Middle Woodland component, and 119 features did not have sufficient diagnostic material or contextual data to allow a cultural affiliation to be confidently posited. The features are mapped by subtype and component within each excavation area (Figures 5.1-5.10).

Woodland Features of Unknown Cultural Affiliation

Diagnostic materials or other criteria that permit assignment to a particular component were absent for 28.3 percent of the features considered to derive from Woodland occupations. Within the main area of Early Woodland and Middle Woodland habitation the number of features of uncertain age was not a major deterrent to understanding the spatial arrangement of the settlements. Only 17.2 percent of the features in the 100 Block, 9.4 percent of the features in the 200 Block, 4.5 percent of the pits in the 148N49W Trench, and 18.2 percent of those in the 253N80W Trench were unable to be assigned to a particular component. At the north end of the site the number of features with unidentified Woodland components was much higher. In the 300 Block 48.6 percent of the features could not be assigned cultural affiliations, and 58.7 percent of the features in the 400 Block are of unknown affiliation. South of the main habitation areas a similar situation occurred. In the 63N47W Trench 31.2 percent of the features are of unknown cultural affiliation, and 55.6 percent of those in the 15N27W Trench are of unknown age. The intensity of activity in the Phase II South Block is indicated by the absence of unidentified features, and the ephemeral nature of activity to the north of the area is shown by the lack of diagnostic attributes for 71.4 percent of the features in the Phase III South Block area.

Twenty-two features in the 100 Block do not have demonstrable links to a particular component. Five of the six refuse scatters contained minimal amounts of cultural material, but one feature (Feature 100-1) in the northwest corner of the block contained a very large concentration of fire cracked rock. A medium sized, shallow basin hearth in the southeast corner of the block had almost no cultural material. The 14 shallow pits of unknown cultural affiliation scattered throughout the block ranged in size from that of a possible post mold to more than 70 cm in diameter. None had more than minimal amounts of cultural material, except for one pit with a moderate amount of debitage.

Eight features in the 200 Block did not have diagnostic materials. The basin hearth contained a large amount of fire cracked rock, the surface scatter had a moderate amount of fire cracked rock, and one of the four pits had moderate amounts of debitage and fire cracked rock, and another had a moderate amount of rock. These features were widely scattered, and the understanding of the Early and Middle Woodland components is not compromised by the uncertainty of their affiliations.

The few features with unidentified cultural affiliations in the 148N49W Trench and the 253N80W Trench do not effect interpretation of these excavation areas. The two features in the 253N80W Trench contained minimal amounts of cultural material. The feature in the 148N49W Trench was a small, shallow pit filled with burnt nut shells.

The five features in the 63N47W Trench with unidentified cultural affiliations were found in or near the small clusters of Middle Woodland features. One large, shallow basin pit contained a moderate amount of debitage, but the other features had little cultural material. The five small to medium sized, shallow features with unknown cultural affiliations scattered along the ridge crest in the 15N27W Trench contained minimal amounts of debitage and fire cracked rock. The four features identified as Middle Woodland also had minimal amounts of cultural material except for one feature with a large amount of pottery. Activity in this trench was quite transitory.

The Phase III South Block area is not well understood because such a high percentage of the features encountered are of unidentified cultural affiliation. One very large, shallow pit/hearth (Feature 17), which contained a large amount of late stage Wyandotte debitage, was surrounded by many small to medium sized, shallow basin pits and hearths, but few of these features had more than minimal quantities of cultural material. These features could represent an extension of the small but intensive Early Woodland component of the Phase II South Block, or they could be part of the ephemeral Middle Woodland component that was encountered in the Phase II area.

Eighteen features in the 300 Block cannot be attributed to a particular component, and a thorough understanding of the use of this portion of the site is impeded by the lack of specific cultural affiliations for these features. The size and shape and contents of the features did not suggest derivation from a specific component, but the quantities of cultural material are not great enough to necessitate reinterpretation of either component. Seven of the features contained moderate amounts of debitage, two had large amounts of fire cracked rock, and three yielded moderate amounts of fire cracked rock. The majority of the unidentified features were located around the periphery of the cluster of Middle Woodland features situated on the ridge crest. Middle Woodland features are much more numerous than the Early Woodland features in the 300 Block, and, like the non-specific Woodland features, are located primarily to the south of the known Early Woodland features.

Twenty-seven features in the 400 Block cannot be attributed to a particular component, and a thorough understanding of the use of this portion of the site is impeded by this lack of specificity. All but one of the features are small-medium sized and shallow, and few have more than small amounts of cultural debris. One large, moderately deep basin pit had a large amount of debitage and fire cracked rock, one other pit had a large amount of rock and a moderate amount of debitage, three features had moderate amounts of debitage, and three additional features had moderate amounts of fire cracked rock.

Early Woodland and Middle Woodland features were about equally represented in the 400 Block. The features with unidentified components were scattered throughout the block, and some of them form small clusters in the northwest and southwest portions of the block. The locations do not indicate association with a particular component, although most of the Middle Woodland features are downslope to the east of these features and Early Woodland features are intermingled among the indeterminate features. The small quantities of cultural material in the features with unknown cultural affiliations are not sufficient to potentially necessitate reevaluation of either component, but one or both components may have had additional small activity areas composed of these features.

Feature Types

A variety of criteria were used to define and categorize the features:

Feature Origin: If the feature and its related activities were restricted to the aboriginal occupation surface and no subsurface facility was excavated, its point of origin was considered to be *surface*. If the feature and its related activities involved excavation of a pit below the aboriginal activity surface its point of origin is considered to be *pit*.

Boundary: If a feature had boundaries that could be clearly delineated from the surrounding matrix, as in the case of an excavated facility, it is considered to have an *abrupt* boundary. If, as in the case of refuse accumulations, there was a gradual, vaguely-defined transitional zone between the feature and the surrounding matrix, it is considered to have a *diffuse* boundary.

Burning: If an in situ fire oxidized or reduced the sediments of a feature, in situ burning is considered *present*. If there was no evidence of in situ burning, in situ burning is considered *absent*. It is worthy of note that many features contained oxidized soil pellets that appeared to be redeposited, in such instances in situ burning is considered absent. It also is possible that a pit functioned as a hearth at some point in its use-life but was so thoroughly cleaned that no evidence of burning remains or that the pit contained a fire that did not oxidize or reduce the sediments. Because no evidence of the fire remains, in situ burning is considered absent.

Pit features with evidence of in situ burning are labeled *pit/hearths*, and those without in situ burning are considered *pits*. If the size and profile of the feature coincide with the dimensions of a post, the feature is classified as a *post mold*. If a feature showed vertical layering of deposits with different materials or combinations of materials, the number of strata was noted and each zone was described. Refuse accumulations are subdivided according to the kinds of materials they comprise, and pit features are subdivided according to their vertical cross sections.

Profiles representative of major features types are shown in Figure 5.11.

Refuse Scatters

Thirty-seven refuse scatters were encountered at the Knob Creek site. Twelve of the features (32.4 percent) are from the Early Woodland component, ten (27.0 percent) are attributable to the Middle Woodland component, and the specific Woodland component of 15 features could not be identified (Table 5.3). Those classified debris scatters (Table 5.4) were nearly equally divided, with seven examples in the Early Woodland and seven in the Middle Woodland component and six from unidentified Woodland components, but the surface area of the scatters from the Early Woodland component encompassed more than twice the area of those from the Middle Woodland component. The Middle Woodland debris scatters had only very small quantities of cultural materials, but the Early Woodland scatters included examples with large amounts of refuse. The three features identified as rock scatters in the Early Woodland component covered twelve times the surface area of the two rock scatters in the Middle Woodland component.

Three Early Woodland refuse scatters form an arc in the northeast corner of the 200 Block adjacent to a cluster of pit features. Moderate amounts of fire cracked rock (3-9.99 kg) and debitage were present in two of the scatters, and one of these also contained several bifaces, a point, and a hammerstone, and the third feature had a moderate amount (50-199 g) of pottery. This debris is comparable to the midden in the surrounding area. The mixed contents suggest this may be debris redeposited downslope rather than primary refuse in situ in a manufacture locus. The similarity of sherds from one refuse scatter in the northeast corner to those dispersed throughout the northwest portion of the block supports the interpretation that some of the debris in the refuse scatter is redeposited from that area. One of the refuse scatters yielded a sizable amount of maygrass (*Phalaris caroliniana*), as do two adjacent pit features.

Phase II Feature 40, an Early Woodland lithic concentration beyond the northern edge of the 200 Block, encompassed parts of several Phase II units and extended into adjoining Phase III units. This concentration produced thousands of pieces of late stage debitage. The debitage may represent primary deposition in a manufacture area that was physically separated from the habitation area because of the impediment it represented.

South Block Phase II Feature 100, at the edge of the baked soil mass (Feature 78) was composed of a dense layer of debitage overlain by a dense layer of fire cracked rock. The homogeneity of the thick layer of debitage suggests that much of the reduction debris was confined to a hide or a similar receptacle and discarded at the end of the knapping session, and the rock may be cooking debris subsequently redeposited from the baked soil mass or one of the hearths around it. Other Early Woodland pit features across the site had sizable amounts of debitage in contexts that demonstrate similar disposal of knapping debris at the end of a session. Deposition of debitage into pits may be a safety precaution in heavily trafficked areas. Large quantities of debitage were occasionally encountered in Middle Woodland pits and apparently were subjected to similar disposal procedures.

Trench Feature 144, the Hathaway cache, was the only large cache of tools and is attributable to the Early Woodland component. Phase II Feature 77, a cache of several tools, possibly related to chert tool manufacture, is of indeterminate cultural affiliation. Feature 400-15 was composed principally of a scatter of Falls Plain pottery, and Trench Feature 242 was a pottery scatter composed of a large fragment of a vessel that may postdate the early Middle Woodland component.

Surface Hearths

Eighteen surface hearths were found on 12HR484. Seven of the features (38.9 percent) are from the Early Woodland component, three (16.7 percent) are attributable to the Middle Woodland component, and the precise Woodland component of eight could not be identified. With the exception of Early Woodland Feature 200-65 and South Block Phase II Feature 78, these do not appear to be major heating or cooking facilities. It is more plausible that most cooking, particularly in the Middle Woodland component, was done in pits that were subsequently cleaned and reused and ultimately served as refuse receptacles.

The Early Woodland surface hearths were confined to the 200 Block and the Phase II South Block. The features showed considerable diversity in size and had surface areas that ranged from approximately 470 cm^2 to 281,960 cm^2 and had a median size of 2130 cm^2. The differences in size may indicate that the surface hearths served a variety of functions. The smallest hearths can be attributed to brief heating or cooking activities by individuals or small groups. These were various hues of red (10R 4/6, 5YR 4/6) and had very little fire cracked rock, burned bone, and other debris associated with them.

The two inordinately large, intensely-fired surface hearths may represent different cooking methods and communal or specialized use. Phase II South Block Feature 78 (Figure 5.12) was a huge baked soil mass, approximately 5 x 7 m in size, which reflected a distinctive function, perhaps for large-scale baking, smoking, roasting, or grilling. The majority of the surface was yellowish red (5YR5/8), but soil colors shifted as the effects of oxidation or reduction (2.5YR 2.5/1) radiated outward from individual branches. Fire cracked rock was scattered across the baked surface, and there were very large quantities of rock around the periphery of the hearth and in the adjoining features. A steep sided pit/hearth, a surface hearth, and four medium-sized (50-100 cm diameter), shallow basin hearths were positioned within and around the baked area. It is not evident whether these features were used to prepare heated stones for cooking on the surface of Feature 78 or whether the stones in Feature 78 were heated in situ, but the final function of all these features and an adjacent refuse scatter was as disposal facilities for fire cracked rock. Feature 200-65 was a very large (220 x 152 cm) surface hearth or shallow basin hearth with an abundance of baked soil pieces and an intensely-fired (2.5YR 4/6), uneven base derived from repeated use and cleaning. The feature was associated with a huge amount (36 kg) of fire cracked rock and could have been a communal fire or special purpose fire that fulfilled a function similar to that of South Block Feature 78. A light scatter of burn bone was found in the vicinity of the hearth.

The Middle Woodland surface hearths were more uniform in size and had surface areas that ranged from 2090-10930 cm^2 and a median size of 4340 cm^2. These features could have served similar purposes, possibly as short-term heating or cooking facilities for small groups. These were various hues of red (2.5YR 4/6) to dark reddish brown (5YR 3/3) and had little fire cracked rock, burned bone, and other debris associated with them. The two surface hearths in the 100 Block were at opposite ends of the block and not within feature clusters. The features that could not be attributed to a specific Woodland component ranged from 1430-15,020 cm^2 and had a median size of 3450 cm^2.

Pit/hearths

The 56 features in the pit/hearth sample were subdivided into steep sided pit/hearth, expanding sided pit/hearth, and basin hearth subtypes. The Early Woodland hearths were overwhelmingly basin shaped (89.5 percent), and one was a steep sided pit/hearth and one was an expanding sided pit/hearth. Steep sided and expanding sided variants composed 43.5 percent of the Middle Woodland pit/hearth sample. Three steep sided pit/hearths and 11 basin hearths could not be assigned to a particular Woodland component.

Phase II Feature 126, the only Early Woodland steep sided pit/hearth, was moderate sized and shallow and contained a dense concentration of fire cracked rock and a moderate amount (100-999 g) of debitage. It was one of six surface and pit hearths situated near the baked soil mass (Feature 78) in the Phase II South Block. Feature 400-39, a moderately large, deep (>59 cm) pit/hearth with expanding sides, was found in a small feature cluster in the 400 Block. Three fill episodes were evident, and it contained a moderate amount of debitage, a large amount (>10 kg) of fire cracked rock, several formal tools, an informal tool, and turtle and beaver remains.

Early Woodland basin hearths displayed oxidation on the base, sides, rim or top surface individually or in various combinations. Most feature fill was very dark grayish brown (10YR 3/2) with oxidized sides with hues of 2.5YR. Half of the basin hearths had two to four strata composed of debris from multiple fill episodes. The basin hearths were most abundant in the 200 Block and the South Block. A cluster of six basin hearths were present within and adjacent to Structure C, in the northwest corner of the block. These features were at the base of an extremely dense layer of fire cracked rock, and all but one contained large to extremely large amounts of rock. Four of the pits yielded moderate amounts of debitage, and two contained moderate amounts of grit tempered pottery. These features contained much more cultural material than the other basin hearths in the block, possibly because they were at the focal point of a habitation area. In the east-central portion of the 200 Block, two small, shallow basin hearths and two surface hearths of approximately the same size (2600-3038 cm^2) were in an area about 3 x 10 m in size, and a larger surface hearth was located about 2 m to the northeast. The differential placement of the hearths of disproportionate sizes may signify diverse functions for these features.

The basin hearths in the Phase II South Block were within and around Feature 78, and, although all were of medium size and shallow, their contents varied. Phase II Feature 104 contained a huge amount of fire cracked rock, a large amount (1000-1999 g) of debitage, formal and informal tools, and mammal and freshwater drum remains; Phase II Feature 109 yielded a moderate amount of fire cracked rock, debitage, and mammal, turtle, and freshwater drum remains; Phase II Feature 78A had a moderate amount of pottery, and Phase II Feature 71 had little cultural debris. Another basin hearth was located in the Phase III South Block area.

Trench Feature 151, a medium-sized, shallow basin hearth with moderate amounts of debitage and fire cracked rock was part of a small feature cluster in the 253N80W Trench. Feature 400-38, which had little cultural material, was found next to a pit/hearth, Feature 400-39, in a loose cluster of Early Woodland and indeterminate Woodland features.

The distributions of Middle Woodland pit/hearths and basin hearths differ markedly. Seventy percent of the steep sided and expanding sided pit/hearths were in the 300 and 400 Blocks, but no basin hearths were identified in the 400 Block and only one was present in the 300 Block. Although hearths were well represented in the Middle Woodland component (n=23), only one small, shallow pit/hearth and one small, shallow basin hearth were identified in the 100 Block, and no hearths were found in the 148N49WTrench, although refuse from hearths was abundant. It is plausible that hearths in these areas were not recognizable because of insufficient oxidation of the walls and base of the pits and surrounding soil, or they may have been thoroughly cleaned and the oxidized soil removed. The pit/hearths had oxidized soil at the base or at the base and sides, and the basin hearths were less regularized in the location of the heated portions. As was the case with the Early Woodland pit/hearths and basin hearths, the feature fill was very dark grayish brown (10YR 3/2) and the sides were oxidized with hues of 2.5 YR. The one basin hearth in the 100 Block was inside Structure X and showed only a baked soil ring around the periphery and a high concentration of baked soil pellets, in addition to a small amount of fire cracked rock, charcoal, burnt bone, and burnt chert flakes.

The 200 Block contained 58.3 percent of the Middle Woodland basin hearths on the site. Seven of the eighteen Middle Woodland features in the 200 Block were basin hearths and one was a pit/hearth. The largest basin hearths in the 200 Block, Feature 200-61 and Feature 200-97, were less than one meter apart and positioned directly outside Structure A. These had the largest amounts of fire cracked rock and debitage, and, like all of the basin hearths in the block, they contained very little pottery. Within the cluster of Middle Woodland features in the southwest corner of the block, a large basin hearth (Feature 200-5) and two medium-sized basin hearths (Feature 200-1 and Feature 200-19) were less than a meter apart, and Feature 200-40, the only steep sided pit/hearth in the block, was less than 2 m away, but none of these features nor those around them contained much cultural debris. Feature 200-5, one of two basin hearths with multiple strata of hearth refuse, was the only one of the features with even a moderate amount of fire cracked rock or debitage. The number and aggregation of the features in the southwest corner of the block, the high percentage of hearths, and the low artifact and debris content of the features indicate that activity in this area was limited and differed from that in the 100 Block and 148N49W Trench and from that in the 300 and 400 Blocks.

Small to medium-sized, shallow Middle Woodland basin hearths were found elsewhere in the 200 Block and in the South Block, the 15N27W Trench, and the 300 Block, but none were near other Middle Woodland features. Feature 200-49, in the northwest corner of the 200 Block, had several formal and informal tools and a moderate amount of fire cracked rock; Phase II South Block Feature 120 had a moderate amount of debitage; Feature 300-46 contained a large amount of fire cracked rock; and Trench Feature 220 and Trench Feature 244, in the 15N27W Trench, had a moderate amount of pottery and a moderate amount of debitage, respectively. These reflect a variety of scattered, short-term activities.

A sizable volume of cultural debris was present in the large, deep Middle Woodland pit/hearths at the north end of the site. Many kinds of tools were found in the pit/hearths of the 300 Block, including tools for cutting, scraping, drilling, engraving, and nut or seed processing. The large, deep, expanding sided pit/hearth (Feature 300-60) and the steep sided pit/hearth (Feature 300-52) of similar size each contained very large amounts of fire cracked rock, large amounts of debitage, and a variety of formal and informal tools. Feature 300-52, which had a moderate frequency of chenopod (*Chenopodium*) and a significant amount of knotweed (*Polygonum erectum*), appears to be the focal point of the main feature cluster, and several meters south of this feature was Feature 300-13, the only large, deep, steep sided pit on the site. This pit also contained a very large amount of fire cracked rock, a variety of tools, and a very large amount (>2000 g) of intermediate and late stage Muldraugh debitage. Feature 300-47, the other pit/hearth in the block, contained moderate amounts of debitage and pottery and a high density of maygrass and chenopod and a moderate density of black walnut (*Juglans nigra*). The contents of these features reflect a variety of activities, including processing vegetal foods, but the thin midden and small amount of pottery provide little evidence of habitation.

Four of the nine Middle Woodland features in the 400 Block were pit/hearths with expanding or steep sides. The three expanding sided pit/hearths contained the largest amounts of fire cracked rock, debitage and pottery, and included the feature with the most tools in the block. A large, moderately deep (30-59 cm) hearth and a medium sized, deep hearth (Feature 400-5 and Feature 400-7) both contained very large amounts of fire cracked rock, and the latter had several formal and informal cutting tools and the largest amount of pottery and debitage of any Middle Woodland feature in the block. Feature 400-7 and Feature 400-17 contained moderate densities of knotweed and chenopod.

Small to medium-sized Middle Woodland pit/hearths of shallow to moderate depth were found in each of the blocks, but they were clustered at the north end of the site. These yielded little fire cracked rock, debitage, or pottery, and few, if any, tools, except for Phase II Feature 36, in a trench west of the 400 Block, which had a very large amount of fire cracked rock and a large amount of debitage.

The large, deep, expanding and steep sided Middle Woodland pit/hearths of the 300 Block and 400 Block are associated with processing loci rather than habitation areas, although the volume of material and repeated use of these features suggest at least brief encampments in the area. Three steep sided pit/hearths and three expanding sided pit/hearths from the 300 and 400 Blocks showed multiple fill episodes with hearth debris. The near absence of steep sided and expanding sided pit/hearths in the 100 Block, 200 Block, and 148N49W Trench, which display the most intensive Middle Woodland occupation, further substantiates the placement of these features outside the main habitation areas and increases the possibility that they were associated with processing activities and brief, multipurpose encampments.

Pits

The Middle Woodland component had 41 steep sided pits, and there were nine in the Early Woodland component. Eight steep sided pits did not have diagnostic materials to indicate the exact Woodland component from which they derived. Steep sided pits composed

21.6 percent of the Middle Woodland features and 8.3 percent of the Early Woodland features. Expanding sided pits composed 3.2 percent of the Middle Woodland features and were absent from the Early Woodland component and the features of unidentified Woodland cultural affiliation. Basin shaped pits predominated in both components. The Middle Woodland component had 103 basin shaped pits, the Early Woodland component contained 65, and the cultural affiliation of 70 could not be determined. Basin shaped pits composed 54.5 percent of the Middle Woodland features and 55.0 percent of the Early Woodland features.

The 200 Block held five (55.6 percent) of the Early Woodland steep sided pits. These features were not large or deep (mean depth 23.4 cm) and contained limited amounts of cultural debris. Three steep sided pits were spaced about 2 m apart in the north central portion of the block. Feature 200-43 had moderate amounts of fire cracked rock and debitage, and Feature 200-8 had a moderate amount of debitage. Feature 200-25, a medium sized, shallow, steep sided pit with moderate amounts of fire cracked rock, debitage, and pottery, was in an arc of features within Structure B.

Feature 300-96, which was isolated on the lower slope of the ridge in the 300 Block, had moderate amounts of fire cracked rock and debitage. The three steep sided pits scattered across the 400 Block composed one-third of the sample of Early Woodland steep sided pits and one-third of the Early Woodland features in the block. Feature 400-4 and Feature 400-27 contained very large amounts of fire cracked rock, and the former also had a moderate amount of pottery and a very large amount of debitage and the latter a moderate density of maygrass. The steep sided pits in the 400 Block were larger and contained much more fire cracked rock than the basin pits.

Thirty-nine of the 59 Early Woodland basin pits were located in the 200 Block. Nine of the 200 Block features were more than one meter in diameter, but only one was more than 30 cm deep. Twelve of the pits yielded large to extremely large amounts of fire cracked rock. Five of the pits contained strata from multiple episodes of refuse deposition. The majority of these were clustered in small groups in the northwest, northeast and east-central portions of the block. Sixteen of the pits had moderate amounts of debitage, but only one had a large amount, and three pits had moderate amounts of pottery. Few features yielded tools, but five of the pits contained Early Woodland projectile points, and several yielded small numbers of expedient flake tools or intermediate or late stage bifaces. The very large processing pit (Feature 200-59) in the center of the block contained numerous tools and a large amount of debitage, in addition to the extremely large amount of fire cracked rock. The number of basin pits and their contents suggest that they were more closely affiliated with habitation activities in the 200 Block than the other pit types.

Half the Early Woodland features in the 253N80W Trench were basin pits, but none of the four pits yielded more than a small amount of cultural debris. Four of the five Early

Woodland features in the 300 Block were basin pits. The four scattered pits were small or medium sized and shallow and contained little cultural material. Two of the features showed multiple episodes of refuse deposition.

Basin pits composed half the Early Woodland features in the 400 Block. Four Phase II basin pits on the crest of the ridge at the north end of the block formed a tight cluster. Feature 39, a medium sized, moderately deep feature with a large amount of debitage and pottery, a drill, four biface fragments, and mammal, turtle, and hawk remains also contained refuse from a hearth. The other three pits had sparse amounts of cultural debris. The contents of these features and the scatter of rock around them indicate proximity of a cooking area. Feature 400-3, on the ridge crest in the middle of the 400 Block had a large amount (>200 g) of pottery and a moderate amount of debitage, which, when combined with the sizable amounts of cultural debris from adjacent steep sided pit Feature 400-4, suggest this was part of an activity area, perhaps related to a brief encampment.

Phase II Feature 63, within the 63N47W Trench, was the only large basin pit outside the 200 Block, but it contained little cultural material other than a moderate amount of debitage. The three basin pits in the South Block were widely scattered and quite different. One was a very small pit at the periphery of the baked soil area which contained almost nothing but burnt nut shells; one was a medium sized, shallow pit with little refuse; and one was a shallow pit with a large amount of debitage and fire cracked rock and an Adena point. Neither of the latter two features was near the baked soil area.

The Middle Woodland expanding sided pits in the 100 Block, more than any other feature type, reflect the intensity of the occupation. They were paired in two activity areas. Feature 100-112 (Figure 5.13) was unique and had far more cultural material than any other feature on the site. Nine zones with various combinations of fire cracked rock, charcoal, burned soil, and ash suggest multiple episodes in which large areas were cleaned and the debris deposited into the pit (Figure 5.14). Extremely large quantities of debitage, fire cracked rock, and pottery, and large numbers of formal and informal tools were recovered from the pit. Faunal remains included deer, turtle, turkey, and freshwater drum. Feature 100-61 was positioned next to Feature 100-112, but this large, moderately deep feature contained only a moderate amount of debitage, pottery, and fire cracked rock, and only one tool fragment.

Large, deep, expanding sided pits, Feature 100-37 and Feature 100-67, were part of the feature cluster in the southwest corner of the block. Feature 100-37 was second only to Feature 100-112 in the amount of pottery and number of tools, and it had the third largest amount of fire cracked rock of any Middle Woodland feature on the site and a very large amount of debitage. The feature also had the highest density of seeds on the site. Feature 100-67 contained a large amount of pottery and fire cracked rock and a moderate amount of debitage. The original function of these pits is not apparent, but the size and depth allow the possibility that they initially served as storage facilities. Both Feature 100-112 and Feature 100-37 ultimately were receptacles for debris from activity areas that reflect a wide variety of domestic and processing tasks.

The medium sized, moderately deep, expanding sided pit in the 148N49W Trench (Feature 332) had moderate amounts of debitage and fire cracked rock and a large amount of pottery. The pit was part of a small feature cluster that appeared to be related to a habitation or special activity area. The medium sized, moderately deep, expanding sided pit in the 300 Block (Feature 300-24) held a large amount of fire cracked rock and a moderate amount of debitage, but the pit was relatively isolated on the slope of the ridge.

Steep sided Middle Woodland pits were primarily (63.4 percent) located in the 100 Block. Within the Middle Woodland component 75.6 percent of the steep sided pits were small to medium sized and shallow, and 73.1 percent of the pits in the 100 Block fit this description. The pits were clustered in four main activity areas–two large steep sided pits were within Structure X; there was a concentration of pits south of Feature 100-112; several pits were within the feature cluster in the southwest corner of the block; and two pits were the focal points of activity in the southeast corner of the block.

More than half (53.8 percent) the 26 steep sided pits in the 100 Block had at least a moderate amount of pottery. Ten of these pits had moderate or large amounts of both pottery and fire cracked rock or debitage, and eight of them had at least moderate amounts of all three. Two features contained projectile points and four features had middle or late stage bifaces, but the other features yielded only utilized or retouched flakes. Three of the steep sided pits showed multiple fill episodes with general refuse.

The two large, moderately deep, steep sided pits (Feature 100-7 and Feature 100-135) accounted for the two largest groups of tools, the first and third largest quantities of fire cracked rock, the first and fourth largest amounts of pottery, and the third and fourth largest amounts of debitage in the steep sided pits in the 100 Block. Feature 7 was within Structure X, and Feature 100-135 was at the south end of the cluster of features in the east-central portion of the block. A pair of medium sized, shallow pits (Phase II Feature 20 and Feature 92) in the southeast corner of the block contained the second largest quantities of fire cracked rock and pottery, respectively.

Two of the three pits (7.3 percent of the total features from the trench) in the148N49W Trench yielded moderate amounts of pottery, two had moderate amounts of debitage, and two contained moderate amounts of fire cracked rock. The three pits found in the southwest corner of the 200 Block all contained moderate amounts of debitage and one had a moderate amount of pottery and a light density of maygrass and chenopod, but the features had very little fire cracked rock and only one tool was recovered. The other features in this area contained little cultural material, and only a few pieces of deer bone and turtle shell, and there is no evidence of intensive habitation or processing in the vicinity.

Five steep sided pits were found in the 300 Block and composed 38.5 percent of the Middle Woodland features in that block. Three of the five pits (Features 300-6, 300-13, and 300-14), were in the main feature cluster, and two of these contained large or very large quantities of fire cracked rock and moderate or large amounts of debitage. One relatively isolated pit (Feature 300-2) contained a large amount of fire cracked rock, a moderate amount of debitage, three projectile points, and three Stage 3 bifaces. None of the pits had more than a (<50 g) amount of pottery. These features correlate well with the other feature types in the block by having lots of debitage and fire cracked rock and little pottery, which supports the assessment that the area was used for processing rather than habitation.

The 65 Middle Woodland basin pits in the 100 Block composed 63.1 percent of the basin pit sample for the site and 61.9 percent of the Middle Woodland features in the block. Middle Woodland basin pits throughout the site were predominantly (82.2 percent) small to medium sized and shallow (<30 cm deep), and 87.7 percent of the basin pits in the 100 Block were of this size. Of the 57 small or medium sized, shallow basin pits in the 100 Block only four yielded at least moderate amounts of pottery, debitage, and fire cracked rock; three pits had moderate amounts of both pottery and debitage or fire cracked rock; and one contained moderate amounts of fire cracked rock and debitage. An additional ten pits had moderate or large amounts of pottery, five yielded at least moderate amounts of debitage, and four contained moderate amounts of fire cracked rock. Five of the pits contained moderate densities of maygrass or chenopod. These features were represented in the four main activity areas of the block. Five of the pits were in the cluster of features around Feature 100-112, four were inside or near Structure X, three were in the feature cluster in the southwest corner of the block, and two were in the loose cluster of features in the southeast corner. Other pits were scattered throughout the block, sometimes in small clusters.

Seven basin pits in the 100 Block were large and shallow to moderately deep, and one was medium sized and moderately deep. Seven of these larger features had a moderate or large amount of pottery; six yielded a moderate to very large amount of fire cracked rock; and six contained at least a moderate amount of debitage. Half of the pits were part of the cluster of features around Feature 100-112, one was adjacent to Feature 100-37 in the southwest corner, and one was in the southeast corner. Five of the seven pits contained moderate densities of starchy seeds. Few of the basin pits contained tools, but projectile points were found in pits of all sizes, as were intermediate and late stage bifaces and informal flake tools.

Fourteen of the 21 Middle Woodland features in the 148N49W Trench were basin pits, and these composed 13.8 percent of the basin pit sample. Seven of these were large, shallow to moderately deep pits and one was medium sized and deep. Seven of these larger features contained moderate or large amounts of fire cracked rock, six of them had moderate amounts of debitage, and four held moderate or large amounts of pottery, and one had a moderate density of maygrass. One of the smaller pits contained moderate amounts of pottery, debitage, and fire cracked rock, and a pipe fragment comparable to some of those found in the 100 Block. Two of the smaller features had moderate amounts of pottery. The percentage of large or moderately deep basin pits in the 148N49W Trench is higher than in the 100 Block, but the eight features in each excavation area had comparable volumes of cultural materials. The percentage of small or medium sized, shallow pits with at least moderate amounts of pottery was greater in the 148N49W Trench, but the average amount of pottery was much less. There was a consistent amount of refuse in the 148N49W Trench features that indicates moderate activity, including domestic tasks.

The 200 Block contained only 5.8 percent of the Middle Woodland basin pit sample. Five of the six small to medium sized, shallow basin pits were in the feature cluster in the southwest corner. Three of the features had almost no cultural material, one contained a moderate amount of debitage, and one contained a large amount of pottery and moderate amount of fire cracked rock. The hearths and other pits in this area did not contain much cultural material. These features do not appear to be associated with a major processing or habitation area. The other basin pit was relatively isolated and contained moderate amounts of debitage and fire cracked rock.

Four basin pits were present in the 300 Block. Feature 300-19, a large, shallow pit, had more fire cracked rock than all but two 100 Block basin pits, the amount of debitage was exceeded by only one 100 Block pit, and it yielded a moderate amount of pottery, bifaces from all stages of manufacture, and several expedient tools. Feature 300-7 contained more fire cracked rock and debitage than all but one of the 100 Block basin pits, and an adjacent basin pit contained a moderate amount of debitage. These pits coincide with the other 300 Block features in the abundance of fire cracked rock and debitage and the sparsity of pottery.

Only two Middle Woodland basin pits were present in the 400 Block. Feature 400-16 was part of a small cluster of features and held moderate amounts of debitage and pottery and a projectile point and had a moderate density of knotweed and chenopod.

Seven of the ten Middle Woodland features in the 63N47W Trench were basin pits. Two of the features contained moderate amounts of fire cracked rock and pottery, one had moderate amounts of fire cracked rock and debitage, and one had a moderate amount of debitage. Two clusters of features that included three basin pits each appear to be minor activity areas.

Four pits with conical cross sections were encountered. Two of the features were from the Early Woodland component and one was from the Middle Woodland component, and the cultural affiliation of one pit was unclear. The two Early Woodland pits were the focal points of activity in small activity areas. Feature 200-108, the large, deep, Early Woodland pit in east-central portion of the 200 Block, yielded a moderate amount of debitage, a large amount of pottery, a very large amount of fire cracked rock, and a high density of maygrass. Trench Feature 154, the medium-sized, moderately deep, Early Woodland pit in the 253N80W Trench contained an extremely large amount of fire cracked rock and a variety of bifacial tools, a large amount of pottery, and a moderate density of seeds and a variety of animal remains. The Middle Woodland pit, from the 148N49W Trench contained moderate amounts of pottery and fire cracked rock.

There were six features with irregular cross sections–four were from the Middle Woodland component, one was Early Woodland, and the cultural affiliation of one could not be determined. All were shallow and small or medium sized, and none contained tools. Only small amounts of debitage (<100g) and fire cracked rock were inside the pits, and there were no others signs of uniformity.

Fire cracked rock in features

Features with large amounts of fire cracked rock were common in habitation, refuse disposal, and cooking areas in the Early Woodland component. There were 21 Early Woodland features (30.4 percent) in the 200 Block with large to extremely large amounts of rock (Figure 5.15). An exceedingly dense layer of fire cracked rock that appears to be attributable to the Early Woodland component extended downslope beneath and south of Structure A. Fire cracked rock was present in huge amounts in the area around Structure C, in the northwest corner of the block. Many of the features in this area were basin hearths, and most units in this area had large (>200 g) amounts of pottery and thick layers of fire cracked rock. This may be an indication that stone-boiling was still practiced during the early development of pottery. Most of the rock is above the structure and the associated features. This suggests the some of the rock may have been deposited by the occupants of the structure, but much may derive from a later occupation of the block.

A very large amount of rock and a large amount of pottery were present in and around Feature 200-65. This expansive surface hearth may represent a method of heated stone use that differed from that of the hearths in the northwest corner, but it generated an abundance of fire cracked rock. Feature 78, the huge baked soil mass in the Phase II South Block, had a very large amount of fire cracked rock in and around it, and it may be the primary source of the rock in the South Block (Figure 5.16). However, numerous hearths and a limited amount of pottery also were found in the vicinity and some of the rock may have derived from stone boiling.

Only one feature (Trench Feature 154) yielded a very large amount of fire cracked rock in the 253N80W Trench, and none of the Early Woodland features in the 300 Block yielded a large amount of rock. Three Early Woodland features (30 percent) in the 400 Block had large amounts of fire cracked rock (Figure 5.17). One of the features was associated with a large amount of pottery but no hearth, and the other two were part of a small feature cluster with two hearths but very little pottery. These features and the fire cracked rock do not show the affiliation with habitation and cooking areas that is evident in the 200 Block. The absence of features with large amounts of fire cracked rock in the 300 Block may be an indication that the activities there differed from those elsewhere on the site.

In the Middle Woodland component there were more features with large quantities of rock in the areas of specialized activity and processing than in the habitation areas. There were only seven Middle Woodland pit and pit/hearth features (6.6 percent) in the 100 Block (Figure 5.18), two features (11.1 percent) in the 200 Block (Figure 5.19), and four features (20.0 percent) in the 148N49W Trench with more than 10 kg of fire cracked rock (Figure 5.20), but nine features (64.3 percent) in the 300 Block (Figure 5.21) and three features (33.3 percent) in the 400 Block and another directly outside the block contained this amount.

The 100 Block features with large amounts of rock were distributed across the block in the areas of most concentrated activity. Two of the features were associated with the feature cluster in the southwest corner of the block; Feature 100-112 had 96.44 kg of rock and the pit next to it had a very large amount of rock; one feature was inside Structure X; one was part of the loose cluster of features in the southeast corner of the block; and one was in the northwest corner of the block. All these features were refuse pits rather than hearths; thus, there is not a direct association with cooking.

The disparity in the amount of fire cracked rock between the Early Woodland main habitation area in the 200 Block and the Middle Woodland main habitation area in the 100 Block may be due in large part to the absence of large surface hearths like Feature 200-65 in the Middle Woodland component, and quite possibly to cessation of stone-boiling after ceramic technology improved markedly. Undoubtedly, the Middle Woodland inhabitants used rock in earth ovens and other types of hearths. The largest quantities of fire cracked rock in the 100 Block were found at the top of the Middle Woodland midden, thus it does not appear that the rock is attributable to the preceding Early Woodland occupation. Fire cracked rock was densely distributed across the entire block. Very large quantities were found in the northeast, central, and southeast portions of the 100 Block, even in areas with few features. The only sizable area without a large amount of fire cracked rock extended from the east side of Structure X through the southern portion of the feature cluster south of Feature 100-112. This area also had an inordinately small amount of debitage and Falls Plain pottery and few faunal remains. The sparse amount of cultural debris may indicate that the area was cleaned or that the range of activities permitted there was limited.

The two features with large amounts of fire cracked rock in the 200 Block were positioned next to one another outside Structure A. These hearths had little pottery and botanical refuse and did not appear to be associated with domestic activities. The incompleteness of the post mold pattern, the absence of features inside the structure, and the rarity of features outside it suggest the structure may have had limited use or had never been completed.

The majority of the features in the 148N49W Trench contained a moderate amount of fire cracked rock, and the four features with the most rock in the148N49W Trench were in three small feature clusters, with two features intersecting in one cluster. All these features were refuse pits with moderate amounts of debitage and moderate or large amounts of pottery within the feature or in the adjacent features. Despite the lack of identifiable hearths in the trench, hearth refuse was common in the pits and scattered around them. These features appear to contain fire cracked rock from processing or domestic activity.

The 300 Block features with large amounts of fire cracked rock were scattered throughout the block, with the two largest quantities in the main feature cluster. The limited amount of pottery and the distribution of the pits suggest that the features were more likely to have been associated with processing than extended habitation. The 400 Block pit/hearths with large amounts of fire cracked rock were dispersed in the east half of the block. These contained moderate to large amounts of pottery, but were not part of habitation areas.

Summary

The most distinctive Early Woodland feature type was the conical pit. Both pits contained very large or extremely large amounts of fire cracked rock, large amounts of pottery, and moderately large amounts of debitage. These features are two of the three Early Woodland features with large amounts of pottery. Seventeen of the 45 Early Woodland basin pits in the 200 Block had large to extremely large amounts of fire cracked rock.

The features in the 400 Block had relatively larger amounts of cultural debris than did those of the 200 Block. Two of the three steep sided Early Woodland pits in the 400 Block had very large amounts of fire cracked rock, and one of these also had a very large amount of debitage. One basin pit contained a very large amount of debitage and a large amount of pottery.

No Middle Woodland basin hearths and only one pit/hearth were identified in the 100 Block. Essentially, all pit features ended up being refuse pits. The expanding sided pits in the block were distinctive in their size and depth and the moderate to extremely large quantities of cultural debris and tools they contained. Three of the four expanding sided pits contained large to extremely large amounts of pottery (>2000 g) and fire cracked rock, and two had very large to extremely large amounts (>3000 g) of debitage. Only two of 26 steep sided pits in the block contained large or very large amounts of fire cracked rock, and only one steep sided pit had a large amount of debitage, but seven yielded large or very large amounts (>500 g) of pottery. Only two of 65 basin pits had very large to extremely large amounts of debitage, and only two contained large or very large amounts of fire cracked rock, and four basin pits had large amounts of pottery.

Despite the sizable number of features in the 100 block, few features had inordinately large quantities of debris. The features that did have these higher amounts are of a variety of sizes and depths, except for the expanding sided pits, which are all large and at least moderately deep. The debris is somewhat concentrated because many of the pits with large amounts of one type of debris have at least a moderate amount of one of the other kinds of debris as well. None of the features outside the 100 Block have more than a large quantity of pottery, but very large quantities of fire cracked rock and debitage were found in the 300 and 400 Blocks.

The 148N49W Trench resembles the 100 Block in its lack of hearths, and it contrasts with the 300 and 400 Blocks for the same reason. Moderate amounts of debitage and large amounts of fire cracked rock were limited to three of the 12 basin pits. Two of these pits and the expanding sided pit had large amounts of pottery. The features in this trench resemble those of the 100 Block in their moderate quantities of debitage and large amounts of pottery, but they have more fire cracked rock. This may be an indication of general continuity with the 100 Block, but with more emphasis on processing.

In the 200 Block, the only Middle Woodland feature with a large amount of pottery was a basin pit. Three basin hearths had moderate amounts of debitage, but the two with large amounts of fire cracked rock were separated from the other Middle Woodland features and appeared to have different functions. Most of the features are in the southwest corner of the block and have little cultural material. The sparsity of material in the features may derive from their position on the periphery of the 100 Block occupation and certainly reflects different or less intensive activities than those seen in the other blocks.

In the 300 Block large quantities of Middle Woodland cultural debris and many tools were found in a variety of feature types. Nine of the 14 features yielded at least a large amount of fire cracked rock, including one steep sided pit, one steep sided pit/hearth, and one expanding sided pit/hearth with very large amounts. Large amounts of debitage and multiple tools were found in one basin pit, one steep sided pit, one steep sided pit/hearth, and one expanding sided pit/hearth. The larger quantities of fire cracked rock and debitage and small amounts of pottery (<30 g) suggest emphasis on processing activities.

In the 400 Block, there were only two Middle Woodland features that had not been hearths at one time. The three expanding sided pit/hearths contained the largest amounts of fire cracked rock, debitage and pottery and included the feature with the most tools. Only one of these features had more than a moderate amount of debitage and pottery, but three had large or very large amounts of fire cracked rock. The features in this area reflect processing activities more than habitation.

Structures

At least 26 post molds appear to form the walls of Middle Woodland Structure X in the 100 Block. Three additional post molds may form part of an entryway to the structure or may represent a related framework, and at least one internal post other than the centerpost was identified. Three post molds elsewhere in the block were in a linear alignment, and four other possible post molds were not near other post molds. These additional post molds probably derive from the Middle Woodland component, but this cannot be positively stated. In the 200 Block 12 post molds were part of a Middle Woodland structure and one additional post mold may be an interior post. Elsewhere in the 200 Block, six post molds were attributable to a small Early Woodland structure, and six post molds were part of a large Early Woodland structure, one post was within an Early Woodland feature, and four possible post molds were isolated from other post molds and could not be assigned to a particular component.

Structure X

Description

A circular arc of post molds was found in the west-central portion of the 100 Block (Figures 5.22 and 5.23). These outlined a structure with a diameter of 7.3 m and an area of 41.8 m^2 that was composed of single post walls and a thick oak (*Quercus sp*.) centerpost (Feature 100-22). The posts were driven straight into the ground rather than placed in excavated holes or driven in at an angle and were not bolstered by pieces of rock. The post molds that were identified were not evenly spaced. In the southeastern quadrant the posts were closer together. The distance between post molds ranged from 38 cm to approximately 2 m, and eight pairs were positioned 90-97 cm apart. It is feasible that posts were present in some of the large gaps but did not leave recognizable stains.

The most likely position for the entrance was at the westernmost arc of the circle, where, despite intensive scrutiny of the surface, no post molds were detected in a 1.8 m gap between Post mold (PM)100-35 and PM100-15. Three possible post molds were present outside the east side of the circle and could be associated with the structure. If a door was present on the east side of the structure, these might form part of an entryway.

It is probable that the centerpost or a center point was used to align posts on opposite sides of the structure. A line that passes through or very nearly through the centerpost can be drawn between most posts and the corresponding post on the opposite side of the structure (Figure 5.24). The wall posts averaged 11 cm in diameter and 13.2 cm deep (Table 5.5), and the centerpost was 23 cm in diameter and 32.5 cm deep. No interior support posts were positively identified, but one interior post could have fulfilled this function, and several pit features could have been excavated to hold posts.

There were seventeen features inside the structure. It is not known if all the features were contemporaneous with the structure, but none were attributable to a component other than the Middle Woodland component. All but three of the features (Feature 100-48, Feature 100-55, and Feature 100-103) contained sherds of Falls Plain pottery. Feature 100-83 and Feature 100-7 yielded Snyders Cluster projectile points, and Feature 100-7 also contained an Adena point, but it is not certain whether it originated in Early Woodland deposits and was unearthed during Middle Woodland feature excavation or whether it was part of the tool kit of the inhabitants of the structure. There was variation in the depth at which individual post molds and features were distinguishable from the midden, and the abundant cultural debris on the floor of the structure may have been intermingled with debris from an earlier component; thus, it was not possible to identify a discrete living surface. The presence of cultural debris scattered across the tops of features may indicate multiple occupations of the surface.

The presence of numerous tool fragments and debitage flakes along the interior wall of the structure is considered an indication that the floor had been cleaned intermittently, and comparable patterns of debris dispersal have been interpreted similarly (Wiant and McGimsey 1986:138). There were few features in the southwestern half of the structure, but many tools and tool fragments were found there, including adze/axes, celts, drills, expedient tools, a metate, pottery, and cutting tools such as projectile points and Stage 3 bifaces. The lack of pit features may indicate that this area was used for domestic activities such as sleeping, sitting, or working.

With only a few exceptions, the features inside Structure X contained small to minimal amounts of cultural debris, and the functions of only a few features could be determined. The variety of tools indicates diverse activities, but large-scale processing and disposal were not evident within the structure. Two large pits and a scatter of small and medium sized, shallow features filled the northeastern half of the structure. The area around Feature 100-7 contained an especially diverse assortment of artifacts, including large vessel fragments of Falls Plain pottery, many cutting tools and drills, a complete axe, and personal items such as gorget and pipe fragments. Among the many features in the east-central portion of the structure were numerous cutting tools, several drills, a celt, and many pottery sherds.

Based upon the number of tool fragments and the amount of debris in the vicinity of Feature 100-7, it appears to have been a focal point of activity in its original function--perhaps as a storage pit or hearth, and its final use was as the main refuse pit within the structure. It was a large, moderately deep, steep sided pit positioned inside the north wall. The pit contained abundant cultural refuse, including a deer mandible**,** turtle shell, projectile points, a biface fragment, a utilized flake, a retouched flake, and the highest density of wood charcoal of the features inside the structure. This feature yielded the third largest amount of pottery, the fifth largest amount of fire cracked rock, and the seventh largest amount of debitage of the Middle Woodland features in the 100 Block. Wood charcoal from the pit produced a radiocarbon date of 2000 +/- 70 RCYBP. Additional hearth refuse was present in Feature 100-16, adjacent to Feature 100-7.

Feature 100-70, a large, moderately deep, straight sided refuse pit directly inside the east wall of the structure may have been the focal point of activities comparable to those associated with Feature 100-7. This pit contained hearth debris, a small amount of fire cracked rock, a moderate amount of debitage, a large amount of pottery, and two pieces of antler that were worked or used as tools. It is feasible that two nuclear families or one large extended family group inhabited the structure and that Feature 100-7 and Feature 100-70 were analogous concurrent facilities, or groups may have occupied the structure sequentially rather than concurrently.

Feature 100-13 appears to be the hearth for the structure. This small, shallow basin hearth was located less than 30 cm to the west of the centerpost--an ideal position for removal of smoke through the center of the roof. The pit had been cleaned, but there was a baked soil ring around the periphery, and the fill contained a high concentration of baked soil pellets, as well as charcoal, burnt bone, burnt chert flakes, and a small amount of fire cracked rock.

Feature 100-17 and Feature 100-20 were small, shallow pits with similar diameters and depths that were situated about one meter from the centerpost. Feature 100-17 contained very little refuse, but a metate was positioned next to it, and Feature 100-20 held only a minimal amount of debris. There is a possibility that the both features held support posts, but this cannot be confidently posited. One interior post was identified (PM100-11). Feature 100-48, Feature 100-55, and Feature 100-107 had small diameters, shallow depths, and minimal cultural material, like PM100-11, and could be aligned with it, with each other, or with Feature 20 or Feature 17, but there is no direct evidence of the function of any of these features.

Feature 100-21 and Feature 100-23 were medium sized, shallow pits positioned directly south and north of the centerpost, respectively. These pits were of comparable size and depth and contained only small amounts of refuse. Feature 100-15 contained little cultural debris except a large pottery fragment beneath a small concentration of fire cracked rock. Feature 100-76 and Feature 100-83 were small, shallow pits located inside the east wall. These pits contained only small amounts of debris, although Feature 100-83 yielded a Snyders point. Feature 100-24 and Feature 100-103 were medium sized, shallow, non-circular features. Both contained small amounts of hearth debris and minimal amounts of other refuse.

Botanical remains were limited in quantity but showed considerable diversity. Small quantities of chenopod, maygrass, knotweed, marshelder, and sunflower seeds were recovered from features, and hickory, walnut, and acorn shells also were present. Eleven species of trees from bottomland to upland locales were represented in the ten features analyzed for wood charcoal, and more than one species was present in each of these features. The seasonal availability of the seeds and nuts suggest possible occupation from spring through fall, and these food items were suitable for storage, thus the structure could have been occupied for a greater seasonal span**.** Deer bone and turtle shell were found in several of the features and in the interior of the structure, and deer and turkey bones were found directly outside it. Turtle and drum fish, and rat and snake remains that could be incidental, were found in the feature (Feature 22) that held the center post, and a beaver tooth was found in a feature (Feature 100-15) adjacent to the post.

Associated diagnostic materials

Major portions of a conical, tubular pipe and an elbow pipe were found within the structure, and fragments from one or two other pipes were recovered directly north of the structure. An expanded center gorget was found directly southwest of the structure and a fragment of a gorget with an unidentified form was found within the structure. A large rim/upper body fragment of a Falls Plain vessel was found in Feature 100-7, and two large upper body fragments (Vessels A and B) were positioned together about 3 m outside the western side of the structure and may be associated with it. Diagnostic projectile points were found in two features within the structure. Snyders points were recovered from Feature 100-7 and Feature 100-83, and an Adena point in Feature 100-7 could be either intrusive or part of the assemblage.

Function

Structure X (Figure 5.25) appears to be a domestic structure based upon the pottery, tools, and personal items within and near it. The pipe fragments reflect manufacture and use of smoking implements, and gorgets also may have been manufactured there. There is no evidence of ceremonial activity associated with any of these items.

The many adze, axe, and celt fragments, some of which may be related to the construction of the structure, reflect woodworking by the inhabitants. Numerous hammerstones, tested cobbles, cores, Stage 1 and Stage 2 bifaces of Muldraugh and Wyandotte chert, and abundant debitage attest to early stage lithic reduction as well as tool manufacture adjacent to the structure and, to a lesser extent, within it. The structure contained one of the three Wyandotte cores, and the only unit in the block to have a large amount of intermediate to late stage Wyandotte debitage was within the structure. A moderate number of Stage 3 bifaces and Snyders points, primarily of Wyandotte chert, indicate the use of formal cutting tools, and the abundance of drills and perforators attests to the importance of perforating tasks. There were few scrapers and unifaces on the site, but examples were present within and around the structure. The abundance of retouched and utilized flakes in and around the structure demonstrates the importance of tasks that required expedient scraping and cutting tools.

Cooking activities are reflected by sizable vessel fragments within Feature 100-7 and Feature 100-15 and next to Feature 100-7. The hearth (Feature 100-13) may have functioned more for heat and light than cooking, based upon its small size. The eleven features within the structure that were analyzed for botanical remains contained a variety of nuts and seeds in quantities that reflect personal consumption rather than large-scale processing, but the large metate shows that vegetal foods were processed within the house.

According to Cook's "Rule of thumb formula" for estimating the number of occupants within a structure (25 square feet apiece for the first six individuals and 100 square feet for each additional individual) (Cook 1972:16), Structure X could have housed approximately nine people.

Structure A

Description

A semicircle of post molds was encountered along the east wall of the 200 Block (Figures 5.26 and 5.27). As can best be determined, these formed the west half of a circular structure, but post molds that composed the east wall of the structure were not located despite intensive scrutiny of the area. Open-ended, C-shaped arcs of post molds, interpreted as windbreaks or warm weather, open-sided shelters, were common at the sites summarized by (Smith 1992:201-248) in his review of the literature on Middle Woodland structures. It is possible that Structure A is one such shelter, but the evidence to the contrary is substantial. The open shelters lack the symmetry of Structure A, wattle and daub construction is more practical for enclosed structures, and the distribution of burned daub suggests the former presence of an eastern wall.

Large, linear masses and smaller, scattered pieces of fire-blackened, thoroughly reduced daub were dispersed throughout the area that coincided with the interior of the east half of the structure and along the estimated arc of the southeast wall of the structure (Figure 5.27). Wattle impressions in the daub demonstrated the presence of posts and branches. The sandstone inside and outside the wall in the southern portion of the structure was thoroughly reduced, and several of the post molds were burned, which corroborates that the wall burned and collapsed in that area. A dense layer of sandstone and fire cracked rock, probably from an antecedent Early Woodland occupation, underlay most of the structure and the area surrounding it and may have significantly impaired aboriginal attempts to sink posts and recent attempts to detect them.

The extant post molds indicated the structure had a diameter of 6.4 m and was composed of single post walls, but no central post was present. Most post molds that were identified were approximately 75 cm apart, but there were several gaps in the pattern. It is feasible that posts were present in some gaps but did not leave visible stains or did not penetrate into the soil below the rock layer. PM200-22 and PM200-18 were inside the arc of the wall on the western side and may be unaligned wall posts or internal supports. The wall posts averaged 10.6 mm in diameter (Table 5.6). No Middle Woodland features were present within the interior of the structure; thus, the structure may have burned prior to completion or use. If Structure A were a complete structure it would hold about eight individuals according to Cook's "Rule of thumb formula" for estimating the number of occupants within a structure (Cook 1972:16).

Burned wood (oak) from one burned post (PM200-1) was used to acquire an AMS date for the structure. A date of 2167 +/- 47 RCYBP was obtained from the sample. The calibrated range of this date markedly predates that of Structure X, and a T-test (T=3.92 [.05=3.84]) shows a significant difference at the 95 percent level, which suggests the structure was not contemporaneous with Structure X.

Associated materials

The midden in the area of the structure sloped gradually to the north and declined more than 30 cm from west to east across the structure. The steep slope and intrusion into the earlier deposits made the floor of the structure indiscernible. Limestone tempered and grit tempered pottery were found intermingled in the deposits. Snyders and Adena points were common in and around the structure but displayed minimal evidence of stratification, although many Adena points were found below the level with the maximum amount of Falls Plain pottery. It was not possible to link any of the tools found within and around the structure to its inhabitants, but the number of Middle Woodland tools and pottery far exceeded the Early Woodland artifacts.

Feature 28, a surface fire, was the only feature identified within the outline of the structure. The presence of several grams of grit tempered pottery within the feature and the location of the feature within the dense underlying rock layer suggest it is more likely to belong to the preceding Early Woodland component. Feature 200-61 and Feature 200-97, located 3-4 m west of the structure, were large Middle Woodland basin hearths that were subsequently used for refuse disposal. Each contained a small amount of Falls Plain pottery, and both may be associated with the structure.

Function

Structure A could have burned before, during, or after use. It does not have interior features or associated personal items as did Structure X, but its comparable size may indicate that it was or was intended to be a comparable structure. The presence of daub may indicate it was intended to be a cold weather dwelling

Structure B

Description

A structure appears to have been present in the southwest portion of the 200 Block. It is difficult to verify the validity of this possible structure because so few post molds were identified; however, five post molds form a semicircle 10.1 m in diameter and the sixth post mold is slightly outside the arc but aligned with one of the other post molds through the centerpoint of the possible structure. Alternatively, it is feasible that the structure had a slightly ovate form and was open sided. The post molds were widely dispersed, but their sizes were comparable to other post molds from the site (Table 5.7). Three were clustered on the north edge of the arc, one was located on the west edge, one was on the south edge, and another was about one-half meter outside the south edge (Figure 5.28). The units along the northeastern edge of the proposed circle were machine scraped but not hand-excavated, thus it is plausible that additional post molds were present in that area but were not detected.

Four Early Woodland features were found within the area inside the semicircle, and a fifth Early Woodland feature was within the boundaries of the inscribed circle. It is not certain whether these features are directly associated with the structure. Feature 200-25, in the southern portion of the circle, was a medium-sized, shallow, steep sided pit that held moderate amounts of grit tempered pottery, debitage, and fire cracked rock, and a biface fragment. Wood charcoal from the pit produced a radiocarbon date of 2740 +/- 130 RCYBP, but this age appears to be too early to accurately date the grit tempered pottery recovered from the pit. Feature 200-88, in the east-central portion of the circle, was a basin pit of similar size that contained a large amount of fire cracked rock, a small amount of debitage, several grams of grit tempered pottery, a tested cobble and a retouched flake. Three small features were directly inside the southwest edge of the circle. Feature 200-60, located several centimeters from PM 200-16, was a small, shallow basin hearth with almost no cultural debris. Approximately one meter to the south of it was Feature 200-42, a shallow rock scatter, and approximately two meters farther southeast was Feature 200-67, another shallow basin pit with almost no cultural material. The flotation sample from Feature 200-88 contained small amounts of black walnut and hickory nutshell, single seeds of amaranth, maygrass, and grape, and two knotweed seeds. Feature 200-42 had a small amount of black walnut and a very small amount of hickory nutshell, and Feature 200-60 yielded very small amounts of black walnut and hickory nutshell. The botanical remains of the other two features were not analyzed.

Associated Materials

The majority of the pottery and projectile points within Structure B and around the exterior are Early Woodland, as are all the features within it. The woodworking tools potentially associated with the structure more closely resemble those found in Early Woodland contexts. Twelve Early Woodland Contracting Stemmed points and a Turkey-tail point were recovered inside the circle and four additional Early Woodland Contracting Stemmed points and two Turkey-tail points were found directly outside the circle.

Grit tempered pottery was relatively abundant in the units inside the structure, with the largest quantities in the center, especially around Feature 200-88 and Feature 200-25. Grit tempered pottery also was plentiful in the area between the north end of the structure and Feature 200-59. Directly inside the northwest edge of the circle over 400 g of intermediate-late stage Wyandotte debitage was found in one unit. Inside the southwest edge more than 200 g of intermediate-late stage Wyandotte debitage was recovered in the unit that contained Feature 200-67, and units that contained Feature 200-25, Feature 200-42, Feature 200-60, and Feature 200-88 each yielded more than 100 g of intermediate-late stage Wyandotte debitage. Another 100 g of intermediate-late stage Wyandotte debitage was present inside the northeast edge of the circle and a comparable amount was recovered from a unit adjacent to Feature 200-42 and Feature 200-60.

The boundaries of Structure B, like Structure X, encompass inordinately large numbers of scrapers, drills, and perforators, and adzes and celts. Two complete adzes, an adze/celt fragment, and a celt fragment were found in the north half of the inscribed circle, and another adze fragment was present inside the southeast edge. Two additional complete adzes and a fragment were found outside the north edge of the circle, and a complete adze, an adze fragment and two celt fragments were found within 4 m of the west and south sides. Three drills and a perforator were clustered in the center of the circle. Scrapers were relatively rare in the block, but three were found within the boundaries of Structure B. A large number of bifaces from all stages of manufacture, especially Stage 3 tools, indicate production and maintenance of cutting tools. Numerous retouched and utilized flakes recovered from within and directly adjacent to the walls of the structure demonstrate the importance of tasks that required expedient scraping and cutting tools. A light scatter of deer bone, unidentified mammal bones, and a piece of turtle shell were found within and directly outside the structure.

Function

The distribution of cultural materials and features within the proposed walls suggest that the existence of Structure B can be accepted. The post molds intersect the inscribed circle well, but the absence of additional post molds is perplexing. A comparable problem was encountered in definition of the east half of Structure A, thus it may be that under some circumstances the post molds are not readily distinguishable in these soils. The three small features coincide well with the arc of the possible wall, and paired larger pits, such as Features 200-25 and 200-88, are present in Structure X and are common in the structures examined in the comparative section that follows this discussion. Another characteristic of Structure B seen in Structure X and in some of the comparative sites is restriction of the features to half of the interior, possibly to maintain an unencumbered working/sleeping/sitting area.

The debitage, pottery, fire cracked rock, and formal and expedient tools indicate that a variety of domestic activities were carried out in this area, and, as in the case of Structure X, scrapers and drills were especially prevalent. Perhaps the most salient similarity to Structure X is the presence of numerous adzes and celts that may be associated with the construction of a dwelling and with subsequent woodworking activities of the inhabitants. The debitage distribution correlates with the features, but the largest quantities were in the units near the wall of the possible structure. These concentrations may represent work areas and areas into which debris was swept. Although pottery was common inside the structure, the small size and shallow depth of the hearth and the miniscule quantity of carbonized botanical remains suggest that cooking was done elsewhere.

If Structure B were a complete circular structure it would have an area of approximately 80.74 m^2 which would be sufficient space for occupation by about thirteen individuals according to Cook’s “Rule of thumb formula” for estimating the number of occupants within a structure (Cook 1972:16). The size of this structure may indicate that it was used by more than a single family.

Structure C

Description

A structure appears to have been present in the northwest corner of the 200 Block. It is difficult to verify the existence of this possible structure because so few post molds were identified; however, six post molds intersect or nearly intersect a circle 3.9 m in diameter, and two of the post molds are aligned through the centerpoint of the inscribed circle. The post molds were widely dispersed, but the profiles were distinct, and there were several relatively large posts and several deep posts (Table 5.8). Two posts were positioned on the southeast edge of the circle, one was located on the east edge, one was on the north edge, and two were along the west edge (Figure 5.29). It is possible that additional post molds were present but undetected because they did not penetrate 10-15 cm of dark midden below the living surface and above the lighter soil at the base of the Early Woodland deposits.

An extremely dense rock layer covered the entire structure and the units surrounding it and made detection of the living surface difficult. However, debris scraped from several basin hearths covered the surface around them and partially delineated the occupation surface, and reddened soil at the rims of several pits further defined the surface. Because of the compressed cultural deposits in the vicinity of the structure, it is not possible to determine if the fire cracked rock derives from a single occupation, but the diagnostic cultural materials within the layer are predominately Early Woodland. Some of the rock may have been deposited prior to the occupation of the structure because Terminal Archaic Buck Creek Barbed points were plentiful in the vicinity. A Middle Woodland feature was present to the west of the structure, thus it is possible that some of the rock is from a later component. It is quite possible that some of the rock in the vicinity was deposited at the time the structure was inhabited because there were six Early Woodland hearths within and directly outside the structure. A very large surface hearth, Feature 200-65, was located about 12 m east of the structure, but its age relative to that of the structure is not known. Most of the rock appears to have accumulated after the abandonment of the structure.

Three Early Woodland features were found within the boundaries of the structure. Feature 200-30, positioned inside the east edge of the structure, was a large, shallow basin pit that held a moderate amount of debitage, particularly late stage Wyandotte flakes, a large amount of fire cracked rock, and a sherd of interior/exterior cordmarked pottery. Feature 200-16, a large, shallow basin hearth that held a moderate amount of debitage, a large amount of fire cracked rock, a tested cobble, and several sherds of grit tempered, cordmarked pottery, was located inside the southeast edge of the structure. Feature 200-2, a medium sized, shallow basin hearth with a moderate amount of fire cracked rock and no other cultural material, began several centimeters to the northwest of Feature 200-16. The latter two pits showed evidence of in situ fires, and the other feature contained hearth refuse but no evidence of use as a fire pit.

Wood charcoal was abundant in all the pits, but very little nut and very few seeds were found in the features within the structure or those around the periphery. Black walnut was present in small quantities, and thick shelled hickory and hazelnut were present in even smaller amounts. Only nine starchy seeds were recovered from the three interior features, and nine starchy seeds were found in the three basin hearths directly outside the structure analyzed for botanical remains. A total of nine fleshy fruit seeds, mostly from grapes, were recovered from the aforementioned six features. The sparsity of botanical remains is comparable to that of the features within Structure B, which also contained knotweed and grape seeds and slightly more black walnut than hickory.

Faunal remains, although sparse, showed a distribution comparable to lithic and artifactual materials and fire cracked rock. Deer, turtle, and freshwater drum remains were found within and to the east of the structure in larger quantities than elsewhere in the block. It is possible that the area to the east of the structure was used for food preparation and subsequent refuse disposal.

Most of the units within Structure C and in the area around it contained very large quantities of intermediate to late stage Wyandotte and Muldraugh debitage. Like the fire cracked rock layer, this distribution extended across much of the northwest portion of the block. Unlike the fire cracked rock, the debitage generally occurred at about the same depth as the features within and around Structure C, which may indicate at least partial contemporaneity with the structure. Interior/exterior cordmarked sherds also were scattered throughout much of this area and were especially common between Feature 200-65 and the knapping station in Phase II U225N60W. The distribution of these materials may provide an indication of the area used during the occupation of Structure C.

Associated Materials

The most diagnostic artifacts associated with the structure are the interior/exterior cordmarked sherds within the structure and in the surrounding units. Sherds were recovered from Feature 200-30, inside the structure, and Feature 200-32, directly outside the southeast portion of the wall. The latter feature yielded a radiocarbon date of 2550 RCYBP, which substantiates the early occurrence of the pottery.

Four Early Woodland basin hearths and a basin pit were positioned less than 2 m from the periphery of the structure. Three of these features contained Early Woodland Contracting Stemmed points or preforms. One Early Woodland Contracting Stemmed point was recovered inside the circle, and four additional points and a Turkey-tail point were found within 2 m of the circle, but these tools were not necessarily contemporaneous with the structure.

There was a cluster of bifaces of all stages of manufacture within and around the structure, and several hammerstones, cores, and tested cobbles were in the vicinity. Several drills and perforators were found at the periphery of the structure, but, unlike Structures X and B, scrapers were not found within the boundaries and no adzes or celts were nearby. No personal items were found within the structure, but a bead discarded during manufacture was found several meters to the southeast.

Function

The existence of Structure C is accepted because the post molds efficiently intersect the proposed circular outline of the structure, and two of the interior features and three exterior features abut the wall without undermining it. Another characteristic of this putative structure seen in Structures X and B at the Knob Creek site and in some of the comparative sites is restriction of the features to half of the interior, possibly to produce an unencumbered sleeping/working/ sitting area. Structure C encompassed an area of approximately 11.94 m^2 which would be sufficient space for occupation by about five individuals according to

Cook's "Rule of thumb formula" for estimating the number of occupants within a structure (Cook 1972:16).

A distinctive aspect of the features within and around the structure is the number of hearths within a small area. It is not evident if this concentration of hearths is atypical of Early Woodland camps. The Phase II South Block also encompassed an Early Woodland activity area, and there was a cluster of hearths in that area as well. The origin of the dense rock layer is not clear. The rock could have derived from earth oven cooking or lining of an open hearth. Also, it is possible that stone boiling was still the preferred method of cooking during the early stages of pottery use. The presence of pottery suggests cooking in the vicinity, but the amount of food remains was minimal. It is possible that the structure had a function other than or in addition to habitation. Faulkner (1977) documents a number of ethnohistoric and purported prehistoric examples of sweat lodges or winter "hot houses" in the Southeast and Midwest which utilized heated rocks and fires to maintain extreme temperatures.

Regional Comparisons

Late Archaic-Middle Woodland structures in the Midwest and Midsouth were made in a variety of forms, but all the structures at the Knob Creek site were single post, circular or semi-circular facilities. Dragoo (1963:188-189) lists single post, circular structures (Category A) as Adena traits, but does not list any examples from Kentucky, Indiana, or Ohio. Structures associated with the Adena mounds in these states were primarily paired post structures with dissimilar interior features and with human remains, caches of tools, and ceremonial items often present. A number of Middle Woodland structures in the Midwest and Midsouth were somewhat comparable to structures of the Knob Creek site. These facilities were examined to gain comparative information about their method of construction, internal support system, internal features, function, seasons of occupancy, and number of occupants.

It is worthy of note that sites generally have too few or too many post molds and features to provide a precise interpretation of the exterior, interior, and roof forms of a structure; thus, there is variability in individual interpretation dependent upon which posts and features are chosen for discussion. In recognition of this situation, while deference is given to the interpretation of the excavators, it is valuable to at least consider alternative explanations.

A circular structure (Figure 5.30 upper) was found at the Middle Woodland Buckmeyer Site in central Ohio (Bush 1975). Much data was lost because the surface had been scraped by machinery prior to investigation, but nine post molds that averaged approximately 12.5 cm in diameter outlined a structure approximately 10 m in diameter, and there were four interior support posts. All five interior features (Bush 1975:10-13: Figure 2) were identified as fire pits, but Feature 3, the small pit without cultural material in the exact center (Bush 1975:12-13; Figure 2), may have been a basin for a centerpost. Three pits directly adjacent to Feature 3 extended in a line across the center of the structure and the fourth pit was near the south wall. The north half of the interior contained no features. This confinement of the features to half of the interior is similar to that of structures at the Knob Creek site.

Extremely large quantities of grit tempered, plain, and grit tempered, incised pottery, comparable to Adena Plain and Montgomery Incised pottery, respectively, were recovered from pits in the interior of the Buckmeyer structure (Bush 1975:13-21). Adena Stemmed projectile points and Adena and Robbins leaf-shaped bifaces were recovered from the features. A radiocarbon date of 1975 +/- 200 RCYBP was obtained from charcoal from one of the pits.

Structure 1 at the Napoleon Hollow site (Wiant and McGimsey 1986), in the lower Illinois River Valley, was a circular Middle Woodland structure. Two dates from the midden around the structure and one date from a feature within it ranged from 1810-1880 RCYBP and are considered by the analysts (Wiant and McGimsey 1986:73) to accurately date the facility. A date of 2000 RCYBP was obtained from another feature in the interior of the structure, but the analysts were unable to explain the discrepancy in age, and this date could neither be accepted nor rejected. A radiocarbon sample from the midden elsewhere on the site yielded a date of 1800 RCYBP (Wiant and McGimsey 1986:74), but another sample from that same area produced a determination of 1970 RCYBP. The earlier date is discounted by the analysts, but the reason for the discrepancy in the two dates is not readily explained.

Structure 1 (Figure 5.30 lower) was 8.0 m in diameter, and the wall posts were saplings that were approximately the same diameter as those of structures at the Knob Creek site but were placed in pits and supported by blocky pieces of chert used for chinking. There was no centerpost. The analysts (Wiant and McGimsey 1986:129, 132) hypothesize, based on ethnohistorical information from the upper Great Lakes area, a modern reconstruction by the Center for American Archaeology, and comparison with similar facilities in the Midwest and Midsouth, that this was a tensioned pole structure formed by lashing together the tops of saplings to form a circular dome.

Heavily-fired hearths were not present within Structure 1. (Wiant and McGimsey 1986:143) hypothesize that hearths may have been removed or obliterated after use. One lightly-fired hearth (Feature 40) was identifiable (Wiant and McGimsey 1986:144; Figure 12.17) and it was located about one-half meter north of the center of the structure, which, like the hearth in Structure X at the Knob Creek site, would allow dispersal of smoke through the hole in the center of the roof. The features in the structure, like those within most structures at 12HR484, were largely confined to one half of the interior. The north half of

Structure 1 contained only the hearth and one small, shallow pit (Wiant and McGimsey 1986:Figure 12-17). The pits, like most of those within the structures at the Knob Creek site, contained very little cultural debris other than hearth refuse (Wiant and McGimsey 1986:143-154). As in Structure X, one large, deep pit (Feature 45) directly inside the wall yielded the only sizable amount of cultural material. The varied depths of the features and post molds, the sizable amount of debris on the floor of the structure, and the patterns of feature fill suggest possible reuse of the facility. Wiant and McGimsey (1986:511) use a wide range of information to conclude that the Napoleon Hollow site was a ceremonial/mortuary site.

Feature 1 at the Truck #7 site, 11MO200, in the American Bottom of Illinois (Fortier 1985), was another Middle Woodland structure with similarities to Structure X at the Knob Creek site. Feature 1 (Figure 5.31 upper) was a circular structure with a diameter of 9.5-10.0 m, a thin (17 cm) centerpost, and 10 internal features (Fortier 1985:181-183; Figure 46). Wall posts were slightly larger (mean of 13.5 cm) than those at the Knob Creek site, and were spaced an average of 114 cm apart. There were three pairs of internal support posts with one post of each pair in one of two concentric rings (Fortier 1985:186-192; Figure 48), and two of these pairs may have been supplemented by posts placed in shallow pits (Fortier 1985:Figure 46; 197) (Figure 5.31 lower). Like Structure X at the Knob Creek site and Structure 1 at the Napoleon Hollow site, the centerpost appears to have been used to align posts on opposite walls (Fortier 1985:Figures 48 and 49) and, in this instance, formed the centerpoint for inscription of the concentric circles (Figure 5.32) that aligned the support posts. The interior did not have the features confined to one half of the structure, as did structures at the Knob Creek site and Structure 1 at the Napoleon Hollow site; rather, there were four large areas without features (Fortier 1985:Figure 46) separated by features and post molds. Fortier (1985:192; Figure 47) hypothesizes that the most reasonable form for the structure consisted of vertical walls with beams laid from the walls to the center post, with the slanted roof beams supported by the intermediate support posts.

Like Structure X at the Knob Creek site and Structure 1 at Napoleon Hollow, the large, deep pits had the widest varieties of cultural and ethnobotanical materials (Fortier 1985:181). Unlike the two aforementioned structures, some of the small pits contained abundant cultural debris, and other features contained moderate amounts of botanical remains. Hide/meat processing and lithic reduction were more pronounced than in Structure X.

Fortier (1985:183) hypothesizes that a variety of activities took place inside the structure because it was primarily a fall-winter dwelling. This assessment may be supported by the observation that the doorway was covered and located on the east side of the structure--away from the prevailing winds. The presence of pokeweed and papaw, both available in September and October and not readily stored (Fortier 1985:299), support his contention about fall use, but the presence of starchy seeds, such as maygrass and chenopod, that ripen in spring and late summer, respectively, could be an indication of additional warm weather occupation, although they could have been stored. The absence of hearths inside the structure (Fortier 1985:181) makes it less likely that this was a cold weather house. Features within the structure yielded radiocarbon dates of 1860 +/- 75 RCYBP, 1790 +/- 75 RCYBP, 1720 +/- 75 RCYBP, and 1505 +/- 75 RCYBP, but the last date was discounted (Fortier 1985:271).

The Holding site (11MS118) (Fortier, et al. 1989:58, 61: Figure 18), was a Middle Woodland site in the American Bottom with seven radiocarbon dates that ranged from 2010-1760 RCYBP and averaged 1881 RCYBP. Structure Feature 1 (Figure 5.33) was a single-post, nearly-circular structure (6.82 x 6.50 m) without a centerpost or interior support. Two features were present along the interior of the west wall and one was located against the east wall, but the remainder of the interior was unencumbered with pits. None of the features were hearths.

Circular Middle Woodland structures also were reported in the Wabash Valley of Illinois and Indiana. The early Allison-LaMotte Stoner site, 11CW109, (Stephens 1974:9-11) was reported to have remains of as many as 11 circular, single post structures with diameters of 3.3-10.6 m. A structure (Figure 5.34) 6.7 m in diameter with four interior roof supports (Stephens 1974:Figure 4) was illustrated and briefly discussed, but there was not sufficient information provided to allow detailed discussion.

A comparable structure type may be House Type III at the Allison-LaMotte phase Daugherty-Monroe site, 12SU13, (Pace and Apfelstadt 1980:54, 56-57) which consisted of circular structures 2.7-7.3 m in diameter with single rows of wall posts and no consistent pattern of roof supports. The hearths generally were shallow basins. Doorways were unprotected gaps in the wall and located on the south or east side. These were interpreted to be warm weather structures.

House Type II (Pace and Apfelstadt 1980:54; Figure 5) consisted of circular structures 5.5-9.7 m in diameter with double rows of thin (about 7.5 cm), closely-spaced (33 cm) wall posts and large roof support posts in rectangular arrangements. Some of these structures had protected entrances facing away from the prevailing winds, and multiple hearths were present in the interiors. The double walls and sheltered entries are interpreted as adaptations for cold weather. Charcoal from one of the Type II houses yielded a radiocarbon date of 1715 +/- 80 RCYBP, but both Type II and Type III houses are considered to have been manufactured during a long temporal span (Pace and Apfelstadt 1980:56-57).

Additional insights may be gained from the analysis of Middle Woodland structures in the Duck River Valley of central Tennessee. Structure I at the Banks III site (40CF108) (Faulkner and McCollough 1974:263; Figures 22-23) was an oval structure (7.6 x 6.7 m) with a centerpost (Figure 5.35 upper). The wall posts were spaced 61-73 cm apart and were approximately 15 cm in diameter, as was the centerpost. The centerpost was deeply set and chinked with limestone, and a line of wall posts on the east side were chinked also (Faulkner and McCollough 1974:264). The wall posts on the east and west sides were vertical, and the north and south wall posts were inclined outward. These were considered adaptations to facilitate construction of a tensioned pole structure, and such a structure was subsequently reconstructed by the excavators by placing posts in the excavated post molds (Faulkner and McCollough 1974:Plates XXIV-XXXI). No interior support posts were identified. Doorways were entered through porticoes on the east and west sides (Figure 5.35 lower).

The main hearth in Structure I was positioned about one meter from the centerpost, and a smaller hearth was located slightly more than one meter from the centerpost. The analysts noted that the hearth locations facilitated smoke removal (Faulkner and McCollough 1974:265). Another small hearth was located next to the proposed sleeping area. Other features within the periphery of the structure consisted of three small, shallow pits that were of indeterminate age and function and a large, shallow pit tentatively considered Middle Woodland. Very little cultural material was found inside the structure, post molds, and features. A radiocarbon date of 1590 +/- 315 RCYBP was obtained from deer and fox mandibles found at the bottom of the centerpost and a doorway posthole, but the large sigma prevented determination of a more precise age. The structure was believed to be a summer dwelling attributable to either an early Middle Woodland McFarland phase occupation or a late Middle Woodland Owl Hollow phase occupation (Faulkner and McCollough 1974:272).

The McFarland site, 40CF48, (Kline, et al. 1982) type site of the McFarland phase, contained five circular structures with single post walls (Figure 5.36). Wall posts were moderately thick (15 cm) and widely, but regularly, spaced, and there appeared to be interior roof supports in the structures, but the locations were not standardized (Kline, et al. 1982:22). Interior features included at least one deep, generally straight-sided, storage pit against one wall and a shallow, basin-shaped, processing pit near the opposite wall (Kline, et al. 1982:22-23). Like Structure I at the Banks III site, there were few interior features, and the features were generally confined to the north half of the interior. These structures were interpreted to be tensioned pole dwellings (Kline, et al. 1982:22), although they did not have outward inclined or chinked wall posts.

Structures 1, 3, and 5 appear to have centerposts (Kline, et al. 1982:Figures 11,13, and 15), although there is no specific mention of their presence in the report. Post mold 338 is directly in the center of Structure 3 (Kline, et al. 1982:27), and what appear to be four large interior support posts (PM 337, 345, 31, and 62) form a rectangle with the corners approximately one meter inside the wall and intersect a concentric circle approximately 6 m in diameter centered on this post.

Structure 1 is suggested to have a linear arrangement of interior support posts (Kline, et al. 1982:30), but four posts (PM 33, 126, 83, and 98) nearly form a rectangle similar to that of Structure 3 and nearly intersect a concentric circle drawn from what appears to be a centerpost (PM 33). This arrangement of support posts in a rectangle resembles that of some of the Allison-LaMotte structures of the Wabash Valley that are considered to support roofs with separate beams descending to vertical wall posts (Pace and Apfelstadt 1980; Stephens 1974). Support posts this close to the walls would prove more advantageous for bearing the weight of the roof of a vertical walled structure than of a tensioned pole structure.

Structure 4 does not have a centerpost, but possible interior posts intersect two concentric arcs less than one meter inside the north and south walls and may indicate a structural support system based on principles similar to those of Structure 3. The placement of support posts in concentric circles is reminiscent of the arrangement of the posts in the Truck #7 structure, which is posited to be a dwelling with vertical walls. Structures 1, 3, and 4 may indicate the presence of vertical walled dwellings in McFarland phase sites. The internal support systems of the other structures are not clear, (Kline, et al. 1982:23, 30). No geometric patterns of internal supports are present for Structures 2 and 5, although the latter appears to have a centerpost. Features within Structures 1, 2, 3, and 5 yielded radiocarbon determinations clustered between 1860-1830 RCYBP and the feature from Structure 4 yielded a date of 1740 RCYBP (Kline, et al. 1982:68). The presence of botanical taxa that ripen in spring, summer, and fall and the large, deep pits considered storage features lead the analysts to conclude that at least part of the local population used the site on a year-round basis (Kline, et al. 1982:64).

Structure I and Structure IV from the McFarland phase component at the Eoff I site (40CF32) (Faulkner 1982:303-388), in the Duck River Valley, like Structure 2 at the McFarland site, had no centerposts and no rectangular or concentric arrangement of interior support posts (Figure 5.37). Structure I from the McFarland phase component at the Parks site (40CF5) (Brown 1982:Figure 24; 464-468), in the Duck River Valley, like Structure 4 at the McFarland site, did not have a centerpost, but the authors (Brown 1982) hypothesize that there may have been a rectangular arrangement of interior support posts, with one corner obscured by a large tree fall (Feature 142) (Figure 5.38 upper--dashed line). There are no clearly defined interior support configurations, but other posts may be parts of other support structures (Figure 5.38--dotted lines). These structures from the Eoff I and Parks sites, like structures at the Knob Creek site and other McFarland phase structures discussed above, have approximately half of the interior unencumbered by pits.

Early Woodland structures comparable to those of the Knob Creek site were not found in the literature, although circular structures without centerposts were present in later components and earlier components. The structure that comprised Feature 5 at the Florence Street site (Emerson 1983:22-27; Figure 7) may have been similar, but its outline and internal structure were not readily identifiable. The exact form of the structure and the internal support system are not readily apparent because of the abundance of post molds and the overlap of features. The excavators hypothesized that it was an ovate (7.42 x 5.76 m), bent pole wigwam. It is possible that there was a rectangular arrangement of internal support posts, and one post could have functioned as a centerpost, but this cannot be confidently posited (Figure 5.39).

Structure 4 at the Ewell III site, 40CF118, was considered to have begun as an open, semicircular cabana with a centerpost and was subsequently modified into a circular tensioned-pole house 4.57 m in diameter (DuVall 1982:37-39; 60-69). The walls were formed by closely-spaced posts that generally were paired, and the interior contained a centerpost and eight additional post molds. DuVall suggests that a group of posts that follow the arc of the wall a short distance inside it may have been interior wall/roof supports. Some of the traits of this structure are found in later dwellings in the Upper Duck Valley, and some are seen in the Early Woodland and Middle Woodland structures at the Knob Creek site. It is identified as a Terminal Archaic Wade phase structure on the basis of a radiocarbon date of 2790 +/- 80 RCYBP from Feature 21, which contained a Wade point and a projectile point attributed to a Late Archaic/Early Woodland type cluster but not specifically identified in the report.

After examination of the post mold patterns and comparison with later structures from the region, it is suggested herein that other interpretations may be worthy of consideration. It is possible that Structure 4 did not begin as a semicircular dwelling. The identified semicircular structures on the Ewell III site (DuVall 1982:67-70) and in the Midwest (Smith 1992) are not as symmetrical as Structure 4, and the posts are not as closely spaced and regularized in their placement. It is possible that this originated as a circular structure and that the differences in post spacing reflect a functional adjustment rather than two distinct construction phases. It is further suggested that four of the interior post molds form a rectangular support framework for the roof. Such a support system would be more efficient for holding up a roof, especially if there were vertical walls and a roof with straight, descending beams. The arc of posts at the periphery of the interior noted by DuVall would not significantly strengthen the roof of a tensioned pole structure.

Interior features consisted of a hearth, Feature 21, near the centerpost and a shallow basin pit on the other side of the centerpost. The arrangement of the features left much of the interior unencumbered with pits. The placement of the hearth and the spatial restriction of the pit features are characteristics seen in structures from the Knob Creek site and elsewhere in the Midwest and Midsouth.

Interpretation

An attempt has been made to locate structures in the literature comparable to those found at the Knob Creek site in order to gain perspective about their methods of construction, internal support systems, internal features, functions, seasons of occupancy, and numbers of occupants. Circular, single post, Middle Woodland structures, with or without a centerpost, were found throughout the Midwest and Midsouth; however, interpretations of their characteristics varied.

The orientation of the walls and the shape of the roof of a dwelling are not necessarily evident from the post molds alone. Structures with chinked wall posts, posts inclined outward, or both have been interpreted as tensioned pole structures at the Banks III site (Faulkner and McCollough 1974:264) and at the Napoleon Hollow site (Wiant and McGimsey 1986:132). The aboriginal use of such structures in both areas has been verified by ethnographic accounts, and comparable structures have been reconstructed (Faulkner and McCollough 1974:265-272; Wiant and McGimsey 1986:129). However, structures at the McFarland site with vertical post molds and without chinking also have been interpreted as being tensioned pole dwellings (Kline, et al. 1982:22). Structures with vertical post molds at the Daugherty-Monroe site (Pace and Apfelstadt 1980:54; Figure 5) and the Truck #7 site (Fortier 1985:192; Figure 47) are hypothesized to have had separate beams radiating from the center of the roof and descending to vertical wall posts. Observation of the possible internal support post molds of the McFarland site structures suggests it is feasible that some of these may have had vertical walls and separate roof beams.

There is no strong evidence whether the structures at the Knob Creek site had vertical walls or walls made of bent saplings. Inclined posts and chinked posts were absent from structures at the Knob Creek site, thereby allowing the possibility that they were not tensioned pole structures. The wattle and daub wall covering on Structure A may be more readily applied to vertical walls, as seen in Mississippian houses.

Perhaps the most essential engineering necessity is proper support of the roof, and, consequently, interior roof supports are among the most varied attributes of the structures observed. At the Stoner site (Stephens 1974:Figure 4), four large interior support posts form a rectangle beneath the center of the roof of an Allison-LaMotte dwelling and could potentially support diagonal beams descending to vertical walls. Comparable supports were present for a Type II Allison-LaMotte structure at the Daugherty-Monroe site (Pace and Apfelstadt 1980:54, 56; Figure 5), but the lighter Type III structures at that site had no consistent pattern of roof supports. The structure from the Buckmeyer site (Bush 1975:Figure 2) also had four probable interior support posts in a rectangular formation, but one pair of posts aligned with the north-south axis of the structure and a probable centerpost, and the other pair were positioned to the east. The structure at the Truck #7 site displayed two concentric rings of interior roof support posts and possibly a centerpost to hold up the descending roof poles proposed to rest upon vertical walls.

Structure X at the Knob Creek site did not have obvious interior support posts in a rectangular arrangement or in concentric circles; thus, it may not have been able to support a roof with beams descending from the center of the structure. A rectangular arrangement of Features 13, 17, and 20 and PM11 around the centerpost is evident, but Feature 13 is considered a small hearth rather than a possible pit for a support post. Several linear arrangements of possible support posts (Features 17, 20, 48, 55, 107, and PM11) could have been present, but none of these can be verified. It is possible that support posts were placed as needed after the construction of the shelter. This informal placement of the supports, with the posts clustered near the center, is more likely to occur in a tensioned pole structure than one with separate roof beams.

The role of the centerpost in circular structures is interpreted in several ways. Use of a centerpost or center point for alignment of diametrically opposed pairs of posts is commonly posited (Faulkner and McCollough 1974; Fortier 1985; Wiant and McGimsey 1986), and in the instance of the structure at the Truck #7 site and possibly some of the McFarland site structures, it was used to position the interior support posts as well. Fortier (1985:188) notes that in at least one ethnohistorical account the centerpost was removed after the structure was laid out. Structures X, B, and C at the Knob Creek site have at least one pair of posts that are diametrically opposed through the centerpoint and Structure A has a pair of posts with an inscribed line that passes within several centimeters of the centerpoint.

Fortier (1985:186) points out that on a tensioned pole structure the centerpost may have been used as an object to which to lash opposed pairs of poles, but it was not necessarily intended to bear weight. In such an instance the post need not be thick--only strong enough to bear the counterbalanced forces of the opposed poles. This roof support system is quite feasible for Structure X. However, an alternative type of roof cannot be ruled out. The centerpost of Structure X may have been sufficiently thick (23 cm) and deeply set (32.5 cm) that, if the roof poles were properly counterbalanced and the roofing material relatively light, it might support a roof composed of poles descending to vertical walls. It is more likely, however, that a rectangular arrangement of roof supports or concentric supports would be preferable to supplement the capacity of the centerpost to hold up such a roof.

There also appear to be adjustments in the structures necessary due to temperature and wind. The probable orientation of the door toward the prevailing winds, the absence of a covered doorway, and the moderate spacing of the wall posts may indicate that Structure X was primarily occupied during warm weather. This is substantiated by the botanical remains which reflect spring through fall availability, although seeds and nuts could have been stored for later consumption. The small size of the hearth also suggests warm weather occupation. In contrast, the presence of wattle and daub walls may indicate that Structure A was intended to be occupied in colder weather. Structure B had only a small interior hearth, and the limited botanical remains have spring through fall availability, thus it may be primarily a warm weather facility. Structure C has two hearths within a relatively small area and could have been occupied during cold weather or it could have served a specialized function (e.g., sweat lodge). The limited botanical remains inside the structure are of plants that ripen in the late summer and fall, and the features outside have several maygrass seeds that ripen in the spring.

The two Middle Woodland structures at the Knob Creek site had estimated occupancy of eight and nine individuals. Structures with estimated occupancy of eight residents were the most common among the 83 Middle Woodland habitation and corporate-ceremonial structures surveyed by Smith (1992:Figure 9.8), including houses at the Holding, McFarland, Eoff I, and Stoner sites discussed above, and the first two of these sites also had houses with estimated occupancy of nine individuals. Smith (1992:213) concludes that most known Hopewellian structures appear to have been occupied by 5-13 people.

Community Patterning

One of the focuses of the investigations at 12HR484 is delineation of the community patterning displayed within each component. This was accomplished by exposure of large portions of major settlements and special activity areas in order to examine the spatial distribution of artifacts, features, and subsistence remains and assess the interrelationships among them. The internal arrangement of each encampment was investigated by observation of the location of the structures, if any were present, and the contents of the features within and around them; examination of the kinds of tasks that took place within the horizontally circumscribed occupation or activity areas; description of the location and contents of distinctive activity areas and feature clusters; and consideration of the topographic locations of facilities.

Early Woodland

The inferences gained from observation of the number, sizes, and locations of the features, the contents of the features and midden, the location of the structures, and the distribution of the botanical remains are that the Early Woodland component is composed of spatially-restricted activity and habitation areas from more than one occupation. These range from small gathering and processing loci to sizable habitation areas. The diagnostic artifacts and radiocarbon dates indicate that the site was used intermittently over a considerable temporal span.

The most extensive Early Woodland deposits are centered on the 200 Block. Two Early Woodland structures and 69 Early Woodland features were found within the block and another feature was located directly north of the block. At least 10 species of seeds, five species of nut, and 19 species of wood were identified from the block, and these reflect the variety of activities and resources associated with extended habitation. Although the abundance and size of the features could signify an intensive Early Woodland occupation, the diversity of the projectile point forms, the pottery forms, and pottery surface treatments suggest the Early Woodland deposits do not derive from a single occupation.

Understanding of the Early Woodland component of the 200 Block was impeded by the substantial mixture of deposits caused by extensive Middle Woodland activity in the southwestern and eastern portions of the block, and the marked slope of the eastern side of the ridge further complicated separation of the Early Woodland and Middle Woodland deposits. Statements about the internal structure of the habitation area are based upon the location of the structures, the features with diagnostic materials, and the distribution of cultural materials. The possible internal structure of the main occupation was investigated by examination of several distinctive features and clusters of features and by consideration of several areas that have few features but many tools.

Two very large, possibly communal, features suggest the possibility of intensive occupation. Feature 200-59 is a very large, shallow pit that appears to be the center of various processing activities, perhaps by the occupants of Structure B, which lies about 5 m to the south or Structure C, which lies about 10 m to the north. A variety of formal drilling, scraping, and cutting tools were found in the feature, but the strongest indication of its significance is the abundance of expedient tools in the feature and in the surrounding area. The sizable amounts of intermediate to late stage Wyandotte debitage inside the feature and in the adjacent units indicate tool manufacture and maintenance in the vicinity. The very large quantity of fire cracked rock within the pit indicates use of a hearth, possibly Feature 200-65, which lies about 7 m to the northeast. Directly to the north of Feature 200-59 was an area that contained only a few small features and only small quantities of fire cracked rock and pottery but numerous woodworking tools and a large number of complete Early Woodland Contracting Stemmed projectile points and a knapping area.

Feature 200-65, the largest hearth in the block, is another focal point of activity. This feature is a shallow basin hearth or a surface hearth with intensely baked soil patches and a layer of baked soil pieces that reflect extensive use and multiple cleaning episodes. Probable use for cooking is indicated by abundant fire cracked rock and a moderate amount of pottery within it and in several adjoining units. A metate, a pestle, and a pitted stone indicate botanical items were processed in the vicinity, and refuse pits within several meters contained burned nut and starchy seeds. Deer teeth and calcined bone fragments were found within the feature. A variety of cutting, drilling, and scraping tools, including several dense clusters of utilized flakes, in the surrounding units suggest other processing activities took place nearby. Grit tempered pottery was concentrated directly northwest of the hearth (Figure 5.40) and very large amounts of fire cracked rock and debitage began directly north of the pottery concentration. The abundance of debitage in the feature and in adjacent units attests to tool manufacture around the feature, including intermediate to late stage reduction of tools of Wyandotte chert. Numerous adzes and celts from nearby units denote woodworking in the immediate proximity.

The northwest corner of the 200 Block may represent a short term locus of domestic activity. A series of conjoining pits, most of them basin hearths, were located within and around Structure C. Huge amounts of fire cracked rock covered the structure and the surrounding units and radiated to the south and east. Large amounts of intermediate to late stage Wyandotte chert were most common in the units and features in the northwest and north-central portion of the block. The structure and associated features appear to be below most of the rock layer, and it is not evident how much of the rock is contemporaneous with them. It is possible that the majority of the stone was deposited by a subsequent occupation during the Early Woodland. Expedient tools were common in the area and reflect processing activities. Abundant debitage, cores, and hammerstones, and bifacial tools in all stages of manufacture attest to considerable lithic reduction. A scatter of interior/exterior cordmarked pottery was centered on Structure C, and sherds were found in three features and many of the surrounding units. The presence of this pottery and the associated radiocarbon date from Feature 200-32 indicate that this area was occupied early in the Early Woodland. The scatter of interior/exterior cordmarked pottery extended to the lithic workshop in Phase II Unit 225N60W and to Feature 200-65; thus, either could be affiliated with this occupation.

It is not apparent whether the feature cluster in the northeast corner is a separate processing area or the locus of refuse disposal from the activities in the northwest corner and possibly the activity areas around Feature 200-59 and Feature 200-65. Freshwater drum remains were confined to the north end of the block and turtle and deer remains were most common in this area. Two sizable pits and two large refuse scatters in the northeast corner were repositories for very large amounts of fire cracked rock. One of the refuse scatters had a rim sherd comparable to the one from the northwest corner, and a biface fragment from within or near the feature refit with a fragment from Feature 200-59. The units and the features in the northeast corner had little cultural material other than retouched and utilized flakes, and two of the features had moderate amounts of maygrass.

A huge, dense layer of rock extended downslope in the eastcentral and southeast portions of the block. At the edge of the layer, in the southeast portion of the block, was an activity area with processing debris and some refuse from cooking as well. Two large Early Woodland refuse pits, one of which may be a cleaned hearth, and one medium-sized refuse pit contained very large amounts of fire cracked rock, but the other contents differed. The two large pits (Feature 200-108 and Feature 200-26) had moderate to large amounts of debitage. The former pit had a large amount of pottery and a very large amount of maygrass, and the latter yielded numerous expedient tools and several formal tools but no pottery. The diversity of the feature contents reflects more varied tasks in the4 vicinity than solely refuse disposal. Also within this area were several sherds of interior/exterior cordmarked pottery, including a rim sherd that was virtually identical to the rim fragments in the northwest and northeast feature clusters, and the three rim sherds from all three areas could be from the same vessel or by the same potter. It is possible that the area around Features 26 and 108 was used for refuse disposal by the individuals who utilized Structure C. It also is possible that the dense rock layer is associated with the occupants of Structure B, which, if it is circular would lie about 3 m from Feature 200-108, the nearest of the large refuse pits.

Interpretation of this cluster of features is obscured by problems with the associated radiocarbon dates. Radiocarbon samples from Feature 200-25, within Structure B, and Feature 200-26 yielded inordinately early dates, and two dates from Feature 200-108 are inordinately recent. The pottery in Feature 200-25 was similar to that found in Feature 200-108, but the radiocarbon dates differ by more than 1000 years. Relative dating suggests these features should be approximately contemporaneous.

A major intermediate to late stage lithic reduction locus outside the northern edge of the 200 Block centered upon Phase II Feature 40 and encompassed U250N60W and extended into several Phase III units. The moderate amount of pottery and the numerous late stage bifacial tools and expedient tools, as well as several formal scraping, drilling, and woodworking tools, support the likelihood that this area was used for a multiplicity of tasks. The distance of the workshop from the main feature clusters and the lack of associated pit features may indicate that it was a spatially segregated activity area.

The dense, dark midden, the amount of refuse, and the number and variety of artifacts and features signify the presence of substantial occupation within the 200 Block. The distribution of interior/exterior cordmarked pottery and the number of features in close proximity at the north end of the block make it plausible that there is a sizable early ceramic-bearing occupation in the 200 Block. However, the majority of the pottery lacks interior cordmarking; thus, there may be a sizable later occupation. If the various activity areas are contemporaneous they reflect an occupation that incorporated a diverse array of activities. The contents and locations of the features denote spatial segregation of domestic, processing, manufacture, and disposal tasks.

The periphery of a 200 Block Early Woodland occupation may extend into the southern portion of the 253N80W Trench, but the midden in this area was sparse and the total number of Woodland features was small. Eight of eleven Woodland features scattered along the crest of the ridge are attributable to the Early Woodland component. Two clusters of three features were encountered, and two features were relatively isolated. No large pits were encountered, and most of the features had minimal quantities of debris. The Hathaway cache, a group of Adena-like Early Woodland preforms, was isolated in the northern part of the trench, but the lack of debitage in the vicinity indicates that the tools were manufactured elsewhere. It is more likely that the tools were produced at the quarry site or in a lithic workshop distinct from the cache location.

Trench Feature 154 was the only feature in the 253N80W Trench of even moderate depth and the only one with abundant debris. It contained an extremely large amount of fire cracked rock, a large amount of pottery, a moderate amount of debitage, an Adena Stemmed point, several other formal tools, a small amount of nut, a variety of seeds, and deer, woodchuck, unidentified mammal, and turtle remains. A medium sized pit/hearth and a small, shallow basin pit completed the cluster. The range of the corrected radiocarbon date from Feature 154 does not overlap the range of the date from the 200 Block, but the feature could be contemporaneous with undated features in the 200 Block. The date from Feature 154 is not significantly different from that of Phase II Feature 39 in the 400 Block and the ranges of the two features from the South Block at the 95 percent confidence level, but the interval of highest probability for the date from Trench Feature 154 barely overlaps those of the two South Block dates. Early Woodland occupation in the 253N80W Trench consists of small, scattered activity areas related to brief encampment or processing rather than extended habitation, and the features and feature clusters more closely resemble those in the blocks to the north than those of the 200 Block.

The five widely separated Early Woodland features in the 300 Block did not show proximity to or continuity with those of the 253N80W Trench. They were dispersed along the ridge crest in the north half of the block. Eighteen additional Woodland features in the block were of unidentified cultural affiliation, but most of these were in the south half of the block and their distribution more closely resembles that of the Middle Woodland features. The five Early Woodland pit features were all small to medium sized and of shallow to moderate depth. Three of the pits had moderate amounts of fire cracked rock and three contained moderate amounts of debitage, and little pottery was found in any of the features. There is no evidence of more than brief use of the area during the Early Woodland, and the features indicate processing or short term activity rather than habitation. Feature 300-37 yielded a radiocarbon date of 2590 RCYBP, and the range of the calibrated date correlates well with the date from Feature 200-32 at the one sigma level, but it should be noted that the pit was without pottery and contained a Riverton projectile point; thus, its cultural affiliation is uncertain.

Only 10 of the 47 features in the 400 Block could be attributed to the Early Woodland component, but 27 Woodland features are of unknown cultural affiliation and their locations suggest that many of these may be Early Woodland. Although the features of unknown age generally did not have large amounts of cultural material, if a high percentage of them derive from the Early Woodland component, interpretation of this component might be altered.

The identified Early Woodland features in the 400 Block consist of three small clusters of pits along the crest of the ridge. One cluster consisted of three medium sized, shallow pits with moderate to large amounts of debitage, and two of the pits had moderate amounts of pottery, and one had a very large amount of fire cracked rock and a dense concentration of maygrass. Another cluster consisted of two pits and a pit/hearth. Two of the features had moderate amounts of debitage and two had large to very large amounts of fire cracked rock, and one had a moderate amount of hickory (*Carya spp*.) and black walnut and a large amount of knotweed, but pottery was scarce in all three features. The third group consisted of four tightly clustered pits with moderate amounts of debitage, and one of them also yielded a large amount of pottery and numerous formal tools. The 400 Block features reflect a variety of specialized activities, and it appears that both seeds and nuts are being processed in that area. A short term encampment may be represented by these deposits.

The range of the calibrated radiocarbon date from the Phase II Feature 39 correlates well with that of the date from Feature 154 in the 253N80W Trench. The date is not significantly different from the dates of the South Block features at the 95 percent confidence level, and the interval of highest probability moderately overlaps the later end of the range of the South Block dates. The range of the calibrated date from Feature 39 does not overlap that of the date from Feature 200-32 at the one sigma level, and the intervals of highest probabilities of the calibrated dates do not overlap.

The Early Woodland occupations of the 200 Block do not extend far to the south. The 148N49W Trench displays a break in the distribution of cultural materials between the 200 and 100 Blocks. No Early Woodland features were identified in the trench, although several Middle Woodland features had moderate amounts of grit tempered pottery and the midden contained grit tempered sherds.

Although the midden in the 100 Block contained a consistent scatter of grit tempered pottery (Figure 5.41), only one Early Woodland feature was identified, only four percent of the units contained more than 100 g of grit tempered pottery, and 66 percent of the units had less than 30 g of grit tempered pottery. The northeast portion of the block had a dense cluster of Middle Woodland features and the Early Woodland pit. Within this area grit tempered pottery composed 30-47 percent of the pottery in six features, and grit tempered pottery was scattered across the units surrounding these features. It is probable that the Middle Woodland pits were excavated into the Early Woodland midden and grit tempered pottery was redeposited into these features. Another area with a sizable amount of Early Woodland material is in the southwest corner of the block. A group of units on the ridge crest in this area contained a light scatter of grit tempered pottery, and the scatter extended across the ridge and downslope to the east and to the north along the edge of the slope. This area also contained the majority of the Adena points recovered from the block. The nature of the Early Woodland activity in this block is not apparent, but no habitation, processing, or special activity facilities were evident.

The Early Woodland component is only minimally represented for more than 150 m south of the 100 Block. No Early Woodland features were encountered in the 63N47W Trench during Phase III, and one feature was found during Phase II. Less than 14 g of grit tempered pottery was recovered from all the features in the trench. No Early Woodland features or grit tempered sherds were found in the 15N27W Trench.

At the south end of the site, in the Phase II South Block, there was a small but prominent Early Woodland activity area centered on a huge baked soil mass. Although spatially restricted to an area less than 20 m in diameter, there were a variety of features. The Phase III South Block 64S12W Trench, which adjoined this block to the north, had two features that may be associated with this activity area, but more Middle Woodland material was present than in the Phase II area, and the cultural affiliation of most features cannot be ascertained.

The focal point of activity in the Phase II South Block was Feature 78, a baked soil mass about 5 x 7 m in size. The baked surface had areas of differential oxidation, but it did not show impressions of wood or thatch, nor did it show bifacial oxidation, thus it is not considered to be daub. Large pieces of bone were found within the soil mass and very small pieces of calcined bone were scattered throughout it. Burned deer, unidentified mammal, turtle, and freshwater drum remains were identified. Burned branches lay upon the surface, and wood charcoal was plentiful. Fire cracked rock was scattered throughout Feature 78, and there were large to extremely large quantities of burned sandstone and cobbles around the southern and southwestern periphery of the mass and in the features. Some of the rock may have originated in the hearths, but the distribution suggests much of it was dispersed from Feature 78.

Four basin hearths, a pit/hearth, a surface hearth, a refuse pit filled almost entirely with burnt nut shell, and a dense debitage and fire cracked rock concentration, all potentially contemporaneous, were within 5 m of the baked soil mass, and one refuse pit was slightly farther away. Feature 78A, a basin hearth that functioned as an earth oven, was within the baked soil mass. Knapping loci with dense debitage layers of intermediate to late stage Wyandotte flakes and limited numbers of early stage Wyandotte flakes were present directly south and several meters to the north of the feature, and there was a moderately dense scatter of debitage several meters to the west. Projectile points were numerous, and expedient tools were scattered throughout the block, especially in and around Feature 78. Interior cordmarked pottery was recovered within and at the periphery of the baked soil mass, and a pestle and concentrations of burnt nut shells also were found at the periphery.

Feature 78 and the six features within and around it bore evidence of limited exploitation of nuts--primarily hickory, varied quantities of black walnut, and small amounts of hazelnut (*Corylus americana*) and acorn (*Quercus*). Minimal amounts of fleshy fruits, dry fruits, squash (*Cucurbita sp.*), and an unidentified tuber also were present. The small amount of nut in Feature 78 indicates that the purpose of the feature was not related to nut processing. Phase III Feature 1, about 13 m north of Feature 78, bore evidence of more intensive nut processing. It contained five nut species and a minute amount of squash, but no seeds.

Feature 78 and five of the six nearby features that were sampled had small numbers of chenopod seeds. Feature 71, within the baked soil layer, also contained knotweed seeds, and Feature 104, about 2 m south of the baked soil, had maygrass and amaranth (*Amaranthus*) as well. The one feature without chenopod had a sunflower (*Asteraceae*) seed. At least seven wood species were represented in Feature 78 and the surrounding features. The assortment of nuts, seeds, and woods attest to use of a variety of local resources, and the density of the midden, the quantity of tools and debris, and the variety of features corroborate probable short-term habitation in the South Block. The prominence of chenopod and nut correlates well with the botanical signature of the preceding Late Archaic component of the Knob Creek site.

The ranges of the calibrated dates for these two South Block features are discontinuous and overlap that of Feature 200-32 at the one sigma level, but the intervals of highest probability do not provide a clear indication of whether they date the same event. The ranges of the dates from Phase II Feature 39 and Trench Feature 154 barely overlap with the lower end of the South Block ranges at the one sigma level. The interval of highest probability for the date from Trench Feature 154 barely overlaps those of the South Block dates, and the interval for Feature 39 overlaps them only moderately, thus it cannot be definitively stated whether the two pairs of assessments date the same event.

Conclusions

It is possible that Early Woodland community patterning included spatial segregation of some large-scale activities and incorporation of less intensive activities into the habitation areas. A major knapping station with debitage from all stages of lithic reduction, including extremely large amounts of intermediate to late stage Wyandotte debris, was present to the north of the 200 Block. The size and density of the debitage concentration exceeded those of other Early Woodland knapping areas in the block, and it is feasible that the lithic concentration imposed enough of an obstruction to necessitate placement outside the primary living area.

A band of units and a lithic scatter (Feature 200-7) with very large quantities of intermediate to late stage Wyandotte debitage extended across the north end of the west half of the 200 Block. These lithic reduction areas appear to form an integral part of the domestic activity area around Structure C. Other areas with large amounts of debitage were adjacent to a large surface hearth (Feature 200-65) and within and around a very large processing feature (Feature 200-59). About equidistant from these two features and the activity area in the northwest corner was a dense concentration of knapping debris that may be contemporaneous with the Early Woodland occupation in the northwest corner or one or both of the features.

The 200 Block displays use of secondary refuse areas and features. The features within Structure C and around its periphery appeared to begin near the base of the dense layer of fire cracked rock in the northwest corner of the block. It is plausible that the rock layer is not primarily the product of the component that used the structure. The rock may derive from subsequent use of the area for refuse disposal by a later Early Woodland occupation. An even larger layer of rock was present in the eastcentral portion of the block. The area beneath and south of Structure A had few features but enormous quantities of rock on the downward slope toward the slough.

Fragments of a rim and 15 tools could be refit with other fragments (Figure 5.42). More than half of the fragments (52.9 percent) were found in the same unit or an adjoining unit, but three (17.6 percent) tools were found in or near refuse scatters 9-20 m away.

The presence of tools, pottery, and midden northward in the 253N80W Trench and southward in the 148N49W Trench and 100 Block suggests that the periphery of the settlement may have extended into these areas, but the number of features in those areas was small and the midden was sparse, thus the deposits could be from a separate occupation. The abundance and variety of cultural material in the South Block indicate a brief but intensive occupation. The large size of the features in the 300 and 400 Blocks and abundance of botanical refuse, fire cracked rock, and debitage within them suggest they are related to processing and specialized activities more than habitation, although the amount of pottery suggests possible short-term encampment in the 400 Block.

Middle Woodland

The inference gained from observation of the distribution, number, and sizes of the features and the contents of the features and midden is that the Middle Woodland component is composed of habitation and activity areas used over a moderate temporal span. There were differential horizontal distributions of the nut and seed types within the Middle Woodland component, and the quantities and compositions varied from area to area. The frequency and ubiquity of the botanical remains suggest links between certain areas and distinct differences between others. These variations support data from other avenues of investigation that point to functional differences between areas. At least one major occupation was present in the 100 Block, and the settlement may have extended into adjoining blocks and trenches. Elsewhere there appear to be activity areas, perhaps unrelated to the main occupation and each other, and several of these involved short-term encampment. The areas range from small processing loci to sizable, intensive settlements.

The Middle Woodland component is centered on the 100 Block. A dense midden covered the entire block, and 105 Middle Woodland features were identified during Phase II and Phase III excavations, and more may be present among the 22 Woodland features in the block with unidentified cultural affiliations. In addition to charcoal from 18 wood species, the 100 Block bore evidence of a diverse array of seeds and nuts that reflect varied food sources and seasons of occupation, and these were present in sufficient quantities to suggest extended habitation.

The majority of the features were in three clusters on the ridge. A house on the crest of the ridge had numerous features in and around it; a large, dense cluster of refuse pits lay about 8 m to the east along the edge of the ridge; and an activity area on the ridge crest, about 10 m south of the house, encompassed a cluster of pits. A scatter of features in the southeastern corner of the block forms a fourth activity area. The distribution of Falls Plain pottery (Figure 5.43) provides an indication of the location of refuse areas, activity loci, and areas possibly cleaned of debris.

The large, dense feature cluster at the edge of the ridge crest and the loosely grouped cluster of features in the southwestern portion of the block had features with nearly identical uncorrected radiocarbon dates of 2080 and 2070 RCYBP. A feature from within the structure and a feature from the small group of features in the southeastern portion of the block yielded uncorrected radiocarbon dates of 2000 RCYBP. The calibrated ranges of the pairs of dates overlap at the one sigma level and could reflect contemporaneity or reoccupation of the locus after a brief hiatus.

It is recognized that the Middle Woodland deposits of the100 Block may represent more than one occupation. Clusters of features, rather than individual features, are scrutinized and discussed as entities, and the distributions of cultural deposits within portions of the block are mapped and their possible interrelationships discussed. The contents of levels considered to be Middle Woodland are used to document the amount of fire cracked rock, debitage, and pottery in the component. Individual tools are plotted as a means to identify loci where clusters of comparable or related tools accumulated and to gain insight into activities performed in those areas.

The area with the most intensive activity is around Structure X. Within the structure and in the immediate vicinity there were a large number and wide variety of tools. The many adze, axe, and celt fragments reflect woodworking by the inhabitants, some of which may be related to the construction of the structure. Numerous hammerstones, tested cobbles, cores, Stage 1 and Stage 2 bifaces of Muldraugh and Wyandotte chert, and abundant debitage attest to early stage lithic reduction and tool manufacture adjacent to the structure. The area within the structure included one of the three Wyandotte cores and the only unit in the block to have a moderate amount of intermediate to late stage Wyandotte debitage. A moderate number of Stage 3 bifaces and many Snyders points, primarily of Wyandotte chert, indicate the use of formal cutting tools, and the abundance of drills and perforators attests to the importance of perforating tasks. There were few scrapers and unifaces on the site, but examples were present in and around the structure, and the abundance of retouched and utilized flakes indicates the use of expedient scraping and cutting tools. The abundant pottery, including sizable vessel fragments within Feature 100-7, attest to cooking activities, and the large metate inside the structure shows that vegetal foods were processed at this locus. The substantial amount of acorn in the feature corroborates this observation. The eleven features within the structure outline that were analyzed for botanical remains contained a variety of nuts and seeds, and these were found in quantities that reflect personal consumption rather than large-scale processing. Bone preservation was poor throughout the site, and only a few groups of animals identified in the Middle Woodland component, but all except, raccoon, were represented within the structure or directly outside it. Pipe fragments reflect manufacture and use of smoking implements, and gorgets also may have been manufactured there.

There were few features within a radius of about 5 m around the structure, although two pots and four features were clustered to the west of the structure. South of the structure, despite the scarcity of features, there was evidence of a variety of processing and maintenance tasks. Abundant debris from the manufacture and use of late stage bifacial tools and a small amount of early stage reduction debris indicate lithic reduction. Several grinding tools suggest botanical food processing, and a few scrapers and drills and many expedient tools attest to other activities. The northwest portion of the block, north of the structure, yielded several celt and adze fragments and contained artifacts indicative of manufacture and use of bifacial tools and the use of expedient tools as well.

The area east of the structure displays possible evidence of cleaning or a limitation of activities. Few of the units in this area yielded more than 10 kg of fire cracked rock, and three contiguous units produced less than 3 kg of rock. This area also had inordinately low amounts of Falls Plain pottery and debitage.

The northeast portion of the block, north of Feature 100-112, had large amounts of debitage and fire cracked rock but few features, and there was little cultural material in the small, shallow features that were present. Of potential significance is an area approximately 8 m (north-south) by 6 m directly east of Structure X that had low amounts of debris and tools. Within the 48 m^2 area only three small features were present, 10 of the 12 units had only small or moderate amounts of Falls Plain pottery and fire cracked rock, and nine units had only small to moderate amounts of debitage. Missing from the units were adzes, axes, celts, scrapers, unifaces, drills, gravers, pitted stones and hammerstones, and only four bifaces and two points were present. The sparse amount of cultural debris may indicate that the area was cleaned or that the range of activities permitted there was limited.

On the east and north sides of the aforementioned cleaned or open area was a dense cluster of features. Feature100-112, which probably originally functioned as a storage facility, appears to be the main repository of habitation debris. Huge amounts of pottery, including large vessel sections, and layers of ash attest to its proximity to a cooking area. Several features in this cluster contained an inordinately large amount of maygrass, including one feature with 38 percent of the maygrass from the entire block, and another feature yielded 42 percent of the acorn from the block. Feature 100-30, next to Feature 100-112, contained deer, turtle, and beaver remains, and deer and turtle were sparsely represented in several of the features and units of the cluster. Several adze/celt fragments in Feature 100-112 and several more nearby indicate woodworking in the vicinity. Abundant lithic reduction debris, Snyders Cluster projectile points, and late stage bifaces within the feature, and several tools in nearby features, indicate some manufacture and use of tools, but the profusion of rock and the near absence of formal and expedient tools in the surrounding features and the adjacent units suggest that this area was used more for disposal than processing. A biface fragment from the middle of the feature cluster, which refit with two fragments from inside Structure X, shows at least some disposal of material from the house into this refuse area.

An additional area of domestic activity was evident in the southwest corner of the block. Feature 100-37 contained very large amounts of debitage, fire cracked rock and pottery and a wide variety of formal and expedient tools, but few of the other features in the cluster had tools or more than a small amount of debris. Small numbers of drills, perforators, scrapers, bifaces, and points within and around the periphery of the feature cluster attest to a variety of tasks, and celt fragments in and around Feature 100-37 support the likelihood that woodworking was one of the nearby activities. Large to very large quantities of fire cracked rock and debitage were present around the periphery of the feature cluster, but several units adjacent to Feature 100-37 had comparatively low quantities of fire cracked rock and debitage, which may be an indication that the area had been cleaned and the refuse deposited into the feature. The large amounts of pottery and fire cracked rock in Feature 100-37 and nearby Feature100-67, the sizable amounts of burnt nutshell in several features in the cluster, and the light scatter of burned deer bone and turtle shell suggest cooking in the adjacent area. Feature 100-37 contained 46 percent of the chenopod and 27 percent of the maygrass from the 100 Block, and it also held the largest amounts of knotweed and little barley (*Hordeum pusillum*), and adjacent Feature 100-80 yielded 37 percent of the acorn from the block. The presence of two of the four expanding sided pits in the southwest feature cluster and the other two in the feature cluster around Feature 100-112**,** along the east edge of the ridge, may reflect similar activities and substantiate the possible link between the areas provided by the radiocarbon dates.

Another cluster of features occurred in the southeast portion of the block in the area around Phase II Unit 100N25W. The contents of these features and units show evidence of woodworking and a variety of drilling, cutting, and scraping activities with expedient and formal tools. Tool manufacture and maintenance is indicated by the consistent scatter of late stage debitage and by several refit tools. This area also contained a dense concentration of Snyders points. Two-thirds of the 18 points recovered in this area were complete, which suggests the area was used for processing rather than disposal. Cooking is suggested by fire cracked rock and pottery, which were plentiful in several of the Phase II features and in the surrounding units. Moderate amounts of nut were present, but very few seeds were recovered from five of the six features in and around the feature cluster that were analyzed for botanical remains. Marshelder (*Iva annua*) was found primarily in the 100 Block, where it surpassed knotweed, and 73 percent of the marshelder from the block came from Feature 100-45. This feature, at the periphery of the cluster, had little nut but moderate amounts of chenopod and maygrass, and a pitted stone was found nearby. The only other feature with a sizable amount of marshelder was Feature 100-22, which held the centerpost of Structure X. This may substantiate the possible link between the two areas suggested by the radiocarbon dates.

The portion of the block between the feature cluster in the southeast corner and the feature cluster around Feature 100-112 contained several large but relatively empty features and a large amount of debitage and fire cracked rock. The rarity of expedient and formal tools may indicate this upper slope of the ridge was used more for disposal than for specialized activities.

The feature clusters in the 100 Block reflect one or more occupations that incorporated a diverse array of activities. The contents of the features denote spatial segregation of domestic, processing, manufacture, and disposal tasks. The dense, dark midden and the number and variety of artifacts and features signify the presence of a substantial occupation.

The Middle Woodland component was well represented in the 148N49W Trench. Eighteen of the nineteen Woodland features found during Phase III and all three of the pits found within its boundaries during Phase II were of Middle Woodland cultural affiliation. There was a dense midden, small clusters of features, and several somewhat isolated features along the crest of the ridge. Sixty percent of the pit features were medium sized and 35 percent were large, and 35 percent were moderately deep to deep. None of the features had an oxidized base or sides, but features in all four clusters contained hearth refuse in the form of baked soil, abundant charcoal, and burned nut, and most pits had moderate amounts of fire cracked rock. It is plausible that some of these pits originally functioned as earth ovens or other types of hearths that did not result in oxidized sides and bases or were thoroughly cleaned.

The contents of the feature clusters were generally comparable. Each bore evidence of reduction and maintenance but not large scale manufacture of chert tools, and tools were sparse but diverse. Domestic activities and cooking were indicated by moderate to large amounts of pottery (Figure 5.44) and at least small amounts of botanical and faunal debris in each of the clusters. Each cluster contained at least one pit associated with disposal of debris.

Although the contents of the feature clusters reflect a common set of activities, the diversity of the refuse suggests they were not limited to the same specialized activity. The diversity of the tools recovered and the midden contents suggest a multiplicity of tasks were performed. The features and midden in the trench were closely aligned with domestic activities and correlate well with the main occupation in the 100 Block. This link is substantiated by the occurrence of thick-shelled hickory nuts as the most common nut species in the 100 Block and the148N49W Trench, where they had the same ubiquity as black walnut but a much larger volume. Maygrass was the most common seed in the 100 Block, and it was especially abundant in the148N49W Trench. The continuity of the feature distribution from the 100 Block to the148N49W Trench may indicate that the area was a peripheral part of the main occupation of the 100 Block, although it is feasible that the features were part of a smaller Middle Woodland occupation.

The Middle Woodland component of the 200 Block consisted of a cluster of twelve features in the southwest corner of the block, two large, shallow basin hearths outside Structure A, and several scattered pits. Seventy-five percent of the features in the southwest corner were medium sized, only one was large, and all were shallow. Three of the four hearths were nearly sterile, and the other was one of only two features in the area with even a moderate amount of fire cracked rock. One of the refuse pits had a large amount of pottery (Figure 5.45) and one had a moderate amount, and five features had moderate amounts of debitage. Only one formal tool was recovered from the features, although four Snyders Cluster projectile points were found at the north edge of the feature cluster. There were moderate to large amounts of debitage and fire cracked rock in the units surrounding the cluster of features, but only a small amount of pottery was found in most units. Four of the pits had small densities of crop seeds. Although there is evidence of small scale lithic reduction and possibly food preparation, these features do not reflect the concentrated habitation, manufacture, and processing activity seen in the100 Block and 148N49W Trench. The large number of basin hearths in the southwest corner of the 200 Block, 58.3 percent of the entire Middle Woodland sample, and their absence from the 100 Block indicate different activities were performed in the 200 Block.

Structure A is perplexing. Post molds were not found to demarcate the east side of the structure, but fire-blackened daub was confined primarily to the area where these post molds and the eastern half of the structure should have been. There were no features within the arc of identified post molds or within the area that would have been the east half of the structure. It is possible that the house burned before it was completed or occupied. The calibrated radiocarbon date from Structure A overlaps at the one sigma level with the older dates from the 100 Block and the date from the 400 Block but predates that of Structure X from the 100 Block by enough years that the dates do not overlap at the one sigma level, which may indicate that they represent distinct, possibly sequential, occupations.

A dense concentration of complete and fragmentary Snyders Cluster projectile points and large amounts of pottery, debitage, and fire cracked rock were found in the units south of Structure A, but the only Middle Woodland features were a small hearth and a small refuse scatter. The tools appeared to have been discarded downslope, but the sizable number of complete points within this small area suggests the possible presence of an activity area. The two basin hearths on the west side of the structure had large amounts of fire cracked rock and moderate amounts of debitage but very little pottery. Although sizable numbers of Falls Plain sherds and Snyders variant projectile points were found in the block, in the east-central portion of the block few were recovered.

The botanical remains of the 200 Block differed from the 100 Block and the 148N49W Trench because of the minor quantities of thick-shelled hickory nut and chenopod and the inordinately high quantity of fleshy fruit seeds. Chenopod showed a decrease in frequency from the 100 Block to the 148N49W Trench to the 200 Block. In the 200 Block, the seed count was small and the frequency and ubiquity of the three main starchy seeds were low. The block yielded a much higher frequency of fleshy fruit seeds than any other block or trench, but the ubiquity was low. The 200 Block is linked to the 100 Block by the abundance of acorn, although the ubiquity was much less in the 200 Block, and the amount of black walnut was much higher. The isolated pit/hearth in the northwest corner of the block contained almost all of the butternut (*Juglans cinerea*) from the entire Middle Woodland component and charcoal from a variety wood species. The abundant fire cracked rock and debitage and a refit broken Snyders preform indicated other associated activities.

The continuity of the feature distribution along the ridge allows the possibility that this area could be an outlier of the main occupation in the 100 Block, but the distance from the 100 Block increases the likelihood that the occupations are distinct. The shallowness and sparse contents of the features, the dearth of pottery in them, and the lack of formal tools in association with the features suggest that this was not a major habitation area. The low seed and nut counts substantiate the likelihood that it was peripheral to the 100 Block main occupation or part of a distinct brief encampment.

No early Middle Woodland features were identified in the 253N80W Trench, although a large vessel fragment may be from a later Middle Woodland encampment. In light of the break in the distribution of the Middle Woodland component denoted by the lack of features in the 253N80W Trench, it is plausible that the 300 Block features represent an occupation different from the main occupation of the 100 Block. Fourteen features in the 300 Block are attributable to the Middle Woodland component, and many of the eighteen Woodland features with unidentified cultural affiliations were near these and are likely to be Middle Woodland as well. Pottery was sparse in the block; therefore, it was difficult to identify the component to which many pits belong. Most of the Middle Woodland features were relatively closely spaced along the ridge crest in the south half of the block, and several were downslope to the east. Eleven of the fourteen features were hearths or contained refuse from a hearth. Moderate to very large amounts of fire cracked rock and moderate to large amounts of debitage were found in the features. Two pits had moderate amounts of chenopod, and one of them had an even larger amount of maygrass and a large amount of hickory and walnut, but none of the features contained a large amount of pottery. It is plausible that this portion of the site was primarily used for processing or short-term activity rather than habitation.

The radiocarbon date of 2190 RCYBP for Feature 300-60 is intermediate between the Early Woodland and Middle Woodland dates from the site. The calibrated date yields a range that overlaps some Early Woodland dates and some Middle Woodland dates at the one sigma level. It is feasible that this feature may derive from an occupation that is temporally and technologically intermediate between the Early Woodland and Middle Woodland components. The presence of small to moderate quantities of both grit tempered and limestone tempered pottery in some features allows the possibility of a transitional period in ceramic preferences. The cooccurrence of Adena Stemmed points and limestone tempered pottery in several features may indicate their contemporaneity, and an Adena Stemmed point in a feature with two Snyders Cluster projectile points could indicate temporal overlap of the two point types. These cooccurrences of projectile point types and pottery groups in the 300 Block are not, however, unequivocal. The depositional integrity of the contents of two of the aforementioned features is not sufficient to confirm the associations because each feature could be composed of two features from different components. The possible overlap of the pottery groups and point groups does provide a subject for future research.

There was a gap of approximately 50 m between the Middle Woodland features in the 300 Block and those in the 400 Block, thus they may be from different occupations. Most of the Middle Woodland features in the 300 Block were located on the level surface of the ridge crest, unlike the features of the 400 Block. The features were not in large clusters in either block, and neither block showed evidence of extensive habitation. The preponderance of steep sided and expanding sided pit/hearths in the 300 and 400 Blocks and their near absence from the 100 Block denote different activities. They could be loci of similar activities performed independently.

Only 41 percent of the 46 possible Woodland features in the 400 Block can be assigned cultural affiliations, and nine of these are attributable to the Middle Woodland component. Except for a loose cluster of four features, the features in the 400 Block were moderately dispersed, and almost all were scattered along the steep eastern slope of the ridge–an area more suitable for refuse disposal than habitation. All the 400 Block pit/hearths and pit features were medium to large sized, and one third were moderately deep to deep and the pit/hearths had moderate to very large amounts of fire cracked rock and small to moderate amounts of debitage. The basin pits contained very little cultural material. The Middle Woodland component in the 400 Block does not appear to have a principal domestic area, rather there were scattered hearths and refuse pits, and the abandoned hearths served a secondary function as refuse pits.

The 400 Block Middle Woodland feature contents suggest a variety of tasks, but the tools are limited to a few formal and informal cutting tools. Feature 400-7 was the only feature to contain more than one chert tool. Activities may have focused upon processing nuts and seeds. The largest amounts of nut and the highest percentage of black walnut were in the 300 and 400 Blocks, which had very similar nut sample compositions. Knotweed was found in all the Middle Woodland features sampled in the 400 Block, where it was the most abundant seed, but it composed less than 9 percent of the seed samples in the other blocks and trenches. Amaranth also had its highest frequency in the 400 Block but remained a very minor part of the botanical sample, as it was in all the blocks and trenches. Maygrass occurred only in low frequency in the 400 Block. The abundance of autumn seeds and scarcity of spring seeds suggest that the 400 Block was occupied primarily during the fall. The seeds in this area were readily harvested and most were relatively easily processed. It is plausible that this area was the focal point of activities related to acquisition of seeds and nuts for use during the winter.

The radiocarbon date of 2100 RCYBP from Feature 400-7 suggests near contemporaneity with the earlier pair of the dated features in the 100 Block, and the calibrated ranges of all the 100 Block dates overlap with it at the one sigma level. The distance between the blocks and the presence of food items not well represented in the 100 Block allows the possibility, despite the nearly contemporaneous radiocarbon date, that this area was not linked to or was ancillary to the main occupation. The interval of highest probability of the calibrated date from the 400 Block barely overlaps that of the 300 Block date, thus it is plausible that the 400 Block occupation is distinct from that of the 300 Block.

The Middle Woodland component was not as prominent south of the 100 Block. All ten of the Phase III features with identified cultural affiliations in the 63N47W Trench are Middle Woodland, and five other features are of unknown Woodland cultural affiliation. There were two small clusters of features and several pairs of pits on the ridge. All of these are refuse pits, some with debris from fires, but they contained only small amounts of cultural material other than fire cracked rock. One pit was large and the others were medium sized, and all but one were shallow. Only small to moderate amounts of pottery were present, which suggests this area may have been used for processing more than habitation. The proximity to the 100 Block and the spatial concentration of the pits suggest it area may have been at the periphery of the 100 Block main component, although the features could be from an unrelated brief use of the site.

The Middle Woodland component appears to have dissipated by the 15N27W Trench. This trench had fewer possible Woodland features and fewer Middle Woodland features, but all four features with identified cultural affiliations are Middle Woodland. These small to medium sized pits were widely scattered, and the minimal amount of cultural debris suggests this area was used only briefly.

The Middle Woodland component is minimally represented in the Phase II and Phase III South Block areas. The Phase II area had three Middle Woodland features, all with moderate amounts of debitage and one with a moderate amount of fire cracked rock, but there was very little Falls Plain pottery and only one tool. Fifteen of the 21 Woodland features in the Phase III area are of unidentified cultural affiliation, and four of them are Middle Woodland. Two features had very small amounts of Falls Plain pottery, and two others had atypical sherds that may postdate Falls Plain pottery. The activity in the South Block appears to be quite transitory.

Conclusions

The 100 Block provides the best opportunity for observation of Middle Woodland community patterning; however, it is not certain whether the features derive primarily from a single occupation. Evidence for or against this possibility is discussed throughout this report, but no definitive statement can be made. Based upon the radiocarbon dates, it is quite plausible that the feature clusters in the northeast and southwest portions of the block are contemporaneous and that Structure X and the loose cluster of features in the southeast corner were used simultaneously. The ranges of the two pairs of dates overlap sufficiently to allow the possibility that all four clusters were in use at approximately the same time; therefore, in the ensuing discussion all the clusters will be considered potentially contemporaneous.

Middle Woodland community patterning included spatial segregation of some processing and refuse disposal activities and incorporation of less intensive activities into the domestic areas. Lithic manufacture and maintenance debitage were present in the domestic and processing areas, but there were no large scale knapping stations. Woodworking was an integral part of the intensive occupation of the 100 Block, and many fragmented tools were scattered in the areas with few, if any, features between the major feature clusters. The few manos also were found in these open areas, and the pitted stones were situated at the eastern edge of the ridge.

Structure X in the 100 Block was the focal point of numerous and varied tasks. The absence of features around the periphery of the structure may indicate there were areas of restricted usage (paths, work areas, above-ground storage facilities) that were unsuitable for excavated facilities. The quantities of pottery in and around the structure, the diversity of seeds and nuts inside its features, and the presence of the only metate on the site illustrate the importance of food preparation and cooking. The number and variety of tools and the dense midden reflect diverse domestic tasks, and the presence of pipes broken during manufacture show domestic production of personal items.

Although only one house was found in the 100 Block, the feature cluster in the southwest corner indicates there were areas of domestic activity elsewhere within the block.

Many activities were reflected in the feature clusters, and the diverse array of botanical items within individual features indicates that few features were single-use facilities. Several of the very large expanding-sided and straight-sided, flat-bottomed pits within the southwest feature cluster and the cluster around Feature 100-112 probably originally functioned as storage facilities associated with processing and cooking activities. These clusters may demonstrate the spatial separation of the refuse facilities from the house. No communal hearths were encountered. It is possible that much of the activity in the block relates to a single household.

The 100 Block Middle Woodland component displays evidence of the use of secondary refuse disposal areas and features. The use of secondary refuse areas may indicate that the occupation was of sufficient size and length that it was necessary to remove refuse for safety and hygiene purposes. Despite extensive efforts, only ten broken artifacts were able to be refitted (Figure 5.46). An extensive contiguous area was excavated and it would be expected that the other fragments would have been recovered if they were discarded in the vicinity as primary refuse. Three (30 percent) of these artifacts had one piece on the crest of the ridge and the other piece 8-12 m to the east on the slope of the ridge. One of these tools had two fragments within Structure X and one fragment among the cluster of refuse pits along the east edge of the ridge.

The absence of features within Structure A in the 200 Block suggests it did not have a use-life comparable to that of Structure X. The abundance of projectile points (Figure 5.45), debitage, and fire cracked rock on the slope of the ridge south of the structure does, however, illustrate the use of secondary refuse disposal areas. Differences between the size, depth, and contents of the features in the southwest corner of the 200 Block and those of the 100 Block and 148N49W Trench show that activity in this area was less intensive and the activity was less closely tied to domestic tasks.

It is plausible that some of the features and feature clusters were peripheral processing areas for the main occupation in the 100 Block, while other areas may be associated with unrelated short-term encampments. The 200 Block features and those of the 63N47W Trench could be specialized activity areas associated with the main occupation of the 100 Block or small, short-term habitation or processing areas. The 300 Block appears to contain a processing area, but it shows less evidence of habitation and may precede the 100 Block and 400 Block occupations. The 400 Block features reflect activities similar to those seen within the 300 Block, but there is more evidence of short-term occupation, and it may be approximately contemporaneous with, but not necessarily related to the 100 Block occupation.

Chapter 6

CERAMICS

Little research has been undertaken into the early ceramics of the Falls of the Ohio area. Myers (1986) examined a diverse sample of Early Woodland grit-tempered pottery from the Clark Maritime Centre Archaeological District and assigned the label Mid-Valley Cordmarked to it. Mocas (1988) performed an intensive examination of Zorn Punctate pottery and refined the type description. The Middle Woodland limestone-tempered, plain-surfaced pottery from the CMCAD was described (Mocas 1988) and given the name Falls Plain (Mocas 1988). Subsequently, Mocas (1992) examined these collections, identified additional Falls Plain samples, and reappraised the type description.

Excavation of the Knob Creek site, 12HR484, in the Caesars World project area yielded a huge pottery collection that provides the opportunity to expand understanding of the Falls Plain type. A smaller collection of grit-tempered ceramics from the site offers a chance to observe variation and continuity within local grit-tempered ceramics and facilitates re-evaluation of the pottery that Myers labeled Mid-Valley Cordmarked. A very small sample of Zorn Punctate sherds from 12HR484 provides additional information about the occurrence of this pottery in the Falls area, but offers few insights into the position of Zorn Punctate pottery within the ceramic chronology of the Falls area.

In the present study emphasis is placed upon thorough description of the ceramics from 12HR484 because understanding of the ceramic sequence and chronology in the Falls of the Ohio area is still in its initial stages. The Falls Plain collection from the site is particularly valuable because of the number of large rim, base, and body fragments that provide insight into the sizes and forms of the vessels. The rims, bases, and bodies of both limestone tempered and grit tempered vessels are illustrated in considerable detail, and the ranges of variation of numerous attributes are detailed. This study is intended to be a future source for comparative data about the technological and developmental aspects of the early pottery of the Falls area and the basis for compilation of a local ceramic sequence and chronology. In addition, the study is intended to assess and expand information about absolute dates, associated cultural materials, and site structure.

The goals of this study are: 1) to thoroughly describe the grit tempered and limestone tempered pottery from 12HR484 and assess the variation and continuity within the individual groups; 2) to expand knowledge of the forms and functions of the vessels in these ceramic groups; 3) to use the limestone-tempered, plain pottery to refine the Falls Plain ceramic type description; 4) to assess the validity of the term Mid-Valley Cordmarked; 5) to examine the relationship between the Falls Plain and grit tempered ceramic groups and other regional pottery groups, particularly those of the Bluegrass region of Kentucky and the middle and lower Ohio Valley; and 6) to observe the divergence and continuity within the local ceramic sequence and how they reflect upon the inhabitants of the Falls area.

Methods

The 100 Block, the area of greatest concentration of Middle Woodland deposits, and the 200 Block, the focal point of Early Woodland occupation, were excavated in the same way and under the same conditions. The areas of greatest density of cultural debris in each block were thoroughly hand excavated and the soil water-screened through 6 mm mesh. The peripheral areas were tested with additional hand excavated units and the units that were not hand excavated were carefully scraped with the trackhoe blade so that a large contiguous portion of the living surface was exposed. This approach provided a comprehensive view of particular activity areas. All indications are that the main activity loci of both components were examined and areas of less intensive activity were sampled.

All sherds at least 4 cm^2 in size and with both surfaces present were considered analyzable. Those that do not meet these criteria were considered unanalyzable and only weighed and sorted into limestone tempered and grit tempered groups. The sherds were grouped according to temper and surface treatment, and the number of analyzable sherds and their weights and the total weight of the unanalyzable sherds of each temper type were recorded for all features and for each level of the hand excavated units.

All analyzable rim sherds and basal sherds, and body sherds larger than 25 m^2, were studied. Rims were measured and described for 36 different attributes, and 17 attributes of the bases were tabulated. Rim and base profiles were drawn for sherds that were of sufficient size to ensure accurate representation, and profiles were drawn of some of the larger body fragments. Thickness measurements were rounded to the nearest .5 mm. Rims were measured at the lip and one centimeter below the lip, and body sherds were measured at the thinnest edge, and an average was taken if there was more than a 2 mm difference between the maximum and minimum thickness. Basal thickness measurements were taken at the interior edge and one centimeter above the base. Maximum and minimum orifice diameters and body diameters were measured to the exterior surfaces. Temper particles were considered small if they were less than 1 mm in maximum length; medium if 1-3 mm in size, and large if more than 3 mm in size. The tempering material composed less than 10 percent of the paste in lightly tempered sherds, and 11-40 percent of the paste of moderately tempered sherds, and more than 40 percent in heavily tempered sherds.

Further analysis was performed on representative samples of the limestone tempered, plain surfaced body sherds from the midden and on all analyzable sherds from features. The purpose of this procedure was to establish a mean thickness for the pottery in each block and within the site based upon a sample of sherds taken from the main activity areas and the peripheral areas. The weight and thickness were recorded for samples of Falls Plain body sherds from both the 100 Block and the 200 Block to determine if there was a significant difference in the size and thickness of the sherds in the two blocks. The 100 Block sample is composed of all analyzable sherds in a rectangular area of 574 m^2 in the west portion of the block, which represents 62 percent of the excavated surface area in the block and encompasses most of the main habitation area. Ten additional units, which represent 11 percent (40 m^2) of the remaining excavated surface area, were chosen from clusters of 9-11 units distributed relatively evenly across the east half of the block to gain information about pottery in peripheral areas, and the sherds from these units also were weighed and measured. Additionally, temper size and amount were recorded for 80 units from a rectangular area of the 100 Block. Interior, exterior, and core color was recorded for every twentieth limestone tempered sherd in the sampling groups and for all large fragments.

The sample from the 200 Block (168 m^2; 20 percent of the excavated area) is composed of the sherds from two units in each of 21 clusters of 9-11 units distributed relatively evenly across the block. A sample of sherds from the Phase II South Block hand excavated units (32 m^2; 20 percent of the hand-excavated area) also were counted, weighed, and measured.

Measurements of thickness and weight and descriptions of the temper materials, surface treatment, cordmarking attributes, decoration, and color were made for the grit tempered body sherds. All decorated and interior cordmarked sherds and most analyzable cordmarked sherds were examined. Unless otherwise stated, only the analyzable sherds will be discussed.

Grit tempered Pottery

Distribution of Grit tempered Pottery at 12HR484

The pottery from 12HR484 that is tempered with one or more kinds of rock other than limestone has been placed in the grit tempered category. The grit tempered pottery sample consists of 55,815 g of pottery, including 1624 sherds of analyzable size, of which 124 are rims and 18 are bases, and the number of rims below analyzable size is about equal to that of the analyzable rims. Most rims (64.6 percent) are tempered primarily with coarse sand, 30 percent have fragments of sandstone or crushed river cobbles as the main temper, and 5.4 percent have chert as the main temper.

The Early Woodland deposits appear to derive from small, spatially-restricted activity areas that may be temporally and culturally distinct. This possibility is substantiated by the radiocarbon dates from features with grit tempered pottery, which span at least 360 radiocarbon years. The largest concentration of grit tempered pottery was in the 200 Block, where 72 rim and 16 base fragments were found among the 38,421 g of pottery recovered during Phase III, and four rims were among the 978 g of pottery found in Phase II units within the block. The 200 Block deposits are composed of clusters of features that probably derive from more than one Early Woodland occupation. The radiocarbon date from a cluster of features at the north end of the block (2550 +/- 70 RCYBP) indicates the early occurrence of pottery. Inordinately early and late radiocarbon dates associated with Features 200-25 (2740 +/- 130 RCYBP) and 200-108 (1710 +/- 80 RCYBP and 1510 +/- 90 RCYBP) confuse interpretation of the number of components represented and the duration of the use of grit tempered pottery. The pottery from these features is comparable to most of the other grit tempered pottery from the site, and it is likely that it dates between 2200 and 2500 RCYBP.

The scatter of Early Woodland features extended into the southern portion of the 253N80W Trench, but a radiocarbon date from Trench Feature 154 (2280 +/- 70 RCYBP) indicates an Early Woodland occupation in this area that significantly postdates the occupation in the northern portion of the 200 Block. Phase II excavation units within the 253N80W Trench boundaries yielded 227 g of grit tempered pottery. The trench contained three rims and a base among the 2740 g of grit tempered pottery obtained during Phase III excavations, but one rim and base, totaling 1066 g, may be from a component that postdates the Early Woodland and early Middle Woodland pottery that compose the remainder of the grit tempered pottery sample from the site.

Phase III trackhoe scraping and feature excavation in the 300 Block produced two rims among the 378 g of pottery recovered, and 39 g of grit tempered pottery was found in the Phase II unit within the block. Much of the grit tempered pottery in the 300 Block was in features that contained comparable amounts of Falls Plain pottery and grit tempered pottery. The radiocarbon date from Feature 300-60 (2190 +/- 70 RCYBP) suggests that these features may represent an occupation during the transition from the use of grit tempered pottery to the use of limestone tempered (Falls Plain) pottery.

One rim was found among the 349 g of grit tempered pottery recovered during Phase III in the 400 Block, and one rim was among the 275 g of pottery obtained from Phase II units within the block. The radiocarbon date from Phase II Feature 39 suggests near contemporaneity with the dated feature from the 253N80W Trench.

