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JUL 3 1 2014

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Dear Madams/Sirs:

TRANSMITTAL OF THE PHASE II ARCHAEOLOGICAL SURVEY REPORTS ON SELECTED AREAS RESULTING IN IDENTIFICATION OF HISTORIC PROPERTIES AT THE PORTSMOUTH GASEOUS DIFFUSION PLANT, PIKE COUNTY, OHIO

One archaeological report is enclosed for your information: *Phase II Archaeological Investigations of 33PK347, 33PK348, 33PK349, 33PK371, and 33PK372 within the Portsmouth Gaseous Diffusion Plant (PORTS), Pike County, Ohio.*

Beginning in 1996, the U.S. Department of Energy (DOE) has conducted a number of cultural resource surveys at PORTS. The surveys were conducted for purposes of identifying historic properties, pursuant to Section 110 of the National Historic Preservation Act. In 2011, DOE initiated additional archaeological surveys with the intention of completing a uniform identification process for the PORTS reservation. The field work was completed in late 2012.

For survey management purposes, PORTS was divided into six areas (areas 1-6) with further subdivision of areas 4, 5 and 6 into areas 4A, 4B, 5A, 5B, 6A, and 6B. The survey work resulted in preparation of six Phase I prehistoric survey reports for survey areas 1-6, as well as one Phase II prehistoric survey report on survey areas 2 and 6B. The Phase II summary report for Area 2 and Area 6B is attached.

As indicated above, historic properties were identified in the areas surveyed and documented in the enclosed summary report which exclude sensitive archaeological site location information. Since 2011, DOE has been evaluating waste management solutions for PORTS and one of the alternatives being analyzed (using the Comprehensive Environmental Response Compensation Liability Act [CERCLA] process) involves on-site disposal. The most technically suitable location for a potential disposal cell is near two of the historic properties. Project conceptual engineering design has taken the presence of the historic properties into consideration, should an on-site disposal cell be the selected remedy, and design changes have been made to avoid, minimize, or mitigate adverse effects.

In one instance, the conceptual engineering design change has enabled the historic property to be avoided. DOE employed information from the archaeological surveys and investigations to avoid direct effects to this property. Concerning the other historic property, avoidance is not practical and mitigation measures are being developed should an on-site disposal cell be the selected remedy. The conceptual engineering design in consideration of the presence of historic properties was discussed in the December 10, 2012 consulting party meeting, in the February 2013, and the June 2014 National Historic Preservation Act Activity Update Newsletter.

A discussion of the cultural resources in the potential disposal cell area, the potential effects, and the proposed mitigation to address those effects will be included in the *Proposed Plan for the Site-wide Waste Disposal Evaluation Project* waste management project, should an on-site disposal cell be the selected remedy. The Proposed Plan is a public document, currently in development, and is planned for release for public review in the late summer/fall of 2014. DOE will notify members of the public, including the consulting parties, about the availability of the Proposed Plan, the public review period, and how to provide comments.

Additionally, information, data, interpretations, and conclusions concerning identified cultural resources contained within these reports, as well as earlier PORTS cultural resource reports, are being incorporated into a *Comprehensive Summary Report of Cultural Resource Investigations Conducted at the Portsmouth Gaseous Diffusion Plant (PORTS Facility), Scioto and Seal Townships, Pike County, Ohio*. The above referenced report, which is in development, will include information on all temporal aspects of PORTS, from the prehistoric period to the historic-era to the DOE-era, and will be submitted to the Ohio State Historic Preservation Office (SHPO) and consulting parties in the near future. This Comprehensive Report should be a useful resource in understanding and interpreting the overall history of the PORTS site.

The enclosed report is being provided to assist in your understanding of these survey areas and their resources, and to supplement the information that will be included in the forthcoming Proposed Plan and the Comprehensive Summary Report described above.

The SHPO and DOE have discussed the approach of providing this summary report to each of you in an effort to share archaeological information but also protect confidential site location details. We hope that you will find the summary report useful and helpful as you participate in the CERCLA process. Maintaining open lines of communication is a priority for DOE and SHPO. We believe that working together, DOE and SHPO can facilitate a strong engagement with all parties interested in historic preservation as we consider the Proposed Plan for the Site-wide Waste Disposal Evaluation Project and the effects to cultural resources.

If you have any questions, please contact Amy Lawson at 740-897-2112.

Sincerely,

Dr. Vincent Adams
Portsmouth Site Director
Portsmouth/Paducah Project Office

David Snyder

Dr. David Snyder
Archaeology Reviews Manger
State Historic Preservation Office

Enclosure:
Phase II Summary Report for the Archaeological Investigations of 33PK347, 33PK348, 33PK349, 33PK371, and 33PK372 within the Portsmouth Gaseous Diffusion Plant (PORTS), Pike County, Ohio

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OVAI Contract Report #2012-47PV

PHASE II ARCHAEOLOGICAL INVESTIGATIONS OF 33PK347, 33PK348, 33PK349, 33PK371, AND 33PK372 WITHIN THE PORTSMOUTH GASEOUS DIFFUSION PLANT (PORTS), PIKE COUNTY, OHIO

By

Albert M. Pecora, Ph.D.

and

Jarrod Burks, Ph.D.

April 28, 2014

Report for Public Distribution
(This report version excludes sensitive archaeological site location information)

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OVAI Contract Report #2012-47PV

PHASE II ARCHAEOLOGICAL INVESTIGATIONS OF 33PK347, 33PK348, 33PK349, 33PK371, AND 33PK372 WITHIN THE PORTSMOUTH GASEOUS DIFFUSION PLANT (PORTS), PIKE COUNTY, OHIO

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April 28, 2014

Report for Public Distribution
(This report version excludes sensitive archaeological site location information)

Management Summary

In August and September of 2012 Ohio Valley Archaeology, Inc. conducted Phase II archaeological studies on four prehistoric archaeological sites (33Pk347, 33Pk348, 33Pk371, and 33Pk372) and one historic-era farmstead site (33Pk349) within the Portsmouth Gaseous Diffusion Plant (PORTS) in Pike County, Ohio. Various surveys within PORTS, beginning in 1997, have identified 54 archaeological sites with prehistoric temporal components, many of which are collocated with historic-era sites, including primarily farmstead sites. Others, including those examined in this study, are standalone prehistoric sites. Site 33Pk349 is one of 61 historic-era archaeological sites documented within PORTS to date and, although it is a historic-era farmstead, it contains a small prehistoric component.

Site 33Pk349 is one of many historic-era farmsteads documented and investigated within PORTS. The Phase II study was recommended because, unlike many of the other PORTS farmsteads, this farmstead was abandoned early (1920s) and returned to cultivated fields. Most of the other PORTS farmsteads were abandoned in the 1950s and, once abandoned and razed were left undisturbed. It was anticipated that this farmstead might contain older and possibly different types of archaeological remains than were found at the other farmsteads. Furthermore, it was also expected to have been a more pristine example of a nineteenth century farmstead—one lacking massive amounts of relatively modern debris (1920s-1950s) that accumulated at the other sites before they were purchased by the federal government. The Phase II work, however, revealed that the artifact assemblage dates to the late 1800s and early 1900s and is not significantly different from what was found at other nearby farmstead sites, though it does lack the more recent debris from after the 1920s. The current archaeological information suggests that site 33Pk349 is not eligible for the National Register of Historic Places. The existing archaeological data and potential historical documentation, however, could be used to further understand the PORTS site prior to the Atomic Energy Commission land acquisition (predecessor of the Department of energy (DOE)).

The purpose of the prehistoric Phase II surveys was to evaluate the contents, condition, and age of the archaeological remains contained within these sites and to determine if they have the potential to yield information that is important to our understanding of prehistoric settlement practices in the Scioto River Valley. All four prehistoric sites were found to contain subsurface features and sites 33Pk347, 33Pk348, and 33Pk372 were determined to be unplowed contexts. These sites contain near surface features that have not been destroyed by historic-era cultivation. All four prehistoric sites appear to be in good condition and contain evidence of as few as two (33Pk347) and as many as five (33Pk371) prehistoric temporal components. These temporal components represent the Early Archaic (33Pk371), Middle-Late Archaic (33Pk347), Late Archaic (33Pk348, 33Pk371, 33Pk372), Late Archaic-Early Woodland (33Pk348, 33Pk371, 33Pk372), Early Woodland (33Pk348, 33Pk371, 33Pk372), Late Woodland (33Pk371), and Late Prehistoric (33Pk347, 33Pk372) periods and demonstrate prehistoric use of this upland setting for a span of perhaps 9,000 years. These Phase II studies of four PORTS prehistoric sites yielded information that is important to our understanding of prehistory in this region and, considering that only 1-2 percent of these sites have been excavated, it is likely that they each contain additional important information not yet identified. Sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372 appear to meet the criteria of eligibility for the National Register of Historic Places, under Criterion D.

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1. INTRODUCTION AND BACKGROUND

Between August 29 and September 21, 2012, Ohio Valley Archaeology, Inc. (OVAI) conducted the field work for Phase II archaeological assessment studies on four prehistoric-era Native American archaeological sites (33Pk347, 33Pk348, 33Pk371, and 33Pk372) and one historic-era Euro-American farmstead site (33Pk349) located within the Portsmouth Gaseous Diffusion Plant (PORTS) in Pike County, Ohio (Figures 1.1). The results of the field work and subsequent artifact analyses are presented in this report.

The prehistoric sites examined in this study represent four of 54 archaeological sites with prehistoric components that have been found during various surveys within the 3,777-acres of the PORTS reservation (Table 1.1) (Garrard and Burden 2012; Hazel 2003; Klinge 2009; Klinge and Mustain 2011; Norr 2012; Mustain 2012; Mustain and Lamp 2012; Pecora 2012a; Pecora 2012b; Pecora and Burks 2012b, 2012c; Schweikart et al. 1997). Site 33Pk349 is one of 61 historic-era archaeological sites documented within PORTS. Eighteen of the PORTS prehistoric archaeological sites are collocated with historic-era archaeological sites.

PORTS contains 54 known archeological sites with prehistoric-era Native American temporal components, some of which consist of just one recovered prehistoric artifact. Such sites date to the period before Euro-Americans came to the region, which in southern Ohio was the early 1700s. Prehistoric-era Native American sites typically include artifacts such as fire-cracked rock (FCR), flint tools (e.g., spear points), and flint-tool-making debris (e.g., flakes and shatter). Including the data presented in this report, 31 prehistoric *isolated finds* and 23 *lithic scatters* have been documented at PORTS. These two site type terms—isolated finds and lithic scatters—are used to impart a basic sense of the scale and character of the archaeological remains that have been found; and these terms are often used at the Phase I level. However, they relay little about what is actually present at a location or what occurred at a site when it was occupied in the past. A prehistoric isolated find, for example, is a place where an archaeologist happened to find a single prehistoric artifact. A lithic scatter is a place where an archaeologist found multiple lithic artifacts (e.g., stone tools, manufacturing debris, or FCR). Site 33Pk347, 33Pk348, 33Pk371 and 33Pk372, for example, were originally documented as prehistoric lithic scatters (Pecora 2012a; Pecora 2012b), but were found in the current Phase II study to be more complex archaeological deposits created by multiple occupations separated by hundreds and, in some cases, thousands of years.

Sites 33Pk347, 33Pk348, and 33Pk349 represent three of 18 archaeological sites recorded in Area 2 in the eastern part of PORTS (Pecora 2012a). Six of the Area 2 sites are standalone prehistoric sites, including 33Pk347 and 33Pk348. The twelve remaining sites are historic-era sites, but 11, including 33Pk349, contain small prehistoric components. Sites 33Pk371 and 33Pk372 represent two of three prehistoric sites originally recorded in Area 6B in the western part of PORTS (Pecora 2012b). The third prehistoric site (33Pk370) within Area 6B was recorded as a small lithic scatter and was not recommended for further work. Area 6B also contains a large historic-era farmstead (33Pk324) that was recorded by Mustain and Klinge (2012), who also documented a prehistoric isolated find at the site.

Table 1.1 Prehistoric archaeological sites documented within PORTS.

OAI	Historic-era Site Colocation	Prehistoric Site Type	Temporal Affiliation	Reference
33Pk184	Davis Farmstead	Isolated find	Unassigned prehistoric	Klinge and Mustain 2011
33Pk185	South Shyville Farmstead	Lithic scatter	Unassigned prehistoric	Pecora and Burks 2013
33Pk186	n/a	Lithic scatter	Unassigned prehistoric	Schweikart et al. 1997
33Pk189	Mount Gilead Cemetery PIK-206-09	Isolated find	Unassigned prehistoric	
33Pk193	The Iron Wheel Farmstead	Isolated find	Unassigned prehistoric	Klinge and Mustain 2011
33Pk194	The North Shyville Farmstead	Isolated find	Early Woodland	
33Pk195	The Beaver Road Farmstead	Isolated find	Unassigned prehistoric	
33Pk197	The Dutch Run Road Farmstead	Isolated find	Unassigned prehistoric	
33Pk198	n/a	Isolated find	Unassigned prehistoric	Schweikart et al. 1997
33Pk203	Ruby Hollow Farmstead	Lithic scatter	Early Archaic; Late Archaic; Early Woodland	Pecora and Burks 2013
33Pk204	n/a	Isolated find	Unassigned prehistoric	Schweikart et al. 1997
33Pk205	n/a	Isolated find	Unassigned prehistoric	
33Pk206	Terrace Farmstead	Lithic scatter	Unassigned prehistoric	
33Pk207	n/a	Isolated find	Unassigned prehistoric	
33Pk208	n/a	Isolated find	Unassigned prehistoric	
33Pk210	n/a	Lithic scatter	Unassigned prehistoric	Schweikart et al. 1997; Hazel 2003
33Pk211	Bamboo Farmstead	Lithic scatter	Middle-Late Archaic	Pecora and Burks 2013
33Pk213	The Log Pen Farmstead	Isolated find	Unassigned prehistoric	Klinge 2009
33Pk217	Stockdale Road Dairy	Lithic scatter	Unassigned prehistoric	Pecora and Burks 2013
33Pk218	Cornett Farmstead	Lithic scatter	Late Archaic	
33Pk311	Brodess Farmstead	Isolated find	Unassigned prehistoric	Pecora and Burks 2012b
33Pk317	Mechling House	Lithic scatter	Late Archaic	
33Pk318	Mechling Farmstead	Lithic scatter	Unassigned prehistoric	
33Pk323	Moore School	Isolated find	Unassigned prehistoric	Mustain and Klinge 2012
33Pk324	Map Location 50 Farmstead	Isolated find	Unassigned prehistoric	
33Pk339	n/a	Isolated find	Unassigned prehistoric	Mustain 2012
33Pk341	n/a	Isolated find	Unassigned prehistoric	
33Pk342	n/a	Isolated find	Unassigned prehistoric	
33Pk343	n/a	Isolated find	Unassigned prehistoric	
33Pk346	n/a	Lithic scatter	Unassigned prehistoric	Pecora 2012a

Table 1.1 Prehistoric archaeological sites documented within PORTS.

OAI	Historic-era Site Colocation	Prehistoric Site Type	Temporal Affiliation	Reference
33Pk347	n/a	Lithic scatter	Late Prehistoric; Middle-Late Archaic	Pecora 2012a;
33Pk348	n/a	Lithic scatter	Early Woodland; Late Archaic-Early Woodland; Late Archaic	Pecora 2012a;
33Pk349	Farmer Farmstead	Lithic scatter	Unassigned prehistoric	Pecora 2012a
33Pk350	n/a	Isolated find	Unassigned prehistoric	Pecora 2012a
33Pk351	n/a	Lithic scatter	Unassigned prehistoric	Pecora 2012a
33Pk352	n/a	Lithic scatter	Unassigned prehistoric	Pecora 2012a
33Pk354	n/a	Isolated find	Unassigned prehistoric	Garrard and Burden 2012
33Pk357	n/a	Isolated find	Unassigned prehistoric	Garrard and Burden 2012
33Pk358	n/a	Isolated find	Unassigned prehistoric	Garrard and Burden 2012
33Pk359	n/a	Lithic scatter	Unassigned prehistoric	Garrard and Burden 2012
33Pk361	n/a	Isolated find	Unassigned prehistoric	Garrard and Burden 2012
33Pk365	n/a	Isolated find	Unassigned prehistoric	Norr 2012
33Pk366	n/a	Isolated find	Unassigned prehistoric	Norr 2012
33Pk367	n/a	Lithic scatter	Unassigned prehistoric	Norr 2012
33Pk368	n/a	Isolated find	Unassigned prehistoric	Norr 2012
33Pk370	n/a	Lithic scatter	Unassigned prehistoric	Pecora 2012b
33Pk371	n/a	Lithic scatter	Late Woodland; Early Woodland; Late Archaic-Early Woodland; Early Archaic	Pecora 2012b
33Pk372	n/a	Lithic scatter	Late Prehistoric; Early Woodland; Late Archaic	Pecora 2012b
33Pk373	n/a	Isolated find	Late Archaic-Early Woodland	Mustain and Lamp 2012
33Pk376	n/a	Lithic scatter	Unassigned prehistoric	Mustain and Lamp 2012
33Pk377	n/a	Isolated find	Unassigned prehistoric	Mustain and Lamp 2012
33Pk378	n/a	Isolated find	Unassigned prehistoric	Mustain and Lamp 2012
33Pk383	n/a	Lithic scatter	Unassigned prehistoric	Mustain and Lamp 2012
33Pk384	n/a	Isolated find	Unassigned prehistoric	Mustain and Lamp 2012

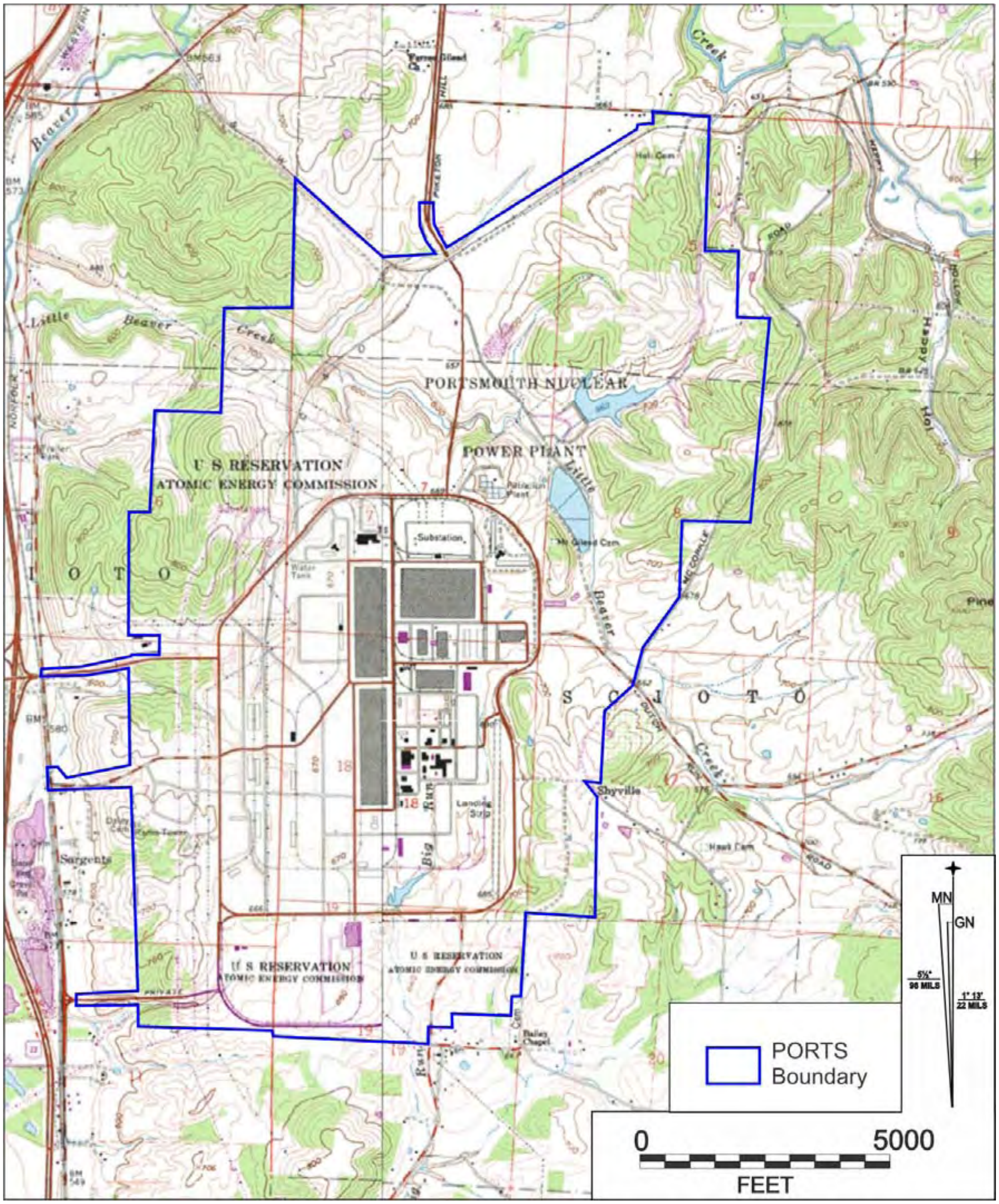

Figure 1.1. Portions of the 1992 Waverly South, 1961 (PR 1974, PI 1979) Piketon, 1961 (PR 1986) Wakefield, and 1961 (PR 1975) Lucasville, Ohio 7.5" USGS topographic maps showing PORTS.

2. HISTORICAL CONTEXT

Archaeology is the study of past human behavior through the excavation and analysis of preserved cultural remains—that is, features (e.g., hearths, earth ovens, storage pits, and structural post molds) and artifacts (e.g., flint flakes, fire-cracked rock, pottery sherds). Paramount to archaeological research is time and space.

Spatial context is critical to all archaeological research and is the foundation of the systematic survey, excavation, and mapping methods used by modern archaeologists. Artifacts found out of context, such as in a cigar box in an attic, offer little value to archaeological research. To study past human behavior, archaeologists rely heavily on the spatial arrangement of objects and debris (e.g., artifacts), features, and sites (e.g., spatial concentrations of artifacts and features).

Temporal context is equally important. Once the spatial context is established it is essential to establish the age of the archaeological remains found in that context. This is typically established through radiometric dating (C^{14} dating) and temporally diagnostic artifacts. Radiometric dating measures the rate of radioactive decay of carbon. Carbonized (i.e., burned) organic remains, such as wood or nutshell charcoal, found in prehistoric features typically are used to obtain radiometric dates. Radiometric dates measure the age of the organic material and, by association, the age of the context (e.g., feature) in which it is found. Archaeologists also use certain artifact types (temporally diagnostic types) as temporal indicators. Chipped stone projectile points, especially their shape, changed through time and can therefore be used as indicators of broad time periods. For example, the Brewerton and Matanzas projectile point types have been dated consistently to around 2980-1723 B.C. and 3700-2000 B.C. in the eastern United States, respectively (Justice 1987). However, a large assemblage of similar artifacts from site 33At982 in Athens County, Ohio were found in association with nine radiometric dates that bracket 4000 B.C. (Pecora and Burks 2006). With this additional, regionally specific information, it is reasonable to suggest that in southern Ohio the Matanzas and Brewerton types date to about 4000-1723 B.C. Projectile points are not the only temporally diagnostic artifacts. Various pottery types, defined by their temper, paste, thickness, vessel and rim shape, and surface treatment, are also useful temporal markers. The widespread use of pottery in Ohio did not occur until after 1500 B.C., so the presence of pottery at an archaeological site reveals that it likely was occupied after this time; other pottery attributes may narrow the age down to a more specific temporal period.

The term "temporal component" is typically used by archaeologists to refer to the different periods of time represented at archaeological sites. For example, a site with Early and Late Archaic period temporal components is one where an archaeologist documented radiometric dates and/or temporally diagnostic artifacts that date from between 8000 and 5000 B.C. (Early Archaic) and 3000-1000 B.C. (Late Archaic). Figure 2.1 is a schematic diagram that illustrates a timeline of Ohio's past. Over 100 years of research in Ohio, through the study of the spatial and temporal arrangement of archaeological remains, archaeologists have established and refined five general temporal periods: Paleoindian, Archaic, Woodland, Late Prehistoric, and Historic-era. The Archaic and Woodland periods each contain three subperiods each: Early, Middle, and Late.

Figure 2.1 also lists several "archaeological culture groups/terms" that refer to unique cultural suites of cultural attributes. For example, Glacial Kame and Maple Creek refer to two distinct cultural taxa—a suite of archaeologically visible and defined cultural traits—that occur in the Late Archaic period and have been identified in Ohio. Likewise, the Adena, Hopewell, and Intrusive Mound/Jack's Reef taxa correspond with specific behavioral practices during the Early, Middle, and Late Woodland Periods.

OHIO'S TIMELINE

Period Names	Subperiods	Archaeological Culture Groups/Terms	Time: Calendar Years	Time: Years Before Present
			A.D.2013	Today
Historic-Era		PORTS-Era Farmstead-Era Euro-American Settlement	A.D.1800	213
			A.D.1650	363
Late-Prehistoric		Fort Ancient	A.D.1000	1013
Woodland	Late	"Intrusive Mound," Jack's Reef Horizon	A.D.450	1563
	Middle	Hopewell	200 B.C.	2213
	Early	Adena	1000 B.C.	3013
Archaic	Late	Glacial Kame/ Maple Creek	3000 B.C.	5013
	Middle		5000 B.C.	7013
	Early		8000 B.C.	10,013
Paleoindian		Folsom/ Clovis	12,000 B.C.	14,013

Figure 2.1. Schematic representation of Ohio's historical timeline (modified from Burks 2010).

2.1. PALEOINDIAN PERIOD

Human occupation of Ohio spans at least 12,000-14,000 years, beginning with the arrival of Paleoindian groups in the Ohio region as the last of the glaciers receded northward around 14,000 years ago. Distinctive lanceolate and fluted lanceolate shaped projectile points characterize Paleoindian archaeological deposits. Artifacts representative of this period tend to be fairly homogeneous in shape throughout North America, and many specimens have been collected in the Ohio region (e.g., Prufer and Baby 1963).

Paleoindian people appear to have focused on both hunting and gathering for food resources (Tankersley 1996). Archaeological deposits containing the remains of Pleistocene mega-fauna in association with Paleoindian artifacts are not uncommon in the western and arctic regions of North America, but in Ohio they are quite rare (cf. Fisher et. al 1994; Lepper 1994; McDonald 1994; Redmond and Tankersley 2005). Technological similarities in the Paleoindian tools found in Ohio and those found elsewhere in the eastern U.S. suggest that similar subsistence strategies were followed across vast regions.

Prufer and Baby (1963) advanced a Paleoindian settlement pattern model in Ohio based on the distribution of fluted, lanceolate projectile points. In a later study, Seeman and Prufer (1982) expanded this study with a much larger sample of projectile points and concluded that these earlier hunters focused on large game animals. Lepper (1986), however, suggests that these earlier hunter-gathers occupied a more generalized niche—one not so focused on big game hunting.

The current Ohio Archaeological Inventory (OAI) lists only five sites in Pike County with Paleoindian temporal components. None of the PORTS sites contain Paleoindian artifacts or radiometric dates.

2.2. ARCHAIC PERIOD

Early Archaic

The Early Archaic period temporal sequence for the Ohio Valley is defined, in part, by the deeply stratified St. Albans site on the Kanawha River in West Virginia (Broyles 1971). Broyles' (1971) excavations at St. Albans resulted in the identification of a stratified geologic sequence in which each stratum contained distinct projectile point forms. The temporal sequence of projectile point types from the lower to upper strata are Charleston, Kirk, MacCorkle, St. Albans, LeCroy, and Kanawha. Additional sites in the region with artifacts in association with radiocarbon dates appear to substantiate the St. Albans sequence. These projectile point forms are widely distributed and extend from the southern Mississippi River Valley to southern Canada—essentially corresponding to the extent of the Eastern Deciduous Forest (Chapman 1977). The similarities in projectile points throughout this vast region may reflect homogenous adaptations to similar environments and/or social or cultural homogeny. However, they may also reflect a widespread exchange of ideas and objects between different cultural groups.

It is generally thought that Early Archaic populations were highly mobile and dispersed hunter-gatherer groups (Blank 1970). The population at this time was rather low and was probably made up of small extended family groups or bands composed of several related men, women, and children (as well as dogs). As mobile hunter-gatherers, these groups would have moved from place to place, bringing along their belongings. They settled for short periods of time (perhaps a few weeks) to exploit various resources, such as game, plant foods, and raw materials. In this way these groups mapped themselves onto the landscape, being present at the right place at the right time to harvest seasonally available foods and raw materials.

Several models for Early Archaic settlement have been developed for the American southeast (Amick and Carr 1996; Anderson and Hanson 1989; Johnson 1989a, 1989b; Morse 1975; Schiffer 1975). Morse (1975) argues that Dalton populations in the lower Mississippi Valley (Arkansas) were virtually sedentary and occupied distinct territories within major drainages. In contrast, Schiffer (1975) argued that this same population alternated seasonally between a residentially mobile system (moving the entire group from place to place) during the summer and autumn months, and a logistically mobile system (the group stays in one location, but individuals/groups head out to collect nearby resources) during the winter and spring months. Anderson and Hanson (1989) postulate a similar Early Archaic settlement organization pattern for the East Coast. This settlement model approximates Caldwell's (1958) fission-fusion settlement pattern, in which populations were dispersed in small residential groups throughout part of the year but came together at larger base camps during other parts of the year.

Other researchers argue that Early Archaic populations were considerably more mobile and occupied a more residential-type pattern. Jeffries (1988) argues that the absence of features, burials, and middens at sites such as Longworth-Gick near Louisville, Kentucky, St. Albans in West Virginia, Modoc and Koster in Illinois, and Rose Island and Icehouse Bottom in Tennessee indicates that Early Archaic populations in these regions were composed of small, mobile bands who occupied large territories. Numerous rock shelter and open ridgetop sites in Eastern Kentucky support this model. Most of these are thought to be camps occupied to exploit seasonal resources, such as acorns and hickory nuts. Johnson (1989a, 1989b) suggests a similar settlement pattern in the Southeast, based on lithic technology data.

Stafford (1994) observed a shift in land use during the Early and Middle Archaic in southwestern Indiana. Based on the spatial patterning of temporally diagnostic bifaces (projectile points), Stafford suggests that Early Archaic bifaces tend to be found farther from the major drainages than bifaces from the later Archaic periods. He interprets this change as a shift in settlement organization. Early Archaic artifact patterning suggests a mobility strategy that involved fine grained patch-to-patch movement through multiple basins in highly mobile, forager-like fashion (patches are places where a particular resource is readily available). Within this system, Early Archaic groups moved to resources on an encounter basis—from a stand of nut trees to a winter yard full of deer.

Only one Early Archaic site has been documented within PORTS. Site 33Pk371 produced two projectile points that resemble Early Archaic point types (Pecora 2012b). One is a nearly complete side-notched form that resembles types within the Large Side Notched Cluster and the other is the distal portion of a serrated point that resembles types within the Kirk Cluster. According to the Ohio Archaeological Inventory (OAI) housed at the Ohio Historic Preservation Office (OHPO), only eight percent (n=25) of the sites recorded in Pike County have defined Early Archaic components.

Middle Archaic

The Middle Archaic (5000-3000 B.C.) is less well defined in the Ohio Valley than any other time period. It is generally understood that by the end of the Middle Archaic, climatic conditions in the Ohio Valley were similar to those of modern times. Although toolkits are similar to those in the Early Archaic, there is a trend towards regional diversity through time in the Middle Archaic. A significant increase and widespread occurrence of ground stone artifacts, which are thought to be indicative of plant food processing technologies, indicates that a broader range of resources was exploited during this time—or at least a broader range of durable tools was being used. Perhaps this is an indication of the increase in the degree to which these resources (those requiring the ground stone tools) were being used. Wood working tools, such as adzes, and atlatl weights increase in popularity during the Middle Archaic and indicate the continuing development of both hunting and non-hunting oriented technologies. Manos, mortars and pestles, and pitted nutting stones become very common, indicating an increased use of plant foods, or at least a development in the technology used to exploit these resources.

Projectile point forms appear to change slightly and a variety of side notched forms become more common, including side-notched projectile point types of the Raddatz Cluster, Matanzas Cluster, Stanley, and Big Sandy II (Justice 1987). Middle Archaic settlement is probably very similar to that of the Early Archaic, with a gradual trend toward territorial restrictions, more substantial archaeological sites due to increased occupation redundancy, and an increase in centralized burial or mortuary-related sites towards the end of the period. In southwestern Ohio the majority of Middle Archaic sites are found on terraces and floodplains of stream valleys (Genheimer 1980).

By the latter portion of the Middle Archaic, in some regions of the Eastern Woodlands, sites become large with substantial middens, large pit features, diverse lithic and bone tool assemblages, exotic goods, and human and dog burials. These sites are thought to have resulted from the reoccupation of the same locations more regularly on an annual basis (Brown and Vierra 1983; Smith 1986). Large, "base camp"-like sites that date to the Middle Archaic are located in northwest Tennessee (Eva), the Carolina Piedmont, and Illinois (Modoc and Koster) (Jeffries 1988; Smith 1986; Steponaitis 1986). Excluding site 33At982 in Athens County, Ohio, no Middle Archaic base camp-like sites have been excavated in Ohio (Pecora and Burks 2006). In fact, this lack of Middle Archaic sites in Ohio has led some to suggest that the Ohio area was depopulated during this period (Purtill 2009).

The closest study of Middle Archaic settlement to Ohio comes from southwestern Indiana. Using the distribution of side notched projectile points, Stafford (1994) recognized a shift from a fine grained patch-to-patch, forager system with frequent residential moves during the Early Archaic to a coarse-grained collector-like system with valley floor base camp occupations during the Middle Archaic. Although this type of settlement shift may have occurred here in central Ohio, no studies of this sort have been conducted to date and sufficient data on Middle Archaic sites does not exist yet.

One very important late Middle Archaic site (33At982) has been documented in southern Ohio, in Athens County, along the Hocking River near its confluence with the Ohio River (Pecora and Burks 2006). The Phase III work at site 33At982 resulted in the discovery of an unplowed midden with associated features (hearths and earth-ovens) and an artifact assemblage dating to *circa* 4000 B.C., based on nine radiometric dates from feature and midden contexts. This site is interpreted to be a residential base camp at which numerous tools, including a whole suite of Matanzas/Brewerton Cluster projectile points, were discarded. The *circa* 4000 B.C. component at 33At982 is unique in that no other examples of this time period have been documented in Ohio. All other reported radiometric dates from this period are associated with isolated features located within larger sites or rockshelters dating to later periods. The projectile point assemblage from 33At982 is particularly important because the nine associated radiometric dates definitively date the Matanzas/Brewerton Cluster to 4000 B.C. in Ohio. Site 33At982 may also be an example of the valley floor base camp anticipated by Stafford (1994) in southwestern Indiana. In fact, site 33At982 may be analogous to the large late Middle Archaic base camps in northwest Tennessee, the Carolina Piedmont, and Illinois (Jeffries 1988; Smith 1986; Steponaitis 1986).

No Middle Archaic sites have been documented in PORTS. Site 33Pk347, however, produced a small notched projectile point that resembles the Matanzas/Brewerton types (see Section 6.3.2, this report). Since these types are typically assigned to the Late Archaic, a Middle Archaic component at 33Pk347 is dubious. According to the OAI housed at the OHPO, only three percent (n=9) of the sites recorded in Pike County have defined Middle Archaic components.

Late Archaic

Many notable technological changes are known to take place during the Late Archaic period (3,000-1,000 B.C.). Stone toolkits from Late Archaic period sites across the Midwest show an increase in the variety of stemmed and notched projectile points, suggesting that populations have settled in to their local regions and there is less inter-region contact. Ground stone artifacts, thought to be plant food processing tools, are common, with an increase in the presence of stone bowls. This period is also known for deposits containing a range of “exotic” material, which indicates the development of regional trade during this period. Late Archaic diets remain similar to those of the earlier periods but an increased use of plant foods, aquatic resources, and native cultigens is evident. The end of the Late Archaic period also sees the earliest production of pottery in Ohio and the beginnings of mound construction.

An important and influential model for the Late Archaic settlement pattern is Winters’ (1969) model for the Riverton Culture in the Wabash Valley of Illinois/Indiana. This model states that the Archaic settlement system was oriented around seasonal movement within a restricted area. Seasonal movement in this fashion is not alien to the earlier Archaic and Paleoindian periods. During the Late Archaic, however, territory size becomes smaller and more restricted due to population growth and social circumscription—more neighbors packed onto the landscape meant less room for groups to roam during their seasonal rounds. According to Winters, summer occupations were centered on base camps. During the spring and fall, settlements were oriented around smaller, transient camps. Changing and limited resource availability during spring and fall dictated the transient nature of the camps. Cold season winter-time occupations were large, substantial settlements. All three seasonal settlement types are linked to small, ancillary hunting, gathering, and bivouac camps.

Late Archaic settlement systems differ from those of the Early Archaic because of the large winter sites of the Late Archaic, which tend to be massive archaeological deposits containing an abundance of debris, huge pit features, hearths, and even storage facilities. Restricted territory also had an impact on settlement and resulted in a settlement pattern that was different form Early Archaic settlements. Due to territory restrictions, Late Archaic people may have frequently returned to certain locations, again creating more substantial archaeological deposits. The burial complex associated with the Glacial Kame in central Ohio (Converse 1980) and Late Archaic phenomena in other areas (e.g., Red Ochre, Old Copper) also suggests the presence of regionally-specific cultural traditions and well defined territories.

Site locations along terraces suggest that during the spring and summer aquatic and plant resources in river valleys were heavily utilized, while during the fall and winter the uplands were focused upon for nut harvesting (e.g., hickory and walnut) and wild game hunting (Genheimer 1980; Vickery 1980). Vickery (1980) has suggested that two types of settlements occurred during this period in southern Ohio, the local base camp affiliated with a restricted territory and larger scale camps indicative of the use of regional resources. These sites fall within the taxonomic unit Maple Creek Phase, which Vickery developed for the Late Archaic in southern Ohio—especially along the Ohio River. During the Maple Creek Phase, larger base camps were located along river terraces.

An example of this kind of site, the large Late Archaic base camp, is site 33Ms29. This large Late Archaic Maple Creek phase site was interpreted as an aggregated base camp by Keener and Pecora (2003) based on large scale geophysical survey, shovel testing, and targeted feature excavation. Numerous subsurface pit features and post holes were identified by geophysical survey and limited excavation. Merom-like points were found associated with the site and are commonly found with Maple Creek sites located along valley floors. Maple Creek sites found in the uplands are typically smaller in size and less complex (Vickery, personal communication 2003).

At the other end of the state, in the Lake Erie Basin, Prufer and Long (1986) propose two Late Archaic site types for Northeastern Ohio: (1) Large base camps on higher ground along major stream valleys, and (2) small encampments, many of which are located on glacial knolls overlooking lakes, ponds, and swamps. A similar pattern is probably present in central Ohio, with small encampments in the interfluvial areas, and larger base camps along the floodplains of the Scioto, Olentangy, Licking, Hocking (upper), and Muskingum (upper) Rivers.

Terminal Late Archaic period pottery has been found at a number of sites in southern Ohio, demonstrating that this innovation in container production got an early start in Ohio. Recently, Pecora and Burks (2005) obtained some of the oldest radiocarbon dates for pottery in Fairfield County, Ohio when pottery was recovered in two features dating to 3980±60 BP and 3290±120 BP. Dates as early as 2400 B.C. are exceptionally rare, but there are numerous examples from across south and central Ohio of pottery dating between 1500 B.C. and 1000 B.C.

According to the current Ohio Archaeological Inventory (OAI), more sites within Pike County contain Late Archaic components (n=51, 17%) than any other time period. Late Archaic temporal components are well-established at sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372. Six of the twelve radiocarbon dates procured from these sites date to this period or straddle the end of the Late Archaic and beginning of the Early Woodland periods (see sections 6.5, 7.5, 8.5, and 9.5). It is likely that most of the artifactual material found at these sites was created during the Late Archaic or Early Woodland period.

2.3. WOODLAND PERIOD

Early Woodland

The Early Woodland Period (1,000 B.C. to 200 B.C.) represents a continuation and elaboration of cultural manifestations developed in the Late Archaic, most visibly in the area of the treatment of the dead. In fact, the Early Woodland is set apart from the Archaic by the intensification of mortuary practices with the construction of burial mounds and extensive exchange networks for burial/ritual goods, use of ceramic vessels, and the use of indigenous or non-indigenous domesticated cultigens such as chenopodium and sunflower (Dragoo 1976). The florescence in the use of pottery is important because it suggests a greater reliance on food processing (cooking) and storage (e.g., for small seeds), and may indicate a greater emphasis on the gathering and processing (i.e., cooking) of plant foods versus hunting. This change in subsistence practices marks a shift towards the development of cultivation, which by the end of the Woodland period becomes intensive corn agriculture. While pottery first appears in the region well before 1000 B.C., its presence on archaeological sites between 1,000 and 200 B.C. is fairly commonplace in today's research. In central Ohio, this early pottery is plain surfaced, thick, and grit tempered and typically vessels have moderately narrow to very narrow (essentially subconoidal), flat bases (e.g., Dominion Thick type [Cramer 1989]). Other contemporaneous, thick pottery types in the Middle Ohio Valley, such as Fayette Thick, have a wide range of surface treatments (e.g., cord marking and fingernail impressions) and tempers (Clay 1992; Seeman 1992). The Adena cultural manifestation, characterized by large burial mounds, small circular earthworks, the widespread use of small amounts (relative to later Hopewell practices) of exotic raw materials like mica and copper, and a subsistence strategy more focused on the use of cultigens than previously, does not begin until about 450 B.C. (Seeman 1986).

Early Woodland settlements, especially after 450 B.C., are small, one- to two-house sites with cooking pits and trash dumping areas generally located on the low terraces and floodplains of stream valleys. Most work on sites from this time period in Ohio has been done in the Muskingum Valley (Carskadden 1992; Carskadden and Gregg 1974) and other nearby areas in west-central Ohio (e.g., Bush 1975; Schweikart 2008). Evidence of substantial, circular structures has been found at several sites, suggesting that they were inhabited for large portions of the year, if not year around. Projectile points found at Early Woodland sites are generally large ovate-based or stemmed varieties (Justice 1987) that were hafted to spears/darts. The mortuary complex of the Adena was focused on the construction and use of conical mounds as vertical cemeteries—some mounds were over 60 feet in height. Most Adena mounds were constructed in isolation, but some were accompanied by surrounding enclosures and/or other small mounds. Burial mounds are typically found along high terrace or bluff edges overlooking stream valleys, as is common in the Hocking Valley. However, Adena mounds are also found on or near floodplains in small creek valleys, as is the case in the Deer Creek Valley in northern Ross County and southwestern Pickaway County. Examples of large Early Woodland mounds include the Sentinel Mound (Harrison County), the Miamisburg Mound (Montgomery County), the Adena Mound (Ross County), and the Conus Mound (Washington County). Pike County boasts several large mounds that likely are Adena constructions, including the Vulgamore Mound and the Van Meter mounds located west of PORTS (see Burks 2010). Burials are often, but not always, placed in log-lined crypts in the center of the mound floors. Some of the log-lined burials contain exotic goods such as high quality flint projectile points, copper bead necklaces and bracelets, and slate and ground stone items. In many cases mounds contain the remains of multiple crypts, though some Adena mounds lack crypts altogether (Hays 1994).

The current Ohio Archaeological Inventory (OAI) lists 33 (11%) sites with Early Woodland components in Pike County. Within PORTS, Early Woodland temporal components are well-established at sites 33Pk348, 33Pk371, and 33Pk372, and they are represented by radiometric dates, thick grit tempered pottery, and a micro-drill technology that may also be Early Woodland (see section 9.3). Six of the twelve radiocarbon dates related to these sites date to this period or straddle the end of the Late Archaic and beginning of the Early Woodland. It is likely that most of the artifactual material found at these sites was created during the Late Archaic or Early Woodland period.

Middle Woodland

The Middle Woodland Period (200 B.C. to A.D. 400) is best known for its Hopewell cultural manifestation and the large earthworks built in central and southern Ohio. Middle Woodland subsistence strategies continued to rely heavily on food supplies obtained from hunting and gathering (e.g., nut varieties, deer, berries, fish, seeds, and small mammals). There is, however, an apparent greater reliance on cultigens such as chenopodium, sunflower, and maygrass, known as the Eastern Agricultural Complex (Wymer 1996). Corn was also present during this period but it was in very small quantities at just a few sites; it was not a minor part of the Middle Woodland diet.

Settlement patterns of the Middle Woodland appear to center around small, permanently occupied (i.e., year around) “hamlets” that have been found within 1-5 kilometers of the earthwork complexes and also far from the earthworks in upland settings (Dancey and Pacheco 1997; Pacheco 1996; Pacheco et al. 2005, 2009a, 2009b). Prufer’s (1965) work on the McGraw site led him to postulate that Middle Woodland communities consisted of small, permanently occupied farming hamlets (each hamlet represented by one or two households) that were tied to a ceremonial and burial area. Pacheco (1988, 1993, 1996, 1997) and Dancey and Pacheco (1997) later expanded upon Prufer’s research and proposed four correlates that should be evident at Middle Woodland habitation, or hamlet sites:

1. Hamlets are relatively small in size, usually covering no more than 1 ha. The size distribution of hamlets is distinctly uninodal;

2. The surface structure of hamlets is characterized by high density areas of artifacts resulting from formal refuse disposal. Household garbage dumps appear as sharply defined single peak (uninodal) concentrations when mapped;

3. Hamlet artifact assemblages contain functionally equivalent generated tool kits necessary to maintain the day-to-day existence of the domestic unit. These assemblages will contain both the products and by-products of the manufacturing and maintenance of the tool kits; and

4. Hamlets are locally dispersed in the general vicinity of ceremonial centers. Clusters of hamlets form communities associated with particular centers/burial mounds (Pacheco 1997: 43-44).

Dancey and Pacheco (1997) advocate a dispersed sedentary community model for Ohio Hopewell hamlets along drainage systems. Related communities are viewed as peer polities, and related polities make up regional traditions.

A number of researchers disagree with the Dispersed Sedentary Community model and try to argue that the Hopewell moved around the landscape, living in seasonal encampments (e.g., Yerkes 1988, 1990, 1994). In addition, the proponents of the mobile Hopewell model argue that the ceremonial centers were occupied by, or bordered by, temporary settlements, such as the Hale site (Lepper and Yerkes 1997: 187-188). The presence of temporary encampments immediately adjacent to Hopewell ceremonial centers does not actually support or refute either model of Hopewell settlement patterns as both positions suggest the presence of intermittently occupied camps near the earthworks. Recent work around Hopewell Mound Group (Burks and Pederson 2006) and the Hopeton Works (Burks and Gagliano 2009), for example, have documented the presence of short-term camps in the vicinity of large earthwork centers.

While the Hopewell settlement debate is still evolving, excavations at such notable sites as Jennison Guard (Blosser 1996), Murphy (Dancey 1991, 1992), Twin Mounds (Fisher 1969, 1970), Strait (Burks 2004) and Brown's Bottom (Pacheco et al. 2005, 2009a, 2009b) have found that Hopewell settlements are located in large and small stream valleys. Secondary encampments have been found in the uplands, indicating exploitation of seasonal plant (e.g., nuts) or animal (e.g., deer) resources (Pacheco 1988).

At least two Hopewell settlements have been found and documented in the PORTS area in the last two decades. The archaeology work conducted in preparation for the construction of an exit ramp off U.S. Route 23 at Route 32/124 identified several Hopewell structures, what appear to be part of a small Hopewell settlement (33Pk153) (Church and Erickson 1995). Circular and square structures were found but the excavations were not extensive enough to locate cooking pits and other features associated with this occupation. Archaeological site assessment work has also been performed at a second Hopewell settlement located in the vicinity of the Rt. 23/32 interchange. Systematic shovel testing at this location revealed four artifact clusters and magnetic survey identified numerous pit features, three of which were excavated. Charcoal samples from all three excavated pit features produced middle-late Hopewell-era dates and mica (a common material used by the Hopewell) was found in two of the pit features. It is possible that many more Hopewell sites are present in the Scioto River floodplains south of Piketon.

A distinction from the Early Woodland period is the development of extensive and elaborate geometric earthwork complexes during the Middle Woodland. Most archaeological work on the Hopewell has been conducted at these earthwork sites and associated mounds (e.g., Shetrone 1926). Some of the more notable Middle Woodland complexes include Hopewell Mound Group, Mound City Group, High Bank Works, Newark, Seip, Harness, Stubbs, and Marietta. Near PORTS, the Seal Township Works and the Piketon Graded Way (Burks 2011; Squier and Davis 1848) are two of the most prominent earthwork complexes in Pike County. Hilltop enclosures tend to be more common in the southwest Ohio area and are exemplified by such sites as Fort Ancient, Pollock, Fort Hill, and Miami Fort. From work done at the above sites, and many others, it is clear that at least some individuals in Hopewell communities participated in elaborate, and "expensive," mortuary-ceremonial activities. Some of these mortuary activities involved the consumption (e.g., through burning or burial) of large amounts of exotic grave goods, suggesting the Hopewell had well established trade connections or some other long distance acquisition mechanism (e.g., questing).

The makeup of artifact assemblages of Middle Woodland period sites is dependent on context. Exotic trade goods are generally concentrated in mortuary sites, while utilitarian artifacts such as ceramics and lithic debris are concentrated at hamlets or encampments. Middle

Woodland ceramics are typically manufactured with grit temper and possess cordmarked or plain exterior surfaces. Some ceramics are decorated with stamped, punctated or zoned designs, with a few rare items containing iconography (Greber and Ruhl 1989). Domestic vessels generally have thinner walls than the Early Woodland ceramics, and are typically globular to subconoidal in form. Lithic artifacts include bladelets, polyhedral cores, expanding base projectile points (e.g., Snyder type and other Lowe Cluster types [Justice 1987]), drills, and a variety of ground stone tools. Aside from the use of many types of local flint, many other kinds of raw materials were used by the Hopewell, including chlorite and mica from the southern Appalachians; marine shell and alligator and sharks' teeth from the Gulf Coast; obsidian from the Yellowstone area in the Rocky Mountains; copper from the Great Lakes; silver from Ontario; meteoric iron; and non-local, fine quality flint from North Dakota (Knife River) and southeast Indiana (Harrison County [Indiana Hornstone] flint). Other items made from non-local or local material include platform pipes, copper axes/adzes and plates, copper and silver earspools, pendants and necklaces of large predatory animal canine teeth, and leaf shaped flint cache blades (Griffin 1978; Seeman 1979).

The current Ohio Archaeological Inventory (OAI) lists 36 (12%) sites with Middle Woodland components in Pike County. None of the PORTS sites, however, produced radiometric dates or artifacts that date to this period.

Late Woodland

The beginning of the Late Woodland period (A.D. 400/500 to A.D. 1000) marks a distinctive change in some cultural traditions in the Middle Ohio Valley and a continuation of others. The large ceremonial earthwork centers of the Hopewell, and much of the conspicuous consumption of exotic raw materials, were abandoned at about A.D. 400 to A.D. 500. Other Middle Woodland period traits, such as the intensive cultivation of Eastern Agricultural Complex (EAC) plants and the use of Lowe Cluster projectile points, carried on. Distinct, subregional expressions of certain ceramic attributes, and perhaps cultural characteristics, also appear during this period, such as Cole, Newtown, and Peters (Baby and Potter 1965; Prufer and McKenzie 1966). Ceramic assemblages in southern and central Ohio are typically cordmarked, and commonly tempered with either chert or limestone (e.g., Peters and Chesser series). Most cordmarking goes up to, and on top of, the vessel lip. Later in the Late Woodland rims are thickened and some are castellated. Projectile points go through a major metamorphosis as they transition from spear points (Lowe Cluster types) to thin, notched arrow points (Raccoon notched and Jack's Reef), to small, triangular arrow points (Justice 1987). Ground stone tools such as celts, pestles, and metates are common. There is also an increase of representative bone tool artifacts (e.g., awls, punches, etc.) during this period.

Seeman and Dancey (2000) partition the Late Woodland into early (A.D. 400-650) and late (A.D. 650-900) phases. Early Late Woodland sites typically contain a few bladelets from failing bladelet production industries, Lowe Cluster projectile points, large quantities of extra-local lithic material, and Newtown Cordmarked (southwestern/central Ohio), Childers Cordmarked (south-central Ohio), and Watson Cordmarked pottery (southeastern/eastern Ohio). The late Late Woodland is defined by assemblages containing a variety of cordwrapped-stick impressed ceramics and Levanna or Jack's Reef projectile points. The material culture of the Late Woodland as a whole includes well developed lithic, pottery, bone, and fiber technologies. Subsistence focused heavily on nuts, cultigens, and game hunting. Fish and shellfish are poorly represented at Late Woodland sites, though not many Late Woodland period settlements, especially late Late Woodland, have been excavated.

Settlement patterns in the Late Woodland period see populations begin to coalesce into more densely packed communities/villages typically along or next to river/stream valleys. This process of community nucleation may have begun as early as the third century A.D. in some areas of the region (Burks 2004). During this period, native plant cultigens and hunting provided most of the dietary needs. Late Woodland settlements frequently have dense midden deposits with abundant quantities of fire-cracked rock. These FCR middens are frequently associated with large earth ovens, some of which exceed 7.8' (2.4 m) in diameter (Seeman and Dancey 2000). However, by about A.D. 800, the large, nucleated villages of central and southern Ohio were vacated and the Late Woodland populations took up a more dispersed settlement pattern (Church 1987). Unfortunately, very few sites have been documented for the late Late Woodland period. Thus it is not yet known what happens just prior to the advent of corn agriculture, which does not become important until the very end of the Late Woodland period, after A.D. 950.

The current OAI lists 16 (5%) sites with Late Woodland components in Pike County. One radiometric date from a feature excavated at site 33Pk371 produced a Late Woodland period date (see Section 8.5).

2.4. LATE PREHISTORIC PERIOD

Just before the end of the first millennium A.D., something quite remarkable began to happen in Ohio and all across much of what today is the eastern United States—a process that you might say has come to define many aspects of modern American culture: corn agriculture. Corn was introduced into the Ohio Valley as early as the Middle Woodland period. It made its way here, with the help of people and trade, all the way from the highlands of Mexico. Along the way many generations of selective planting caused the corn plant to change, from a plant called *teosinte* 4000-5000 years ago that produced very small ears to, around A.D. 800-900, something more like what we know today.

It was that last change in the corn plant, the one just prior to A.D. 1000 that fueled quite a revolution in Ohio. This new corn plant could withstand a shorter grower season, cooler temperatures, and less rain than its earlier ancestors; and it produced quite a large yield as compared to plants in the past. One estimate puts that yield at 35-45 bushels per acre in southwestern Ohio (Cowan 1987). This boom in corn production fueled a revolution in settlement organization. Starting at about A.D. 1000, during the Late Prehistoric period (A.D. 1000-1650), southern Ohio comes to be dominated by peoples belonging to what archaeologists now call the Fort Ancient culture (Griffin 1943). Many Fort Ancient people lived in large circular villages (with hundreds of occupants) surrounded by a stockade. Most such villages had an open plaza at their centers, and some contained low burial mounds along the edge of the plaza. But not all Fort Ancient people lived in large villages. Smaller settlements of just a few houses are known, including single family farmsteads.

Along with this change in subsistence and settlement pattern came a marked evolution (or revolution) in pottery technology—the numbers of cooking pots made, used, and broken at Fort Ancient sites vastly increased over their use during the Woodland period. Furthermore, Fort Ancient cooking pots experienced a major change in construction technique. Unlike the crumbled up stone temper used by their Woodland period forbearers, the Fort Ancient used burned and ground up mussel shell to produce very strong, heat resistant cooking vessels.

Other Fort Ancient technologies are also quite easy to spot on archaeology sites. The Fort Ancient used the bow and arrow and produced small flint triangular arrow points that are near ubiquitous across Ohio. They dug deep storage pits for storing all of the corn produced during the warm months. And they built fairly large (5-10 meters across), rectilinear houses, some of which even had wall posts set in trenches.

While the Fort Ancient built many of their villages and smaller settlements in the floodplains of major rivers and streams, near their fields of corn, or on nearby bluff tops at the edges of the valleys, they also ventured into the uplands to access other kinds of resources. It is not uncommon to find stray Fort Ancient arrow points on ridge tops in topographic settings. Rockshelters also commonly contain copious amounts of Fort Ancient material deposited by groups on resource gathering forays (e.g., Pitner 2000). No doubt the Fort Ancient were hunting deer, bear, raccoon, and other forest animals in these settings—their villages are littered with the bones of these animals. They also likely harvested nut crops in the uplands and gathered many other kinds of plants, for though they focused very heavily on corn, they did not totally give up some of the earlier plant food types heavily used during the Woodland period.

Unlike their neighbors to the far west, the Mississippians, the Fort Ancient do not seem to have had a complex, multi-level political organization. While there is some evidence for social stratification, lacking are the elaborately appointed burials of the elite that are found in Late Prehistoric period villages and towns along the Mississippi River. In fact, most deceased Fort Ancient people were buried in graves right outside their houses, along the edge of the plaza. Nor did the Fort Ancient have large platform mounds on top of which priestly chiefs lived. Theirs was a political system more based on achieved status. Though certainly seated in familial relations and clan ties, those who were leaders in villages were not necessarily given such status at birth (e.g., Pollack and Henderson 2000).

By the late 1500s and early 1600s, strange and exotic objects and materials began to appear in Fort Ancient villages, signaling much change to come and the beginning of what archaeologists refer to as the Protohistoric period. Scraps of brass and copper fashioned into arrow points and tinkle cones, beads made of colorful glass, and even objects of iron, all indicate down-the-line contact with Europeans (Drooker and Cowan 2001). Not long thereafter, in the late 1600s and early 1700s, population migration, aggressive groups from the Northeast, and European diseases all worked to turn Ohio into a much depopulated land. Groups like the Shawnee, Miami, Delaware, Wyandot, and many others eventually re-filled some of Ohio (the Shawnee in particular are known to have lived in the Scioto Valley [e.g., Tanner 1987]), but by then their way of life had changed much from pre-contact times, looking much less like Fort Ancient and much more like the Euroamerican pioneers who would, in the mid-late 1700s, begin to push them out of Ohio.

The current Ohio Archaeological Inventory (OAI) lists 18 (6%) sites with Late Prehistoric components in Pike County, but the Piketon area is an archaeological void when it comes to identified Late Prehistoric period villages and other kinds of sites. The nearest well-documented Fort Ancient village is the Feurt Village site (33Sc6), located 13.5 miles south of PORTS along U.S. Route 23 and just north of Portsmouth. Just north of that, near the south edge of Lucasville, is the Schisler Village site (33Sc9), though this site is less well documented. To the north of PORTS, no major villages south of the Richmondale area (e.g., the Morrison Village site [Prufer and Anders 1967]) have been documented. It is possible that there are many undocumented Fort Ancient sites in the floodplains above and below Piketon. Within PORTS, sites 33Pk347 and 33Pk372 produced Late Prehistoric radiometric dates and 33Pk347 also produced a triangular-shaped arrow point that may date to this period.