Directly south of the 200 Block the amount of Early Woodland pottery dissipates abruptly. Two rims were among the 146 g of grit tempered pottery found during Phase III excavation of the 148N49W Trench, and Phase II excavations within the trench boundaries yielded an additional 202 g of pottery, but none of the features were identified as Early

Woodland. The 100 Block shows evidence of moderate Early Woodland activity. The block yielded 36 rims and one base among the 8306 g of grit tempered pottery recovered during Phase III, and 98 g of pottery were found during Phase II. Only one feature was identified as Early Woodland, although other Early Woodland features may be present among the 22 Woodland features that could not be assigned a more specific cultural affiliation. Only 6 g of grit tempered pottery was found in the 63N47W Trench during Phase III, and the Phase II units contained 32 g of grit tempered pottery. No grit tempered sherds were found in the 15N27W Trench during Phase III, and 30 g of grit tempered pottery was recovered from the Phase II units within the trench.

Phase II and III excavations in the South Block yielded 1035 g of grit tempered pottery. This area contained a dense cluster of Early Woodland features in a specialized activity area, and the radiocarbon dates (2390 +/- 70 RCYBP and 2400 +/- 70 RCYBP) suggest they predate feature clusters in the 253N80W Trench and the 400 Block, and postdate or are generally contemporaneous with the dated feature cluster at the north end of the 200 Block. One rim was found in a Phase II trench, and two rims were recovered from Phase II excavation units outside the Phase III blocks and trenches.

Grit tempered Vessel Forms in the Falls of the Ohio Area

Grit tempered pottery in the Falls of the Ohio region is known primarily from the analysis of the ceramics from the Clark Maritime Centre Archaeological District (Myers 1986) and from an article on Zorn Punctate ceramics (Mocas 1988). Only two relatively complete Early Woodland vessel forms (Mocas 1988:Figure 8; Myers 1986:Figure 7.15) have been reconstructed in the Falls of the Ohio area, and one vessel from a short distance downriver (Mocas 1993) may be of relevance. These are illustrated (Figure 6.1) to provide an idea of vessel forms that may be associated with the rims from the Knob Creek site.

Myers (1986:236-246; Figures 7.12-7.22) suggested three grit tempered vessel forms. Mid-Valley Cordmarked Form #1 is a tall jar with straight, vertical sides. The reported orifice diameter of the Form #1 rim (Myers 1986:237) was determined to be erroneous. The present author examined the rim and found that the diameter at the orifice is approximately 26 cm, rather than the published diameter of 13 cm. The comparable rim/upper body fragments in Rim Group 8 from 12HR484 are approximately the same diameter as this vessel, but there is no indication of the lower body and basal form at either site. Form #2 is a large, globular vessel with a very small (4.5 cm diameter), flat base and a strongly constricted upper body with a narrow (14 cm) orifice and a short, slightly everted rim (Figure 6.1c). Vessels with similar rim forms and strongly constricted upper bodies, suggestive of globular bodies, were recovered from 12HR484, and several bases nearly that small were seen. Form # 3 consists of four basal sherds from flat bottomed vessels, one of which has straight, moderately flared lower sides. The sherd identified as a rim (Myers 1986:237) is actually a lower body sherd with a coil break at the top.

A flat based, subglobular vessel, with a moderately constricted upper body and a tall, slightly everted rim (Figure 6.1a) was found during the Phase II excavations at the CMCAD (Mocas 1988:Figure 8). This rim form and basal form are represented at 12HR484. The rim form and basal form also are common for Zorn Punctate vessels ((Mocas 1988). The Zorn Punctate rim from 12HR484 has a comparable form and orientation, and the Zorn Punctate base from 12HR484 has a similar form.

Description

It must be taken into consideration that the measurements and descriptions of the grit tempered ceramic sample reflect a diverse group of sherds that may have been deposited over an extended period of time; therefore, statistical manipulation of many attributes is of limited utility. The average thickness of a sample of 318 analyzable body sherds is 9.2 mm, and the range of thickness is 5-17.5 mm, with almost half between 8-10 mm.

Temper

The grit tempered pottery sample from 12HR484 consists of sherds tempered with one or more kinds of rock other than limestone. Although some sherds have small quantities of limestone, this rock is usually in sufficiently small amounts to suggest it was an incidental inclusion. Some sherds have very little temper evident, and a few rim sherds have both sand particles and small pits formed by dissolved limestone. All the attributes of these sherds were considered before they were placed within one of the temper groups, and the combination of possible tempers was noted. None of the cordmarked sherds have limestone as a major tempering agent. The most common type of grit utilized is sand, which is present in varied amounts in most sherds. The sand probably was obtained from sand bars in the Ohio River or Knob Creek. Other sherds have chert, sandstone, siltstone, crushed igneous or metamorphic cobbles, shale, or coal as primary or secondary tempering materials. Most of the kinds of rock were probably present in the sands and gravels of the Ohio River. The seven chert tempered rims all were found in the 200 Block.

The size and amount of temper was estimated for all grit tempered rims and bases and twenty percent of the body sherds. Fine sand is present in most sherds, and some are tempered exclusively with it. Temper particles are 1-3 mm in size in 61.3 percent of the rims and 54.7 percent of the body sherds, and the temper composes less than 10 percent of the paste in 84.6 percent of the rims and 55.1 percent of the body sherds. None of the rims or bases has more than 40 percent of the surface filled with temper particles and only one rim has large pieces of temper. Very thick sherds heavily tempered with large mineral particles were not found on the site.

Color

In general, the grit tempered sherds have redder hues than the Falls Plain sherds. The exteriors are primarily red or reddish brown. Exposure to smoke produced darker, dusky surfaces with purplish colors that do not correlate well with the Munsell Soil Color Chart chips. The interior colors are often similar to the exterior colors, but dark gray to black interior surfaces (N2.5/-N5/, 10YR4/1, 7.5YR4/1) are common. Often the interior surface is one color and the exterior is a different color and the center is a third color. The redder paste of the grit tempered pottery may be attributable to clay gathered from heavily weathered upland soils, while the clay for the Falls Plain pottery may have been mined from a riverine source.

Surface Treatment

Exterior surfaces are cordmarked, smoothed cordmarked, or plain. Over one-half of the body sherds (55.3 percent) bear some indication of cordmarking. Lightly exfoliated surfaces often obscure the interior or exterior surface treatment, and in many instances the surface has been worn to such an extent that the cord impressions are obliterated. Exterior cordmarking extends to the base of several vessels. In some instances, the cord impressions are distinct (38.3 percent), while on the smoothed cordmarked sherds the impressions have been intentionally partially smoothed (17 percent). Thoroughly smoothed, "plain", exteriors are present on some vessels. Rims show a higher incidence of smoothed surfaces (48 percent) than body sherds because cord impressions on the rim or the rim and upper body of cordmarked vessels are sometimes intentionally eradicated. The rims of Groups 9 and10 have smooth exteriors comparable to those of Falls Plain pottery and are considered variants of Falls Plain.

Cord impressions reflect use of implements or hands wrapped with loosely woven to tightly woven fabrics or, rarely, groups of individual cords. No instances of the use of a single cord to form a design were seen, and no rolled cord impressions, or cord-wrapped dowel impressions were present, but cord wrapped paddle edge or stick impressions are present on several rims. Both Z-twist and S-twist two-ply cord impressions were common, and in several instances both were present on the same sherd. Eighty percent of the observable rims and 65.2 percent of the observable analyzed body sherds had impressions made by Z-twist cords.

Cord orientation on the bodies of the vessels was not standardized. In some instances, the cord impressions on the exterior of the rim are oriented vertically (20.2 percent), or in the case of woven materials, the thicker warp cords are vertically aligned.

Interior cordmarked sherds, which composed 1.1 percent of the body sherds, 5.3 percent of the bases, and 2.4 percent of the rims, were clustered in the northwest corner and scattered across the north end and east-central portion of the 200 Block. These sherds were virtually identical in temper size and amount, exterior and interior surface colors, and the rarity of distinct exterior cord impressions on the body sherds and presence of distinct interior cord impressions. Even rims sherds found 30 m apart could have been from the same vessel. It is quite possible that the majority of the vessels represented in the 200 Block were manufactured at the same time.

Other interior cordmarked rims may have been present but not detected because the cordmarking was obscured by irregular or weathered surfaces. Upper rim and lip finishing partially obliterated the uppermost interior cordmarks on the identified rims. The interior cordmarks are quite distinct on the body sherds, while the cordmarks on the exterior surface of the body sherds are completely or almost completely obliterated by a friable surface or heavy wear. In instances where both exterior and interior cord impressions are evident, the impressions on the interior are horizontally oriented, and the cords are thicker than those on the exterior. This is an indication that different tools were used for the treatment of the interior and exterior surfaces. One base, from the South Block, bore partially obscured interior cord impressions at the basal-lateral juncture of the vessel.

Less than one percent of the grit tempered sherds have decoration. One rim, one base, 14 body sherds of analyzable size, and six sherds below analyzable size display punctate impressions. One incised sherd below analyzable size, and possibly a second, was found. Triangular and circular tool bits, as well as fingers, were used for punctation. As can best be determined, decoration was limited to horizontal or diagonal lines of impressions. In one instance, punctation extended to the base of a vessel, and one body sherd shows vertical cessation of horizontal lines of decoration.

The decorated pottery (Figure 6.2) is encompassed in the general category of Zorn Punctate (Mocas 1988), which has Early Woodland or Middle Woodland cultural affiliation or possibly both. Although the 200 Block had more grit tempered pottery, the majority (64.7 percent) of the decorated sherds of analyzable size (n=17) and 85.7 percent of the sherds below analyzable size (n=7) are from the 100 Block. Fingernail impressed (Figure 6.2a), gouged (Figure 6.2b), and triangular punctated (Figure 6.2c) sherds were found dispersed downslope on the side of the ridge, rather than in the main habitation area of the 100 Block. Only two punctate sherds were found at the bottom of or below the levels with the highest Falls Plain pottery counts. The majority were within or above these levels. Many Middle Woodland pits were excavated into Early Woodland deposits in the 100 Block, thus there is considerable mixture of material in the cultural strata and the punctate sherds could belong to either component. Four of the five punctate sherds in the 200 Block have circular or crescentic impressions, and the other sherd is a rim gouged with a finger. The incised sherd also came from this block. No clear evidence was obtained about whether the decorated sherds were contemporaneous with the Falls Plain pottery or whether they predate or postdate it. None of the decorated sherds have limestone temper.

Rims

A variety of factors or combinations of factors may be responsible for the diversity within the rim sample. The differences may derive from ceramics being manufactured at the site over a period of several centuries. It also is plausible that there was functional differentiation in vessel forms within one or more occupations. The small size of the rim sherds severely restricts the ability of the analyst to distinguish variation in any but the uppermost portions of the vessels. Because there is no pre-existing framework into which to place the early pottery of the Falls area, considerable description is provided for the rim sherds.

The majority of the rims that can be oriented are inverted (72.5 percent), and the others have everted (17.5 percent) or vertical (10 percent) orientations. Rim thickness ranges from 5-11 mm. Most lips are flattened or slightly flattened, and in some instances these are beveled to the exterior. The lips of three cordmarked rims bear cord impressions (2.4 percent of sample). Two of these rims have interior cordmarking, and one rim with uncertain lip treatment also has interior cordmarking.

Eight percent of the rims (n=10) have measurable orifice diameters, and the maximum orifice diameter of these range from 8-34 cm. Fifty percent of the rims have diameters of 20 cm or less, but this is not necessarily an accurate reflection of the body size, because some rims are atop strongly constricted upper bodies. Because most of the upper bodies are constricted or vertical, the minimum orifice diameter is often at the lip of the vessel (Figure 6.3). No fragments indicate the height of a vessel.

Rim Groups

Although grit tempered rims are numerous, the small size of most sherds and the absence of large vessel fragments limit the range of observations. The rim attributes that offer the most potential for identification and differentiation of the vessels are the form, orientation, height, and orifice diameter. The rims are grouped primarily according to these criteria, with some consideration of the surface treatment as a classificatory attribute. In addition to the sherds discussed below, other probable members of various groups were encountered but did not differ from the illustrated examples sufficiently to merit illustration or could not be placed confidently in one of several similar groups.

Approximately one-third of the analyzable rims are sufficiently complete to provide an indication of the orientation. Some upper body walls are inverted without inflection, thus the rim consists of nothing other than the lip of the vessel. These are referred to as rim/upper body fragments. Both straight and slightly convex rim/upper body fragments are present.

Group 1. This group (n=8) is composed of moderately constricted rim/upper body fragments (Figure 6.4a-c; Figure 6.5a-h) that have little or no inflection, thus the rim consists primarily or solely of the lip. None of the rims provide evidence of the form or the size of the vessel. Some of the vessels may have forms and orientations somewhat similar to the vessel from Phase II excavations at 12CL109 (Figure 6.1a). This vessel has a subglobular lower body and a moderately constricted upper body with a vertical rim. This rim form is common for Zorn Punctate vessels (Mocas 1988:Figure 6), and one of the rims in Group 1 (Figure 6.4b; Figure 6.5a) is a Zorn Punctate rim.

Three of the rims have unsmoothed cordmarks with larger, nearly vertical warp cord impressions (Figure 6.4a). Four of the rims have deep, thick, warp impressions but thoroughly smoothed patches are adjacent to the cordmarks (Figure 6.4c). The surface treatment of the Zorn Punctate rim is not discernible. The Zorn Punctate rim and five other rims are from the 200 Block, and the other two rims are from the 100 Block.

Group 2. These rims (n=3) are tall, vertical, thick, and plain surfaced (Figure 6.5 i-k). One rim exhibits at least slight constriction of the upper body and an orifice diameter of 20 cm (Figure 6.6a), but very little can be determined about the exact upper body form. The minimal horizontal curvature in another rim suggests it is from a sizable vessel. These two rims are thoroughly smoothed (Figure 6.5d), and only a few faint cord impressions remain. The rim with the measurable orifice is from the 400 Block, and the other is from the 200 Block.

The other rim appears to be unique. It is grouped with these rims because of its thickness, vertical or slightly inverted orientation, and smoothed surface, but it is too small to accurately identify the vessel form. Of particular interest is its small orifice diameter of 8 cm (Figure 6.6b). It also is from the 200 Block.

Group 3. This group (n=3) is composed of slightly constricted rim/upper body fragments with convex forms that are inverted without inflection (Figure 6.5l-m), thus the rim consists of only the lip. All the sherds have deep, paired cord impressions oriented diagonally (Figure 6.4e; Figure 6.5k). One sherd is from the 200 Block, one is from Feature 200-108, and the other is from the 300 Block.

It is worthy of note that rim and body sherds in features and within single levels of units often display a variety of forms, surface treatments, and thicknesses. Feature 200-108 contained not only this moderately thin (7 mm), inverted rim with distinct, paired warp cords, but a strongly constricted neck sherd with thick woven cord impressions, and a thick (13.5 mm) lower body sherd with thoroughly obliterated cordmarks. Rims with comparable forms were recovered from the Arrowhead Farm site, directly across the river (Mocas 1988:Figure 9b), and the vessel form may be comparable to that of the reconstructed Zorn Punctate vessel (Figure 6.1b) from between sites 15BC138 and 15BC164 (Mocas 1993).

Group 4. This group (n=2) illustrates the variation within individual vessels (Figure 6.7a-b). A large vessel section that included two rim sherds was found, and three additional rim sherds were recovered from adjoining units within a two by six meter area and later refit onto the vessel. The reconstructed rim (Figure 6.7a) yielded a maximum orifice diameter and a minimum orifice diameter of 28 cm (Figure 6.6c), the lip form fluctuates from round to flattened and extruded, and the lip thickness varies from 8.5-10.5 mm. Lower body sherds are as thick as 13.5 mm. The rim and body sherds have both coarse sand and medium sized angular cobble fragments for temper. One portion of the rim has deep, thick cord impressions that have not been altered (Figure 6.4f), and on either side of this area the cordmarks have been smoothed until nearly obliterated. Although the vessel was badly fragmented, it was determined that the upper body is moderately constricted and the body shows vertical curvature that indicates a subglobular or globular form. The vessel and rims were found between Feature 200-65 and Phase II Unit 225N60W, which is the same area as the main concentration of interior/exterior cordmarked sherds. The other rim sherd (Figure 6.7b) was from the area of interior/exterior cordmarked pottery in the northwest corner of the 200 Block.

Group 5. These rims (n=2) are very short, thick, vertical to slightly everted, and rise from strongly constricted upper bodies. The rim from the east ridge of the site has an orifice diameter of 18 cm (Figure 6.7c; Figure 6.6d), and the other rim (Figure 6.7a), from the 200 Block, has an orifice diameter of 11.5 cm (Figure 6.7d; Figure 6.6e), but the bodies are much wider. The larger of the sherds has unsmoothed woven cord impressions like those of the vessel in Group 4, and the other rim has similar cordmarks that are smoothed in places.

Group 6. These rims (n=3) are very short and vertical, and the lips are slightly extruded to the exterior, which gives the rims a slightly concave appearance (Figure 6.7e-g). None of the rims are complete enough to yield an orifice diameter or an indication of body form. The exteriors are smooth enough to be considered plain. The profiled rims come from the 100 block, 200 Block, and the 253N80W Trench. One rim is from Trench Feature 154, which yielded a date of 2280 RCYBP, and a similar rim was found in Phase II Feature 39, which was radiocarbon dated to 2320 RCYBP.

Group 7. This group (n=3) is composed of short, inverted, concave rims with interior/exterior cordmarking. Two rims (Figure 6.8a, b) have orifice diameters of 34 cm, and the curvatures denote maximum body widths in excess of 40 cm. These two rims have cordmarked lips, and the lip of the third one cannot be assessed accurately. The exteriors of the rims (Figure 6.4g) were cordmarked by two horizontal strokes of a cord wrapped paddle edge or stick. These paddle or stick strokes may be instrumental in shaping the inverted rim. A thicker, woven material wrapped around an anvil was used to cordmark the interior of the rim (Figure 6.4h) and body, and a similar material was wrapped around a paddle to cordmark the exterior of the body. A fourth specimen (Figure 6.8d) has a profile and orientation similar to the other three, and the rim cordmarks were applied with two strokes of a cordwrapped paddle edge or stick, but the exterior cord impressions are nearly obliterated, and the interior of this rim is plain. It is not certain if this sherd is comparable to the others. All the sherds are from the 200 Block. One rim was found in Feature 200-32, which yielded a radiocarbon date of 2550 RCYBP.

Group 8. These sherds (n=2) are very tall, straight, and vertical to slightly inverted rim/upper body fragments (Figure 6.8e-f). Neither of the fragments provides an indication of the precise orifice diameter or the vessel form, but the curvature of one (Figure 6.8e) indicates a diameter in excess of 30 cm. This rim extends over 11 cm below the lip without marked curvature, but there is no indication of the lower body or basal form. This vessel has widely spaced individual cords with much of the surface thoroughly smoothed, and the other vessel (Figure 6.4i; Figure 6.8f) has comparable smoothed cordmarks. Both sherds are from the 200 Block. The widely spaced (5.5 mm), partially-smoothed cordmarks, vertical orientation, and large diameter of the former sherd are quite similar to the Mid Valley Cordmarked Form #1 rim at 12CL109 (Myers 1986:237; Figure 7.13H).

Group 9. This group (n=5) is composed of moderately to very tall, slightly everted to vertical rims (Figure 6.8g-k) that resemble Falls Plain rims in form, orientation, and plain surface treatment but have sand temper. Three rims, from the 100 Block, have smooth, plain surfaces and only a few limestone pits. One of the rims has a nearly vertical orientation and an orifice diameter of 35 cm (Figure 6.9b). The slightly everted rim, also from the 100 Block, has many limestone pits, in addition to the sand temper. It has a diameter of 18 cm at the lip and a minimum orifice diameter of 17 cm (Figure 6.9c). The rim from one of the Phase III trenches has a similar pitted surface and is taller and thicker than the other rims. If these rims were tempered primarily with limestone, they would be considered Falls Plain ceramics. They may represent Falls Plain vessels with inordinately high ratios of sand to limestone in the paste. The atypical tempering materials may be an idiosyncrasy of one or more artisans among a group of individuals who manufactured Falls Plain pottery. The presence of four of the sherds in the 100 Block lends further credence to the possibility that they were contemporaneous with Falls Plain ceramics.

Group 10. This group (n=6) is composed of six moderately tall, thick, slightly convex rims (Figure 6.10a-d) found within an 8 x 8 m area in the south central portion of the 100 Block. All have plain surfaces comparable to Falls Plain pottery but have sand as the primary temper and very few limestone pits. As can best be determined, the rims are slightly everted and rise from moderately constricted upper bodies, but none of the rims were large enough to yield a precise orientation. The actual orientations could range from very slightly inverted to strongly everted. The orientation angle used for illustration is based upon comparison with Falls Plain rims. Numerous large Falls Plain body sherds and a Falls Plain Group 1 rim were present in Phase II Feature 92, which contained one sand tempered rim (Figure 6.10a). None of the rims are complete enough to yield precise orifice diameters, but this sherd has an orifice diameter in excess of 30 cm.

If these rims were tempered primarily with limestone, they would be considered Falls Plain sherds. They may represent Falls Plain vessels with inordinately high ratios of sand to limestone in the paste, or they could be transitional forms. The atypical tempering materials may be an idiosyncrasy of one or more artisans among a group of individuals who manufactured Falls Plain pottery. However, when combined with the atypical rim form and orientation, their distinctiveness is accentuated. At present, there is no definitive evidence that there is temporal or cultural significance to the temper and rim form, but this possibility can be investigated in future studies. Four of the six rims are complete enough to show angular or slightly rounded interior rim angles. Although Falls Plain rims with angular interior rim angles have been recovered elsewhere in the Falls area (Mocas 1992:Figure 3a; 62; Figure 7a; 68), none were found at 12HR484. It is feasible that this may be a temporally diagnostic attribute within the Falls Plain type.

These rims are not considered evidence of long-term coexistence of grit tempered pottery and Falls Plain pottery. Only one feature on the site contained Falls Plain pottery and a sand tempered, plain rim. The grit tempered sherds in the other features with Falls Plain pottery were cordmarked and quite distinct from the Falls Plain sherds. The fact that all these rims were found within a small area increases the likelihood that they derive from a single occupation, or perhaps even from a single individual.

*Group 11***.** These rims (n=2) display cordmarking (Figure 6.11a) that differs from that of the other ceramics from the site. These vessels (Figure 6.10e-f) could be Early Woodland, but it is plausible that they postdate other grit tempered vessels and Falls Plain vessels from 12HR484.The rim from the 253N80W Trench (Figure 6.10e) has an orifice diameter of 24 cm and rises vertically from a round based, globular vessel more than 34 cm in maximum diameter. The fragment has partially smoothed, thick, parallel, individual cordmarks applied with a cord wrapped paddle perpendicular to the lip. The compact paste, light temper, thinness of the rim, parallel individual cordmarks, and round base distinguish this vessel from other grit tempered pottery.

The rim/upper body sherd from the 200 Block is straight and inverted. The partially smoothed exterior surface has thick, widely separated (5 mm), paired cord impressions applied by cord-wrapped paddle nearly perpendicular to the rim. The cordmarks and compact paste distinguish the sherd from other grit tempered pottery from 12HR484.

Bases

With one exception, the grit tempered bases are flat, and several display a heel at the basal-lateral juncture. The basal/lower body fragments display a continuum of curvature indicative of subglobular and globular, and possibly conical or cylindrical lower bodies. The sides rise at angles as shallow as 161 degrees and as steep as 110 degrees. The round bottom of one vessel is unique. Very little information is available about the diameters because few basal fragments extend more than a few centimeters inward from the basal-lateral juncture or form more than a few degrees of an arc. The three measurable bases have diameters that range from six to twelve centimeters.

All but one of the bases were constructed with small to medium-sized pieces of temper in light to moderate amounts. One base is heavily tempered with medium-sized crushed cobble pieces. Maximum basal thicknesses range from 11-21.5 mm. The round base is the only basal sherd with cordmarking on the exterior, and one flattened base has the remnants of interior cordmarking at the basal-lateral juncture.

Group 1. This group (n=1) consists of a lower body/basal fragment from the 253N80W Trench that exhibits a large (in excess of 34 cm diameter), globular body and round base (Figure 6.11 a, b; Figure 6.12). The entire exterior, including the base, is covered with cord-wrapped paddle impressions of parallel individual cords. The vessel constricts very strongly in the upper body to a vertical rim (Rim Group 11) 24 cm in diameter. The round form of the basal fragment is unique among the grit tempered bases. The form is appropriate for a cooking vessel, but there is no organic staining to substantiate this use.

Group 2. This group (n=1) consists of a basal sherd from the 200 Block that is relatively thick (16-18 mm) and has a flat bottom, and the shallow sides (Figure 6.13a) reflect a globular lower body form or possibly a cauldron-like form comparable to Fayette Thick vessels recovered from the Peter Village site (Tune 1985:Figure 8).

Group 3. This group (n=2) consists of two sherds from the 200 Block that possess flat bottoms, rounded basal-lateral junctures, and moderately shallow sides (Figure 6.13b,c) that indicate a subglobular or globular lower body. They appear to be comparable to the above sherd and are distinguished from it primarily by the angle of the sides.

Group 4. This group (n=3) is composed of bases from the 200 Block with flat bottoms and with slight heels at the basal-lateral juncture formed by the connection of the side of the vessel to a basal disc (Figure 6.13d-f). The heel becomes more accentuated with steeper sides. The lower bodies of two vessels appear to be subglobular, and one of them has a basal diameter of 6 cm (Figure 6.13h). The vessel with the steepest sides (Figure 6.13g) is 10 cm in basal diameter, and the lower body is subglobular or conical. Flat bases with heeled basal-lateral junctures are seen in the Falls of the Ohio area on Zorn Punctate vessels (Mocas 1988:Figure 5c).

Group 5. This group (n=6) is composed of basal fragments with flat bottoms, rounded basal-lateral junctures, and steep sides (Figure 6.14a-e). The lower body forms are subglobular or conical, and some may be nearly cylindrical. Basal thicknesses range from 9-21.5 mm. One of these vessels has a basal diameter of 12 cm (Figure 6.14a). Four bases and a lower body sherd are from the 200 Block, one lower body sherd and base is from the South Block, and one base is from the 100 Block.

The basal and lower body fragments from the Phase II South Block (Figure 6.14e) no longer conjoin, but show a very thick (16-21.5 mm), flat base and steep sides that indicate a relatively cylindrical lower body with a diameter of at least 24 cm. This heavily tempered base has layers of clay added to the interior and exterior surfaces to strengthen the basal-lateral juncture. There are partially obliterated cord impressions on the interior of the basal-lateral juncture, and the exterior has a very worn cordmarked surface. This fragment is not sufficiently complete to allow comparison with other ceramic types, but it shares the general attributes of a flat bottom, relatively straight sides, and interior cordmarking with early ceramics of the region. Marion Thick vessels with comparable thick, steep sides have been reported from the Midwest (Harn 1986:Figure 13.11; Morgan, et al. 1986:Figure 11.4). One sherd is a very steep-sided lower body fragment that is broken directly above the base (Figure 6.14f). This sherd came from the portion of the 200 Block with the concentration of interior/exterior cordmarked sherds.

Body

The curvature of the grit tempered vessels made them particularly susceptible to breakage. Very few sherds were found in features; thus, almost all fragments were exposed to weathering and trampling. Only one large lower body fragment and two large rim/upper body fragments were recovered; therefore, the small amount of information available about vessel form was gained by observation of rims and bases. A small number of rims provide evidence of the curvature of the uppermost portion of the vessel body, and these indicate moderate to strong constriction from a globular or subglobular body. At least two globular vessels are in excess of 40 cm in maximum diameter, and several other vessels have diameters in excess of 30 cm. One rim has an orifice diameter of only 8 cm, but there is no indication of the form of the body of the vessel. Only two measurable lower body fragments were recovered. One has a diameter of 34 cm, which is slightly less than the maximum diameter of the body, and the other is at least 24 cm in diameter. No evidence of vessel height was obtained from any of the reconstructed sections. No organic stains or distinctive smoke patterns indicated cooking vessels, although the upper body forms of some suggest they might have served in that capacity.

It is probable that cylindrical or conical forms occurred but are no longer identifiable. One such vessel form may be represented by an extremely tall, nearly cylindrical rim/upper body fragment in Rim Group 8. It extends over 11 cm below the lip and is straight sided and vertical or slightly inverted, but the form of the vessel below the bottom of the sherd could not be determined.

The upper body sherd with a lug fragment (Figure 6.10g; Figure 6.11) indicates a relatively cylindrical (“barrel-shaped”) vessel that expands to its maximum diameter of approximately 36 cm at the lug and constricts toward the lip. The lug is 33 mm in diameter and is broken off 12.5 mm from the side of the vessel. The lug fragment may have a slight upward orientation and may taper in diameter, but this cannot be positively ascertained. The body fragment varies in thickness from 11.0-15.5 mm, and is thickened around the lug. The vessel is tempered with small pieces of crushed rock, and the exterior and interior surfaces are plain.

There are no clear indications of the form of the interior/exterior cordmarked vessels from the site. Cylindrical and conical forms have been reported for Marion Thick vessels in Illinois (Conrad, et al. 1986:Figure 10.5; Harn 1986:Figure 13.9; Morgan, et al. 1986:Figures 6.3, 6.4, and 6.7), and it is possible that the vessels from 12HR484 have similar forms. The lower body/basal sherd from the South Block appears to have a conical or cylindrical form, and the largest of the interior/exterior cordmarked body sherds from the 200 Block shows little horizontal or vertical curvature, which suggests a cylindrical or conical form and wide body diameter. The rim sherds indicate a wide orifice diameter but do not provide information about the vessel form.

Discussion

Despite the sizable sample of pottery, little progress in delineation of ceramic groups and identification of developmental trends resulted from the analysis. Although distinctive and atypical individual sherds were encountered, compilation of ceramic clusters of demonstrable temporal or cultural significance is impeded by the lack of large sherds and body fragments, the rarity of specific temporal and cultural indicators among the ceramic attributes and among associated materials, and by the sparsity of data from comparative collections. There is diversity among the tempering materials, surface treatments, rim and base forms, and vessel forms, but the significance of the differences is difficult to assess. The variety within the grit tempered pottery sample indicates it was not manufactured by a single group, and the radiocarbon dates verify that a considerable temporal span is represented. Some sherds display characteristics that denote affinity to the earliest pottery in the Ohio Valley, while others show attributes that reflect technological, functional, or stylistic development and bear resemblances to later ceramic groups.

Marion Thick (Conrad, et al. 1986; Griffin 1952; Harn 1986; Morgan 1992), the earliest pottery in the region to the west and north, is generally characterized by very thick, interior cordmarked vessel walls, frequently in excess of 20 mm, and heavy tempering with large pieces of rock. Although Marion Thick has not been demonstrated to extend as far east as the Falls of the Ohio, comparable ceramics, under a variety of labels, are present to the east of the Falls. The pottery from the West Runway site (Duerksen, et al. 1992) near Cincinnati, appears to be equivalent to this ware, and the dates from this site (2590-2400 RCYBP) correlate well with the early pottery dates from 12HR484. The early pottery collections from east of the Falls are relatively small and the technological attributes and vessel forms are not well established, consequently, the ceramic types are not well delineated, and any comparisons are limited.

The ceramics of 12HR484 are not as thick as these earliest regional types, nor are they heavily tempered with very large pieces of temper, but some sherds show these traits to a lesser degree. The interior cordmarked lower body sherds and basal sherd recovered from the South Block bear the closest resemblance to this pottery. The sides are 13-16 mm thick, and the base is 16-21.5 mm thick, and they are heavily tempered with large pieces of crushed rock. This vessel is associated with a radiocarbon date of 2400 RCYBP. The date, thickness, and temper size and quantity correlate well with the thinner (14-16 mm), less heavily tempered Marion Thick pottery from the York site, in the Wabash Valley. The dates from this site were 2400 +/- 90 years RCYBP and 2410 +/- 70 years RCYBP (Munson and Munson 2004).

Interior cordmarked rims and upper body sherds from the 200 Block, including those associated with Feature 200-32, which was radiocarbon dated to 2550 years RCYBP, are less than 10 mm thick at the rim and slightly more than 10 mm in body thickness and are tempered with moderate amounts of small to medium sized pieces of grit. These sherds generally correlate with some of the thinner samples of Marion Thick (Morgan 1992:128) and some samples referred to as Marion Thin (Conrad, et al. 1986:195). The body form of the interior cordmarked vessels from 12HR484 could not be determined because of the absence of large body sections.

The lug may be another early temporal or cultural indicator. A lug was among the collection of very thick, heavily tempered pottery from the Hartman Mound (Webb and Snow 1943: 547; Figure 15-D), and a vessel with a lug and an upper body form that may resemble the vessel from the Knob Creek site was found at the Dominion Land Company site (Cramer 1989).

The majority of the grit tempered sherds could not be subdivided. Attempts to separate the pottery according to the size and spacing of the cords and the types of woven material used for cordmarking were not successful because the sherds are too small and the surfaces frequently are thoroughly worn, the samples are not of sufficient size, and too few sherds were recovered from features. Observation of the rims led to the conclusion that sherd thickness and the size and amount of temper are not necessarily temporal indicators. The interior/exterior cordmarked rims are relatively thin and are tempered with only moderate amounts of small to medium sized temper, yet they are among the oldest sherds.

The Zorn Punctate rim from Group 1 may eventually be culturally diagnostic, but, at present, the temporal span and cultural affiliation of the type are not known. Pinched sherds are present in Fayette Thick and other relatively early types, but other pinched and punctated sherds have attributes that suggest Middle Woodland cultural affiliation.

The tall, thin, vertical upper body fragment seen in Group 8 is distinctive and potentially diagnostic, but, at present, cannot be attributed to a particular time span or cultural group.

It was determined that there was some overlap in the use of grit tempered and limestone tempered pottery. Several features had nearly equal amounts of cordmarked, grit tempered pottery and plain, limestone tempered (Falls Plain) pottery. Feature 300-60 contained approximately equal amounts of grit tempered pottery (95 g) and limestone tempered pottery (82 g), and the radiocarbon date of 2190 RCYBP is intermediate between the dates of features with grit tempered pottery and those of features with Falls Plain pottery. It is, of course, necessary to await further substantiation of this cooccurrence, but the radiocarbon date fits the expected temporal span of such a transition.

The sand tempered, plain surfaced rims of Group 10 cooccur with Falls Plain sherds and are considered a variant of Falls Plain pottery. These may represent Falls Plain vessels with inordinately high amounts of sand in the paste due to personal preference of the potter. One of the rims came from Phase II Feature 92, which intersected and appeared to be part of or contemporaneous with Phase II Feature 20, which has a radiocarbon date of 2000 RCYBP, which is the most recent date for Falls Plain pottery from the site. It is possible that these sherds presage a shift back to sand as a preferred temper. Some or all of the plain surfaced, sand tempered rims of Group 9 may be equivalent to Falls Plain.

The majority of the grit tempered sherds have exterior surfaces impressed with various kinds of loosely to moderately tightly woven cordage. One distinctive, potentially diagnostic type of cordmarking is malleation with a paddle wrapped with a group of parallel individual cords. One vessel and two rims display this surface treatment. Although the temper material, size, and quantity are within the range exhibited by other grit tempered sherds at 12HR484, the nearly vertical rim, round bottom, and globular body bear resemblances to some later regional Middle Woodland types, particularly McGraw Cordmarked and McGraw Plain (Prufer 1965:19-23; Figures 3.2 and 3.6). This vessel may represent the most recent grit tempered pottery from 12HR484.

In summation, the grit tempered pottery sample from 12HR484 is not a single entity. Some sherds derive from Early Woodland occupations that may be among the first in the region to produce pottery. Other sherds have characteristics that are comparable to pottery found at later Early Woodland sites throughout the region. There is evidence that a transition to limestone temper and plain surface treatment occurs as the popularity of grit temper and cordmarked surfaces declines. Sand tempered sherds that would otherwise be considered Falls Plain could denote the beginning of reintroduction of grit as a tempering agent. The distinctive surface treatment and rim and vessel forms of at least one grit tempered vessel may signify the presence of a later Middle Woodland occupation that postdates the main occupation that produced Falls Plain pottery.

Comparison with Other Local Sites

Comparison with ceramics from other sites in the Falls area has not significantly increased understanding of the cultural and temporal placement of the grit tempered pottery from 12HR484. Myers (1986) tried to avoid perpetuating misuse of extant typologies by creating the label Mid-Valley Cordmarked to refer to the grit tempered, cordmarked ceramics from the CMCAD. This admirable gesture, unfortunately, is thwarted by the highly fragmented condition of the pottery, which largely precludes delineation of rim, body and basal forms. Myers' Form #1 is represented by a very tall, vertical rim/upper body fragment and a group of non-definitive rim sherds, but no large body fragments and no bases. Form #2 is composed of one vessel, a large, spherical pot, and several rims with measurable diameters but little indication of body form. Form #3 is represented by several basal sherds and a lower body sherd misidentified as a rim. It is suggested by this author that the term Mid-Valley Cordmarked not be used because it appears to encompass three highly dissimilar vessel forms that have not been temporally, culturally, or stylistically linked. The grit tempered pottery from the CMCAD was not subdivided beyond these groups and has not been of use for seriation or identification of culturally diagnostic attributes.

Relative dating has provided a general time span for the some of the grit tempered pottery but not a refined temporal position. Only two clusters of diagnostic projectile points have been found in association with grit tempered pottery in features at12HR484. Both Dickson Cluster (Justice 1987:191-198) and Turkey-tail points (Justice 1987:173-179) have lengthy temporal spans, beginning with pre-ceramic or non-ceramic sites. Turkey-tails appear to extend through much of the Early Woodland, and Adena Stemmed points apparently extend into the early Middle Woodland. Adena Stemmed points are also associated with the grit tempered pottery at other sites in the Falls area. Feature 3 at 15JF246 contained an Adena point and grit tempered, cordmarked and smoothed cordmarked pottery. Adena points were common on 12CL109, and Feature 98 contained both grit tempered pottery and an Adena point (Sieber 1986:302). A refuse accumulation at 12CL103 (Feature 10) contained grit tempered pottery and a point identified as a Bakers Creek point (Sieber 1986:280), but this association may be fortuitous.

Absolute dating of grit tempered pottery in the Falls area has been limited by the dearth of radiocarbon dates and the lack of diagnostic pottery associated with the dates. The previous discussion about the radiocarbon dates from 12HR484 shows that grit tempered pottery was present by 2550 RCYBP (calibrated age of cal 801-543 at B.C. the one sigma level), and may have been present at the site as early as 2740 RCYBP, and continued until as late as 2190 RCYBP (calibrated age of cal 380-130 B.C. at the one sigma level), when it apparently partially overlapped with Falls Plain pottery. If dates for comparable pottery at other local sites are accurate they may extend the potential range toward the present.

Feature 11 at 12CL109, an amorphous refuse scatter, contained a very tall, straight, vertical, rim/upper body fragment, with widely spaced individual cord impressions (Mid-Valley Cordmarked Form # 1), along with hundreds of grit tempered, cordmarked sherds and several grit tempered, plain sherds (Sieber 1986:299-301). The radiocarbon date of 2220 +/- 60 years RCYBP is considered suspect because the oxalic acid sample used for standardization during dating was later found to be weak. The straight sided vessel fragment is comparable to the rims of Group 8 at 12HR484.

The date of 2230 +/- 60 RCYBP obtained for Feature 98 at 12CL109 (Sieber 1986:302) also is suspect, because of the weak oxalic acid sample. The feature contained an Adena point, two grit tempered, cordmarked sherds, and one grit tempered, plain surfaced sherd. Feature 85 from 12CL109 received dates of 2030 +/- 60 RCYBP and 2020 +/- 65 RCYBP when the weak acid sample was used, but a date of 1995 +/- 45 RCYBP was obtained at a different laboratory (Sieber 1986:301). The only pottery in the pit was one grit tempered, cordmarked sherd. Feature 3 at 15JF246 yielded a date of 2055 +/- 75 RCYBP for a pit that contained grit tempered, cordmarked and grit tempered, smoothed cordmarked sherds. If these two radiocarbon dates are valid, they may extend the presence of grit tempered, cordmarked pottery in the Falls area toward the present, but caution is urged until further substantiation is obtained.

Relationship to Other Regional Types of Grit-tempered Pottery

The majority of the grit tempered pottery from 12HR484 can be considered part of the ubiquitous grit tempered, cordmarked ware found throughout the Ohio Valley and Midwest during the Early Woodland. A number of localized types have been defined, but these descriptions are based on very small ceramic samples taken from only a few sites. None of the types can be confidently considered applicable over large distances. The best known and most seriously misconstrued of these local types is Fayette Thick. The type was defined from a small sample of sherds from the Peter Village site and may best be left as a local term for pottery from the area around Fayette County, Kentucky.

Griffin (Griffin 1943:668-669) described the Fayette Thick pottery from Peter Village as having limestone or chert temper, or both, and he attributed little significance to which of the nonplastics was used. Subsequent analysis (O'Malley, et al. 1983) has shown that the clays and tempering materials were obtained from the area around the site. The most salient attribute of the Fayette Thick sherd sample from Peter Village was the thickness, which has been used subsequently as the basis for assigning the label Fayette Thick to pottery from widely dispersed sites. Additional confusion has resulted from the discovery of small samples of sherds even thicker than those recovered from Peter Village (Duerksen, et al. 1992), thus the ensuing problem is not only determination of how thick pottery must be to qualify as Fayette Thick but at what point a sherd is too thick for this classification. Some consider decoration to be an integral characteristic of Fayette Thick pottery, thus, inordinately thick sherds that have thoroughly smoothed exteriors and lack decoration sometimes are considered a separate type. Consequently, even within the Bluegrass region there is disagreement about which collections can be labeled Fayette Thick and whether an earlier ceramic type is present.

The three original Fayette Thick rims were too small to give an accurate idea of the vessel shape, but it was suggested that they represented a wide mouth bowl or vertical walled jar, and the basal fragments suggested a flat based vessel (Griffin 1943:669). Additional excavation at Peter Village (Tune 1985) produced large, round bottomed vessel fragments that are markedly dissimilar to the forms suggested by the original sherds. The general impression of this “type” is that there is marked variation within this small sample and considerable uncertainty about basic attributes--particularly rim, body, and basal forms.

The rarity of radiocarbon dates for Fayette Thick pottery further complicates comparison. The date of 2260 RCYBP taken from a post mold inside the ditch around Peter Village has not been positively linked to the sherds at the bottom of the trench according to some investigators (Duerksen, et al. 1992:83), but the context strongly suggests that it dates the Fayette Thick pottery from the site. If this is a valid date, then there may be one to three centuries separating it from the pottery at the West Runway site.

Part of the value of comparison of the grit tempered ceramics from 12HR484 with Fayette Thick pottery is that it becomes evident that these two local groups share certain attributes, probably based on a common ancestral ware. Temper differences may derive from differential availability of particular materials, but both groups reflect use of local materials. Comparable kinds of woven materials are impressed upon the exteriors of both ceramic samples, and both groups have some vessels with cordmarked interiors. Pinched decoration on the pottery from 12HR484 is very rare but similar to that of Fayette Thick pottery from Peter and Grimes Villages. Flat bases occur in both samples. Although average wall thickness of the Fayette Thick sample is markedly greater than the sample from 12HR484, more recent studies (Clay 1985; Tune 1985) note the variation in wall thickness from the lower to upper body. There is overlap in the thicknesses and the size and quantity of the temper between the Peter Village sample and that of 12HR484. The date for Fayette Thick pottery at the Peter Village site (Clay 1985:15), suggests contemporaneity with some of the dated pottery from 12HR484. Neither Fayette Thick pottery nor the grit tempered pottery from 12HR484 is well enough delineated to allow more detailed comparisons, thus more extensive affinity between the groups cannot be posited confidently.

Falls Plain

The limestone-tempered, plain pottery from 12HR484 correlates well with the Falls Plain type, as described by Mocas (1992). Because the rim, base, and body forms and the tempering and surface treatment are comparable, the pottery will be referred to as Falls

Plain. Rims with angular interior junctures of the rim and upper body, found on several sites in the Falls area (Mocas 1992:62; Figure 3: Figure 7), were not seen at 12HR484, but several sand tempered rims comparable to these were recovered in a feature with large sherds of Falls Plain, and several limestone tempered rims have similar forms with slightly rounded interior junctures. No sherds with a red interior slip comparable to the Interior Red Painted sherds described by Myers (1986:233) and found elsewhere in the Falls area (Griffin 1942:351; Plate XXXII; Mocas 1992:Figure 6e) were encountered at 12HR484.

The Falls Plain pottery sample from 12HR484 consists of 187,590 g of limestone tempered, plain surfaced pottery, including 8349 sherds of analyzable size, of which 583 are rim sherds and 46 are basal sherds, and one rim and one base are assigned to the type although they have no identifiable temper. The number of rim sherds less than analyzable size exceeds the number of analyzable rims. Tables 6.1 and 6.2 provide a count and tabulation of total weight of Falls Plain pottery in the various excavation areas and a count of the number of rims, bases, analyzable sherds in the excavation areas.

Description

All the sherds have smooth surfaces and lack decoration. The compactness of the paste, the evenness of the interior and exterior surfaces, and the occasional marks from a hard-edged rubbing tool indicate that at least some vessels were smoothed and compacted with the hand or a soft, yielding tool prior to the final smoothing of the moistened surface. Manganese pellets are often seen in the paste, and in a very small percentage of the sherds small amounts of sand are present but not in sufficient quantities to suggest they derive from intentional inclusion as temper.

Individual vessels are relatively consistent with respect to color, although mottled patches caused by differential oxidation and reduction are scattered across the interior and exterior surfaces. The most common exterior colors are very pale brown (e.g., 10YR8/3) and reddish yellow (e.g., 7.5YR7/6) if the surface was not exposed to excessive heat or smoke. Sherds that were well aerated when exposed to heat have surfaces with redder hues (5YR-2.5YR, and infrequently 10R), and those exposed to smoke and a reduced atmosphere have darker color values that extend into the gray and dark gray range. Core colors overwhelmingly are dark gray or very dark gray (N3/ and N4/) from directly below the exterior surface to directly above the interior surface. If the interior or exterior surface of the sherd is heavily worn or scraped the dark gray core color is evident. If the sherd was broken and exposed to weathering soon after deposition a thin, pale brown or reddish yellow layer is present over the dark gray core. Sherds exposed to intense heat, probably from being deposited in hearths, generally exhibit a blanched white color on the upper side and a dark gray to black reduced surface on the downward side.

The interior and exterior colors of the Falls Plain pottery rarely overlap with the redder colors of the grit tempered sherds. The core color of Falls Plain sherds is uniform from surface to surface, while in the grit tempered sherds, generally, different interior color and exterior colors extend toward the center of the core, and the center often is of a third color.

Rims

Examination of the larger vessel fragments demonstrated that some rims vary enough that segments of a single rim could readily be mistaken for portions of two different vessels if they had been broken apart. Every effort was made to avoid this misinterpretation when the analysis was performed. Rims with characteristics and proveniences that indicated they could be confidently attributed to the same vessel were counted as one vessel. Exposure to weathering has rounded the sherd edges sufficiently that few sherds can be refit onto others, but sherds from individual units and adjacent units were compared to identify possible fragments of the same vessel. Profiles were drawn of 138 rims that were sufficiently complete to provide accurate orientation. Although it is possible that some sherds originate from the same vessel, an effort was made to illustrate only rims that could be distinguished from all others. The reconstructed upper half of a medium sized vessel weighed approximately one kilogram. Even if the estimated weight of a complete vessel were tripled to account for slightly thicker sides of the lower body and base, the total mass of the Falls Plain pottery from the site would represent the weight of approximately 62 vessels. The minimum number of vessels on the site is suggested to lie between the number of illustrated rims and the number of vessels represented by the total weight of the Falls Plain sample.

Almost all the rim sherds categorized as Falls Plain have plain surfaces, contain holes from leached limestone temper, and lack secondary tempering material. Only 2.6 percent of the rims have enough sand for it to qualify as a possible secondary temper. Less than one percent of the rims do not show visible temper of any kind or have only fine sand and a few minute limestone pits in the paste. In these rare instances, other attributes were used to justify identification as Falls Plain sherds. The size and amount of temper was estimated for all rims. Limestone pits in the surfaces and in the core most commonly are 1-3 mm in size and compose less than 10 percent of the surface area. Less than one percent of the rims have more than 40 percent of the surface marked by limestone pits, and less than three percent are tempered primarily with large particles.

Almost all the Falls Plain rims with identifiable orientations were everted (98.2 percent), although the amount of eversion varies from 43-81 degrees, with a mean of 67 degrees and a mode of 70 degrees. Several rim sherds from Feature 100-67 that apparently represent a single small, thin ceramic item, appear to have inverted orientations. The rim does not belong to a pot, but the small size and fragmented condition of the sherds impede determination of the form.

Difficulty was encountered measuring the orifice diameters represented by many rim sherds. It was observed that in most instances it is necessary for the arc of the rim to be at least six percent of the circumference in order to yield a reasonably accurate measure of the orifice diameter. A large number of the rim sherds are slightly less than this size, which leads to the conclusion that human and natural agencies tended to break sherds with curvature greater than 20 degrees (5.5 percent of the circumference). Irregularity in the shape of the lip, particularly variation in the thickness, causes asymmetry and further complicates measurement of the arc of the rim.

A similar breakage pattern is evident at the neck of the vessels, which complicates measurement of the amount of constriction of the upper body. A high percentage of the necks are fragmented at approximately the point of minimum orifice diameter--where the curvature of the rim and upper body change directions. The larger rim and upper body fragments display diversity in the amount of eversion in the rim orientation. Generally, the upper body is slightly to moderately constricted, and the rims vary from slightly to strongly everted.

The 118 rims with measurable maximum orifice diameters average 26.4 cm in maximum diameter, and 21.1 percent of the vessels have maximum orifice diameters greater than or equal to 30 cm, while 3.3 percent are smaller than or equal to 20 cm in diameter. The minimum orifice diameters of 13.4 percent of the vessels are greater than or equal to 30 cm, and 6.7 percent have diameters of less than 20 cm (Figure 6.16). The most complete rim and upper body fragments have a maximum orifice diameter approximately the same as the maximum diameter of the vessel. The three relatively complete vessels are elongated and have heights at least 25 percent greater than the maximum diameter of the body.

As noted in Mocas (1992), lip form and thickness vary markedly, even within a few centimeters along the edge of a vessel. The interior edge of the lip is almost always the highest point, but the crest may be round, slightly flattened, flat, or more than one of these. Several rims (1.5 percent) have lips that form an acute angle at the crest. Lips are slightly extruded to the exterior on 3.9 percent of the rims, and 1.2 percent of the lips are extruded to the interior, and none of the lips were decorated. The lip form and thickness do not appear to be dependable criteria for comparison. The lips range from 3-11.5 mm in thickness and average 6.9 mm and cluster around the mode of 7 mm. The rims range from 4-12 mm in thickness and average 7.15 mm, and over half are 7-8 mm thick.

Rim height varies from 11-63 mm and averages 31.5 mm. The majority of the rims (64.6 percent) have concave forms, and convex forms also are common (26.2 percent). Thinned necks occur on 28.7 percent of the rims. A frequent characteristic of Falls Plain vessels is a thinned neck and a rim that expands in thickness toward the lip. Adena Plain rims with similar shapes are identified as “folded” (Haag 1940:78) because of an added rim strip. Although the Falls Plain rims have similar shapes, they do not have added strips. The shape is due to the neck being compressed from the exterior and the rim pulled upward and everted.

Rim Groups

The rims are grouped into arbitrary clusters to facilitate comparison and to elucidate continuity within the sample (Table 6.3). It must be taken into account that individual rims frequently show variation in thickness, curvature, form, orientation, and, especially, lip thickness and form. Although there are marked extremes of variation, considerable continuity exists within the sample, and the ends of the spectra are often linked by numerous incremental differences that yield a continuum. Rim groups with comparable forms and orientations sometimes display marked differences in thickness. Other groups differ primarily in the height or degree of eversion of the rim. Some attributes with little or no apparent functional difference are separated because they represent readily distinguishable ends of a continuum and could have temporal significance. Because of the scarcity of sizable body fragments, particular rim forms rarely can be associated with discrete vessel forms, but an effort is made to provide information about such possible correlations.

Based upon the research of Braun (1983), the attributes that offer the most potential for identification of functional differences in vessels are the height and amount of eversion of the rim and the maximum and minimum orifice diameters. The former provide an indication of the efficiency of pouring, ease of covering and protection of the contents, and potential for suspension of the vessel. The orifice diameters may reflect ease of access to the contents, efficiency at prevention of splashing, and deterrence of heat loss or evaporation of contents. Other attributes are listed to demonstrate the diversity within the sample. The variations in these traits could signify some undetected value to the trait or emphasize the range of acceptable modifications. In either instance, it is important to show the entire range of morphological attributes in the Falls Plain ceramic type.

During the analysis, 26 attributes of each analyzable rim were measured and described and the results entered into a spreadsheet. Approximately one-third of the 583 Falls Plain rims are sufficiently complete to provide a relatively accurate indication of rim shape. Profile drawings were made of each of these. Rims with distinctive forms or lip forms were also drawn. The profiled rims were placed into groups with similar combinations of characteristics, and the validity of the groups evaluated and then refined. A discussion of each group was written and the number of examples in the group and their general proveniences compiled. The most informative examples from each group were chosen for illustration. A close approximation of the maximum orifice diameter (“diameter at the lip”) and minimum orifice diameter (“diameter at the neck”) can be derived from about one-fifth of the rims. These are listed at the end of the discussion of each rim group. Several rims from each group are mirrored to facilitate visualization of the shape of the vessel.

In addition to the sherds discussed below, other probable members of various groups were encountered but did not differ from the illustrated examples sufficiently to merit illustration or could not be placed confidently in one of several similar groups.

Group 1 (n=12). These rims (Figure 6.18a-l) appear to be from vessels with a variety of potential functions. The measurable rims have small to medium minimum orifice diameters (Table 6.4), and one sizable body fragment indicates an elongated, relatively cylindrical vessel with a diameter equal to the maximum orifice diameter. Vessel B (Figure 6.17; Figure 6.18a; Figure 6.19b) has a very thin (about 5 mm) neck and body and a thicker (9 mm) rim. This combination of a thin lower body and a thicker rim is commonly seen among Falls Plain vessels. The thinness of the lower body may enhance its thermal properties, and the thicker upper portion may strengthen the vessel to withstand stirring, pouring, and handling. Stains on the interiors of two vessels (Figure 6.18a, d) indicate they are cooking vessels. These vessels are discussed in more detail in the "Vessels" section of this chapter.

One rim (Figure 6.18g; Figure 6.19c) appears to be too small to be from a cooking or storage vessel. The narrowness and thinness make this vessel easily portable, and the rim height and strong eversion would facilitate pouring. This may be a personal or small group serving vessel, or a liquid storage or transportation vessel. The combination of a large orifice and thin sides of one rim (Figure 6.18l; Figure 6.19a) suggest the vessel may have been too large to be moved readily. The width of the orifice would allow easy access to the contents when used as a cooking vessel, but it would be difficult to seal for storage. The thin sides lend themselves more to thermal conductivity for cooking than strength for storage. All the rims, except one, are from the 100 Block.

Group 2 (n=15). This group is composed of rims (Figure 6.20a-n) of moderate to large size (Table 6.5) that have thin bodies with little constriction of the upper body. The largest fragment (Figure 6.20a; Figure 6.21a) is from a cooking vessel which is discussed in more detail in the "Vessels" section of this chapter. This rim is from Feature 100-37 which was dated to 2070 RCYBP. All the rims are from the 100 Block, except one sherd from the 200 Block.

Group 3 (n=28). These rims (Figure 6.22a-u) show little evidence of vessel form, but many have distinctive thickening of the upper rim. Seven of the 10 rims from the 200 Block show incremental variation in diameter at the orifice from 23-30 cm (Table 6.6). Most of these rims were found in the vicinity of Structure A, as were some of the rims from Group10, which are thicker but have comparable orientations and forms. Fifteen rims are from the 100 Block, two rims were found in the 148N49W Trench and one was in a Phase II unit. One rim was recovered from Feature 100-112, which dated to 2080 RCYBP.

Group 4 (n=13). This may represent a common, versatile vessel form that is of moderate size (Table 6.7) and has moderate rim height and eversion (Figure 6.23a-m). The few rims from this group that extend below the neck show little constriction of the upper body.

The walls of one rim (Figure 6.23a, o) are thin enough and the vessel is small enough that it could be portable, and the height, angle, and eversion of the rim would permit easy pouring. Although vessels of approximately this size and smaller show use for boiling liquids, this vessel does not show organic staining on the interior and may have served a function other than cooking. The minimum orifice diameter is large enough to allow some access to the contents, and a covering could be cinched to the everted rim. The vessel size would suffice for storage, processing, or transfer. The rim was recovered from Feature 100-112, which was dated to 2080 RCYBP.

One vessel (Figure 6.23m, n) is more likely to have been used for cooking. The large size and minimally restricted orifice and the short, moderately everted rim would allow easy access to the contents. Although the everted rim could provide a place for cincture of a cover, the diameter of the orifice is more conducive to cooking than sealing the contents efficiently, and the thin walls are more advantageous for cooking than storage. One rim is from the 200 Block and two rims are from Phase II units, and the others are from the 100 Block.

Group 5 (n=9). These rims (Figure 6.24a-j) are moderately to strongly everted at the top, and the measurable rims have medium to large orifice diameters (Table 6.8). There is no evidence of the vessel forms. Two rims (Figure 6.24 a, b) from the same vessel show marked difference in the eversion of the top of the rim. One rim (Figure 6.24 d; Figure 6.24m) is from a cooking vessel with an interior boiling line, and it has orifice measurements essentially comparable to those of Vessel B of Group 1, which also has a boiling line. The rim is discussed in more detail in the “Vessels” section of this chapter. One rim (Figure 6.24i, k) may be from a large cooking vessel comparable to the largest vessel in Group 4 (Figure 6.23n). Three rims are from the 200 Block and the other six rims are from the 100 Block. One rim is from Feature 100-37, which was dated to 2070 RCYBP.

Group 6 (n=7). These rims (Figure 6.25a-g) have orifice diameters relatively evenly distributed from 22-30 cm (Table 6.9). Vessel A (Figure 6.25a; Figure 6.26a) is particularly strongly everted, and below the neck the upper body gradually expands to a maximum body diameter of 32 cm. The constriction of the upper body partially reduces access to the contents of this subglobular vessel, but the organic staining on the interior indicates that this is a cooking vessel. The vessel is discussed in more detail in the “Vessels” section of this chapter.

The orifices of the other vessels in this group are smaller and less strongly everted, and may have been better suited for controlled pouring. Several of the upper bodies show little constriction, which suggests that the vessels may have been relatively cylindrical. These rims are generally comparable to those of Group 1. The greater thickness of one rim (Figure 6.25g; Figure 6.26c) may be an indication that it has a different function, perhaps for storage or processing. This rim is one of two from the 200 Block, four rims are from the 100 Block, and the other rim comes from the 148N49W Trench. One rim (Figure 6.25d) was recovered from Feature 100-112, which was dated to 2080 RCYBP.

Group 7 (n=5). These strongly everted rims (Figure 6.24; Figure 6.28a-e) form a continuum with Group 5 rims and are generally smaller at the orifice (Table 6.10). Several appear to have relatively cylindrical bodies (Figure 6.28g) and other sherds suggest a more subglobular body form. The vessels may be used for a variety of functions. The smallest (Figure 6.28h) could be a personal or small group serving vessel, and the largest (Figure 6.28f) could be a cooking vessel. All the rims are from the 100 Block.

Group 8 (n=10-13). These rims (Figure 6.29a-m) share a common intermediate size and shape and are very similar in form and orientation. The orifice diameters are evenly spaced from 24-32 cm (Table 6.11). Four rims (Figure 6.29a-c, h; Figure 6.30a) are from Feature 100-37 and represent as few as one or as many as four vessels. It is feasible that they are part of the same vessel because rims frequently display marked variation in form and orientation, and lip irregularity is common.

None of the fragments in the group have interior organic staining suggestive of boiling, but the wide, unrestricted orifices are conducive to use for cooking. The thicker walls of one rim (Figure 6.29d) may facilitate use for storage or processing, and other vessels could fulfill any of the three functions. One rim is from the 200 Block and one is from the 400 Block, and the others are from the 100 Block. One rim (Figure 6.29e) was recovered from Feature 100-112, which was dated to 2080 RCYBP. Feature 100-37 was dated to 2070 RCYBP, and one rim (Figure 6.29a; Figure 6.30b) was recovered from Feature 100-7, which was dated to 2000 RCYBP.

Group 9 (n=9). This group (Figure 6.31a-e) comprises another common rim form with taller, less everted rims (Table 6.12). One rim (Figure 6.31a; Figure 6.32a) is a cooking vessel that is inordinately thick (about 8 mm) from the lip to the midsection and displays slight variation in the rim and lip shape. The body of the vessel is subglobular. This vessel is discussed in more detail in the “Vessels” section of this chapter. The curvature in the necks of other rims from this group suggests they may have comparable vessel forms. One rim (Figure 6.31e) is from a shorter, more globular vessel (Figure 6.32b). One rim is from the 200 Block, and the other rims are from the 100 Block.

An additional 21 rims resemble the illustrated examples, except they taper toward the lip and display irregular lip forms, including two with lips extruded toward the exterior. Two of the rims were found in the 148N49W Trench and one in the 63N47W Trench, and all the others are from the 100 Block. One rim (Figure 6.31a) is from Feature 100-112, which was dated to 2080 RCYBP and another rim (Figure 6.31b) was from Feature 100-37, which dated to 2070 RCYBP.

Group 10 (n=22). Most of these rims (Figure 6.33a-n) are only approximately 5 mm thick, but, despite their thinness, vessel size varies considerably (Figure 6.34a-c) (Table 6.13). These are essentially the same rim forms and orientations seen in rims nearly twice as thick in Group 11. The few fragments that extend below the neck show little constriction of the upper body. However, one rim and upper body fragment from a cooking vessel (Figure 6.34c) is 19 cm at the lip and 17 cm at the neck, but expands to a maximum body diameter of at least 32 cm. This vessel is discussed in more detail in the "Vessels" section of this chapter.

One rim (Figure 6.34a) is a short, thin rim on a vessel with a large orifice. It was recovered from Feature 300-60, which was dated to 2190 RCYBP. Also in the pit were approximately equal amounts of Falls Plain pottery and grit tempered, cordmarked pottery, possibly indicating that the rim was manufactured at the time of a transition from grit tempered to limestone tempered pottery. Rim thinness is not an indicator of late temporal position within the development of Falls Plain pottery, because this is the earliest date on the site for Falls Plain pottery, yet the rim is one of the thinnest. Another rim (not illustrated) is from Feature 100-7, which was radiocarbon dated to 2000 RCYBP—the latest date for Falls Plain pottery at the site. The five rims in the 200 Block were recovered from a 16 x 8 m area around Structure A. The date of 2167 RCYBP from the structure correlates well with the aforementioned date from Feature 300-60. Fifteen rims are from the 100 Block, six rims are from the 200 Block, and one rim is from the 300 Block.

Group 11 (n=15). These rims (Figure 6.35a-n) resemble those of Group 10, but they are approximately twice as thick. The large, unrestricted orifices (Figure 6.36a,b) (Table 6.14) would allow ready access to the contents, but little can be determined about the forms or functions of the vessels because there are no associated body fragments and the thickness of the body does not necessarily correlate with the thickness of the rim. These pots could have been used for cooking, storage, or processing. Two of the rims are from the 200 Block, one rim is from a Phase II unit, and the remainder are from the 100 block.

Group 12 (n=14). The short, everted rims of this group (Figure 6.37a-l) would permit access to the contents, and the larger vessels (Figure 6.36c, d) could have been used for cooking. The narrow orifices of other vessels (Figure 6.36e, f) (Table 6.15) may be too restrictive for cooking vessels, unless they were atop globular vessels and could aid in retention of heat and moisture. All the rims are from the 100 Block, except two from the 300 Block.

Group 13 (n=1). This rim (Figure 6.37m) is short, thin, and inverted, but the fragments are too small to determine the shape of the pottery piece. It does not appear to be from a pot. The sherd is from the 100 Block.

Discussion. Despite the sizable sample of pottery, little progress in identification of developmental trends and delineation of ceramic groups resulted from the analysis of the Falls Plain pottery of 12HR484. There is diversity among the rim, base, and vessel forms, but the significance of the differences is difficult to assess. The variety within the sample suggests it may not have been manufactured by a single group, but, at present, functional attributes have not been distinguished from those with cultural or temporal significance. The radiocarbon dates indicate that a temporal span of several hundred years may be represented, but the dates from the 100 Block, the main area of Middle Woodland occupation, vary only 80 years and overlap to the extent that they could represent a single protracted occupation. It is possible that a large portion of the sample of Falls Plain was produced within a short temporal span and by a limited number of individuals. Future projects will, hopefully, clarify this situation.

Although distinctive individual sherds were encountered, almost all the sample fits continua of rim, base, and vessel shapes. Subdivision of these continua is impeded by the scarcity of large sherds and body fragments, the rarity of sherds with distinctive ceramic attributes in features, and the limited utility of data from comparative collections. Tall and short rims, strongly everted and slightly everted orientations, thinned and unthinned necks, tapered and thickened upper rims, concave and convex forms all cooccur in individual features or in contemporaneous features.

The diversity of attributes found on pottery within individual features, in contemporaneous features, and at the same depths within individual units or adjacent units may denote that much of the variation in the sample reflects functional characteristics of the ceramic assemblage of a single group or several groups, rather than shifts in style over an extended period of time. The relative depths of rims with contrasting attributes were examined to ascertain whether particular traits temporally preceded others, but no characteristic could be demonstrated to consistently occur higher or lower in the deposits than its contrasting trait. The midden was generally only 20-30 cm deep and contained abundant intermingled refuse from this component and the underlying Early Woodland component; thus, relative depths of individual artifacts or small numbers of artifacts were not dependable indicators of temporal sequence.

A thin rim was found in the feature with the earliest radiocarbon date, but, in another unit, one was found well above a thick rim with a comparable form and orientation, and thin rims also occurred at the same depth as thick rims in individual units and adjacent units. Thinned necks were found on sherds at the top and bottom of the Woodland deposits in the same unit. In one unit a short, thin rim, a short, thick rim, and a tall, thick rim were found at nearly the same depth. In another unit, a tall, strongly everted rim that is thinned at the neck and thickened toward the lip was found at the same depth as a short, slightly everted rim that is tapered toward the lip and not thinned at the neck.

There is considerable continuity and probably contemporaneity among the rim groups. Groups 2-6, 8, and 9 have one or more rims from Feature 100-37 or Feature 100-112, which have radiocarbon dates of 2070 RCYBP and 2080 RCYBP, respectively. Group 10 rims were associated with the earliest (Feature 300-60) and latest (Feature 100-7) Middle Woodland dates, and a Group 8 rim cooccurred with the latter rim. Vessel B, from Group 1, cooccurred with Vessel A, from Group 6.

The main attribute not represented in the dated features is inordinate thickness, as exemplified by Group 11. The rims of Group 11 have forms and orientations comparable to moderately thin (Groups 8 and 9) and thin (Group 10) rims. Groups 1-4 have orientations and forms comparable to those of Group 11, but are thinned at the neck. Groups 5-7 differ from Group 11 rims primarily in orientation, and Group 12 rims differ from Group 11 rims mainly in height.

Bases

The basal forms display a continuum of curvature indicative of subglobular, globular, and nearly cylindrical lower bodies. The basal-lateral junctures show various amounts of curvature from round to angular, and the sides rise at angles as shallow as 161 degrees and as steep as 124 degrees. Rounded bases compose seven percent of the basal form sample, and twenty percent of the bases are flattened. At least one partially flattened bottom has slight convexity, and another partially flattened bottom has slight concavity.

Very little information is available about the diameters of the bases because few basal fragments extend more than a few centimeters inward from the basal-lateral juncture or compose more than a few degrees of an arc. Measurable bases have flattened portions as narrow as 3.5 cm and as wide as 20 cm in diameter. The bases are not constructed with disproportionately large amounts of temper. Only one base (2.2 percent) qualifies as heavily tempered, and 78.2 percent are lightly tempered. Temper particles are not larger or more numerous than those of the rim and body sherds, and no bases are tempered primarily with large particles. Portions of bases range from a minimum of 3.5 mm to a maximum of 17 mm thick, the average maximum thickness is 9.1 mm, and the average minimum thickness is 7.6 mm.

Group 1. This group (Figure 6.39a-d; Figure 6.40a, b) is composed of basal fragments (n=14) with round or slightly flattened bottoms, and the sides slope outward at shallow angles. Basal thicknesses range from 6-17 mm, and the fragments suggest a variety of vessel sizes. The round basal fragment from Feature 100-37 (Figure 6.38a; Figure 6.40b) (discussed further in the “Vessels” section) and the relatively globular lower body fragment (Figure 6.40a) from the 148N49W Trench bear no evidence of use as cooking vessels despite thin walls and round bottoms, which are advantages for cooking. Their small size, probably 20-22 cm in maximum body diameter for the former and 25 cm for the latter, may make such use impractical. These may be personal or small group serving vessels or liquid transportation vessels. This does not preclude use of larger vessels with similar shapes for cooking. Seven of the bases were found in the 100 Block, and six fragments, representing 5-6 vessels, are from the 200 Block. Feature 100-37 was dated to 2070 RCYBP.

Group 2. This group is (Figure 6.39e-I; Figure 6.40c) composed of basal fragments (n=12) with rounded basal-lateral junctures, flattened or partially flattened bottoms, and moderately sloping sides. One of the basal/lower body fragments from the 200 Block (Figure 6.38c; Figure 6.40c) is small, thick, and subglobular or globular. It has an irregular, partially flattened base. The maximum body diameter is 21 cm, and there is no discernible evidence of use as a cooking vessel. This may be a personal or small group serving vessel.

The other basal/lower body fragment from the 200 Block was part of a vessel (mirrored in Figure 6.32b and discussed further in the "Vessels" section of this chapter) with a tall, slightly everted rim from Rim Group 9 that had a maximum orifice diameter of 26 cm. The base has curvature to the sides comparable to the aforementioned base, but the basal diameter of 20 cm and maximum body diameter of 32 cm indicate a much larger, globular vessel, and the sides are thinner. Organic staining on the interior of the vessel indicates use for cooking. The larger size, thinner walls, and moderately wide orifice make this vessel suitable for cooking. In light of the similarity of these two lower body forms, it is feasible that a particular body form can serve multiple purposes.

Most of the ten bases from the 100 Block are too small to yield much information about vessel form. One fragment (Figure 6.39e) is 15 cm in basal diameter and has sides indicative of a subglobular lower body. The bases all were 10 mm or less in thickness. Two basal fragments were found in Feature 100-112, which was dated to 2080 RCYBP.

Group 3. This group is composed of basal fragments (n=4) with angular basal-lateral junctures, flattened bottoms, and moderately sloping sides (Figure 6.41a-c). One of the three fragments from the 100 Block has a basal diameter of 15 cm (Figure 6.42a), and the maximum and minimum thicknesses ranged from 6-8 mm. The sherd from the 200 Block (Figure 6.41c) was markedly thicker (13-14 mm).

Group 4. The group is represented by a basal-lower body fragment from Feature 100-112 (Figure 6.41d). The sides are relatively steep, the basal-lateral juncture is rounded, and the base is partially flattened and has a slight convexity (about one centimeter) in the bottom (Figure 6.42b). The sides expand to 27 cm at the top of the sherd and the maximum diameter may be one or two centimeters greater. Smoke discoloration on the exterior surface and discoloration on the interior may be evidence of use for cooking. This base was found in Feature 100-112, which was dated to 2080 RCYBP.

Discussion. There is considerable continuity and possibly contemporaneity among the bases. Group 1 is represented in Feature 100-37, and Groups 2 and 4 are represented in Feature 100-112, which has a comparable radiocarbon date. Group 1 (Figure 6.39a), Group 2

(Figure 6.39i) and Group 3 (Figure 6.41a) are represented in Feature 100-135. Examples of Groups 1-3 are present in both the 100 and 200 Blocks.

Body

Very few large vessel fragments were recovered from 12HR484. Human activity and natural agencies were responsible for thorough breakage of the vessels. Information about vessel form was obtained from less than 20 rim and upper body fragments and base and lower body fragments. Lower body forms range from nearly cylindrical (Figure 6.18a) to subglobular (Figure 6.26a) to globular (Figure 6.32b). The upper bodies of some vessels (Figure 6.32a) are strongly constricted, while other vessels (Figure 6.18a) show only slight constriction.

There are few fragments that provide measurements of the maximum vessel diameter. Vessels with widths as small as 21 cm and as large as 32 cm (Figure 6.40a) have been documented. The thickness of the vessel walls is not necessarily correlated with the size. The vessel with a maximum body diameter of 21 cm (Figure 6.40c) has body sherds 8-11 mm thick, but another vessel (Figure 6.21a) is 32 cm at the orifice and has a maximum body diameter greater than 32 cm, yet the body sherds are 4.5-6.5 mm thick.

The body sherds from the site range from 3-14 mm in thickness and average 6.5 mm, and over half are 6-7 mm thick. Appendages are absent except for one probable hemispherical lug. No evidence of podal supports was seen on the Falls Plain vessels.

Vessels

Although the two previous studies (Mocas 1992; Myers 1986) illustrated several large rim and basal sherds, no Falls Plain vessels were able to be reconstructed sufficiently to provide an accurate illustration of the complete vessel form. Despite the extensiveness of the excavation area and the enormity of the ceramic collection from 12HR484, few nearly complete vessels were encountered; however, these few intact sections provide substantial information about the form and potential functions of Falls Plain vessels.

On the interior of several of the larger body fragments (Figure 6.43a) a dark, organic stain terminates at a consistent height above the base, probably indicating the top of the liquid being boiled in the vessel. Some of the largest vessel fragments will be described in detail to illustrate points about the size, shape, manufacture, and, possibly, the function of the vessels. These detailed descriptions are also intended to show the amount of variance in the characteristics and measurements of a single vessel.

A number of studies of the physical properties and functional attributes of pottery vessels (Braun 1983; Hally 1986; Hendrickson and McDonald 1983; O'Malley 1988; Rice 1987) have been consulted to gain insight into the possible uses of the containers from

12HR484. The Falls Plain ceramic assemblage is likely to reflect a mixed subsistence base of hunting, gathering, fishing, and horticulture. There is no evidence of craft specialization or mortuary activity, and no ceremonialism is evident, thus the pottery vessels are considered largely, if not entirely, functional.

The vessels were most likely manufactured on the site and used by the manufacturers. The attributes of the vessels are likely to reflect the needs of the manufacturers and incorporate the experiences of these individuals concerning which traits facilitate successful manufacture, improve mechanical efficiency, provide suitability for a particular range of tasks, and ensure performance for an extended period without failure. The lack of decoration may in some respects be advantageous because use of particular vessels or limitation of use was not determined by aesthetic or decorative factors, and the form of the utensil was not altered by the need to decorate it. Again, these pots should exhibit primarily functional attributes.

The rim, base, and body forms of the vessel are important for determining the function. The bases may tell about stability and suitability for placing over a fire. The rims may tell about adaptations for pouring, prevention of evaporation, ease of handling, stabilization, accessibility to contents or restriction of accessibility, and prevention of splashing of liquids. Analogous to what was seen by Braun (1983)in the Woodland of eastern Missouri and western Illinois, Early and Middle Woodland ceramics of the Falls area show a series of changes over time that suggest compensation for or expanded capacity to endure more thermally stressful conditions of higher temperatures of use by increase of thermal conductivity and greater resistance to thermal shock.

Based on the flotation samples and observations of the botanical debris during excavation, there was less evidence of the use of nut during the Early Woodland and Middle Woodland occupations of 12HR484 than in the Late Archaic Riverton component. This may indicate warm weather occupations or a difference in disposal of nutshells, but also may reflect on the economy of the Woodland groups.

One major dichotomy of the Early Woodland versus the Middle Woodland vessels may be the use of stone boiling with the early pottery and direct placement over the fire for the latter group. Thick walls on the pots would have afforded flexural strength and enhanced the capacity to withstand the weight and impact of heated stones. The large size and thick walls of the Early Woodland pots may have restricted facility of movement. Minimal movement combined with the lessened thermal stress of indirect heating may have curtailed the amount of breakage. Early Woodland vessels were stable because of the flattened bases and thick walls, and some may have been comparatively low and wide like the Fayette Thick cauldron from Peter Village (Tune 1985). The wide orifices and globular, cylindrical, and conical forms of some vessels would have facilitated addition and withdrawal of heated stones. Other vessels appear to be globular, but have very small orifices. The small orifice aids in heat retention, but restricts access to the interior. These vessels may have functions other than for cooking, or they may have been placed directly over the fire.

If the Middle Woodland economy entailed extensive gathering, and some horticulture, dietary items such as oily and starchy seeds may have been made more digestible and palatable by the extended cooking time (Braun 1983:116) and higher temperatures possible with direct placement of the pots over a fire. The Middle Woodland vessels have more rounded bottoms and thinner walls and limestone temper, all of which augment the thermal conductive properties and distribution of the heat (Braun 1983:118; Hendrickson and McDonald 1983:280). This expanded conductivity allows elongation of the vessels without a deleterious effect on the boiling capability, and a narrower vessel is stronger than a wider vessel of comparable thickness (Braun 1983:118). Although thinner walls facilitate absorption and distribution of heat and prevent build-up of steam within the walls, they decrease the flexural strength of the vessel (Braun 1983:118-119). However, the added curvature of the vessel walls and base compensate by improvement of the shock resistance and prevention of moisture collection (Rice 1987:231). The decrease in stability of the less flattened bases and higher centers of gravity may have necessitated additional support when placed over a fire, perhaps by cordage tied below the flared rims and attached to external supports. These lighter, more portable containers may have had expanded versatility for functions other than cooking. Varied combinations of structural attributes suggest particular traits were added to facilitate specialized uses or to increase versatility of a single vessel. The variety of vessel sizes, forms, and orifice diameters denotes the presence of specialized containers.

#002-4575 Vessel A from Unit 100-19 (Figure 6.26a). The tall, strongly everted rim is 30 cm at the maximum diameter of the orifice and constricts to 25 cm at the minimum diameter, then the upper body expands to a maximum body diameter of 32 cm. The vessel width and subglobular form, with pronounced constriction of the upper body, are comparable to those of rim (Figure 6.32a). The sides are consistently about 5 mm thick from the bottom of the fragment to the point of maximum diameter, then about 6 mm to the top of the upper body, and the rim is about one millimeter thicker. The lip is irregular in thickness and form. The crest is slightly flattened to rounded, and the lip is angled, with the interior edge as the highest point. The amount of temper varies from about 5-25 percent, and the rim and upper body are particularly porous. The amount of temper and size of the pieces are greater than in Vessel B, which was sitting next to it.

The exterior shows smoothing from handling at the widest portion of the body. The base of the vessel is not present, but the estimated height of the vessel is about 40 cm. The ratio of height to width is approximately 1.25:1. The total weight of the sherds attributable to the vessel is in excess of 1 kg. These derive primarily from the upper half of the vessel, thus when the additional weight of the lower body and base are factored in the weight of the entire vessel would have exceeded 2 kg and may have approached 3 kg. The volume of the vessel is approximately 22 liters, about twice that of Vessel B. The exterior color of most of the vessel is light brown (7.5YR6/4). The interior has a dark gray (5YR4/1), organic stain that extends upward to about 6 cm above the point of maximum diameter then terminates in a horizontal line. It is quite probable that this stain derives from boiling liquid in the vessel. It is plausible that oils from boiling nuts or other foods would be more concentrated at the top of the liquid and leave a film as the fluid level receded. The presence of this stain is particularly important because it helps identify this as a cooking vessel. The vessel has a lower center of gravity and is a wider and more subglobular than Vessel B. It could have been used for general cooking and would have been relatively stable, but still able to be tipped.

#002-4586 Vessel B from Unit 100-19 (Figure 6.19b). Vessel B contrasts markedly with Vessel A, which was found next to it, although both appear to be cooking vessels. Vessel B is more elongated and cylindrical, but shorter, and it has a taller rim that is more gradually everted, and the neck and body are very thin (about 5 mm). The base of the vessel is not present, but the estimated height of the vessel is greater than 29 cm, and the approximate height to width ratio exceeds 1.30:1. The tall, moderately everted rim is 25 cm at the maximum diameter of the orifice and 21 cm at the minimum diameter, and the sides expand to a maximum body diameter of 25 cm. There are mending holes 4 cm below the lip and striations on the rim parallel to the lip. The striations may derive from the vessel being supported, which may explain the fracture of the rim. It is possible the scratches resulted from a covering being attached to the orifice, but the depth of the striations suggests they were the result of greater pressure than that would entail. The thickness is 4.5-6 mm from the bottom of the fragment to the top of the upper body, where it expands to 9 mm in the middle of the rim then tapers to 6.5 mm at the lip. The lip varies less in thickness and form than does the lip of Vessel A.

The exterior shows smoothing from handling at the widest portion of the body. The total weight of the sherds attributable to the vessel is slightly less than 1 kg, thus the weight of the entire vessel would have exceeded 2 kg. The volume of the vessel is approximately 12 liters, which is about half that of Vessel A. The interior and exterior surfaces have been heated in a relatively well aerated environment.

The upper body is only minimally constricted and the rim does not significantly restrict the orifice; therefore, access to the contents is not markedly obstructed, but the moderate size and width of the vessel and its elongated body do not lend themselves to preparation of large quantities of food or foods that require manipulation of the ingredients. The interior has a very dark gray (7.5YR3/1) organic stain that terminates in a horizontal line. It is quite probable that this stain derives from boiling liquid. The presence of this stain is particularly important because it helps identify this as a cooking vessel, despite its relatively narrow width. The tall, gradually everted rim lends itself to pouring, as does the high center of gravity. Additional uses may have included transportation of liquids because the thinness of the walls and moderate size would allow portability.

#002-4600 Feature 100-37 (Figure 6.21a). The tall, slightly everted rim of this vessel is 32 cm at the maximum diameter of the orifice and 30 cm at the minimum diameter. The rim thickens toward the lip to a thickness of 8-11 mm, and below the neck the vessel thins to 4 mm. There is not enough of the body present to allow description of the middle and lower portion of the vessel, but minimal expansion below the neck suggests a relatively cylindrical body, not much wider than the rim.

The interior has a black (5YR2.5/1), organic stain that terminates in a horizontal line at the bottom of the neck, about 7 cm below the lip (Figure 6.43a). It is quite probable that the stain marks the top of liquid boiled in the vessel. The large orifice diameter and minimal restriction of the orifice would facilitate manipulation of the ingredients. Although the vessel could have been used for storage, the thin walls lend themselves better to thermal conductivity for cooking than strength for storage. The thinness of the walls and the size may have prohibited frequent movement.

(#002/4904) Unit 100-97 (Figure 6.18d). The tall, strongly everted rim is 27 cm at the maximum diameter of the orifice and 24 cm at the minimum diameter. The convex rim expands from 5.5 cm at the neck to 6-9 mm at the lip. There is a black encrustation on the topmost 2 cm of the interior. The origin of this stain is not apparent, although it is possible that it was deposited when the vessel was covered while cooking. The remainder of the interior and the exterior of the rim are uniformly dark reddish gray (5YR4/2). None of the body of the vessel was recovered, thus it is not known if the interior of the body bore evidence of use for cooking.

(#002/4815/4816) Feature 100-112 (Figure 6.32a). The extremely tall, slightly everted rim of this vessel is 27 cm wide at the maximum diameter of the orifice and 26 cm wide at the minimum diameter, and the upper body gradually expands to a diameter slightly greater than 32 cm. The estimated height is 41 cm, which would yield a height to width ratio of more than 1.30:1. This vessel is comparable to other large vessels, such as Vessel A and the rim from Feature 100-7 (Figure 6.30b) in body form and probably exceeded 27 liters in volume.

The thickness could indicate use for storage or processing, but the interior has a stain that begins about 10 cm below the lip and is consistent in darkness for 13 cm downward (Figure 6.43b) and may substantiate use of the pot for cooking. The width of the orifice and body and the relatively unrestricted orifice further support the possibility that this vessel could have served that purpose. The partially flattened bottom (Figure 6.39e) would combine with the low center of gravity and wide body to provide stability.

(#002/4719) Feature 100-115 (Figure 6.24m). The tall rim is strongly everted at the top and is 24 cm at the maximum orifice diameter and 20 cm at the minimum diameter. The sherd does not extend below the neck, but very tall, relatively vertical rims in other rim groups are from comparatively cylindrical vessels. The two large, straight sided upper body sherds that appear to belong to this vessel further increase the possibility that the vessel is somewhat cylindrical. These two sherds have interior staining that shows a transition from a dark stain to a lighter one. These stains may derive from desiccated liquid that infiltrated the walls during boiling. The narrowness of the vessel does not seem to support its use for cooking large amounts, but liquids could have been prepared in this pot. The everted rim would make stirring and pouring easy.

(#002/5224) Unit 100-260 (Figure 6.34c). The short, slightly everted rim is 19 cm at the maximum diameter of the orifice and 17 cm at the minimum diameter, and the body expands very gradually to a maximum diameter of at least 32 cm. In order for the vessel to expand so markedly at such a steep angle, the vessel must have been relatively tall. The rim and upper body are thin (5 mm) and the vessel body thickens very abruptly from 4 mm to 7 mm in thickness between two coils then expands to a maximum thickness of 8 mm. This abrupt change in thickness and curvature corroborates the importance of specific upper body and rim attributes for particular functions. There is a distinct transition line to a dark, organic stain on one of the large body sherds. It is quite probable that this stain derives from boiling liquid in the vessel. The relatively narrow orifice would restrict access to the contents, but if liquids were boiled this is less of a problem than with other kinds of cooking. The combination of a wide body and thin walls may have restricted the portability of the vessel.

(#002/4801) Unit 200-98 (Figure 6.40c). This is the lower half of a small subglobular or globular vessel with a maximum diameter of 21 cm and a partially flattened base. The irregular base is 7.5-10 cm in diameter and has a slight concavity in the bottom. The sides are relatively thick, ranging from 8-11 mm, with a mode of 9 mm. Although this vessel is at the lower end of the size range for Falls Plain vessels, the body thickness is at the high end of the range. There are no distinctive color or wear patterns that indicate the function of the vessel, and the small size and the thickness may be disadvantageous for cooking; thus, this may be a personal or small group serving vessel.

(#002/4602) Feature 100-37 (Figure 6.40b). This is a basal fragment of a small vessel with a nearly round bottom. The sides are relatively thin (5-6 mm) and the lower body expands to about 18 cm in diameter about 5 cm above the bottom, but this is not the maximum diameter of the body. There is a gray ring directly above the bottom on the interior, but it is not dark and organic like the stains on some other vessels. This discoloration more closely resembles smoke discoloration than organic staining. The exterior is uniformly light red (2.5YR7/6) in color and does not have smudged areas. The small size of this vessel and the lack of an organic stain may indicate that the vessel had a function other than that of a cooking pot, perhaps as a personal or small group serving vessel.

(#002/4615) Unit 200-230 (Figure 6.40a). This fragment consists of a base/lower body fragment and a rim/upper body sherd from a large globular vessel. The base is not reconstructable, but appears to be relatively flat and 20 cm in diameter. The maximum diameter of the body is 32 cm, and the walls are of moderate thickness (7 mm or less). The tall, slightly everted rim sherd has a maximum diameter at the orifice of 26 cm and the minimum diameter is 25 cm. This vessel is more globular than other large vessels. The general shape is comparable to the large body fragment from Feature 100-112 (Figure 6.32a), but the base is about 5 cm wider and the upper body is more constricted, and the rim is shorter but about the same diameter at the orifice. The height of the rim offers some protection against splashing and the size of the orifice and slight eversion of the rim allow moderately unimpeded access to the contents. The vessel may be short and have a low center of gravity, which would render it relatively stable.

The interior of the base and lowest portion of the body are reddish yellow (5YR6/6), and a dark gray (7.5YR4/1), organic stain rings the interior, but it begins about 6 cm above the base and extends beyond the top of the lower body fragment, which is approximately the point of maximum diameter of the body. Although this stain is not as dark and organic as some stains on the interiors of vessels, the most plausible explanation is that it derives from desiccated liquid that infiltrated the walls during cooking. The lack of a stain on the lower body and base was noticed on other vessels. A possible explanation is that the stain on the middle of the body was produced when a film of the liquid coated the interior wall as the level of the liquid receded and was baked into the interior surface, but the lower portion of the wall may have been consistently submerged so that the film did not form and become baked into the wall.

(#002/4825/4738) Feature 100-112 (Figure 6.42b). This is a base and lower body fragment from a medium-sized, elongated vessel with a slightly convex base about 14 cm in diameter. The sides expand to 27 cm at the top of the fragment, but the maximum diameter of the vessel may be one or two centimeters larger. Smoke discoloration of the exterior of the base and lower sides suggest possible use as a cooking vessel. The dark patches on the interior do not form a uniform pattern, but become darker higher on the wall. If the stains were formed as a liquid receded, it is feasible that the upper portion of the side was more frequently exposed to desiccated liquid which infiltrated the walls and made them darker.

Intrasite Comparisons

Falls Plain pottery was found for more than 500 m along the axis of 12HR484, and it is probable that the Middle Woodland component is the result of several occupations of varied sizes and durations. Attempts to distinguish between occupations by use of ceramic attributes have not been successful. This is largely due to the sparsity of rims and bases outside of the 100 and 200 Blocks and the 148N49W Trench. Only the 100 Block and the 148N49W Trench had more than 10 features with more than 30 g of Falls Plain pottery.

Although there were many possible Woodland features in the 300 and 400 Blocks and the other Phase III trenches, very little Falls Plain pottery was found in these areas and most features could not be assigned a cultural affiliation.

In the 100 Block, the large vessel fragments were associated with the main activity loci. Vessels A and B (Figure 6.44), cooking and boiling pots, were found outside the west side of Structure X, and a possible cooking pot (Figure 6.18d) was found to the north of the structure. A cooking pot (Figure 6.32a) and a possible cooking pot (Figure 6.32b) were found within the huge refuse pit, Feature 100-112. A cooking pot (Figure 6.21a) and possible personal serving vessel (Figure 6.40b) were found within the very large refuse pit, Feature 100-37. Fifty of the 128 Woodland features excavated during Phase III had at least 30 g of Falls Plain pottery, and three Phase II features within the block had at least 30 g of Falls Plain.

In the 148N49W Trench there were 20 Middle Woodland features, and 14 had more than 30 g of Falls Plain pottery, and two Phase II features within the block had more than 30 g of Falls Plain. Only five of the Middle Woodland features in the 200 Block had more than 30 g of Falls Plain pottery. This may be an indication that the features were associated more with specialized activities than habitation.

The rim and base forms from the 200 Block appear to be comparable to those of the 100 Block. In the 100 Block 26.2 percent of the rims with necks were thinned at the neck, while in the 200 Block 28.6 percent were thinned. In the 100 Block 83.0 percent of the rims had heights of 20-39 mm and in the 200 Block 85.3 percent were within this span. The average thickness of the rims of the 100 Block was 7.09 mm, versus 7.34 mm for the 200 Block rims, and the difference in thickness at the lip (6.86 mm versus 6.95 mm) was even less.

Only one rim and no bases were found in the 200 Block features. A cooking pot (Figure 6.32b) and many of the rims from the 200 Block were clustered around Structure A and the features directly south of it. A secondary cluster of Middle Woodland features was present in the southwest corner of the block, but few had large amounts of pottery.

Farther to the north, the amount of Falls Plain pottery diminished markedly, and there may be a break in the Middle Woodland occupation area. None of the nine Woodland features in the 253N80W Trench were identified as Middle Woodland. The 300 Block had 35 Woodland features, but only seven had more than 30 g of Falls Plain pottery, and grit tempered sherds formed 30-54 percent of the pottery sample in four of these features. It is plausible that some or all of the features with approximately equal amounts of Falls Plain and grit tempered pottery are earlier than the main Middle Woodland occupation. This is supported by the radiocarbon date from one such feature, Feature 300-60, which had a date 110 years earlier than the earliest date from the 100 Block. The rim from that feature was, however, comparable to some rims from the 100 Block. The 400 Block had 46 Woodland features, but only seven had more than 30 g of Falls Plain pottery. The dated feature from the block, Feature 400-7, yielded a date comparable to those of the 100 Block, and the few rims recovered from the block were comparable to rims from the 100 Block, thus it is plausible that the activity in the block was partially contemporaneous with that of the 100 Block.

The amount of Falls Plain pottery decreased abruptly to the south of the 100 Block. Four of the 15 Woodland features in the 63N47W Trench had more than 30 g of Falls Plain pottery, and two of the nine Woodland features in the 15N27W Trench had more than 30 g of Falls Plain pottery. Only six of the 34 Woodland features in the South Block had Falls Plain pottery, and none had more than 16 g. There are no indications of major Middle Woodland activity areas south of the main occupation area around the 100 Block.

Comparison with Other Local Sites

It has not been determined to what extent there is change within Falls Plain ceramics, either diachronically or geographically. The rim and base forms seen at the Zorn Avenue Village site (15JF250), the Hunting Creek site (15JF268), and 12CL103 are present at 12HR484, but these sites have not contributed secure dates to the absolute dating of the type. The Falls Plain dates from the Clark Maritime Centre Archaeological District encompass a huge temporal span that is not supported by the associated diagnostic projectile points. At 12CL103 in the CMCAD, Falls Plain pottery is consistently associated with Snyders and Snyders Variant points (identified in Myers 1986 as Snyders, Manker, Norton, and Bakers Creek points) in feature context. There is one feature that contained an Adena point and Falls Plain pottery, but an earlier feature lay beneath the pit, thus the association is not secure.

The only dates for Falls Plain pottery at the CMCAD were obtained at 12CL103. Feature 55, an expanding sided pit comparable to those of 12HR484, contained Falls Plain pottery and a Snyders Variant point, and yielded a radiocarbon date of 1920 +/- 55 years (Sieber 1986:285-287). As can best be determined from the correspondence, this was the only date from the site that was not run using a weak oxalic acid standard sample, thus it may be accurate. The other radiocarbon dates from the site are suspect. Feature 88, which produced a date of 1840 +/- 55 years RCYBP (Sieber 1986:287-289), contained Falls Plain pottery and two Snyders Variant points. Feature 204, which contained Falls Plain pottery and a Snyders point, produced a radiocarbon date of 1570 +/- 50 years RCYBP (Sieber 1986:296-298). Feature 200, which yielded a date of 1550 +/- 60 years RCYBP (Sieber 1986:294-296), contained Falls Plain pottery and a Snyders point. A date of 1320 +/- 70 years (Sieber 1986:283-284) was obtained from Feature 35, which contained Falls Plain pottery, a Snyders point and a Snyders Variant point. Two dates from Feature 122 (1250 +/- 190 years RCYBP and 1170 +/- 75 years RCYBP) from a sample described by the staff of the testing laboratory as “very small” (DiCarb communication to Resource Analysts, Inc. 1982) were believed to be contaminated by Feature 63 (Myers and Ottesen 1986:402), and the Falls Plain pottery in this feature was not considered to be accurately dated by these radiocarbon assessments.

Snyders and a few Snyders Variant points and Adena points were abundant at the Zorn Avenue Village site, but it is not known if any came from features bearing Falls Plain pottery. At the Hunting Creek site, Snyders points were found in association with Falls Plain pottery in Feature 4, and other Snyders points were found during excavation and surface collection of the site.

The relative dates from the other Falls area sites substantiate the general age and cultural affiliation of Falls Plain ceramics, but the radiocarbon dates from the CMCAD do not correspond to the known temporal range of the projectile points, thus the absolute dates are highly questionable.

Relationship of Falls Plain Pottery from 12HR484 to Other Regional Ceramic Types

Some Adena Plain ceramics from the Bluegrass region of Kentucky bear close resemblances to Falls Plain pottery from 12HR484. Ceramics from the Wright Mound (15MM6) and the submound portion of the Robbins Mound (15BE3) exhibit rim and vessel form characteristics that are similar to those of Falls Plain. These traits include rims with thinned necks and convex forms; globular, subglobular, and cylindrical body forms; and flattened or slightly convex bases. Some of the Falls Plain rims have shapes comparable to folded rims from Peter Village (Tune 1985:Figure 2f), the Wright Mound, and the Robbins Mound. Two of the five rims from Peter Village have marked thickening below the lip. Griffin (Griffin 1943:667) reported that the Peter Village site (15FA166) had one Adena Plain basal sherd with a flat base and angled sides, and the second sherd displayed the slightly convex basal shape found at the Morgan Stone Mound (Haag 1941:Figures 17 and 18). The vessel from the Morgan Stone Mound (Haag 1941:Figure 17) is similar to Vessel B in rim and body form and to the large lower body fragment from Feature 100-112 (Figure 6.42b) in basal form, although the Adena Plain vessel is much smaller.

The absolute dates of Adena Plain pottery in Kentucky indicate that some of these ceramics may be contemporaneous with Falls Plain pottery. A radiocarbon date of 2100 +/- 140 years RCYBP has been obtained from the Robbins Mound, and dates of 2160 +/- 140 years RCYBP and 2000 +/- 150 years RCYBP (O'Malley 1988:48) have been obtained from the Wright Mound. A date of 2140 +/- 110 years RCYBP was obtained from the Peter Village site in association with Adena Plain pottery (Clay 1985:27).

In the middle Ohio Valley, north of the Bluegrass and east of the Falls, a comparable sequence of temper materials appears to occur. Bennett (1986:68, 70) notes that in the Lower Great Miami Valley, despite an abundance of limestone, the Early Woodland pottery is grit tempered, but there is a switch to limestone as the dominant temper in the early Middle Woodland. She further (1986:71) suggests the possibility that limestone may be the dominant temper during the early Middle Woodland throughout southern Ohio. Twin Mounds Plain pottery has rims (Bennett 1986:Figure A-2 a-d, l-q) with forms and orientations comparable to Falls Plain and Adena Plain rims, and some bases are comparable to Falls Plain and Adena Plain bases. Although not discussed in detail, Adena Plain is considered ancestral to Twin Mounds Plain by Bennett. Based on observations made during the present study, it is plausible that Adena Plain is ancestral to and possibly partially contemporaneous with Twin Mounds Plain pottery., and Falls Plain may continue well into the Middle Woodland in the Falls of the Ohio region.

SUMMARY

The descriptive goals of the ceramic study were more successfully fulfilled than were the interpretive goals. Despite thorough measurement and description of the ceramic samples and subsequent attribute analysis, little progress was made in identification of developmental trends within the pottery groups or in refinement of the local ceramic sequence. Perhaps the major impediment to understanding the Woodland components and their associated assemblages was the relative stability of the land surface during the Woodland and in the millennium prior it. The Early Woodland and Middle Woodland deposits in the100 and 200 Blocks were compressed into a layer approximately 20 cm thick, and a small Terminal Archaic component and an extensive Riverton component began within several centimeters below the Woodland midden. The intensity of activity during the Middle Woodland occupation, particularly in the 100 Block, resulted in considerable mixture of deposits. Numerous pits were excavated into earlier deposits by the aboriginal occupants, and earlier materials were frequently found at the same depth as Woodland deposits or above them.

The method of investigation for the site emphasized an intensive look at the area of maximum activity of each component and sampling of the peripheral areas. Hand excavation of hundreds of units in the main areas of the Early Woodland and Middle Woodland occupations resulted in the retrieval of a large sample of grit tempered pottery and a huge sample of Falls Plain pottery. Outside of the main occupation areas there was much less cultural debris, and hand excavation of Woodland units was not undertaken during Phase III. The scarcity of features with pottery suggests that some of the peripheral areas were loci of specialized activities rather than habitation areas, and some of these deposits may have derived from occupations other than those represented by the deposits of the 100 and 200 Blocks, as exemplified by the features in the 300 Block that contained both grit tempered and limestone tempered pottery. Few Woodland features contained large amounts of pottery, and many contained little or none. The Early Woodland component had very little pottery in the features, and the sherds that were recovered, both in features and in the general midden, were consistently small. The simplicity of design and lack of decoration of both the grit tempered pottery and the Falls Plain ceramics further hindered attempts at subdivision of both ceramic groups.

There are not enough large fragments to permit identification of vessel forms among the grit tempered vessels, but the wide orifice diameters of some vessels and their location in the midst of dense fire cracked rock layers suggests they may be cooking vessels and possibly were used for hot rock boiling. A variety of types and patterns of cordage were used for surface treatment, and most vessels appear to have been cordmarked initially. It is frequently difficult to distinguish whether smoothing is intentional or related to wear, and multiple surface characteristics on the same vessel are common. Although there is variety in the exterior surface treatment of the grit tempered pottery, few temporal or cultural divisions have been identified. The grit tempered pottery may represent a series of small occupations.

Comparison with the grit tempered pottery from the Clark Maritime Centre Archaeological District and examination of the collections from those sites leads to the conclusion that the ceramic type Mid Valley Cordmarked is not a valid one and that use of the term should be discontinued. As originally defined, the term encompasses a variety of poorly defined groups that do not share ceramic attributes and may span hundreds of years, and analysis of the pottery from 12HR484 did not clarify the diversity in the ceramic clusters. At present the grit tempered ceramics of the Falls of the Ohio area are not sufficiently well defined to allow categorization into specific temporal or cultural groups or new ceramic types. Although there are similarities between the grit tempered pottery of the Falls area and other regional groups, they cannot be subsumed into any of these groups, particularly the Fayette Thick type.

The thorough measurement, description, and illustration of the pottery produced a comprehensive view of the variation and continuity within Falls Plain ceramics at 12HR484. The study documents variation in the size and form of the Falls Plain vessels, but no traits were identified that could be linked positively with earlier or later stages in the development of the ceramic type. Such traits may exist, but limitations of the provenience data preclude identification if they are present.

The essential characteristics of the Falls Plain sample from 12HR484 are seen in other local sites and, with one exception, the ceramic traits from these sites are all present at 12HR484. In addition to elucidation of the range of sizes and shapes of Falls Plain vessels, the functions of some vessels could be identified and the function of others posited from the characteristics of the reconstructed forms. The variety of activities represented supports the possibility of lengthy or recurrent settlement.

Few definitive statements can be made about the ceramic groups and their interrelationships, but a number of observations can be made. Pottery may have been present in the Falls area as early as 2740 RCYBP (cal B.C. 790-1050 at the one sigma level), but problems with some of the absolute dates from the 200 Block suggest further confirmation is necessary before this early date can be accepted. The radiocarbon dates and characteristics of the interior/exterior cordmarked grit tempered pottery indicate that these ceramics are consistent with the earliest regional types and were present in the Falls area by 2550 RCYBP (cal B.C. 800-540 at the one sigma level) and lasted until at least 2400 RCYBP (cal B.C. 760-400 at the one sigma level). Other grit tempered pottery from 12HR484 came from features that postdated the interior/exterior cordmarked pottery by 80-120 radiocarbon years (cal B.C. 410-210 at the one sigma level), and there may be a transition to limestone tempered pottery at cal B.C. 380-130. During the majority of the time limestone tempered Falls Plain pottery was in use, grit tempered pottery was rare or absent. The possibility of a later transition to grit tempered pottery is suggested by sand tempered Falls Plain rims in and around a feature with limestone tempered Falls Plain pottery.

Falls Plain pottery originates by approximately 2190 RCYBP (cal B.C. 380-130 at the one sigma level) and is the predominant pottery type until at least 2000 RCYBP (cal B.C. 50-cal A.D. 90 at the one sigma level). The radiocarbon dates from the Knob Creek site significantly predate the broad temporal span of the dates from the CMCAD and cast further doubt on their validity. There is a strong association of Snyders and Snyders Variant projectile points and Falls Plain pottery at 12HR484 and at the CMCAD sites, and the dates from the Knob Creek site correlate well with the established temporal span of these tools (Justice 1987:203) and strongly indicate that most or all of the CMCAD dates are erroneous.

The similarity of Falls Plain ceramics to Adena Plain pottery of the Bluegrass region of Kentucky provides a valuable link between these regional Middle Woodland groups and demonstrates shared influences. The expanded sample of Falls Plain pottery provided by12HR484 affirms the links to ceramic groups to the east of the Falls of the Ohio area and confirms the lack of affinity with pottery types from the west of the Falls. The Crab Orchard ceramics of the lower Ohio Valley do not resemble Falls Plain pottery in vessel form.

Chapter 7

LITHIC ASSEMBLAGE

The lithic assemblage of the Knob Creek Site provides an unprecedented opportunity to examine Early Woodland and Middle Woodland stone tool assemblages from excavated contexts in the lower Ohio River Valley. The extensive hand-excavation blocks permit rare insights into the interrelationships of a variety of tools and features within habitation areas. Analysis of the lithic assemblage focuses upon (1) detailed description of the projectile points and their variations and continuities, manufacture, and maintenance, as well as the contexts, relative and absolute ages, and affinities; (2) observation of the technological, morphological, and functional characteristics of other tool types, their potential as diagnostic tools, and their interrelationships and distributions; and (3) study of a sample of debitage designed to identify lithic reduction techniques and trajectories. Special emphasis is placed upon the types of chert used for each tool type and the distribution of tools throughout the site. Ultimately, the analysis is intended to assess what types of tools were used during the Early Woodland and Middle Woodland occupations and how the types of tools, the tool forms and functions, and the manufacturing techniques show continuity and change over time.

The lithic industries of the Early Woodland and Middle Woodland components of the Knob Creek Site are clearly based upon bifacial tools and supplemented by retouched and utilized flakes and other expedient tools, often manufactured from biface reduction debitage. Over 60 percent of the tools are bifaces or projectile points (Table 7.1), but a wide variety of tools are represented. Hardstone tools also form a significant part of both industries.

Distinctive tool forms are identified and illustrated in hopes that they can be recognized as culturally diagnostic by information from this report or in combination with data from other sites by future researchers. The essential lack of vertical stratigraphy and the intermingling of debris from multiple components markedly limit attribution of individual tools to a certain component. Partial horizontal separation of the components increases the likelihood that particular tools can be associated with a specific component; therefore, the horizontal proveniences of tools are often included in the discussion.

Analysis of the distribution of previously recognized diagnostic tools and ceramics has led to the conclusion that the main Middle Woodland occupation is centered on the 100 Block and extends northward into the south half of the 200 Block. Based upon this information, tools in the 100 Block have a higher likelihood of being Middle Woodland, and those around the feature clusters in the southwest and east-central portions of the 200 Block have a lesser, but significant chance of being Middle Woodland. The main Early Woodland occupation is centered on the 200 Block, and this or another Early Woodland occupation is present in the 100 Block. Based upon this information, materials found in most of the 200 Block are more likely Early Woodland and some of the tools from the 100 Block also may be Early Woodland. The Phase II South Block is the locus of another Early Woodland activity or habitation area and the Middle Woodland is only sparsely represented there, thus most of the material from this area is likely to be Early Woodland. These correlations are not absolute, but they do form a point of departure for examination of the distribution of cultural materials. The distribution of each tool type is described and where appropriate the tools are linked to possible activity areas and clusters of features in an effort to gain perspective about the significance of these loci.

Projectile Points

The projectile point analysis presents a description of the projectile points and their differences and interrelationships. The tools have been divided into groups based upon shared characteristics derived partially from type descriptions in Justice (1987) then subdivided according to other characteristics. The points are illustrated and the morphological attributes are described and related to manufacture and maintenance, with emphasis on the function, wear, and resharpening sequence. The internal consistencies of the groups are enumerated and the ends of the continua are examined to suggest possible links to other groups.

The distribution of specimens from particular groups (Table 7.2) may reflect the areas of the site used during distinct occupations and provides insight into the spatial patterning of certain activities. Chert preferences (Table 7.3) and sources are used to gain information about the movements and trade networks of the manufacturers. Radiocarbon dates and contextual information are used to establish relative and absolute chronologies. The abundant illustrations are intended to facilitate recognition of atypical tools on sites with less extensive collections. There is a discussion of comparable tools at local and regional sites. Noel Justice provided considerable guidance in the identification of projectile point types and deserves much of the credit and none of the blame for the analysis. Russell Stafford provided invaluable insight into the analysis of the Snyders Variant projectile points

Early Woodland Projectile Points

The Early Woodland projectile point assemblage consists of a very large number of Early Woodland Contracting Stemmed points, primarily those of the Dickson Cluster (Justice 1987:191-198), referred to herein as the Early Woodland Contracting Stemmed Cluster; a moderate number of Turkey-tail points (Justice 1987:173-179); a small number of points that bear traits of both groups (Justice 1987:178), referred to herein as Turkey-tail/Adena points; and a few Early Woodland Stemmed points (Justice 1987:184-189). Early Woodland sites elsewhere in the Midwest (Farnsworth and Emerson 1986; (Emerson and Fortier 1986:494) display a comparable variety of contracting stemmed points and knives, and some of these tools continue as minority types into the Middle Woodland (Butler and Jefferies 1986:528; Emerson and Fortier 1986:494; Farnsworth and Asch 1986:366).

Turkey-tail

The term Turkey-tail has been used as a label for a wide variety of tool forms found from the Midsouth to Canada and from the Mississippi River nearly to the Atlantic Ocean, and it reflects Late Archaic to Early Woodland cultural affiliations (Justice 1987:173-179). The points are known primarily from sizeable caches of large, thin, bi-pointed specimens, frequently in burial context and often of exotic raw materials, particularly Wyandotte chert. The Turkey-tail points (n=32) from 12HR484 (Figure 7.1a-g) were not found in caches, nor were they found in association with burials or in ceremonial contexts. The tools were more utilitarian forms most of which bore some traits of contemporaneous projectile point types.

Seven Turkey-tail points fit the general description of Harrison or Fulton Turkey-tails (Justice 1987:173-175). The blades show thorough use of both lateral edges and vary from slightly excurvate to asymmetrically incurvate-excurvate, dependent upon the amount of use and resharpening. The blades were shaped with broad, shallow flakes and resharpened by a combination of percussion and pressure flaking and are biconvex in cross section. The moderate thickness reflects their essentially utilitarian role. Small, deep side notches separate the base from the blade, and the basal edges of some tools are ground. All these tools are made of high quality Wyandotte chert.

One point with the large, triangular stem with the bivectoral basal edges and narrow blade characteristic of Harrison Turkey-tail points (Figure 7.1c) was recovered from Phase II South Block Feature 104 (Figure 7.2), which yielded a radiocarbon date of 2390 +/- 70 RCYBP, and is associated with the large baked soil area (Feature 78) that is the focal point of activity in the South Block. Within the clay mass was a feature (Feature 78A) with interior cordmarked pottery that yielded a comparable radiocarbon date (2400 +/- 70 RCYBP). Three other Turkey-tail fragments came from the South Block and combine with this one to form 57.1 percent of the sample of Harrison Turkey-tails. The South Block contained 15.6 percent of all Turkey-tails from the site, yet is only about one-sixth the size of the 100 Block and the 200 Block. The other Harrison Turkey-tails were in the 200 Block (Figure 7.3) and the Phase III trenches to the north and south of it.

Some of the other Turkey-tails do not fit well into any known variants (Figure 7.1h). The combination of a broad blade and narrow stem seen on four points resembles McWhinney Heavy Stemmed points (Justice 1987:138-139), a Late Archaic type abundant in the Falls area, but may bear closer affinity to Turkey-tail variants such as Fulton and Fulton Stemmed (Justice 1987:173-179).

The stems of most of the Turkey-tails are moderate in length, with very slightly expanding to very slightly contracting sides, and have basal corners that are tapered or squared. Only one specimen has moderate lateral and basal grinding of the stem. The shoulders vary from horizontal to upward-sloped and some have a distinct notch at the top of the stem. The blades were shaped with broad, shallow percussion flakes, and sharp lateral edges along the entire blade were produced with numerous short, closely spaced pressure flakes. The blades begin excurvate, with the maximum width above the shoulder, become parallel ovate with light retouch, and in later stages are triangular, with the maximum width at the shoulder, and taper markedly to a pointed distal end with a mucronate tip.

In the last stages of resharpening both the length and width of the blade have been reduced, but symmetry is maintained (Figure 7.1g). The importance of the sharp tip and the adjacent cutting edge is evidenced by straighter lateral edges at the distal end of several tools, which indicates additional retouch in this area. The blades are of moderate thickness, ranging from biconvex to flattened in cross section. None of the tools showed impact fractures, but the mucronate and acuminate tips could facilitate use as a projectile point.

All the points are of high to medium quality Wyandotte chert except for one point of St Louis and one of Lead Creek chert, and three of the four tools that resemble both Late Archaic and Turkey-tail points are made of Muldraugh chert. Nearly half (46.9 percent) of the Turkey-tail points on the site come from the 200 Block, 9.4 percent were in the trenches to the north and south of the block, 18.8 percent come from the 100 Block and nearby Phase II units, and 9.4 percent were found in the 300 Block and in a Phase II trench west of the 400 Block.

Turkey-tail/Adena. A group of projectile points (n=17) display a combination of blade and stem attributes that share characteristics with both Turkey-tails and Adena Stemmed points (Figure 7.1**i-l**). These tools reflect a hybrid or transitional form that can be grouped with either type. The points have stems with parallel, slightly expanding, or slightly contracting sides; straight or slightly convex lateral margins, or one of each; and basal edges that are slightly convex or straight and bivectoral. Some points have notches at the top of the stem and appear to be distinctly side notched (Figure 7.1j**)**, others lack the notches (Figure 7.1k) and qualify as stemmed variants, and intermediate forms blur the distinction between side notched and stemmed tools. Blade cross sections vary from flattened to plano-convex to bi-convex. The area of maximum width is near the midpoint or in the lower blade or at the shoulder dependent upon the amount of retouch. Ground and unground basal edges are present in about equal numbers within the sample.

Most of the tools that show a combination of Turkey-tail and Adena Stemmed attributes have blades that are quite similar to those of the large sample of Adena Stemmed points from 12HR484. Deep notches and bivectoral bases are not traits attributable to Adena Stemmed points, but there are continua in the depth of the notches and straightness of the sides and base that link some points with typical Adena Stemmed variants.

Heavily resharpened specimens show use wear and resharpening along the entire length of the blade, a trait seen in both Adena and Turkey-tail points from the site. The last several millimeters of the distal end of some tools are broken off, and the intact tips are either acuminate or mucronate, and in several instances show rounding and polish of the tip and adjacent edges indicative of use for perforation of a moderately penetrable material. Only one tool has a broken blade, and it has numerous step fracture flakes removed from the distal end, possibly a thinning mechanism to produce a sharp cutting edge. One of the tools has a longitudinal flake removed from one edge, perhaps to dull the non-cutting edge of a backed knife.

The blades of all these tools have sloping shoulders and are formed by broad, shallow percussion flakes and are resharpened along the entire edge by pressure flakes. The centers and margins of the flake scars below the broken tips show wear that suggests that they were used even after breakage. The resharpened blades are symmetrical or nearly so, and a sharp, non-sinuous edge was maintained. All but two of the tools are made of Wyandotte chert, and these are made of high quality, heated St Louis chert. Eleven (64.7 percent) of the Turkey-tail/Adena points came from the 200 Block, and ten of these came from within an area 20 m in diameter. Three points (17.6 percent) came from the South Block, one point came from the 253N 80W Trench, one from the 300 Block, and one from the sparsely occupied east ridge of the site. These projectile points are utilitarian forms that show a combination of traits seen in both Turkey-tail and Adena points, and the radiocarbon dates from the South Block (2390 RCYBP and 2400 RCYBP; cal B.C. 757-395 at the one sigma level) may provide a temporal placement for the intersection of Turkey-tail and Adena technologies.

Early Woodland Contracting Stemmed

The Early Woodland Contracting Stemmed Cluster (n=200) is composed of projectile points that share characteristics of stem and blade forms with Dickson Cluster points (Justice 1987:189-198). Adena Stemmed points compose 79.5 percent of the projectile points in the cluster, 8.5 percent resemble the closely related variant, Cypress Stemmed, three tools resemble Little Bear Creek points, and 8.5 percent are the aforementioned Turkey-tail/Adena variants.

Because of the broad temporal span of Early Woodland Contracting Stemmed points these tools were subdivided, primarily on the basis of stem metrics and morphology, to assess whether the morphological variation had chronological significance. The groups (Figures 7.4-7.6) were of necessity somewhat arbitrary because there is enough diversity and conformity within the sample that particular tools with intermediate characteristics could be placed in several different groups and individual groups overlap with one or more other groups.

The proveniences of the points in each group and their proximity to other members of the group and to members of other groups were examined for distributional links and disparities. None of the groups showed distributional anomalies that suggested they were spatially restricted within the site or attributable to only a segment of the Early Woodland temporal span at 12HR484. A satisfactory distinction between diachronic developments and concurrent assemblage variation was not found.

Although examination of the groups of points with comparable stem attributes did not identify tools from distinct occupations, it did facilitate elucidation of functional aspects of the tools. Variations in use wear, retouch, breakage, and rejuvenation indicate functional differences among the tools. Observation of the working edge maintenance methods, sequences of resharpening, proportional reduction of width and length, alternating areas of use and retouch, and alteration of exhausted or broken blades to form other tool types provides a fuller understanding of the tasks responsible for the points attaining certain characteristics essential to their definition and recognition. Certain points are described to gain insight into the attributes that appear to have been considered important to the artisans, and others are discussed to facilitate identification of similar tools on sites that have less extensive collections.

It is understood that these tools generally were multipurpose implements and that they underwent a variety of cycles of use and resharpening. With this taken into consideration, possible methods of use and sequences of retouch are proposed based upon the morphological attributes, macroscopic wear patterns, and types of retouch flakes and their locations on the tools. It is recognized that some of these cycles of use and repair probably were not as linear as those proposed herein; therefore, some of the conclusions were tested by microwear analysis (Pope 2005).

Adena Stemmed. The tools of Groups 1, 2, (Figure 7.4a-e) and 11 (Figure 7.6d-e) **(n=13)** extend the continuum initiated by the Turkey-tails with broad, side notched stems and thin, broad blades. Most of the tools have no notches at the top of the stem, and retouch of the lateral edges yielded a stemmed rather than side notched form. Most of the tools are snapped in the lower portion of the blade. The width and thinness of the blade and stem may have facilitated use as a cutting tool, and the breadth of the blade may have precluded use as a projectile point except in the narrowest examples.

One of the points has several intentional impact fractures that originate from the distal end--one extends down one surface, one breaks the blade longitudinally, and several flakes thin the last several millimeters of the distal end. One point has several impact fractures that thin several millimeters of the distal end. These flakes provided a cutting edge or a graver spur, and may have served some other purpose, as well. One specimen (Figure

7.4e) has a single impact fracture that breaks off the distal end and extends down the center of the blade. The latter provides the best evidence of possible use as a projectile point. All the points were made of high quality chert except one made of Newman chert. Groups 1 and 2 each have four points from the 200 Block and one are from the South Block, and Group 11 has one tool from the 200 Block, one from the 100 Block, and one from the 253N80W Trench.

The Early Woodland Contracting Stemmed tools of Group 12 (n=6) (Figure 7.6f-g) resemble the previous groups but are thicker in the stem and blade and potentially less stable in a haft, but the lateral edges of all the blades are sharp. The asymmetrical, incurvate-excurvate blade of the nearly complete example (Figure 7.6g) is heavily resharpened and the tip is broken off, but it represents the most likely example of a projectile point in this group. All the tools are made of high quality Wyandotte chert. Three of the tools were from the 200 Block, one was from the 300 Block, and two were from Phase II trenches to the east and west of the 300 Block.

Group 5 tools (n=14) (Figure 7.4p-t) are similar to Turkey-tail/Adena points but are closer to Adena points than they are to Turkey-tails. They are characterized by notches at the top of the stem (e.g., Figure 7.4t) that are atypical of Adena Stemmed points and give the upper lateral edges of the stem a slightly rounded appearance, but lower lateral edges of the stem and the basal edge are convex like Adena points rather than bivectoral. The blades resemble the majority of Adena Stemmed points from the site. About half the blades are asymmetrical (e.g., Figure 7.4p), and, with one exception, the distal ends have acuminate or mucronate tips or have the apex of the tip broken off.

Two points (Figure 7.4s) with long, excurvate blades appeared to be relatively unaltered by cycles of use and retouch. These were subjected to microwear analysis to see if the initial use or early use-life could be determined. Polish along the full length of both blade edges of the tools and striations parallel to the lateral edges suggest extensive cutting. Most of the wear was confined to the distal one-third to one-half of the blade. The initial use of both tools was as a knife.

One point (Figure 7.4t) has been reworked into a perforator with a tip that shows wear from use in a twisting motion, and several others have wear and resharpening that suggest similar use. Sharp blade edges were maintained, and resharpening reduced both the length and width of the tools. All the points are made of high quality Wyandotte chert, except two tools of medium quality Wyandotte. One of the two points found in 253N80W Trench came from Trench Feature 154, which had a radiocarbon date of 2280 +/- 70 RCYBP. Eight of the tools (57.1 percent) were found in the 200 Block, 21.4 percent are from the South Block, and one (7.1 percent) is from the 100 Block.

Group 8 tools (n=26 and 20 proximal fragments) (Figure 7.5d-l) are readily recognizable as Adena Stemmed points (Justice 1987:191-196), although one (Figure 7.5l) more closely resembles a Little Bear Creek point. These are characterized by stems of short to medium length and narrow to medium width, with lightly ground or rounded, convex, lateral edges, contracting sides, and convex basal edges. The shoulders are horizontal to upward sloping, and all but two of the complete specimens have comparatively long blades, with slightly excurvate to straight edges. The initial forms of the blades appear to have prominent shoulders and slightly excurvate edges (Figure 7.5i). Subsequent retouch removes the shoulders, and the distal end is shortened and becomes comparatively broader, accentuating the excurvature (Figure 7.5f). Further retouch gradually straightens the edges without major reduction of the length (Figure 7.5g), and, finally, the length is reduced after the distal end gets narrower and steeper sided.

One tool has an impact fracture that extends down the center of one surface. This break could be due to propulsion or could be an intentional rejuvenation measure. Another tool has an angular break at the distal end, which could be due to impact or prying. Two tools with the tip snapped off have the broken distal end reworked into narrow, shallow cutting edges. Two tools show intentional removal of several small step fracture flakes from the distal end. Two blades (Figure 7.5g, j) have acuminate tips that show slight evidence of use in a rotating motion, but the other pointed distal ends are better suited for cutting. Only one tool is markedly asymmetrical. Sharp blade edges were maintained with numerous small, closely spaced pressure flakes.

One unusually large tool with a very broad stem and blade (Figure 7.5i) has the same shape as the smallest of the Adena points (Figure 7.5h) recovered from the site. These two points with the same form but markedly different sizes were subjected to microwear analysis (Pope 2005) to see if they served different functions. Analysis showed that both tools were used for cutting animal remains. The smaller tool was extensively used for cutting and showed additional use of the tip against bone/antler, but, although the possibility cannot be ruled out, it bore no evidence of use as a projectile point. Despite the large size and broad blade, the larger tool also was used as a projectile point. These results are noteworthy because the broad blade could be viewed as a potential detriment to use as a projectile point and the small size of the other tool could be considered an asset for use in such a manner.

As part of the investigation of the advantages and detriments of certain stem forms, three points with long, narrow stems and long, narrow to moderately narrow blades (Figure 7.5k) were examined to see if they displayed distinctive use wear. The long, narrow stems were considered well adapted insertion in a socketed haft and able to provide stability for cutting. All three tools showed extensive polish from cutting meat and hide on both edges, with the heaviest wear in the distal one-third of the blade and more pronounced polish on one edge and one surface. All the tools displayed random striations on the distal blade edge, and striations on the midsection both parallel and perpendicular to the edge. The distal ends of two tools showed contact with bone/antler. All three tools apparently were used intensively for butchering.

All the tools were made of high to medium quality Wyandotte chert, except two made of high quality, heated Muldraugh chert, and one of high quality St Louis chert. Twelve of the points are from the 200 Block, six are from the100 Block, seven are from the 300 Block, including the unusually large and small points, and one is from the 400 Block.

Ten proximal fragments were broken in the middle of the stem, seven were fractured slightly above the shoulder, three were broken in the middle of the blade, and one may have an impact fracture. With the exception of the last specimen, the breaks appeared to be from prying. All the fragments were made from high to medium quality Wyandotte chert, except one specimen of high quality, heated Muldraugh, two tools of medium quality Muldraugh, and one tool of medium quality Allens Creek chert. Sixty percent of the fragments came from the 200 Block and 40 percent came from the 100 Block.

The Group 4 tools (n=8) (Figure 7.4k-o) are Adena Stemmed points with slightly more parallel sided stems than the Group 8 points. The tools with intact distal ends all have mucronate or acuminate tips, and three tools (Figure 7.4k, n, o) have wear suggestive of perforation and drilling. Sharp blade edges were maintained, and resharpening reduced both the length and width of the blades. One tool has a lateral edge resharpened to exhaustion and a portion of one surface and the lateral edge on the opposite edge removed by a long longitudinal flake, and several step fracture flakes originate at the distal end. It is plausible that the breakage is an effort to rejuvenate the tool into a graver. The points are made of high quality Wyandotte chert, except one tool made of medium quality Wyandotte, one made of Allens Creek, and one of high quality, heated Muldraugh chert. One of the points is from Feature 300-60, which has a radiocarbon date of 2190 +/- 70 RCYBP. Three of the tools (37.5 percent) came from the 100 Block, two (25 percent) came from the 200 Block, and two from a trench at the north end of the sparsely occupied eastern ridge.

Two points from this group and a point from Group 7 with comparable small stems and different blades were subjected to microwear analysis (Pope 2005) to see if the blades represented different functions. The tool with the widest blade (Figure 7.4n) has polish along the length of both edges and heavier wear toward the tip, and there are striations parallel to the longitudinal axis on the distal half. These attributes suggest it is a knife. A tool with a similar shape but a smaller blade (Figure 7.4k) has extensive polish from contact with hide along the full length of both blade edges and more wear on one of the edges. It also has striations parallel to the edge suggestive of use to cut through hide. The comparable wear and similar stem size could indicate that this tool is a resharpened variant of the other implement. The tool with a similar stem but a mucronate tip (Figure 7.5c) had more polish streaks on the surface than on the edges, which suggests primary use as a projectile point through many cycles of resharpening and use. This does not appear to be a more resharpened variant of the other two implements with a mucronate point formed as a rejuvenation technique.

The Group 6 tools (n=6) (Figure 7.4u-x) are Adena Stemmed points that have stem forms comparable to Group 4 points, but have slightly wider stems. Three of the tools are of high quality Wyandotte chert, one is of high quality St Louis, one is of Newman, and one point may be of Fort Payne chert (Figure 7.4u). Two-thirds of the tools are from the South Block and one-third are from the 200 Block.

The four complete tools may represent sequential stages of resharpening and possibly alternating methods of use. The largest tool (Figure 7.4u) has an excurvate blade with an elongated tip with considerable wear. The next widest tool (Figure 7.4v) appears to represent a stage where the blade is reduced in length and is too wide for perforation but is at its optimum for cutting along the entirety of both blade edges. After several resharpening episodes the blade may reach the triangular, slightly incurvate form represented by the next tool in the progression (Figure 7.4w), which shows polish on the tip. The last tool (Figure 7.4x) has been resharpened to a width narrower than the base and does not a cutting edge along most of the blade, but the thin distal end of this asymmetrical, incurvate-excurvate blade has sharp edges. To examine the relationships between morphology and use and maintenance and to test the possibility that the four tools represent a progression of retouch stages they were sent for microwear analysis. Due to temporal constraints only the latter two tools were analyzed (Pope 2005).

The edges and surfaces of the point with the triangular blade (Figure 7.4w) bear evidence of intensive use on soft tissue, and the use wear increases toward the distal end. The wear suggests repeated use and maintenance as a projectile point and possible use as a knife late in its use-life. The other point (Figure 7.4x) displays haft wear, probably from wood, directly above the juncture of the blade and stem. The distal half of the blade shows considerable wear, and the blade is asymmetrically worn from use as a knife, and the tip may have been used against wood late in its use-life. At least in the instance of these two tools, there does not appear to be comparable usage.

The Adena Stemmed points of Group 7 (n=12) (Figure 7.5a-c) are characterized by stems of at least moderate length and width, with straight edged, slightly contracting sides and slightly convex basal edges. All the tools have retained prominent, slightly sloping to horizontal shoulders and have comparatively long blades with slightly excurvate edges, except one tool that has been resharpened until the blade is triangular with straight sides (Figure 7.5a) and one tool with a transverse fracture of unidentified origin. The distal end of one tool has been reworked into a beveled, rounded cutting edge. All the other points have acuminate or mucronate tips. Three tools (Figure 7.5b, c) have very sharp tips, two have long, thin mucronate tips, and two tools have the terminus of the tip broken off. None of the tips bore evidence of use in a rotating motion. Sharp blade edges were maintained, and resharpening appears to have reduced the width more than the length. All the points are made of high quality Wyandotte chert, except one tool of medium quality Wyandotte, and one tool of medium quality Muldraugh. One-third of the tools were found in the 200 Block, one-fourth came from the 100 Block, 16.6 percent are from the South Block, 16.6 percent from the 300 Block, and one point was recovered in the 253N80W Trench.

Three points (Figure 7.7) with long, parallel sided stems and triangular blades with acuminate tips, two from Group 7 and one from Group 3, were subjected to microwear analysis (Pope 2005) to see if they had specialized usewear. The proximal one-third of the blades bore haft wear, and the distal one-third showed contact with meat, bone/antler, and hide that suggests use as projectile points and possibly as knives.

The Group 9 tools (n=3**)** (Figure 7.5m-o) may be variants of Group 7 that show sequential stages of a resharpening pattern. All the tools have acuminate or mucronate tips. One tool (Figure 7.5m) has a thin, very sharp, strongly asymmetrical blade. Another point (Figure 7.5n) appears to be a more resharpened version of the first point and is thicker and has asymmetrical, alternately beveled sides that are sharp despite the steep angle of the flakes. The third point (Figure 7.5o), which appears to be a more resharpened version of the second point, is symmetrical and has a centered, steep edge that is exhausted. The blade variation appears to derive from use of the beveled, dulled edges as striking platforms to produce the next cutting edge. The length of the blade appears to remain constant during resharpening. Two of the points are made of high quality Wyandotte chert, and one tool is of medium quality Muldraugh. Two of the tools were found in the 300 Block and one in the 253N80W Trench.

To examine the relationships between morphology and use and maintenance and to test the possibility that the three tools represent a progression of retouch stages they were sent for microwear analysis. Due to temporal constraints only one tool was analyzed with a microscope (Pope 2005). The implement subjected to microwear analysis (Figure 7.5o) shows extensive evidence of use and retouch as a projectile point. There is haft wear on the proximal one-third and intensive wear from contact with soft tissue as a point or knife and no evidence of contact with other materials. The tip could have been used to penetrate hide.

Group 10 (n=7) (Figure 7.6a-c) is composed of points that might ordinarily be attributed to a Late Archaic component but have attributes that link them to one another and possibly to the Adena points, especially the narrow stemmed tools in Group 8 and the Cypress Stemmed points in Group 3. Part of the reason for the dissimilarity may be the flaking qualities of the raw material. All the points in the group have sloping shoulders and symmetrical blades. Two of the tools have the tip broken off and the others have acuminate tips. One tool has been resharpened to exhaustion and the others have sharp sides.

One of the interesting aspects of this group is that one point of high quality but flawed Newman chert (Figure 7.6b), the point of Wyandotte chert (Figure 7.6c), which more closely resembles a Little Bear Creek point**,** and the point of Salem chert (Figure 7.6a) came from the same unit in the 200 Block. These tools were found horizontally clustered but at a difference of 17.5 cm in depth in an area considered to be a possible pit but lacking a soil difference to distinguish it from the matrix. The other tool of Newman chert also came from the 200 Block. The three points of Muldraugh chert came from the100, 300, and 400 Blocks. This group has a very low incidence of the use of Wyandotte (14.2 percent) compared to the overall percentage of 80.5 percent for all Adena points. The group accounts for half of the Early Woodland Contracting Stemmed points made of Newman chert and one-third of the Early Woodland Contracting Stemmed points made of chert outcropping more than 50 km east of the site.

Cypress Stemmed. The tools of Group 3 (n=17) (Figure 7.4f-j) fit the description of Cypress Stemmed points (Justice 1987:197-198; Figure 41o-q). These show a higher incidence of incurvate blade edges than any of the other Early Woodland point groups. Four additional tools began as Cypress Stemmed points and were subsequently transformed into drills (Figure 7.4g) and perforators. The less resharpened tools (Figure 7.4h) display sharp cutting edges on both lateral edges, and the blade becomes shorter and more incurvate and slightly asymmetrical when resharpened**.** The more heavily retouched examples show use in a piercing and twisting motion (Figure 7.4g, j). There is extensive retouch to maintain both functions. In some instances the narrowness of the stem may be attributable to fracture from lateral pressure caused by rotation in the haft (Figure 7.4f).

One tool has sides too steeply retouched to function as a cutting tool, but the tip has been flaked to produce a tiny graver spur. Another point has crushed lateral edges indicative of heavy use in a twisting motion, and the diagonal break of the blade may be from an intentional blow to produce a graver spur. Another of the points has at least seven forceful blows to the distal end, which produced hinge fracture flakes that removed both lateral edges and pieces of the distal end of the tool. These blows may have been intended to prepare the blade for rejuvenation into a drill or perforator.

This group has a lower incidence of the use of Wyandotte chert (68.8 percent) than the Adena Stemmed points (80.5 percent), and single points are made of high quality St Louis, Brassfield, Newman**,** Holland (Figure 7.4g)**,** and Salem cherts, and medium quality Muldraugh. The 200 Block contained 43.8 percent of the points, 18.8 percent came from the 100 Block, and 18.8 percent from the 253N80W Trench, and only one tool (6.3 percent) came from the South Block.

Little Bear Creek. Two Little Bear Creek points (n=3) (Figure 7.5l; Figure 7.6c) are distinguished by their broad blades and short, narrow stems. Both tools were made of high quality Wyandotte chert. One of the tools came from the 100 Block and one came from the 200 Block.

Discussion of Early Woodland Contracting Stemmed points. Few of the Early Woodland projectile points appear to have had stem and basal grinding as part of the manufacture process. Rounded lateral edges on the proximal portion of the blade, indicative of binding, are common, but rounded stem and basal edges are more likely due to movement of the tool within the haft. Rounded edges are more accentuated on resharpened tools than on those broken during the early stages of the use-life. The blades overwhelmingly show emphasis on use of the entire blade and the tip for cutting, with the heaviest wear on the distal portion. Some distal ends show use for perforation, and occasionally there is evidence of use of the tip for boring.

There is little macroscopic evidence to distinguish use as a projectile point from use as a knife. Large hinge fractures are extremely rare, and breakage along the basal margin is very infrequent. Although perverse fractures and bend breaks can indicate fracture upon impact, they can derive from other uses as well. Mucronate and acuminate tips can be interpreted as preparations for use as a projectile point, but often display use as a perforator or knife. Microwear analysis indicates that six of the 16 tools examined microscopically were primarily projectile points and one was used about equally as a point and as a knife. Of the seven projectile points, four had markedly acuminate tips and one had a mucronate tip, and the other two were not pointed as sharply. Several tools identified as knives had tips as pointed as some of the projectile points. The Early Woodland Contracting Stemmed points are quite sturdy, and less than half show breaks of the blade or stem.

The method of manufacture is very consistent throughout the assemblage, as is the method of resharpening. The blades generally appear to have begun with excurvate sides that became parallel ovate with light retouch and later became straight-sided and triangular, and in a few instances incurvate, as the resharpening process continued. It appears that many tools began with wide blades that had slight barbs that were removed as the tool was resharpened, which usually resulted in a shoulder that was horizontal and was eventually slanted upward by further retouch. Microwear analysis of a small sample of projectile points indicated that this linear progression did not apply to all tools. There was diversity in the manner in which tools with similar forms were used and resharpened. The analysis suggested some implements were used primarily for a single purpose throughout their use-life and other comparable forms had different or multiple uses. Preliminary results of the analysis suggest examination of a larger sample and replication studies are necessary before delineation of resharpening sequences can be accomplished accurately.

Although the dulled cutting edges were retouched frequently, resulting in some asymmetry, basic symmetry generally was maintained. Almost all the blades were initially shaped with broad, shallow percussion flakes and resharpened with a combination of percussion and pressure flakes. The stages of retouch suggest that the distal end of the tool was the focal point of much of the resharpening. There generally was more reduction of the length than the width, but both might be reduced in the process of resharpening.

Exhausted or broken blades were sometimes reshaped by blows to the distal end that removed worn or unusable edges or ends and produced cutting or scraping edges, graver spurs, or perforator points, or formed striking platforms that prepared the blades to be reworked into drills or cutting tools. Similar techniques were used to produce flat transverse edges for backed cutting tools or to thin the stem to facilitate hafting.

The Early Woodland Contracting Stemmed groups differ with respect to possible functions. The broad stemmed, broad bladed points of Groups 1, 2, 11, and 12 show an emphasis on use for cutting. The blades have sharp lateral edges, and the thinness is particularly conducive to cutting, but this may have resulted in structural weakness because most are broken across the middle. There is little information about the distal ends of these tools because all but one of the tips are broken off. The tools of Group 2 also show frequent breaks from prying and subsequent retouch and reuse of the broken distal ends for cutting and graving.

The other projectile point groups do not show as high an incidence of broken blades as the aforementioned groups, perhaps because of the relatively thicker blades. Sharp edges were maintained on the specimens in all the groups, and mucronate and acuminate tips were prevalent, which indicates an emphasis on penetration with the tip and cutting with the upper portion of both lateral edges. Removal of flakes from the distal ends of broken tools to rejuvenate them into graving, perforating, and cutting tools is common.

The Group 3, Cypress Stemmed, points are the only tools predominantly used for drilling as well as perforation and cutting. The tips of tools in Groups 4 and 5 are not as robust but show use for penetration, and some bear evidence of limited use in a twisting motion. The Group 6 specimens were intended to illustrate a sequence of resharpening and to show possible alternation between use for cutting and for penetration as the resharpening process proceeds, but microwear analysis was incomplete. The tools of Group 7 show predominant use for cutting, and the delicate tips are suitable for perforation but not drilling. The Group 9 points are comparable to this group, but were chosen to assess the possibility that they represent stages of retouch in which the angle of the working edge and possibly the function was altered during resharpening. This hypothetical progression could not be evaluated because microwear analysis was not completed. Group 8 tools are primarily cutting tools, but a number of other uses are suggested by patterns of breakage and retouch, and the variations in stem and blade attributes are linked by intermediate forms. The tools of Group 10 illustrate that imperfections in the raw material and extreme resharpening can result in tools that are difficult to recognize as part of the Early Woodland projectile point sample. The strong emphasis on maintenance of a mucronate or acuminate tip and sharp lateral edges allows the possibility that the tools in most groups could be used as projectile points, as well as for cutting, piercing, or drilling.

The Early Woodland projectile point sample reflects a preference for retention and full exploitation of hafted formal tools of high quality chert prior to their discard. The high incidence of rejuvenation and alteration into other tool types of the exhausted or damaged tools demonstrates an emphasis on conservation of the high quality Wyandotte chert. Only one Early Woodland projectile point, a Turkey-tail point, was able to be refit with a fragment broken from it.

Early Woodland Straight Stemmed points

There were a small number of projectile points scattered throughout the site that are identifiable as variants of the Early Woodland Stemmed Cluster (Justice 1987:184-189). It is not evident whether these derive from one of the main Early Woodland occupations or whether they are the result of ephemeral activity during a brief encampment.

Cresap. The two complete Cresap Stemmed points (n=3) (Justice 1987:187); Figure 40) are markedly different in size (Figure 7.8a-b). Both have a small, straight-sided, straight based stem, a very narrow, sloping shoulder, and a narrow blade. The lateral edges of the stems are not ground. The smaller of the points has a blade less than half the length of the blade of the other point, but it appears to be a heavily retouched version of the larger point. The length of the blade is reduced by retouch, but the narrow width remains essentially the same. The sharp tip and blade edges were produced by small, closely spaced pressure flakes. One tool is made of high quality Wyandotte chert and one is made of high quality, unheated Muldraugh. Two tools were found in the 100 Block and the other in a Phase II unit directly west of the 100 Block.

Kramer. Three small, very heavily resharpened points (Figure 7.8c-d) appear to be comparable to Kramer points (Justice 1987:184-187) reported from the West Runway Site (Duerksen, et al. 1992; Wall, et al. 1995). These have short, straight to slightly expanding stems, with straight to slightly convex basal edges. Little can be determined about the original form of the blades, which are still slightly excurvate, because they have been reduced to almost the width of the stem. All the points were made from high quality Wyandotte chert. Two were found on the sparsely occupied east ridge of the site, and one came from the 200 Block.

Robbins. Two Robbins points (Justice 1987:186-189; Figure 41), markedly different in size (Figure 7.8e-f), were recovered. One example has a small, straight-sided, straight based stem, horizontal shoulders, and a large, slightly asymmetrical, excurvate blade, with a mucronate tip. The smaller point has a stem of nearly the same size as the larger point and a slightly asymmetrical blade, with a width nearly as great but a blade length about half that of the other tool. This appears to be a more retouched version of the larger point. One tool is from the 100 Block and the other is from the 400 Block.

Six other points resemble Robbins points found at the top of the Cresap Mound (Dragoo 1963:Plate 40). These tools are one end of a continuum of stem length and width and blade width within the Early Woodland Contracting Stemmed Group 4 points and have a distribution similar to that of the other Group 4 points and can be considered Early Woodland Contracting Stemmed points. Two points (Figure 7.8g-h) have short, straight-sided, convex based stems and broad, barbed blades. Three points have narrower stems and broad, barbed, slightly asymmetrical blades that contract gradually from the maximum width at the shoulder. The distal ends are pointed, and resharpening appears to reduce the length more than the width. All the tools are made of Wyandotte chert. Two of the points are from the 100 Block, two are from the 200 Block, one is from the 253N 80W Trench, and one is from the 300 Block.

Several other tools (Figure 7.8i-l) share the broad blades of the above points and also have similarities to Snyders points. Two points (Figure 7.8i-j) have thin, broad, barbed blades and short, broad, contracting stems. These blades are especially similar to those of some Snyders variants, as well as some Adena variants, such as Belknap points recovered from the Ambrose Flick Site (Stafford 1992:Figure 7.8m). One of the points is from the South Block and the other is from the 253N 80W Trench.

Three points (Figure 7.8k-l) have narrower blades, one with a mucronate tip and one with an acuminate tip, and expanding, convex based stems that are closer to Snyders than Adena. It appears that these tools are reduced more in width than in length by resharpening. The most heavily resharpened example has a long, triangular blade with straight edges. One tool is snapped in the middle of the blade by impact or prying. All three of these tools are from the 200 Block.

The blades of all the above points were shaped by broad percussion flakes that overlap or nearly overlap the flakes from the other edge and yield a moderately thin, biconvex cross section. Small, closely spaced pressure flakes were used to keep the entirety of both lateral edges sharp. All the points were made of high quality Wyandotte chert.

Although none of these points conform closely to classic examples of a single type, they show trends in manufacture that may presage Snyders points. These tools differ markedly from some of the Early Woodland Straight Stemmed points and appear to indicate multiple uses of the site during the Early Woodland. At the Cresap Mound (Dragoo 1963), there is evidence of a distinct temporal difference between the occurrence of Cresap points and Robbins points, with Adena Stemmed points intermediate. A similar temporal span may be indicated by the projectile points at 12HR484.

Summary of the Early Woodland points

Early Woodland points, especially Adena Stemmed points, were found throughout the site and were especially abundant in the South Block and 200 Block. The points were less common in the 100 Block, the 253N80W Trench, and the 300 Block and occurred in only small numbers in the 400 Block. The presence of a moderate number of these points in the 100 Block may signify continuation of the main Early Woodland occupation from the 200 Block, but the absence of Early Woodland Contracting Stemmed points in the 148N49W Trench, between the two blocks, could indicate that the 100 Block and 200 Block materials were from different occupations. The absence of Turkey-tail/Adena points in the 100 Block may be a further indication that a minor Early Woodland occupation found in the 200 Block is not represented in the 100 Block.

The numbers of Early Woodland Contracting Stemmed points in the 253N80W Trench and the 300 Block are at least proportionally equivalent to those of the 100 Block because they were obtained through trackhoe scraping and feature excavation rather than hand excavation. These areas could be outliers of the main Early Woodland occupation. The number of points in the 400 Block is proportionally the smallest of the aforementioned excavations areas, but the presence of numerous Early Woodland features and comparable amounts of pottery could indicate that it had an occupation of equivalent size.

Turkey-tail points also were most abundant in the South Block and 200 Block, and there were moderate numbers in the 100 Block. The 200 Block contained 46.9 percent of the Turkey-tails and 64.7 percent of the Turkey-tail/Adena points, and all but two of these came from a 26 x 26 m area. This may be further evidence of the concentration of the Early Woodland activities and could denote a separate occupation within the Early Woodland component.

The distribution of the Turkey-tail, Turkey-tail/Adena, and Early Woodland Contracting Stemmed points was such that it cannot be confidently stated that the Turkey-tail points completely precede the other two groups. Limitation of interior cordmarked pottery to the South Block and 200 Block and the prevalence of Turkey-tail points in these two areas may indicate that these were the epicenters of one or more of the earliest occupations. The radiocarbon dates from the South Block corroborate the association of interior cordmarked pottery and Turkey-tail points, but Early Woodland Contracting Stemmed points also were abundant in the South Block. Feature 200-32, which had interior cordmarked pottery in and around it and a radiocarbon date earlier than those from the South Block, was within several meters of two Turkey-tail points and several Adena Stemmed points, and Feature 200-56, which contained both interior cordmarked pottery and an Adena Stemmed point, also was within several meters of four Turkey-tail points and numerous Adena points.

The midden in the Phase II South Block area is spatially restricted and relatively isolated from the other Early Woodland loci and could derive largely from a single occupation. However, the density of the midden and relative number of tools are comparable to the 200 Block. The midden derives overwhelmingly from the Early Woodland component, and it yielded an inordinately large number of Early Woodland projectile points and evidence of a variety of activities.

There is considerable variety among the 28 Early Woodland projectile points found in the South Block, all of which came from the Phase II area or within 10 m of its northern end. Particularly noteworthy is the variety in the stem and blade attributes of these projectile points. Harrison Turkey-tails, other Turkey-tails, Turkey-tail/Adena points, and one of the

Turkey-tails that resembles Late Archaic points, as well as Adena Stemmed, Cypress Stemmed, and one of the tools that resembles both Robbins and Snyders points, all were recovered therein. The 40 units (160 m^2) of the Phase II area, which are encompassed within a rectangular block 12 x 18 m in size, contained 15.6 percent of the Turkey-tails, 17.6 percent of the Turkey-tail/Adena points, 10.3 percent of the Adena points, and 6.3 percent of the Cypress Stemmed points from the site. This diversity may indicate that the deposits do not derive from a single occupation. The points from the 253N80W Trench and the 300 Block also showed considerable morphological diversity for such small samples.

It is possible that the Early Woodland component comprises several occupations with tool kits that are indistinguishable given the lack of vertical separation. While there are tools that conform to established projectile point types, such as Adena Stemmed, Cypress Stemmed, and Turkey-tail, there are groups of tools, such as the Turkey-tail/Adena points, that show combinations of the attributes of more than one established point type, and other groups of tools that display marked variations within a single type. Whether these combined groups represent the terminus of the popularity of one type and the initial stages of another or whether they represent a melding of two contemporaneous types is not evident.

One of the dominant characteristics of the Early Woodland assemblage is the use of high quality chert, overwhelmingly Wyandotte, and over 95 percent of the chert could have been obtained within 50 km of the site. Wyandotte chert was used for 80.5 percent of the Adena points and 83.8 percent of the Turkey-tail points. Three Early Woodland Contracting Stemmed points were tentatively identified as Fort Payne and Dover and another tool is made of Holland. These are the only points made of chert that outcrops more than 50 km to the west of the site, and they represent less than two percent of the sample. Four Early Woodland Contracting Stemmed points are made of Newman chert, and one made from Brassfield chert. These cherts (<3 percent of sample), though from more than 50 km to the east of the site, could have been obtained from the Ohio River gravels near the site. The only Turkey-tail (3.2 percent of sample) of non-local chert is a point of Lead Creek chert, which outcrops more than 50 km to the west. It appears that the Early Woodland inhabitants of the site engaged in minimal travel or trade outside the local area to obtain the cherts from west of the site and may not have traded or traveled to the east either.

Early Woodland points in features

Fewer than 10 percent of the Early Woodland points were recovered from feature contexts, and only one feature contained more than one Early Woodland specimen. Eighteen Early Woodland Contracting Stemmed points were recovered from features, including features at opposite ends of the site.

It is not evident if any Early Woodland Contracting Stemmed points predate the appearance of pottery on the site. One-third of the features with Early Woodland Contracting

Stemmed points contained less than one gram of grit tempered pottery (Table 7.4), but grit tempered pottery was sparse throughout the site and at least one feature with a radiocarbon date indicative of Early Woodland cultural affiliation contained no pottery. A Cypress Stemmed point and a Buck Creek Barbed point cooccurred in Phase II Feature 88. The two points display comparable barbs on the blades despite the extensively resharpened blade of the Cypress Stemmed point, and the affinity of these types (Denny 1972; Koldehoff 1992) is evident. Less than a gram of grit tempered pottery was recovered from this feature. Buck Creek Barbed points were found in large numbers in the northwest portion of the 200 Block, in the area with interior-exterior cordmarked pottery, but the points were not linked directly with the Early Woodland deposits.

An Early Woodland Contracting Stemmed point and a large amount of grit tempered pottery and a small amount of Falls Plain pottery were found in Trench Feature 154, and the radiocarbon date from the feature is indicative of Early Woodland cultural affiliation. Moderate amounts of grit tempered pottery were found in three other features with Early Woodland Contracting Stemmed points, and lesser amounts of pottery were found in a number of other features with these points.

It has not been ascertained whether Early Woodland Contracting Stemmed points are contemporaneous with Falls Plain pottery and Snyders Cluster projectile points. Adena points cooccurred with Snyders Cluster points in three features. Feature 100-37 contained a very large amount of Falls Plain pottery and two Snyders Cluster points and was dated to 2070 RCYBP**.** An Early Woodland Contracting Stemmed point also was found within the feature and three other Early Woodland Contracting Stemmed points were recovered within 4 m**,** and moderate amounts of grit tempered pottery were found in the units in the vicinity. It is not evident whether these represent artifacts from an earlier occupation. Feature 100-7, inside Structure X, contained a very large amount of limestone tempered pottery and three Snyders Cluster points and produced a date of 2000 RCYBP, but a possible crude Adena Stemmed point made from poor quality chert was within the feature, and six other Early Woodland Contracting Stemmed points were within the boundaries of the structure or nearby. Very little grit tempered pottery was found in the surrounding units. Feature 300-2 contained an Adena Stemmed point and two Snyders Cluster points, a small amount of Falls Plain pottery, and a few grams of grit tempered pottery, but the interrelationship of the materials is not clear because the feature could have been composed of two pits. Because of the lack of significant vertical separation of the Woodland deposits, pit excavation by Middle Woodland groups resulted in some intermingling of deposits. The points in all three of the aforementioned features could have been displaced by aboriginal excavation, and it is considered plausible that the Early Woodland points were intrusive or even re-used by Middle Woodland occupants.

The most substantive cooccurrence of an Adena Stemmed point and grit tempered pottery with Falls Plain pottery is in Feature 300-60. This pit yielded a moderate amount of grit tempered pottery and a moderate amount of Falls Plain pottery in addition to the Adena Stemmed point, and the radiocarbon date was intermediate between the Early Woodland dates and the Middle Woodland dates from the site. Two Adena points were found with a moderate amount of grit tempered pottery and a small amount of Falls Plain pottery in Feature 300-13, but the interrelationship of the materials is not clear because the feature could have been composed of two pits. An Adena Stemmed point, a moderate amount of Falls Plain pottery, and **a** very small amount of grit tempered pottery were found in Trench Feature 193 in the 63N47W Trench. There are no apparent problems with the feature, thus it is feasible that the point and pottery are contemporaneous, although the point could have been displaced from an earlier component.

The evidence of cooccurrence of Adena points and Falls Plain pottery is not conclusive. The association in Feature 300-60 and perhaps the other two 300 Block features appears plausible, but the 100 Block associations occur one to two centuries later and would represent considerable extension of the use of Adena points.

Falls Area Early Woodland Points

Forty-one projectile points from the CMCAD (Sieber and Ottesen 1986:168) were identified as Adena variants. The points predominantly were found in the midden of 12CL109, as was most of the grit tempered pottery. Two Adena points were recovered from features. One Adena point on 12CL109 was from Feature 98, which also contained grit tempered pottery and was radiocarbon dated to 2230 +/- 60 RCYBP. As mentioned elsewhere, there were major problems in the laboratory procedures for at least some of the radiocarbon dates from the CMCAD, thus it is not certain if any of the dates are accurate. The date from 12CL109 appears to be plausible when compared to the few dates available from the region.

One of the two Adena points from 12CL103 was in Feature 3, which also yielded Falls Plain pottery (Sieber and Ottesen 1986:280). The projectile point was not considered to be intrusive by the excavators (Sieber, personal communication 1986).

Five Turkey-tail points were found in the CMCAD, and the only Turkey-tail found in a feature was considered intrusive (Sieber and Ottesen 1986:294). Feature 198 on 12CL92, which yielded a date of 1720 +/- 85 RCYBP, contained no pottery but had a Turkey-tail point. Either the date is highly inaccurate or the Turkey-tail point is intrusive, or both.

Many Early Woodland Contracting Stemmed points were present on the surface of the Zorn Avenue Village site. Most of these probably are contemporaneous with the grit tempered pottery retrieved from the site. Four Adena points were found in Feature 21 at the Villier Site (15JF110), which received a radiocarbon date of 2390 +/- 70 RCYBP (M. B. Collins 1979:646). Grit tempered pottery was present on the site, but none was recovered from this feature. Feature 3 at 15JF246 contained grit tempered pottery and an Adena point and was radiocarbon dated to 2065 +/- 75 RCYBP, but the investigators (Dobbs and Dragoo 1976:53) questioned the validity of the date. A projectile point comparable to those in Early Woodland Contracting Stemmed Groups 1 and 2 was recovered from a funerary fire above a bundle burial at the Arrowhead Farm Site (Mocas 1976:18-19, 52; Figure 8).

Middle Woodland Projectile Points

The Middle Woodland projectile point assemblage consists of a very large number of points considered Snyders Cluster points (Justice 1987:201-204) or Snyders Variants, a Lowe Flared Base point (Justice 1987:212-213), and a small number of Copena points (Justice 1987:204-208).

Snyders Cluster

The Middle Woodland projectile point assemblage from 12HR484 consists primarily of expanding stemmed and corner notched specimens (Figures 7.9-7.12) (n=188, including one perforator double listed as a point) that display combinations of attributes that suggest affinities to Snyders Cluster points as defined by Justice (1987). The tools have basal edges that are straighter, notches that are smaller, and overall forms that are narrower and less excurvate than classic Snyders points found in mortuary and ceremonial contexts. The specimens from the Knob Creek Site more closely resemble utilitarian forms of Snyders points.

There is variation among the attributes of the Middle Woodland projectile point sample from the Knob Creek Site, but the assemblage forms a single, unified continuum. About half of the points fall within the range of Affinis Snyders points and other utilitarian variants (Justice 1987:201-204) and are referred to herein as Snyders points (e.g., Figure 7.9m, o; Figure 7.12e, i). Other points within the assemblage (referred to herein as Snyders Variants) have blades comparable to the utilitarian Snyders points, but the stems have straight lateral margins (Figure 7.9h; Figure 7.10a; Figure 7.11f)--a trait not generally associated with Snyders points. Individual points often have stems with one straight lateral edge and one concave edge (Figure 7.9j; Figure 7.12d) and can be classified as members of either of these groups. The two groups of points from the Knob Creek site are collectively referred to throughout this report as Snyders Cluster points (recognizing that they do not correlate exactly with Justice’s categorization).

Possible affinities of the Snyders Cluster points from 12HR484. Points with straight lateral edges of the stem have been documented in both the Illinois Valley and the lower Ohio Valley at sites with Snyders variants and are quite similar to the Snyders points morphologically and technologically. In the Illinois Valley these tools were defined as Manker Stemmed points (Montet-White 1963:67-73), and in southern Illinois and southern

Indiana tools with these attributes were labeled Saratoga Expanding Stem points (Justice 1987:157-159). Montet-White (1963:71) characterizes Manker Corner Notched and Manker Stemmed as smaller counterparts of Snyders points and, based on several small samples, posits that they begin and develop simultaneously (Montet-White 1963:175), and little additional research has been performed since this original study. Because of the lack of Havana/Hopewell cultural material in the Falls area and the geographical separation, it is difficult to apply terminology from the Illinois Valley.

At Carrier Mills, Snyders variants and Saratoga Expanding Stem points are reported to share a large number of attributes (May 1982:1374). May notes that the size and flaking technology and the expanding stem and basal flaking of the Saratoga Expanding Stem points are very similar to those of Affinis Snyders points, but little more can be said about associations because the tools were found in thoroughly mixed deposits from numerous components (May 1982:1494-1495). Saratoga Expanding Stem points are best known from Crab Orchard sites in southern Illinois and southern Indiana, but connections with the Falls area remain tentative because Crab Orchard pottery only extends as far east as the periphery of the Falls region and does not resemble the Middle Woodland pottery from the Knob Creek site.

The culture history of the Falls of the Ohio area has not been documented well enough to evaluate the influence of cultural groups from the Illinois Valley and southern Illinois. There is presently insufficient evidence to indicate whether the points in the Falls area developed concurrently with the comparable points to the west or whether they are derivative or ancestral forms. It does appear, however, that in both the Illinois Valley and the lower Ohio Valley there are points with straight-sided stems that are quite similar to Snyders Cluster points, an observation that concurs with the results of the Middle Woodland projectile point analysis of 12HR484.

Assignment of the expanding stemmed variants with straight lateral edges from the Knob Creek Site to a known type is complicated by the dearth of formal studies of the relevant point types. Although further research is necessary before the temporal span and derivative forms of Saratoga Expanding Stem points are fully understood, Noel Justice (personal communication 2003), after examination of the assemblage of points from 12HR484, concludes that the points are sufficiently close morphologically and technologically to the type collection and collections used for refinement of the Saratoga Expanding Stem type (Justice 1987:156-159) to justify use of this label rather than designation of a new projectile point type.

Although other members of the Saratoga Cluster and their morphological affiliates are known primarily from Late Archaic contexts (Justice 1987:154-157), Saratoga Expanding Stem may be primarily a Middle Woodland type (Noel Justice, personal communication 2001). Unfortunately, the three Saratoga variants are often grouped together under the cluster name in charts and discussions. Much of the problem with use of the type name derives from uncertainty about the characteristics of the type and difficulty in determination of the cultural affiliation of individual points in reports.

Jefferies (1982:1494) notes the absence of unmixed Middle Woodland deposits at the Carrier Mills sites, and none of the Saratoga Expanding Stemmed points from that project are from dated features. One of the few documented occurrences of Saratoga Expanding Stemmed points in a Middle Woodland feature is at the Throgmorton Dam Site (Cremin 1975). The points were found in Feature 47a and Feature 82, which contained Crab Orchard pottery. At the Rose Hotel Site (DelCastello and Butler 1999:Figure 7.5H; Figure 7-6I), comparable tools labeled Snyders-like and Saratoga Straight Stemmed or Expanding Stem occur in Middle Woodland features along with Crab Orchard pottery and, unfortunately, a variety of earlier point types. Points and scrapers equivalent to Saratoga Expanding Stem points are among tools attributed to Types 4e, 4f, and 4i (Maxwell 1951:Plate VIII-X) and recovered from Middle Woodland levels of the Sugar Hill Camp Site (Maxwell 1951:Table 9). Additional examination of collections, larger samples, and better cultural contexts are needed before Saratoga Expanding Stem points can be adequately understood, but this type appears to be a viable antecedent or contemporary of Snyders Cluster points.

The antecedent forms and developmental stages of Snyders points have yet to be fully documented (Justice 1987:157), and the technological developments in the Falls area cannot be expected to mirror those of the regions where Snyders, Manker, and Saratoga points are best known. It is feasible that the points from 12HR484 reflect local responses to some of the same influences that led to the development of Snyders points and their variants elsewhere. The four radiocarbon dates of features at the Knob Creek site that contain these points cluster between 2000-2100 RCYBP (corrected range of cal B.C. 201-cal A.D. 85 at the one sigma level) and indicate that the assemblage was produced close to the beginning of the estimated temporal span of Snyders Cluster points (Justice 1987:202) and at a time when Saratoga Expanding Stem points were thought to be common in southern Illinois and Indiana. During the early Middle Woodland in the Falls region one or both of these types may have been in a state of flux or the attributes may have undergone a concrescence into a third form that includes a variety of acceptable shapes for the stem. It is plausible that the Snyders variant points in the Falls region develop simultaneously with those to the west; therefore, it is more important to recognize the cooccurrences of comparable points than to focus on the label applied to them.

The points with stems with straight lateral edges at the Knob Creek site differ from Lowe Flared Base points (Justice 1987, 212-213) in several ways. Kline and Apfelstadt (1975) show that beveled blades and stems of Lowe points are not as common as reported by Winters (1967), with the frequency of hexagonal cross sections ranging from 9-35 percent among the various samples studied; however, none of the points with stems with straight lateral edges from 12HR484 have hexagonal cross sections. The points from 12HR484 are wider in the stem and blade than Lowe points described in the above study, and they have shorter blades relative to the stems. The incidence of convex basal edges is higher than in Lowe points and the less resharpened examples show a relatively broader blade and more prominent barbs.

Technological and morphological aspects of the Snyders Cluster points from 12HR484. As previously stated, the differences between the Snyders and Snyders Variants (grouped as Snyders Cluster points) are largely confined to the stem forms. The assemblage is composed of points with attributes that form a series of continua that are unified by the technology, and it is much more advantageous to view the assemblage as a single entity. The essential continuity of the assemblage is further elucidated by the inordinately large size of the sample. Individual points provide increments that fill in the continua of length, width, stem form, blade form, and resharpening patterns rather than increase diversity within the sample or polarize the assemblage into groups. In discussion of the technological aspects and morphological attributes the assemblage will be considered a unified whole, with occasional references to traits considered essential to a particular variant.

A notch made by indirect percussion is used to initiate formation of the shoulder and stem. The notches generally are formed by large hertzian cone flake scars, often on both surfaces, and in most instances there is pressure flaking of the notch. Few of the points have deep, circular notches, and a few have deep, narrow notches reminiscent of Early Archaic notch forms. The variants with straight-sided stems often begin with higher, shallower notches that are retouched to remove the curvature of the lower portion of the notch, and the lateral edge is straightened toward the proximal end with additional pressure and percussion flakes. Neither the basal nor the lateral edges of the stems in the assemblage are ground.

The basal edges of the points in the assemblage are straight or slightly convex and very thin. In some instances, one surface of the base has only marginal retouch of the ventral surface of the original flake. The most patterned retouch of the basal edge appears to be for use as a platform for stem thinning flakes. Generally, one or more long thinning flakes extend up the center of the stem, frequently past the shoulder, then small stem thinning flakes are removed at a moderate angle to produce a bifacial or unifacial taper toward the base, and a very thin basal edge is formed with small percussion flakes. The basal edge is not shaped by groups of fine pressure flakes. Because of the thinness, minor breakage or crushing from use often is present along the edge. The stems are proportionally moderately wide, and although they are comparatively thin for their width, there is a very low incidence of major breakage.

The blades are shaped with broad percussion flakes and refined with small percussion flakes and scattered pressure flakes. Resharpening is accomplished mostly with small percussion flakes, with small numbers of pressure flakes used to produce a thin, sharp edge. The initial percussion flakes generally cross the longitudinal axis and efficiently thin the broad blades. Biconvex profiles often emerge after resharpening, and plano-convex profiles result when the ventral surface of the original flake is only marginally retouched. The broad shoulders of the points in the initial stages of use often have small, downward sloping barbs, which are removed and supplanted by an upward slanted shoulder after repeated retouch.

Most of the points are made directly from flakes rather than from preforms. Nearly unifacial tools, with much of the ventral surface of the flake unaltered compose a small percentage of the sample. Also present are points with large areas of cortex or flat surfaces formed by natural breaks in Wyandotte chert nodules. The flatness of the cortical and ventral flake surfaces facilitates manufacture of broad, thin tools. Medial ridges are infrequent. The maximum thickness of the point is usually in the lower portion of the blade. These points are quite sturdy and show a low percentage of breakage in the blade, although the barbs often are broken. Discard appears to result more from exhaustion of the working edge rather than breakage. No impact fractures are evident.

When they are resharpened, the blades are reduced in both length and width. One reason for the decrease in length of the tool is frequent retouch to maintain a very sharp and pointed distal end. There is apparent extensive use of the tip and distal end to pierce and cut, and these refinements also facilitate potential use as a projectile point. Although the blades are broad, they are pointed, and mucronate tips are very common. The tip does not appear to have been used in a rotating motion. Resharpened blades display an emphasis on maintenance of a mucronate or at least acutely pointed tip, even if it produces an asymmetrical blade or a unifacially steeply retouched distal end. The blade edges are quite thin early in the use-life of the tool and become less so when reworked, but the outermost several millimeters are generally quite sharp. Extensively resharpened blade edges are steep. The blade shape shifts from slightly excurvate to straight and triangular, dependent upon the amount of resharpening, and lateral asymmetry is common. Incurvate blade edges infrequently occur.

The points are overwhelmingly made of high quality chert, predominantly Wyandotte. Wyandotte chert was used in the manufacture of 90.9 percent of the Snyders Cluster points. One point was made of Holland chert, and the chert of one point was tentatively identified as Fort Payne. These tools, which represent less than one percent of the sample, are the only points made of chert that does not occur within 50 km of the site and would have required trade or travel or addition of band members to obtain. It appears that the Middle Woodland inhabitants of the site engaged in minimal travel or trade outside the local area to obtain the cherts used for projectile points.

Although the implications for the rest of the Midwest may be limited, it appears that at least in the Falls of the Ohio region, the attributes of Snyders and Saratoga Expanding Stem points may be intermingled into a single form with a range of variation that combines attributes from both types and includes recognizable examples of each type at the ends of the continuum.

It is not hypothesized that all the projectile points are attributable to a single occupation, but the continuum formed by the assemblage suggests that the tools may be largely coeval, and radiocarbon dates and the horizontal and vertical distribution of the points support the possibility of general contemporaneity. It is probable that the site was revisited during the Middle Woodland, but there are no indications of major temporal spans when one variant was in use and the other absent.

The number of points with evidence of use and resharpening until exhaustion demonstrates an emphasis on conservation of the high quality Wyandotte chert. No Middle Woodland projectile points were able to be refit with fragments broken from them. The high ratio of projectile points to expedient tools and thorough exploitation of high quality chert may denote a relatively sedentary population**.**

Snyders Cluster points in features. Eighteen Snyders Cluster points, representing 9.8 percent of the sample, were found in 14 features. Ten features in the 100 Block (Figure 7.13) contained 13 points and one point reworked into a drill, one feature in the 148N 49W Trench yielded a point, one feature in the 300 Block had two points, and two features in the 400 Block had points. Three radiocarbon dates from the 100 Block and one from the 400 Block provide a temporal span of 2100-2000 RCYBP (corrected range of cal B.C. 201-cal A.D. 85 at the one sigma level) for the Snyders Cluster points.

Snyders Cluster points are strongly associated with Falls Plain pottery. Eight of the features with Snyders Cluster points had large amounts of Falls Plain, and the other six features had at least small amounts of Falls Plain. Although two of the features had moderate amounts of both Falls Plain and grit tempered pottery and one feature had an extremely large amount of Falls Plain and a large amount of grit tempered pottery, the grit tempered pottery probably derived from Early Woodland midden into which this cluster of features were dug.

Based upon the projectile point distribution, it appears that intensive Middle Woodland occupation is largely restricted to the 100 Block and south half of the 200 Block. None of the features in the 200 Block contained Snyders Cluster points, but a large number of points were clustered around Structure A and to the south of it. There was a light scatter of points north of the Middle Woodland feature cluster in the southwest corner of the block, but the north half of the block was nearly devoid of Snyder Cluster points. Despite having only 9.2 percent of the Middle Woodland features and 20.0 percent of the Falls Plain pottery, the 200 Block contained 37.8 percent of the Snyders Cluster points. The 100 Block had 54 percent of the Middle Woodland features and 71.2 percent of the Falls Plain pottery and 49.5 percent of the Snyders Cluster points.

The Snyders Cluster projectile points were dispersed throughout the 100 Block (Figure 7.13). The only concentration of points was around a small feature cluster in the southeast corner of the block. A large number of points were within and directly outside Structure X. Small numbers of points were scattered around the small feature clusters in the northwest and southwest corners of the block and within the dense feature cluster in the northeast portion of the block.

No Woodland units were excavated in the Phase III trenches and the 300 and 400 Blocks, but only 5.3 percent of the Snyders Cluster points were found north of the 200 Block. Despite hand excavation of the Phase II South Block and machine scraping of the Phase III South Block area, only five Snyders Cluster points were recovered, and only four points were found between the South Block and the 100 Block.

Falls Area Middle Woodland Points. Sieber and Ottesen (Sieber and Ottesen 1986) report that 29 Middle Woodland projectile points were identified at the Clark Maritime Centre Archaeological District. These were divided into four groups that are subsumed by Justice's (Justice 1987:201-204) Snyders Cluster. One Snyders Corner Notched point (Sieber and Ottesen 1986:Figure 6.3.21A; 154) [not Figure 6.3.20, as listed in the report] was recovered from Feature 204 at 12CL103, which contained a moderate amount of Falls Plain pottery. Snyders Cluster projectile points and Falls Plain pottery were recovered from 12CL103 Features 17, 34, 35, 38, 142, 182, and 200. Seven projectile points that were classified as Bakers Creek points (Sieber and Ottesen 1986:283, 287, 289) were identified as Saratoga Expanding Stem points by Justice (personal communication 1989) and coincide with the Snyders Variants from the Knob Creek site. Features 35, 55, and 88 each contained one Snyders Cluster point (Justice 1987:201-204) and a Saratoga Expanding Stem/Snyders Variant point, as well as Falls Plain pottery. A Saratoga Expanding Stem/Snyders Variant point was recovered in 12CL103 Feature 10, along with grit tempered pottery, but no other combinations of this point type and this kind of pottery have been encountered in the Falls Area and the cooccurrence may be fortuitous.

The Zorn Avenue Village site contained 42 Snyders Cluster projectile points (Mocas 1992:Figure 8), and reexamination of the collections led to the determination that, contrary to the report, Saratoga Expanding Stem/Snyders Variant points also were present. All these points were recovered from the surface of the site. A Snyders Cluster point was found in Feature 4 at the Hunting Creek Site(Mocas 1992:Figure 9c), which also contained Falls Plain pottery. A Snyders Cluster point fragment (Mocas 1992:Figure 9e) was recovered from the lower levels of Test Pit A at the Hunting Creek site, and fragments of four other Snyders Cluster points and a Snyders preform (Mocas 1992:Figure 9a-b, d, f-g) were found on the surface of the site.

Late Middle Woodland to Late Woodland Points

A small number of late Middle Woodland-Late Woodland Copena and Lowe projectile points (Figure 7.13), classified as Middle Woodland Expanding Stem points, were recovered from the Knob Creek site, but no features and only one ceramic vessel fragment were identified as potentially contemporaneous with these tools. With the exception of the Lowe fragment from the South Block, all of the late Middle Woodland/Late Woodland points came from an area slightly more than 100 m in diameter. The tools may derive from short term activity by a group encamped elsewhere. At least one late Middle Woodland/early Late Woodland site, 15JF187 (Mocas 1995), is known to be located directly across the river.

Lowe Flared Base. One Lowe Flared Base point (Justice 1987:212-213), Figure 45) was recovered from the 200 Block (Figure 7.14a) and one stem fragment was found in the South Block. Both were made of Wyandotte chert.

Copena. Six Copena points (Justice 1987:204-208) were recovered from the site (Figure 7.14b-c). All were made of Wyandotte chert. Five of the points were found in the 100 Block, and the other point came from a trench to the northwest of that block. A probable Copena fragment with an impact fracture, potentially the result of use as a projectile point, was found in Feature 100-84. Falls Plain pottery, including two rim sherds, was recovered from this pit. Unfortunately, this feature was heavily disturbed and it cannot be posited confidently that these materials are contemporaneous.

Bifaces

Comparison of the number of biface fragments (n=1302) to the number of retouched and utilized flakes (n=738) and other expedient tools indicates that the lithic industries of both components are based upon formal tool forms with supplementary use of expedient tools. The comparatively small percentage of Stage 1 bifaces (n=159; 12.5 percent of the Stages 1-3 biface sample) verifies that 12HR484 was not primarily a workshop site, and the larger number of Stage 2 (n=347) and Stage 3 (n=770) bifaces corroborates extensive manufacture, use, and maintenance of formal tools.

The classification of bifaces into three stages is a rough measure of their position along a reduction continuum. Criteria for stage assessment, adapted from Callahan (1979), include degree of symmetry, sinuosity of the edge, cross section, amount of reduction of the surface, and type of retouch. Subdivision into stages is considered a means to measure the relative importance of acquisition and reduction of raw material from a quarry or streambed, manufacture of formal tools, and use and retouch of formal tools at the site. Identification of these behaviors and the areas where the activities are carried out facilitates understanding of the site functions and the intrasite structure.

Stage 1 bifaces

Stage 1 bifaces represent the results of the initial steps of biface manufacture and would be expected in loci to which raw materials or tools that underwent preliminary shaping at the quarry were transported for further reduction. Most of the Stage 1 biface fragments recovered are small pieces of Muldraugh chert broken along natural fracture lines during manufacture because of the poor quality of the raw material, thus the number of fragments is inordinately large compared to the number of relatively complete Stage 1 bifaces found.

The sparse representation of Stage 1 bifaces confirms that decortication and initial reduction were minor aspects of the lithic manufacture at the site during the Early Woodland and were very rare during the Middle Woodland occupation. Several dozen large Stage 1 bifaces of Muldraugh chert (Figure 7.15) and a few bifaces of Allens Creek were found in the 200 Block (Table 7.5), which suggests that the Early Woodland occupants of the site occasionally transported large pieces of tabular chert (Figure 7.15c) from the adjacent bluffs for reduction. Ninety-eight Stage 1 biface fragments (Figure 7.16; Figure 7.17a-f) were scattered throughout the block and were especially common in the northwest portion, which may be the primary reduction area, and many tool fragments were discarded downslope in the southeastern portion of the block. All stages of biface reduction, including Stage 1 bifaces were evident in the lithic manufacture loci around Phase II Unit 225N60W (Figure 7.15a; Figure 7.17a), in the northwest portion of the block, and Phase II Unit 250N60W, directly north of the block. A small number of tools of all stages were present in the processing area around Feature 200-59 and the large surface hearth Feature 200-65.

A variety of Stage 1 biface forms, rectangular, triangular (Figure 7.15b), ovate (Figure 7.17e), and circular (Figure 7.17f), of Muldraugh chert appear to be early forms of tools other than projectile points. Long, narrow Stage 1 and Stage 2 (Figure 7.18b, c, d) bifaces with pointed or rounded bases, as exemplified by the Hathaway Cache, which will be discussed subsequently, were common and demonstrably related to the manufacture of Adena Stemmed projectile points and similar knives.

A small number of Stage 1 and Stage 2 bifaces were found in the upper levels of the southwest corner and a larger number in the upper levels of the southeast corner of the 200 Block (Figure 7.19). These tools could be from the Middle Woodland component. Stage 3 bifaces in these levels were more numerous in the southwest corner, perhaps an indication of tool use associated with the Middle Woodland feature cluster.

The Stage 1 bifaces from the 100 Block are fewer (n=42) and generally smaller and more thoroughly flaked than those of the 200 Block, which suggests that the Middle Woodland occupants brought much of their chert to the site in the form of quarry blanks. No large manufacture areas were encountered in the 100 Block (Figure 7.20). There was a cluster of Stage 1 bifaces in and around Structure X, and another cluster of tools in the area with few features between the structure and the feature clusters in the southwest and southeast portions of the block. Stage 1 bifaces were conspicuously rare in the activity areas in the southeast and southwest corners of the block and around Feature 100-112. The central portion of the north end of the block bore evidence of lithic reduction, but few Stage 1 bifaces were present.

Stage 2 and 3 bifaces

The number of manufacture breaks among both Stage 2 and Stage 3 tools and the abundant late stage debitage indicate that intermediate and late stage manufacture took place in the Phase II South Block (Figure 7.21) and at two locations within the 200 Block and one directly outside the northern edge. The bifaces in the South Block (Figure 7.21) are closely related to Adena Stemmed projectile points (Figure 7.18f), and some have broader, thinner blades suggestive of Turkey-tail affiliations as well. Most of these narrow and broad bladed bifaces have cortex on at least one end. One of the Stage 2 bifaces from the South Block resembles preforms of the Hathaway Cache, and several of the Stage 3 tools could have been made from comparable preforms.

The area around Phase II Unit 225N60W and the northwest portion of the block had very large numbers of Stage 2 and Stage 3 bifaces. A few were broken during manufacture, but most have use wear or have edges suitable for cutting. These tools include Adena preforms/knives made of Muldraugh chert (Figure 7.18b), as well as Wyandotte chert (Figure 7.18h-j). Some tools appear to have been made directly from flakes rather than being the final stage of one of several types of preforms. These preforms/knives were among the moderate number of Stage 2 and Stage 3 bifaces scattered in the area south and east of Feature 200-59. At least four other features in the 200 Block had comparable tools. Similar bifaces were found in the South Block, including one in Phase II Feature 78. Many late stage bifaces were recovered around Phase II Unit 250N60W, the dense debitage concentration directly north of the 200 Block. Within the boundaries of Structure B and in the vicinity of the structure, numerous Stage 2 and Stage 3 (Figure 7.18g) bifaces were recovered. It is plausible that some of the tools in the 200 Block may derive from the Middle Woodland component. Stage 2 and Stage 3 bifaces also were common in the area around Structure A, but it is not evident to which component they belong.

Stage 2 and Stage 3 bifaces are scattered throughout the 100 Block (Figure 7.20), particularly in the west half. These tools were not as numerous or tightly clustered as within the 200 Block and were not linked to specialized manufacture areas. Large numbers of bifaces of both stages were found in and around Structure X (Figure 7.22a, b, f, g, i) and in the area between the structure and the feature cluster in the southwest corner. Stage 2 and Stage 3 bifaces were clustered in (Figure 7.22e) and around Feature 100-37, but few tools were found in the rest of that activity area. Few Stage 2 bifaces were found in the feature cluster around Feature 100-112, but a moderate number of Stage 3 tools were found within Feature 100-112 and in and around the other features in the cluster. Both Stage 2 and Stage 3 (Figure 7.22i) bifaces were common in the southeast corner. The Middle Woodland occupation of the 100 Block shows consistent evidence of the use and maintenance of late stage bifacial cutting tools, which is suggestive of extended sedentary activity.

Outside the 100 and 200 Blocks and the South Block, bifaces were only recovered through trackhoe scraping and feature excavation. Trench 253N80W had 23 bifaces and the Hathaway Cache of 20 tools, far more than the other Phase III trenches and blocks. The comparatively large number of tools may be due to the position of the trench at the northern periphery of the main Early Woodland habitation area in the 200 Block. The presence of Stage 1 bifaces in the trench attests to early stage manufacture, although the sparsity of cortex indicates that quarry blanks rather than pieces of raw material were probably brought to the area. The Hathaway Cache provides additional evidence of quarry blanks brought to the site for manufacture although they were probably reduced to their present form elsewhere. The number of fragments of Stage 2 and Stage 3 tools in the 253N80W Trench suggests tool use and retouch in the vicinity.

The number of bifaces decreased to the north. The 300 Block had more bifaces (n=26) than the 400 Block. These were primarily small cutting tools. Only 14 biface fragments were recovered from the Woodland midden of the 400 Block. One Stage 3 biface from Early Woodland Phase II Feature 39 (Figure 7.18d) is a more refined example of the preforms found in the Hathaway Cache and correlates well with tools found in the Woodland hand excavation blocks. South of the main Woodland excavation blocks the numbers of bifaces decreased markedly. The 148N49W and 63N47W (Figure 7.22h) trenches yielded only four and three bifaces, respectively.

The most distinctive Early Woodland biface form may be a preform for Adena Stemmed projectile points or a knife of comparable form manufactured with the same techniques. Six very large, bipointed, Stage 2 or Stage 3 (Figure 7.18h, i) bifaces were found at the north end of the 200 Block. More than 20 other bipointed Stage 3 bifaces were found in the 200 Block (Figure 7.18e, g) and South Block (Figure 7.18f), and a comparable number of less diagnostic fragments that may be from similar tools also were recovered. These tools could function as preforms for Adena Stemmed points, but most show wear and resharpening that suggest they functioned as knives as well. At least one possible Robbins point preform (Figure 7.18j) was identified.

The number of possible preforms in comparison to the large number of Snyders variant points from the site suggests that the points were more commonly made from large flakes without the intermediate step of preform manufacture. A small number of biface fragments bear resemblances to Snyders variant preforms found elsewhere. The convex lateral edges, convex basal edge, and relatively broad blade of several tools (Figure 7.22c) resemble Manker preforms (Montet-White 1963:Figure 15), and other tools (Figure 7.22f, g) resemble Middle Woodland subtriangular preforms (Montet-White 1963:48) from the Illinois Valley. One of the triangular tools (Figure 7.22h), recovered from Middle Woodland Feature 193 in the 63N47W Trench, and the others were from the 100 Block. These may represent less resharpened variants of smaller triangular bifaces with beveled, elongated sides and slightly convex, beveled basal edges (Figure 7.22i, k) which are discussed below. This continuity in lateral edge form may indicate that both groups are knives rather than preforms.

These Stage 3 bifaces are medium sized, triangular, and have straight to slightly convex basal edges, and, like several other biface groups, they appear to be cutting tools that were reworked into drills when the lateral edges became too steep. Like the earlier forms discussed above, these tools were found in Middle Woodland contexts--two were from the 100 Block and the other two were found near Structure A in the 200 Block.

Small to medium sized, narrow, pointed Stage 2 and Stage 3 bifaces (Figure 7.23) were found in both the 100 Block and the 200 Block. The Stage 2 bifaces (Figure 7.23a, b, d-f) were less distinctively shaped and could not be attributed confidently to a particular Woodland component. The Stage 3 tools, which may have been hafted, have forms that overlap with some of the drills and appear to have been reworked into drills when the cutting edges were exhausted. Four of the five Stage 3 bifaces with convex basal edges (Figure 7.23g, h, j, k)) are from the 200 Block from contexts that suggest they may be of Early Woodland cultural affiliation. Tools of similar size, but with straight basal edges and more pointed distal ends (Figure 7.23l-q) were found in the 100 Block, and probably are Middle Woodland. One implement with a thin, sharp blade (Figure 7.23c), recovered from Feature 100-112, may represent a more specialized variant of the tool. The distribution of the corresponding drill forms supports the possibility that although these variants are quite similar they derive from separate components. The sample sizes are small and the possibility of intermingled cultural materials is significant, but if these biface and drill groups are from separate components, they may be an indication of continuity in lithic technology and exploitative tasks.

Microwear analysis (Pope 2005) indicated that the small to medium sized, narrow, pointed Stage 3 bifaces were used to perform a variety of tasks. Nearly all of the ten tools analyzed have haft wear on the proximal portion. Two of the five tools considered to be Middle Woodland have continuous polish along the lateral edges suggestive of use to manufacture items. One of these tools appears to have been used to cut and perforate hide, and the other may have been used to scrape/perforate hide. The wear on another tool appears to derive from use to engrave or bore hard material such as antler or bone and possibly wood. Weak, discontinuous polish development on the vertical plane of two tools suggests contact with soft tissue from use as a projectile point.

The five tools considered to be Early Woodland show use for manufacture. The smooth, rounded edges of the bits, domed topography, and dull reflectivity of three of these tools indicate use to scrape/perforate hide. Another tool was used to scrape/bore antler or bone. One tool shows evidence of several cycles of use and maintenance, and the grit polish prevents unambiguous interpretation of its use.

Other bifaces with potentially diagnostic forms were recovered from contexts that may indicate their cultural affiliation. A crescentic tool with very heavy bifacial polish (Figure 7.24a) was recovered from Early Woodland Feature 200-89; a small, ovate biface (Figure 7.24b) was found in the Phase II South Block area; and an elongated, point tool (Figure 7.24c) from inside Early Woodland Structure B resembles a more refined version of the Hathaway Cache bifaces. Four bifaces with distinctive shapes (Figure 7.24d-g) were found in the 100 Block. The small, pointed, ovate tool (Figure 7.24f) was found inside Structure X, and the small triangular biface was recovered from the feature cluster around Feature 100-37.

Muldraugh and Allens Creek cherts were used for 50.3 percent of the Stage 1 biface fragments, while only 42.1 percent are made of Wyandotte chert. Stage 2 bifaces compose 27.2 percent of the Stages 1-3 biface sample, and a higher percentage of the Stage 2 bifaces are made of Wyandotte chert (52.9 percent) than of Muldraugh and Allens Creek (43.9 percent). Stage 3 bifaces compose 60.3 percent of the total biface sample, and an even higher percentage of the tools are made of Wyandotte chert (70.7 percent) rather than Muldraugh and Allens Creek (24.9 percent). There are many distal fragments of tools that do not have corresponding proximal fragments. Considering the size of the area excavated, many of the other portions should have been encountered unless the fragments were discarded outside of the habitation area. It may be that the larger fragments were reworked into other tools as a chert conservation measure. A possible indication of the thorough exploitation of the available Wyandotte debitage in the Early Woodland component of the 200 Block is the absence of conjoining pieces of broken Stage 1 bifaces and the presence of only one refit Stage 2 biface. Refits were less rare among the Stage 3 bifaces, but both halves of one of the six refit tools had been reworked after the initial breakage.

Less than one percent of the bifaces are made of chert that outcrops more than 50 km from the Falls of the Ohio. Only one Stage 1 biface and one Stage 2 biface are made of non-local chert, and these cherts originate to the east and could have been displaced downriver and deposited in the river gravels near the site. Three of the Stage 3 bifaces are made of cherts that outcrop upriver from the site, but three of the bifaces were made from non-local cherts (Lead Creek and Holland) that outcrop downriver and could have been obtained only through travel or trade.

The 200 Block contained 61.6 percent of the Stage 1 bifaces recovered from 12HR484. These compose 15.9 percent of the biface sample from the block, nearly twice the percentage (8.9 percent) seen in the 100 Block. The Early Woodland occupants of the Knob Creek Site apparently brought more raw material and quarry blanks onto the site than the Middle Woodland inhabitants, and a higher percentage of the Stage 1 tools (41.8 percent vs. 33.3 percent) were made of Wyandotte chert and a lower percentage (53.1 percent vs. 59.6 percent) were made of Muldraugh and Allens Creek than in the 100 Block.

The 200 Block had 48.3 percent of the Stage 2 bifaces from the site, and these composed 27.5 percent of the bifaces in the block, a percentage equivalent to that in the 100 Block (27.0 percent), which contained 36.4 percent of the Stage 2 bifaces from the site. The threefold increase in the number of tools and the percentage of the biface sample from the block for the Stage 2 bifaces of the 100 Block was accompanied by an increase in the use of Wyandotte chert (51.6 percent) and a corresponding decrease in the use of Muldraugh and Allens Creek chert (45.2 percent). A less marked shift is evident in the 200 Block as well. There was a rise in Wyandotte use to 49.7 percent and a comparable decline in Muldraugh and Allens Creek use (47.3 percent). In both components the advantage of the higher quality Wyandotte chert becomes evident as the refinement of the tools intensifies.

The trend toward higher quality chert for more refined tools is accentuated with Stage 3 bifaces. In the 200 Block 56.5 percent of the bifaces are Stage 3 tools and 65.7 percent of these are made of Wyandotte chert while the number made of Muldraugh or Allens Creek decreases to 30.0 percent. A corresponding but more pronounced trend is evident during the Middle Woodland, as exemplified by the 100 Block, which shows an increase in the number of tools and in the percentage of Stage 3 bifaces found on the site (39.6 percent) and in the percentage of biface sample from the block (64.4 percent). The use of Wyandotte chert markedly intensifies (78.3 percent) as the use of Muldraugh and Allen Creek proportionally diminishes (19.4 percent).

Hathaway Cache

Trench Feature 144 is composed of a cache of 20 Early Woodland bifaces (Figure 7.25). The bifaces resemble “Adena leaf-shaped blades” (Dragoo 1963:178-180, Figure 10-D), which are often found in caches in Adena mounds, but lack the refinement and uniformity that typifies the mortuary items (Dragoo 1963:107-109, Plate 37). The tools (Figures 7.26 and 7.27) all were made of Wyandotte chert, and, although they are complete, they all have flaws in the chert or knapping errors that prevented further reduction without significant reduction in the size of any subsequent product. Because of the incomplete reduction, it is not possible to relate them to specific final forms or functions, but the variation in present form makes it apparent that they were not all intended to have the same final shape. Elongated, amygdaloidal, and bipointed forms are present (Table 7.6). All could have been shaped into Early Woodland Contracting Stemmed points, but alternative tool types also were possible.

The cache was found in the middle of the 253N80W Trench in an area with only a very light scatter of cultural debris, and only one feature was within 10 m of the cache. No debitage was found in the vicinity of the bifaces, which indicates that the tools had been manufactured elsewhere and transported to the locus. The orderly arrangement of the tools led to the conclusion that they had been placed in a container and deposited in a shallow pit. The bifaces were stacked in four layers, each composed of five tools laid parallel to one another and diagonal to the layer below. The soil surrounding the tools was not discolored, possibly because the pit was dug specifically for the purpose of tool deposition and did not contain organic refuse.

There is no succinct explanation for such orderly disposition of these flawed tools. Acquisition of the raw material would involve travel of at least 20 km to the Wyandotte chert source area, and a moderate expenditure of time would be required for the reduction of 20 bifaces, thus the time/labor expenditure represented is significant. These may represent trade items that were not able to be exchanged and thus were disposed of rather than transported further, or they may be quarry blanks that were deemed unsuitable for refined manufacture by the inhabitants of the site.

Unifaces

Fifteen unifaces were found in the Woodland components of the Knob Creek site. Most of the sample consists of fragments, and there does not appear to be much uniformity to the forms that can be identified. Wyandotte chert is the predominant raw material (80.0 percent), and 20.0 percent of the tools are made of Muldraugh chert.

The 200 Block contained 40.0 percent of the tools. These generally are larger and more thoroughly flaked than the tools from the 100 Block. There are two narrow, pointed, unifacial tools (Figure 7.28a-b) that resemble some Early Woodland bifaces in form, but the imperfections in the chert prevent determination of whether this is the intended final form. Both have lateral cutting edges in the middle, and one (Figure 7.28a) has bilateral cutting edges at the thin, pointed distal end. It is not certain if they both are from the Early Woodland component because one was found within the outline of Middle Woodland Structure A (Figure 7.29) but cannot be directly associated with it. One group of tools that do appear to be attributable to the Early Woodland component is composed of large flakes with broad, excurvate cutting edges. One is cortically backed (Figure 7.28c), one has a natural fracture plane as backing (Figure 7.28d), and one has been flaked to provide the backing (Figure 7.28e). These are similar to backed side scrapers from the Early Woodland component and differ from the scrapers primarily because the unifaces have shallower working edges.

The 100 Block yielded 33.3 percent of the tools (Figure 7.30). These are primarily small to medium sized flakes with the lateral edges used for cutting. One tool (Figure 7.28f) has polish at the juncture of the cutting edge and the retouched break at the distal end that probably functioned to facilitate additional pressure with the forefinger. The tool from Middle Woodland Feature 100-37 (Figure 7.28h) is a cortically backed cutting tool that is unique, and another uniface fragment was found in the same feature cluster. Another tool was at the inside edge of Structure X.

Adzes and Axes

A sample of 21 chert adzes (Figure 7.31) was recovered from the Woodland components of 12HR484. Although only one culturally diagnostic form was identified, most of the artifacts came from contexts that suggest they derive from the Early Woodland component. Thirteen of these tools (61.9 percent) came from the 200 Block, one from the South Block, and one from the 253N80W Trench, and only 28.6 percent of the tools came from the 100 Block. Muldraugh chert was used to make 76.2 percent of the tools, and 23.8 percent were made of Wyandotte chert.

Several distinctive tool forms were encountered. One group of six medium to large-sized, amygdaloidal tools of Muldraugh chert (Figure 7.31a-c) were found in the 200 Block, South Block, and 253N 80W Trench. The most distinctive characteristic of these tools is the extensive grinding of the edge of the pointed proximal end and both lateral edges. All of the tools showed at least light dorsal polish, and one of the tools (Figure 7.31c) shows considerable bifacial polish. Microwear analysis (Pope 2005) established that on two of the tools surface polish appeared to be part of the manufacture process. Three tools showed clear wear on both surfaces, but the wear was not equally distributed. The dorsal surface had polish that did not extend as far inward from the bit edge, but was more intensive, as indicated by the relative degree of development and linkage of the polish. The ventral wear was more invasive and indicates an acute angle of contact. The wear on the tools was not consistent with use as hoes. The texture and reflectivity of the polish areas with the greatest degree of linkage suggest use against wood rather than hide. The tools were mostly probably used to chop wood or to form fairly large items--such as dug-out canoes. It is possible that he tools were used on charred wood, but they were not used intensively enough to allow affirmation of this possibility.

The proveniences of the aforementioned tools strongly indicate they are of Early Woodland cultural affiliation. Although none of the artifacts were recovered from features at 12HR484, an identical tool was recovered from site 12HR482, which lies about 150 m to the west on the opposite bank of Knob Creek. This tool was found in Feature 27 a pottery bearing pit that contained charcoal that yielded a radiocarbon date of 2270 +/- 70 RCYBP. This distinctive adze form may be diagnostic of the Early Woodland.

Another group is composed of three small to medium sized, thick, elliptical tools, two of which (Figure 7.31e) were made of Wyandotte chert. Two came from the 200 Block and the other from the Early Woodland knapping area at the north end of the block. Large, rectangular tools (Figure 7.31f) and medium-sized, elongated tools (Figure 7.31g) were recovered, but it is not evident if they are characteristic of a particular component. The tools all show at least minimal wear polish, and the lack of opaline polish and lack of smoothing inside the flake scars suggest these were woodworking tools rather than hoes.

The tools in the 100 Block and 200 Block were scattered throughout the blocks and were not closely associated with feature clusters. The 200 Block adzes and axes were more often found in areas with few features in the vicinity (Figure 7.32); however, a large number of chert adzes were found inside and in the vicinity of Structure B. Although adzes and axes were occasionally found within several meters of one another, the two groups did not regularly cooccur.

Four chert axes were recovered from the Woodland components. Two of the tools came from the 100 Block (Figure 7.33), including one tool found inside Structure X, and two were found in the 200 Block. One of the tools (Figure 7.31h) displays extensive, symmetrical bifacial wear that suggests use as an axe. A tool with comparable form from nearby site 12HR482 has a beveled bit that suggests use as an adze, which may indicate that there is flexibility in the manner of use of the tool form. All the tools were made of Muldraugh chert. One additional tool fragment from the 100 Block, made of Wyandotte chert, did not have an identifiable bit to allow categorization as an adze or axe.

Drills

A sample of 87 drills was recovered from the Woodland components of 12HR484. Both components contained a relatively large number of these tools. The 100 Block yielded 44.8 percent of the drills. Nine drills (23.1 percent of 100 Block sample) were inside or directly outside Structure X (Figure 7.34). A smaller cluster was present in the southeast corner of the block and several tools were found in and around Feature 100-37. There also was a scatter of tools in the northwest portion of the block Few drills were present in the feature cluster around Feature 100-112.

The 200 Block contained 39.1 percent of the drills. Although the predominant component of the 200 Block is Early Woodland, a number of drills were concentrated near the Middle Woodland feature cluster in the southwest corner of the 200 Block (Figure 7.35), and these tools appear to derive from that component. The other drills, considered to be Early Woodland, were scattered across the block (Figure 7.36). Several drills were found adjacent to the very large surface hearth, Feature 200-65, and the activity area at the north edge of the block had several associated tools, as did feature clusters in the southcentral and eastcentral portions of the block, but many drills were in areas with few features nearby.

Drills were found in three Middle Woodland features and one Early Woodland feature. Twelve of the tools (Figure 7.37a-c) were made from Early Woodland Contracting Stemmed points, and two resemble narrow variants of these (Figure 7.37e-f). Two drills from the 100 Block were made from reworked Archaic projectile points (Figure 7.37g-h). Wyandotte chert (80.5 percent) is the predominant raw material, and 14.9 percent of the tools were made of Muldraugh chert.

Five medium sized, broad based, triangular drills could be either Early Woodland or Middle Woodland. Two of the tools are from the 100 Block (Figure 7.37q), one from the 148N49W Trench (Figure 7.37o), and two are from the 200 Block (Figure 7.37p, r), thus it is not evident to which component they belong. These tools may have begun as triangular bifaces and been reworked into drills when the cutting edge was exhausted. Two small, triangular drills (Figure 7.37i-j) were found in the 200 Block in levels with slightly more Early Woodland pottery than Middle Woodland pottery. Seven small, triangular drills with convex based stems (Figure 7.37l-m) were found in the 200 Block in contexts suggestive of Early Woodland cultural affiliation. These tools, like all of the aforementioned tools potentially of Early Woodland origin, have pressure flaked bases. They closely resemble a group of small, narrow, convex based bifaces from the 200 Block and may represent reworked examples of these tools. A drill with a long, narrow, tapered bit and a broad, ovate base (Figure 7.37n) may be diagnostic of the Early Woodland component because perforators with similar forms also were recovered from the 200 Block. The only drill fragment from an Early Woodland feature is a parallel sided medial fragment of a bit found in Phase II Feature 39 in the 400 Block.

The largest group of drills (n=16) consists of medium-sized tools with triangular bits and slightly expanding stems with straight basal edges (Figure 7.37w-y) or slightly contracting stems with convex basal edges(Figure 7.37s-v). The former tools are isosceles triangular in plan view and the latter tools have the maximum width 15-20 mm above the basal edge and taper slightly toward the base. Although these are not finely crafted tools adherent to a precise “mental template”, they are of relatively uniform length and width and have similar forms. The stems are thinned from the basal edge, and many of the tools have broken basal portions or have flakes pressed from the base and lower stem by use. Combined with the lateral and basal edge wear of the proximal end these attributes indicate the tools were hafted. The bits are not parallel sided and are not of uniform thickness. Several of these tools are made from biface fragments and many tools have inordinately thin or thick portions of the blade or have cortex or flaws. These characteristics suggest that the tools may be somewhat expedient and were crafted from available debitage or broken tools rather than formed through a strictly prescribed set of reduction steps from a specific preform.

The tools are closely linked to one group of Middle Woodland Stage 3 bifaces and many represent exhausted forms of the bifaces that have been adapted to use as drills. Some of the tools with resharpened edges could be considered either drills or bifaces. The entire tool is shaped with percussion flakes, and pressure flakes are generally used only for retouch of the bit. The bits are triangular in plan view and are biconvex, rather than circular, in cross section. These tools derive from the Middle Woodland component and many were found around Structure X in the 100 Block and near the small feature cluster in the southeast corner of the 100 Block.

Six straight drills (Figure 7.37z-aa) were found in Middle Woodland contexts. Two tools were found at the edge of Structure A, two tools were recovered elsewhere in the 100 Block, another was found near the Middle Woodland feature cluster in the southwest corner of the 200 Block, and a very small, thin drill was found in Middle Woodland Feature 300-62. A very small, expanded stemmed drill (Figure 7.37bb) was found in Phase II South Block Middle Woodland Feature 102, and a medial fragment was found in Middle Woodland Feature 300-52. Two small, amygdaloidal drills with one side more excurvate than the other (Figure 7.37cc-dd) came from the area around Structure A and another possible example also came from the 100 Block. A bi-pointed drill (Figure 7.37ee) was recovered from the 100 Block.

Expedient Perforating Tools

Perforators, like drills, appear to form a significant part of the tool kits of both components. A sample of 38 perforators was recovered from the Woodland components of the Knob Creek site. The diversity of tool forms and types of flakes used for their manufacture indicate that perforators were expedient tools. Most appear to be flakes that were minimally retouched, used, and then discarded. Some have broad stems and edge crushing to facilitate use as handheld tools, but few show wear suggestive of hafting. Some bits are strong enough to be used in a rotating motion although the ends are not necessarily pointed, others are too thin for such use, and the wear indicates they were better suited only for penetration.

The functions of the perforators may supplement those of the drills. Perforators cooccurred more with drills than with other perforators. In the 100 Block only two pairs of perforators were found within 2 m of one another, but seventeen drills were found within 2 m of a perforator. In the 200 Block only two pairs of perforators were found within 2 m of one another, but five drills were found within 2 m of a perforator.

The 100 Block yielded 50.0 percent of the perforators. Three tools were within and around Structure X and four others were to the south and west of it. Four perforators were around the feature cluster in southwest corner of the block, and three were near the feature cluster in the southeast corner. Perforators were found in two Middle Woodland features. The other tools were scattered across the block. The 200 Block contained 44.7 percent of the perforators. The tools were dispersed across the block, primarily in the north half of it. Like the drills, some of the perforators in the block are attributable to the Middle Woodland component.

Four perforators were reworked Early Woodland Contracting Stemmed points (Figure 7.38a), and one was made from a Snyders Cluster point and another from a point of indeterminate cultural affiliation. Only four perforators have bifacial invasive flaking. Three of these (Figure 7.38c-d) are triangular with straight basal edges and small protrusions with rotation wear. These may derive from the Middle Woodland component because two are from the 100 Block, including one (Figure 7.38e) from Middle Woodland Feature 100-40, and the other is from the Middle Woodland feature cluster in the southwest corner of the 200 Block. The fourth tool (Figure 7.38f) appears to be a rejuvenated biface with a small protrusion at one end and possibly another one broken off the opposite end. Six perforators (Figure 7.38g-h) are made from flake fragments that have been shaped into pointed tools with one incurvate and one excurvate lateral edge and only marginal retouch. These appear to be mostly or entirely the product of the Middle Woodland component because four are from the 100 Block and one was found next to a Middle Woodland feature in the 200 Block. Two perforators with narrow, tapered bits and broad, ovate bases (Figure 7.38i) resemble a drill also found in the 200 Block and may be attributable to the Early Woodland component.

The variety of tool forms appears to reflect diversity in the capacities and methods of use. Four tools are very small, thin biface reduction flake fragments that had been retouched to sharp points (Figure 7.38j). Three other flakes have blunt distal ends (Figure 7.38k), but lateral retouch facilitated use in a rotating motion. Two tools are made on small, thick flakes and have an elongated spur at the distal end (Figure 7.38l), and two large, thick flakes (Figure 7.38m-n) have forms similar to these and may represent handheld tools. Eight of the tools (Figure 7.38o-q) appear to be small pieces of debitage that have been minimally retouched to fulfill immediate piercing, twisting, and cutting needs. Wyandotte chert (78.9 percent) is the predominant raw material, and 18.4 percent of the tools are made of Muldraugh chert.

A sample of 10 gravers (Figure 7.39) was recovered from the Woodland components of 12HR484. Gravers were found in two Early Woodland features in the South Block (Phase II Feature 104 (Figure 7.39c) and Phase III Feature 1 (Figure 7.39f), two Middle Woodland features (Phase II Feature 20A and Feature 300-19), and Feature 300-52 (Figure 7.39e), which had nearly equal amounts of grit tempered, cordmarked pottery and Falls Plain pottery.

The 100 Block yielded 20 percent of the tools, the 200 Block had 10 percent of the sample, but 40 percent of the tools came from the South Block (Figure 7.40), which was only about one-fifth the area of the other two blocks. Eighty percent of the tools were made of Wyandotte chert and 20 percent were made of Muldraugh chert.

Eleven tools have tapered distal ends and battered proximal ends and may be wedges. These varied considerably in size and were not standardized in form.

Scrapers

The Woodland components contained relatively few formal scraping tools. Only 45 scrapers were recovered, and these show little uniformity of shape. Thirty of the tools are end scrapers, nine are side scrapers, four are combination end and side scrapers, one is a scraper with a graver spur, and two are indeterminate fragments.

The 100 Block yielded only 33.3 percent of the scrapers. These tools were widely scattered within the block. There were three scrapers in and around Structure X, three around the feature cluster in the southeast corner, and two near the feature cluster in the southwest corner. Few formal tools were present within the large feature cluster around Feature 100-112, and only one scraper was found in this area.

The 200 Block contained 48.9 percent of the scrapers. The scrapers were widely dispersed, with the end scrapers on the ridge crest and the side scrapers at the edge of the ridge and downslope. Two of the end scrapers were made from Adena points (Figure 7.41a-b). One of these (Figure 7.41a) was found inside Structure B. Three tools were inside or near Early Woodland Feature 200-59, and several tools were found in the activity area along the north edge of the block. Some of the tools may be from the Middle Woodland component. One tool was within the Middle Woodland feature cluster in the southwest corner of the block and one was inside Middle Woodland Feature 200-49.

Two distinctive hafted end scrapers with long, narrow, tapered stems (Figure 7.41c-d) were found several meters apart in the northwest corner of the 200 Block. Both surfaces of these tools are thoroughly bifacially flaked, but on one tool (Figure 7.41d) the necessary taper for the stem was obtained by splitting a bifacial tool diagonally, and only minimal retouch of the edge was needed to form the lateral edge of the stem. An elongated, ovate, end scraper with diffuse haft polish on the dorsal surface (Figure 7.41e) was made from a flake with a similarly broken lateral edge. These tools apparently derive from the Early Woodland component.

Hafted end scrapers with shorter stems and bifacial flaking (Figure 7.41f-g) were found in contexts that suggest Early Woodland origin. Unifacially flaked tools with broader stems were found in contexts that suggest they could be either Early Woodland or Middle Woodland. One large, thick flake with steep retouch of the distal edge (Figure 7.41h) from the 100 Block could be either a hafted or hand held tool, and is likely to derive from the Middle Woodland component. The remainder of the scraper sample was composed of unique tools, small fragments, or exhausted tools that could not be attributed to particular components, except for exhausted end scrapers in Early Woodland Feature 200-59 and Middle Woodland Feature 200-49.

Several tools display similarities in the lateral scraping edges. One side scraper has retouch on one incurvate and one excurvate lateral edge (Figure 7.42a), another has retouch on parallel edges and a concavity on one edge (Figure 7.42c) and one combination tool (Figure 7.42b) has lateral retouch and distal retouch. These tools were from the 200 Block and may derive from the Early Woodland component. Three cortically backed side scrapers were found--one (Figure 7.42d) in Phase II South Block Early Woodland Feature 126 and the other two (Figure 7.42e-f) in the 200 Block. These also may be attributable to the Early Woodland component. Two of these tools (Figure 7.42d-e) have polish in the center of the dorsal surface. Another tool (Figure 7.42g) with retouch and crushing on the edge opposite the scraping edge has patches of polish on two places in the middle of the dorsal surface and at the proximal end and middle of the ventral surface. The position of the polish indicates scraping of a rigid material, perhaps wood.

Wyandotte chert (77.8 percent) is the predominant raw material, and 17.8 percent of the tools were made of Muldraugh chert. Only 60 percent of the 15 scrapers from the 100 Block were made of Wyandotte chert, while 40 percent were made of Muldraugh chert. This chert use is in marked contrast to the 200 Block, where 90.9 percent of the 22 scrapers were made of Wyandotte and 9.1 percent were made of Muldraugh chert. It appears that there is a decrease in the use of scrapers and less focus on high quality chert for these tools during the Middle Woodland. The scarcity of standardized end scrapers in both components may indicate a lack emphasis on hide working, although it is certainly plausible that such tools were present but made of perishable materials.

Expedient Scraping Tools

A sample of eight denticulates (Figure 7.39g-j) was recovered from the Woodland components of the Knob Creek site. Half the denticulates came from the 100 Block, including one tool inside Structure X and one tool inside Feature 100-37 and another tool near the feature cluster around the latter feature. Another tool (Figure 7.39g) was found in Middle Woodland Feature 300-60. One-fourth of the sample came from the 200 Block, and one tool came from the South Block. Wyandotte chert was used for the manufacture of 75 percent of the tools.

Retouched Flakes and Utilized Flakes

The Woodland components of 12HR484 yielded 239 retouched flakes. Eleven Early Woodland features, 17 Middle Woodland features, and four Woodland features of unknown cultural affiliation yielded retouched flakes. These tools were predominantly made of

Wyandotte chert (79.1 percent), and Muldraugh was used to make 15.5 percent of the tools. The Woodland components also contained 499 utilized flakes. The utilized flakes were overwhelmingly made of Wyandotte chert (85.8 percent), and 12.4 percent were made of Muldraugh chert. Thirty-one utilized flakes came from Early Woodland features, thirty-seven flakes were found in Middle Woodland features, and six other Woodland features with indeterminate cultural affiliations yielded utilized flakes.

The 100 Block contained 39.3 percent of the retouched flakes. Eleven flakes were inside or directly outside Structure X (Figure 7.43). Small groups of flakes also were near the feature cluster in the southeast corner of the block and the feature cluster in the southwest corner. Very few flakes were found in and around the feature cluster that included Feature 100-112. The 100 Block yielded 34.5 percent of the utilized flakes. Twenty-three flakes were found in or directly outside Structure X, with a cluster at the south edge. Almost ten percent of the utilized flake sample from the block occurred within a four meter square area in the southeast corner. Nine flakes occurred in Feature 100-37 and four in Feature 100-112, but few flakes were found in the area surrounding these features. Both utilized and retouched flakes were common in the areas between feature clusters, but other than those in the aforementioned features few were found along the western and eastern edges of the block.

The 200 Block held 43.1 percent of the retouched flakes, which were scattered across the block (Figure 7.44), and 49.1 percent of the utilized flakes. The utilized flakes were more concentrated than the retouched flakes. Feature 200-59 had 14 flakes within it and others were scattered nearby. In the northeast portion of the block there were several dense concentrations of utilized flakes, which compose nearly ten percent of the sample from the block, and a scatter of retouched flakes in a two by six meter band directly south of a group of Early Woodland features. The area also contained five woodworking tools, including two complete celts. Nearly ten percent of the utilized flakes occur in the northwest corner of the block.

Several concentrations of utilized and retouched flakes are in areas with few other formal or informal tools and cannot be readily associated with either component. Approximately one-third of the retouched flakes and many utilized flakes were found in a ten by ten meter area in the east-central portion of the block (Figure 7.45). This area is south of Structure A and east of Feature 200-51 and other Early Woodland features. Because the structure is Middle Woodland and there are several Middle Woodland features nearby, and especially because of the dense concentration of Snyders points it is feasible that many of the tools derive from that component. The majority of the retouched and utilized flakes were found at the same depth or above the Snyders points in their respective units. This area is, however, on a moderate slope and the tools may have been discarded downslope. In the southwest portion of the block a concentration of utilized flakes and a scatter of retouched flakes lie in the area with both Middle Woodland and Early Woodland features.

A light scatter of retouched and utilized flakes, as well as gravers, denticulates, and unifaces, recovered around the periphery of Feature 78 in the Phase II South Block indicate moderate use of expedient tools. The utilized flakes represent 8.2 percent of the sample from the site and the retouched flakes compose 6.3 percent of the sample. In light of the size of the area, these tools were well represented.

Hammerstones

Thirty-nine chert hammerstones were recovered from the Woodland components of the Knob Creek Site. These composed 57.4 percent of the combined chert and hardstone hammerstone sample from the site, and 60 percent came from the 200 Block. Twenty-nine tools were made of Muldraugh or Allens Creek chert, and 19 of these came from the 200 Block. Three of the seven hammerstones made of Wyandotte chert came from the 100 Block and two came from the 200 Block, but two (Figure 7.46b) came from the Phase II South Block, which was only about one-sixth the size of each of the other two areas but had dense concentrations of Wyandotte debitage around the periphery of Feature 78.

The 100 Block contained 39.7 percent of the combined chert and hardstone hammerstone sample, including eight tools inside or directly outside Structure X (Figure 7.47). Hammerstones were found in three Middle Woodland features (Feature 100-7, Feature 100-112, and Trench Feature 325 in the 148N 49W Trench). A small cluster of hammerstones was present in the lithic reduction area in the center of the north end of the block, and there was a scatter of tools in areas with few features in the southern portion of the block.

The 200 Block yielded 47.1 percent of the combined chert and hardstone hammerstone sample. There appears to have been a preference for chert hammerstones and reluctance to use sandstone hammerstones. The north half of the block contained several clusters of hammerstones (Figure 7.48), as well as many of the cores and tested cobbles and extremely large amounts of debitage. Three Early Woodland features (Feature 200-7, Feature 200-56, and Feature 200-59) contained hammerstones, and two additional tools were found directly outside Feature 200-7.

Cores and Tested Cobbles

Only thirty-six cores were recovered from the Woodland components of 12HR484. One core was recovered from an Early Woodland feature and one core was found in a Middle Woodland feature. Half of the cores were made of Wyandotte chert and 38.9 percent were made of Muldraugh chert. No blade cores were found.

One-third of the cores were found in the 100 Block, where they were widely dispersed across the west side of the block (Figure 7.47). The 200 Block yielded 38.9 percent of the cores, and half of them were in the northwest portion of the block (Figure 7.48), which also contained over one quarter of the tested cobbles and 16 percent of the hammerstones in the block. The Phase II and Phase III South Block hand excavation units contained 13.9 percent of the cores, although the area was only about one-fifth the size of each of the other two blocks. The relative abundance of cores in the South Block, all made of Wyandotte chert, correlates well with the dense concentrations of debitage found around Feature 78 (Figure 7.49).

Although there was abundant evidence of lithic reduction in both components, the manufacture process apparently did not begin with unaltered nodules or tabular pieces of raw material in most instances. The high percentage of cores made of Wyandotte chert suggests the possibility of occasional forays into the source area to obtain raw material. This is substantiated by the frequent presence of cortex on tools (Figure 7.50c, d) and debitage. Despite the low frequency of tools made from Muldraugh chert, cores of this raw material are moderately common (Figure 7.50a, b). This chert was obtainable with little expenditure of effort from the Knobs a short distance from the site, but much of the raw material in the outcroppings and residuum was of poor quality, as were the rejected cores and tested cobbles.

Fifty-seven tested pieces of chert raw material were recovered from the Woodland components. Only 12.3 percent of the tested pieces are made of Wyandotte chert, despite the overwhelming use of this material for the manufacture of formal tools. It is plausible that some testing of the nodules took place at the source area and that the high quality of the chert may have resulted in a low discard rate for the pieces transported to the site. Two-thirds of the tested materials are made of Muldraugh chert and 15.8 percent are made of Allens Creek chert. The large number of the tested items reflects the abundance of the raw material in the outcroppings of the Knobs above the site and the poor quality and high rejection rate of the tabular blocks. No more than three flakes were removed from each of these pieces of raw material before they were discarded.

The 100 Block contained 52.6 percent of the tested cobbles, which were scattered across the block, particularly in areas with few features. Twenty percent of the tools were in or directly outside Structure X, and several were found near the feature cluster in the southwest corner of the block. The 200 Block held 40.4 percent of the specimens, which were scattered across the block, but over one-fourth of them were in the northwest corner. Three Early Woodland features and five Middle Woodland features contained tested raw materials.

Hardstone and Groundstone Tools

Adzes and Celts

Based upon the criteria used for the lithic analysis of the Caesars World Project, those groundstone tools with symmetrical bits and ungrooved medial portions are categorized as celts (Figure 7.51a-c). Observation of the use wear patterns and haft wear patterns yields the conclusions that these tools have been used in manners similar to the chert axes and that the celts and the groundstone and chert adzes are woodworking tools rather than digging tools. Most of the tools are represented by bit fragments, and no culturally diagnostic tool groups were identified. The very large number of adzes, axes, and celts found in the Woodland components, primarily in the 100 and 200 Blocks (Table 7.7), attest to extensive woodworking during both the Early Woodland and the Middle Woodland occupations of the site. A large number of adzes and celts were found within and near Early Woodland Structure B. An especially large number of these tool fragments were recovered within and near Middle Woodland Structure X and in the area around the feature cluster containing Feature 100-112.

Four groundstone adzes of granitic/metamorphic rock were recovered from the Woodland components of 12HR484. Three of the four tools were found in the 200 Block and two of these (Figure 7.51a, c) were within and at the edge of Structure B. Only one tool (Figure 7.51b) came from the 100 Block.

A sample of 32 groundstone celts was recovered from the Woodland components. Four of the tools were made of sandstone and the remainder of granitic/metamorphic rock. Unlike the adzes, these tools were more common in the 100 Block than the 200 Block, and a higher percentage are attributable to the Middle Woodland component. Twenty of the tools (59.4 percent) came from the 100 Block, 10 (31.3 percent) were found in the 200 Block, and two (6.3 percent) came from the Phase II South Block, which was about one-sixth the size of each of the other two blocks. Ten groundstone tool fragments from the Woodland components, labeled adze/celt fragments, could not be identified specifically as adzes or celts. Seven of the tools were made of granitic/metamorphic rock and three were of sandstone. Seven of these adze/celt fragments came from the 100 Block and two were from the 200 Block.

Most of the celt fragments in the 100 Block were in the south half of the block, and they were generally closer to features and to other celts than those in the 200 Block. Two of the adze/celt fragments were found in Middle Woodland Feature 100-112 and another was found nearby. Two celts and a chert axe were found within several meters of these tools.

Woodworking tools were closely associated with Middle Woodland Structure X. A bit fragment from a heavily bifacially-polished celt was found in Middle Woodland Feature

100-71, directly outside of Structure X, and a similar fragment was recovered nearby, and a chert axe was found inside the structure. The bit of another celt was found several meters outside the structure and a conjoinable medial fragment of the tool was found inside the structure. One adze/axe fragment was found inside Structure X, another was near its edge, and another was found several meters west of the structure. It is not apparent whether these tools derive from construction of the structure or from woodworking activities of the occupants.

Four small to medium sized, narrow celts (Figure 7.51f) were recovered. One tool from the 100 Block is composed of two pieces found more than 8 m apart. Because three of the tools were from the 100 Block, including one from inside Structure X, and the fourth was near a Middle Woodland feature in the 200 Block and no Early Woodland features were nearby, these artifacts are tentatively considered to be of Middle Woodland cultural affiliation.

The celt fragment recovered from South Block Phase II Feature 109 provides the only Early Woodland feature association. The celt fragments in the 200 Block were widely scattered, and most were located in relatively open areas several meters away from the closest feature. One cluster of woodworking tools was inside and in the immediate vicinity of Structure B. Two complete adzes and an adze fragment, a celt fragment, an adze/celt fragment were found within the outline of the structure, and five whole or fragmentary adzes and two celt fragments were found within 4 m of the structure. The presence of three complete chert adzes and two complete groundstone adzes among these tools suggests this was a woodworking locus rather than an area merely strewn with refuse.

One very large river cobble from the 200 Block was thoroughly pecked but not flaked, and an ovate celt from the 200 Block (Figure 7.51e) and two small, ovate celts (Figure 7.51d, g) and a larger ovate celt (Figure 7.51h) from the 100 Block were discarded while in the process of being flaked and pecked into shape. These provide evidence of the manufacture of celts at the site, possibly by individuals from each component.

Hammerstones

Sixty-eight hammerstones were recovered from the Woodland components of the Knob Creek Site. Twenty-one of the tools were made of granitic/metamorphic rock, seven of sandstone, and one of goethite. Six of the sandstone tools came from the 100 Block, and none came from the 200 Block. Ten of the tools made of granitic/metamorphic stone were from the 100 Block and eight were from the 200 Block.

The Phase II and Phase III South Block hand excavation units held 11.9 percent of the hammerstones (Figure 7.46a) although the area was only about one-fifth the size of the 100 and 200 Blocks. The 253N80W Trench, 300 Block and 400 Block did not yield any hammerstones in the mechanical excavation or the feature excavation, despite large quantities of debitage in some features.

Pitted Stones

Thirteen pitted stones were recovered from the Woodland components. The 100 Block contained 23.1 percent of the tools, the 200 Block held 30.8 percent of the sample. Hammerstones were particularly well represented in the Phase II South Block, which yielded 15.4 percent of the sample, despite being only about one-sixth the size of each of the other two blocks. Three of the tools were found in Middle Woodland features (Features100-96, Feature 300-24, and Trench Feature 323 in the 148N49W Trench), one tool was from Feature 300-52, which had nearly equal amounts of grit tempered pottery and Falls Plain pottery, and one (Figure 7.52b) was recovered from a Woodland feature of uncertain cultural affiliation. Nine tools were made of sandstone, two were of limestone, and two were of goethite.

Manos

Four manos were found within a 12 x 14 m area in the southcentral portion of the 100 Block, outside any of the feature clusters, and are considered to derive from the Middle Woodland component. Three were of sandstone and one was of granitic/metamorphic stone. A possible mano fragment was found in a Phase II unit near Middle Woodland Structure A in the 200 Block, and another possible mano fragment was recovered from a Phase II unit west of the 300 Block.

Metates

Three sandstone metates were recovered from the Woodland components. One large metate (Figure 7.52a) was found at the edge of Middle Woodland Feature 17 inside Structure X. One very large metate with a grinding depression on one surface and battering on both surfaces was found in Phase II South Block Feature 78, a huge baked soil concentration, and a pestle was found in an adjacent unit. The other tool was found next to the very large Early Woodland surface hearth Feature 200-65 in the 200 Block. These associations demonstrate that both Early Woodland and Middle Woodland groups made use of these tools.

Pestles

Three bell-shaped pestles were recovered from Early Woodland contexts at the Knob Creek Site, but none were found in Middle Woodland contexts. One of the two tools in the 200 Block was found adjacent to the very large surface hearth, Feature 200-65, and the other

(Figure 7.46b) was recovered at the edge of Structure B. The pestle in the Phase II South Block (Figure 7.46b) was found at the edge of the huge surface hearth, Feature 78.

Abraders

Twelve abraders were found in the Woodland components of 12HR484. Eight of the tools were scattered across the 200 Block (Figure 7.46e, f), including one found at the edge of the large processing pit, Feature 200-59 (Figure 7.46f). Two tools are from the 100 Block, and one tool was recovered from a feature of unknown cultural affiliation in the 400 Block, and one tool was from a Middle Woodland feature in a Phase II trench. The grooves ranged from 1-18 mm in diameter. Ten of the tools were made of sandstone, and one was made of limestone, and one of granitic/metamorphic rock.

Personal Items

Pipes

Fragments of a maximum of seven pipes were found in the Woodland components of 12HR484. Major portions of a sandstone tubular pipe and a sandstone elbow pipe were recovered slightly more than one meter apart inside Structure X in the 100 Block (Figure 7.53). One pipe is straight and conical, expanding toward the distal end, and is circular in cross section (Figure 7.54a). This tubular pipe has a section missing from the middle, but has an estimated length of 120-130 mm. The exterior width at the mouthpiece is 21.2 mm and the hole is14.2 mm in diameter, and the distal end is 41.6 mm in width, with a hole 24.1 mm in diameter.

This pipe appears to be comparable to the “tubular” pipe recovered from Burial 3 at the Fisher Mound, as described by Webb and Haag (1947:62-65, 90-91; Figure 7). Webb and Haag (1947:90-91) also report that a similar pipe was found at the nearby Tarlton Mound (15FA15). Webb and Haag (1947:93) see the prototype of the tubular pipe in implements from the Archaic shell mounds of the Pickwick Basin, but the presence of the tubular pipes at Tremper Mound is used to justify considering the Fisher site to be late Adena, because they consider the complexity of Tremper to be indicative of lateness in the Adena. Dragoo (1963:183. 194, Figure 11) describes this pipe form, his Category A, as “cigar shaped”, and notes that they are quite rare in Adena mounds and considers them to occur early in the Adena. Dragoo (1963:197) uses the pipe as part of the basis for his consideration of Fisher to be the best example of an early-middle Adena site in Kentucky.

The distal portion of a sandstone tubular pipe with a more cylindrical body than the specimen from 12HR484 was recovered from the Hunting Creek Site, another Middle Woodland site in the Falls area with Falls Plain pottery. A conical tubular pipe, comparable to the pipe from 12HR484, was found near Howardstown, Nelson County, Kentucky, and is part of the collection of avocational archaeologist James J. Matthews, and a proximal fragment of a pipe similar to that of 12HR484 was recovered in the Rough River drainage at 15BC272 (Schenian and Mocas 1993:Figure 18F, G). A small proximal fragment of a pipe with a circular cross section and straight or expanding sides was recovered from Trench Feature 313 in the 148N49W Trench of 12HR484.

A second form is represented by an elbow pipe that is rectangular in cross section, with rounded edges and parallel sides (Figure 7.54b). The lower portion of the stem is present and shows a straight stem, 95 mm in length, and a distal end that is inclined upward at an angle of approximately 114 degrees to form the bowl, which is unfinished and 54 mm in height. The bowl split during manufacture and the top was not finished. The bowl was drilled with a hollow, circular implement, possibly a piece of cane, which formed a hole with a diameter of 21.5 mm (Figure 7.54c). The end of the mouthpiece shows a series of parallel and intersecting lines (Figure 7.54d). A drill was inset into the end of this tool and left a deeper hole 8 mm wide at the distal end. A circular indentation at the distal end of the stem hole indicates that the same implement apparently was used to bore the stem. The mouthpiece is flat on the end and is 42.4 mm wide and has a hole 19.4 mm in diameter that narrows toward the distal end of the stem, and the bowl is 35.0 mm wide. A pipe stem fragment with a rectangular cross section was found about 6 m north of Structure X and may be another fragment of this pipe.

This implement appears to be comparable to the “elbow” pipe fragment recovered from the larger Wright Mound, 15MM6, as described by (Webb 1940:58-59; Figure 34S). The sandstone elbow pipes from the Ricketts site (Funkhouser and Webb 1935:Figure 2; Webb and Funkhouser 1940:222; Figure 10), are extremely large and have proportions that differ considerably from the pipe from the Knob Creek site. A pipe similar to the pipes from Ricketts was found at the Farnsley-Moorman site (15JF569), a short distance downriver from 12HR484.

Two small proximal fragments from pipes were found in the unit north of Structure X. These may be fragments of one pipe. They share attributes with both of the pipe types above. They are thin and tapered at the mouthpiece, like the tubular pipe, but the cross sections are slightly rectangular, with rounded edges, like the elbow pipe. A drilled piece of sandstone from the 200 Block may represent the initial stages of the manufacture of a pipe. A rectangular piece of sandstone, about 36 mm wide, bore two shallow circular holes, 7.7 mm in diameter, and part of a third hole in an arc, possibly intended to form the bowl of a pipe.

Gorgets

Two distinctive gorget types were identified in the 100 Block of 12HR484, and other forms were present but the exact morphology could not be determined. An expanded center bar gorget made of metamorphic rock was found in Middle Woodland Feature 100-12 in a cluster of features in the southeast portion of the 100 Block. Three other gorget fragments from two gorgets were found within 12 m. The gorget (Figure 7.55a) is biconvex in cross section and the sides expand to a slightly rounded center. It has the beginnings of two holes on one surface along the centerline in the middle of the gorget. A similar gorget, but with a plano-convex cross section, was found at the Zorn Avenue Village site. Expanded center gorgets with large, rounded centers and plano-convex cross sections (Category D) are described and illustrated by Dragoo (1963:182; Figure 10). Dragoo (1963:182, 215) notes that these implements were quite common on Adena sites and considers them the most distinctive and diagnostic late Adena gorget form. Webb and Snow (1974:84-85) consider them atlatl weights, but agree that they are late Adena. Both C&O Mounds (15JO2 and 15JO9) had numerous expanded center gorgets that resembled those from 12HR484. The gorget from the Robbins Mound (15BE3) (Webb and Elliott 1942:437; Figure 29F) is comparable to these. The Stoops Mound (12FR123) had one drilled and one undrilled center expanded gorget, both with plano-convex cross sections. Seeman (1975:55) reports five expanded center gorgets in private collections from southern Harrison County, Indiana. Small fragments of possible expanded center gorgets were found at the Morgan Stone Mound (Webb 1941:Figure 12) and the larger Wright Mound (15MM6) (Webb 1940:58; Figure 34N), and the Mt. Horeb mound (15FA1) is reported to have had three (Webb and Snow 1974:23). The center expanded gorgets from Ricketts (Funkhouser and Webb 1935:97; Figure 25) are more circular in the center and narrower at the ends and are plano-convex in cross section. Comparable gorgets were reported from several sites in east-central Indiana. An undrilled variant was found at the Law Mound in Randolph County, Indiana (McCord and Cochran 2000:82; Figure 44). The White Site, 12HN10, in Henry County, Indiana, had a gorget (Swartz 1970:23; Figure 12b) very similar to the one from 12HR484 and one similar to the example from the Zorn Avenue Village site.

The other gorget type (Figure 7.55b) identified may be a variant of the “bow-tie” or “reel” gorget groups illustrated and discussed by Dragoo (1963:182-183; Figure 10), but it does not closely resemble either. This fragment, found directly outside Structure X, has a unifacially drilled hole along the centerline, near the middle of the gorget. The implement is flat on both surfaces and has concave edges along the longitudinal axis, but the ends are straight rather than concave or convex. The distinctiveness and rarity of this type of gorget may allow it to be used as a temporal or cultural marker.

Another gorget fragment was found within Structure X. This was a medial fragment from a shale gorget of undetermined shape. It is plano-convex in cross section and broken at the one hole that remained. Two medial fragments of another shale gorget (Figure 7.55d), with an undetermined shape and concave-convex cross section, were recovered about 10 m apart near the feature cluster in the southeast corner of the 100 Block. This fragment was drilled from both surfaces. One piece of ground shale found several meters west of the structure may be a gorget fragment discarded in the process of manufacture. A lateral fragment of another gorget (Figure 7.55e) with an undetermined shape was found in the northeast corner of the 100 Block, and a possible lateral fragment of a shale gorget was recovered from Feature 100-112. A medial fragment of a green, banded slate gorget with an undetermined shape and drilled from both surfaces (Figure 7.55c), was found between the very large surface hearth, Feature 200-65, and the lithic concentration in Phase II Unit 225N60W in the 200 Block.

One artifact of unidentified function from the 100 Block is a water-rolled pebble of quartzite that has been flattened on one surface and has a longitudinal groove on the opposite surface (Figure 7.55f). The groove suggests a cord was tied around it longitudinally. The specimen is relatively light, thus it is not likely to be a bannerstone. There may be aesthetic value to the sparkling, white stone, so it could be a pendant, but it is equally likely that it is a net weight.

Bannerstones

Two artifacts from the site appear to be atl-atl weights, for which the generic terms bannerstone will be used. One artifact from the 200 Block is a piece of goethite that is flattened on one surface and is tapered toward the proximal and distal ends and laterally keeled on the other surface (Figure 7.56a). This specimen fits the description of a semi-keeled bar gorget (Dragoo 1963:Figure 8B), except that it is not drilled. Despite the name, Webb and Snow (Webb and Snow 1974:85) recognize that similar artifacts from Adena mounds are atl-atl weights. The weight of the item supports the probability that this is an atl-atl weight rather than a pendant. Comparable artifacts were recovered from the Hartman Mound in the Bluegrass region of Kentucky (Webb 1943:543-545), Mound 3 at Chillicothe, Ohio, (Greenman 1932:430; Squier and Davis 1848; Figure 126#1), and Natrium Mound in West Virginia (Dragoo 1963:Figure 8b; 182).

A possible bannerstone fragment of sandstone was found in the 100 Block (Figure 7.56b).

Beads

A goethite bead (Figure 7.56c) was found near the feature cluster around Feature 100-37 in the 100 Block. A bifacially drilled, but not shaped, shale bead (Figure 7.56d) and a possible sandstone bead with unfinished surfaces were found in the 200 Block. A possible undrilled goethite bead was found in the lithic workshop area north of the 200 Block.

Bone tools

Several Middle Woodland features had faunal remains that may have been altered during manufacture or use as a tool. A piece of turtle shell in Feature 300-52 was cut and incised and may have been part of a bowl or rattle. Two pieces of cervid antler in Feature 100-70 may have been ground during manufacture or use of a tool, and a piece of deer humerus from Feature 200-33 bore possible polish on the distal end.

Discussion

The personal items from 12HR484 show affinities to items found in Adena mounds in Kentucky, southeastern Indiana, southwestern Ohio, and western West Virginia. These items may elucidate some of the relationships between the mounds and between the groups who utilized the mounds and contemporaneous, regional groups. Tubular pipes and elbow pipes cooccurred in Structure X and were associated with a distinctive form of gorget and an unidentified form of gorget in this same locale. Additionally, a variant of the expanded center bar gorget was found within 10 m of the structure. The radiocarbon date from the refuse pit within the structure may provide an absolute date for these items and perhaps an approximate age for comparable artifacts from Adena mounds. The cooccurrence of these items and the structure may complicate as well as elucidate the identification of early and late Adena traits and sites.

Debitage Analysis

Wyandotte debitage was much more plentiful in the Early Woodland component than in the Middle Woodland component. Lithic mass analysis reveals 41 Phase III Early Woodland units and three Early Woodland features in the 200 Block with more than 100 g of 1/2" Wyandotte flakes and 35 Phase III Early Woodland units and one Early Woodland feature in the block with >100 g of 1/4" Wyandotte flakes (Figure 7.57) (Table 7.8). Two features in the Phase II South Block yielded >100 g of ½" and >100 g of ¼" Wyandotte debitage; three of the 40 units contained >100 g 1" Wyandotte; 12 units held >100 g of ½" Wyandotte; and 16 units yielded >100 g of ¼" Wyandotte debitage (Figure 7.58). In contrast, only one Phase III Middle Woodland unit in the 100 Block had even a moderate amount (>100 g) of Wyandotte debitage, and one Middle Woodland feature in the 100 Block had large amounts (>1000 g) of intermediate and late stage Wyandotte debitage (Figure 7.59) (Table 7.9). None of the Early Woodland or Middle Woodland features in the other blocks and trenches contained even moderate amounts of Wyandotte debitage.

Neither component showed major early stage reduction of Wyandotte chert, but several units and three features in the Early Woodland component (Feature 200-56, Feature 200-59, and Phase II Feature 40), bore evidence of early stage reduction of a few Wyandotte chert nodules. The Early Woodland component of the 200 Block and the Phase II South Block provided ample evidence of intermediate to late stage reduction of Wyandotte chert that probably entered the site as quarry blanks. Late stage debitage, typified primarily by ¼" flakes, often had the greatest mass in a unit or feature despite the miniscule weight of the individual flakes.

Several Early Woodland knapping areas were identified. Phase II Feature 40, which was directly outside the north end of the 200 Block and is included as part of the 200 Block in discussions, yielded an extremely large amount (approximately 5000 g of ½" flakes) of intermediate stage Wyandotte debitage, both with cortex and without cortex, and nearly as much (approximately 3600 g of ¼" flakes) late stage Wyandotte debitage. Three of the Phase III units placed south of the feature yielded a combined total of over 10,000 g of ¼" Wyandotte flakes. Phase II U225N60W was not subjected to lithic mass analysis but yielded over 10,000 g of debitage, and an extension to the north produced nearly 2000 g more debitage. The concentration was composed primarily of intermediate to late stage debitage of Wyandotte and Muldraugh cherts. Feature 200-59 yielded a moderate amount of early stage Wyandotte debitage and a large amount of intermediate to late stage Wyandotte debitage. In the Phase II South Block, Feature 100 and Feature 104 and the dense layers of debitage in the surrounding units yielded extremely large quantities of intermediate and late stage Wyandotte flakes. Feature 104 displayed evidence of the reduction of three types of chert, possibly in two knapping sessions. A dense layer of intermediate to late stage Wyandotte debitage underlay a layer of early to intermediate stage Allens Creek and Muldraugh cherts.

The only Middle Woodland feature with a large amount of intermediate and late stage reduction debitage of Wyandotte chert was Feature 100-65, which was relatively isolated at the north end of the 100 Block. The only unit with even a moderate amount of Wyandotte debitage was Unit 100-56, which contained intermediate to late stage debitage along the inside of the wall of Structure X. One of the three Wyandotte cores from the block was within the structure in an adjacent unit. A moderate amount of intermediate to late stage Wyandotte debitage was found in a unit with one of the Middle Woodland refuse pits next to Structure A in the 200 Block (Figure 7.60), but these features contained very little Wyandotte debitage, thus the chert could have derived from the precedent Early Woodland component.

With the aforementioned exceptions, the features (Tables 7.8 and 7.9) and units with large amounts of debitage in both Woodland components contained primarily Muldraugh debitage. The preponderance of Muldraugh chert is perplexing because both formal and informal tools were overwhelmingly made of Wyandotte chert. The ready availability of Muldraugh and Allens Creek cherts in the bluffs above the site and the considerable distance to the nearest Wyandotte sources may have been factors responsible for the abundance of Muldraugh and Allens Creek cherts on the site. Another pair of factors may be that Muldraugh and Allens Creek cherts generally are highly fractured and weathered and produce an inordinately large amount of unusable debitage during the manufacture of early stage bifaces and the reduction of cores. Tested cobbles, chert cobbles and blocks that were discarded after no more than three flakes had been removed, were overwhelmingly (82.5 percent) made of Muldraugh or Allens Creek chert, and 47.2 percent of the cores, which often showed removal of only a few more flakes than did tested cobbles, were of these raw materials (Table). Wyandotte nodules contained few flaws and appear to have been tested and trimmed prior to transportation to the site.

Specimens of almost all tool types were made from Muldraugh chert (Table), and a few tools were made of Allens Creek chert, but most of the tools from these materials were large or were completed with minimal fine retouch. The percentage of bifaces made of Muldraugh chert declined markedly as the tools became more refined. In the 100 Block, 59.6 percent of the Stage 1 bifaces were made of Muldraugh or Allens Creek, but only 19.4 percent of the Stage 3 tools were made of these materials. A similar situation exists in the 200 Block where 53.1 percent of the Stage 1 bifaces were made of Muldraugh or Allens Creek, but only 30 percent of the Stage 3 tools were made of these cherts. The only tool types predominantly made of Muldraugh or Allens Creek chert were adzes and axes. All four chert axes, which were evenly divided between the 100 Block and the 200 Block, were made of Muldraugh chert, and five of the six chert adzes in the 100 Block and nine of the 13 chert adzes in the 200 Block were made of this chert. Although the manufacture of the aforementioned tools may account for much of the mass of the Muldraugh and Allens Creek debitage, the quantities of intermediate and late stage debitage suggest additional Muldraugh and Allens Creek lithic reduction activities. The only other flaked tools commonly made of Muldraugh chert were the scrapers of the 100 Block. Forty percent of these were made of Muldraugh chert.

The volume of Muldraugh and Allens Creek debitage was greater than that of Wyandotte debitage in both components, but large knapping areas with Muldraugh and Allens Creek cherts were not present. Four Middle Woodland features (Feature 100-112, Feature 300-19, Feature 300-52, and Feature 300-60) (Figure 7.61) and two Early Woodland features (Feature 200-59 and Feature 400-4) (Figure 7.62) had more than 1000 g of Muldraugh and Allens Creek chert, but no features or units had quantities of debitage comparable to the Wyandotte chert knapping areas. One Early Woodland feature contained a large amount of early stage Muldraugh and Allens Creek debitage and eight features contained moderate amounts. Ten features contained moderate amounts of intermediate stage debitage, and six features held moderate amounts of late stage debitage.

Muldraugh and Allens Creek cherts were not abundant in the 200 Block Early Woodland features (Table). One of the 69 Early Woodland features from the 200 Block yielded moderate amounts of early, intermediate, and late stage Muldraugh and Allens Creek debitage; two features contained moderate amounts of early stage and intermediate stage debitage; one feature yielded moderate amounts of intermediate and late stage debitage;

another feature contained a moderate amount of intermediate stage debitage; and one feature produced a moderate amount of late stage debitage.

There were few Early Woodland features in the 400 Block (n=10) and the Phase II South Block (n=10), but in comparison to the 200 Block these areas had relatively more features with at least moderate amounts of Muldraugh and Allens Creek debitage (Table). It is possible that the short-term occupations relied more upon readily available chert than did the more stable occupation. One Early Woodland feature in the 400 Block had a large amount of early stage Muldraugh and Allens Creek debitage and moderate amounts of intermediate and late stage debitage. One Early Woodland feature from the block had moderate amounts of early, intermediate, and late stage debitage, and another feature had a moderate amount of intermediate stage debitage. Two Early Woodland features in the Phase II South Block contained moderate amounts of early stage and intermediate stage Muldraugh chert, and one feature yielded a moderate amount of early stage debitage. Of the 40 units with Early Woodland deposits excavated in the Phase II South Block, 18 contained moderate amounts of early stage Muldraugh or Allens Creek chert, 29 yielded moderate amounts of intermediate stage debitage, and 13 produced moderate amounts of late stage debitage.

Muldraugh and Allens Creek cherts were common, but not abundant in the Middle Woodland features of the 100 Block (Table). Flakes from the early and intermediate portions of the reduction sequence comprised the majority of the debitage mass. Six of the 105 features yielded moderate amounts of early stage debitage; three features produced moderate amounts of the intermediate stage debitage, and one contained a large amount; and two features contained moderate amounts of late stage debitage. The features from the 300 and 400 Blocks contained comparatively higher weights of these cherts. Two of the 14 features in the 300 Block contained moderate amounts of early, intermediate, and late stage Muldraugh and Allens Creek debitage; one feature contained moderate amounts of early and intermediate stage debitage; and five features yielded moderate amounts of intermediate stage debitage. One of the nine features in the 400 Block contained moderate amounts of early stage and intermediate stage debitage and one feature yielded a moderate amount of intermediate stage debitage. None of the features in the 148N49W Trench contained more than a moderate amount of debitage (Figure 7.63), and it was overwhelmingly Muldraugh and Allens Creek. As with the Early Woodland component, it appears plausible that the short-term Middle Woodland occupations relied more on readily available chert than did the more stable occupation.

Exploitation of both Wyandotte chert and a combination of Muldraugh and Allens Creek cherts occurred more frequently in the Early Woodland features than in the Middle Woodland features. Of the six Early Woodland features with more than 1000 g of debitage, one feature yielded >1000 g of Wyandotte chert and a combined total of >1000 g of Muldraugh and Allens Creek cherts, and one feature yielded a combined total of >1000 g of Muldraugh and Allens Creek cherts and a sizable amount of Wyandotte chert. One feature contained >8600 g of Wyandotte chert, one feature yielded a combined total of >1000 g of Muldraugh and Allens Creek cherts, and another feature had nearly this amount of Muldraugh and Allens Creek cherts. The Early Woodland knapping area in Phase II U225N60W yielded very large volumes of both Wyandotte and Muldraugh chert from intermediate and late stages of lithic reduction. Of the eight Middle Woodland features with more than 1000 g of debitage, one contained >1000 g of Wyandotte chert, four features yielded a combined total of >1000 g of Muldraugh and Allens Creek cherts, and Muldraugh and Allens Creek cherts were the predominant types in three other features.

Summary

The Early and Middle Woodland components of the Knob Creek Site are quite similar in their chert usage. The formal tools and the expedient tools of both components are overwhelmingly made of Wyandotte chert. The Early Woodland component yielded only four projectile points and several other formal and expedient tools made of chert that could not be obtained within 50 km of the site, and the Middle Woodland component contained only four points and several other tools of non-local chert.

The tool kits for the two components are essentially the same in the variety of tools, and the tools generally form comparable percentages of the lithic assemblage of their respective components. The Early Woodland groups do not have fewer hafted tools or less intensively utilized tools, which may reflect mobility comparable to that of the Middle Woodland groups. Although projectile points were reworked into drills and scrapers more frequently during the Early Woodland, chert tools of both components commonly were hafted and were retouched and reworked into other tool forms occasionally. It is possible there was at least a moderate effort by both groups to conserve chert because of the distance to Wyandotte outcroppings. The lithic industries reflect comparability and continuity rather than divergence.

The presence of Wyandotte cortical debris indicates that at least a limited number of nodules were transported to the Knob Creek Site, but the recovery of only eighteen cores from Woodland contexts elicits the conclusion that the vast majority of this raw material entered the site in the form of bifaces or quarry blanks, rather than unaltered nodules or cores. Only three Wyandotte cores were present in the 100 Block despite the intensive Middle Woodland occupation in that area. A slightly higher incidence of Wyandotte core use during the Early Woodland is suggested by the seven Wyandotte cores from the 200 Block, which represent half of the cores recovered from the block, and the five cores from the South Block, all of which were made of Wyandotte chert. The scarcity of these tools demonstrates that they did not form a major segment of the lithic industry of either occupation. No blade cores were recovered from the site, and the minimal number of cores does not support the possibility that the hundreds of informal and formal tools originated from cores reduced at the site.

Although 57 tested cobbles were found, 82.5 percent were made of Muldraugh or Allens Creek chert, and the large number reflects the poor quality of raw material rather than its relative importance to the economies. These cores and tested cobbles do not appear to be an integral part of formal tool or expedient tool manufacture despite the abundance of the raw materials in the nearby bluffs. Although more than half of the tested cobbles (52.6 percent) came from the 100 Block, only one of these is made of Wyandotte chert, and only 26.1 percent of the 23 tested cobbles in the 200 block and none of the three tested cobbles from the South Block are made of Wyandotte.

Utilized and retouched flakes are a major constituent of the lithic assemblage in both the Early Woodland and Middle Woodland components. The prevalence of multiple dorsal flake scars on these expedient tools confirms that the majority of the flakes were obtained from bifacial reduction debitage. The 100 and 200 Blocks contain comparable percentages of the retouched flake sample, differing by less than four percent, but the 200 Block held 14 percent more of the utilized flake sample. The ratios of Wyandotte to Muldraugh chert in the utilized flake and retouched flake categories are comparable. The utilized flakes have a slightly higher percentage of tools made of Wyandotte chert than the retouched flakes and a slightly smaller percentage of tools made of Muldraugh chert. The predominately Middle Woodland 100 Block and the primarily Early Woodland 200 Block and South Block differ by less than three percent in the percentage of utilized flakes made of Wyandotte chert and by less than 2 percent in the percentage made of Muldraugh chert. The percentage of retouched flakes made of Wyandotte chert in the 100 Block differs from that of the 200 Block by less than one percent, and the percentage of tools made of Muldraugh chert is 10 percent less in the 100 Block. Other types of expedient tools (gravers, perforators, and denticulates) show percentages of Wyandotte and Muldraugh cherts comparable to those of utilized and retouched flakes, and these percentages are equivalent to those of formal tools such as projectile points and drills.

The Middle Woodland component has fewer projectile points than the Early Woodland component despite indications of a more intensive occupation during the later period. Both Early Woodland Contracting Stem points and Snyders Cluster points show extensive evidence of use for cutting and perforating, as well as use as projectile points, thus it is difficult to attribute the decrease in these tools to de-emphasis in a particular activity.

Both components had large numbers of drills and perforators, and although the numbers of tools from the 100 and 200 Blocks are nearly the same, a significant number of the tools from the 200 Block apparently derive from the Middle Woodland occupation. This may reflect an increase in the use of these tools during the Middle Woodland.

Generally, comparable percentages of the tools in the 100 Block and 200 Block are made of Wyandotte chert. One notable exception is the scrapers from the 100 Block. The percentage of Wyandotte is much smaller (60 percent) and the percentage of Muldraugh (40 percent) is much larger than in the other formal tools categories, but the chert percentages for the scrapers from the 200 Block correlate well with the other formal tool groups. The Middle Woodland Snyders Cluster projectile points, the majority of which came from the 100 Block, display a slightly higher percentage of Wyandotte chert (90.9 percent) than most of the formal tool groups, and the Early Woodland Contracting Stem Cluster, most of which derive from the 200 Block, have a percentage of Wyandotte (81.2 percent) that is comparable to the other formal tool groups. Less than two percent of both the Early Woodland and Middle Woodland points are made of cherts that outcrop more than 50 km from the site and could not be found in the gravels of the adjacent Ohio River. The formal and informal tools of both components reflect a focus on local lithic resources and attest to little trade or travel on the part of the inhabitants of the Knob Creek site.

Both components yielded an inordinately large number of woodworking tools. Heavy groundstone axes suitable for felling trees and chert adzes and celts for shaping of wooden objects were found in both components. There is a strong possibility that some of the tools were used in construction of the Middle Woodland structures, and the numbers of chert axes and adzes and groundstone celts near Structure X may be an indication that the occupants of the structure performed additional woodworking in and adjacent to the house. Proximity to the Ohio River also allows the possibility that watercraft were manufactured.

The larger number of manos in the 100 Block could reflect the increased importance of grains and seeds in the diet of Middle Woodland groups, but the small number of manos, metates, pitted stones, and pestles may show a lack of emphasis on the processing of seeds and nuts in both components.

The lithic assemblages of the two components are quite alike, and it is possible that the Early and Middle Woodland economies were sufficiently similar to necessitate the use of the same types of tools and in nearly the same quantities. The industries attest more to continuity than change. The botanical remains suggest that the Middle Woodland may represent an intensification of the Early Woodland economy, and the lithic assemblages support this idea. The percentage of formal tools suggests relatively sedentary groups and the chert types point to localized economies.

The absence of exotic materials may indicate a lack of extensive trade networks and external influences, although the Middle Woodland component at the nearby Zorn Avenue Village site (Mocas 1992) does include exotic material, in the form of mica. The gorgets and pipes bear resemblances to items from the Bluegrass region of Kentucky and may denote affiliations with regional groups, but these may be more in the form of ideas than movement of people.

Chapter 8

HUMAN SKELETAL REMAINS

Few human skeletal remains were recovered from 12HR484. Enamel from 3-4 deciduous teeth, one mandibular premolar crown, and one maxillary canine crown were recovered from one unit. The states of development of the tooth crowns are consistent with those of a child of five years of age. A distal hand phalange was recovered from another unit.

There are several potential explanations for the lack of burials. The occupations may have been short enough that no one or few people died. However, the thickness of the midden, the amount of cultural material, and the presence of structural remains suggest that extended habitation took place and that there were a moderate number of people living there. Interments may have been placed away from the habitation or activity areas. If this were the case, it still seems likely that human remains would have been discovered within the huge area excavated if they were present. It is feasible that cremation took place or bundle burials were used, but no burned human bone was identified and no disarticulated human bones were encountered. The deceased could have been buried off-site, but there is no way to determine if this was the practice.

The most plausible explanation for the lack of human remains is that the acidity of the soil dissolved the bones. Results of the faunal analysis for the site indicate that very little bone of any kind was preserved. Even poorly preserved bone was only present in small quantities.

Earlier components at 12HR484 and two of the other three sites excavated in the Caesars Archaeological Project area yielded no human bone. The poorly preserved human bones in Feature 20 at HR481 may have preserved because of the proximity to small shell areas and burnt limestone. The cranial fragment from Feature 113 at HR481 may have been present due to another anomaly of preservation.

The lack of burials on all the sites except 12HR481 and the general rarity of non-calcined bone reinforce the possibility that the soil on the Knob Creek site is too acidic for bone to preserve and that any bone preservation was a product of unusual circumstances.

Chapter 9

OVERVIEW OF THE EARLY WOODLAND AND MIDDLE WOODLAND COMPONENTS

Much of the contribution of the Caesars World Archaeological Project is that excavation of the Knob Creek site provides an overview of local manifestations of the Early Woodland and early Middle Woodland cultural/temporal periods. The analyses resulted in identification of sets of artifacts and attributes that can be linked to particular components and permit comparisons with the material culture and social and economic characteristics of local and regional groups.

Diagnostic Tools and Pottery

The abundance and diversity of distinctive cultural materials and the numerous cultural features facilitate clarification of which tool types and ceramics are associated with each component and provide a method of relative dating for the Woodland deposits of the Knob Creek site and those elsewhere in the Falls of the Ohio region. These materials are examined to ascertain if the tools diagnostic of particular cultural/temporal periods elsewhere also identify these periods in the Falls of the Ohio region and if local sites have additional or alternative diagnostic items. The ways in which these tools adhere to and diverge from type descriptions provide insight into possible developmental or transitional stages.

A variety of attributes were used to differentiate the Woodland ceramics of the Knob Creek site. Early Woodland sherds initially were identified by the presence of grit temper and cordmarked or smoothed cordmarked, and occasionally plain, exterior surfaces--traits common among regional Early Woodland pottery types and seen in the few components of this cultural/temporal period excavated in the Falls area. This pottery was scattered throughout the Knob Creek site but was comparatively rare in features. The sherds were highly fragmented, thus few vessel forms could be deciphered and few developmental trends and temporal and cultural indicators were identified.

The radiocarbon dates from features with grit tempered, cordmarked pottery (2740-2190 RCYBP; calibrated range of cal B.C.1050-130 at the one sigma level) correlate well with those associated with similar ceramics in the Midwest and Midsouth, except for the earliest date. The grit tempered sherds with cordmarked exterior surfaces but without interior cordmarking that were associated with the earliest date are sufficiently similar to other pottery from the Knob Creek site and elsewhere in the Falls area that the date is drawn into question.

The second earliest date associated with pottery (2550 +/- 70 RCYBP) from the Knob Creek site demonstrates that some early pottery was well made. The small sample of interior/exterior cordmarked sherds provides the first documented example of early ceramics in the Falls area comparable to Marion Thick pottery (Conrad, et al. 1986; Griffin 1952; Harn 1986; Helmen 1951; Morgan 1992). Some sherds from 12HR484 resemble samples of Marion Thick, although the thickness is not quite as great and the temper is smaller at the Knob Creek site. Other sherds are analogous to some of the thinner samples of Marion Thick (Morgan 1992:128) and sherds that are referred to as Marion Thin (Conrad, et al. 1986:15). The radiocarbon assessments from the Knob Creek site (2550-2400 RCYBP; corrected range of cal B.C. 800-400 at the one sigma level)) correlate well with the dates from elsewhere in the Midwest.

The association of Marion Thick pottery and Kramer points (Munson 1971:6; Stafford 1992) is not seen at 12HR484, although such associations are present locally at the Shippingport site (Michael French, personal communication 2006). The interior/exterior cordmarked pottery at the Knob Creek site is associated with Turkey-tail points and Adena Stemmed points and projectile points that share traits of both types. Buck Creek Barbed points were abundant in the portion of the 200 Block that contained interior-exterior cordmarked pottery, but these tools could not be confidently linked to the Early Woodland deposits.

The cooccurrence of grit tempered sherds and limestone tempered (Falls Plain) sherds in about equal quantities in some features presents the possibility that there may have been a transitional period in ceramic preferences. If the cooccurrence of grit tempered and limestone tempered pottery in the Feature 300-60 is valid, grit tempered pottery may have been in use until at least 2190 RCYBP (corrected range of cal B.C. 380-130 at the one sigma level) at the site. A small number of Zorn Punctate sherds were recovered, but the contexts were such that the temporal span and cultural affiliations were not clarified.

There is a substantial increase in the use of pottery during the Middle Woodland. Falls Plain pottery represents the primary criterion for recognition of the Middle Woodland component. These ceramics were recovered from well-documented, unmixed contexts in numerous features. Associations of this pottery with Snyders or Snyders Variant projectile points seen at other local sites (Mocas 1976; Sieber and Ottesen 1986) are substantiated, and similarities to regional ceramic types to the east (Mocas 1992) are elucidated. A range of absolute dates for the ceramic type and the Middle Woodland component (2190-2000 RCYBP; corrected range of cal B.C. 380-cal A.D. 90 at the one sigma level) are provided by the first suite of credible radiocarbon dates from the area. The morphological and technological attributes of these ceramics adhere quite closely to those presented in the type description (Mocas 1992), but additional temporally or geographically variant traits were not identified.

One large grit tempered vessel fragment differed from the other grit tempered sherds because of its cord wrapped paddle impressed surface treatment and rounded bottom. This vessel is tentatively considered to postdate Falls Plain pottery. The vessel fragment and several Copena and Lowe Flared Base projectile points (Justice 1987:204-213) may reflect brief later Middle Woodland or Late Woodland activity at the site.

Both the Early Woodland and the Middle Woodland projectile points show distinctive combinations of attributes that form continua that encompass more than one projectile point type but are internally consistent. Several projectile point types are diagnostic of the Early Woodland component. Early Woodland Contracting Stemmed points comparable to Dickson Cluster points (Justice 1987:189-198) were plentiful throughout the site, particularly in the areas with the largest amounts of grit tempered pottery. Adena Stemmed points were found in features with grit tempered pottery, and one such feature yielded a date of 2280 RCYBP (corrected range of cal B.C. 400-210 at the one sigma level). An Adena point cooccurred with interior/exterior cordmarked sherds in one feature, and Adena points were common in the South Block (corrected dates of two South Block features have a range of cal B.C. 760-400 at the one sigma level), which contained interior/exterior cordmarked pottery, thus the points may have been present several centuries earlier than the aforementioned date. The presence of an Adena point in a feature that had both grit tempered and limestone tempered pottery and yielded a date of 2190 RCYBP (corrected range of cal B.C. 380-130 at the one sigma level) may indicate that the type persisted into the early Middle Woodland. Adena points also were recovered from other Middle Woodland features, but there is uncertainty about the integrity of these associations because Middle Woodland features frequently penetrated into the Early Woodland deposits.

Turkey-tail points were less common than Adena Stemmed points but were found in most of the same areas. One feature that contained a Turkey-tail point yielded a radiocarbon date of 2390 RCYBP. Projectile points that shared traits with both Early Woodland Contracting Stemmed points and Turkey-tail points were found throughout much of the site. The radiocarbon dates from the South Block (2400 and 2390 RCYBP; corrected range of cal B.C. 757-395) may provide a temporal placement for the intersection of Turkey-tail and Adena technologies. Small numbers of Early Woodland Straight Stemmed projectile points (Cresap, Kramer, and Robbins) also were recovered, but none were in features or were directly associated with pottery or other cultural materials or facilities.

Corner notched and expanding stemmed projectile points that display combinations of attributes suggestive of affinities to Snyders Cluster projectile points, as defined by Justice (1987:201-204), function as diagnostic attributes for the Middle Woodland component. These tools form a continuum of variation that correlates with utilitarian forms of Snyders points such as Affinis Snyders and Manker Corner Notched and Manker Stemmed (Montet-White 1963) and in some instances are similar to Saratoga Expanding Stem points (Justice 1987:157-159). Although the implications for the rest of the Midwest are uncertain, it appears that at least in the Falls of the Ohio region, the attributes of Snyders and Saratoga Expanding Stem points are intermingled in a projectile point form with a range of variation that includes recognizable examples of both types at the ends of a continuum and in some instances combines attributes from both types. Variants of these points cooccur in features and in the midden throughout much of the site, and the radiocarbon dates indicate a temporal span of 2100-2000 RCYBP (corrected range of cal B.C. 200-cal A.D. 90 at the one sigma level). None of these Snyders Variant points were recovered in contexts that suggested they were affiliated with the Early Woodland component. Despite the difficulties intrinsic to typological discussions of point types defined and known from distant sites, analysis of the Snyders and Snyders Variant points has clarified their affinities and cultural/temporal affiliations and provided a new perspective on the development of the relevant point types.

The tool kits for the Early and Middle Woodland components are comparable in the variety and quantities of tools. Both groups exploited the same cherts and in approximately the same ratios, and there was almost no use of non-local cherts. The chert and other artifactual materials do not reflect long distance trade or travel by either group. The lithic assemblages of both components are dominated by formal tools and have nearly equal quantities of expedient tools. The small, narrow bifaces found in both Early Woodland and Middle Woodland contexts may have secondary diagnostic value if further research documents their occurrence elsewhere.

Chronology

Few radiocarbon determinations have been obtained from Early Woodland and Middle Woodland components in the Falls of the Ohio region, and the validity of many of the assessments is seriously in question (Mocas 1988:141; 1992:70-72). One goal of the present project is to establish a dependable absolute chronology for the Early Woodland and Middle Woodland periods in the Falls of the Ohio region by acquisition of radiocarbon determinations from samples obtained in clear association with diagnostic materials in cultural features. The radiocarbon dates are further intended to establish depositional rates and clarify the degree to which individual zones of debris represent palimpsests.

The Knob Creek site provides the first suite of radiocarbon dates that confidently can be considered to reflect the chronological placement of the ceramics, projectile points, structures, personal items, and technological and subsistence activities of the Middle Woodland period in the Falls area. Six radiocarbon dates from features with Early Woodland diagnostic material provide a temporal framework for the Early Woodland component. Two additional features with Early Woodland materials and one feature within an Early Woodland feature cluster produced dates of questionable accuracy.

Occupations characterized by interior/exterior cordmarked pottery, Turkey-tail, Adena Stemmed, and Turkey-tail/Adena points may have begun as early as 2550 RCYBP (corrected range of cal B.C. 800-540 at the one sigma level) and continued through at least 2390 RCYBP (corrected range of cal B.C. 760-400 at the one sigma level). Other Early Woodland settlements with grit tempered, cordmarked pottery and Adena points were present in the 400 Block and 253N80W Trench during the span of 2320-2280 RCYBP (corrected range of cal B.C. 410-210 at the one sigma level), and occupations with similar diagnostic artifacts could have persisted until approximately 2190 RCYBP (corrected range of cal B.C. 380-130 at the one sigma level)--a possible transitional period in ceramic preferences when Falls Plain pottery was first manufactured. Middle Woodland occupations typified by Falls Plain pottery, Snyders Cluster points, and circular structures were established by 2167 RCYBP (corrected range of cal B.C. 350-130 at the one sigma level) and continued until at least 2000 RCYBP (corrected range of cal B.C. 90-cal A.D. 90 at the one sigma level). Circular structures were present by 2167 RCYBP and remained in use until at least 2000 RCYBP.

Subsistence

An extensive program of flotation provided botanical and faunal samples for reconstruction of the prehistoric diet. Examination of the tools and cultural debris within the features and midden yielded insights into the subsistence strategies and the shifts in economic bases and land use associated with dietary changes. Identification of wood charcoal taxa, dietary items, and other botanical ecofacts facilitate reconstruction of the local plant communities and act as a gauge of resource fluctuation.

Analysis of Early Woodland and Middle Woodland wood taxa shows an increase in the number of species used, but the sample is still dominated by floodplain and terrace species. The presence of hazelnut, starchy seeds, and certain weed seeds indicate some break in the forest canopy, but it cannot be demonstrated that major alteration of the forest occurred or that formal garden plots or fields were in use. The absence of hoes from the tool kit and hoe flakes from the debitage may be another indication that garden plots were not extensively used.

The ratio of nut to wood and the amount of nut in the units dropped noticeably from the Late Archaic Riverton component to the Early Woodland component, but the Early Woodland features contained quantities of nut comparable to those of the Riverton component, and the species composition was comparable. This may support the observation (Smith 1992:209) that farming communities throughout the eastern United States were additive rather than reductive in their food exploitation. Ethnographic accounts (Gardner 1997:161; McCollough and Faulkner 1976:237) confirm that these resources may have been an integral part of survival during the late winter through spring, even during historic times. The quantities of thick-shelled hickory nut slightly exceeded those of black walnut, and hazelnut and acorn were present in small amounts. Although hickory nut was well represented (52.7 percent of the nut sample) at 12HR484, it did not dominate the nut sample as it did in the Early Woodland component of 12CL109 (Zone 7), in the Clark Maritime Centre Archaeological District, where thick-shelled and thin-shelled hickory nuts composed 92 percent of all food plant remains (Crites 1986:363). At 12HR484 black walnut composed 44 percent of the nut sample in the Early Woodland features, but at 12CL109 black walnut, hazelnut, and acorn combined to form only 2.7 percent of the food plants.

The extensive exploitation of black walnuts at the Knob Creek site may be due to the proximity of the resource rather than a consistent cultural preference. Black walnuts formed a large percentage of the nut sample from the Late Archaic through the Middle Woodland at the site. The abundance of walnut wood, which was relatively common in the Early Woodland features of the 200 Block, may indicate the presence of trees in the immediate vicinity, and the clarify why the frequencies of black walnuts in the 200 Block and 253N80W Trench were particularly high, although the amount of nut shell per 10 liters of flotation soil was not inordinately large. The South Block had a high frequency of walnut wood, and black walnut shells were plentiful, and hickory nut was more abundant in these features.

In the Middle Woodland component of the Knob Creek site black walnut was the most abundant species of nut (44.5 percent of the nut sample in the features), but this may be due largely to the presence of two small, short-term encampments in the 300 and 400 Blocks that may have focused upon exploitation of walnut trees in the vicinity. Walnut wood was moderately common in the Middle Woodland features of the 300 and 200 Blocks, and the 300 Block features had abundant nut remains and extremely high frequencies of black walnut (71.2 percent). The 400 Block features contained a smaller amount of nut but an even higher frequency (79.0 percent) of black walnut. In the 100 Block and the148N49W Trench, the focal areas of the main Middle Woodland occupation, hickory nuts composed 45 percent and 52 percent of the nut samples, respectively.

Black walnut was present in only very small quantities in the CMCAD Middle Woodland sites. Hickory nuts dominated the nut sample. They composed 91.4 percent of the plant food at 12CL103 (Zone 1) and 94.7 percent of the plant food at 12CL92 (Zone 4) (Crites 1986:330, 342). This predominance of hickory nut coincides well with the ethnobotanical record of Early Woodland and Middle Woodland sites in the American Bottom (Johannessen 1984:199-201) and lower Illinois Valley (Asch and Asch 1985:349-354). It is possible that the extensive exploitation of black walnut seen at the Knob Creek site and the Early Woodland component of the Florence Street site of the American Bottoms represents an opportunistic or task specific use of the resource.

The frequency of acorn rose dramatically from 1 percent in the Early Woodland features to16 percent in the Middle Woodland features at the Knob Creek site, and the number of features with acorn tripled. Acorn was nearly absent (.01 percent) from the Early Woodland features of the CMCAD and formed 1.1 percent of the nut sample in the Middle Woodland component of 12CL103 and was absent from the Middle Woodland component of 12CL92.

The density of small, starchy seeds in the Early Woodland component at the Knob Creek site represents a fourfold increase in the presence of these foods over the Riverton component. In the Late Archaic component chenopod was the most abundant and most ubiquitous seed, and it continued to be most ubiquitous in the Early Woodland features, but it still occurred in only small amounts. Maygrass (55 percent of the seed sample) supplanted chenopod (18 percent) as the most abundant seed crop primarily because of two features with very large quantities of maygrass. Chenopod formed only a small percentage (4.6 percent) of the Early Woodland seed sample at 12CL109, and maygrass was present in even smaller amounts.

Extensive natural stands of chenopod and marshelder/sumpweed may have colonized the open areas produced by the spring floods (Smith 1992:28) along the Ohio River. Marshelder/sumpweed was abundant in the Early Woodland component at 12CL109, where it formed 87.7 percent of the seed sample (Crites 1986:363-364), but these seeds derived almost exclusively from one feature. The marshelder seeds at the site may have been larger than modern wild populations because of the ideal growing environment or possibly because of slight modification by human intervention. The marshelder specimens from the Middle Woodland component at the CMCAD are within the size range of wild populations. Marshelder composed only 1.4 percent of the Early Woodland seed sample at 12HR484, and the seeds from both the Early Woodland and the Middle Woodland components, like all seeds from 12HR484, are within the morphological range of variation of wild specimens.

The Falls of the Ohio region is beyond the natural range of maygrass (Cowan 1978; Crites and Terry 1984), thus it was present at both 12HR484 and the CMCAD due to human intervention. Cucurbita, present at both 12HR484 and 12CL109, may be beyond its natural geographical range (Asch and Sidell 1992), although there a possibility that it occurred naturally during the prehistoric occupation of the region (Smith, et al. 1992).

There was differential horizontal distribution of the seed taxa among the Early Woodland activity areas at the Knob Creek site. Maygrass was almost absent from the South Block, but composed 71.6 percent of the feature sample in the 200 Block, then dropped to 5.2 percent of the sample in the 253N80W Trench features. Chenopod had a high frequency in the South Block (80.9 percent) because of one feature, was scarce in the 200 Block (9.7 percent frequency) although still the second most common seed, and was moderately common in the 253N80W Trench (37.0 percent) primarily because of one feature. This may be an indication that the South Block and the 253N80W Trench were occupied for a shorter portion of the year than the 200 Block. Chenopod and maygrass occurred in the same features in the 400 Block, but maygrass composed 66.1 percent of the sample because of a large quantity in one feature. Knotweed was much less common than maygrass and chenopod. It was found in less than 15 percent of the features in both the South Block and 200 Block and formed less than 3 percent of the seed sample in those areas, but it was found in half the features in the 253N80W Trench and 80 percent of the features in the 400 Block and composed about 16 percent of the sample in each area. No little barley was encountered, although this taxon was present in the Middle Woodland component.

There appears to have been diversification of the botanical dietary items during the Early Woodland at the Knob Creek site as exemplified by the emphasis on a mixture of spring and fall ripening seed taxa and a lessened reliance on fruits and nuts. Exploitation of starchy seeds increased, but wild variants, perhaps growing around the areas opened by human activity, may have been relied upon rather than domesticated variants. This suite of taxa occurs on a number of sites throughout the Midwest and Midsouth and is frequently interpreted as evidence of incipient horticulture (e.g., Crites 1978; Johannessen 1984; Smith 1992; Watson 1985). No single plant appears to be the focus of the economy.

The density of Eastern Agricultural Complex seeds in Middle Woodland features at the Knob Creek site increased nearly twofold over the Early Woodland component, and there were significant increases in the ubiquity of the seeds. Schroeder, in this report, considers maygrass, chenopod, and erect knotweed probable cultigens, but all the seeds are within the size range of wild populations. In the Early Woodland component chenopod was the most ubiquitous starchy seed and second in frequency to maygrass, and this pattern continued in the Middle Woodland features, although the frequency of chenopod increased markedly--rising to 31.4 percent.

Chenopod was the most ubiquitous seed (53.9 percent) in the Middle Woodland component of 12CL103, at the CMCAD, and maygrass was present in 30.8 percent of the features (Crites 1986:330, 336), but these composed only 4.4 percent and 5.7 percent of the seed sample, respectively. Sunflower seeds/achenes composed 73 percent of all seeds in Zone 1 at 12CL103, but 99.3 percent came from one feature (Crites 1986:330). These sunflower achenes are of sizes that are within the range of cultigens (Crites 1986:336). Maygrass composed 14.6 percent and chenopod made up 6.3 percent of the seed sample from the only feature at 12CL92 with starchy seeds. This feature was dominated by knotweed, which composed 63.5 percent of the sample. The oily seed marshelder/sumpweed was second most abundant in the feature (15.6 percent).

In the Middle Woodland features at 12HR484 knotweed increased in ubiquity but decreased slightly in frequency in comparison with the Early Woodland features, and amaranth formed a very minor part of the botanical sample**,** as it had in the Early Woodland component. Little barley made its initial appearance in small quantities across the site. Oily seeds (giant ragweed, marshelder, and sunflower) formed 5.5 percent of the seed sample**,** which was two and one-half times the frequency seen in the Early Woodland component. Fleshy and dry fruit seeds composed about 5 percent of the sample**,** an amount very slightly greater than in the Early Woodland component but far less than in the Late Archaic component.

The importance of pottery vessels to the economy of the Early and Middle Woodland groups may be demonstrated by the increase in exploitation of starchy seeds as the ceramic technology is refined and diversified. The enhanced capabilities of the pottery vessels for boiling and storage may have expanded use of these foods.

The diversity of the resources may be a reflection of multi-seasonal habitation. Distributions and volumes of nuts and seeds in the Middle Woodland component varied sufficiently to indicate that the community was not reliant primarily upon a single gathered or horticultural product. The compositions of the botanical samples from the various areas within the Middle Woodland component reflect processing of the same group of foods but in different relative abundances. At both 12HR484 and the CMCAD the Woodland components show exploitation of the same nuts and seeds but in different quantities from site to site and from area to area within the sites.

Bruce Smith (1992:289) points out that the relative representations of species, or even subspecies or varieties, in the samples from different areas of the Eastern Woodlands indicate that the importance of individual species differed within a developmental mosaic of Middle Woodland food production systems. It is feasible that the specific seed crops and nuts exploited by the Early Woodland and Middle Woodland populations in the Falls area were dependent upon the season and environmental conditions. The broader, moister floodplain of the CMCAD was more conducive to propagation of marshelder, and this was the most abundant seed found in the Early Woodland component. The better drained soils of 12HR484 were more suited to the growth of maygrass and chenopod, and each was present in large amounts in two Early Woodland features. These same seeds were found in large quantities in Middle Woodland features at the Knob Creek site, but amaranth and knotweed also were abundant in individual features in the 300 and 400 Blocks. These blocks at the north end of the site appear to have been more briefly occupied, perhaps only seasonally, as indicated by the strong reliance on nut and fall-harvest seeds and the rarity of spring seeds. Sunflower and squash were cultigens at the CMCAD and were recovered in large amounts from single features. The main Early Woodland and Middle Woodland habitation areas of the Knob Creek site showed more diversity of food species, and in at least one instance (Middle Woodland Feature 100-37) large amounts of both maygrass and chenopod were recovered from the same pit, a possible indication of storage since these taxa ripen at opposite ends of the growing season.

Both the Early Woodland and Middle Woodland components of the Knob Creek site showed exploitation of both black walnuts and hickory nuts. The amount of black walnut was comparatively much higher than that of sites of comparable age in lower Illinois Valley and the American Bottoms, with the exception of the Florence Street site, which is considered aberrant (Johannessen 1984:200). It is not evident whether the abundance of black walnut is due to a cultural preference or whether the Knob Creek site was inordinately close to black walnut stands.

The economies of the Early Woodland and the Middle Woodland inhabitants of the Knob Creek site show evidence of continued reliance on nut resources. The consumption of an inordinate amount of black walnut and acorn, compared to other Woodland sites in the Midwest, may reflect exploitation of nuts that were more difficult to process than hickory nuts but offered nutritional and gustatory rewards and were readily available in abundance. There is a steady increase in exploitation of starchy seeds from both wild populations and cultivated plots, and squash appears to have been grown for use, if not for food. Areas of the site showed specialized and seasonal exploitation of nut and seed resources, and the main occupation areas of both components evidence a diverse array of food items. The quantities of seeds recovered do not indicate intensive reliance on these resources, but the ubiquity of the taxa shows consistent consumption.

Due to poor bone preservation, very little information was obtained about the faunal resources exploited during the Early Woodland and Middle Woodland occupations (Styles and Brand 2005). The only faunal groups identified in the Early Woodland component were deer, turtle, freshwater drum, beaver, woodchuck, and hawk. The Middle Woodland component yielded similar species, except that woodchuck and hawk bones were not recovered, and turkey, rabbit, and raccoon were found. Snake and rice rat bones also were found in Middle Woodland features, but these may have been incidental occurrences.

Settlement Function within the Settlement System

A fundamental question addressed by the research design is determination of the function of each occupation or component thereof within its respective settlement system. The function of the site is evaluated by observation of the environmental setting of the site, the seasons it was occupied, the types of features and their relative frequencies of occurrence, the numbers and types of tools, and the amount and kinds of refuse generated. The role of the site within its settlement system is assessed by comparison with contemporaneous sites.

The cultural deposits at 12HR484 undoubtedly derive from multiple, varied uses of the site, which potentially range from brief, specialized resource exploitation episodes to long-term settlement. These occupation types may be associated with different subsistence-settlement systems and economic strategies. One framework for such discussions is the continuum of collecting and foraging strategies proposed by Binford (1980). The proposed approach of foragers is employment of a series of residential moves to resource patches and exploitation of the resources as they are encountered. Alternatively, collectors are proposed to procure specific resources through specially organized task groups, and the resources are transported to the consumers.

Multiple short-term residential camps are characteristic of a strategy dominated by foraging, while base camps, characterized by greater residential stability and supplemented by specialized foraging camps, are more typical of the logistical strategy of the collector. Although neither strategy need be employed exclusively by a group, the mixture of these methods should typify a particular settlement system. The location of the Knob Creek Site permitted its potential use as a base camp. Collectors were positioned in an ecotonal area with access to upland, floodplain, and riverine resource zones. Logistical forays could be made readily to gather aquatic, avian, and terrestrial game, nuts, seed crops, and other botanical resources, and chert, hardstone, and sedimentary minerals for tools.

The Middle Woodland component of the 100 Block contained an array of botanical foods that attest to at least spring through late fall occupation. The botanical and faunal remains have not provided a clear indication of whether the site was occupied throughout the year during either component. Year-round occupation of the sites may have been precluded by winter conditions on the floodplain, but structural remains, exploitation of storable foods, and sizable possible storage pits allow the possibility. Historic flood records (Engineers 1973) indicate that the site would likely have been inundated at least briefly in the late winter or spring more frequently than once every two years.

Early Woodland

The dense, thick, organic midden and the continuous scatter of features and tools within the 200 Block are indicative of a protracted Early Woodland occupation or multiple short-term occupations, and the 76 grit tempered rim sherds attest to considerable domestic activity. It is possible that this portion of the site functioned as a base camp during the Early Woodland. Structure B could house approximately 13 individuals (Cook 1972:16), and several extended families could have occupied the area around the 200 Block on a seasonal or long-term basis and been responsible for much of the midden and cultural debris. Structure C could have held about five individuals (Cook 1972:16) and may have been part of a short term encampment at an earlier time.

Of particular interest is the feature cluster in the northwest corner of the 200 block that may be the center of a habitation area. Several features within and directly outside of Structure C and numerous units around the structure are linked by the presence of interior/exterior cordmarked pottery. The radiocarbon date from Feature 200-32 indicates the occupation took place early in the Early Woodland, and the sparsity of food remains in the area and the rarity of this pottery in the block may indicate only a brief occupation. Refuse from this area was discarded downslope a moderate distance to the east. The extent and density of the rock layer above the structure and its associated features and the abundance of tools within this midden suggest some of the rock may derive from a later Early Woodland occupation.

This rock layer and an even larger layer in the eastern portion of the block and clusters of large, deep features filled with refuse attest to the need for secondary disposal areas. The locations and distances between fragments of several reconstructed tools offer further evidence of use of secondary disposal areas. The presence of an isolated knapping area and another knapping area within the main habitation area but away from other features may illustrate the necessity for spatial segregation of some activities. The number and diversity of the features and the quantity and variety of materials found within them reflect the multiplicity of tasks appropriate for a habitation site. The lithic assemblage is dominated by curated, formal tools, although expedient flake tools and fragmented formal tools used as expedient tools also were common.

The diversity of the dietary and technological resources seen within the 200 Block reflect exploitation of a variety of environmental zones and attest to the complexity of the settlement and its subsistence system. The scarcity of Wyandotte cortical debris among the debitage confirms the use of special task groups to acquire and process high quality chert prior to its transportation to the site. The site bears no evidence of the production of bifaces for export. The quantity of intermediate to late stage reduction debris in the knapping area north of the 200 Block denotes the manufacture of large numbers of finished tools suitable for immediate use.

Another small Early Woodland encampment was in the South Block where a variety of features encircled a huge baked soil area. The dense, dark midden, the sizable number of tools, and the diversity of the features support the idea that a variety of domestic and processing tasks were performed within this area. The spatial restriction of the deposits indicates an encampment too small to be a base camp, but short-term habitation and resource procurement are plausible functions for the occupation. The extreme size of Feature 78 supports the possibility that it is a specialized facility, but the presence of several knapping stations, hearths, refuse pits, and nut concentrations expand the function of the locus beyond single resource foraging. The circumscribed activity areas and the refuse scatters and pits dominated by discrete episodes of the deposition of single materials–nut, debitage, and fire cracked rock–substantiate the evidence that this may be a short-term habitation camp with specialized processing of certain resources.

The features in the 300 Block and 400 Block were few and widely scattered, and the midden was thinner than in the 200 Block. There were small clusters of features scattered across the 400 Block and many of the surrounding features with unidentified cultural affiliations could be part of this component. Some of the features contained moderate to large amounts of pottery, thus limited habitation is feasible. The 300 Block features have very little pottery and could represent a distinct activity area or the periphery of the transitory habitation and processing encampment in the 400 Block.

Middle Woodland

The dense, thick, organic midden and the continuous scatter of features that extended from the 100 Block into the 200 Block may be indicative of a long occupation by a small group, intensive occupation by a larger group, or repeated occupation of the area. It is not evident which of these alternatives characterize the Middle Woodland component in this focal area. It is likely that this portion of the site functioned as a base camp more than one time during the Middle Woodland. Two pairs of radiocarbon dates from the 100 Block are separated by 70-80 years. These overlap at the one sigma level but may represent sequential occupations. The radiocarbon date from Structure A in the 200 Block differs sufficiently from that of Structure X in the 100 Block to allow the possibility that they were from separate occupations.

The frequency of adjoining Middle Woodland pits but rarity of intersecting features suggests some continuity to habitation in the block. Overlap of features in the area with densely clustered refuse pits in the northeastern portion of the block may signify repeated use of the ridge slope for secondary deposition of refuse. It is difficult to identify storage features, but the extreme depth of several features, particularly Feature 100-112, suggests they were used for this purpose, and their sizes denote intended use during a long occupation or by a large number of individuals. Clusters of large, deep features filled with refuse attest to the need for secondary disposal areas. The dearth of broken tool refits and the distance between the fragments of some of the tools that were reconstructed offer further evidence of use of secondary disposal areas. The number and diversity of the features and the variety of materials found within them reflect the multiplicity of tasks appropriate for a large group of inhabitants or extended habitation by a small group.

The 428 Falls Plain rim fragments and over 500 formal chert tools from the 100 Block represent thousands of person-hours of labor for their manufacture and many times that for their use and maintenance. The marked increase in the number of vessels over that of the Early Woodland component could show general intensification of activity, expansion of the population, regularized reoccupation, or extended sedentism. Residential stability may have been further facilitated by the use of pottery vessels for refined exploitation of starchy seeds during the Middle Woodland occupations.

The presence of Middle Woodland domestic structures in the 100 Block and 200 Block corroborates the protracted occupation of the area. Replicative experiments (Callahan 1976; (Faulkner and McCollough 1974)have shown that shelters similar to those at the Knob Creek site could be used for extended periods of time or revisited for multiple seasons. The wattle and daub construction of Structure A could potentially make it habitable through the winter. Although the Middle Woodland features in the 200 Block had lesser amounts of cultural material, the block contained 20.0 percent of the Falls Plain pottery and 37.6 percent of the Snyders Cluster projectile points from the site. A cursory examination of the 1.5 m of stratified deposits in Feature 100-112 shows a decrease in chenopod from the bottom to the top of the pit and an increase in maygrass. The amount of seed in the strata also fluctuates. Although alternative explanations are feasible, the deposits may show seasonal variation or an extended period of deposition.

Bruce Smith (1992:201-248) concludes that most known Hopewellian habitation structures appear to have been occupied by 5-13 individuals and that very few Hopewellian habitation sites in the Midwest and Midsouth are larger than three households. Spatially discrete and dispersed single household settlements are consistently found in the archaeological record (Smith 1992:240). Smith's research shows that few large, year-round Middle Woodland villages have been encountered, but seasonal farming encampments of 3-5 households and small, spatially segregated year-round settlements of 1-3 houses are both well documented along river and stream corridors. Either of the latter two models could apply to the Knob Creek site, but characterization of the site as a farming encampment may not be justified. Despite the large size of the Ohio River, the floodplain is relatively narrow at 12HR484, the land available for natural or cultivated seed crops is limited, and the soil is not conducive to cultivation with stone, bone, and wood implements. The importance of the seed crops may be their value in supplying food during winter and spring and during years of poor nut mast yield (Cowan 1985; Gremillion 1996).

There is no evidence at the Knob Creek site of the presence of more than one structure during any occupation. It is possible that structures were present in unexcavated portions of the site, but the available level area is limited and most of the crest of the ridge was examined. Difficulty was experienced in location of some portions of the identified structures, but the chances of missing all the post molds of a structure during hand excavation are small.

It is possible that the midden at the Knob Creek site was derived from a settlement with only one or two houses. At the Smiling Dan site 50-60 cm of midden was spread over a .5 ha area, 2 m of deposit filled a tributary channel dump, and 182 pit features were identified, yet there were only three or four structures identified and there was no evidence of contemporaneous use of the structures (Smith 1992:231-233).

While the number of tools recovered from the 100 Block reflects extensive activity, the rarity of Wyandotte cortical debris shows that the raw material was not reduced on the site. The scarcity of early stage manufacture debitage indicates the use of special task groups to acquire and process high quality chert prior to its transportation to the site. The site does not bear evidence of use as a manufacturing site for processing raw material or production of tools for export. The presence of larger amounts of Wyandotte debitage in the 100 Block than in the other Middle Woodland areas may demonstrate that the occupants of the more stable settlement had the luxury of acquisition of high quality chert through specialized task groups or trade while the individuals in the special activity loci and short-term encampments used locally available materials.

The Middle Woodland deposits in the 300 Block and 400 Block may have derived from short-term encampments. The midden in both blocks was less concentrated than in the 100 Block, and the pits were not always full of debris and most lacked sufficient diagnostic material to allow the cultural affiliation to be determined. There were very large amounts of fire cracked rock, debitage, and refuse from hearths in the features, but little pottery. These features reflect specialized processing more than diversified domestic tasks. The main seeds in the 400 Block (chenopod, amaranth, and knotweed) ripen in the fall and are easily harvested, and the first two are easily processed. There also is abundant nut processing evident in the 300 and 400 Blocks. The density of nut in the 300 Block and 400 Block is generally much greater than in the 100 Block. It is possible that the activities in the 400 Block and to a lesser extent in the 300 Block are related to acquisition of seed and nut resources for winter use.

The features in the 300 Block are separated by approximately 100 m from those of the 200 Block and by about 50 m from those of the 400 Block. Both the artifacts and the date from the 300 Block suggest the deposits may originate earlier in the Middle Woodland than the main occupation of the 100 Block. The radiocarbon date from the 400 Block places it close to the 100 Block in time, but the features and midden suggest a brief occupation with generalized activity areas related to processing.

The lesser amounts of cultural material in the midden and features and the minimal amount of pottery indicate the Middle Woodland activity south of the 100 Block may be peripheral to the main occupation or may be from one or more brief uses not associated with that occupation. The scarcity of pottery and the smaller amount of debris in the midden may indicate use for processing rather than habitation in the 63N47W Trench, and the 15N27W Trench and South Block showed only light activity.

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Chapter 1

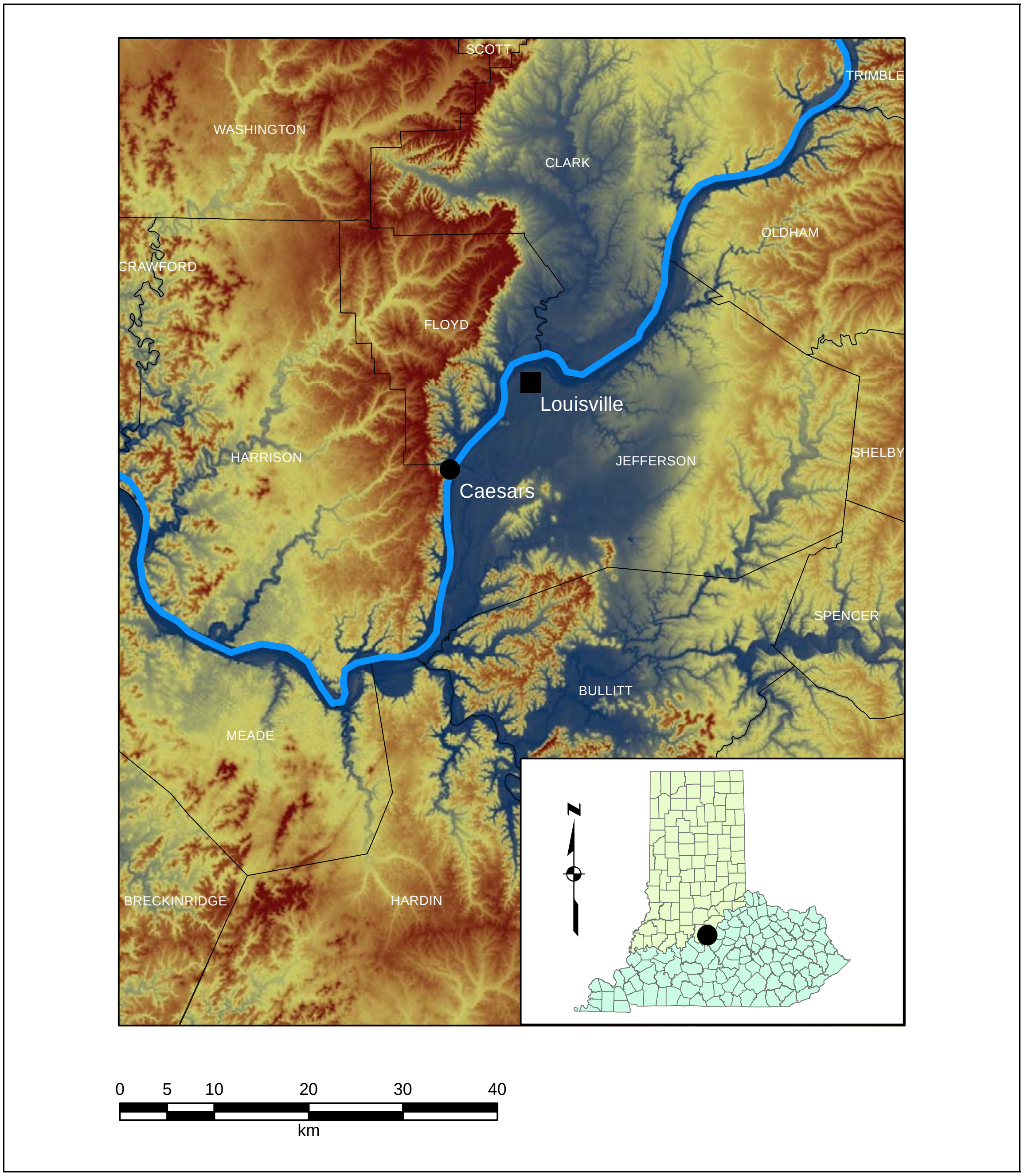

Figure 1.1 Location of Knob Creek site within Falls of the Ohio River area.