There is little information available for the PORTS area concerning the period from 1650 to the 1790s, when Euroamericans began flooding into the Scioto Valley. This period in Ohio is referred to as the Protohistoric period. Several individuals are known to have traveled through the area and written journals during their travels, including for example Christopher Gist in 1750, William Trent in 1752, and the Reverend David Jones in 1772-1773 (see Foster for excerpts of these journals). Since both Gist and Trent were visiting the Shawnee towns at the mouth of the Scioto and traveled back and forth to Pickawillany, a Miami town with an English trading fort near modern day Piqua, Ohio, it is likely that many other Euroamericans also were traveling around southern Ohio in the early-mid 1700s.

Several historic maps (e.g., the Mitchell 1755 map, the Pownall 1776 map, and the Hutchins 1777 Map [all shown in Smith 1977]) show the famous Scioto Trail (a Native American trail) running north-south along the Scioto River and passing by the west side of PORTS, but only two Native American villages are shown in the lower Scioto Valley. A Delaware village of as many as twenty families (Smith 1977), that of Wanduchales, is present on the Mitchell 1755 map and reappears on the Pownall 1776 and Hutchins 1777 maps. One wonders, however, if the village was still there in 1777 or if Hutchins had just copied over its location from the earlier maps. Smith (1977), likely informed by Christopher Gist's journal, suggests that Wanduchales' (or Windaughalah) town, also known as the Lower Delaware Town, was founded as early as 1738 and was located on the east side of the Scioto River in Clay Township, Scioto County—at least 12 miles south of PORTS. The only other Native American village or town to appear on any maps of the lower Scioto valley (i.e., below Chillicothe) is Hurricane Tom's town, which is shown on the west side of the Scioto River, opposite its confluence with Salt Creek and near what today is the small town of Higby. Many Shawnee villages are known from the Portsmouth area and around Chillicothe, but none have been recorded near Piketon or PORTS.

3. ARCHAEOLOGICAL TERMS AND CONCEPTS

As was discussed above, archaeology attempts to reconstruct past human behavior by studying the spatial and temporal arrangement of artifacts, features, and archaeological sites. An archaeological site is defined as a place where evidence of past human activity has been preserved, and it is essentially a concentration of features and artifacts. Excluding the famous mounds and earthworks, which are generally thought to be mortuary and ceremonial sites, most of Ohio's prehistoric archaeological sites are domestic locations where people lived and/or carried out a variety of food and resource procurement activities.

Through most of the course of prehistory, Ohio's residents were highly mobile hunter-gatherers, especially during the Paleoindian and Archaic periods. It was not until after around 200 B.C. that Ohio's residents started to settle down and become somewhat or completely sedentary. Prior to living in permanent settlements, earlier hunter-gatherers usually lived in small extended family groups that moved themselves and their residences over the landscape in search of seasonal resources. Residential sites, places where people ate, slept, reared children, and carried out other social activities, were rarely occupied for more than a few weeks or months. This settlement pattern persisted through most of Ohio's prehistory, but by the Late Archaic period these small multiple family groups appear to have coalesced into large residential groups during certain seasons. Annual group coalescence is evident during the late Middle and Late Archaic periods and probably occurred in the winter season when food resources, especially plant resources, are scarce. By coalescing into larger groups in the winter, the various family groups would have been able to share stored food resources that were collected and preserved during summer and autumn months, and pool labor resources for exploiting migrating water fowl, aquatic resources, and deer yards or winter deer concentration areas. Residential sites might be termed residential base camps for the earlier mobile hunter-gatherers or hamlets and villages for the more sedentary peoples during the later periods. Once people became sedentary and began to live in hamlets during the Early and Middle Woodland periods or villages during the Late Woodland period, horticulture and agriculture become an increasingly important part of food production. Like their earlier counterparts, however, hunting and gathering remained important to those living in the Middle-Late Woodland.

Prehistoric peoples engaged in a multitude of activities over the landscape beyond their residential sites. Whether residentially mobile or sedentary, people had needs for various resources that were not locally available. Both food and non-food resources are not evenly distributed over the landscape and the procurement of these resources would have required specialized procurement forays by a subset of people from the settlements. For example, a group of hunters might leave the residential base camp, hamlet, or village for a few days or weeks to hunt deer. This would require the establishment of a short-term camp site at a location away from the residential base. During the hunt, the group might find a crop of hickory nuts and report this information back to the residential base. This information might then draw out another subset of the group to exploit the nut crop. A nut gathering foray might require less than a day of work, but it likely would result in the creation of a staging area for nut processing.

Regardless of the settlement system, daily human activities result in the formation of archaeological sites. The construction of wooden post-supported shelters or houses, cooking and storage facilities, and other kinds of archaeological features, as well as the manufacture and use of tools and clothing, the preparation and consumption of food, and the many other activities people engaged in would have left behind some kind of archaeological signature. When found by archaeologists, locations containing such archaeological signatures are defined as archaeological sites.

Most of the material remains left by Ohio's prehistoric occupants have been lost to decay. Wood architecture and utensils, animal skin bags and bark containers, clothing made of hides—none of these things lasts longer than several decades after being left behind. Archaeological sites are frequently represented by only the most durable items made of stone. Lithic debris and fire-cracked rock (FCR) are the most abundant artifact types found at prehistoric archaeological sites in Ohio. Lithic debris consists of flint flakes or slivers of flint that were created during the manufacture, use, and maintenance of stone tools such as spear points. FCR is created from heated rock, usually sandstone or igneous rock that was used for food processing and cooking as well as for heating the home. The exposure of hot igneous rocks to cooler air or water causes them to spall and crack, leaving very distinctive fracture patterns that make it easy to identify the rocks as FCR. Sandstone was frequently used when igneous rocks were not available. Fire-cracked sandstone is sometimes not as easily identified as FCR like fractured igneous rock is, but it is frequently reddened and charred.

Other durable, though less abundant, artifacts that are found at Ohio's archaeological sites include pottery and a variety of stone tools, some chipped and others ground stone. Pottery, however, was not widely used until about 1500-1000 B.C. Elaborate objects and ornamentation made from various material types, such as shell, bone, copper, and pipestone, for example, are extremely rare at domestic sites and are usually confined to mortuary contexts.

Lithic debris and FCR are important indicators for the presence of an archaeological site. These are the things that archaeologists typically seek out when conducting a survey to look for and define archaeological sites. Concentrations of these artifact types over the landscape define archaeological sites, and smaller concentrations within sites define activity areas and/or refuse disposal areas. The archaeological field methods used during Phase I surveys are primarily designed to locate sites with fairly substantial quantities of these artifacts located in discrete areas of space. When archaeological surveys fail to locate any artifacts or sites, there usually are at least two reasons why. First, there may in fact be no archaeological remains present—prehistoric people did not live within the area surveyed. The second possibility is that prehistoric people did live within the Phase I survey area but did not engage in activities that resulted in the deposition or preservation of the types of things that are detectable in archaeological surveys. In other words, most of the items left behind decomposed over time or were deposited in such low frequencies that they are not detectable using traditional and accepted archaeological survey methods.

The Phase II survey methods used in this study focus on specific archaeological sites and, in part, are designed to define artifact distribution patterns and sample the artifact contents of a site. Whereas Phase I surveys focus on the broader landscape and frequently use a 15 meter shovel test interval to locate archaeological sites, the current Phase II survey excavated shovel tests on a 5 meter grid within the previously defined limits of known archaeological sites. For obvious reasons, the closer shovel test interval improves site coverage and improves the potential for collecting a representative sample of a site's artifact contents.

The prehistoric sites examined in this study were originally identified based on the Phase I recovery of lithic artifacts and fire-cracked rock (FCR). Had the prehistoric inhabitants of these locations not engaged in the earlier stages of stone tool manufacture or if they had not discarded appreciable quantities of FCR from the repeated use of thermal features, these sites would not be detectable using the shovel testing technique used in the Phase I and II surveys. The following sections examine how these artifact types were created and how they result in the formation of archaeologically detectable sites.

3.1. THE FORMATION OF LITHIC ASSEMBLAGES

Figure 3.1 depicts an idealized stone tool manufacture, use, and maintenance sequence for a single spear point, which is the most common formal chipped stone tool type found in the Ohio Valley. This process—the lithic reduction process—is the source of the lithic debris found in archaeological sites. How this process was organized has a direct effect on the quantity of debris that is deposited within archaeological sites (Pecora 2002). This sequence is a reductive process that involves chipping away flint flakes to shape and repair tools. The process begins with the selection of a piece of raw flint (nodule/core) and ends with the discard of an exhausted projectile point that is too small or irregular to continue reworking. The schematic in Figure 3.1 also makes a distinction between *Primary* and *Secondary* reduction. *Primary* reduction is defined as the process of manufacturing a "new" tool. *Secondary* reduction is defined as the process during which a tool is used and repaired or maintained. *Tertiary* reduction (not depicted) occurs when a broken or exhausted tool is converted (recycled) into another tool type. Archaeological evidence demonstrates that broken and exhausted projectile points were frequently recycled into drills, borers, scrapers, and cutting tools. Assuming that a projectile moves through a sequence like that shown in Figure 3.1, making it all the way to the exhausted tool, none of the intermediate stages would ever end up in the archaeological record. Archaeological evidence, however, reveals that individual reduction sequences were interrupted or terminated at various points in the process due to reduction errors, discard, and loss. This results in a diverse range of artifact forms in the archaeological record.

This dynamic process of making and rejuvenating stone tools such as projectile points affects the characteristics of archaeological assemblages. For example, there is usually a spatial disconnect between the stone procurement site and the residential base. When stone is procured from a quarry site some distance away from a residential base, most of the early stages of reduction would have been performed at the quarry site to prepare the stone to be transported as flake blanks, biface blanks, or preforms. Removing much of the excess waste material from the raw stone at the quarry site would have made it easier to transport more useful stone and would have led to less future waste material. Once the stoneworkers had returned to the base camp, the reduction process could resume and blanks or preforms would be converted into "new" tools. In some cases, blanks and preforms were stored or cached for trade or use at a later time. Finding caches in the archaeological record is relatively rare because few were forgotten and lost. The reduction process might also have been terminated or aborted at various stages due to unintentional manufacturing errors, resulting in the deposition of blank and preform fragments in the archaeological record.

The *secondary* reduction process is more complex. While certain types of tools would have been used at the residential base camp, projectile points were used elsewhere on hunting excursions. During use, projectile points would have been dulled or damaged, and in many cases would have been lost. Secondary reduction is terminated as a result of loss or discard due to excessive damage, but minor breakage or damage, as depicted in Figure 3.1, could have been fixed through maintenance and rejuvenation. Retrieved projectile points would have been returned to the hunting camp or base camp for repair. In areas where raw material was scarce, severely damaged projectile points would have been recycled into other tool forms. For instance, hunters at a deer kill site would have the need for butchering tools. Broken projectile points would have been a potential stone source for the manufacture of such butchering tools, in a *tertiary* reduction process. The scarcity of new raw stone has the effect of creating a diverse range of tool forms because tool rejuvenation (*secondary reduction*) and tool recycling (*tertiary reduction*) occurs at a higher rate (Pecora 2002).

In summary, the lithic reduction sequence depicted in Figure 3.1 was probably never completely achieved at a single location. The initial parts of the *primary* reduction process would have taken place at or near a quarry source, whereas consecutive portions of the *secondary* reduction process may have occurred at either the base camp or hunting camp, or at multiple base camps or hunting camps. The important point here is that the lithic reduction sequence occurred in segments at different locations and this partitioning of the reduction sequence had a major effect on the quantity of debris produced at those locations.

3.1.2. Lithic Technology Terms and Definitions

The analysis of the PORTS prehistoric site lithic assemblages makes use of various terms that are associated to specific artifacts and the reduction sequence described above. These terms refer to objects with morphological and technological attributes that are diagnostic of certain stages within the reduction process.

Core

A flint core is the parent material from which flakes are detached. The objective is to produce flakes of sufficient size and shape to be used as blanks for tool manufacture. The core reduction process also creates a large amount of flaking debris, or refuse. *Primary Decortication*, *Secondary Decortication*, and *Interior* flakes are the debris categories associated with this process. The cores in PORTS assemblages tend to be small nodules that were procured from glacial deposits that would have been available in river gravel along the Scioto River and its tributaries in the floodplain. In this analysis, cores are frequently referred to as *Nodule Cores*.

Blank

A blank is a piece of flint material that would have been converted into a tool. In some cases, an intended blank may be a tabular piece of flint of a sufficient size and shape for an intended tool. Frequently, however, blanks are flakes or spalls derived from cores. Such blanks are sometimes minimally altered to form expedient flake tools or *Modified Flake* tools. Others may be converted into biface blanks, which are intended for further reduction as presented in the biface reduction process described above. Debris created from initiating the biface reduction process consists of *Alternate* (Alt) flakes and *Edge Preparation* (Edge-Prep) flakes, and these flakes often have cortex.

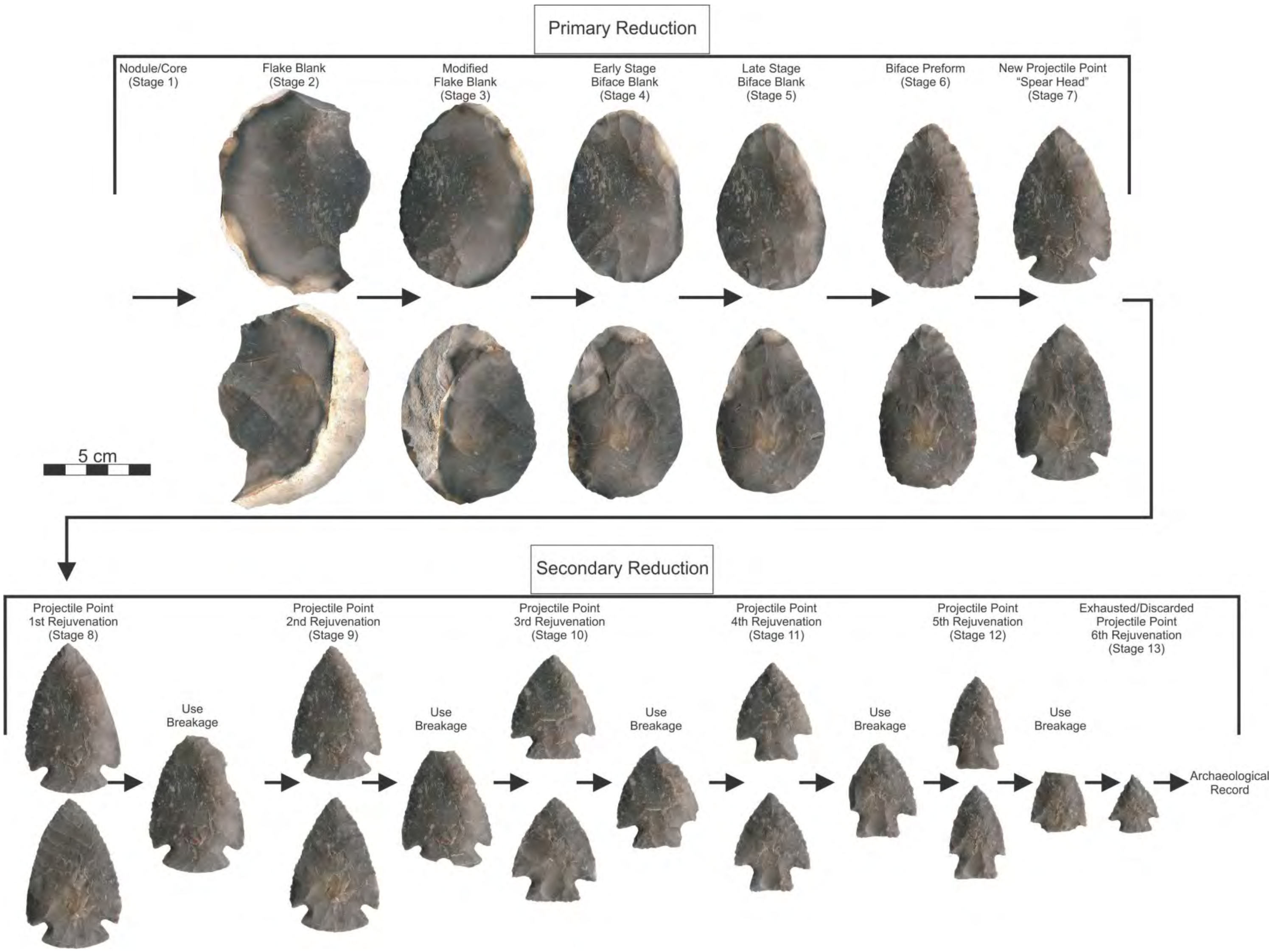

Figure 3.1. Illustration of replicated lithic tool manufacture, use, and maintenance sequence.

Biface Blank

A biface blank is a blank that has been fully or nearly fully flaked on both sides, forming a symmetrical or nearly symmetrical object. These are created during the percussion biface thinning process, which creates debris referred to as *Early Biface Thinning* (EBT) and *Late Biface Thinning* (LBT) flakes. As the biface proceeds through the thinning process, it is altered from being relatively thick and irregular (*Early Stage Biface Blank*) to relatively thin and symmetrical (*Late Stage Biface Blank*). Ideally, such bifaces would not enter the archaeological record, but they frequently break and are discarded. All of the biface blanks found at PORTS are fragments.

Preform

A preform is a late stage biface blank that has been made thinner and more symmetrical with a pressure thinning reduction technique, which allows for greater control and detail. A preform resembles a finished bifacial tool, usually a projectile point, but lacks the hafting element (that part of the projectile that is attached to the spear or arrow shaft), such as a stemmed or notched base. Unlike projectile points, which are usually heavily reworked (through the *Secondary Reduction* process), preforms tend to be thinner relative to their width. When fragmentary, which is how preforms usually enter into the archaeological record, they are often difficult to distinguish from projectile point fragments. Debris generated from the production of preforms is referred to as *Pressure* flake debris. Pressure flakes are usually under-represented in archaeological assemblages that were collected with the use of ¼-inch screening because they tend to be small and fragmentary. Pressure flakes are also produced in much lower frequencies per object than percussion biface thinning debris or core reduction debris.

Projectile Point

The term *projectile point* is used to refer to spear points, dart points, and arrow points. All three are the most common formal chipped stone tool types used in prehistoric Ohio, and their production and use is the source of most of the lithic debris and objects found at archaeological sites. The bow-and-arrow was not introduced into the Ohio region until after around A.D. 700 (Late Woodland). Prior to this period, spear and dart points represent the primary weapon systems. Most projectile points found in archaeological sites have undergone multiple maintenance episodes (*Secondary Reduction*) and no longer retain their primary formal or functional characteristics. Though not represented in the PORTS assemblages, prehistoric stone tool users frequently recycled *exhausted* projectile points and converted them into other tool types (*Tertiary Reduction*). Maintenance and recycling debris tend to be very small, fragmentary, and are underrepresented in archaeological assemblages.

Modified Flake Tool

A modified flake tool is a flint flake that has been modified along one or more of its edges. These are generally thought to be expedient flake tools that were derived from flaking debris created during the core reduction process. The modification is small micro-flaking that was created with slight pressure. The purpose of the modification was to create a dulled or smooth backing opposite the sharp and unmodified edge of the flake.

Uniface

Unifaces or unifacial tools are similar to modified flake tools but have more pronounced and steep flaking on at least one edge. These tools are generally thought to be some sort of scraping tool. It is not uncommon to find exhausted projectile points that have been recycled into a unifacially modified bifacial tool. Such artifacts are often referred to as *hafted end-scrapers*.

Biface

The term *biface* refers to any number of bifacially worked stone objects, many of which are defined above. These objects have flaking scars on two faces or sides and bifacial margins. Several of the PORTS assemblages contain artifacts that were classified as *biface fragments*. These are too fragmented to assign to any of the defined types. They could be fragments of biface blanks, preforms, projectile points, or some other type of bifacial tool.

Flake

The concoidal fracture properties of flint are exactly the same as those we see in glass, though glass fractures are smoother because glass is finer-grained than flint. Chipped stone tool manufacture is a process that induces controlled breakage to create stone tools. The process detaches flakes or slivers of flint with a percussive hammer or pressure device. Most of the flakes found in the archaeological record are detritus from the reduction process, but the objective of *Core Reduction* is to systematically detach flake blanks that would be used for flake tools or blanks for bifacial tool manufacture. Since most flake blanks were converted into other objects, they are rarely found at archaeological sites.

Formed Artifact

Formed artifacts are defined as stone objects that were either used as tools or objects that were the precursors of tools. A precursor to a tool may include a core, blank, or preform. Tools are actual implements, such as flake tools, drills, projectile points, cupstones/nutting stones, celts, and pitted stones. Archaeologists' interpretations of tool function are based largely on inferences stemming from object shape. The actual function of some items like the nutting stones, pitted stones, and chipped/ground hoes in several of the PORTS assemblages is not well established.

3.2. FIRE-CRACKED ROCK

Fire-cracked rock (FCR) is defined as any rock that appears cracked, spalled, or otherwise modified by heat. Classic FCR is typically characterized by rounded river cobbles (sedimentary, metamorphic, and igneous) that exhibit very pronounced, angular fracture edges.

Sedimentary rock, such as sandstone, does not always crack in distinctive ways like granitic igneous rock. Instead, sandstone often deteriorates and crumbles from heat, with less obvious spalling and cracking—though it frequently turns reddish in color with heating.

Prehistoric people used hot stones for both heating and cooking. The simplest use of rock for heating and cooking is to line hearths with large stones and cobbles. The rock absorbs and retains the heat of the fire, and it continues to radiate heat long after the fire has gone out. While repeated heating and cooling will cause the rock to spall and crack, rapid cooling tends to produce the most classic FCR fracture patterns, with jagged edges. Hot rocks also were heated in hearths and moved to pits where they provided the heat in making an earth oven. Similarly, hot rocks were placed in shallow pits beneath sleeping platforms (e.g., where they acted as heat radiators) or other parts of the domicile or activity areas. Stone boiling is another classic use of heated rock that creates FCR. Stones were first heated in a surface hearth and then they were picked up and dropped into a container of liquid to bring it to a boil. The rapid temperature changes in the rock during stone boiling causes it to fracture into jagged pieces. FCR was probably recycled and used repeatedly until it was too small for efficient thermal transfer. One way to test this is to compare the size of FCR in features (if in primary contexts) with FCR in midden or plowzone contexts. Midden FCR is more likely to have been discarded, and thus smaller, whereas FCR that lines the bottoms of hearths and earth ovens, especially if it has not been recycled, is more likely to be larger than the preferred minimum size for heating stones.

FCR is an important indicator for the presence of archaeological sites. Unlike naturally occurring flint, which is found only in regionally discrete areas of Ohio, suitable rock for thermal use is nearly ubiquitous throughout the state. Most of Ohio's river beds are loaded with igneous cobbles and chunks of local sandstone and limestone bedrock. Potential thermal rock is also readily available in the uplands, including in the glaciated regions. It appears that igneous and metamorphic rocks were preferred over sedimentary rocks, namely because they have excellent thermal qualities that allow them to be heated to extremely high temperatures and retain heat for long periods of time without structural failure. Sedimentary rocks, such as sandstone and limestone, have much poorer thermal qualities, but they were frequently used in places where better quality stone was not available. Because sandstone and limestone quickly crumble away when excessively heated, FCR made of these stone types is often difficult to identify.

3.3. OTHER ARTIFACTS

While fire-cracked rock and lithic artifacts contribute to the bulk of what archaeologists find on residential domestic sites, archaeological sites frequently contain other artifacts: groundstone implements, pottery, animal bone, botanical remains, and other items. Groundstone implements were commonly made beginning in the Middle Archaic period. They may include adzes, axes, celts, and hoes, as well as pestles and cupstones or nutting stones. Groundstone tool manufacturing varied depending on the raw material and the intended end product. Often, the process began with a chipped out biface which was then finished by grinding and polishing. Hammerstones, used to manufacture chipped stone tools, crack nuts, or generally hammer other materials, are usually unmodified stone cobbles that become pitted and facetted, and reveal the indication of their use.

There are a wide range of decorative objects made of stone, usually slate or sandstone, that are not often included in the tool category. Gorgets and other kinds of pendants come in many shapes and sizes (though typically flat and rectangular) and often have holes drilled through them. Their exact functions are unknown, but it is likely that they were worn in some manner and they are often found accompanying burials or in/under burial mounds. Bannerstones and birdstones are more three-dimensional in shape, also often have drilled holes (at least in the bannerstones), and may be related to Middle-Late Archaic period spear throwing technology. Beginning in the Early Woodland period, pipes of a variety of types (e.g., tubular, platform, and elbow) were made from stone (pipestone, sandstone, steatite, and limestone), as were beads, though the latter are more commonly made from shell, bone, or copper.

Food remains, such as plant seeds and nutshell, squash rinds, and animal bone, are rarely preserved in the archaeological record, especially in upland settings, except under rare conditions. The most common preservation condition for plant remains is carbonization through heat. Carbonized botanical remains can be easily recovered by passing soil samples through a water flotation device, a technique used in this study. Animal bone may be calcined (burned) and is sometimes preserved in this fashion. Soils that contain certain substances that bring down the soil pH, such as calcium carbonate, can often preserve raw bone (i.e., unburned). Late Prehistoric period Fort Ancient sites are well known for the excellent bone preservation, which results from the large numbers of mussel shells (made of calcium carbonate) deposited with the bone.

Pottery was not used by Ohio's early inhabitants until the latter part of the Late Archaic period, and it became common by the beginning of the Early Woodland period (1000-200 B.C.). Prehistoric pottery in Ohio was manufactured using a low-fire technique, so it us usually soft and fragile. When preserved in pit features and unplowed middens, pottery sherds are often much larger and better preserved than those found in plowed contexts. Because of the large amounts of grit used for temper, the oldest pottery in Ohio does not preserve very well and the fragments found at archaeology sites are often small (usually no more than an inch across). But later sites, especially dating to the Late Prehistoric period when shell was used for temper, can produce tens of thousands of pottery sherds.

3.4. ARCHAEOLOGICAL FEATURES

This report uses the terms "feature" and "archaeological feature" interchangeably. A simple definition for this term is a hole or pit in the ground that was created by the occupants of a site. These pits are filled in or become filled in and their distinct, darker fill make them easy (usually) to identify during an excavation. Archaeologists seek-out features because they are often rich in artifacts and usually contain carbonized plant remains that can be used to study subsistence or for radiocarbon dating. Often times, features were created to serve a specific function, such as storage or baking, but after their primary use they were cleaned out and then served as trash receptacles—making it hard to determine their primary functions. Other features, however, retain the structure related to their primary functions. Common feature types include earth ovens, storage pits, and post molds. Prehistoric hunter-gatherers no doubt constructed and used cooking hearths, as well. Most hearths were shallow features and unfortunately most have been destroyed in the last 200 years by cultivation.

Earth ovens are one of the more commonly found feature types at archaeology sites in Ohio because they are easy to identify and are large—usually over a meter in diameter and as deep. Archaeological evidence suggests that wood fires were placed in the bottoms of these pits. Stone was then placed into the fire and, once hot, the stone served as the heat source as the fire died down. This cooking technique is somewhat analogous to a modern wood-fired pizza oven, where the interior dome is heated and then is the source of the actual cooking heat. Once heated up and filled with food to be cooked, the earth ovens were then covered over with earth for the prescribed amount of cooking time. Earth oven like features, with hot rock, might also have been used for indoor heating devices, which would have been important during the colder months. However, it is rare to find full-sized earth ovens inside prehistoric structures.

Post molds are another common feature type found on prehistoric archaeological sites in Ohio. These are simply the remains of a hole where a wooden post was set. Posts were used for house or shelter construction as well as for racks for storage, cooking, and hide processing. Larger posts were sometimes used to construct palisades around villages during the later parts of Ohio's prehistory, and they served to mark significant places, such as the center of a village or an important sight line.

Storage pits are a final common feature type found at Ohio archaeology sites. These pits are typically associated with sedentary agricultural groups and first begin to appear at Middle Woodland period sites. Storage pits are often large and some are bell shaped. Archaeological evidence shows that storage pits were often lined with bark, leaves, grasses and/or woven fabric matting.

4. PHASE II SURVEY METHODS

In most areas of Ohio, agriculture in the last 200 years has had very negative effects on the integrity of prehistoric archaeological sites. Cultivation, especially the deep plowing that was common during the early half of the twentieth century, has truncated the tops of deeper features such as earth ovens, and it has completely erased/destroyed shallow features, such as hearths and building floors. Because of this, archaeological sites containing intact archaeological features are traditionally considered to be archaeologically significant—and unplowed archaeology sites are even more so.

The Phase I archaeological surveys found sites 33Pk347, 33Pk348, 33Pk371 and 33Pk372 to be low- to moderately low-density lithic (i.e., flint) artifact scatters with some FCR (Pecora 2012). The presence of FCR in the Phase I survey data from these sites demonstrated that thermal features had been used by the sites' prehistoric occupants. Additionally, several shovel tests encountered dense concentrations of FCR below the surface at sites 33Pk371 and 33Pk372. Aerial photography of the 4 site areas from 1938/39 and 1951 show the sites to be either in pasture land with sparsely scattered large trees or in a large wooded area. These aerial photographs, considered along with the shallow features exhibited indicate that there was a lack of cultivation, potentially an absence at certain sites. Because of the nature of these undisturbed sites the Phase I survey work concluded that sites 33Pk347, 33Pk348, 33Pk371 and 33Pk372 had the potential to contain intact archaeological features and recommended Phase II work to assess their potential for inclusion in the National Register of Historic Places (NRHP), under Criterion D.

The fifth site to be addressed in this report, site 33Pk349, is a historic-era farmstead that has had limited disturbance from cultivation, but not until after 1938/1939. A Phase II project was recommended for this farmstead because unlike many other PORTS farmsteads it was abandoned and demolished early, before the Atomic Energy Commission (AEC) purchased the property in the 1950s. The Phase I work showed that it might have an older artifact and feature assemblage (perhaps mid-late nineteenth century) that is unencumbered by the material remains of the early-mid twentieth century that are so common on the other farmstead sites. Thus, site 33Pk349 could provide a clearer view of what life was like at a post-Civil War farmstead in this region.

In consideration of the Phase I site attributes and their archaeological potential, the following field methods were used for the Phase II studies of sites 33Pk347, 33Pk348, 33Pk349, 33Pk371 and 33Pk372. These methods are designed to identify and document archaeological features, improve upon artifact samples (i.e., produce larger and more representative samples), and yield important information about site structure. Site structure refers to the presence and arrangement artifacts and features on a site—it reveals the layout of the settlement or the location of activity areas. It is important to understand that the Phase II survey effort was designed to better define the area of each site (size and shape) and obtain only a small sample (~1-2%) of the sites' contents. Phase II-level work does not and cannot produce a complete and infallible picture of a site, but it should provide ample information to determine a site's degree of preservation and potential to answer questions significant to understanding the past.

The following five steps were employed in the field at each of the sites:

(1) Work began at each site by setting up a site grid (wood stakes set at 20 meter intervals) using a total station laser transit. A submeter Trimble GeoXT global positioning system (GPS), with an external hurricane antenna, was used to tie the site grids to real-world coordinates. The site grid was used to position all excavations and when collecting geophysical data. Metal rebar was used to establish two site datums at each site.

(2) Geophysical surveys were conducted at each site to locate subsurface archaeological features. At the prehistoric sites (33Pk347, 348, 371, and 372) a magnetometer and a magnetic susceptibility meter were used to locate pit features and help uncover site structure. At site 33Pk349, this historic-era site, the magnetometer and a ground-penetrating radar were used to locate subsurface features.

(3) While the Phase I survey employed a 15 meter (50 ft) shovel test grid to locate the sites, the Phase II effort required a higher-resolution shovel test interval to reveal evidence of site structure—in this case a 5 meter (16 ft) interval was used. Prehistoric people carried out various activities within their settlements (sites) and some of these activities routinely occurred in specific parts of the site, leaving behind spatially discreet clusters of artifacts. Although modern cultivation can disperse artifacts across a larger area, it is still possible for archaeologists to decipher artifact patterning in plowed contexts and make inferences based on this patterning about how various behaviors were arranged within sites. The rare uncultivated areas of Ohio have the potential to contain archaeological sites with very discrete artifact patterning (i.e., very small clusters of artifacts). Close-interval shovel testing is also useful for obtaining a more representative sample of a site's artifact assemblage.

(4) The shovel testing was supplemented with the excavation of 1x1 meter units in select locations at each site. These units were used to further explore artifact concentrations (areas with high artifact quantities) identified in the shovel testing and to investigate geophysical anomalies and uncover subsurface features.

(5) A sample of archaeological features was documented and partially excavated. The purpose of these excavations was to develop an understanding of feature size, shape, and content. Approximately one-half to three quarters of each uncovered feature was left intact. Soil flotation samples were collected from the excavated portion of each prehistoric feature. These samples were processed to recover burned plant materials, and this is often the context from which carbon samples were pulled for radiocarbon dating. Subsurface archaeological features are particularly important for prehistoric archaeological research because they are the remains of deliberately constructed facilities that were used by prehistoric people. They not only inform archaeologists about certain kinds of activities carried out by prehistoric people (e.g., cooking and storage), but they also frequently contain food remains in the form of carbonized plant stems and seeds or animal bones. Without the radiocarbon dates run on carbonized plant materials found in the pit features it would not have been possible to know the range of occupation ages represented at some of the sites.

5. GEOPHYSICAL SURVEY METHODS

Geophysical survey instruments measure a wide range of physical properties at archaeology sites by detecting subtle differences in electrical conductivity, electrical resistance, and magnetic susceptibility/remanent magnetism, among many other observable properties (Aspinall et al. 2008; Bevan 1998; Clark 2000; Gaffney and Gater 2003; Heimmer and DeVore 1995; Lowrie 1997; Weymouth 1986). Three different instruments were used during the Phase II surveys reported here: a magnetometer (Geoscan Research FM256 fluxgate gradiometer), a magnetic susceptibility meter (Bartington MS2 system), and a ground-penetrating radar (Sensors & Software Noggin Plus 500 MHz system) (Figure 5.1). The following section describes in brief how these instruments work and how the data were processed and analyzed in an effort to locate buried archaeological features.

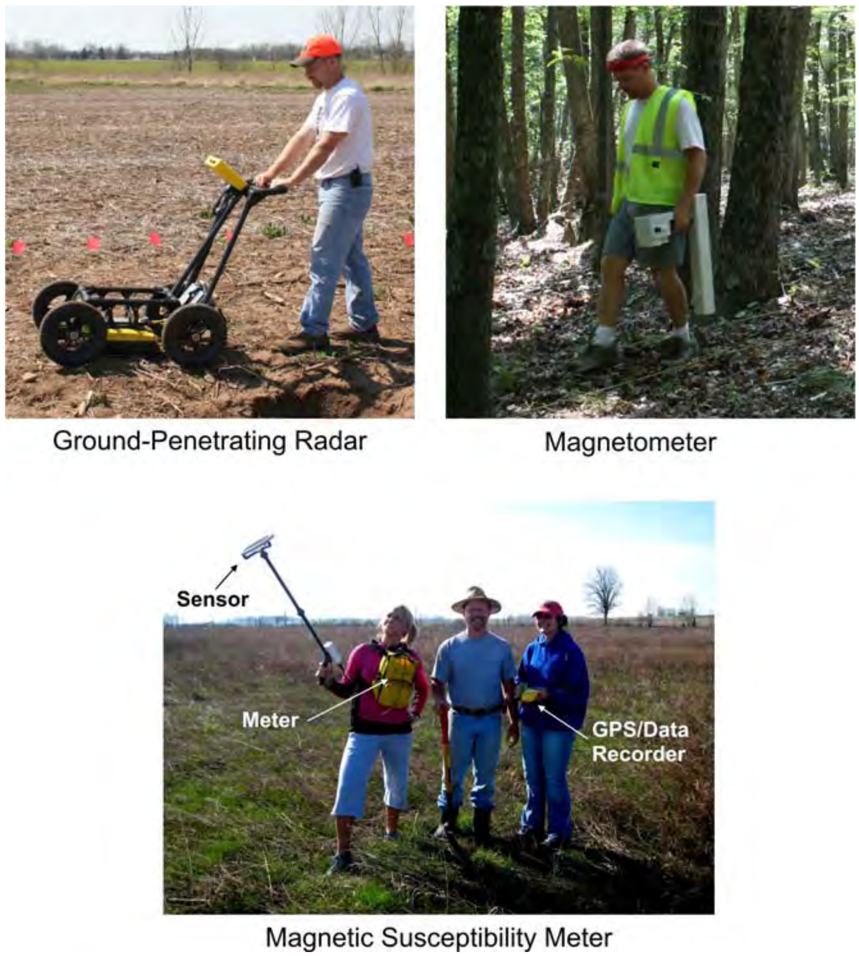

Figure 5.1. The geophysical survey instruments used during the Phase II investigations.

Magnetic Gradient Surveys

Magnetometers are instruments used to measure magnetism and during the PORTS Phase II the magnetometer was the primary tool used for locating prehistoric pit features.

Magnetometers are useful to archaeologists because they can detect two kinds of magnetization: thermoremanent magnetization and magnetic susceptibility (Clark 2000). When sediments and rocks are heated above a certain temperature, known as the ferromagnetic Curie temperature (ca. 500-700^{o}C; Lowrie 1997), their magnetization is in effect zeroed and realigned to the local magnetic field, producing a permanent *remanent magnetization*. Campfires and trash burning can produce more than enough heat to reach the Curie point. Upon cooling, magnetic minerals in the soil, such as magnetite and maghemite, recrystalize and are fixed with a common orientation toward magnetic north or some other strong magnetic signal that might be nearby. Intense heating can make an otherwise magnetically neutral (i.e., random) patch of ground highly magnetic by altering magnetic minerals and by producing magnetic ash (Linford and Canti 2001). Even sediments that have been disturbed, such as by sweeping, raking, plowing, or other kinds of earth moving can maintain at least some of their permanent magnetization, which is not reset until the sediments are once again heated above the Curie temperature. Objects and sediments that are permanently magnetic do not require an outside magnetic field to be magnetic, like those materials that are susceptible to magnetic fields.

Soils and ferromagnetic substances that have high *magnetic susceptibility* react when they are in the presence of a magnetic field, which on archaeological sites is the earth's own magnetic field. Certain soil horizons and components of soil, such as organic rich topsoil (A horizon), are generally more susceptible to induced magnetic fields than other soil horizons (Le Borgne 1955, 1960), such as Bt horizons. If a hole dug a few feet into the ground is backfilled with mixed up sediments, the backfilled hole will likely have a different magnetic susceptibility than the surrounding, intact soils—especially if the topsoil ends up in the bottom of the hole adjacent to clay-rich (organic poor) subsoil. Furthermore, the magnetic susceptibility of the surface soil at a site is known to increase when people live and work there for a length of time (Tite and Mullins 1971). While the mechanisms behind soil susceptibility enhancement are complex and not totally understood, bacteria that use and produce small magnetic particles are known to contribute to the process (Fassbinder et al. 1990), as well as burning and the amount of iron oxides present in the soil (Evans and Heller 2003; Graham 1974; von Friese 1984).

Today's magnetometers, many of which are fluxgate gradiometers like the FM256 system used for the PORTS Phase II sites, are passive instruments (i.e., they do not create a magnetic field) that simultaneously detect both kinds of magnetism important at archaeology sites, remanent magnetism and magnetic susceptibility—though they cannot differentiate the two. Like all fluxgate gradiometers, the FM256 contains two fluxgate sensors (50 cm apart) in a vertical gradiometric array—that is, the two sensors are arranged one atop the other. With this configuration, fluxgate gradiometers measure the change in the vertical component of the magnetic field surrounding the two sensors. The uppermost sensor detects the earth's background magnetic field, which in the Midwest U.S. region measures approximately 50,000-55,000 nanotesla and can vary as much as a few hundred nanotesla from morning to evening in one day (Breiner 1973). The lower sensor detects the earth's background magnetic field *and* changes to it caused by objects or soils on the surface or up to about two to three feet beneath the surface. Fired earth in prehistoric hearths and organic-rich soil in buried pits tend to concentrate the earth's magnetic field in measurable amounts of approximately 2-30 nanotesla while large iron objects or brick-filled features can measure in the hundreds or thousands of nanoteslas (when measured with a gradiometer at 50-100 cm sensor separation). Sandy soils or deep, highly organic soils like those found in floodplains can reduce the range of more subtle features to 1.5-10 nT. Once the instrument has taken readings simultaneously from each sensor, the instrument's onboard computer subtracts the reading of the top sensor (earth's varying background magnetism) from the reading of the bottom sensor (earth's varying background magnetism plus local magnetic variability), leaving—in principle—the local magnetic gradient caused by surface and buried archaeology or other phenomena. This number is then stored in the instrument's memory until the data is retrieved.

During the PORTS Phase II project the FM256 was used to collect eight readings per meter along transects spaced 50 cm apart (Figure 5.1). The magnetic gradient data were then downloaded into Geoscan Research's Geoplot (ver. 3.00s) software for data processing. Such processing is fairly common and involves applying complex mathematical algorithms to the data in an effort to reduce background noise and accentuate the potential, buried archaeological phenomena. Three processing algorithms were used in Geoplot to prepare the magnetic gradient datasets for presentation and analysis: zero mean traverse, interpolation, and low pass filter.

After processing, the data were exported from Geoplot into Surfer 8.0◆, where a color scale and grid were added. The surfer images were then copied into CorelDRAW◆ for integration with the area site maps, interpretation, and final image production. Data processing does well in aiding interpretation and visualization; however, excessive processing can also produce false data anomalies. Even minimal data processing can produce undesired ghosts in the data when large and very strongly magnetic objects are present, such as large iron objects.

Interpreting Magnetic Gradient Results

There is a certain knack to interpreting magnetic gradient data at archaeology sites, and general rules of thumb vary between historic-era and prehistoric sites. Historic sites are usually covered in objects that are very magnetic and the signatures of these objects can dominate a dataset, obscuring the locations of important architecture. Of course, they can also highlight the locations of buildings since artifacts often occur in higher densities around buildings and within foundations. For example, Figure 5.2 shows the results of a fluxgate magnetometer survey around the John Rankin House, a standing brick structure built in 1828 at a farmstead on the bluff overlooking Ripley, Ohio. Dark areas are more magnetic while light areas are less magnetic. Relatively even gray tones represent areas with little magnetic variability. Clearly, there are a lot of anomalous magnetic areas, or *magnetic anomalies*, just around the house, and the dense concentration of anomalies off the northwest corner of the house marks the location of a buried summer kitchen foundation. The clusters of anomalies to the east of the house are related to a trash dump (with iron objects) in the bottom of a swale. Farther to the north is a rectangular pattern of anomalies indicating the location of a fence that once surrounded a barn. Picking out individual features in magnetic data at historic sites is difficult because it can be hard to differentiate the magnetic signature of a well, for example, from that of a large iron object, like a fragment of a cast-iron stove. However, foundations and former building locations are often indicated by tight clusters of small anomalies, which make it sometimes possible to identify the general location of buildings in magnetic data—assuming that these buildings were built with nails and other magnetic hardware or they were the locus of iron-bearing trash disposal.

At prehistoric sites every little positive anomaly (i.e., small dark area in the data) might be an archaeological feature, but usually pit features can be identified in the data because they have a very distinctive magnetic signature that occurs within a consistent size range. Figure 5.3 is an example of a magnetic gradient survey at a prehistoric Native American site, in this case in Ross County, Ohio, about 20 miles upstream from PORTS. Excavations have shown that the many circular anomalies are pit features, including earth ovens, which are the strongest anomalies, storage pits, fire hearths, and at least one burial. The two large linear anomalies arcing through the survey area from southwest to northeast are old stream channel scars that have since been filled in with flood deposits and prehistoric trash. Many of the lighter-colored areas along the stream channels and in small areas here and there in the data have been shown to be sand near the surface—sand has very low magnetism and when it is plentiful it displaces the more magnetic topsoil.

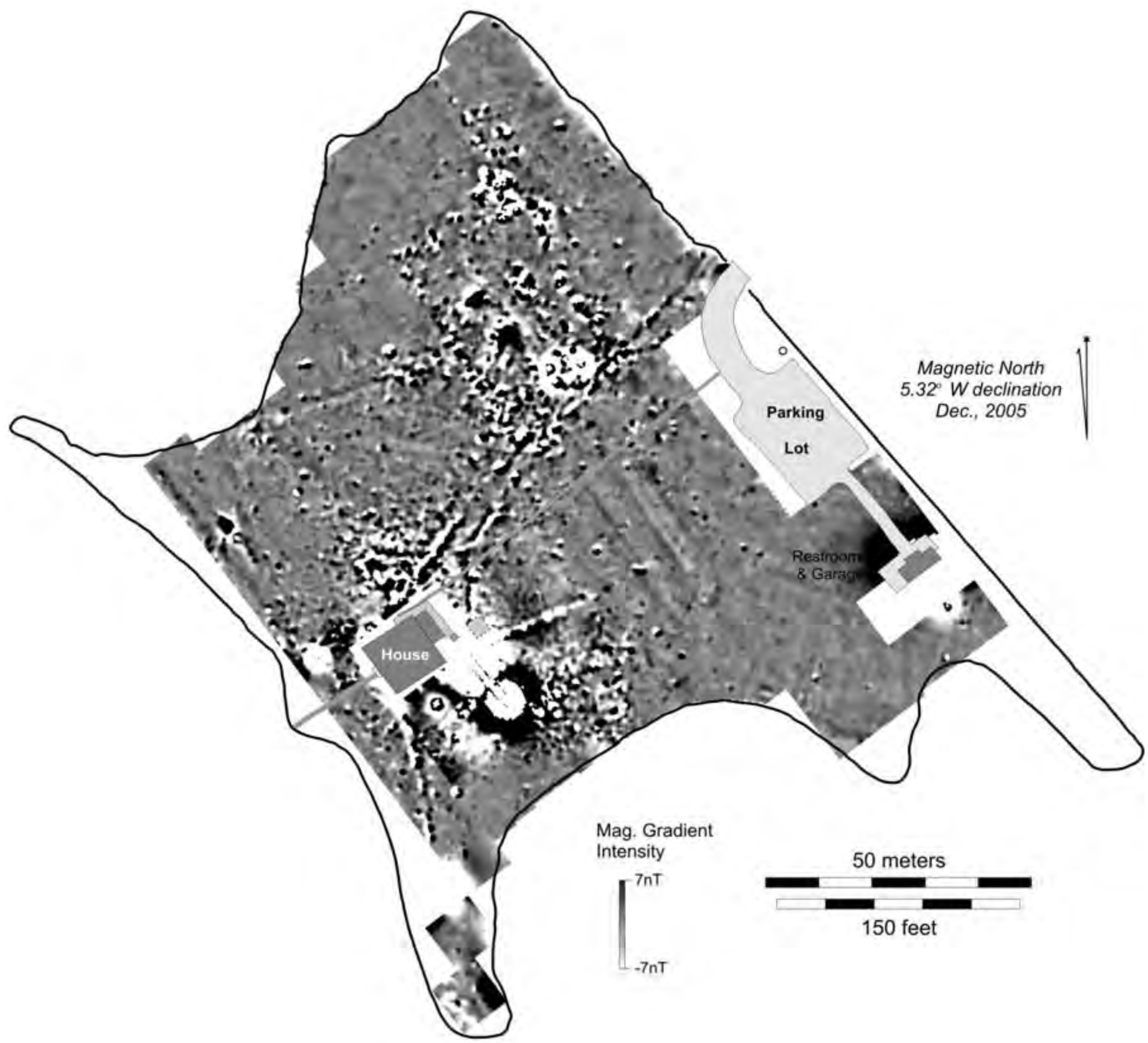

Figure 5.2. Example of magnetic gradient data around a historic-era house/farmstead in Brown County, Ohio (from Burks 2006).

Of course, there are other things in the ground that can create magnetic data anomalies that look much like the magnetic signatures of prehistoric and historic-era features. Some of this equifinality can be overcome by knowing the peak magnetic amplitude and anomaly type for each anomaly of interest. For this reason such information for each anomaly of interest has been tabulated and is presented.

In most magnetic gradient data there are five kinds of potentially significant magnetic anomalies that can occur on archaeology sites: Monopolar Positive, Dipolar Simple, Dipolar Complex, Multi-Monopolar Positive, and Monopolar Positive/Dipolar Simple. It can be useful to classify a site's anomalies as this is one way to locate archaeological features of interest. The shape, size, intensity, and polarity (positive or negative) of magnetic anomalies is determined by the characteristics of the anomaly's source (or target), including the target's (object or archaeological feature) shape, material composition, mass, orientation, and depth. An object or feature's anomaly shape can also be affected by the magnetic signatures of surrounding objects and features. And of course, anomaly shape and intensity is affected by where on the planet (especially latitude) the survey was conducted, which determines the inclination of the earth's magnetic field: approximately horizontal at the equator and vertical at the poles.

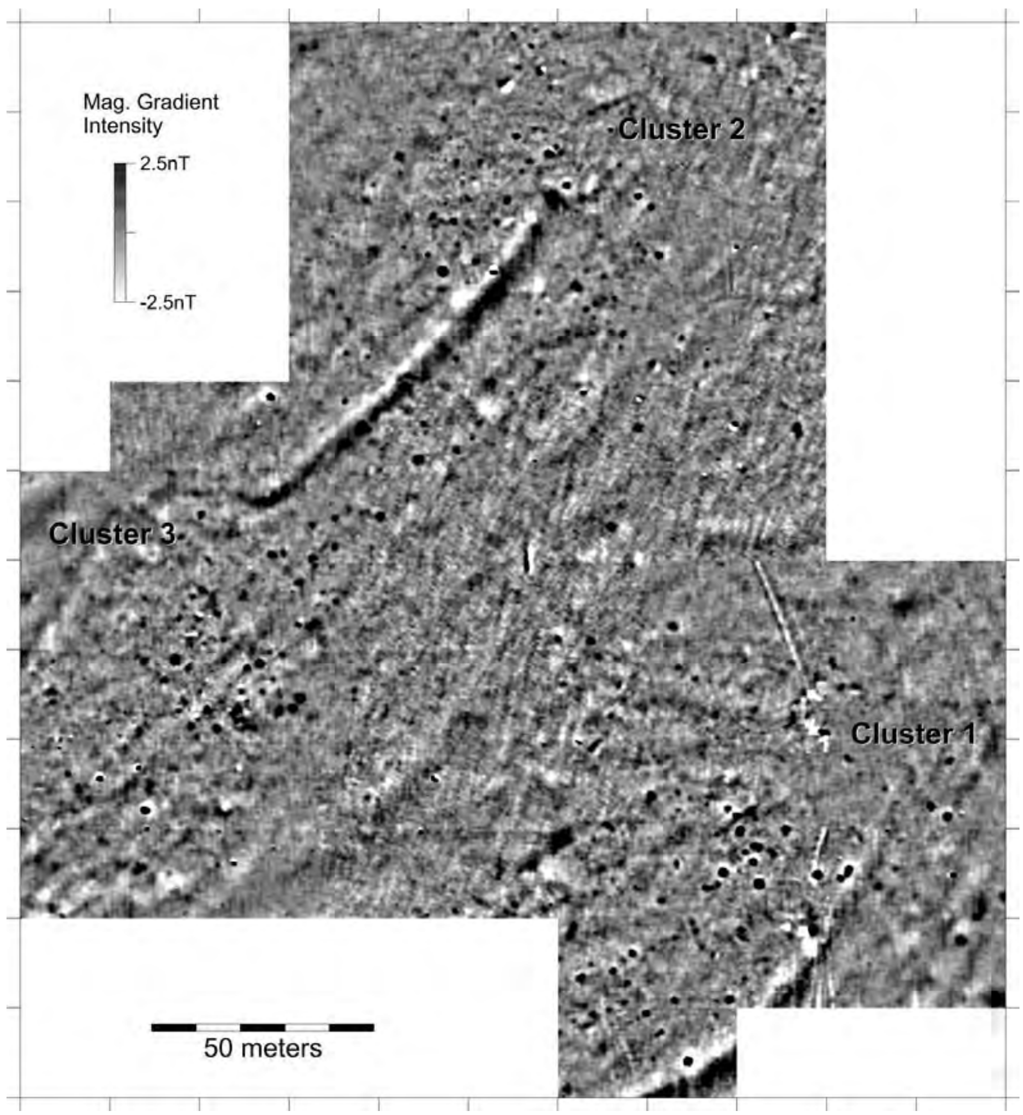

Figure 5.3. Example of magnetic gradient data from prehistoric Native American site, in this case the Brown's Bottom cluster of sites in Ross County, Ohio. Many of the small dark anomalies are archaeological features (see Pacheco et al. 2005, 2009a, 2009b for more on Brown's Bottom).

Most targets of interest, such as pit features, hearths, wells, foundations, cellars, and the like, produce fairly consistent kinds of anomalies that are comparable all across the U.S. and at similar latitudes around the globe where soils are formed into alluvium and glacial tills. For example, in vertical gradiometer data (with 50-100 cm sensor separation) prehistoric pit features are almost always weakly magnetic (2-20 nT), positive monopolar anomalies. As a type of pit feature, historic cisterns, wells, and privies can also appear as somewhat stronger, positive monopolar anomalies. However, historic pits frequently contain large amounts (high mass) of highly magnetic materials, such as bricks and iron objects. If these materials are well represented, or are large in size, they can make the historic pit's magnetic signature look like that of a large bar magnet with north and south poles (i.e., dipolar). Given these consistencies between magnetic anomalies and their sources, the five anomaly classes used in this report serve to describe and summarize the magnetic survey results as well as provide an estimate for the kinds of targets found:

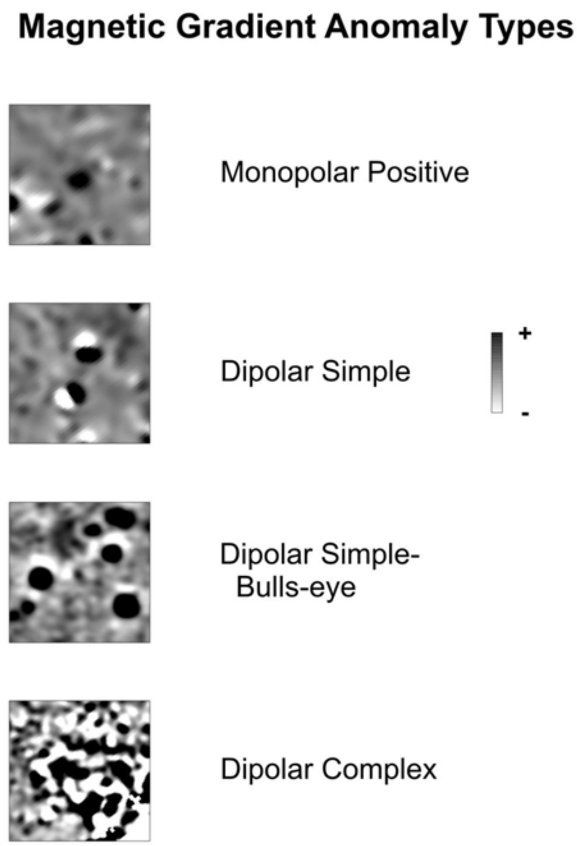

Figure 5.4. Magnetic gradient anomaly types.

Monopolar Positive (MP)- Anomalies in this class are localized, positive peaks in the magnetic gradient signature of the site. They appear as isolated dark gray to black areas in black and white data displays (Figure 5.4). Typically, these anomalies are created by localized areas of soil with increased magnetic susceptibility (e.g., pit features, large tree root casts). However, it is not uncommon for weakly magnetic or deeply buried objects with a dipolar magnetic signature (e.g., an iron object or a large magnetic rock) to be detected as positive or negative monopolar anomalies. If one of the poles of a dipolar anomaly is close to the surface (and close to the magnetometer) and the opposite pole is too far away to be detected (because it is too deep underground, for example), then objects that typically produce distinctive dipolar anomalies (iron objects) can be mistaken for those that typically produce monopolar anomalies (prehistoric pit features). Positive monopolar targets of interest, such as pit features, can produce peak intensities ranging from 1 nT to 200 nT, though only historic period features tend to be greater than 40 nT in intensity (unless highly magnetic rocks are present). Not all pit features, prehistoric or historic, produce positive monopolar anomalies. In fact, a small percentage of pit features can produce dipolar simple and dipolar complex anomalies, especially when intensely burned, *in situ* sediments and rocks are present within the feature. Thus, prehistoric earth ovens and hearths are sometimes dipolar anomalies. Historic-era pits filled with iron objects will also likely be dipolar.

Dipolar Simple (DS)- Dipolar anomalies are characterized by negative and positive peaks that are immediately adjacent to one another, making distinctive black and white anomalies in magnetic data (Figure 5.4). A simple dipolar anomaly has only one positive and one negative peak. These peaks can be similar in size and intensity (e.g., +6/-5 nT) or highly asymmetrical (e.g., +57/-4 nT). Iron objects and magnetic rocks are the most common sources of dipolar anomalies on archaeology sites. In general, the larger (greater mass) the iron object, the more magnetic intensity (i.e., higher highs and lower lows) it will have and the more area its signature will affect. For example, most historic-era square nails, while highly magnetic, are so small that when buried in the plowzone or just below surface they are difficult to detect with a gradiometer during a typical survey, unless there are many nails bunched together. Conversely, a foot-long piece of half inch diameter iron rebar pounded down into the ground vertically (like a datum) is exceptionally magnetic and sometimes can be detected (as a large positive area surrounded by negative, or vice versa) from 2-3 meters away (i.e., making an anomaly 4-6 meters across). Steel well casings left in the ground are even more magnetic, and they can be detected from over 10 meters away even though the steel pipe is *not* visible at the surface. Exceptionally magnetic prehistoric features, such as hearths and intact earth ovens, can also produce dipolar simple anomalies. Frequently, the magnetic signature of these burned prehistoric features appears as an area of strong positive (up to 35-40 nT) surrounded by a weak negative ring—much like the signature of a bar magnet buried in the ground vertically. These are referred to here as the Dipolar Simple, Bull's-Eye type. However, the positive and negative components of the signature can also be side by side, which is common for shallow, burned features. With most dipolar simple anomalies in the northern hemisphere (because of the inclination of the magnetic field), the target creating the anomaly is located below, but not directly, the center of the positive area of the anomaly.

Dipolar Complex (DC)- Complex dipolar anomalies have multiple negative and positive peaks of varying intensity that are clustered together (Figure 5.4). Typically, this class of anomaly is associated with burned areas or features/disturbed areas filled with magnetically mixed sediments and objects. In-filled historic foundations and cellars, as well as some back-filled trenches and excavation pits, produce dipolar complex anomalies because the mixed fill in these features is more or less magnetic than the surrounding soils and generally contains historic objects that are also magnetic (in fact, the example in Figure 5.4 is the foundation and remains of a summer kitchen). Areas of soil burned to different depths and/or temperatures can also produce this kind of complex anomaly (Linford and Canti 2001). Prehistoric structure floors, if intact, sometimes appear as dipolar complex anomalies. Lightning strikes are an important natural source of dipolar complex anomalies. Lightning strikes can generate very strong magnetic fields and high temperatures, changing the remanent magnetization of the materials they strike (Verrier and Rochette 2002). Classic lightning strike anomalies have a tentacled (positive and negative) appearance (Jones and Maki 2005) and they can range in size from a couple meters across to over 10 meters. Extensive animal burrow systems, such as those of groundhogs, sometimes produce similar anomalies, as well, though not as large or intense as lightning strikes. Dipolar complex anomalies can have weak (+5/-5 nT) or very strong (+100/-100 nT, or more) magnetic gradient signatures.