Figure 1.2. 1998 DOOQ photo of Knob Creek site in CAP.

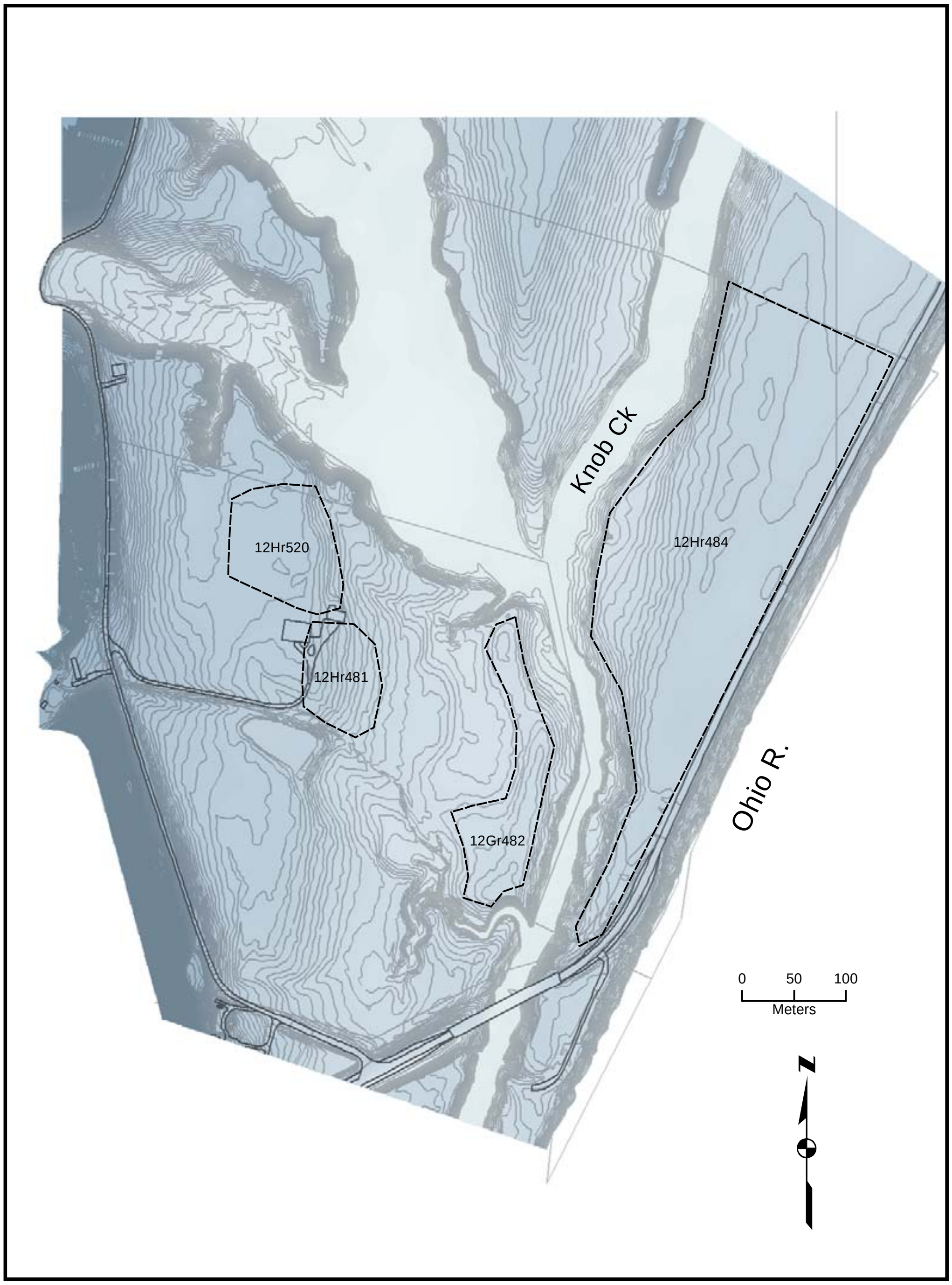

Figure 1.3. Position of Knob Creek site (12Hr484) in Caesars development.

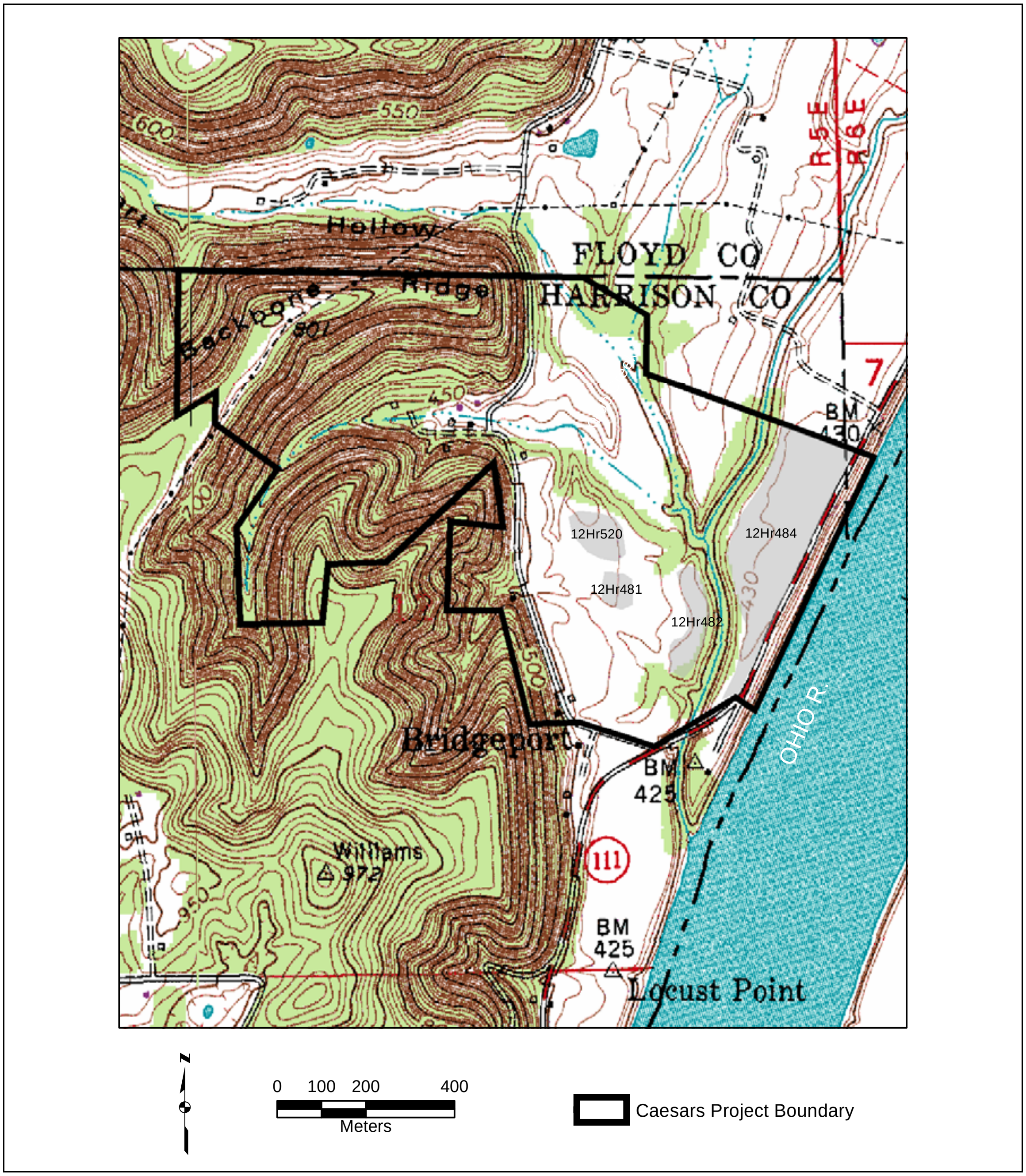

Figure 1.4. Location of 12Hr484 on USGS 7.5' Lanesville quadrangle.

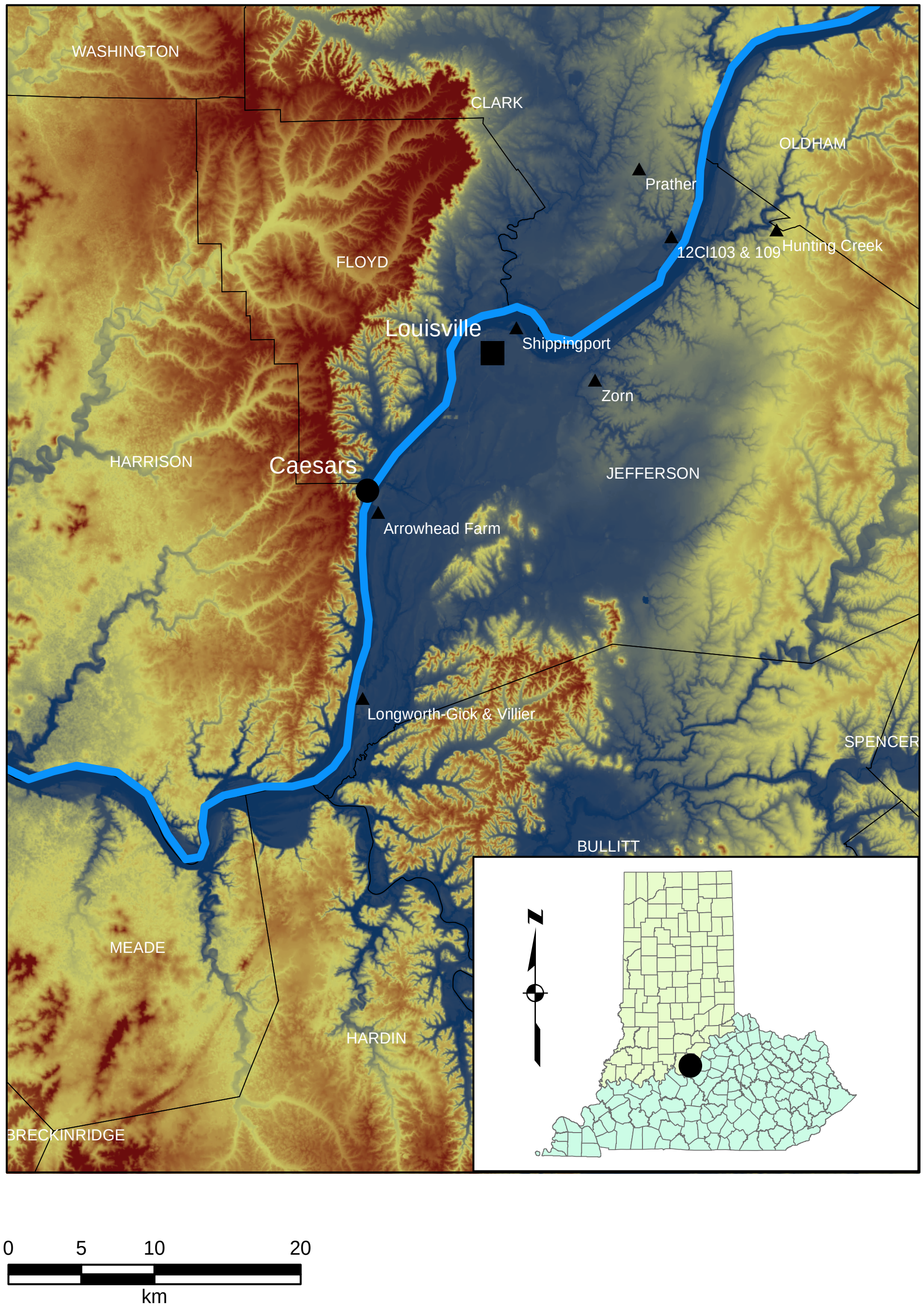

Figure 1.5. Location of CAP area and selected Early Woodland and Middle Woodland sites in the Falls of the Ohio Region.

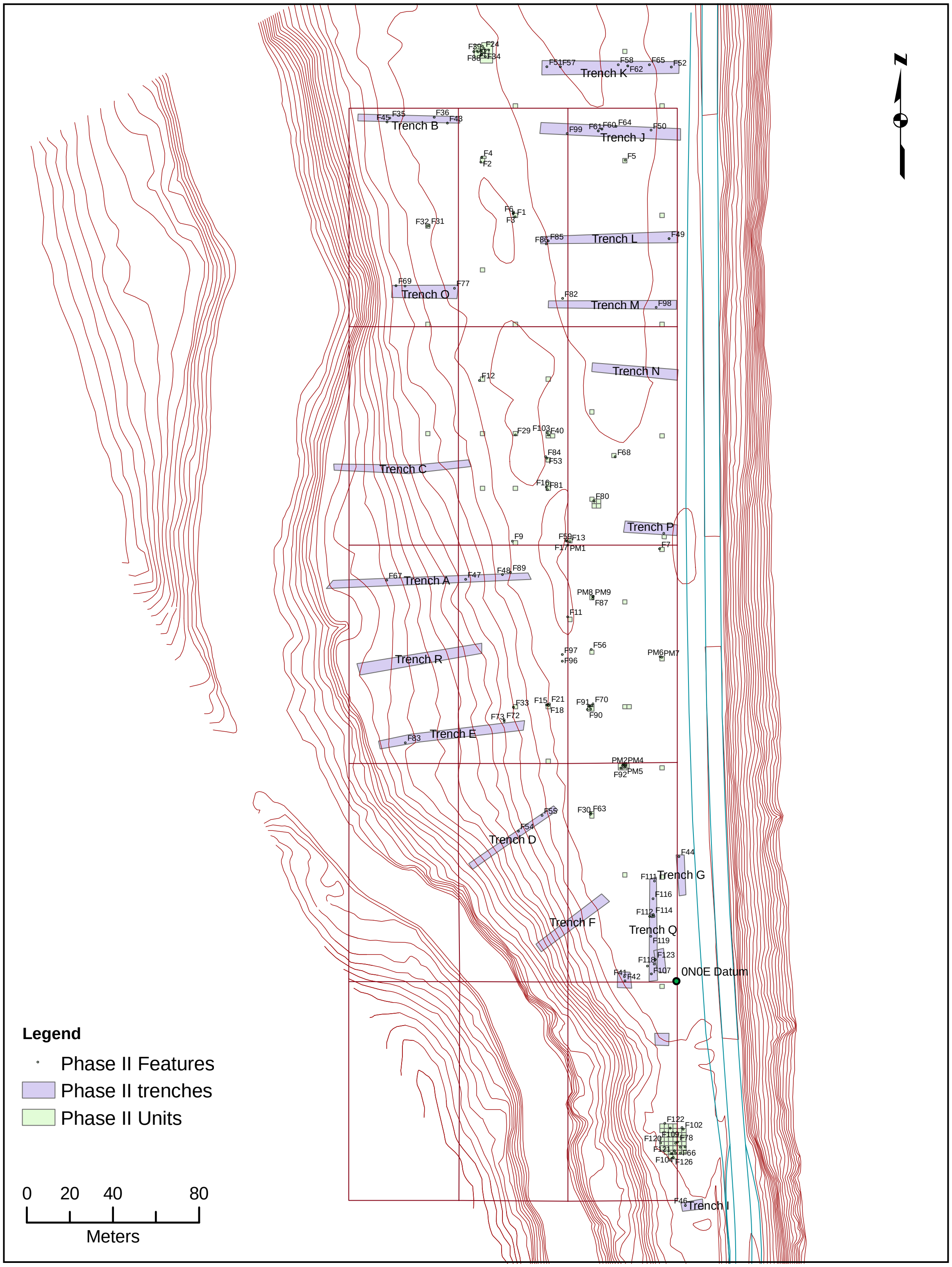

Figure 1.6 Phase II units, trenches, and features at the Knob Creek site.

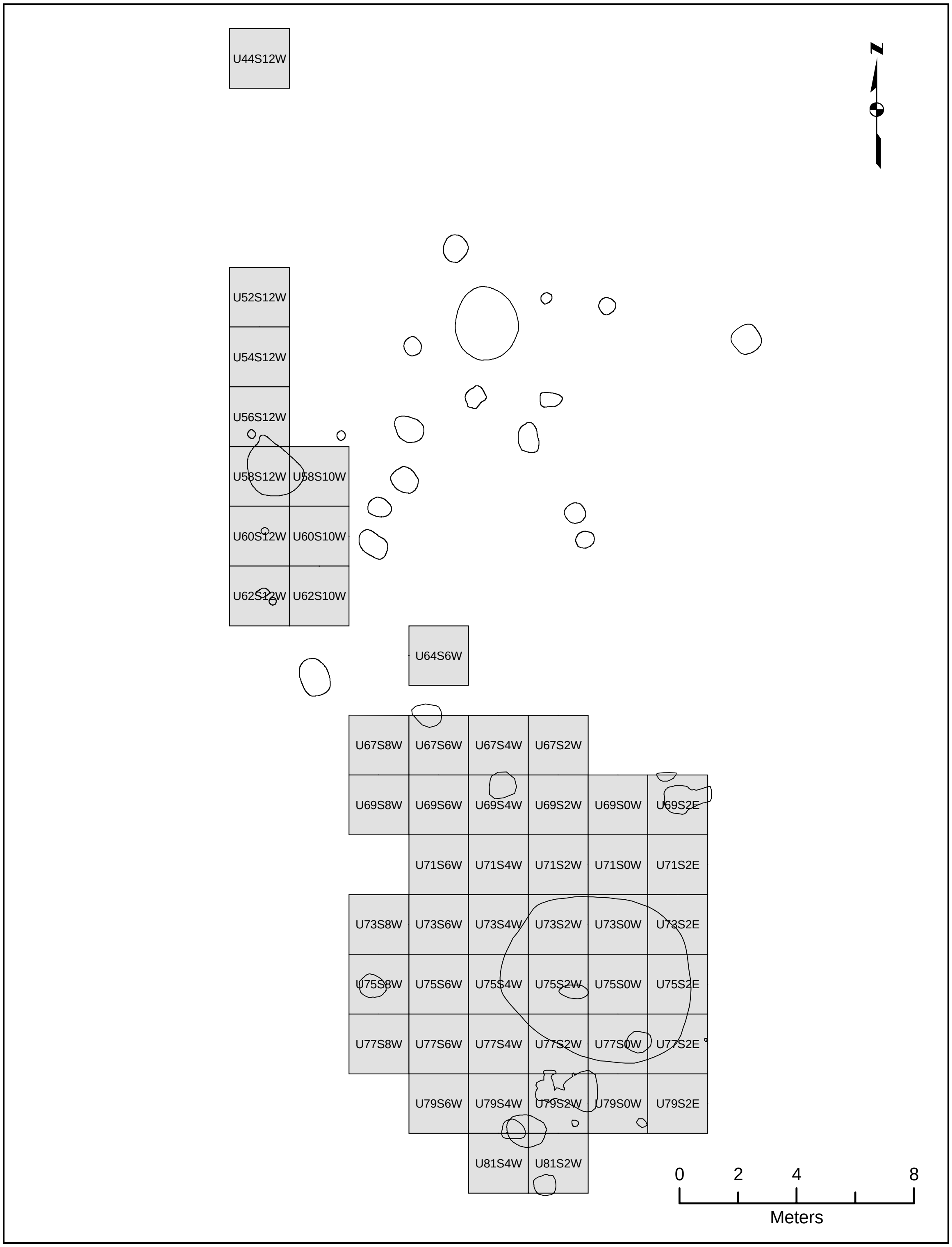

Figure 1.7. Hand excavation units in the Phase II and Phase III South Block.

Figure 1.8. View of excavations within the 200 Block.

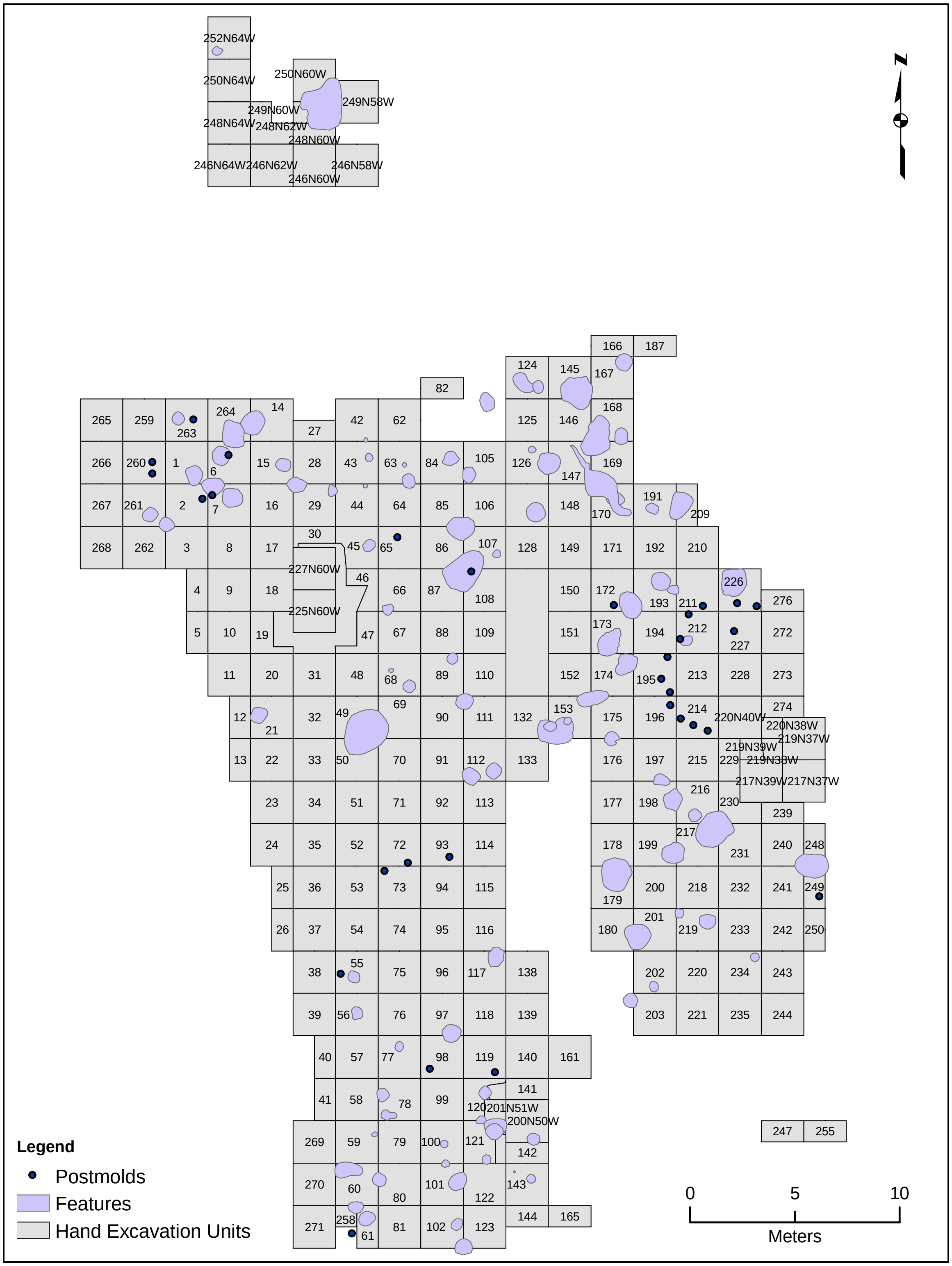

Figure 1.9. Hand excavation units in the 200 Block.

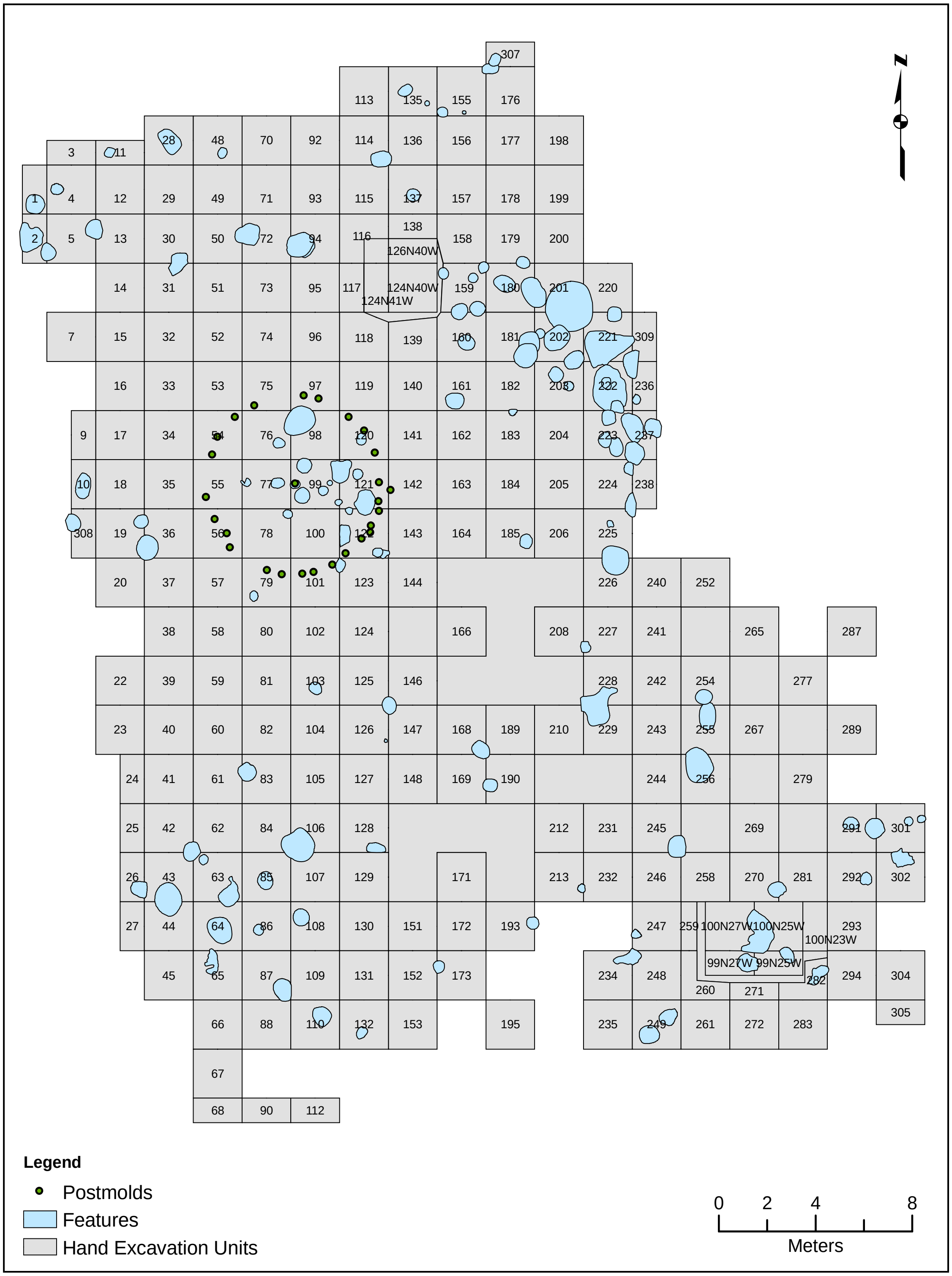

Figure 1.10. Hand excavation units in the 100 Block.

Figure 1.11. The Knob Creek site from the north--excavation structures above the 300, 200, and 100 Blocks, Knob Creek beyond treeline to the right and Ohio River beyond treeline to left.

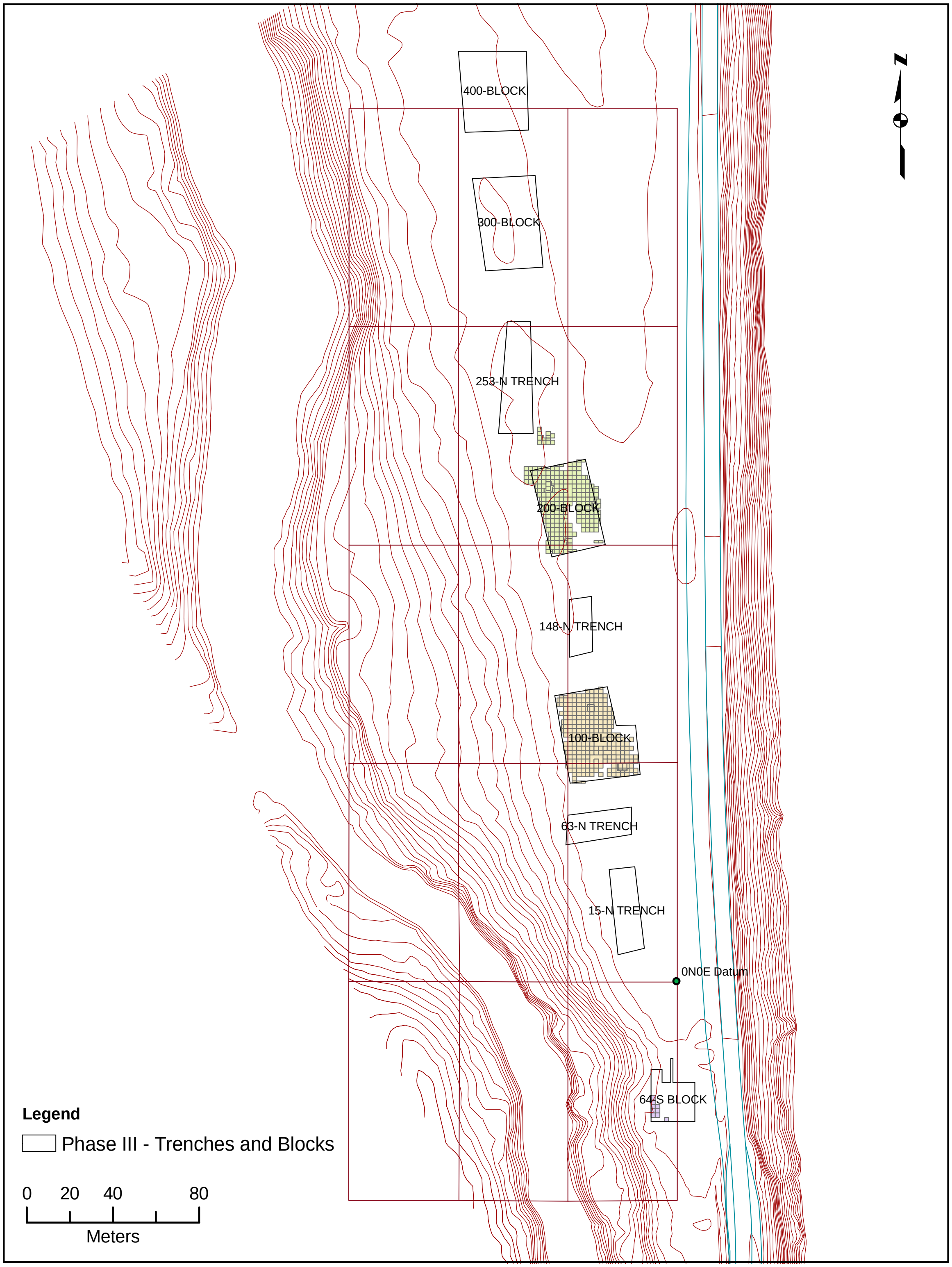

Figure 1.12. Phase III excavation units, trenches, and blocks at the Knob Creek site.

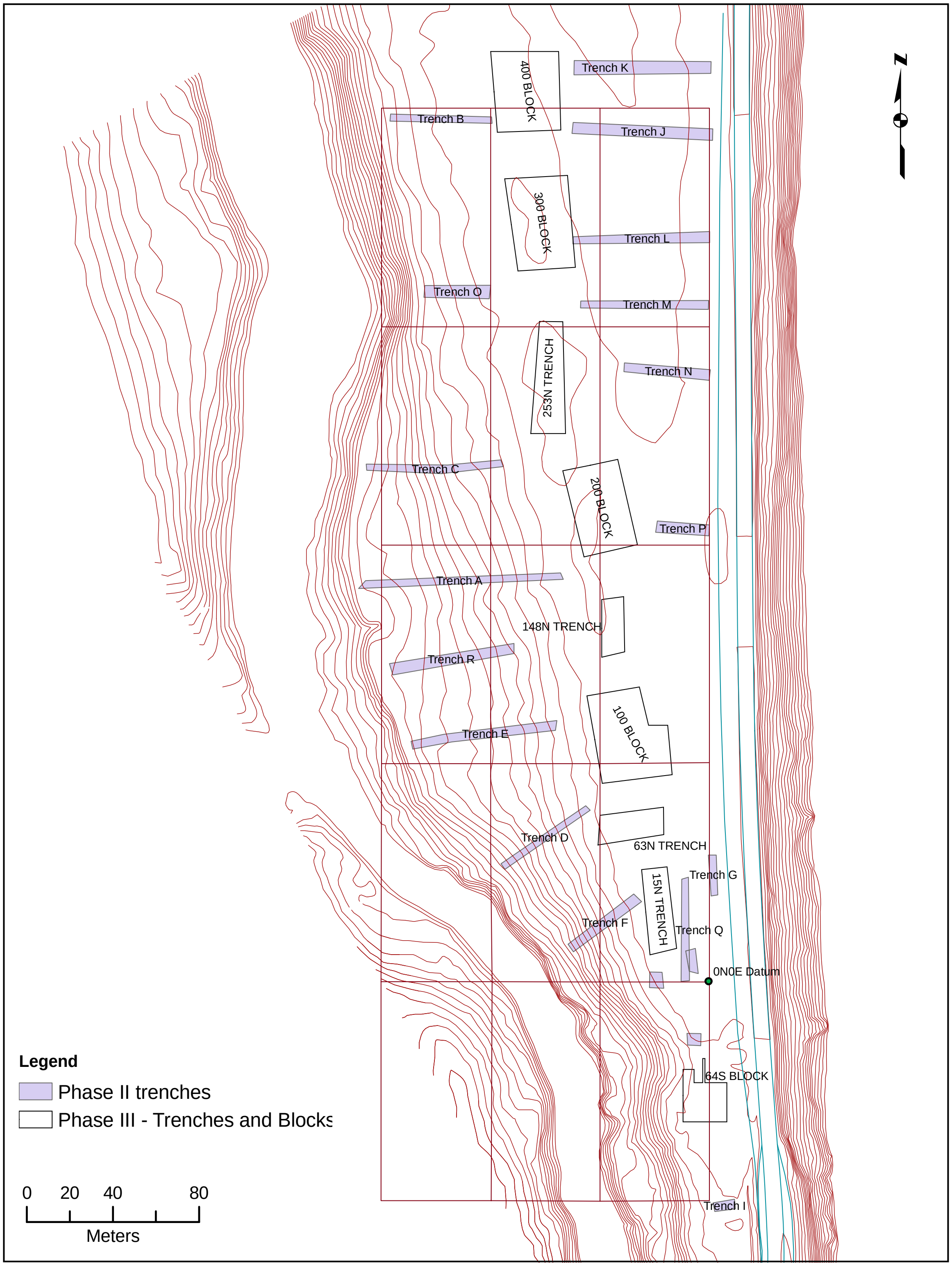

Figure 1.13. Locations of Phase II and Phase III trenches and blocks.

Chapter 2

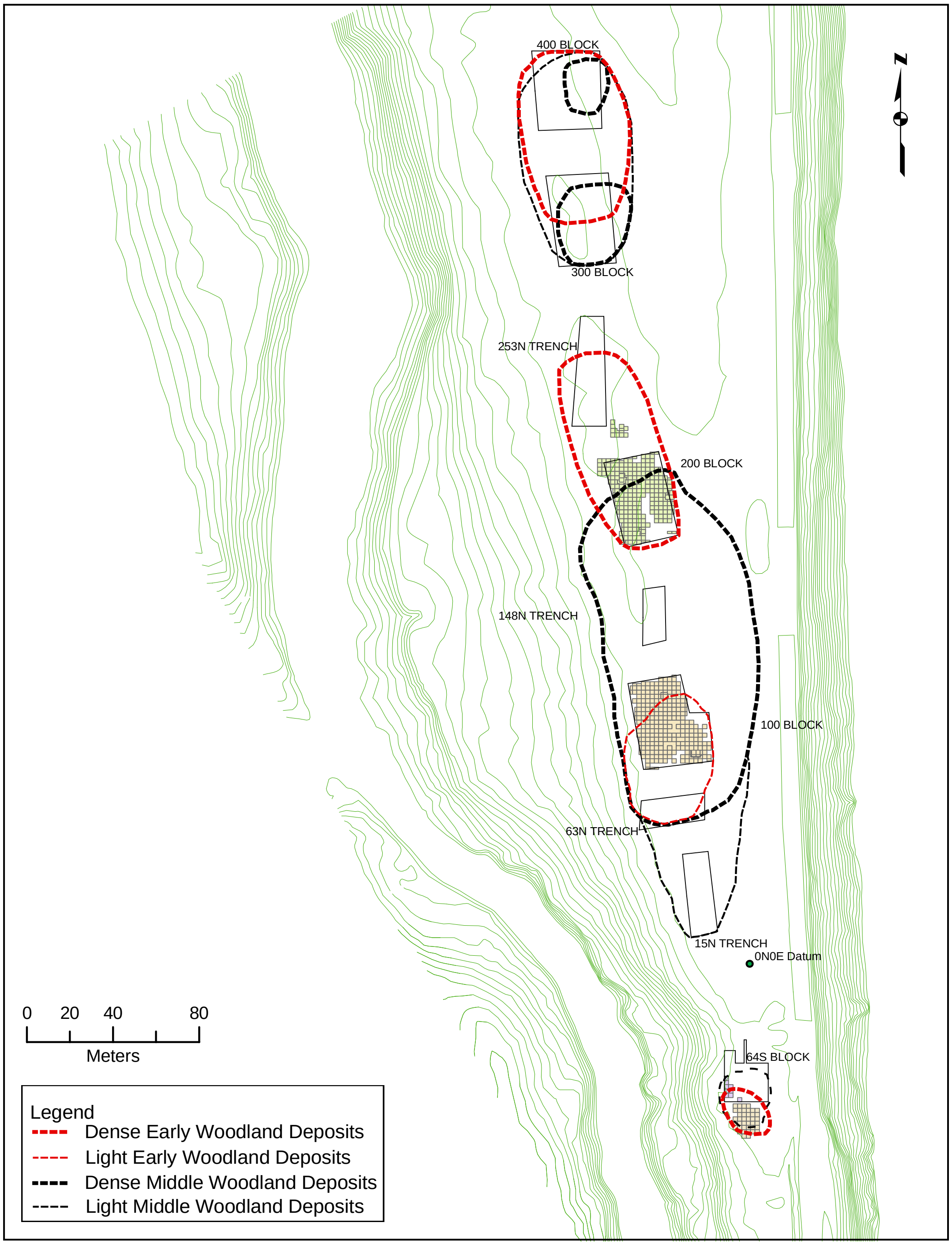

Figure 2.1 Horizontal distributions of the Early Woodland and Middle Woodland components.

Chapter 4

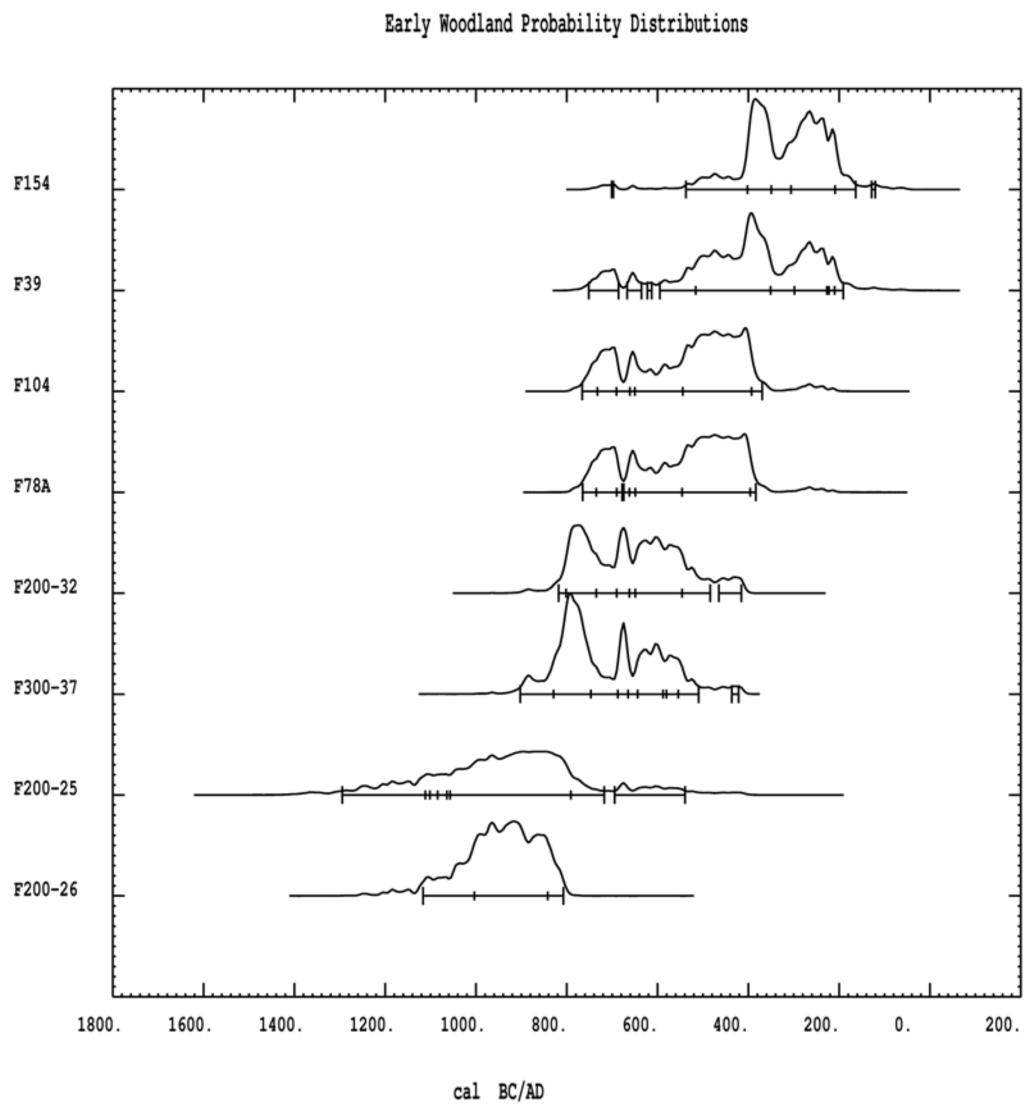

Figure 4.1. Graph of probability distributions of Early Woodland radiocarbon dates.

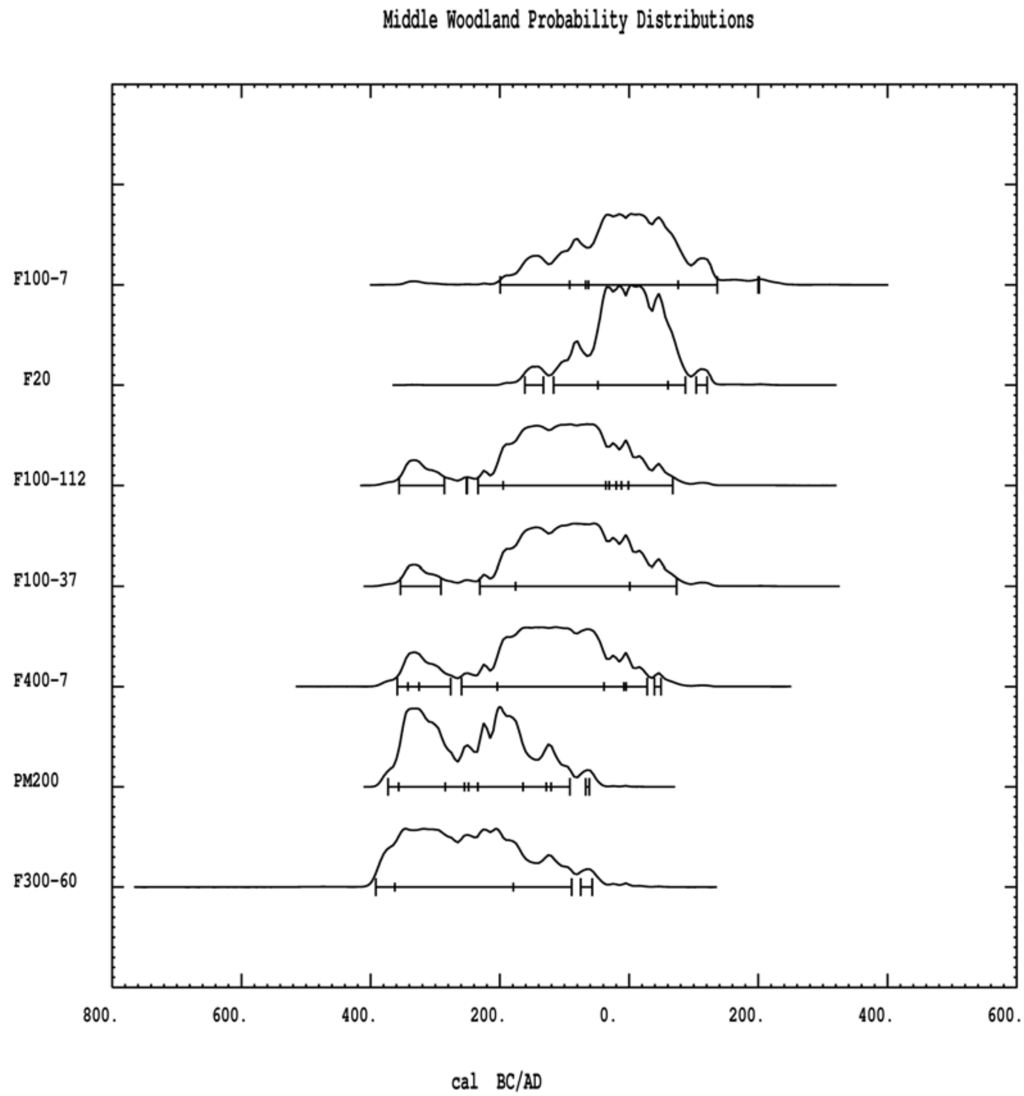

Figure 4.2. Graph of probability distributions of Middle Woodland radiocarbon dates.

Chapter 5

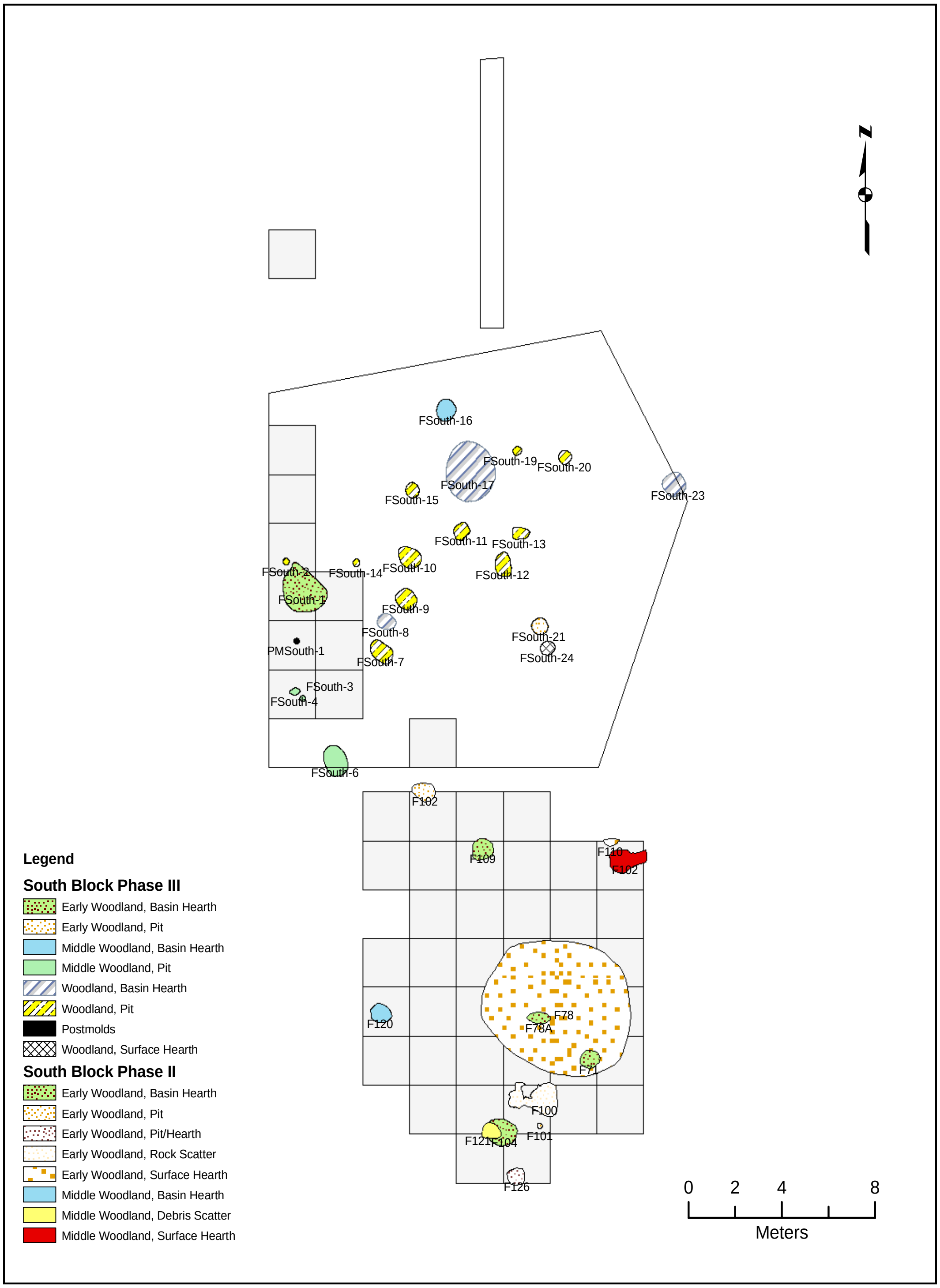

Figure 5.1. South Block Phase II and Phase III feature components and subtypes.

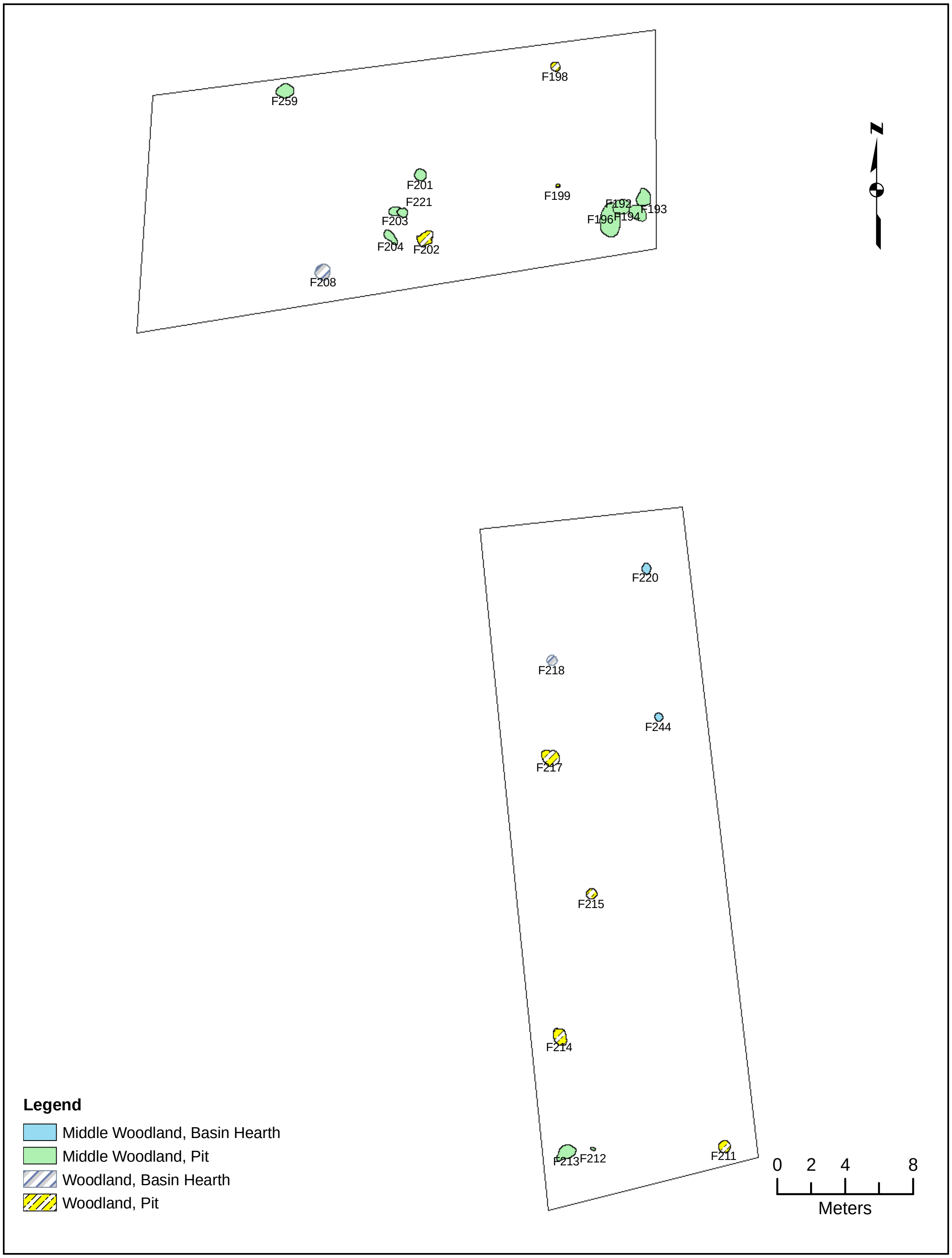

Figure 5.2. 15N27W and 63N47W Trenches feature components and subtypes.

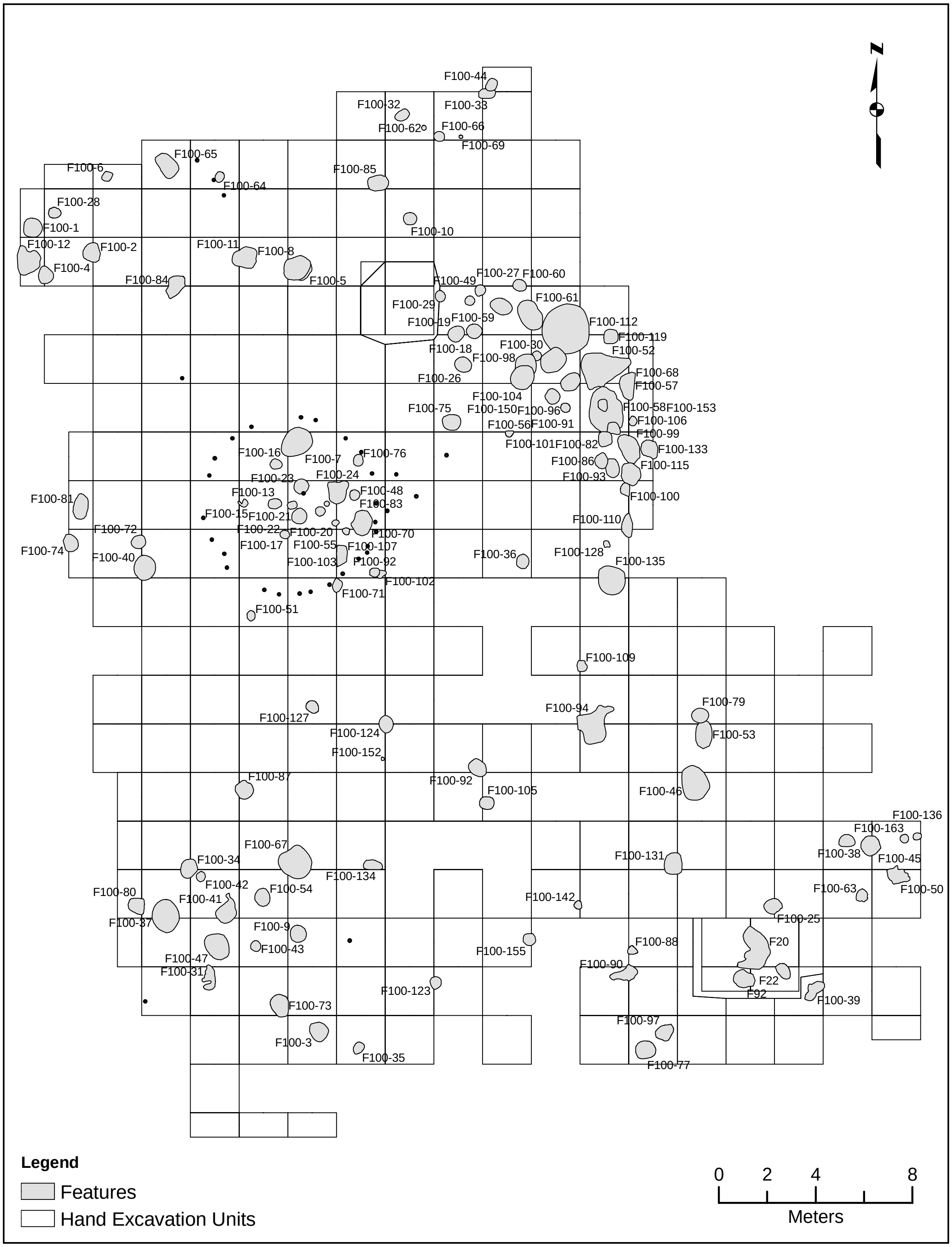

Figure 5.3. 100 Block feature numbers and locations.

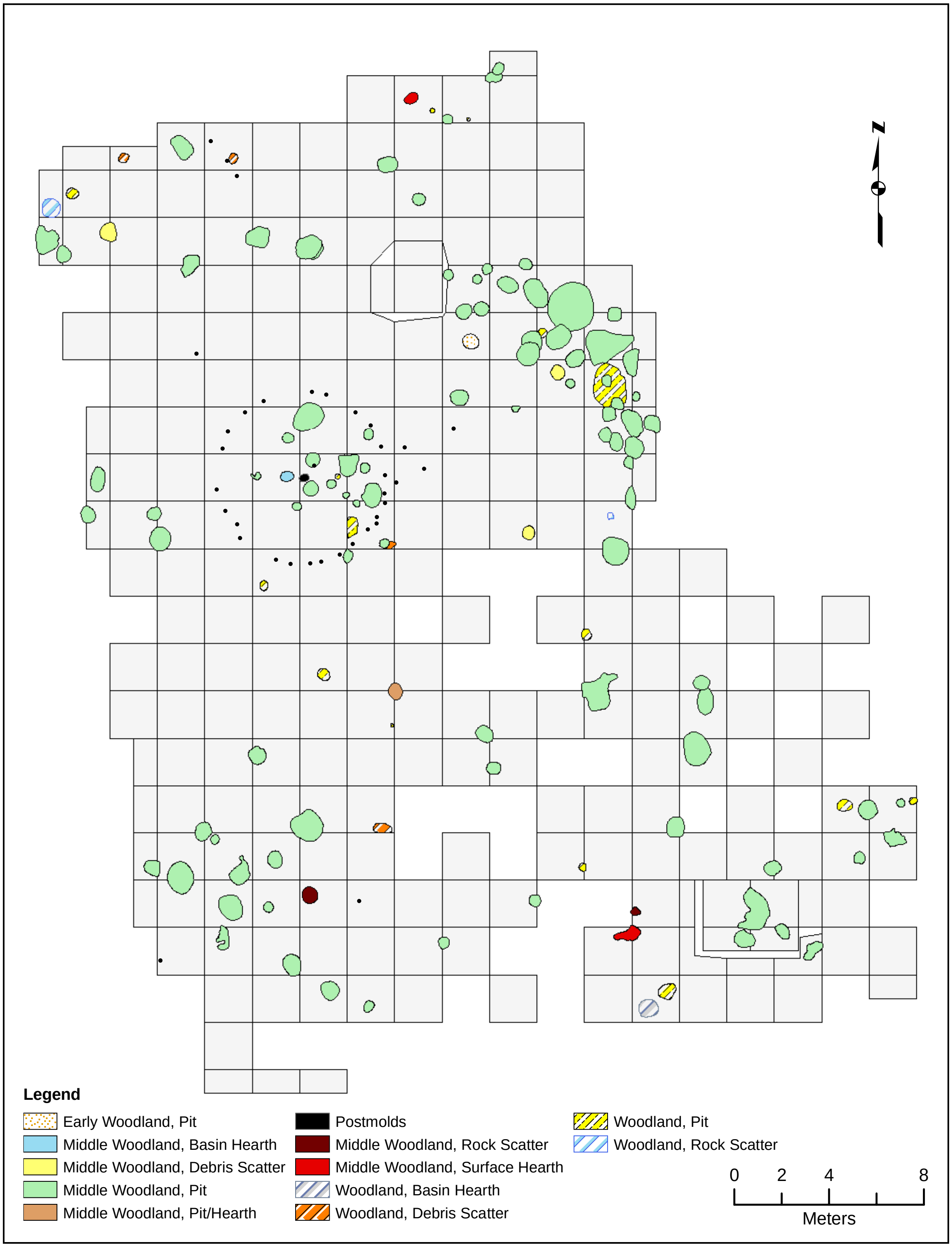

Figure 5.4. 100 Block feature components and subtypes.

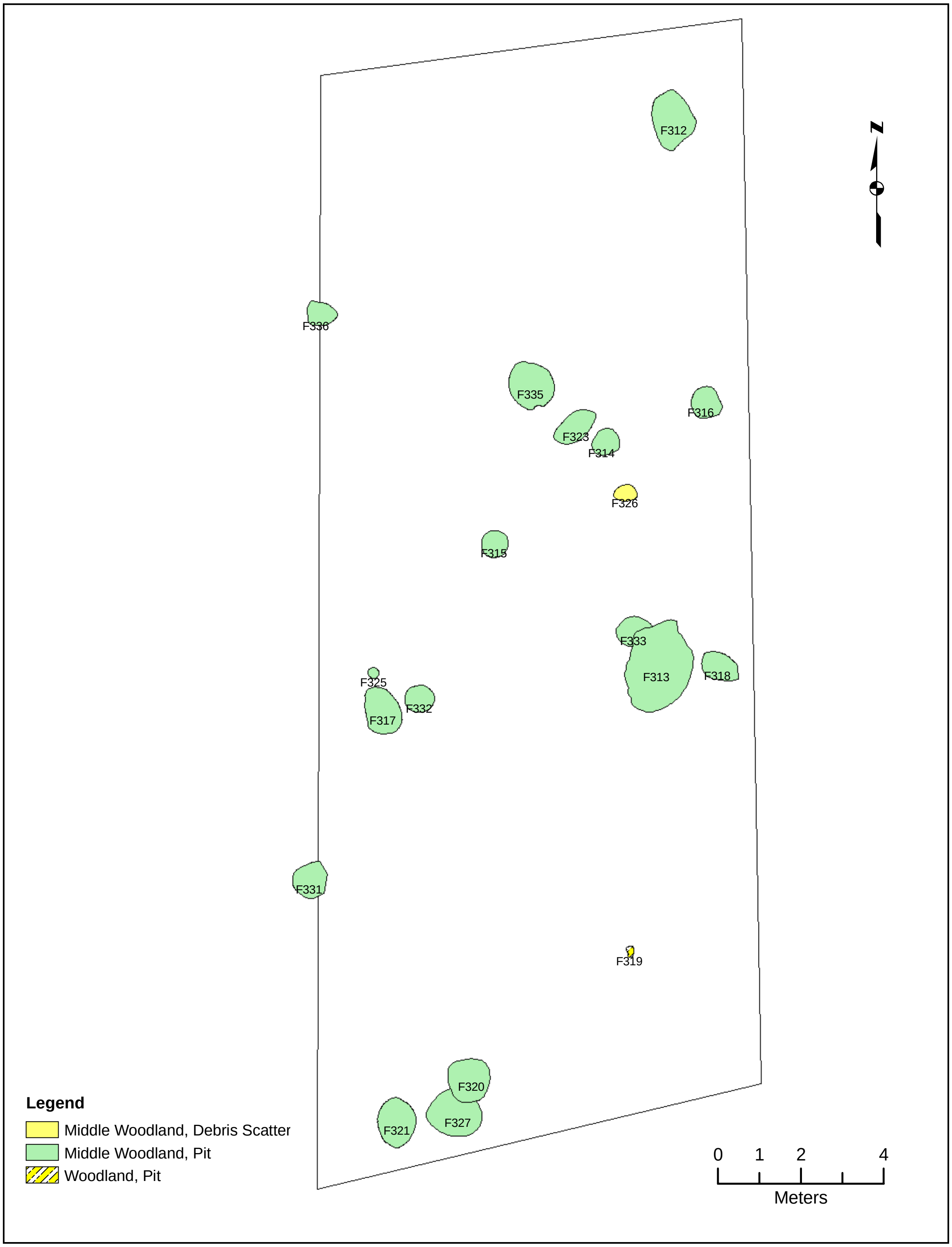

Figure 5.5. 148N49W Trench feature components and subtypes.

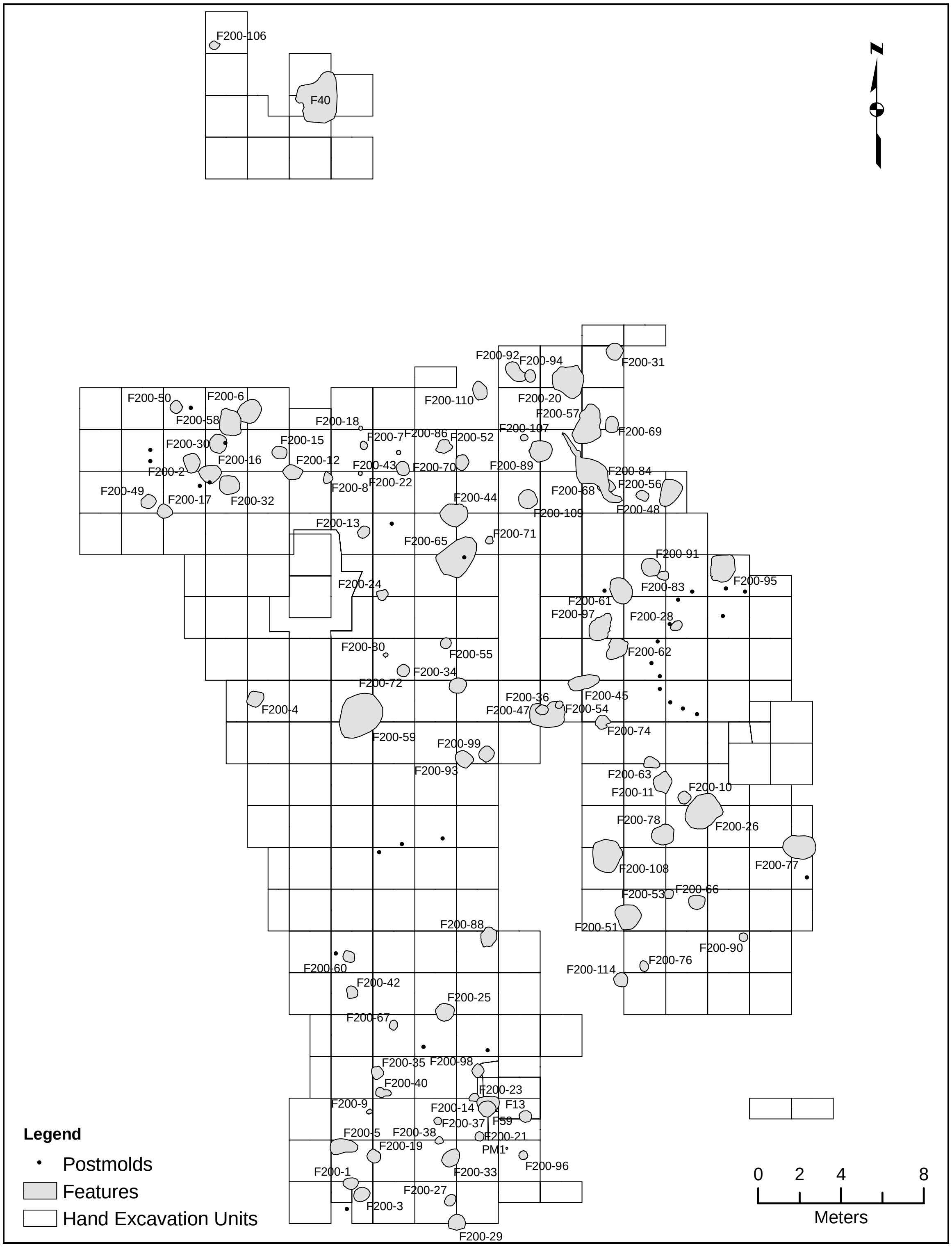

Figure 5.6. 200 Block feature numbers and locations.

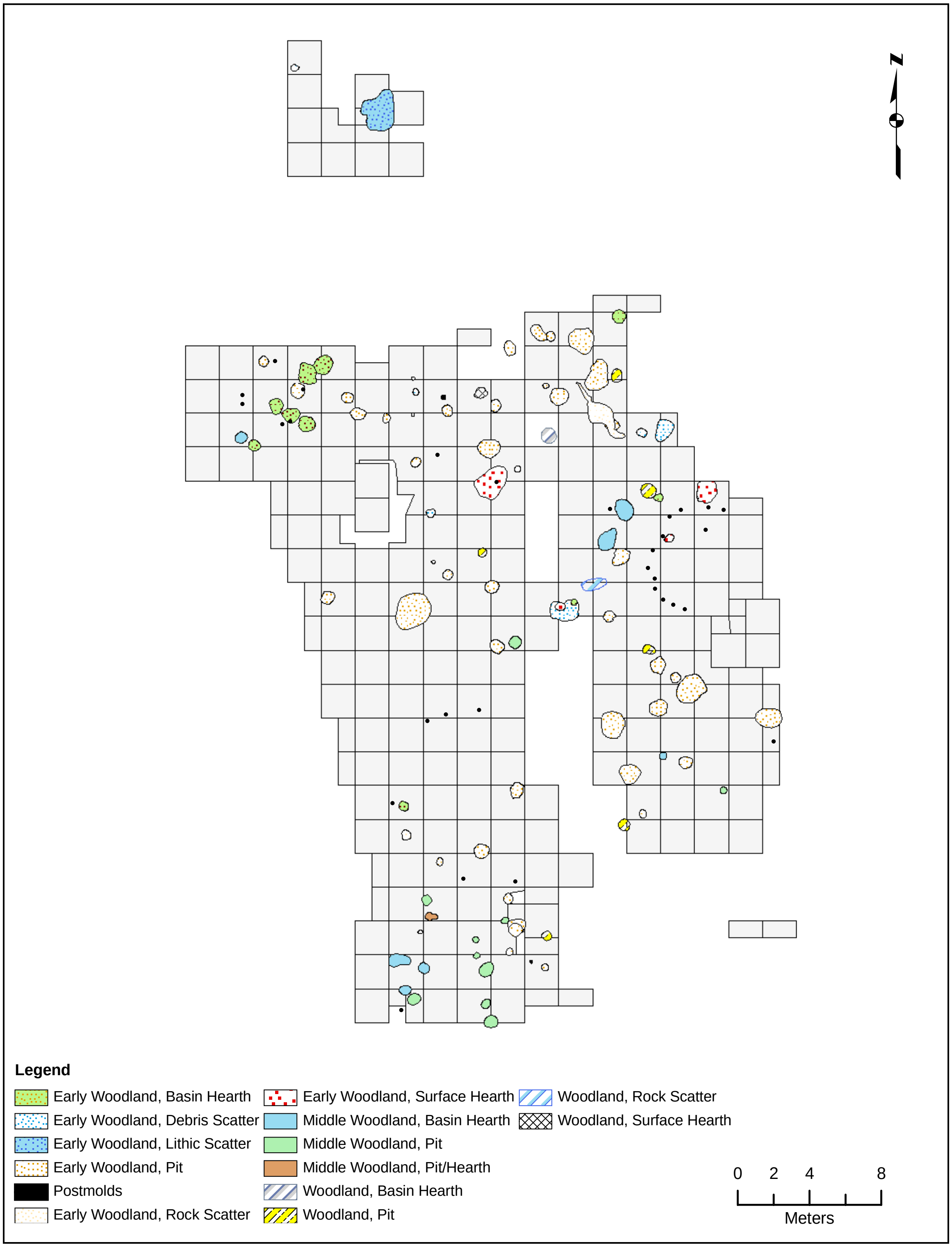

Figure 5.7. 200 Block feature components and subtypes.

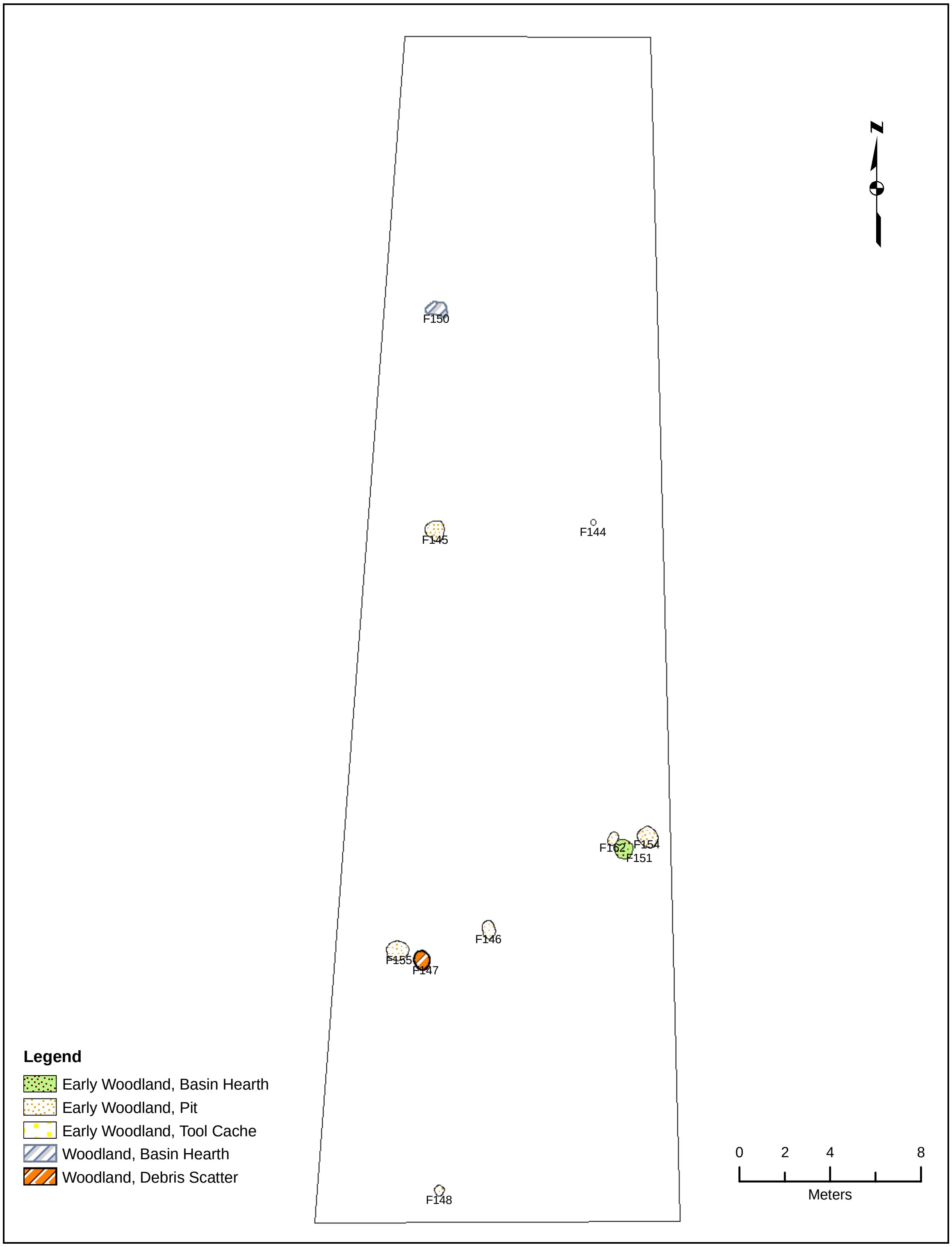

Figure 5.8. 253N80W Trench feature components and subtypes.

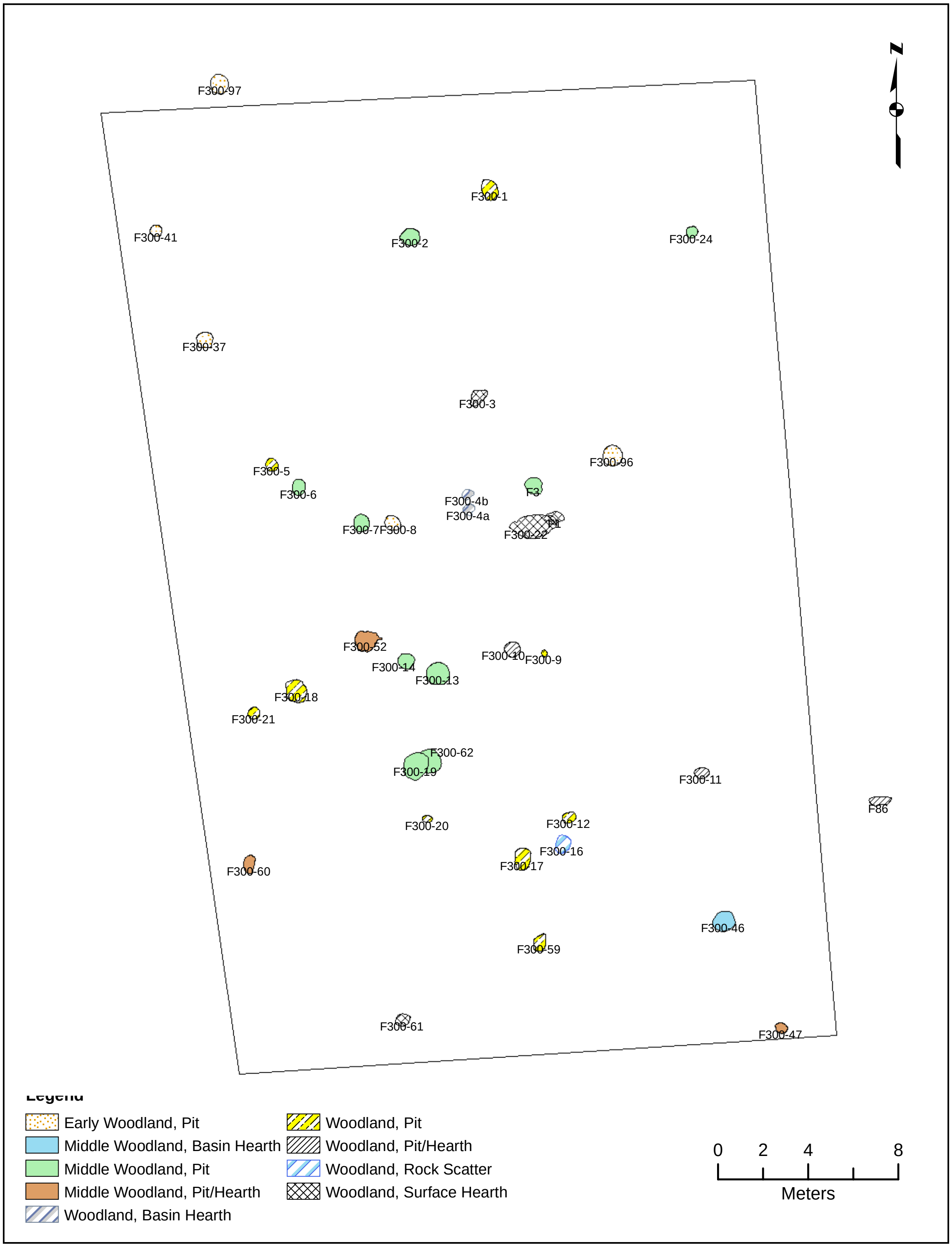

Figure 5.9. 300 Block feature components and subtypes.

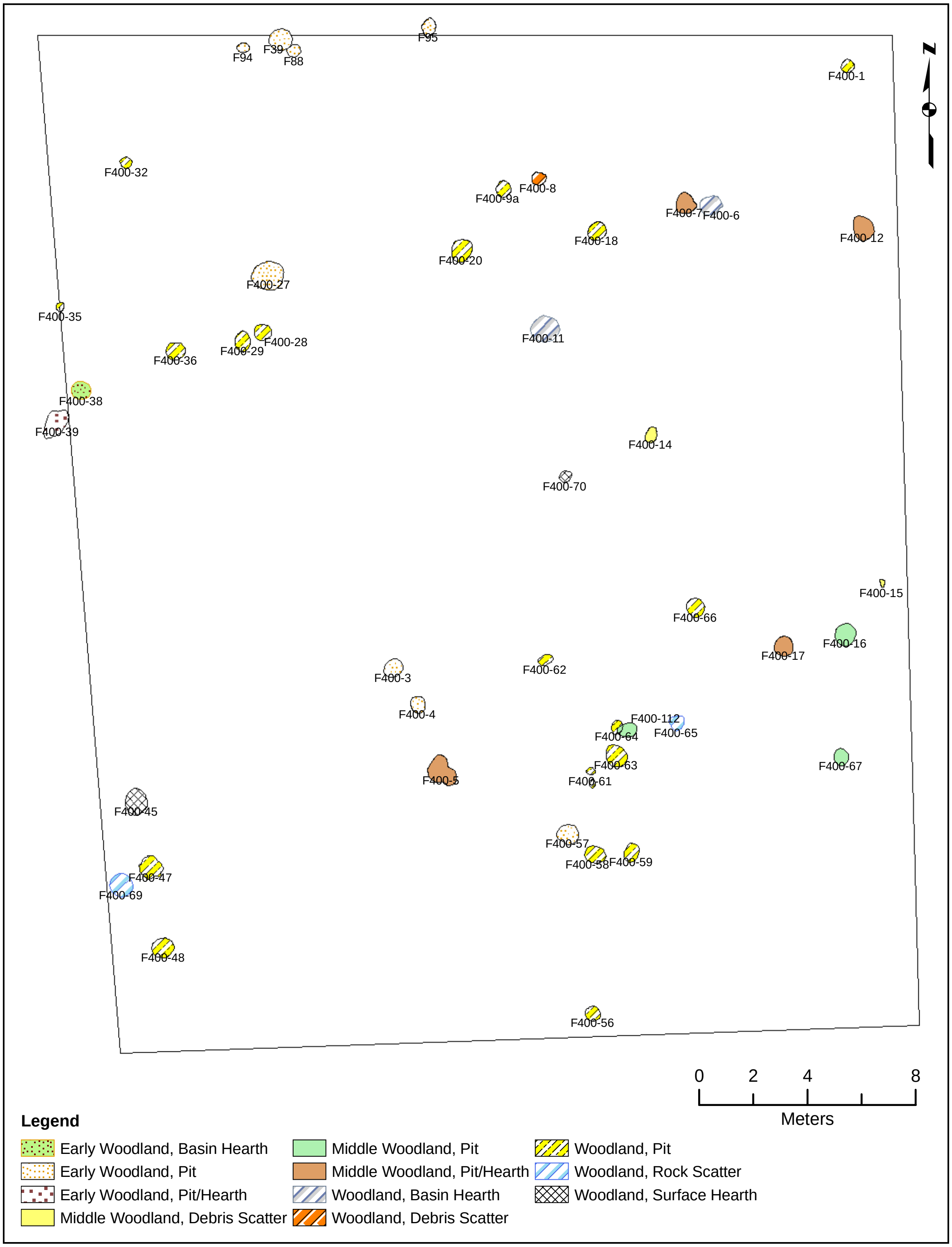

Figure 5.10. 400 Block feature components and subtypes.

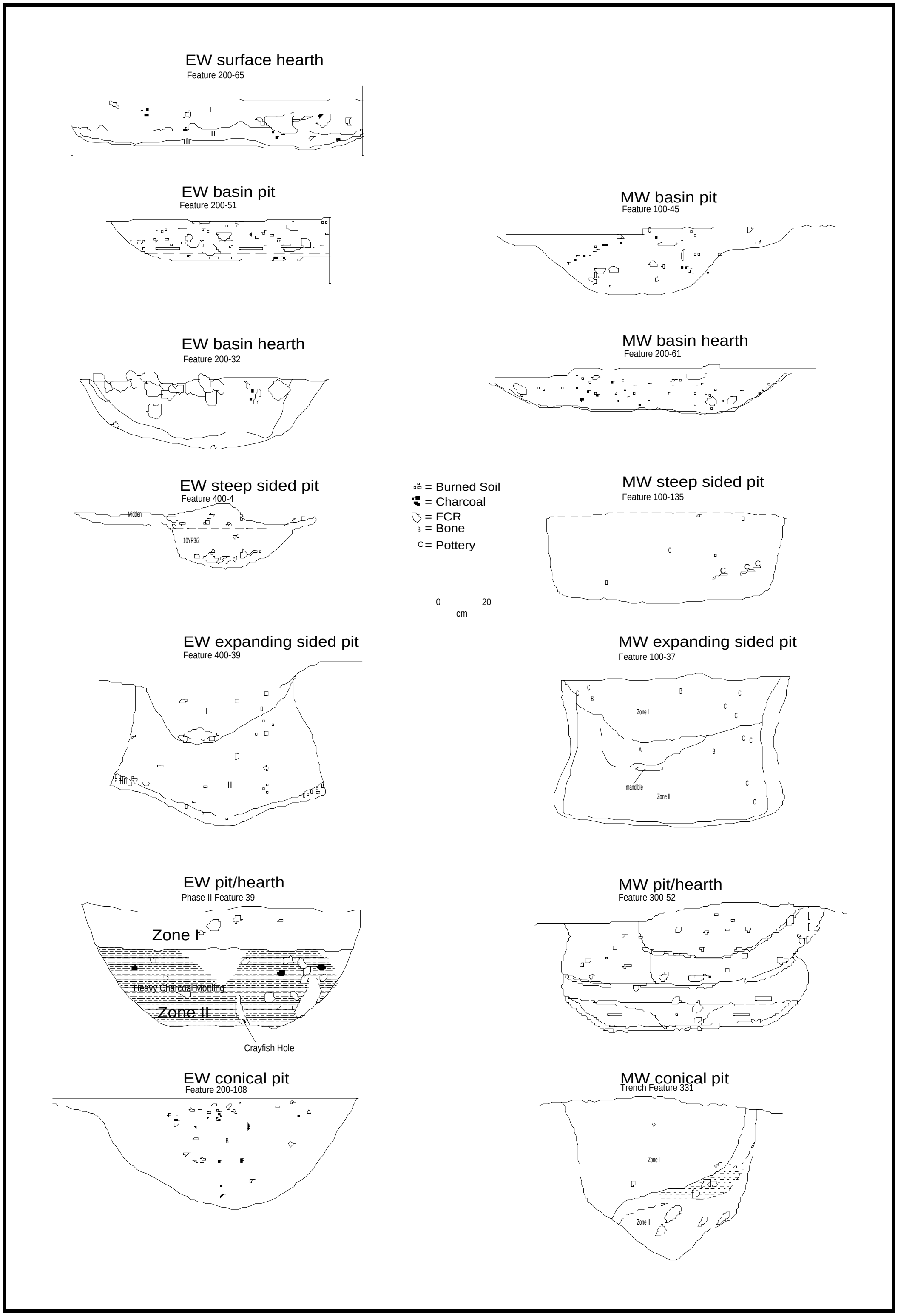

Figure 5.11. Profiles representative of major feature types.

Figure 5.12. Phase II South Block Feature 78 from the east.

Figure 5.13. Feature 100-112 post excavation.

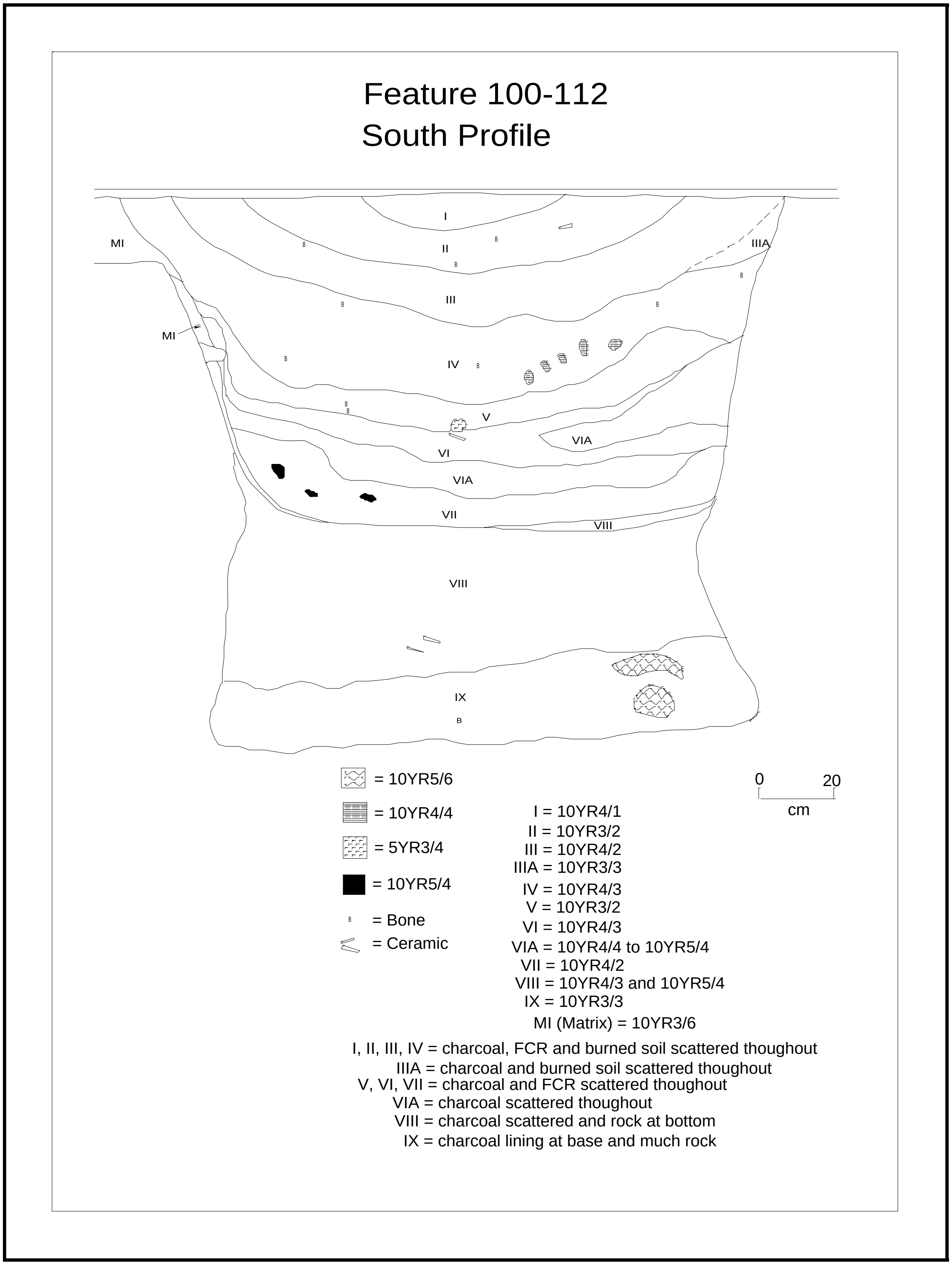

Figure 5.14. Feature 100-112 vertical profile.

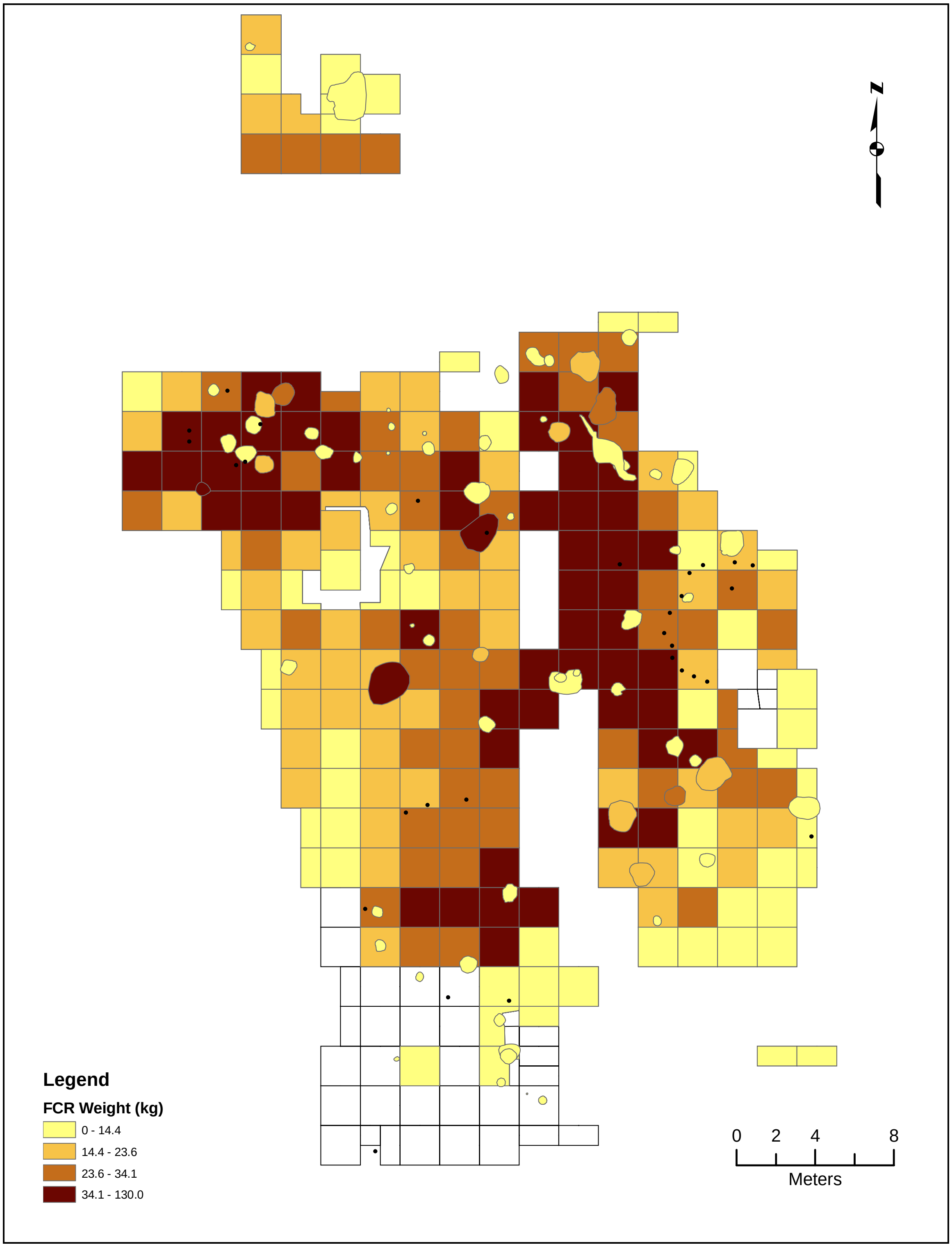

Figure 5.15. Fire-cracked rock in the 200 Block Early Woodland levels and features.

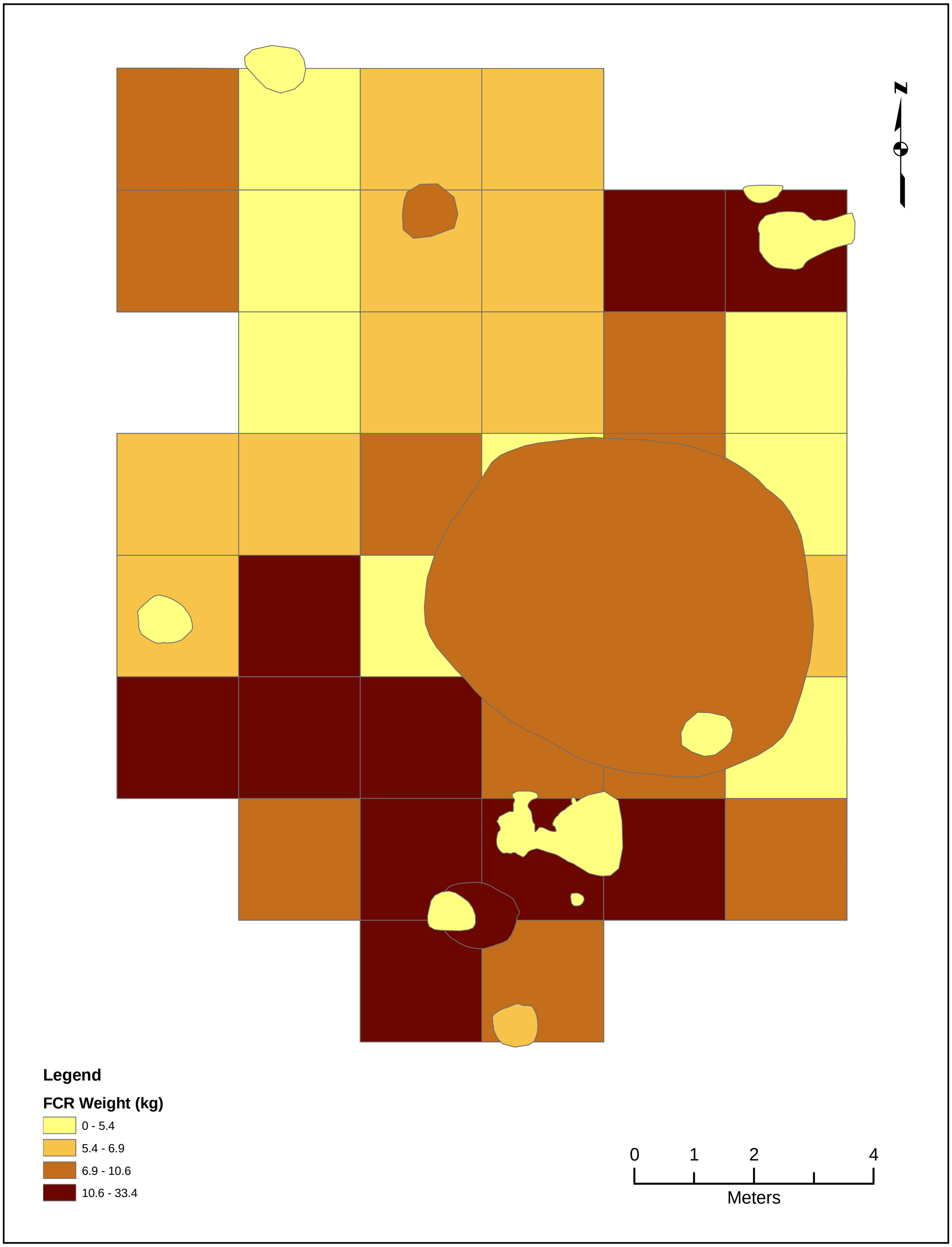

Figure 5.16. Fire cracked rock in the Phase II South Block Woodland levels and features.

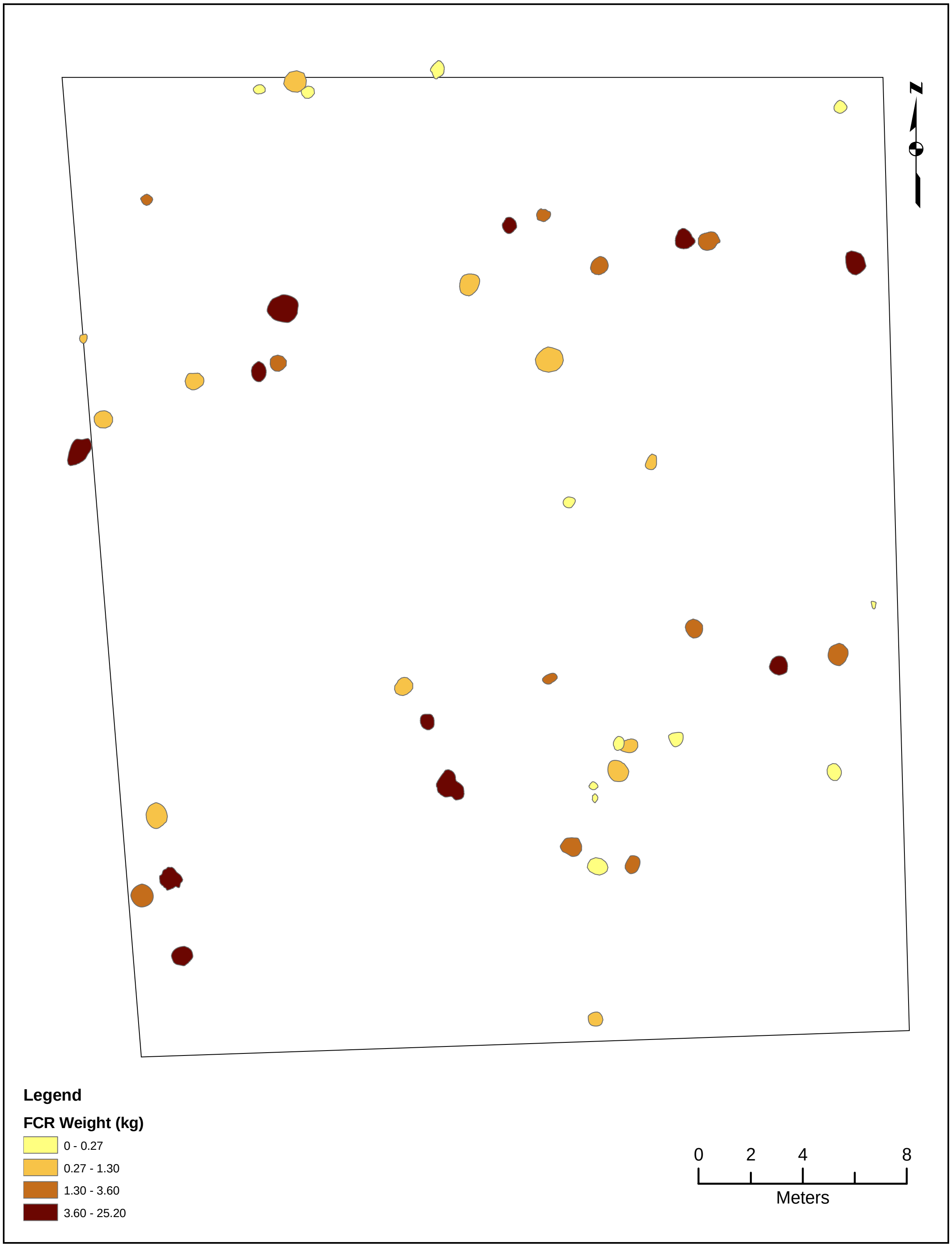

Figure 5.17. Fire cracked rock in the 400 Block features.

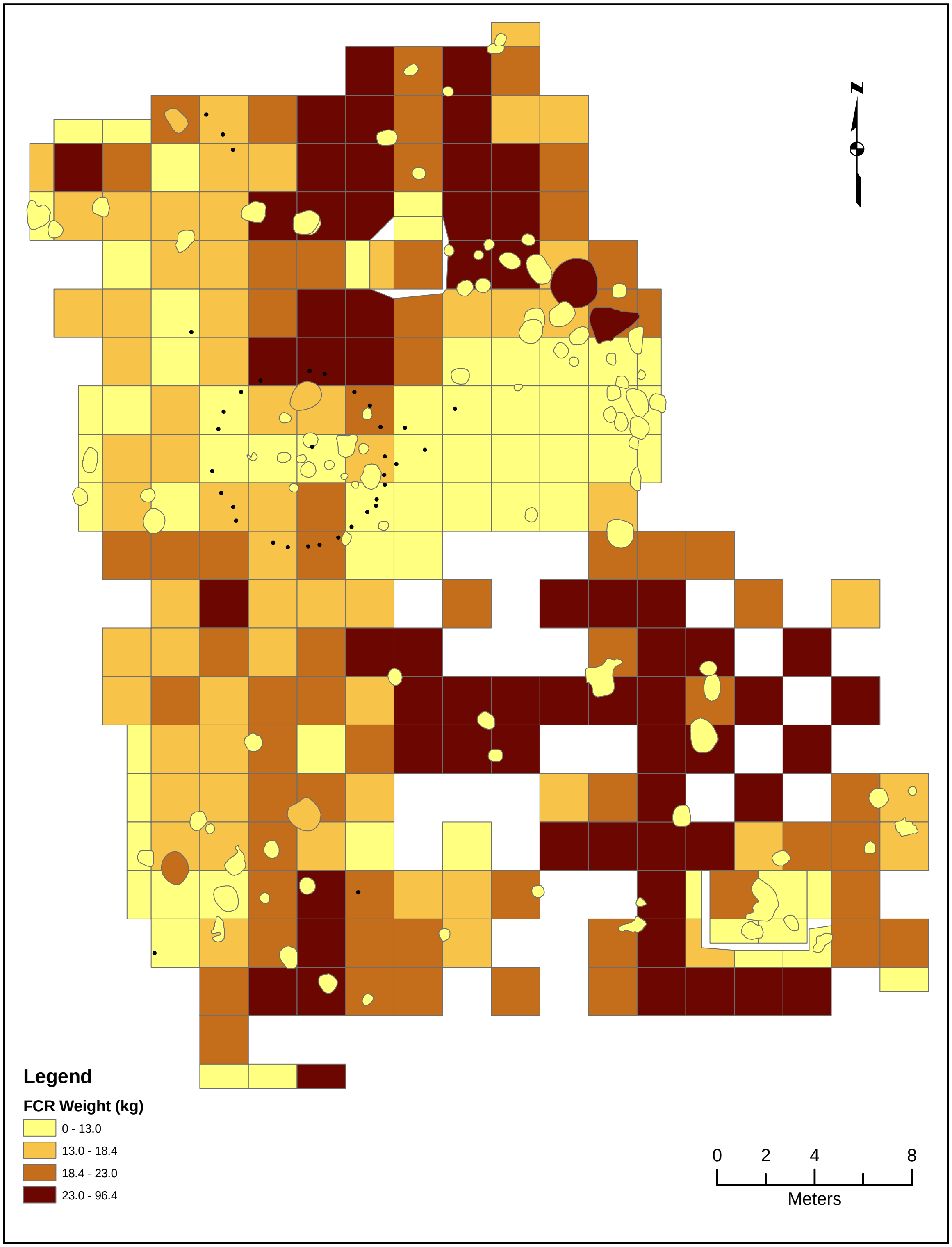

Figure 5.18. Fire-cracked rock in the 100 Block Woodland levels and features.

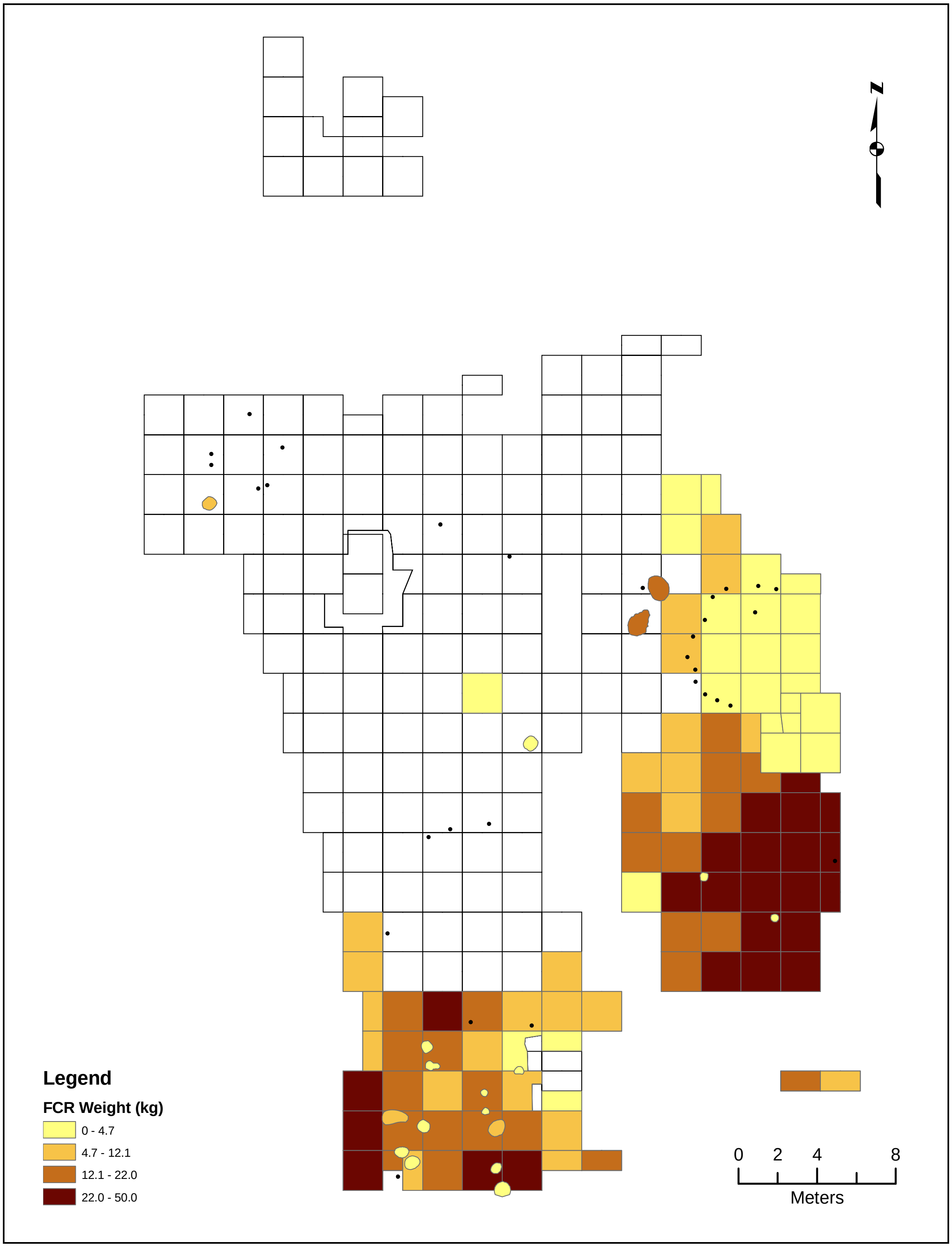

Figure 5.19. Fire-cracked rock in the 200 Block Middle Woodland levels and features.

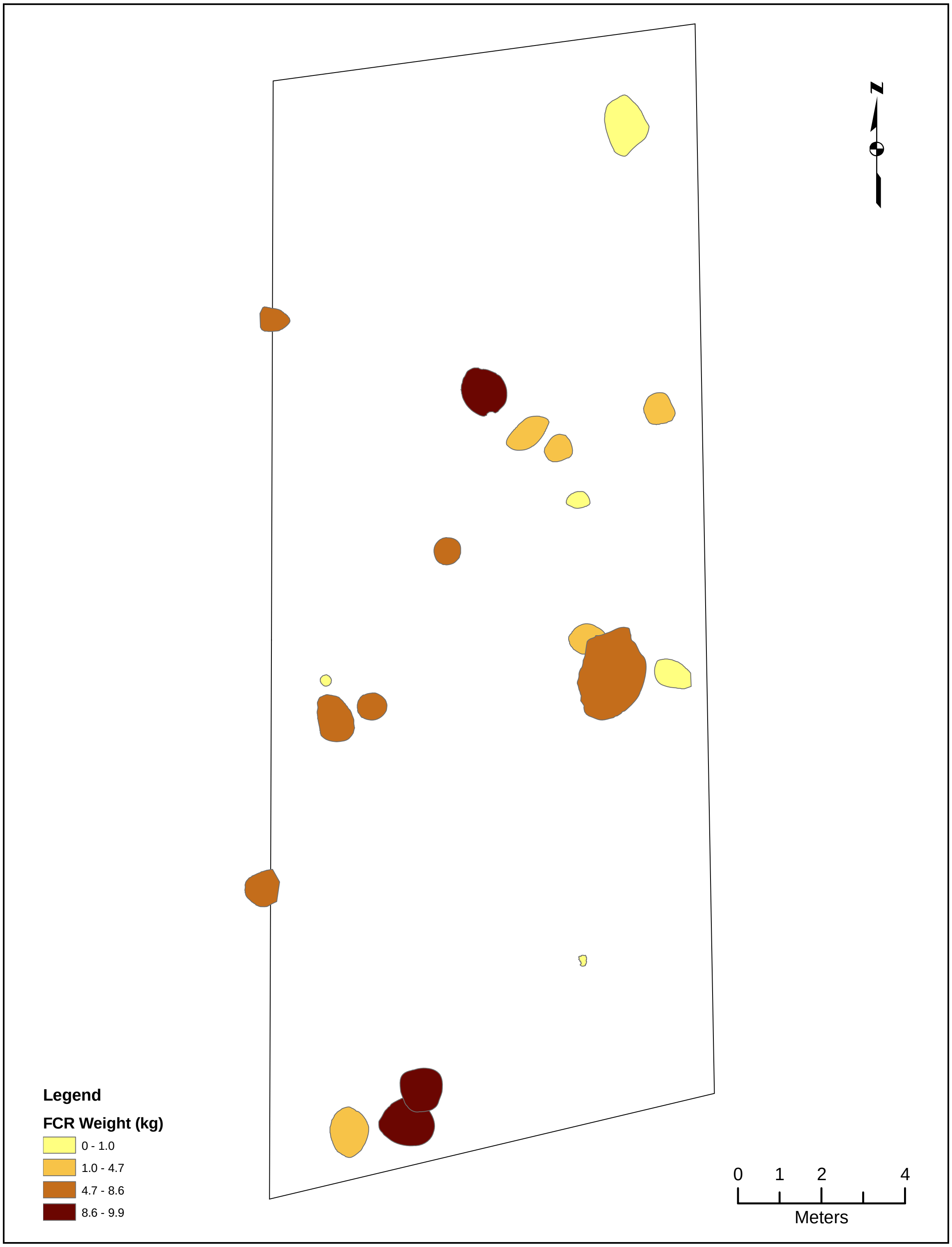

Figure 5.20. Fire cracked rock in the 148N49W Trench features.

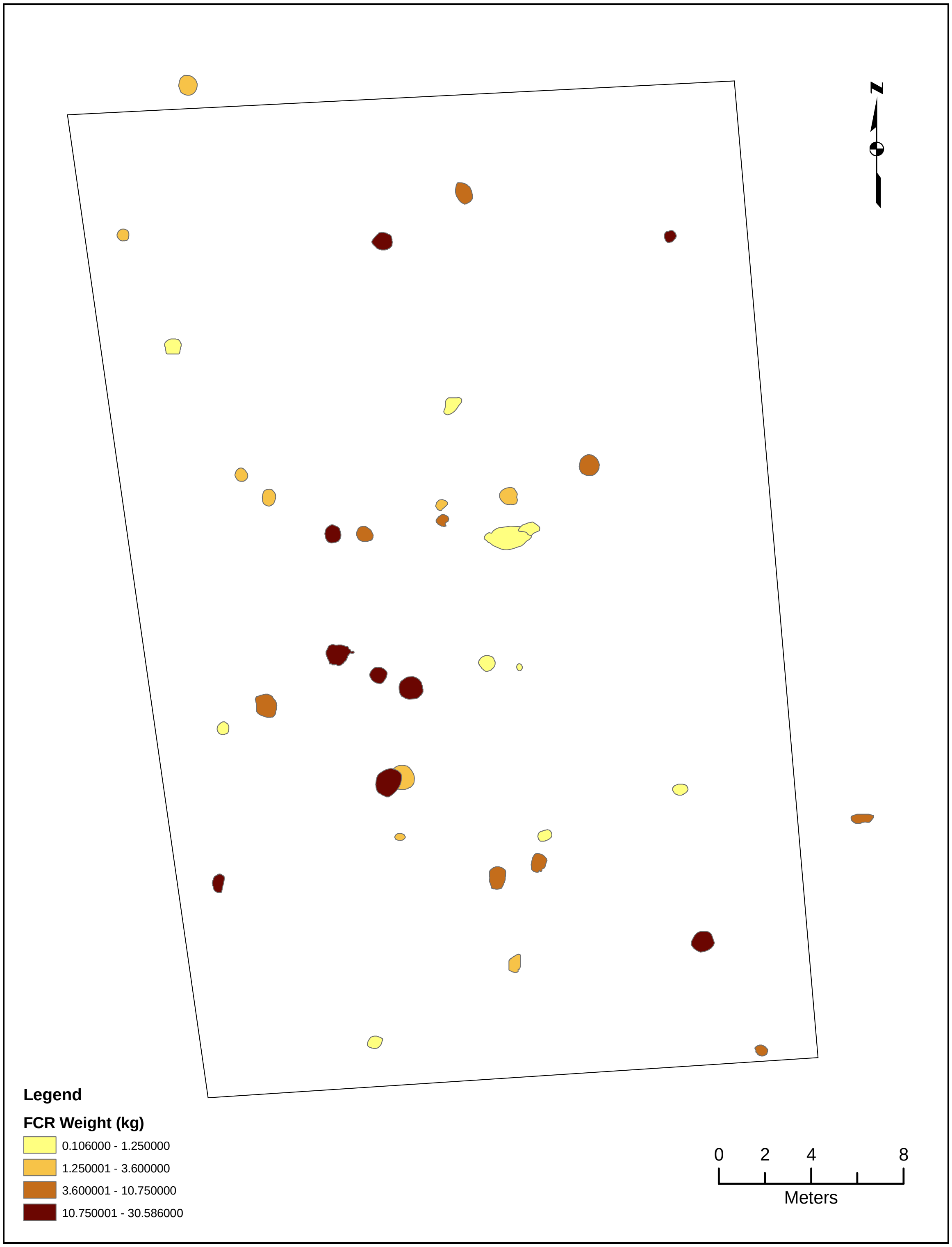

Figure 5.21. Fire cracked rock in the 300 Block features.

Figure 5.22. Structure X--view from the north.

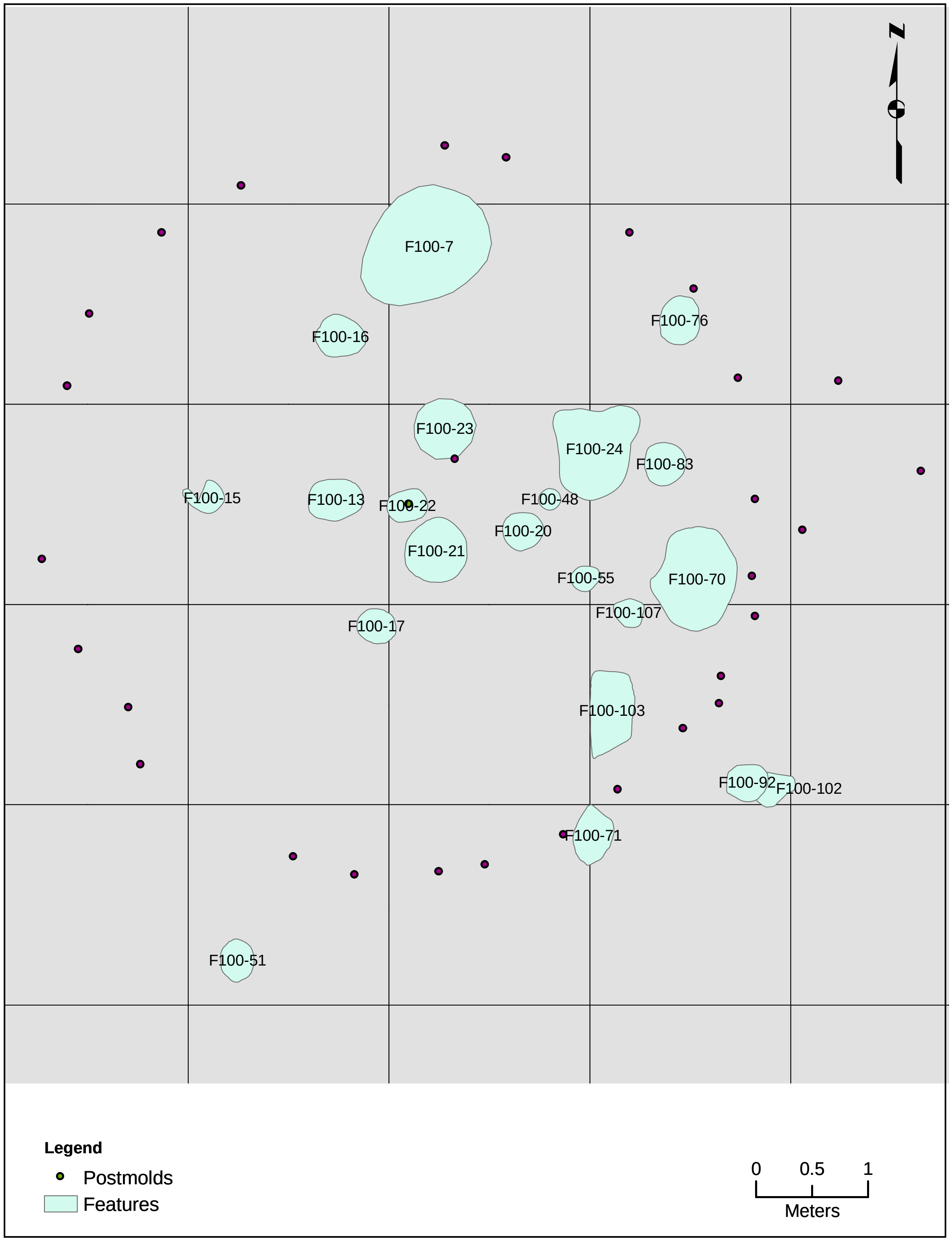

Figure 5.23. Structure X--post molds and interior features.

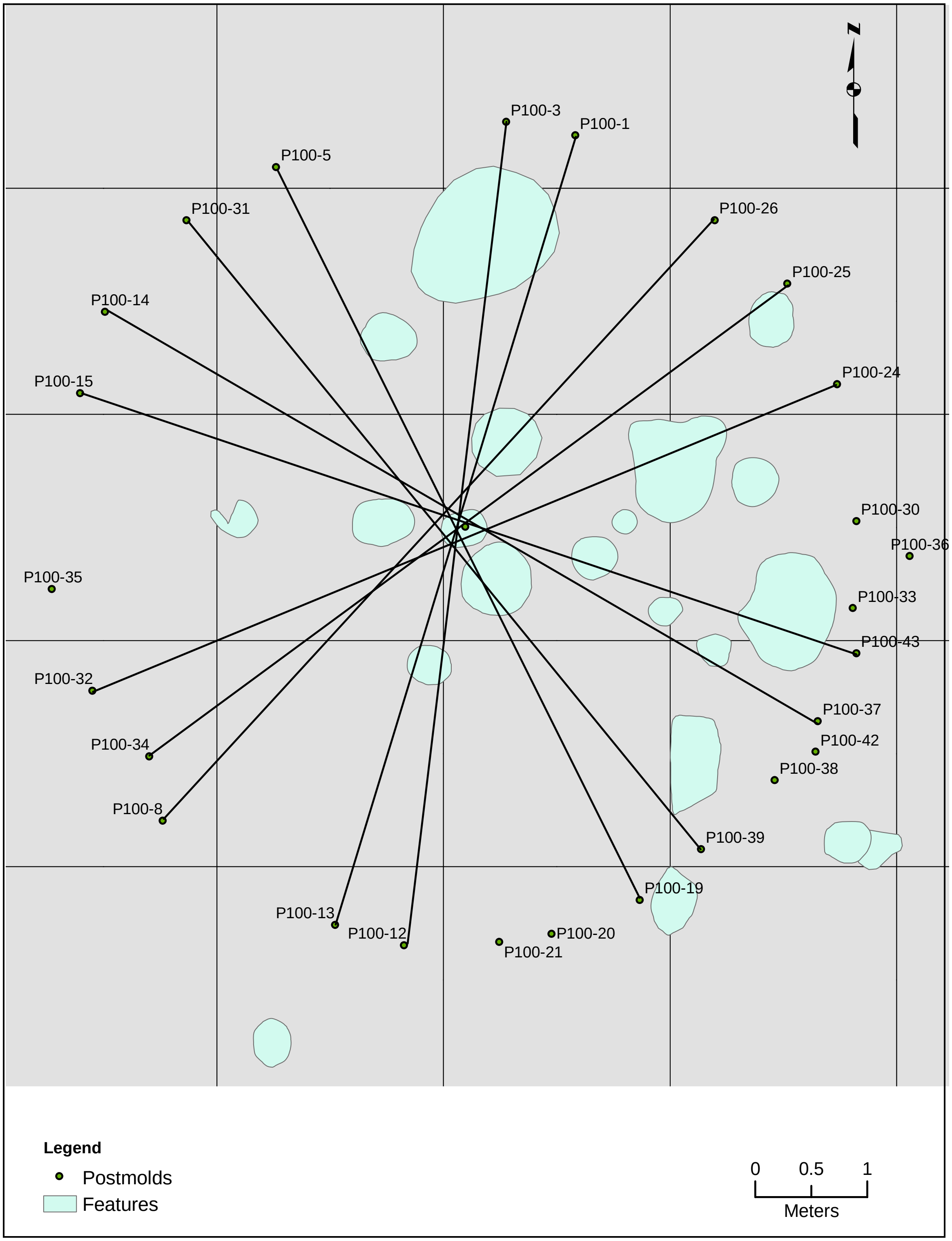

Figure 5.24. Structure X--numbered postmolds with opposed wall posts aligned through centerpost.

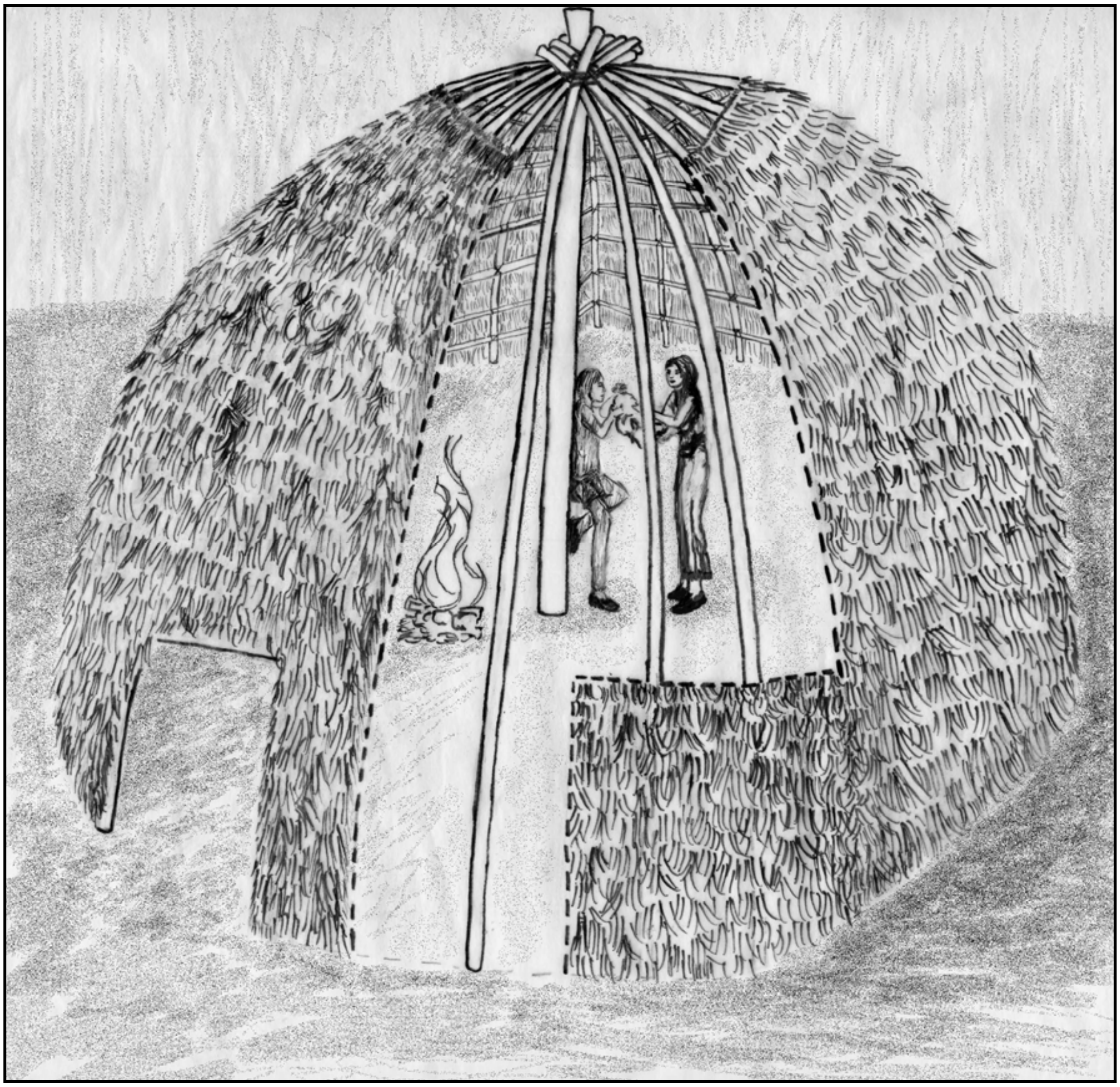

Figure 5.25. Tentative reconstruction of Structure X.

Figure 5.26. Structure A--view from the east—burned daub in the foreground and post molds in background.

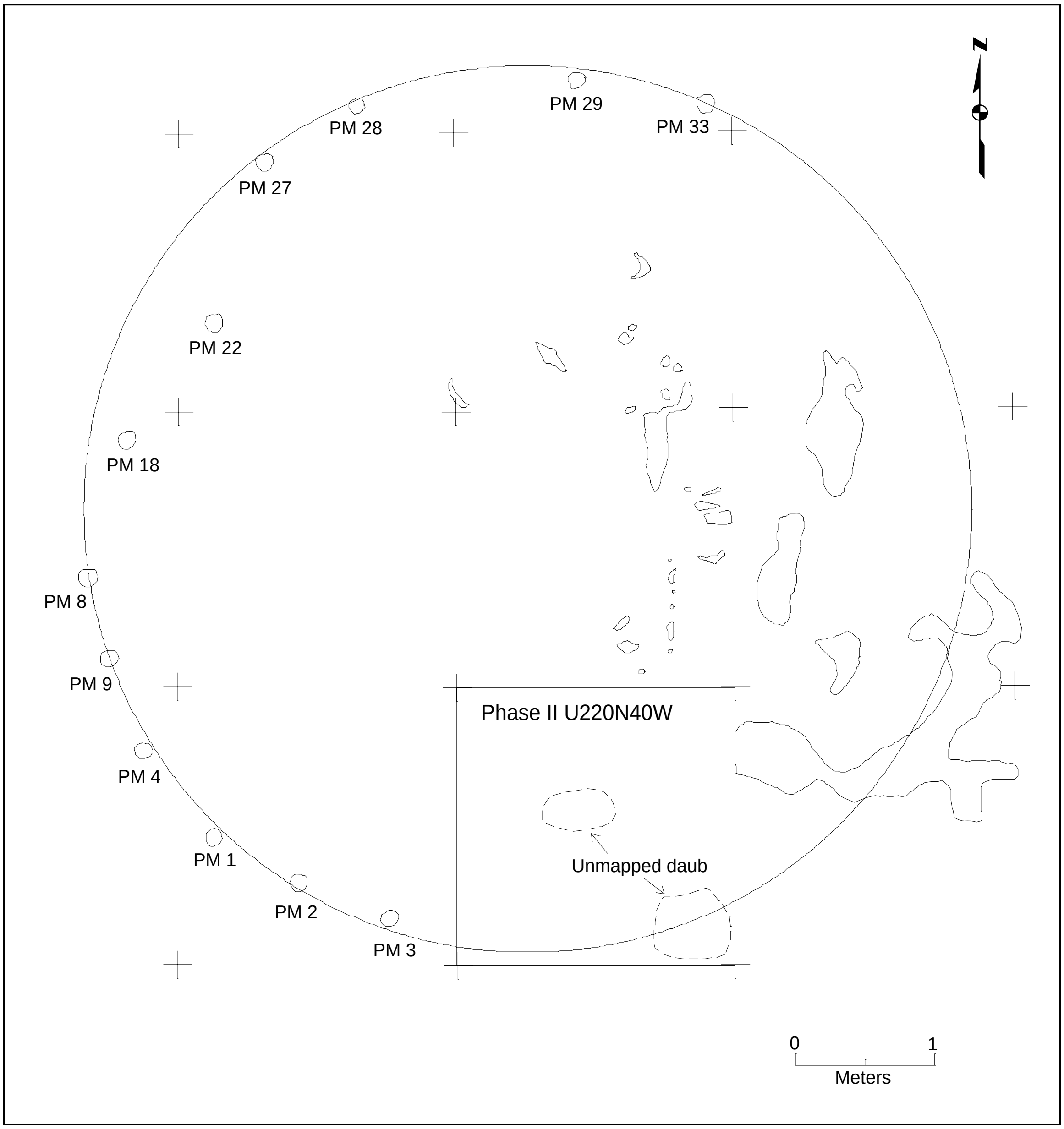

Figure 5.27. Structure A--numbered postmolds with hypothetical wall inscribed and burned daub mapped.

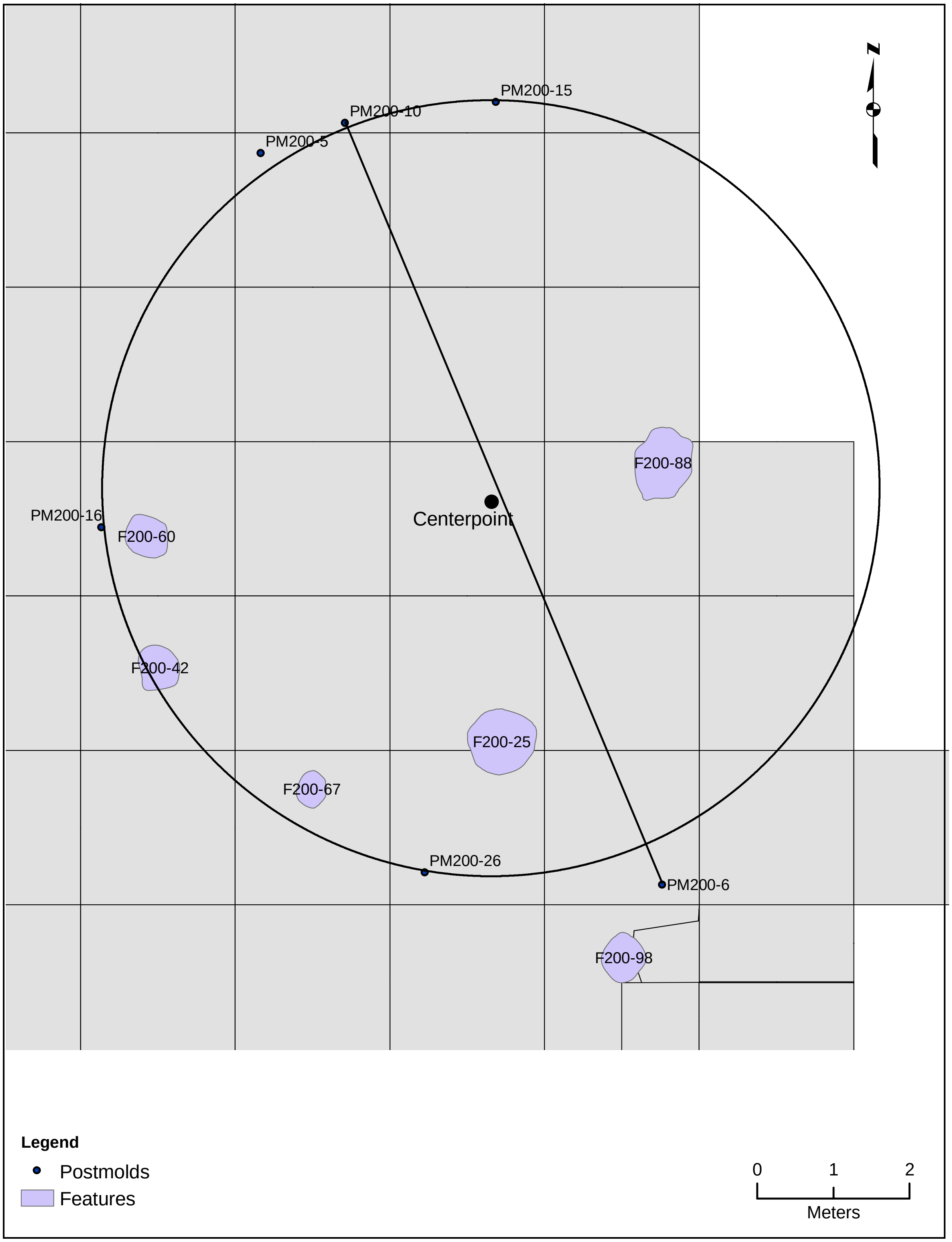

Figure 5.28. Structure B--numbered post molds and interior features with hypothetical wall inscribed and opposed wall posts aligned through centerpoint.

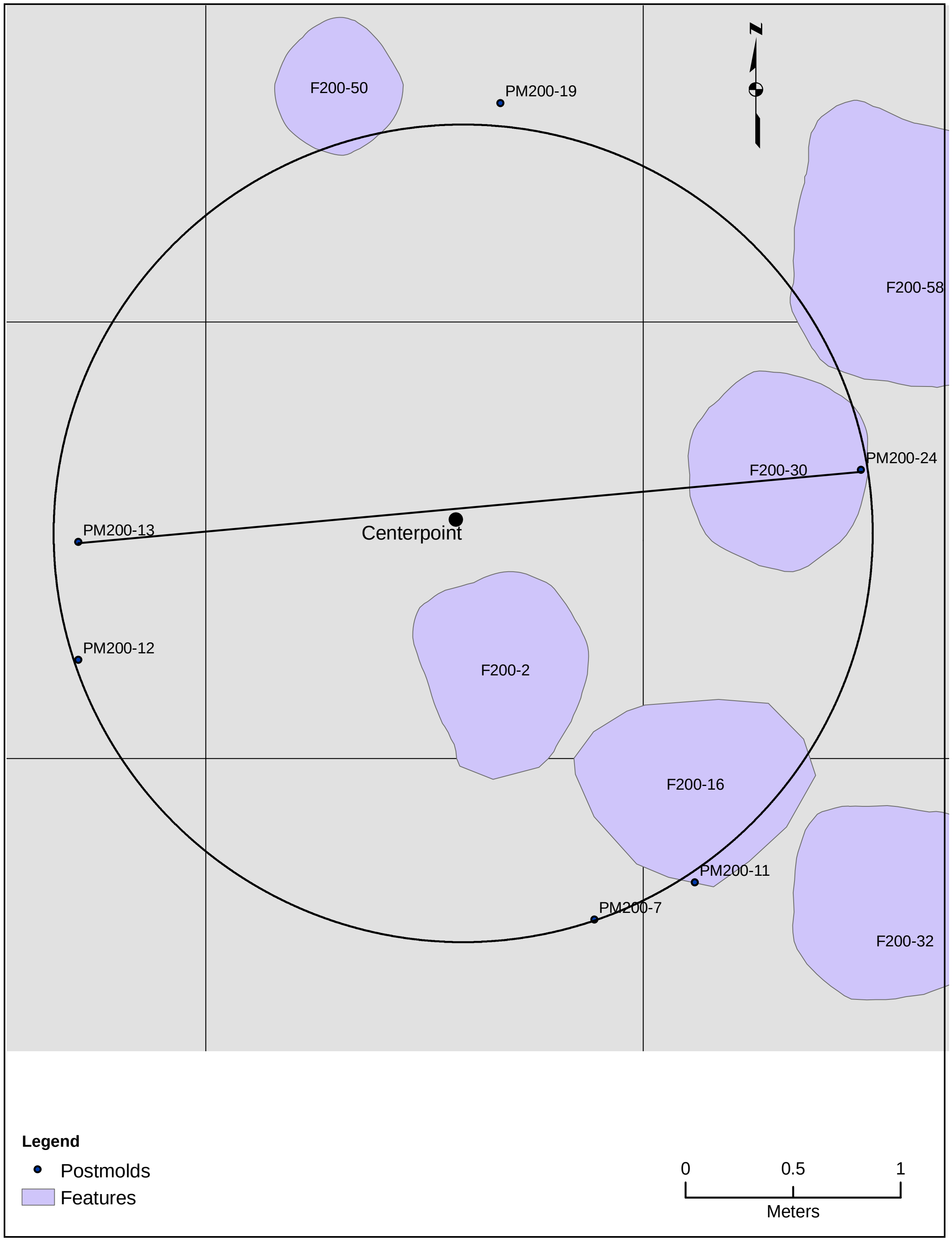

Figure 5.29. Structure C--numbered post molds and interior features with hypothetical wall inscribed and opposed wall posts aligned through centerpoint.

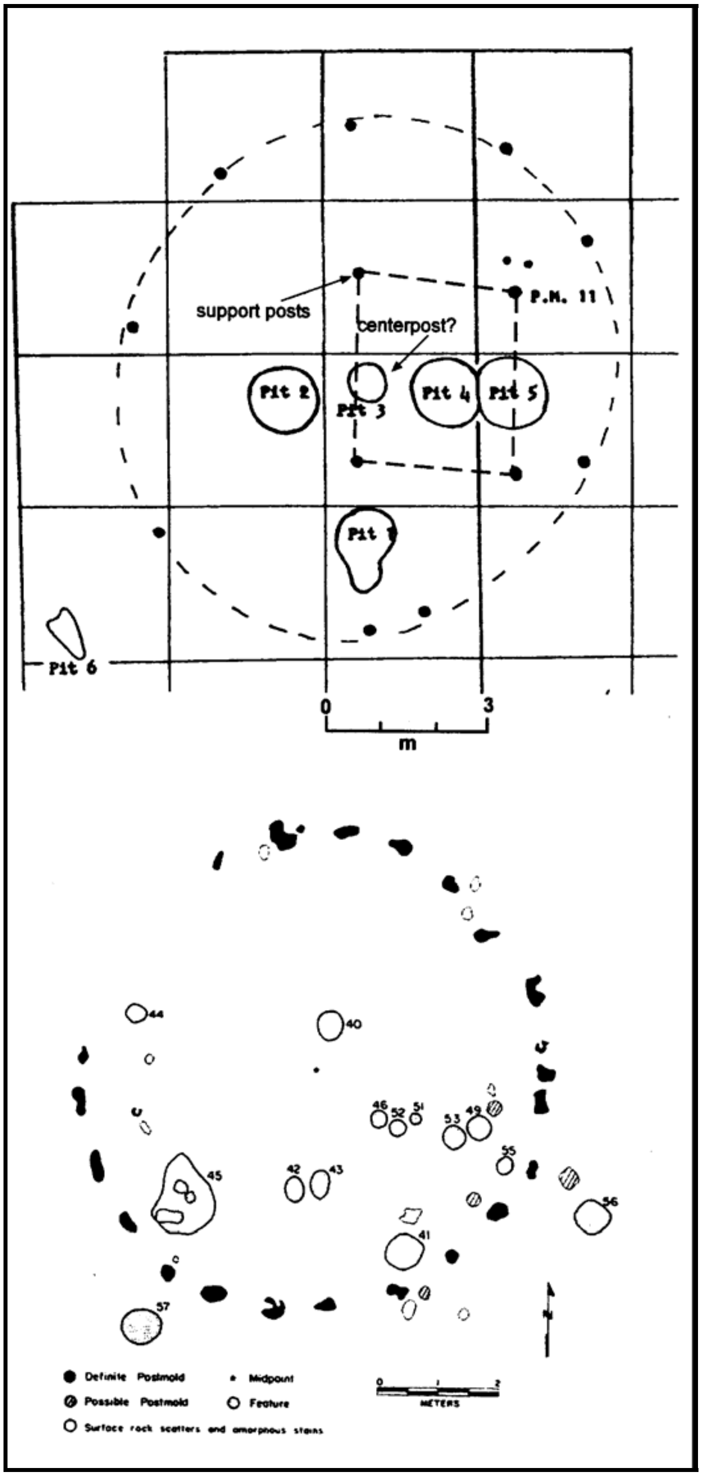

Figure 5.30. Structure at Buckmeyer site (adapted from Bush 1975) with possible centerpost indicated (upper); Structure 1 at Napoleon Hollow site (adapted from Wiant and McGimsey 1986) (lower).

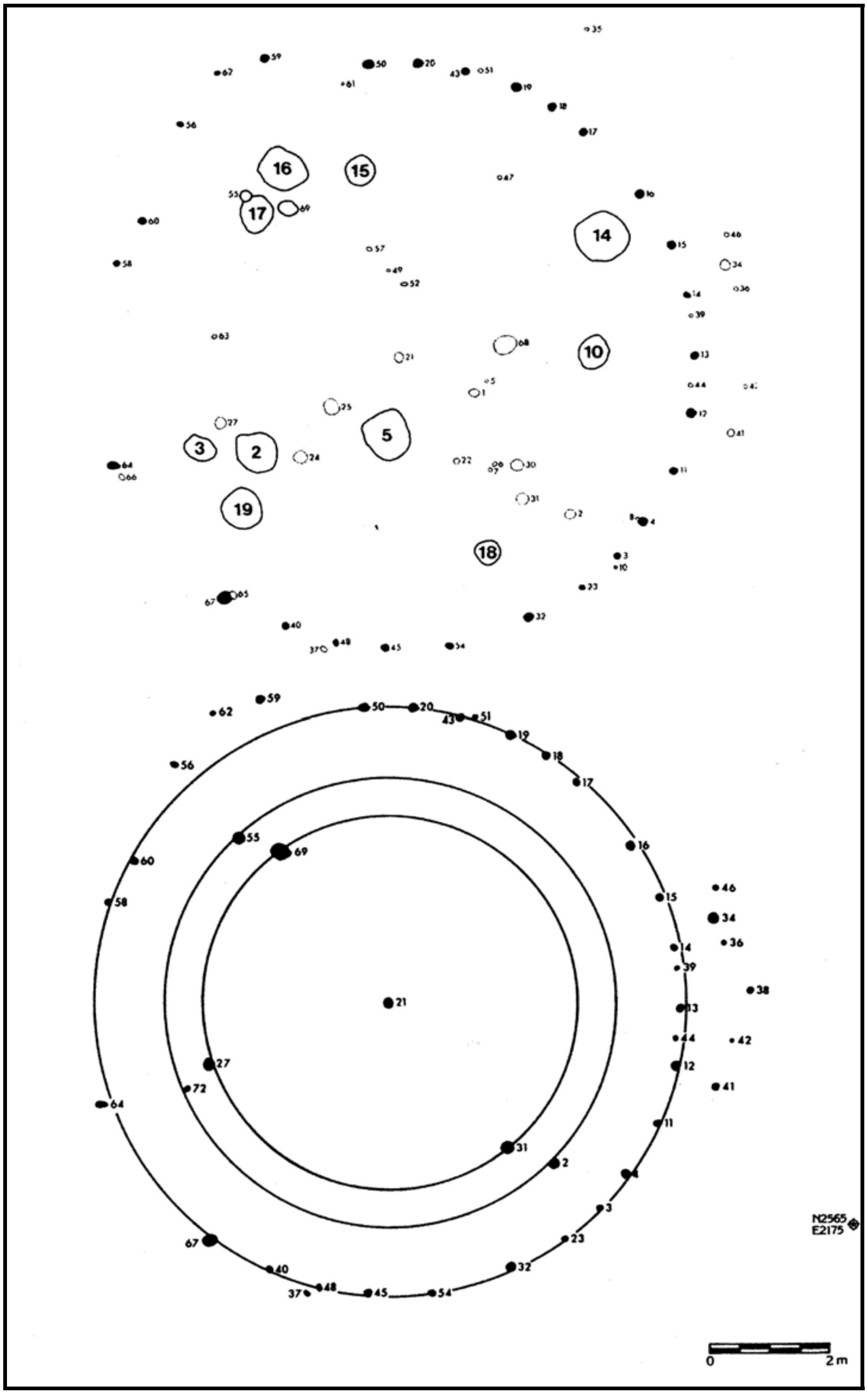

Figure 5.31. Feature 1 at the Truck #7 site (adapted from Fortier 1985): upper drawing shows features; lower drawing shows postmold alignment.

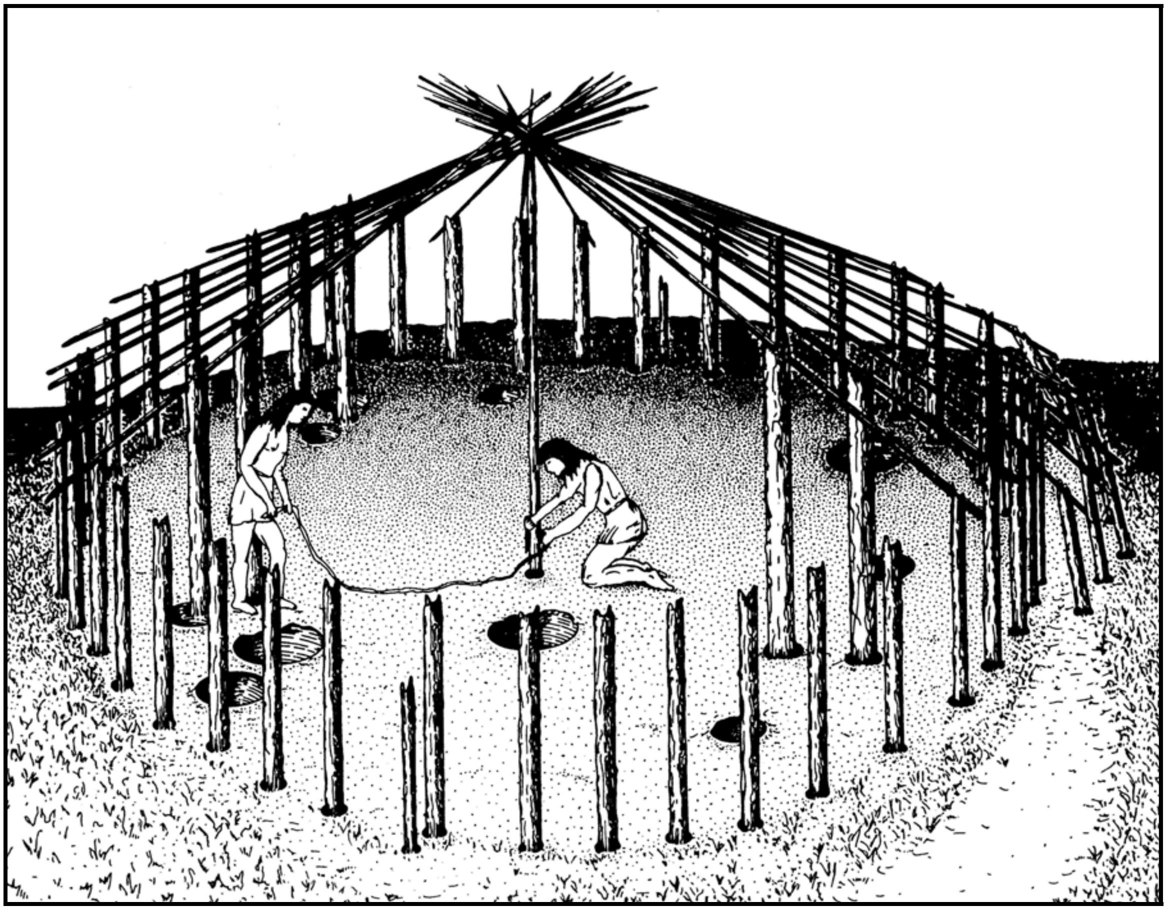

Figure 5.32. Wall posts and centerpost and method of alignment of Feature 1 at the Truck #7 site (adapted from Fortier 1985).

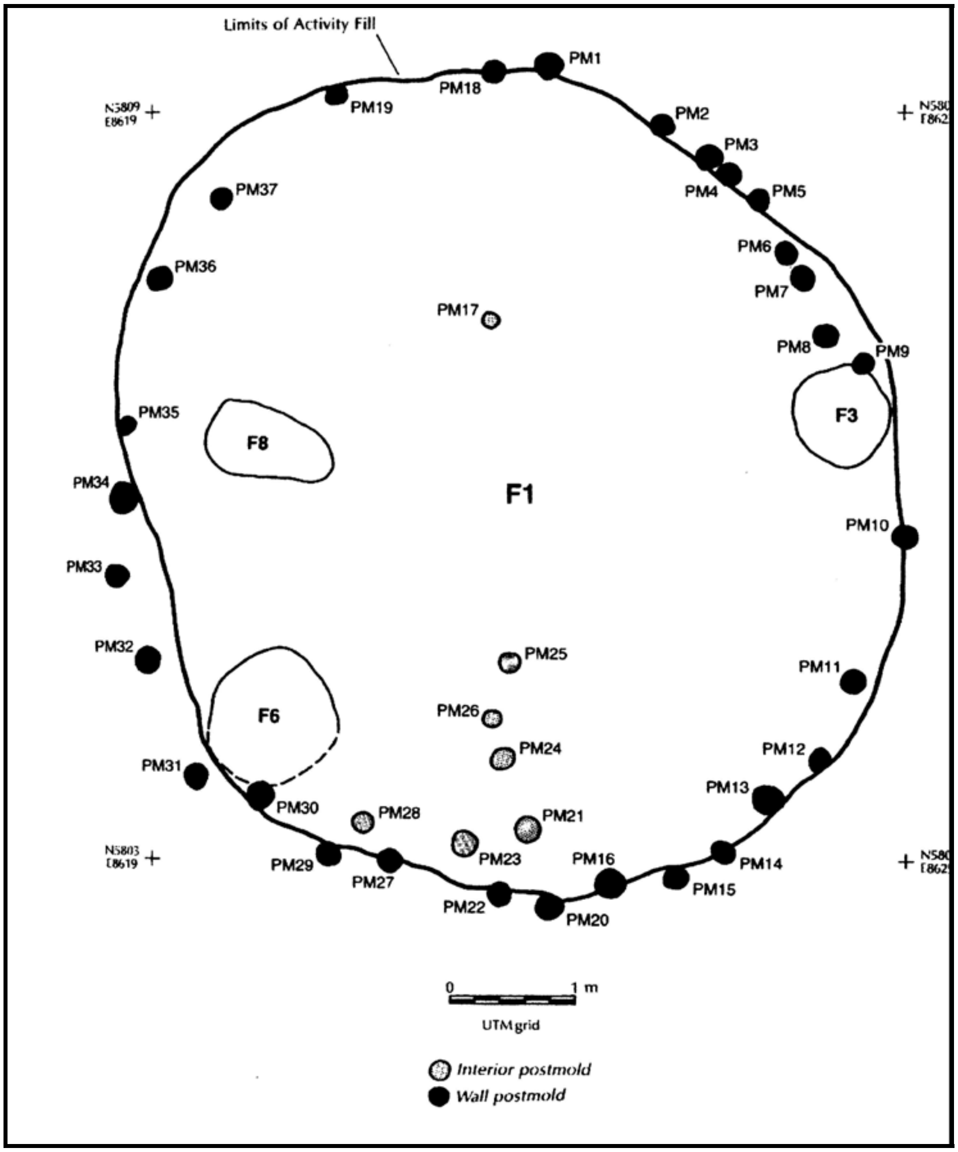

Figure 5.33. Structure Feature 1 at the Holding site (adapted from Fortier et al. 1989).

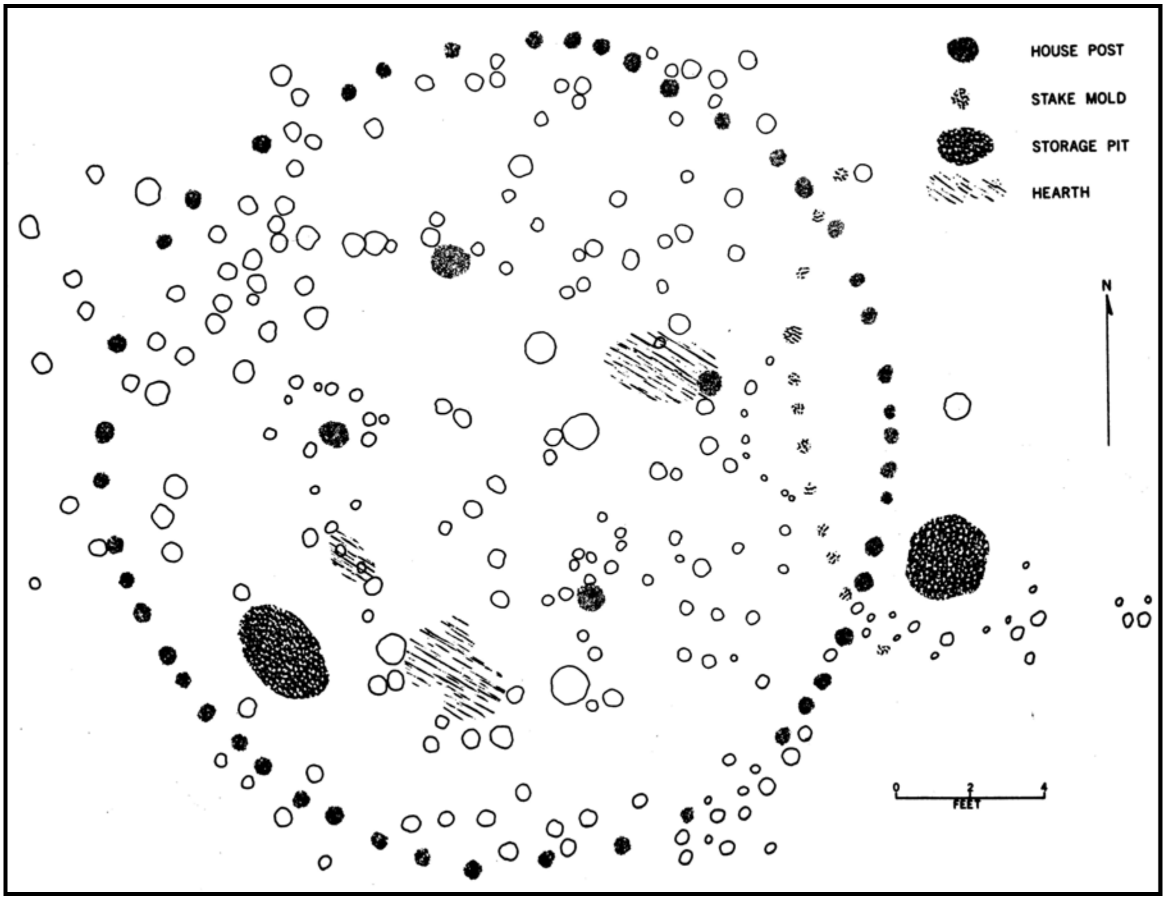

Figure 5.34. Structure from the Stoner site (adapted from Stephens 1974).

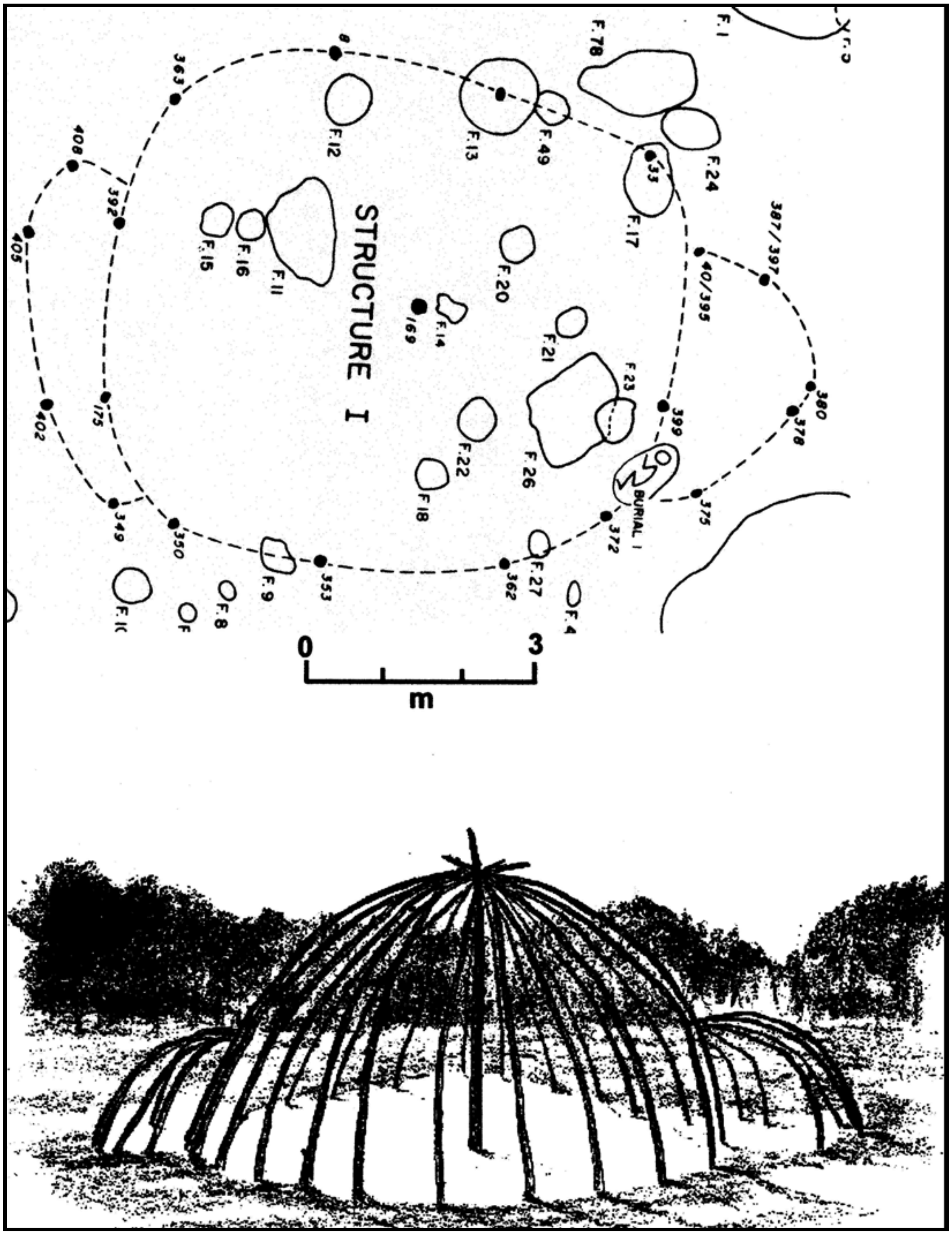

Figure 5.35. Structure 1 at the Banks III site: upper drawing shows postmolds and features; lower drawing shows schematic reconstruction (adapted from Faulkner and McCollough 1974).

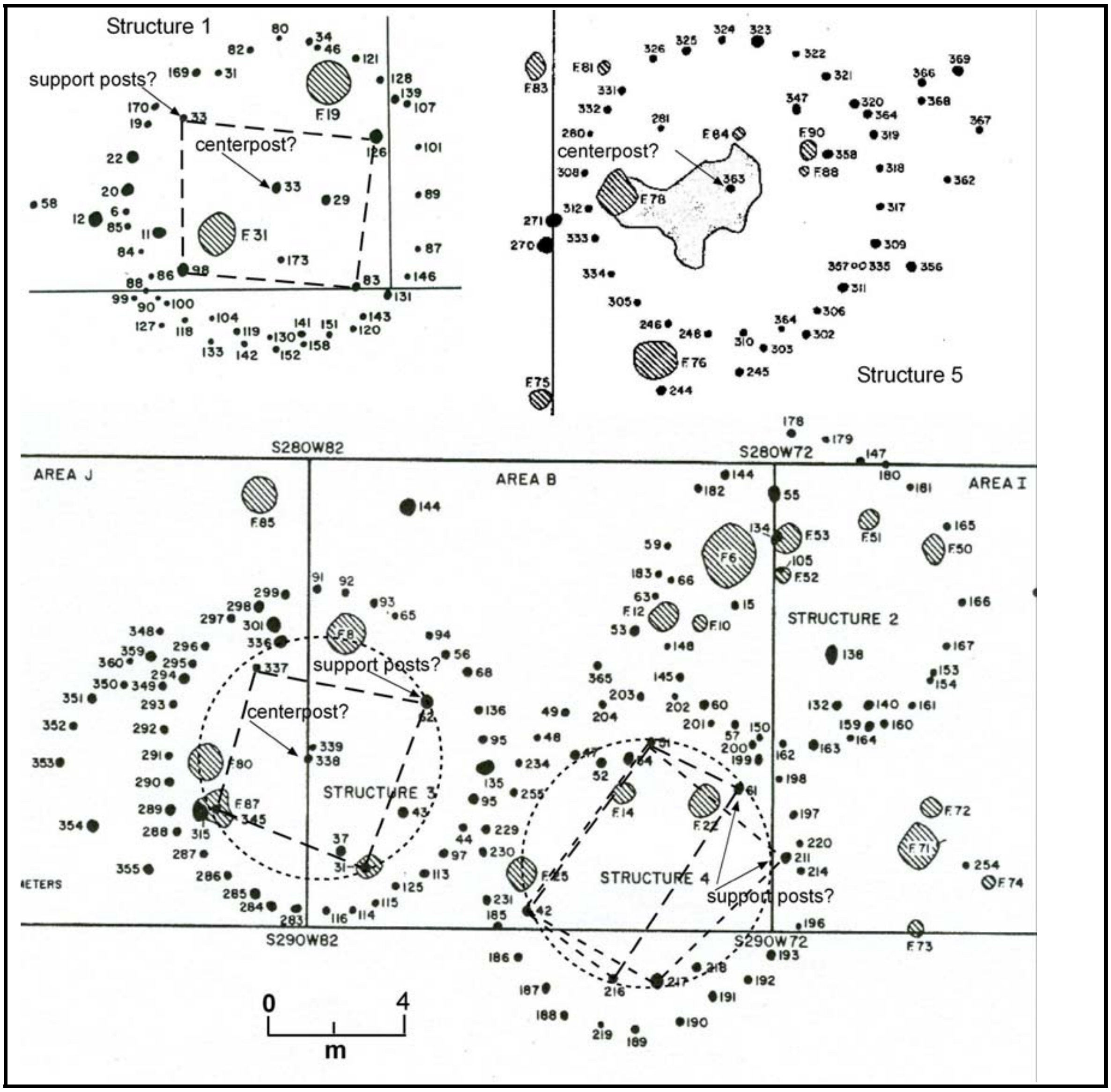

Figure 5.36. Structures 1-5 at the McFarland site (adapted from Kline et al. 1982) with possible centerposts and support posts indicated.

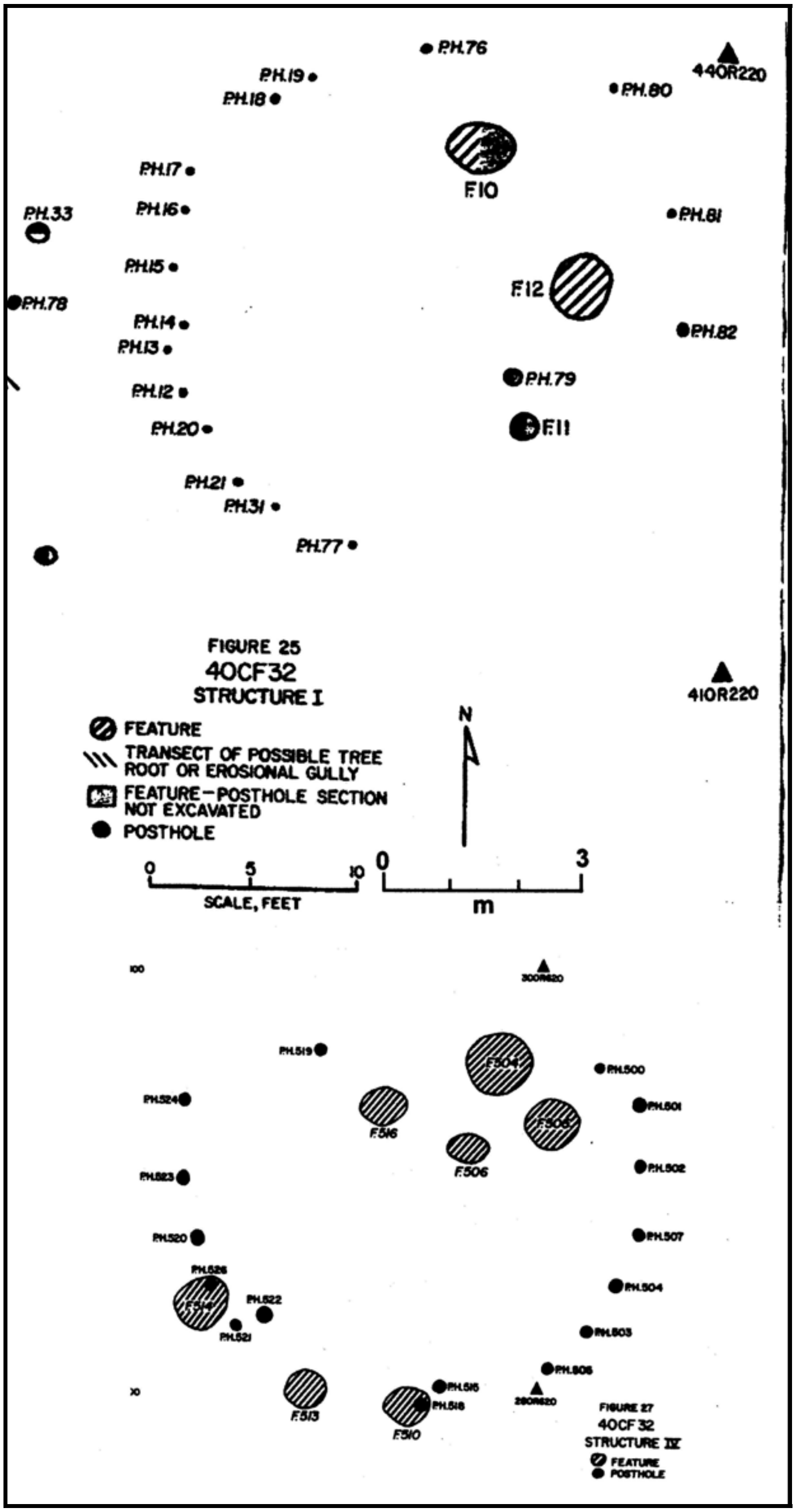

Figure 5.37. Eoff I site Structure I (upper) and Structure IV (lower) (adapted from Faulkner 1982).

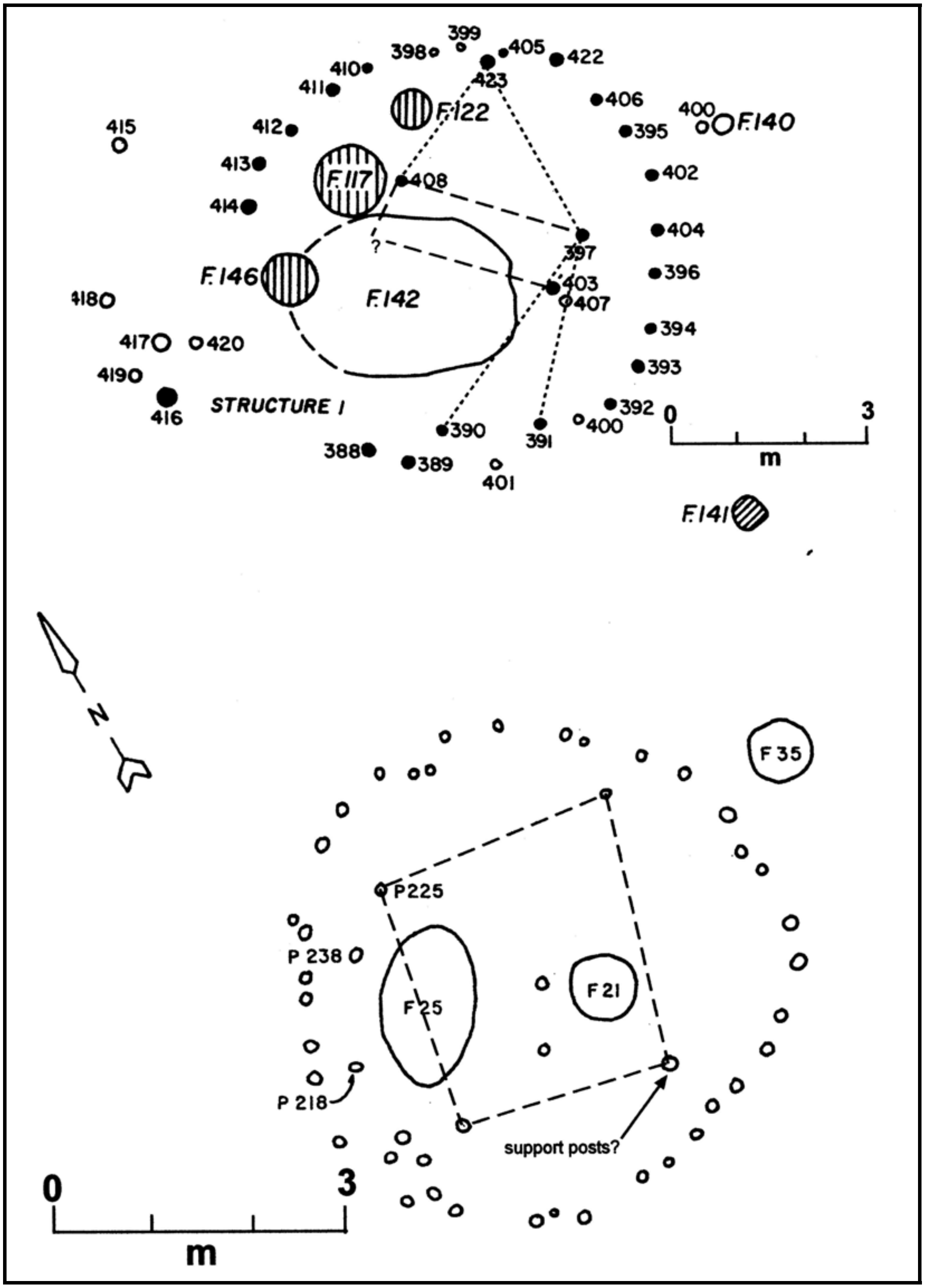

Figure 5.38. Parks site Structure I (adapted from Brown 1982) (upper) with possible support posts indicated; Ewell III site Structure 4 (adapted from DuVall 1982) (lower) with possible support posts indicated.

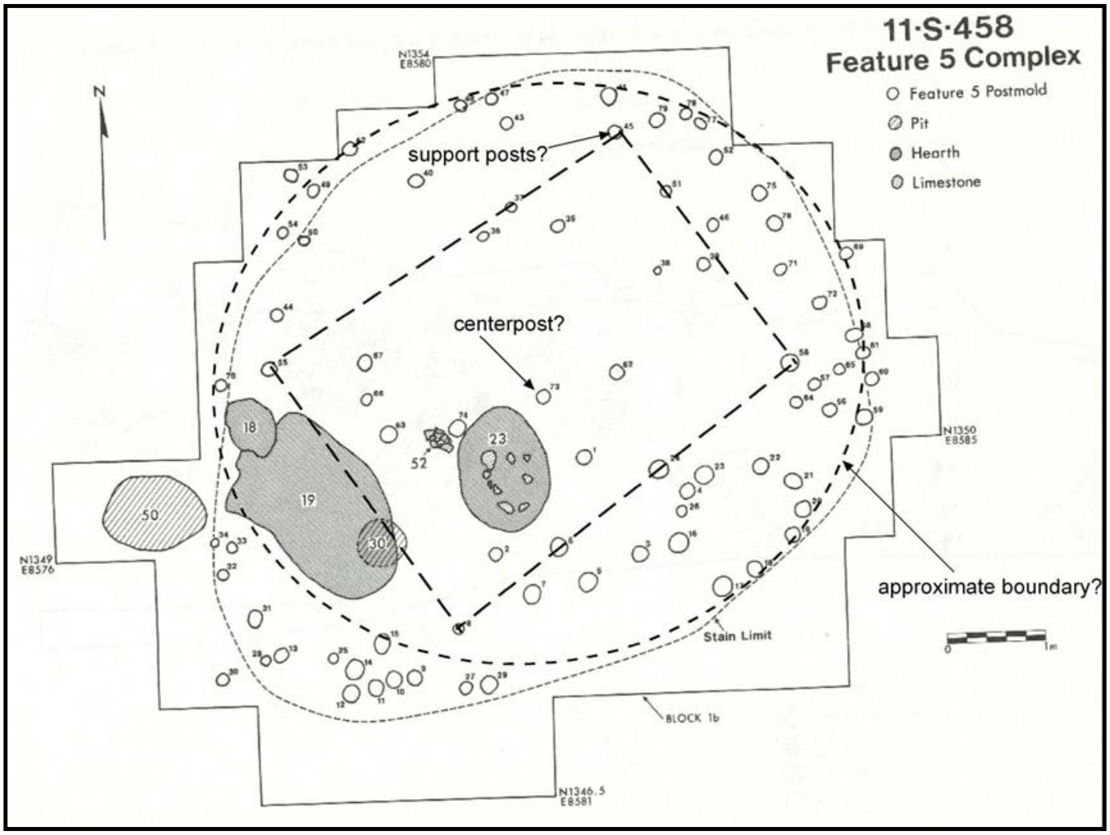

Figure 5.39. Structure from Florence Street site (adapted from Emerson et al. 1983) with possible centerpost and support posts indicated.

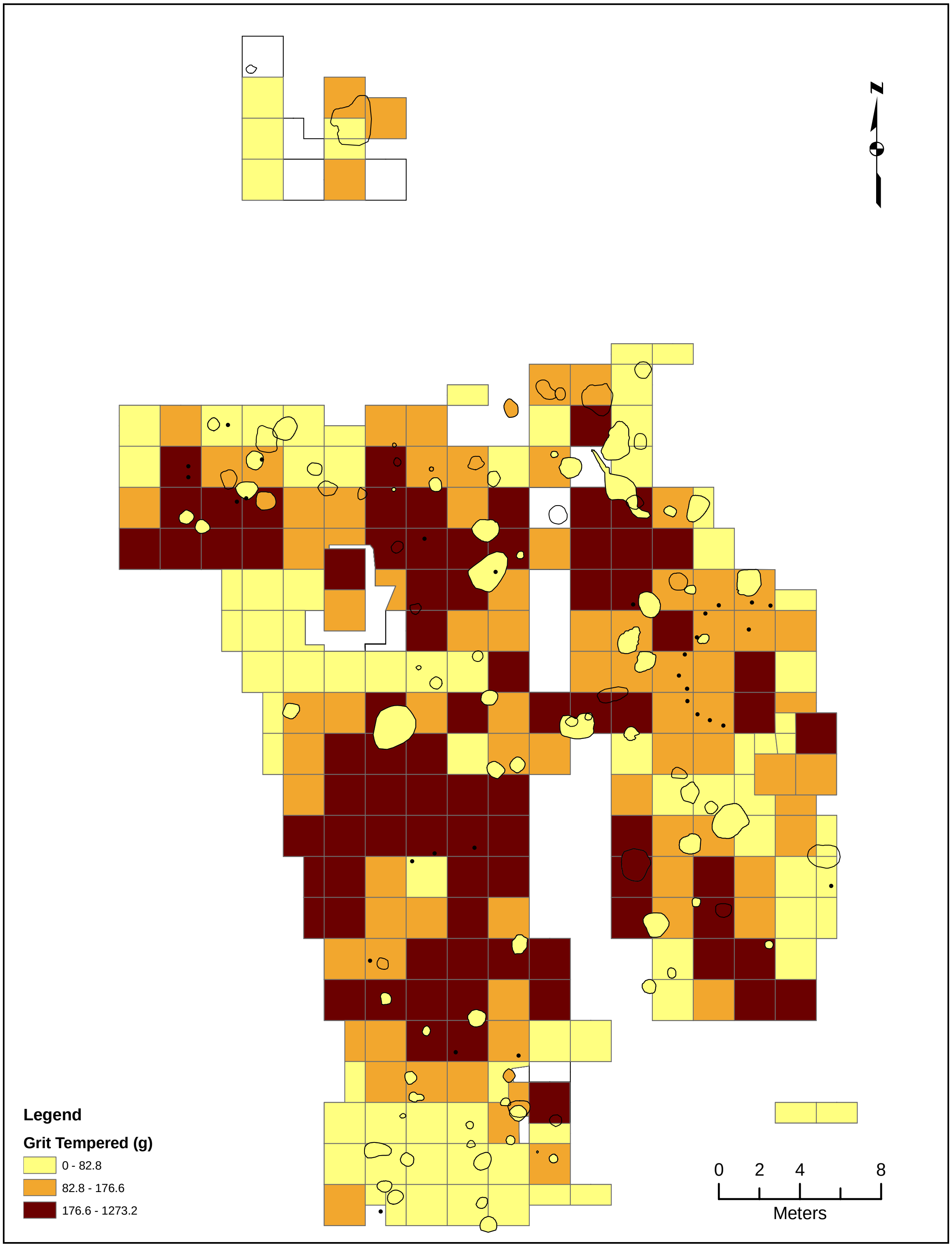

Figure 5.40. Grit tempered pottery in the 200 Block Woodland levels and features.

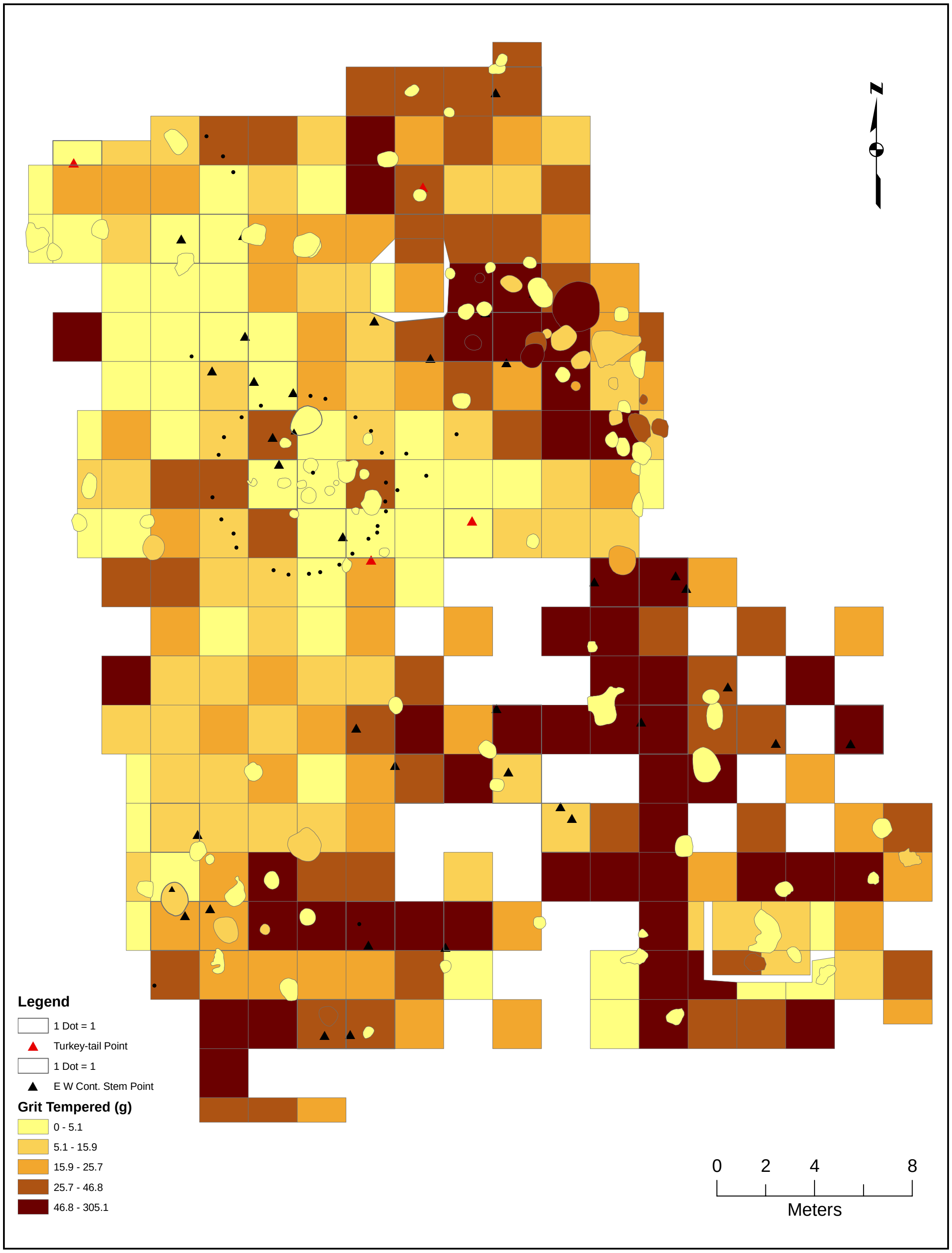

Figure 5.41. Grit tempered pottery, Early Woodland Contracting Stemmed and Turkey-tail points in the 100 Block levels and features.

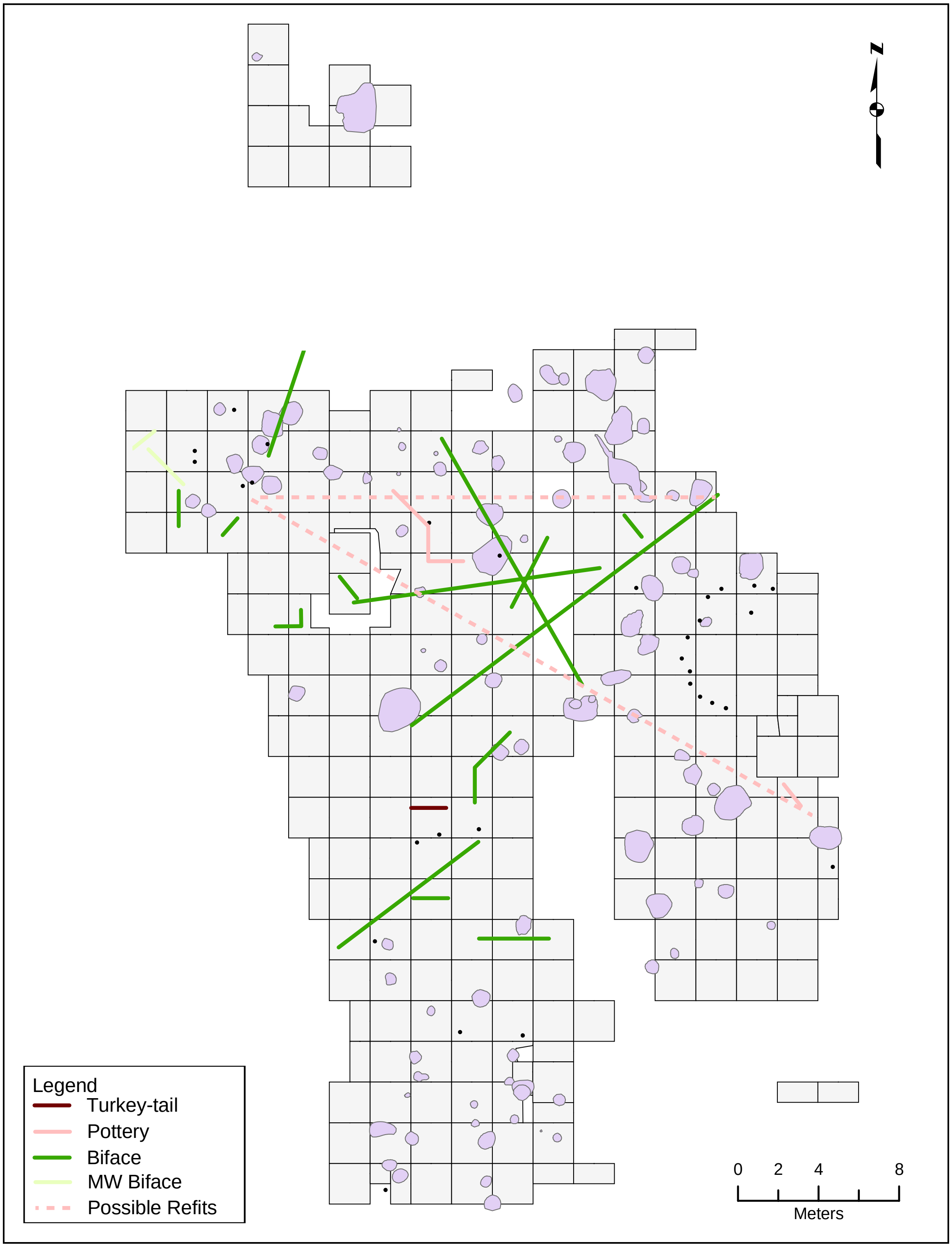

Figure 5.42. Tool and pottery refits in the 200 Block Woodland levels.

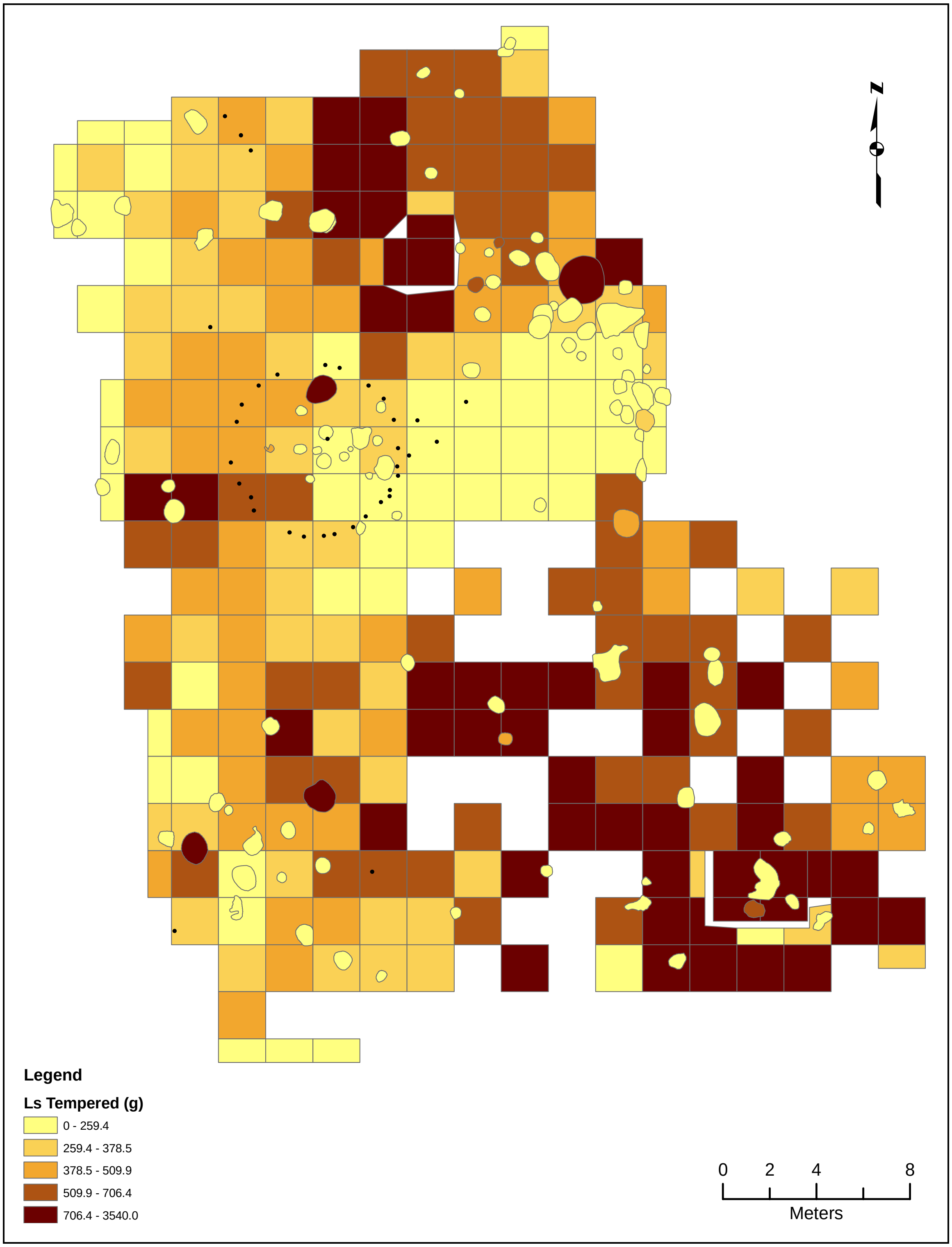

Figure 5.43. Falls Plain pottery in the 100 Block Woodland levels and features.

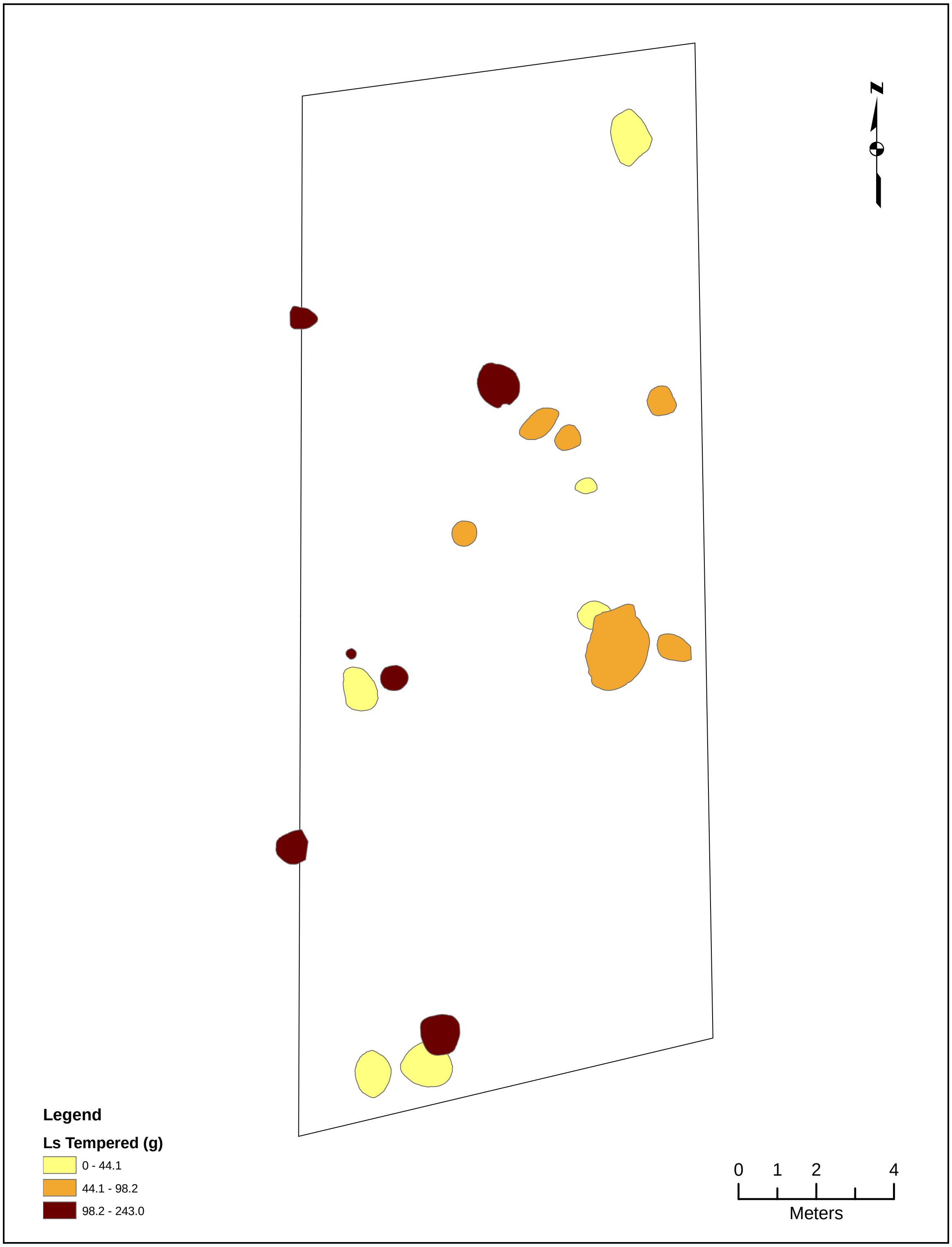

Figure 5.44. Falls Plain pottery in the 148N49W Trench Woodland features.

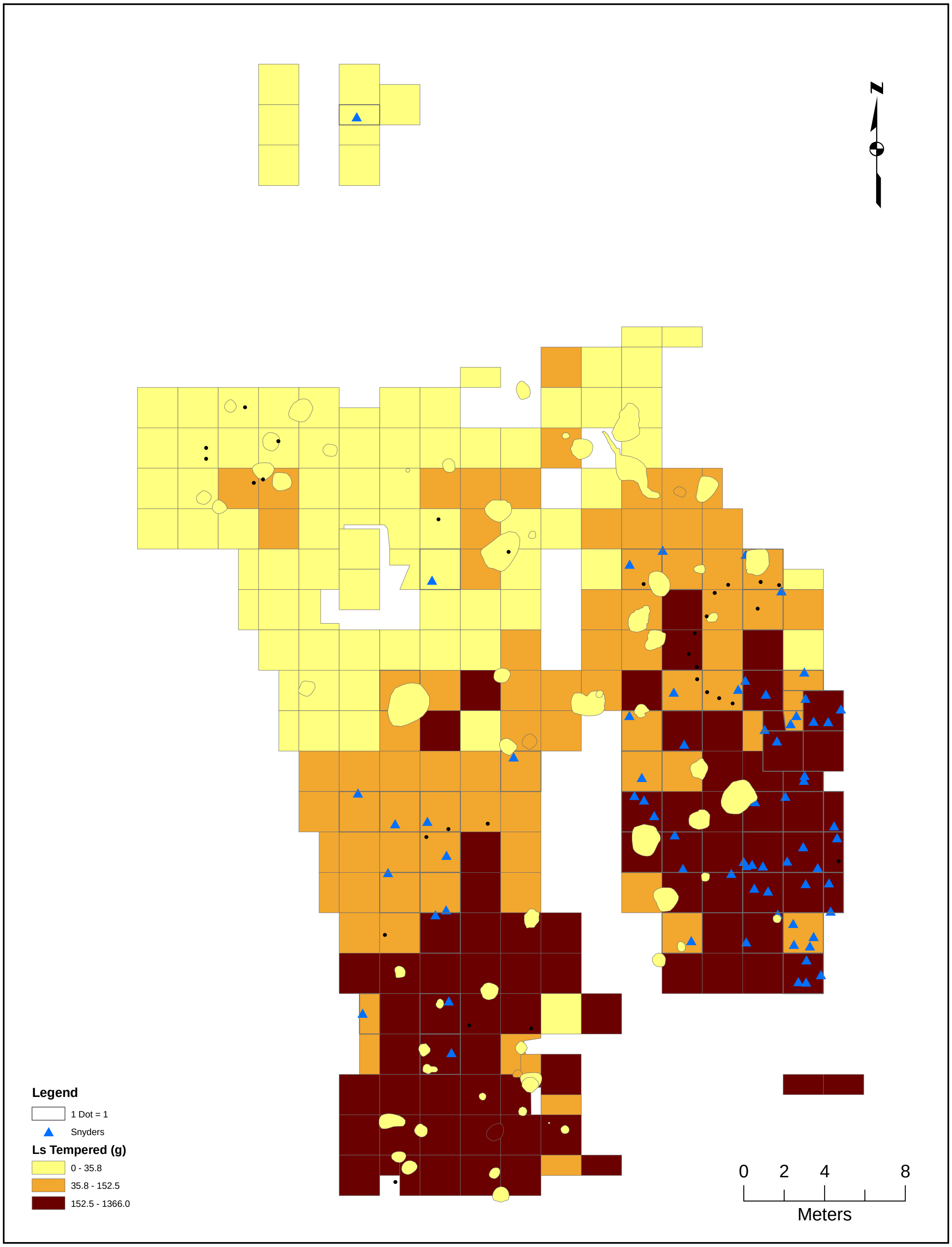

Figure 5.45. Falls Plain pottery and Snyders points in the 200 Block Woodland levels and features.

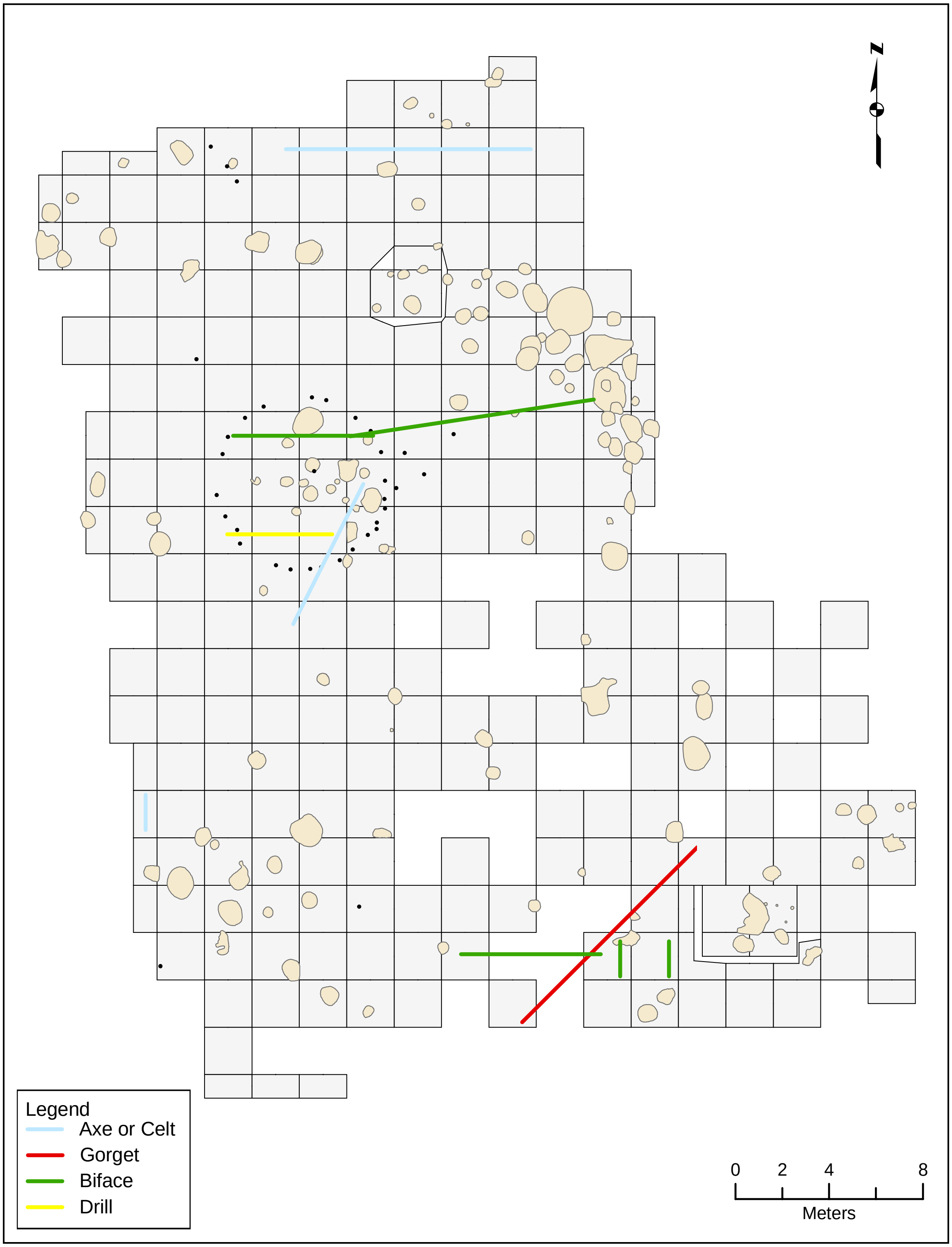

Figure 5.46. Tool refits in the 100 Block Woodland levels.

Chapter 6

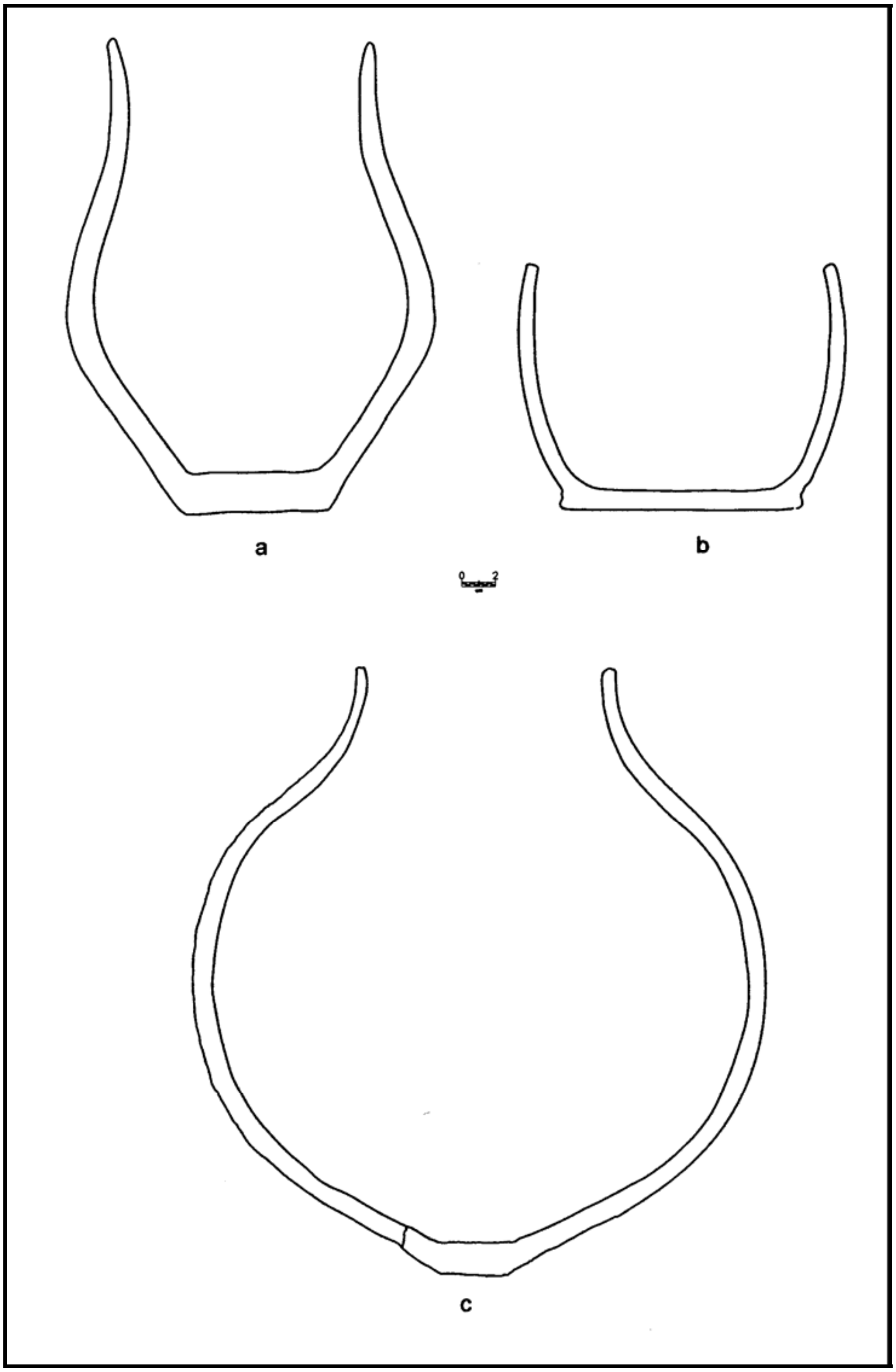

Figure 6.1. Reconstructed Early Woodland vessel forms from the Falls of the Ohio area: (a) 12CL109; (b) 15BC164; (c) 12CL109.

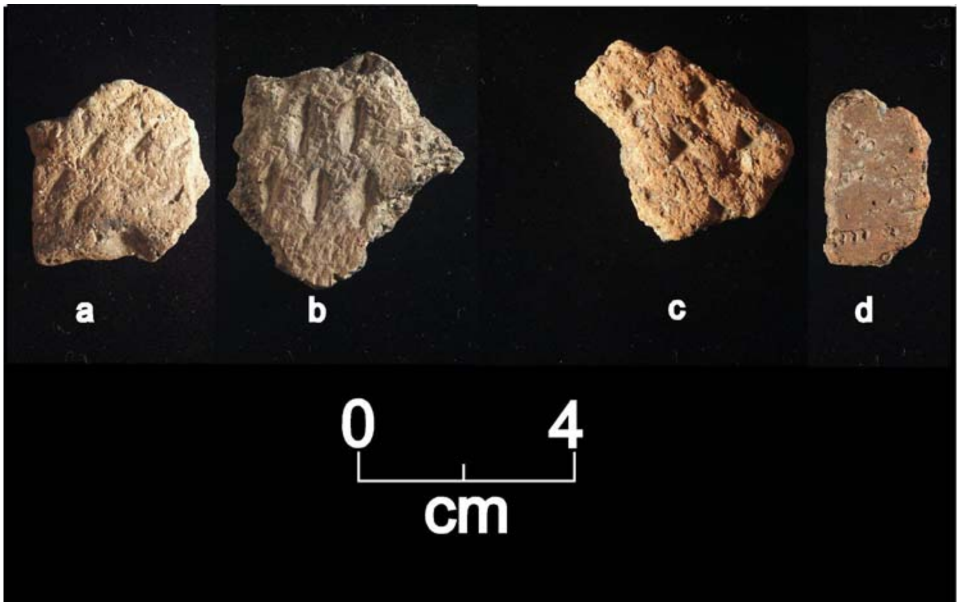

Figure 6.2. Zorn Punctate sherds: (a) fingernail impressed; (b) gouged; (c) triangular punctate; (d) annular punctate.

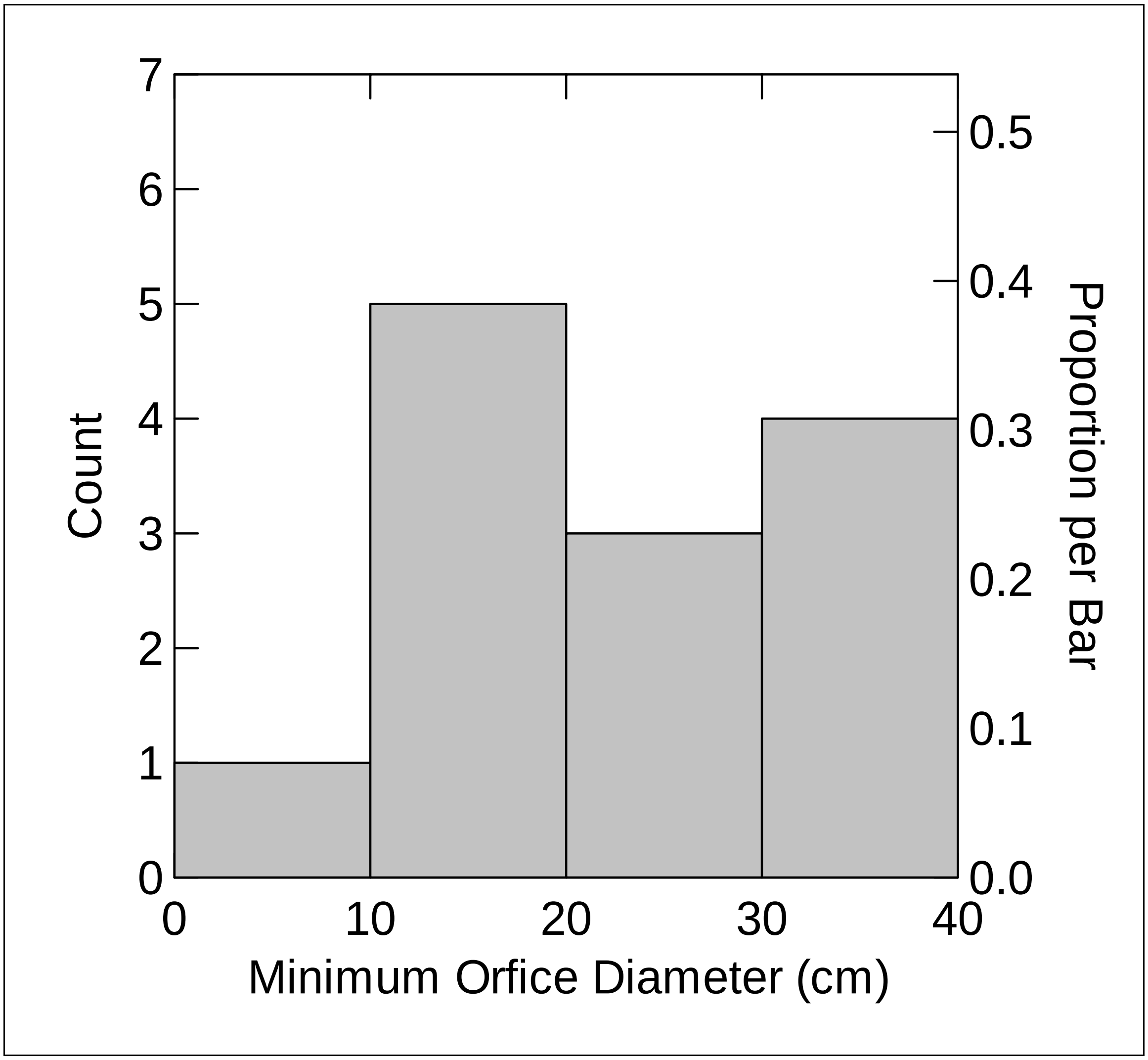

Figure 6.3. Minimum orifice diameters of grit tempered rims.

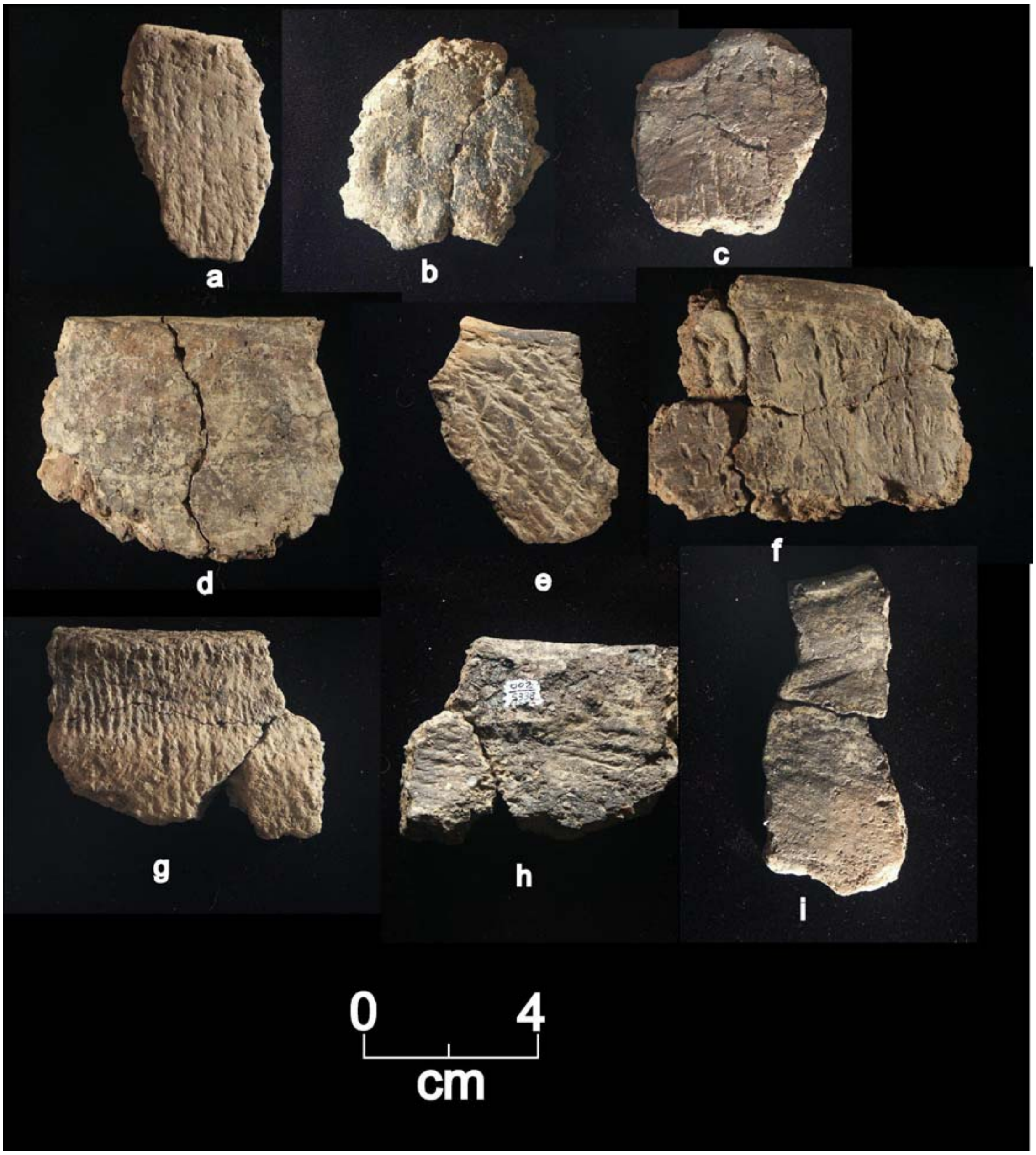

Figure 6.4. Grit tempered rims: (a) Group 1 vertical cordmarks; (b) Group 1 gouged; (c) Group 1 partially smoothed cordmarks; (d) Group 2 plain; (e) Group 3 diagonal cordmarks; (f) Group 4 thick, deep cordmarks; (g) Group 7 vertical exterior cordmarks; (h) Group

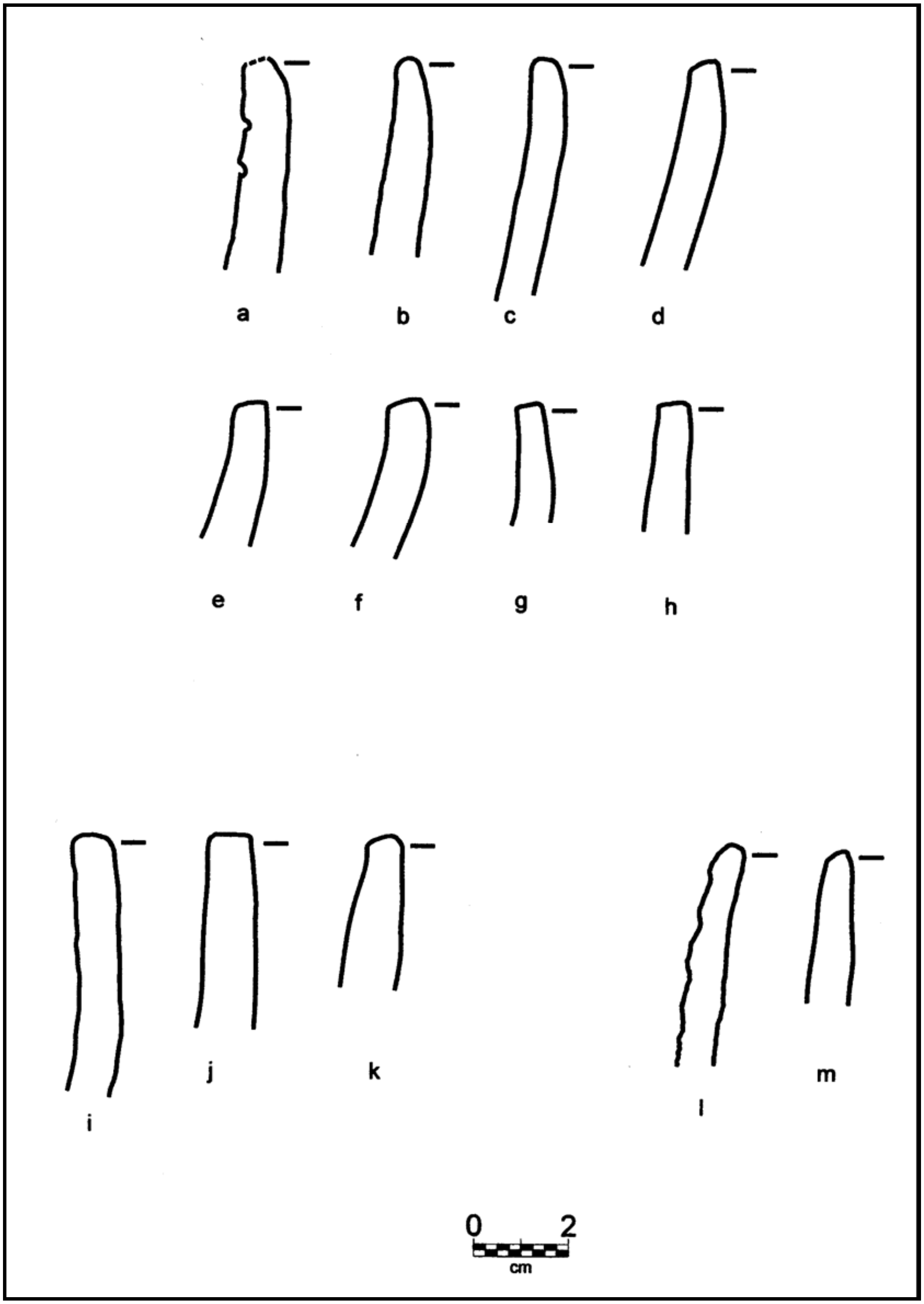

Figure 6.5. Grit tempered Rim Groups 1-3 profiles: (a-h) Group 1; (i-k) Group 2; (l-m) Group 3.

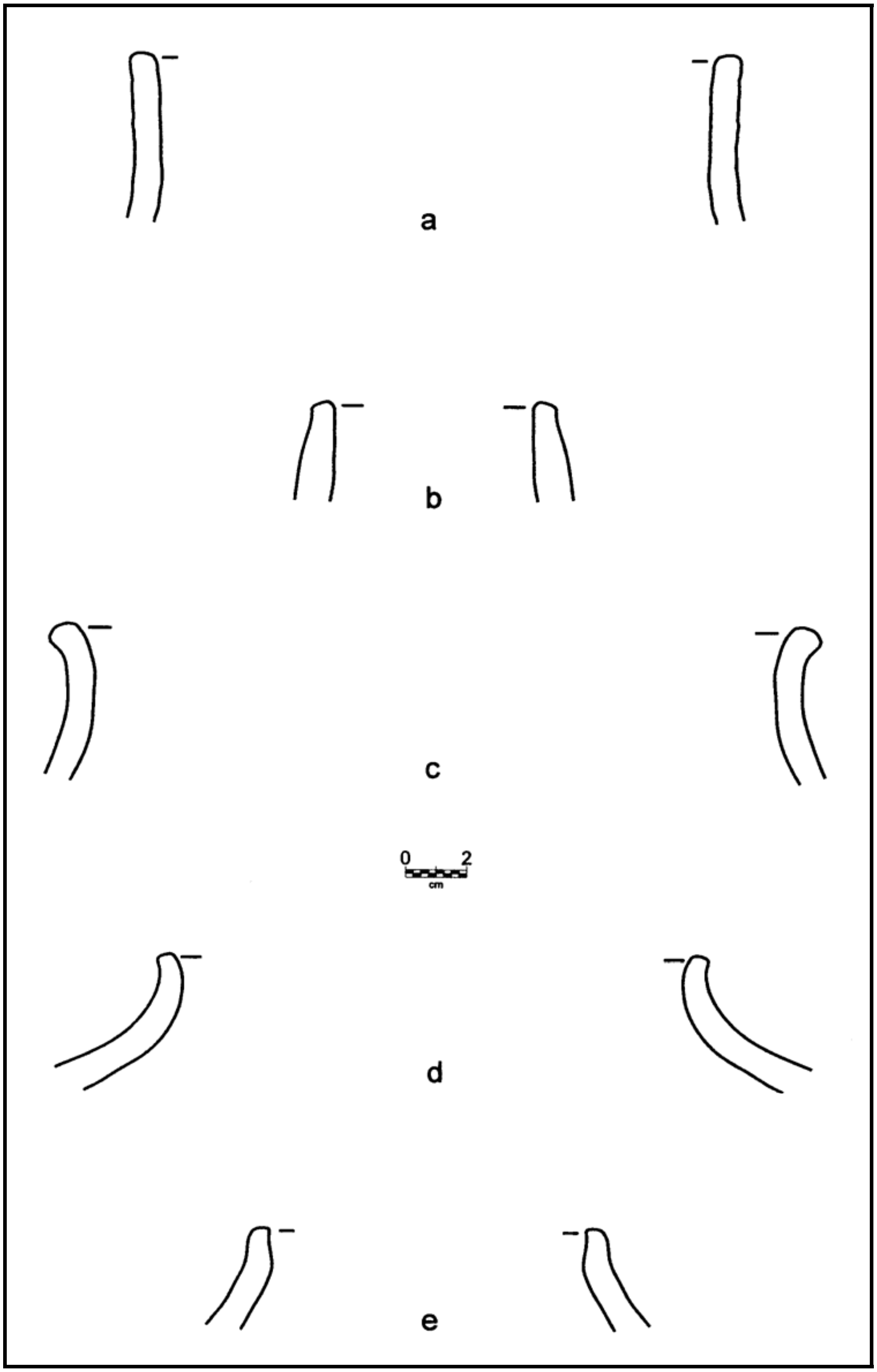

Figure 6.6. Grit tempered Rim Groups 2, 4, and 5 mirrored profiles: (a) Group 2i; (b) Group 2k; (c) Group 4a; (d) Group 5f; (e) Group 5g.

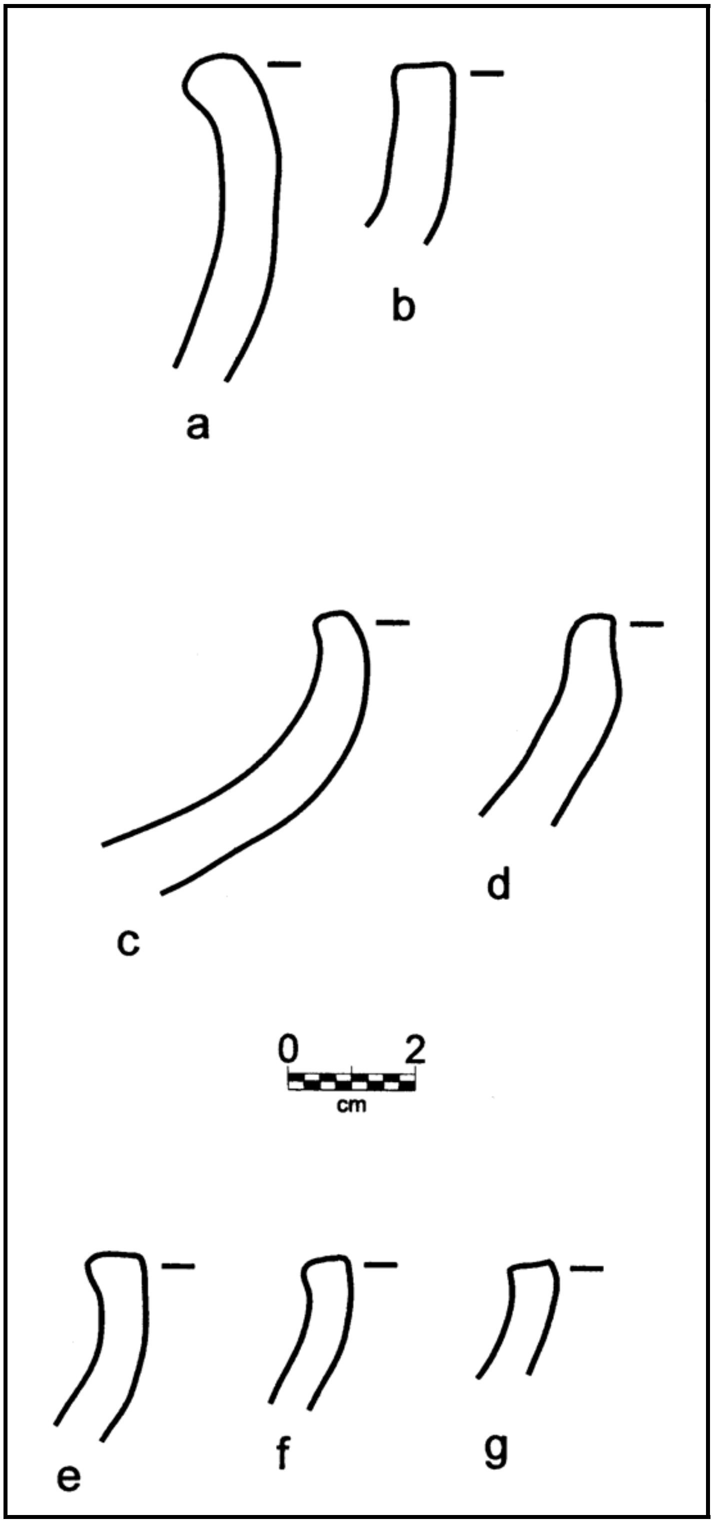

Figure 6.7. Grit tempered Rim Groups 4-6 profiles: (a-e) Group 4; (f-g) Group 5; (h-j) Group 6.

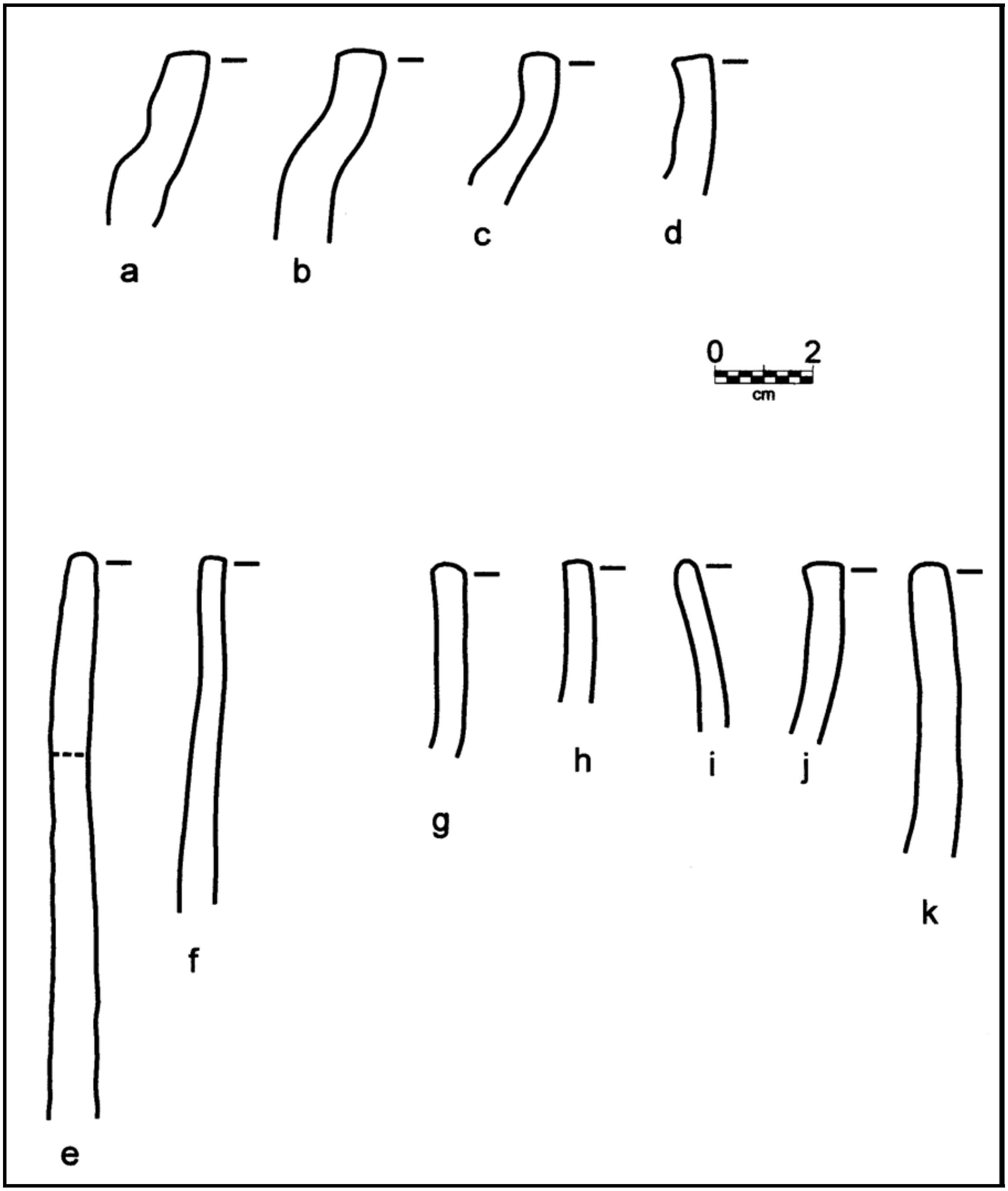

Figure 6.8. Grit tempered Rim Groups 7-9 profiles: (a-d) Group 7; (e-f) Group 8; (g-k) Group 9.

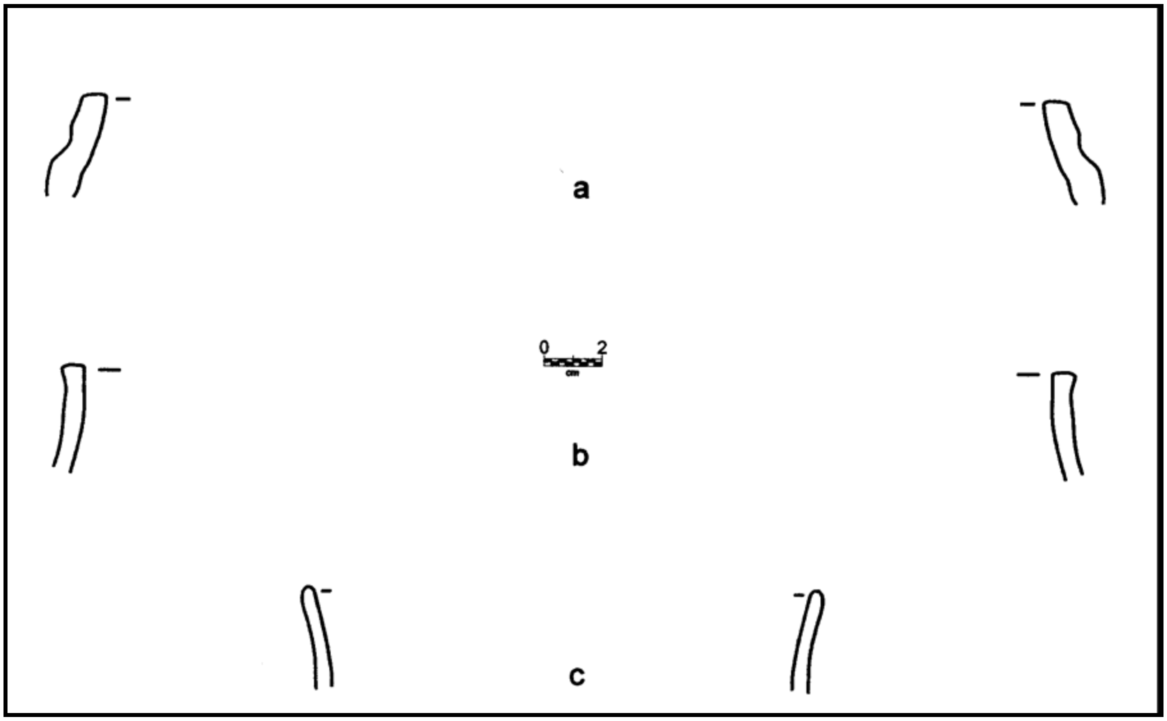

Figure 6.9. Grit tempered Rim Groups 7 and 9 mirrored profiles: (a) Group 7a; (b) Group 9j; (c) Group 9i.

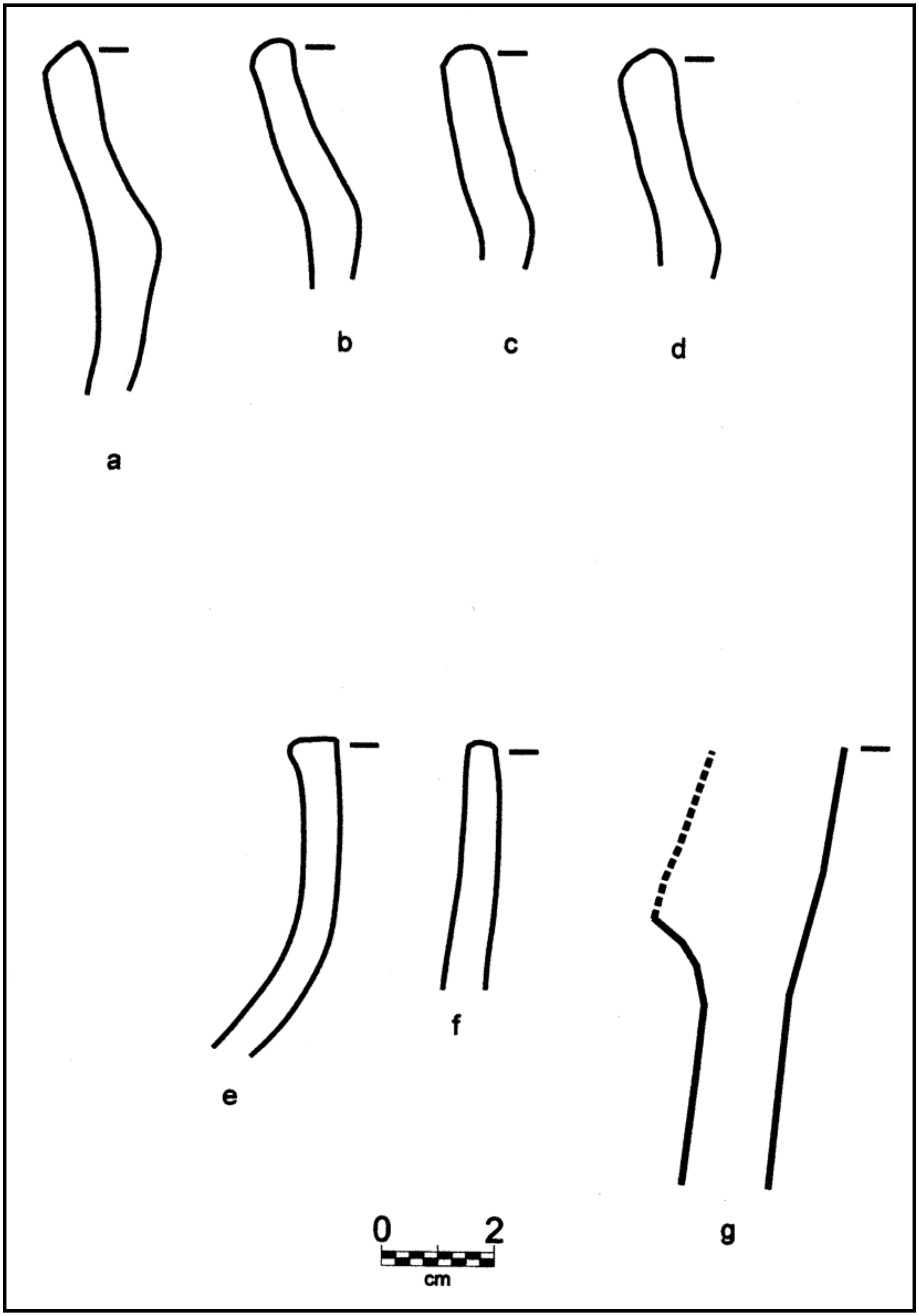

Figure 6.10. Grit tempered Rim Groups 10 and 11 and upper body sherd with lug profiles: (a-d) Group 10; (e-f) Group 11; (g) upper body sherd with lug.

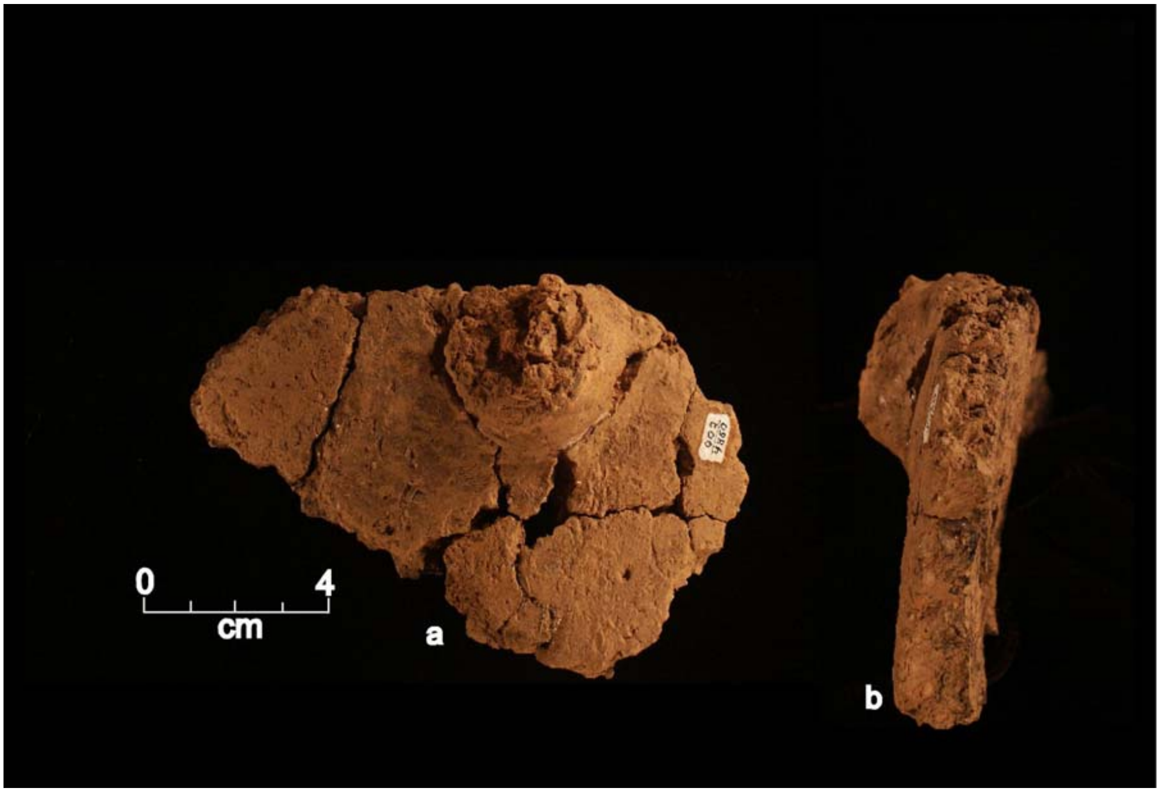

Figure 6.11. Grit tempered upper body fragment with lug (a) exterior view; (b) profile.

Figure 6.12. Grit tempered Base Group 1 vessel: (a) exterior cord wrapped paddle impressions; (b) profile.

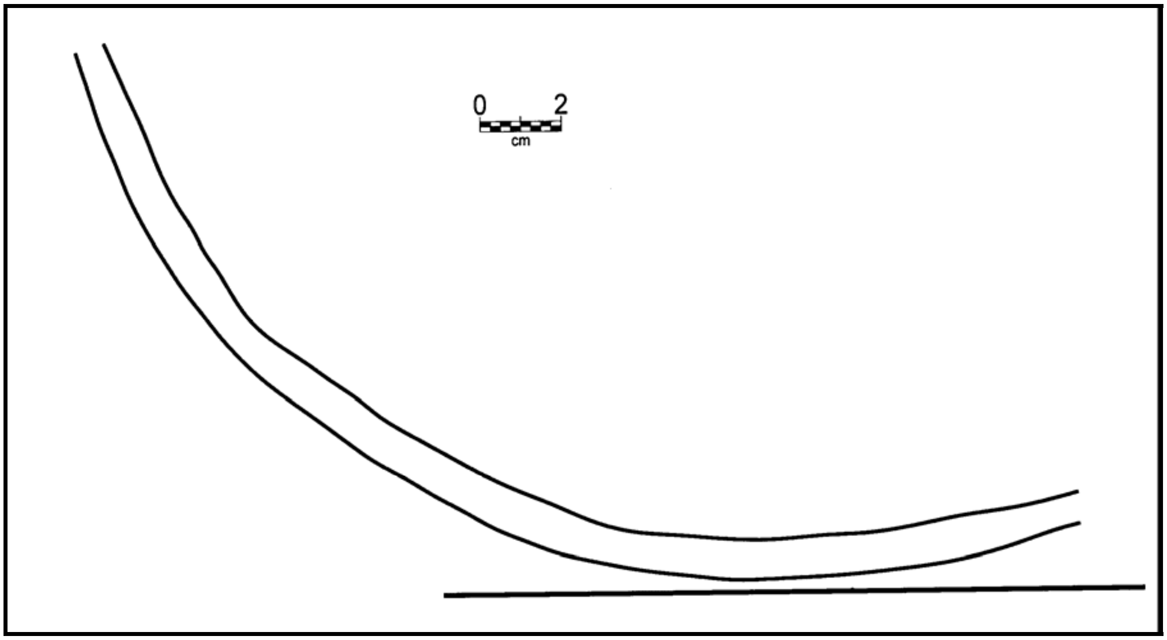

Figure 6.13. Grit tempered Base Group 1 profile.

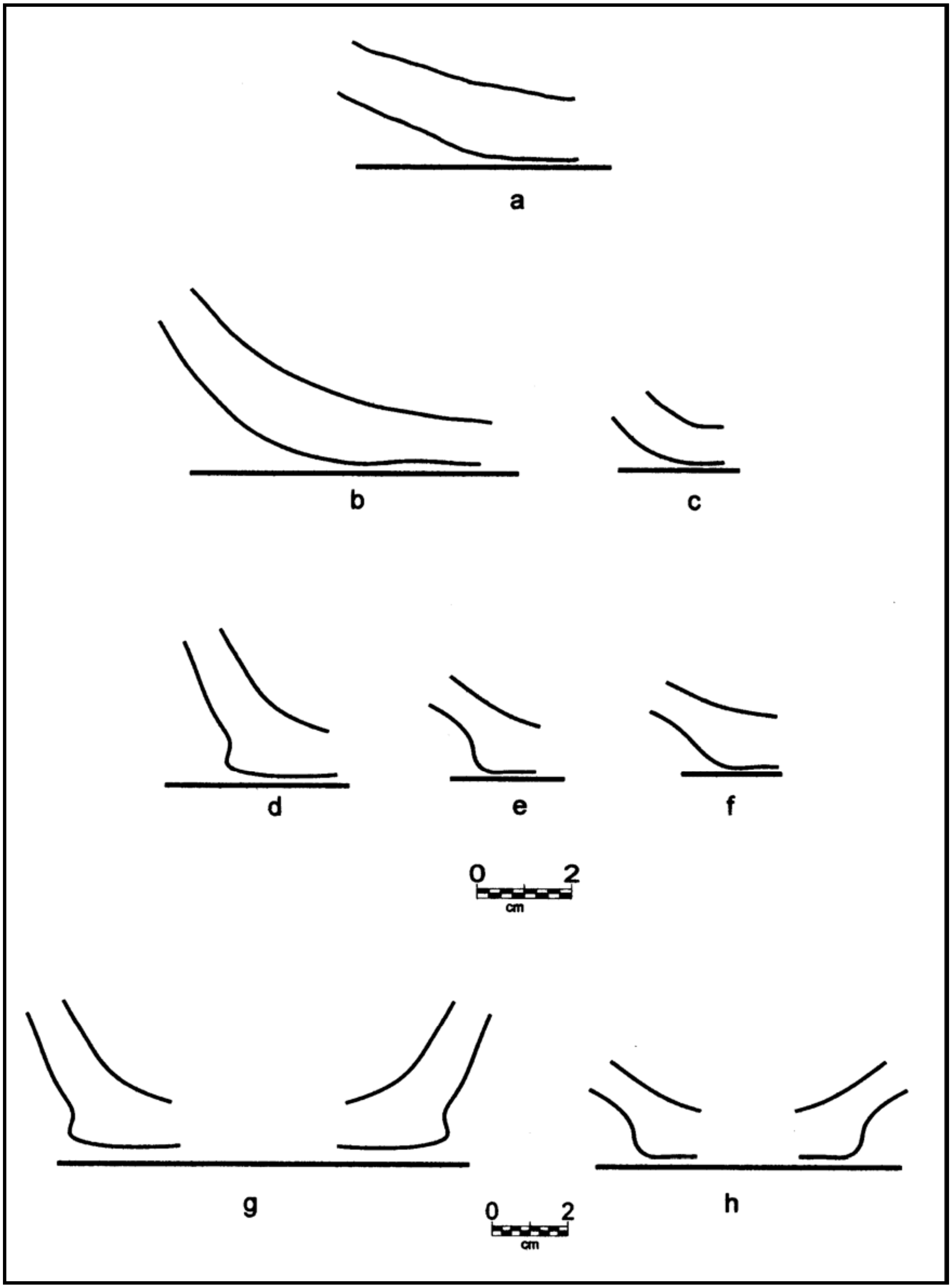

Figure 6.14. Grit tempered Base Groups 2-4 profiles and Group 4 mirrored profiles: (a) Group 2; (b-c) Group 3; (d-f) Group 4; (g) mirrored Group 4d; (h) mirrored Group 4 e.

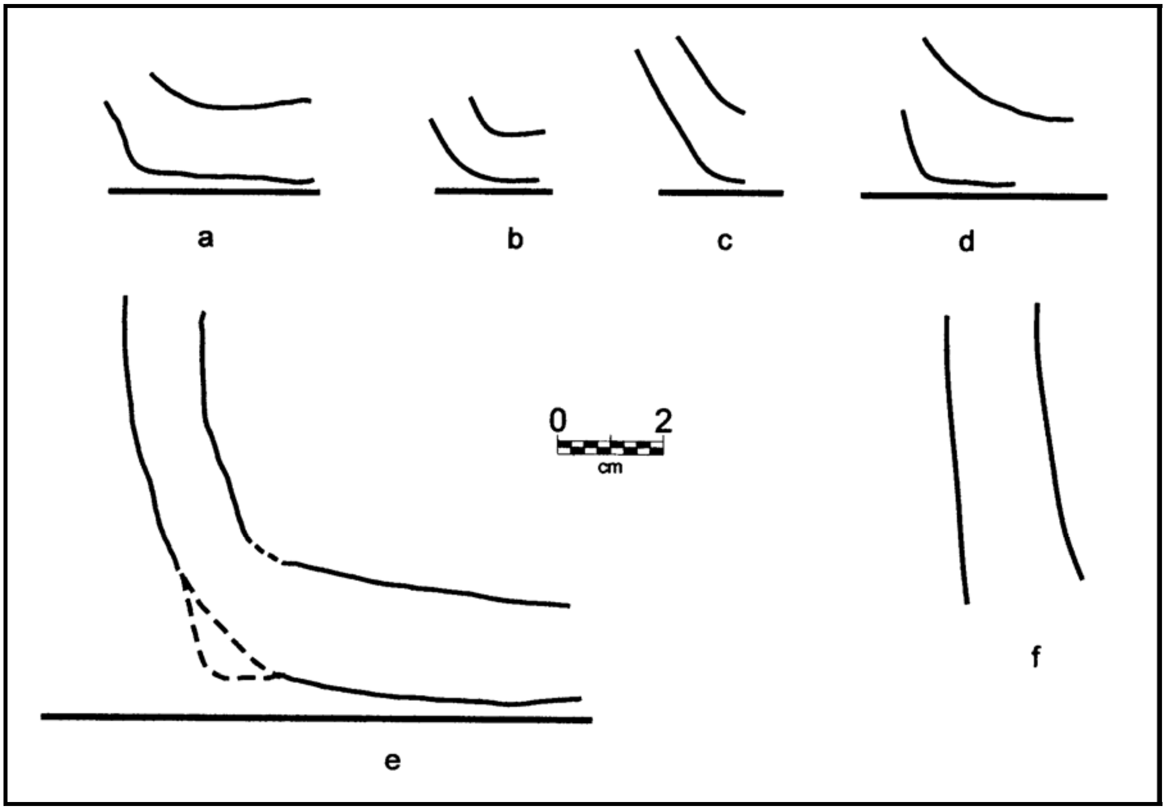

Figure 6.15. Grit tempered Base Group 5 profiles and lower body fragment: (a-f) Group 5; (f) steep-sided lower body fragment.

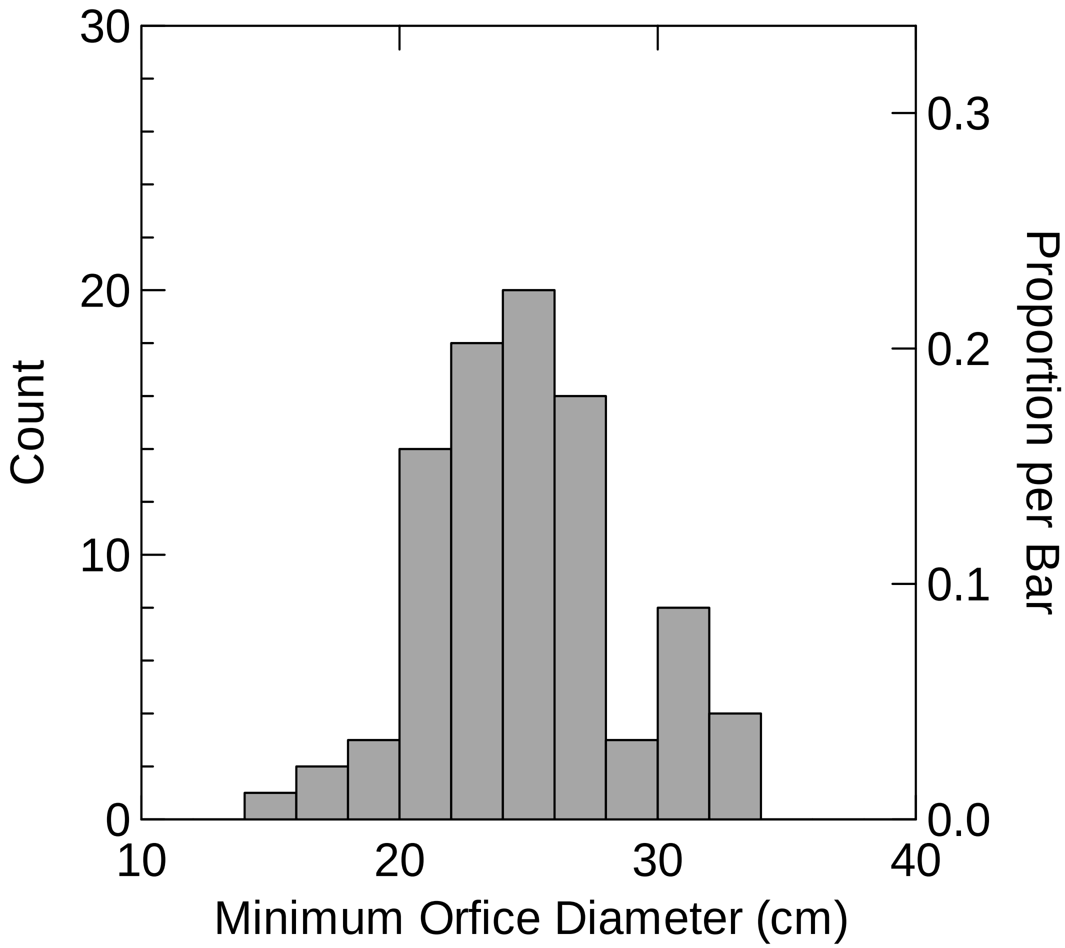

Figure 6.16. Minimum orifice diameters of Falls Plain rims.

Figure 6.17. Falls Plain Rim Group 1 Vessel B--Rim Group 1a.

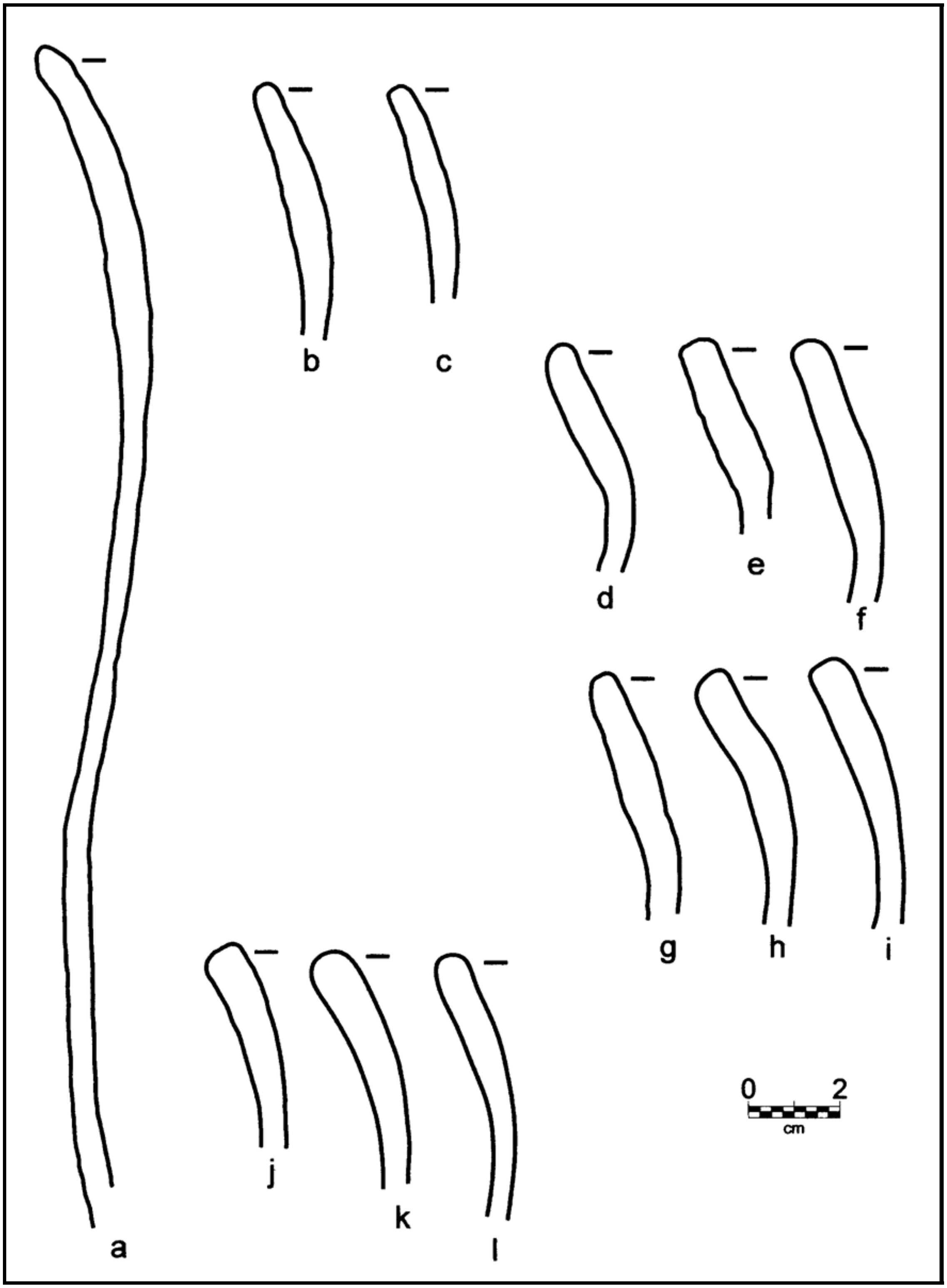

Figure 6.18. Falls Plain Rim Group 1 profiles.

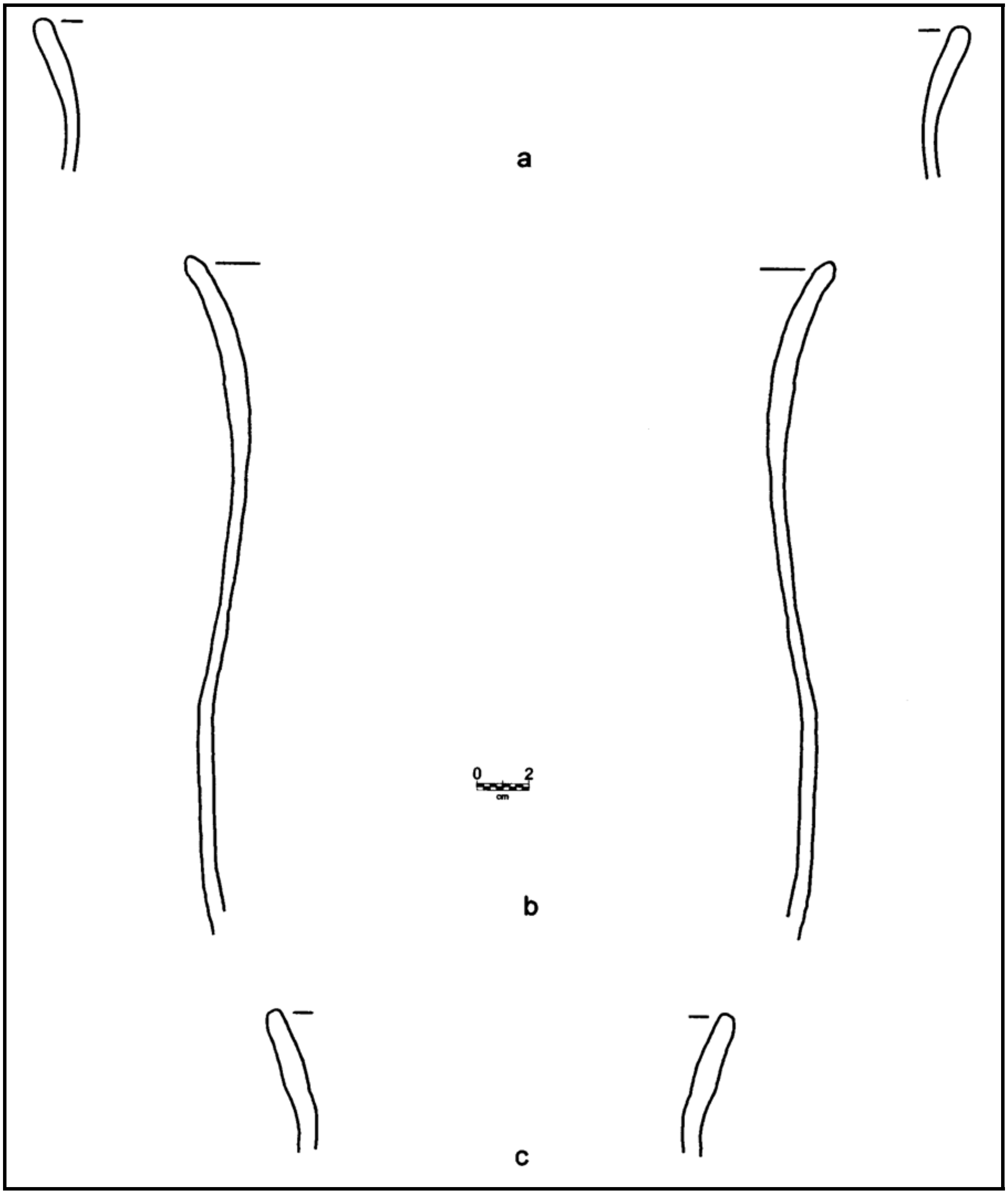

Figure 6.19. Falls Plain Rim Group 1 mirrored profiles: (a) Group 1l; (b) Group 1a; (c) Group 1g.

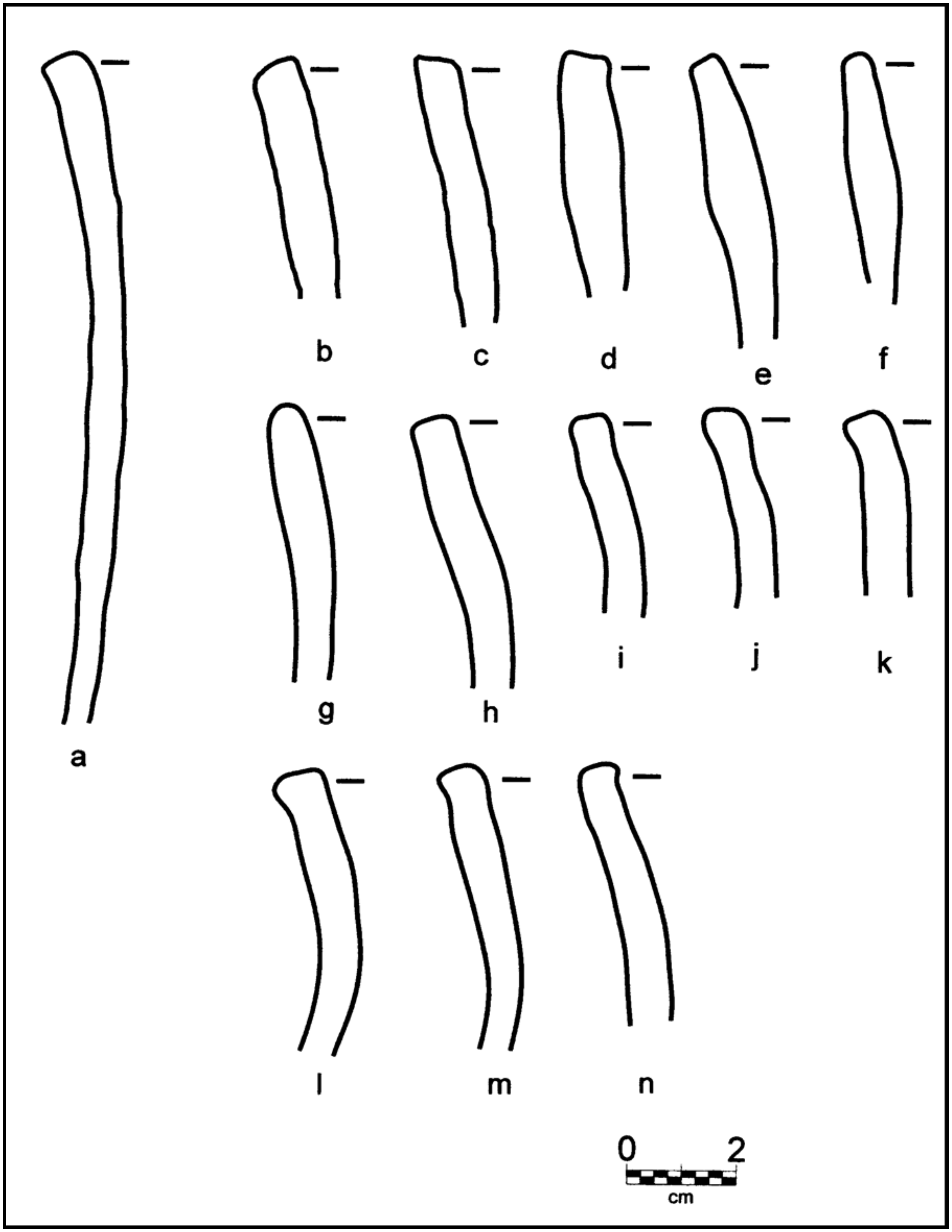

Figure 6.20. Falls Plain Rim Group 2 profiles.

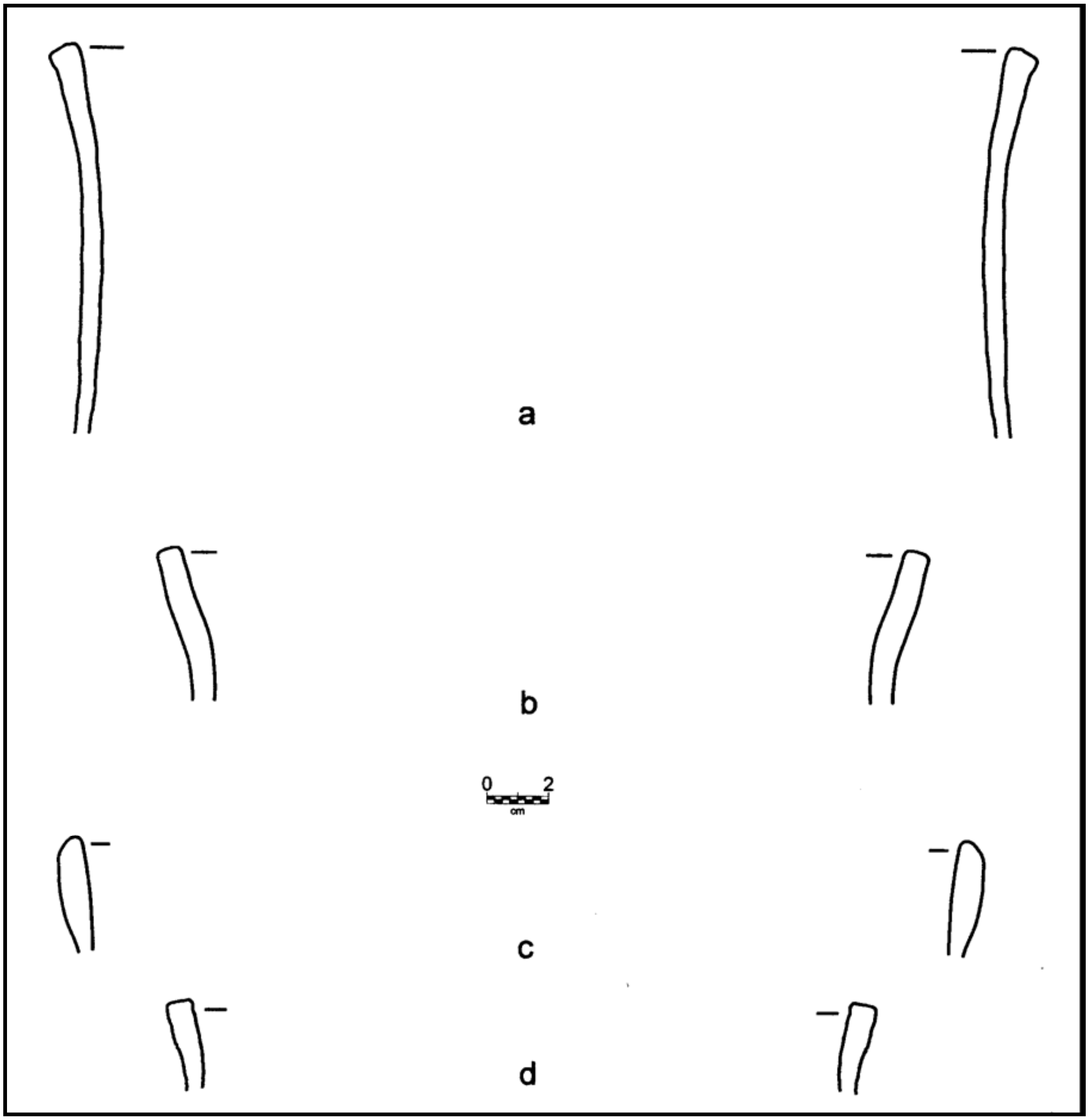

Figure 6.21. Falls Plain Rim Groups 2 and 3 mirrored profiles: (a) Group 2a; (b) Group 2 h; (c) Group 3g: (d) Group 3c.

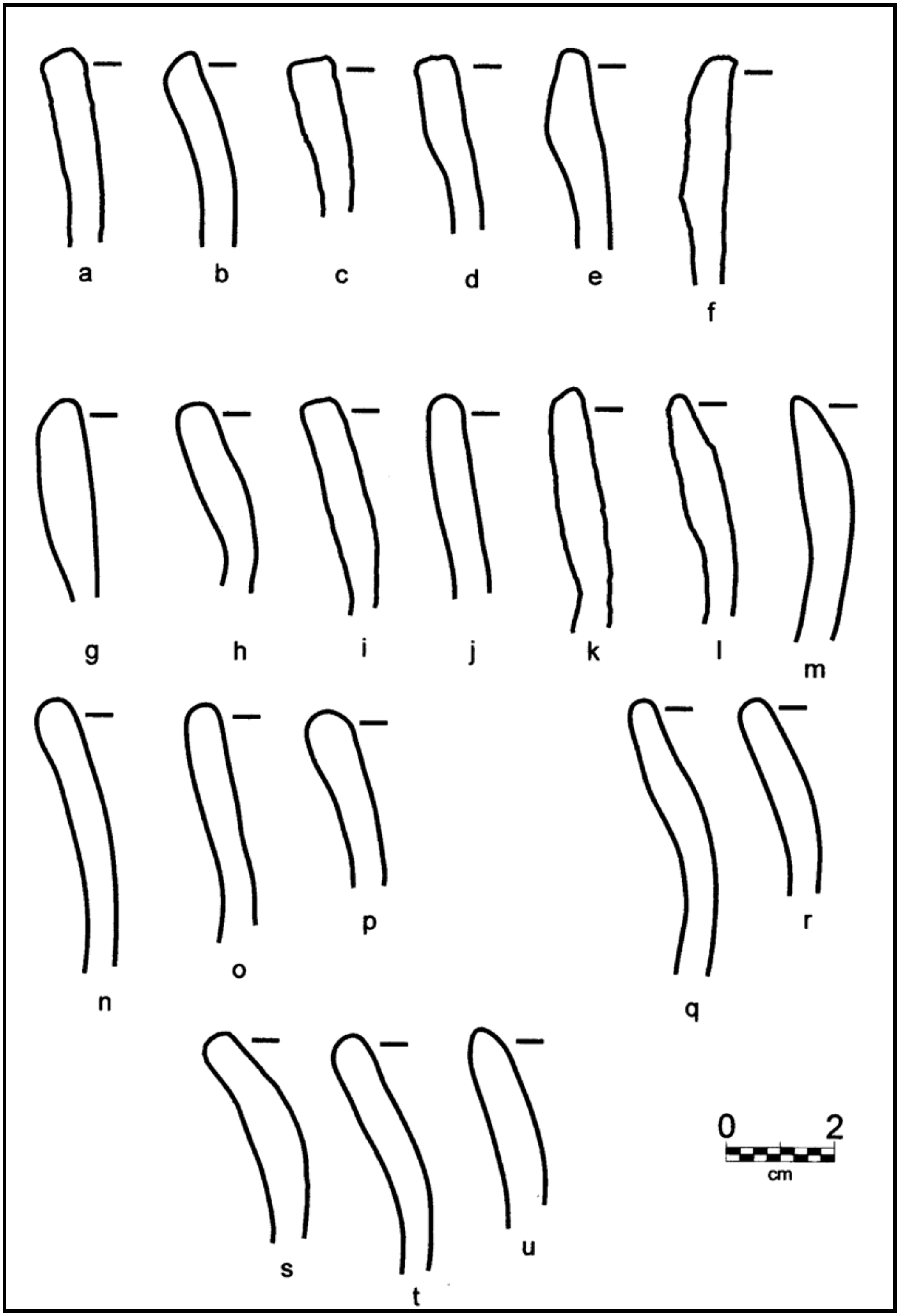

Figure 6.22. Falls Plain Rim Group 3 profiles.

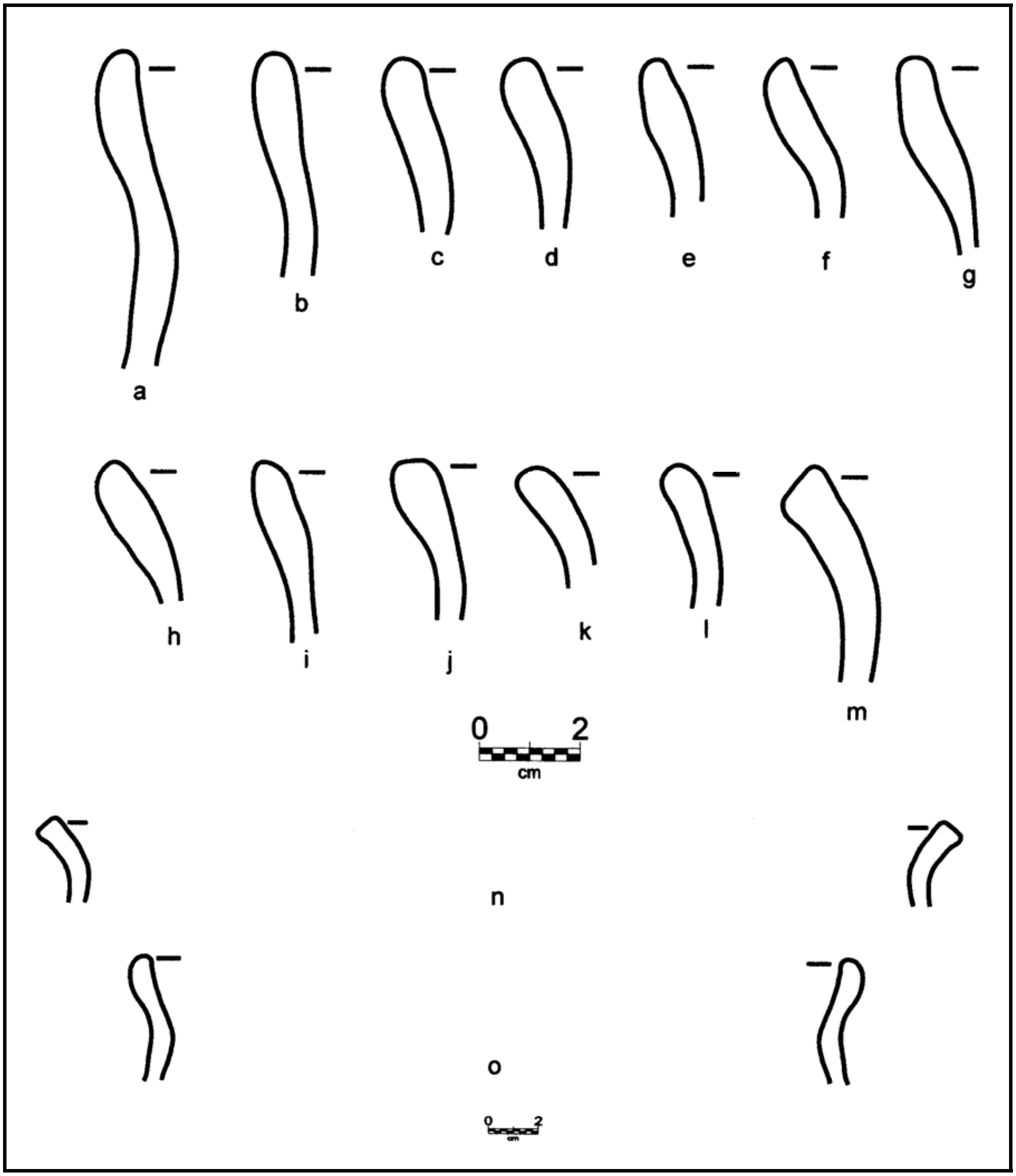

Figure 6.23. Falls Plain Rim Group 4 profiles and mirrored profiles: (n) Group 4m; (o) Group 4a.

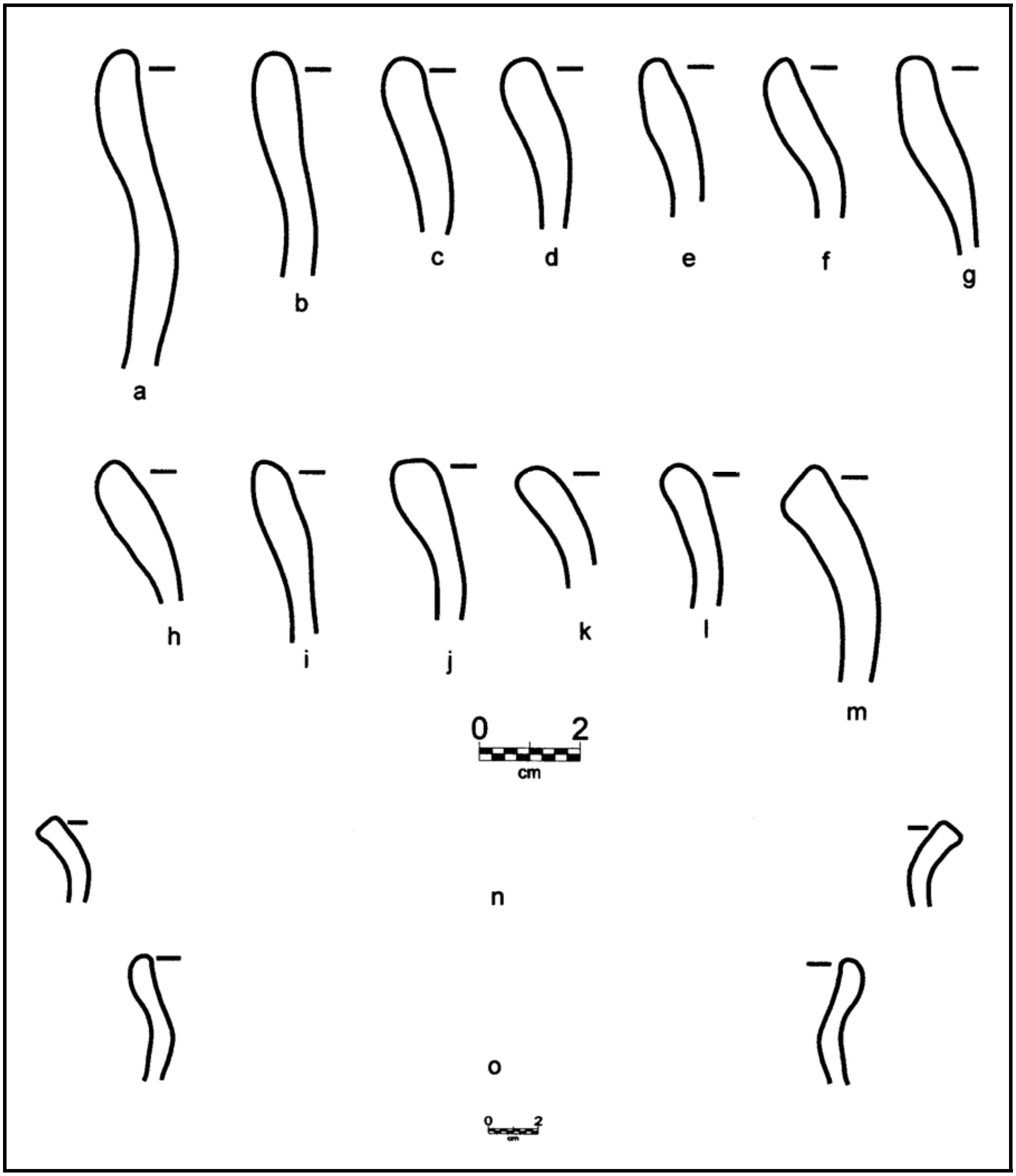

Figure 6.24. Falls Plain Rim Group 4 profiles and mirrored profiles: (n) Group 4m; (o) Group 4a.

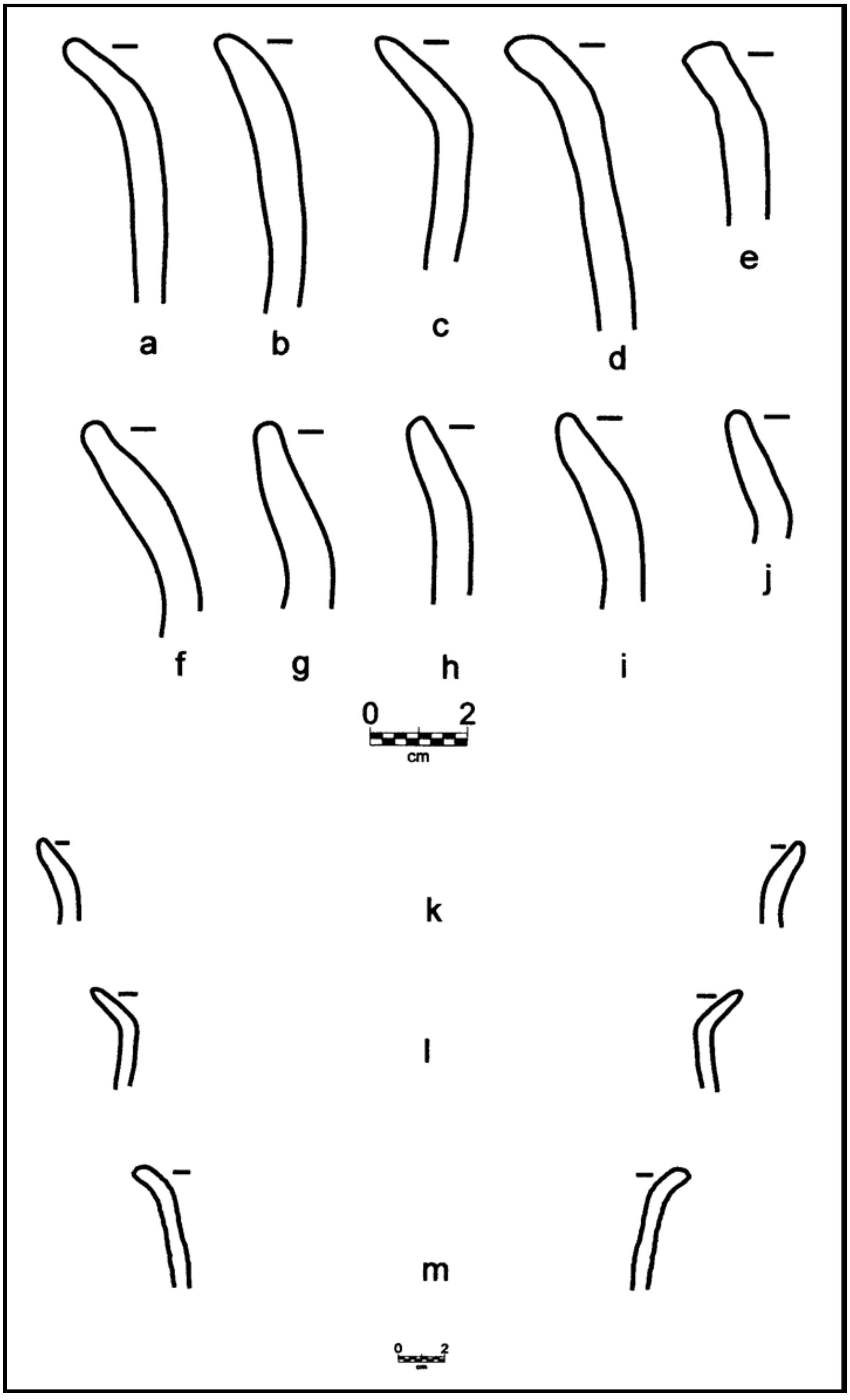

Figure 6.25. Falls Plain Rim Group 5 profiles and mirrored profiles: (k) Group 5h: (l) Group 5d; (m) Group 5c.