Multi-Monopolar Positive (MMP)- Anomalies in this class are clusters or groups of positive monopoles, generally arranged in linear or arcing patterns, that are usually fairly weak

(1-4 nT) in intensity. Most gradiometer datasets are full of dozens or hundreds of small, weakly positive anomalies—making it difficult to pick individual features out of the mass of anomalies. However, patterned groups of anomalies (MMPs) stand out from the other small anomalies. Architectural facilities such as prehistoric structures or historic fences can produce linear arrangements of small, weakly positive monopolar anomalies. This class of anomaly is rare in gradiometer data, especially in survey data collected along transects separated by more than 50 cm. Exceptionally large postholes (>30 cm in diameter), or those filled with burned sediment, can be more evident in magnetic data. Likewise, the magnetic signatures of two or more closely spaced postholes can combine to make a more obvious, and larger, anomaly.

Monopolar Positive/Dipolar Simple (MP/DS)- In some cases it is difficult to discern whether an anomaly is monopolar positive or just a portion of a dipolar simple anomaly. These anomalies are assigned to the MP/DS class. In essence, this class serves as an "unknown" category like those used in any type of analysis or classification scheme.

Every magnetic gradient dataset from an archaeological site contains hundreds or even thousands of magnetic anomalies, only few of which originate from a point-source archaeological feature (e.g., a pit feature). While the magnetic anomaly classes presented above do not cover all variability, they do attempt, at a general level, to begin the process of segregating and categorizing the magnetic signatures of potentially cultural anomalies. Though intended to be descriptive, these five classes *do* commonly correlate with certain kinds of archaeological and natural features found just below the surface.

Magnetic Susceptibility Surveys

Nearly all sediments contain minerals that react (magnetically) when a magnetic field is present—some more so than others. This reaction is called magnetic susceptibility and the measure of this property in sediments is known to have many applications in archaeology (e.g., Dalan 2008; Dalan and Banerjee 1998; Le Borgne 1965; Mullins 1974; Tite and Mullins 1971).

In general darker, organic-rich sediments formed near the surface, in A horizons, are more magnetically susceptible (i.e., more magnetic) than the underlying soil horizons (i.e., clay subsoil) (Le Borgne 1955). Unless soils are severely disturbed or eroded, magnetic susceptibility should be greatest near the surface and decrease with depth (Evans and Heller 2003). This natural variability in soil susceptibility is caused in part by natural oxidation and reduction cycles in iron oxide-rich sediments and by bacteria that feed off of organic-rich sediments and produce tiny magnetic particles as a by-product (Fassbinder *et al*. 1990). In well drained soils (i.e., not gleyed) the elevated magnetic susceptibility of topsoils is stable, such that if the soil is buried under alluvium, for example, the buried topsoil will still have elevated magnetic susceptibility (Le Borgne 1955; Graham and Scollar 1976; Mullins 1977). The same is true for buried archaeological sediments with elevated magnetic susceptibility.

This higher soil susceptibility in the A horizon can be greatly (i.e., measurably) enhanced by human occupation (e.g., Tite and Mullins 1971). Thus, mapping the distribution of magnetic susceptibility values across a site can tell us something about site structure. In particular, it can identify areas of increased susceptibility that likely resulted from certain activities, such as intense, repeated burning (Linford and Canti 2001) or the repeated dumping of organic waste or cleanings from fire hearths (see Dalan [2008] and Dalan and Banerjee [1998] for a longer discussion of the use of magnetic susceptibility in the study of site structure). In fact, the longer people live in one place, and the more organic waste builds up and becomes burned, the greater the enhancement of the magnetic susceptibility, to a point (Tite and Mullins 1970)—though this enhancement is dependent on the soil parent material, the porosity of the soil, and the peak temperatures attained by the fires (Fitzpatrick 1985; Maher 1986; Oldfield *et al*. 1981).

In the least, a map of magnetic susceptibility values from soil samples or readings gathered at a regular interval across a site should be useful for mapping the distribution of more intense midden deposits and trash dumps. It might also indicate the locations of certain *kinds* of midden/trash dumps, such as those containing the refuse from cleaning up after thermal activities (e.g., heating and cooking around a ground-surface hearth within or outside of a structure). While it is not known exactly how much midden/refuse (i.e., how thick) is required to noticeably increase the soil susceptibility at an archaeological site, intense occupation/refuse disposal clearly does increase soil susceptibility (Tite and Mullins 1970)—in Ohio this observation is based on susceptibility surveys that Burks has conducted at a number of settlements, including Hopewell hamlets (Brown's Bottom #1 and Lady's Run in Ross County [Dalan 2008; Pacheco et al. 2005]), many Fort Ancient villages (e.g., the Wildcat site north of Dayton [Cook and Burks 2011] and Reinhardt Village south of Columbus [Nolan et al. 2008]), an early Late Woodland village (the Water Plant site in southern Franklin County [Royce 2011]), and at the multicomponent Heckleman site in northern Ohio (Burks 2008). In most of these site examples, shovel testing or surface collection has identified clusters of artifacts that correspond to elevated magnetic susceptibility levels.

For the PORTS Phase II project, a Bartington MS2 magnetic susceptibility meter, with an attached MS2D field loop (see Figure 5.1 for an example), was used at each of the prehistoric sites to collect readings at an interval of about 10 meters. Each reading was taken on flat, bare earth. The MS2D field loop can detect down about 15-20 cm and thus is measuring the magnetic susceptibility of the A horizon. A Trimble GeoXT GPS (sub-meter accuracy) was used to record the location of each susceptibility measurement. The resulting data were then regridded in Surfer™ and color image maps of the results were created. These image maps were then pulled into CorelDraw™ and integrated with each site map.

The magnetic susceptibility meter was also used to assist in the excavation of magnetic gradient anomalies. In many cases it was difficult to see the pit features in plan view during the excavations because the feature fill was the same color as the surrounding subsoil. The susceptibility meter provided a quick way to outline feature boundaries and detect buried feature fill.

Radar

A Sensors and Software Noggin Plus 500 MHz ground-penetrating radar (GPR) was used to survey a portion of site 33Pk349. Data were collected at a rate of 40 traces per meter along transects spaced 50 cm apart.

GPR surveys are an effective way to locate subsurface features at historic farmstead sites. Privies and pit cellars are relatively small and are very difficult to locate with systematic shovel testing, even when shovel tests are excavated at 7.5 meter or 5 meter intervals. However, these pit- or shaft-type features can be the most important sources of artifacts and stratigraphic information at a historic-era archaeology site—especially if they are older pit-type features that were abandoned early on in a farmstead's occupation. Therefore, locating such pit-type features is an important step in assessing a site's integrity and determining its eligibility for the National Register of Historic Places.

GPR works by moving a radar antenna along the ground as it transmits thousands of pulses of radar energy per second. As these waves of energy travel into the ground and pass through different things, especially those things with distinctly different electrical properties and in particular things that cause the radar energy to change velocity, some of the energy is reflected back to the surface and received by the antenna (Conyers 2004; Witten 2006). The instrument records how strong the reflections are and how long it took the energy to travel away from and back to the antenna. This radar travel time can be used to calculate the depth of a detected object or feature, assuming one can determine the velocity of the radar energy in the ground.

Many things below ground can cause strong and weak radar reflections, including tree roots, pipes, larger rocks/bedrock, distinct layers (gravel or brick paths, garden features), foundations, shaft-type features (e.g., graves, wells, cisterns, and privies), and disturbances to the natural soil layers, like a gap in a gravel layer caused by a grave shaft. Various chemicals in the ground, for instance motor oil, can also produce distinctive reflections. Buried pavements or foundations made of asphalt and concrete will also cause strong reflections, though the radar can penetrate these materials. In fact, concrete and asphalt are excellent materials on which to survey (when these materials are at the surface) because they are very good at allowing the radar energy to pass into the ground. Other materials, especially clayey, moist soils, tend to absorb radar energy and do not allow it to pass (cf. Weaver 2006). At the extreme, radar energy cannot penetrate metals, so metal pipes and other large metal objects are easily detected, but they obscure things below them.

The depth of the radar signal penetration, and the depth to which objects can be detected, depends on the frequency of the antenna being used and the conductivity of the ground. Higher frequency antennas (e.g., 1000 MHz) can detect very small things but only at shallow depths, while lower frequency antennas (e.g., 50 MHz) can penetrate into the ground much deeper but can only detect larger things. The frequency of the antenna, however, can be a moot point if the ground is so conductive that all of the radar energy is absorbed before it returns to the surface. A 500 MHz antenna was used for site 33Pk349 surveys. This is a common frequency used for archaeological surveys.

Radar systems are often used to collect 40 traces per meter (essentially, a "reading" [a.k.a. trace] taken every 2.5 cm) along transects spaced 50 cm apart. This is a *standard-density* survey. To increase the resolution of the resulting radar images, one only need increase the data collection density. In particular, increasing the number of transects per meter greatly enhances the image quality. A *high-density* survey consists of a one-directional survey with transects spaced 25 cm apart. Besides shrinking the transect spacing, a higher-density image also can be created by surveying an area twice, once in the grid north-south direction (a.k.a., Y-lines) and once in the grid east-west direction (a.k.a., X-lines). A *bi-directional high-density* survey includes X- and Y-line data with 25 cm transect spacing and traces collected at 2.5 cm intervals along each transect. Collecting X- and Y-lines is important when searching for linear features like foundation walls, though such a survey requires twice as much time to complete (Neubauer et al. 2002; Pomfret 2006). Even with a narrower transect spacing, like 25 cm, foundation walls can be missed if the data collection transects run parallel to the foundation walls. For the Phase II farmstead surveys at PORTS, the radar data were collected at 40 traces per meter along transects spaced 50 cm apart—a standard-density survey. The many obstacles (e.g., trees, roots, fallen limbs) and remaining brush made collecting higher-density data or X- and Y-line data impractical.

Radar traces (the fundamental unit of measurement on a radar survey - 40 are recorded per meter along a transect) are each a tiny radar profile of the ground. When all of these tiny profiles, or traces, are put together side by side along their collection transect they form a *radargram*. Figure 5.5 has three example radargrams from nineteenth-century historic-era sites in Ohio (one in Ripley and the other in Carrollton, Ohio). These radargrams are the fundamentals of a radar survey. They show the locations, shapes, intensities, and sometimes frequencies of the radar reflections. Although the shapes of the reflections do not immediately reveal what has been detected, historic-era features can be quite distinctive in radargrams, like the wells and cistern in Figure 5.5. However, sometimes it can be difficult to interpret what has been found based on the radargrams alone. One very useful aspect of radar data is that the radargrams can be stacked up side by side, creating a three-dimensional block of data, and then the whole group can be "sliced" horizontally and looked at from the top rather than the side—giving the effect of being able to excavate down through the data, and the site, one layer at a time (Figure 5.6). These horizontal data slices are called "time slices" or "amplitude slices" and they show a horizontal map of the radar reflection amplitude (or reflection strength) at a desired depth (Goodman et al. 1995). The thickness of the slice can be adjusted to any desired thickness, though slices 2-15 cm thick usually work the best on sites in the Midwest.

Because there are many ways to slice and display radar data, it can be quite difficult to show all of the important radar features from a survey area in one map. Often, radar data are shown as a series of side-by-side amplitude slices at varying depths. Each slice generally is chosen so as to display the variability in the radar data with depth. If one knows the velocity of the radar energy as it travels through the ground, then the depth of each slice can be estimated. When examining the radar data from site 33Pk349, a variety of slice thicknesses were examined in an effort to find the best thickness for imaging the historic-era features. Once the slices were produced (all data were processed in Ekko_Mapper™ 4 using a variety of processes, like dewow, migration, enveloping, and background subtraction), they were exported to Surfer™ and then they were pulled into CorelDraw™ where they were layered into the site map with the other site data.

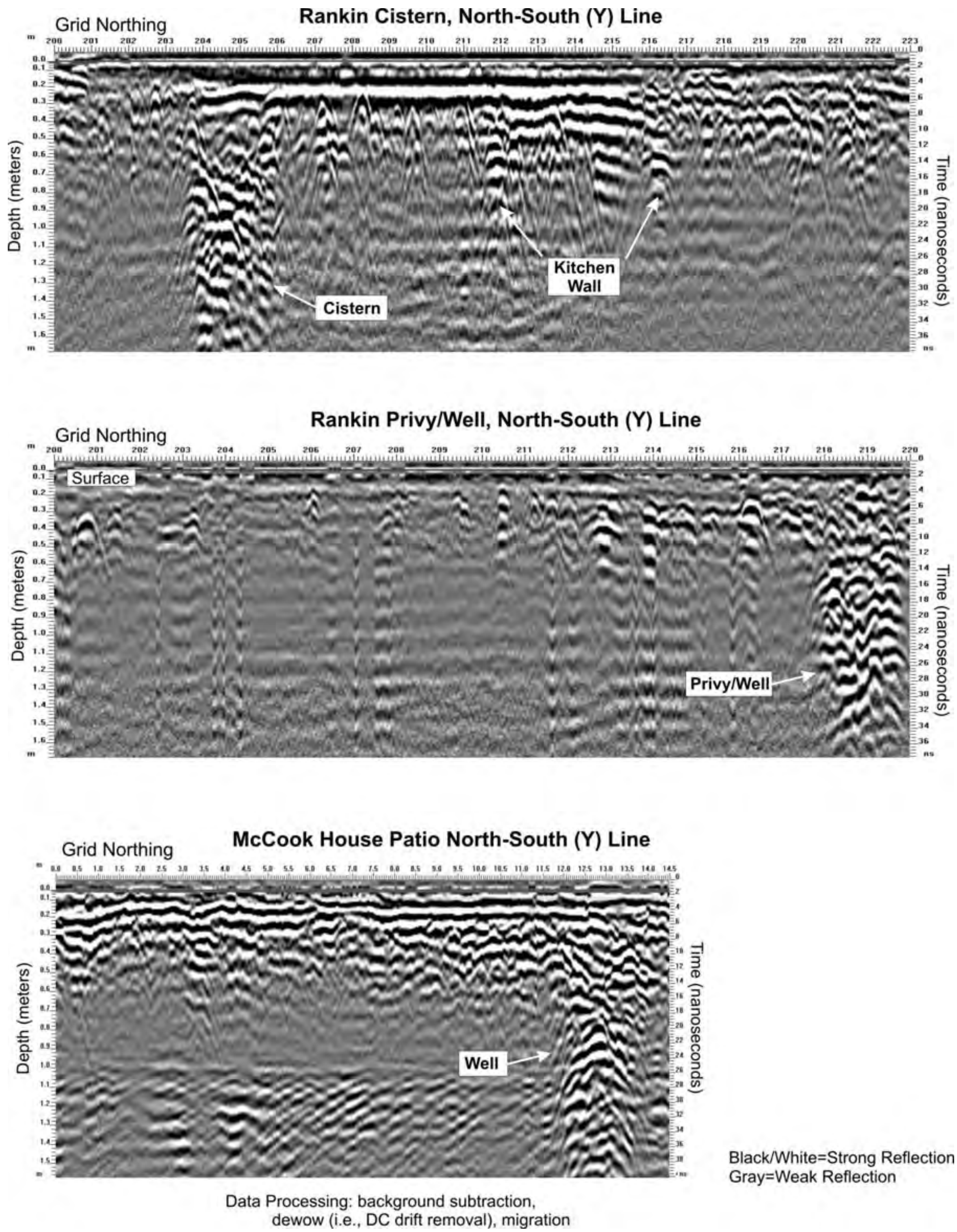

Figure 5.5. Radar profile examples with wells and cisterns from sites in Brown and Carroll Counties, Ohio.

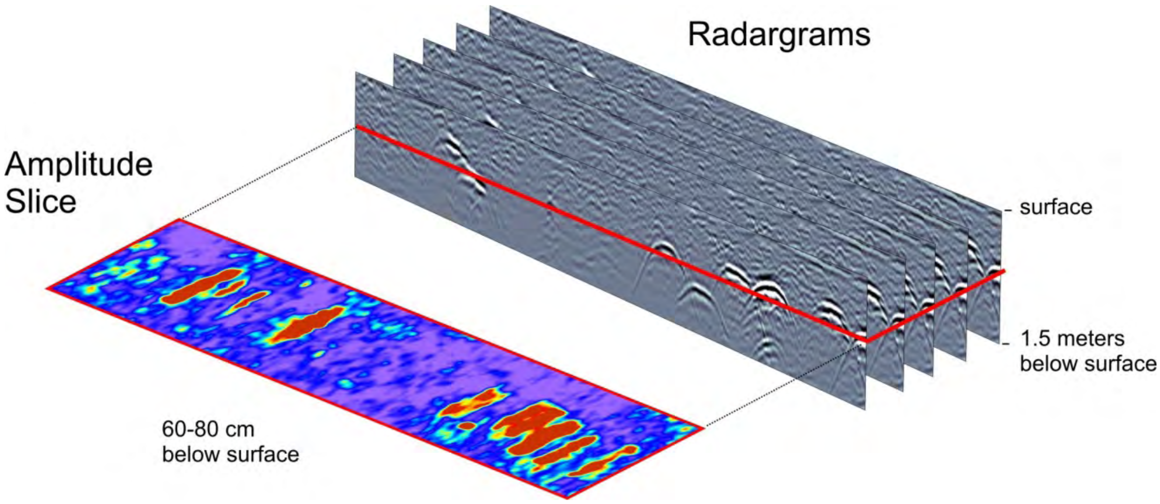

Figure 5.6. Creating amplitude slices from radargrams.

Interpreting Ground-Penetrating Radar Results

The radar slices were first examined using Sensors and Software's Ekko_Mapper™ 4 slicing software. This software allows one to examine slices and radargrams simultaneously. Like other kinds of geophysical data, radar data contain hundreds or thousands of anomalies. However, unlike most geophysical data, such as magnetic data, radar data are built into a cube and one can find anomalies of interest at any depth within this data cube. Furthermore, some anomalies are not evident unless the right slice thickness is used. Therefore, one must try a variety of slice thicknesses before settling on the best choice for displaying the data. With the data from site 33Pk349, 10 cm thick slices were found to work best.

Picking anomalies of interest in radar data is usually straightforward when identifying foundations, cellars, and other large features. Such features usually produce rectilinear anomalies that look like the shape of the foundation or cellar. Linear features like utility lines or trenches and paths and walkways are also fairly easy to spot. More difficult to identify are shaft-type features, like wells, cisterns, and privies. With shaft-type features, it is especially important to examine the radargrams for evidence of archaeological features because shaft-type features are sometimes not evident in amplitude slices. This is particularly the case with privies, which often lack architectural stone and thus are hard to detect in radar surveys. Smaller features, such as foundation piers, are also sometimes only recognized in the radargrams. Therefore, during the data analysis every radargram was examined for small and distinctive reflections, as well as scanning the slices.

6. 33PK347 PHASE II RESULTS

Site 33Pk347 is located in the northeast quadrant of PORTS (Figure 6.1). The current vegetation at the site is secondary growth hardwoods, though most of the trees appear to be less than 50 years old. The 1938/39 and 1951 aerial photographs show this portion of PORTS to be covered fully in trees, so it is likely that the site was timbered just before or after the land was purchased by the AEC in the 1950s.

Site 33Pk347 was originally documented during a Phase I archaeological survey that involved systematic shovel testing on a 15 meter grid (Pecora 2012a). All shovel test fill was screened through ¼-inch mesh screen. The Phase I survey effort recovered only 12 prehistoric artifacts from 10 shovel tests. These artifacts include a projectile point or biface preform tip, two early biface thinning flakes, two late biface thinning flakes, four flakes that resemble late biface thinning or early pressure flakes, one late pressure flake, and a single piece of FCR. The Phase I survey concluded that 33Pk347 is a low density lithic scatter, but recommended additional work (the current Phase II) because the artifact assemblage represented a late stage lithic reduction trajectory that differed from the other lithic scatters recorded within this survey area (Pecora 2012).

Table 6.1 summarizes the Phase II survey effort at 33Pk347. The Phase II survey was initiated with the establishment of a work grid and a geophysical survey designed to identify subsurface archaeological features such as hearths and earth ovens (Figure 6.1). The geophysical survey covered 3,394 m^2 of the site area. One-hundred-ninety-seven shovel tests were then excavated on a 5 meter grid for the purposes of procuring a representative artifact sample, to locate intrasite clusters of artifacts (perhaps representing discrete activity or refuse dumping areas), and to better define the site boundaries.

Table 6.1. 33Pk347 Phase II investigation summary.

Description	**Value**
50x50 cm Shovel Tests (Total)	n=197 (49.25 m^2)
50x50 Shovel Tests (Artifact-bearing)	n=56 (14 m^2)
1x1 m Units (Anomaly Ground-truthing)	n=15.5 (15.5 m^2)
1x1 m Units (Artifact Sampling)	n=15 (15 m^2)
Percentage of Site Area Excavated	2.2%
Geophysical Survey Area	3,394 m^2
Number of Archaeological Features Identified	n=2
Number of Artifacts Recovered	n=3826
Number of Artifacts per Excavated Square Meter	n=48.3
Average Number of Artifacts per Positive Shovel Test (0.25 m^2)	n=8.1

Artifact concentrations identified in the shovel testing were investigated further with the excavation of 15 1x1 m units. Additional 1x1 m units (n=15.5) were placed over selected geophysical anomalies in an effort to determine if the anomalies were related to archaeological features. In total, the Phase II survey effort excavated 79.5 m^2 or 2.2% of the site area. The geophysical survey identified several other anomalies that were not investigated in this survey. All or many of these anomalies may be archaeological features.

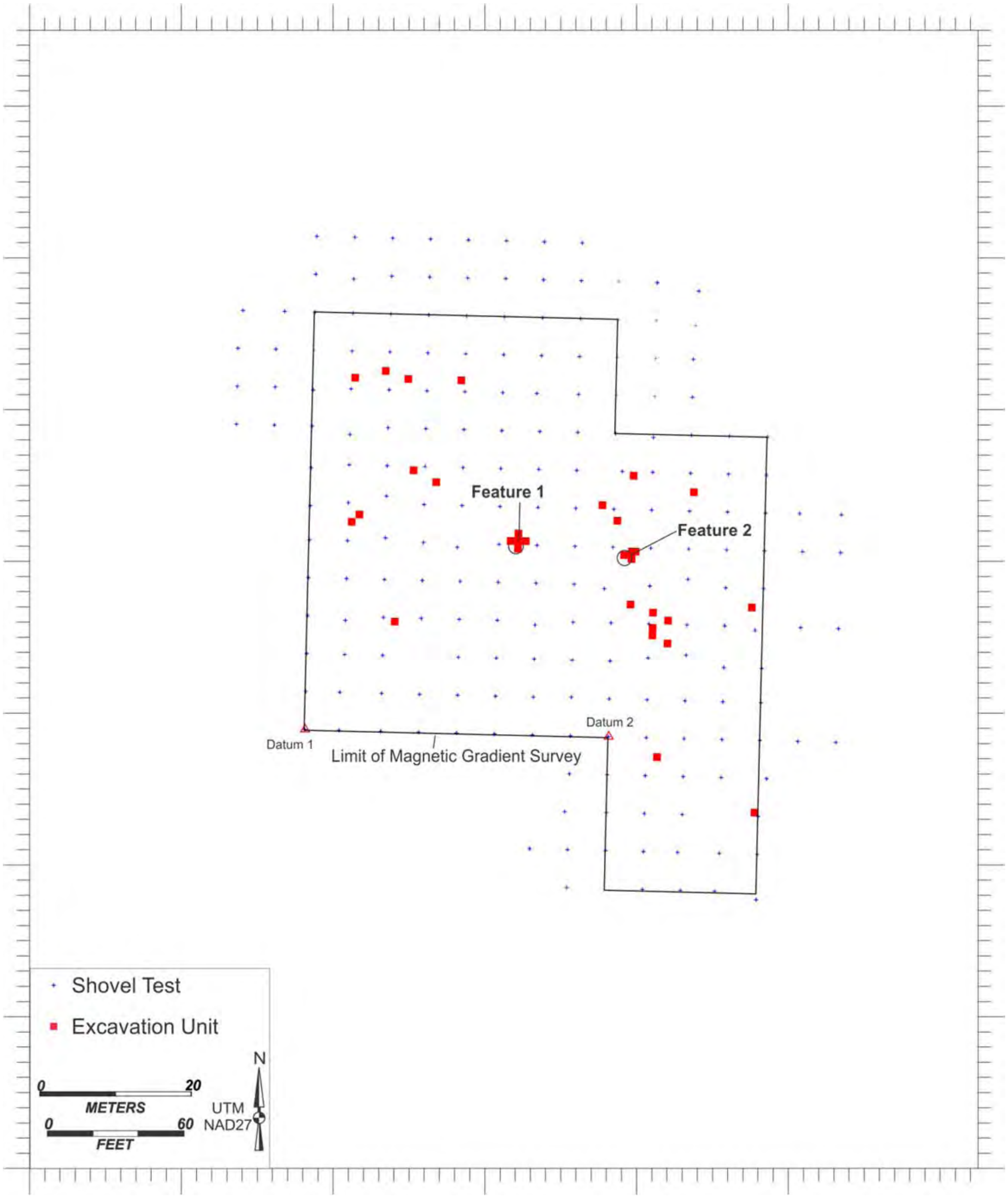

Figure 6.1. Illustration of 33Pk347 showing the Phase II fieldwork.

6.1. 33PK347 GEOPHYSICAL SURVEY RESULTS

Two geophysical survey instruments were used at site 33Pk347. A magnetometer was used to collect magnetic data in the search for subsurface archaeological features, and a magnetic susceptibility meter was used to map the distribution of magnetically enhanced soil near the surface in the search for midden, refuse dumps, and activity areas (see Section 5 for a discussion of these two methods).

The results of the magnetic gradient survey are shown in Figure 6.2. Dark areas in this map are higher magnetic readings and lighter colored areas indicate lower magnetic readings. Several large dipolar anomalies also indicate the locations of iron objects here and there in the surveyed area. However, there also appear to be many magnetic anomalies of potential archaeological interest at this site. Typically, archaeological pit features appear in magnetic gradient data as monopolar positive anomalies, as outlined in Section 5. Features with intense burning or large volumes of fire-cracked rock can produce dipolar simple and dipolar complex anomalies.

The only way to know with certainty if any of these anomalies are archaeological features is to acquire some kind of ground-based evidence linked to each of the anomalies of interest. Typically a soil coring device would be used to extract small columns of soil from each of the anomalies, but this was not possible due to the dry and hard ground encountered during the survey work. Instead, 1x1 meter excavation units were used to test the anomalies for the presence of archaeological features.

Figure 6.3 shows the locations of 27 magnetic gradient anomalies of potential interest. Details about each, including peak magnetic strength, location, type of anomaly, and a brief interpretation/comment are provided in Table 6.2. Seventeen of these anomalies are possible pit features, six may be related to iron objects or strongly magnetic thermal features, and four others may or may not be associated archaeological features. A ranking value was given to the top ten anomalies. An anomaly's rank is related to its likelihood to be an archaeological feature, with Anomaly 1 being the most likely and Anomaly 10 the tenth most likely of the 27 anomalies that have been singled out. Ranking criteria included observations on anomaly size, shape, and peak amplitude. Since the goal of the Phase II work was to determine if buried archaeological features were present at this site, this ranking helped zero-in on the anomalies most likely to be associated with archaeological features. It is possible that some of these anomalies are not archaeological features and also possible that some archaeological features were detected but were not singled out and numbered.

The Figure 6.3 map also shows the results of the magnetic susceptibility survey, behind the anomalies. Red colored areas indicate high susceptibility values while blue areas are low. Areas with enhanced magnetic susceptibility could be the locations of prehistoric activities involving fire, or they might be areas where magnetically enhanced soil or hearth sweepings were regularly dumped. Several of the high susceptibility areas are associated with magnetic gradient anomalies, such as Anomaly 10, 11, 18, 19, and 25. Excavations at Anomalies 11 and 25 identified prehistoric features. The larger area around Anomaly 25, a thermal feature (Feature 2), may indicate that this feature was repeatedly used and cleaned out, with the magnetically enhanced cleanings having been dumped on the surface in the area around the feature.

The susceptibility survey also found high susceptibility values at the north and south edges of the site. This is somewhat unexpected given that the highest density of artifacts and pit features occurs near the middle of the site, on the higher ground. It is possible that this accumulation of high susceptibility material at the edges of the site is a sign that the top of the landform has eroded down slope, taking with it some of the magnetized soil constituents but leaving behind the artifacts and features.

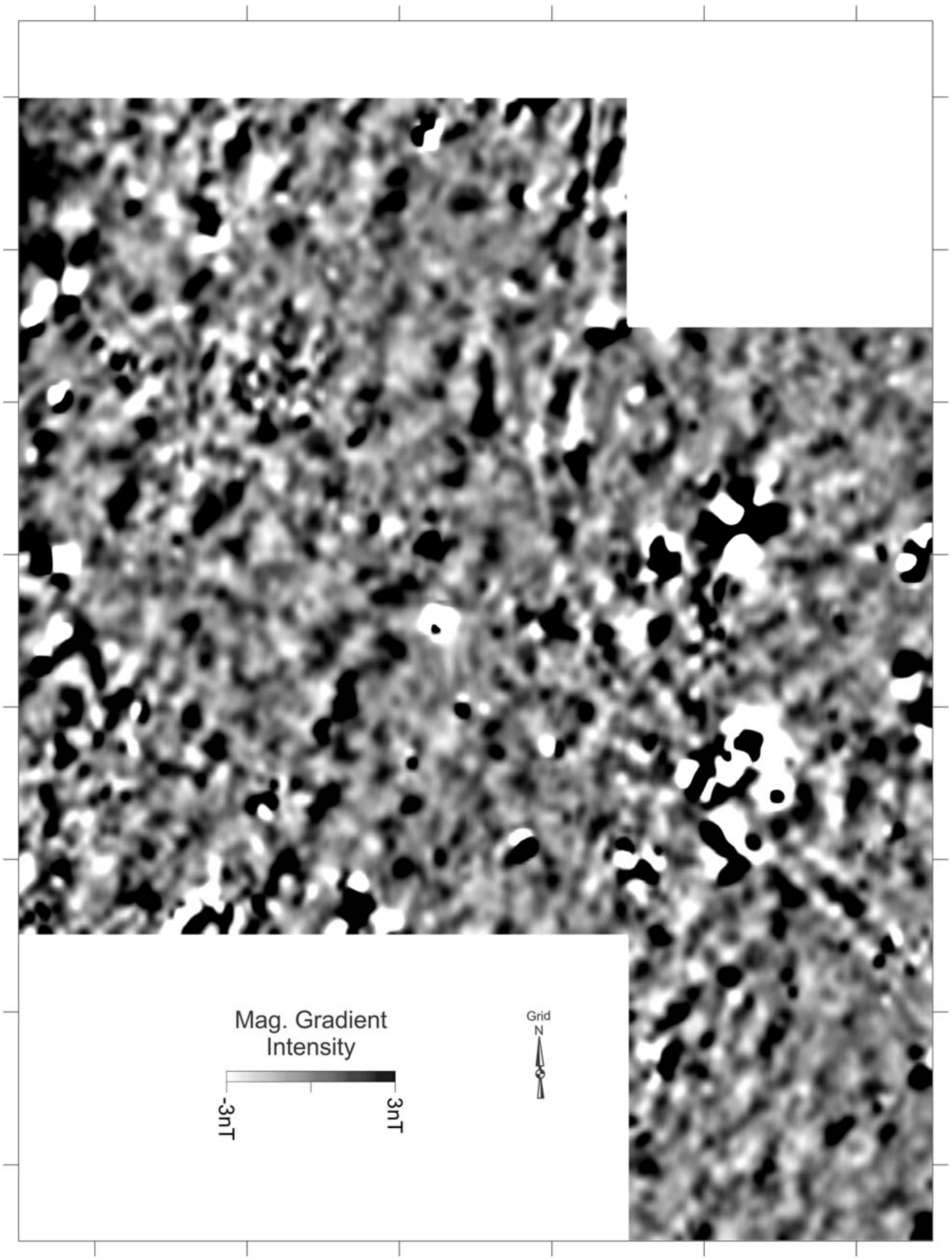

Figure 6.2. Magnetic gradient data from site 33Pk347.

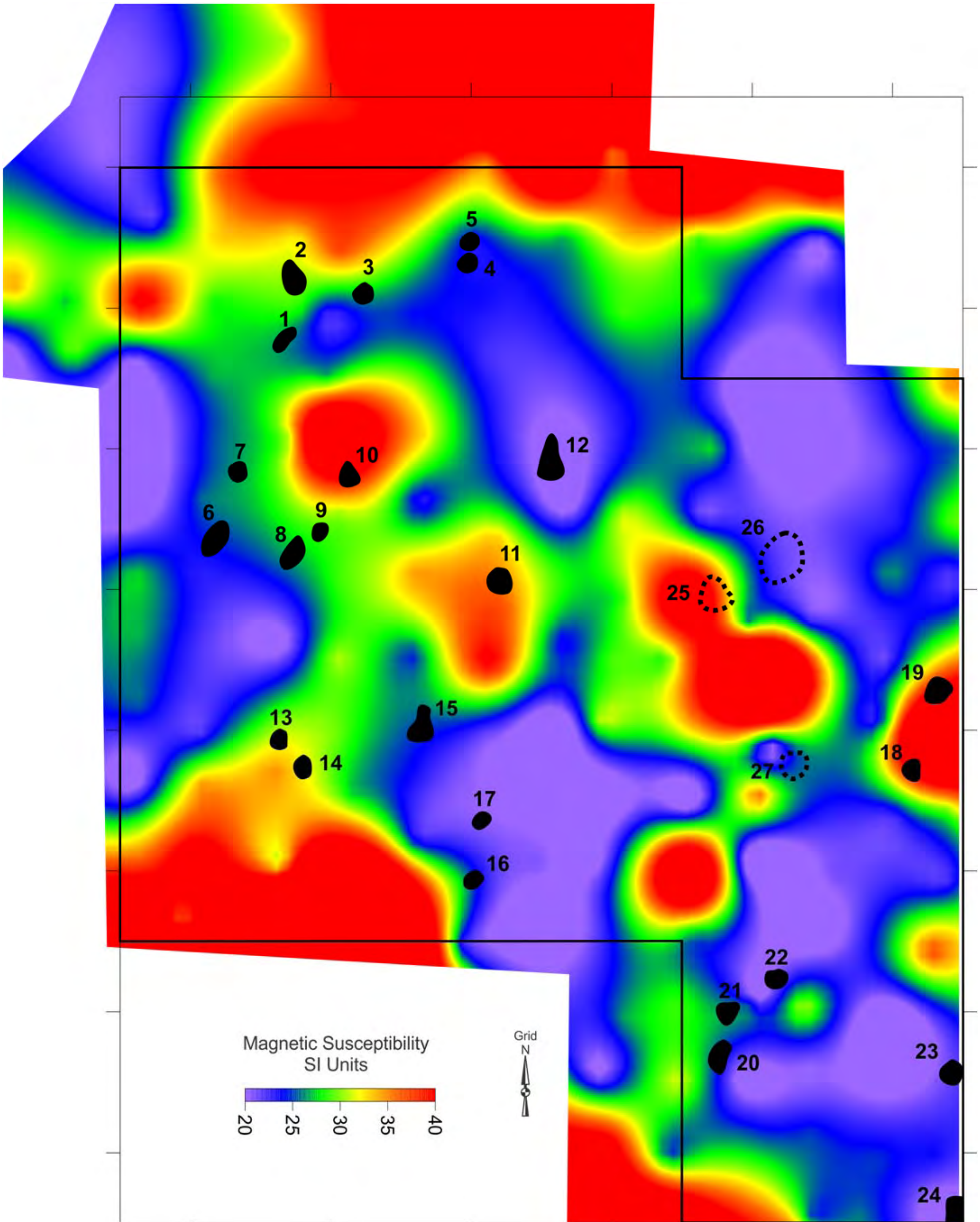

Figure 6.3. A map of magnetic anomalies of potential interest and the magnetic susceptibility survey results at 33Pk347.

Table 6.2. Anomaly information from site 33Pk347.

rank	Anom. #	Peak Intensity (nT)	Anomaly Class[a]	Comments/Interpretation[c]
	1	6.52	MP	Ppf
2	2	15.35	MP/DS	Ppf
	3	4.59	MP	Ppf
	4	7.59	MP	Ppf
	5	6.43	MP	Ppf
1	6	9.11	MP	Ppf
	7	11.65	MP	Possible iron
	8	6.67	MP	Ppf
	9	7.85	MP	Part of 8?
4	10	7.08	MP	Ppf
8	11	10.37	MP	Possible iron or thermal
	12	10.10	MP	Ppf, southern most likely
3	13	13.95	MP	Ppf
	14	10.3	MP	Ppf
	15	13.25	MP	Ppf
	16	8.21	MP	Ppf
	17	7.21	MP	Ppf
	18	5.37	MP	Probably not a feature
10	19	39.30	DS	Possible thermal/iron object
	20	16.25	MP/DS	Ppf
	21	14	MP	Ppf
5	22	7.88	MP	Ppf
7	23	11.45	MP/DS	Possible thermal/iron object
	24	25.45	MP/DS	Possible thermal/iron object
6	25	104.9	DS-B	Thermal?
	26	47.4	DC	Disturbance, burning, lightning?
9	27	204.7	DS-B	Thermal/iron object

a – MP=monopolar positive; DS=dipolar simple; DC=dipolar complex
b – Ppf=possible pit feature

6.2. 33PK347 FEATURES

The geophysical survey detected numerous magnetic anomalies at site 33Pk347, 27 of which were selected as potential archaeological features. Ten anomalies (A.2, A.6, A.10, A.11, A.13, A.19, A.22, A.23, A.25 and A.27) were selected for further investigation or "ground-truthing." Two of the tested anomalies proved to be archaeological features (Feature 1 and Feature 2). Both features were partially or completely uncovered and partially excavated in an effort to document their profile shapes, sample their contents, and procure carbon samples for radiocarbon dating. Anomaly 27 was found to be caused by three pieces of rebar; the source or cause of the other magnetic anomalies could not be determined. Similar survey work at sites 33Pk371 and 33Pk372 found that some of the archaeological features at these sites are very subtle and lack fill that is visibly different from the surrounding native soil. At 33Pk371, for example, several features were not visibly detectable and had to be identified with the aid of the magnetic susceptibility meter. The 33Pk347 anomaly testing units seldom exceeded 20 cm in depth. It is entirely possible that the Phase II effort failed to identify archaeological features at some of the magnetic anomaly locations, even though features are present.

6.2.1. 33Pk347 Feature 1

Feature 1 was initially identified as a magnetic anomaly (A.11) located in the center of 33Pk347 (Figures 6.1, 6.4-6.6). Five 1x1 meter excavation units were excavated in an effort to expose and define the feature plan view (Figures 6.4 and 6.5). A one meter diameter FCR concentration was encountered. Additional displaced FCR extends well beyond the main concentration. The approximate southeastern quadrant was excavated to expose portions of the east-west and north-south vertical profiles and to sample the feature's contents. These profiles reveal a shallow basin-shaped pit (Figures 6.4 and 6.6). This feature is a broad, shallow pit with a flat bottom and it was packed with FCR.

The excavated portion of Feature 1 produced 923 (28 kg) pieces of FCR, two formed artifacts, and 23 pieces of lithic debris. The formed artifacts include a flint core and a notched projectile point. The projectile point resembles the Matanzas and/or Brewerton types, which date to the latter part of the Middle Archaic period and into the Late Archaic.

Two soil flotation samples from Feature 1 produced 5.2 grams of oak, pine, and unidentified wood charcoal. A small fragment of oak charcoal (2.8 g) was also collected from the bottom of Feature 1. This sample produced a radiocarbon date of A.D. 1260 to 1290 (2-sigma cal.), which indicates that the oak tree grew during the Late Prehistoric period—and likely that the feature was used during this period, as well. This radiocarbon date is incongruent with the Middle-Late Archaic projectile point, but it is not uncommon to find older projectile points in later pit features.

The function of Feature 1 is not known, though it is similar in form and content to Feature 2, and other features documented at 33Pk348 and 33Pk372, suggesting that all served a similar function. There is no evidence of *in situ* burning within the feature, such as burnt earth or ash layers, but the FCR in the feature fill demonstrates that this feature was likely involved in food cooking or processing or heating. The thermal stone may have been heated in a nearby surface feature prior to being transferred to the shallow basin (Feature 1), which might explain why there is no burned earth in Feature 1.

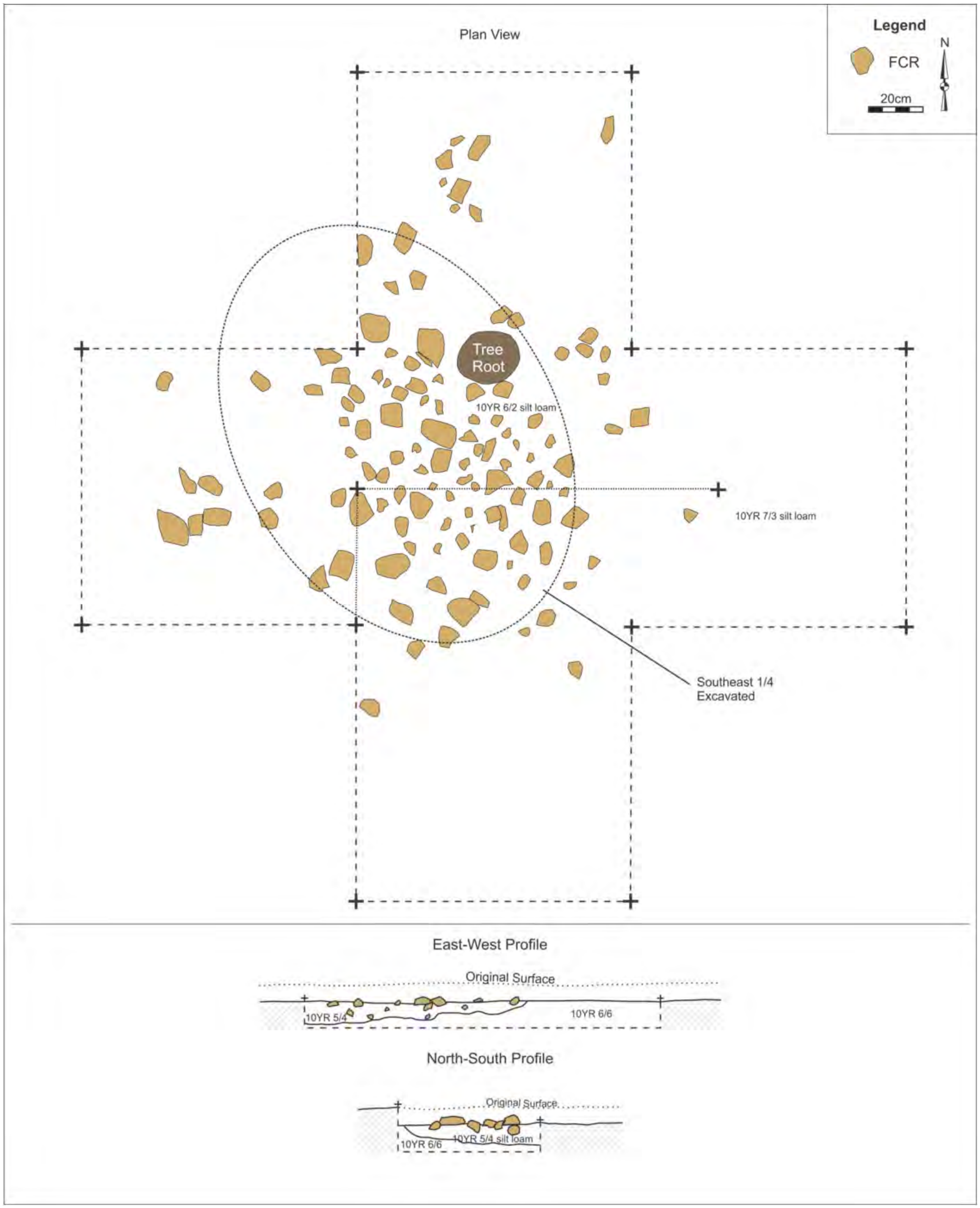

Figure 6.4. Illustration of 33Pk347 Feature 1.

Figure 6.5. Photograph of 33Pk347 Feature 1 plan view.

Figure 6.6. Photograph of 33Pk347 Feature 1 profile.

6.2.2. 33Pk347 Feature 2

Feature 2 was initially identified as a magnetic anomaly (A.25) in the east-central part of 33Pk347 (Figures 6.2, 6.7-6.9). Five 1x1 meter units excavated over this feature exposed an approximately one meter diameter concentration of FCR with numerous pieces extending out well beyond the main concentration. The approximate northeastern quadrant was excavated to expose portions of the north-south and east-west vertical profiles and to sample the feature's contents. These profiles reveal a shallow flat-bottomed pit that is filled with FCR.

The excavated part of Feature 2 produced 2,185 (31.7 kg) pieces of FCR. No lithic artifacts were recovered from this excavation. Two soil flotation samples produced 1.58 grams of hickory, oak, and unidentified wood charcoal. No radiometric date was procured from Feature 2. The function of Feature 2 is not known, but it is very similar to Feature 1 in terms of size, shape, and content.

Figure 6.7. Photograph of 33Pk347 Feature 2 plan view.

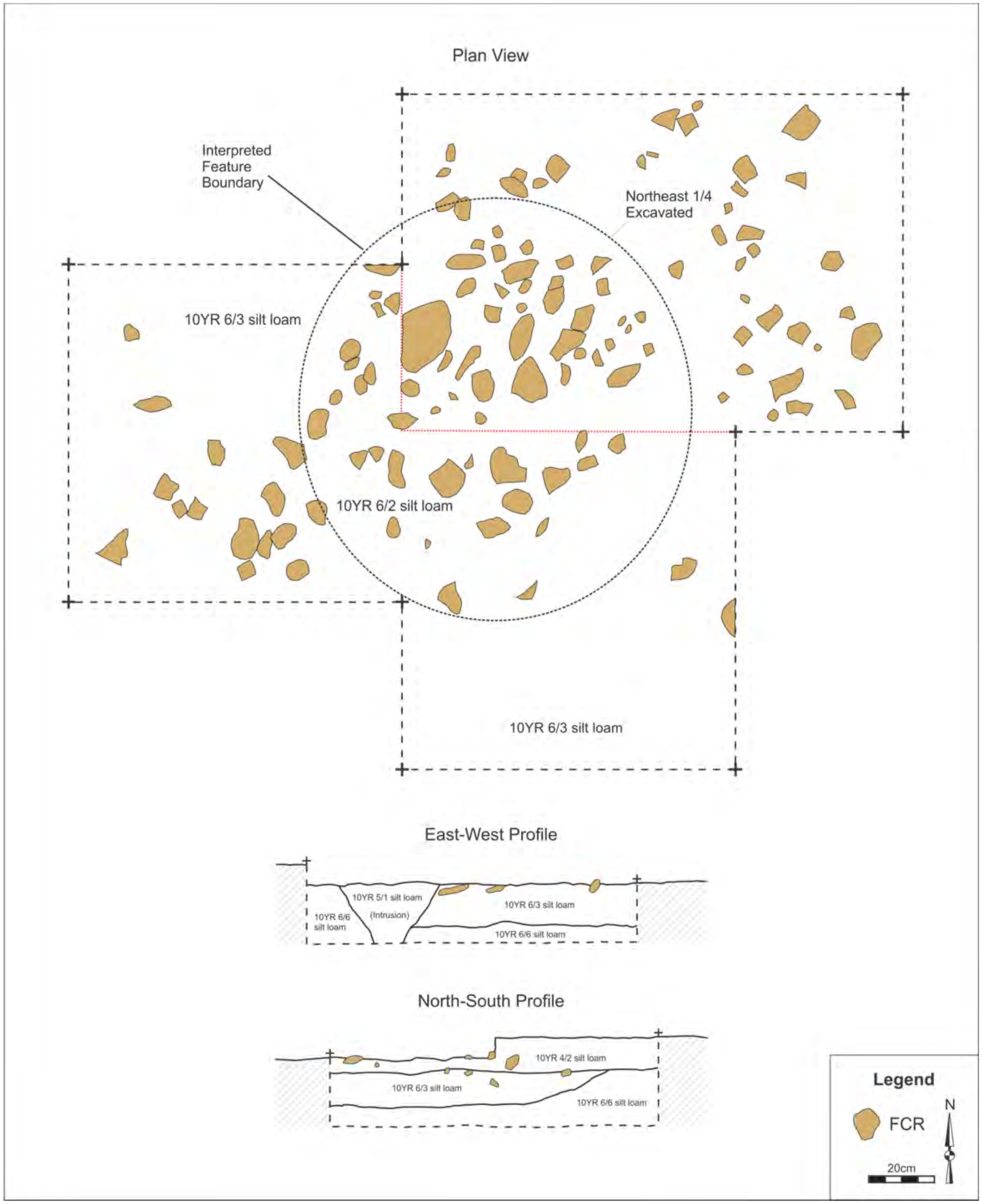

Figure 6.8. Illustration of 33Pk347 Feature 2.

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Figure 6.9. Photograph of 33Pk347 Feature 2 profile.

6.3. 33PK347 ARTIFACT ASSEMBLAGE

The Phase II survey effort at 33Pk347 recovered 3,826 artifacts (Table 6.3). The most abundant artifact type is FCR (n=3,723, 76 kg), followed by lithic debris (n=95) and formed chipped stone artifacts (n=8). Of the four prehistoric sites examined in this study, 33Pk347 produced the smallest assemblage.

Table 6.3. 33Pk347 Phase II artifact inventory.

Context	**FCR**	***FCR Weight (g)***	**Formed Artifacts**	**Lithic Debris**	**Total**
Shovel Tests	392	*12,631.8*	5	58	455
1x1 m Units	114	*1,771.1*	-	10	124
Anomaly 6	19	*208.5*	1	3	23
Anomaly 10	35	*1,262.0*	-	1	36
Anomaly 13	10	*123.9*	-	-	10
Anomaly 22	16	-	-	-	16
Anomaly 23	16	-	-	-	16
Anomaly 28	13	-	-	-	13
Feature 1	923	*28,443.0*	2	23	948
Feature 2	2,185	*31,738.7*	-	-	2,185
Total	**3,723**	***76,179***	**8**	**95**	**3,826**

6.3.1. 33Pk347 Lithic Debris

The 33Pk347 Phase II assemblage contains 95 pieces of lithic debris (Table 6.4). The most abundant flint types are an unidentified type(s) and Delaware flint. Much lower frequencies of Brassfield, Brush Creek, Upper Mercer/Zaleski, and Vanport were also present. Although no flint is known to crop out in Pike County, it is probably available in secondary deposits, such as stream beds. It is also possible that some of the material, especially Vanport and Upper Mercer/Zaleski, was transported directly to 33Pk347 in a partially altered form, such as blanks, preforms, and finished tools. The presence of water worn cortex on some of the Delaware and Unidentified flint debris and cores demonstrates that it was procured in the form of small cobbles from nearby secondary deposits. Of certainty, all of the flint in this assemblage was imported to site 33Pk347.

Nine technological debris categories were identified in this assemblage and, excluding flake fragments and shatter, all exhibit characteristics that reveal how and when they were created in the reduction process. The lithic reduction model presented above in Figure 3.1 provides guidance on how this process is organized. Nearly all of the debris in the 33Pk347 assemblage is characterized as *Primary Reduction* debris, which results from the process of converting raw stone into a serviceable tool. Two pieces of debris are potentially related to tool use and maintenance (*Secondary Reduction*) and tool recycling (*Tertiary Reduction*), and these are classified as biface pressure flakes. This does not mean that tool maintenance and recycling did not occur at 33Pk347—these lithic reduction activities tend to produce debris that is very small, fragile, and fragmentary and is seldom recoverable with the use of ¼-inch screening. It is also produced in very small quantities relative to what is produced during *Primary Reduction* (Pecora 2002).

Most of the lithic debris (over 63%) was created from early and late biface reduction, which is the process of converting a non-bifacial blank (such as a flake blank) into a thin and symmetrical biface blank, which is the precursor to a bifacial preform and ultimately a finished bifacial tool. Only slightly more than 30 percent of the debris assemblage was created during the earliest stage or core reduction. This reduction profile differs from the three other assemblages which tend to be dominated by core reduction debris rather than biface reduction debris.

Table 6.4. 33Pk347 lithic debris.

Technological Type	**Brassfield**	**Brush Creek**	**Delaware**	**Upper Mercer/ Zaleski**	**Vanport**	**Unidentified**	**Total**	**Reduction Stage**
Primary Decortication	-	-	2	-	-	1	3	Initial Reduction (Core) ***30.2%***
Secondary Decortication	-	-	4	-	-	3	7	
Interior	2	-	3	-	-	4	9	
Interior-Edge Prep	-	-	1	1	-	-	2	Initial Biface Reduction (Blank Preparation) ***3.2%***
Early Biface Thinning	-	-	6	-	-	2	8	Early Biface Reduction (Blank Thinning) ***12.7%***
Late Biface Thinning	1	7	11	9	1	3	32	Late Biface Reduction (Blank Thinning) ***50.8%***
Biface Pressure	-	2	-	-	-	-	2	Pressure Thinning (Preform, Tool, Tool Maintenance, Recycling) ***3.2%***
Flake Fragment	1	-	2	3	-	14	20	Non-Diagnostic Debris
Shatter	-	-	1	-	-	11	12	
Total	**4**	**9**	**30**	**13**	**1**	**38**	**95**	
%	***4%***	***9%***	***32%***	***14%***	***1%***	***40%***	***100%***	

6.3.2. 33Pk347 Formed Artifacts

The Phase II investigation recovered eight formed artifacts from 33Pk347 (Table 6.5; Figure 6.10). Although this assemblage is small, it is fairly diverse and contains seven classes of formed artifacts. Stone types include Brassfield, Delaware, Upper Mercer/Zaleski, and unidentified flints, and sandstone. The sandstone object is a cupstone or nutting stone. All of the stone in this assemblage is locally available in secondary deposits in the Scioto River flood plain.

Table 6.5. 33Pk347 formed artifacts.

Provenience	**Brassfield**	**Delaware**	**Upper Mercer/ Zaleski**	**Unidentified Flint**	**Sandstone**	**Total**
Nodule/Core	-	1	-	1	-	**2**
Nodule Blank	-	-	-	1	-	**1**
Early Biface Blank	-	-	-	1	-	**1**
Biface/Projectile Point?	1	-	-	-	-	**1**
Notched Projectile Point	-	-	1	-	-	**1**
Triangle Projectile Point	-	1	-	-	-	**1**
Pitted Stone	-	-	-	-	1	**1**
Total	**1**	**2**	**1**	**3**	**1**	**8**
%	***13%***	***25%***	***13%***	***38%***	***13%***	***100%***

33Pk347 Cores and Nodule Blanks

The 33Pk347 Phase II survey identified three artifacts: two nodule cores and a nodule/blank (Table 6.6; Figure 6.10). The cores are flint nodules obtained from secondary deposits. Flakes or spalls detached from these were then converted into bifaces or flake tools. The nodule-blank is a tabular-shaped piece of flint, also from a secondary deposit, that was possibly intended to be used as a blank that was meant to be converted directly into a biface. But along the way this piece was discarded for some reason. Over 30 percent of the lithic debris from 33Pk347 is derived from core reduction and over 50 percent of this material has water-worn cortex, which shows that this material was collected in secondary deposits such as stream beds.

Table 6.6. 33Pk347 formed artifact metrics.

Context	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Unit	Core Nodule	48.6	35.5	21.2	41.7
Feature 1	Core Nodule	65.6	37.4	26.5	58.6
Unit	Nodule Blank	62.3	49.8	11.6	51.0
Unit	Early Biface Blank	35.6	31.3	14.0	10.7
Unit	Biface Fragment-Projectile Point?	19.6	13.5	5.3	1.5
Unit	Triangle Projectile Point	47.0	21.4	5.2	3.5
Feature 1	Notched Projectile Point	24.3	19.8	6.4	3.0
Unit	Pitted Stone	89.8	59.2	36.8	305.1

33Pk347 Biface Blanks

The Phase II investigation recovered one early stage biface (Table 6.6; Figure 6.10). This object is fragmentary, but represents the earliest stages of biface thinning. Over 12 percent of the lithic debris from 33Pk347 was created from manufacturing biface blanks at this stage of reduction.

33Pk347 Tools

Four artifacts within the 33Pk347 Phase II assemblage are classified as actual tools or implements (Table 6.6; Figure 6.10). These include two projectile points, a biface fragment that resembles a fragment of a projectile point, and a pitted stone. The Phase I survey also recovered a biface fragment that resembles a portion of a projectile point blade. The two obvious projectile points include a well-made triangular form with its tip missing and a small broken corner notched form. The triangular form is probably a “true arrow point” and may date to the early portion of the Late Prehistoric period (ca. A.D.1000-1200). The small notched specimen resembles the Brewerton or Matanzas types, which date to the Late Archaic period but were recently found in well-dated late Middle Archaic contexts in Athens County, Ohio (Pecora and Burks 2006).

The only groundstone artifact in the 33Pk347 assemblage is a pitted stone. This artifact is a rectangular-shaped sandstone block with a centrally located pit created by repeated pecking or battering. Artifacts like these are not uncommon in Ohio’s archaeological sites of all ages. The function of this artifact is not known, but it is possible that it is a support rest used for a bipolar flint knapping technique, which involves setting a piece of flint on a hard surface and then bashing it from above with another stone. Although the bipolar reduction technique is not evident in the 33Pk347 lithic assemblage, bipolar reduction attributes are not always recognizable.