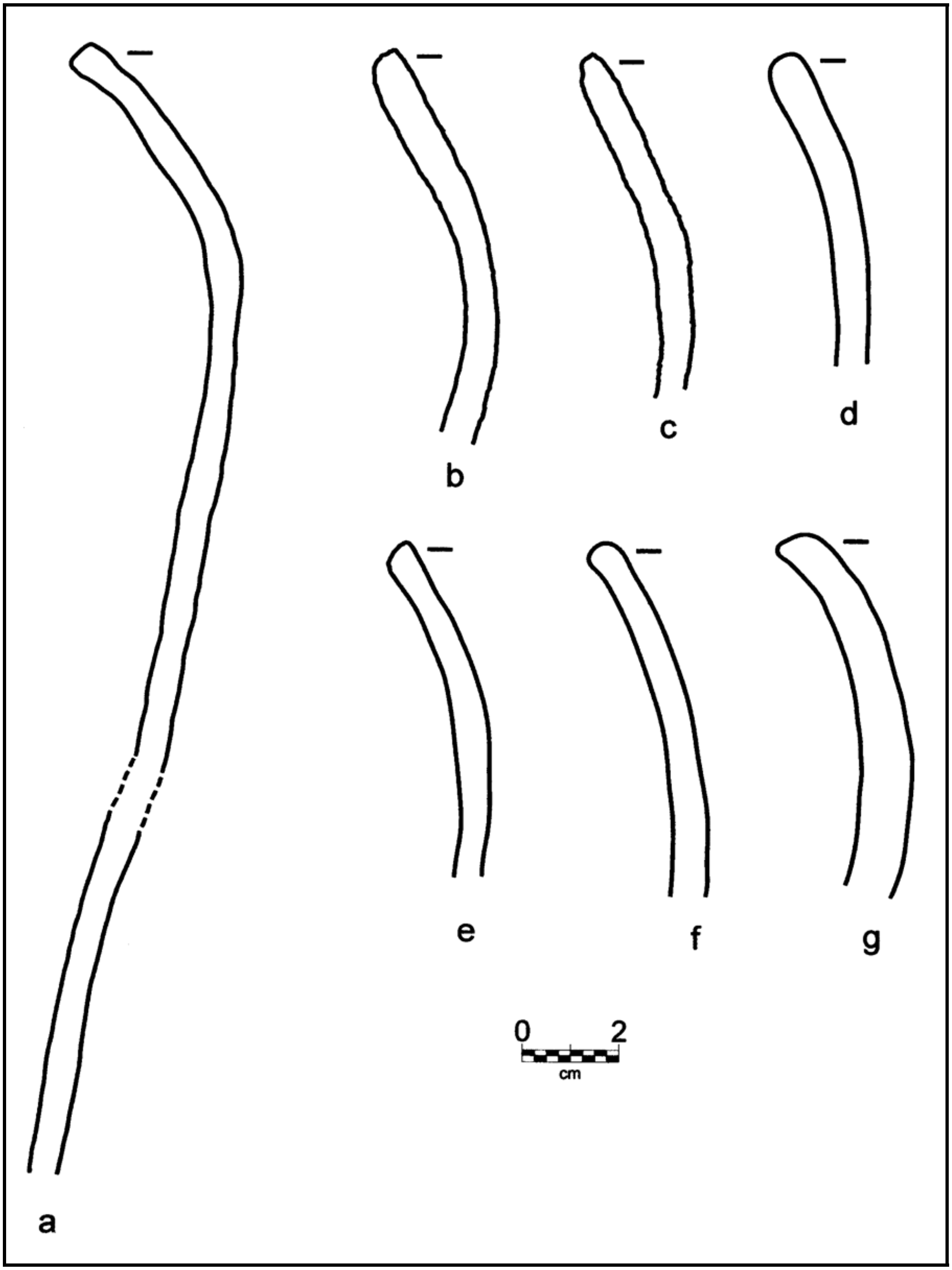

Figure 6.26. Falls Plain Rim Group 6 profiles.

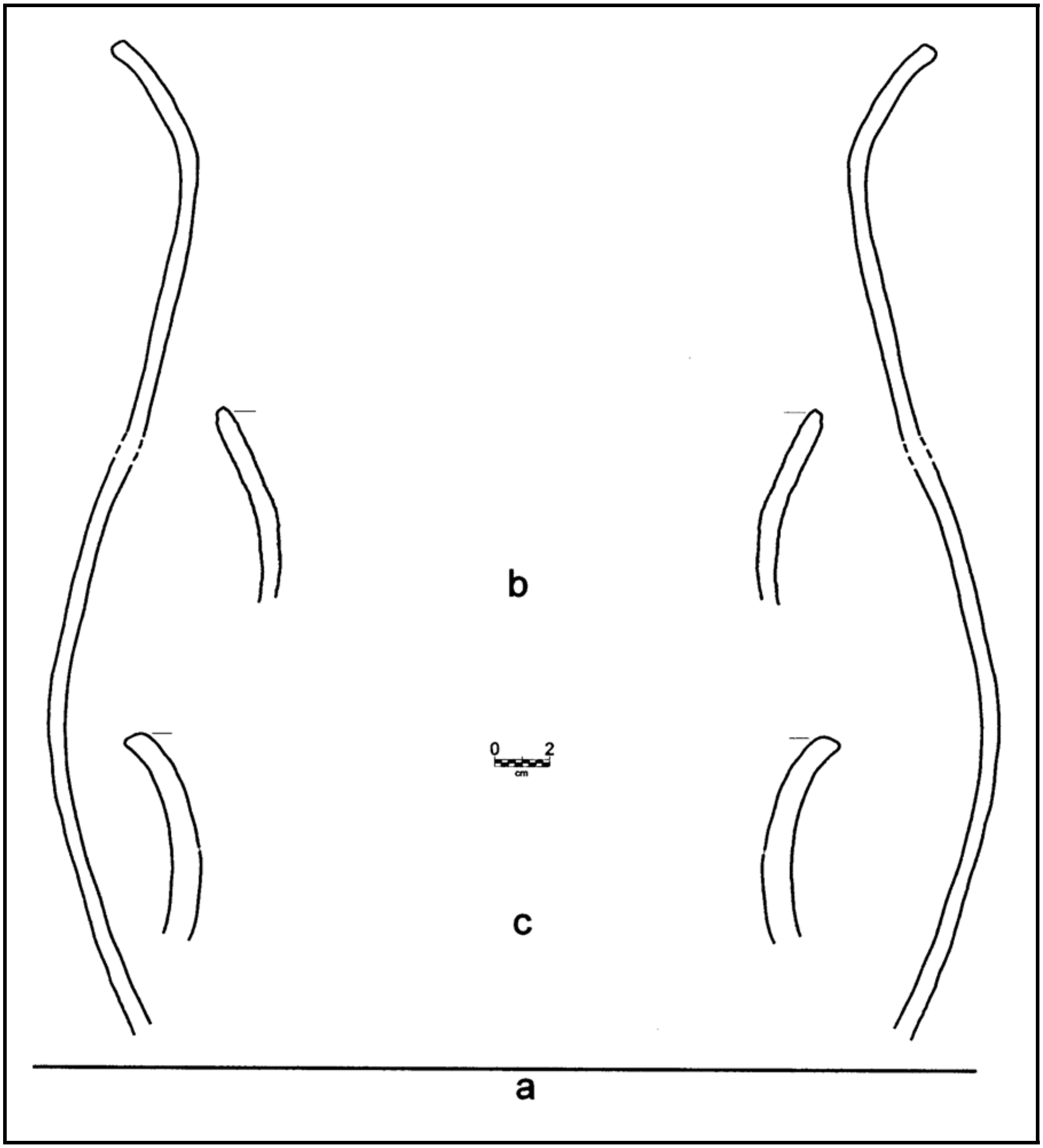

Figure 6.27. Falls Plain Rim Group 6 mirrored profiles: (a) Group 6a; (b) Group 6c; (c) Group 6g.

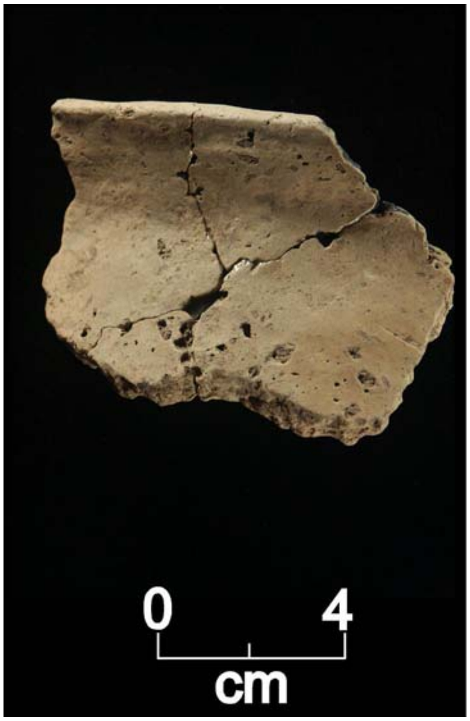

Figure 6.28. Strongly everted rim--Falls Plain Rim Group 7a.

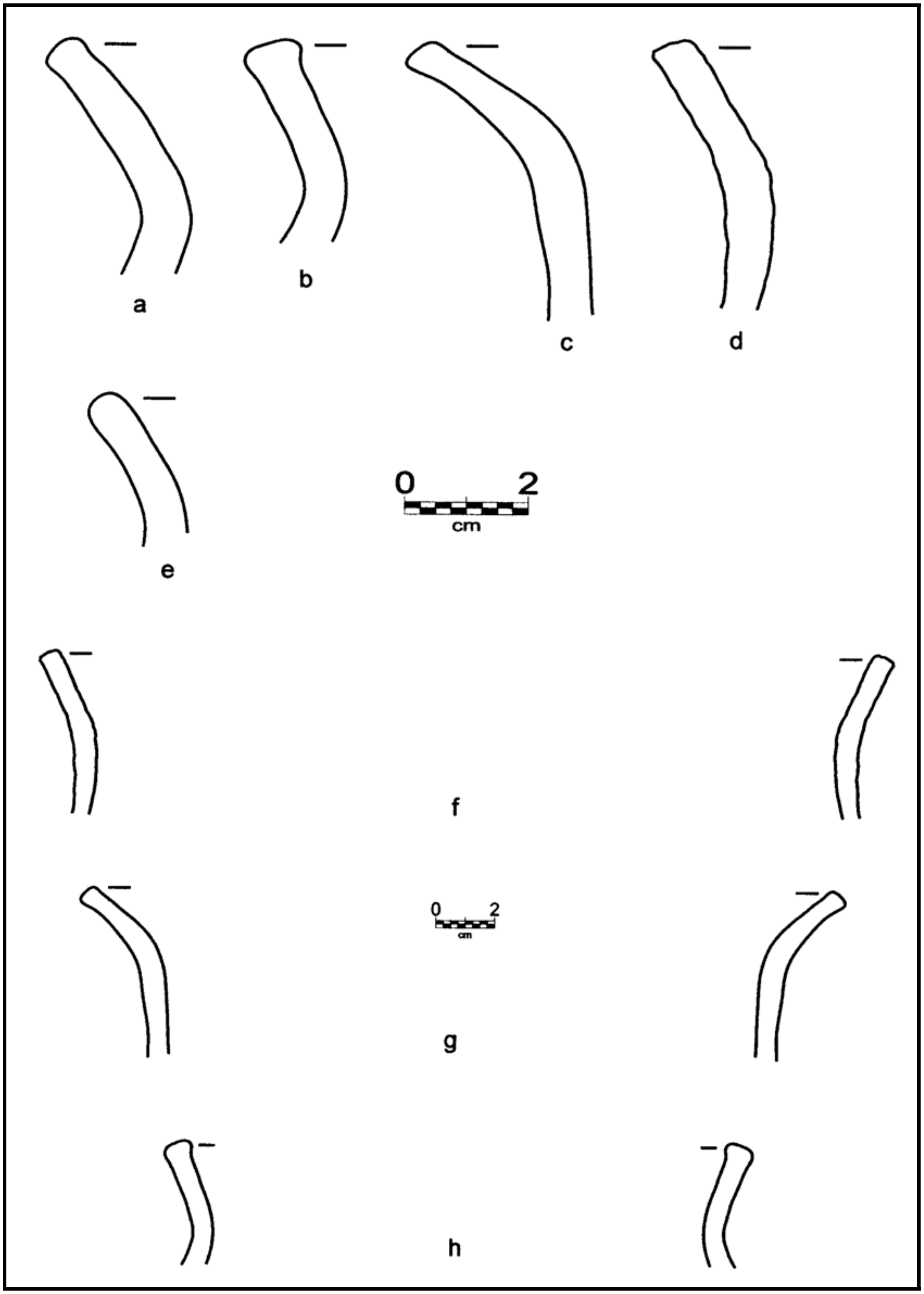

Figure 6.29. Falls Plain Rim Group 7 profiles and mirrored profiles: (f) Group 7c; (g) Group 7d; (h) Group 7b.

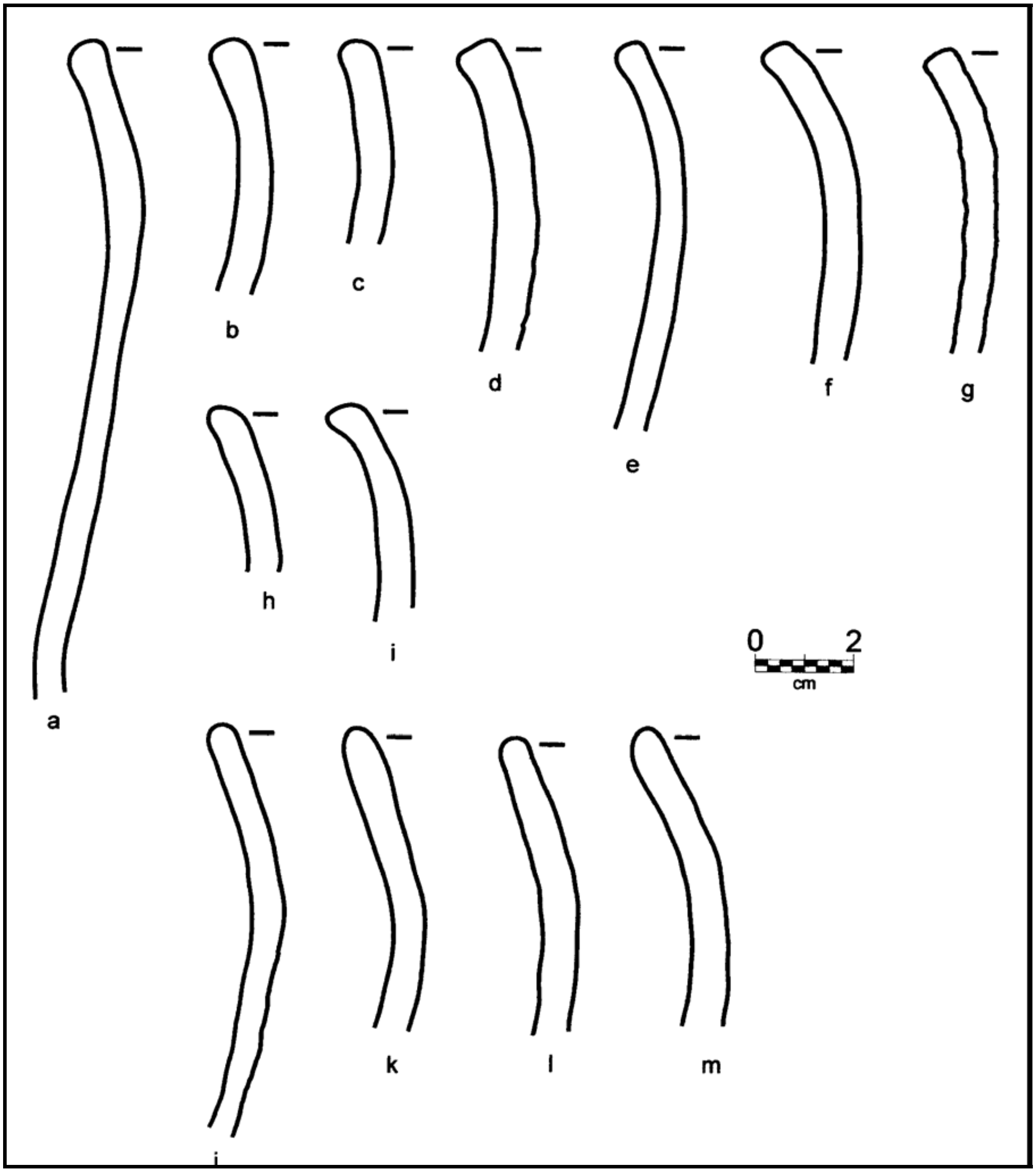

Figure 6.30. Falls Plain Rim Group 8 profiles.

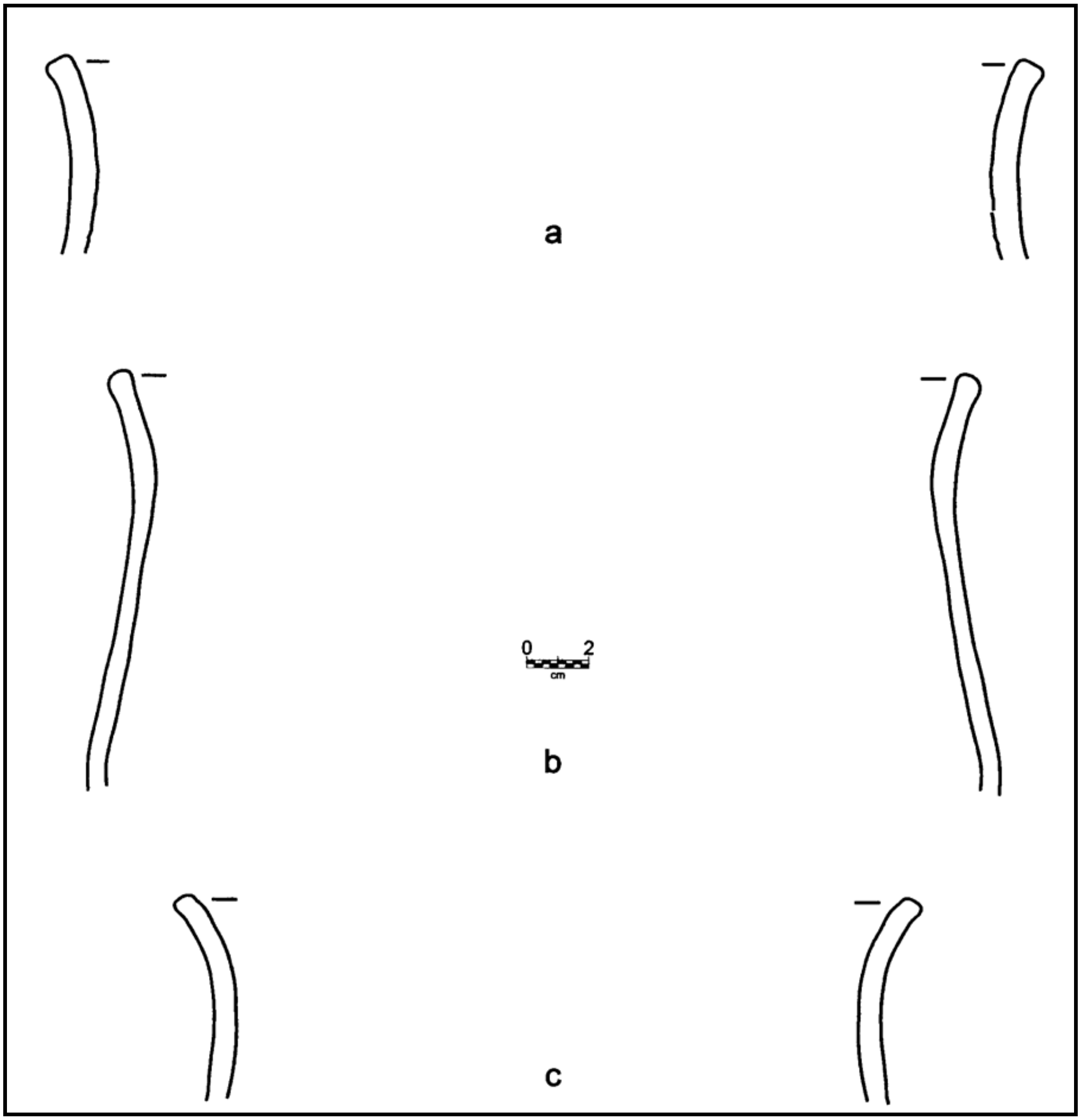

Figure 6.31. Falls Plain Rim Group 8 mirrored profiles: (a) Group 8d; (b) Group 8a; (c) Group 8f.

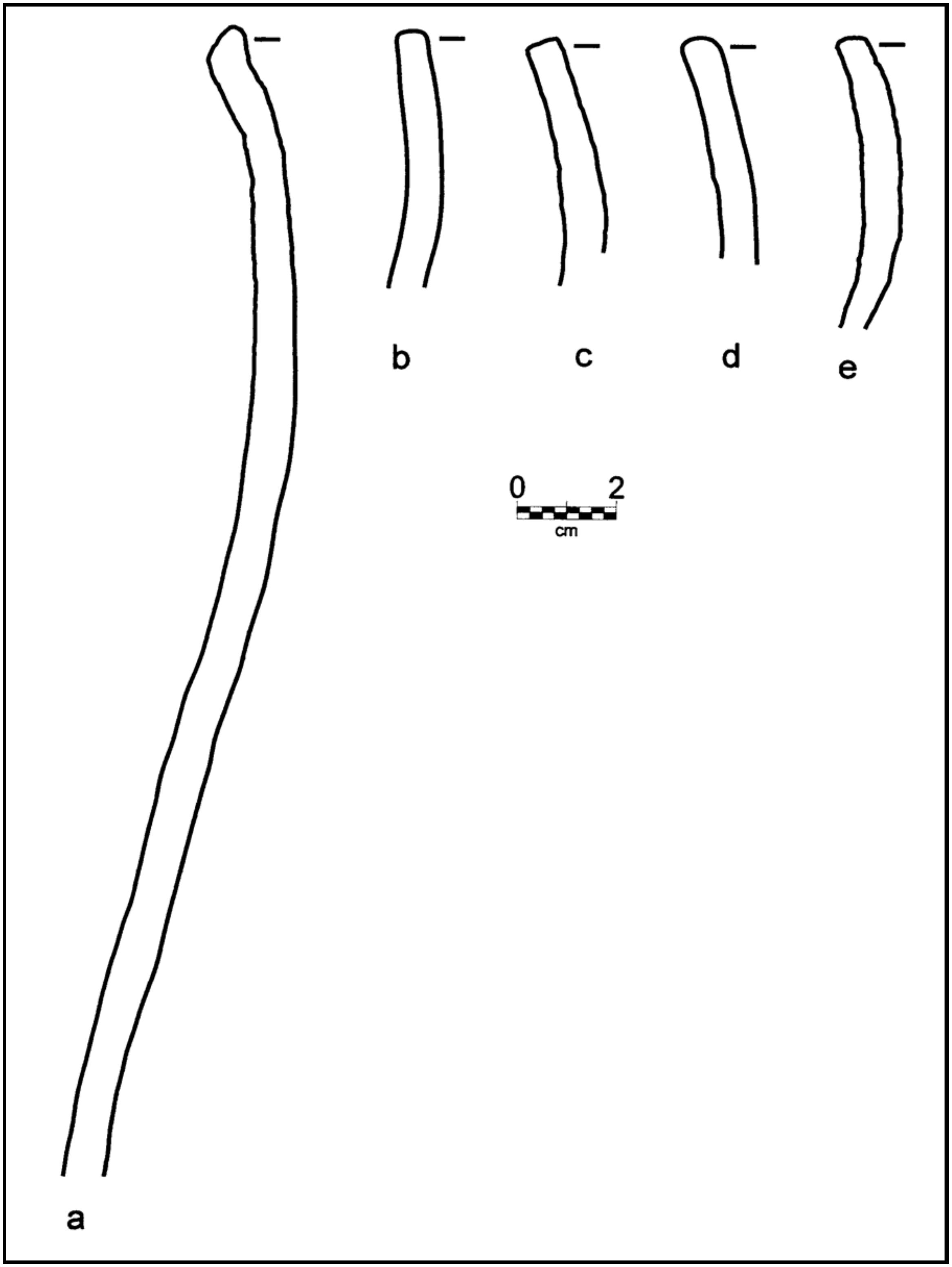

Figure 6.32. Falls Plain Rim Group 9 profiles.

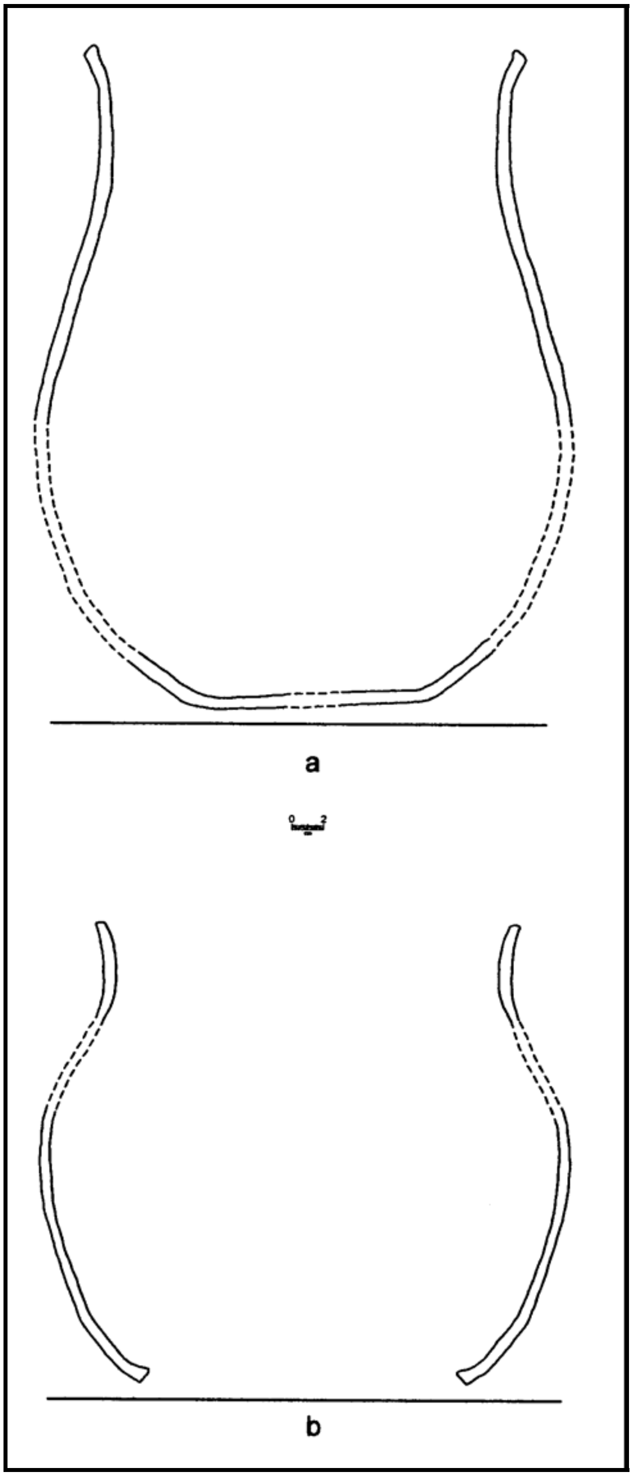

Figure 6.33. Falls Plain Rim Group 9 mirrored vessel profiles: (a) Rim Group 9a and Base Group 2e; (b) Group 9e and base from Base Group 2 (not included in profile drawings).

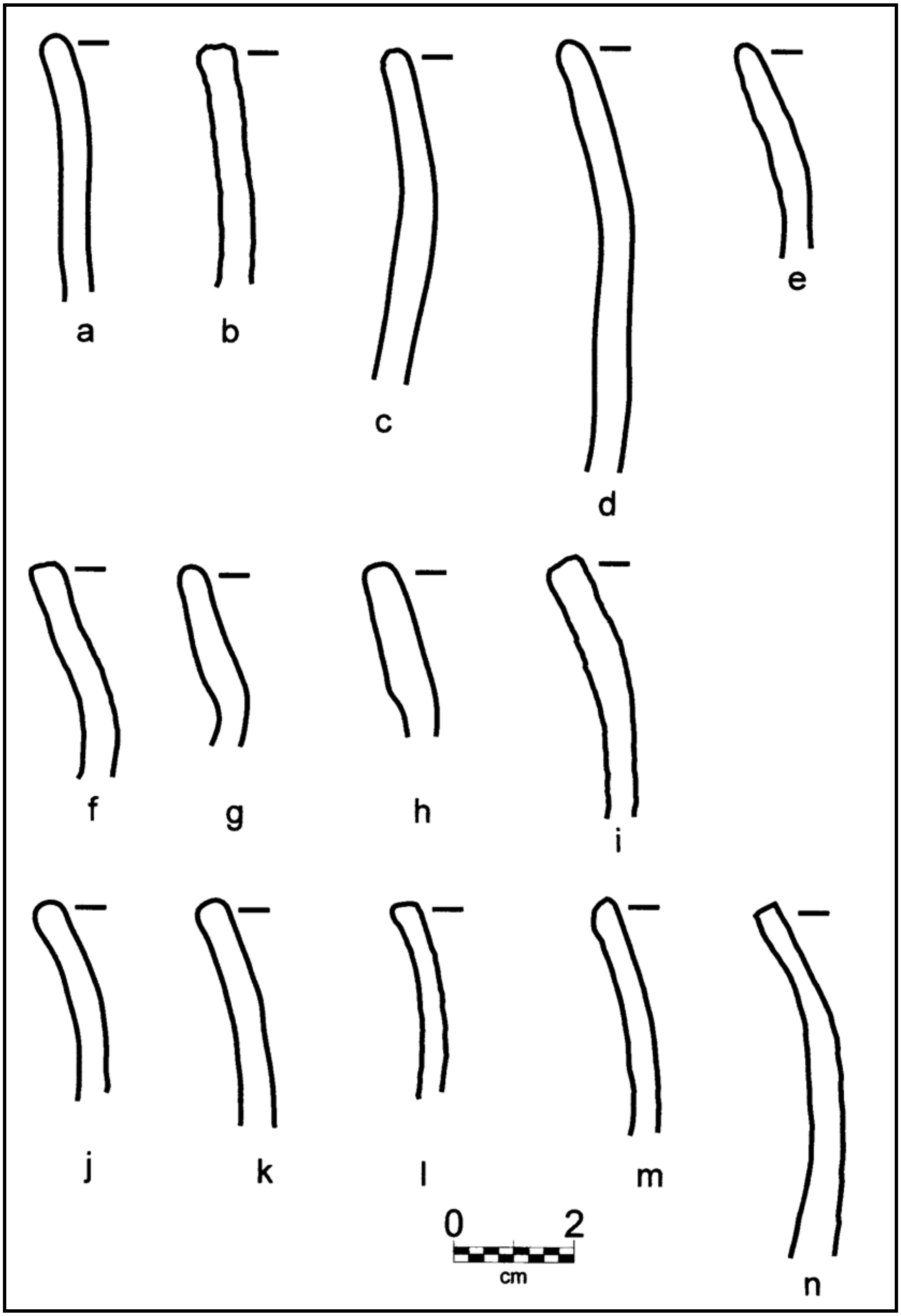

Figure 6.34. Falls Plain Rim Group 10 profiles.

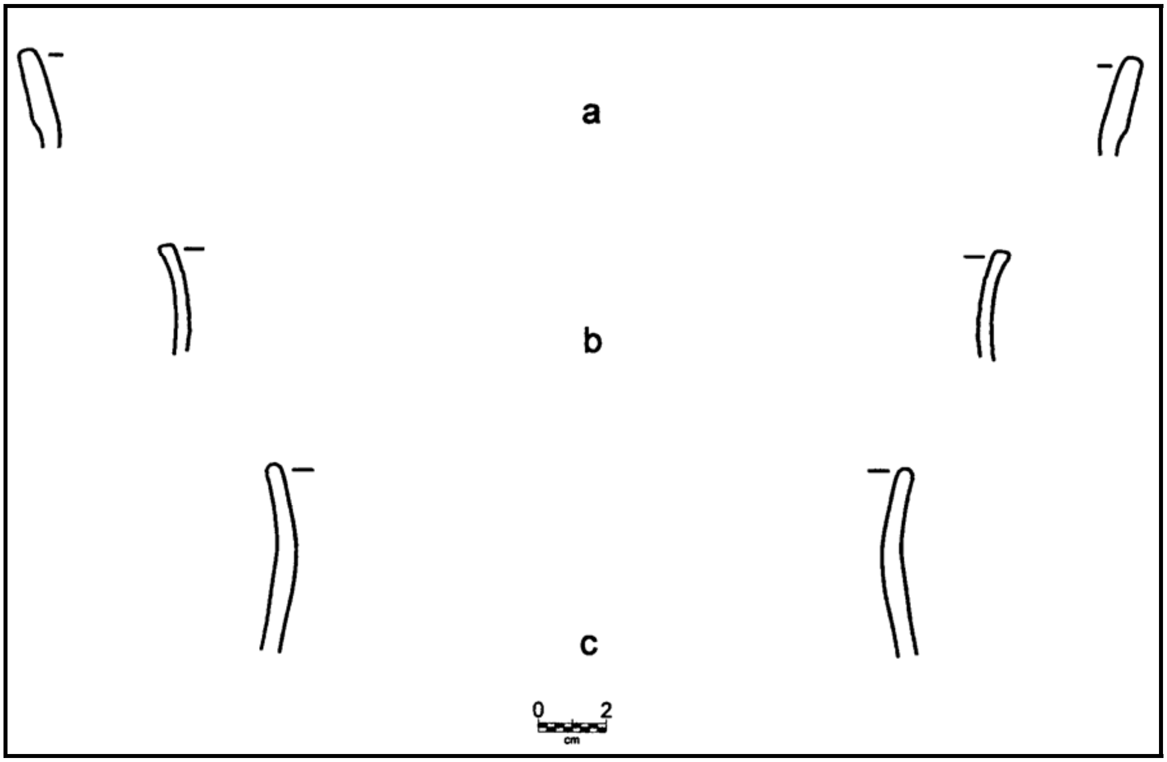

Figure 6.35. Falls Plain Rim Group 10 mirrored profiles: (a) Group 10h; (b) Group 10l; (c) Group 10c.

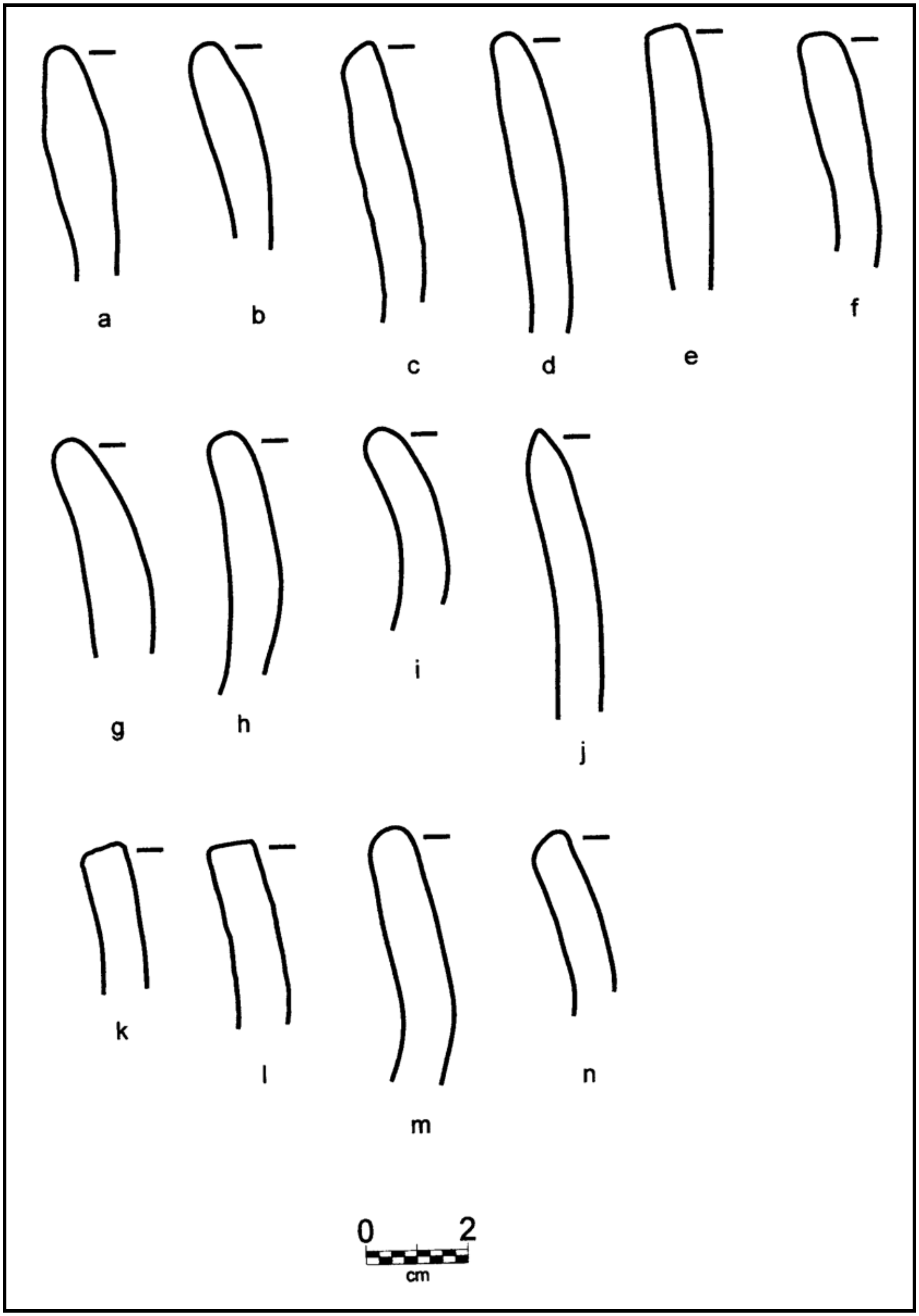

Figure 6.36. Falls Plain Rim Group 11 profiles.

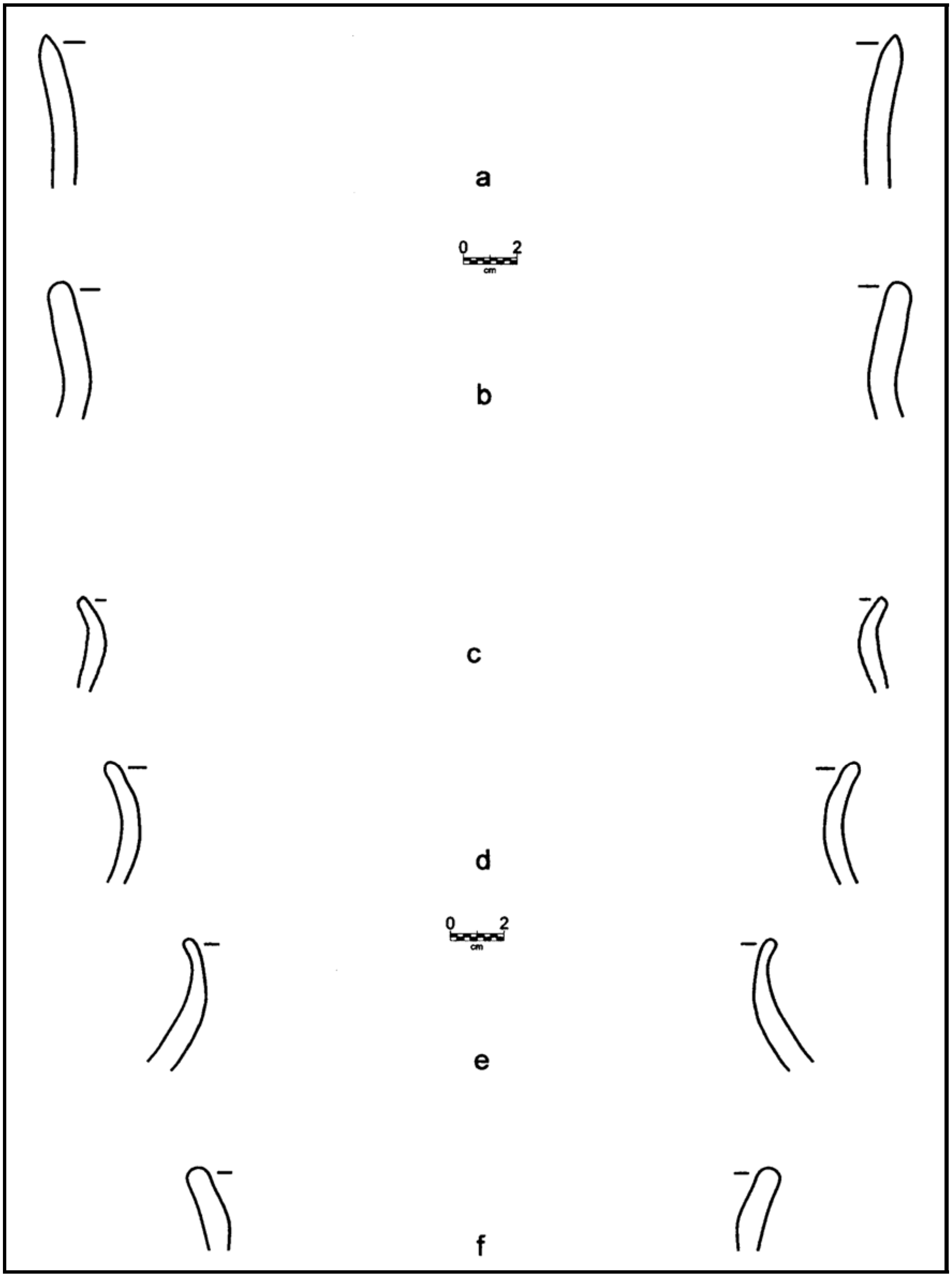

Figure 6.37. Falls Plain Rim Groups 11 and 12 mirrored profiles: (a) Group 11j; (b) Group 11m; (c) Group 12j; (d) Group 12a; (e) 12h; (f) Group 12d.

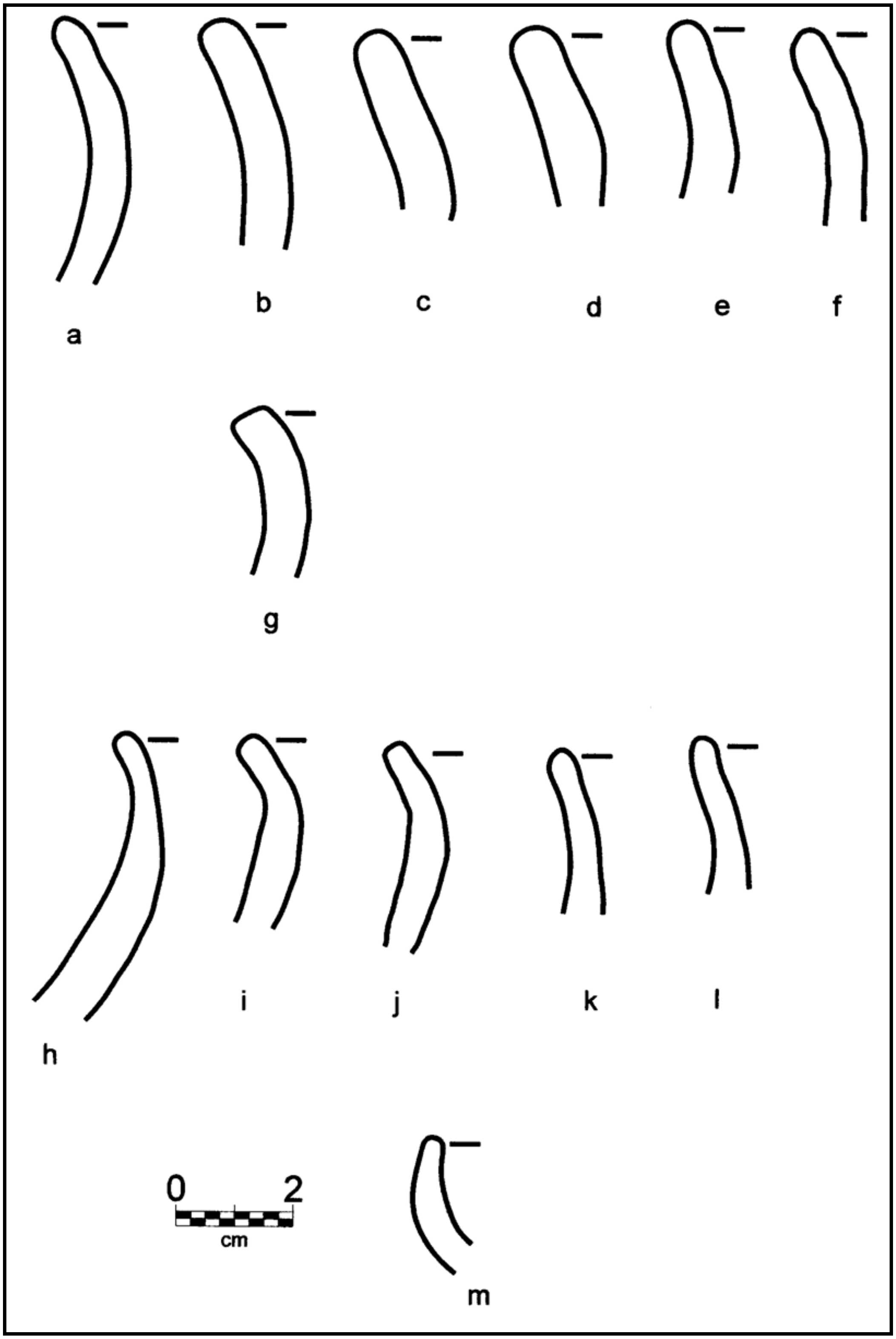

Figure 6.38. Falls Plain Rim Groups 12 and 13 profiles: (a-l) Group 12; (m) Group 13.

Figure 6.39. Falls Plain bases--profile views: (a) Group 1b; (b) Group 2c; (c) Group 4.

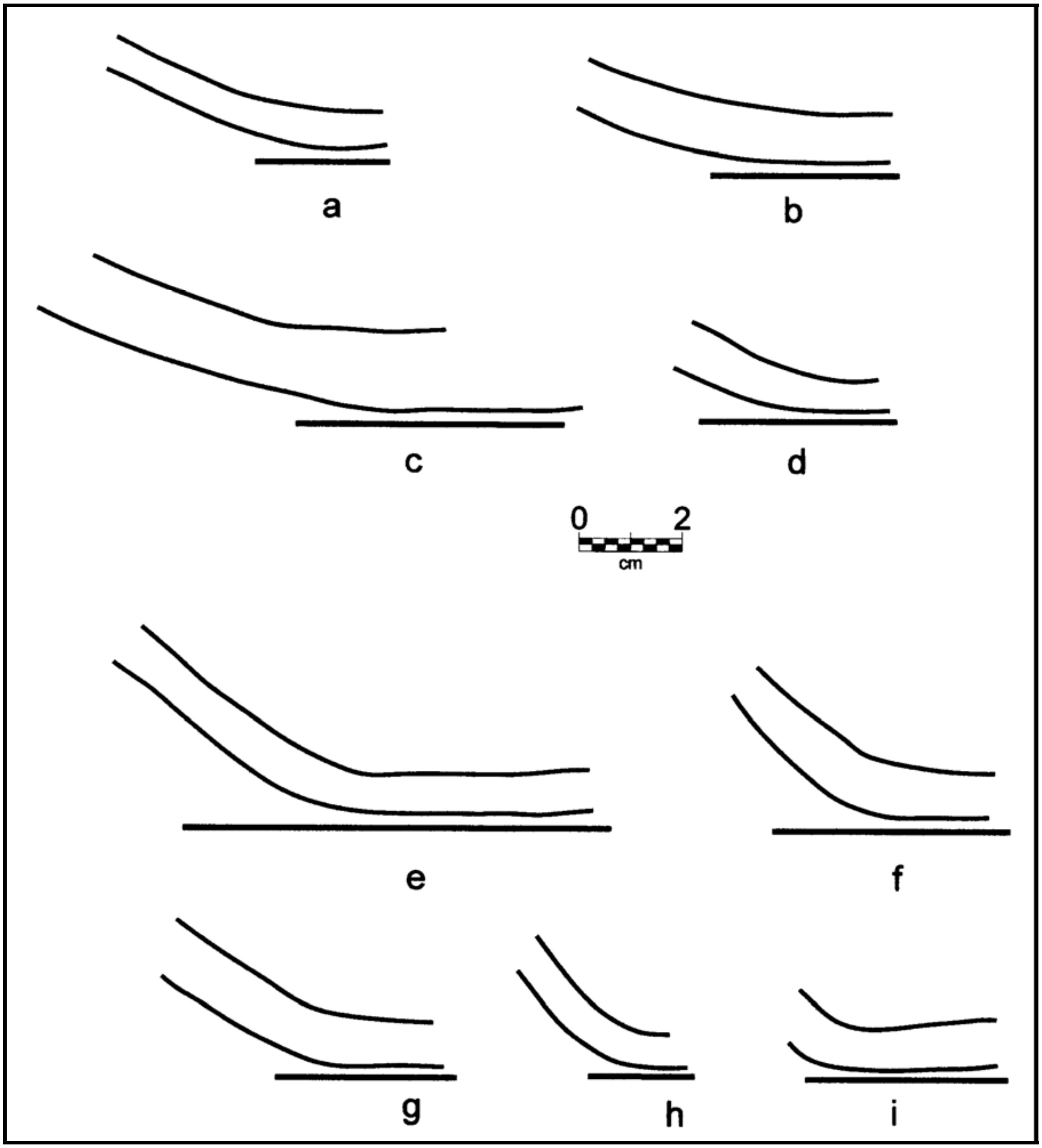

Figure 6.40. Falls Plain Base Groups 1 and 2 profiles: (a-d) Group 1; (e-i) Group 2.

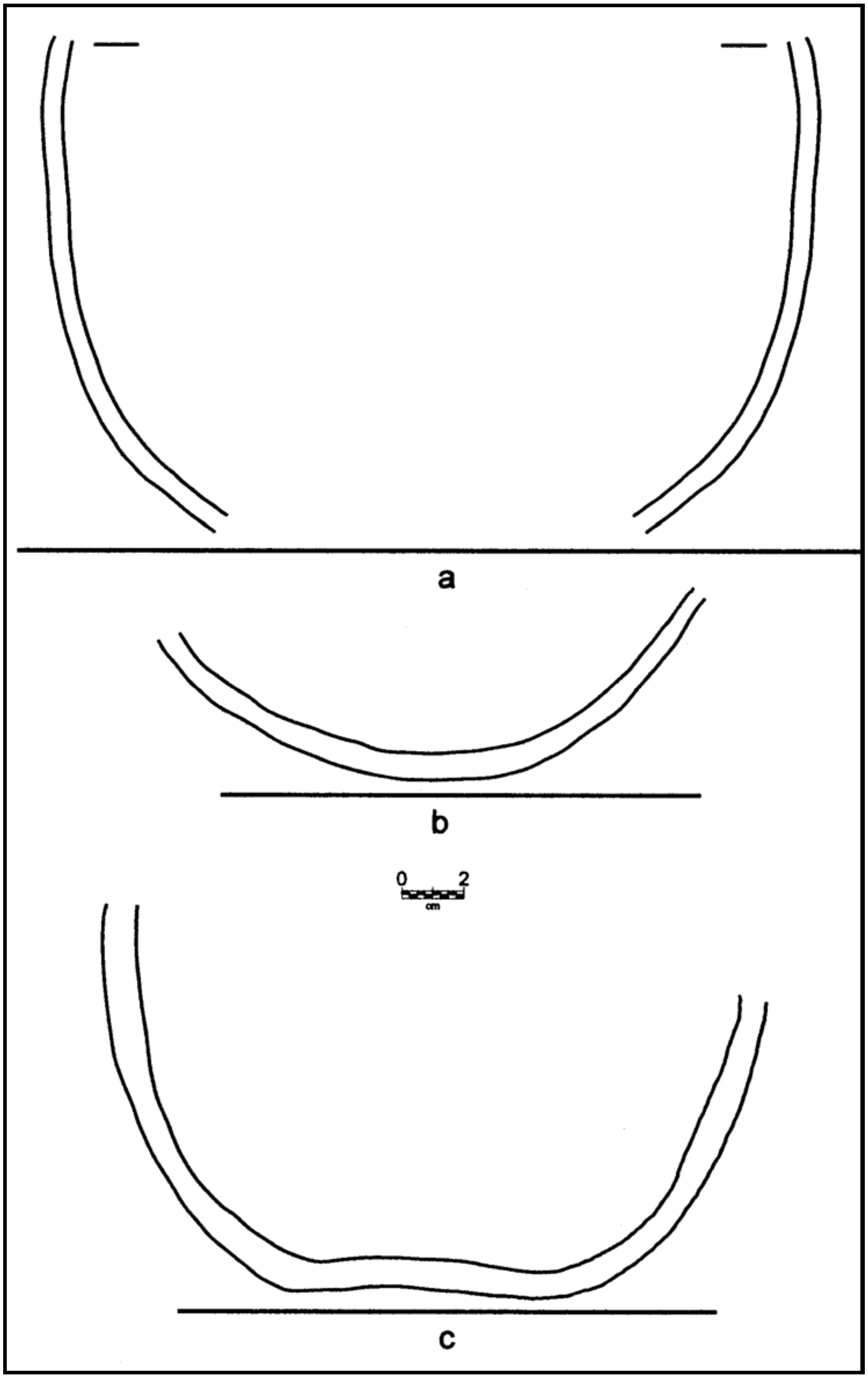

Figure 6.41. Falls Plain Base Groups 1 and 2 additional profiles and mirrored profile: (a) Group 1 mirrored profile; (b) Group 1; (c) Group 2.

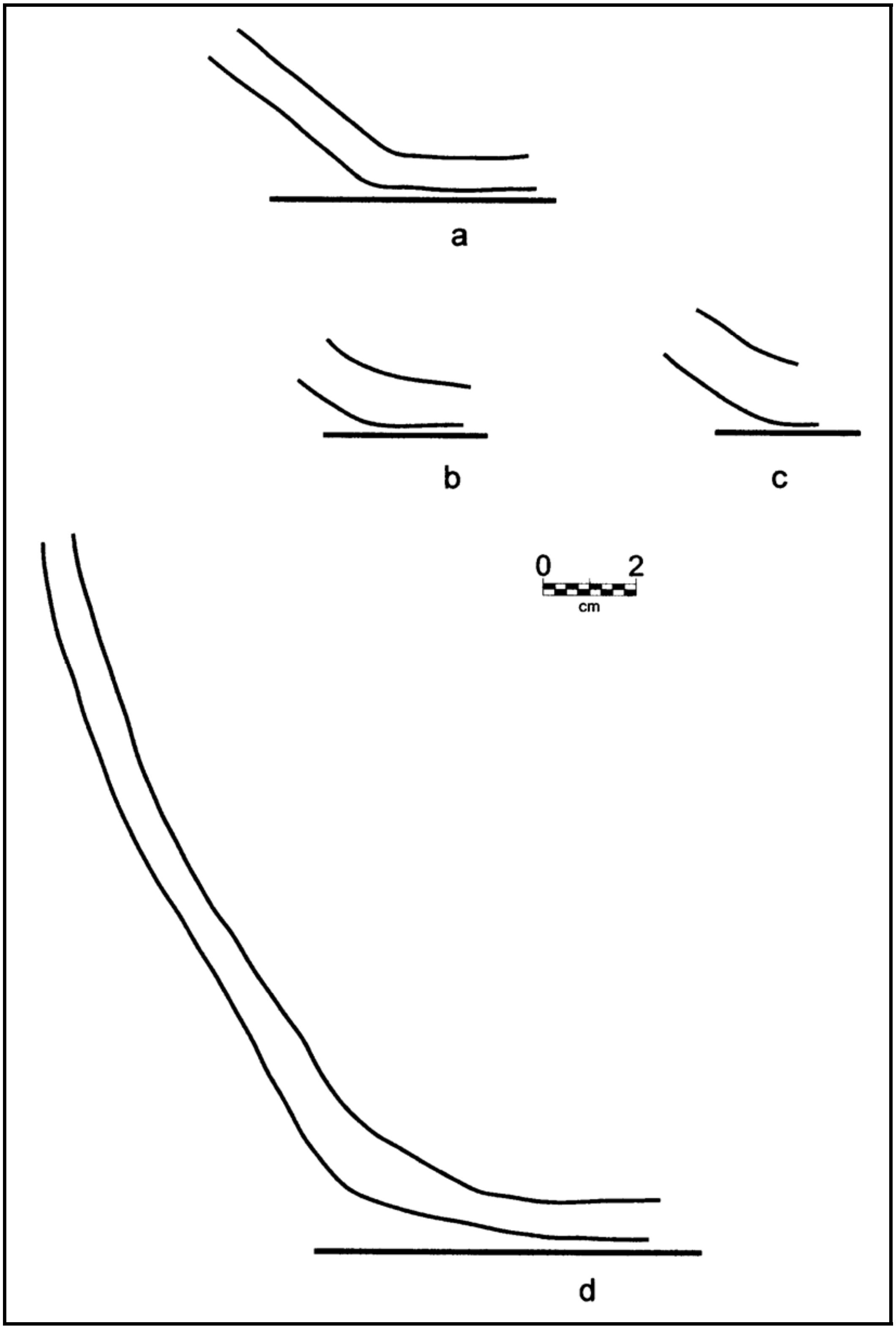

Figure 6.42. Falls Plain Base Groups 3 and 4 profiles: (a-c) Group 3; (d) Group 4.

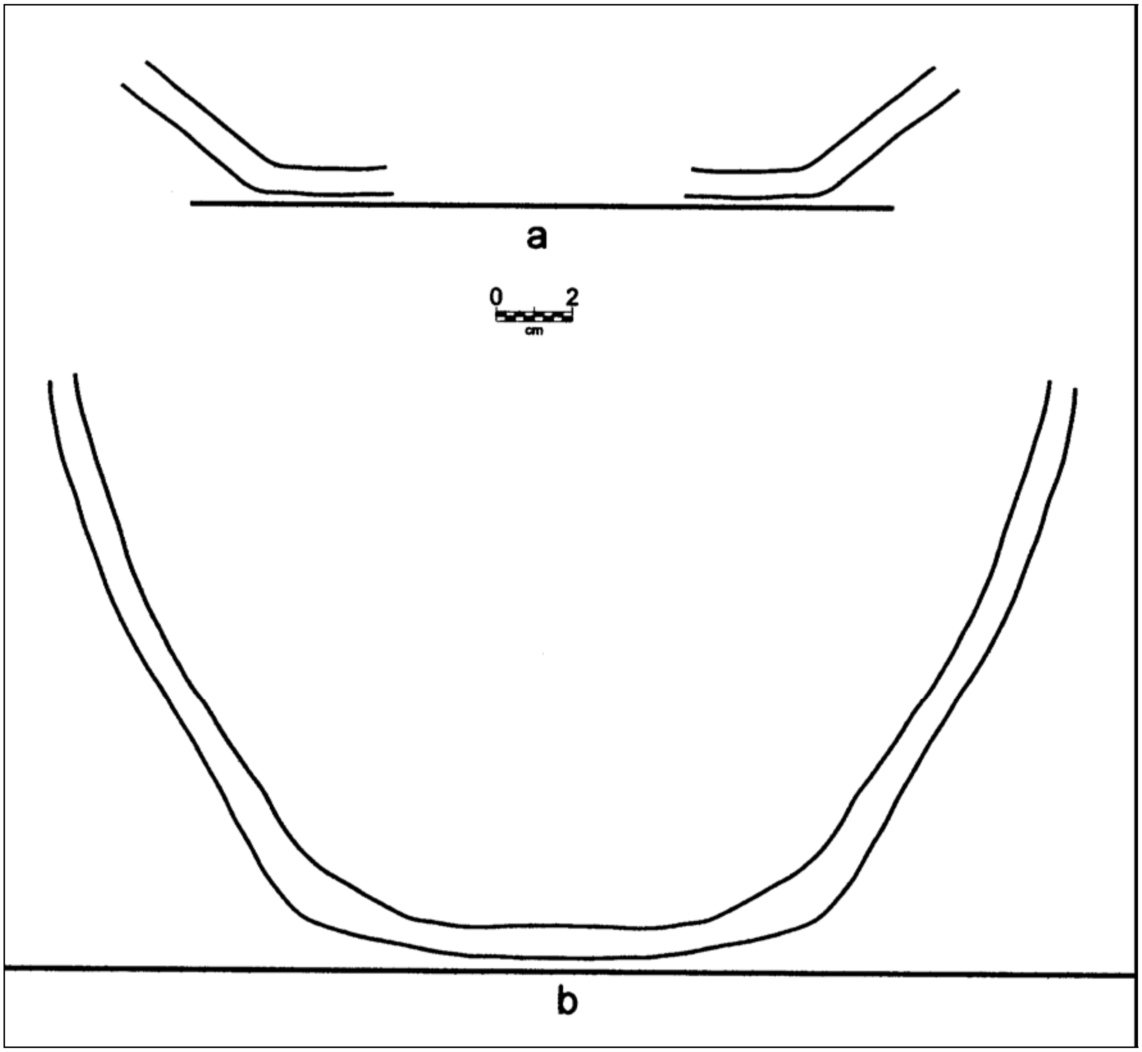

Figure 6.43. Falls Plain Base Groups 3 and 4 mirrored profiles: (a) Group 3a; (b) Group 4d.

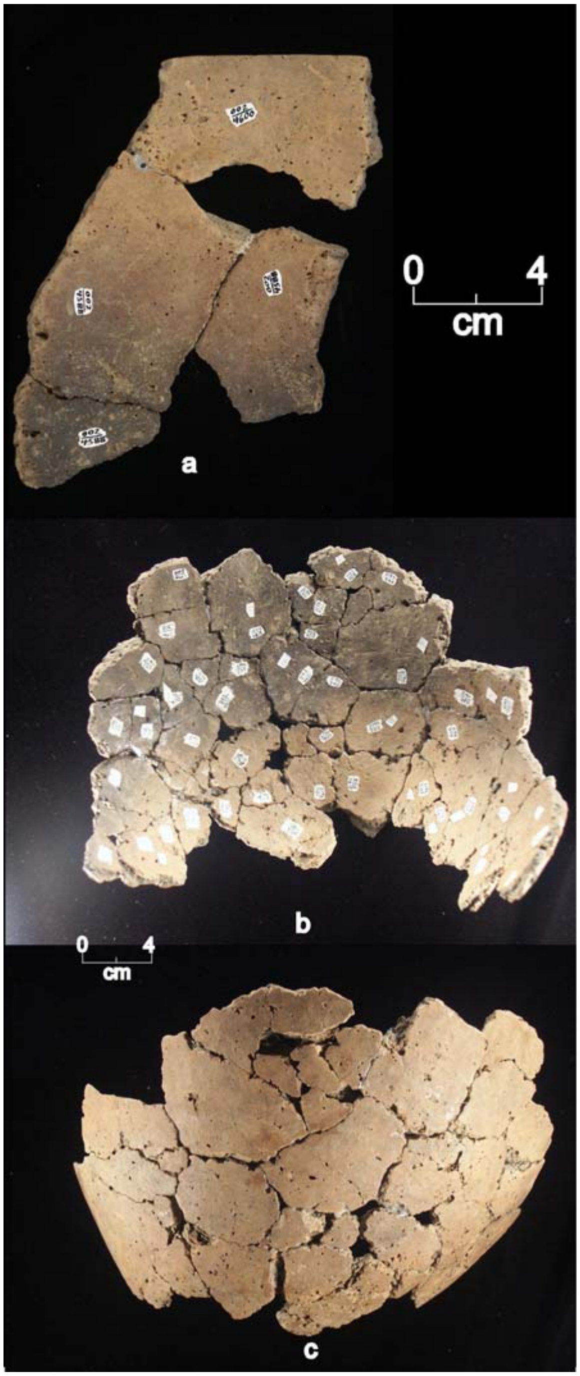

Figure 6.44. Organic stains on the interior of Falls Plain vessels: (a) Rim Group 2a--interior boiling line on upper body; (b) Base Group 2/Rim Group 9e vessel--interior boiling line beginning 6 cm above base; (c). Base Group 2/Rim Group 9e vessel--exterior view.

Figure 6.45. Vessels A and B in situ.

Chapter 7

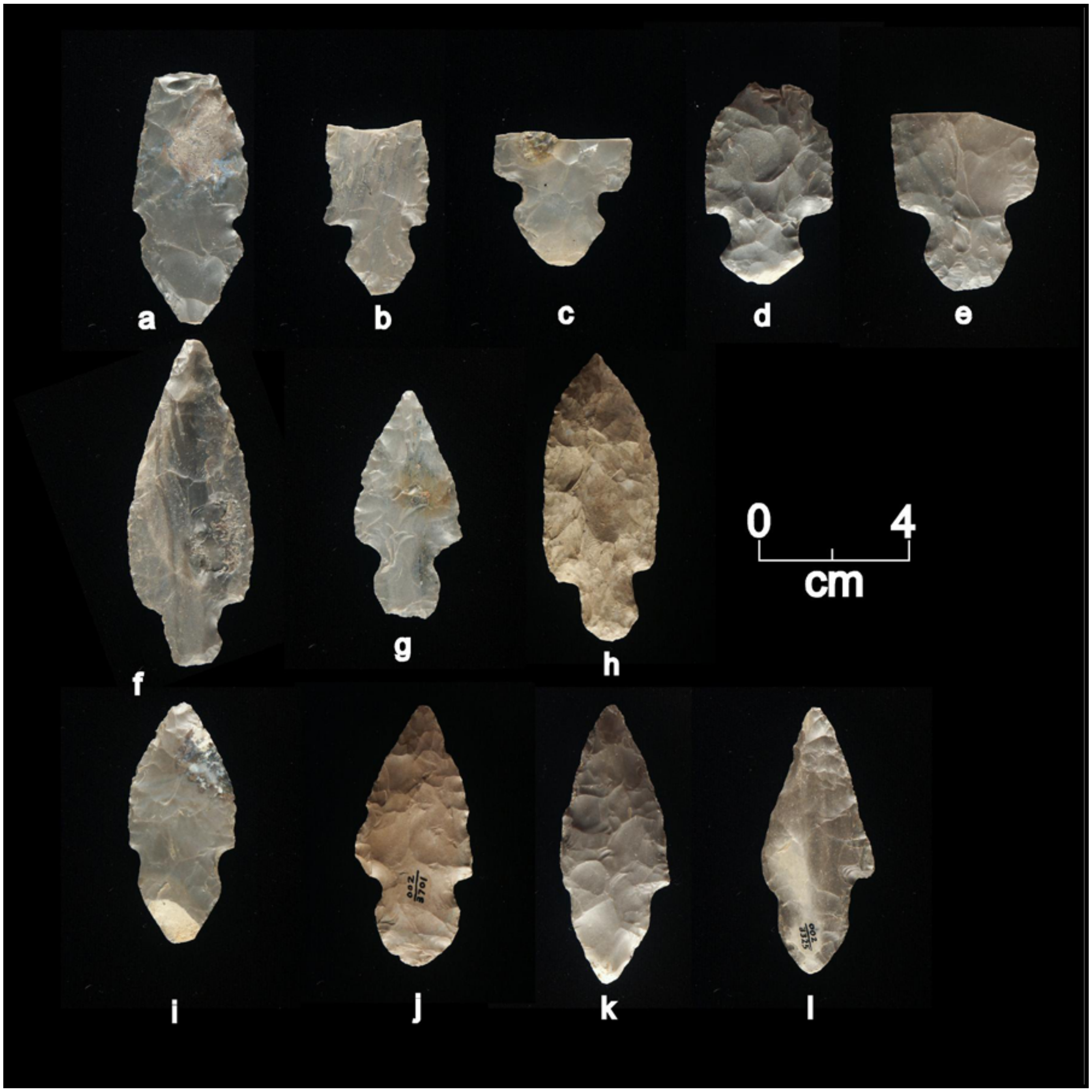

Figure 7.1. Turkey-tail points and Turkey-tail/Adena points: (a-g) Turkey-tail; (h) Late Archaic/Turkey-tail; (i-l) Turkey-tail/Adena.

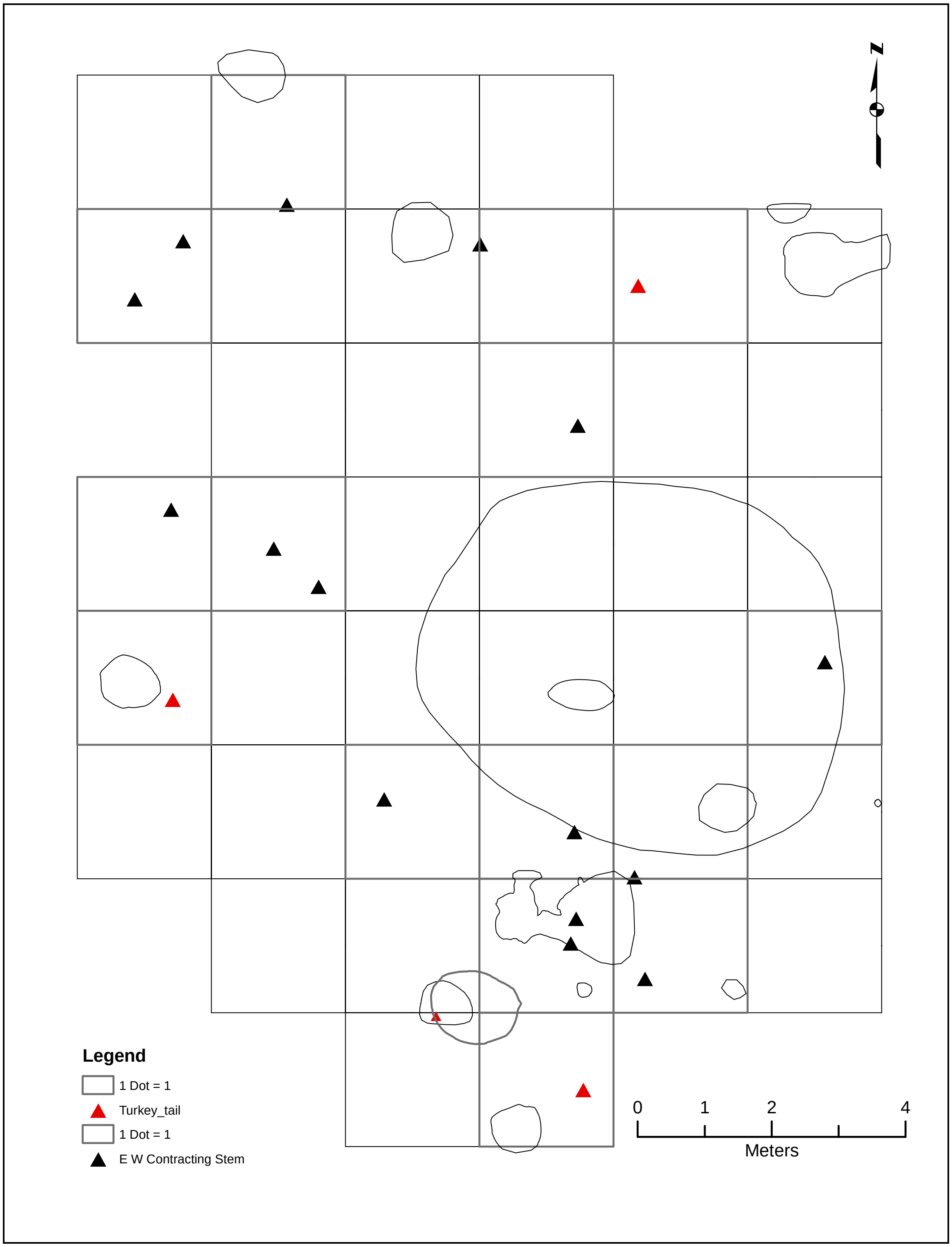

Figure 7.2. Early Woodland Contracting Stemmed Cluster and Turkey-tail projectile points in the Phase II South Block.

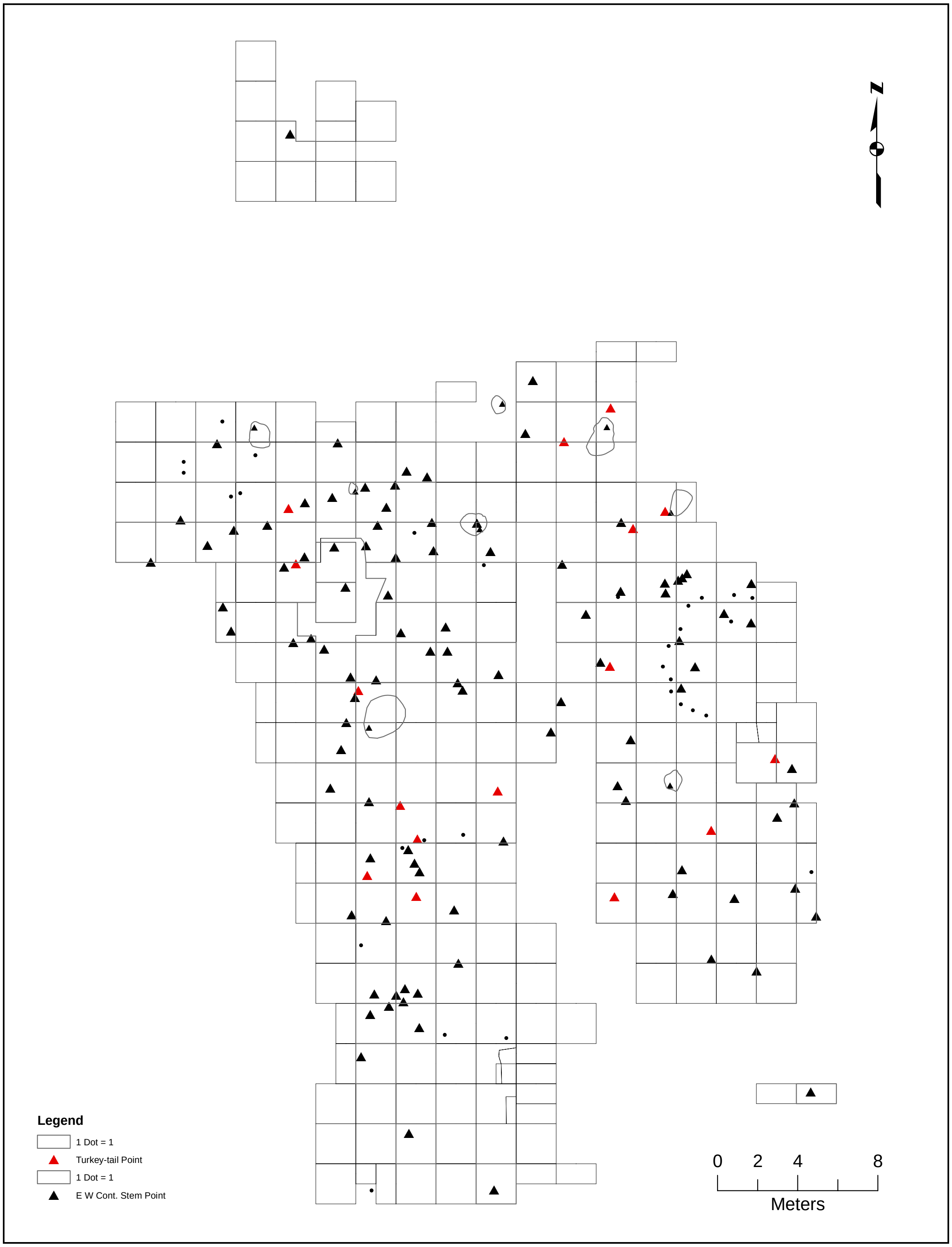

Figure 7.3. Early Woodland Contracting Stemmed Cluster and Turkey-tail projectile points in the 200 Block.

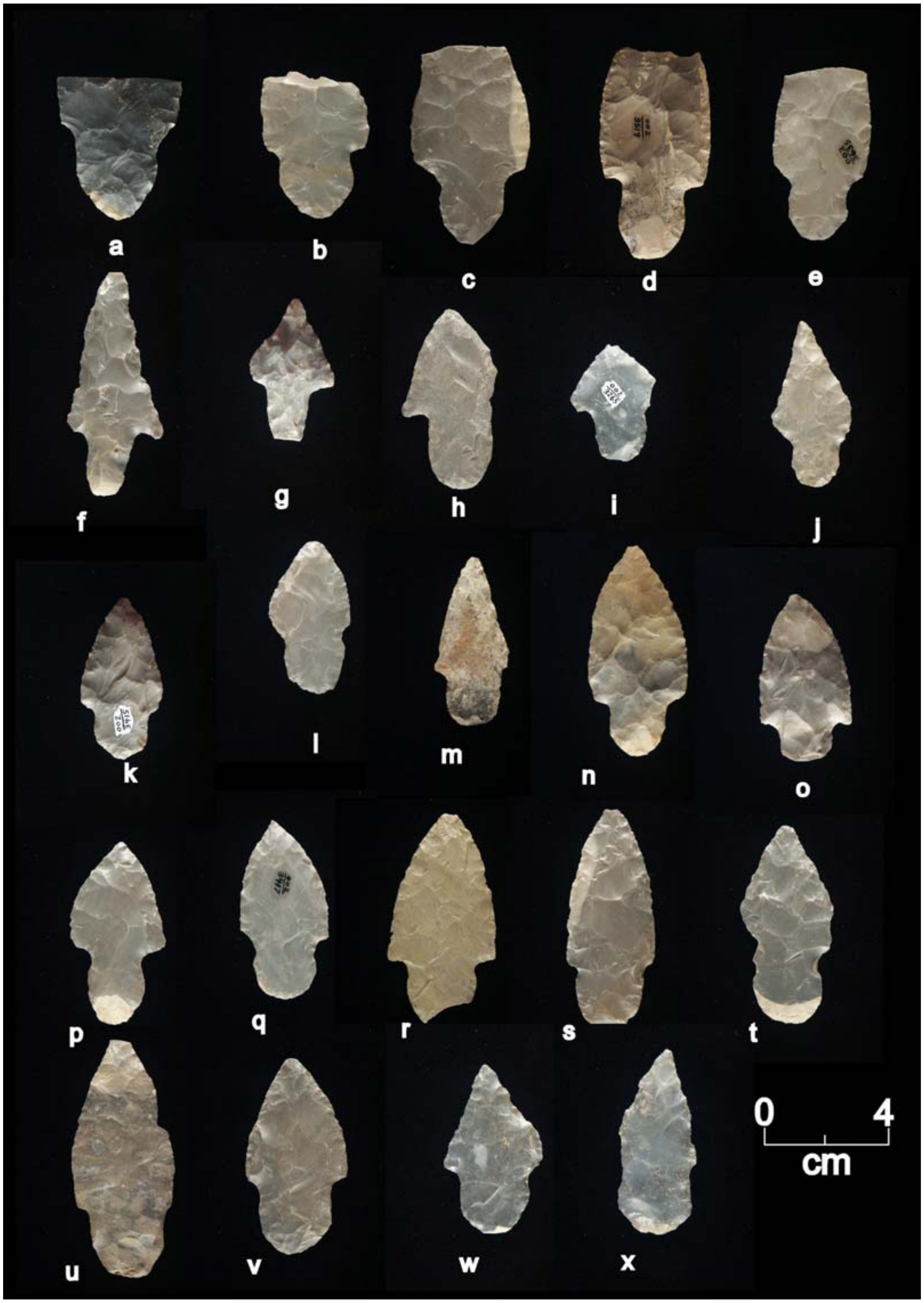

Figure 7.4. Early Woodland Contracting Stemmed Groups 1-6: (a-b) Group 1; (c-e) Group 2; (f-j) Group 3; (k-o) Group 4; (p-t) Group 5; (u-x) Group 6.

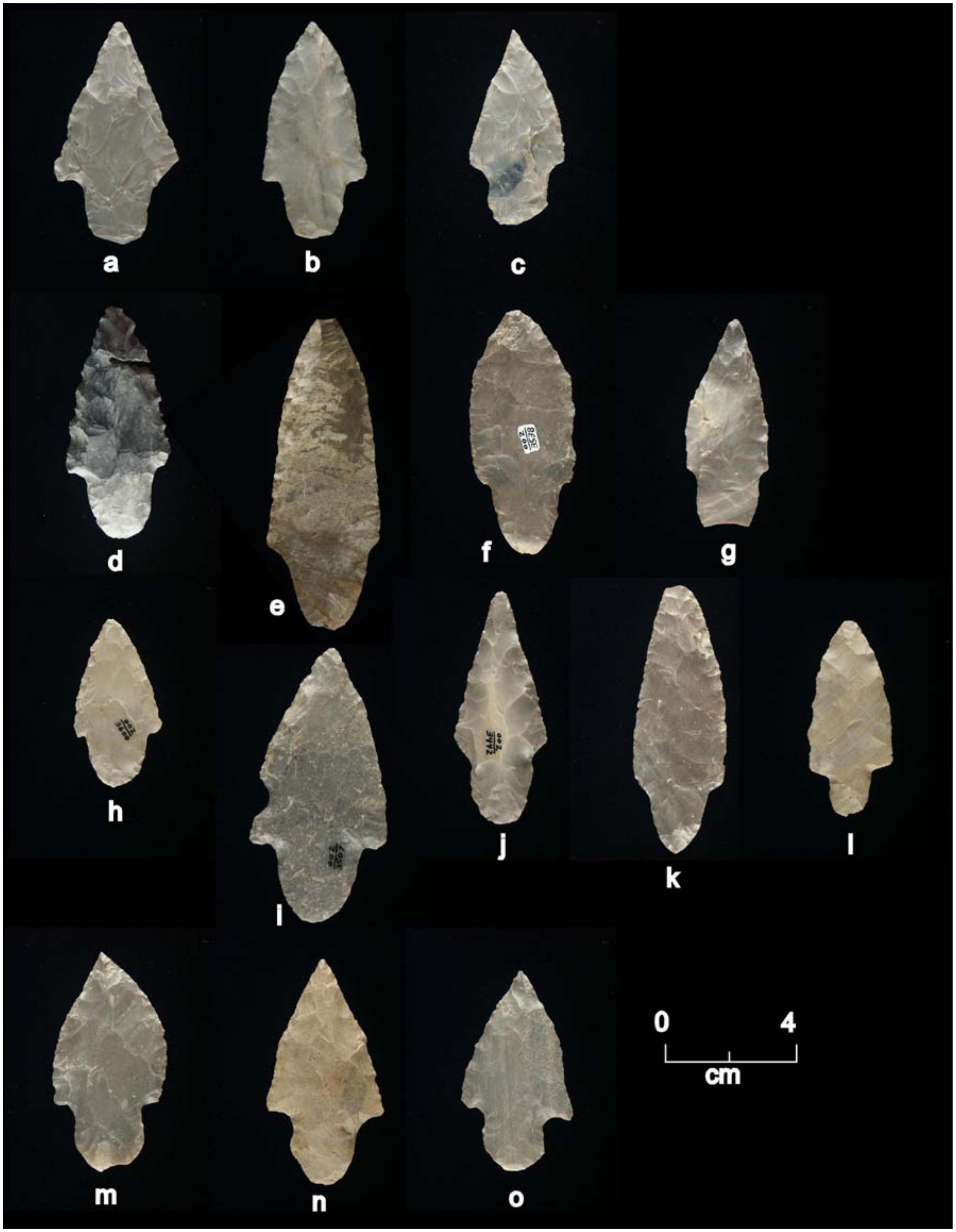

Figure 7.5. Early Woodland Contracting Stemmed Groups 7-9: (a-c) Group 7; (d-l) Group 8; (m-o) Group 9.

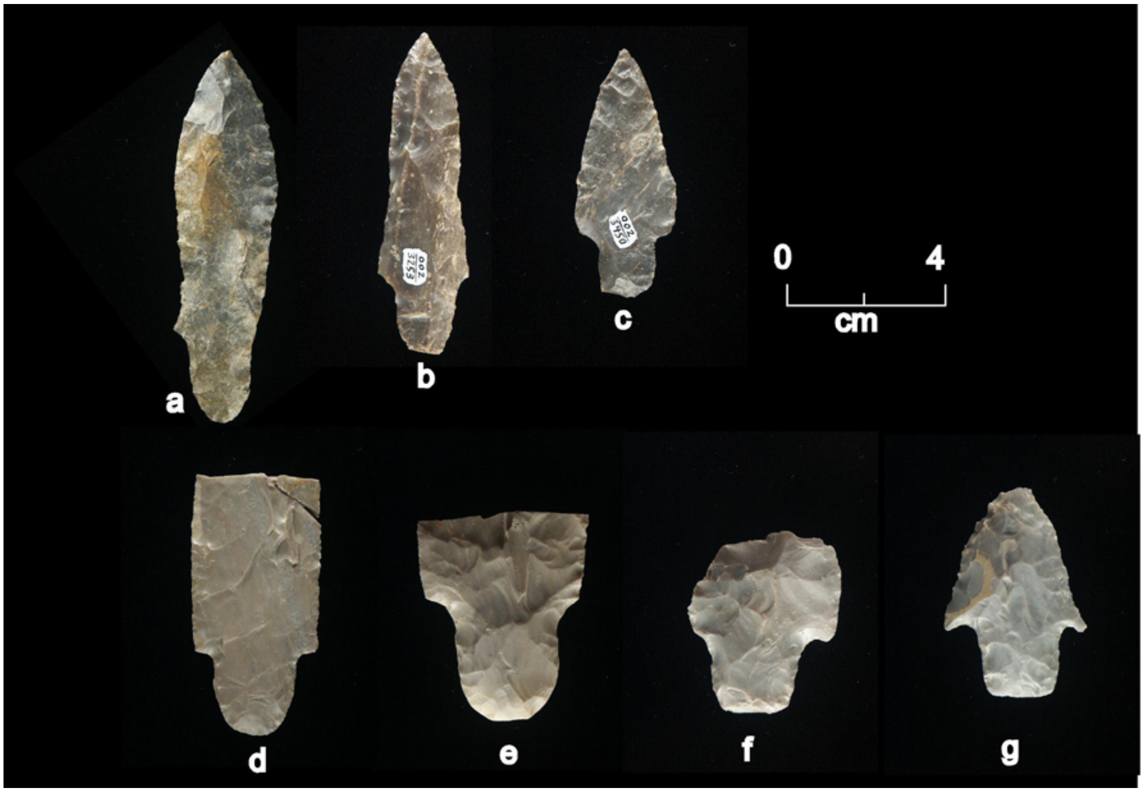

Figure 7.6. . Early Woodland Contracting Stemmed Groups 10-12: (a-c) Group 10; (d-e) Group 11; (f-g) Group 12.

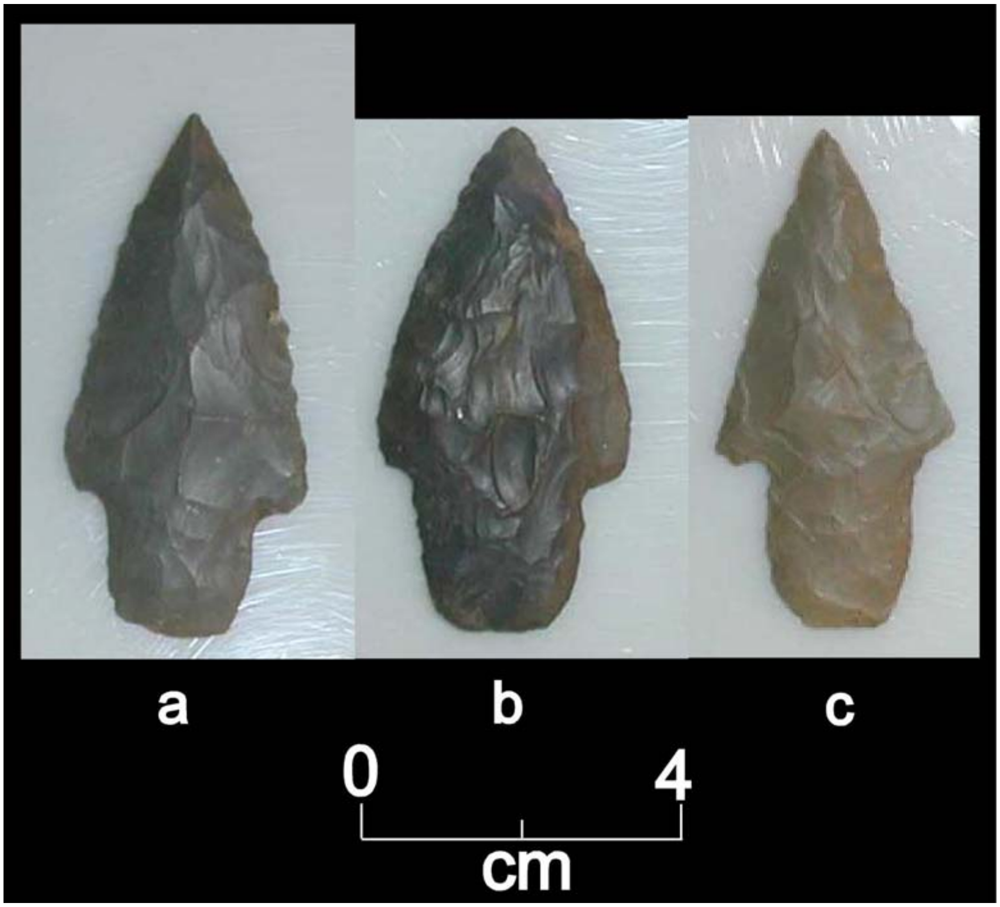

Figure 7.7. Early Woodland Contracting Stemmed projectile points from Groups 7 and 3 examined for microwear.

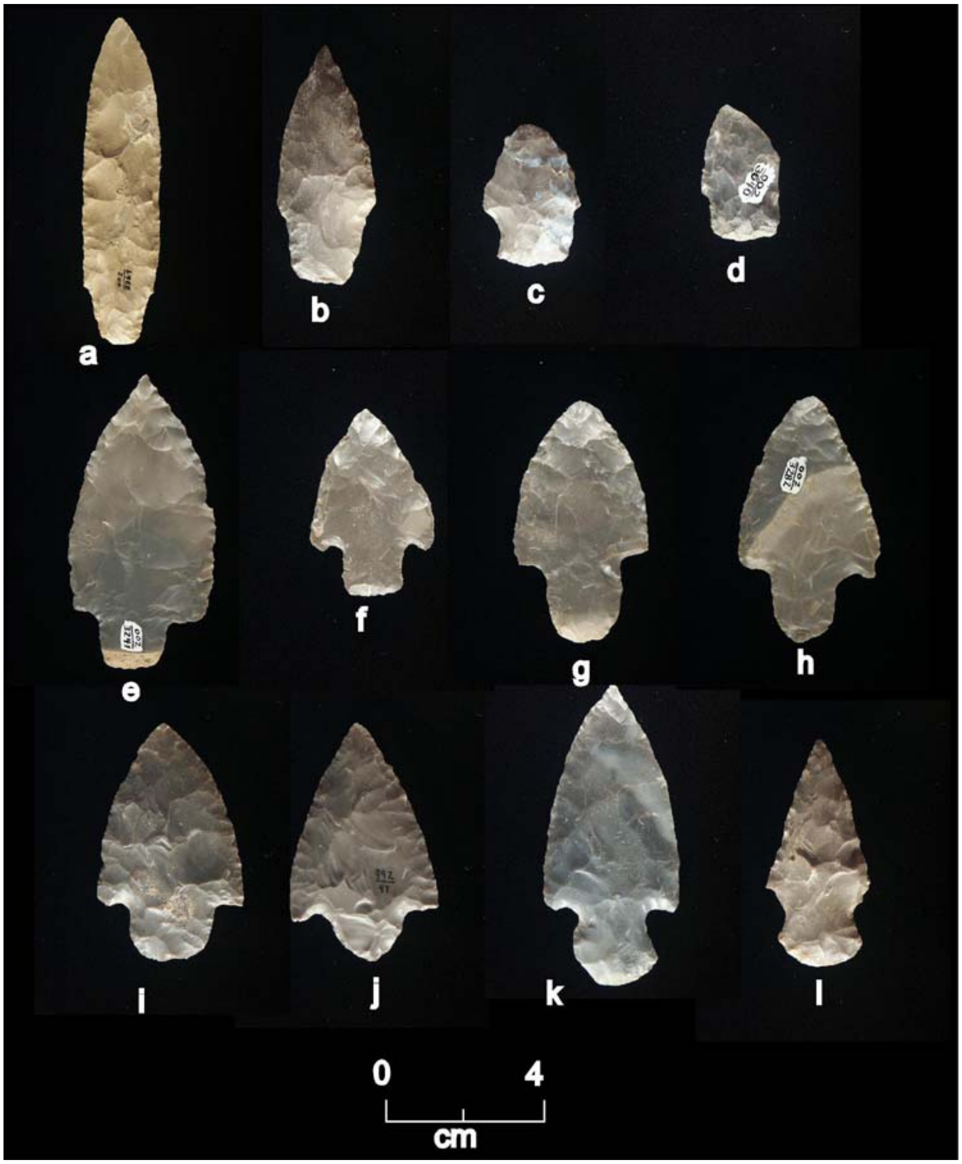

Figure 7.8. Kramer, Cresap, Robbins, and Robbins/Snyders points: (a-b) Cresap; (c-d) Kramer; (e-h) Robbins; (i-l) Robbins/ Snyders.

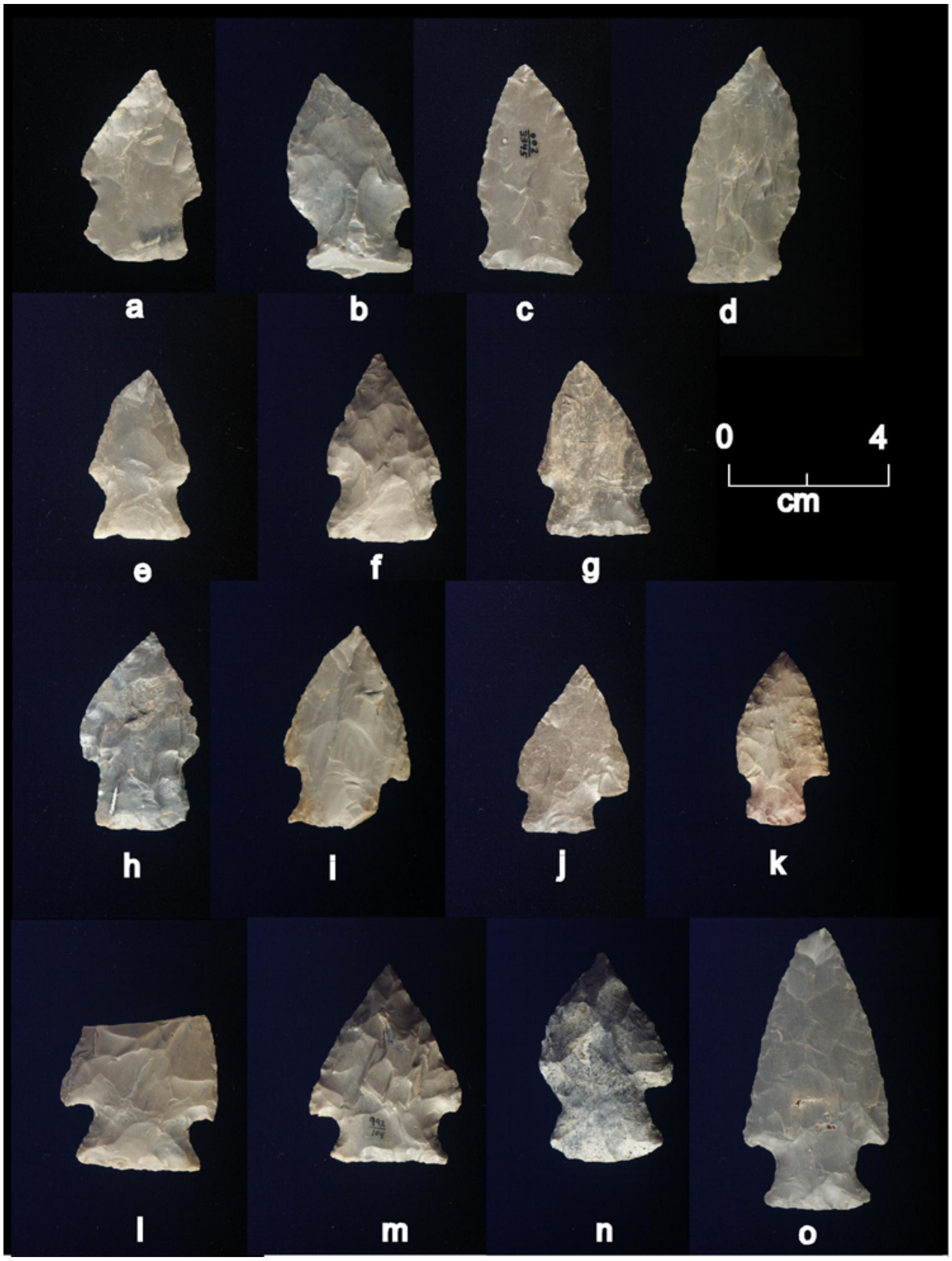

Figure 7.9. Snyders Cluster Groups 1-3: (a-g) Group 1; (h-k) Group 2; (i-o) Group 3.

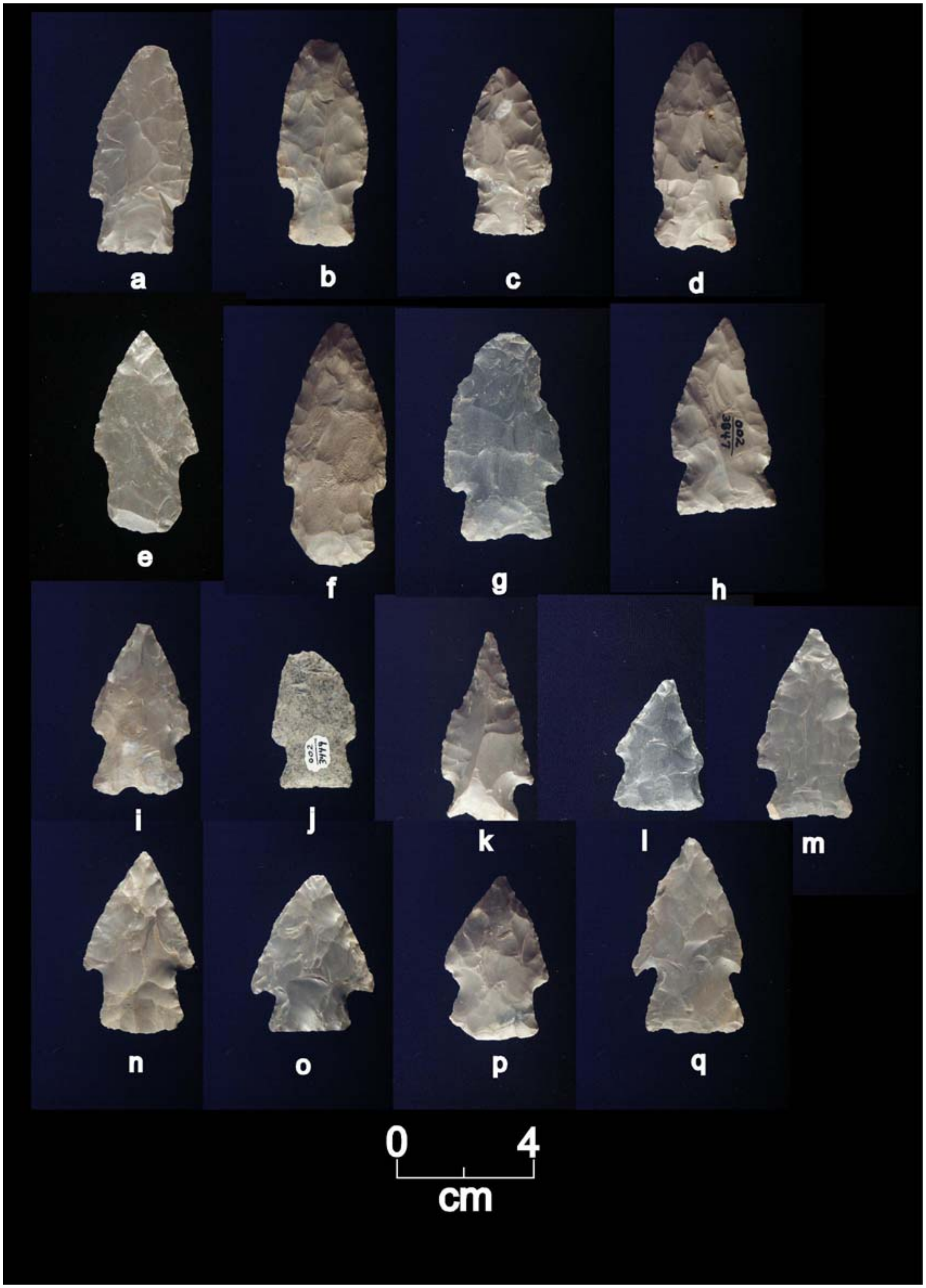

Figure 7.10. Snyders Cluster Groups 4-6: (a-h) Group 4; (i-m) Group 5; (n-q) Group 6.

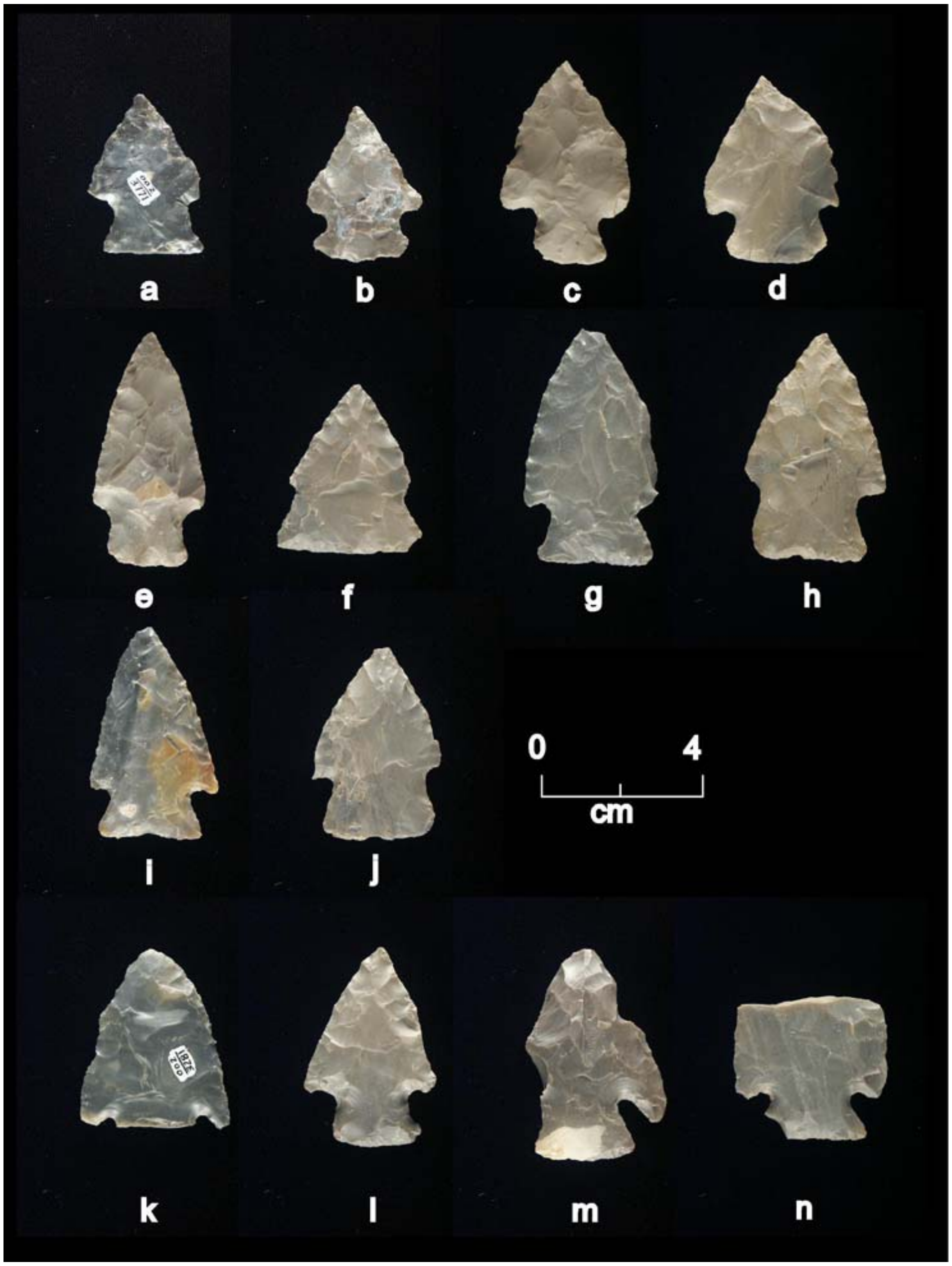

Figure 7.11. Snyders Cluster Groups 7-9: (a-d) Group 7; (e-j) Group 8; (k-n) Group 9.

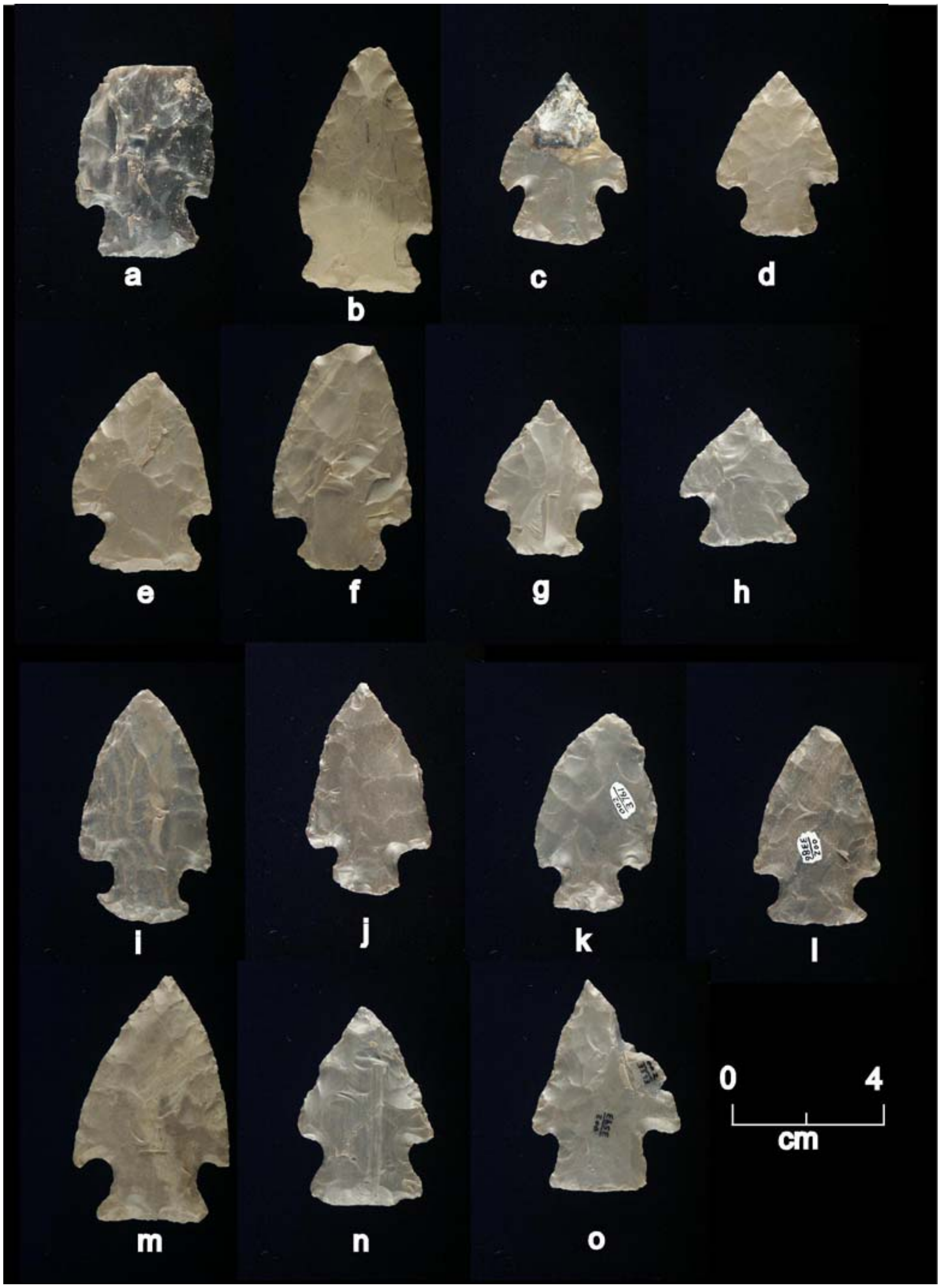

Figure 7.12. Snyders Cluster Groups 10-13: (a-d) Group 10; (e-h) Group 11; (i-l) Group 12; (m-o) Group 13.

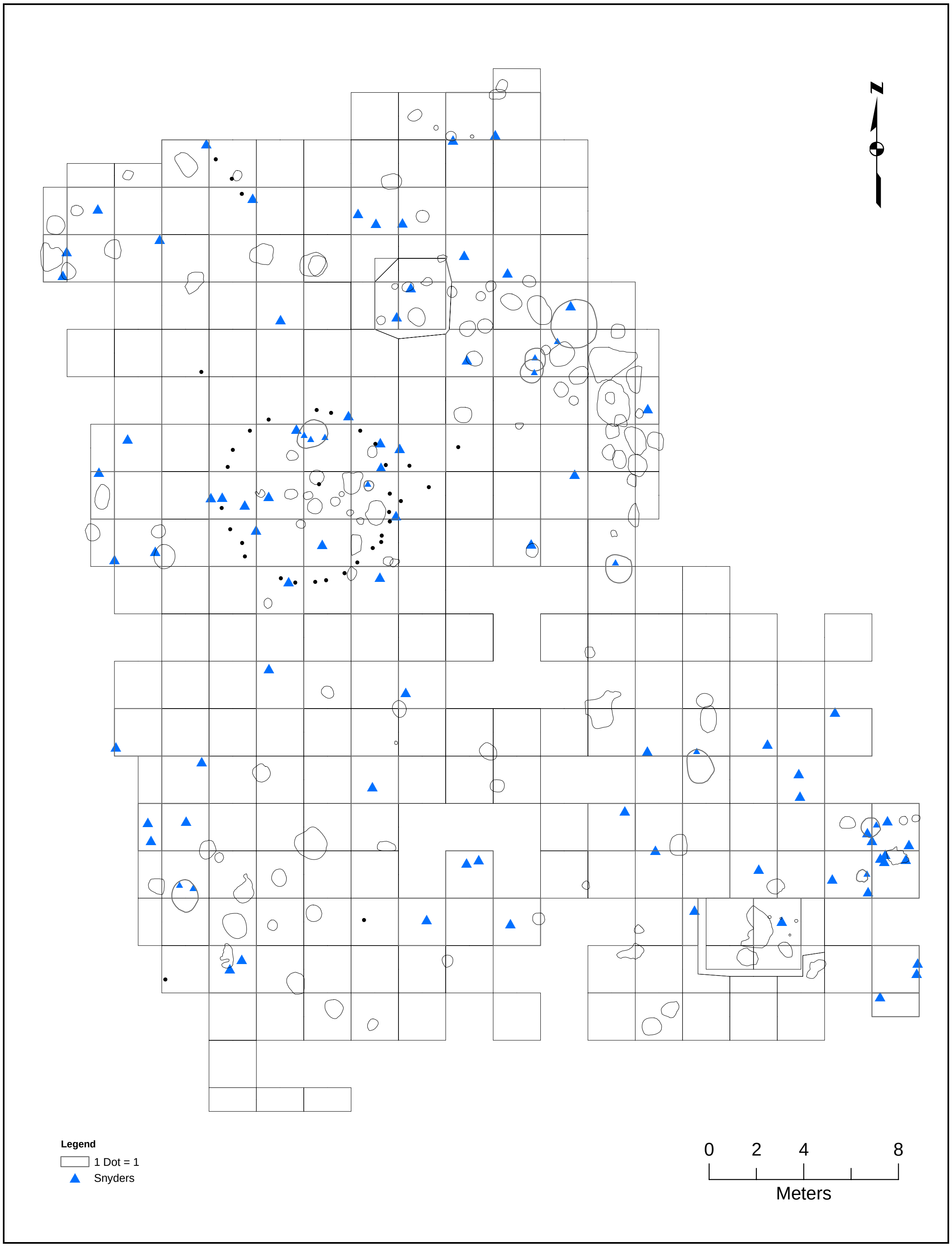

Figure 7.13. Snyders Cluster projectile points in the 100 Block.

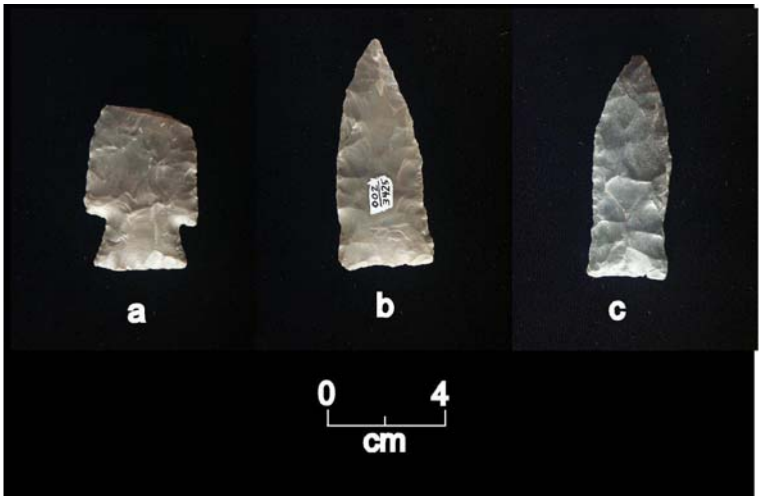

Figure 7.14. Copena and Lowe points: (a) Lowe; (b-c) Copena.

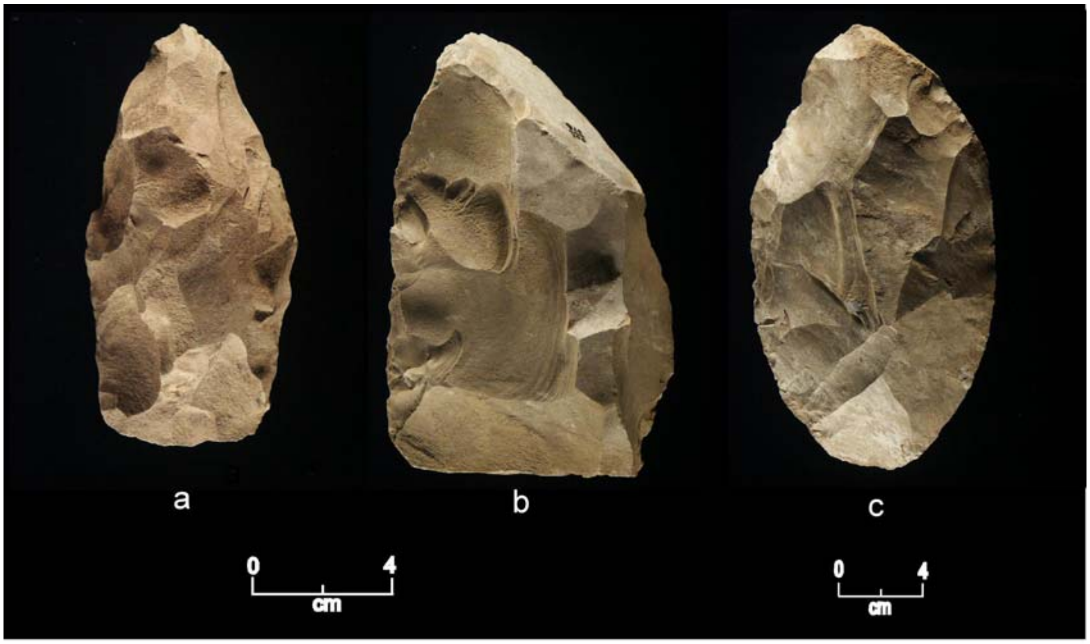

Figure 7.15. Early Woodland Stage 1 bifaces.

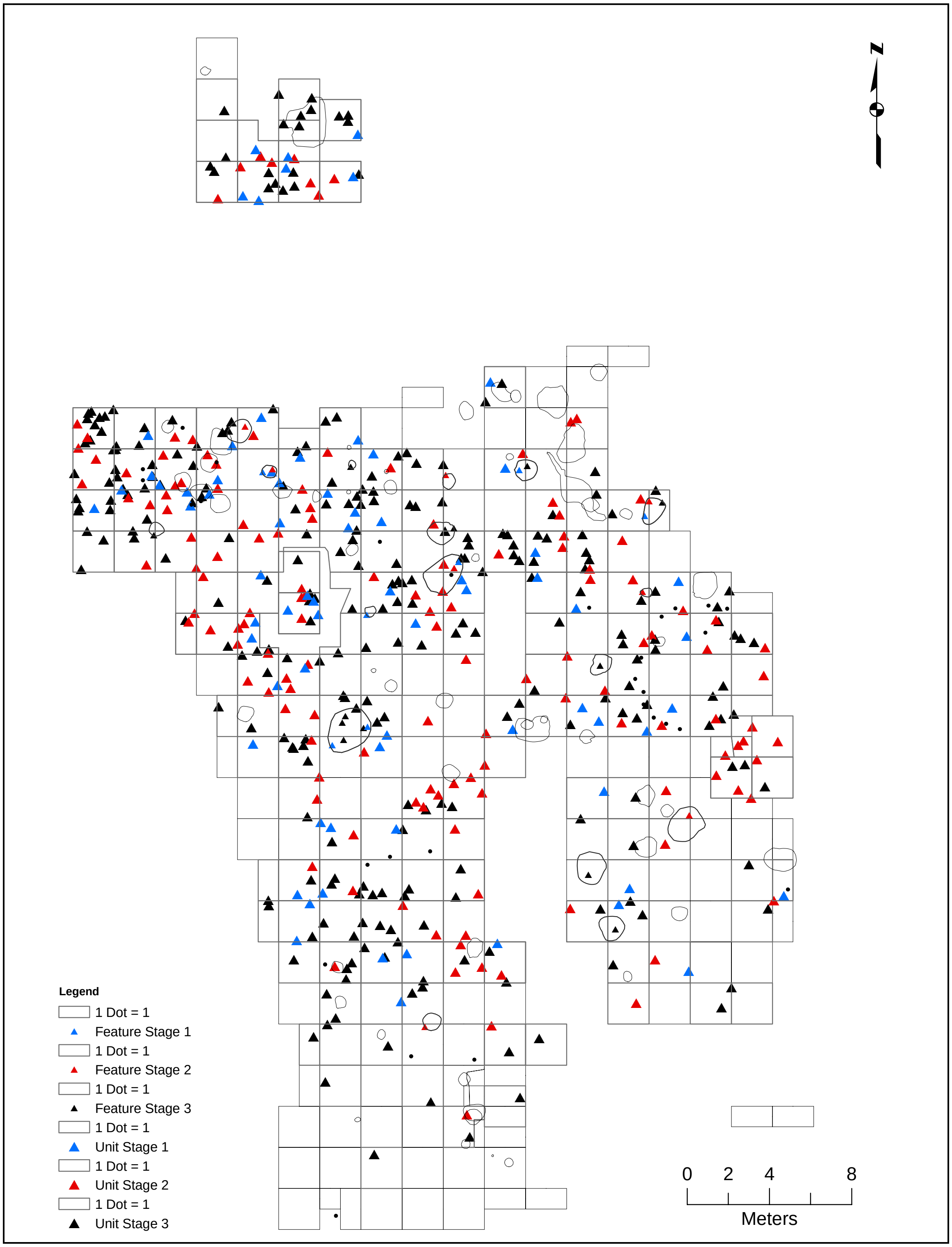

Figure 7.16. Bifaces in Early Woodland levels and features in the 200 Block.

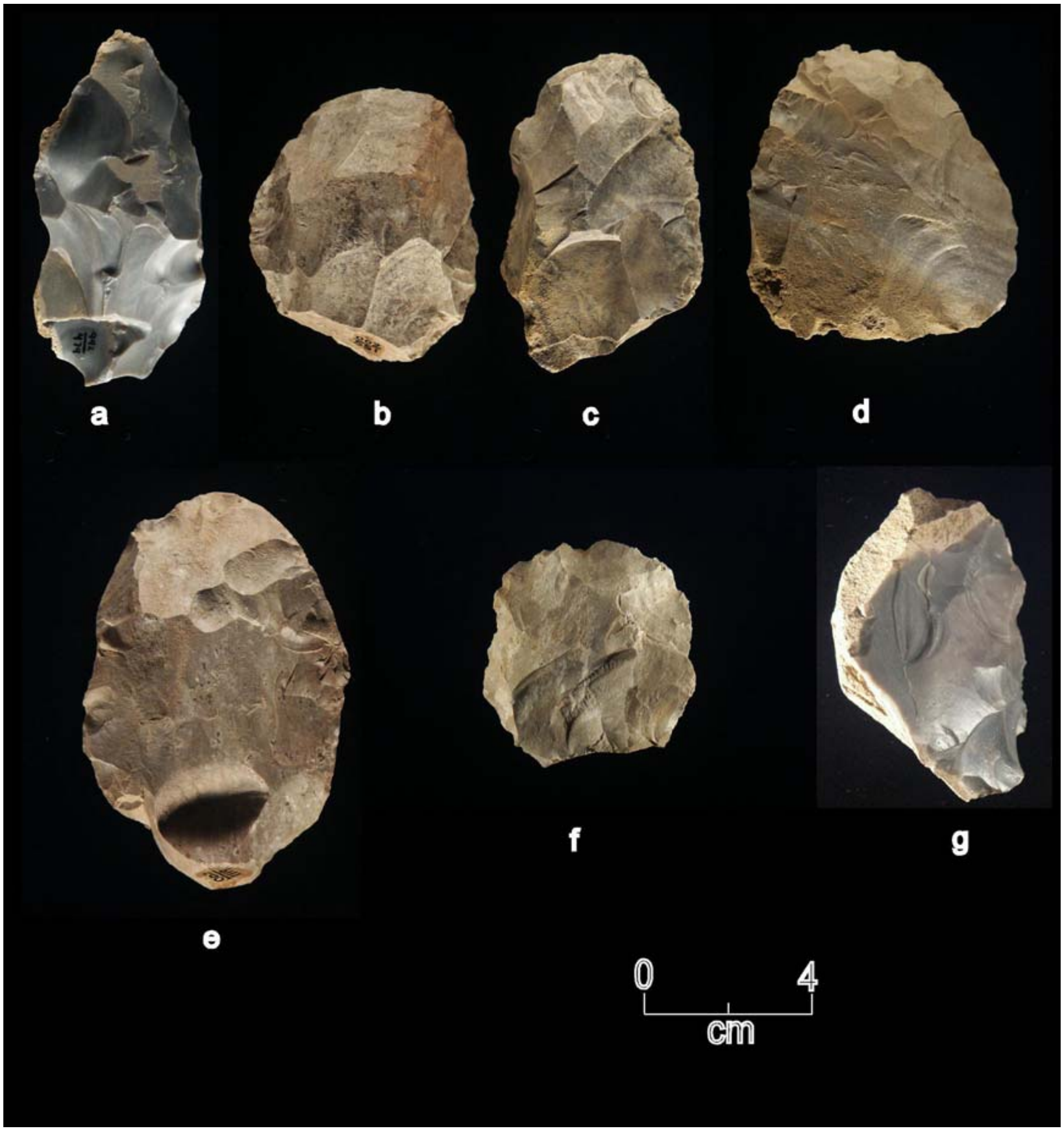

Figure 7.17. Stage 1 bifaces: (a-e) Early Woodland; (f) Middle Woodland.

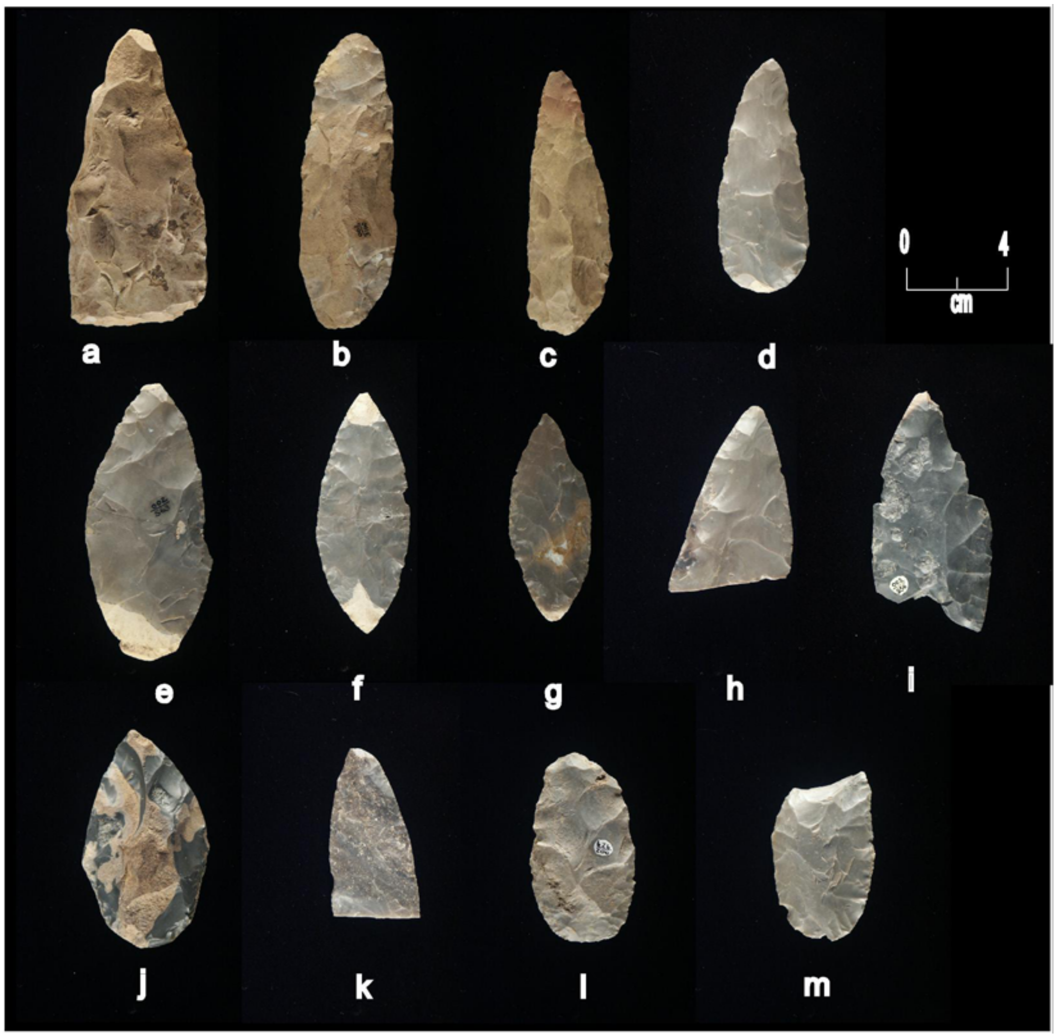

Figure 7.18. Early Woodland Stage 2 and 3 bifaces.

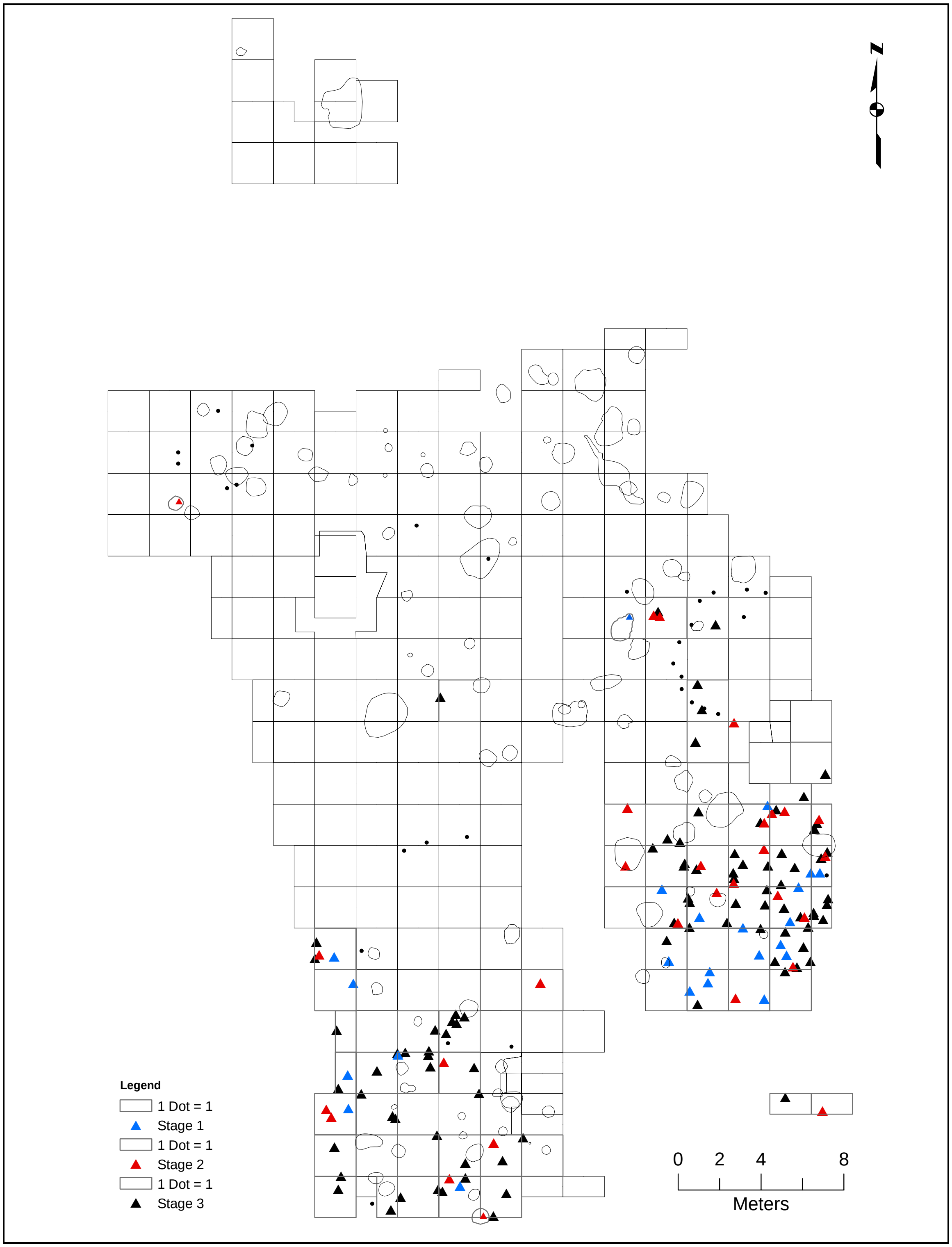

Figure 7.19. Bifaces in Middle Woodland levels and features in the 200 Block.

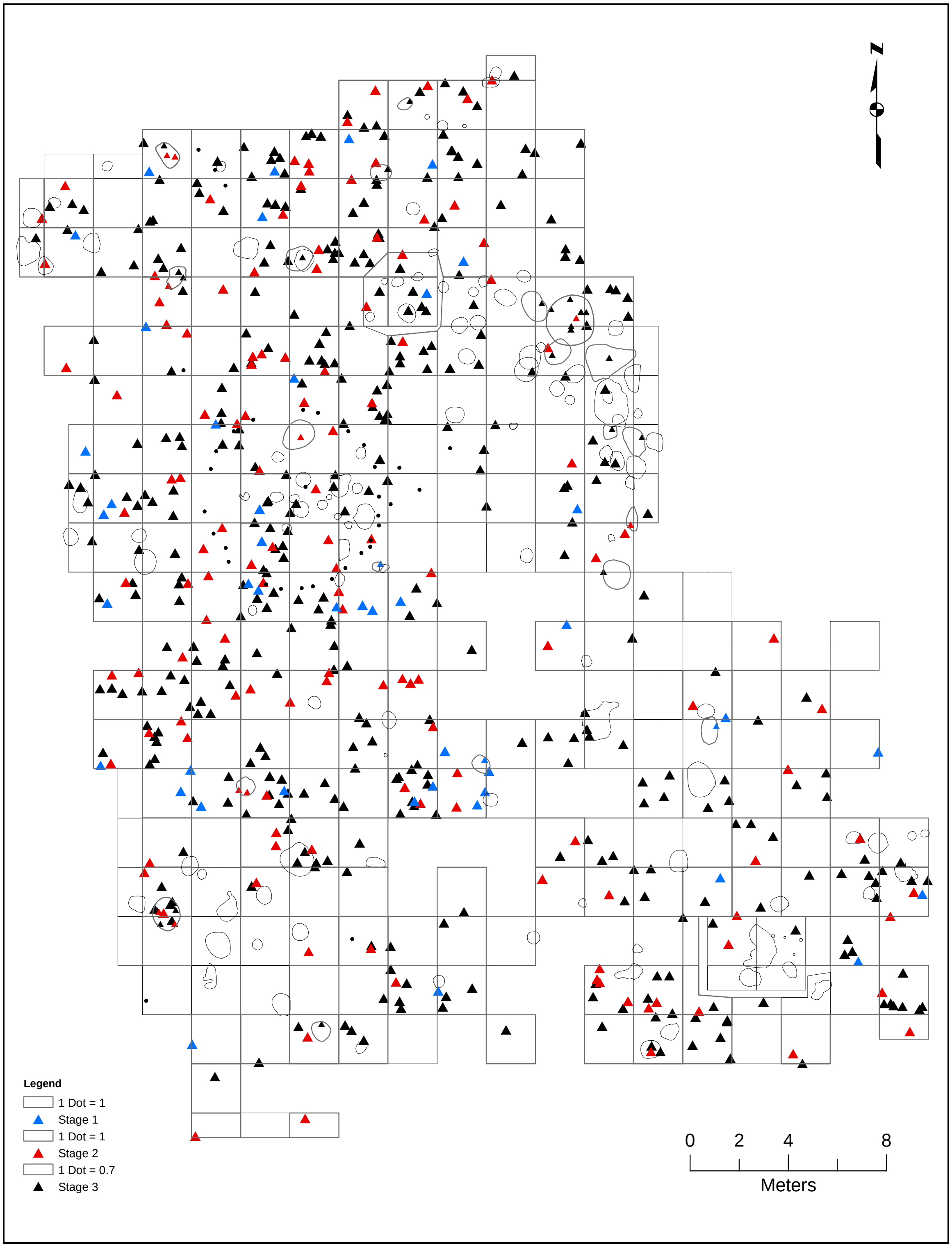

Figure 7.20. Bifaces in Woodland levels and features in the 100 Block

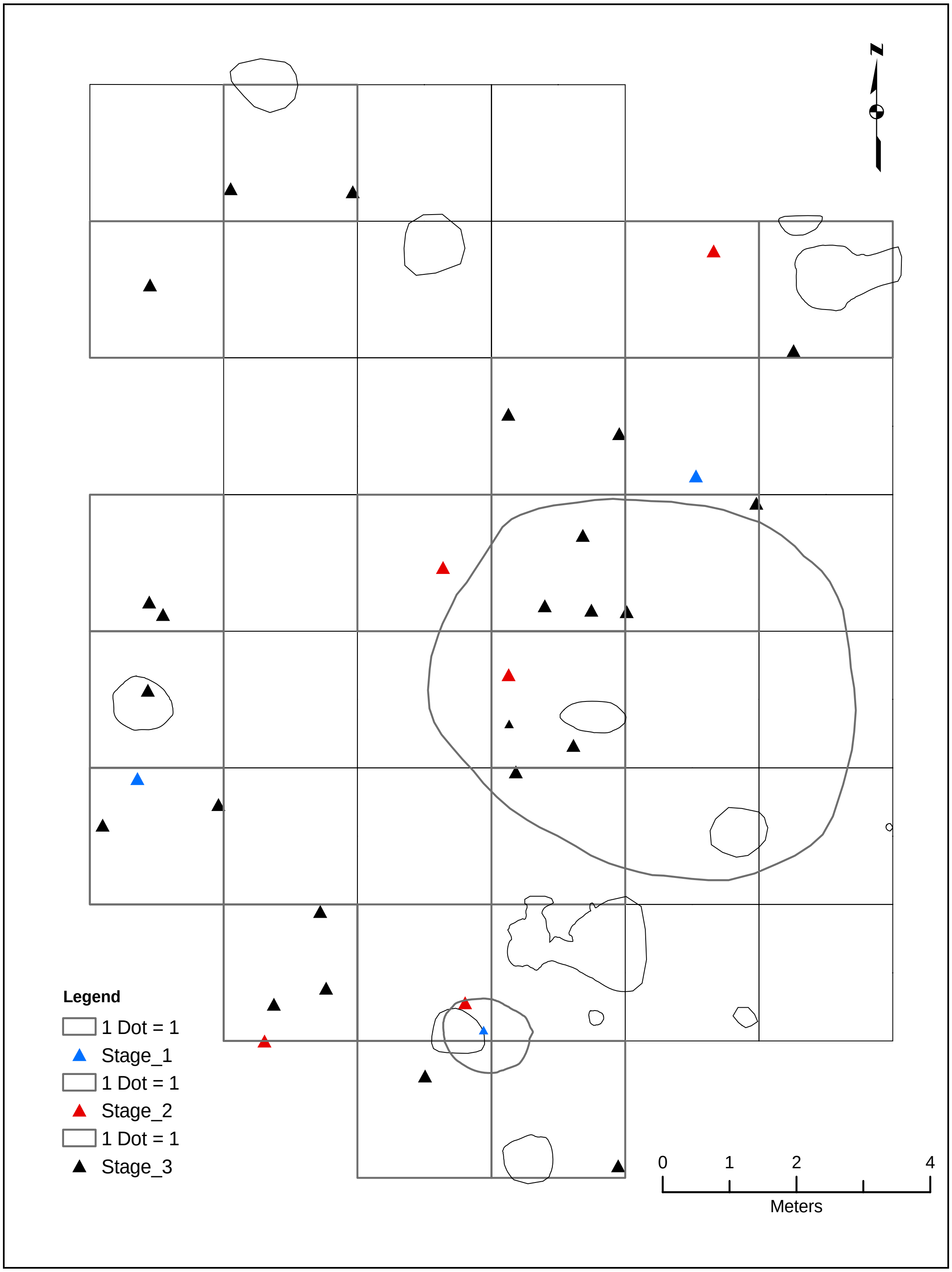

Figure 7.21. Bifaces in Woodland levels and features in the Phase II South Block.

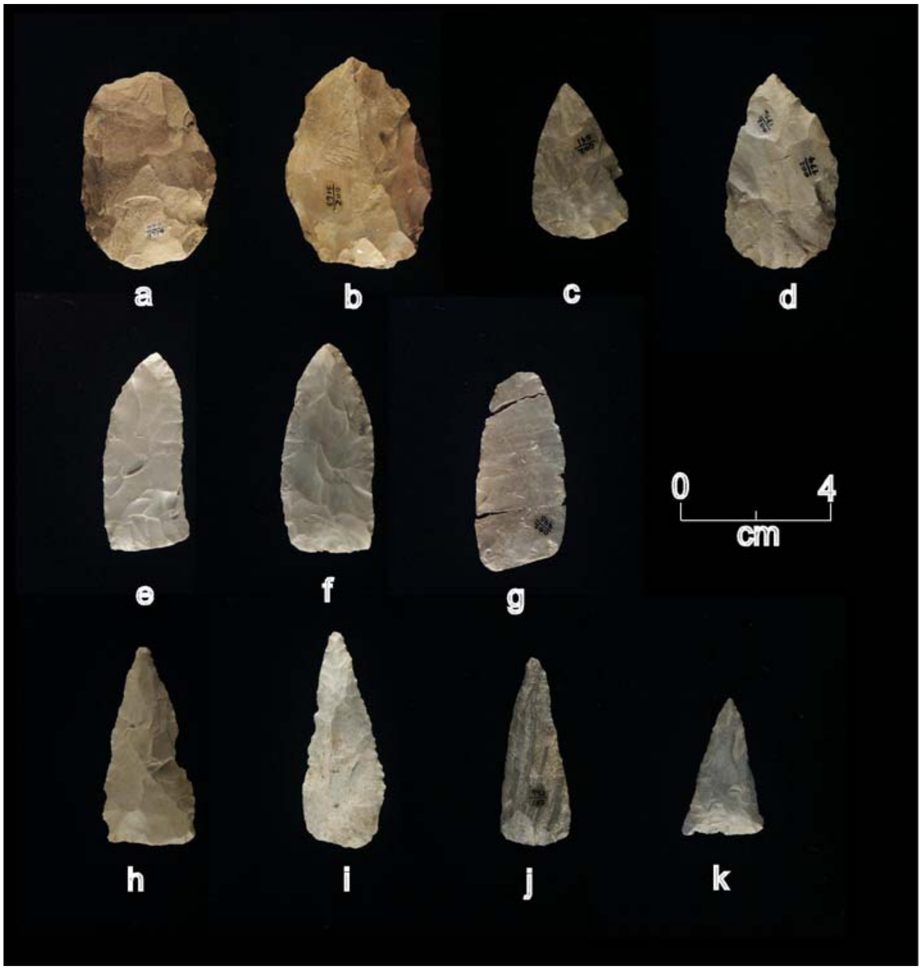

Figure 7.22. Middle Woodland Stage 2 and 3 bifaces.

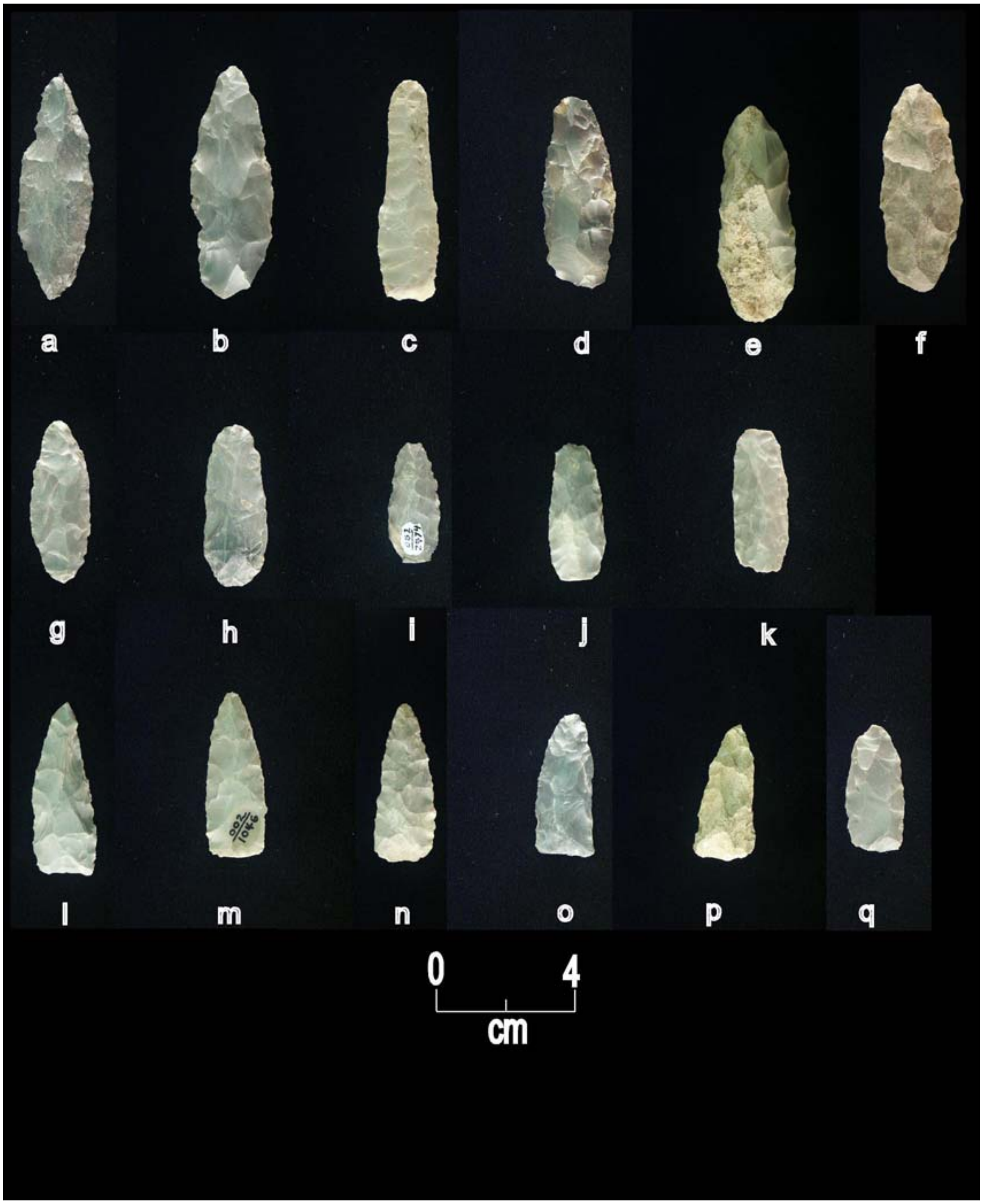

Figure 7.23. Small to medium sized, narrow, pointed bifaces.

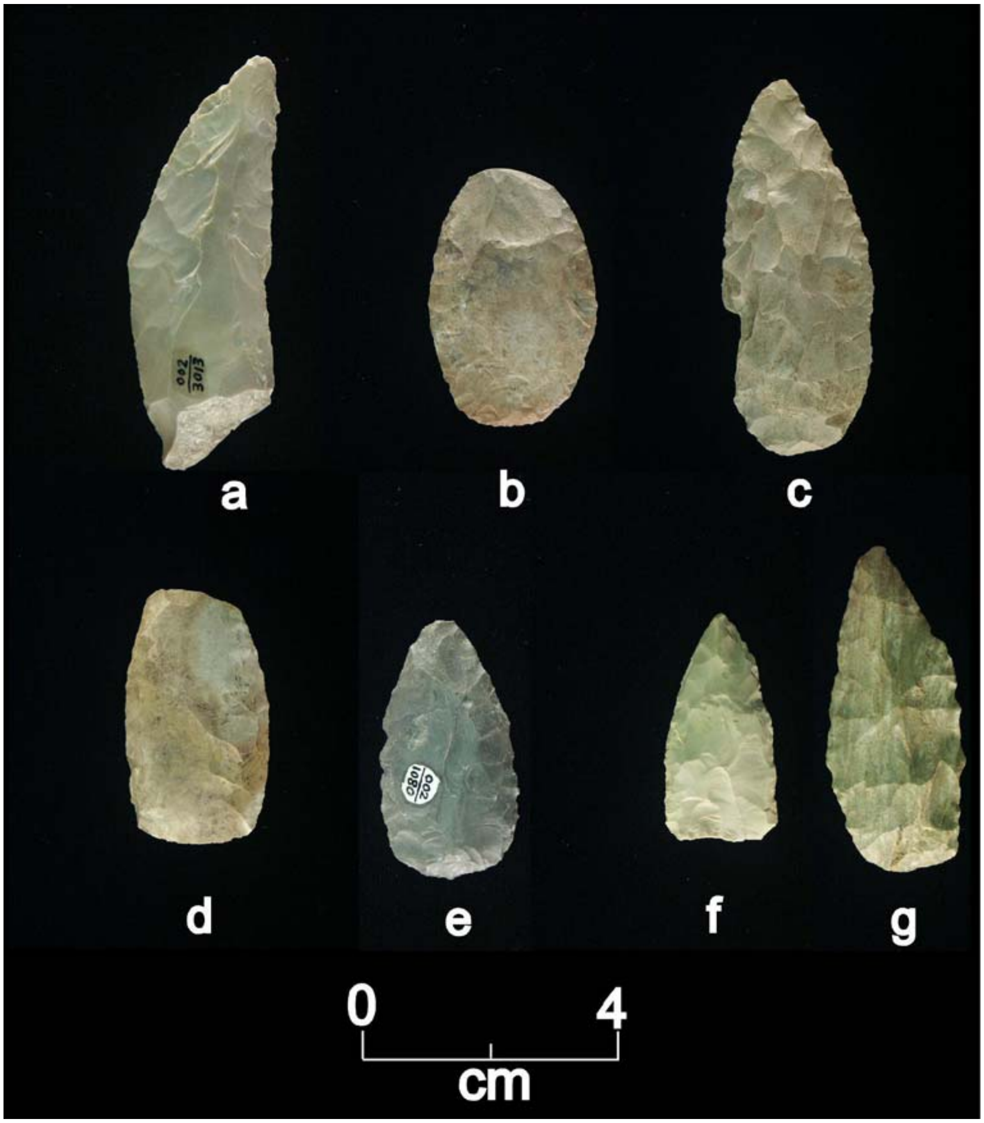

Figure 7.24. Additional distinctive bifaces.

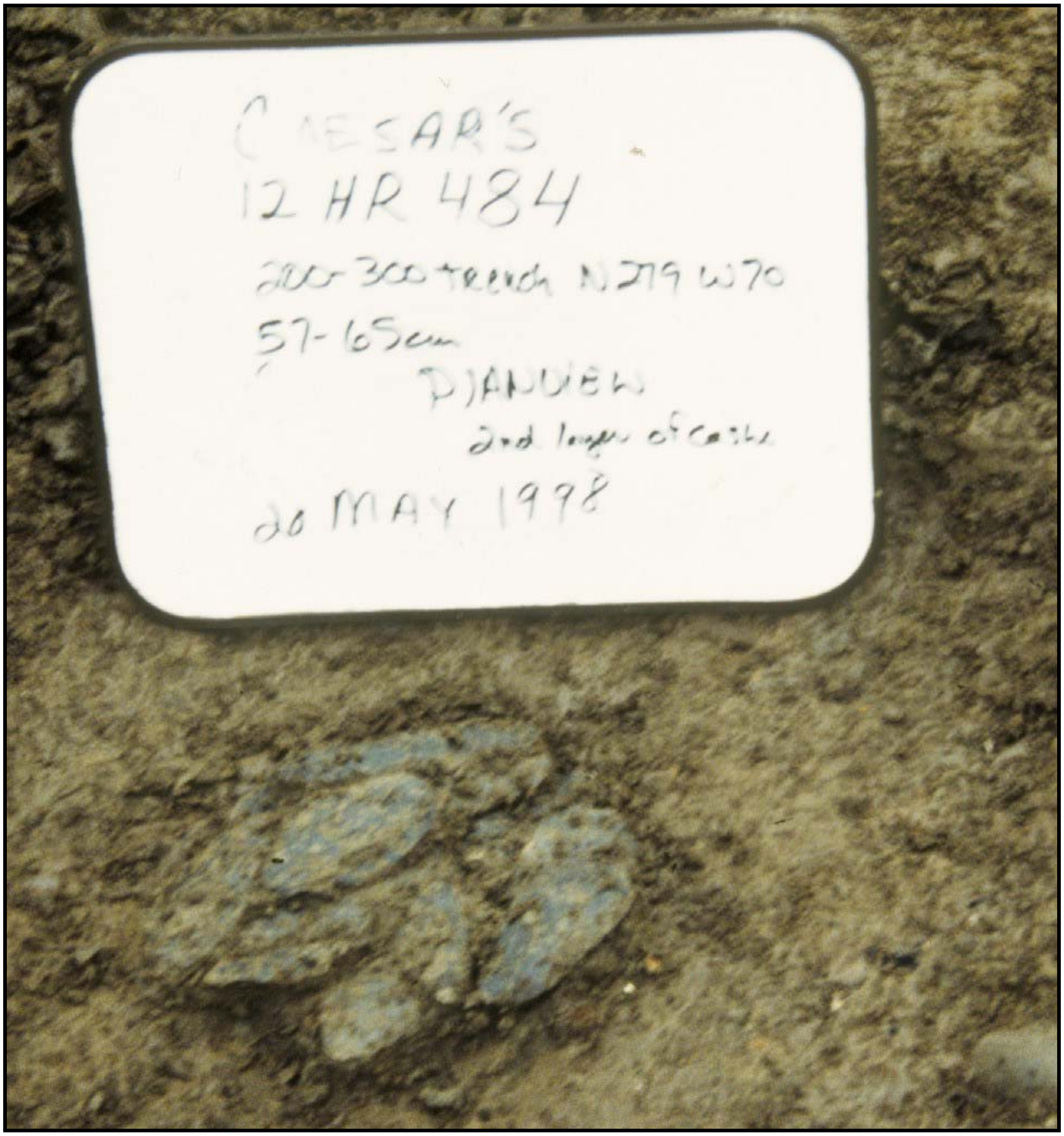

Figure 7.25. Hathaway Cache during excavation showing layers of tools.

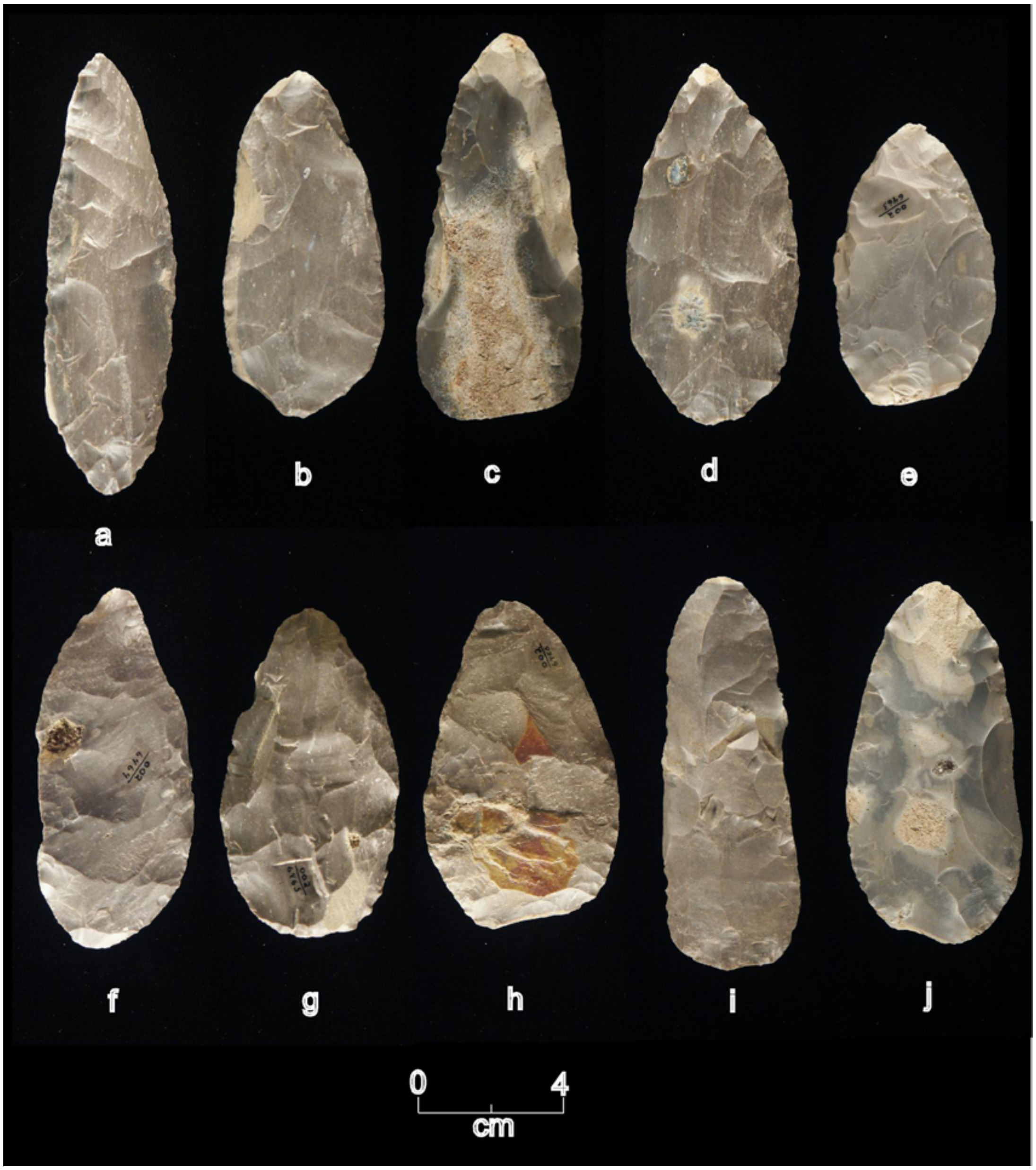

Figure 7.26. Hathaway Cache (002-6459-6468).

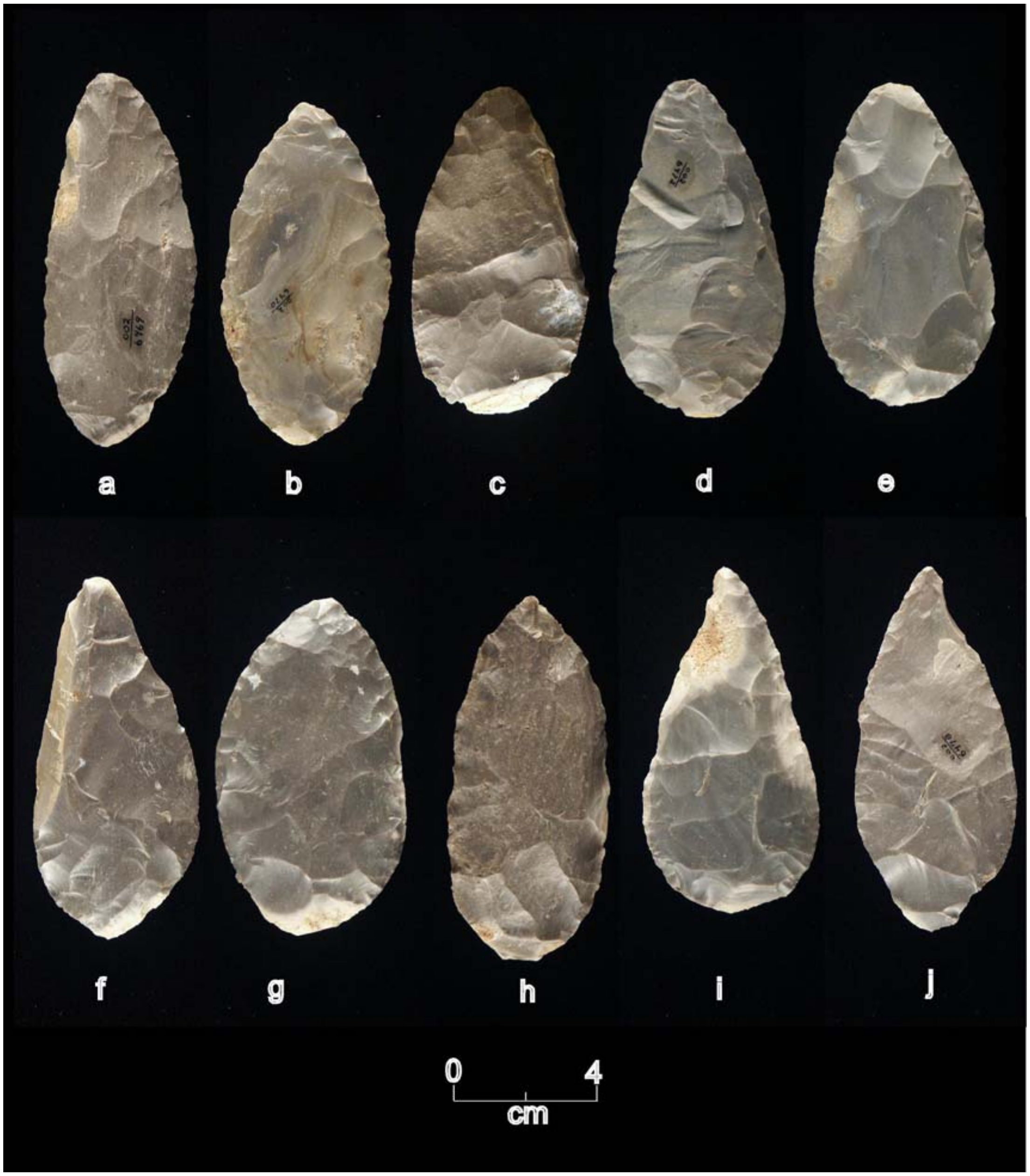

Figure 7.27. Hathaway Cache (002-6469-6478).

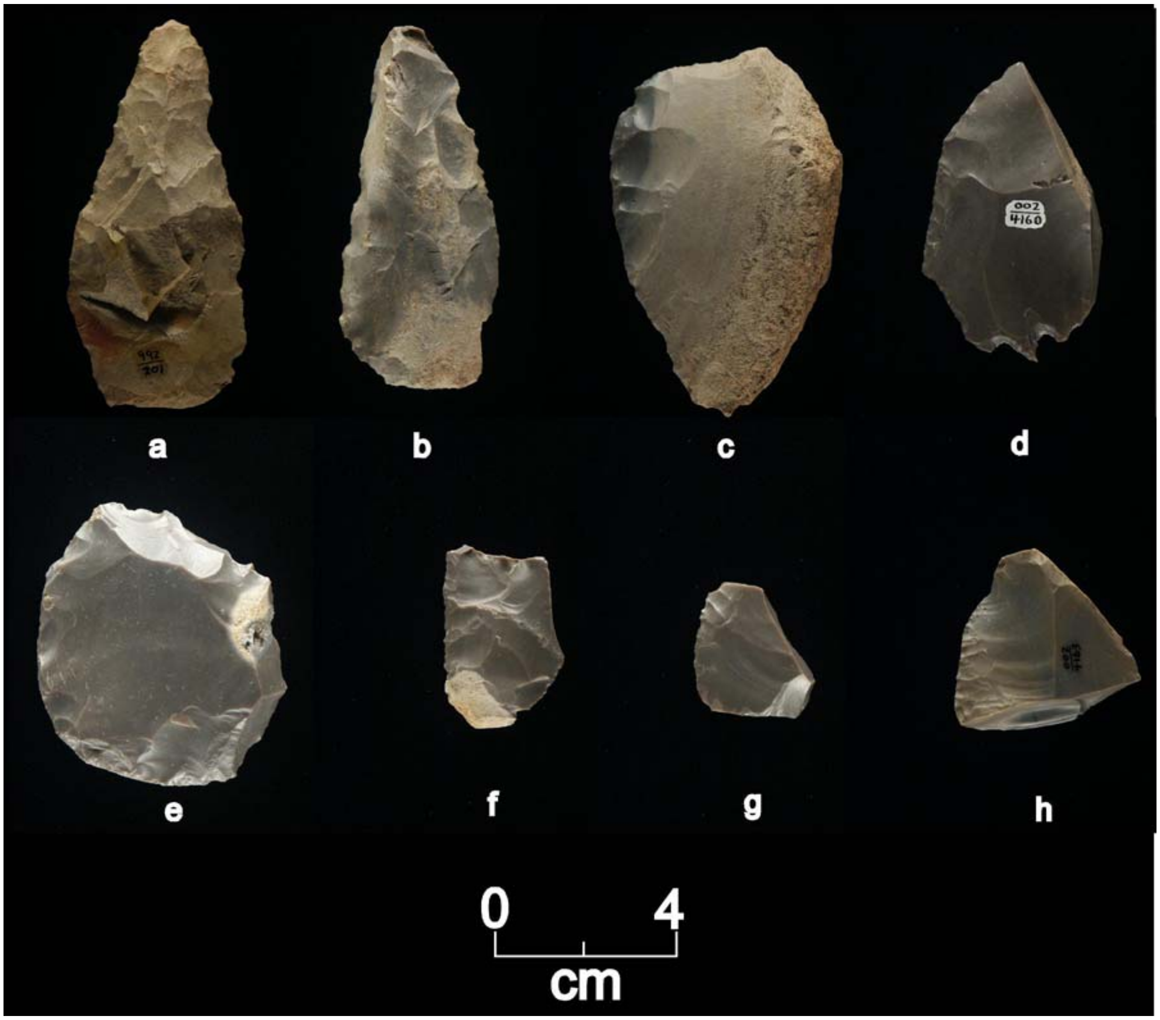

Figure 7.28. Unifaces.

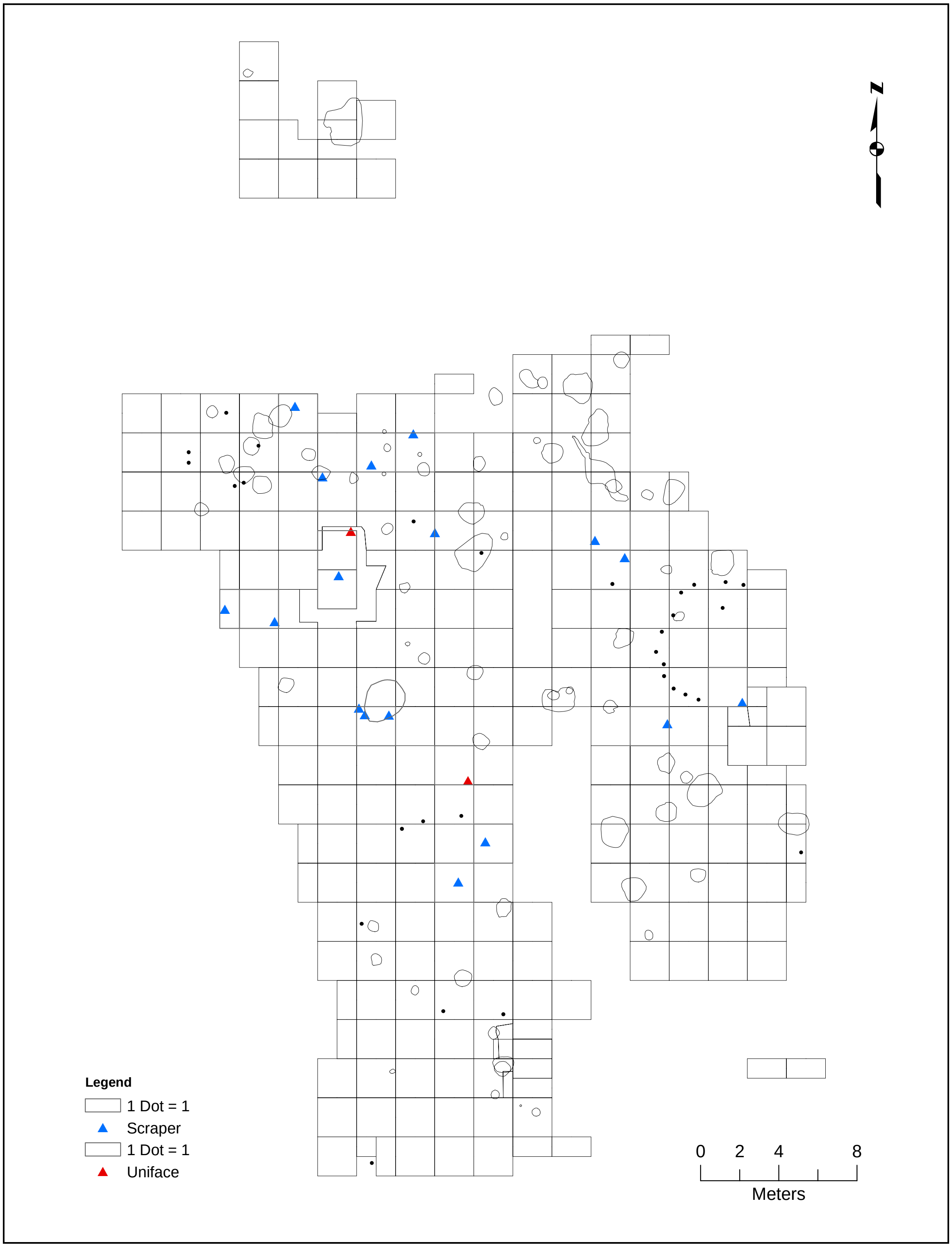

Figure 7.29. Scrapers and unifaces in Early Woodland levels and features in the 200 Block.

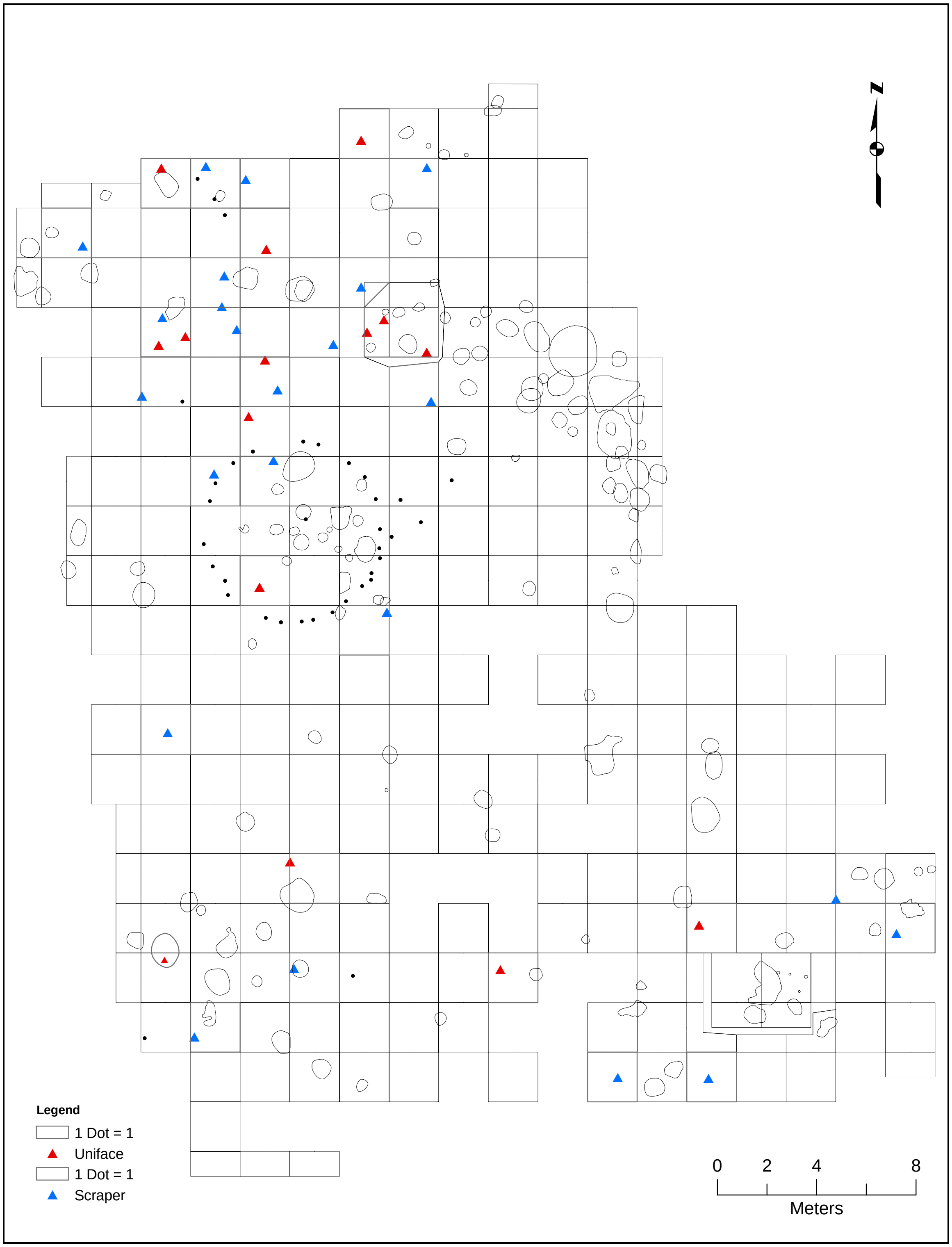

Figure 7.30. Scrapers and unifaces in Woodland levels and features in the 100 Block.

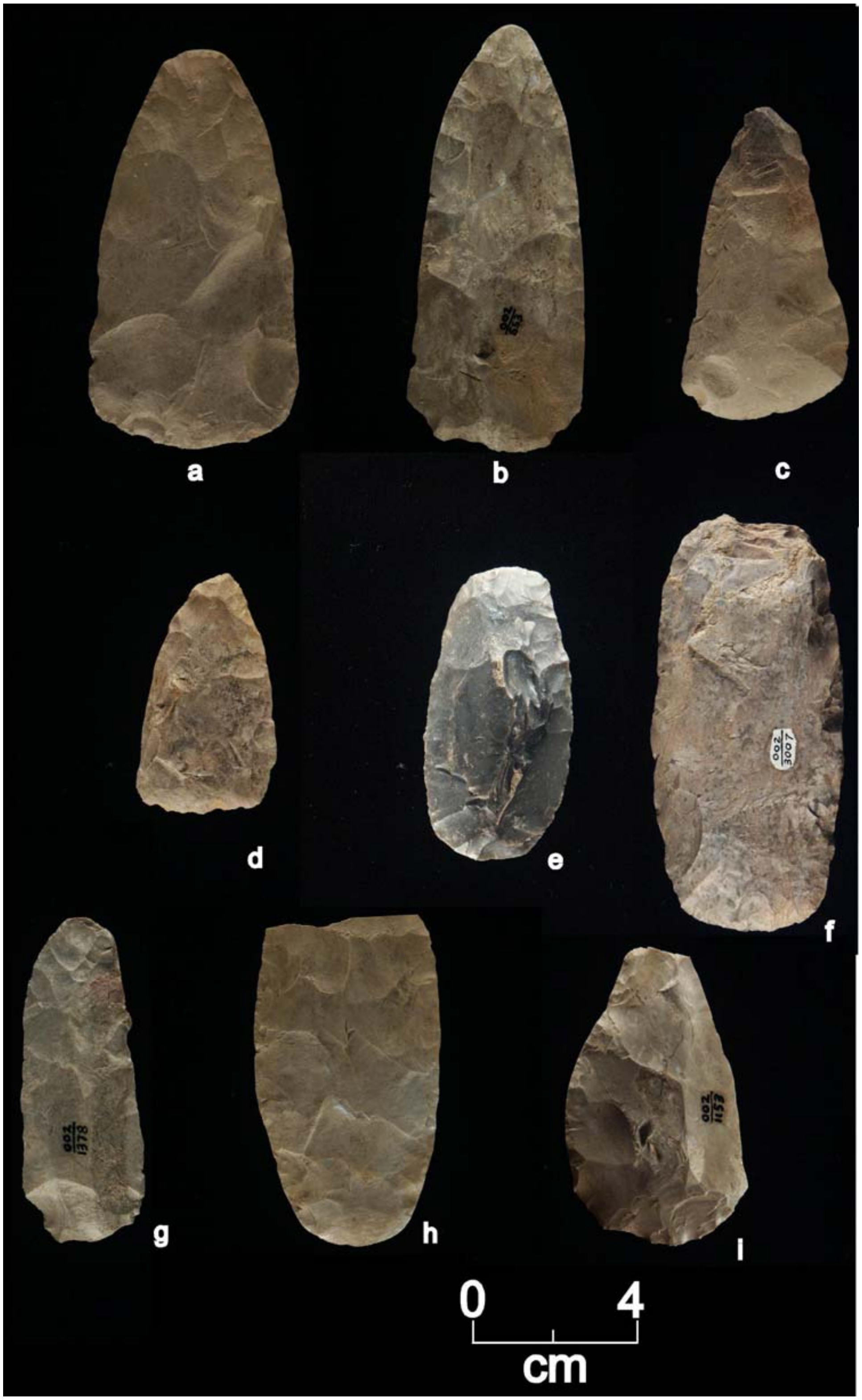

Figure 7.31. Adzes and axes.

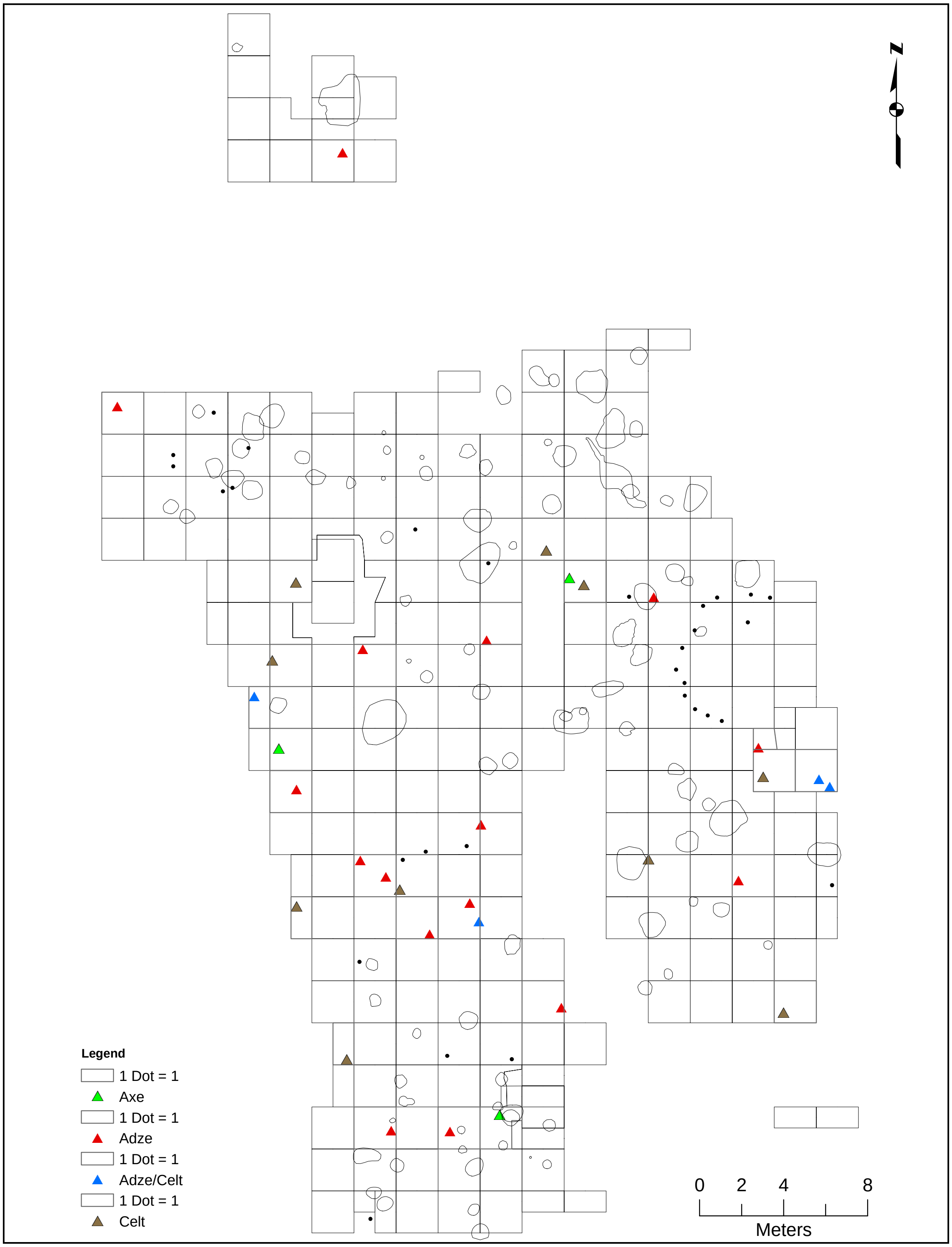

Figure 7.32. Adzes, axes, and celts in Woodland levels and features in the 200 Block.

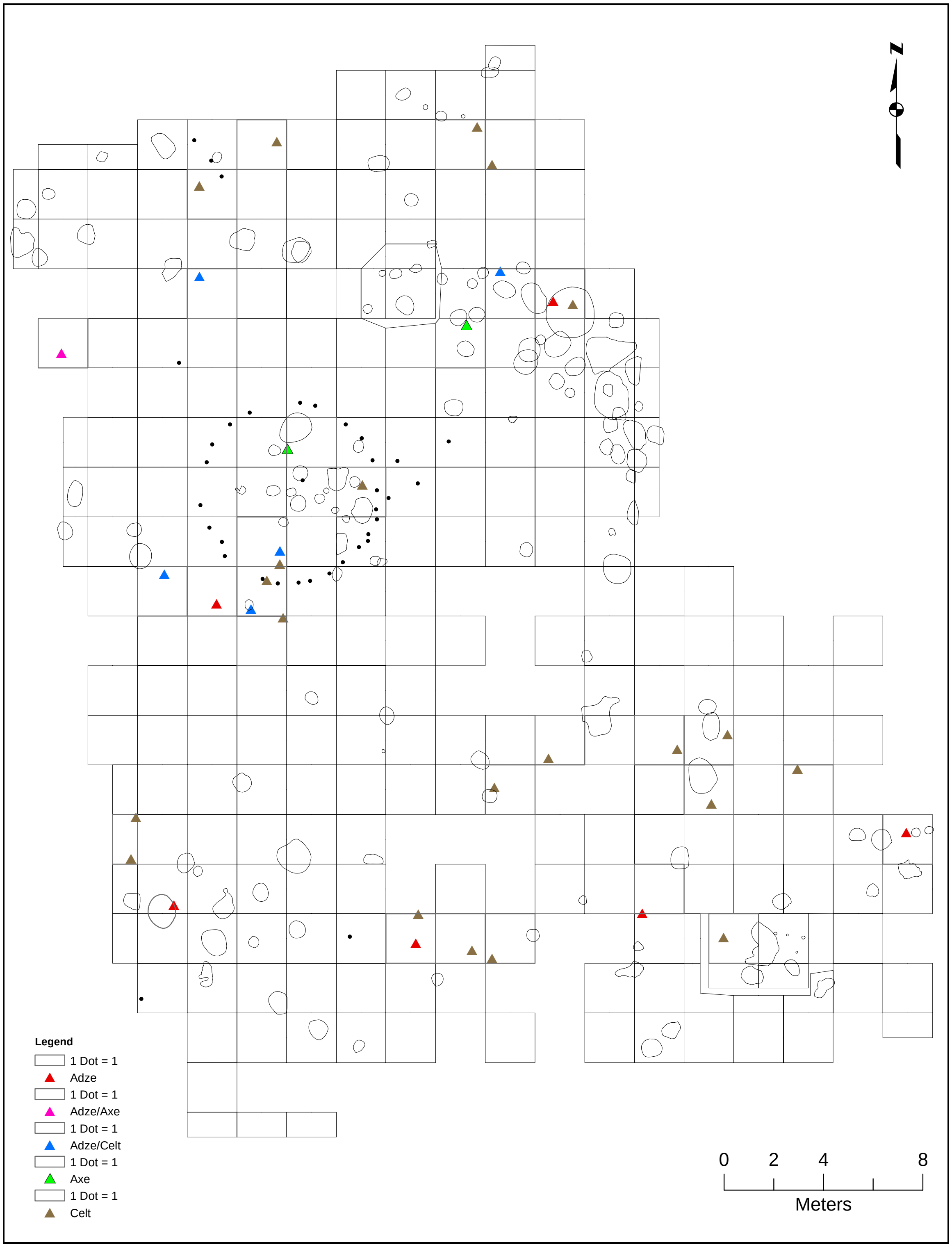

Figure 7.33. Adzes, axes, and celts in Woodland levels and features in the 100 Block.

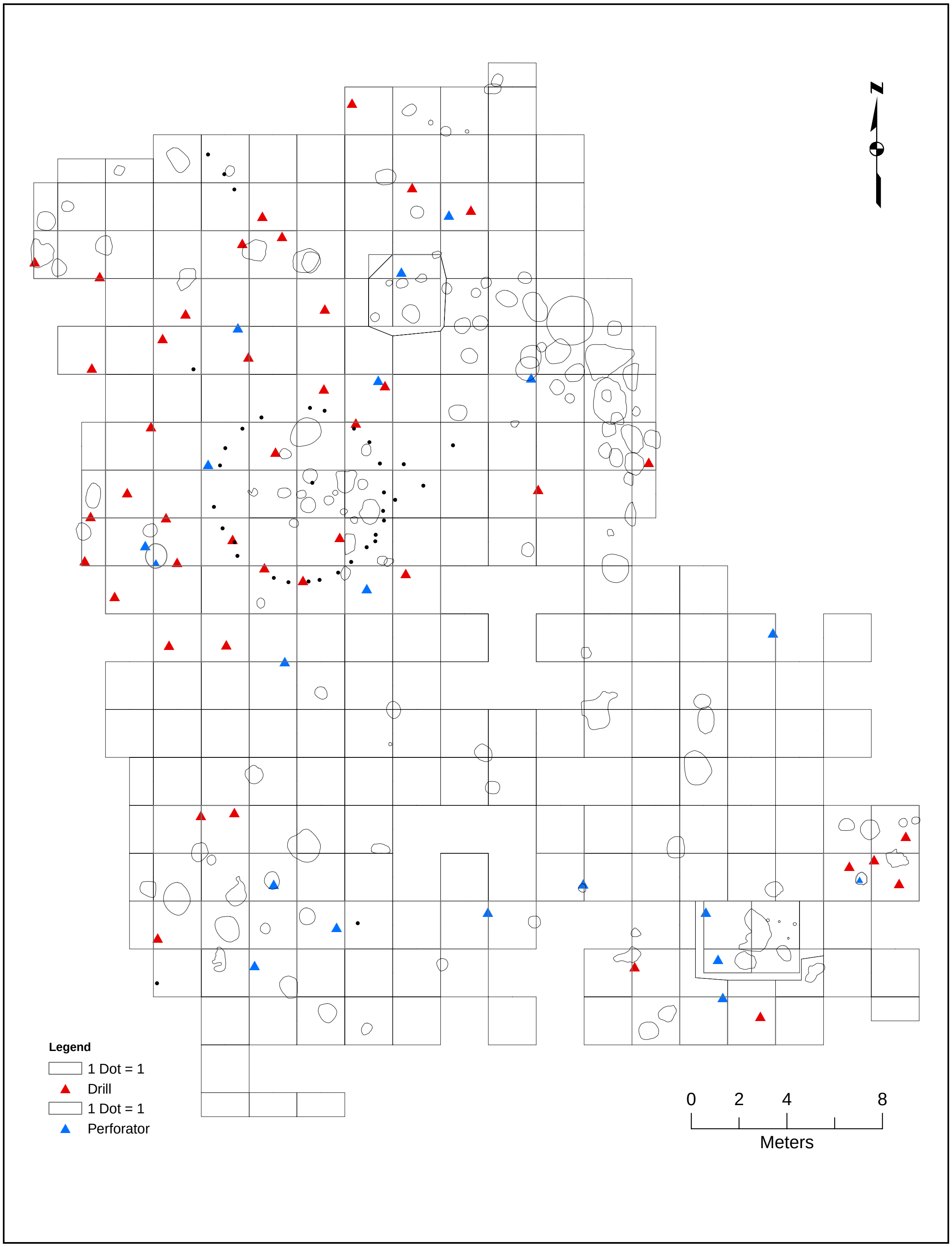

Figure 7.34. Drills and perforators in Woodland levels and features in the 100 Block.

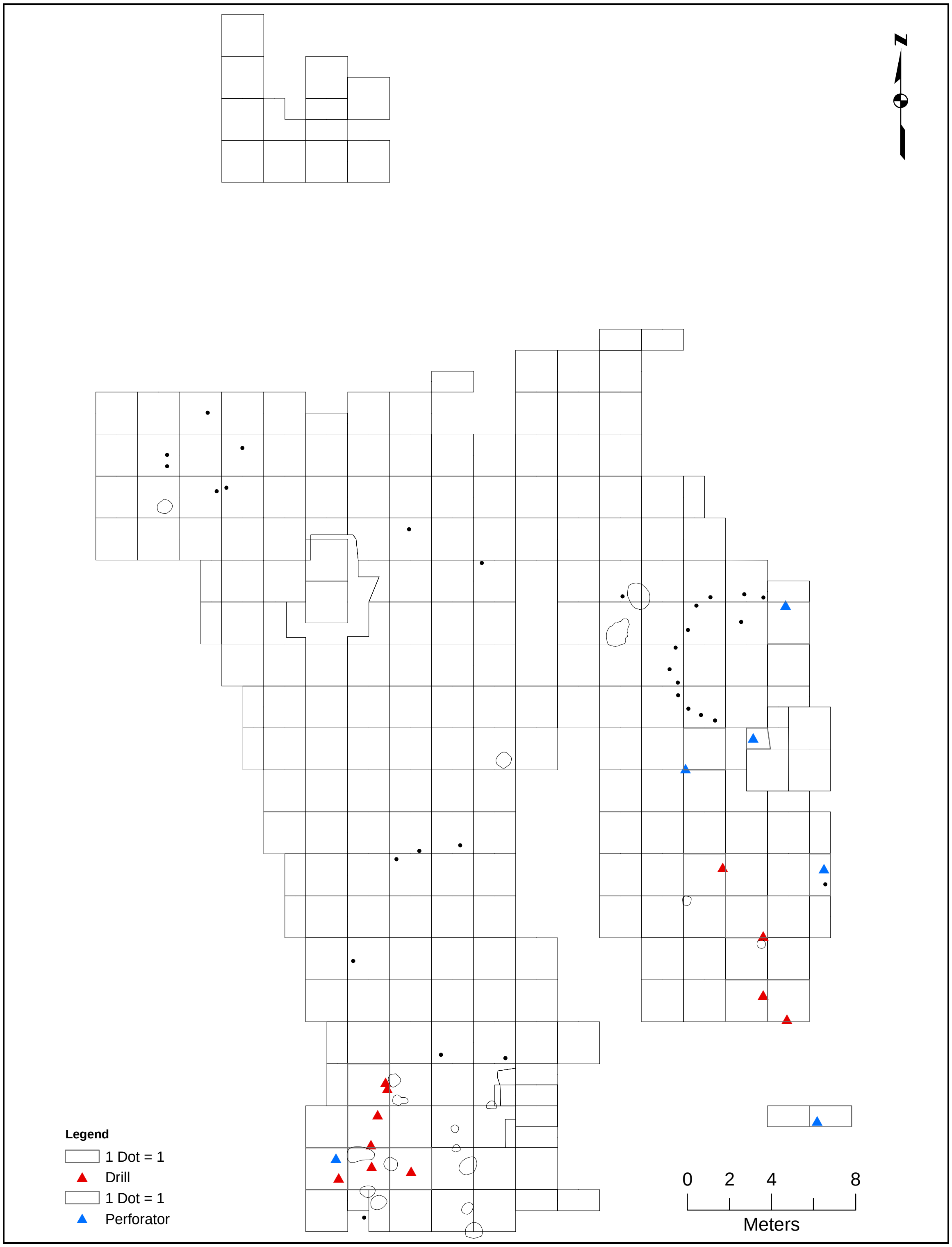

Figure 7.35. Drills and perforators in Middle Woodland levels and features in the 200 Block.

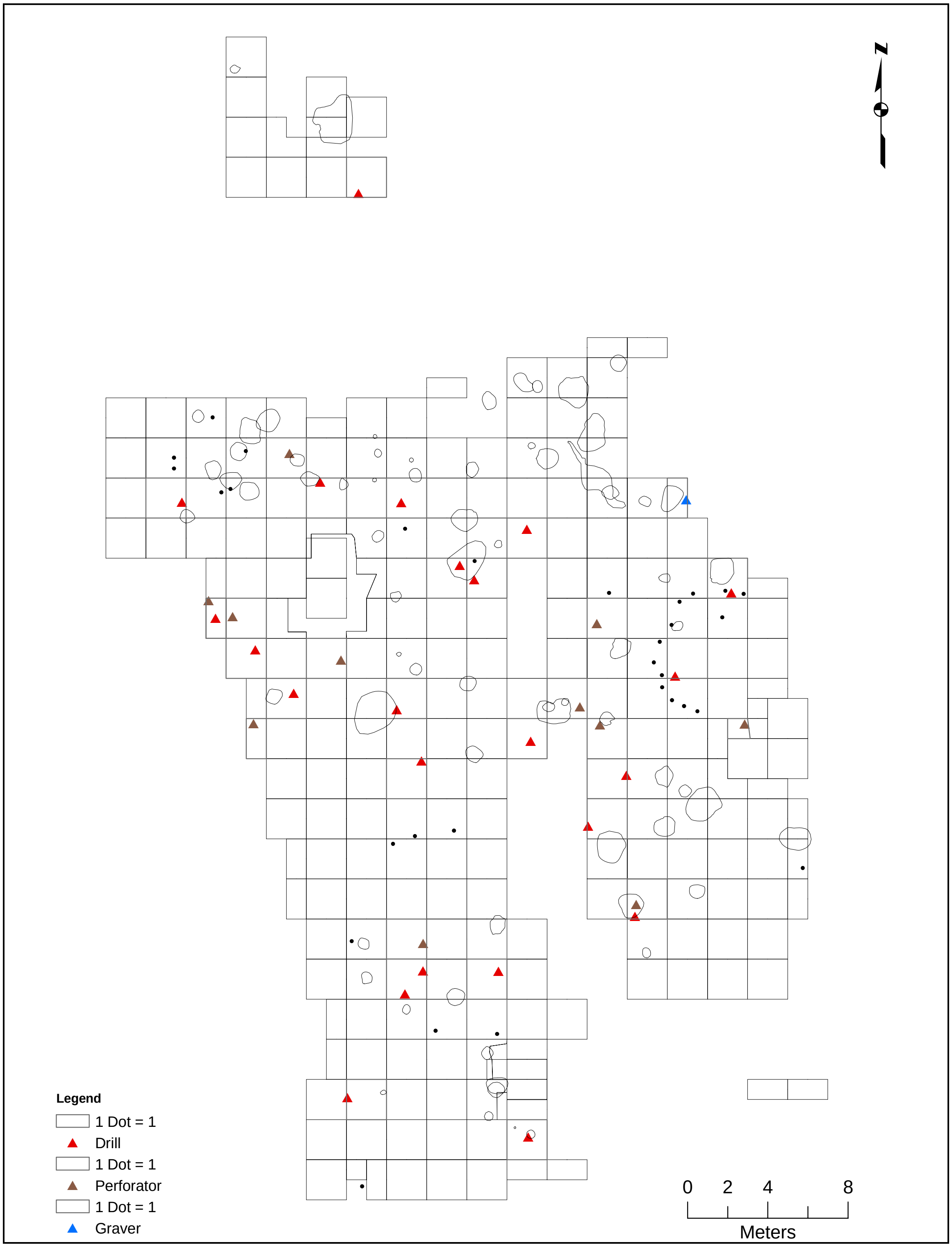

Figure 7.36. Drills, perforators, and gravers in Early Woodland levels and features in the 200 Block.

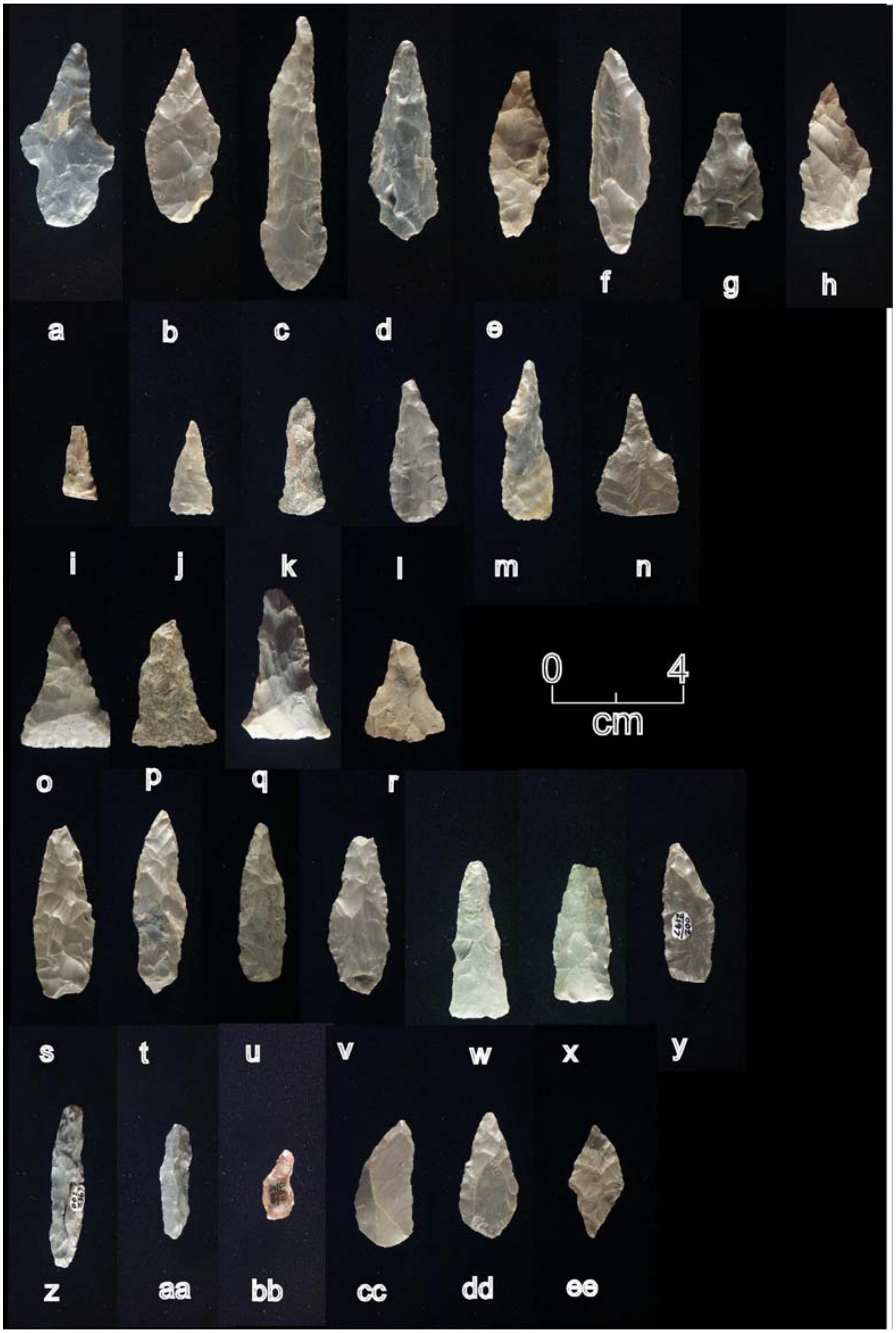

Figure 7.37. Drills: (a-f, i-r) Early Woodland; (g-h) Archaic; (o-r) unknown cultural affiliation. (s-ee) Middle Woodland.

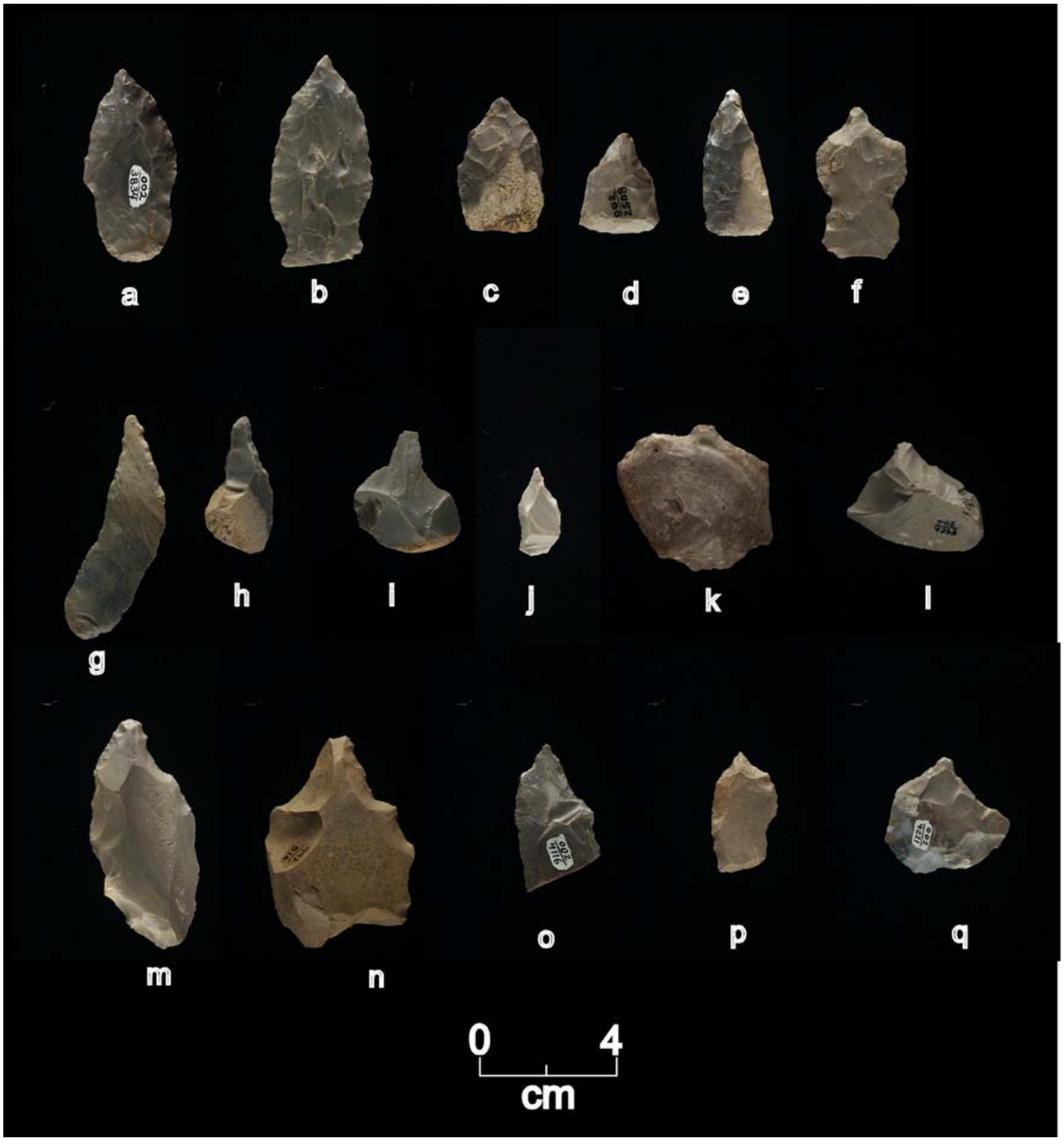

Figure 7.38. Perforators.

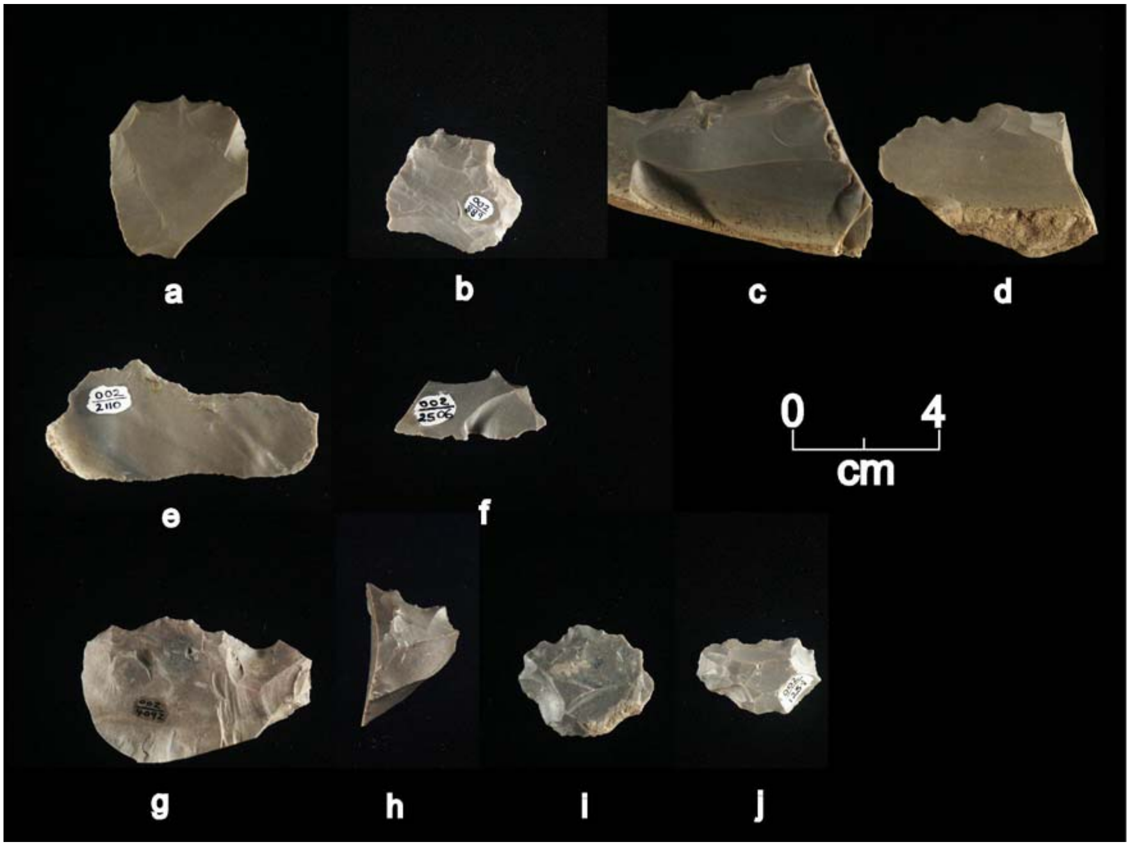

Figure 7.39. Gravers and denticulates: (a-f) gravers; (g-k) denticulates.

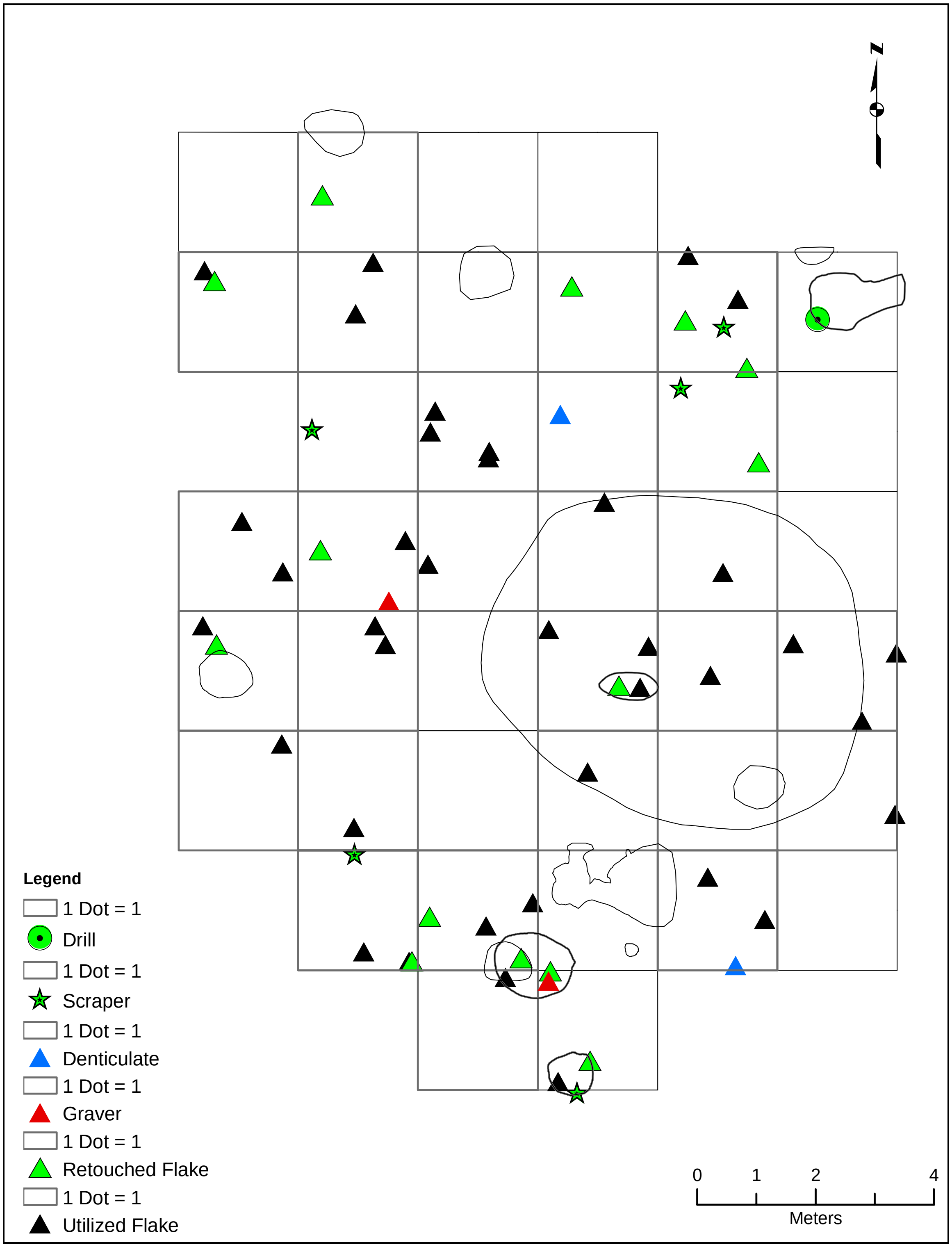

Figure 7.40. Denticulates, drills, gravers, scrapers, unifaces, retouched flakes, and utilized flakes in Woodland levels and features in the Phase II South Block.

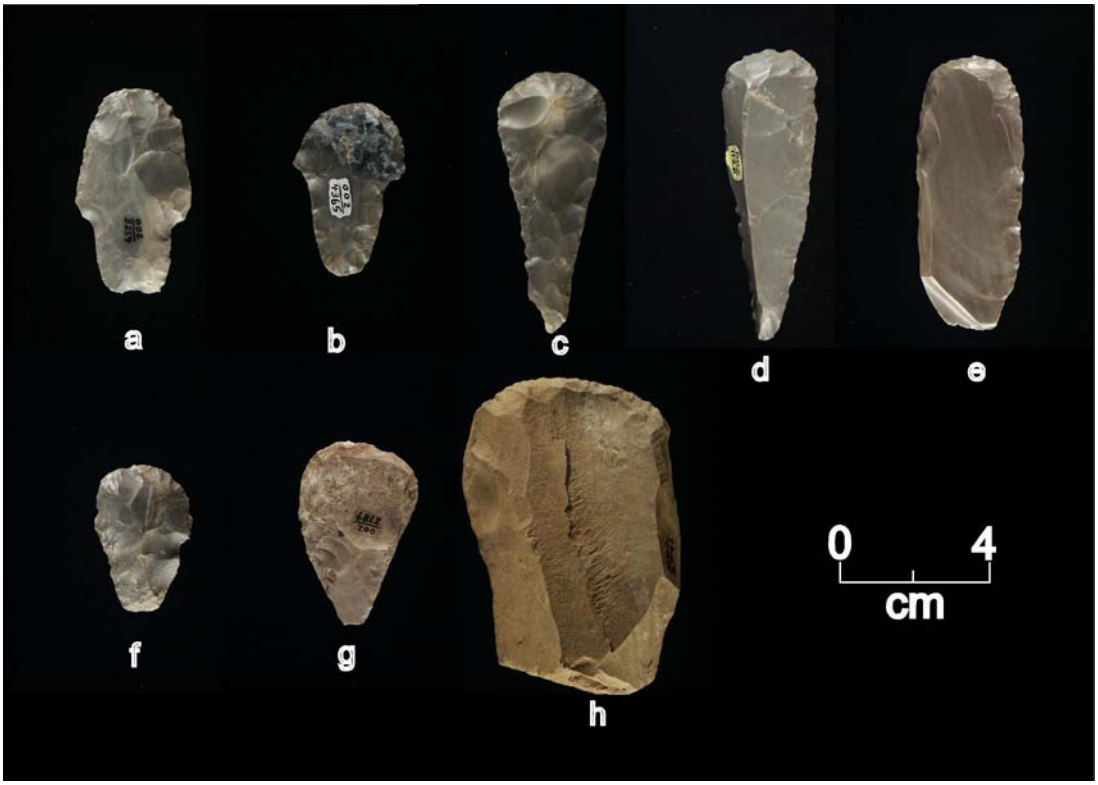

Figure 7.41. End scrapers.

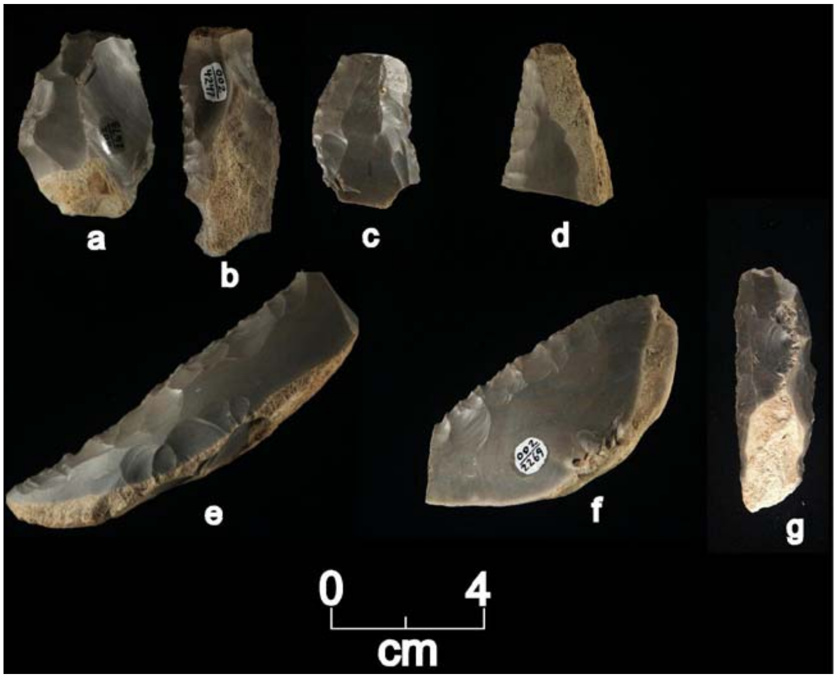

Figure 7.42. Side scrapers.

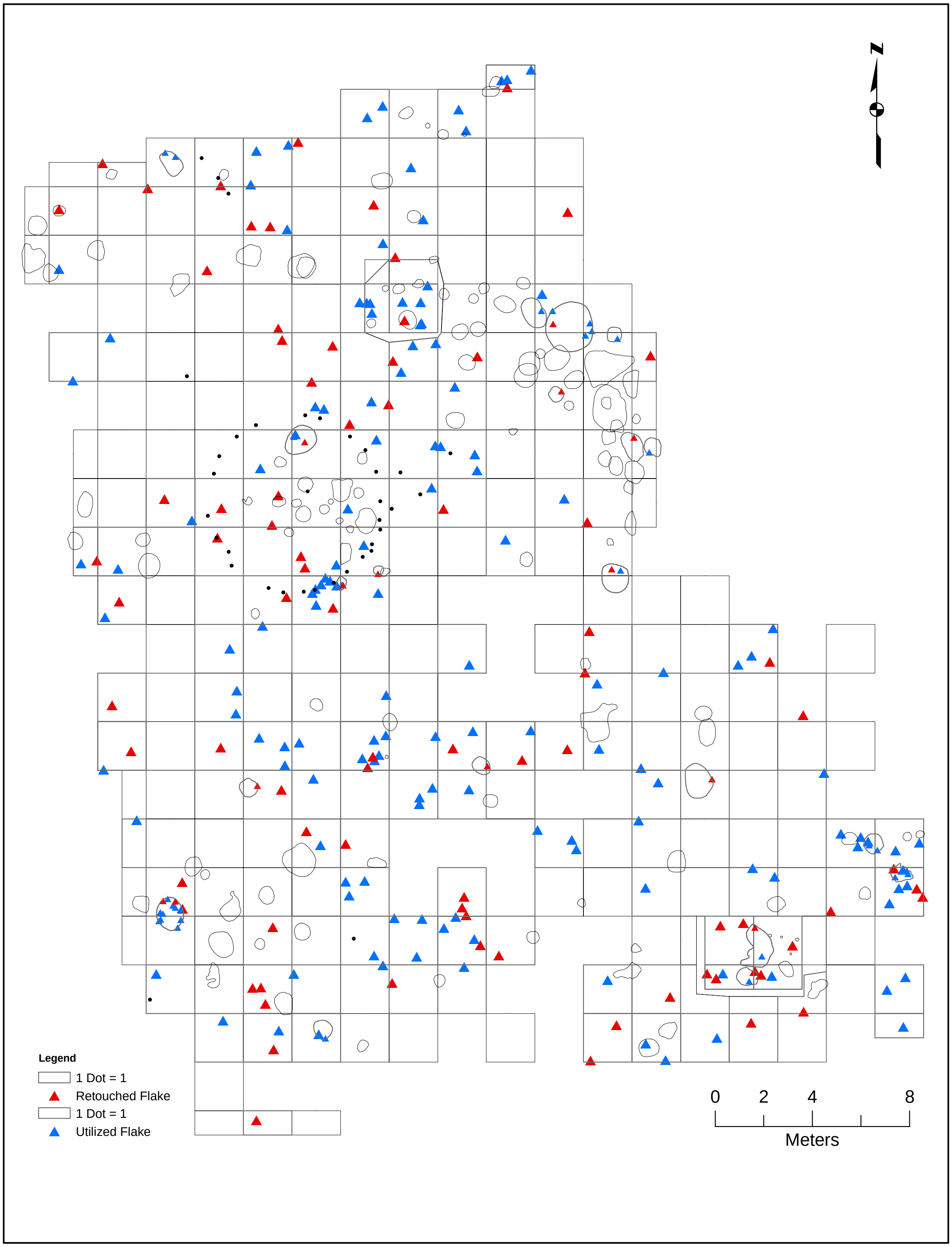

Figure 7.43. Retouched flakes and utilized flakes in Woodland levels and features in the 100 Block.

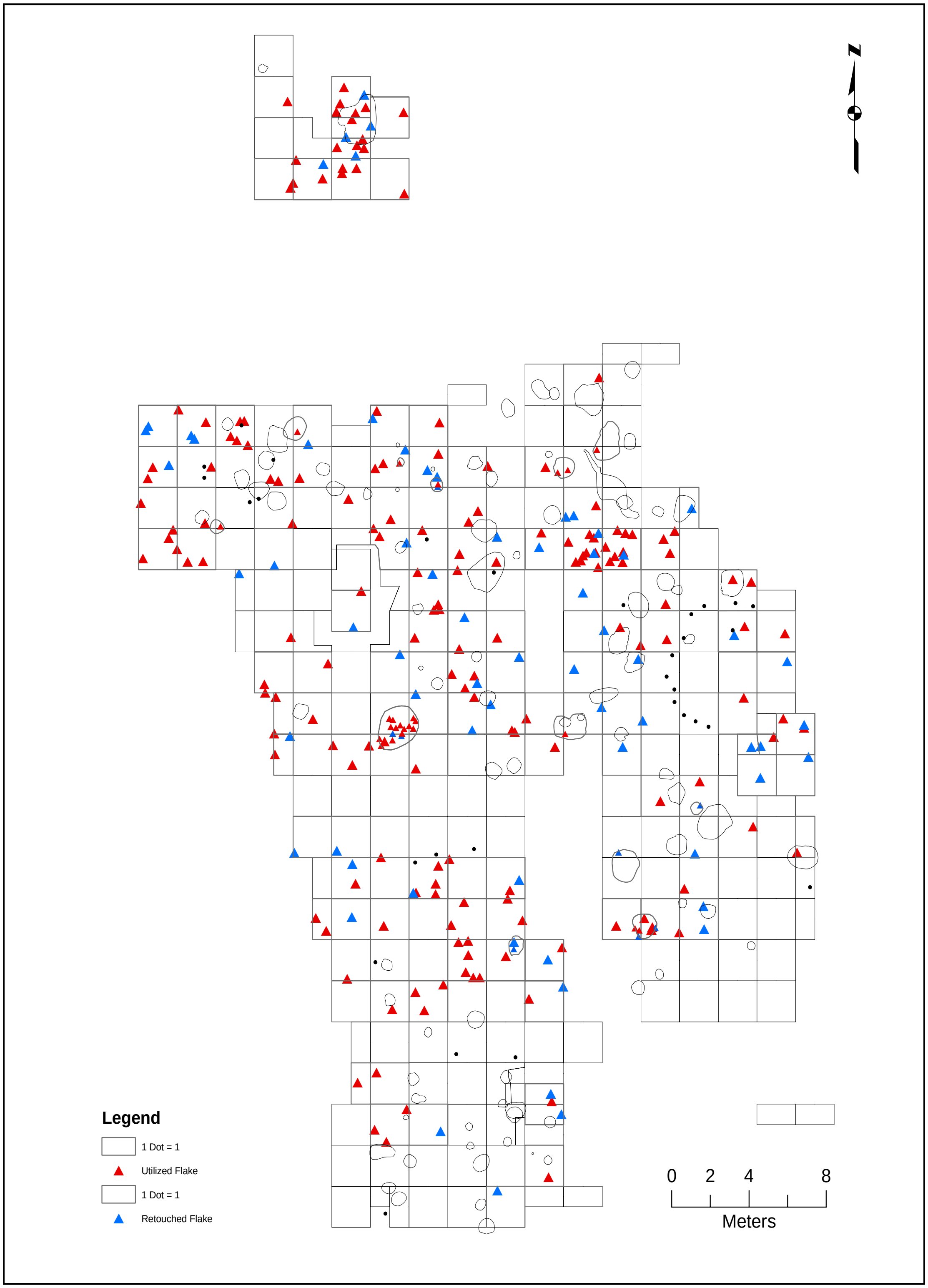

Figure 7.44. Retouched flakes and utilized flakes in Early Woodland levels and features in the 200 Block.

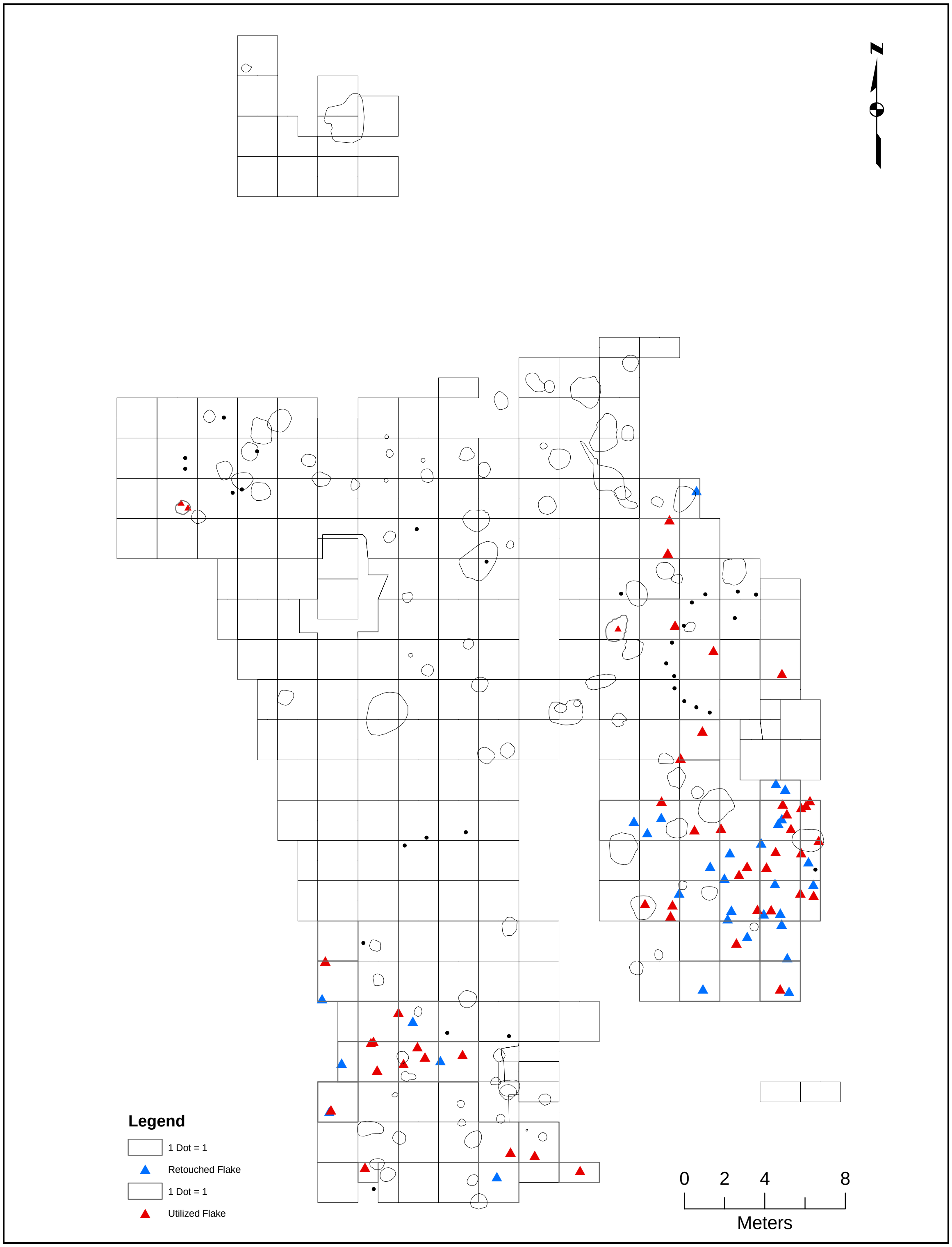

Figure 7.45. Retouched flakes and utilized flakes in Middle Woodland levels and features in the 200 Block.

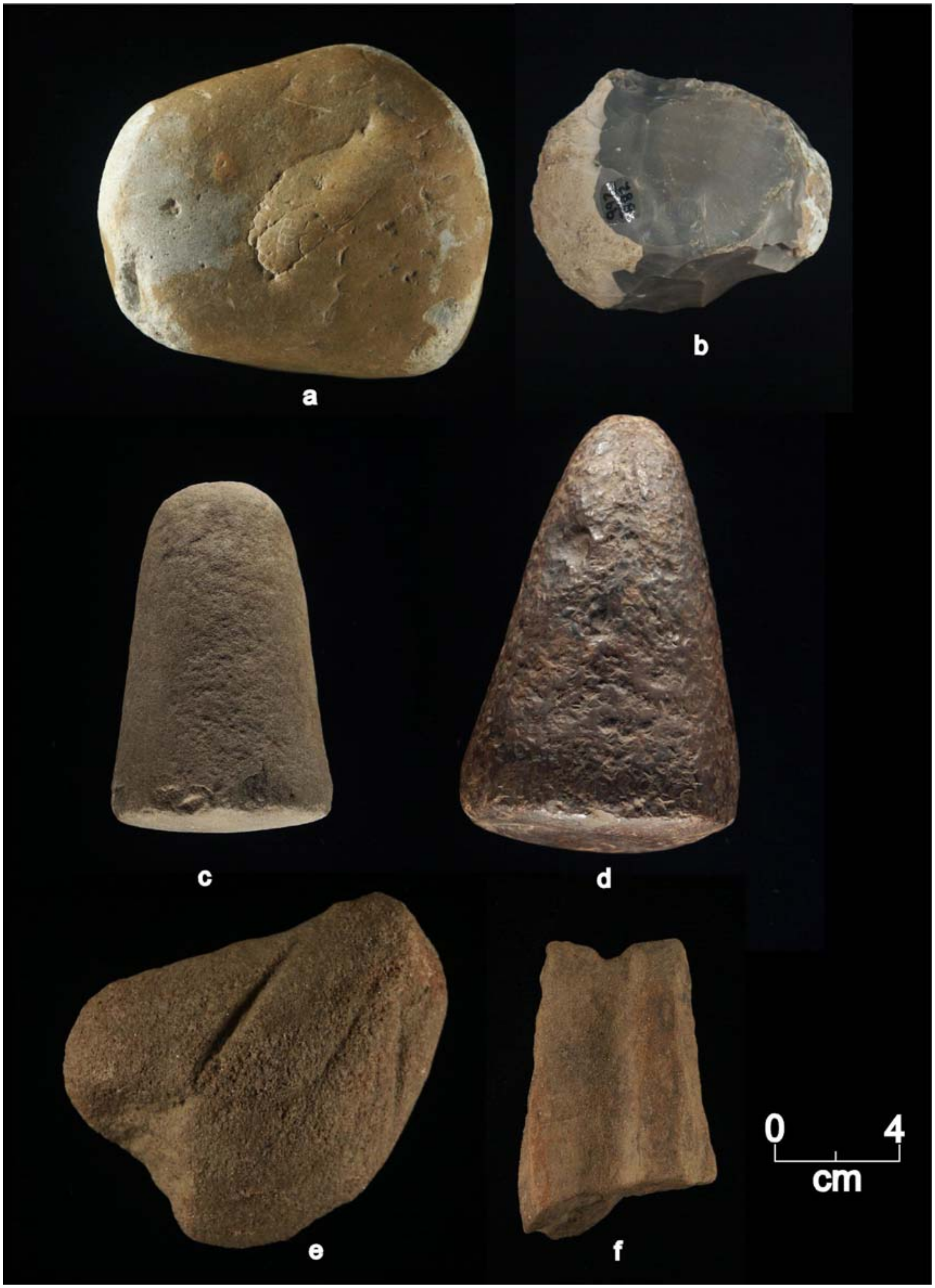

Figure 7.46. Hammerstones, pestles, and abraders: (a, b) hammerstones; (c-e) pestles; (f-g) abraders.

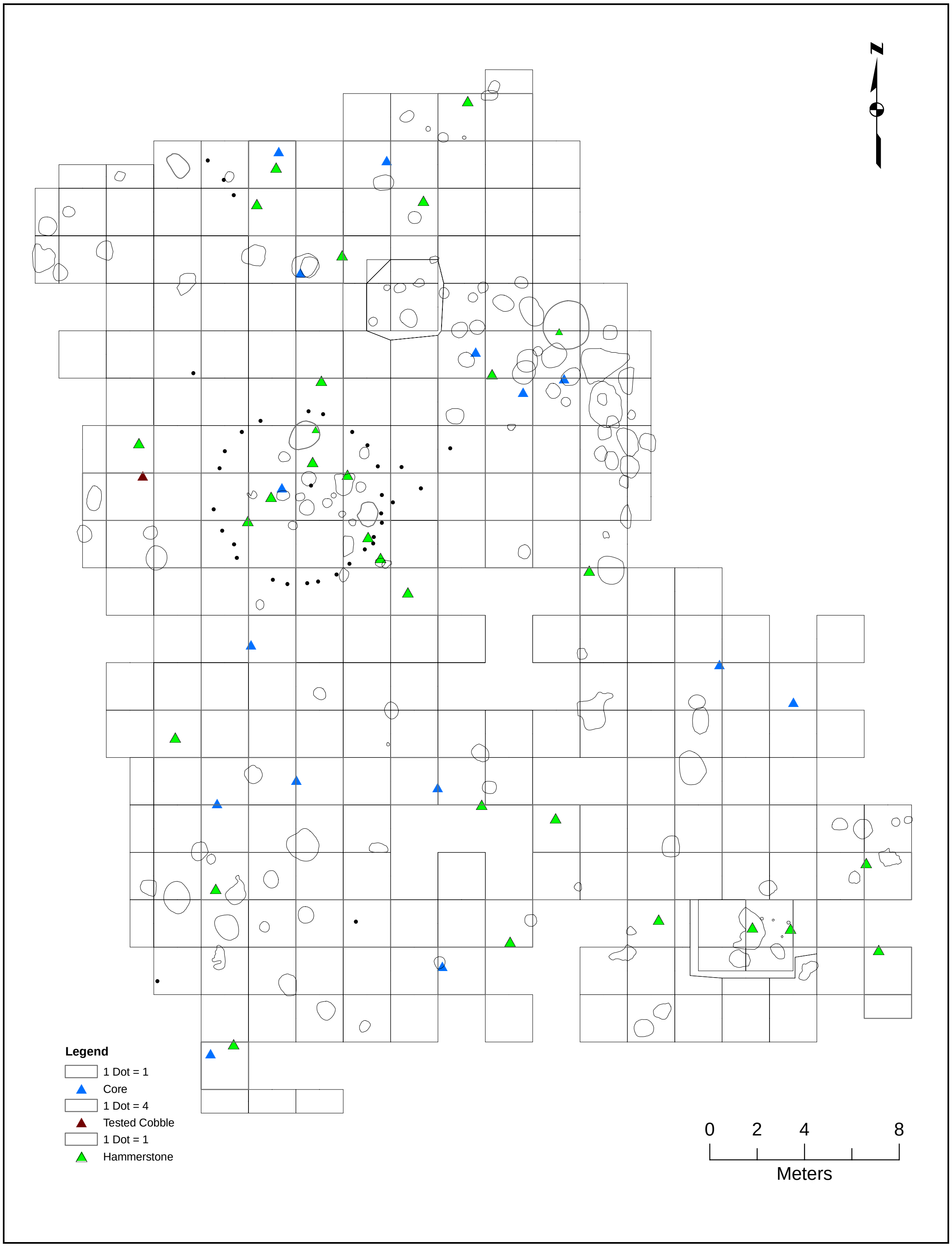

Figure 7.47. Cores, tested cobbles, and hammerstones in Woodland levels and features in the 100 Block.

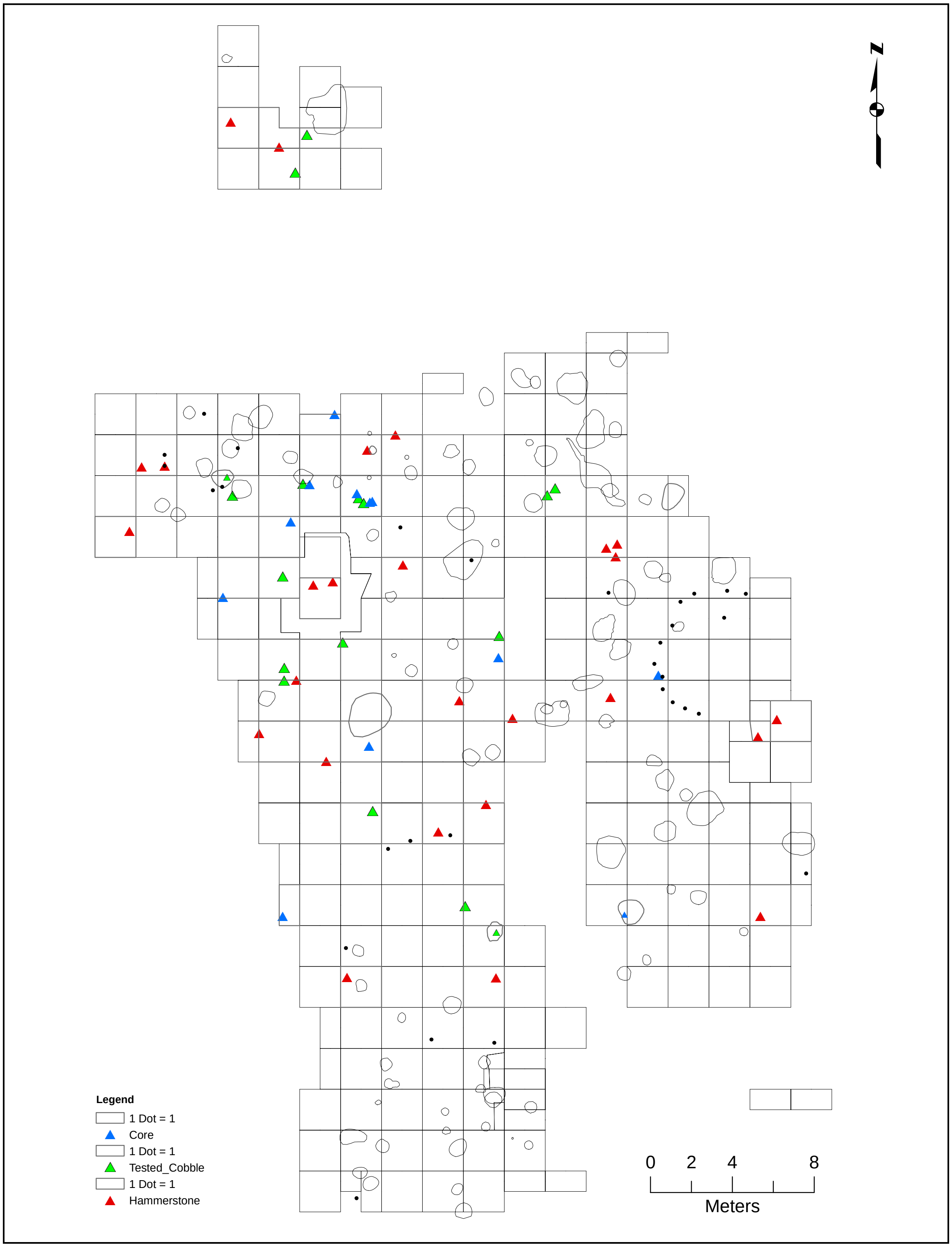

Figure 7.48. Cores, tested cobbles, and hammerstones in Early Woodland levels and features in the 200 Block.

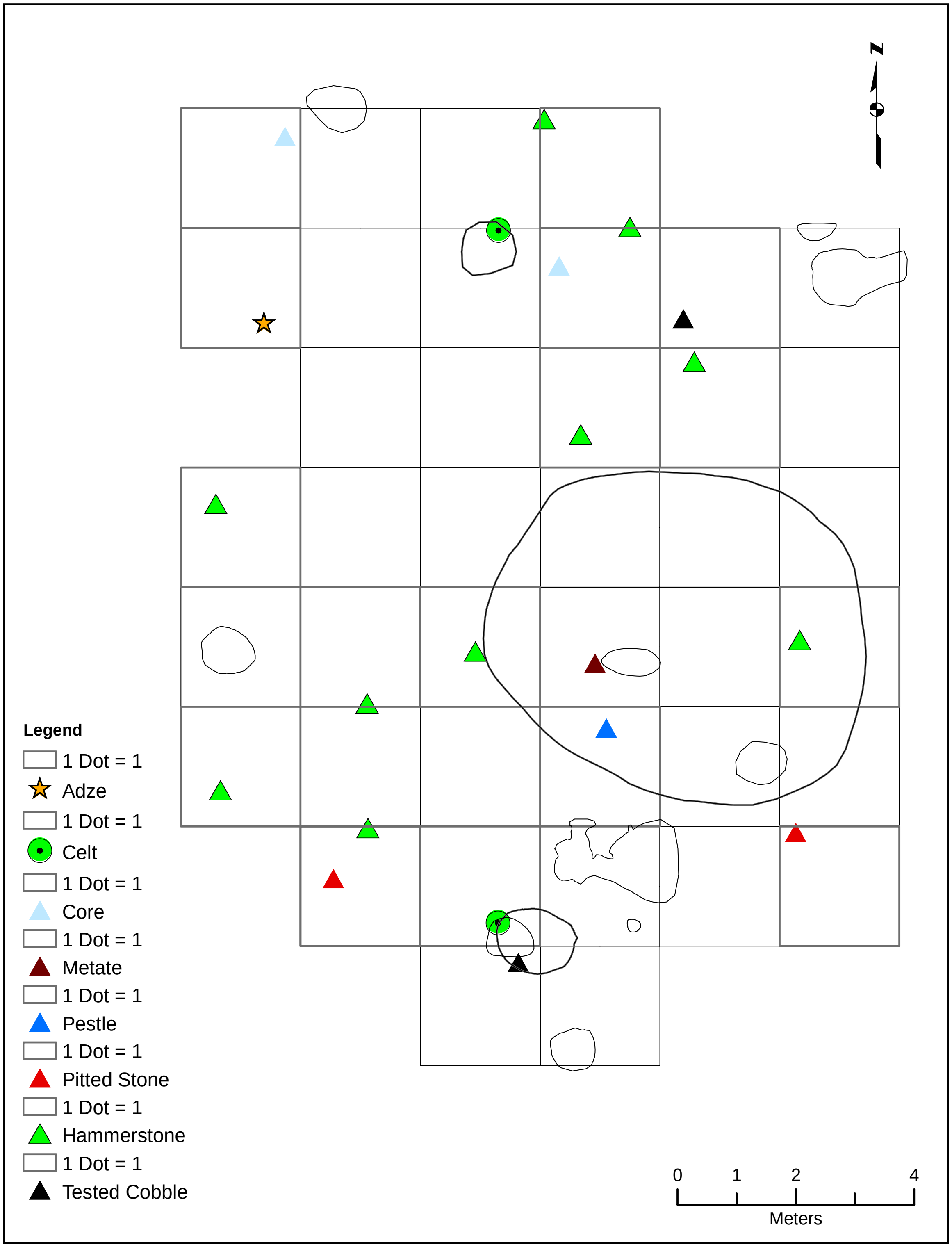

Figure 7.49. Adzes, celts, hammerstones, cores, tested cobbles, pitted stones, pestles, and metates in Woodland levels in the Phase II South Block.

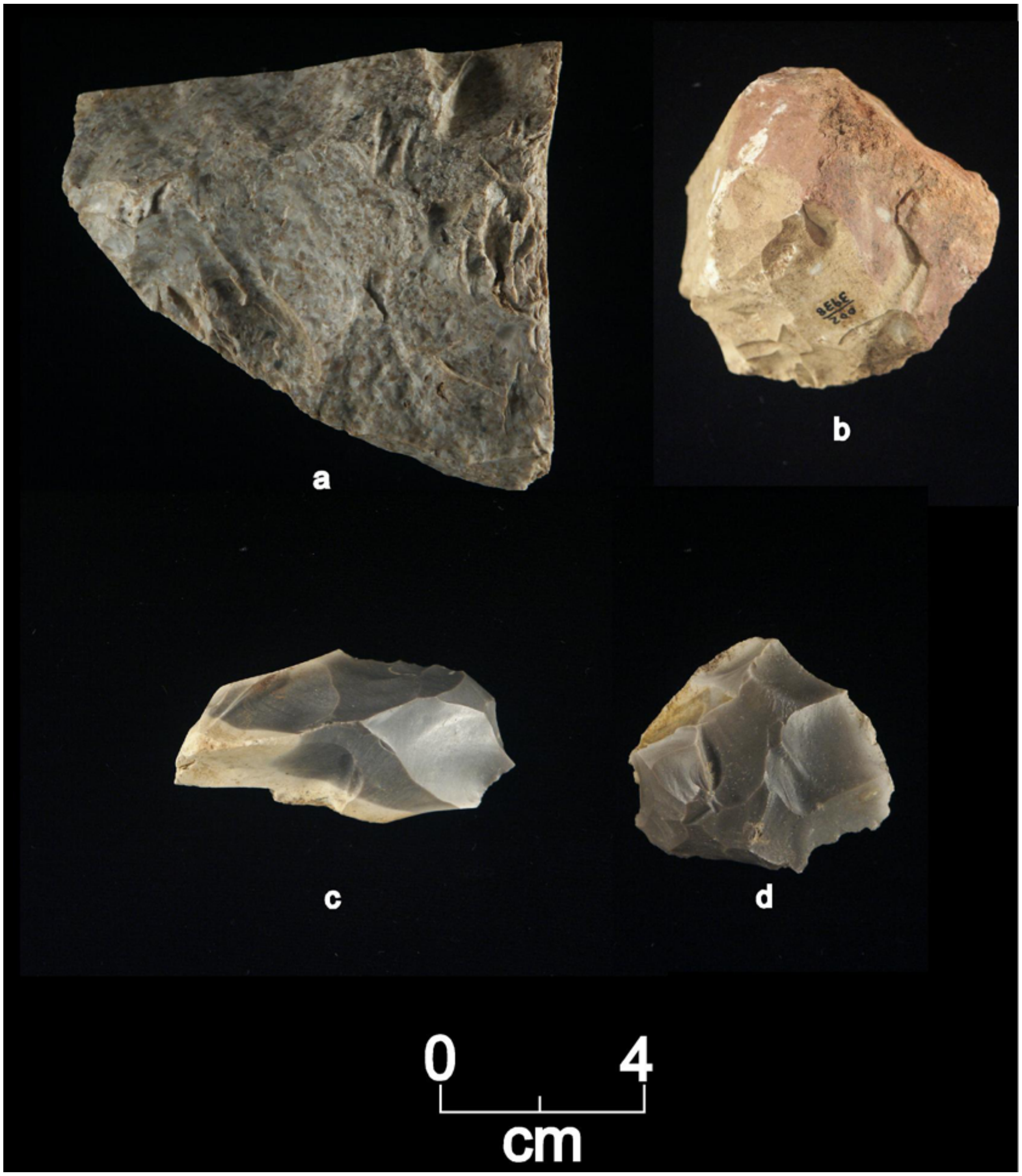

Figure 7.50. Cores.

Figure 7.51. Adzes and celts.

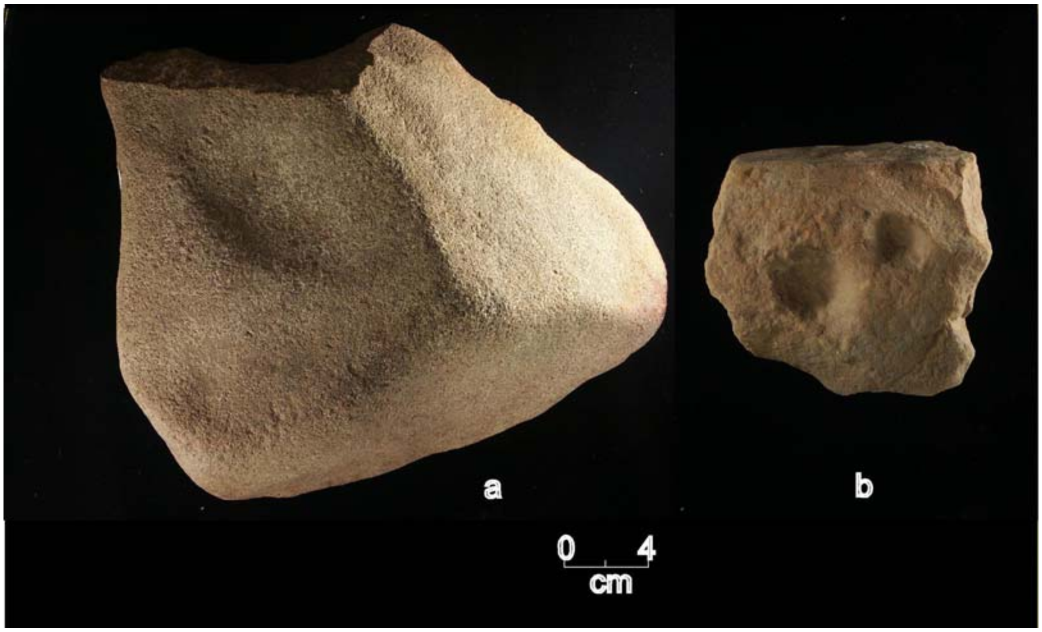

Figure 7.52. Metate and pitted stone: (a) metate; (b) pitted stone.

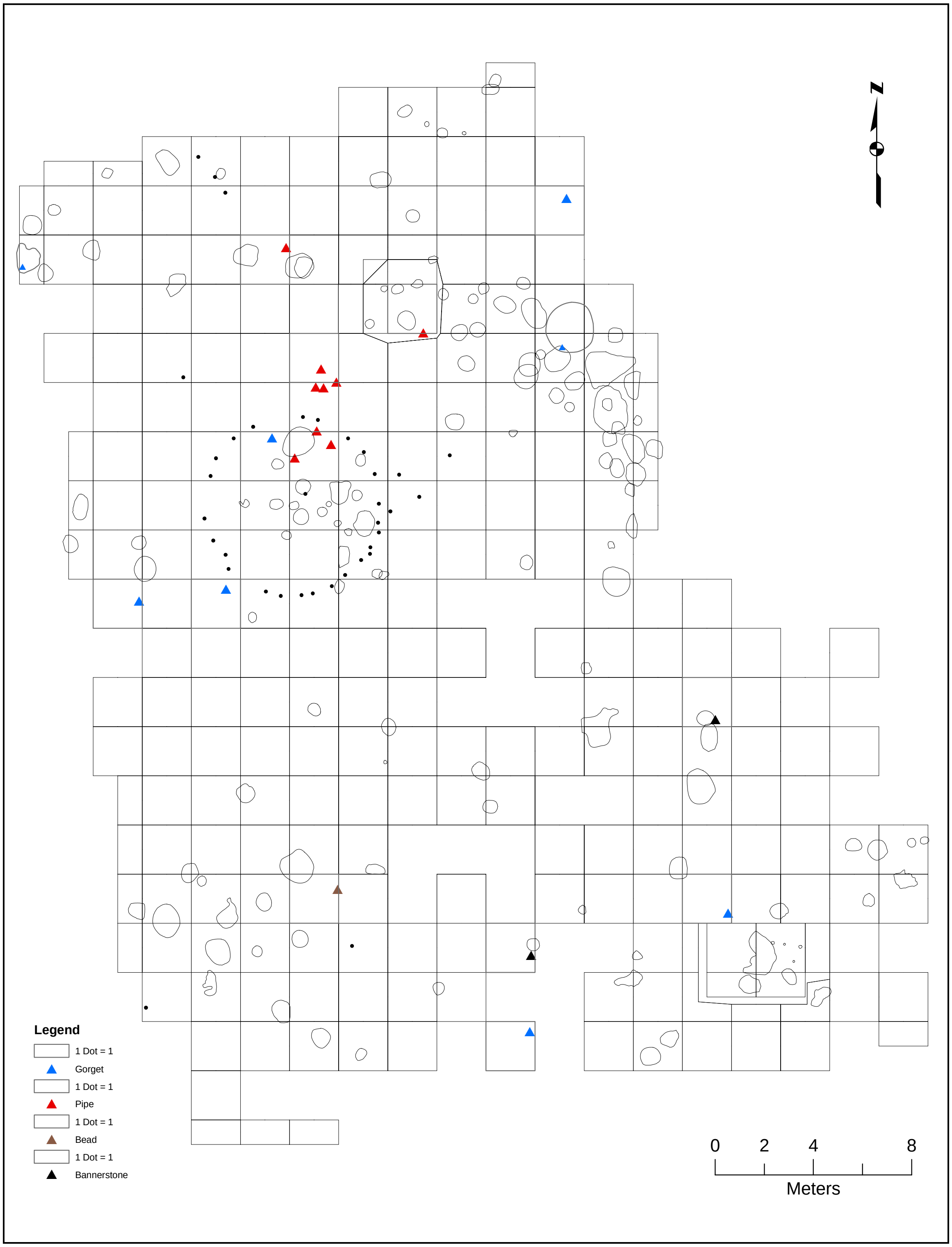

Figure 7.53. Pipes, Gorgets, Beads, and Bannerstones in the Woodland levels and features in the 100 Block.

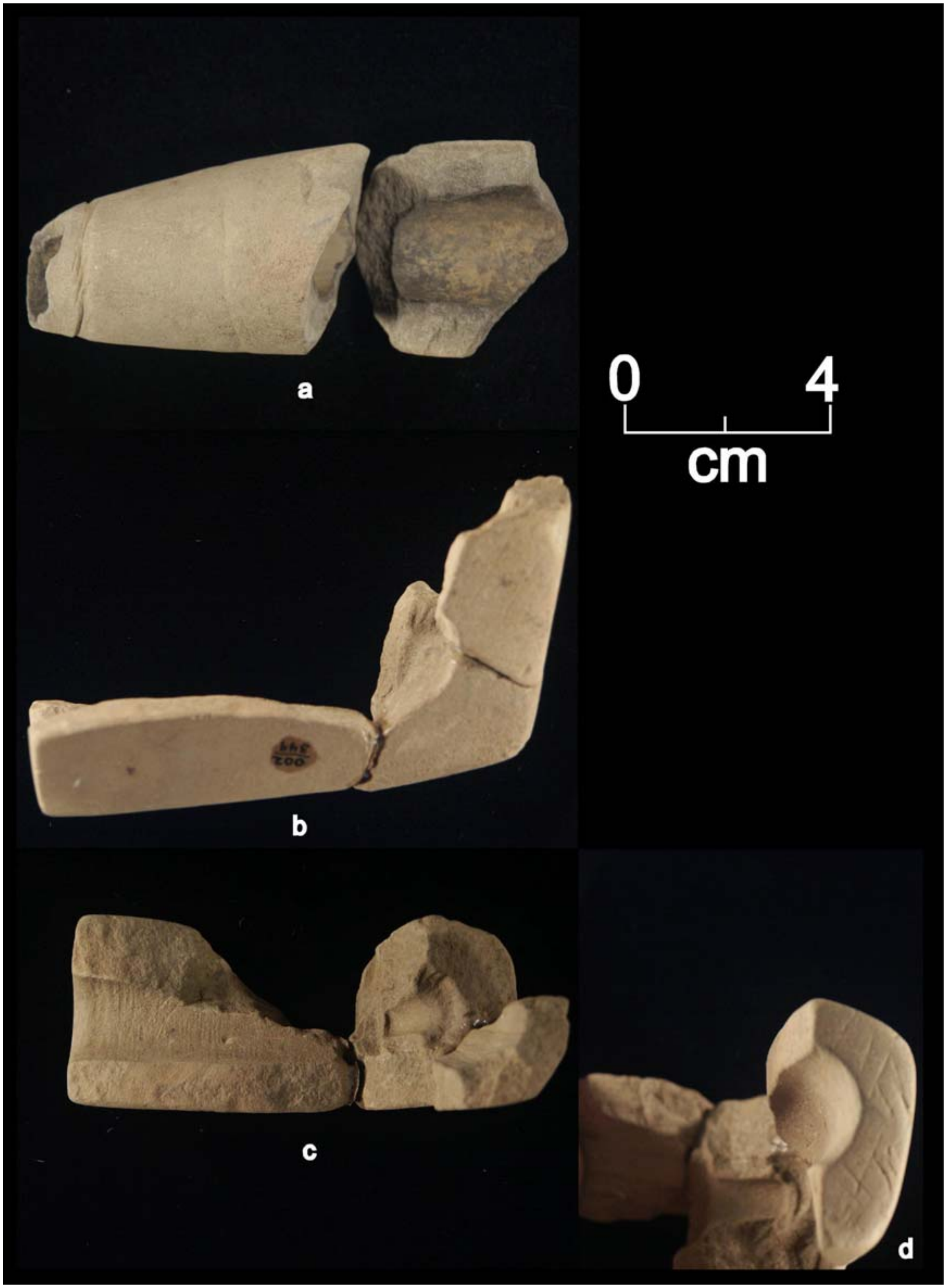

Figure 7.54. Pipes: (a) tubular; (b) elbow pipe--side view; (c) elbow pipe-- superior view; (d) elbow pipe--linear marks on mouthpiece.

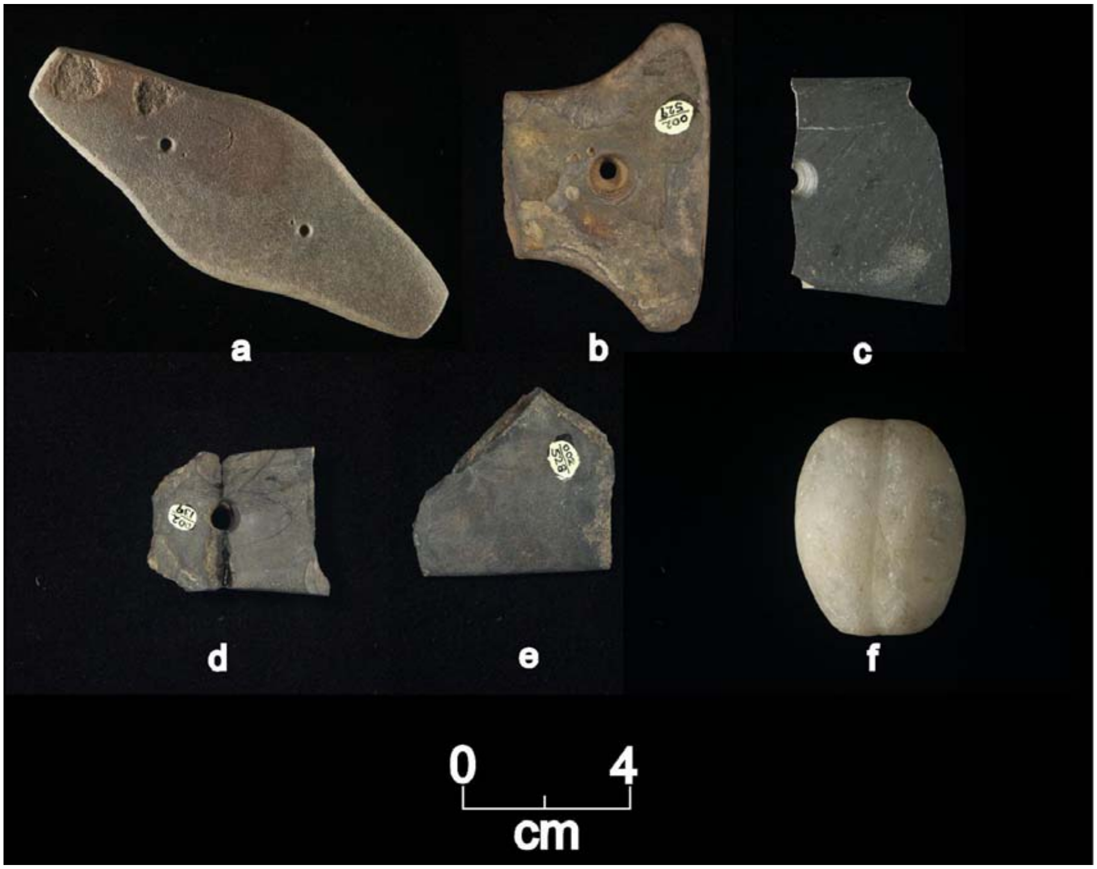

Figure 7.55. Gorgets: (a) expanded center; (b) possible variant of “bowtie” or “reel” shaped; (c-e) unknown shape; (f) possible gorget or net weight.

Figure 7.56. Bannerstones and beads: (a) bannerstone often labeled “semi-keeled bar gorget”; (b) bannerstone--unknown shape; (c) goethite bead; (d) bead--unshaped.

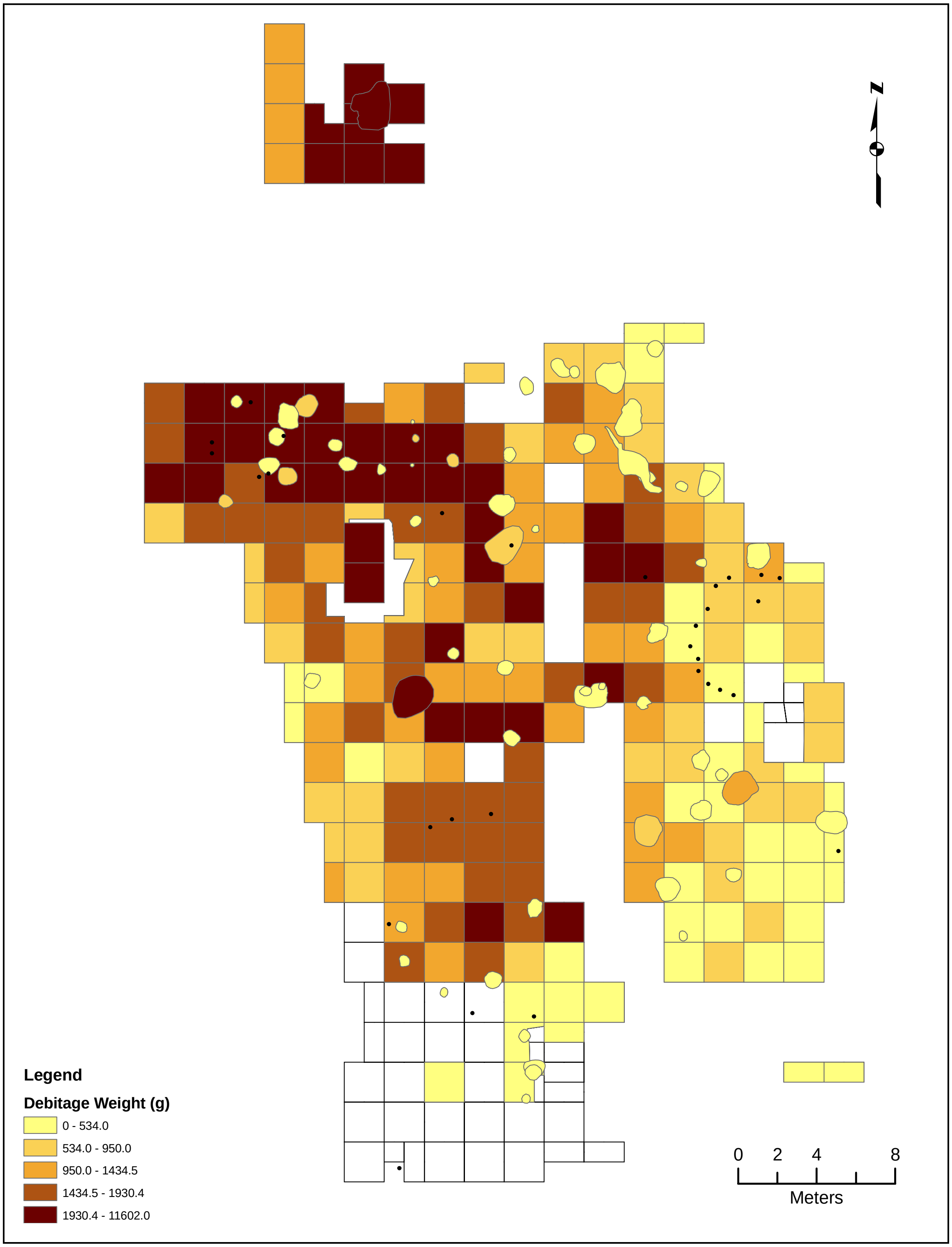

Figure 7.57. Debitage in Early Woodland levels and features in the 200 Block.

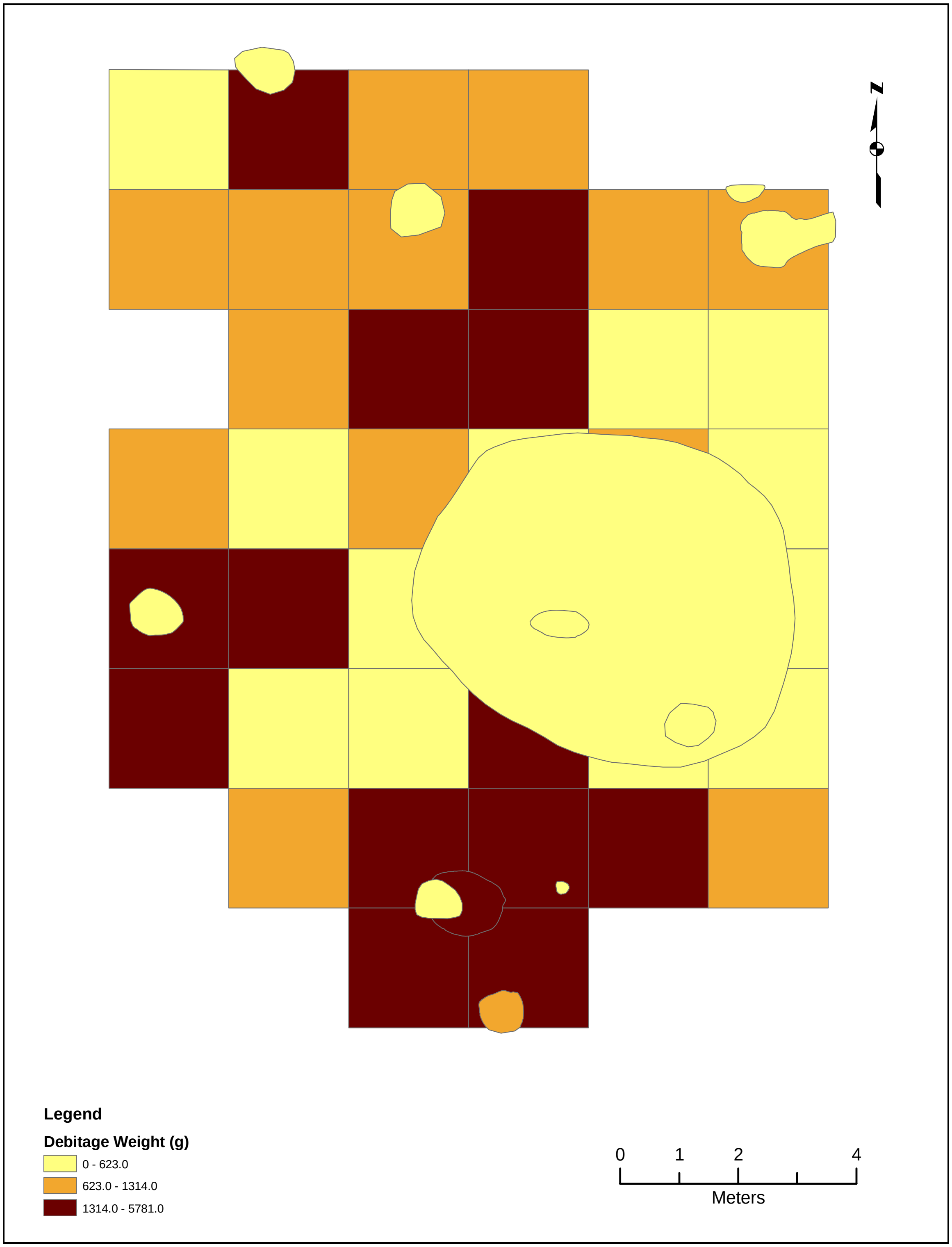

Figure 7.58. Debitage in Woodland levels and features in the Phase II South Block.

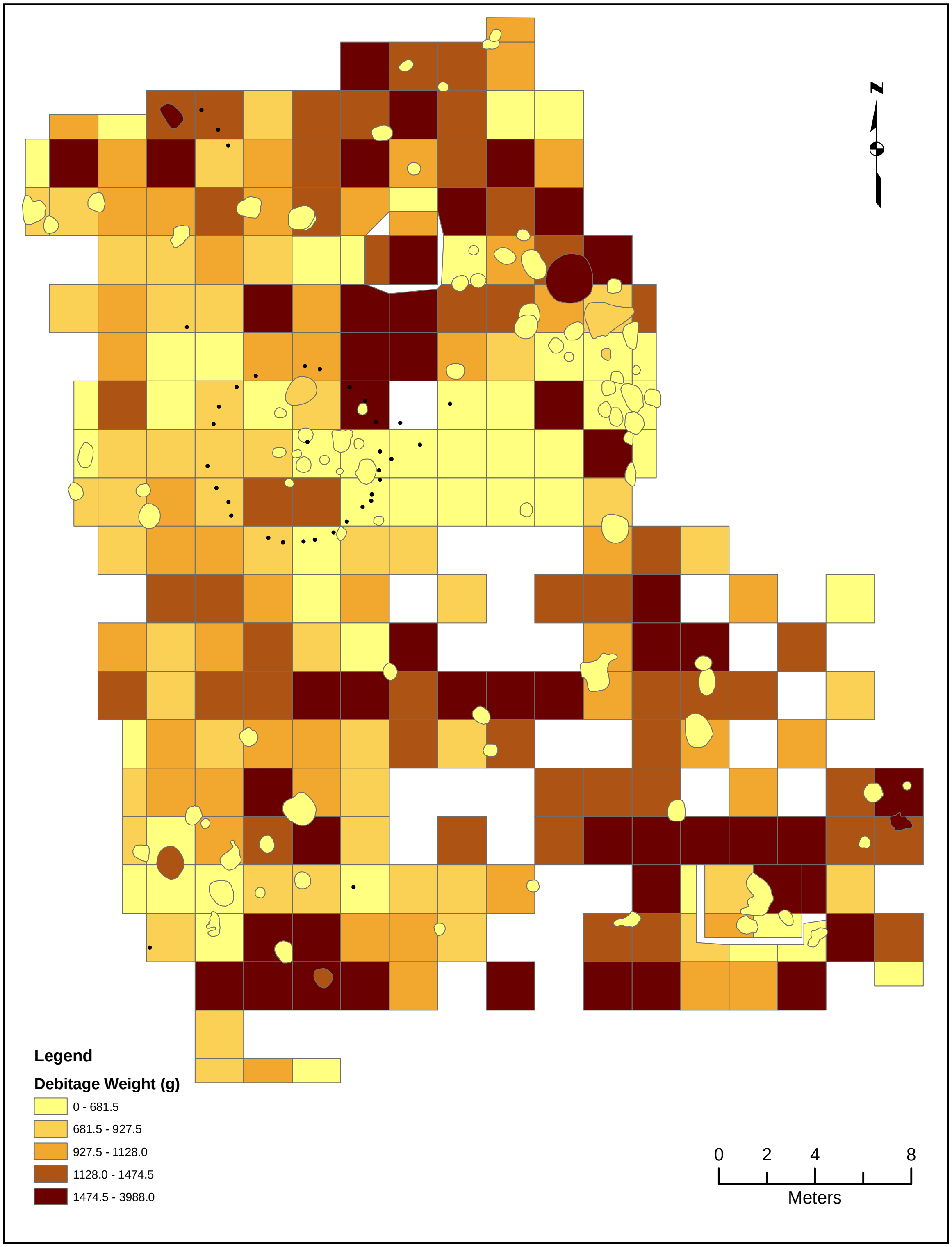

Figure 7.59. Debitage in Woodland levels and features in the 100 Block.

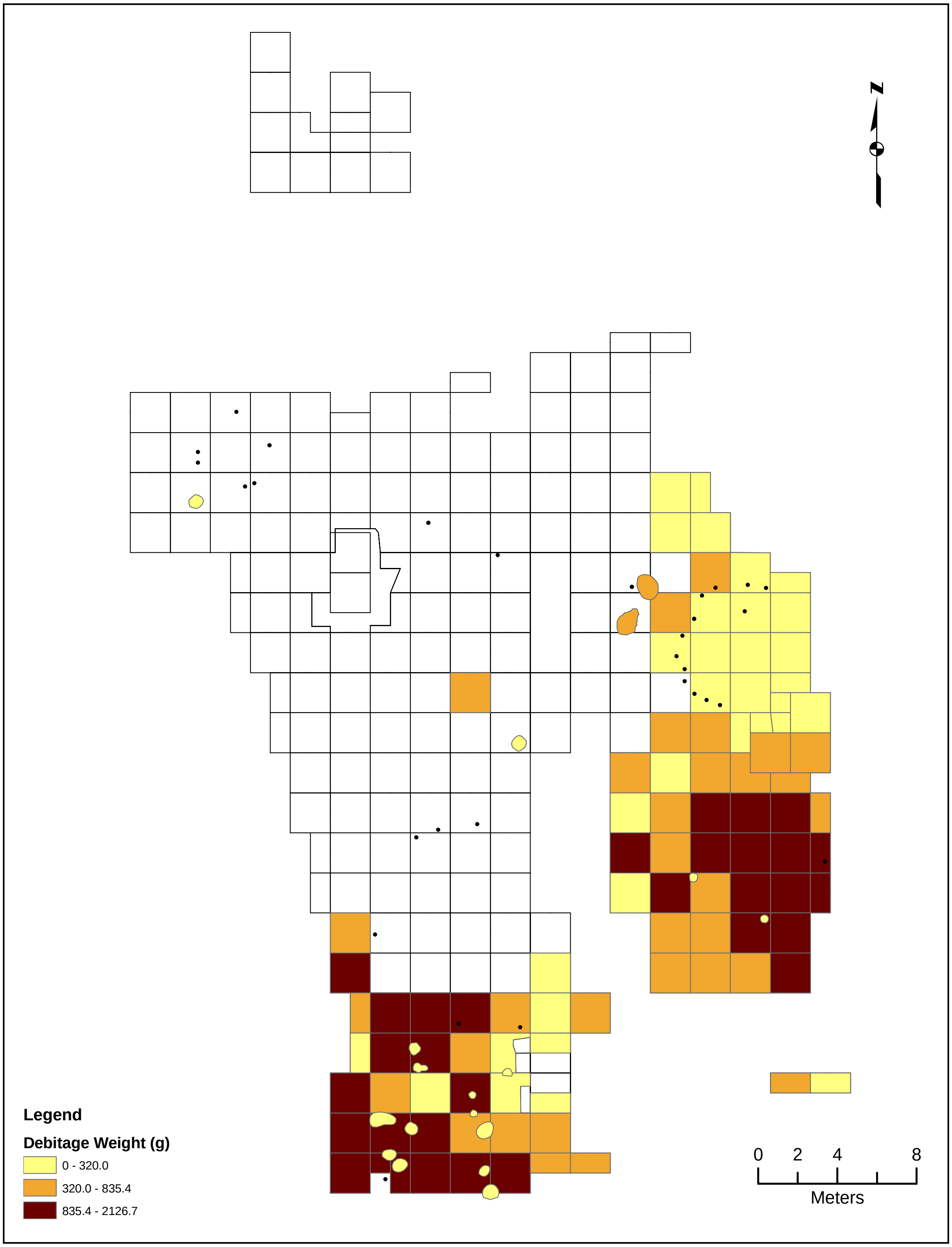

Figure 7.60. Debitage in Middle Woodland levels and features in the 200 Block.

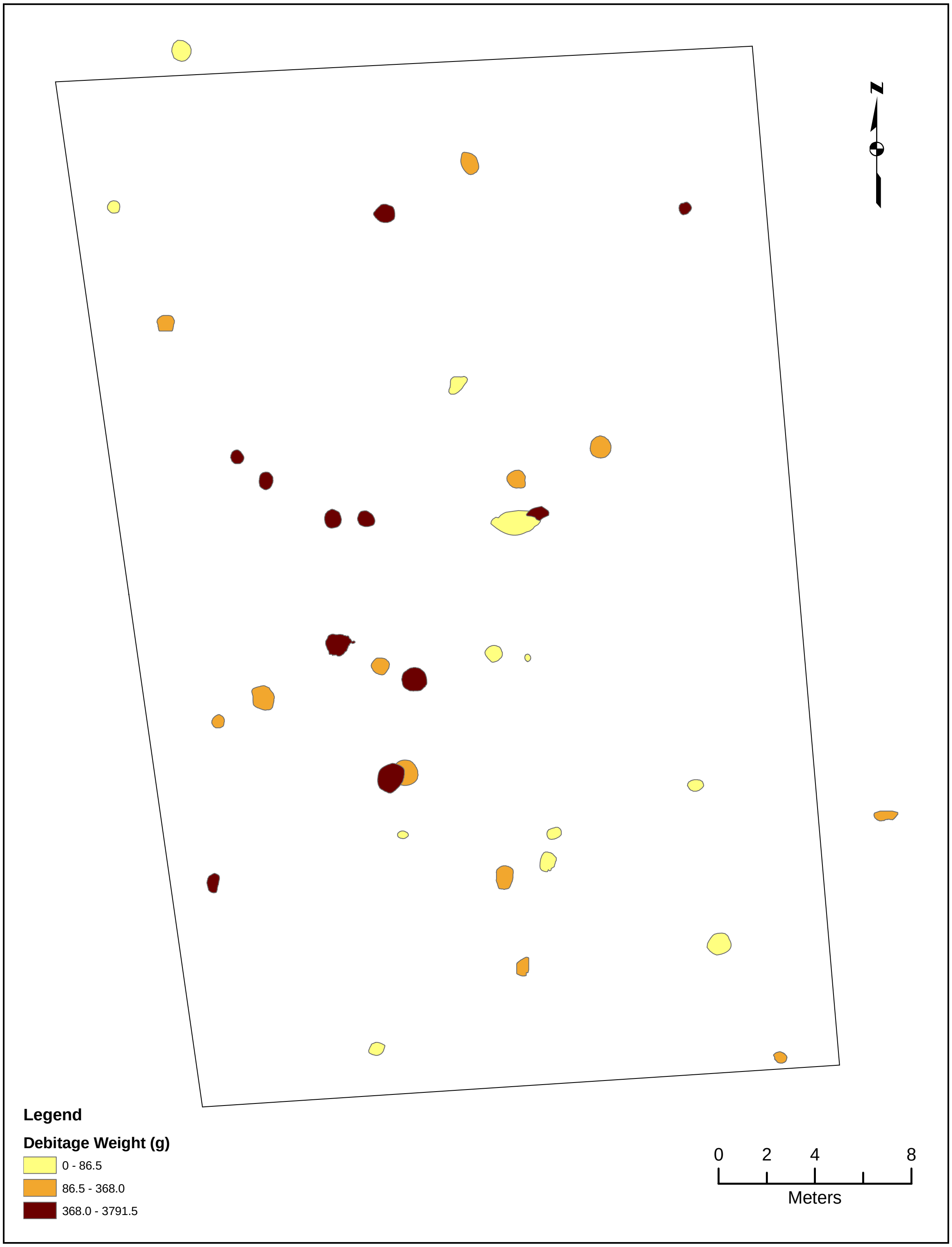

Figure 7.61. Debitage in Woodland levels and features in the 300 Block.

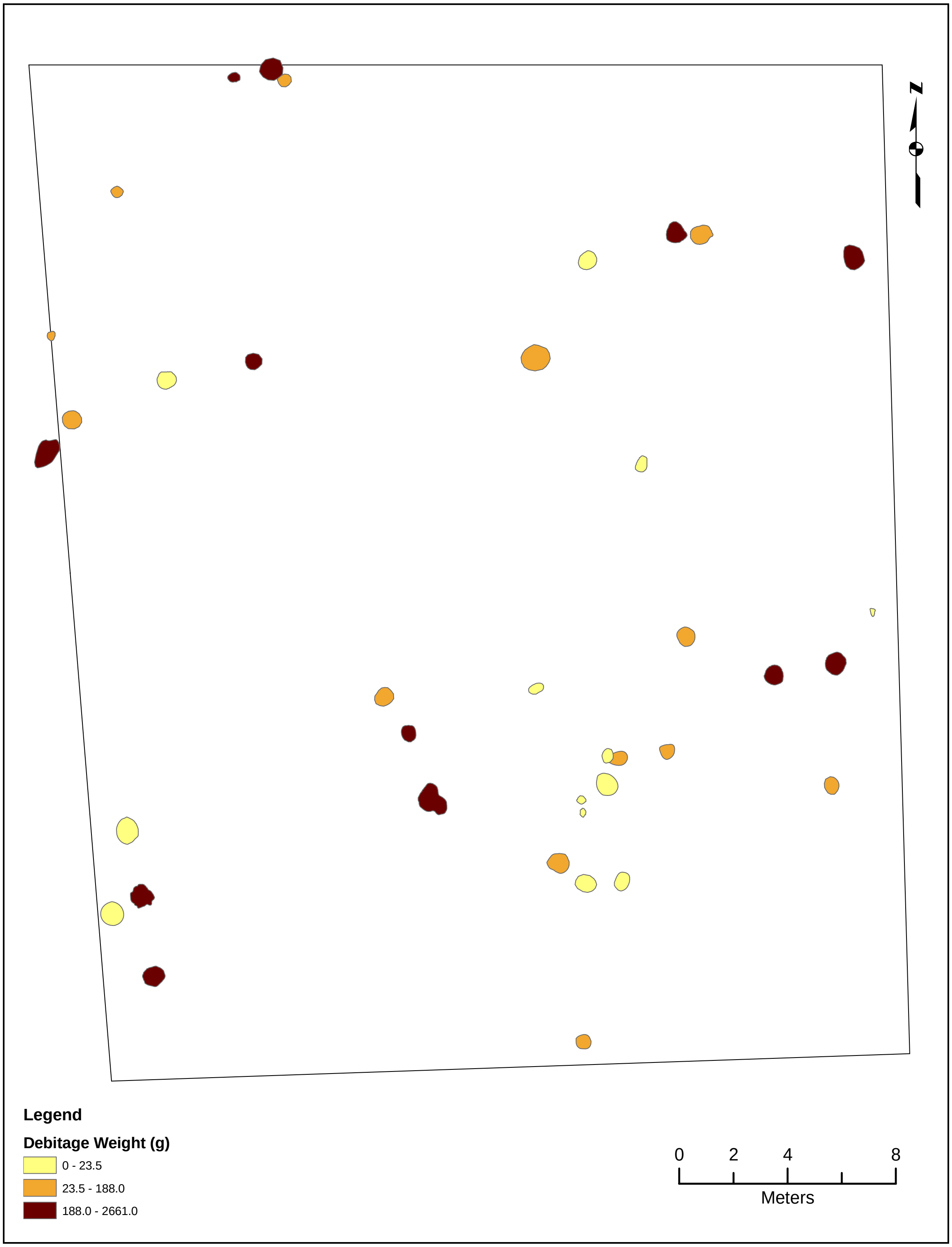

Figure 7.62. Debitage in Woodland levels and features in the 400 Block.

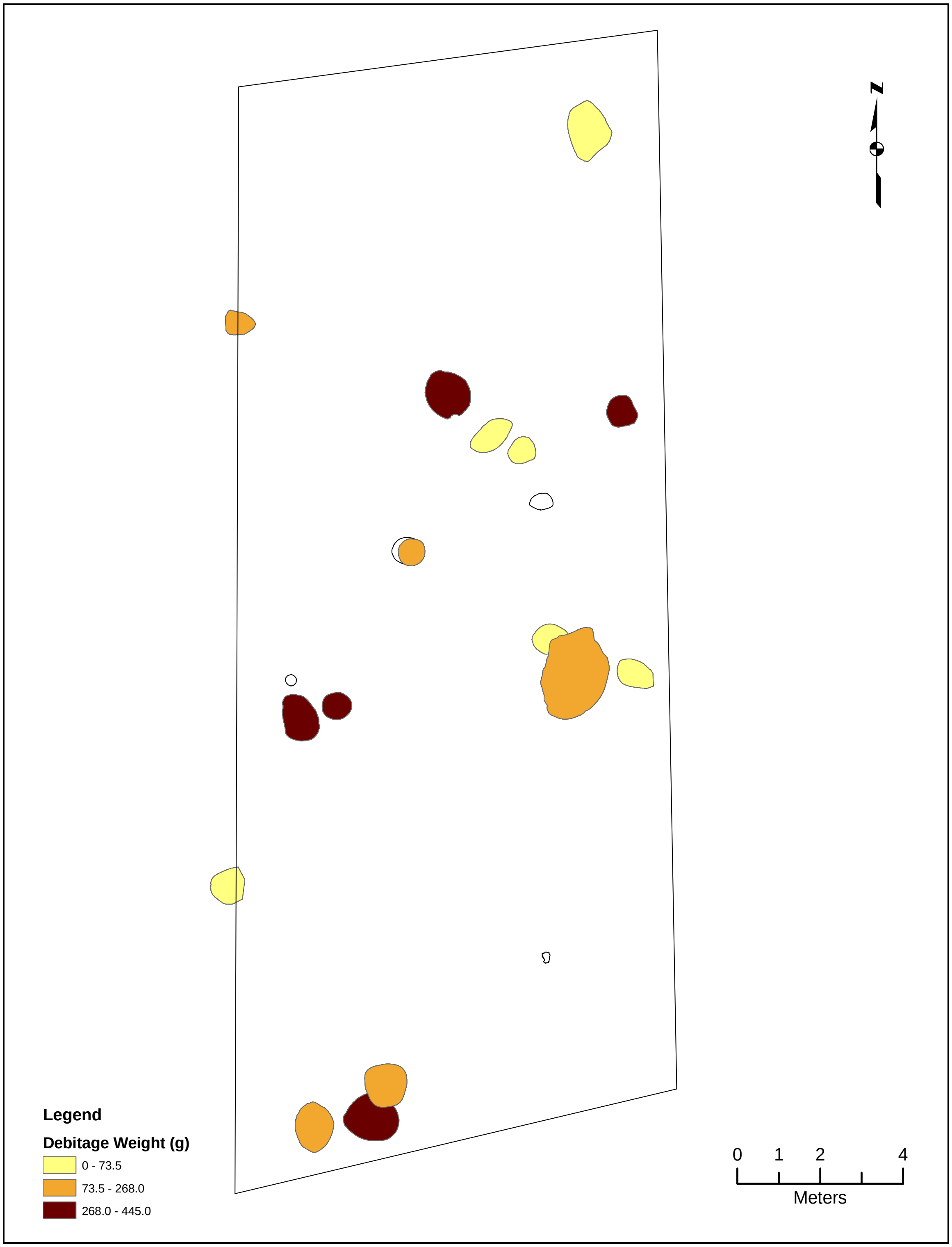

Figure 7.63. Debitage in Woodland levels and features in the 148N49W Trench.

Chapter 4

Table 4.1. Early Woodland and Middle Woodland Uncorrected and Calibrated Radiocarbon Dates, One Sigma Calibrated Ranges, and Component Assignments.

Lab #	Provenience	Uncorrected Date (RCYBP)[1]	1 Sigma Cal (BC/AD)	Component
ISGS 5634	F200-26	2780 ± 70	1004-842 BC	Early Woodland?
ISGS 5680[3]	F200-25	2740 ± 130	1111-791 BC	Early Woodland?
ISGS 5186	F83	2630 ± 70	898-672 BC	?
ISGS 4958	F300-37	2590 ± 70	829-555 BC	?
ISGS 4900	F200-32	2550 ± 70	802-546 BC	Early Woodland
ISGS 4905	Phase II F78A	2400 ± 70	735-396 BC	Early Woodland
ISGS 4902	Phase II F104	2390 ± 70	733-393 BC	Early Woodland
Beta 113984	Phase II F39	2320 ± 80	516-210 BC	Early Woodland
ISGS 4984	TrF154	2280 ± 70	405-205 BC	Early Woodland
ISGS 4971	F300-60	2190 ± 70	362-179 BC	Early/Middle Woodland
Oxford A-0224[2]	PM200-1	2167 ± 47	356-121 BC	Middle Woodland
ISGS 4972	F400-7	2100 ± 70	342-4 BC	Middle Woodland
ISGS 4903	F100-112	2080 ± 70	195-1 BC	Middle Woodland
ISGS 4901	F100-37	2070 ± 70	176 BC-AD 1	Middle Woodland
Beta 113981	Phase II F20	2000 ± 50	48 BC-AD 60	Middle Woodland
ISGS 4904	F100-7	2000 ± 70	92 BC-AD 76	Middle Woodland
ISGS 5784[3]	F200-108	1710 ± 80	AD 237-420	Early Woodland?
ISGS 5839[3]	F200-108	1510 ± 90	AD 435-632	Early Woodland?

[1]All ages corrected for isotopic fractionation and calculated on the C-14 half-life of 5568 years. Calibration data set: Intcal04.14c. [2] AMS. [3]Sample is considered accidentally introduced by non-cultural means and result inaccurate.

Chapter 5

Table 5.1. Feature Totals by Component in Excavation Blocks, Trenches, and Units.

Block	Early Woodland	Middle Woodland	Woodland	Total
100 Block	1	105	22	128
200 Block	69	18	9	96
300 Block	5	14	18	37
400 Block	10	9	27	46
15N27W Trench	0	4	5	9
63N47W Trench	1	10	5	16
148N49W Trench	0	21	1	22
253N80W Trench	8	1 (mid-late MW?)	2	11
South Block Phase II	10	3	0	13
South Block Phase III	2	4	15	21
Phase II (outside Phase III Blocks and Trenches)	10	12	17	21
Total	109	192	119	420

Table 5.2. Features by Component in Excavation Blocks, Trenches, and Units.

Block	Early Woodland	Middle Woodland	Woodland
100 Block Phase III	Feature 100-26	Feature 100-2, 3-5, 7-13, 15-21, 23-25 27, 29-37, 39-47, 49-50, 52-57, 59-61, 63, 65-68, 70-76, 79-88, 90-94, 96, 98-101, 104-107, 110, 112, 113, 115, 119, 123-124, 131, 133, 135, 153, 155, 163	Feature 100-1, 6, 28, 38, 48, 51, 58, 62, 64, 69, 77, 97, 102-103, 109, 127-128, 134, 136, 142, 150, 152
100 Block Phase II Units:99N25W; 99N27W; 100N23W;100N25W; 100N27W; 124N40W; 124N41W		Feature 20, 20A, 20B, 22, 92	
200 Block Includes Phase III Units: 246N58W; 246N60W; 246N62W; 246N64W; 248N60W; 248N62W; 248N64W; 250N64W; 252N64W	Feature 200-2, 4, 6-13, 15-18, 20-26, 28, 30-32, 34, 36, 42-44, 47-48, 50-51, 54, 56-60, 62, 65-68, 70-72, 74, 76-78, 80, 83-84, 88-89, 92-96, 98, 106-108, 110	Feature 200-1, 3, 5, 14, 19, 27, 29, 33, 35, 37-38, 40, 49, 53, 61, 90, 97, 99	Feature 200-45, 52, 55, 63, 69, 91, 109, 114
200 Block Phase II Units: 200N50W; 201N51W; 217N37W; 217N39W; 219N37W; 219N38W; 219N39W; 220N38W; 220N40W; 225N60W; 227N60W; 249N58W; 249N60W; 250N60W	Feature 40, 59		Feature 13

300 Block	Feature 300-8, 37, 41, 96, 97	Feature 300-2, 6,-7, 13-14, 19, 24, 27, 46-47, 52, 60, 62	Feature 300-1, 3-5, 9-12, 16-18, 20-22, 50, 59, 61
300 Block Phase II Units: 350N75W		Feature 3	Feature 1
400 Block	Feature 400-3-4, 27, 38-39, 57	Feature 400-5, 7, 12, 14-17, 67, 112,	Feature 400-1, 6, 8-9a, 11, 18, 20, 28-29, 32, 35-36, 45, 47-48, 56, 58-66, 69-70
400 Block Phase II Units: 400N75W; 423N88W; 423N90W; 425N88W; 425N90W	Feature 39, 88, 94-95		
15N27W Trench		Trench Feature 212-213,220,244	Trench Feature 211, 214-215, 217-218
15N27W Trench Phase II Unit: 48N25W			
63N47W Trench		Trench Feature 192-195, 197, 201, 203-204, 221, 259	Trench Feature 196, 198-199, 202, 208
63N47W Trench Phase II Units:75N40W; 77N40W	Feature 63		
148N49W Trench		Trench Feature 312-318, 320-321, 323, 325-327, 331-333, 335-336	Trench Feature 319
148N49W Trench Phase II Units: 150N40W; 165N50W; 175N40W		Feature 11, 56, 87	

253N80W Trench	Trench Feature 144-146, 148, 151, 154-155, 162	Trench Feature 242 * mid-late MW?	Trench Feature 147, 150
253N80W Trench Phase II Units: 250N75W; 300N75W			
South Block Phase II	Feature 71, 78, 78A, 100-101, 104, 109-110, 122, 126	Feature 102, 120, 121	
South Block Phase III	South Feature 1, 21	South Feature 3-4, 6, 16	South Feature 2, 7-15, 17, 19-20, 23-24
Phase II (outside Phase III Blocks and Trenches)	Feature 2, 53, 64	Feature 36, 99, 108	Feature 5, 7, 12, 14-15, 18, 33, 45-47, 54, 72, 77, 82,86

Table 5.3. Feature Totals by Type, Component, and Excavation Area.