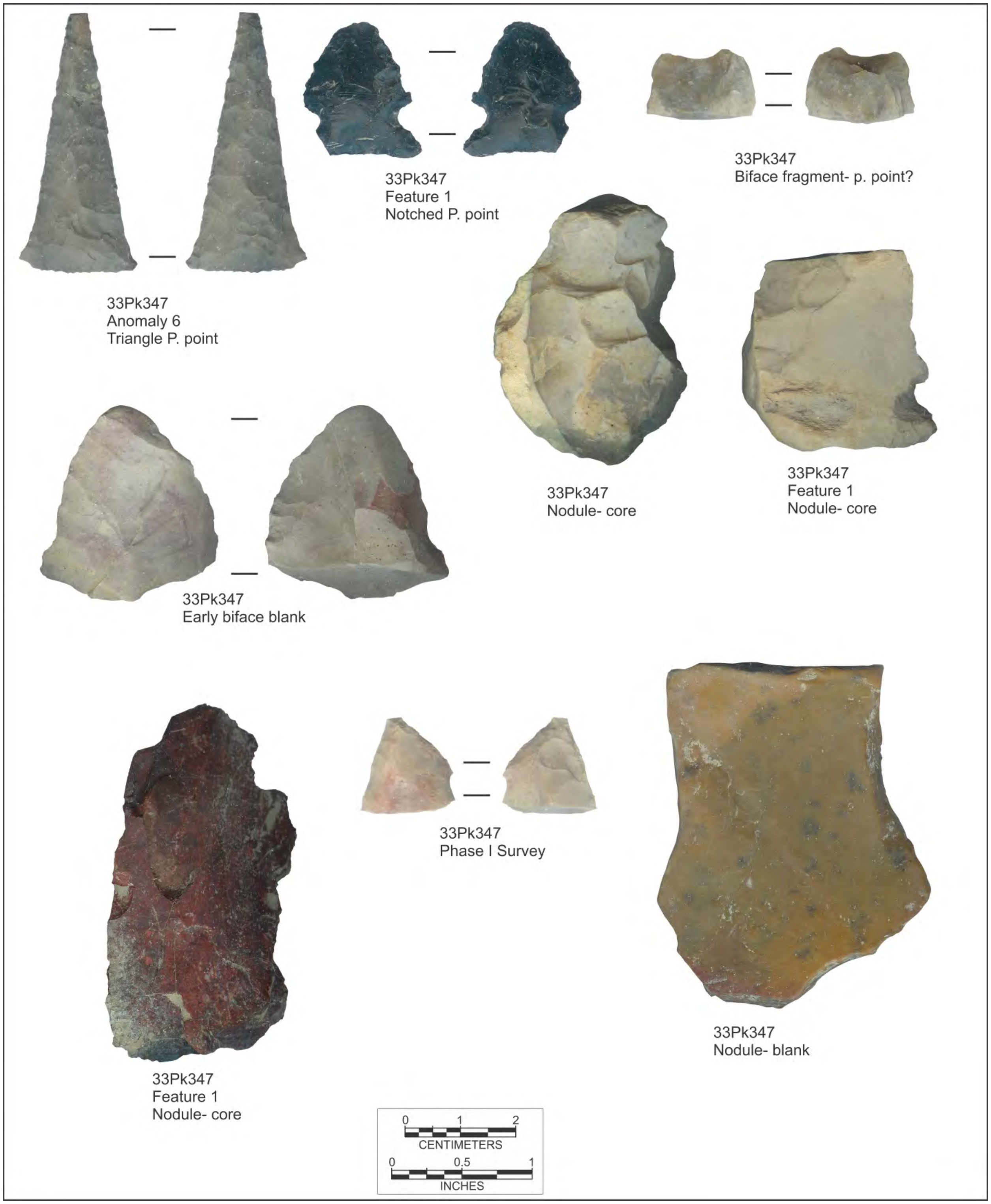

Figure 6.10. Images of selected artifacts from 33Pk347.

6.4. 33PK347 PALEOETHNOBOTANICAL ANALYSIS

(by Karen Leone, M.A.)

Charred wood was the only category of plant material recovered from the analyzed contexts at site 33Pk347. A total of 550 fragments (6.8 g) were recovered from four soil samples (Table 6.7). Two samples were from two levels within Feature 1 and two samples were from two levels within Feature 2. Wood taxa identified include oak (*Quercus* sp.), hickory (*Carya* sp.), and pine (*Pinus* sp.). Oak dominated (98%) the wood assemblage from Feature 1, which further included two percent pine. One hand-collected charcoal sample from Feature 1 consisted of oak, corresponding to the soil sample. The wood assemblage from Feature 2 consisted of a predominance of oak (70%) and a moderate (30%) frequency of hickory. Both taxa were recovered from each level, suggesting a single feature fill episode. A hand-collected sample was taken from Anomaly 23 (no soil sample was taken) and it consisted of either oak bark or root. Wood density is very low at the site, with 0.1 grams (11 fragments) per liter of sediment (g/*l*) in Feature 1 and 0.03 grams, or two fragments, per liter of soil in Feature 2.

Given site location, in the Mixed Mesophytic Forest region of North America, as described by Braun (1950), the site's surrounding environment would have consisted of a wide variety of species dominated by upland hardwood forest taxa (Gordon 1969), including the oak, hickory, and pine species recovered from 33Pk347. These species thrive in the well-drained soils of upland areas and the pieces found in the features were likely derived from deadfall collected nearby, with hardwoods, such as oak and hickory, being the fuel of choice when available. It is hardwoods rather than softwoods (pine) or secondary growth species that are usually the more valued fuel source when available—perhaps because of their smoke-curing properties or fuel efficiency (Asch and Asch 1985; Babrauskas 2005).

Table 6.7**.** 33Pk347 botanical inventory.

Provenience	**Feature 1**	**Feature 1**	**Feature 2**	**Feature 2**
Context	FCR Pit	FCR Pit	FCR Pit	FCR Pit
Flotation #	001	002	003	010
Soil Volume (liters)	26	15	33	13
Wood Total (n / g)	**398 / 4.66**	**50 / 0.51**	**68 / 1.23**	**34 / 0.35**
Black Locust (*Robinia pseudoacacia*)	-	-	-	-
Hickory (*Carya* sp.)	-	-	5	4
Oak (*Quercus* spp.)	20	19	15	6
Pine (*Pinus* sp.)	-	1	-	-
Sycamore (*Platanus occidentalis)*	-	-	-	-
Walnut (*Juglans* sp.)	-	-	-	-
Total Identified	20	20	20	10
Total Unidentified / Bark	-	-	-	10
Identifications Attempted	20	20	20	20
Nut Total (n / g)	**0**	**0**	**0**	**0**
Acorn (*Quercus* sp.)	-	-	-	-
Hickory (*Carya* sp.)	-	-	-	-
Walnut (*Juglans* sp.)	-	-	-	-
Unidentified Plant Material (n / g)	**0**	**0**	**0**	**0**
GRAND TOTAL (n / g)	**398 / 4.66**	**50 / 0.51**	**68 / 1.23**	**34 / 0.35**

6.5. 33PK347 TEMPORAL DATA

The 33Pk347 Phase II investigation produced two temporally diagnostic artifacts and one sample was submitted for radiocarbon dating (Table 6.8). Two time periods are represented in these two different sources of temporal data: the Middle-Late Archaic (4000-1000 B.C.) period and the Late Prehistoric (A.D. 1000-1650) period. These data indicate that site 33Pk347 was occupied by at least two different culturally and temporally distinct groups separated by 2300-4300 years.

The Late Archaic period is represented at 33Pk347 by the small, corner-notched projectile point that was recovered from the top of Feature 1. This artifact resembles the well-known and common Brewerton or Matanzas types. Matanzas type projectile points have been found in contexts that date from 3700 to 2000 B.C. and Brewerton types have been dated to 2980 B.C. to 1723 B.C. (Justice 1987). Recent excavations at site 33At982 in Athens County found a large assemblage of Matanzas/Brewerton points in a buried floodplain context along the Hocking River (Pecora and Burks 2006). Nine radiometric dates procured from features associated with this assemblage push the age of Brewerton dates back to about 4000 B.C. Thus, it is possible that 33Pk347 was occupied as early as 4000 B.C.

Site 33Pk347 also produced evidence of a Late Prehistoric period occupation, which is represented by the radiometric date from Feature 1 and a triangular-shaped projectile point (arrow point). The A.D. 1260-1290 (2-sigma cal.) feature 1 radiocarbon date was run on a wood charcoal sample collected from the very bottom of the feature. What is odd about this date is that the Middle-Late Archaic period projectile point was found in the top of this feature, directly below the humus layer. It is not unusual to find older artifacts at later sites. Older artifacts can find their way into later features by accident, when they happen to be in soil disturbed by a later occupation. Or, in many cases it is likely that later individuals picked up earlier artifacts when they found them and brought them back to their residential or camp sites. In this case, it may be that somebody occupying site 33Pk347 in the thirteenth century A.D. found an old Middle-Late Archaic period point and brought it back with them to the site, where it ended up getting tossed into Feature 1. In fact, Late Prehistoric period flintknappers probably kept an eye out for easy tool-stone sources like old projectile points or debitage from old sites as these would be handy sources for stone to make arrow points. Since Late Prehistoric period arrow points are so small, old spear points could have easily been reworked into an arrow point.

Table 6.8. 33Pk347 temporal data.

Context	AMS C^{14} 2-sigma Cal	Temporal Diagnostic	Temporal Period
Feature 1	AD 1260-1290	Early Fort Ancient	Late Prehistoric A.D. 1000-1650
Anomaly 6	n/a	Triangle Projectile Point (A.D. 700-1200)	
Feature 1	n/a	Notched Projectile Point (Brewerton/Matanzas) (4000-2000 BC)	Middle-Late Archaic 4000-1000 B.C.

The triangular "arrow point" recovered from 33Pk347 is likely an example of the Hamilton Incurvate type, though it could also be a Fort Ancient type point lacking serrated edges. It has straight blades (i.e., edges) that flair at the base. The blade has a biconvex to “diamond-shaped” cross-section and the base is slightly rounded (excurvate). Basal thinning scars are short and are not as well executed as the blade thinning scars. This specimen is delicately made and has excellent symmetry. While Justice (1987) suggests that Hamilton Incurvate points date to the period A.D. 500-1000, other Fort Ancient scholars place this type in the early Late Prehistoric period, from about A.D. 1000-1200 (Railey 1992).

6.6. 33PK347 SITE STRUCTURE

The 33Pk347 Phase II survey identified two archaeological features (Features 1 and 2) from the investigation of anomalies identified during the geophysical survey. Both are nearly identical shallow basins filled with FCR. This is an important attribute because historical cultivation has a negative effect on archaeological sites and their structure. Had 33Pk347 been cultivated, both of the features identified at this site would have been disturbed and their contents would have been scattered throughout the plow layer.

The geophysical survey identified 27 anomalies of potential interest for being archaeological features; ten of these were investigated with 1x1 meter excavation units. While only two anomalies proved to be archaeological features, subsequent survey work on sites 33Pk348, 33Pk371, and 33Pk372, demonstrated that many features, including those in excellent physical condition, have been affected by pedogenic overprinting—in other words, continued soil develop after the sites were abandoned has changed the features such that they look like the intact soil around them. This made it very difficult to visually differentiate feature fill from the native soil matrix. Since the difficulty in identifying features was not recognized until after the 33Pk347 field work was completed, it is very possible, if not likely, that archaeological features at several of the tested 33Pk347 geophysical anomalies were overlooked. Full excavation of site 33Pk347 would likely identify additional archaeological features, especially those that are different in terms of size, shape, and contents, than Feature 1 and 2. However, such excavations would have to be particularly aware of the subtle nature of the 33Pk347 features—not all will be dark soil stains with discrete boundaries.

Well over 80 percent of the FCR from 33Pk347 was recovered from the excavations of Features 1 and 2 (see Table 6.2). This material is what defines these features and is directly related to how they were used. Only four percent is from 1x1 meter units excavated over geophysical anomalies found to lack visible evidence of features. Additional 1x1 m units excavated to sample lithic debris concentrations produced only three percent of the FCR and the balance, 11 percent, was recovered from shovel tests spread across the site and excavated on a 5 meter grid. Figures 6.11 and 6.12 show the distribution of FCR and lithic artifacts within 33Pk347 based on the 5 meter shovel test data. The FCR is fairly widely distributed across the site but is concentrated in four or five areas (Figure 6.11). The largest concentration, centered on Feature 1, results from the recovery of 120 pieces of FCR from a single shovel test in this area. Feature 1 is the source of the FCR in this shovel test. Feature 2 is also located in an area of FCR, though it is somewhat lower density. Similar clusters of lithic debris are present in the shovel test data. These three or four clusters of artifacts could be discrete activity or refuse dumping areas from a single occupation, or each could be related to separate occupations, of which there may be two based on the temporal evidence collected to date.

Tables 6.9 and 6.10 present further information on the distribution of lithic artifacts at 33Pk347 found during the Phase II survey. Over 60 percent of the lithic debris and formed artifacts are from shovel tests. Feature 1 produced roughly one-quarter of the formed artifacts and lithic debris, and Feature 2 produced no artifacts in either class. What is surprising is that 1x1 meter units dedicated to sampling artifact concentrations identified in the shovel test data produced only 11 percent of the lithic debris and none of the formed artifacts. This implies that the artifact concentrations are small and tightly defined, and, because of this, were missed when placing the excavation units.

Table 6.9. 33Pk347 lithic debris distribution.

Technological Type	**Shovel Tests**	**1x1 m Units**	**Anomaly 6**	**Anomaly 10**	**Feature 1**	**Total**	**Reduction Stage**
Primary Decortication	2	1	-	-	-	3	Initial Reduction (Core) ***30.2%***
Secondary Decortication	3	3	-	-	1	7	
Interior	4	3	1	-	1	9	
Interior-Edge Prep	1	-	-	-	1	2	Initial Biface Reduction (Blank Preparation) ***3.2%***
Early Biface Thinning	7	-	1	-	-	8	Early Biface Reduction (Blank Thinning) ***12.7%***
Late Biface Thinning	24	3	1	-	4	32	Late Biface Reduction (Blank Thinning) ***50.8%***
Biface Pressure	2	-	-	-	-	2	Pressure Thinning (Preform, Tool, Tool Maintenance, Recycling) ***3.2%***
Flake Fragment	11	-	-	1	8	20	Non-Diagnostic Debris
Shatter	4	-	-	-	8	12	
Total	**58**	**10**	**3**	**1**	**23**	**95**	
%	**61%**	**11%**	**3%**	**1%**	**24%**	**100%**	

Table 6.10. 33Pk347 formed artifact distribution.

Provenience	**Shovel Tests**	**Anomaly 6**	**Feature 1**	**Total**
Pitted Stone	1	-	-	**1**
Nodule Blank	1	-	-	**1**
Nodule Core	1	-	1	**2**
Early Biface Blank	1	-	-	**1**
Biface/Projectile Point?	1	-	-	**1**
Notched Projectile Point	-	-	1	**1**
Triangle Projectile Point	-	1	-	**1**
Total	**5**	**1**	**2**	**8**
%	***63%***	***13%***	***25%***	***100%***

The distribution analysis from the 33Pk347 shovel test data demonstrates the presence of artifact concentrations that are small and tightly defined. It is likely, given the small size of the artifact concentrations, that a very different pattern would emerge on a slightly different shovel test grid because the site likely contains other artifact concentrations located between the shovel tests excavated for the Phase II work. This pattern is what might be expected on a site that has not been historically cultivated, as cultivation disperses tight artifact clusters and mixes nearby clusters together.

Figure 6.13 shows the locations of the lithic artifact and FCR clusters, as well as the areas of high magnetic susceptibility values at site 33Pk347. There appear to be four primary clusters at the site, all of which have overlapping clusters of the three data classes—FCR, lithic artifacts, and high susceptibility values. Feature's 1 and 2 are located within two of these clusters. We suspect that features similar to 1 and 2 are present in the other two clusters. Based on radiocarbon dating we know that at least one of these clusters likely dates to the thirteenth century A.D. of the Late Prehistoric period. The age of the other clusters is unknown, but the presence of a Middle-Late Archaic period projectile point at Feature 1 suggests that there may have been a significantly older occupation at this site as well. The function of these small clusters is not readily apparent. The low density of debris at each suggests fairly short-term occupations, but the presence of thermal features indicates that individuals stayed at the site at least several days. As with the other sites presented in this report, it is likely that the site's occupants came to 33Pk347 to access a seasonally available food resource. Their stay was not long and thus they discarded little in the way of refuse.

In summary, site 33Pk347 seems to be the least intensively occupied of the four prehistoric sites examined in this study. It was smaller and produced fewer artifacts and features. This would seem to make it less significant than the other sites. However, since all of the sites produced similar kinds of artifacts and features, it is easier to see that site 33Pk347 represents a series of spatially discrete occupations while the other sites represent multiple overlapping occupations. In this way we think that site 33Pk347 is unique among the PORTS prehistoric sites because it is a clearer, less structurally complicated example of an upland camp site occupied for the purposes of resource extraction during the Late Prehistoric period (and perhaps the Middle-Late Archaic period). The primary temporal affiliation of site 33Pk347 also sets it apart as the other sites are Woodland and Archaic period in age. Upland Late Prehistoric sites, while not rare in Ohio, are rarely documented and preserved in an unplowed state, making site 33Pk347 a significant cultural resource for understanding how Late Prehistoric period Fort Ancient populations used the uplands surrounding their corn-based, floodplain communities.

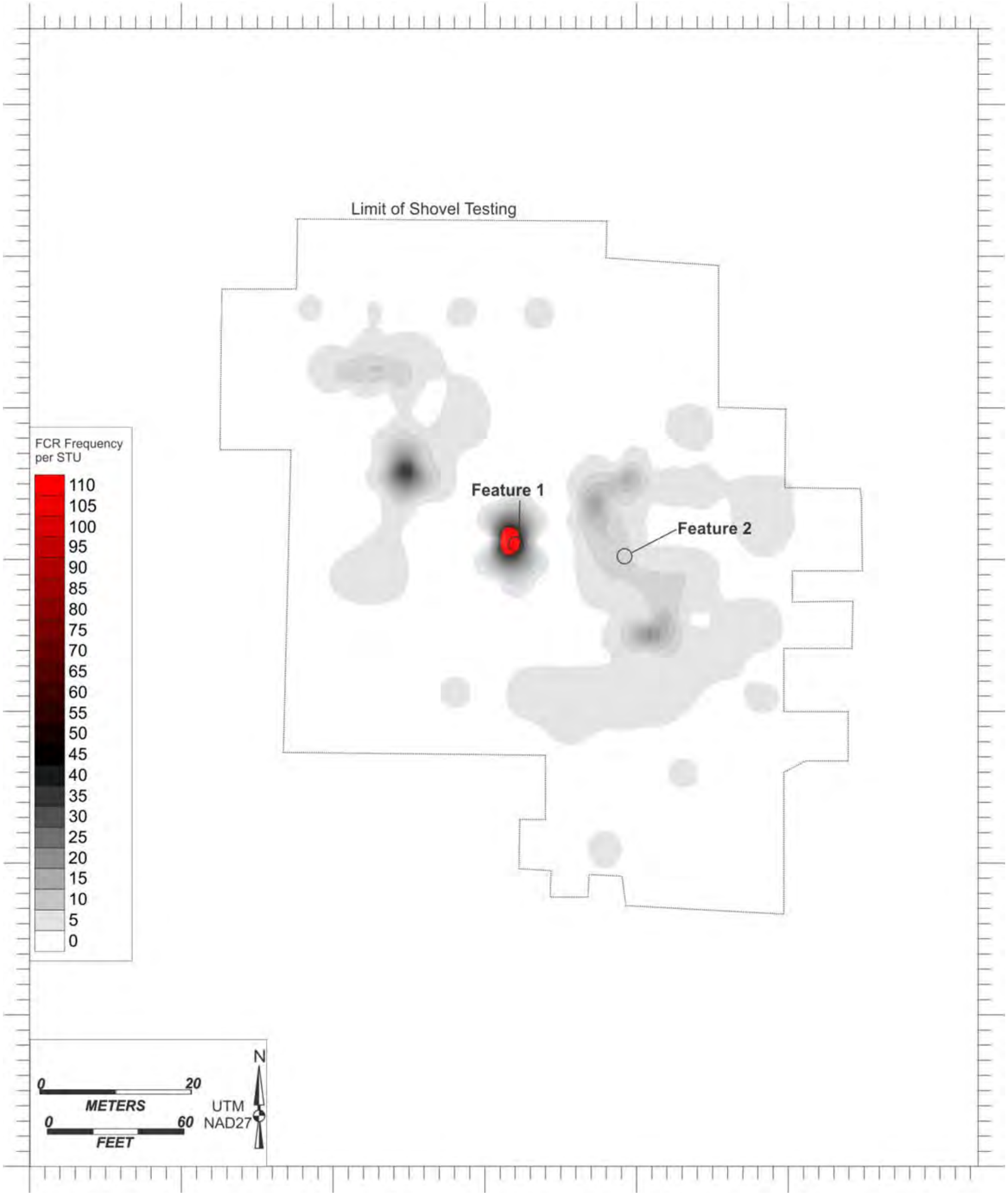

Figure 6.11. Illustration of site 33Pk347 showing the distribution of FCR.

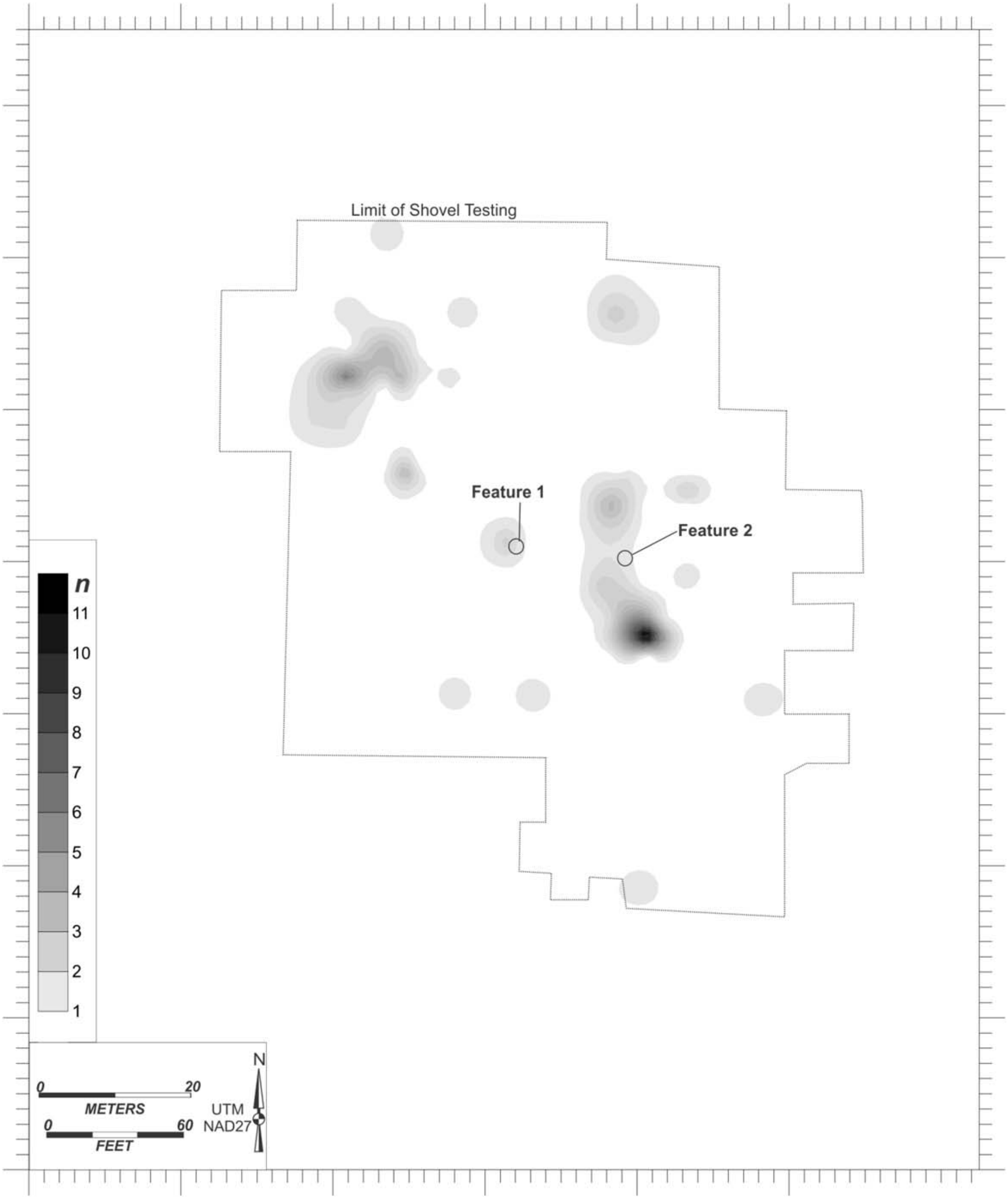

Figure 6.12. Illustration of site 33Pk347 showing the distribution of lithic artifacts.

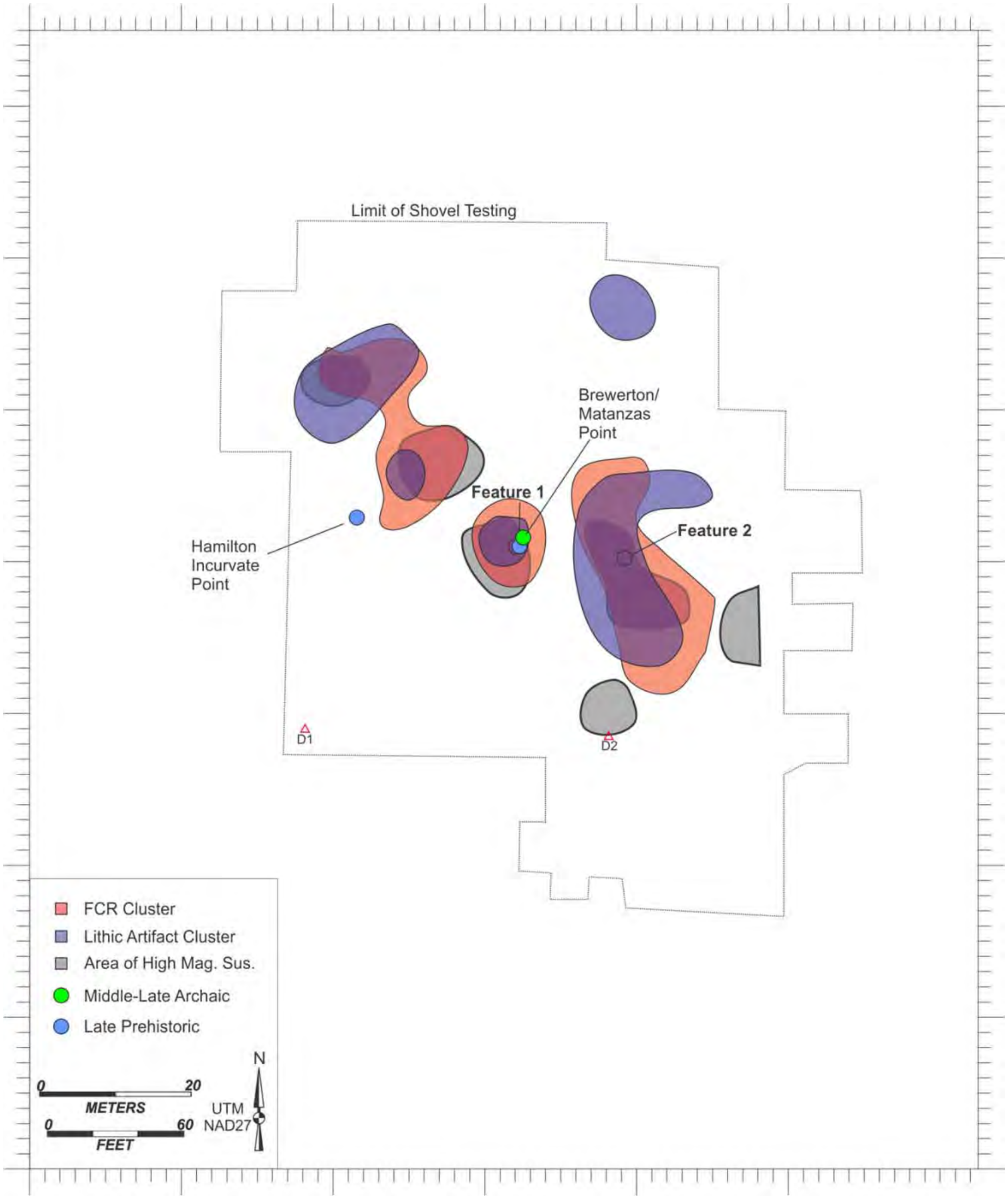

Figure 6.13. Illustration of site 33Pk347 summary map.

7. 33PK348 PHASE II RESULTS

Site 33Pk348 is located in the northeast quadrant of PORTS (Figure 7.1). Secondary growth hardwoods currently cover the site, though most of the trees appear to be less than 50 years old. The 1938/39 and 1951 aerial photographs show this portion of PORTS to be covered fully in trees, so it is likely that the site area was timbered shortly before or after the land was purchased by the AEC in the 1950s.

This site was originally documented during a Phase I archaeological survey that involved systematic shovel testing on a 15 meter grid (Pecora 2012a). The Phase I survey effort recovered 59 prehistoric artifacts from 22 shovel tests. These artifacts include a flake core, two small unifacially modified flake tools, six secondary decortication and interior flakes, an early biface thinning flake, a late biface thinning/early pressure flake, a late pressure flake, three flake fragments, a piece of flint shatter, and 43 pieces of FCR. The Phase I survey concluded that site 33Pk348 is a low density lithic scatter with the potential for archaeological features based on the large amounts of FCR.

Table 7.1 summarizes the Phase II survey effort at 33Pk348. The Phase II work began with the setup of wood stakes marking the corners of a 20x20 meter grid. Grid setup was followed by a geophysical survey designed to identify subsurface archaeological features such as hearths and earth ovens. The geophysical survey covered 7,200 m^2 of the site area. Three-hundred-eighty shovel tests were excavated on a 5 meter grid to (1) procure a representative artifact sample, (2) better define the site's boundaries, and (3) identify the presence of site structure in the form of variable artifact distributional patterning.

Table 7.1. 33Pk348 Phase II investigation summary.

Description	**Value**
50x50 cm Shovel Tests (Total)	n=380 (95 m^2)
50x50 Shovel Tests (Artifact-bearing)	n=220 (55 m^2)
1x1 m Units (Anomaly Ground-truthing)	n=19 (19 m^2)
1x1 m Units (Artifact Sampling)	n=14 (14 m^2)
Percentage of Site Area Excavated	1.5%
Geophysical Survey Area	7200 m^2
Number of Archaeological Features Identified	n=4
Number of Artifacts Recovered	n=9421
Number of Artifacts per Excavated Square Meter	n=73.6
Average Number of Artifacts per Positive Shovel Test (0.25 m^2)	n=10.41

Artifact concentrations identified in the shovel testing were investigated further with the excavation of 14 1x1 m units. Additional 1x1 m units (n=19) were placed over eight geophysical anomalies in an effort to identify and examine archaeological features. In total, the Phase II survey effort excavated 128 m^2 or 1.5% of the site area. The Phase II survey also recovered 9,421 artifacts and identified four archaeological features. Numerous other archaeological features were detected in the magnetic survey that were not investigated during the Phase II excavations.

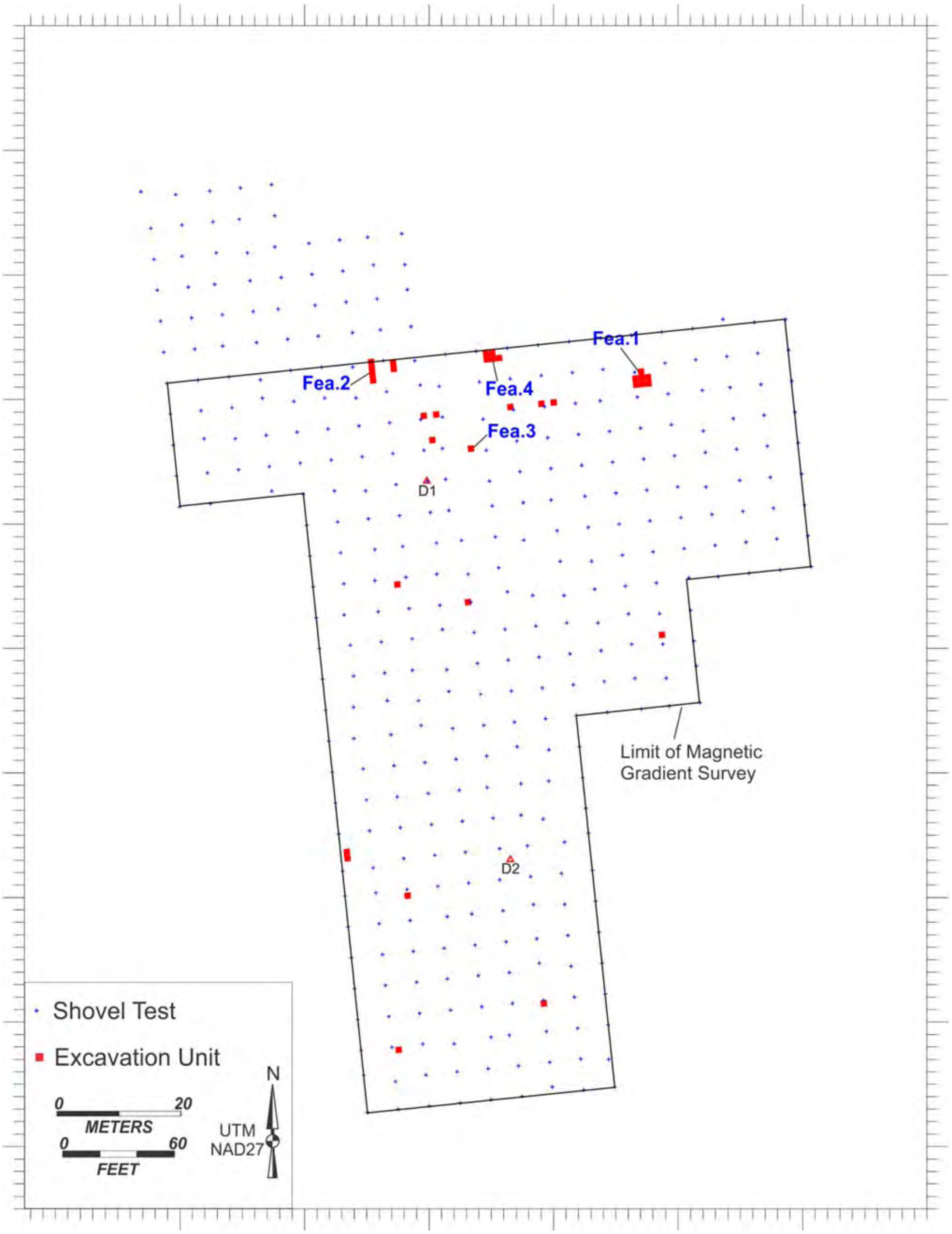

Figure 7.1. Illustration of 33Pk348 showing the Phase II fieldwork.

7.1. 33PK348 GEOPHYSICAL SURVEY RESULTS

The geophysical survey at 33Pk348 began with a magnetic gradient survey covering 7,200 m^2 of the site. Figure 7.2 shows the results of the survey. Numerous large and small anomalies were found in various parts of the site.

There are numerous anomalies of potential archaeological interest in the 33Pk348 data. The large dipolar simple-bull's-eye anomalies were noticed immediately. They have the look of anomalies typical of prehistoric earth oven features but their magnetic amplitude was off the charts (>204 nT), with readings that went well beyond the detection range of the FM 256 magnetometer as it was set on the 0.1 nT sensitivity mode. Generally such strong readings are only associated with historic-era features or objects in Ohio. Frequently such anomalies are large magnetic rocks. A quick sweep of the area with a metal detector failed to find any historic-era iron objects, nor did the shovel testing find historic-era artifacts in this part of the site. The metal detector did, however, locate several pieces of fire-cracked rock that were distinctly "hot," that is, their magnetic signatures were strong enough that they even set off a metal detector. This is likely the cause of the strong dipolar simple-bull's-eye anomalies—numerous discrete clusters of FCR, likely concentrated in pit features. Excavations at two of these anomalies (Anomalies 2 and 12) support this assertion.

Figure 7.3 is a map of anomalies singled out of the 33Pk348 data as possible archaeological features. There are 68 anomalies of potential interest, and Table 7.2 contains details related to each. Twelve anomalies indicate the locations of FCR-packed thermal features (Anomalies 1-12). Interestingly, there seem to be linear clusters of smaller anomalies (Anomalies 17-19) streaming off of and downslope from Anomalies 1-11, especially near Anomalies 1, 5, and 11. Between these fields of smaller anomalies and the thermal features are tighter clusters of dipolar complex anomalies (Anomalies 13-15). It appears that Anomalies 17-19 are debris fields running down slope that are full of FCR. This thermal debris was likely cleaned out of the thermal features (Anomalies 1-11) and tossed down slope. Whether Anomalies 13-15 are discrete thermal features or activity areas themselves, or just areas containing more FCR discarded from the thermal features, is not known, but certainly they are related to the thermal activities that occurred in Anomalies 1-11.

The blue-highlighted anomalies in Table 7.2 were recommended for excavation during the Phase II work, though not all were investigated (e.g., Anomaly 51). An attempt was made to pick a range of different kinds of anomalies and not just obvious thermal features. Once it was confirmed that Anomaly 2 was indeed a thermal feature packed full of FCR, it was determined that the other ten anomalies in this linear arrangement were also thermal features and those were left intact. Anomaly 12 (not originally chosen for testing) was also excavated to show that these thermal features occur in other parts of the site.

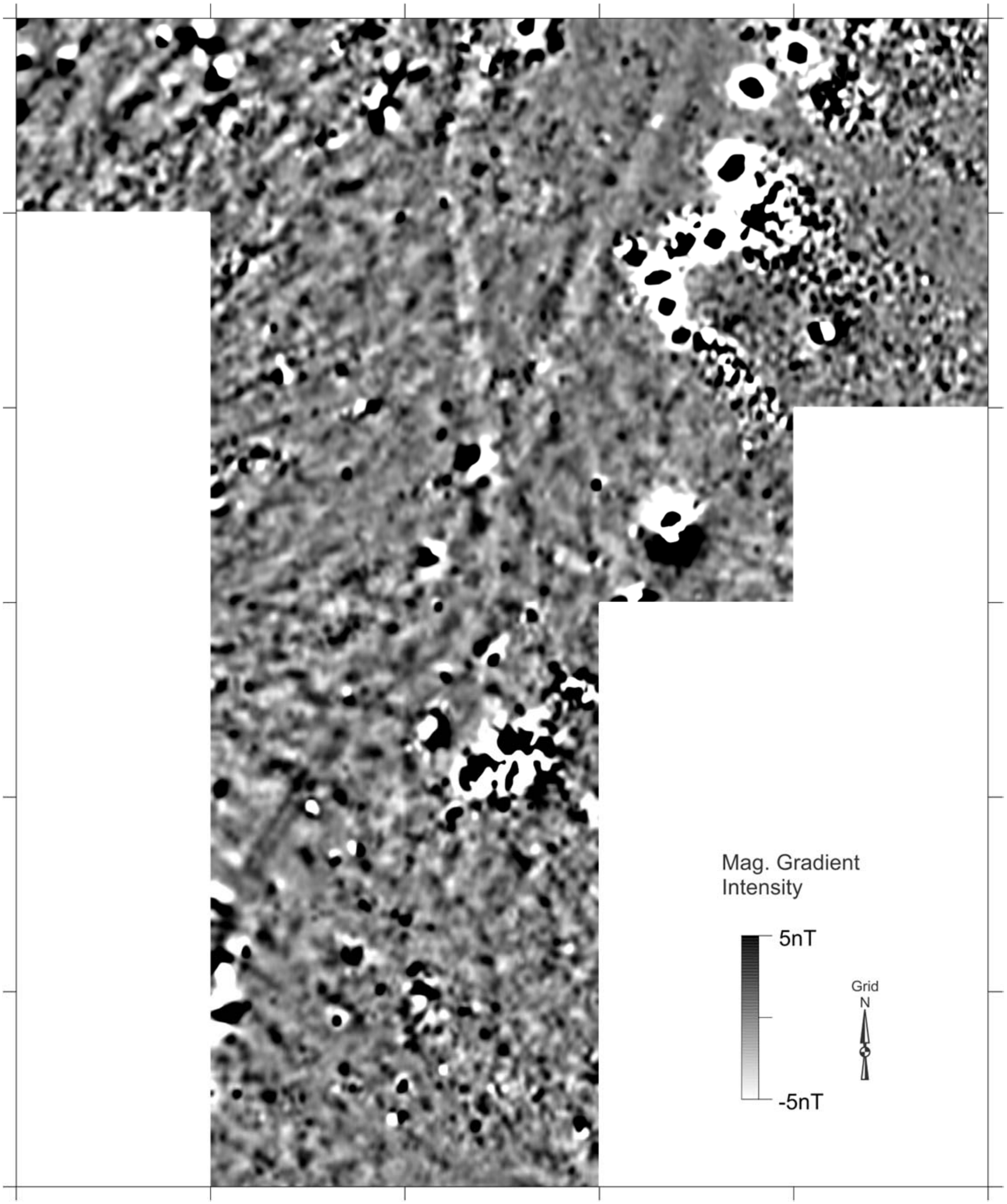

Figure 7.2. Magnetic gradient survey results at 33Pk348.

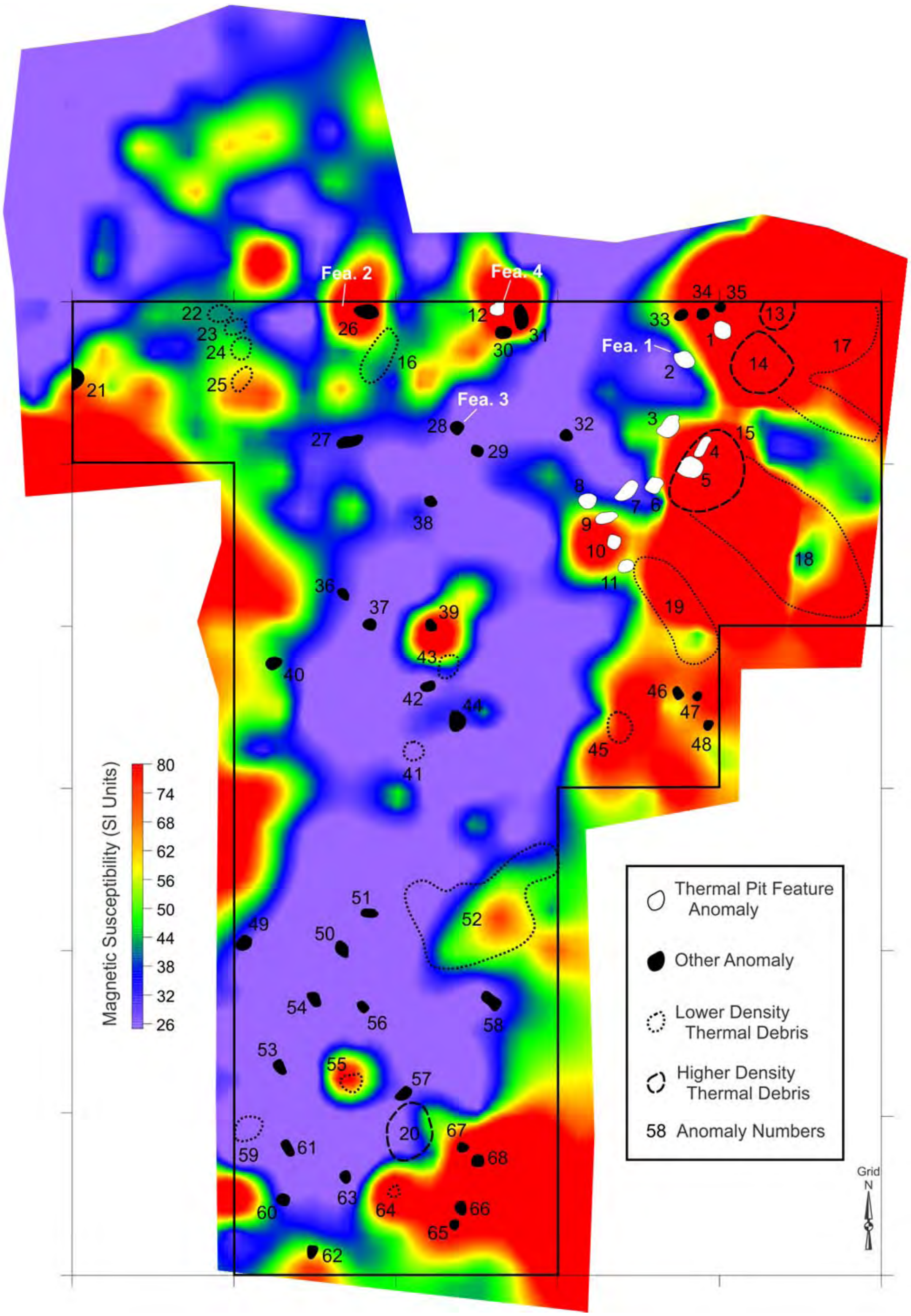

Figure 7.3. Magnetic gradient anomalies and magnetic susceptibility survey results at 33Pk348.

Table 7.2. Anomaly information from site 33Pk348.

Anom. #	Peak Intensity (nT)	Anomaly Class[a]	Size[b]	Comments/Interpretation[c]
1	204.7	DS-B	4	Thermal Feature
2	204.7	DS-B	4	Thermal Feature
3	183.4	DS-B	5	Thermal Feature
4	65.2	DS-B	4-5	Possible thermal feature/thermal debris
5	204.7	DS-B	5	Thermal Feature
6	204.7	DS-B	4	Thermal Feature
7	204.7	DS-B	5	One or possibly 2 thermal features
8	95.05	DS-B	3	Probable thermal feature
9	204.7	DS-B	2	Oval thermal feature
10	204.7	DS-B	4	Thermal Feature
11	91	DS-B	4	Thermal Feature
12	128.05	DS-B	3	Thermal Feature
13		DC		Concentration of thermal debris
14		DC		Concentration of thermal debris
15		DC		Concentration of thermal debris
16	41.75	DC		Possible concentration of thermal debris, through anomalies larger
17				Thermal refuse scatter
18				Thermal refuse scatter
19				Thermal refuse scatter
20	40.05			Possible concentration of thermal debris, through anomalies larger
21	21.05	MP	5-6	Ppf
22	45.65	DS	6	Possible object, large rock, or shallow burned area
23	38.55	DS	3	Possible object, large rock, or shallow burned area
24	101.6	DS	4-5	Possible object, large rock, or shallow burned area
25	12.90	DS	6	Possible object, large rock, or shallow burned area
26	19.1	MP/DS	4	Possible pit or thermal feature
27	9.81	MP-D	3	Ppf
28	10.32	MP	4	Ppf
29	11.20	MP	4	Possible rock or Ppf
30	45.5	MP/DS	2	Possible object, large rock, or shallow burned area
31	32.75	MP	5-6	Possible burned area next to A. 12
32	8.97	MP	2-3	Ppf along road edge
33	33.90	DS	2	Possible object or thermal rock
34	45.80	DS	2	Possible object or thermal rock
35	22.85	DS	3	Possible object or thermal rock
36	13.45	MP	2-3	Possible pit, object
37	35.40	DS	4	Possible object, large rock, or shallow burned area

Blue anomalies were chosen for excavation.
a – MP=monopolar positive; DS=dipolar simple; DC=dipolar complex
b – these are approximate sizes; magnetic anomaly edges may not directly match edges of subsurface features.
c – Ppf=possible pit feature

Table 7.2. Anomaly information from site 33Pk348, *continued*.

Anom. #	Peak Intensity (nT)	Anomaly Class[a]	Size[b]	Comments/Interpretation[c]
38	7.26	MP	2-3	Ppf along road
39	16.25	MP	4	Ppf
40	11.28	MP/DS	2	Possible object, rock
41	77.7	DS	4	Possible rock/Thermal Feature
42	21.15	MP/DS	2	Possible object, rock
43	72.05	DS	5	Possible thermal feature
44	10.85	MP	5-6	Ppf in road
45	204.7	DC	4	Possible iron pipe
46	6.39	MP	3	Possible pit feature/rock
47	20.1	MP	3	Probable rock
48	7.36	MP	3	Possible pit/rock
49	19.2	MP/DS	4	Possible rock/pit feature
50	7.53	MP	3	Possible pit/rock
51	7	MP	3	Possible pit feature
52				Area just south of well
53	6.86	MP	3-4	Ppf
54	7.26	MP	4	Ppf
55	15.55	DS	3-4	Possible rock/thermal feature
56	9.26	MP	3	Ppf/rock
57	34.45	DS	2	Possible rock
58	10.86	MP	4	Ppf
59	61.70	DS	4	Possible object, large rock, or shallow burned area
60	10.43	MP	2-3	Ppf/rock
61	8.74	MP	3	Ppf/rock
62	6.67	MP-D	4	Ppf
63	14.82	MP/DS	3	Ppf/rock
64	57.2	DS	2	Probable iron object, rock, or possible thermal feature
65	29.3	MP	2	Probable rock
66	10.92	MP/DS	4-5	Ppf
67	12.40	MP	2	Possible rock or pit feature
68	10.71	MP	3	Ppf

Blue anomalies were chosen for excavation.
a – MP=monopolar positive; DS=dipolar simple; DC=dipolar complex
b – these are approximate sizes; magnetic anomaly edges may not directly match edges of subsurface features.
c – Ppf=possible pit feature

The magnetic susceptibility data in Figure 7.3 nicely match the results of the magnetic gradient survey. Large areas of strong susceptibility values were found in the area of the thermal features (Anomalies 1-11) and running down slope with the FCR debris fields (Anomalies 17-19). High susceptibility values were also found in the area of Anomalies 12 and 26, both of which produced thermal features or dense concentrations of FCR. The higher susceptibility readings in the areas of the thermal features show that these features are not only just associated with FCR; they contain dispersed surface deposits of soil heated up enough to effect a change in the magnetic susceptibility of the soil's constituent iron minerals. Since these magnetically enhanced soils are spread around on the surface near the thermal features, this shows that these features were likely used more than once and the debris from cleaning them out was dumped nearby on the surface, and in the area of Anomalies 1-11 it was cast down the slope. The cluster of higher susceptibility values to the northwest of Anomaly 26 suggests that there likely is another thermal feature just beyond the edge of the magnetic gradient survey. Anomaly 39 is associated with a similar cluster of high susceptibility values. Excavation of this anomaly, as discussed below, did encounter a burned soil feature, but no FCR was present. It was tentatively concluded in the field that this burned soil anomaly was not an archaeological feature, largely because it was lacking any obvious artifacts.

The source of the high susceptibility values in the areas adjacent to Anomalies 21, 40, 49, and 68 is not understood. It does not seem likely that thermal activity would occur on the edges of a site. These areas along the edge of the site are not associated with increased frequencies of FCR or other kinds of artifacts. They are, however, somewhat sloped, lower elevation areas of the landform. It could be that the same slope-related susceptibility phenomenon detected at site 33Pk347 is also present at 33Pk348. Whether this “edge” susceptibility is the result of the erosion of magnetically enhanced topsoil down onto lower, sloped portions of the site, the result of some other sloped-related process, or even the result of a cultural process involving the down slope dumping of enhanced soils, is not known.

The linear clustering of Anomalies 1-11 provides another clue about site 33Pk348. If these thermal features were used repeated times, as suggested by the debris fields, the linear arrangement of anomalies can be used to support several statements concerning the use and layout of the site. First, it is important to note that none of these anomalies appears to overlap another—each is a discrete location. This suggests that whoever created and used the anomalies knew where each was located, such that one did not impinge on another. With this in mind, we can put forth two possibilities: (1) the thermal features (at least Anomalies 1-11) were all created at the same time (i.e., during the same visit) by a large group composed of multiple work units, each of which used its own, or several of the thermal features independent of the other work units; or (2) one smaller group visited this site numerous times over a fairly short period of time (5, 10, or 15 years perhaps) and performed the same suite of activities during each visit. Whatever the function of the thermal features, a new one was created upon each successive visit and the previous ones could still be seen on the surface. Apparently parts of the site had the right kind of setting to facilitate the activities associated with the thermal features.

7.2. 33PK348 FEATURES

The geophysical survey detected numerous magnetic anomalies at site 33Pk348, 68 of which were selected as potential archaeological features. Eleven anomalies (A.2, A.12, A.26, A.28, A.36, A.39, A.46, A.49, A.54, A.60, and A.68) were chosen for further investigation or "ground-truthing." An attempt was made to pick anomalies from all across the site that exhibited a variety of magnetic attributes, increasing the chances of uncovering a variety of different feature types. Three anomalies (A.2, A.28, and A.12) were determined to be definite archaeological features (Feature 1, Feature 3, and Feature 4). A fourth feature, Feature 2, is a midden (a dense concentration of FCR and lithic artifacts) that was discovered in a series of 1x1 m units excavated to sample an artifact concentration discovered in the shovel testing. All four identified features were partially or completely uncovered and partially excavated in an effort to document their profile shapes, to sample their contents, and to procure carbon samples for radiocarbon dating.

The excavations over Anomaly 26, which is located near Feature 2, failed to identify a distinct visible feature. This effort, however, did produce 18 percent of the FCR, 24 percent of the lithic debris, and 36 percent of the formed artifacts recovered from 33Pk348. The high concentration of artifacts at this location is unusual and the concentration of FCR is probably the source of the magnetic anomaly. In all likelihood Anomaly 26 is a feature, but not one that could be delineated in a 1x1 meter unit. Anomaly 39 contains burnt earth and charcoal that appeared to have a circular shape, but no discernible feature boundary could be detected with further excavation. It is also likely that Anomaly 39 is an archaeological feature—the susceptibility survey identified an area of high readings around Anomaly 39, not unlike the situation found at Anomaly 2, for example. Finally, the excavation of Anomaly 49 also encountered what appeared to be reddened soil. While the magnetic susceptibility meter detected unusually high readings and the unit was expanded to the north, no discrete feature boundaries were found. The source or cause of the other tested magnetic anomalies magnetic could not be determined. Similar survey work at sites 33Pk371 and 33Pk372 found that some of the archaeological features at these sites are very subtle and lack fill that is visibly different from the surrounding native soil. At 33Pk371, for example, several features were not visibly detectable until a considerable depth below surface and were identified with the aid of the magnetic susceptibility meter. The 33Pk348 anomaly testing units were seldom extended to such depths.

The magnetic survey also identified numerous other anomalies that were not tested. Those in the Anomaly 1-12 group are probably features similar to Feature 1 and 4. Other untested magnetic anomalies may also be archaeological features. There likely are other features present at 33Pk348, such as postholes, that were not detected in the geophysical surveys.

33Pk348 Feature 1

Feature 1 was initially identified as a magnetic anomaly (A.2) in the northeastern part of 33Pk348 (Figures 7.1, 7.4-7.6). Five contiguous 1x1 meter units were opened up and to reveal a large and roughly circular-shaped feature (dense concentration of FCR) that measures well over one meter (3.2 ft) in diameter. Additional displaced FCR extends outward for approximately a meter beyond the defined feature boundary. The southeast quadrant of the feature was excavated to reveal its shape in profile and to sample its contents. The profile shows what appears to be an FCR-filled, basin-shaped pit that is most evidence in the profile photo in Figure 7.6. Although a small amount of charcoal was recovered from the interior of Feature 1, there is no evidence for *in situ* burning within or along the edges of this feature—i.e., there are lenses of charcoal or ash, or a layer of burned earth. It is possible that this feature was a basin used for water/liquid boiling, rather than as an oven or hearth. As a boiling pit, the hot rock would have been heated up nearby and then set into the pit that was already filled with water.

Feature 1 is nearly identical to Feature 4 (Anomaly 12), which produced a very similar magnetic anomaly (see Figure 7.2). Similar features/magnetic anomalies were also identified at sites 33Pk347 and 33Pk372, though all but Feature 3 at 33Pk372 appear to be dismantled or cleaned out.

The excavated portion of Feature 1 produced 1105 (31.8 kg) pieces of FCR and a single piece of lithic debris. Two soil flotation samples produced 33.9 grams of oak, pine, and unidentified wood charcoal. Over 20 grams of oak bark and pine charcoal were also hand collected from the feature fill. The oak bark charcoal produced a two sigma radiocarbon date range that intersects the calibration curve at four points: B.C. 1290-1280, B.C. 1270-1110, B.C. 1100-1080, and B.C. 1060-1060. These date ranges correspond to the latter part of the Late Archaic period.

Figure 7.4. Photograph of 33Pk348 Feature 1 plan view.

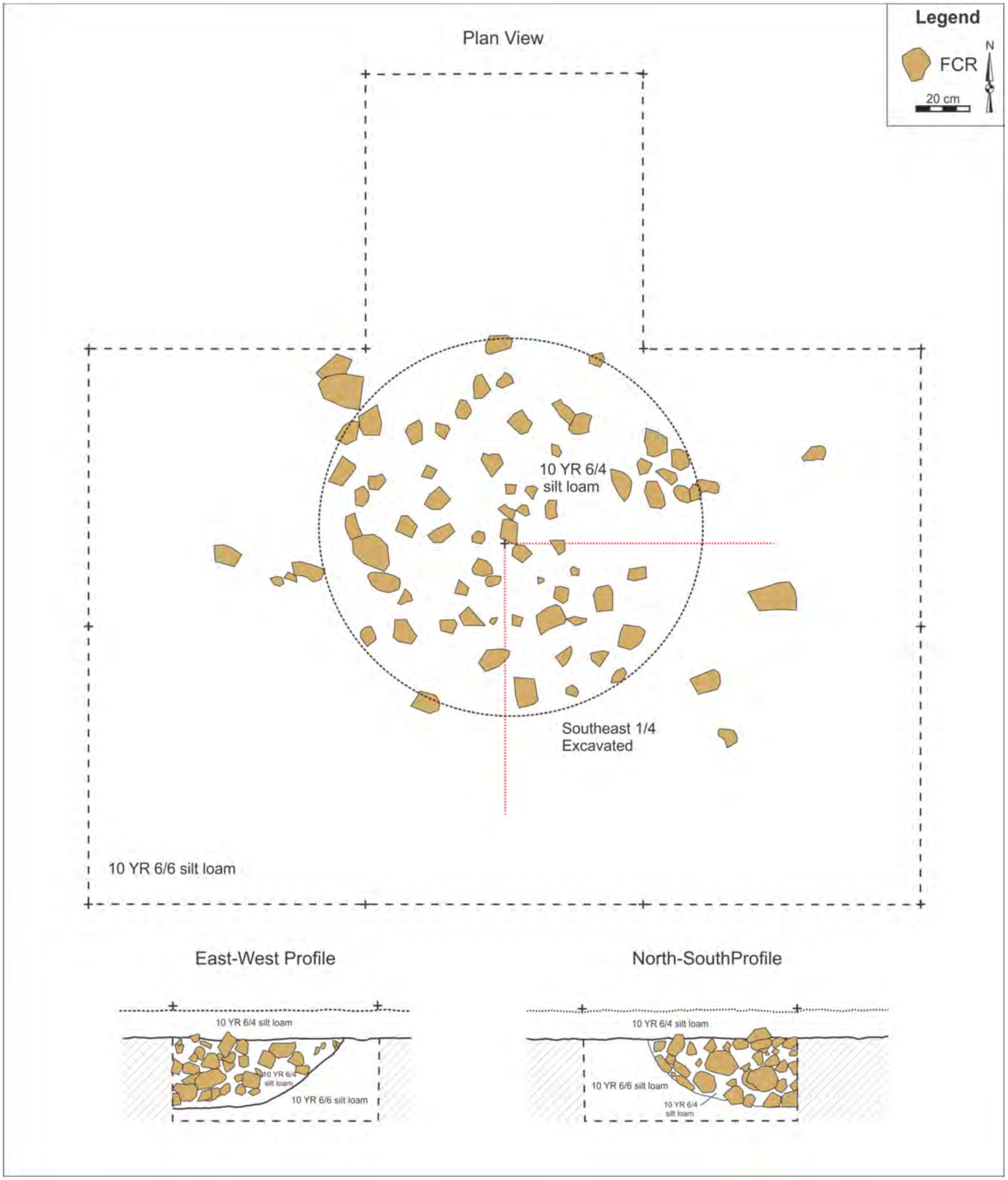

Figure 7.5. Illustration of 33Pk348 Feature 1.