Feature Type	SB	15N	63N	100 Block	148N	200 Block	253N	300 Block	400 Block	P II Unit & Trench	Total
Refuse Scatter											
Early Woodland	1					9	1			1	12
Middle Woodland	1			5	1		1		2		10
Woodland				6		1	1	1	3	3	15
Surface Hearth											
Early Woodland	2					5					7
Middle Woodland	1			2							3
Woodland	1					1		4	2		8
Pit/Hearth											
Early Woodland	6					10	1		2		19
Middle Woodland	2	2		2		8		4	4	1	23
Woodland	3	1	1	1		1	1	3	2	1	14
Pit											
Early Woodland	3		1	1		45	6	5	8	2	71
Middle Woodland	3	2	9	96	20	10		10	3	2	155
Woodland	11	4	3	15	1	6		10	20	10	80
Total	34	9	14	128	22	96	11	37	46	20	417
Postmolds											
Early Woodland						13					13

Middle Woodland				26		12					38
Woodland	2			7		5		1			15

Table 5.4. Features by Subtype, Cross Section, and Component.

Feature Subtype and Cross-section	Early Woodland	Middle Woodland	Woodland	Total
Debris scatter	7	6	6	19
Lithic scatter	1		1	2
Rock scatter	3	2	7	12
Tool cache	1		1	2
Pottery scatter		2		2
Surface hearth	7	3	8	18
Pit/hearth				
steep sided	1	6	3	10
expanding sided	1	4		5
Basin hearth	17	13	11	41
Pit				
basin	59	102	70	231
steep sided	9	41	8	58
expanding sided	0	6	0	6
conical	2	1	1	4
irregular	1	4	1	6
unknown		2		2
Total	109	192	117	418

Table 5.4. Structure X Post Mold Sizes and Depths.

Postmold #	Length (cm)	Width (cm)	Top (cmbd)	Bottom (cmbd)
PM100-1	13	13	62	75
PM100-3	14	12	62.5	75.5
PM100-5	11	10	70	86
PM100-11	20	20	67	76
PM100-13	8	8	62	81
PM100-14	11	9	69	77
PM100-15	9	8	70	75
PM100-19	10	10	63	80
PM100-20	14	13	61	75.5
PM100-21	14	12	62	79
PM100-24	11	11	64	89
PM100-25	12	10	65	85
PM100-26	12	11	67	77
PM100-28	11	10	69	75
PM100-30	12	12	60	81
PM100-31	11	10	70	79
PM100-32	11	10	71	88
PM100-33	12	12	64	72.5
PM100-34	11	11	70	82
PM100-35	12	11	70	86
PM100-36	10	10	69	77
PM100-37	10	10	69	77
PM100-38	12	12.5	59.5	81

PM100-39	13	11	59	80
PM100-42	10	10	62	74
PM100-43	11	10	65	75
F100-22	23	23	51.5	84

Table 5.5. Structure A Post Mold Sizes and Depths.

Postmold #	Length (cm)	Width (cm)	Top (cmbd)	Bottom (cmbd)
PM200-1	13	13	111	120
PM200-2	12	10	110	120
PM200-3	_	_	111	_
PM200-4	13	12	104.5	114.5
PM200-8	11	10	105	113
PM200-9	10	10	105	115
PM200-18	10	10	115	124
PM200-22	10	10	109	123
PM200-27	13	12	116	123
PM200-28	9	8	118	122
PM200-29	10	9	130	134
PM200-33	10	9	115	123

Table 5.6. Structure B Post Mold Sizes and Depths.

Postmold #	Length (cm)	Width (cm)	Top (cmbd)	Bottom (cmbd)
PM200-5	9	10	70	82
PM200-6	10	10	70	90
PM200-10	7	11	65	76
PM200-15	10	12	65	75
PM200-16	14	14	59	67
PM200-26	11	12	78	88

Table 5.7. Structure C Post Mold Sizes and Depths.

Postmold #	Length (cm)	Width (cm)	Top (cmbd)	Bottom (cmbd)
PM200-7	13	13	71	85
PM200-11	15	15	70	80
PM200-12	8	8	70	78
PM200-13	15	15	70	78
PM200-19	14	13	66.5	82
PM200-24	11	11	70	92

Chapter 6

Table 6.1. Number of Analyzable Sherds and Total Weight of Falls Plain Pottery by Excavation Area.

Block or Trench	# analyzable Ls-tempered sherds	weight of Ls-tempered sherds (g)
100 Block	6,142	137,933
200 Block	1,451	37,795
300 Block	44	714
400 Block	57	1,184
15N27W Trench	15	377
63N47W Trench	31	675
148N49W Trench	188	3,108
253N80W Trench	1	100
South Block Phase II and III	21	546
Other	430	6,691
Total	8,380	189,123

Table 6.2. Number of Falls Plain Rim Sherds and Base Sherds by Excavation Area.

Block or Trench	# rims	# bases
100 Block	417	33
200 Block	112	12
300 Block	5	0
400 Block	3	0
15N27W Trench	1	0
63N47W Trench	4	0
148N49W Trench	17	1
253N80W Trench	1	0
South Block Phase II and III	0	0
Other	23	0
Total	583	46

Table 6.3. Attributes of the Falls Plain Rim Groups.

Rim Group	Height (Very Tall, Tall, Medium, Short)	Orientation (Slightly, Moderately, Strongly Everted; Inverted)	Neck (Thinned, Not Thinned)	Thickness (Thin, Thick)
Group 1	T	M-St E	Th	
Group 2	T	Sl-M E	Th	
Group 3	M	Sl-M E	Th	
Group 4	S	M E	Th	
Group 5	T	M-St E at top	NTh	
Group 6	VT	St E	NTh	
Group 7	M	St E	NTh	
Group 8	M	M E	NTh	
Group 9	T	Sl E	NTh	
Group 10	S	Sl E	Th-NTh	Thin
Group 11	M	Sl E	NTh- Sl Th	Thick
Group 12	S	M E	NTh	Thick
Group 13	S	In	NTh	

Table 6.4. Falls Plain Rim Group 1 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/4586	Group 1-a	25	21
992/984	Group 1-b	24	22
002/4904	Group 1-d	27	23
002/5403	Group 1-g	18	15.5
002/5162	Group 1-h	25	22
002/4939	Group 1-i	24	21
002/5747	Group 1-k	28	25
992/940&982	Group 1-l	24	21

Table 6.5. Falls Plain Rim Group 2 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/4600	Group 2a	32	30
002/5373	Group 2e	24	-
002/5602	Group 2h	25	24
002/5556&5569	Group 2l	29	27
002/5646&5647	Group 2m	33	31
002/4989	Group 2n	28	26

Table 6.6. Falls Plain Rim Group 3 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/5835	Group 3a	24	23
002/6014&6015	Group 3c	23	21.5
002/5895&5898	Group 3e	26	25
002/5722	Group 3f	25	-
992/1000	Group 3g	30	29
002/4809	Group 3j	24	23
002/5716	Group 3l	30	28.5
992/981	Group 3r	27	25

Table 6.7. Falls Plain Rim Group 4 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/4822&4653	Group 4a	27	25
992/974	Group 4b	26	-
002/5979&5881	Group 4m	34	32

Table 6.8. Falls Plain Rim Group 5 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/5097&5105	Group 5a	25	22-22.5
002/5749	Group 5c	28	25
002/4719	Group 5d	24	20
002/5354&5355	Group 5h	30	-
002/5990	Group 5i	33	31
002/4595	Group 5j	22	-

Table 6.9. Falls Plain Rim Group 6 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/4575	Group 6a	30	25
002/5223	Group 6b	25	21
002/4797	Group 6c	22	19
002/4811	Group 6d	24	21
002/6240	Group 6e	27	24
002/5632	Group 6f	29	25
002/5794	Group 6g	26	23

Table 6.10. Falls Plain Rim Group 7 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/5015	Group 7a	25	22
002/4664	Group 7b	20	18
002/5561	Group 7c	26	22
002/5535	Group 7d	29	26

Table 6.11. Falls Plain Rim Group 8 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/5633	Group 8a	28	26
002/4589	Group 8b	26	24
002/4590	Group 8c	25	24
002/4751etc.	Group 8d	32	30
002/4810	Group 8e	25	23
002/5000	Group 8f	24	22
002/5900	Group 8g	27	25.5
002/4594	Group 8h	24	23
002/5442	Group 8j	28	26
002/5736	Group 8l	25	23
002/5795	Group 8m	26	24

Table 6.12. Falls Plain Rim Group 9 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/4815&4816	Group 9a	27	26
002/4592	Group 9b	24	22
992/958	Group 9c	23	-
002/4669	Group 9d	27	25
002/4615	Group 9e	26	25
002/4761	Group 9f	22	21

Table 6.13. Falls Plain Rim Group 10 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/6036	Group 10b	25	-
002/5224	Group 10c	19	17
992/1092	Group 10e	18	17
002/5544	Group 10h	33	31.5
002/5340	Group 10i	22	20
002/5333	Group 10k	22	20
002/6023	Group 10l	25	24
992/1056	Group 10m	28	27

Table 6.14. Falls Plain Rim Group 11 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/5774	Group 11d	27	-
002/5767	Group 11j	32	31
002/4932	Group 11m	32	31

Table 6.15. Falls Plain Rim Group 12 Maximum and Minimum Orifice Diameters.

Accession #	Profile	Max. Orifice (cm)	Min. Orifice (cm)
002/4917	Group 12a	28	26
992/951	Group 12d	22	20.5
002/5159	Group 12h	22	21
002/5549	Group 12j	30	29

Chapter 7

Table 7.1. Locations of Chert Tools.

Chert Tools	SB	15N	63N	100 Block	148N	200 Block	253N	300 Block	400 Block	P II & Trench	Total
Adze	1	0	0	6	0	13	1	0	0	0	21
Axe	0	0	0	2	0	2	0	0	0	0	4
Adze/Axe	0	0	0	1	0	0	0	0	0	0	1
Biface S-1	5	0	0	42	1	98	5	1	4	3	159
Biface S-2	11	0	2	126	0	167	25	2	3	11	347
Biface S-3	37	0	1	304	3	344	13	23	7	38	770
Core	5	1	0	12	0	14	0	1	1	2	36
Denticulate	1	0	0	4	0	2	0	1	0	0	8
Drill	3	0	2	40	1	34	1	3	1	4	89
Graver	4	0	0	2	0	1	0	2	0	1	10
Hammerstone	5	0	0	11	0	23	0	0	0	0	39
Perforator			1	19		17		1			38
Point	31	1	5	144	4	192	18	24	7	22	444
Retouched Flake	15	0	0	94	1	103	3	10	3	10	239
Scraper	3	0	0	15	0	22	1	2	0	2	45
Spokeshave	0	0	0	0	0	0	0	0	0	1	1
Tested Cobble	3	0	0	30	1	23	0	0	0	0	57
Uniface	2	0	0	5	0	6	0	2	0	0	15
Utilized Flake	41	0	1	172	11	245	1	2	8	18	499
Wedge	0	0	0	4	0	8	0	0	0	0	12

Table 7.2. Locations of Diagnostic Projectile Points.

Diagnostic Projectile Points	SB	15N	63N	100 Block	148N	200 Block	253N	300 Block	400 Block	P II Unit & Trench	Total
Turkey-tail	2	0	1	4	1	15	2	1	0	3	32
TT/A	3	0	0	0	0	11	1	1	0	1	17
Adena	16	0	1	27	0	79	7	18	3	8	159
Cypress	1	0	0	3	0	8	3	1	1	0	17
Little Bear Creek	0	0	0	2	0	1	0	0	0	0	3
Cresap	0	0	0	2	0	0	0	0	0	1	3
Kramer	0	0	0	0	0	1	0	0	0	2	3
Robbins	0	0	0	1	0	0	0	0	1	0	2
Robbins/ Snyders	1	0	0	0	0	3	1	0	0	0	5
Snyders Cluster	5	1	1	93	3	71	4	3	2	6	189
Lowe	0	0	0	1	0	1	0	0	0	0	2
Copena	1	0	0	4	0	0	0	0	0	1	6

Table 7.3. Numbers and Percentages of Chert Tools Made of Wyandotte, Muldraugh, and Allens Creek Chert.

Chert Tools	#	# Wyan	% Wyan	# Muld	% Muld	# AC	% AC
Axe	4	0	0	4	100%	0	0
Adze/Axe	1	1	100%	0	0	0	0
Biface S-1	159	67	42.1%	80	50.3%	5	3.1%
Biface S-2	346	183	52.9%	136	39.3%	16	4.6%
Biface S-3	767	542	70.7%	177	23.1%	14	1.8%
Core	36	18	50%	14	38.9%	3	8.3%
Denticulate	8	6	75%	1	12.5%	0	0
Drill	87	70	80.5%	13	14.9%	2	2.2%
Graver	10	8	80%	2	20%	0	0
Hammerstone	39	7	17.9%	25	64.1%	4	10.3%
Perforator	38	30	78.9%	7	18.4%	1	2.6%
Point	458	384	83.8%	23	5.0%	4	.9%
Retouched Flake	239	191	79.1%	37	15.5%	1	.4%
Scraper	45	35	76.1%	9	19.6%	0	0
Spokeshave	1	1	100%	0	0	0	0
Tested Cobble	57	7	12.3%	38	66.6%	9	15.8%
Uniface	15	12	80%	3	20%	0	0
Utilized Flake	499	429	85.8%	62	12.4%	1	.2%
Wedge	12	7	58.3%	3	25%	0	0
100B UF	172	148	86.0%	22	12.7%	0	0
200B UF	245	211	86.1%	28	11.4%	0	0

SB UF	41	36	87.8%	5	12.2%	0	0
100B RF	94	74	78.8%	5	5.3%	0	0
200B RF	103	82	79.6%	16	15.5%	0	0
SB RF	15	15	100%	0	0%	0	0

Table 7.4. Features with Early Woodland Contracting Stemmed Points and Associated Pottery, Projectile Points, and Radiocarbon Dates.

Feature	Early Woodland Point Type	Grit tempered (g)	Falls Plain (g)	MW Points	Date RCYBP
F100-7	Adena	4	1433.7	3 Snyders	2000
F100-37	Adena	14	2573.8	2 Snyders	2070
F200-8	TT/Adena	0	0		
F200-11	Adena	0	.2		
F200-44	Adena	10.4	0		
F200-56	Adena	11.5	0		
F200-57	TT/Adena	.6	0		
F200-58	Adena	0	0		
F200-59	Adena	6.6	1.8		
F200-110	Cypress	154.3	.3		
F300-2	Adena	3.5	24.0	2 Snyders	
F300-13	2 Adena	62.4	38.4		
F300-60	Adena	105.2	95.9		2190
F400-39	Adena	37.5	7.6		
TrF154	Adena	223.4	49.2		2280
TrF193	Adena	2	84.5		
PhIII SB F21	Adena	0	0		
PhII F88	Cypress	.5	0		

Table 7.5. Numbers, Locations, and Chert Types of Stage 1, 2, and 3 Bifaces.

	100 Block	200 Block
Bifaces S-1	n=42	n=98
% Stage 1 Bifaces on Site	26.4%	61.6%
% Bifaces in Block	8.9%	15.9%
% Wyandotte	33.3%	41.8%
% Muld & AC	59.6%	53.1%
Bifaces S-2	n=126	n=167
% Stage 2 Bifaces on Site	36.4%	48.3%
% Bifaces in Block	26.7%	27.0%
% Wyandotte	51.6%	49.7%
% Muld & AC	45.2%	47.3%
Biface S-3	n=304	n=344
% Stage 3 Bifaces on Site	39.6%	44.9%
% Bifaces in Block	64.4%	56.5%
% Wyandotte	78.3%	65.7%
% Muld & AC	19.4%	30.0%

Table 7.6. Hathaway Cache Measurements.

Catalog No#	Max# Length	Max# Width	Max# Thickness	Weight
002-6459	119.49	34.85	14.07	64.70
002-6460	93.62	43.67	13.79	66.40
002-6461	104.32	45.21	14.31	69.10
002-6462	97.56	47.46	14.67	67.59
002-6463	76.18	43.30	13.13	47.80
002-6464	98.35	41.50	11.97	62.60
002-6465	88.65	47.68	11.95	64.90
002-6466	88.15	52.89	14.17	72
002-6467	106.32	37.63	18.51	69.5
002-6468	97.54	47.36	12.89	69.40
002-6469	101.58	41.68	17.46	69.90
002-6470	93.71	45.59	15.16	67.5
002-6471	90.15	48.64	13.47	65.59
002-6472	92.57	48.23	14.57	69.60
002-6473	87.93	49.92	14.01	68.4
002-6474	99.37	46.03	14.35	67.5
002-6475	92.21	52.03	14.59	86.40
002-6476	100.4	44.66	20.16	99
002-6477	95.07	48.89	11.82	58.20
002-6478	99.07	44.66	12.93	53.80

Table 7.7. Locations of Hardstone Tools.

Hardstone Tools	SB	15N	63N	100 Block	148N	200 Block	253N	300 Block	400 Block	P II & Trench	Total
Adze	0	0	0	1	0	3	0	0	0	0	4
Adze/Celt	0	0	0	8	0	2	0	0	0	0	10
Abrader	0	0	0	2	0	8	0	0	1	1	12
Anvil	0	0	0	0	0	0	0	0	1	0	1
Bannerstone	0	0	0	2	0	1	0	0	0	0	3
Bead	0	0	0	2	0	2	0	0	0	0	4
Celt	2	0	0	19	0	10	0	0	0	1	32
Chopper	1	0	0	0	0	0	0	0	0	0	1
Gorget	0	0	0	7	0	1	0	0	0	0	8
Hammer-stone	3	0	0	16	1	9	0	0	0	0	29
Mano	0	0	0	4	0	1	0	0	0	1	6
Metate	1	0	0	1	0	1	0	0	0	0	3
Misc. GS	1	0	0	12	0	5	0	0	0	0	18
Pestle	1	0	0	0	0	2	0	0	0	0	3
Pipe	0	0	0	5	1	1	0	0	0	0	7
Pitted Stone	2	1	00	3	1	4	0	2	0	0	13

Table 7.8. Locations of Early Woodland Features with More Than 100 g of Early, Intermediate, or Late Stage Wyandotte or Muldraugh/Allens Creek debitage.

Reduction Stage	**Early**		**Intermediate**		**Late**	
Chert	M&AC	Wyan	M&AC	Wyan	M&AC	Wyan
200 Block	4	3	5	3	2	1
400 Block	2		3		2	
Ph II South Block	3		2	2		2

Table 7.9. Locations of Middle Woodland Features with More Than 100 g of Early, Intermediate, or Late Stage Wyandotte or Muldraugh/Allens Creek debitage.

Reduction Stage	**Early**		**Intermediate**		**Late**	
Chert	M&AC	Wyan	M&AC	Wyan	M&AC	Wyan
100 Block	6	0	4	1	2	1
300 Block	3	0	8	0	4	0
400 Block	1	0	2	0	0	0

APPENDIX A
FEATURE DIMENSIONS

APPENDIX A
Feature Dimensions

Feature	Block	Component	Length cm	Width cm	Depth cm	Area cm^2	Volume cm^3
F100-10	100	Middle Woodland	57	51	8	2220	8781.82
F100-100	100	Middle Woodland	55	40	17	1660	16011.93
F100-101	100	Middle Woodland	40	40	11	1180	12980.00
F100-104	100	Middle Woodland	105	95	33	7570	137949.17
F100-105	100	Middle Woodland	55	55	13	2600	17326.89
F100-106	100	Middle Woodland	65	50	30	2260	67800.00
F100-107	100	Middle Woodland	28	30	12	670	8040.00
F100-11	100	Middle Woodland	90	70	16	6990	55739.39
F100-110	100	Middle Woodland	138	96	27	3290	52519.27
F100-112	100	Middle Woodland	192	203	150	31860	4779000.00
F100-113	100	Middle Woodland	37	40	14	1240	17360.00
F100-115	100	Middle Woodland	78	52	30	5810	145244.19
F100-119	100	Middle Woodland	64	60	27.09	3000	59772.50
F100-12	100	Middle Woodland	90	84	26	8380	113405.55
F100-123	100	Middle Woodland	60	60	8.5	1830	7774.69
F100-124	100	Middle Woodland	45	45		3150	
F100-13	100	Middle Woodland	55	39	12	1850	11523.46
F100-131	100	Middle Woodland	70	42	5.5	5510	14629.92
F100-133	100	Middle Woodland	64		24	4140	54632.45
F100-135	100	Middle Woodland	100	106	42	10760	451920.00
F100-15	100	Middle Woodland	34	34	11	790	4839.36
F100-153	100	Middle Woodland	60	90	23	1000	17147.83
F100-155	100	Middle Woodland	54		11	2070	11597.76
F100-16	100	Middle Woodland	60	54	8	1610	6439.42
F100-163	100	Middle Woodland	37	36	15	980	8750.25
F100-17	100	Middle Woodland	35	36	18	1070	12172.46
F100-18	100	Middle Woodland	66	63	10.5	3000	15701.13
F100-19	100	Middle Woodland	60	60	19.5	3420	35733.47
F100-2	100	Middle Woodland	81	42		4420	
F100-20	100	Middle Woodland	35	40	13.5	1210	9075.91
F100-21	100	Middle Woodland	56	60	17	3140	53380.00
F100-22	100	Middle Woodland	40	34		1070	
F100-23	100	Middle Woodland	56	54	16.5	2890	25143.85
F100-24	100	Middle Woodland	94	80	8	6210	24103.42
F100-25	100	Middle Woodland	64	74	14	3510	24964.69
F100-26	100	Early Woodland	70	60	16.5	3380	29024.65
F100-27	100	Middle Woodland	69	63	22.5	1210	18786.09
F100-29	100	Middle Woodland	46	20	11	1500	8588.16
F100-3	100	Middle Woodland	80	76	42	4670	159363.75
F100-30	100	Middle Woodland	105	90	17	8150	68970.33
F100-31	100	Middle Woodland	90	46	18	3640	34377.26

Feature	Block	Component	Length cm	Width cm	Depth cm	Area cm^2	Volume cm^3
F100-32	100	Middle Woodland	78	76		2090	
F100-33	100	Middle Woodland	33	28	17	2450	22458.33
F100-34	100	Middle Woodland	40	60	14.5	4240	31040.81
F100-35	100	Middle Woodland	48	23	7	1630	5648.99
F100-36	100	Middle Woodland	60	51		2400	
F100-37	100	Middle Woodland	96	96	68	11480	780640.00
F100-39	100	Middle Woodland	102	30	22	3750	64556.25
F100-4	100	Middle Woodland	69	66	13	3390	22256.49
F100-40	100	Middle Woodland	95	90	22	7070	80004.50
F100-41	100	Middle Woodland	75	103	25	6070	80683.75
F100-42	100	Middle Woodland	47	47	9	1180	5463.56
F100-43	100	Middle Woodland	45	40	18.5	1430	15876.88
F100-44	100	Middle Woodland	54	42	16	1900	16648.19
F100-45	100	Middle Woodland	118	137	30	5020	85842.00
F100-46	100	Middle Woodland	121	101	19.5	12560	121283.87
F100-47	100	Middle Woodland	105	95	31	8430	140393.48
F100-49	100	Middle Woodland	45	44	13.5	1560	21060.00
F100-5	100	Middle Woodland	89	70	12	5210	30877.06
F100-50	100	Middle Woodland	62	28	21	4510	50109.82
F100-52	100	Middle Woodland	240	130	33	19870	332781.17
F100-53	100	Middle Woodland	100	68	11	6200	33404.16
F100-54	100	Middle Woodland	75	63	30	3570	79425.36
F100-55	100	Middle Woodland	30	24	15	570	6073.07
F100-56	100	Middle Woodland	21	34		700	
F100-57	100	Middle Woodland	83	38	19	5610	54606.42
F100-59	100	Middle Woodland	92	70	10.5	4590	23714.73
F100-60	100	Middle Woodland	56	48	8.5	2120	8957.89
F100-61	100	Middle Woodland	140	86	45	9320	419400.00
F100-63	100	Middle Woodland	48	50	18	1920	19516.46
F100-65	100	Middle Woodland	94	126	17	6430	54935.13
F100-66	100	Middle Woodland	37	44	7	1400	4876.19
F100-67	100	Middle Woodland	137	140	67	13630	913210.00
F100-68	100	Middle Woodland	50	58	39	1570	61230.00
F100-7	100	Middle Woodland	100	92	33	11600	382800.00
F100-70	100	Middle Woodland	102	84	40.45	6560	201537.82
F100-71	100	Middle Woodland	60	40	15	1690	13862.25
F100-72	100	Middle Woodland	60	57	10	2570	12838.00
F100-73	100	Middle Woodland	88	75	18	5460	50102.06
F100-74	100	Middle Woodland	70	40	13	3390	22256.49
F100-75	100	Middle Woodland	74	54	6	4020	11686.03
F100-76	100	Middle Woodland	58	38	13	1580	11658.50
F100-79	100	Middle Woodland	70	60	18	3290	31353.26
F100-8	100	Middle Woodland	100	94	12	8580	50288.26
F100-80	100	Middle Woodland	73	73	19.5	3660	37979.87

Feature	Block	Component	Length cm	Width cm	Depth cm	Area cm^2	Volume cm^3
F100-81	100	Middle Woodland	105	60	16	5030	40686.59
F100-82	100	Middle Woodland	61	90	21	2950	34385.02
F100-83	100	Middle Woodland	42	44	14	1410	10852.69
F100-84	100	Middle Woodland	90	45	25	4950	67243.75
F100-85	100	Middle Woodland	86	70	9	4540	19978.76
F100-86	100	Middle Woodland	63	56	29	2630	76270.00
F100-87	100	Middle Woodland	78	77	34.5	4240	146280.00
F100-88	100	Middle Woodland	36	38		1050	
F100-9	100	Middle Woodland	69	66		3680	
F100-90	100	Middle Woodland	115	68		4340	
F100-91	100	Middle Woodland	59	56		2880	
F100-92	100	Middle Woodland	74	60	18	4010	37574.06
F100-93	100	Middle Woodland	71	55	22	3550	78100.00
F100-94	100	Middle Woodland	93	80	8	14140	54554.62
F100-96	100	Middle Woodland	93	65	22	4600	53921.30
F100-98	100	Middle Woodland	100	90	28	6850	103083.90
F100-99	100	Middle Woodland	88	82	31	7770	130572.68
PM100-1	100	Middle Woodland	13	13		120	
PM100-13	100	Middle Woodland	8	8		60	
PM100-14	100	Middle Woodland	9	11		100	
PM100-15	100	Middle Woodland	8	9		60	
PM100-19	100	Middle Woodland	10	10		70	
PM100-20	100	Middle Woodland	13	14		100	
PM100-21	100	Middle Woodland	12	14		110	
PM100-24	100	Middle Woodland	11	11		80	
PM100-25	100	Middle Woodland	12	10		80	
PM100-26	100	Middle Woodland	12	11		90	
PM100-3	100	Middle Woodland	14	12		120	
PM100-30	100	Middle Woodland	12	12		100	
PM100-31	100	Middle Woodland	11	10		70	
PM100-32	100	Middle Woodland	11	10		80	
PM100-33	100	Middle Woodland	12	12		110	
PM100-34	100	Middle Woodland	11	11		90	
PM100-35	100	Middle Woodland	11	12		100	
PM100-37	100	Middle Woodland	11	12.5		100	
PM100-38	100	Middle Woodland	12	12.5		110	
PM100-39	100	Middle Woodland	11	13		80	
PM100-42	100	Middle Woodland	10	10		70	
PM100-43	100	Middle Woodland	10	11		80	
PM100-5	100	Middle Woodland	10	11		70	
PM200-1	200	Middle Woodland	13	13		110	
PM200-2	200	Middle Woodland	12	10		80	
PM200-27	200	Middle Woodland	12	13		110	
PM200-28	200	Middle Woodland	9	8		50	

Feature	Block	Component	Length cm	Width cm	Depth cm	Area cm^2	Volume cm^3
PM200-29	200	Middle Woodland	10	9		120	
PM200-3	200	Middle Woodland				80	
PM200-33	200	Middle Woodland	10	9		70	
PM200-4	200	Middle Woodland	13	12		110	
PM200-8	200	Middle Woodland	10	11		70	
PM200-9	200	Middle Woodland	10	10		60	
F200-1	200	Middle Woodland	75	65	10	3110	15430.00
F200-10	200	Early Woodland	61	56	6.5	2790	8842.66
F200-106	200	Early Woodland	50	50		1420	
F200-107	200	Early Woodland	32	37	16	860	8660.99
F200-108	200	Early Woodland	120	135	39	17560	358501.34
F200-11	200	Early Woodland	96	90	23	6470	77536.63
F200-110	200	Early Woodland	92	70	12	4690	27881.86
F200-12	200	Early Woodland	70	95	16	4920	39841.79
F200-13	200	Early Woodland	65	68	20	2540	28400.00
F200-14	200	Middle Woodland	56	45	20	1480	29600.00
F200-15	200	Early Woodland	70	60	14	3490	24830.29
F200-16	200	Early Woodland	127	83	15	6830	50870.25
F200-17	200	Early Woodland	75	80	21	3640	41340.22
F200-18	200	Early Woodland	20	20	7	290	1146.59
F200-19	200	Middle Woodland	63	62	8	3210	12583.42
F200-2	200	Early Woodland	93	83	11	5600	30236.16
F200-20	200	Early Woodland	146	135	19	17630	164228.82
F200-21	200	Early Woodland	40	40	5	1470	3590.75
F200-22	200	Early Woodland	25	25	17.5	280	5042.41
F200-23	200	Early Woodland	100	85	26	7100	97431.15
F200-24	200	Early Woodland	43	20		2080	
F200-25	200	Early Woodland	86	86	23	5810	110177.94
F200-26	200	Early Woodland	167	124	20	21800	213296.00
F200-27	200	Middle Woodland	70	50	20	2280	25904.00
F200-28	200	Early Woodland	62	49		1970	
F200-29	200	Middle Woodland	76	44	20	4870	97400.00
F200-3	200	Middle Woodland	75	70	8	4050	15809.02
F200-30	200	Early Woodland	97	110	14.5	5910	42664.01
F200-31	200	Early Woodland	70	82	10	4950	24262.00
F200-32	200	Early Woodland	99	92	21	7100	76217.02
F200-33	200	Middle Woodland	82	70	17	5470	47101.53
F200-34	200	Early Woodland	80	60	11	4760	25800.96
F200-35	200	Middle Woodland	61	62	10	2710	13510.00
F200-36	200	Early Woodland	96	120		17240	
F200-37	200	Middle Woodland	36	38	4	1020	1990.53
F200-38	200	Middle Woodland	35	35	5	1040	2558.75
F200-4	200	Early Woodland	92	63	10	4640	22774.00
F200-40	200	Middle Woodland	73	48	8.87	2480	19371.08

Feature	Block	Component	Length cm	Width cm	Depth cm	Area cm^2	Volume cm^3
F200-42	200	Early Woodland	52	50		2520	
F200-43	200	Early Woodland	45	50	32	3320	106240.00
F200-44	200	Early Woodland	134	126	18.5	11090	101657.68
F200-47	200	Early Woodland	60	45		2130	
F200-48	200	Early Woodland	50	60		2280	
F200-49	200	Middle Woodland	75	70	20	3640	38960.00
F200-5	200	Middle Woodland	130	75	15	7560	56126.25
F200-50	200	Early Woodland	70	63	8	2690	10586.62
F200-51	200	Early Woodland	100	98	23	11310	130970.23
F200-53	200	Middle Woodland	42	40	9	1520	6932.36
F200-54	200	Early Woodland	52	50	12	990	6569.86
F200-56	200	Early Woodland	70	87		10120	
F200-57	200	Early Woodland	108	127	27	18640	251455.27
F200-58	200	Early Woodland	114	120	14	11060	75700.69
F200-59	200	Early Woodland	200	220	17	33990	279824.73
F200-6	200	Early Woodland	113	115	29	10010	151582.48
F200-60	200	Early Woodland	54	54	8	2470	9741.82
F200-61	200	Middle Woodland	136	106	22.5	10410	118146.09
F200-62	200	Early Woodland	107	96	26	7750	105543.15
F200-65	200	Early Woodland	220	152		25190	
F200-66	200	Early Woodland	70	75	4	4290	8268.93
F200-67	200	Early Woodland	58	44	14	1410	10852.69
F200-68	200	Early Woodland	230	69		24070	
F200-7	200	Early Woodland	40	35		1080	
F200-70	200	Early Woodland	77	66	22	3620	58750.43
F200-71	200	Early Woodland	53	50	10	1060	5590.00
F200-72	200	Early Woodland	42	40	15	2640	20702.25
F200-74	200	Early Woodland	57	37	17	3350	43862.89
F200-76	200	Early Woodland	50	40	8	1630	6516.22
F200-77	200	Early Woodland	119	58	10	14410	69670.00
F200-78	200	Early Woodland	98	68	20	8260	83312.00
F200-8	200	Early Woodland	23	22	26	1830	35537.50
F200-80	200	Early Woodland	20	18	16	350	4744.19
F200-83	200	Early Woodland	53	53	14	1870	13943.89
F200-84	200	Early Woodland	70	85	6	4210	12233.23
F200-86	200	Early Woodland	19	7	7	320	2240.00
F200-88	200	Early Woodland	80	80	20	5510	56912.00
F200-89	200	Early Woodland	114	126	16	8600	68104.19
F200-9	200	Early Woodland	23	29		470	
F200-90	200	Middle Woodland	40	40	8	1310	5287.42
F200-92	200	Early Woodland	60	55	12	2370	14518.66
F200-93	200	Early Woodland	54		9	5130	22527.56
F200-94	200	Early Woodland	94	104	26	6040	84202.35
F200-95	200	Early Woodland	123	84		12920	

Feature	Block	Component	Length cm	Width cm	Depth cm	Area cm^2	Volume cm^3
F200-96	200	Early Woodland	42	42	12.5	1360	9140.47
F200-97	200	Middle Woodland	164	120	22	10220	113268.50
F200-98	200	Early Woodland	66	60	11	2660	14712.96
F200-99	200	Middle Woodland	82	82	12	4090	24425.86
F300-13	300	Middle Woodland	102	98	61	7970	486170.00
F300-14	300	Middle Woodland	103	74	16	3920	32161.79
F300-19	300	Middle Woodland	105	103	15	10110	74486.25
F300-2	300	Middle Woodland	87	76	24	5000	120000.00
F300-24	300	Middle Woodland	90	88	32	1990	63680.00
F300-27	300	Middle Woodland	80	90	12	5620	33238.66
F300-37	300	Early Woodland	72	75	15	3960	30206.25
F300-41	300	Early Woodland	45	49	11	2070	11597.76
F300-46	300	Middle Woodland	90	70	26	6660	91939.95
F300-47	300	Middle Woodland	52	47	26	1900	49400.00
F300-52	300	Middle Woodland	118	100	53.72	7240	345546.33
F300-6	300	Middle Woodland	69	56	16	3300	43829.28
F300-60	300	Middle Woodland	138	105	67	3110	280111.79
F300-62	300	Middle Woodland	108	106	17	8680	147560.00
F300-7	300	Middle Woodland	89	78	14	4200	29601.49
F300-8	300	Early Woodland	80	70	12	3600	21603.46
F300-96	300	Early Woodland	90	86	48	6100	292800.00
F300-97	300	Early Woodland	90	75	28	5310	82386.30
F400-112	400	Middle Woodland	68	62	15.5	2840	22998.99
F400-12	400	Middle Woodland	91	78	26	5260	136760.00
F400-14	400	Middle Woodland	40	70		1880	
F400-15	400	Middle Woodland	27	18		380	
F400-16	400	Middle Woodland	90	84	24	4790	62120.45
F400-17	400	Middle Woodland	70	72	30	3890	116700.00
F400-27	400	Early Woodland	112	108	61	9460	502734.67
F400-3	400	Early Woodland	68	71	7	3540	12066.59
F400-38	400	Early Woodland	72	67	15	3660	28046.25
F400-39	400	Early Woodland	100	89	60	6540	392400.00
F400-4	400	Early Woodland	56	51	23	2580	34591.03
F400-5	400	Middle Woodland	140	120	45.96	7840	254258.21
F400-57	400	Early Woodland	70	82	29	4350	126150.00
F400-67	400	Middle Woodland	55	66	20	2620	44519.04
F400-7	400	Middle Woodland	72	78	60	4190	251400.00
F53	Phase II	Early Woodland	80	71		3330	
F56	Phase II	Middle Woodland	60	30	18	4510	41894.06
F59	Phase II	Early Woodland	76	84	22	4750	55505.30
F63	Phase II	Early Woodland	135	120	9	9240	40282.76
F64	Phase II	Early Woodland	40	40	10	790	4294.00
F71	Phase II	Early Woodland	72	61	10	4770	23398.00
F78	Phase II	Early Woodland	484	704		281960	

Feature	Block	Component	Length cm	Width cm	Depth cm	Area cm^2	Volume cm^3
F78A	Phase II	Early Woodland	53	53	25	3500	49843.75
F87	Phase II	Middle Woodland	57	45	10	3120	15478.00
F88	Phase II	Early Woodland	56	46	23	1730	25207.03
F92	Phase II	Middle Woodland	87	83	26	4920	127920.00
F94	Phase II	Early Woodland	49	35	9	1210	5593.16
F95	Phase II	Early Woodland	55	60	10	2430	12166.00
F99	Phase II	Middle Woodland	93		8	5320	20685.82
F20A	Phase II	Middle Woodland	47	41	25		
F20B	Phase II	Middle Woodland	100	85	36		
F2	Phase II	Early Woodland	64		19	3010	30894.42
F20	Phase II	Middle Woodland	95	90		14580	
F22	Phase II	Middle Woodland	75	45	20	2750	30416.00
F100	Phase II	Early Woodland	172	95		18540	
F36	Phase II	Middle Woodland	97	80	50	8180	259070.00
F39	Phase II	Early Woodland	101	91	34	5320	106553.01
F40	Phase II	Early Woodland	206	110		34930	
F3	Phase II	Middle Woodland	85	75	10	4510	22150.00
PM1	Phase II	Early Woodland	24	13		60	
F101	Phase II	Early Woodland	21.5	21	11.5	380	2861.08
F102	Phase II	Middle Woodland	143	93		10930	
F104	Phase II	Early Woodland	71	56	29	11230	168564.88
F108	Phase II	Middle Woodland					
F109	Phase II	Early Woodland	88	82	22	6490	73879.70
F11	Phase II	Middle Woodland	55	60		6110	
F110	Phase II	Early Woodland	60	28		1440	
F120	Phase II	Middle Woodland	83	75	10	5390	26374.00
F121	Phase II	Middle Woodland	48	88		4160	
F122	Phase II	Early Woodland	94	43	12	5790	34217.86
F126	Phase II	Early Woodland	70	58	28.5	4260	121410.00
FSouth-1	South	Early Woodland	204	186	13	26350	165526.89
FSouth-16	South	Middle Woodland	84	77	19	5820	56521.62
FSouth-21	South	Early Woodland	65	60	7	3710	12637.79
FSouth-3	South	Middle Woodland	25	25	19	470	8930.00
FSouth-4	South	Middle Woodland	45	40	7.5	980	3739.78
FSouth-6	South	Middle Woodland	130	85	25	10070	128683.75
F312	T148N49W	Middle Woodland	154	106	6	10360	29945.23
F313	T148N49W	Middle Woodland	70	76	23.5	26210	302163.69
F314	T148N49W	Middle Woodland	62	60	17.5	3250	29990.41
F315	T148N49W	Middle Woodland	103	73	28	3260	54834.30
F316	T148N49W	Middle Woodland	70	65	27	4280	65349.67
F317	T148N49W	Middle Woodland	95	115	19	7740	74032.02
F318	T148N49W	Middle Woodland	78	90	12	4750	28227.46
F320	T148N49W	Middle Woodland	102	98	34	8510	158613.81
F321	T148N49W	Middle Woodland	120	92	18	8130	73170.86

Feature	Block	Component	Length cm	Width cm	Depth cm	Area cm^2	Volume cm^3
F323	T148N49W	Middle Woodland	113	90	35	5260	109891.25
F325	T148N49W	Middle Woodland	27	27	11	530	3466.56
F326	T148N49W	Middle Woodland	56	40		1690	
F327	T148N49W	Middle Woodland	140	115	34	11460	206757.81
F331	T148N49W	Middle Woodland	88		57.55	5470	260702.59
F332	T148N49W	Middle Woodland	71	66	41	3580	146780.00
F333	T148N49W	Middle Woodland	88	70	10.5	4640	23966.73
F335	T148N49W	Middle Woodland	125	107	33.5	9380	169703.28
F336	T148N49W	Middle Woodland	100	72	57.5	3200	183754.91
F244	T15N27W	Middle Woodland	59	48	8	1780	7092.22
F220	T15N27W	Middle Woodland	64	50	12	2490	15209.86
F212	T15N27W	Middle Woodland	36	20	10	430	2566.00
F213	T15N27W	Middle Woodland	120	78	5	6790	16358.75
F242	T253N80W	Middle Woodland	60	30			
F144	T253N80W	Early Woodland	25	25		480	
F145	T253N80W	Early Woodland	90	82	8	5640	21914.62
F146	T253N80W	Early Woodland	96	88	14	3520	25031.89
F148	T253N80W	Early Woodland	50	42	9	1450	6629.96
F151	T253N80W	Early Woodland	90	80	23	5280	64399.03
F154	T253N80W	Early Woodland	99	89	40	6070	131209.12
F155	T253N80W	Early Woodland	96	85	14.5	6360	45796.01
F162	T253N80W	Early Woodland	51	35	17	2000	18786.33
F192	T63N47W	Middle Woodland	85	88	21	6860	112554.08
F193	T63N47W	Middle Woodland	77	80	16	6310	50516.99
F194	T63N47W	Middle Woodland	101	82	13	6800	43534.89
F195	T63N47W	Middle Woodland	142	113	25	17950	223243.75
F197	T63N47W	Middle Woodland					
F201	T63N47W	Middle Woodland	68	68	48.16	3610	154250.25
F203	T63N47W	Middle Woodland	75	50	18	2430	23922.86
F204	T63N47W	Middle Woodland	86	58	17	3660	32331.93
F259	T63N47W	Middle Woodland	103	85	8.5	6190	25563.49
F221	T63N47W	Middle Woodland	61	53	21	2420	29042.62

APPENDIX B
FEATURE CONTENTS

APPENDIX B
Feature Contents

Feature	Rock Wt (g)	Debitage Wt (g)	Grit sherds Wt (g)	Limestone sherds Wt (g)	Lithic tool Ct	Hardstone tool Ct
F100-10	0.045	0.5	0	0.5		
F100-100	0.817	67.5	0	22.2		1
F100-101	0	36	17.5	23.3		
F100-104	5.041	103	57.5	59.6	1	
F100-105	1.443	36.5	0	456		
F100-106	2.712	16.5	1.3	77.8		
F100-107	0		0	6.7		
F100-11	2.235	158.5	0	59.8		
F100-110	2	113	0	92.6	1	
F100-112	197.31	3988.3	565.6	7081.8	13	4
F100-113	0.612	63	0.3	2	1	
F100-115	5.027	157	1.8	309.4		
F100-119	0.147	6	1	7.7	1	
F100-12	4.606	338.5	2.8	123.1	1	1
F100-123	0.4	43	0	7.4		
F100-124	2.258	42	0	6.9		
F100-13	0.234	9	0	4.3		
F100-131	0.204	26.5	0	2.1		
F100-133	2.4	83.5	26.1	41.2	1	
F100-135	8.506	471	22.3	501.3	4	
F100-15	0		0	445.8		
F100-153	1	17.5	37.9	53.6		
F100-155	1.352	244	0	7.9		
F100-16	0.326	3	0	3.6		
F100-163	0	1.5				
F100-17	0.216	16.5	0	7		
F100-18	1.3	24.5	0	19.1		
F100-19	0.8	20.5	0	617.3		
F100-2	0.102	32.5	0	1.9		
F100-20	0	6.5	0	1.8		
F100-21	0.824	93.5	0	64.6		
F100-22	0	47	0	17.1		
F100-23	0	56	0	14.5		
F100-24	0.587	13.5	0	17.5		
F100-25	0		0.6	21		
F100-26	2	6.9	149	2	1	
F100-27	1.611	64	75.1	43.1		
F100-29	0		0.1	2.3		
F100-3	6.868	1295.5	28.9	161	2	
F100-30	7.097		9.6	59.2	2	

Feature	Rock Wt (g)	Debitage Wt (g)	Grit sherds Wt (g)	Limestone sherds Wt (g)	Lithic tool Ct	Hardstone tool Ct
F100-31	0.868	9	0	31.3		
F100-32	1.256	114.6	0	1.2	1	
F100-33	0.478	1.5	0	1.3		
F100-34	0.102	33.5	0	15.8		
F100-35	0.04		0	0.1		
F100-36	0	0	0	20.4		
F100-37	24.512	1279.2	14	2575.8	23	
F100-39	1.439	73	0	75.9		
F100-4	0.543	29	0	17.1		
F100-40	2.795	148.5	6	26.7	1	
F100-41	1.516	256	2.1	67.9		
F100-42	0.027	0.5	4	16.5		
F100-43	2.377	8.5	12.9	16		
F100-44	0.922	10.5	2.3	7.7		
F100-45	6.52	224.8	5	202.2	3	
F100-46	4.838	1	0	251.6	2	
F100-47	2.747	59	11.8	83.1		
F100-49	4.8		0	609.7		
F100-5	1.042	44	1.9	70.9		
F100-50	0.96	2171.4	6.1	28.1	3	
F100-52	26.59	822	13.6	181.9	1	
F100-53	3.288	52	0	51.9	1	
F100-54	1.432	40.5	0	24.1		
F100-55	0	9.5				
F100-56	0					
F100-57	3.7	56	0	102.2		
F100-59	1.318	62.5	13	38.3		
F100-60	1.167	50.5	0	4		
F100-61	6.82	489.5	2.7	111.5	3	
F100-63	0	13.5	0	43.6	2	
F100-65	15.512	3004	0	4	7	
F100-66	0.196	37.5	1.3	4		
F100-67	14.772	339.5	12.8	714		
F100-68	7.634	834.5	10	78.7		
F100-7	14.28	721.5	4.1	1433.7	7	1
F100-70	2.674	517.4	0	198.2	1	
F100-71	1.075	23	0	168.9	3	1
F100-72	0.391	19	0	20.7		
F100-73	4.469	60	0.6	61		
F100-74	0.818	20	0	13.9		
F100-75	5.3	18	0	1.8		
F100-76	0.553	29.5	0	15.5		
F100-79	1.328	38	0.7	87.9		

Feature	Rock Wt (g)	Debitage Wt (g)	Grit sherds Wt (g)	Limestone sherds Wt (g)	Lithic tool Ct	Hardstone tool Ct
F100-8	2.269	72.5	0	113	2	
F100-80	4.182	12.5	3.5	16.7		
F100-81	0.8	406.5	0	1.5		
F100-82	0.98	50.5	5.7	12.6	1	
F100-83	2.152	24.5	0	8.5	1	
F100-84	9.2	442.5	0	54.5	6	
F100-85	4.3	160	0	0.6	1	
F100-86	0.691	51	0	3.26		
F100-87	3.249	248.7	0	111.8	4	
F100-88	2		0	1.3		
F100-9	0.153	19	0	1		
F100-90	0.195	7	0	0.5		
F100-91	1.184	38	4.5	13.6	1	
F100-92	3.657	105	1.9	248.6	2	
F100-93	1	25	4	35.2		
F100-94	2.003	37	2.3	78.9		
F100-96	3.155	42.5	9.5	32.1	1	1
F100-98	3.604	398	43.8	84.8	1	
F100-99	6.313	304	32.8	130.6	2	1
PM100-1					1	
PM100-13					1	
PM100-14						
PM100-15			0	0.5		
PM100-19						
PM100-20					1	
PM100-21					2	
PM100-24			0	1.2	1	
PM100-25						
PM100-26			0	6.7		
PM100-3						
PM100-30			0	2.1		
PM100-31			0	0.4		
PM100-32						
PM100-33						
PM100-34			0	0.3		
PM100-35			0	8.4	2	
PM100-37			0	1.4	1	
PM100-38			0	14.4		
PM100-39			0	0.9		
PM100-42						
PM100-43			0	0.8		
PM100-5						
F200-1	2.45	22.5	0	6.3		

Feature	Rock Wt (g)	Debitage Wt (g)	Grit sherds Wt (g)	Limestone sherds Wt (g)	Lithic tool Ct	Hardstone tool Ct
F200-10	0.12	24.5			2	
F200-106	0					
F200-107	0		0	1.4		
F200-108	20.718	767	207	17.9	2	
F200-11	6.806	87	0	0.2	1	
F200-110	1.803	102.5	154.3	0.3	1	
F200-12	3.806	101.5				
F200-13	4.885	195.5				
F200-14	1.899	161.5	13.9	85.5		
F200-15	2.521	523	0	2.4	2	
F200-16	13.86	168	14.9	0	1	
F200-17	37.86	626.5	63.5	0	2	
F200-18	0	32.5				
F200-19	0.308	49.5	0	19.5		
F200-2	5.6					
F200-20	21.533	44				
F200-21	0	3.5	6.6	0		
F200-22	0	43	6.6	0		
F200-23	2.927	193	166.4	0.3		
F200-24	0.5	26.5			1	
F200-25	4.7	256	51.8	10.8	1	
F200-26	41.142	966.4	0	2.2	1	
F200-27	1.639	150	0	11.1		
F200-28	0.4		1.6	0		
F200-29	2.05	167	7.1	24.7	3	
F200-3	0.601	15.5	5.7	15.5		
F200-30	11.006	293.5	15.6	0		
F200-31	2.5	22				
F200-32	20.2	642.5	113.6	0		
F200-33	6.153	40.5	0	211.6	2	
F200-34	15.1	79	13	0		
F200-35	0.398	225	2.6	18		
F200-36	4.8	68	4.3	0	1	
F200-37	0	0.5	0	5.7		
F200-38	0	18				
F200-4	4.351	34.5	3.1	0		
F200-40	0.377	26.4	0	6.4		
F200-42	1.118	17	4.5	0		
F200-43	8.909	820.5	28	0	2	
F200-44	14.407	337	10.4	0	2	
F200-47	0.281	8.5				
F200-48	2.722	41.5	31.8	127.3		
F200-49	6.005	81.5	0	27.4	4	

Feature	Rock Wt (g)	Debitage Wt (g)	Grit sherds Wt (g)	Limestone sherds Wt (g)	Lithic tool Ct	Hardstone tool Ct
F200-5	5.562	263.5	1.2	28.3		
F200-50	1.084	103.5	6.2	0		
F200-51	20.387	332	20.9	0.3	8	
F200-53	0.279	56	0	11.6		
F200-54	0.985	9.5	0	0.4		1
F200-56	12.719	461	11.5	0	5	
F200-57	25.832	495.5	0.6	0	2	
F200-58	22.29	281			1	
F200-59	35.04	2339.5	0	1.8	25	1
F200-6	24.508	816.5	0.6	0	3	
F200-60	0.092	2				
F200-61	16.567	484.5	0	31.4		
F200-62	12.523	302.5	0	7.4	1	
F200-65	36.586	798	75	3.2	2	
F200-66	0.337	22.5				
F200-67	0.309	13.5	2.8	3.4		
F200-68	10.446	211.5	3.5	5.2		
F200-7	2.6	746			3	
F200-70	2.3	48.5			1	
F200-71	1.606	5	16.7	0		
F200-72	0.4	9.5				
F200-74	1.371	14.5	0.4	0.6		
F200-76	0.128	11.5	0	1		
F200-77	5.81	18.5				
F200-78	30.26	59	0	0.4		
F200-8	1.024	341.5			1	
F200-80	0					
F200-83	1.3	5.5	2.7	0	1	
F200-84	0.773	8.5				
F200-86	0					
F200-88	11.392	141	5.2	0	2	
F200-89	18.882	449.5	20.3	4.8	4	
F200-9	0					
F200-90	1	21	0	5.9		
F200-92	0.717	5.5				
F200-93	7.422	94.5	15.4	0		
F200-94	5.6	40.5				
F200-95	0.517	10	0	0.5		
F200-96	0		55.7	0		
F200-97	16.546	438.5	0.9	26.7	3	
F200-98	0.3	4	85.6	0		
F200-99	4.3	129	2.2	40.4		
PM200-1						

Feature	Rock Wt (g)	Debitage Wt (g)	Grit sherds Wt (g)	Limestone sherds Wt (g)	Lithic tool Ct	Hardstone tool Ct
PM200-2						
PM200-27						
PM200-28						
PM200-29						
PM200-3						
PM200-33						
PM200-4		0.5				
PM200-8		0.5				
PM200-9		0.5				
F300-13	30.926	3791.5	62.4	38.4	5	
F300-14	11.845	260	19.8	45.7		
F300-19	11.921	1309.5	8.3	184.3	6	
F300-2	11.563	788	3.5	24	6	
F300-24	14.588	635	0	6		1
F300-27	2.8	263.5	7.3	44.8		
F300-37	1	181.5			1	
F300-41	3.899	21.5	37.2	0		
F300-46	12.733	80	3.6	12.1	1	
F300-47	4.528	211	0	130.6	2	
F300-52	30.826	1188	69.7	63.7	5	1
F300-6	3.477	609.5	0	16.1	1	
F300-60	24.337	1279.5	105.2	95.9	11	
F300-62	3.508	368	3.1	10.8	2	
F300-7	15.511	944.5	2.3	3.2	1	
F300-8	4.108	417.5	8.1	0	1	
F300-96	7.004	340	31.1	3.2	1	
F300-97	2.833	86.5	29.4	8.7		
F400-112	0.809	48	0	39.4		
F400-12	5.101	226.5	2.3	49		
F400-14	0.6	1	0	2.5		
F400-15	0.206	3	0	284.1		
F400-16	2.401	214.5	0	81.7	1	
F400-17	10.268	316	8.3	106.4		
F400-27	24.591		21.7	7	1	
F400-3	1.166	101.5	111	0.5		
F400-38	1.3	108	6.7	0		
F400-39	11.799	581.9	37.5	7.6	4	
F400-4	23.551	2661	148.5	2		
F400-5	25.383	883	2.4	60.8	1	
F400-57	2.91	105	3.3	0.8	1	
F400-67	0	106	0	3.2		
F400-7	16.186	1217	0	459.9	8	
F100	13.251				1	

Feature	Rock Wt (g)	Debitage Wt (g)	Grit sherds Wt (g)	Limestone sherds Wt (g)	Lithic tool Ct	Hardstone tool Ct
F101	0	2				
F102	1.229	109			1	
F104	56.624	1917			6	
F108	1.834	95				
F109	8.758	454				1
F11	22.266	939	10	275.2		
F110	0	2				
F120	1.349	338	0	0.8		
F121	4.961	173				
F122	2.363	43				
F126	18.658	830			3	1
F2	4.556	189				
F20	46.098	536	0	792.8	2	
F20A		156	0	18.5	1	
F20B		8	0	1.7		
F22	0.183	36	0	4.2		
F3	26.568	528	0	25.2		
F36	20.806	2576	9.2	22	3	1
F39	2.561	2007	270.5	2.5	6	
F40	8.087	11584				
F53	9.272	244	1.9	0	1	
F56	0.211	49	0	24		
F59	4.189	241	56.2	0		
F63	2.863	251	9.7	0		
F64	0.535	148	47.1	0		
F71	0.383	14				
F78	13.814	353			1	1
F78A		44	106.9	0	1	
F87	0	17	0	44.3		
F88	0	188	0.5	0	2	
F92	4.015	280	30.8	691.7	1	
F94	0.869	298	1.8	0	1	
F95	0		4.3	0		
F99	4.034	1513	0	30.1		
PM1	0.17		26.4	0		
FSouth-1					2	
FSouth-16						
FSouth-21					5	
FSouth-3						
FSouth-4					1	
FSouth-6						
F312	0.742	11	5	21.5		
F313	9.7	135	2	69.1		1

Feature	Rock Wt (g)	Debitage Wt (g)	Grit sherds Wt (g)	Limestone sherds Wt (g)	Lithic tool Ct	Hardstone tool Ct
F314	4.281	73.5	0.7	71.7		
F315	4.9	237	10	49.9	1	
F316	5.31	311	36.6	80.8		
F317	6.095	420.5	0	44.1		
F318	1.072	9.5	0	75.8		
F320	10.58	268	0	202.6	1	
F321	3.218	236	0	7.9	1	
F323	4.727	56.5	37	98.2	1	1
F325	0		0	135.9		1
F326	0		0	2.9		
F327	10.606	281.5	0	35.9		
F331	8.6	70	0.2	118.9	1	
F332	6.411	440	0.3	243		
F333	1.462	38.5	0	21.8		
F335	9.879	445	23.9	215.4	3	
F336	5.818	161.5	10.4	113.3		
F212	0		0	13.4		
F213	0.288	78	0	7.2		
F220	0.999	98	0	260.3	1	
F244	1.321	121	0	39.8		
F144	0	7.5			20	
F145	0.7	6.5	2	0		
F146	1.886	61	2.4	1		
F148	0.19		21.4	0		
F151	7.608	163.5	23.3	8.2		
F154	35.122	684	223.4	49.2	6	
F155	4.228		30.7	0		
F162	0.613	44.5	0	1.6		
F242	0					
F192	3.005	54.5	0	26.1		
F193	6.772	73	2	84.5	2	
F194	0.918	191	0	22.6		
F195	5.751		0.9	78.3		
F197	0.221	74	0	30.1		
F201	3.4	131	0.3	77.2		
F203	1.163	2	0	9		
F204	3.902	115	1.4	34.2		
F221	1.7	38	0	11.5		
F259	1.2	53	0	23.8		

APPENDIX C

FAUNAL REMAINS FROM THE KNOB CREEK SITE (12HR484), HARRISON COUNTY, INDIANA

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Illinois State Museum
August 2006

Introduction

Faunal remains from stratified Archaic, Woodland, and Historic components at the Knob Creek site (12Hr484) in Harrison County, Indiana, were collected through excavations by the Indiana Sate University Anthropological Laboratory for the Caesars Indiana Development project under the auspices of the U.S. Army Corps of Engineers, Louisville District. The animal remains were analyzed to provide information on taxa represented at the site, conditions and natural and human modifications of the bone, human subsistence practices, and paleoecological conditions. Although bones are for the most part poorly preserved and highly fragmented, they provide some evidence, albeit limited, for human use of fauna by the Archaic, Woodland, and Historic Period inhabitants of this floodplain site.

Methods

Animal bones were identified by comparisons to the Illinois State Museum's extensive modern comparative collection of animal skeletons. Taxonomy follows the Integrated Taxonomic Information System (www.itis.usda.gov). Taxa were identified to the most precise level possible for specimens recovered through 1/4" screening. Specimens collected through flotation using a Dausman flotation machine were tabulated if they could be identified more precisely than class of animal and/or if they could be identified to body part. Specimens were coded in an ACCESS database on an IBM-compatible computer. The following categories were coded for each specimen from the 1/4" screened fauna: site number, component, Unit/Feature number, accession number, depth, class of animal (M=mammal, B= Bird, R=reptile, A=amphibian, F=fish, V=indeterminate vertebrate), taxon to the finest level possible (cf. = a referral to the taxon), element (e.g., tooth, humerus), body size (lg=large, m/l=medium to large, m=medium, s/m=small to medium, sm=small; or 8-cm grouped length class for fish), portion of element (e.g., whole, distal); completeness of element (1=<1/4, 2=≥1/4 to <1/2 , 3=≥1/2 to < 3/4, 4 =≥ 3/4 to <whole, wh=whole), burning (black, calcined, brown), weathering, gnawing (rodent, carnivore, unknown), ingestion, human modifications (artifact manufacture and/or use, food processing), staining (black, brown, red, total (number of bones identical for all attributes), notes (descriptive comments about age,

modifications, or other issues). The same coding scheme was employed for bones recovered through flotation; however conditions and modifications were not coded for these remains.

Counts are based on the number of identified specimens (NISP) per taxonomic category. Minimum numbers of individuals (MNI) are calculated for the component as a whole and are based on the most abundant singly occurring element per taxon. MNI are counted for grosser-level identifications only if they are additive to more precise identifications.

Environmental Setting

The Knob Creek site is situated the Ohio River and Knob Creek floodplain in south-central Indiana. This area of Indiana was not overridden by Wisconsin or Illinois glaciations and uplands surrounding the Ohio River floodplain are hilly. Historically the hills were covered with a mixed mesophytic forest, and the area was likely forested in Archaic and Woodland times as well, although the composition of the forest likely changed through time (Schroeder, Volume I). The Knob Creek site is located in the floodplain of the Ohio River between Knob Creek and the Ohio River. Open forest in the site vicinity, especially in the uplands, would have supported animal species such as white-tailed deer (*Odocoileus virginianus*), turkey (*Meleagris gallopavo*), fox and gray squirrels (*Sciurus niger* and *S. carolinensis*), southern flying squirrel (*Glaucomys volans*), and eastern box turtle (*Terrapene carolina*). A wide variety of medium and small mammals would have been available in wooded habitat along Knob Creek and the Ohio River, such as raccoon (*Procyon lotor*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), river otter (*Lutra canadensis*), and opossum (*Didelphis virginiana*). More open areas would have supported woodchuck (*Marmota monax*), eastern cottontail (*Sylvilagus floridanus*), swamp rabbit (*S. aquaticus*), striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoargenteus*), and coyote (*Canis latrans*). Located in the Falls of the Ohio region of southern, Indiana, the Ohio River in this area is known for its falls and shallow riffles interspersed with deeper pools. The Ohio River in this area historically sustained migratory waterfowl, such as geese and ducks, shorebirds, aquatic turtles, and a wide variety of fish and freshwater mussels. Knob Creek is a small perennial stream that reached its current course by 5,000 B.P. based on geomorphic studies for the Caesars Archaeological Project. The channels of the Ohio River and Knob Creek shifted and evolved throughout the course of the Holocene.

Lower Middle Archaic Faunal Remains

Screening of features and units assigned to the Lower Middle Archaic (Knob Creek) component yielded 128 poorly preserved bone fragments (Table C1). About half of the remains (49.2%) were classified as indeterminate mammal. Freshwater drum (*Aplodinotus grunniens*), represented only by pharyngeal arch teeth, contributed 37.5% of the remains. A minimum of two individuals are represented, one 40-48 cm long, and one 48-56 cm long. White-tailed deer (*Odocoileus virginianus*) bones constituted 11.7% of the screened assemblage. Deer is represented only by fragments of teeth. The fact that deer and freshwater drum are only represented by teeth is testimony to the poor preservation of the faunal remains. A mid-section of ulna referred to chicken (cf. *Gallus gallus*) from Unit 200-98 did not appear to be weathered. Because this domestic animal was introduced to area historically, it has to be intrusive into the Archaic deposits. Analysis of flotation samples primarily yielded more pharyngeal arch teeth from freshwater drum, along with a few fragments of turtle shell and deer teeth (Table C2). All but one of the bones appear weathered and 89.1% are calcined (Table C3). The high proportion of weathered bones suggests that bones may have been exposed on the surface prior to burial. Alternating wetness and dryness in this floodplain setting may have contributed to bone destruction. The high percentage of calcined bone also testifies to bone destruction and a poor preservation environment. Knight (1985) demonstrated that calcination of bone requires high temperatures, reduces bone strength making it more susceptible to fracture, but makes the bone more resistant to dissolution in acidic sediments. The abundance of small calcined bones in this component may primarily reflect resistance of calcined bones to dissolution rather than unusually intense burning. The chicken ulna noted above was well preserved, but was pitted possibly from ingestion. However, the unusually good preservation of this bone and the fact that domestic chicken was introduced historically indicates that it is intrusive into the Early Middle Archaic deposits. It may have been deposited by a carnivore or other animal.

The depauperate assemblage provides few insights into Lower Middle Archaic subsistence or the character of the environment. Freshwater drum teeth occurred in numerous provenience units perhaps suggesting that it was regularly procured. However, it's notable that drum have large, durable pharyngeal arch, which would increase the likelihood of preservation in this less than optimum environment. Drum would have been available in the Ohio River and would have ascended into smaller streams, such as Knob Creek during spawning. The occupants of the site also procured white-tailed deer in open forest settings. They collected turtles as well, but the tiny fragments precluded a determination of whether aquatic or terrestrial species were represented.

Middle Archaic Remains

Three units yielded faunal remains that could only be attributed to the Middle Archaic. Only four bones were recovered from these units─three from indeterminate mammal and one tooth fragment referred to white-tailed deer (Table C1). All four of the bones are calcined and appear weathered (Table C3).

Late Archaic Remains

Screening of Late Archaic features and units only yielded 26 bones. White-tailed deer (including referrals) dominated (76.9% of the NISP) this poorly preserved assemblage (Table C1). Deer is primarily represented by tooth fragments, but single fragments from a tibia and a carpal (scaphoid) are also present. Freshwater drum is represented by five pharyngeal arch teeth. Flotation only added a few elements from freshwater drum, indeterminate turtle, and white-tailed deer (Table C2). Most of the bones are calcined and appear weathered (Table C3). Two bones referred to deer (Unit

400-10) were burned or possibly stained black, possibly ingested, and may have been modified through artifact manufacture or use (Table C3).

Terminal Archaic Riverton Remains

The Terminal Archaic Riverton component yielded a larger sample of faunal remains than the other Archaic components. The screened sample included 599 bones, but most (91.3%) could only be identified as indeterminate mammal (Table C1). Deer (including referrals) dominated among the few remains that could be identified more precisely than class, but only constituted 6.7% of the assemblage. Phalanges constitute over half (55%) of the deer remains, but the assemblage also includes elements from the skull (antler, petrous bone of temporal, mandible, tooth), forelimb (radius, unciform), hindlimb (metatarsal, greater cuneiform, lateral malleolus), and metapodials. All of the deer elements are poorly preserved. The mandible was represented by fragments of bone and teeth recovered in a block of sediment matrix. If the remains had been removed from the matrix, they would have crumbled. The only other identified specimens are a raccoon (*Procyon lotor*) mandible, six pharyngeal arch teeth from freshwater drum, a vertebra from indeterminate fish, and two shell fragments from indeterminate turtle (Table C1). Flotation added numerous pharyngeal arch teeth from freshwater drum, two dorsal spines from catfish (Ictaluridae), shell fragments from softshell turtle (*Apalone* sp.), a premaxilla referred to river otter (*Lutra canadensis*), and more fragments of deer bone (Table C2). Fragments of deer teeth predominated among the deer remains recovered through flotation. The drum recovered through flotation minimally came from three individuals with estimated standard lengths of 16-24 cm, 24-40 cm, and 40-56 cm. All of the bones from the Riverton screened assemblage are weathered and most (88.5%) are calcined (Table C3).

This poorly preserved assemblage provides a very incomplete view of subsistence pursuits by the Riverton inhabitants of the Knob Creek site. Based on the screened and flotation assemblages, deer and freshwater drum occur in numerous provenience units, which may indicate that they were important resources. Deer would have been readily available in open forest settings, and raccoon and river otter could have been procured from along Knob Creek or the Ohio River. The drum, catfish, and softshell turtle could have been taken from the Ohio River or the creek. The dense elements preserved in Terminal Late Archaic contexts provide only a partial and biased view of the subsistence base.

Indeterminate Archaic Remains

Bones from Feature 60 in Trench J could only be assigned an indeterminate Archaic affiliation. Screening for this feature only yielded three vertebrae referred to freshwater drum and three bones from indeterminate fish (Table C1). The drum individual was estimated to have had a standard length between 40 and 56 cm. All six bones are weathered and calcined (Table C3).

Early Woodland Faunal Remains

Screening of features and test units levels from the Early Woodland component yielded 343 poorly preserved bone fragments (Table C4). Most of the bones (70.3%) could only be classified as indeterminate mammal (primarily from medium-large or large mammal). Bones from cervids constitute 28.9% of the NISP. Five of the cervid elements were referred to white-tailed deer (cf. *Odocoileus virginianus*), and 73 were definitely attributed to deer (*O. virginianus*). Deer body parts include a small section of a mandible with teeth (Feature 200-59), another fragment of a mid-section of mandible (Feature 200-23), 68 tooth fragments (Features 200-48, 200-59, 200-65, and 200-95), one distal humerus fragment (Unit 200-26), one navicular cuboid (Unit 250N60W), and a probable distal second phalanx (Unit 71S2E). Elements referred to deer included two distal metapodial frgments (Feature 154) and 3 mid-section fragments from mandible (Unit 200-96). Twenty one small fragments of cervid antler, probably from deer, were recovered in Unit 200-117. The deer remains are primarily from relatively dense elements, including tooth enamel, and the representation of deer body parts likely reflects differential destruction of more fragile elements rather than selective transport of body parts. Turtle is the only other identified taxon in the screened assemblage. One plastron fragment (hyoplastron) was referred to box turtle (cf. *Terrapene* sp.). It is most likely from an eastern box turtle, *Terrapene carolina*; however a specific level identification was not possible.

All of the bones in the screened assemblage appear weathered. The weathered and fragmented nature of the bones suggests that they were exposed on the surface prior to incorporation in pit features and were not rapidly buried. Fluctuating wetness and dryness would have also contributed to bone destruction. Many of the bones (67.9%) are calcined (Table C5). As noted above calcination of bone reduces bone strength making it more susceptible to fracture, but makes the bone more resistant to dissolution in acidic sediments. The abundance of small calcined bones in this component may primarily reflect the resistance of calcined bones to dissolution rather than unusually intense burning of bone. Rodent gnawing is noted for only one piece of bone (Table C5). Heavy weathering, fragmentation, and calcination make recognition of gnawing and cultural modifications to bone difficult.

Analyses of bone from flotation samples (Table C6) added pharyngeal arch teeth from a minimum of two individual freshwater drum (*Aplodinotus grunniens*) from five features, more bones from indeterminate turtle, a single bone from Cooper's hawk (cf. *Accipiter cooperi*), a single bone from woodchuck (*Marmota monax*), a single incisor fragment from beaver (cf. *Castor canadensis*), 38 more tooth fragments from white-tailed deer (Feature 200-48 and Feature 200-56), two more tooth fragments referred to deer (Feature 200-70), and an additional fragment of cervid antler (Unit 246N60W). Freshwater drum, predominately a denizen of large rivers, would have most likely have been procured from the Ohio River; however they likely would have entered Knob Creek as well, especially during spring spawning. The Cooper's hawk would have been found in open forest settings year round.

The poorly preserved samples of faunal remains contribute to only limited insights into faunal exploitation at the Knob Creek site during the Early Woodland Period. Differential destruction of less dense bone undoubtedly skews the representation of fauna for this component. The inhabitants of the site procured white-tailed deer from forest or forest-edge settings, woodchuck from more open areas, and beaver and freshwater drum from aquatic environments. The poorly preserved faunal remains undoubtedly represent only a small subset of the animals that they would procured from this settlement.

Middle Woodland Faunal Remains

Screening of features and test units yielded 1,519 poorly preserved bones (Table C7). As was the case for the Early Woodland component, many of the bones (70.7%) could only be classified as indeterminate mammal. Bones from cervids constitute 23.8% of the NISP, and 23.6% are attributed or referred to white-tailed deer. Fragments from most parts of the body are represented for deer including skull and mandible (antler, auditory bulla, petrous bone of the temporal, parietal, basioccipital, occipital and occipital condyle, nasal, teeth, mandible), pectoral girdle (scapula), forelimb (humerus, radius, pisiform, lunate, magnum, scaphoid, and metacarpal) pelvic girdle (innominate), hind limb (tibia, greater cuneiform, navicular-cuboid, astragalus, calcaneum, and metatarsal), and miscellaneous metapodials, phalanges (first, second, and third phalanx), and a sesamoid (Table C8). It's notable that some low-density elements, such as vertebrae and ribs were not noted—probably a testimony to differential destruction of more fragile elements. The broad range of body parts represented suggests that whole animals were probably transported to the site for processing and consumption. Three deer are minimally represented. Based on tooth eruption and wear, the remains included at least one individual around 1.5 years old (Feature 100-7), one about three years old (Feature 100-112), and another more than 3.5 years old (F100-112). Remains from raccoon (*Procyon lotor*), beaver, and indeterminate dog, coyote, or wolf (*Canis* sp.) are also present. Three bones from cow (*Bos taurus*), all from Trench P, are obviously intrusive into the Middle Woodland deposits. A few turkey bones (*Meleagris gallopavo*) are present (Feature 100-84 and 100-112, and a referral in Unit 200-59). Turkey would have been available in the same open woodland and edge habitats as white-tailed deer. Fragments of turtle shell constitute 3.6% of the NISP. Present among the turtle remains are a carapace fragment and a shell fragment from softshell turtle (*Apalone* sp.), one plastron fragment from box turtle, and four carapace fragments from Emydid turtle, which in this area could have included painted turtles, map turtles, cooters and red-bellied turtles, and box turtles. Softshell turtles would have been available in the Ohio River, tributary streams such as Knob Creek, and sloughs. The fish assemblage consists of three pharyngeal arch teeth from freshwater drum. The teeth were from an individual with a standard length around 56 cm. The drum would have most likely have been procured from the Ohio River; however they do ascend tributary streams so they could have been present in Knob Creek as well.

All but one of the bones in the screened faunal assemblage appear weathered. Over half of the bones are calcined (59.2% of the NISP), nine are burned black, and 20 are burned to a brown color (Table C9). Rodent gnawing is noted on two mammal bones, and another mammal bone exhibits gnawing by an unknown source. Two mammal bones were gnawed by carnivores. Three mammal bones may have been ingested based on their pitted appearance. Two pieces of cervid antler (Feature 100-70) may have been ground in the process of artifact manufacture or use. A distal fragment from a deer humerus (Feature 200-33) exhibits several cut marks (possibly from food processing) and also appears polished. A mid-section of an ulna from a medium-sized mammal (Unit 100-148) exhibits cut marks, possibly from food processing. A mid-section of a rib from a coyote-sized mammal (Unit 200-17) also has cut marks. One piece of unidentified turtle shell (Feature 300-52) was cut and incised and may have been a fragment from an artifact, such as a bowl or rattle.

Flotation samples add more bones from freshwater drum, softshell turtle, beaver, and white-tailed deer. It also adds new taxa, including snake (Serpentes), rice rat (*Oryzomys palutris*), small and medium rodents (Cricetidae and indeterminate Rodentia), and eastern cottontail (*Sylvilagus floridanus*) (Table C6). Elements identified or referred to deer include fragments from frontals, molariform teeth, metapodials, and a phalanx. A single piece of cervid antler was recorded. One of the frontal fragments includes the pedicle from which an antler had been shed (F100-112). In Midwestern states such as Illinois, deer normally shed their antlers between February and March, and new growth starts in the spring (Hoffmeister 1989-318). The fact that the antler had been shed suggests that this male was killed in the late winter or early spring.

The eastern cottontail would have been available in open woodland settings. Rice rats occur in marshy environments. The modern range of the rice rat is in the southeastern United States, with the range just reaching the southern edge of Indiana (Jones and Birney 1988:184-185). However, it has been reported for numerous archaeological sites to the north of the modern range in Illinois (e.g., Purdue and Styles 1986:48) and for cave sites in southern Indiana (Richards 1980). The prehistoric range extension has been linked to climatic differences and the attraction of agricultural food products (Guilday et al. 1964, Purdue and Styles 1986, Richards 1980).

Although faunal remains are poorly preserved, they provide some information on human use of fauna by the Middle Woodland inhabitants of the Knob Creek site. They hunted white-tailed deer and turkey, most likely from open forest and forest-edge settings at the valley edge and in the uplands. They brought the whole deer back to the site for processing and consumption. At least one deer was killed in the late winter or early spring. They collected box turtles from woodland settings. They trapped raccoon along the stream or the Ohio River and cottontail rabbit in more open settings. They collected softshell turtles from Knob Creek, the Ohio River, and/or marshy habitats, and fished for freshwater drum, most likely in the Ohio River. The animal species identified for the Middle Woodland component are undoubtedly only a subset of those that would have been used for subsistence and other needs.

Woodland Faunal Remains

A total of 863 bones were recovered through screening of Woodland features and test unit levels that could not be segregated as Early Woodland or Middle Woodland (Table C10). Most of these bones (68.0%) could only be identified as indeterminate mammal. Bones from white-tailed deer constitute 24.7% of the screened NISP, which is similar to the percentages noted for the Early and Middle Woodland components. Fragments from deer bones include skull and teeth (teeth, antler, petrous portion of the temporal, occipital condyles), pectoral girdle (scapula), forelimb (pisiform, unciform, triquetrals, scaphoids, magnums, metacarpal), axial skeleton (lumbar vertebra), hindlimb (patellae, metatarsals, metapodials, phalanges, lateral malleoli, astragali,), and miscellaneous sesamoids, metapodials, and phalanges (first, second, and third). Fragments of toes, tarsals, and carpals are relatively abundant. No ribs and only one fragment from a vertebra were noted. There is little doubt that differential destruction of fragile elements is influencing the body part representation. The whole carcass may have been transported to the site for processing and consumption, but the poor condition of the bones makes more detailed assessments of bone destruction and transport suspect. Remains from a minimum of two deer are present.

An incisor, scapula, and metatarsal from domestic pig (*Sus scrofa*) from Unit 197N8W must be intrusive to the deposits. A few bones from raccoon and opossum (*Didelphis virgiana*) are the only other identified mammals in the screened assemblage. Turkey is represented by eleven bones, including a spurred tarsometarsus from a male. Eastern box turtle (*Terrapene carolina*) is represented by a whole neural from the carapace, indeterminate box turtle by three carapace fragments, and softshell turtle is represented by a single fragment of shell. Emydid turtle is represented by three carapace fragments, and the remainder of the turtle shell fragments could not be identified. Two textured skull bones from bowfin (*Amia calva*) are the only fish bones tabulated for the screened assemblage. The bowfin lives in clear, well-vegetated quietwater environments. However, they were recovered in Unit 197N8W, along with the domestic pig remains, and thus may be intrusive into the deposit.

All of the bones appear weathered (Table C11). Most (78.0%) are calcined. Four bones exhibit puncture marks from carnivore gnawing. Two bones have modifications related to artifact manufacture or use. An indeterminate long bone from a large mammal had edges that may have been ground (F400-57). An indeterminate bone, possibly a skull or innominate fragment, from a large mammal had a deep cut or carving (Unit 100-269).

Flotation samples were not analyzed for these Woodland pit features since they cannot be associated with a specific component. The faunal remains recovered through screening are similar in taxonomic composition and condition to those recovered from the Early and Middle Woodland components.

Historic Period Faunal Remains

Screening of privy deposits (Feature 76) exposed in Test Trench P yielded faunal remains associated with mid-nineteenth century activities at the site (Table C12). This deposit yielded remains from domestic animals including cat (*Felis silvestris*), pig (*Sus scrofa*), cow (*Bos taurus*), and possibly chicken (Galliformes). Cat is represented by elements from the cranium, vertebral column, ribs, scapula, humerus, ulna, sacrum, femur, and metapodials from one fetal or newborn individual and another immature kitten. The kittens may have disposed of in the privy. The pig is represented only by phalanges and a tooth fragment. The cow is represented by an innominate that bears a possible chop mark (Table C13) and a rib. The galliform bird remains consisted of digits from a wing, phalanges and a radius. The remains could not be specifically identified, but are likely from a domestic chicken or immature turkey. The assemblage also included a dentary from an Atlantic mackerel (*Scomber scombrus*). This marine fish is clearly not native to the area and had to be procured through a market or some other exchange system. An operculum fragment may derive from a sucker (Catostomidae) or an introduced carp (Cyprinidae) with a standard length around 40-56 cm. Two native wild taxa are also present—a single scapula from a softshell turtle (*Apalone* sp.), and four dermals from a shovelnose sturgeon (*Scaphirhynchus platorynchus*). Shovelnose sturgeon, formerly more abundant in large rivers such as the lower Ohio River, than they are today, spawn in riffles and will also ascend small streams during spawning (Smith 1979:13-14). All of the bones have a weathered appearance. Few (8.3%) of the bones are calcined (Table C13). These remains likely represent food refuse and kittens thrown into the privy. The food remains from this Historic context testify to a diet very different from the Aboriginal diet, which was based on wild native species.

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Table C1. Knob Creek Site (12HR484), Animal taxa identified in screened samples for Archaic features and units. The Number of Identified Specimens and Minimum Number of Individuals in parenthesis are presented.

		Taxa	**Fish**		**Reptile**	**Bird**		**Mammal**				**Vertebrate**	
			Aplodinotus grunniens	Indeterminate Fish	Indeterminate Turtle	cf. Gallus gallus	Indeterminate Bird	*Odocoileus* virginianus	cf. *Odocoileus virginianus*	cf. *Procyon lotor*	Indeterminate Mammal	Indeterminate Vertebrate	
Feature (or other) provenience	**Block/Trench/ Phase**	**Cultural Component**											**Feature/Unit Total**
F 106	Phase II	MA									3		3
F 124	Phase II	MA	1(1)									1	2
Unit 6N11W	Phase II	MA									1		1
Unit 8N11W	Phase II	MA									2		2
Unit 17N12W	Phase II	MA									9		9
Unit 19N12W	Phase II	MA									9		9
Unit 21N12W	Phase II	MA									2		2
Unit 423N90W	Phase II	MA									3		3
Unit 425N90W	Phase II	MA	4 (1)								3 (1)		7
F 344	T148N49W	MA	7										7
F 356	T148N49W	MA	1										1
F 357	T148N49W	MA	2										2
Unit 155N44W	T148N49W	MA						11 (1)					11
Unit 155N48W	T148N49W	MA	2										2
Unit 200-98	200	MA				1(Intrusive)					20		21
Unit 200-240	200	MA						4(1)					4
F 114	400	MA	11										11
Unit 400-66	400	MA	20										20
F 119	TQ	MA									11		11
		Total for Lower Middle Archaic	**48 (2)**	**0**	**0**	**1(intrusive)**	**0**	**15 (1)**	**0**	**0**	**63 (1)**	**1**	**128**
Feature (or other) provenience	**Block/Trench/ Phase**	**Cultural Component**											
Unit 124N41W	Ph II	MA									2		2
Unit 225N60W	Ph II	MA									1		1
Unit 200-138	200	MA							1 (1)				1
		Total for Middle Archaic	**0**	**0**	**0**	**0**	**0**	**0**	**1 (1)**	**0**	**3**	**0**	**4**
Feature (or other) provenience	**Block/Trench/ Phase**	**Cultural Component**											
F 103	400	LA						15 (1)			1		16
F400-122	400	LA						1(1)					1
Unit 400-10	400	LA							2				2
Unit 400-5	400	LA							1				1
Unit 400-14	400	LA						1 (1)					1
Unit 400-29	400	LA	5 (1)										5
		Total for Late Archaic	**5 (1)**	**0**	**0**	**0**	**0**	**17 (1)**	**3**	**0**	**1**	**0**	**26**
Feature (or other) provenience	**Block/Trench/ Phase**	**Cultural Component**											
F 30	Phase II	Riverton									1		1
F 111	Phase II	Riverton									39		39
Unit 99N27W	Phase II	Riverton									1		1
Unit 100N23W	Phase II	Riverton			1 (1)		1 (1)				17		19
Unit 125N25W	Phase II	Riverton			1						6		7
Unit 126N40W	Phase II	Riverton									56		56
Unit 150N40W	Phase II	Riverton									10		10
F 100-114	100	Riverton									25		25
F 100-121	100	Riverton	6 (1)						2		31		39
F 100-137R	100	Riverton						1 (1)			24		25
F 100-141R	100	Riverton									4		4
F 100-143	100	Riverton									18		18
F 100-147	100	Riverton									25		25
F 100-151	100	Riverton									13		13

Table C1. (cont.) Knob Creek Site (12HR484), Animal taxa identified in screened samples for Archaic features and units. The Number of Identified Specimens and Minimum Number of Individuals in parentheses are presented.

		Taxa	**Fish**		**Reptile**	**Bird**		**Mammal**				**Vertebrate**	
Feature (or other) provenience	**Block/Trench/ Phase**	**Cultural Component**	*Aplodinotus grunniens*	Indeterminate Fish	Indeterminate Turtle	*cf Gallus gallus*	Indeterminate Bird	*Odocoileus* virginianus	cf. *Odocoileus virginianus*	cf. *Procyon lotor*	Indeterminate Mammal	Indeterminate Vertebrate	**Feature/Unit Total**
F 100-177R	100	Riverton							1				1
F 100-185	100	Riverton						11	2	1 (1)	113		127
F 100-188	100	Riverton						1	1		3		5
F 100-188R	100	Riverton							1		6		7
F 100-201R	100	Riverton									5		5
F 100-218	100	Riverton									1		1
Unit 100-26	100	Riverton									1		1
Unit 100-49	100	Riverton						2			2		4
Unit 100-49R	100	Riverton									6		6
Unit 100-50R	100	Riverton									12		12
Unit 100-75	100	Riverton							1		3		4
Unit 100-95R	100	Riverton						1					1
Unit 100-96	100	Riverton						1			1		2
Unit 100-115	100	Riverton									8		8
Unit 100-115R	100	Riverton						1					1
Unit 100-116R	100	Riverton						1			3		4
Unit 100-118R	100	Riverton						1			5	1	7
Unit 100-143	100	Riverton									3		3
Unit 100-161	100	Riverton						1					1
Unit 200-39	200	Riverton									11		11
Unit 200-57R	200	Riverton									1		1
Unit 200-81R	200	Riverton									1		1
Unit 200-99	200	Riverton						3					3
Unit 200-144R	200	Riverton									1		1
Unit 200-201	200	Riverton									20		20
F 200-147	200	Riverton									10		10
F 300-33	300	Riverton									1		1
F 300-43	300	Riverton						1					1
Unit 48N25W		Riverton						1			9		10
Unit 124N41W		Riverton						1			16		17
Unit 125N60W		Riverton									9		9
Unit 248N64W		Riverton						2					2
Unit 250N60W		Riverton									2		2
Unit 252N64W		Riverton						1					1
Unit 325N90W		Riverton							1		24		25
Unit 375N90W		Riverton							1				1
Unit 423N88W		Riverton		1									1
		Total for Riverton	**6 (1)**	**1**	**2 (1)**	**0**	**1 (1)**	**30 (1)**	**10**	**1 (1)**	**547**	**1**	**599**
Feature (or other) provenience	**Block/Trench/ Phase**	**Cultural Component**											
F60	Trench J	Archaic	3 (1)	3									6
		Total for General Archaic	**3 (1)**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**6**
		Total for All Archaic Features	**62**	**4**	**2**	**1**	**1**	**62**	**14**	**1**	**614**	**2**	**763**

Table C2. Knob Creek site (12HR484), Animal taxa from flotation samples from Archaic features and units. The Number of Identified Specimens is presented. EMA=Early Middle Archaic, LMA=Late Middle Archaic, R=Riverton

Block/Unit /Phase	Phase II	300	300	300	400	425 Complex	148N49W	148N49W	148N49W	148N49W	253N80W	***Total for Early Middle Archaic***	400	400
Feature/Unit	425N90W	F 99	F 132	Unit 30	Unit 61	F 124	F 343	F 344	155N44W	155N46W	F 229		F 97	F 102
Cultural Component	EMA	EMA	EMA	EMA	EMA	EMA	EMA	EMA	EMA	EMA	EMA		LMA	LMA
Taxa														
Fish														
Aplodinotus grunniens	3 (1)		1	11	6	2	3 (1)	6	14	3	8	*57 (2)*	2	1 (1)
Ictaluridae sp.												***0***		
Total Fish	**3 (1)**	**0**	**1**	**11**	**6**	**2**	**3 (1)**	**6**	**14**	**3**	**8**	***57 (2)***	**2**	**1 (1)**
Reptile														
Apalone sp.												*0*		
Testudines sp.												*0*		
Indeterminate turtle		3 (1)		1								*4 (1)*		
Total Reptile	**0**	**3 (1)**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	***4 (1)***	**0**	**0**
Mammal														
cf. L*utra canadensis*												*0*		
Odocoileus virginianus		1 (1)										*1 (1)*		
cf. *Odocoileus virginianus*									1			*1*		
Total Mammal	**0**	**1 (1)**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	***2 (1)***	**0**	**0**
Total Bone	**3**	**4**	**1**	**12**	**6**	**2**	**3**	**6**	**15**	**3**	**8**	***63***	**2**	**1**

Table C2. (cont.) Knob Creek site (12HR484), Animal taxa from flotation samples from Archaic features and units. The Number of Identified Specimens is presented. EMA=Early Middle Archaic, LMA=Late Middle Archaic, R-Riverton.

Block/Unit /Phase	400	400	400	Trench Q	***Total for Late Middle Archaic***	100	100	100	100	100	100	100	100	100	100	100	100	100
Feature/Unit	F 114	F 120	Unit 13	19N12W		F 114	F 120	F 130	F 132	F 137	F 138	F 143	F 144	F 146	F 147	F 151	F 154	F 158
Cultural Component	LMA	LMA	LMA	LMA		R	R	R	R	R	R	R	R	R	R	R	R	R
Taxa																		
Fish																		
Aplodinotus grunniens	3				***6 (1)***	1		2 (1)	21	6	1	6	12	1	1	1		
Ictaluridae sp.					***0***													
Total Fish	**3**	**0**	**0**	**0**	***6 (1)***	**1**	**0**	**2 (1)**	**21**	**6**	**1**	**6**	**12**	**1**	**1**	**1**	**0**	**0**
Reptile																		
Apalone sp.					*0*													
Testudines sp.					*0*													
Indeterminate turtle				1 (1)	*1 (1)*		1				1				1		1	1
Total Reptile	**0**	**0**	**0**	**1 (1)**	***1 (1)***	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**1**	**0**	**1**	**1**
Mammal																		
cf. *Lutra Canadensis*					*0*													
Odocoileus virginianus			1 (1)		*1 (1)*						2 (1)							1
cf. *Odocoileus virginianus*		2			*2*													
Total Mammal	**0**	**2**	**1 (1)**	**0**	***3 (1)***	**0**	**0**	**0**	**0**	**0**	**2(1)**	**0**	**0**	**0**	**0**	**0**	**0**	**1**
Total Bone	**3**	**2**	**1**	**1**	***10***	**1**	**1**	**2**	**21**	**6**	**4**	**6**	**12**	**1**	**2**	**1**	**1**	**2**

Table C2. (cont.) Knob Creek site (12HR484), Animal taxa from flotation samples from Archaic features and units. The Number of Identified Specimens is presented. EMA=Early Middle Archaic, LMA=Late Middle Archaic, R=Riverton.

Block/Unit/Phase	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	200
Feature/Unit	F 159	F 161	F 162	F 165	F 167	F 173	F 183	F 185	F 186	F 187	F 190	F 191	F 201	F 203	F 205	Unit 32	Unit 96	Unit 118	F 87
Cultural Component	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Taxa																			
Fish																			
Aplodinotus grunniens	19	3	1	1	1	2	1	4	3	1				26	1		1	2	1 (1)
Ictaluridae sp.									2 (1)										
Total Fish	**19**	**3**	**1**	**1**	**1**	**2**	**1**	**4**	**5 (1)**	**1**	**0**	**0**	**0**	**26**	**1**	**0**	**1**	**2**	**1 (1)**
Reptile																			
Apalone sp.		7 (1)												2	1				
Testudines sp.							1 (1)												
Indeterminate turtle		1		11		1			2		3	6	2			1			2
Total Reptile	**0**	**8 (1)**	**0**	**11**	**0**	**1**	**1 (1)**	**0**	**2**	**0**	**3**	**6**	**2**	**2**	**1**	**1**	**0**	**0**	**2**
Mammal																			
cf. *Lutra Canadensis*																			
Odocoileus virginianus								3				35							10
cf. *Odocoileus virginianus*														4					
Total Mammal	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**35**	**0**	**4**	**0**	**0**	**0**	**0**	**10**
Total Bone	**19**	**11**	**1**	**12**	**1**	**3**	**2**	**7**	**7**	**1**	**3**	**41**	**2**	**32**	**2**	**1**	**1**	**2**	**13**

Table C2. (cont.) Knob Creek site (12HR484), Animal taxa from flotation samples from Archaic features and units. The Number of Identified Specimens is presented. EMA=Early Middle Archaic, LMA=Late Middle Archaic, R=Riverton

Block/Unit/Phase	200	200	200	300	300	300	300	300	300	300	300	300	***Total for Riverton***
Feature/Unit	F 100	F 102	F 104	F 26	F 33	F 36	F 52	F 66	F 68	F 72	Unit 9	Unit 31	
Cultural Component	R	R	R	R	R	R	R	R	R	R	R	R	
Taxa													
Fish													
Aplodinotus grunniens	1	1	1	1		5					1	1 (1)	*130 (3)*
Ictaluridae sp.													***2 (1)***
Total Fish	**1**	**1**	**1**	**1**	**0**	**5**	**0**	**0**	**0**	**0**	**1**	**1 (1)**	***132 (4)***
Reptile													
Apalone sp.													*10 (1)*
Testudines sp.													*1 (1)*
Indeterminate turtle			3		1		8		3	1			*50*
Total Reptile	**0**	**0**	**3**	**0**	**1**	**0**	**8**	**0**	**3**	**1**	**0**	**0**	***61 (2)***
Mammal													
cf. *Lutra canadensis*							1 (1)						*1 (1)*
Odocoileus virginianus								1					*52 (1)*
cf. *Odocoileus virginianus*													*4*
Total Mammal	**0**	**0**	**0**	**0**	**0**	**0**	**1 (1)**	**1**	**0**	**0**	**0**	**0**	***57 (2)***
Total Bone	**1**	**1**	**4**	**1**	**1**	**5**	**9**	**1**	**3**	**1**	**1**	**1**	***250***

Table C3. Knob Creek Site (12HR484), Modifications to bone in screened samples from Archaic features and units. The Number of Identified Specimens (NISP) is presented. M=mammal, F=fish, V=vertebrate, B=bird; EMA=Early Middle Archaic; MA=Middle Archaic; LMA=Late Middle Archaic.

Feature (or other) provenience	**Block/Trench /Phase**	**Cultural Component**	**Class**	**NISP**	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
					Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
F 106	Phase II	EMA	**M**	3	3			3									
F 124	Phase II	EMA	**F**	1	1			1									
			V	1	1			1									
Unit 6N11W	Phase II	EMA	**M**	1	1			1									
Unit 8N11W	Phase II	EMA	**M**	2	2			2									
Unit 17N12W	Phase II	EMA	**M**	9	9			9									
Unit 19N12W	Phase II	EMA	**M**	9	9			9									
Unit 21N12W	Phase II	EMA	**M**	2	2			2									
Unit 423N90W	Phase II	EMA	**M**	3	3			3									
Unit 425N90W	Phase II	EMA	**F**	4	4			4									
			M	3	3			3									
F 344	T148N49W	EMA	**F**	7				7									
F 356	T148N49W	EMA	**F**	1	1			1									
F 357	T148N49W	EMA	**F**	2				2									
Unit 155N44W	T148N49W	EMA	**M**	11	11			11									
Unit 155N48W	T148N49W	EMA	**F**	2	2			2									
Unit 200-98	200	EMA	**B**	1				0				1					
			M	20	20			20									
Unit 200-240	200	EMA	**M**	4				4									
F 114	400	EMA	**F**	11	11			11									
Unit 400-66	400	EMA	**F**	20	20			20									
F 119	TQ	EMA	**M**	11	11			11									
Total for Early Middle Archaic				**128**	**114**	**0**	**0**	**127**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**
Feature (or other) provenience	**Block/Trench /Phase**	**Cultural Component**	**Class**	**NISP**	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
					Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
Unit 124N41W	Ph II	MA	**M**	2	2			2									
Unit 225N60W	Ph II	MA	**M**	1	1			1									
Unit 200-138	200	MA	**M**	1	1			1									
Total for Middle Archaic				**4**	**4**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Feature (or other) provenience	**Block/Trench /Phase**	**Cultural Component**	**Class**	**NISP**	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
					Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
F 103	400	LMA	**M**	16	16			16									
F400-122	400	LMA	**M**	1				1									
Unit 400-10	400	LMA	**M**	2		2						2		2		2	
Unit 400-5	400	LMA	**M**	1	1			1									
Unit 400-14	400	LMA	**M**	1	1			1									
Unit 400-29	400	LMA	**F**	5	5			5									
Total for Late Middle Archaic				**26**	**23**	**2**	**0**	**24**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**2**	**0**
Feature (or other) provenience	**Block/Trench /Phase**	**Cultural Component**	**Class**	**NISP**	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
					Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
F 30	Phase II	Riverton	**M**	1	1			1									
F 111	Phase II	Riverton	**M**	39	39			39									
Unit 99N27W	Phase II	Riverton	**M**	1	1			1									
Unit 100N23W	Phase II	Riverton	**R**	1	1			1									
			B	1	1			1									
			M	17	17			17									
Unit 125N25W	Phase II	Riverton	**R**	1	1			1									
			M	6				6									

Table C3. (cont.) Knob Creek Site (12HR484), Modifications to bone in screened samples from Archaic features and units. The Number of Identified Specimens (NISP) is presented. M=mammal, F=fish, V=vertebrate, B=bird; EMA=Early Middle Archaic; MA=Middle Archaic; LMA=Late Middle Archaic.

Feature (or other) Provenience	**Block/Trench /Phase**	**Cultural Component**	**Class**	**NISP**	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
					Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
Unit 126N40W	Phase II	Riverton	**M**	56	56			56									
Unit 150N40W	Phase II	Riverton	**M**	10	10			10									
F100-114	100	Riverton	**M**	25	25			25									
F 100-121	100	Riverton	**F**	6				6									
			M	33	33			33									
F 100-137R	100	Riverton	**M**	25	25			25									
F 100-141R	100	Riverton	**M**	4	4			4									
F 100-143	100	Riverton	**M**	18	18			18									
F 100-147	100	Riverton	**M**	25	25			25									
F 100-151	100	Riverton	**M**	13	13			13									
F 100-177R	100	Riverton	**M**	1		1		1									
F 100-185	100	Riverton	**M**	127	127			127									
F 100-188	100	Riverton	**M**	5	5			5									
F 100-188R	100	Riverton	**M**	7	7			7									
F 100-201R	100	Riverton	**M**	5	5			5									
F 100-218	100	Riverton	**M**	1	1			1									
Unit 100-26	100	Riverton	**M**	1				1									
Unit 100-49	100	Riverton	**M**	4	4			4									
Unit 100-49R	100	Riverton	**M**	6	6			6									
Unit 100-50R	100	Riverton	**M**	12	12			12									
Unit 100-75	100	Riverton	**M**	4	4			4									
Unit 100-95R	100	Riverton	**M**	1	1			1									
Unit 100-96	100	Riverton	**M**	2	2			2									
Unit 100-115	100	Riverton	**M**	8	8			8									
Unit 100-115R	100	Riverton	**M**	1	1			1									
Unit 100-116R	100	Riverton	**M**	4	4			4									
Unit 100-118R	100	Riverton	**M**	6	6			6									
			V	1	1			1									
Unit 100-143	100	Riverton	**M**	3	3			3									
Unit 100-161	100	Riverton	**M**	1	1			1									
Unit 200-39	200	Riverton	**M**	11	11			11									
Unit 200-57R	200	Riverton	**M**	1	1			1									
Unit 200-81R	200	Riverton	**M**	1	1			1									
Unit 200-99	200	Riverton	**M**	3	3			3									
Unit 200-144R	200	Riverton	**M**	1	1			1									
Unit 200-201	200	Riverton	**M**	20				20									
F220-147	200	Riverton	**M**	10				10									
F 300-33	300	Riverton	**M**	1	1			1									
F 300-43	300	Riverton	**M**	1	1			1									
Unit 48N25W		Riverton	**M**	10	10			10									
Unit 124N41W		Riverton	**M**	17	17			17									
Unit 125N60W		Riverton	**M**	9	9			9									
Unit 248N64W		Riverton	**M**	2	2			2									
Unit 250N60W		Riverton	**M**	2	2			2									
Unit 252N64W		Riverton	**M**	1	1			1									
Unit 325N90W		Riverton	**M**	25	25			25									
Unit 375N90W		Riverton	**M**	1	1			1									
Unit 423N88W		Riverton	**F**	1	1			1									
Total for Riverton				**599**	**530**	**1**	**0**	**599**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Feature (or other) provenience	**Block/Trench /Phase**	**Cultural Component**	**Class**	**NISP**	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
					Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
F60	Trench J	Archaic	**F**	6	6			6									
Total for General Archaic				**6**	**6**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Total for All Archaic Features				**763**	**702**	**3**	**0**	**760**	**0**	**0**	**0**	**3**	**0**	**2**	**0**	**2**	**0**

Table C4 Knob Creek Site (12HR484), Animal taxa identified in screened samples from Early Woodland features and test units. The Number of Identified Specimens and Minimum Number of Individuals in parentheses are presented.

	Taxa	**Reptile**		**Mammal**				**Vertebrate**	
Feature (or other) provenience	**Block/Trench/ Phase**	cf *Terrapene* sp.	Indeterminate Turtle	*Odocoileus* Virginianus	cf. *Odocoileus virginianus*	Cervidae	Indeterminate Mammal	Indeterminate Vertebrate	**Feature/Unit Total**
F 78A	Phase II						4		4
F 104	Phase II						14		14
F 126	Phase II						11		11
Unit 77N40W	Phase II	1 (1)							1
Unit 250N60W	Phase II			1 (1)			1		2
Unit 75S4W	Phase II						54		54
Unit 77S2W	Phase II						45	1	46
Unit 77S4W	Phase II						6		6
Unit 81S2W	Phase II						1		1
Unit 71S2E	Phase II			1					1
F 200-23	200			1					1
F 200-36	200						1		1
F 200-48	200			27			3		30
F 200-51	200						14		14
F 200-59	200			29			2		31
F 200-65	200			1					1
F 200-68	200						1		1
F 200-95	200		1	12			28		41
Unit 200-26	200			1					1
Unit 200-96	200				3		27		30
Unit 200-98	200						9		9
Unit 200-117	200					21			21
F 154	TR253N80W				2		13		15
F 39	E Bisection						7		7
Total for Early Woodland		**1 (1)**	**1**	**73 (1)**	**5**	**21**	**241**	**1**	**343**

Table C5. Knob Creek Site (12HR484), Modifications to bone in screened samples from Early Woodland features and test units. The Number of Identified Specimens (NISP) is presented. M=mammal, R=reptile, V=indeterminate vertebrate.

Feature (or other) provenience	Block/Trench /Phase	Class	NISP	Burning			Weathering	Gnawing			Ingested	Human		Staining		Pitted
				Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
F 78A	Phase II	**M**	4	4			4									
F 104	Phase II	**M**	14	14			14									
F 126	Phase II	**M**	11	11			11									
Unit 77N40W	Phase II	**R**	1	1			1									
Unit 250N60W	Phase II	**M**	2	2			2	1								
Unit 75S4W	Phase II	**M**	54	54			54									
Unit 77S2W	Phase II	**M**	45	45			45									
		V	1	1			1									
Unit 77S4W	Phase II	**M**	6	6			6									
Unit 81S2W	Phase II	**M**	1	1			1									
Unit 71S2E	Phase II	**M**	1	1			1									
F 200-23	200	**M**	1				1									
F 200-36	200	**M**	1	1			1									
F 200-48	200	**M**	30	30			30									
F 200-51	200	**M**	14				14									
F 200-59	200	**M**	31				31									
F 200-65	200	**M**	1	1			1									
F 200-68	200	**M**	1	1			1									
F 200-95	200	**R**	1	1			1									
		M	40	28			40									
Unit 200-26	200	**M**	1				1									
Unit 200-96	200	**M**	30				30									
Unit 200-98	200	**M**	9	9			9									
Unit 200-117	200	**M**	21				21									
F 154	TR253N80W	**M**	15	15			15									
F 39	E Bisection	**M**	7	7			7									
Totals for Early Woodland			**343**	**233**			**343**	**1**								

Table C6. 12HR484, Animal taxa from flotation for Early Woodland (EW), Middle Woodland (MW) and Woodland (W) Features and Units. The Number of Identified Specimens followed by the Minimum Number of Individuals in parentheses are presented.

Block/Unit/Phase		100	200	200	200	200	200	200	200	200	200	200	200	200	400	400	253N Trench	425 Complex	246N60W	69S4W	***Total for Early Woodland***	100	100
Feature/Unit	F 104	F 26	F 8	F 20	F 22	F 44	F 48	F 56	F 58	F 68	F 70	F 77	F 94	F 110	F 27	F 39	F 154	F 39		F 109		F 3	F 5
Cultural Component	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW	EW		MW	MW
Taxa																							
Fish																							
Aplodinotus grunniens	2		1 (1)			1 (1)			1	1										1	*7 (2)*		1 (1)
Total Fish	**2 (1)**	**0**	**1 (1)**	**0**	**0**	**1 (1)**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	***7 (2)***	**0**	**1 (1)**
Reptile																							
Serpentes																					*0*		
Apalone sp.																					*0*		
Emydidae turtle																					*0*		
Indeterminate turtle		1 (1)		1	1				1			1	6	13	1	2	1	5			*33 (1)*	3	
Total Reptile	**0**	**1 (1)**	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**6**	**13**	**1**	**2**	**1**	**5**	**0**	**0**	***33 (1)***	**3**	**0**
Bird																							
cf. *Accipiter cooperi*																		1 (1)			*1 (1)*		
Total Bird	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1 (1)**	**0**	**0**	***1 (1)***	**0**	**0**
Mammal																							
Orzomys palustris																					*0*		
Cricetidae																					*0*		
Rodentia																					*0*		
Marmota monax																		1 (1)			*1 (1)*		
Castor Canadensis																					*0*		
cf. *Castor Canadensis*																1 (1)					1 (1)		
Sylvilagus floridanus																					*0*		
Odocoileus virginianus							3 (1)	35													*38(1)*		
cf. *Odocoileus virginianus*											2										*2*		
Cervidae																			1	0	*1*		
Total Mammal	**0**	**0**	**0**	**0**	**0**	**0**	**3 (1)**	**35**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**1 (1)**	**0**	**1 (1)**	**1**	**0**	***43(3)***	**0**	**0**
Total Bone	**2**	**1**	**1**	**1**	**1**	**1**	**3**	**35**	**2**	**1**	**2**	**1**	**6**	**13**	**1**	**3**	**1**	**7**	**1**	**1**	***84***	**3**	**1**

Table C6. (cont.) 12HR484, Animal taxa from flotation for Early Woodland (EW), Middle Woodland (MW) and Woodland (W) Features and Units. The Number of Identified Specimens followed by the Minimum Number of Individuals in parentheses are presented.

Block/Unit/Phase	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	200
Feature/Unit	F 7	F 9	F 15	F 19	F 21	F 22	F 27	F 30	F 37	F 45	F 46	F 56	F 66	F 74	F 84	F 92	F 100	F 104	F 112	F 135	Unit 65	Unit 282	F 14
Cultural Component	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW
Taxa																							
Fish																							
Aplodinotus grunniens				1											5 (1)				1				
Total Fish	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5 (1)**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**
Reptile																							
Serpentes						1 (1)			1						6								
Apalone sp.																							1 (1)
Emydidae turtle								1 (1)															
Indeterminate turtle	2	4			2	4	2	5	6	7		1	2	1	1	2	1	3	4		1		
Total Reptile	**2**	**4**	**0**	**0**	**2**	**5 (1)**	**2**	**6 (1)**	**7**	**7**	**0**	**1**	**2**	**1**	**7**	**2**	**1**	**3**	**4**	**0**	**1**	**0**	**1 (1)**
Bird																							
cf. *Accipiter cooperi*																							
Total Bird	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Mammal																							
Orzomys palustris																							
Cricetidae																							
Rodentia						10 (2)																1	
Marmota monax																							
Castor Canadensis			1 (1)																				
cf. *Castor Canadensis*																							
Sylvilagus floridanus																							
Odocoileus virginianus																			19 (1)				
cf. *Odocoileus virginianus*								1			1									1			
Cervidae					1																		
Total Mammal	**0**	**0**	**1 (1)**	**0**	**1**	**10 (2)**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**19**	**1**	**0**	**1**	**0**
Total Bone	**2**	**4**	**1**	**1**	**3**	**15**	**2**	**7**	**7**	**7**	**1**	**1**	**2**	**1**	**12**	**2**	**1**	**3**	**24**	**1**	**1**	**1**	**1**

Table C6. (cont.) 12HR484, Animal taxa from flotation for Early Woodland (EW), Middle Woodland (MW) and Woodland (W) Features and Units. The Number of Identified Specimens followed by the Minimum Number of Individuals in parentheses are presented.

Block/Unit/Phase	300	300	300	300	148N49W	148N49W	148N49W	148N49W	148N49W	165N50W	*Total for Middle Woodland*	100	100	300	400	400	***Total for Woodland***
Feature/Unit	F 2	F 7	F47	F 62	F 316	F 320	F 323	F 332	F 335	F 11		F 136	F 150	F 18	F 48	F 66	
Cultural Component	MW	MW	MW	MW	MW	MW	MW	MW	MW	MW		W	W	W	W	W	
Taxa																	
Fish																	
Aplodinotus grunniens				1							*9 (2)*				2 (1)		*2 (1)*
Total Fish	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	***9 (2)***	**0**	**0**	**0**	**2 (1)**	**0**	***2 (1)***
Reptile																	
Serpentes											*8 (1)*					17 (1)	*17 (1)*
Apalone sp.											*1 (1)*						
Emydidae turtle											*1 (1)*						
Indeterminate turtle		1	2		1		3	2	4	4	*68*	6 (1)	1	2			*9 (1)*
Total Reptile	**0**	**1**	**2**	**0**	**1**	**0**	**3**	**2**	**4**	**4**	***78 (3)***	**6 (1)**	**1**	**2**	**0**	**17 (1)**	***26 (2)***
Bird																	
cf. *Accipiter cooperi*																	
Total Bird	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	***0***	**0**	**0**	**0**	**0**	**0**	***0***
Mammal																	
Orzomys palustris								3 (2)			*3 (2)*						
Cricetidae								3			*3*						
Rodentia											*11 (2)*						
Marmota monax											*0*						
Castor Canadensis											*1 (1)*						
cf. *Castor Canadensis*											*0*						
Sylvilagus floridanus										1 (1)	*1 (1)*						
Odocoileus virginianus						2			1	1	*23 (1)*						
cf. *Odocoileus virginianus*	4										*7*						
Cervidae											*1*						
Total Mammal	**4**	**0**	**0**	**0**	**0**	**2**	**0**	**6 (2)**	**1**	**2 (1)**	***50 (7)***	**0**	**0**	**0**	**0**	**0**	***0***
Total Bone	**4**	**1**	**2**	**1**	**1**	**2**	**3**	**8**	**5**	**6**	***137 (12)***	**6**	**1**	**2**	**2**	**17**	***28 (3)***

Table C7. Knob Creek Site (12HR484), Animal taxa identified in screened samples from Middle Woodland Features and Test Units. The Number of Identified Specimens and Minimum Numbers of Individuals in parentheses are presented.

	Taxa	**Fish**	**Reptile**				**Bird**			**Mammal**								**Vertebrate**	
Feature (other) provenience	**Block Trench Phase**	*Aplodinotus grunniens*	*Apalone* sp.	cf. *Terrapene* sp.	Emydidae turtle	Indet. turtle	*Meleagris gallopavo*	cf. *Meleagris gallopavo*	Indet. bird	*Castor canadensis*	*Canis* sp.	*Bos taurus*	cf. *Procyon lotor*	*Odocoileus virginianus*	cf. *Odocoileus virginianus*	Indet. cervid	Indet. mammal	Indet. vertebrate	**Fea/Unit Total**
Unit 100N23W	Phase II																1		1
Unit 81S4W	Phase II																2		2
F 20	Phase II													1			1		2
F 92	Phase II		1 (1)		2	11			1					6	2		231 (1)	6	260
F 100-3	100													13					13
F 100-5	100																5		5
F 100-7	100													16	1		8		25
F 100-8	100													1			1		2
F 100-11	100									1 (1)							1		2
F 100-22	100														5				5
F 100-24	100																10		10
F 100-27	100													9					9
F 100-30	100									1									1
F 100-37	100			1 (1)										10 (1)	1		105		117
F 100-40	100													1 (1)			6		7
F 100-43	100																1		1
F 100-45	100								1						1		26		28
F 100-46	100																2		2
F 100-54	100					1											34	1	36
F 100-61	100																1		1
F 100-65	100																31		31
F 100-70	100					8								4	1	2	73		88
F 100-84	100						1 (1)												1
F 100-87	100																7		7
F 100-92	100					2								2			10	1	15
F 100-98	100													1			27		28
F 100-106	100																14		14
F 100-110	100																5	1	6
F 100-112	100				1	8	1		1					86	2		286		385
F 100-115	100													10			1		11
F 100-115R	100													15					15
F 100-123	100														1		4		5
F 100-135	100								3				1 (1)	2			41		47
Unit 100-19	100													1			1		2
Unit 100-56	100													1					1
Unit 100-70	100													1					1
Unit 100-83	100													7					7
Unit 100-106	100																1		1
Unit 100-115	100													1					1
Unit 100-142	100													29					29
Unit 100-148	100																1		1
Unit 100-164	100													1			3		4
Unit 100-169	100																6		6
Unit 100-195	100																2		2
Unit 100-202	100																1		1
Unit 100-210	100													1					1
Unit 100-244	100					5											8		13

Table C7. (cont.) Knob Creek Site (12HR484), Animal taxa identified in screened samples from Middle Woodland Features and Test Units. The Number of Identified Specimens and Minimum Numbers of Individuals in parentheses are presented.

	Taxa	**Fish**	**Reptile**				**Bird**			**Mammal**								**Vertebrate**	
		Aplodinotus grunniens	*Apalone* sp.	cf. *Terrapene* sp.	*Emydidae* turtle	Indet turtle	*Meleagris gallopavo*	cf *Meleagris gallopavo*	Indet bird	*Castor canadensis*	*Canis* sp.	*Bos taurus*	cf. *Procyon lotor*	*Odocoileus virginianus*	cf. *Odocoileus virginianus*	Indet. cervid	Indet. mammal	Indet. vertebrate	
Feature (other) provenience	**Block Trench Phase**																		**Fea/Unit Total**
Unit 100-245	100		1																1
Unit 100-261	100																4		4
Unit 100-283	100																14		14
Unit 100-302	100														1		1		2
F 200-29	200													1					1
F 200-33	200				1	10								2 (1)			3		16
F 200-97	200													1					1
Unit 200-17	200																1		1
Unit 200-40	200	3 (1)																	3
Unit 200-59	200							1											1
Unit 200-76	200													1					1
Unit 200-95	200																1		1
Unit 200-96	200													6					6
Unit 200-98	200																1		1
F 300-13	300													2			2		4
F 300-52	300					1													1
F 300-60	300																26		26
F 400-7	400																21		21
F 20/20A	100N25W																5		5
F 193	T63N47W													2					2
	T148N48W																2		2
F 320	T148N49W													61			1		62
F 325	T148N49W																9		9
F 327	T148N49W													1			8		9
F 331	T148N49W																	1	1
F 332	T148N49W					1								35			10		46
F 335	T148N49W										1 (1)			12			8		21
Trench P	Trench P											3 (1)						1	4
PM 100-43														1					1
Total for Middle Woodland		**3 (1)**	**2 (1)**	**1 (1)**	**4**	**47**	**2 (1)**	**1**	**6**	**2 (1)**	**1 (1)**	**3 (1)**	**1 (1)**	**344 (3)**	**15**	**2**	**1074 (1)**	**11**	**1519**

Table C8. Knob Creek Site (12HR484), Body part representation for white-tailed deer remains from screened samples from the Middle Woodland features and test units. Number of Identified Specimens (NISP) is presented. Includes referrals to deer.

BODY PART	***NISP***
Skull and Mandible	
Antler	*2*
Auditory Bulla	*1*
Petrous Bone of Temporal	*3*
Parietal	*1*
Basioccipital	*2*
Occiptal	*5*
Occipital Condyle	*2*
Nasal	*1*
Tooth	*178*
Mandible	*56*
Pectoral Girdle	
Scapula	*40*
Forelimb	
Humerus	*2*
Radius	*5*
Pisiform	*1*
Lunate	*1*
Magnum	*1*
Scaphoid	*1*
Metacarpal	*3*
Pelvic Girdle	
Innominate	*1*
Hindlimb	
Tibia	*17*
Greater Cuneiform	*2*
Navicular Cuboid	*2*
Astagalus	*3*
Calcaneus	*1*
Metatarsal	*1*
Miscellaneous	
Metapodial	*14*
First Phalanx	*5*
Second Phalanx	*2*
Third Phalanx	*4*
First or Second Phalanx	*1*
Sesamoid	*1*
Grand Total	*359*

Table C9. Knob Creek Site (12HR484), Modifications to bone in screened samples from Middle Woodland features and test units. The Number of Identified Specimens (NISP) is presented. M=mammal, R=reptile, B=bird, V=indeterminate vertebrate.

Feature (or other) provenience	**Block/Trench /Phase**	**Class**	**NISP**	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
				Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
Unit 100N23W	Phase II	**M**	1	1			1									
Unit 81S4W	Phase II	**M**	2	2			2									
F 20	Phase II	**M**	2	1			2									
F 92	Phase II	**R**	14	14			14									
		B	1	1			1									
		M	239	209	1		239									
		V	6	6			6									
F 100-3	100	**M**	13		1		13									
F 100-5	100	**M**	5	1			5									
F 100-7	100	**M**	25	4			25				1					1
F 100-8	100	**M**	2	1			2									
F 100-11	100	**M**	2	1			2									
F 100-22	100	**M**	5				5									
F 100-24	100	**M**	10				10									
F 100-27	100	**M**	9				9									
F 100-30	100	**M**	1				1									
F 100-37	100	**R**	1	1			1									
		M	116	92	1		116	1								
F 100-40	100	**M**	7	2			7									
F 100-43	100	**M**	1	1			1									
F 100-45	100	**B**	1	1			1									
		M	27	27			27									
F 100-46	100	**M**	2	2			2									
F 100-54	100	**R**	1	1			1									
		M	34	34			34									
		V	1	1			1									
F 100-61	100	**M**	1	1			1								1	
F 100-65	100	**M**	31				31									
F 100-70	100	**R**	8	1			8									
		M	80	11			80						2			
F 100-84	100	**B**	1	1			1									
F 100-87	100	**M**	7				7									
F 100-92	100	**R**	2	2			2									
		M	12	12			12									
		V	1	1			1									
F 100-98	100	**M**	28	28			28									
F 100-106	100	**M**	14	14			14									
F 100-110	100	**M**	5	4			5									
		V	1	1			1									
F 100-112	100	**R**	9	9			9									
		B	2	1			2									
		M	374	223	2	19	374				1			48	35	1
F 100-115	100	**M**	11				11									
F 100-115R	100	**M**	15				15									
F 100-123	100	**M**	5	5			5									
F 100-135	100	**B**	3	3			3									
		M	44	41			44									

Table C9. (cont.) Knob Creek Site (12HR484), Modifications to bone in screened samples from Middle Woodland features and test units. The Number of Identified Specimens (NISP) is presented. M=mammal, R=reptile, B=bird, V=indeterminate vertebrate.

Feature (or other) provenience	Block/Trench /Phase	Class	NISP	Burning			Weathering	Gnawing			Ingested	Human		Staining		Pitted
				Calcined	Black	Red		Rodent	Carnivore	Unknown		Cut	Artifact	Brown	Black	
Unit 100-19	100	**M**	2	2			2									
Unit 100-56	100	**M**	1	1			1									
Unit 100-70	100	**M**	1	1			1									
Unit 100-83	100	**M**	7				7									
Unit 100-106	100	**M**	1	1			1			1						
Unit 100-115	100	**M**	1	1			1		1		1					1
Unit 100-142	100	**M**	29				29									
Unit 100-148	100	**M**	1	1			1					1				
Unit 100-164	100	**M**	4	4			4								1	
Unit 100-169	100	**M**	6	6			6								2	
Unit 100-195	100	**M**	2	2			2								1	
Unit 100-202	100	**M**	1	1			1									
Unit 100-210	100	**M**	1	1			1									
Unit 100-244	100	**R**	5	5			5									
		M	8	8			8								2	
Unit 100-245	100	**R**	1	1			1									
Unit 100-261	100	**M**	4				4									
Unit 100-283	100	**M**	14				14									
Unit 100-302	100	**M**	2	2			2									
F 200-29	200	**M**	1	1			1									
F 200-33	200	**R**	11				11									
		M	5	3	1		5					1			1	
F 200-97	200	**M**	1				1									
Unit 200-17	200	**M**	1	1			1					1				
Unit 200-40	200	**F**	3	3			3									
Unit 200-59	200	**B**	1	1			1									
Unit 200-76	200	**M**	1	1			1									
Unit 200-95	200	**M**	1				1									
Unit 200-96	200	**M**	6				6									
Unit 200-98	200	**M**	1	1			1	1								
F 300-13	300	**M**	4	4			4									
F 300-52	300	**R**	1	1			1						1			
F 300-60	300	**M**	26	26			26									
F 400-7	400	**M**	21	21			21									
F 20/20A	100N25W	**M**	5	5			5									
F 193	T63N47W	**M**	2				2									
	T148N48W	**M**	2		2		2									
F 320	T148N49W	**M**	62				62									
F 325	T148N49W	**M**	9	9			9									
F 327	T148N49W	**M**	9	9			9									
F 331	T148N49W	**V**	1		1		1									
F 332	T148N49W	**R**	1				1									
		M	45	6		1	45									
F 335	T148N49W	**M**	21	8			21									
Trench P	Trench P	**M**	3				2		1			1				
		V	1	1			1									
PM 100-43		**M**	1	1			1									
Total for Middle Woodland			**1519**	**900**	**9**	**20**	**1518**	**2**	**2**	**1**	**3**	**4**	**3**	**48**	**43**	**3**

Table C10. Knob Creek Site (12HR484), Animal taxa identified in screened samples from General Woodland features and test units. The Number of Identified Specimens and Minimum Number of Individuals in parentheses are presented.

	Taxa	**Fish**	**Reptile**					**Bird**			**Mammal**							**Vertebrate**	
Feature (other) provenience	**Block Trench Phase**	*Amia calva*	*Terrapene carolina*	*Apalone* sp.	cf. *Terrapene* sp.	Emydidae Turtle	Indet turtle	*Meleagris gallopavo*	cf. *Meleagris gallopavo*	Indet. bird	*Didelphus virginianus*	*Procyon lotor*	*Sus scrofa*	*Odocoileus virginianus*	cf. *Odocoileus virginianus*	Indet. rodent	Indet. mammal	Indet. Vertebrate	**Fea/Unit Total**
F 100-33	100																1		1
F 100-51	100																1		1
F 100-58	100													1 (1)			3		4
Unit 100-15	100													1					1
Unit 100-19	100													1			1		2
Unit 100-20	100																1		1
Unit 100-35	100								1										1
Unit 100-36	100																4		4
Unit 100-43	100																5		5
Unit 100-45	100													1			2		3
Unit 100-50	100																6		6
Unit 100-55	100													1			9		10
Unit 100-56	100													3	1		10		14
Unit 100-57	100													1			2		3
Unit 100-71	100													1			8		9
Unit 100-73	100													1			1		2
Unit 100-76	100						2										17		19
Unit 100-82	100													1			1		2
Unit 100-83	100																17		17
Unit 100-85	100													1			2		3
Unit 100-86	100													1					1
Unit 100-92	100													1			1		2
Unit 100-93	100														1		2		3
Unit 100-95	100																1		1
Unit 100-96	100																5		5
Unit 100-100	100						1										3	1	5
Unit 100-101	100																1		1
Unit 100-105	100													2			3		5
Unit 100-108	100													9					9
Unit 100-109	100													1					1
Unit 100-113	100													1			1		2
Unit 100-116	100																1		1
Unit 100-117	100																4		4
Unit 100-118	100													1 (1)					1
Unit 100-121	100													1			4		5
Unit 100-122	100													1			5		6
Unit 100-135	100													1			2		3
Unit 100-139	100													1			6		7
Unit 100-143	100													1			2		3
Unit 100-151	100						2							1			7		10
Unit 100-152	100						1												1
Unit 100-155	100													1	1				2
Unit 100-156	100													1					1
Unit 100-158	100													2			1		3
Unit 100-173	100																1		1
Unit 100-210	100																7		7
Unit 100-212	100						1										2		3
Unit 100-220	100													1					1
Unit 100-231	100													1			3		4

Table C10. (cont.) Knob Creek Site (12HR484), Animal taxa identified in screened samples from General Woodland features and test units. The Number of Identified Specimens and Minimum Number of Individuals in parentheses are presented.

Taxa		Fish	Reptile					Bird			Mammal							Vertebrate	
Feature (other) provenience	**Block Trench Phase**	*Amia calva*	*Terrapene carolina*	*Apalone* sp.	cf. *Terrapene* sp.	Emydidae turtle	Indet. turtle	*Meleagris gallopavo*	cf. *Meleagris gallopavo*	Indet. bird	*Didelpus virginianus*	*Procyon lotor*	*Sus scrofa*	*Odocoileus virginianus*	cf. *Odocoileus virginianus*	Indet. rodent	Indet. mammal	Indet. Vertebrate	**Fea/Unit Total**
Unit 100-232	100													9		2 (1)	43		54
Unit 100-234	100													1			8		9
Unit 100-237	100													1			3		4
Unit 100-241	100					1													1
Unit 100-245	100													2			2		4
Unit 100-246	100													1					1
Unit 100-247	100																1		1
Unit 100-248	100													1					1
Unit 100-249	100						1			1				7			9		18
Unit 100-260	100													1			1		2
Unit 100-261	100																5		5
Unit 100-267	100					1								1					2
Unit 100-269	100																1		1
Unit 100-271	100																1		1
Unit 100-272	100																29		29
Unit 100-281	100																1		1
Unit 100-283	100																2		2
Unit 100-291	100													1			3		4
Unit 100-292	100						1												1
Unit 100-293	100													1					1
Unit 100-294	100																1		1
Unit 200-1	200													1			1		2
Unit 200-6	200																2		2
Unit 200-9	200																1		1
Unit 200-11	200													1					1
Unit 200-15	200													1					1
Unit 200-16	200													1			1		2
Unit 200-20	200													9	1		14		24
Unit 200-27	200																2		2
Unit 200-28	200													4					4
Unit 200-31	200													1					1
Unit 200-36	200													2			3		5
Unit 200-39	200													1			18		19
Unit 200-43	200						2							1	1		11		15
Unit 200-44	200													1			1		2
Unit 200-45	200													1			3		4
Unit 200-50	200			1 (1)													1		2
Unit 200-52	200													1					1
Unit 200-53	200																4		4
Unit 200-54	200														1		2		3
Unit 200-55	200													1			6		7
Unit 200-56	200						1										3		4
Unit 200-60	200						2												2
Unit 200-62	200													1			3		4
Unit 200-63	200														1		4		5
Unit 200-68	200													1					1

Table C10. (cont.) Knob Creek Site (12HR484), Animal taxa identified in screened samples from General Woodland features and test units. The Number of Identified Specimens and Minimum Number of Individuals in parentheses are presented.

	Taxa	**Fish**	**Reptile**					**Bird**			**Mammal**							**Vertebrate**	
Feature (other) provenience	**Block Trench Phase**	*Amia calva*	*Terrapene carolina*	*Apalone* sp.	cf. *Terrapene* sp.	Emydidae turtle	Indet. turtle	*Meleagris gallopavo*	cf. *Meleagris gallopavo*	Indet. bird	*Didelphus virginianus*	*Procyon lotor*	*Sus scrofa*	*Odocoileus virginianus*	cf. *Odocoileus virginianus*	Indet. *rodent*	Indet. mammal	Indet. Vertebrate	**Fea/Unit Total**
Unit 200-76	200													1			6		7
Unit 200-81	200														1				1
Unit 200-85	200				1									2	1		5		9
Unit 200-86	200													1			1		2
Unit 200-87	200													13					13
Unit 200-94	200																1		1
Unit 200-99	200													1			1		2
Unit 200-117	200																2		2
Unit 200-138	200																1		1
Unit 200-139	200										3 (1)						4		7
Unit 200-149	200						2												2
Unit 200-151	200													1					1
Unit 200-167	200													1					1
Unit 200-173	200													1					1
Unit 200-179	200													1			3		4
Unit 200-191	200																1		1
Unit 200-193	200																3		3
Unit 200-194	200																3		3
Unit 200-197	200													2			1		3
Unit 200-198	200													23			1		24
Unit 200-201	200																1		1
Unit 200-202	200																1		1
Unit 200-212	200													1			1		2
Unit 200-213	200													5			4		9
Unit 200-216	200																2		2
Unit 200-219	200																5		5
Unit 200-227	200														1		8		9
Unit 200-228	200						1								1		14		16
Unit 200-230	200																1		1
Unit 200-231	200																2		2
Unit 200-232	200													1					1
Unit 200-233	200													1					1
Unit 200-242	200													7					7
Unit 200-250	200													5			1		6
Unit 200-258	200					1	1												2
Unit 200-268	200						1												1
Unit 200-272	200																1		1
Unit 200-274	200													2					2
Unit 200-276	200		1 (1)		1									1			1		4
F 400-47	400							9 (1)										2	11
F 400-57	400																2		2
F 400-58	400																	1	1
Unit 97N8W	Phase II														2		2		4
Unit 100N27W	Phase II						2							6			50		58
Unit 124N40W	Phase II											1 (1)					14		15
Unit 124N41W	Phase II						1										13		14
Unit 125N25W	Phase II													7					7
Unit 147N8W	Phase II											1		8			16		25

Table C10. (cont.) Knob Creek Site (12HR484), Animal taxa identified in screened samples from General Woodland features and test units. The Number of Identified Specimens and Minimum Number of Individuals in parentheses are presented.

Taxa		**Fish**	**Reptile**					**Bird**			**Mammal**							**Vertebrate**	
Feature (other) provenience	**Block Trench Phase**	*Amia calva*	*Terrapene carolina*	*Apalone* sp.	cf. *Terrapene* sp.	Emydidae turtle	Indet. turtle	*Meleagris gallopavo*	cf. *Meleagris gallopavo*	Indet. bird	*Didelphus virginianus*	*Procyon lotor*	*Sus scrofa*	*Odocoileus virginianus*	cf. *Odocoileus virginianus*	Indet. *rodent*	Indet. mammal	Indet. Vertebrate	**Fea/Unit Total**
Unit 197N8W	Phase II	2 (1)					1			2			3 (1)	1			14		23
Unit 201N51W	Phase II						1	1											2
Unit 217N37W	Phase II														1		16		17
Unit 217N39W	Phase II													2			5		7
Unit 219N37W	Phase II				1									2			16		19
Unit 219N39W	Phase II													2	2		10		14
Unit 220N40W	Phase II						1							1			4		6
Unit 227N60W	Phase II													1					1
Unit 246N62W	Phase II														1				1
Unit 250N60W	Phase II														1				1
Unit 325N90W	Phase II																1		1
Unit 3S8W	Phase II																1		1
Unit 248N62W																	1		1
Unit 248N64W																	3		3
Unit 252N64W																	1		1
Total for Woodland		**2 (1)**	**1 (1)**	**1 (1)**	**3**	**3**	**25**	**10 (1)**	**1**	**3**	**3 (1)**	**2 (1)**	**3 (1)**	**195 (2)**	**18 (1)**	**2 (1)**	**587**	**4**	**863**

Table C11. Knob Creek Site (12HR484), Modifications to bone in screened samples from General Woodland features and test units. The Number of Identified Specimens (NISP) is presented. M=mammal, R=reptile, B= bird, V=indeterminate vertebrate.

Feature (or other) provenience	Block/Trench /Phase	Class	NISP	Burning			Weathering	Gnawing			Ingested	Human		Staining		Pitted
				Calcined	Black	Red		Rodent	Carnivore	Unknown		Cut	Artifact	Brown	Black	
F 100-33	100	**M**	1				1									
F 100-51	100	**M**	1	1			1									
F 100-58	100	**M**	4	4			4									
Unit 100-15	100	**M**	1	1			1									
Unit 100-19	100	**M**	2	2			2									
Unit 100-20	100	**M**	1	1			1									
Unit 100-35	100	**B**	1	1			1									
Unit 100-36	100	**M**	4	4			4									
Unit 100-43	100	**M**	5	5			5									
Unit 100-45	100	**M**	3	3			3									
Unit 100-50	100	**M**	6	6			6									
Unit 100-55	100	**M**	10	10			10									
Unit 100-56	100	**M**	14	14			14									
Unit 100-57	100	**M**	3	3			3									
Unit 100-71	100	**M**	9	9			9									
Unit 100-73	100	**M**	2	2			2									
Unit 100-76	100	**R**	2	2			2									
		M	17	16	1		17									
Unit 100-82	100	**M**	2	2			2									
Unit 100-83	100	**M**	17	17			17									
Unit 100-85	100	**M**	3	3			3									
Unit 100-86	100	**M**	1	1			1									
Unit 100-92	100	**M**	2	2			2									
Unit 100-93	100	**M**	3	3			3									
Unit 100-95	100	**M**	1	1			1									
Unit 100-96	100	**M**	5	5			5									
Unit 100-100	100	**R**	1	1			1									
		M	3	3			3									
		V	1	1			1									
Unit 100-101	100	**M**	1	1			1									
Unit 100-105	100	**M**	5	5			5									
Unit 100-108	100	**M**	9				9									
Unit 100-109	100	**M**	1	1			1									
Unit 100-113	100	**M**	2	1			2									
Unit 100-116	100	**M**	1	1			1									
Unit 100-117	100	**M**	4	4			4									
Unit 100-118	100	**M**	1	1			1									
Unit 100-121	100	**M**	5	2	3		5									
Unit 100-122	100	**M**	6	6			6									
Unit 100-135	100	**M**	3	2			3									
Unit 100-139	100	**M**	7	7			7									
Unit 100-143	100	**M**	3	3			3									
Unit 100-151	100	**R**	2	2			2									
		M	8	8			8									
Unit 100-152	100	**R**	1	1			1									
Unit 100-155	100	**M**	2	1	1		2									
Unit 100-156	100	**M**	1	1			1									
Unit 100-158	100	**M**	3	3			3									
Unit 100-173	100	**M**	1	1			1									
Unit 100-210	100	**M**	7	7			7									
Unit 100-212	100	**R**	1	1			1									
		M	2	2			2									

Table C11. (cont.) Knob Creek Site (12HR484), Modifications to bone in screened samples from General Woodland features. The Number of Identified Specimens (NISP) is presented. M=mammal, R=reptile, B= bird, V=indeterminate vertebrate.

Feature (or other) provenience	Block/Trench /Phase	Class	NISP	Burning			Weathering	Gnawing			Ingested	Human		Staining		Pitted
				Calcined	Black	Red		Rodent	Carnivore	Unknown		Cut	Artifact	Brown	Black	
Unit 100-220	100	**M**	1	1			1									
Unit 100-231	100	**M**	4	4			4									
Unit 100-232	100	**M**	54	43			54									
Unit 100-234	100	**M**	9	9			9									
Unit 100-237	100	**M**	4	4			4									
Unit 100-241	100	**R**	1	1			1									
Unit 100-245	100	**M**	4	4			4									
Unit 100-246	100	**M**	1	1			1									
Unit 100-247	100	**M**	1	1			1									
Unit 100-248	100	**M**	1	1			1									
Unit 100-249	100	**R**	1	1			1									
		B	1	1			1									
		M	16	10			16									
Unit 100-260	100	**M**	2	2			2									
Unit 100-261	100	**M**	5	5			5									
Unit 100-267	100	**R**	1	1			1									
		M	1	1			1									
Unit 100-269	100	**M**	1		1		1						1			
Unit 100-271	100	**M**	1	1			1									
Unit 100-272	100	**M**	29	4			29									
Unit 100-281	100	**M**	1	1			1									
Unit 100-283	100	**M**	2	2			2									
Unit 100-291	100	**M**	4	3	1		4									
Unit 100-292	100	**R**	1	1			1									
Unit 100-293	100	**M**	1	1			1									
Unit 100-294	100	**M**	1	1			1									
Unit 200-1	200	**M**	2	2			2									
Unit 200-6	200	**M**	2	2			2									
Unit 200-9	200	**M**	1	1			1									
Unit 200-11	200	**M**	1	1			1									
Unit 200-15	200	**M**	1	1			1									
Unit 200-16	200	**M**	2	2			2									
Unit 200-20	200	**M**	24	24			24									
Unit 200-27	200	**M**	2	2			2									
Unit 200-28	200	**M**	4	4			4									
Unit 200-31	200	**M**	1	1			1									
Unit 200-36	200	**M**	5	5			5									
Unit 200-39	200	**M**	19	19			19									
Unit 200-43	200	**R**	2	2			2									
		M	13	13			13									
Unit 200-44	200	**M**	2	2			2									
Unit 200-45	200	**M**	4	4			4									
Unit 200-50	200	**R**	1	1			1									
		M	1	1			1									
Unit 200-52	200	**M**	1	1			1		1							
Unit 200-53	200	**M**	4	4			4									
Unit 200-54	200	**M**	3	3			3									
Unit 200-55	200	**M**	7	7			7									
Unit 200-56	200	**R**	1	1			1									
		M	3	3			3									

Table C11. (cont.) Knob Creek Site (12HR484), Modifications to bone in screened samples from General Woodland features. The Number of Identified Specimens (NISP) is presented. M=mammal, R=reptile, B= bird, V=indeterminate vertebrate.

Feature (or other) provenience	Block/Trench /Phase	Class	NISP	Burning			Weathering	Gnawing			Ingested	Human		Staining		Pitted
				Calcined	Black	Red		Rodent	Carnivore	Unknown		Cut	Artifact	Brown	Black	
Unit 200-60	200	**R**	2	2			2									
Unit 200-62	200	**M**	4	4			4									
Unit 200-63	200	**M**	5	5			5									
Unit 200-68	200	**M**	1	1			1									
Unit 200-76	200	**M**	7	7			7									
Unit 200-81	200	**M**	1	1			1									
Unit 200-85	200	**R**	1	1			1									
		M	8	8			8									
Unit 200-86	200	**M**	2	2			2		1							
Unit 200-87	200	**M**	13				13									
Unit 200-94	200	**M**	1	1			1									
Unit 200-99	200	**M**	2	2			2									
Unit 200-117	200	**M**	2				2									
Unit 200-138	200	**M**	1				1		1							
Unit 200-139	200	**M**	7	2			7									
Unit 200-149	200	**R**	2	2			2									
Unit 200-151	200	**M**	1	1			1									
Unit 200-167	200	**M**	1	1			1									
Unit 200-173	200	**M**	1	1			1									
Unit 200-179	200	**M**	4	4			4									
Unit 200-191	200	**M**	1	1			1									
Unit 200-193	200	**M**	3	3			3									
Unit 200-194	200	**M**	3	3			3									
Unit 200-197	200	**M**	3	3			3									
Unit 200-198	200	**M**	24	1			24									
Unit 200-201	200	**M**	1	1			1		1							
Unit 200-202	200	**M**	1	1			1									
Unit 200-212	200	**M**	2	2			2									
Unit 200-213	200	**M**	9	5			9									
Unit 200-216	200	**M**	2	2			2									
Unit 200-219	200	**M**	5		5		5									
Unit 200-227	200	**M**	9	9			9									
Unit 200-228	200	**R**	1	1			1									
		M	15	15			15									
Unit 200-230	200	**M**	1	1			1									
Unit 200-231	200	**M**	2	2			2									
Unit 200-232	200	**M**	1	1			1									
Unit 200-233	200	**M**	1	1			1									
Unit 200-242	200	**M**	7				7									
Unit 200-250	200	**M**	6	1			6									
Unit 200-258	200	**R**	2	2			2									
Unit 200-268	200	**R**	1	1			1									
Unit 200-272	200	**M**	1	1			1									
Unit 200-274	200	**M**	2	1			2									
Unit 200-276	200	**R**	2	2			2									
		M	2	2			2									
F 400-47	400	**B**	9	9			9									
		V	2	2			2									

Table C11. (cont.) Knob Creek Site (12HR484), Modifications to bone in screened samples from General Woodland features. The Number of Identified Specimens (NISP) is presented. M=mammal, R=reptile, B= bird, V=indeterminate vertebrate.

Feature (or other) provenience	Block/Trench /Phase	Class	NISP	Burning			Weathering	Gnawing			Ingested	Human		Staining		Pitted
				Calcined	Black	Red		Rodent	Carnivore	Unknown		Cut	Artifact	Brown	Black	
F 400-57	400	**M**	2	2			2						1			
F 400-58	400	**V**	1	1			1									
Unit 97N8W	Phase II	**M**	4	2			4									
Unit 100N27W	Phase II	**R**	2	2			2									
		M	56	30			56									
Unit 124N40W	Phase II	**M**	15	15			15									
Unit 124N41W	Phase II	**R**	1	1			1									
		M	13	13			13									
Unit 125N25W	Phase II	**M**	7				7									
Unit 147N8W	Phase II	**M**	25	17			25									
Unit 197N8W	Phase II	**F**	2				2									
		R	1	1			1									
		B	2				2									
		M	18	9			18									
Unit 201N51W	Phase II	**R**	1	1			1									
		B	1	1			1									
Unit 217N37W	Phase II	**M**	17	17			17									
Unit 217N39W	Phase II	**M**	7	5			7									
Unit 219N37W	Phase II	**R**	1	1			1									
		M	18	17	1		18									
Unit 219N39W	Phase II	**M**	14	11	1		14									
Unit 220N40W	Phase II	**R**	1	1			1									
		M	5	5			5									
Unit 227N60W	Phase II	**M**	1	1			1									
Unit 246N62W	Phase II	**M**	1	1			1									
Unit 250N60W	Phase II	**M**	1	1			1									
Unit 325N90W	Phase II	**M**	1	1			1									
Unit 3S8W	Phase II	**M**	1	1			1									
Unit 248N62W		**M**	1	1			1									
Unit 248N64W		**M**	3	3			3									
Unit 252N64W		**M**	1	1			1									
Total for General Woodland			**863**	**673**	**14**	**0**	**863**	**0**	**4**	**0**	**0**	**0**	**2**	**0**	**0**	**0**

Table C12. Knob Creek Site (12HR484), Animal taxa identified in screened samples from a Historic feature. The Number of Identified Specimens and Minimum Number of Individuals in parentheses are presented.

Taxa		**Fish**				**Reptile**	**Bird**		**Mammal**							**Vertebrate**	
Feature (other) provenience	**Block Trench Phase**	*Scomber scombrus*	*Scaphirhynchus platorynchus*	Castomidae/ Cyprinidae sp.	Indet. fish	*Apalone* sp.	cf. Galliformes	Indet. bird	*Felis silvestris*	cf. Felis silvestris	*Sus scrofa*	cf. *Sus scrofa*	*Bos taurus*	cf. *Bos taurus*	Indet. mammal	Indet. vertebrate	**Total**
F 76	Trench P	1 (1)	4 (1)	9 (1)	1	1	13 (1)	1	48 (2)	5	2 (1)	1	1 (1)	1	16	38	142

Table C13. Knob Creek Site (12HR484), Modifications to bone in screened samples from a Historic feature. The Number of Identified Specimens (NISP) is presented. F=fish, R=Reptile, B=Bird, M=Mammal, V=indeterminate vertebrate.

Feature (or other) provenience	**Block/Trench /Phase**	**Class**	**NISP**	**Burning**			**Weathering**	**Gnawing**			**Ingested**	**Human**		**Staining**		**Pitted**
				Calcined	**Black**	**Red**		**Rodent**	**Carnivore**	**Unknown**		**Cut**	**Artifact**	**Brown**	**Black**	
F 76	Trench P	**F**	15				15									
		R	1				1									
		B	14				14							1		
		M	74	12	1		74	1	5							
		V	38		1		38									
		Totals for Historic	**142**	**12**	**2**	**0**	**142**	**1**	**5**	**0**	**0**	**0**	**0**	**1**	**0**	**0**