Figure 7.6. Photograph of 33Pk348 Feature 1 profile.

33Pk348 Feature 2

Feature 2 is an approximately 27 cm thick layer of FCR and lithic debris (midden) found in the north-central part of 33Pk348 (Figures 7.1, 7.7-7.9). The midden was partially exposed with a series of four end-to-end 1x1 m excavation units that were initiated to sample a lithic concentration identified in the shovel test survey. Shovel tests located five meters to the south, west, and east of the Feature 2 excavation units and ten meters to the north produced few artifacts, suggesting that this midden deposit is roughly 10 meters wide and 15 meter long. It is possible that smaller refuse deposits like this within 33Pk348 remain to be identified, but they may be present, though not interpreted in the magnetic data.

The midden layer begins directly below the humus layer. The four excavation units were used to uncover the top of the midden, and then the eastern half of each unit was excavated downward to sample the midden contents. These four 1x1 m excavation units produced nearly 25 percent of the entire Phase II artifact assemblage from 33Pk348, including 2,059 (32.8 g) pieces of FCR, thee formed artifacts, and 212 pieces of lithic debris. The lithic debris from this midden accounts for nearly 40 percent of all lithic debris from 33Pk348. The formed artifacts include a flint core, a biface fragment, and what appears to be a projectile point or preform fragment.

A soil flotation sample collected from the midden produced 0.19 grams of oak and unidentified wood charcoal. The midden also produced nearly 62 grams of walnut wood and unidentified bark charcoal. The walnut wood charcoal produced a radiocarbon date of (calibrated, 2-sigma) B.C. 1000-840, which suggests that the midden and its contents date to the end of the Late Archaic period or the very beginning of the Early Woodland period.

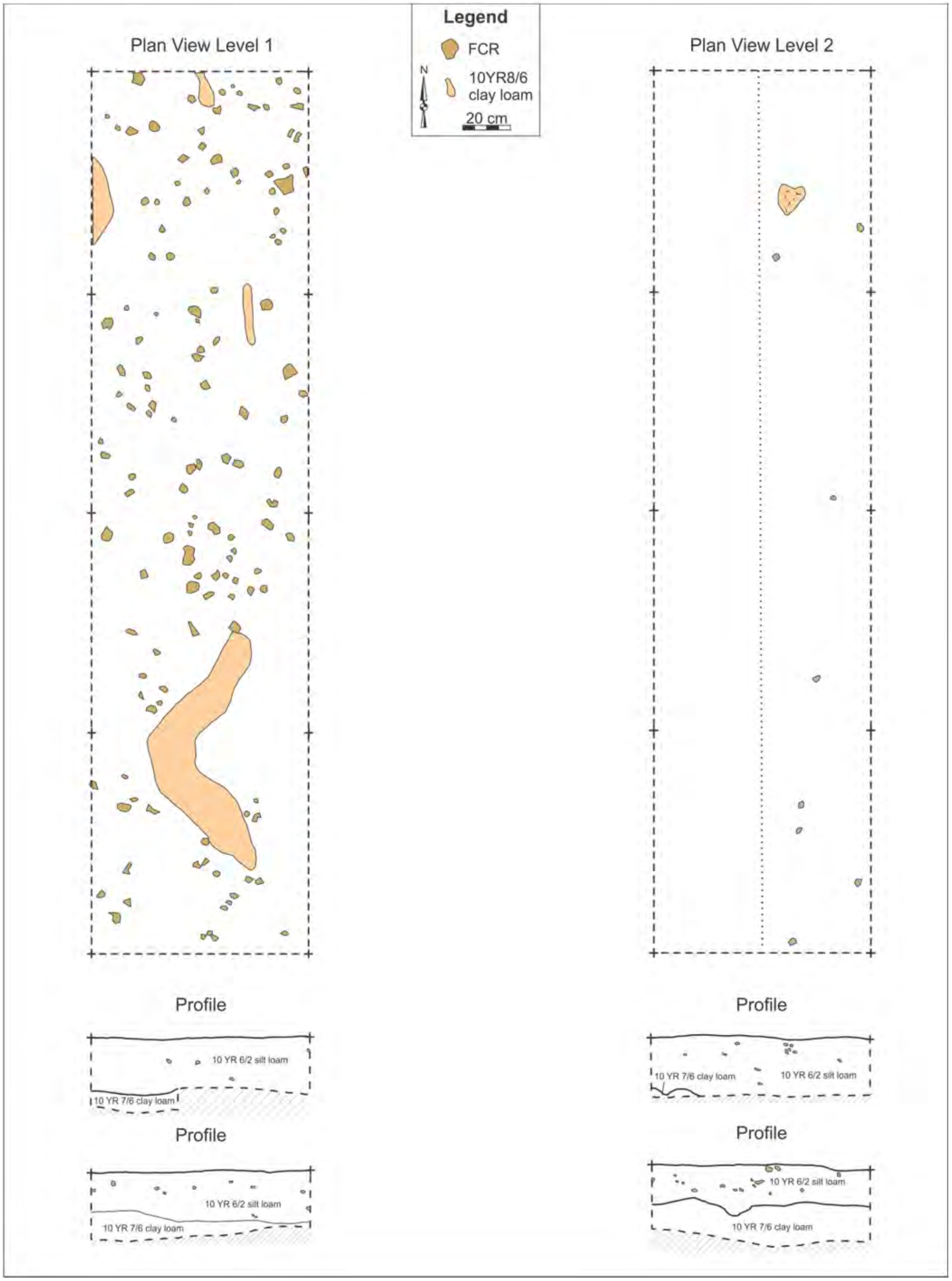

Figure 7.7. Illustration of 33Pk348 Feature 2.

Figure 7.8. Photograph of 33Pk348 Feature 2 plan view.

Figure 7.9. Photograph of 33Pk348 Feature 2 profile.

33Pk348 Feature 3

Feature 3 was identified as magnetic Anomaly 28 (Figures 7.1, 7.10-7.11). A single 1x1 meter unit was excavated over this anomaly in an effort to expose it in plan view. A cluster of small pieces of FCR (about 26 cm across) was encountered. An attempt was made to expose this feature in profile by cutting it in half along a north-south axis, but the feature was found to have no depth and thus it did not show up in profile. The west half of what remained of the feature after profiling was taken as a flotation sample and a very small piece of oak wood charcoal was found in the fill. While magnetic susceptibility tests of the floor of the 1x1 meter excavation unit found that the cluster of FCR was the only magnetic area in the excavation unit, no evidence of burned soil was found—the FCR fragments themselves were causing the higher magnetic readings. It is possible that Feature 3 is the bottom of a surface fire hearth or some other shallow pit that was not evident in plan view. It might also be a post hole containing FCR, though the edges of the posthole are not visible. If Feature 3 is a post hole, then other post holes may be present in the area. Excavations above Feature 3 produced 458 (6.7 kg) pieces of FCR, two formed artifacts, and 23 pieces of lithic debris. The formed artifacts from Feature 3 are classified as a chipped sandstone hoe fragment (see Figure 7.16) and a flint core.

Figure 7.10. Photograph of 33Pk348 Feature 3 plan view.

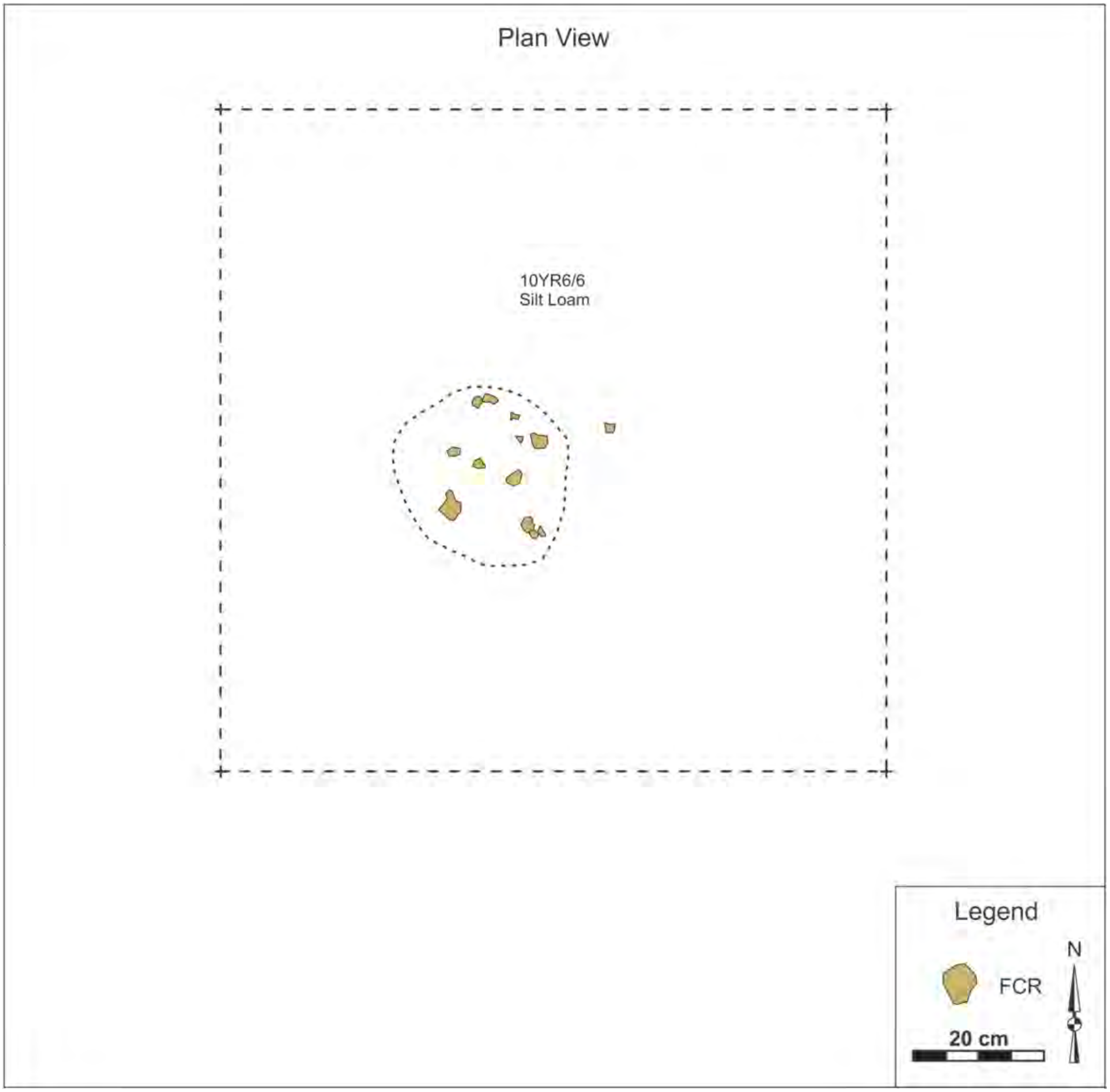

Figure 7.11. Illustration of 33Pk348 Feature 3.

33Pk348 Feature 4

Feature 4 was identified as magnetic Anomaly 12 (Figures 7.1, 7.12-7.14). Five 1x1 m units were excavated to expose the feature in plan view, which was found to consist of a roughly circular-shaped concentration of FCR. Although the entire plan view was not fully exposed, Feature 4 is roughly 1.2 m in diameter. Additional FCR was observed on the excavation floor to the south and east going beyond the feature's edge. The feature fill is undifferentiated in color or texture from the surrounding soil, so the approximate western half of the feature was excavated to expose it in profile and acquire a sample of the feature's contents. The profile shows a basin-shaped pit that is filled with FCR. The bottom of the feature is distinctively marked by a change in soil color and a sharp drop off in FCR frequency. In terms of size, shape, and contents, Feature 4 is nearly identical to Feature 1, and both are similar to Feature 3 at 33Pk372.

The excavated portion of Feature 4 produced 1167 (22.7 kg) pieces of FCR and 11 pieces of flint debris. Two soil flotation samples produced 12.2 grams of oak, pine, and unidentified wood charcoal, as well as 0.18 grams of acorn and hickory nutshell charcoal. An additional 8.8 grams of oak bark and pine charcoal was also hand collected from Feature 4. The oak bark charcoal produced a B.C. 1000-840 (2-sigma cal.) radiocarbon date, which indicates that this feature was constructed and used during the end of the Late Archaic period or beginning of the Early Woodland period.

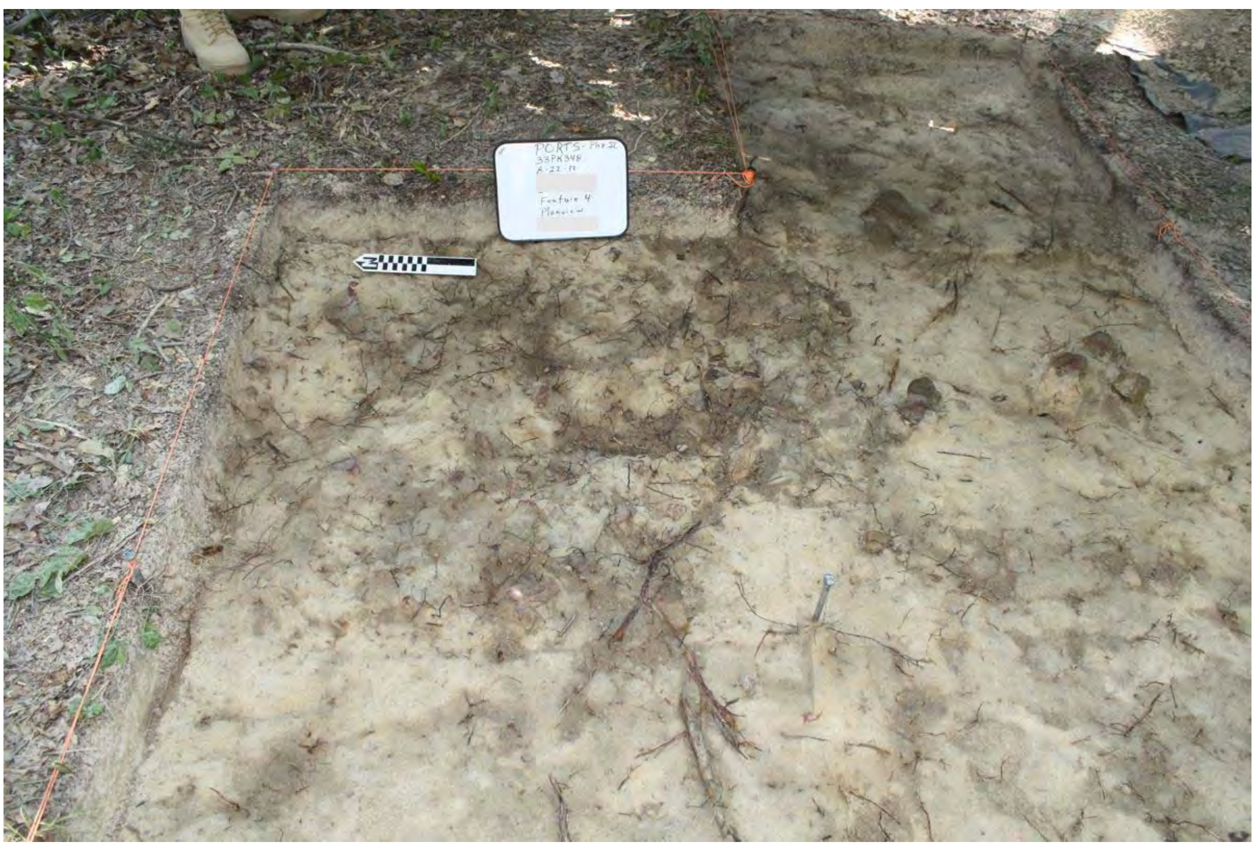

Figure 7.12. Photograph of 33Pk348 Feature 4 plan view.

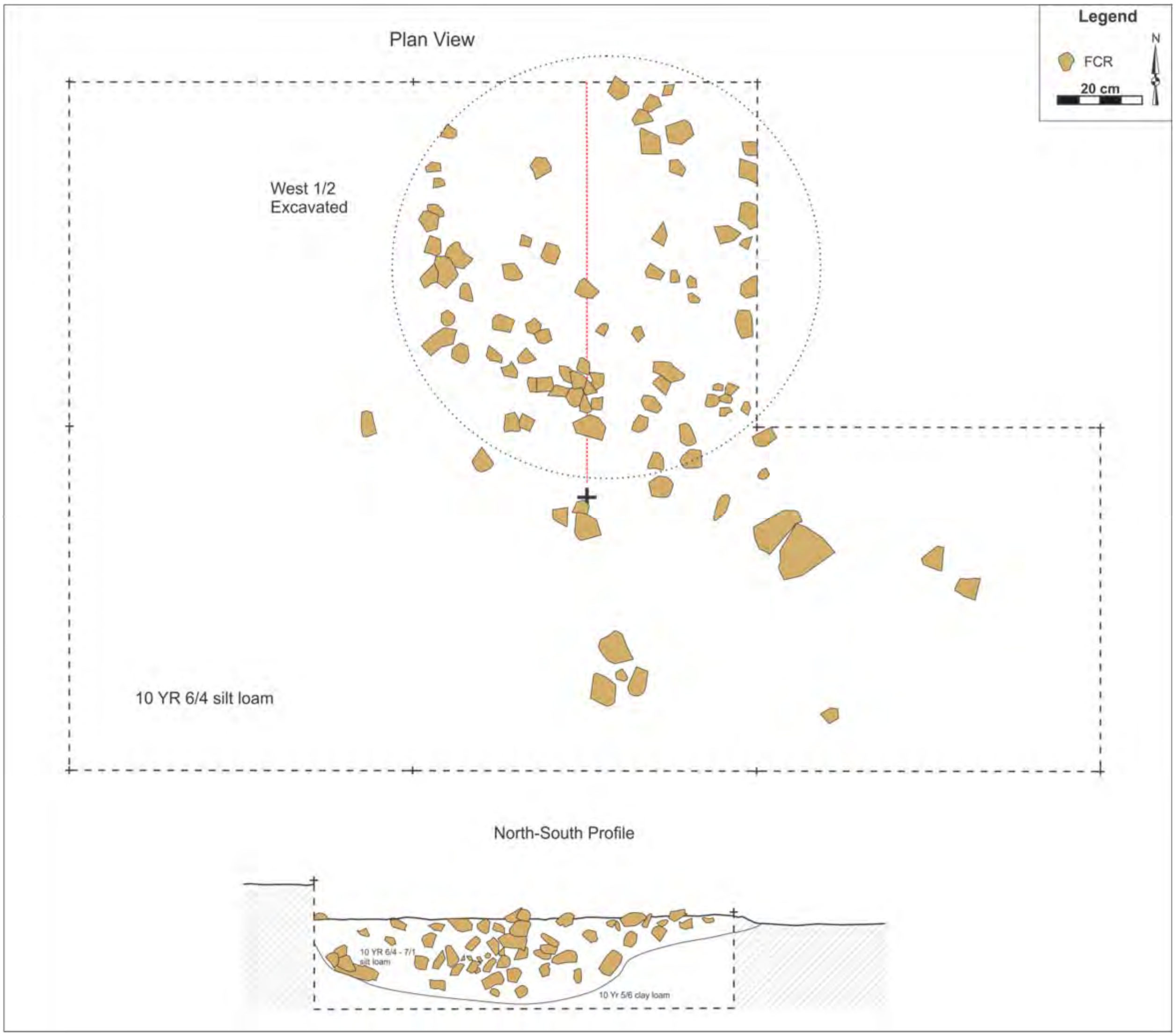

Figure 7.13. Illustration of 33Pk348 Feature 4.

Figure 7.14. Photograph of 33Pk348 Feature 4 profile.

7.3. 33PK348 ARTIFACT ASSEMBLAGE

The 33Pk348 Phase II artifact assemblage contains 9,420 objects (Table 7.3). As with the other three prehistoric sites examined in this study, the 33Pk348 assemblage is dominated by FCR (n=8,874, 205 kg). Lithic debris (n=532) and formed artifacts (n=14) were found in smaller frequencies.

Table 7.3. 33Pk348 Phase II artifact inventory.

Context	**FCR**	***FCR Weight (g)***	**Formed Artifacts**	**Lithic Debris**	**Total**
Shovel Tests	2,162	*56,899.0*	4	124	2,290
1x1 m Units	293	*5,087.9*	-	28	321
Anomaly 26*	1,567	*48,433.9*	5	127	1,699
Anomaly 36	34	*406.3*	-	1	35
Anomaly 39	21	*435.2*	-	5	26
Anomaly 54	4	*60.2*	-	-	4
Anomaly 68	4	*84.8*	-	-	4
Feature 1	1,105	*31,872.6*	-	1	1,106
Feature 2	2,059	*32,870.2*	3	212	2,274
Feature 3	458	*6,671.7*	2	23	483
Feature 4	1,167	*22,667.5*	-	11	1,178
Total	**8,874**	***205,489.3***	**14**	**532**	**9,420**

*Probable feature that was not identified due to pedogenic overprinting.

7.3.1. 33Pk348 Lithic Debris

The 33Pk348 Phase II work produced 532 pieces of lithic debris (Table 7.4). The most abundant flint types are Upper Mercer/Zaleski, the sources of which are not far to the east of PORTS, and Unidentified flints. Lower frequencies of Brassfield, Brush Creek, and Delaware flints were also recovered. All five flint types in this assemblage were probably procured from secondary deposits such as the Scioto River floodplain or tributaries of the Scioto River. It is also possible that some of the material, especially Upper Mercer/Zaleski, was transported directly to 33Pk348 in a partially altered form, such as blanks, preforms, and finished tools. The presence of water worn cortex on some of the debris and cores demonstrates that it was procured in the form of small cobbles from nearby stream deposits. All of the flint in this assemblage was imported to 33Pk348 since none of it occurs naturally in the adjacent uplands.

Objects belonging to fourteen different technological debris categories were identified in this assemblage and, excluding flake fragments and shatter, all exhibit characteristics that reveal how and when they were created in the reduction process. The lithic reduction model presented above in Figure 3.1 provides guidance on how this process is organized. Nearly all of the debris in the 33Pk348 assemblage is *Primary Reduction* debris, created when converting raw stone into a serviceable tool. Less than two percent (5 objects) is potentially from tool use and maintenance (*Secondary Reduction*) and tool recycling (*Tertiary Reduction*), and these objects are classified as biface pressure flakes. This does not mean that tool maintenance and recycling did not occur at 33Pk348, but because the debris generated during these activities tends to be very small, fragile, and fragmentary, it is seldom recoverable with the use of ¼-inch mesh screens. It is also produced in very small quantities relative to *Primary Reduction* (Pecora 2002).

Most of the lithic debris (over 62%) was created during initial reduction, which is the process of detaching flake blanks for use as flake tools or blanks for making bifaces. A small percentage (1.5%) of the core reduction debris exhibits characteristics of a bipolar reduction technique, which is a common technique for reducing small flint nodules. Cores are also the most abundant formed artifact category in this assemblage. Only 36 percent of the debris assemblage was created from the biface reduction process and most of this is from the late biface reduction stage. This implies that some of the stone was introduced to the site in the form of raw or partially altered nodules in some cases, but it was also brought into the site as prepared biface blanks.

Table 7.4. 33Pk348 lithic debris.

Technological Type	Brassfield	Brush Creek	Delaware	Upper Mercer/ Zaleski	Unidentified	Total	Reduction Stage
Primary Decortication	-	-	6	3	5	14	Initial Reduction (Core) ***62.1%***
Prim. Decortication Bipolar	-	-	1	-	-	1	
Secondary Decortication	4	3	19	20	28	74	
Sec. Decortication. Bipolar	-	-	1	-	1	2	
Interior	8	7	25	43	21	104	
Sec. Decort. Edge Prep.	1	-	2	-	-	3	Initial Biface Reduction (Blank Preparation) ***3.2%***
Sec. Decort. Alt.	-	-	-	2	1	3	
Interior-Edge Prep	-	-	-	-	1	1	
Interior Alt.	-	-	2	1	-	3	
Early Biface Thinning	1	3	3	9	1	17	Early Biface Reduction (Blank Thinning) ***5.4%***
Late Biface Thinning	9	9	11	53	5	87	Late Biface Reduction (Blank Thinning) ***27.7%***
Biface Pressure	2	-	1	2	-	5	Pressure Thinning (Preform, Tool, Tool Maintenance, Recycling) ***1.6%***
Flake Fragment	17	6	22	70	39	154	Non-Diagnostic Debris
Shatter	15	0	6	13	30	64	
Total	**57**	**28**	**99**	**216**	**132**	**532**	
%	**11%**	**5%**	**19%**	**41%**	**25%**	**100%**	

7.3.2. 33Pk348 Formed Artifacts

The Phase II investigation recovered 14 formed artifacts from 33Pk348 (Table 7.5; Figures 7.15-7.16). This assemblage is fairly diverse and contains seven general types. Delaware and Unidentified flints, and sandstone are the most common stone types represented by the formed artifact assemblage, followed by Brassfield, Upper Mercer/Zaleski, and Vanport flints, as well as quartzite. The quartzite and sandstone were fashioned into what appears to be a burnishing stone, two chipped-stone hoes, and a cupstone or nutting stone. All of the stone in this assemblage is locally available in alluvial deposits in the Scioto River floodplain.

Table 7.5. 33Pk348 formed artifacts.

Provenience	**Brassfield**	**Delaware**	**Upper Mercer/ Zaleski**	**Vanport**	**Unidentified Flint**	**Quartzite**	**Sandstone**	**Total**
Nodule/Core	-	3	-	-	3	-	-	**6**
Modified Flake	1	-	-	-	-	-	-	**1**
Biface Fragment	-	-	1	-	1	-	-	**2**
Preform/Projectile Point	-	-	-	1	-	-	-	**1**
Burnishing Stone	-	-	-	-	-	1	-	**1**
Chipped-Stone Hoe	-	-	-	-	-	-	2	**2**
Cupstone Stone	-	-	-	-	-	-	1	**1**
Total	**1**	**3**	**1**	**1**	**4**	**1**	**3**	**14**
%	***7%***	***21%***	***7%***	***7%***	***29%***	***7%***	***20%***	***100%***

33Pk348 Cores/Nodules

Cores are the most common formed artifact type in the 33Pk348 assemblage (Table 7.6; Figure 7.15). These cores all have water worn cortex, a characteristic typical of stone found in floodplain gravel deposits and glacial deposits. Such cores would have been used as sources for large flakes or spalls that then would have been converted into flake tools and bifacial tools. Over 62 percent of the lithic debris in the 33Pk348 lithic assemblage was generated from core reduction and a small percentage of this material exhibits bipolar reduction characteristics—evidence of bipolar reduction is also present on the two micro-drills recovered during the Phase I survey.

Table 7.6. 33Pk348 core/nodule metrics.

Context	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Unit	Core	35.8	37.8	20.4	24.9
Unit	Core Nodule	36.1	25.1	20.0	15.7
Unit	Core Nodule	67.5	41.4	26.1	78.2
Unit	Core Nodule	71.9	48.8	32.0	103.5
Feature 3	Core Nodule	40.0	34.8	20.9	37.4
Feature 3	Core Nodule	32.3	28.1	20.2	20.3

33Pk348 Biface Fragments

Only three biface fragments were recovered from 33Pk348 (Table 7.7; Figure 7.15). These include two unidentified biface fragments and a preform/projectile point fragment. It is possible that all three artifacts are fragments of bifacial tools, but they are too fragmentary to make a confident identification.

Table 7.7. 33Pk348 biface fragment metrics.

Context	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Unit	Biface Fragment	14.3	12.8	3.9	0.7
Feature 2	Preform/ Projectile Point	23.4	9.0	6.5	1.2
Feature 2	Biface Fragment	10.1	9.5	3.5	0.2

33Pk348 Tools

The Phase II investigation at 33Pk348 produced three objects that are definitely tools (Table 7.8; Figures 7.15-7.16). These include two chipped stone hoe-like implements, a modified flake tool, a cupstone/nutting stone, and what is interpreted to be a burnishing stone.

The hoe-like implements are large tabular pieces of hard, flinty sandstone that were bifacially modified to create symmetrical, roughly oval to rectangular forms. A similar hoe-like object was recovered from 33Pk372, though it has heavy grinding/polishing and is made from a different type of stone. The 33Pk348 hoes lack polishing. They, like the 33Pk372 specimen, are interpreted to be hoes based on their shape, but they may have functioned in digging more like a mattock. Such digging tools were likely used to excavate out the large basin-shaped pit features (Anomalies 1-12) that are numerous at 33Pk348.

The modified flake tool is a lamellar-shaped flake (bladelet-like) that is slightly modified along its parallel sides by micro-flaking. The function of this tool is not known, but it was probably used for cutting or scraping.

The “burnishing stone” is a small quartzite cobble or large pebble that was clearly brought to 33Pk348 through human agency because such stones do not naturally occur in this upland setting. The stone is water worn and has a naturally smooth surface, but it also has a very smoothed or polished, but subtle, facet on the broad and somewhat flat surface of one side. Burnishing stones were used world-wide to polish all manner of things, including wood and bone implements, so it is possible that this object was used for such a purpose at 33Pk348.

Table 7.8. 33Pk348 tool metrics.

Feat. #	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Unit	Chipped Stone Hoe	61.8	52.9	16.8	54.5
Unit	Modified flake	28.4	9.8	2.5	0.7
Unit	Burnishing Stone	51.3	50.6	33.2	124.0
Unit	Cupstone/ Nutting-stone	40.1	34.2	26.4	22.5
Unit	Chipped Stone Hoe	111.1	78.6	15.3	257.1
Phase I	Micro-drill	22.2	8.0	3.3	0.6
Phase I	Micro-drill	16.8	8.4	3.8	0.4

Figure 7.15. Images of selected artifacts from 33Pk348.

Figure 7.16. Images of chipped sandstone “hoes” from 33Pk348.

7.4. 33PK348 PALEOETHNOBOTANICAL ANALYSIS

(by Karen Leone, M.A.)

Six soil samples were analyzed from site 33Pk348: two samples were taken from two levels within Feature 1, Features 2 and 3 each provided single samples, and the remaining two samples were each taken from a different level within Feature 4. A total of 1,968 fragments (46.3 g) of wood and 28 pieces (0.2 g) of nutshell were recovered from the six soil samples with a combined volume of 108 liters of soil (Table 7.9). Wood taxa identified include oak (*Quercus* sp.), pine (*Pinus* sp.), and hickory (*Carya* sp.), with oak accounting for 66 percent of the assemblage, pine comprising 24 percent, and hickory making up the remaining 10 percent. The nutshell was identified as acorn (*Quercus* sp.; 89%) and hickory (*Carya* sp.; 11%).

Both levels in Feature 1 contained somewhat equal parts of oak and pine wood, suggesting a similar source for these two levels of the feature. The hand-collected samples from Feature 1 are consistent with the wood taxa identified in the soil samples. Wood density is higher in the lower level, at 1.1 g/*l* (49.7 n/*l*), than it is in the upper level, which is 0.5 g/*l* (18.6 n/*l*).

Feature 2, a midden, produced very low wood density counts, at just 0.01 grams, or less than one fragment (in this case, oak) per liter of soil. Three hand-collected charcoal samples from three units used to uncover Feature 2 contained very small quantities of walnut (*Juglans* sp.) wood and bark that was too fragmented to taxonomically identify.

Feature 3 produced an extremely low density of wood (less than 0.01 g/*l*); just one fragment of wood (oak) was recovered from this feature.

Feature 4 contained wood and nut remains, in similar frequencies, in each of the two levels analyzed, suggesting that these two layers in the feature were filled with sediment from the same source. The upper level contained almost equal parts of oak and hickory wood as well as a very low percentage (less than 1%) of pine, whereas oak dominated the lower level. Two hand-collected charcoal samples from Feature 4 were taxonomically consistent with the soil samples. Wood density within the feature as a whole is 0.3 grams (12 fragments) per liter of sediment, and the densities within each of the two levels are similar. Acorn and hickory nutshell are present in low densities in Feature 4. Acorn, exclusively, was recovered from the upper level, less than one specimen per liter of soil. Acorn (83%) and hickory (17%) were recovered from the lower level, at a density of one specimen per liter of soil. The frequency of nutshell within this feature is not enough to suggest that nut harvesting was taking place in or near the feature; however, its presence might indicate that nuts were being actively brought to the site and therefore the nuts may indicate a fall occupation of the site.

A hand-collected charcoal sample was recovered from a shovel test unit and it was identified as pine.

Table 7.9. 33Pk348 botanical inventory.

Provenience	**Feature 1**	**Feature 1**	**Feature 2**
Context	FCR Pit	FCR Pit	Midden
Flotation #	004	005	006
Soil Volume (liters)	30	18	15
Wood Total (n / g)	**558 / 14.94**	**896 / 18.94**	**7 / 0.19**
Black Locust (*Robinia pseudoacacia*)	-	-	-
Hickory (*Carya* sp.)	-	-	-
Oak (*Quercus* spp.)	9	13	7
Pine (*Pinus* sp.)	11	7	-
Sycamore (*Platanus occidentalis)*	-	-	-
Walnut (*Juglans* sp.)	-	-	-
Total Identified	20	20	7
Total Unidentified / Bark	0	0	0
Identifications Attempted	20	20	7
Nut Total (n / g)	**0**	**0**	**0**
Acorn (*Quercus* sp.)	-	-	-
Hickory (*Carya* sp.)	-	-	-
Walnut (*Juglans* sp.)	-	-	-
Unidentified Plant Material (n / g)	**0**	**0**	**0**
GRAND TOTAL (n / g)	**558 / 14.94**	**896 / 18.94**	**7 / 0.19**

Provenience	**Feature 3**	**Feature 4**	**Feature 4**
Context	?	FCR Pit	FCR Pit
Flotation #	007	008	009
Soil Volume (liters)	3	22	20
Wood Total (n / g)	**1 / 0.01**	**221 / 7.05**	**285 / 5.17**
Black Locust (*Robinia pseudoacacia*)	-	-	-
Hickory (*Carya* sp.)	-	9	-
Oak (*Quercus* spp.)	1	10	18
Pine (*Pinus* sp.)	-	1	2
Sycamore (*Platanus occidentalis)*	-	-	-
Walnut (*Juglans* sp.)	-	-	-
Total Identified	1	20	20
Total Unidentified / Bark	-	-	-
Identifications Attempted	1	20	20
Nut Total (n / g)	**0**	**10 / 0.04**	**18 / 0.14**
Acorn (*Quercus* sp.)	-	10 / 0.04	15 / 0.07
Hickory (*Carya* sp.)	-	-	3 / 0.07
Walnut (*Juglans* sp.)	-	-	-
Unidentified Plant Material (n / g)	**0**	**0**	**0**
GRAND TOTAL (n / g)	**1 / 0.01**	**231 / 7.09**	**303 / 5.31**

7.5. 33PK348 TEMPORAL DATA

No well-documented temporally diagnostic artifacts were found at site 33Pk348 to aid in defining the age of the site, but charcoal samples from three of the features were used to acquire radiocarbon dates (Table 7.10). In this case the radiocarbon samples produced a fairly tight cluster of dates at the end of the Late Archaic and beginning of the Early Woodland periods. Two of the dates overlap in the B.C. 1000-900 B.C. (calibrated) range and the third is just slightly older, falling sometime in the range of B.C. 1290-1060 (calibrated).

Of the range of tools found at 33Pk348 that could be temporally diagnostic, the two micro-drills found during the Phase I survey might provide some temporal clues given their presence at another of the PORTS sites, 33Pk372, where they were found in Early Woodland period contexts. While micro-drills are not unique to the Early Woodland period, they are not frequently found, or at least recognized, on sites in Ohio and their presence at a site not far from 33Pk348 suggests that related groups could have occupied both sites. At site 33Pk372 twenty of these micro-drills that are very similar to the two from 33Pk348 were found within a context radiocarbon dated to the Early Woodland period (B.C. 750-680, B.C. 670-610, B.C. 600-400 [2-sigma cal.]). This is several centuries after the primary occupations of site 33Pk348 and could mean that (1) there were in fact at least three occupations at the site, including one that left behind the micro-drills several centuries after the other two occupations, or (2) if this micro-drill technology is unique to this general time period, it may last for at least six or seven centuries from about B.C. 1200-600 and therefore the 33Pk348 micro-drills could date to the two periods of occupation indicated by the radiocarbon dates.

The Phase I and II data indicate that site 33Pk348 was occupied at least two times at the tail end of the Late Archaic period and perhaps another time during the Early Woodland period. Feature 2, the midden, and Feature 4, a nearby thermal feature, produced nearly identical calibrated radiocarbon dates, indicating that at least these two contexts derive from the same occupation. Feature 1, one of at least eleven thermal features, was likely constructed and used several generations earlier. Given that these thermal features in this area are quite close together but do not overlap, it is likely that most, if not all, of these eleven features date to about the same time as this earlier occupation represented by Feature 2.

Table 7.10. 33Pk348 temporal data.

Context	**AMS C^{14} 2-sigma Cal**	**Temporal Diagnostic**	**Temporal Period**
Phase I Shovel Test #530	n/a	Micro-drills (n=2)	Early Woodland?
Feature 2	BC 1000-840	n/a	Late Archaic-Early Woodland
Feature 4	BC 1010-900	n/a	
Feature 1	BC 1290-1280 & BC 1270-1110 BC 1100-1080 & 1060-1060	n/a	Late Archaic

7.6. 33PK348 SITE STRUCTURE

When considering the structure of a site like 33Pk348, it is best to start with the results of the shovel test survey as they give us the clearest overall impression of the size and layout of the site. Figures 7.17 and 7.18 show the distribution of FCR and lithic artifacts at 33Pk348 based on the 5 meter shovel test data (Tables 7.11 and 7.12). Fire-cracked rock was found across much of the site though three distinct clusters are evident. The large amounts of FCR in the concentrations, including the midden, suggests that the thermal features were used more than once, with debris from early uses being dumped on the ground nearby and down slope. Whether these features were repeatedly used during the same occupation or over a series of visits (crossing months or years) is not clear. The magnetic susceptibility data nicely parallel the distribution of FCR and thermal features at the site.

The distribution of the lithic artifacts is somewhat different from that of the FCR. Most of the lithic artifacts were found in the area of the Feature 2 midden. This puts the lithic debris in a different area than the thermal features. Since there is no reason to believe that the lithic debris is not related to the same occupations responsible for the thermal features, it would appear that the site occupants divided up their occupation space into areas related to the use of the thermal features and other areas where stone tools were modified and likely used. The thermal features and their associated FCR debris would have been unappealing areas for habitation—the amount of FCR on the surface in these areas would have made casual movement somewhat hazardous. Thus, it is likely that the area of the lithic debris concentration is also the location of any dwellings or shelters at the site. In fact, this is the location of Feature 3, a possible posthole.

In summary, Table 7.2 provides a breakdown of the context of the artifacts found at 33Pk348. Nearly 54 percent of the FCR was recovered from the excavations of Features 1-4. These features are defined by FCR, which is directly related to their design and function. The midden (Feature 2), a refuse deposit, produced 23 percent of the FCR. It is likely that the midden FCR was cleaned out of a nearby feature similar to size and shape to Features 1 and 4. Perhaps the removal and redeposition of this FCR in Feature 2 is why the distinctive magnetic anomaly at Anomaly 26 was not found to be an archaeological feature upon excavation—the edges of the feature were not evident without the feature's FCR fill. The testing of five additional magnetic anomalies produced 18 percent of the site's FCR, but 96 percent of this is from the Anomaly 26 excavation unit. It is evident, based on the volume of FCR, that the excavation may have failed to identify an archaeological feature at Anomaly 26. As is the case with 33Pk347, 33Pk371, and 33Pk372, pedogenic overprinting has made it very difficult to visually identify the boundaries of many of the features at these locations. Excluding the excavations over the midden (Feature 2), only three percent of the 33Pk348 FCR is from the excavation units meant to sample additional lithic debris concentrations identified from the shovel tests data. This further shows that many of the lithic debris concentrations are located in different areas than the FCR concentrations.

Table 7.11. 33Pk348 lithic debris distribution.

Technological Type	Shovel Tests	1x1 m Units	Anomaly 26	Anomaly 36	Anomaly 39	Feature 1	Feature 2	Feature 3	Feature 4	Total	Reduction Stage
Primary Decortication	5	-	2	-	-	1	5	1	-	14	Initial Reduction (Core) ***62.1%***
Prim. Decort. Bipolar	1	-	-	-	-	-	-	-	-	1	
Secondary Decortication	23	4	16	-	-	-	24	6	1	74	
Sec. Decort. Bipolar	1	1	-	-	-	-	-	-	-	2	
Interior	31	4	23	-	-	-	41	3	2	104	
Sec. Decort. Edge Prep.	2	-	-	-	-	-	1	-	-	3	Initial Biface Reduction (Blank Preparation) ***3.2%***
Sec. Decort. Alt.	-	-	3	-	-	-	-	-	-	3	
Interior-Edge Prep	1	-	-	-	-	-	-	-	-	1	
Interior Alt	1	-	-	-	-	-	2	-	-	3	
Early Biface Thinning	2	3	4	-	-	-	7	1	-	17	Early Biface Reduction (Blank Thinning) ***5.4%***
Late Biface Thinning	22	7	27	1	1	1	25	3	1	87	Late Biface Reduction (Blank Thinning) ***27.7%***
Biface Pressure	2	-	-	-	-	-	3	-	-	5	Pressure Thinning (Preform, Tool, Tool Maintenance, Recycling) ***1.6%***
Flake Fragment	42	5	43	-	1	-	51	6	6	154	Non-Diagnostic Debris
Shatter	18	3	9	-	3	-	27	3	1	64	
Total	**151**	**27**	**127**	**1**	**5**	**1**	**186**	**23**	**11**	**532**	
%	**28%**	**5%**	**24%**	**0.2%**	**1%**	**0.2%**	**35%**	**4%**	**2%**	**100%**	

Given the close association between FCR concentrations and thermal features, it is likely that all FCR concentrations are associated with thermal features at 33Pk348. With this in mind, it can be expected that there are several more thermal features that have yet to be identified.

Tables 7.10 and 7.11 tabulate the lithic artifact distribution data collected from the 33Pk348 Phase II survey. Thirty-five percent of the lithic debris and 20 percent of the formed artifacts are from four contiguous 1x1 meter units excavated over the midden (Feature 2). Similarly, two 1x1 meter units excavated over Anomaly 26, which is near the midden (Feature 2), produced 24 percent of the lithic debris and 33 percent of the formed artifacts. This implies that Anomaly 26 may be a small but dense concentration of refuse (lithics and FCR), and it was the dense concentration of FCR that caused the magnetic anomaly. Features 1, 3, and 4 produced only slightly more than six percent (n=35) of the 33Pk348 lithic debris (Table 7.11). Excluding the four units excavated over the midden (Feature 2), the 1x1 meter units dedicated to sampling lithic artifact concentrations identified in the shovel test data produced only five percent of the lithic debris and none of the formed artifacts. This is an interesting result given that these 1x1 units were placed in areas known from the shovel testing to contain elevated levels of lithic debris. Since the 1x1 units were placed directly over the shovel tests with higher amounts of lithic, and off to the side instead, the lower amounts of lithic debris in these 1x1 m units shows that this site has well-preserved artifact distribution patterns with meaningful patterning across distances less than five meters.

Table 7.12. 33Pk348 formed artifact distribution.

Provenience	**Anomaly 26**	**Feature 2**	**Feature 3**	**Shovel Test**	**Total**
Burnishing Stone	1	-	-	-	**1**
Chipped-Stone Hoe	1	-	1	-	**2**
Pitted Stone	-	-	-	1	**1**
Nodule/Core	2	1	1	2	**6**
Flint Core	-	-	-	1	**1**
Modified Flake	1	-	-	-	**1**
Biface Fragment	-	1	-	1	**2**
Preform/Projectile Point	-	1	-	-	**1**
Total	**5**	**3**	**2**	**5**	**15**
%	***33%***	***20%***	***13%***	***33%***	***100%***

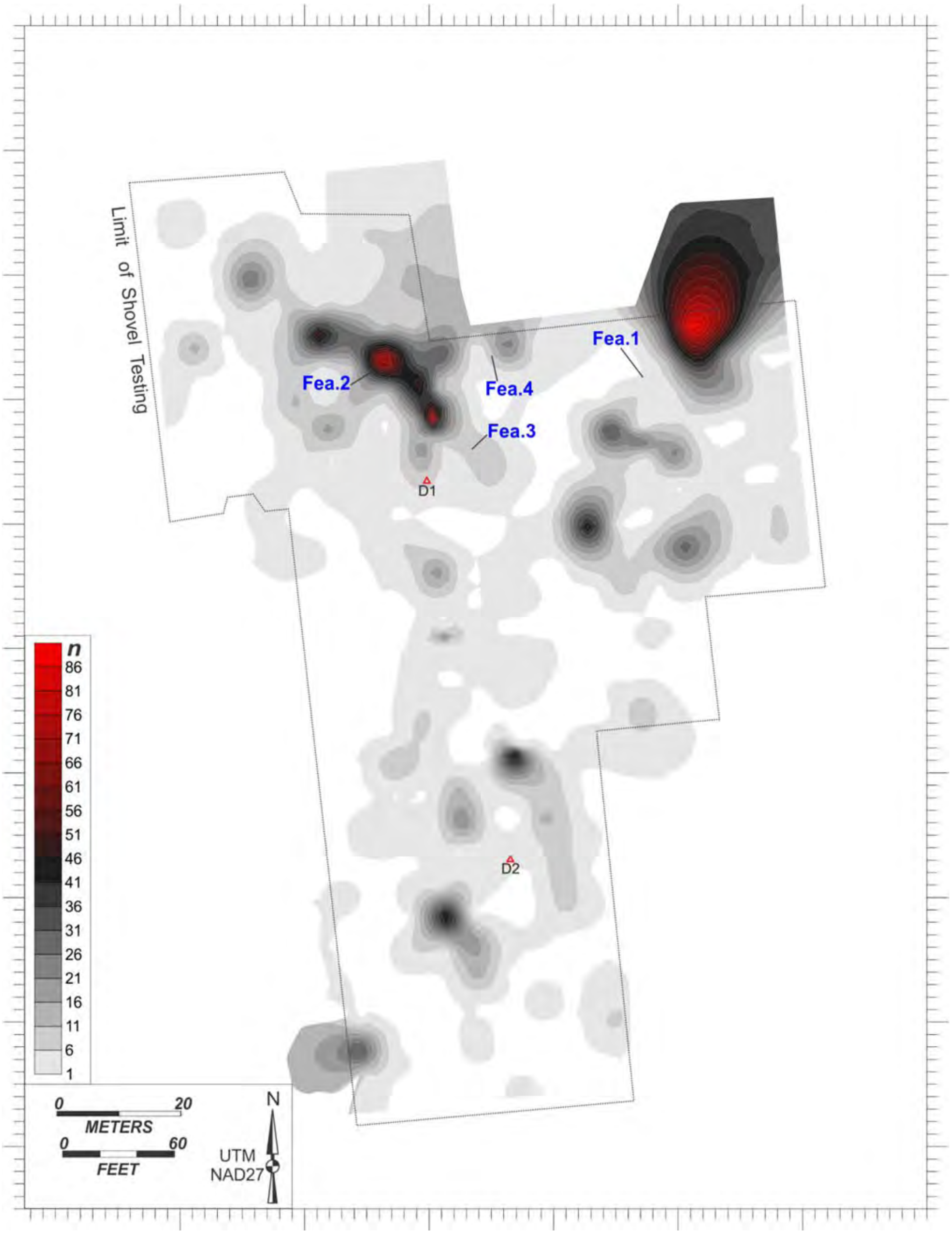

Figure 7.17. Illustration of site 33Pk348 showing the distribution of FCR.

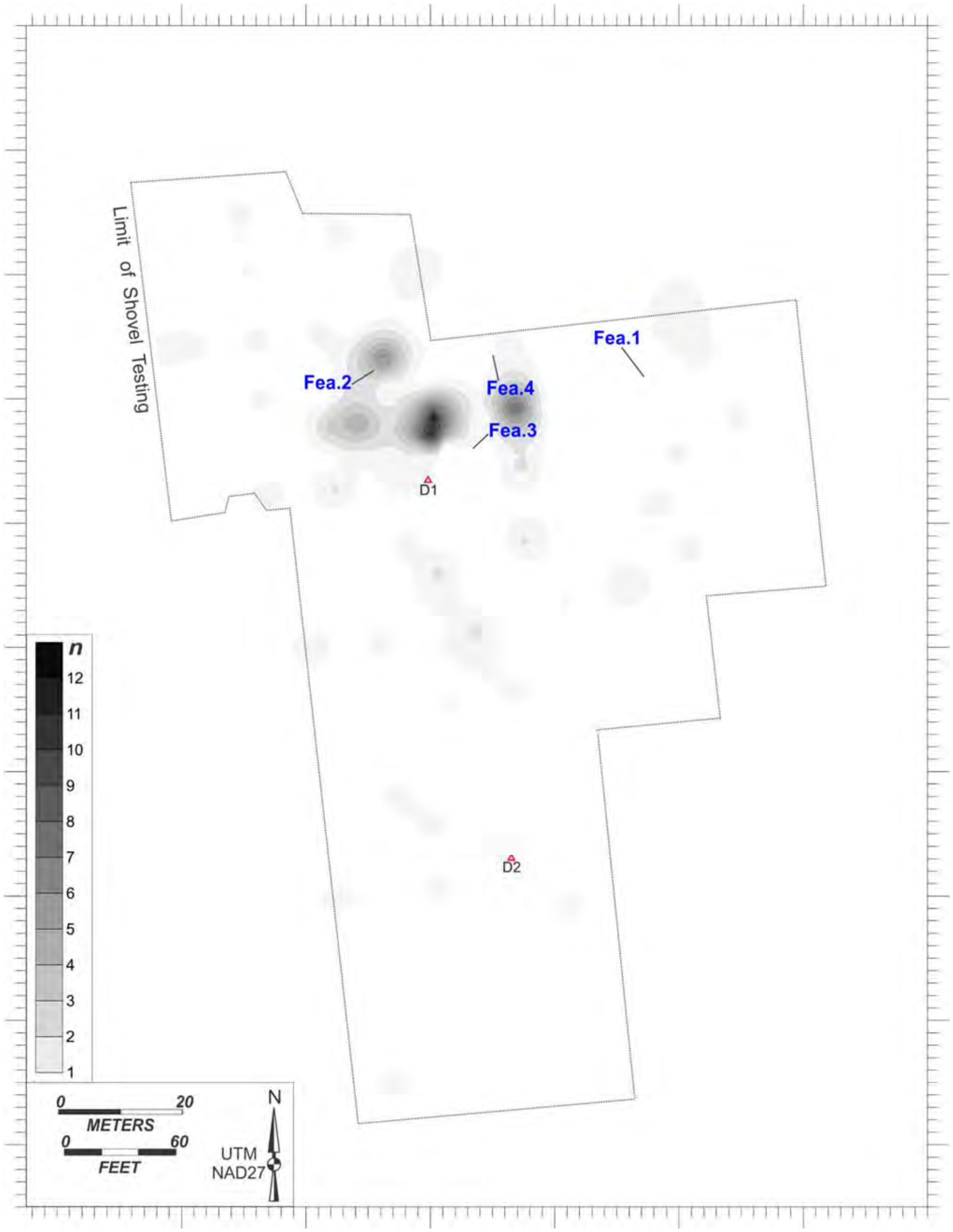

Figure 7.18. Illustration of site 33Pk348 showing the distribution of lithic artifacts.

Figure 7.19 is a summary illustration of the Phase II field work results at site 33Pk348. Clusters of FCR are shown in light red, clusters of lithic artifacts are light blue, and unexcavated thermal features detected in the magnetic survey are red. The FCR clusters fairly closely match the areas of high magnetic susceptibility. The map show that there are no significant lithic debris clusters in the area of the thermal features, but the FCR and magnetically enhanced soils cascade down the slope in this area. This near-industrial scale thermal processing area was repeatedly used over a fairly short period of time, perhaps 1-10 years. But what it might have been used for is still a mystery. The botanical analysis identified wood charcoal and some nutshell charcoal, but seemingly not enough of the latter to indicate this area was used for roasting or parching (i.e., rapidly drying with heat) nuts. Given the large amount of FCR and lack of deep cylindrical pits (i.e., earth ovens), it may be that water boiling was the primary function of the thermal features in this area. Certainly boiling at this scale would have been used to process large amounts of some locally available plant material, and more than likely this was nuts—or, nut meat. This thermal processing area of the site is currently only associated with one radiocarbon date, the oldest date at the site (*circa* B.C. 1290-1060) procured from Feature 1 charcoal.

A large artifact cluster is located a considerable distance from most of the known thermal features. Lithic debris and FCR are plentiful in this area, including the only tools found at the site (e.g., the micro-drills and the hoe-like bifaces). While this area does not have the large number of thermal features, at least one is known (Feature 4) and is very similar to the thermal feature cluster associated with Feature 1. This appears to be a general-use area of the site, with a mix of different, overlapping activities. A dense, class-rich refuse dump (Feature 2) suggests that people were living and/or working on a wider range of things for longer periods of time—that is, long enough for all of this refuse to be deposited. Usually, areas with high refuse density and a wide variety of feature and artifact types are living areas. In this case, a dwelling may be present in the vicinity of Feature 3.

The final distinct area of the site includes several small clusters of FCR and areas of higher magnetic susceptibility values. A lack of lithic artifacts suggests that this area was also used for thermal activities. However, no large thermal features like Features 1 and 4 were found in this area, so these thermal activities may have been somewhat different, or less intense, than those that occurred elsewhere on the site.

This discussion of artifact distribution patterns at site 33Pk348 based on the shovel test and 1x1 meter unit data shows that the site has small and tightly defined artifact clusters. Use of a slightly offset 5 meter shovel test grid might have produced different results, revealing the locations of other small artifact concentrations. Any future examinations of this site should consider this and use site testing intervals sufficient to account for such small artifact clusters—and the surface of this site should not be stripped to reveal subsurface features without additional, high-density shovel testing and/or 1x1 meter unit excavations. In fact, any future survey work should include complete hand excavation and screening of the lithic debris cluster (i.e., the top foot of soil) associated with the midden (Feature 2).

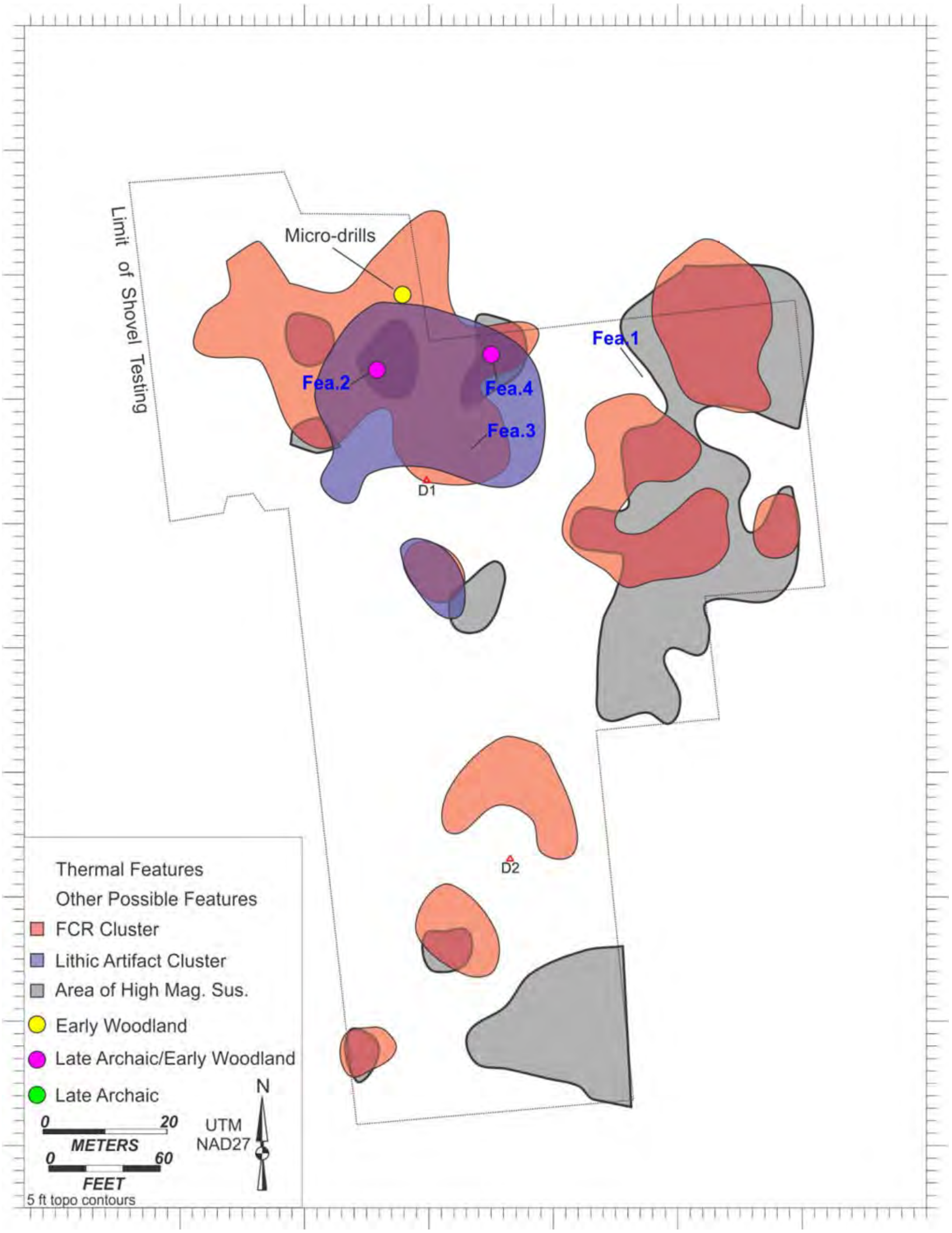

Figure 7.19. Illustration of site 33Pk348 summary map.

8. 33PK371 PHASE II RESULTS

Site 33Pk371 is located on the western quadrant of PORTS (Figure 8.1). The landform in this area is heavily dissected and contains several ridge tops, smaller toe-ridges, and a narrow stream valley that empties into the Scioto River floodplain. The site's surface is fairly irregular with varied sloping surfaces and narrow ridges separated by depressions. Because of the dissected nature of the surrounding landscape, it is not entirely clear where the nearest water source would have been located, especially in the drier times of the year. The site is currently covered by secondary growth hardwoods, a few large sycamore trees (suggesting water is likely near), and dense undergrowth. The 1938/39 and 1951 aerial photographs show this portion of PORTS to be open pasture with scattered trees.

This site was originally documented during a Phase I archaeological survey that involved systematic shovel testing on a 15 meter grid (Pecora 2012b). The Phase I survey effort recovered 324 artifacts, of which 120 were found in 27 shovel tests. The remaining artifacts, 209, were recovered from nine square meters of hand excavation over Feature 1, a large FCR feature that was further examined in the Phase II work. The Phase I shovel tests produced 86 pieces of FCR, 201 FCR fragments were documented in Feature 1. The survey also produced 37 lithic artifacts. Eight of these were found in the fill above Feature 1; the rest came from shovel tests spread across the site. Lithic artifacts in this assemblage include two core/nodules, three tools, and 32 flint flakes and shatter. Six flint types are present in this assemblage, but all types could have been procured from gravel deposits found in the Scioto River floodplain.

The Phase I tool assemblage includes two projectile points and a unifacial scraper-like tool (shown later in Figure 8.26). The two projectile points resemble Early Archaic types. One specimen, made from a dark colored flint (Zaleski or Upper Mercer), has a slightly beveled blade and is similar to the Big Sandy or Graham Cave Side Notched types, which date to as early as 8000 B.C. and as late as 5500 B.C. (Justice 1987). The second projectile point in this assemblage is the distal portion of a very thin and well executed serrated point made from Delaware flint. Kirk Cluster-type projectile points frequently have serrated blades and they date to around 7500-6900 B.C. (Justice 1987).

The Phase I survey concluded that 33Pk371 is a low-density lithic scatter with a moderately high amount of FCR. The Phase I survey also confirmed that there is at least one feature present at 33Pk371.

Table 8.1 summarizes the Phase II survey work at 33Pk371 (Figure 8.1). The geophysical survey covered nearly 70 percent of the defined site area. Three-hundred-nine shovel tests were then excavated on a five meter grid to acquire a representative artifact sample and to better define the site boundaries. Artifact concentrations identified in the shovel testing were investigated further with the excavation of eleven 1x1 m units. Additional 1x1 m units (n=14) were placed over seven geophysical anomalies in an effort to identify and define archaeological features. In total, the Phase II survey effort excavated 103 m^2 or 0.9% of the site area. Approximately nine additional square meters were excavated over Feature 1 during the Phase I survey.

The Phase II work recovered 7,618 artifacts and identified ten archaeological features. Several other geophysical anomalies not investigated in during the Phase II could also be archaeological features.

Table 8.1. 33Pk371 Phase II investigation summary.

Description	Value
50x50 cm Shovel Tests (Total)	n=309 (77.25 m^2)
50x50 Shovel Tests (Artifact-bearing)	n=272 (68 m^2)
1x1 m Units (Anomaly Ground-truthing)	n=14 (14 m^2)
1x1 m Units (Artifact Sampling)	n=11 (11 m^2)
Percentage of Site Area Excavated	0.9%
Geophysical Survey Area	7,465 m^2
Number of Archaeological Features Identified	n=10
Number of Artifacts Recovered	n=7,618
Number of Artifacts per Excavated Square Meter	n=44.6
Average Number of Artifacts per Positive Shovel Test (0.25 m^2)	n=12.6

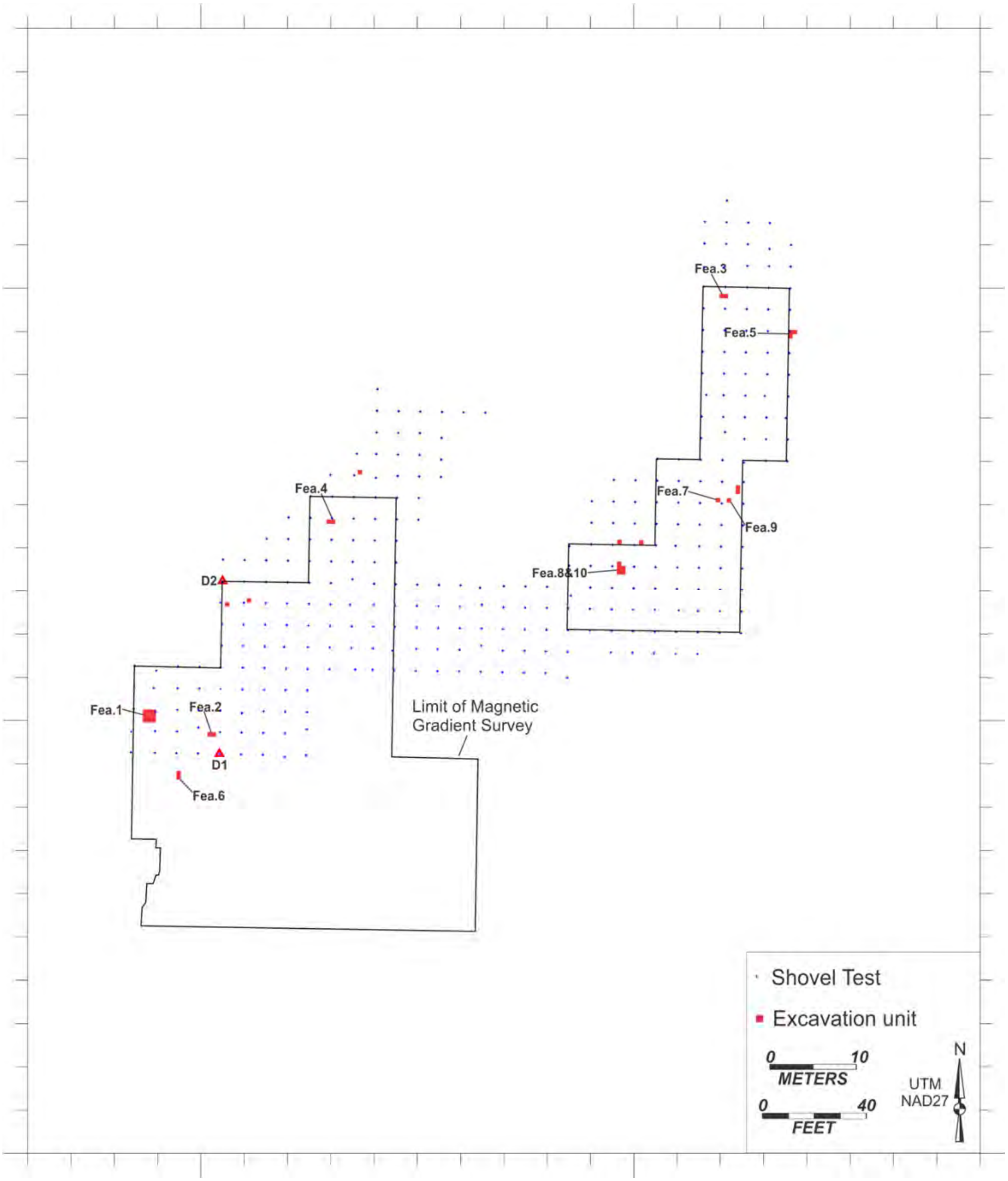

Figure 8.1. Illustration of 33Pk371 showing the Phase II fieldwork.

8.1. 33PK371 GEOPHYSICAL SURVEY RESULTS

The geophysical survey work at 33Pk371 included magnetic gradient and magnetic susceptibility surveys. All of the brushy undergrowth was removed from the site prior to the survey. The magnetic gradient survey was split into two areas that focused on the higher, flatter ground. Figure 8.2 shows the results of the magnetic gradient survey. There are numerous possible prehistoric pit features in the data, as well other anomalies that are likely historic-era in age.

In Figure 8.3 ten anomalies thought to be prehistoric pit features are singled out and numbered (1-10). These are spread across both of the surveyed areas and tend to be located on the high, flat ground. Details related to each of these anomalies are presented in Table 8.2. Most appear to have fairly strong peak magnetic amplitudes, which is partially the result of some features being close to the surface. But in the case of Anomaly 1, for example, the strong magnetic readings are probably related to the large amounts of FCR located close to the surface (Anomaly 1, which is Feature 1, was found during the Phase I work at the site).

The magnetic survey identified several anomalies thought to have a recent origin unassociated with the prehistoric occupation of 33Pk371. Excavations placed over one of these anomalies, however, uncovered portions of what is likely a prehistoric structure (Feature 8, described below). Thus, it appears that this large dipolar anomaly could be the magnetic signature of an intact prehistoric house floor rather than something of recent origin. Intact house floors are rarely found at Ohio archaeology sites, especially in the uplands, because plowing usually thoroughly destroys such features.

The most distinctive magnetic anomalies at site 33Pk371 are the irregular linear anomalies. This area of the site has a very irregular, hummocky surface and looks to have been disturbed by heavy machinery excavations. Generally speaking, linear anomalies such as Anomaly 11 tend to be associated with filled in ditch features. However, soil coring of Anomaly 11 failed to detect any evidence of a ditch, though it did rather unexpectedly reveal that much of this area of the site is underlain by sand (Hendershot 1990 shows this area as being covered by Princeton fine sandy loam, which contains wind-blown fine sands). Sand is not generally magnetic, but pockets of silty or clayey sediment in sand can appear as more strongly magnetic anomalies. In this case, it is possible that the linear anomalies are magnetic soils very near surface that were intentionally or accidentally created by heavy machinery. The irregular anomalies at Anomaly 11a are associated with large excavations certainly resulting from heavy machinery activity. Overall, this entire area of the site looks to be heavily modified, including Anomalies 11 and 11a, during the recent historic-era occupation.

Figure 8.3 also shows the results of the magnetic susceptibility survey. Four areas of higher susceptibility values were identified. All are closely associated with magnetic gradient anomalies found to be features through excavation. These high susceptibility areas are likely associated with the primary occupations of 33Pk371. The strongest readings were found near the large FCR feature (Feature 1) at Anomaly 1. This appears to be a thermal activity area not unlike those at sites 33Pk347 and 33Pk348.

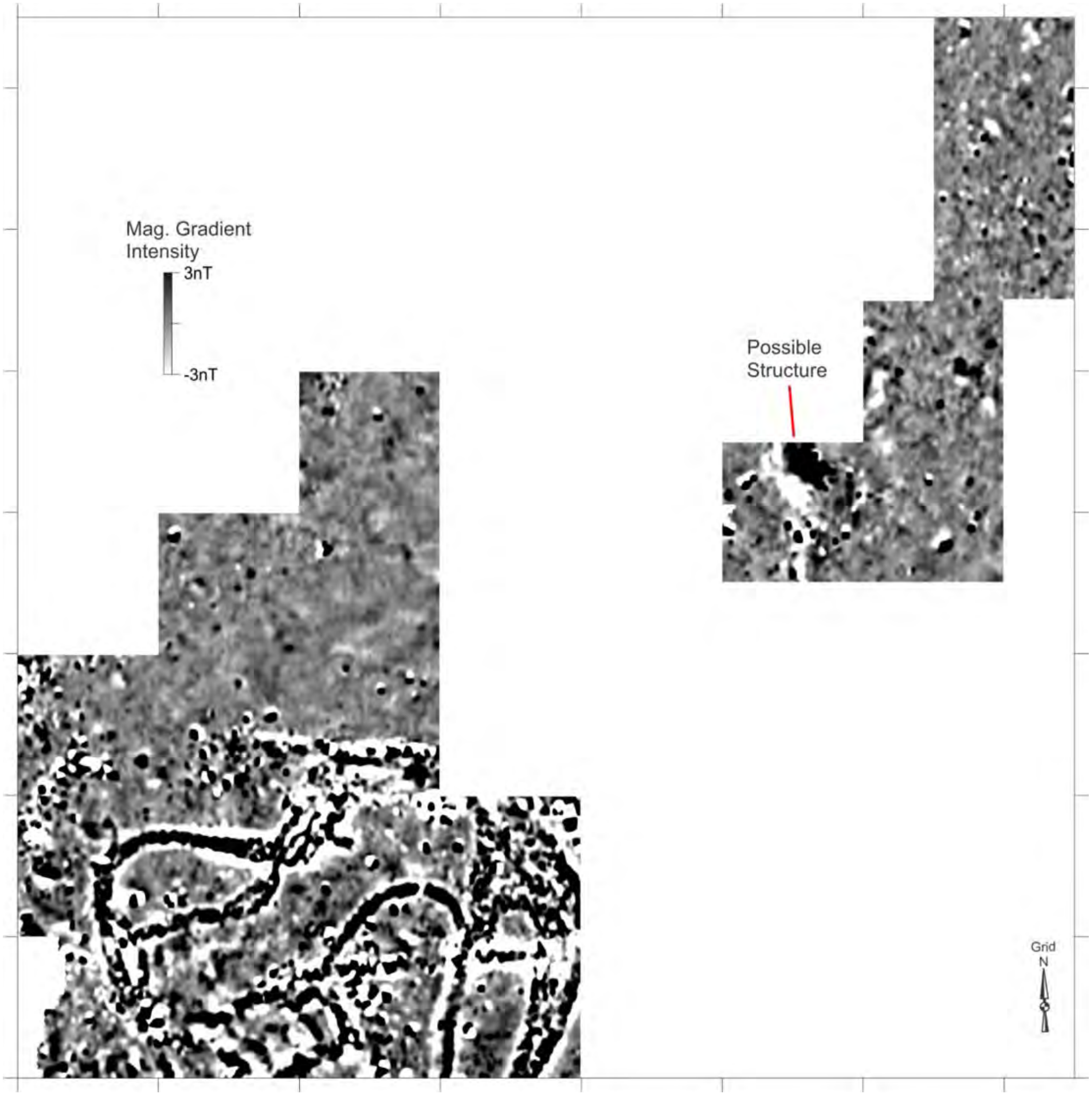

Figure 8.2. Magnetic gradient results from 33Pk371.

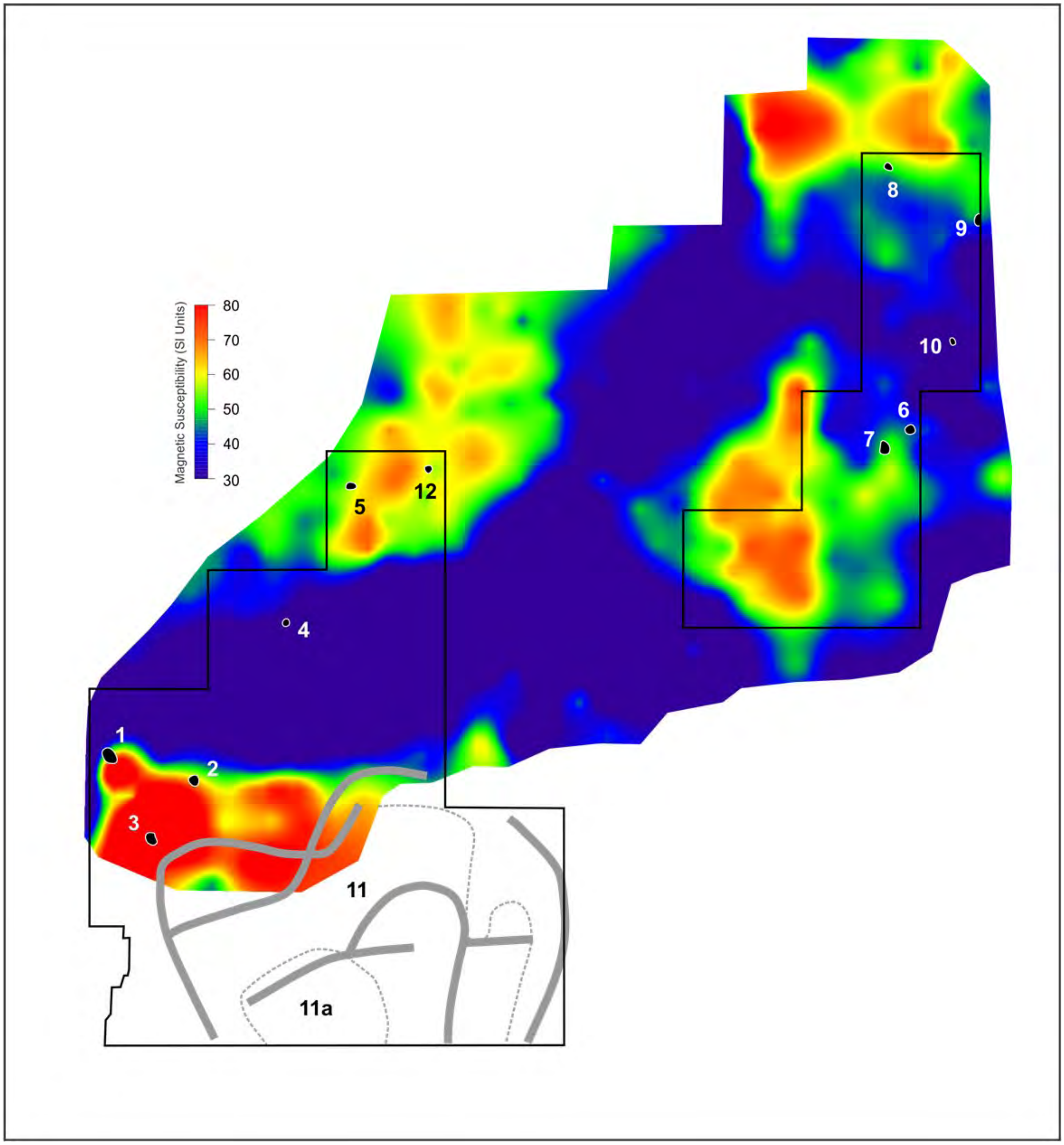

Figure 8.3. Magnetic gradient anomalies and magnetic susceptibility results at 33Pk371.

Table 8.2. Anomaly information from site 33Pk371.

Anom. #	Peak Intensity (nT)	Anomaly Class[a]	Size[b]	Comments/Interpretation
1	15.15	MP	6-7	Known FCR concentration from Phase I
2	18.6	MP/DS	3	Large pit, possible burning
3	8.61	MP	4-5	Possible pit, near linear
4	9.31	MP	3	Probable pit
5	7.26	MP	2	Possible pit
6	6.58	MP	2	Probable pit
7	13.49	MP	4	Probable pit, FCR or burning
8	12.21	DC	3	Possible pit or burned area; iron
9	20.24	DS-B	4	Possible thermal feature
10	9.83	MP	3	Possible pit
11	2-25	DC		Long linear anomalies-filled trenches or paths?
12	8.41	MP	2	Possible pit

a – MP=monopolar positive; DS=dipolar simple; DC=dipolar complex

b – number of transects in which anomaly detected, edges of anomaly may not match edges of feature

8.2. 33PK371 FEATURES

The magnetic gradient survey detected numerous magnetic anomalies within site 33Pk371, twelve of which were selected as potential archaeological features. Six anomalies (A.2, A.3, A.5, A.7, A.8, and A.9) were selected for further investigation or "ground-truthing," and all were found to be features (Features 1-7). Four additional features were found in other excavation units not associated with magnetic anomalies. Feature 1 was identified in a shovel test excavated during the original Phase I survey. Features 8-10 were identified while excavating 1x1 meter units in an effort to sample artifact concentrations detected in the Phase II shovel testing effort. The locations of Features 8 and 10, however, correspond with a large magnetic anomaly that was not originally selected for testing because it occurred within in an area thought to be disturbed in recent historic-era times. In total, the Phase I and II surveys identified 10 features within 33Pk371. All were partially or completely uncovered and four (Features 1, 2, 3, and 6) were partially excavated in an effort to document their profile shapes, collect a sample of their artifacts, and procure carbon samples for radiocarbon dating.

8.2.1. 33Pk371 Feature 1

Feature 1, which was identified and uncovered during the Phase I survey, is an approximately 2.0 m by 2.9 m FCR concentration (Figure 8.1, 8.4-8.6). This feature consists of a much denser FCR concentration, roughly 1.5 m in diameter, located in the south-central part of the larger concentration. The visual impression in plan view is that the smaller and denser FCR concentration represents the top of a nearly circular pit feature.

The southwestern quadrant of this feature was excavated in 10 cm levels to expose two vertical profiles. This quadrant was selected for excavation because it incorporated the Phase I shovel test which extended into this feature. The profile excavation revealed shallow basin-shaped pit filled with FCR and small charcoal fragments in a silt loam matrix. The exposed pit in the east-west and north-south profiles is approximately 1.2 m long. The excavated portion of Feature 1 produced 564 (17.8 kg) pieces of FCR and six pieces of lithic debris.

Three soil flotation samples produced 0.84 grams of black locust, hickory, oak, sycamore, and walnut wood charcoal and 0.12 grams of charred hickory nutshell. An additional 2.0 grams of hickory wood charcoal was hand collected in the field. A portion of the hand collected hickory wood charcoal sample produced a radiocarbon date of A.D. 660-780 (Cal. 2-sigma), which indicates that Feature 1 was constructed and used during the Late Woodland period. No other Late Woodland features or diagnostic artifacts were recovered from 33Pk371. While Feature 1 is clearly some sort of facility related closely to the use of thermal stone, its exact function is not known. The fact that the FCR is located in a pit suggests that this is a constructed feature, presumably with an intended function, and not just a pile of discarded FCR.

In summary, Feature 1 is a 2.4 m diameter flat-bottomed pit. There is a dense concentration of FCR about 1.2-1.5 m in diameter near the center of the pit. FCR occurs sporadically in the remainder of the pit fill and is mixed with small fragments of wood and nut charcoal, as well a few pieces of lithic debris.

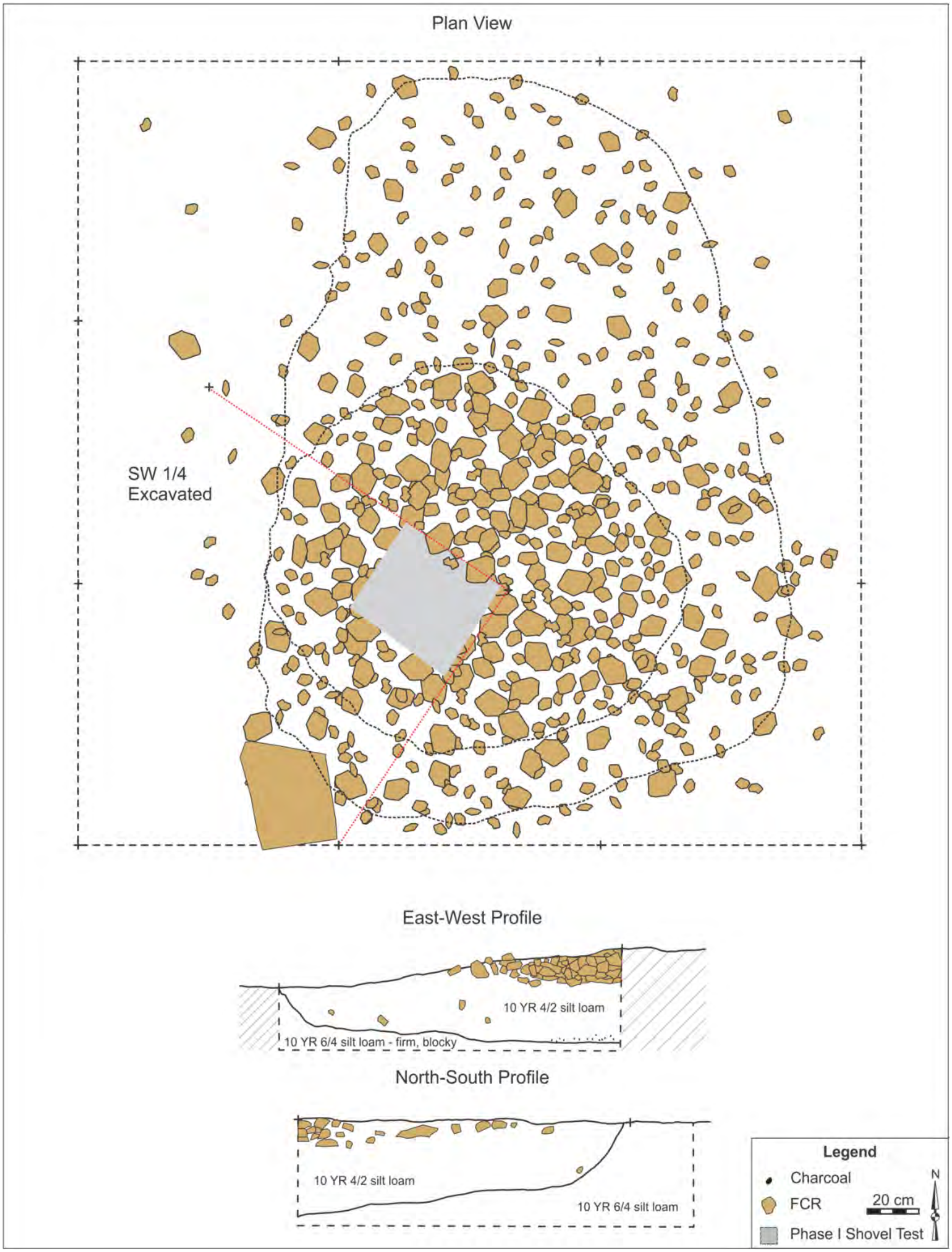

Figure 8.4. Illustration of 33Pk371 Feature 1.


Figure 8.5. Photograph of 33Pk371 Feature 1 plan view.

Figure 8.6. Photograph of 33Pk371 Feature 1 profile.

8.2.2. 33Pk371 Feature 2

Feature 2 is one of several magnetic anomalies (A. #2) selected for further investigation (Figures 8.1, 8.7-8.9). Two contiguous 1x1 meter excavation units were placed over this anomaly to expose it in plan view. Upon initial excavation, no visible evidence of a feature was encountered within the light yellowish brown-brownish yellow soil matrix. At this point, a decision was made to continue excavating down in 10 cm levels. Eventually a clear arc of burned rock and FCR was encountered (Level 1), revealing what appears to be the southern half of a 1.2 m diameter pit feature. Further excavation revealed a distinct ring of burnt earth around the outer edge of what appears to be deliberately arranged stone (Level 2). Because the feature is represented by what appears to be a deliberate (or purposeful) arrangement of stone, no attempt was made to further the excavation and the stone was left in place.

Although the excavation had clearly bisected the pit feature, exposing its northern half in profile, no pit feature boundaries were evident in the profile wall. The lack of a visible pit boundary in profile indicates that after the feature was filled in continuing soil formation worked to homogenize the pit fill, making it look like the soil matrix surrounding the feature—a process referred to as pedogenic overprinting.

The excavated portion of Feature 2 produced 167 (2.6 kg) pieces of FCR and two pieces of lithic debris. Two soil samples taken for flotation processing produced 0.85 grams of black locust, hickory, oak, and unidentified wood charcoal. Two hand collected samples of hickory wood charcoal (4.6 grams) produced a radiocarbon date of with a two-sigma range of B.C. 810-760 and B.C. 680-670 (calibrated), which indicates that Feature 2 was used during the Early Woodland period. Feature 2 appears to be the remains of an earth oven based on the circular arrangement of stone/FCR and the burnt-earth ring observed around the outer margins of the stone.

Feature 2 is an excellent example of a cultural resource that would not be detected using traditional archaeological methods. It was first identified as a magnetic anomaly thought to be a potential feature. Initially, traditional excavation techniques failed to identify the feature (due to a lack of soil color differentiation and pedogenic overprinting) but magnetic susceptibility meter readings prompted additional excavation and enabled the identification of this feature.

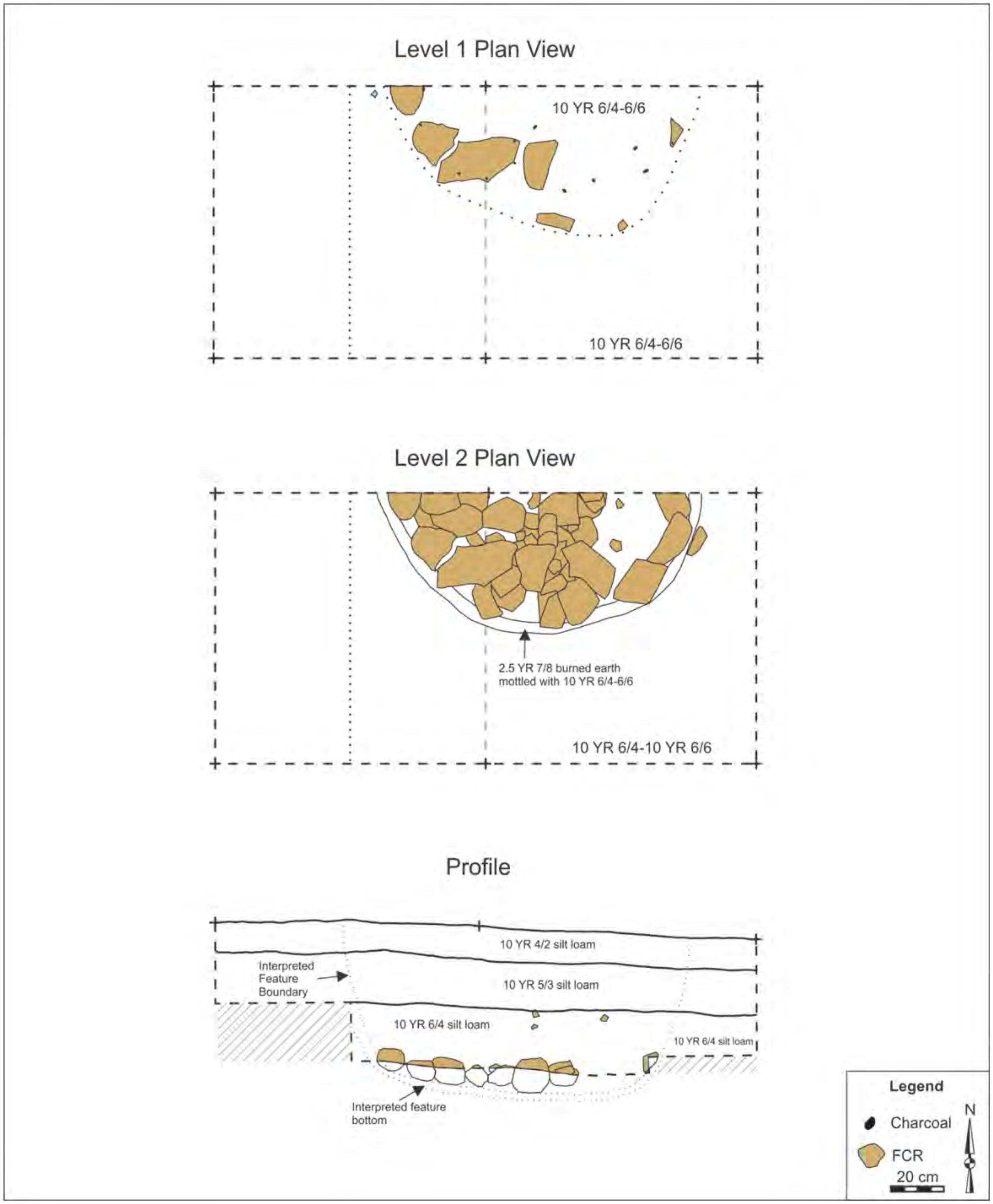

Figure 8.7. Illustration of 33Pk371 Feature 2.

Figure 8.8. Photograph of 33Pk371 Feature 2 plan view (Level 1).

Figure 8.9. Photograph of 33Pk371 Feature 2 plan view (Level 2).

8.2.3. 33Pk371 Feature 3

Feature 3 was initially identified as magnetic Anomaly #8 (Figures 8.1, 8.10-8.12). Two contiguous 1x1 m units were excavated over this anomaly location, revealing a slight soil discoloration and scattered FCR in what appears to be the northern half of a large circular or oval shaped feature. The exposed portion of the feature is roughly 100 cm across along the southern side of the excavation unit. At Level 1, the feature fill is a light yellowish brown friable silt loam with sporadic FCR surrounded by brownish yellow, blocky silty clay loam subsoil. Magnetic susceptibility readings were as high as 121 SI within the feature fill and 90-97 SI in the surrounding subsoil.

Once the plan view of this feature was delineated, the western half (north western quadrant) was excavated in 10 cm levels to expose an east-west and north south vertical profile. These profiles show a steep-sided pit feature that extends downward. The feature fill is very subtly different from the surrounding matrix, but contains FCR and small amounts of charcoal. Unlike Feature 2, which displays a deliberate arrangement of rock and FCR, the FCR in Feature 3 is mixed throughout the fill. This seemingly random mixing suggests that this feature is an empty or cleaned-out pit that was filled in with material containing FCR and charcoal. The excavated portion of the feature fill produced 108 (1.4 kg) pieces of FCR and two pieces of lithic debris. The 22 liter soil sample from Feature 3 produced 0.05 grams of oak wood and unidentified wood charcoal. A small amount of sycamore wood charcoal (0.36 grams) was also collected from the bottom of Feature 3. The sycamore wood charcoal produced a B.C. 1010-830 radiocarbon date (2-sigma cal.), which indicates that Feature 3 was constructed and used at the boundary of the Late Archaic and Early Woodland periods. The function of Feature 3 remains unknown, but it could be a cleaned out earth oven.

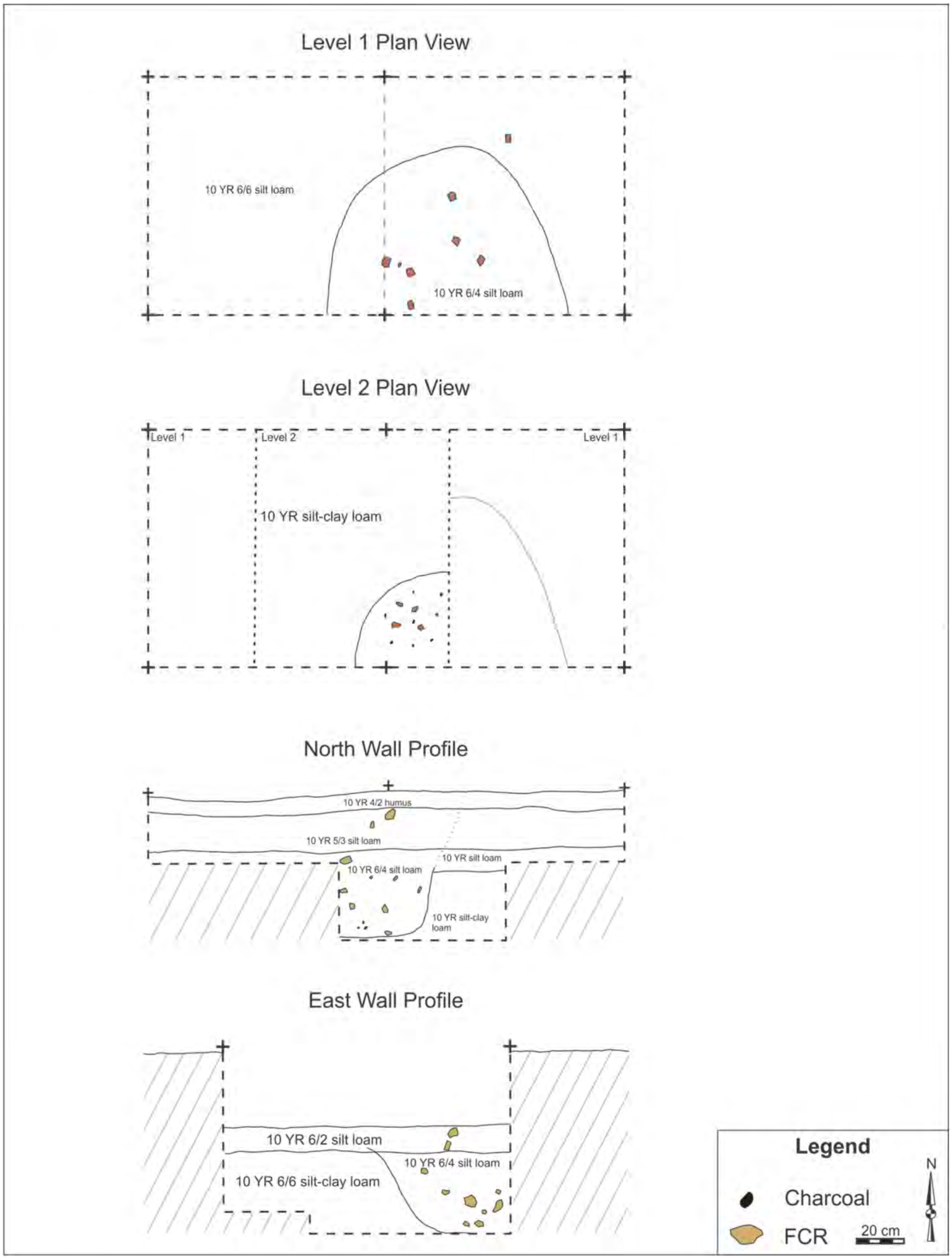

Figure 8.10. Illustration of 33Pk371 Feature 3.

Figure 8.11. Photograph of 33Pk371 Feature 3 plan view.

Figure 8.12. Photograph of 33Pk371 Feature 3 profile.

8.2.4. 33Pk371 Feature 4

Feature 4 was first identified as magnetic Anomaly #5 (Figures 8.1, 8.13-8.14). Two contiguous 1x1 m units were excavated over this anomaly to verify the presence of an archaeological feature. A concentration of FCR was found in the eastern-most part of the excavation unit. A slight soil discoloration was also observed around the FCR. Although not exposed completely in plan view, this feature appears to be a circular FCR-filled thermal feature that extends beyond the northern, eastern, and southern sides of the excavation. The excavation fill above Feature 4 produced 79 (3.7 kg) pieces of FCR, a flint core and six pieces of lithic debris. Once this magnetic anomaly was verified as a probable archaeological feature, it was left unexcavated and the excavation unit backfilled.

Figure 8.13. Photograph of 33Pk371 Feature 4 plan view.

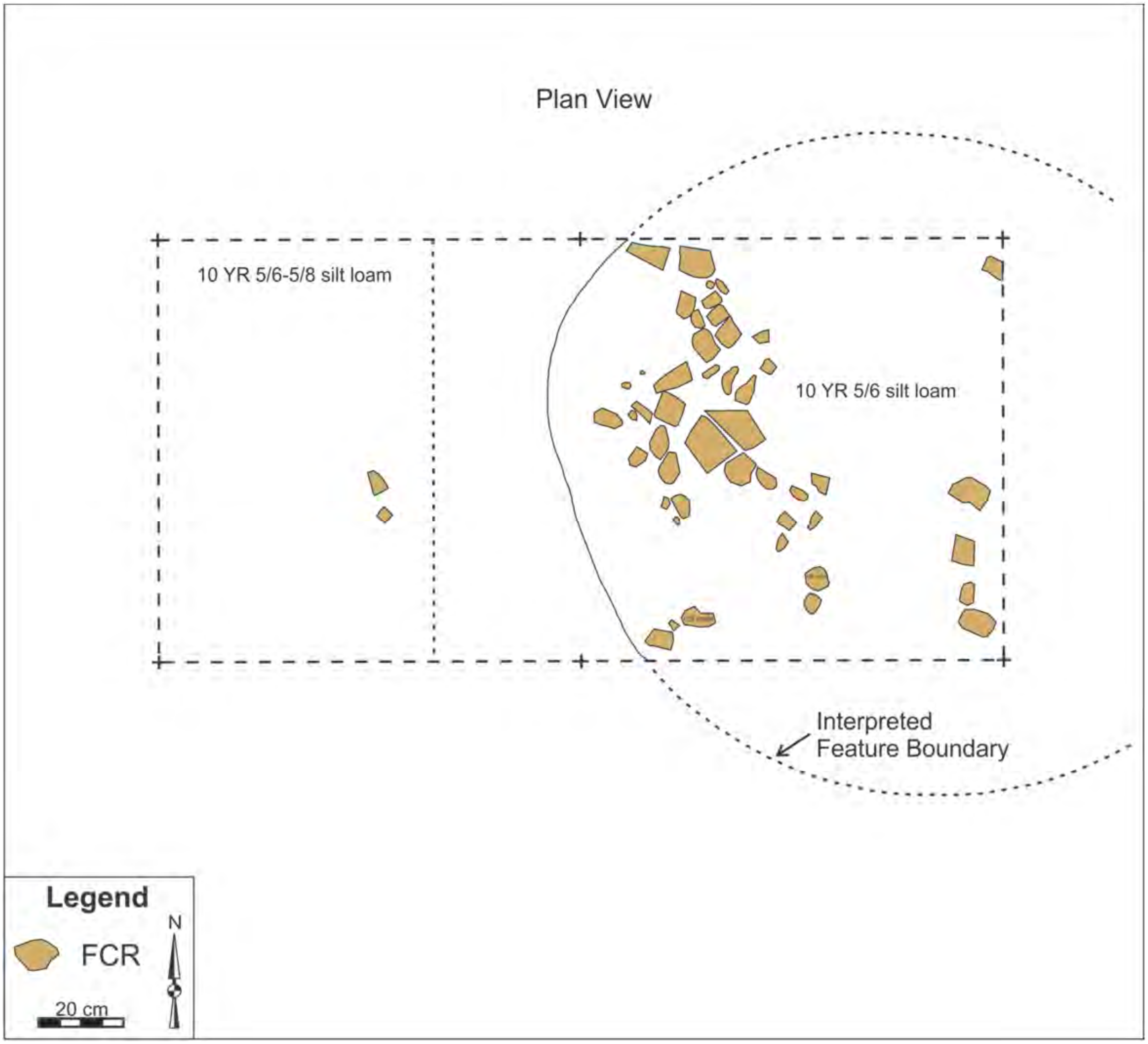

Figure 8.14. Illustration of 33Pk371 Feature 4.

8.2.5. 33Pk371 Feature 5

Feature 5 was initially identified as magnetic Anomaly #9 (Figures 8.1, 8.15-8.16). Three contiguous 1x1 m units were excavated to expose this feature in plan view. The excavation units revealed nearly three-quarters of an oval-shaped feature was revealed, measuring 76 cm by 108 cm. The feature fill consists of a mottled dark red silt loam with weak red silt loam or silty clay peds, FCR, and small charcoal fragments. The FCR, however, was found scattered across the floor of the entire excavation unit and is not contained within the reddened (burnt) earth. The soil excavated and screened to reveal this feature in plan view produced 87 (2.6 kg) pieces of FCR and two pieces of lithic debris. Slightly over four grams of oak wood charcoal were also collected from this feature.

Feature 5 was not further excavated, so it is not possible to determine its vertical shape or to infer function. The burnt earth fill suggests that it is a thermal feature, such as an earth oven. It could also be the remains of a burned tree root system.

Figure 8.15. Photograph of 33Pk371 Feature 5 plan view.

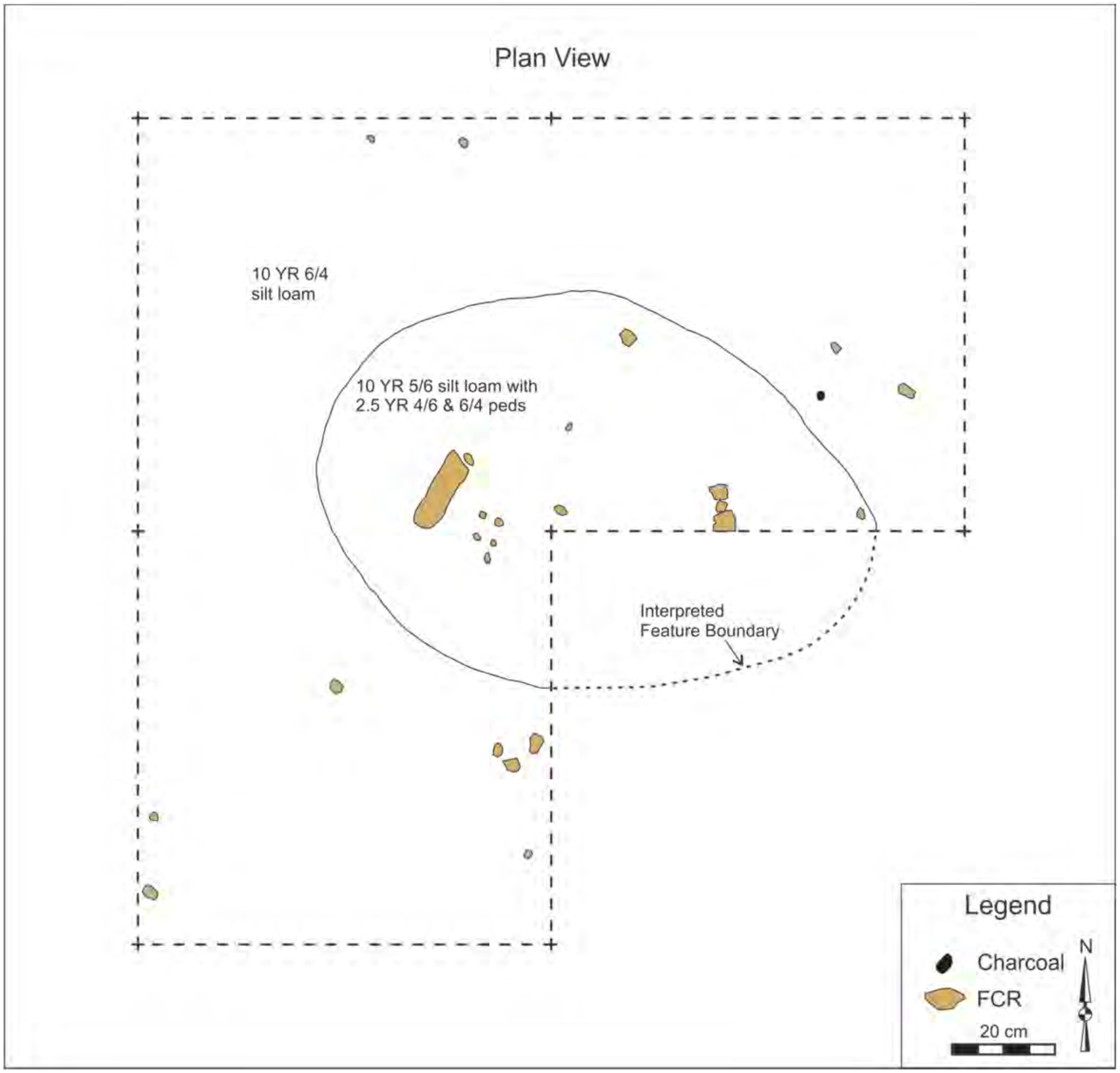

Figure 8.16. Illustration of 33Pk371 Feature 5.

8.2.6. 33Pk371 Feature 6

Feature 6 was initially identified as a magnetic anomaly (A. #3) near Features 1 and 2 at site 33Pk371 (Figures 8.1, 8.17-8.18). Two contiguous 1x1 m units were excavated over this anomaly. At the base of the excavation no discernible feature was observed. Given the lesson learned with Feature 2, which is located just a few meters to the north, the excavation was continued in the southern-most 1x1 m unit in 10 cm levels. At a deeper level, a small FCR fragment was observed in the southern half of the excavation. Continued excavation eventually revealed a clear concentration of small-sized FCR. At this point in the excavation, all FCR was pedestaled and left in place and all soil fill was removed.

The plan view shows what appears to be the northern half of a circular-shaped feature composed of small pieces of FCR. The pile of FCR looks to be the result of a single dumping event. The south and east walls of the excavation revealed a very subtle pit-shaped feature in profile, the bottom of which is not exposed. Like Feature 2, the feature fill above the FCR pile lacks visible artifacts and, due to pedogenic overprinting, the feature profile is only vaguely visible. Feature 6 is another example of a feature that would be difficult to identify without the aid of the magnetometer and magnetic susceptibility meter.

Unlike Feature 2, which displays what appears to be an arrangement of stone significant to the functioning of the feature, the rock in the bottom of Feature 6 appears to be "spent" or exhausted and dumped into the pit after being used elsewhere. Feature 6 also lacks the ring of burned earth observed in Feature 2. The excavated portion of Feature 6 produced 340 (6.7 kg) pieces of FCR and four pieces of lithic debris. Most of the recovered FCR and the lithic debris were found scattered throughout the feature fill above the pile FCR at the bottom of the pit. A soil flotation sample and hand-collected carbon samples produced over 21 grams of hickory and oak wood charcoal. A very small amount of charred walnut nut shell was also recovered. A sample of hickory wood charcoal produced a radiocarbon date that intercepts the calibration curve (2-sigma) at several points, including B.C. 1210-1200, B.C. 1190-1140, and B.C. 1130-1000, which indicates that Feature 6 was constructed and used during the Late Archaic period.

Based on these results the original planned function of Feature 6 could not be determined, but it may have been a thermal feature that was cleaned-out and then subsequently served as a receptacle for spent (i.e., very small fragments) FCR.

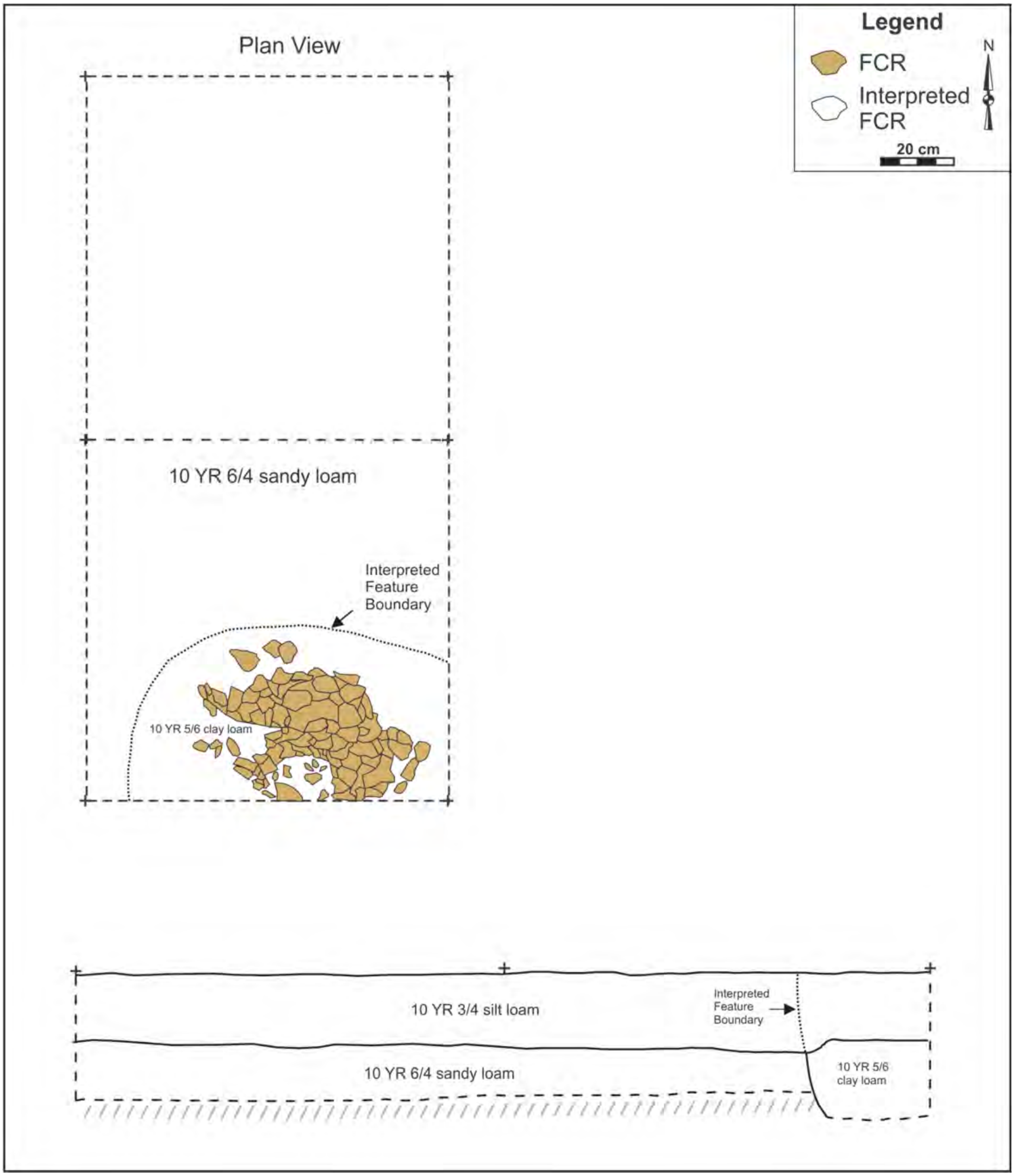

Figure 8.17. Illustration of 33Pk371 Feature 6.

Figure 8.18. Photograph of 33Pk371 Feature 6 plan view.

8.2.7. 33Pk371 Feature 7

Feature 7 was initially identified as a magnetic anomaly (A. #7) (Figures 8.1 and 8.19). A single 1x1 meter unit was placed over this anomaly in an attempt to define a feature in plan view. A concentration of FCR and charcoal was found in the southeastern corner of the excavation unit. The feature fill is very subtle and nearly indiscernible from the surrounding subsoil matrix without the aid of the FCR and charcoal. In plan view, what was exposed of the feature appears to be the northwestern quadrant of a large circular pit that extends to the east and south, beyond the excavation unit boundaries. The excavated and screened fill from above Feature 7 contained 194 (3.9 kg) pieces of FCR and nine pieces of lithic debris. The FCR is probably part of the feature's structure but the lithic debris is likely an incidental inclusion in the soil used to fill in the pit. Feature 7 was left unexcavated beyond this point; its function and final depth remain unknown; however, it appears to be an FCR-filled pit likely used for cooking or heating.

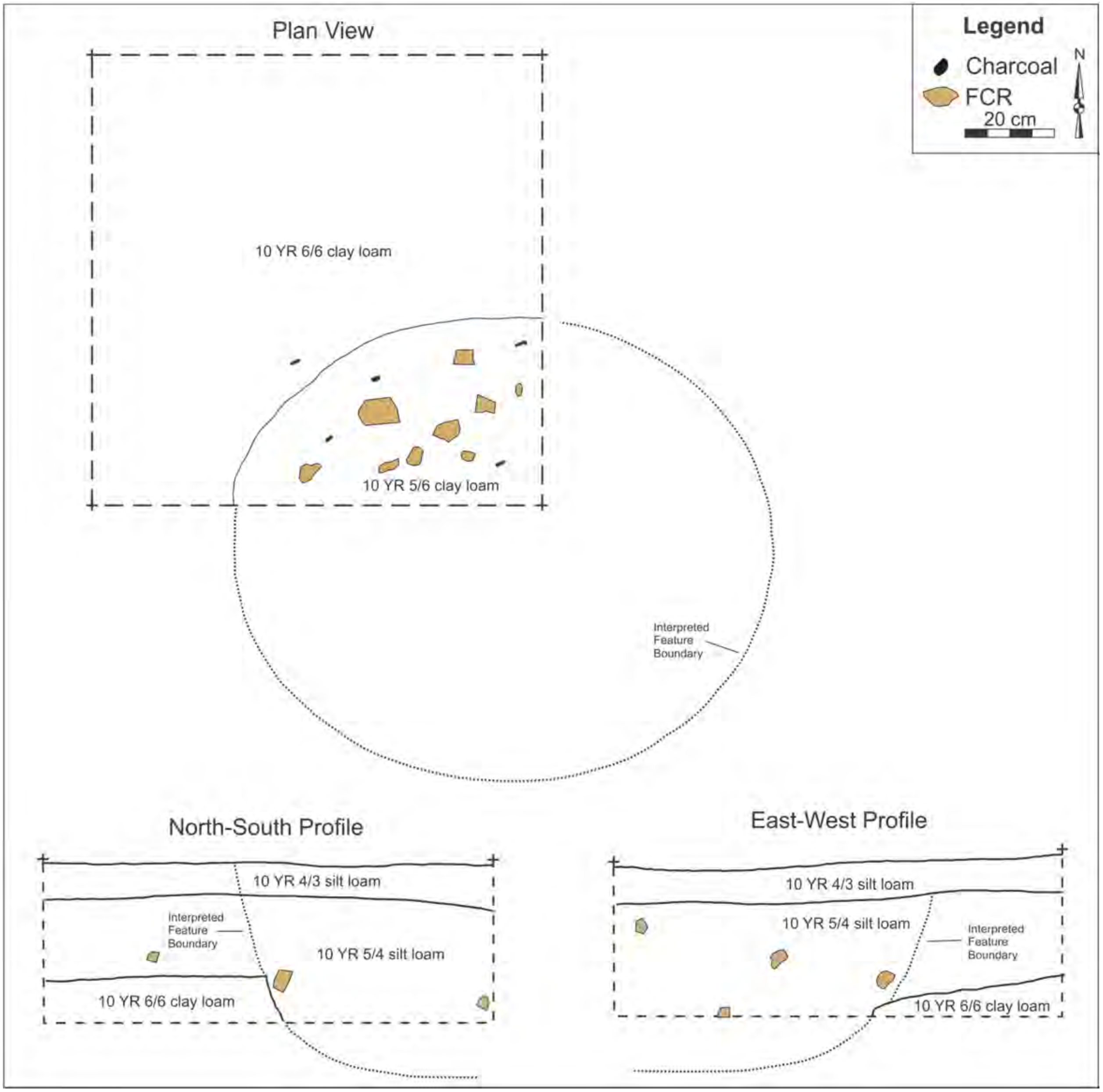

Figure 8.19. Illustration of 33Pk371 Feature 7.

8.2.8. 33Pk371 Feature 8

Feature 8 (along with Feature 10) was identified in the floor of five 1x1 m units excavated in a portion of the site containing a relatively high density of artifacts (Figures 8.1, 8.20-8.22). At the base of the initial excavation, carbon, burnt earth and a large quantity of artifacts were encountered, suggesting the presence of a feature. This prompted the expansion of the excavation, which ended in five conjoined 1x1 meter units. Feature 8 was detected by the magnetic gradient survey but it was not initially selected for further investigation because it was thought to be relatively recent historic-era disturbance.

The horizontal extent of Feature 8 was not fully defined and it appears to extend beyond the excavation units. Near the center of the excavation block is a subtle concentration of FCR and charcoal that form a possible circular-shaped feature measuring approximately 100 cm in diameter. An area of burned earth, about 25 cm across, was found in the center of the charcoal and FCR cluster. Nearby, to the northeast and northwest of the central part of the feature, are two oval-shaped concentrations of carbon, each of which is roughly 25 cm wide by 35 cm long. These smaller features are possible posthole features associated with Feature 8. Feature 10, which is represented by what appears to be the northwest quadrant of an FCR-filled thermal feature, is located in the southeast corner of the excavation block.

The excavated and screened fill above the level at which Feature 8 was defined produced 323 (4.3 kg) pieces of FCR, 19 formed lithic artifact fragments, 148 pieces of flint debitage, and 14 pottery sherds. The formed artifacts include a flint core, the tip of a preform or projectile point, four heavily burnt preform or projectile point fragments (bifaces), 12 pieces of burnt shatter that were derived from the same or similar bifaces, and a groundstone celt fragment. The pottery is a thick, grit-tempered variety with a smooth exterior surface. Small hand collected samples of carbon from Feature 8 include hickory nutshell and honeylocust wood. The hickory nutshell produced a radiocarbon date of 380-180 B.C. (2-sigma cal.), which is consistent with the projected age of the pottery (based on its attributes) and suggests that the features and artifacts in the Feature 8 area date to the end of the Early Woodland period.

Feature 8 and the other possible features uncovered in this excavation block were not further excavated, so at this point it is impossible to know what they represent. With two possible posthole features and a thermal feature (Feature 10), it may be that this excavation block revealed the relatively intact floor of an Early Woodland period house. The magnetic anomaly associated with these possible features is roughly rectilinear, 7 x 9 meters and turned so that its main axes run southeast-northwest. Whether this entire anomaly is related to the possible structure is not known, though structures of this size at the end of the Early Woodland period are not unexpected. What would be surprising is if this is in fact a rectilinear structure—this structure shape does not become popular in the Scioto Valley for another few centuries after the 33Pk371 Feature 8 complex.

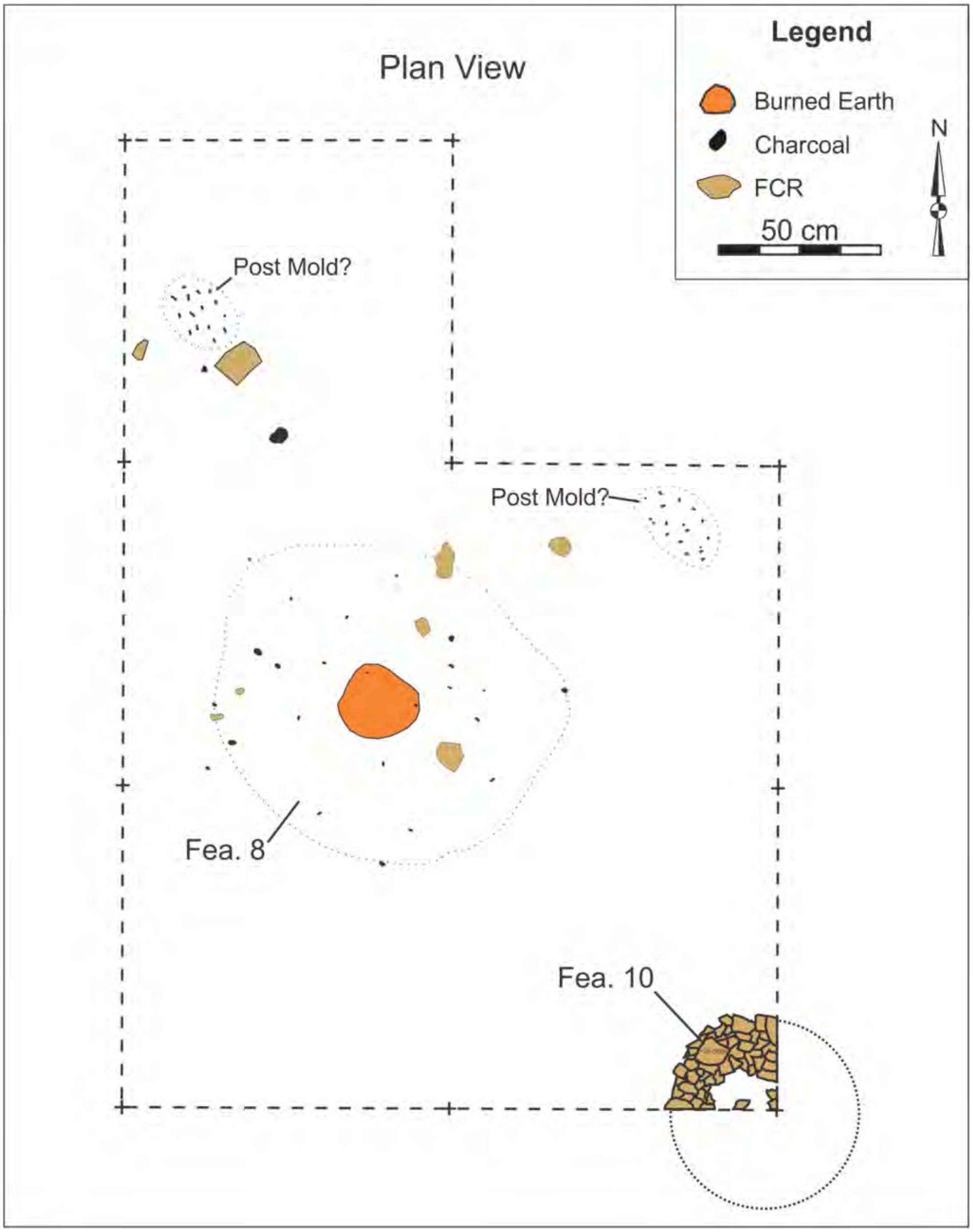

Figure 8.20. Illustration of 33Pk371 Feature 8 and Feature 10.


Figure 8.21. Photograph of 33Pk371 Feature 8 plan view.


Figure 8.22. Photograph of 33Pk371 Feature 8 plan view.

8.2.9. 33Pk371 Feature 9

Feature 9 was identified in the floor of a 1x1 m unit in the same general area as Features 7, 8, and 10 (Figures 8.1, 8.23-8.24). This unit was excavated here to sample a concentration of lithic debitage found during the shovel testing. At the base of the excavation, a dense concentration of FCR was encountered in the northern third of the unit. The excavation fill above this level produced 175 (4.3 kg) pieces of FCR and two pieces of lithic debris. Since the feature was not fully uncovered and excavated, its horizontal and vertical extents remain unknown. This could be a layer or pile of FCR in a midden context or it could be FCR within a pit feature. However, this is not likely a very deep or large pit feature given that there is no indication of a thermal feature at this location in the magnetic data. The irregular that was detected here, however, could be related to a shallow feature or FCR in a midden layer.

Figure 8.23. Photograph of 33Pk371 Feature 9 plan view.

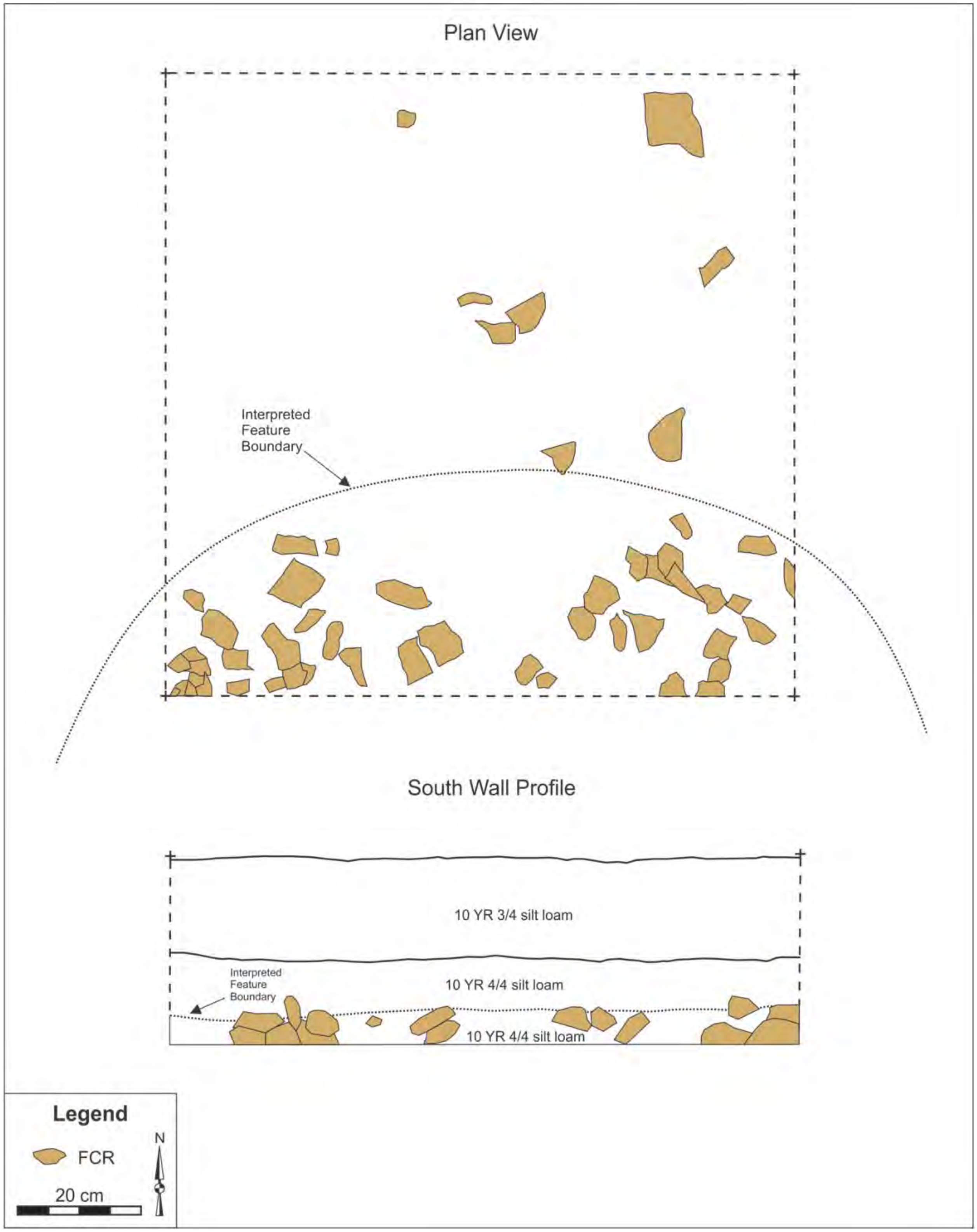

Figure 8.24. Illustration of 33Pk371 Feature 9.

8.2.10. 33Pk371 Feature 10

Feature 10 was identified in the southeast corner of the excavation block containing Feature 8, a possible house floor dating to the Early Woodland period (Figures 8.1, 8.20, 8.25). Feature 10 appears to be the northwestern quadrant of a small but well defined FCR-filled thermal feature. Assuming that this feature is circular in shape and extends in equal proportions to the south and east beyond the bounds of the excavation unit, it is roughly 68 cm in diameter. Although this feature was not excavated, artifacts from its surface were collected during the clean-up and documentation process, including 44 pieces of lithic debris, six formed artifacts, 231 (6.1 kg) pieces of FCR and at least several formed lithic artifacts. The formed lithic artifacts are classified as a modified blank (in this case, a tabular flint nodule that was bifacially modified), a burnt preform/projectile point (biface) fragment, and four burnt biface shatter fragments. The burned biface fragments are similar to artifacts found at Feature 8. The five small grit-tempered pottery sherds from Feature 10 are identical to the thick pottery that was recovered nearby from Feature 8. Although Feature 10 was not fully uncovered or excavated, it is a probably associated with the possible house floor (Feature 8) and it could be a thermal feature or another type of pit filled with refuse.

Figure 8.25. Photograph of 33Pk371 Feature 10 plan view.

8.3. 33PK371 ARTIFACT ASSEMBLAGE

The 33Pk371 Phase II survey produced 7,618 prehistoric artifacts (Table 8.3). As with the three other prehistoric sites examined in this study, FCR (n=6,931, 189.5 kg) is the most abundant artifact type. This assemblage also includes relatively abundant quantities of lithic debris (n=626) and formed artifacts (n=34), as well as a small amount of prehistoric pottery (n=27).

Table 8.3. 33Pk371 Phase II artifact inventory.

Context	FCR	*FCR Weight (g)*	Formed Artifacts	Lithic Debris	Pottery	Total
Shovel Tests	3,151	*92,696.5*	8	261	-	3,420
1x1 m Units	723	*19,077.9*	-	134	-	857
Anomaly 6	-	-	-	3	-	3
Anomaly 8	579	*14,206.6*	-	-	-	579
Anomaly 9	210	*5,790.4*	-	3	-	213
Feature 1	564	*17,829.8*	-	6	-	570
Feature 2	167	*2,567.7*	-	2	-	169
Feature 3	108	*1,433.0*	-	2	-	110
Feature 4	79	*3,668.7*	1	6	-	86
Feature 5	87	*2,581*	-	2	-	89
Feature 6	340	*6,692.1*	-	4	-	344
Feature 7	194	*3,962.9*	-	9	-	203
Feature 8	323	*8,624.9*	19	148	20	510
Feature 9	175	*4,311.1*	-	2	-	177
Feature 10	231	*6,094.4*	6	44	7	288
Total	**6,931**	***189,537***	**34**	**626**	**27**	**7,618**

8.3.1. 33Pk371 Lithic Debris

The 33Pk371 Phase II assemblage contains 626 pieces of lithic debris (Table 8.4). The most abundant flint types are Delaware and Upper Mercer/Zaleski, followed by Unidentified and Brassfield. Very low frequencies of Kanawha, Paoli, and Vanport are also represented. The four prominent flint types were probably obtained from secondary deposits such as gravels present in the Scioto River floodplain or similar settings in its tributaries. The Kanawha and Paoli flints, which come from West Virginia and Kentucky, were almost definitely transported by human agency directly to 33Pk371 in the form of biface blanks, preforms, and finished tools. This may also be true for the Vanport flint in this assemblage since most of it occurs as debris from the later stages of reduction. The presence of water worn cortex on some of the debris and cores made from the more abundant flint types demonstrates these pieces were made from gravel or cobbles derived from secondary deposits. All of the flint in this assemblage was imported to 33Pk371 since there are no naturally occurring sources on site or in the surrounding uplands.

Sixteen technological debris categories were identified in this assemblage, and, excluding flake fragments and shatter, all exhibit characteristics that reveal how and when they were created in the reduction process. The lithic reduction model presented above in Figure 3.1 provides guidance on how this process is organized. Nearly all of the debris in this assemblage is *Primary Reduction* debris, which was created during the process of converting raw stone into a serviceable tool. Less than three percent (11 objects) is potentially derived from tool use and maintenance (*Secondary Reduction*) and tool recycling (*Tertiary Reduction*), and these are classified as biface pressure and notching flakes. This does not mean that tool maintenance and recycling did not occur to a greater degree at 33Pk371, but because the debris generated tends to be very small, fragile, and fragmentary, it is seldom recovered by ¼-inch mesh screens. It is also produced in very small quantities relative to *Primary Reduction* (Pecora 2002).

Most of the lithic debris (nearly 59%) was created from initial reduction, which is the process of detaching flake blanks for use as flake tools or blanks for biface reduction. Cores are a well-represented formed artifact type in this assemblage. A small percentage of the core reduction debris (4.4%) has bipolar reduction attributes—bipolar reduction is a common technique for reducing small flint nodules. Only 38 percent of the debris assemblage was created in the biface reduction process and most of this is from the late biface reduction stage. This implies that some of the stone was introduced to the site as raw or partially altered nodules, in some cases. It also was brought to the site as prepared biface blanks.

Table 8.4. 33Pk371 lithic debris.

Technological Type	**Brassfield**	**Delaware**	**Upper Mercer/ Zaleski**	**Kanawha?**	**Paoli?**	**Vanport**	**Unidentified**	**Total**	**Reduction Stage**
Primary Decortication	4	10	-	-	-	-	8	22	Initial Reduction (Core) ***58.7%***
Prim. Decort. Bipolar	-	2	1	-	-	-	-	3	
Sec. Decort. Bipolar	1	5	-	-	-	-	-	6	
Secondary Decortication	18	45	9	1	1	-	18	92	
Interior	26	46	16	-	-	2	15	105	
Interior Bipolar	-	-	-	-	-	-	1	1	
Sec Decort. Alt.	2	5	-	-	-	-	-	7	Initial Biface Reduction (Blank Preparation) ***4.6%***
Interior. Edge Prep.	2	5	-	-	-	-	-	7	
Interior Alt.	1	3	-	-	-	-	-	4	
Early Biface Edge Prep	-	1	1	-	-	-	-	2	Early Biface Reduction (Blank Thinning) ***5.6%***
Early Biface Thinning	4	6	6	-	-	-	5	21	
Late Biface Thinning	17	45	38	-	-	5	4	109	Late Biface Reduction (Blank Thinning) ***27.9%***
Notching Flake	-	-	-	-	-	1	-	1	Pressure Thinning (Preform, Tool, Tool Maintenance, Recycling) ***2.8%***
Biface Pressure	4	3	2	-	-	1	-	10	
Flake Fragment	29	37	65	-	-	7	33	171	Non-Diagnostic Debris
Shatter	9	13	15	-	-	-	28	65	
Total	**117**	**226**	**153**	**1**	**1**	**16**	**112**	**626**	
%	***19%***	***36%***	***24%***	***0.2%***	***0.3%***	***3%***	***18%***	***100%***	

8.3.2. 33Pk371 Formed Artifacts

The Phase II investigation recovered 34 formed stone artifacts from 33Pk371 (Table 8.5; Figures 8.25-8.26). Of the four sites examined in this study, 33Pk371 produced the second most diverse formed artifact assemblage with 10 general types. Brassfield flint (71%) dominates this assemblage, which also includes lower quantities of artifacts made of Delaware, Upper Mercer/Zaleski, Vanport, and unidentified flints. One object, groundstone celt (i.e., axe) fragment, was made from igneous stone likely obtained from the stream gravel deposits in the Scioto River or one of the nearby tributaries.

The high number of formed artifacts made from Brassfield flint is caused by a large number of small burnt biface fragments found in a single feature context. With the absence of this, probably fortuitous, burning incident, Delaware flint is the most common stone type in the 33Pk371 formed artifact assemblage. In addition to the Phase II artifacts, the Phase I survey recovered two projectile points and a unifacial tool made from Delaware and unidentified flint. All of the stone in this assemblage is locally available in stream deposits.

Table 8.5. 33Pk371 formed artifacts.

Provenience	**Brassfield**	**Delaware**	**Upper Mercer/ Zaleski**	**Vanport**	**Unidentified Flint**	**Igneous**	**Total**
Flint Core	1	3	-	-	1	-	**5**
Modified Blank	1	-	-	-	-	-	**1**
Early Biface Blank	-	1	-	-	-	-	**1**
Preform/Projectile Point Tip	-	-	1	-	-	-	**1**
Burnt Preform/Projectile Point Fragment	5	-	-	-	-	-	**5**
Burnt Biface Shatter*	17	-	-	-	-	-	**17**
Uniface	-	-	-	1	-	-	**1**
Celt Fragment	-	-	-	-	-	1	**1**
Biface Tool	-	1	-	-	-	-	**1**
Biface Fragment	-	1	-	-	-	-	**1**
Total	**24**	**6**	**1**	**1**	**1**	**1**	**34**
%	***71%***	***18%***	***3%***	***3%***	***3%***	***3%***	***100%***

*refers to burnt biface fragments associated with the preceding class “burnt preform/projectile point fragment”

33Pk371 Cores

Cores (n=5) are well represented in the 33Pk371 assemblage (Table 8.6; Figure 8.26). All are small water-worn flint nodules that were probably picked up in nearby stream beds. These objects were used to produce large flakes or spalls that were intended for use as blanks for flake tools or biface tools.

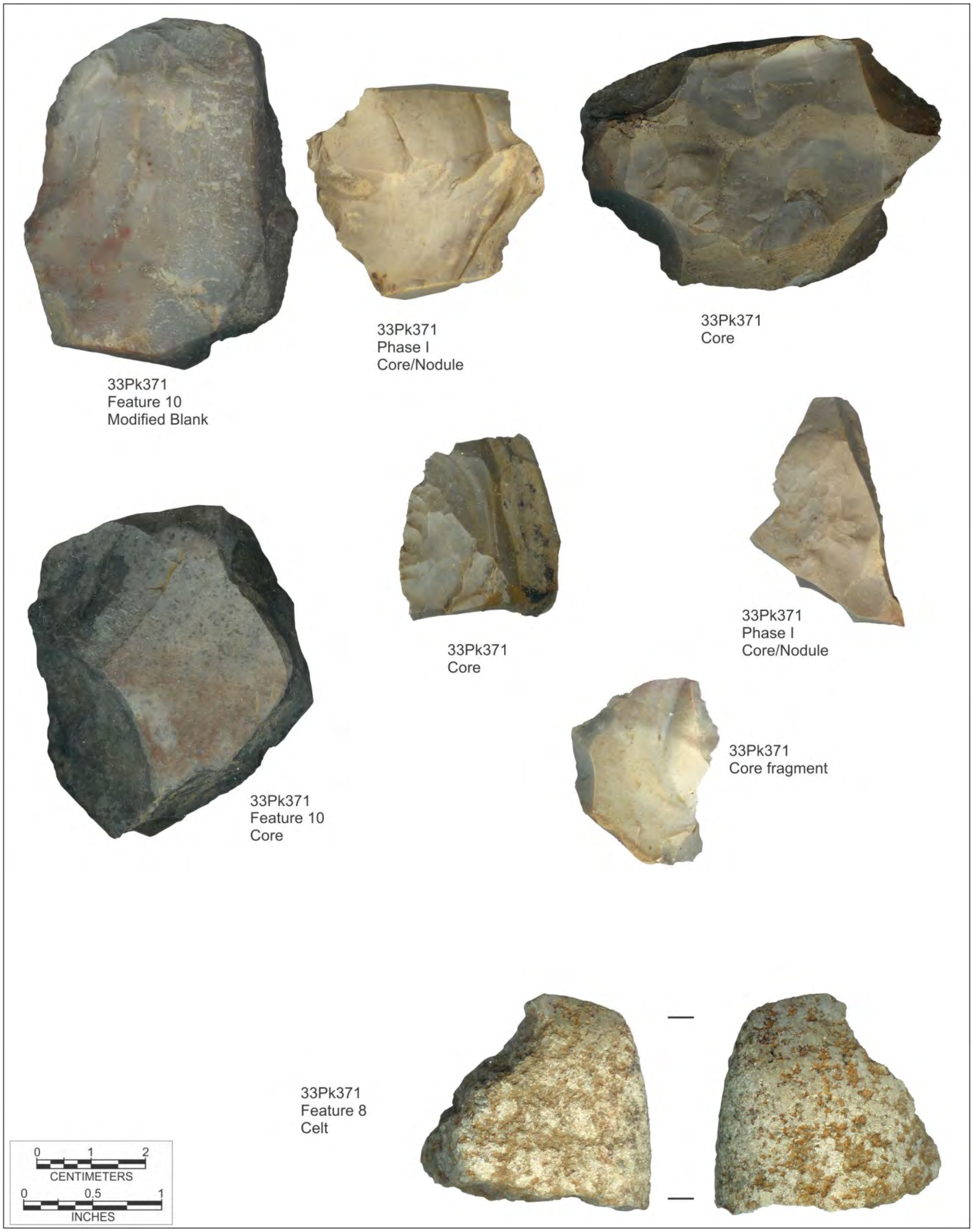

Figure 8.26. Image of cores and a groundstone celt fragment from 33Pk371.

Table 8.6. 33Pk371 core metrics.

Context	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Unit	Core	33.1	30.2	19.9	16.9
Unit	Core	27	21.1	13.5	7.1
Unit	Core	76.85	56.8	45.8	173.9
Unit	Core	34.3	28.4	15.9	12.8
Feature 8	Core	61.6	56.7	38.7	117.2

33Pk371 Blanks and Biface Fragments

Three artifacts in the 33Pk371 assemblage are classified as blanks or biface fragments (Table 8.7; Figures 8.26 and 8.27). The modified blank is not far removed from the core stage and is a tabular nodule that has been bifacially modified along portions of its margins. It appears that this artifact was being prepared for biface thinning to form a biface blank, but it was finished and was discarded for some reason. Initial biface reduction debris, which accounts for nearly five percent of the lithic debris in this assemblage, results from the creation of modified blanks.

The early stage biface blank in this assemblage is further along in the reduction process but it looks to have been inadvertently broken, leading to its discard. This object, had it not broken, would have been bifacially thinned further into a late stage biface blank, then thinned more to create a biface preform, and finally a little more work and it would have been a bifacial tool.

Site 33Pk371 also produced a biface that is too fragmentary to infer its reductions stage, but it appears to be from the earlier stages of biface thinning, approximating an early-to-late stage biface blank.

Table 8.7. 33Pk371 blank and biface metrics.

Feat. #	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Feature 10	Modified Blank	64.3	48.9	19.8	77.4
Unit	Early Biface Blank	27.3	18	10.6	4.6
Unit	Biface Fragment	19.9	12.2	6.2	1.3

33Pk371 Burnt Preform/Projectile Point Fragments

Site 33Pk371 produced 17 heavily burned biface fragments (Table 8.8; Figure 8.27). Excluding one specimen, all are from Feature 8 and Feature 10, which are located near one another and may be part of the same house. Five of these burned objects are large enough to exhibit the intact characteristics of well-made bifaces, probably at the stage of a biface preform or a finished but “unused” projectile point. It appears that these five objects represent fragments of three distinct bifaces. The remaining 12 specimens are small shattered fragments that may also be derived from the three original bifaces. While heating flint objects to improve their workability was not uncommon, a process called *heat treating*, the production of these bifaces was nearly finished and likely beyond the point where heat treating would have been used. It appears that these bifaces were put directly into a fire—that is, they made contact with direct flame for an extended period of time. There are no signs in our excavations that the Feature 8 cluster is the remains of a house that burned down, so it would appear that somebody intentionally burned these bifaces. Intentionally burning objects was a very common practice in the Early and Middle Woodland periods in southern Ohio. There is no way to know, at least not based on the Phase II data, if these bifaces were burned in way and for reasons similar to other Early and Middle Woodland period burned deposits. And all evidence compiled thus far points to the Feature 8 complex being a domestic context, related to habitation and/or resource extraction.

Table 8.8. 33Pk371 burnt preform/projectile point fragments.

Context	**Artifact**	**Max. Length (mm):**	**Max. Width (mm):**	**Max. Thick. (mm):**	**Weight (g):**
Feature 8	Preform/Projectile Point Midsection-Burnt	53	33.6	9.3	21.5
Feature 8	Preform/ Projectile Point-Burnt	23.3	12.2	5.4	1.4
Feature 8	Preform/Projectile Point-Burnt	16.6	12.6	6.1	1.1
Feature 8	Preform/Projectile Point Mid-Section-Burnt	32.1	27.9	9.2	8.3
Feature 10	Preform/Projectile Point-Burnt	35.1	19.6	9.1	7
Unit	Burnt Biface Shatter	10.1	6.4	5.1	0.3
Feature 10	Burnt Biface Shatter	24.1	9.9	6.3	1.1
Feature 10	Burnt Biface Shatter	15.2	9.8	6.2	0.7
Feature 10	Burnt Biface Shatter	13.2	5.4	2.2	<.1
Feature 10	Burnt Biface Shatter	10	5.8	4.8	0.2
Feature 8	Burnt Biface Shatter	22.5	13.3	8.5	2.3
Feature 8	Burnt Biface Shatter	8.9	5.4	2.6	<.1
Feature 8	Burnt Biface Shatter	11.1	4.4	3.7	0.1
Feature 8	Burnt Biface Shatter	22.7	8.3	4.2	1
Feature 8	Burnt Biface Shatter	21.6	11.3	5.5	1
Feature 8	Burnt Biface Shatter	19.2	9.2	4.4	0.8
Feature 8	Burnt Biface Shatter	21.5	9.8	3.6	0.5
Feature 8	Burnt Biface Shatter	12.9	8.3	5.6	0.3
Feature 8	Burnt Biface Shatter	8.4	7.7	1.9	<.1
Feature 8	Burnt Biface Shatter	11.6	6.8	2.1	<.1
Feature 8	Burnt Biface Shatter	15.7	13.8	8.8	1.3
Feature 8	Burnt Biface Shatter	11.2	6.9	4.1	0.2

33Pk371 Lithic Tools

The Phase II survey recovered five objects that are classified as functional implements (Table 8.9; Figure 8.27). These include a bifacial tool fragment, a unifacial tool, a projectile point tip, and a groundstone celt fragment. The Phase I survey also produced a small uniface fragment and two projectile points, a large side notched type and the distal blade portion of a serrated point. In the Phase I report both projectile points were interpreted to be Early Archaic period types. One somewhat resembles an Early Archaic Side-Notched Cluster type and the other (the serrated blade fragment) is similar to the Early Archaic Kirk type (Justice 1987).

The projectile point tip collected during the Phase I survey is very small and cannot be positively identified to a particular type. The Phase I and II unifacial tools are flint flakes that were modified by steep flaking along one margin. This artifact type is commonly referred to as an end-scraper used to scrape hides or other materials.

The small, oval-shaped bifacial tool appears to be too small to be a biface blank or preform and has fine micro-flaking along its margins. It is possible that this object was a small cutting tool.

The celt fragment from 33Pk371 is the bit portion of a celt made of an igneous stone. It is well made and has a finely ground blade. This artifact may have broken from use, but, because it is from Feature 8 and is associated with the burned biface fragments, it also is possible that it broke from heat damage in the same way FCR is created.

The celt fragment and burnt biface fragments are from Features 8 and 10. A radiocarbon date from Feature 8 shows that these objects likely date to the Early Woodland period (2-sigma cal. 380-180 B.C.).

Table 8.9. 33Pk371 tools.

Context	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Units	Biface Tool	30.7	16.3	8.1	4.4
Units	Uniface	36.1	22.2	10.9	7.6
Feature 8	Projectile Point Tip/Preform	12.3	9.3	2.9	0.2
Feature 8	Celt	42.9	40.8	19.7	42.6
Phase I	Side-notched Projectile Point	47.7	33.3	7.7	12.2
Phase I	Serrated Projectile Point Blade	27.3	16.3	4.4	1.7

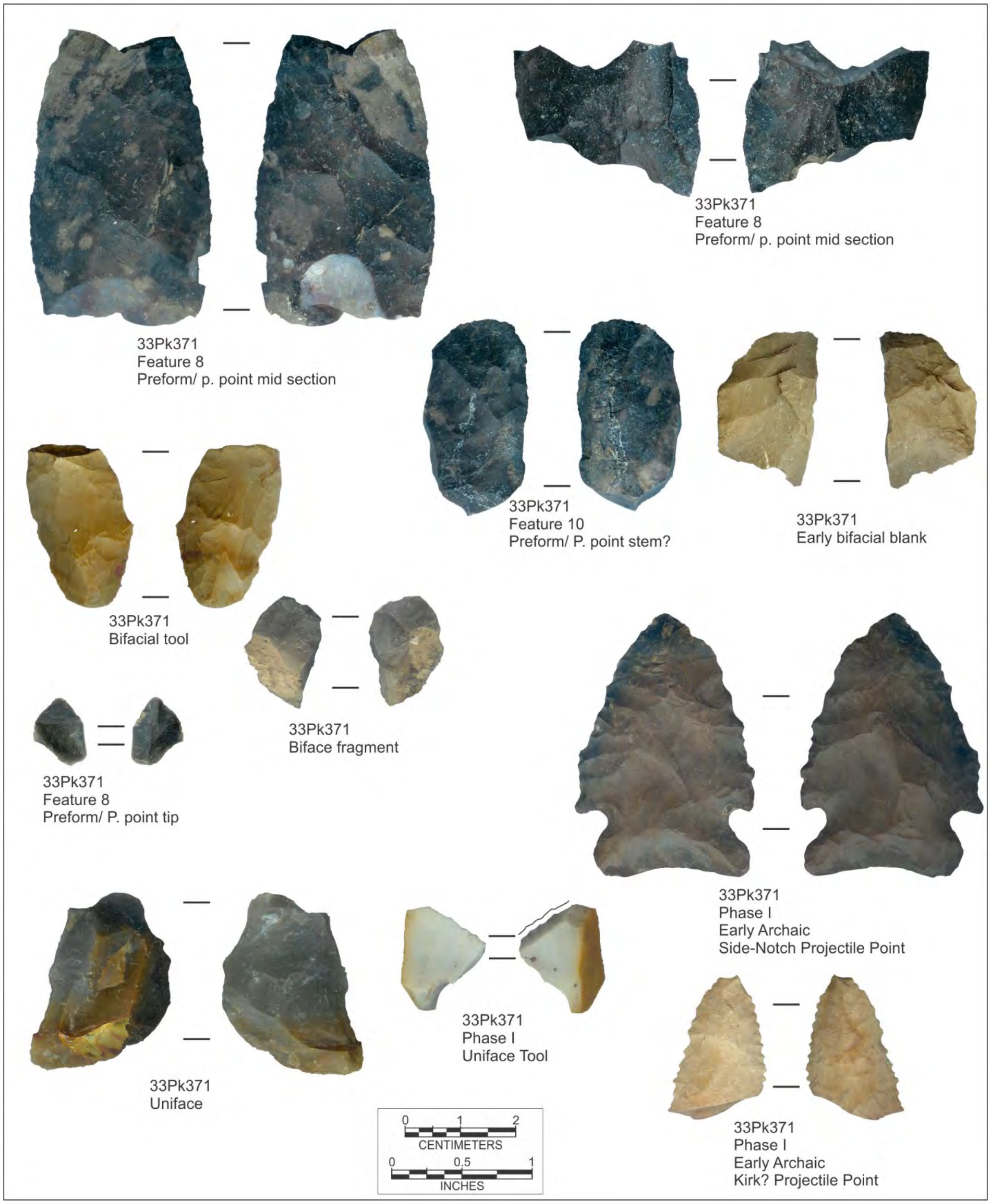

Figure 8.27. Image of bifaces and tools from 33Pk371.

8.3.3. 33Pk371 Pottery

The Phase II excavations at 33Pk371 produced 27 fragments of prehistoric pottery weighing 75.1 g, including one rim sherd, two body sherds, and 24 sherdlets (sherds less than 1 cm^2 in surface area) (Figure 8.28). Twenty of these fragments (1 rim, 1 body, and 18 sherdlets) were found in Feature 8 and seven (1 body sherd and 6 sherdlets) come from Feature 10. Though found in two different features, these sherds look similar enough in paste characteristics and thickness to be parts of the same vessel. The average thickness of the body sherds and the rim (about 2 cm below the lip) is 9.5 mm.

The paste of this vessel is typical for Early Woodland period pottery in southern Ohio. All sherds are granitic grit-tempered with plain exteriors. Temper particles range in size from 0.5-8 mm, but particles about 3-4 mm in size are common and account for about 10% of the paste by volume. All sherds are light colored (oxidized) on the vessel's external surface and dark colored (reduced) on the interior surface and within the core of the sherd. These colors are likely related to the firing of the vessel.

The rim sherd found in Feature 8 has a straight/direct orientation with a flattened and smooth lip of 10.3 mm thickness (Figure 8.27). This rim shape is typical of thick-walled Early Woodland vessels, rather than Adena Plain vessels, which often have thickened lips.

In summary, it appears that the 33PK371 prehistoric pottery assemblage consists of small fragments of one granitic grit-tempered vessel with a plain external surface. Though it is hard to know this vessel's shape, the straight/direct rim suggests that it is likely a straight-sided vessel with a wall thickness averaging about 9.5 mm. Though small, the rim sherd suggests an approximate vessel orifice diameter of about 25-35 cm. The color of the vessel likely resulted from the firing process when it was first produced, rather than colors related to its use. There are no obvious signs of whether this vessel was coil or slab built, but coil built vessels are more common in early southern Ohio ceramic assemblages.

These vessel characteristics are consistent with the Adena Plain type, the most common type of pottery found in the latter half of the Early Woodland period in southern Ohio. Adena Plain vessels are narrow, sinuous-sided jars that lack much in the way of a shoulder or neck. They typically have narrow, flat to rounded bases and are tempered with grit—in Kentucky limestone is common (Haag 1940). Their most telling attributes include a plain surface and a folded or thickened rim, which the 33Pk371 vessel apparently lacks, but this attribute is not always present on Adena Plain rims. In Haag's original description of the type (1940:78), body thickness varied from 4-14 mm with an average of 8.5 mm. Adena Plain vessels generally lack any kind of decoration, though nodes are infrequently found near the rim. Given their thickness, Adena Plain vessels may have been used for hot-rock boiling, whereby the hot rock is placed directly into the ceramic vessel to bring its contents to a boil. However, hot-rock boiling may have been less common in the latter half of the Early Woodland period as vessels were becoming much thinner walled than their predecessors from as much as 1000 years earlier—a time when vessel walls were averaging about as much as 20 mm in thickness.

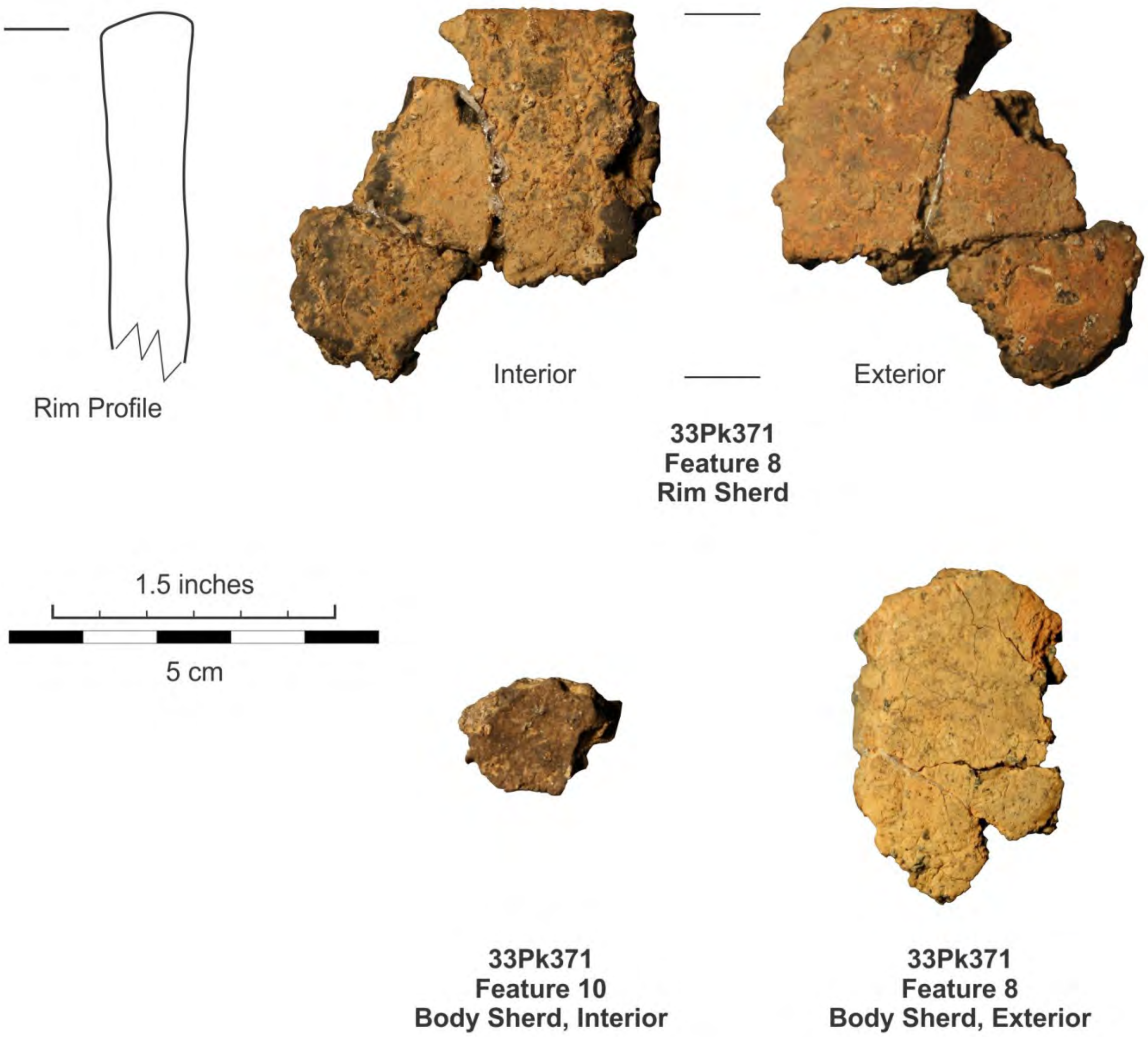

Figure 8.28. Prehistoric pottery sherds from 33Pk371.

8.4. 33PK371 PALEOETHNOBOTANICAL ANALYSIS

(by Karen Leone, M.A.)

Nine soil samples from 33Pk371 were processed through a Flote-Tech flotation machine and the subsequent results analyzed. Three samples were taken from three levels within Feature 1, three samples were taken from three levels in Feature 2, a single sample was taken from Feature 3, and the remaining two samples come from two levels within Feature 6. A total of 450 fragments (5.2 g) of wood, 15 pieces (0.2 g) of nutshell, and two specimens (0.05 g) of unidentified plant material were recovered from the nine soil samples, which had a combined volume of 136 liters of sediment (Table 8.10).

The wood assemblage at 33Pk371 is dominated by hickory (*Carya* sp.; 75%), but also includes oak (*Quercus* sp.; 18%), black locust (*Robinia pseudoacacia*; 4%), sycamore (*Platanus occidentalis*; 2%), and walnut (*Juglans* sp.; 1%). Like hickory, oak, and pine, mentioned previously, the Mixed Mesophytic Forest paleoenvironment would also have supported black locust, sycamore, and walnut. Black locust thrives on dry hillsides, and though sycamore is usually found in the floodplains, it also thrives in areas where there are moist conditions as a result of seepage (Braun 1989:159)—and indeed, sycamore still grows at the site today. It is unknown whether the walnut genus (*Juglans* sp.) identified here is of the black walnut species (*J. nigra*) or of the butternut species (*J. cinerea*); however, butternut can be found on ravine slopes and, therefore, is a more likely candidate to be present at this upland site than black walnut, which thrives best in bottomland environments (Braun 1989:93-94). The wood taxa diversity and frequency between levels in Features 1, 2, and 6 is very similar and suggests that the levels consist of fill derived from a similar source—perhaps the general site midden. This does not imply that all features were used during the same occupation, though the possibility cannot be ruled out given the likely use of random deadfall for fuel. As with the wood assemblage, the nutshell assemblage too is dominated by hickory (*Carya* sp.; 87%), but it also includes walnut (*Juglans* sp.; 13%). The walnut pieces were too fragmented to determine if they are butternut (*J. cinerea*) or black walnut (*J. nigra*). Nutshell was recovered from all four features from which soil samples were taken. However, the quantities recovered from each feature are not enough to make up even one hickory nut so although there is not enough evidence for nut harvesting, their incidental presence may suggest a fall occupation/use of the site.

The three samples from Feature 1 contained all five taxa of wood identified at the site, though the wood was highly fragmented and occurred in low densities (0.01-0.02 g/*l* or 0.8-2.8 n/*l*). The lowest density wood density was in the upper of three levels and the highest density occurred in the lower of the three levels. Two hand-collected samples were taken from the lower part of the feature and they were consistent with the soil samples. Very low quantities of hickory nutshell were recovered from the upper level (n=3) and from the lower level (n=6). Two tiny fragments (0.05 g) of unidentified plant material were recovered from Level 2. This general category of unidentified plant remains typically includes congealed material, sap, stems, buds, etc. that are not assignable to any of the other categories.

The three samples from Feature 2 produced hickory, oak, and black locust wood taxa. Like Feature 1, the wood was highly fragmented and occurred in low densities (0.02-0.05 g/*l* or 0.8-4.9 n/*l*), with the highest density occurring in the lower level. Two hand-collected charcoal samples were taken from Feature 2 and they consisted of species found in the soil samples. Two hickory nutshell pieces (0.01 g) were recovered from the soil sample at the lower level (within the FCR concentration).

One sample from Feature 3 produced a very low density of wood charcoal (less than 0.01 g/*l* or 0.4 n/*l*). The wood was so highly fragmented that only two specimens could be taxonomically identified and they were both oak. However, a hand-collected charcoal sample from this context was identified as sycamore. Two hickory nutshell pieces (0.01 g) were also recovered from this feature.

No soil sample was taken from Feature 5; however, a hand-collected charcoal sample was identified as oak.

Two samples from two levels within Feature 6 contained moderate densities of wood charcoal (0.07-0.15 g/*l* or 5.6-15.0 n/*l*). Feature 6 is a pit containing evidence of an FCR dump. Hickory dominates the wood assemblage (98%) and oak is minimally represented (2%). These relative proportions are consistent with the two hand-collected charcoal samples taken from the same two levels. Two walnut shell pieces (0.04 g) were recovered from the upper of the two levels analyzed.

No soil sample was taken from Feature 8, part of a possible house basin; however, a hand-collected charcoal sample contained honeylocust (*Gleditsia triacanthos*) wood and hickory nutshell below the surface.

Table 8.10. 33Pk371 botanical inventory.

Provenience	**Feature 1**	**Feature 1**	**Feature 1**	**Feature 2Anomaly 2**
Context	FCR Pit	FCR Pit	FCR Pit	Earth Oven
Flotation #	017	018	019	016
Soil Volume (liters)	12	17	15	14
Wood Total (n / g)	**9 / 0.15**	**23 / 0.27**	**42 / 0.42**	**11 / 0.50**
Black Locust (*Robinia pseudoacacia*)	-	1	-	-
Hickory (*Carya* sp.)	-	3	2	3
Oak (*Quercus* spp.)	-	2	5	3
Pine (*Pinus* sp.)	-	-	-	-
Sycamore (*Platanus occidentalis)*	2	-	-	-
Walnut (*Juglans* sp.)	-	-	1	-
Total Identified	2	6	8	6
Total Unidentified / Bark	7	14	12	5
Identifications Attempted	9	20	20	11
Nut Total (n / g)	**3 / 0.03**	**0**	**6 / 0.09**	**0**
Acorn (*Quercus* sp.)	-	-	-	-
Hickory (*Carya* sp.)	3 / 0.03	-	6 / 0.09	-
Walnut (*Juglans* sp.)	-	-	-	-
Unidentified Plant Material (n / g)	**0**	**2 / 0.05**	**0**	**0**
GRAND TOTAL (n / g)	**12 / 0.18**	**25 / 0.32**	**48 / 0.51**	**11 / 0.50**

Table 8.10. 33Pk371 botanical inventory *continued*.

Provenience		**Feature 2**	**Feature 2**	**Feature 3**	**Feature 6**	**Feature 6**
Context		Earth Oven	Earth Oven	Pit	Pit with FCR	Pit with FCR
Flotation #		020	021	023	022	024
Soil Volume	(liters)	20	10	16	22	10
Wood Total	**(n / g)**	**36 / 0.40**	**49 / 0.45**	**7 / 0.05**	**123 / 1.53**	**150 / 1.45**
Black Locust (*Robinia pseudoacacia*)		2	1	-	-	-
Hickory (*Carya* sp.)		8	19	-	19	20
Oak (*Quercus* spp.)		4	-	2	1	-
Pine (*Pinus* sp.)		-	-	-	-	-
Sycamore (*Platanus occidentalis)*		-	-	-	-	-
Walnut (*Juglans* sp.)		-	-	-	-	-
Total Identified		14	20	2	20	20
Total Unidentified / Bark		6	0	7	0	0
Identifications Attempted		20	20	9	20	20
Nut Total	**(n / g)**	**2 / 0.01**	**0**	**2 / 0.01**	**2 / 0.04**	**0**
Acorn (*Quercus* sp.)		-	-	-	-	-
Hickory (*Carya* sp.)		2 / 0.01	-	2 / 0.01	-	-
Walnut (*Juglans* sp.)		-	-	-	2 / 0.04	-
Unidentified Plant Material	**(n / g)**	**0**	**0**	**0**	**0**	**0**
GRAND TOTAL	**(n / g)**	**38 / 0.41**	**49 / 0.45**	**9 / 0.06**	**125 / 1.57**	**150 / 1.45**

8.5. 33PK371 TEMPORAL DATA

The 33Pk371 Phase I and II investigations recovered artifacts and generated radiocarbon dates from at least five different temporal components, including the Early Archaic, Late Archaic, Late Archaic-Early Woodland, Early Woodland and early Late Woodland periods (Table 8.11). The oldest component, dating to the Early Archaic period, is represented by two projectile points recovered during the Phase I survey (Pecora 2012b). One point is fairly complete and has a broad side-notch with slight beveling (opposing bevels) along the blades (see Figure 8.27). The heavily ground and polished base is concave and the one intact basil ear is lightly squared. The blade bevel, basal grinding, and squared basil ear are all technological and morphological attributes commonly are associated with Early Archaic Large Side Notched Cluster projectile point types (Justice 1987). The second Phase I specimen from 33Pk371 is blade section of a beveled and serrated projectile point. The blade shape, beveling, and serration are all characteristics found on many Early Archaic projectile points, such as those in the Early Archaic Side Notched and Kirk Cluster point types. These points were found in shovel tests just south of the Feature 8 complex, which is not an area known to date to the Early Archaic period. Thus, it is possible that these two points represent a transient occupation of the site during the Early Archaic, or they may have been picked up at later time, perhaps the Early Woodland period, and were brought back to the site.

The second temporal component at the site occurred at the very end of the Late Archaic period and the beginning of the Early Woodland period. Two radiocarbon dates from this time period overlap in the two sigma range, meaning that there is a chance they could date to the same occupation. The seemingly older of these two radiocarbon dates comes from Feature 6, which produced a calibrated two-sigma date range that intersects the calibration curve in several places: 1210-1200 B.C., 1190-1140 B.C., and 1130-1000 B.C. (Table 8.11). The second date from this temporal component comes from Feature 3, located all the way over on the other side of the site. More than likely these two dates represent two separate occupations of the site in the centuries around 1100 or 1000 B.C.

Two separate occupations occurred in the Early Woodland period at 33Pk371 (Table 8.11). The first is represented by an earth oven, Feature 2, which was radiocarbon dated to 810-760 B.C. and 680-670 B.C. (cal. 2-sigma range). The second occupation occurred in the Feature 8 complex area. Charcoal from Feature 8 yielded a date of 380-180 B.C. Pottery found in the Feature 8 complex is fairly thick, with coarse temper and a smooth outer surface, which is commonly found on archaeology sites in the region at the time defined by the associated radiocarbon date. Although no radiocarbon date was procured for Feature 10, this feature produced similar pottery and thus also likely dates to this same occupation.

An early Late Woodland component is represented at 33Pk371 by an A.D. 660-780 (cal. 2-sigma range) radiocarbon date from Feature 1, a shallow, FCR-rich thermal feature. No other features of this type that might be associated with Feature 1 were found at 33Pk371 and no artifacts from the Phase I and II work are considered diagnostic of the early Late Woodland period. Given the proximity Features 2 and 3 and their much earlier dates, it would seem that the west side of the site is a palimpsest of overlapping occupations.

In sum, the Phase I and II data indicate that site 33Pk371 was occupied on at least five different occasions, and perhaps six if the Feature 3 and Feature 6 occupations, which are widely separated across the site, are considered as separate occupations.

Table 8.11. 33Pk371 temporal data.

Context	**AMS C^{14} 2-sigma Cal**	**Temporal Diagnostic**	**Temporal Period**
Feature 1	AD 660-780	n/a	Late Woodland
Feature 2	810-760 BC & 680-670 BC	n/a	Early Woodland
Feature 8	380-180 BC	Thick Grit Tempered Pottery	
Feature 10	n/a	Thick Grit Tempered Pottery	
Feature 3	1010-830 BC	n/a	Late Archaic-Early Woodland
Feature 6	1210-1200 BC & 1190-1140 BC 1130-1000 BC	n/a	Late Archaic
Phase I Shovel Test	n/a	Side-Notched Projectile Point	Early Archaic
Phase I Shovel Test	n/a	Serrated Projectile Point	

8.6. 33PK371 SITE STRUCTURE

The structure of site 33Pk371 is somewhat different in several ways from the other three prehistoric sites examined here. First, it has more overlapping occupations from different time periods than the other sites. This is likely due in part to the second way this site differs from the others. The landform is heavily dissected with narrow ridges separated by a stream valley. This landform configuration limited the amount of level surface area that could be occupied and, in essence, forced the overlap of occupations.

The distribution of FCR from the Phase II shovel tests clearly shows how the landform limited the extents of the occupations (Figure 8.29). The FCR was found to be concentrated along the landforms. Both landforms have distinct internal clustering that could be associated with separate occupations or activity areas. Pit features, or at least those that have been documented, are more closely associated with each of the largest FCR clusters.

Though there was far less lithic debitage found than FCR, it follows a similar linear pattern (Figure 8.30). However, while the FCR was found to be more broadly distributed, the lithic debris occurs in several small, discrete clusters and these are not closely associated with the features. This implies that activities involved in the use of pit features and FCR are more closely related to each other than activities associated with lithic debris are to pits or FCR. This pattern holds if we look more closely at the contexts in which FCR was found. Nearly 33 percent of the FCR from 33Pk371 was recovered from the excavation of Features 1-10 (see Table 8.3). Excluding Feature 3, Feature 5, and Feature 8, FCR appears to be directly related to the design and function of most features at 33Pk371. Interestingly, while over forty-five percent of the FCR was recovered from the shovel tests, only slightly more than 10 percent was found in the 1x1 meter excavation units placed in the lithic artifact concentrations. These observations suggest that much of the FCR found in the shovel testing was probably dumped on the surface after having been cleaned out of nearby pit features, and activities associated with lithic debris production and discard were occurring in other areas of the site. The fact that this level of site structure is still present and is apparent in all excavated contexts (shovel tests, 1x1 units, and features) suggests that plowing has not seriously disrupted the artifact distribution patterns at 33Pk371.

Tables 8.12 and 8.13 tabulate the lithic artifact distribution from the 33Pk371 Phase II survey. Forty-two percent of the lithic debris and 24 percent of the formed artifacts were recovered from the shovel tests. Thirty-one percent of the lithic debris and 74 percent of the formed artifacts are from excavation units used to uncover Features 8 and 10, which were originally excavated to recover a larger sample of lithic artifacts. Additional 1x1 m units excavated over other lithic artifact concentrations produced 21 percent of the lithic debris and none of the formed artifacts. The eight other features that were either uncovered or partially excavated produced only 3.8 percent of the lithic debris and three percent of the formed artifacts. Since lithic debris and formed artifacts are not functionally related to the feature types found (i.e., projectile points are not used to cook food in an earth oven), the paucity of these artifact classes in the 33Pk371 assemblage is not unexpected.

Table 8.12. 33Pk371 lithic debris distribution.

Technological Type	Shovel Tests	1x1 m Units	Anomaly 6	Anomaly 9	Feature 1	Feature 2	Feature 3	Feature 4	Feature 5	Feature 6	Feature 7	Feature 8	Feature 9	Feature 10	Total	Reduction Stage
Primary Decortication	14	4	-	-	1	-	-	-	-	-	-	3	-	-	22	Initial Reduction (Core) ***58.7%***
Prim. Decort. Bipolar	-	2	-	-	-	-	-	-	-	-	-	1	-	-	3	
Sec. Decort. Bipolar	3	-	-	-	-	-	-	-	-	1	-	-	1	1	6	
Secondary Decortication	53	17	-	1	-	-	2	-	-	-	1	13	-	5	92	
Interior	43	24	1	1	-	1	-	1	1	1	1	25	-	6	105	
Interior Bipolar	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
Interior. Edge Prep.	3	1	-	-	-	-	-	-	-	-	-	3	-	-	7	Initial Biface Reduction (Blank Preparation) ***4.6%***
Sec. Decort. Alt.	4	3	-	-	-	-	-	-	-	-	-	-	-	-	7	
Interior Alt.	2	1	-	-	-	-	-	-	-	-	-	1	-	-	4	
Early Biface Edge Prep	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	Early Biface Reduction (Blank Thinning) ***5.6%***
Early Biface Thinning	4	7	-	-	-	-	-	1	-	-	2	5	-	2	21	
Late Biface Thinning	45	25	-	-	1	-	-	2	-	-	2	27	1	6	109	Late Biface Reduction (Blank Thinning) ***27.9%***
Notching Flake	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	Pressure Thinning (Preform, Tool, Tool Maintenance, Recycling) ***2.8%***
Biface Pressure	5	-	-	-	1	-	-	1	-	-	-	3	-	-	10	
Flake Fragment	57	41	1	-	1	1	-	1	1	1	1	48	-	18	171	Non-Diagnostic Debris
Shatter	24	9	1	1	2	-	-	-	-	1	2	19	-	6	65	
Total	**261**	**134**	**3**	**3**	**6**	**2**	**2**	**6**	**2**	**4**	**9**	**148**	**2**	**44**	**626**	
%	***42%***	***21%***	***0.5%***	***0.5%***	***1%***	***0.3%***	***0.3%***	***1%***	***0.3%***	***0.6%***	***1%***	***24%***	***0.3%***	***7%***	***100%***	

Table 8.13. 33Pk371 formed artifact distribution.

Provenience	**Feature 4**	**Feature 8**	**Feature 10**	**Shovel Tests**	**Total**
Flint Core	1	1	-	3	**5**
Modified Blank	-	-	1	-	**1**
Early Biface Blank	-	-	-	1	**1**
Biface Fragment	-	-	-	1	**1**
Preform/Projectile Point Tip	-	1	-	-	**1**
Burnt Preform/Projectile Point Fragment	-	4	1	-	**5**
Burnt Biface Shatter*	-	12	4	1	**17**
Biface Tool	-	-	-	1	**1**
Uniface	-	-	-	1	**1**
Celt Fragment	-	1	-	-	**1**
Total	**1**	**19**	**6**	**8**	**34**
%	***3%***	***56%***	***18%***	***24%***	***100%***

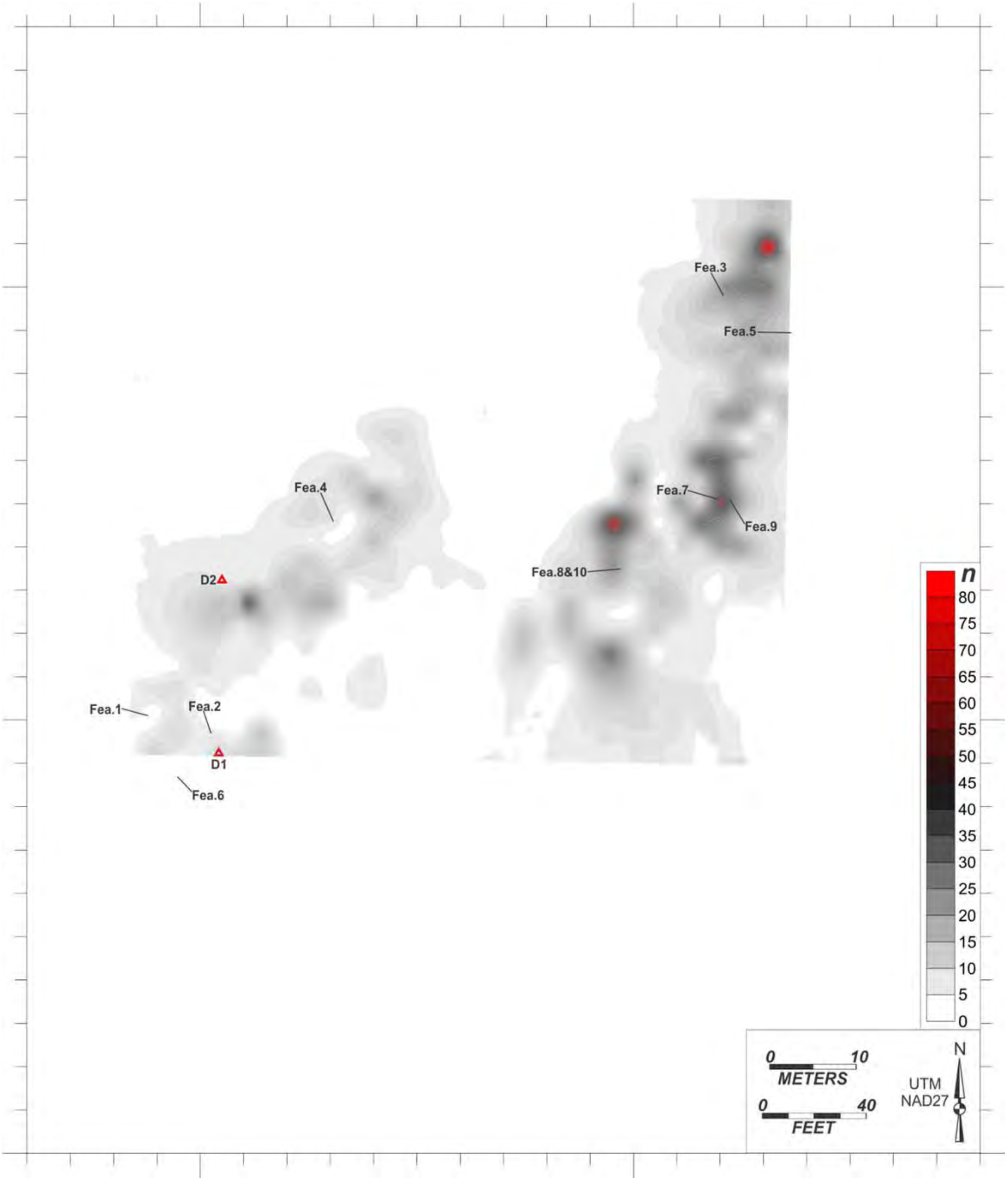

Figure 8.29. Illustration of site 33Pk371 showing the distribution of FCR.

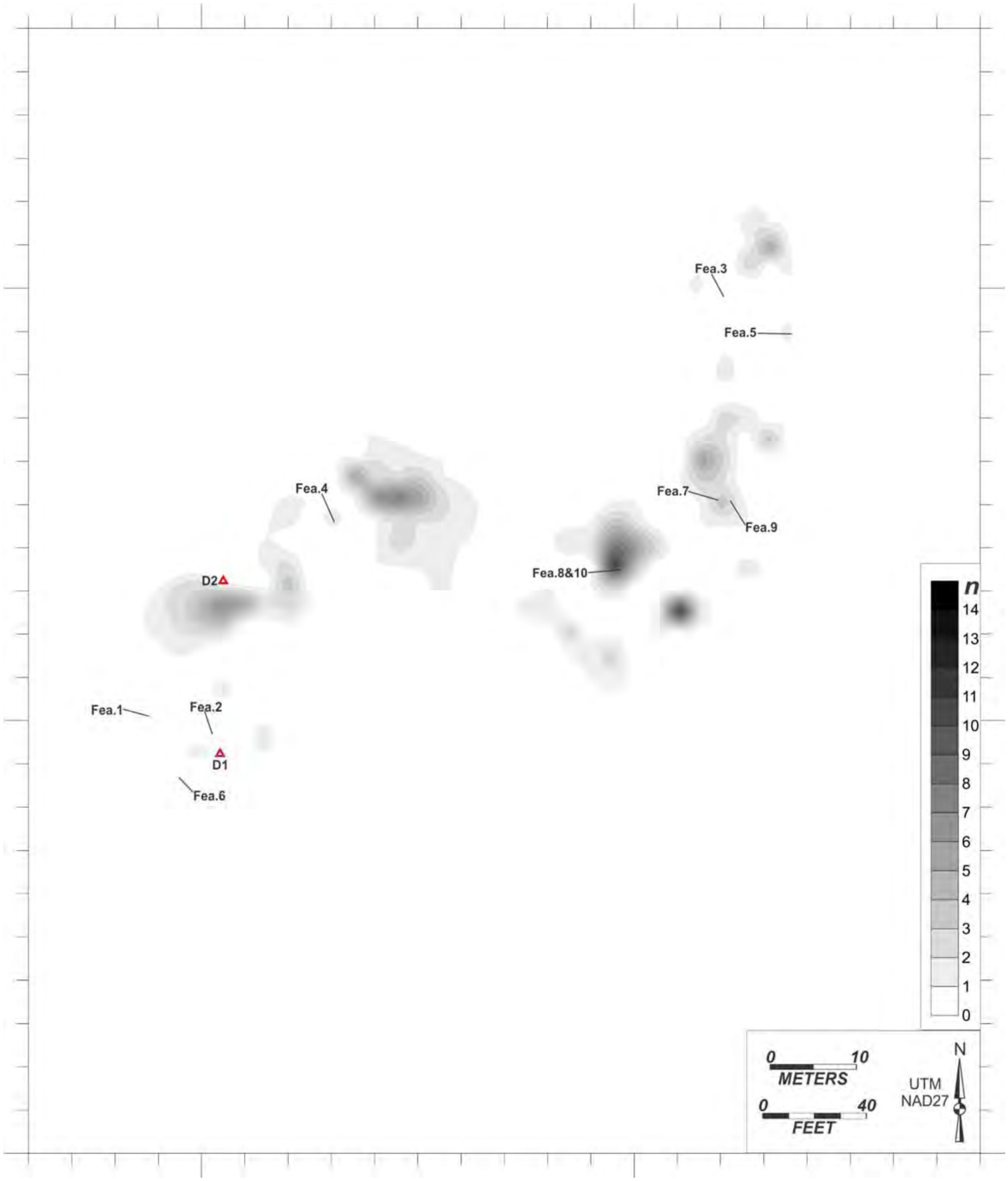

Figure 8.30. Illustration of site 33Pk371 showing the distribution of lithic artifacts.

Figure 8.31 is a summary map showing feature locations, higher density artifact concentrations, and areas of higher magnetic susceptibility readings. The locations of temporal data are also indicated. When viewed in this way, we see that there are four major intrasite site clusters at 33Pk371, each corresponding to overlapping concentrations of FCR, lithic debris, and high magnetic susceptibility readings.

Cluster 1 is the most temporally complicated with at least three different temporal components present in as many features, representing the terminal Late Archaic, the Early Woodland, and the early Late Woodland periods. This area of the site may have been popular because it is closest to a water source. Though FCR was found in large quantities in Cluster 1, especially around Feature 1, there is very little lithic debris. The Cluster 1 occupations are not large and each is associated with a thermal feature containing FCR. Apparently this area of the site was used in similar ways across several different occupations. While cooking or heating was clearly involved, the lack of nutshell indicates that harvesting and processing nuts was not a significant part of what went on here—or this activity did not bring the nutshells into direct contact with fire. Regardless, this cluster's location just above a probable seep suggests that large amounts of water may have been needed for whatever cooking or heating activities were taking place here.

Cluster 2 contains FCR, lithic debris, and slightly elevated magnetic susceptibility levels. While we do not know how many temporal components are represented here, the magnetometer only detected two anomalies thought to be prehistoric pit features, one of which (Feature 4) was partially examined. The mixed artifact assemblage suggests that a wider variety of activities took place here than in Cluster 1. The two small concentrations of lithic debris may represent two distinct activity areas, two refuse dumping locations at the edges of the occupation, or two spatially discrete reoccupations of this small area. Cluster 2 could have been a short-term camp site, perhaps occupied while the group was collecting a seasonally available resource nearby.

Cluster 3 is the largest of the clusters at 33Pk371 and it has the densest concentration of prehistoric refuse. Its primary temporal component, dating to the late Early Woodland period, is associated with what may be the remains of a house (the Feature 8 complex). Features in this area contained tools, FCR, lithic debris, and pottery sherds. Such a wide diversity of artifact classes indicates that many different kinds of activities occurred here, much that would be expected for a group going about their day-to-day lives at a residential site. While concentrations of FCR north of the Feature 8 complex could be the locations of secondary refuse dumps, implying that the house's occupants were maintaining their living and work space, this dump is not so large or dense with artifacts that it indicates anything but fairly short-term occupation. That said, the Cluster 3 occupation is likely the longest-term occupation of site 33Pk371 and it certainly has the most potential to tell more about those who lived at this site. This is the flattest part of the 33Pk371 site with the most space for the kind of site that would need to spread out some, such as a domestic residence with its adjacent cooking and processing facilities (e.g., Features 7 and 9). The Early Archaic period temporal component at this cluster likely amounts to just a couple stray projectile points indicating a transient occupation of the site, or these points might have even been picked up elsewhere and brought home by the Early Woodland occupants of this cluster.

Cluster 4 is a small occupation located in an area that would have had easy access to, and view of, an intermittent stream that runs into the Scioto River floodplain. At least two FCR-related pit features are present here, as is a large area of high magnetic susceptibility off to one side. Pits full of FCR and large magnetically enhanced areas of soil suggest that this site saw lots of thermal activity during its occupation. A very small amount of nut charcoal here suggests that occupation occurred in autumn, but it is unclear if harvesting nuts is what attracted the site occupants to this location. While the radiocarbon date from Feature 3 overlaps with the date from Feature 6 (located over in Cluster 1), indicating that these two occupations could have occurred at the same time, it is likely that Cluster 4 represents a separate, short-term Terminal Archaic occupation of 33Pk371.

Since only 0.9 percent of the 33Pk371 site was tested during the Phase II work, these interpretations of the site should be viewed as working hypotheses. Certainly additional work will produce results that change this picture of the past that has been portrayed for 33Pk371. While plowing across much of the site has clipped off the tops of most features, except for Feature 1, the structure of the site's midden is still well preserved and contains numerous discrete artifact clusters. Cluster 3, the location of the possible Early Woodland period house, should be treated with great care so as not to further damage this important cultural resource. Numerous Adena mounds, some dating to the same period as the Feature 8 complex, have been documented in the Piketon area, but few residential sites are known. This highlights the significance of the Cluster 3 archaeological resource.

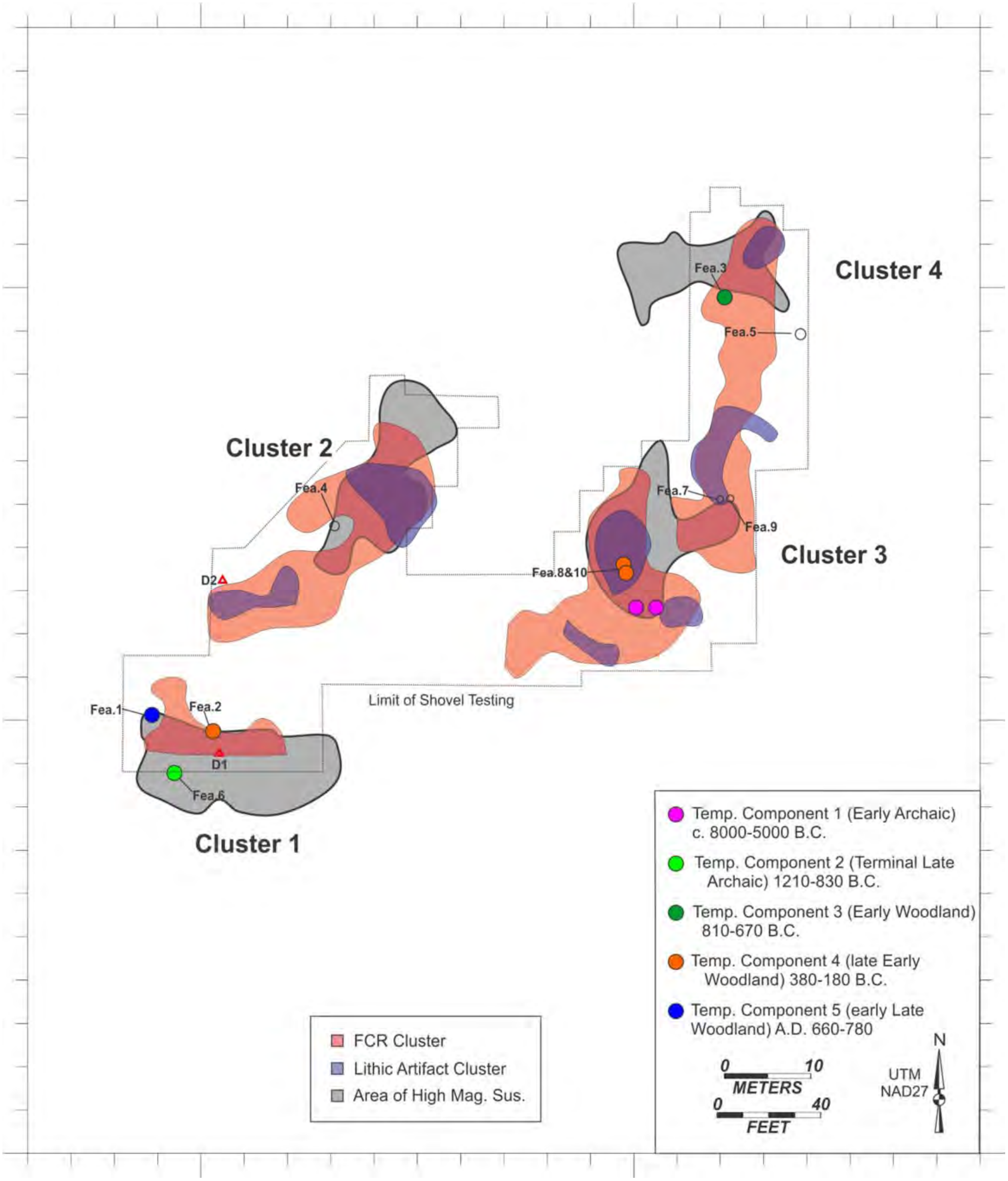

Figure 8.31. Illustration of site 33Pk371 summary map.

9. 33PK372 PHASE II RESULTS

Site 33Pk372 is located in the western quadrant of PORTS (Figure 9.1). The landform is heavily dissected and contains several ridge tops, smaller toe-ridges, and a narrow stream valley that empties into the Scioto River floodplain. The current vegetation is secondary growth hardwoods; all of the brushy undergrowth was removed prior to the Phase II work. The 1938/39 and 1951 aerial photographs show this portion of PORTS to be pasture with scattered large trees.

Site 33Pk372 was originally documented during a Phase I archaeological survey that involved systematic shovel testing on a 15 meter grid (Pecora 2012b). Each shovel test measured approximately 50 cm square. The Phase I survey effort recovered 325 artifacts, of which nearly a third (n=98) were found in just 15 shovel tests. The remaining 227 artifacts were recovered from six square meters of hand excavation over features (Features 1 and 2) that were located by shovel tests. Feature 1 appears to be a tree or animal disturbance containing FCR and a cow scapula, and it was not further investigated in the Phase II study. Feature 2 is a large FCR concentration that was examined and is further described below. Most of the FCR recovered during the Phase I work (226 fragments) came from Feature 1, the rest (65 pieces) was found in shovel tests spread across the site. The Phase I shovel tests also produced 37 lithic artifacts—all lithic debitage—from various areas of the site. The only tool found during the Phase I work was a cupstone/nutting stone found in Feature 2 (see Figure 9.28).

The report of the Phase I work concluded that 33Pk372 is a low density lithic scatter with a low-to-moderate amount of FCR. The Phase I survey also located at least one archaeological feature, indicating that archaeological features are present at the site. Since the top of this feature was located just below the humus layer, the Phase I work also demonstrated that at least some of the site had not been plowed.

Table 9.1 summarizes the Phase II survey effort at 33Pk372 (Figure 9.1). The magnetic gradient survey covered 3,803 m^2 of the site area. Two-hundred-fifty-three shovel tests were then excavated on a 5 meter grid to obtain a representative artifact sample, to better define the site boundaries, and to identify any intrasite artifact patterning. Artifact concentrations identified in the shovel testing were investigated further with the excavation of nine 1x1 m units. Additional 1x1 m units (n=13.5) were placed over six geophysical anomalies in an effort to identify and define archaeological features and to further explore Feature 2. In total, the Phase II survey work resulted in the excavation 85.75 m^2 or 1.0% of the site area. Approximately six additional square meters were excavated over Feature 1 and Feature 2 during the Phase I survey.

In sum, the Phase II survey recovered 13,596 artifacts and identified ten archaeological features. The geophysical survey identified numerous other anomalies that were not investigated in this survey. All or many of these may be archaeological features.

Table 9.1. 33Pk372 Phase II investigation summary.

Description	**Value**
50x50 cm Shovel Tests (Total)	n=253 (63.25 m^2)
50x50 Shovel Tests (Artifact-bearing)	n=139 (34.75 m^2)
1x1 m Units (Anomaly Ground-truthing & Feature Exposure)	n=13.5 (13.5 m^2)
1x1 m Units (Artifact Sampling)	n=9 (9 m^2)
Percentage of Site Area Excavated	1.0%
Geophysical Survey Area	3,803 m^2
Number of Archaeological Features Identified	n=10
Number of Artifacts Recovered	n=13,596
Number of Artifacts per Excavated Square Meter	n=159
Average Number of Artifacts per Positive Shovel Test (0.25 m^2)	n=21.6

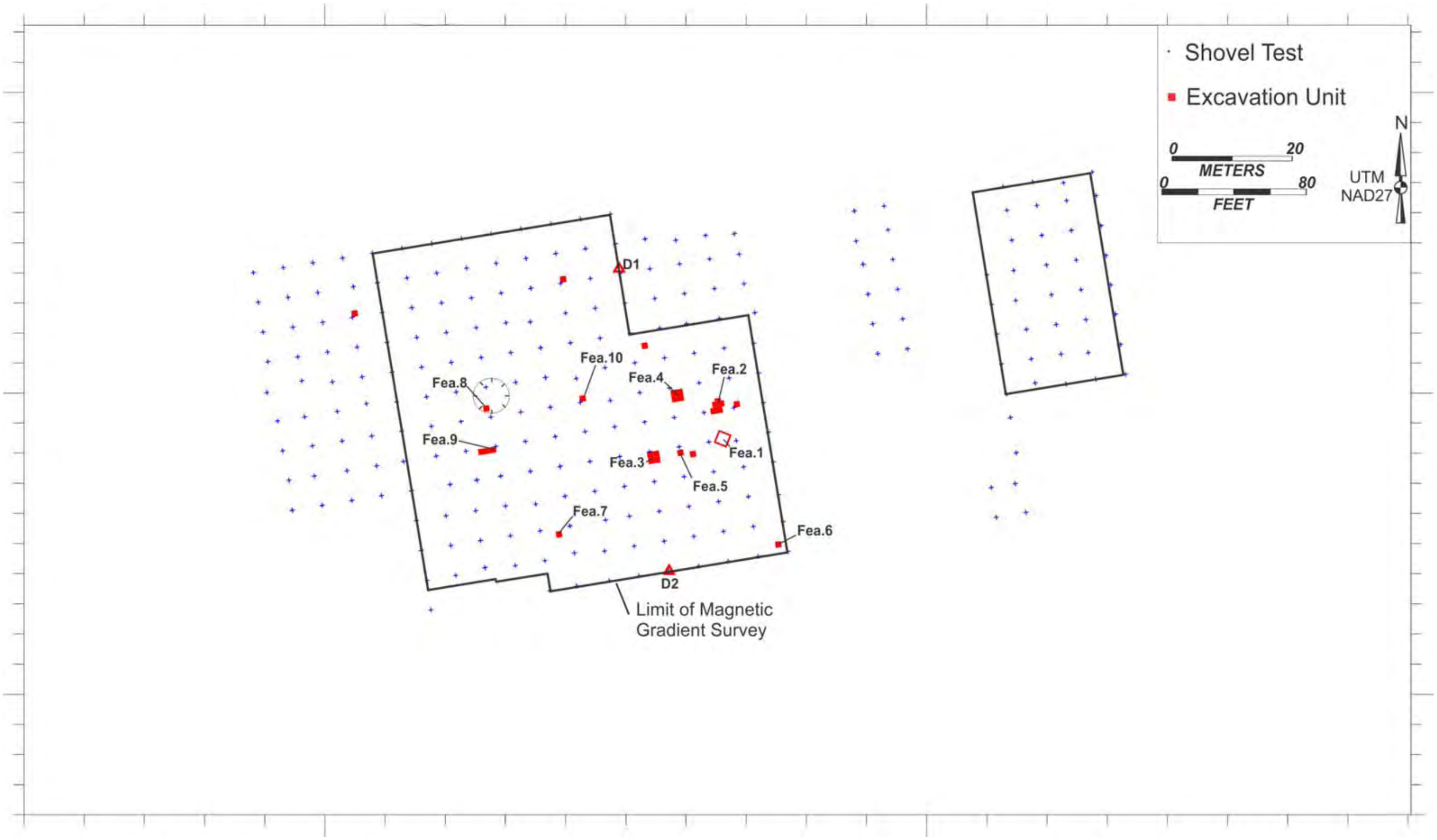

Figure 9.1. Illustration of 33Pk372 showing the Phase II fieldwork.

9.1. 33PK372 GEOPHYSICAL SURVEY RESULTS

The Phase II geophysical survey at site 33Pk372 consisted of a magnetic gradient survey in two areas and a magnetic susceptibility survey of the entire site. The results of the magnetic gradient survey are shown in Figure 9.2. These data were collected on the higher, flatter portions of the site.

Numerous magnetic anomalies of potential interest are present in the data. The data also show that the site area is littered with small pieces of metal, probably associated with historic-era agricultural practices. Small pieces of metal were visible along a linear stretch located in the northwestern part of the survey area. Other large anomalies evident in the data are also probably historic-era objects.

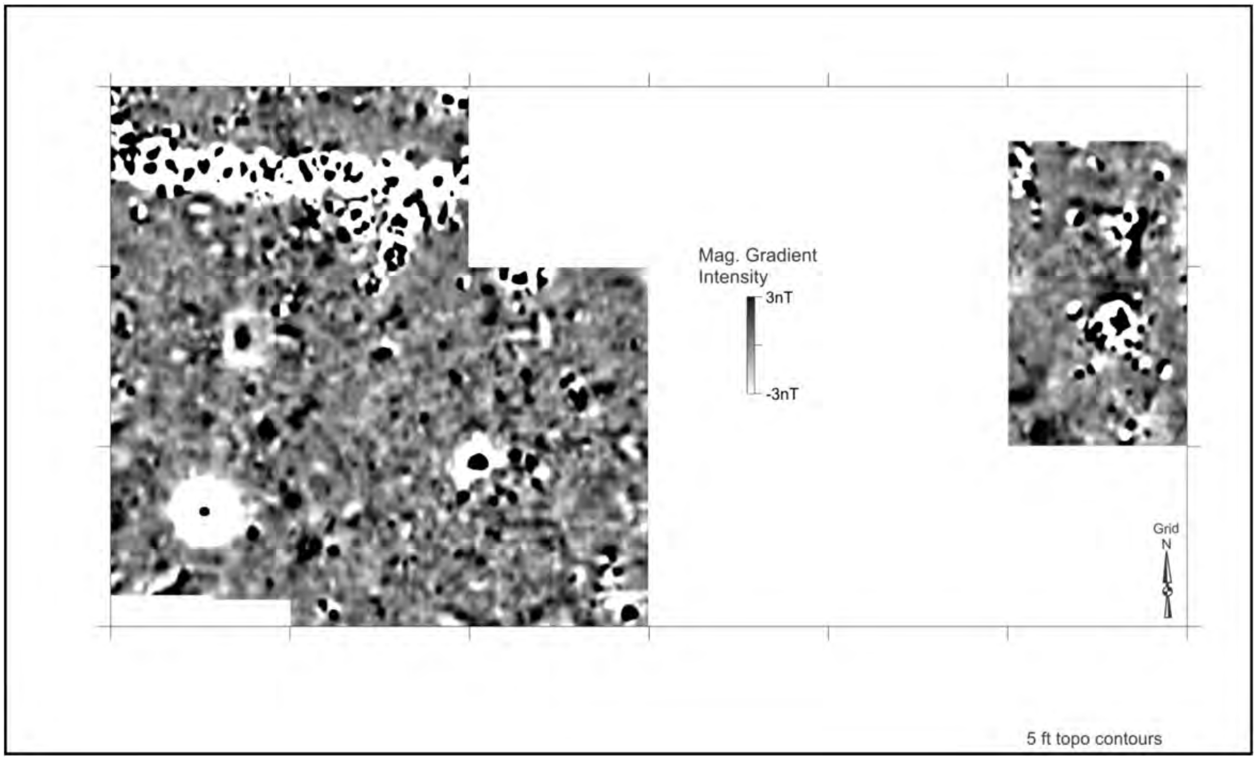

Figure 9.2. Results of magnetic gradient survey at 33Pk372.

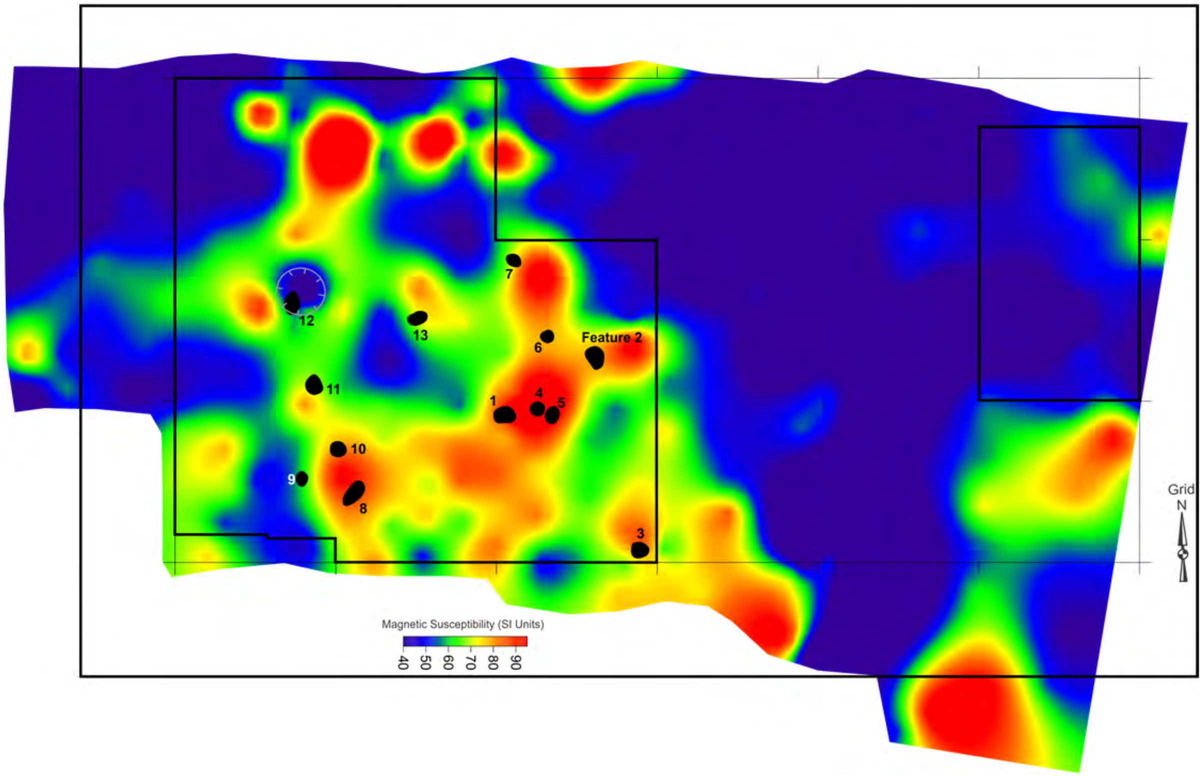

Figure 9.3. Magnetic gradient anomalies and magnetic susceptibility survey results.

Numerous probable prehistoric archaeological features are also present in the 33Pk372 magnetic gradient data. Thirteen of these were singled out for potential excavation and they are identified in Figure 9.3. Details about each of these anomalies are presented in Table 9.2. At least two of these, Anomalies 1 and 3 are strong candidates for probable thermal features. In fact, Anomaly 1 looks strikingly similar to the strongly magnetic thermal features (Anomalies 1-12) detected at site 33Pk348.

Anomaly 12 is perhaps one of the more unique features found during the Phase II work reported here. It is a very large, squarish area of negative readings with stronger positive readings in the middle. This anomaly is located within a circular topographic depression—one too wide to have resulted from a tree toppling over, its roots ripping up a circular chunk of ground. The negative readings appear to be located on the inside of the depression, on the sloping surfaces heading down toward the bottom. The positive magnetic readings occur near the middle of the depression, where the depression is the deepest. It is likely that this depression is a partially filled in pit with a magnetic layer buried near its bottom. This magnetic layer was detected where the overburden filling in the pit is thin, near the middle of the depression, and it was not detected near the inside edges of the pit where the overburden is thicker. However, only excavation can help determine just what is causing this unusual magnetic anomaly associated with this circular depression.

Figure 9.3 also shows the results of the magnetic susceptibility survey. Apparently there was enough historic-era metal on the ground to produce high magnetic susceptibility values in the northwestern part of the survey area though an attempt was made to avoid recording spikes caused by metal objects near the sensor. Besides the anomalies related to the metal, the susceptibility meter found that much of the flat area of the site contains magnetically enhanced topsoil, but these higher readings occur in several clusters conforming to the locations of the probable pit features detected in the magnetic gradient survey. This suggests that many of these features were either themselves the locations of thermal activities or they were associated with thermal activities located very nearby.

The sources of the strong susceptibility readings to the southeast of Anomaly 3 and south of the eastern magnetic gradient survey block are less clear. The high readings southeast of Anomaly 3 are on relatively steep slope. These elevated readings could be tracking the dispersal of topsoil eroding down slope from the site midden above. Or, it is possible that refuse was thrown down the slope in prehistoric times. The higher readings found south of the eastern survey block could be associated with small occupation clusters. However, the surface here is sloped and located close to clear evidence of ground disturbance caused by historic-era activity. Thus, this high magnetic susceptibility along some of the site edges may be related to recent disturbed ground.

Table 9.2. Anomaly information from the 33Pk372 site.

Anom. #	**Peak Intensity (nT)**	**Anomaly Class[a]**	**Size[b]**	**Comments/Interpretation**
1	204.7	DS-B	3-4	Possible Thermal Feature/iron
2	16.08	MP	4	Feature 2
3	48.98	DS-B	3	Possible Thermal Feature
4	17.56	MP	3	Possible iron/rock/pit
5	23.64	MP/DS	3	Probable iron, possible pit
6	10.36	MP	3	Possible pit
7	6.92	MP	2	Possible pit/iron
8	9.83	MP	5	Possible pit/soil anomaly
9	23.5	MP/DS	3	Possible pit/iron object
10	9.45	MP	3	Probable pit, limited amounts of scattered FCR
11	9.65	MP	4	Probable pit, limited amounts of scattered FCR
12	6.7	DS-B	5-13	Possible semi-subterranean structure or large pit with FCR

a – MP=monopolar positive; DS=dipolar simple; DC=dipolar complex
b – these are approximate sizes; magnetic anomaly edges may not directly match edges of subsurface features.

9.2. 33PK372 FEATURES

The geophysical survey detected numerous magnetic anomalies within site 33Pk372, 12 of which were identified as potential archaeological features. Eight of these anomalies (A.1, A.3, A.4, A.5, A.6, A.7, A.8, and A.12) were selected for further investigation or "ground-truthing," and six were found to be features (Features 3-8). Three additional features (Features 2, 9, and 10) were inadvertently discovered during other excavations. Feature 2 was identified in a shovel test excavated during the original Phase I survey. It is evident in the magnetic data. Features 9 and 10 were identified while excavating 1x1 meter units to sample lithic artifact concentrations detected in the Phase II shovel testing effort, and both are midden deposits rather than discrete features—surface midden deposits do not usually show up in magnetic gradient data, especially if they only consist of high-density lithic artifacts. Feature 1 is a rodent burrow or tree disturbance identified during the Phase I survey; it is not considered further in this study.

In summary, the Phase I and II work identified nine features within site 33Pk372. All were partially or completely uncovered and five (Features 2, 3, 4, 8 and 10) were partially excavated. Based on the good correlation between magnetic gradient anomalies and prehistoric features, as we show below, other smaller anomalies present in the magnetic gradient data could also be archaeological features, though they were not singled out and given an anomaly number. The presence of features just below the humus layer shows that at least portion of site 33Pk372 have been minimally impacted by plowing.

9.2.1. 33Pk372 Feature 2

Feature 2, identified during the 33Pk372 Phase I survey (Pecora 2012b), is a large FCR concentration (Figures 9.1, 9.4-9.6). The concentration has a rough circular shape that is approximately 1.6 m in diameter. During the Phase II work, we excavated the approximate northeast quadrant of this feature in 10 cm levels to expose a portion (slightly more than half) of the feature in profile. This quadrant was selected for excavation because it includes the Phase I shovel test that intruded into the feature. In profile the feature looks to be a shallow pit with a lenticular-shaped cross-section. The FCR is concentrated in the upper part of the feature.

The excavated portion of Feature 2 produced 564 (25 kg) pieces of FCR, a formed lithic artifact, and nine pieces of lithic debitage. The formed artifact is likely a projectile point fragment. It and the lithic debris are likely accidental inclusions (i.e., refuse) in the pit fill. A soil sample extracted from Feature 2 produced 0.11 grams of oak wood charcoal; a smaller sample of unidentified wood was hand collected during the excavation. The age and function of Feature 2 is not known. Clearly it is a shallow pit or basin in which a lot of stone was used for a heat-related activity, such processing or cooking food. However, very little charcoal was found inside this feature, so it must have either been cleaned out of the feature and the FCR tossed back in, or this feature was used to produce/hold heat with hot rocks moved over from some other fire-related location. The use of hot rocks in a pit is not an uncommon way to cook food through baking or even water boiling.

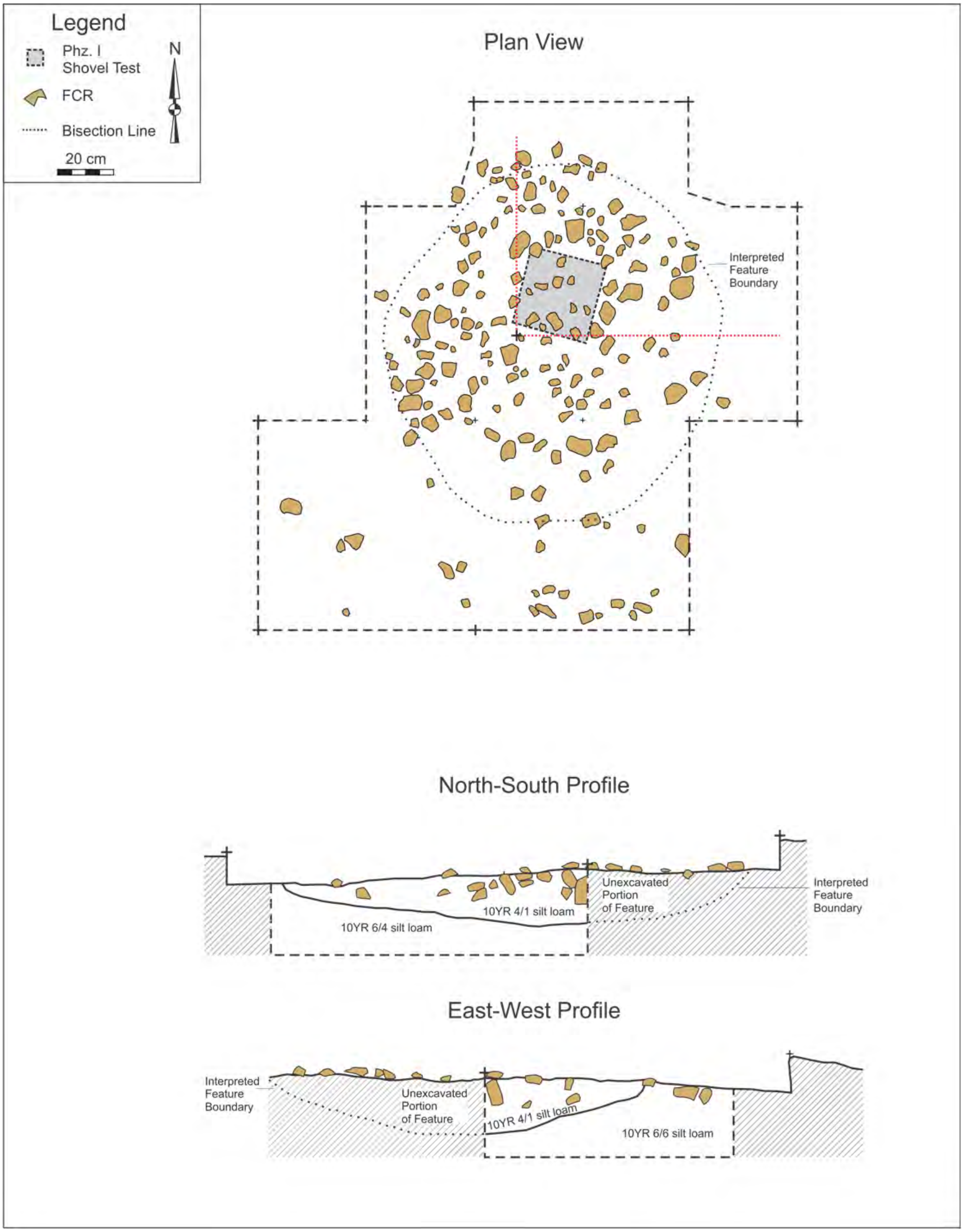

Figure 9.4. Illustration of 33Pk372 Feature 2.

Figure 9.5. Photograph of 33Pk372 Feature 2 plan view.

Figure 9.6. Photograph of 33Pk372 Feature 2 profile.

9.2.2. 33Pk372 Feature 3

Figure 3 was initially identified as a magnetic anomaly (A.1) in the south-central part of 33Pk372 (Figures 9.2, 9.7-9.9). Four 1x1 m units, forming a 2x2 m block, were excavated over this anomaly to reveal it completely in plan view. This effort resulted in the partial exposure of a large circular or oval-shaped FCR concentration. The exposed portion of the feature in plan view measures slightly more than 1.5 m across, but the feature clearly extends into the southeast corner of the excavation block. Assuming this feature has a symmetrical plan, its horizontal extent is likely two meters across.

To produce a profile of the Feature 3, the northwestern quadrant of the exposed portion of the feature was excavated. Figures 9.7 and 9.9 show the resulting two profiles exposed by the excavation. It appears that the FCR is contained within a pit feature. The bottom of the pit looks to be lined with deliberately arranged slabs of sandstone, but the interior is filled with smaller pieces of FCR. No evidence of burned earth was found; therefore, the strong magnetic signature of this feature was caused by the FCR.

The excavated portion of Feature 3 produced a huge amount of FCR—933 pieces weighing 64 kilograms—as well as four formed lithic artifacts and 74 pieces of lithic debris. The formed artifacts include a flint core and three early stage biface blank fragments. While the FCR is clearly linked to the structure and function of this pit, the lithic artifacts most likely ended up in the pit fill accidentally as refuse.

The soil sample taken from Feature 3 for flotation processing produced 0.02 grams of charred hickory nutshell and 1.19 grams of hickory, oak, and unidentified wood charcoal. A hand collected oak wood charcoal sample (0.6 grams) yielded a radiocarbon date of B.C. 2460-2270 and B.C. 2260-2200 (2-sigma cal.), which shows that Feature 3 was constructed and used during the Late Archaic period.

Just how Feature 3 functioned is not known, but clearly it is a constructed basin lined with large rocks in which hot rock was used to heat up something. At least 264 kilos of rock (over 500 lbs) were brought in to create this heating facility. While most of the stone is locally available, it may have had to be hauled in from nearby ravines (perhaps hundreds of meters away). Given the scale of this feature and the effort that went into its construction, and others just like it found at the other sites mentioned in this report, it is likely that this feature was used to cook large amounts of food. But whether this included meat or plants, or perhaps both, is not known at this point. Feature 3 appears to be an intact version of Features 2 and 4, which appear to have been dismantled or cleaned out. Perhaps the rock from Features 2 and 4 was scavenged for use in Feature 3.

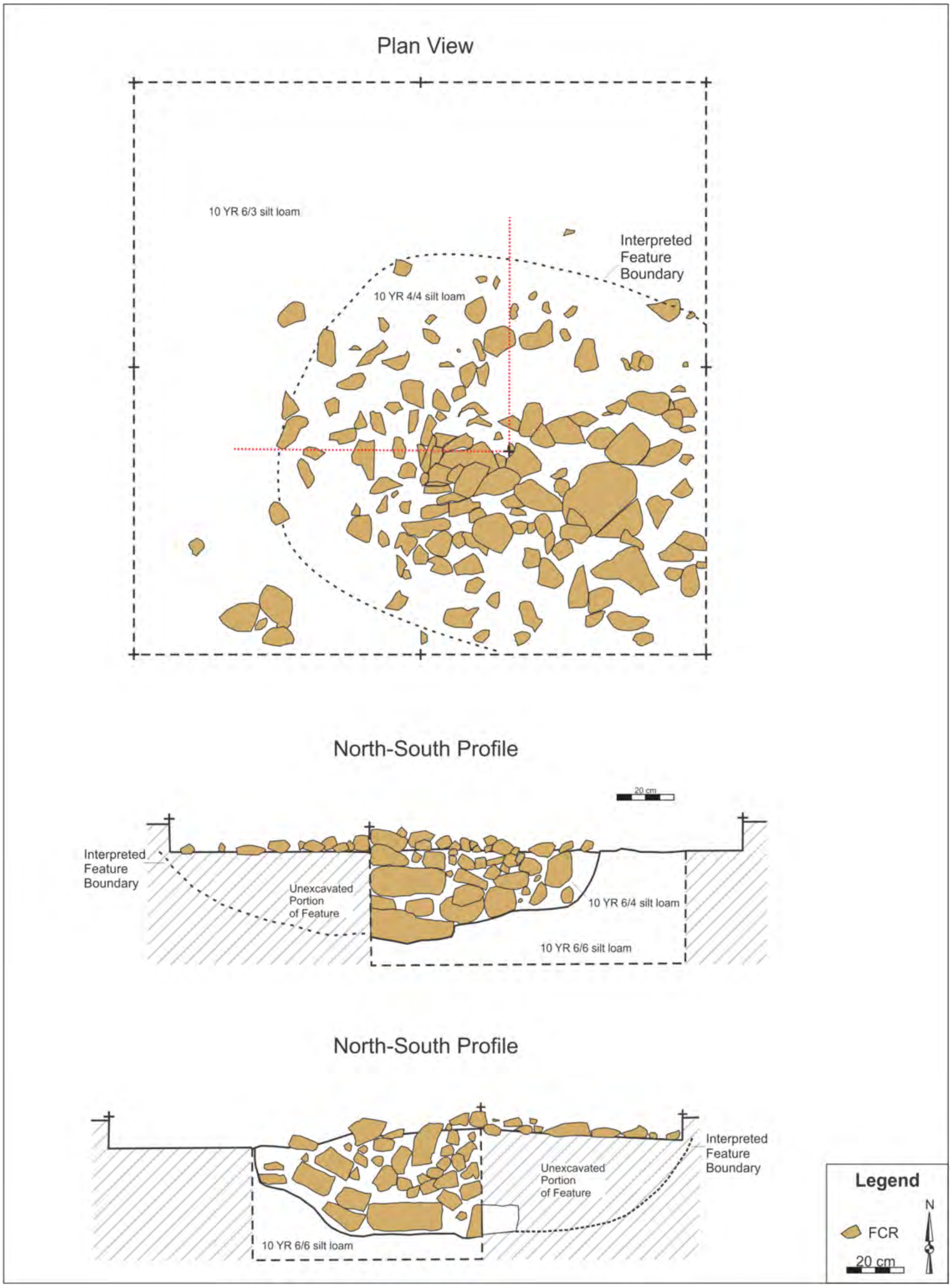

Figure 9.7. Illustration of 33Pk372 Feature 3.

Figure 9.8. Photograph of 33Pk372 Feature 3 plan view.

Figure 9.9. Photograph of 33Pk372 Feature 3 profile.

9.2.3. 33Pk372 Feature 4

Feature 4 was initially identified as a magnetic anomaly (A. 6) (Figures 9.1, 9.10-9.12). Four 1x1 m units, forming a 2x2 m block, were excavated over this anomaly to reveal it plan view. These excavations uncovered a dense, roughly circular-shaped FCR concentration just below the surface that measures approximately 1.4 m across.

Profiles exposed through excavation of the feature’s southwestern quadrant show that it is a shallow pit with mottled silt loam fill surrounded by yellowish-brown subsoil. Like Feature 2, the Feature 4 FCR is concentrated at the top of the feature with a few pieces suspended in the fill.

Though not a deep feature, the excavated portion of Feature 4 produced a large amount of FCR (1,248 pieces [27.6 kg]), as well as two formed artifacts and 21 pieces of lithic debris. The formed artifacts include a flint core and a late stage biface blank. The lithic artifacts are probably incidental inclusions in the feature fill and unrelated to the function of the feature, but the FCR certainly figured in to its intended function. A hand-collected sample of Kentucky coffeetree wood charcoal (0.35 grams) was also found in the southwestern quadrant.

The age and function of Feature 4 is not known, but like many of the other similar concentrations of FCR in shallow basins, this feature likely served to heat up something—be it people as a radiant heat device or food. Feature 4 it is similar to Feature 2 in size and contents, and both Feature 2 and Feature 4 appear to be somewhat cleaned-out or dismantled versions of Feature 3.

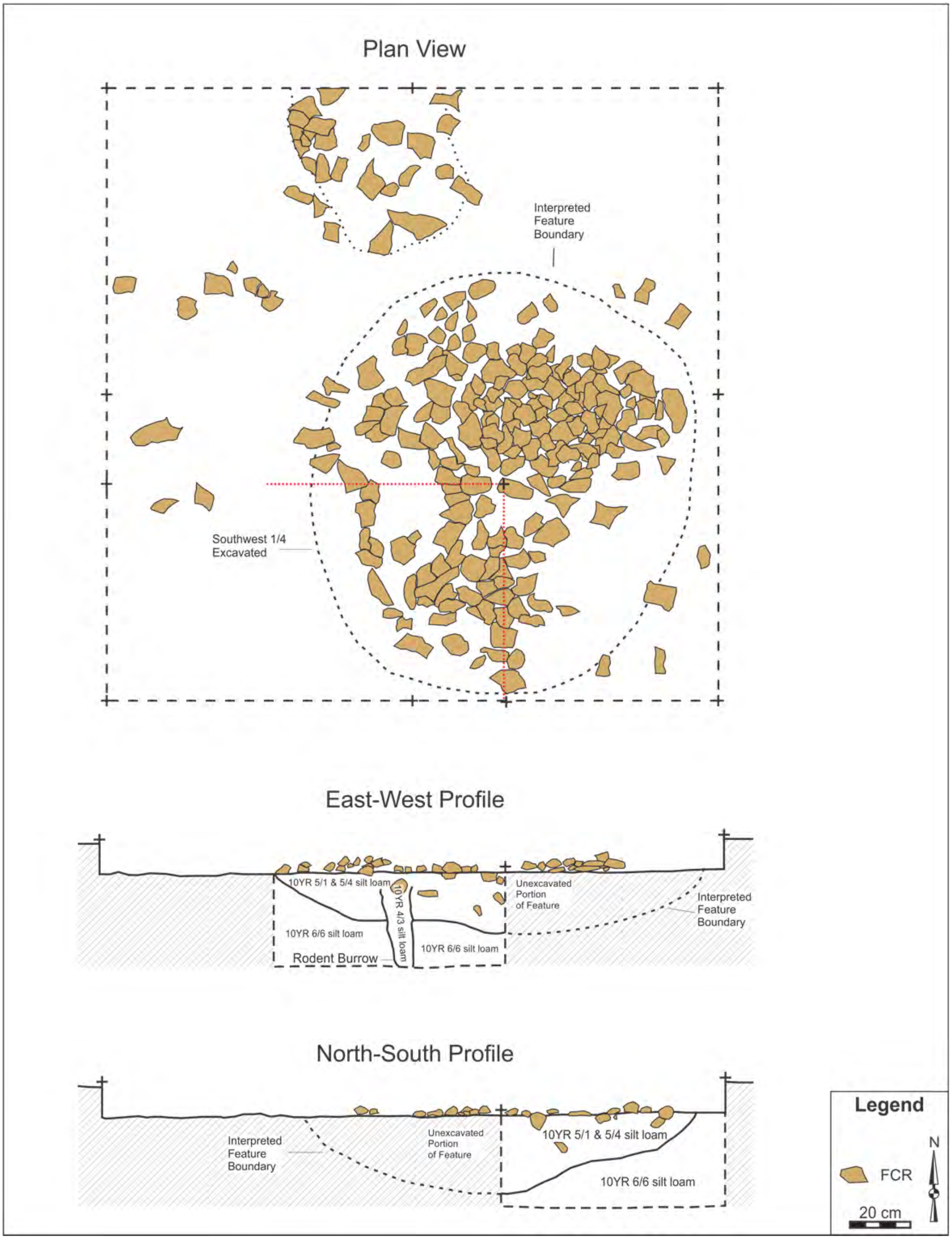

Figure 9.10. Illustration of 33Pk372 Feature 4.

Figure 9.11. Photograph of 33Pk372 Feature 4 plan view.

Figure 9.12. Photograph of 33Pk372 Feature 4 profile.

9.2.4. 33Pk372 Feature 5

Feature 5 was initially identified as a small but strongly magnetic anomaly (A. 4) located in the central part of 33Pk372 (Figures 9.1, 9.13-9.14). A single 1x1 meter unit was excavated over this anomaly in an effort to verify the presence of an archaeological feature. The base of the unit excavation revealed a dense concentration of FCR. The excavated and screened fill above Feature 5 produced 650 (8.9 kg) pieces of FCR and 31 pieces of lithic debris. The full plan-view of this feature was not exposed, but it appears to be similar to the other FCR-filled thermal features at 33Pk372. Given its greater magnetic strength than Feature 4 (Anomaly 6), it's likely that Feature 5 is deeper and contains more rock than Feature 4.

Figure 9.13. Photograph of 33Pk372 Feature 5 plan view.

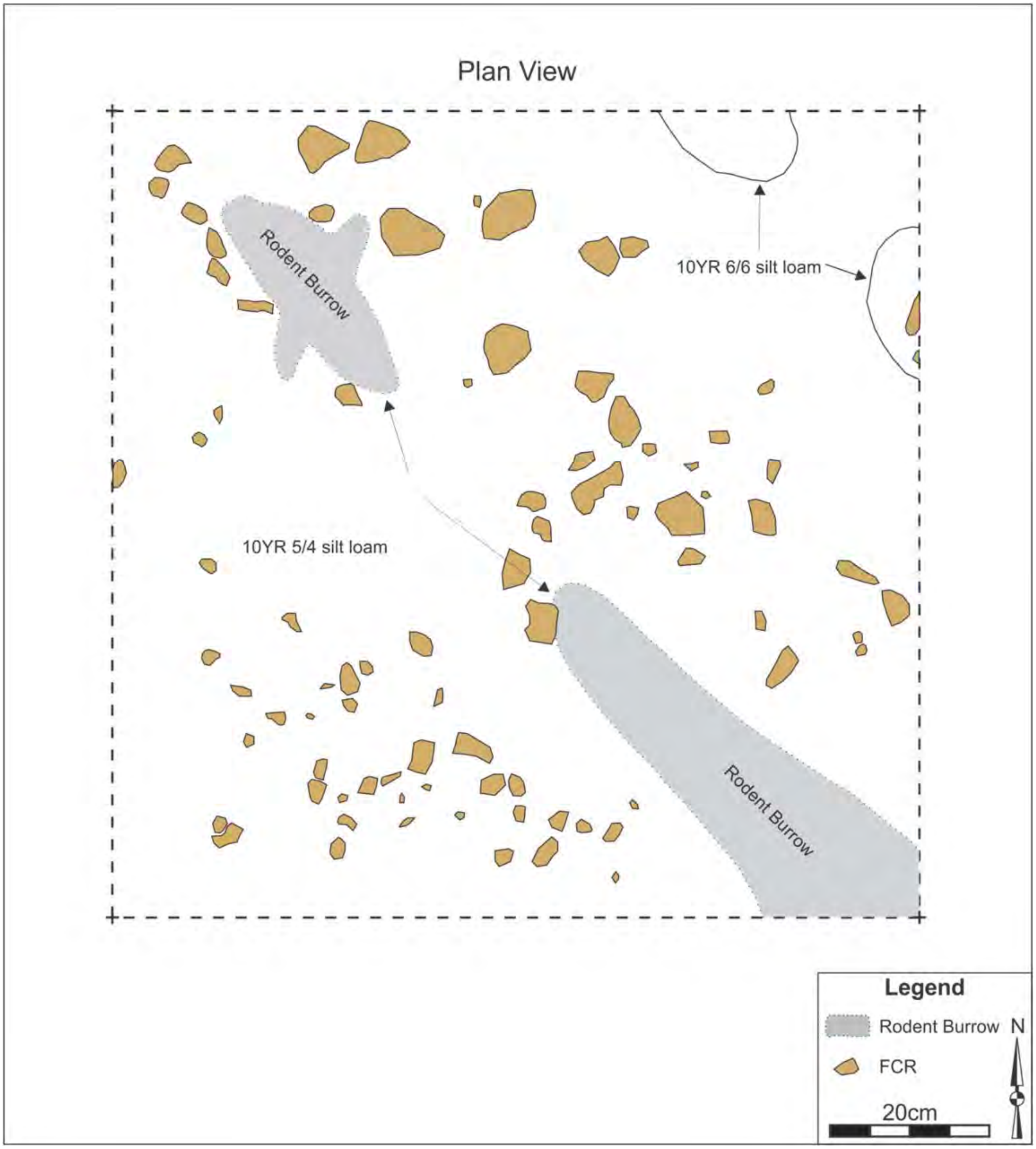

Figure 9.14. Illustration of 33Pk372 Feature 5.

9.2.5. 33Pk372 Feature 6

Feature 6 was initially identified as a very strongly magnetic anomaly (A.3) (Figures 9.1, 9.15-9.16). A single 1x1 m unit was excavated over this anomaly to verify the presence of an archaeological feature. At the base of the excavation, a well-defined FCR concentration was encountered in the northwest corner of the excavation unit. The FCR concentration is shaped like the southeastern quadrant of a circular pit feature that may be roughly 1 m in diameter. A standing tree is located above what would be the western half of this feature. The excavated and screened fill above Feature 6 produced 15 pieces (0.6 kg) of FCR. Although Feature 6 was not fully exposed in plan view or excavated, it appears from its symmetry and magnetic signature to be another large thermal feature that is similar to Feature 3, though perhaps not quite as large. A large area of high magnetic susceptibility extends down slope from this feature. It is possible this feature was used on several occasions, and the thermal debris cleaned out of it between uses was dumped down slope away from the feature.

Figure 9.15. Photograph of 33Pk372 Feature 6 plan view.

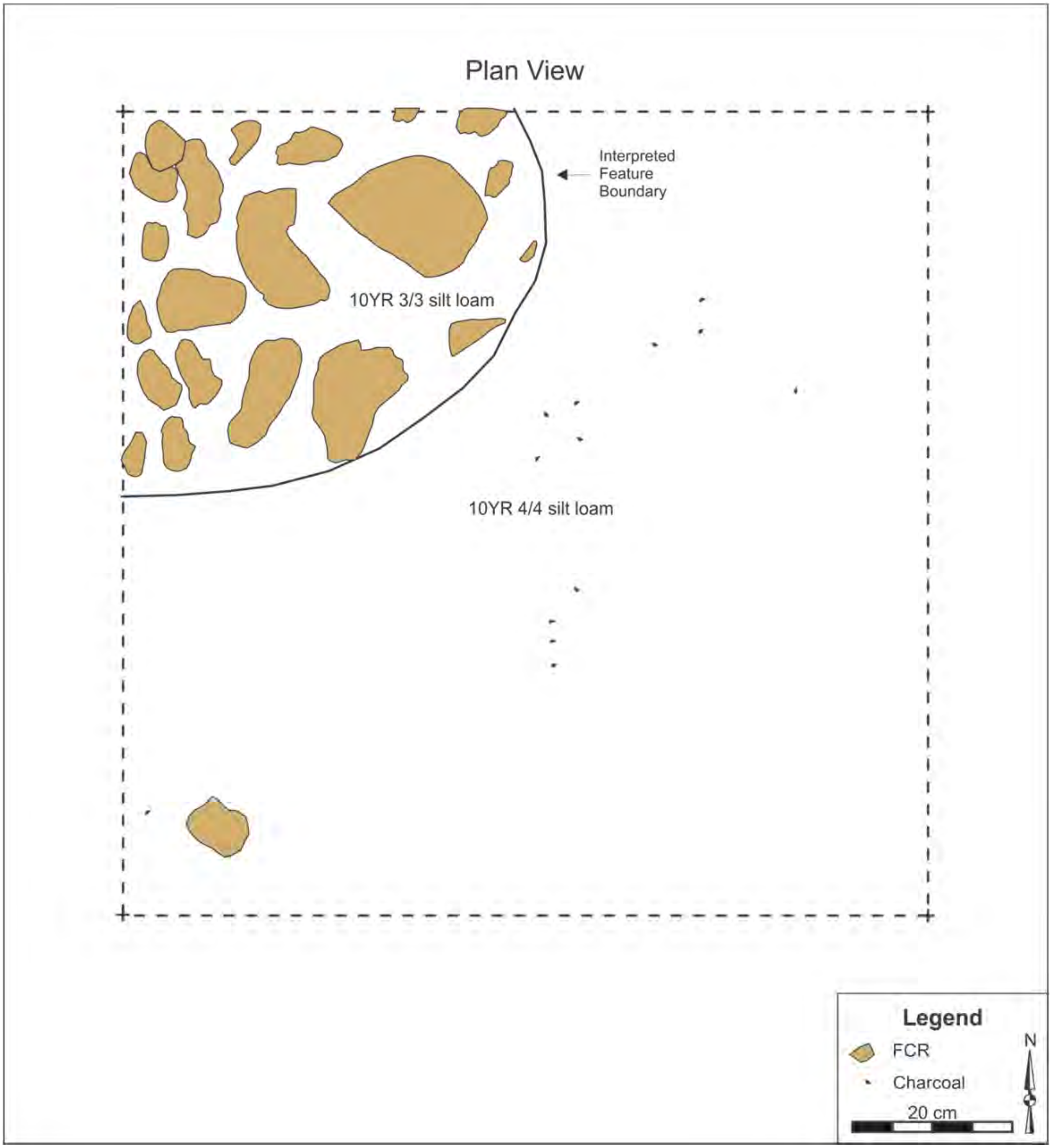

Figure 9.16. Illustration of 33Pk372 Feature 6.

9.2.6. 33Pk372 Feature 7

Feature 7 was initially identified as a small magnetic anomaly (A. 4) (Figures 9.1, 9.17-9.18). A single 1x1 meter unit was excavated over this anomaly in an effort to verify the presence of an archaeological feature. The base of the excavation unit revealed a dense concentration of FCR with charcoal flecking. The excavated and screened fill above Feature 7 produced 239 (6.5 kg) pieces of FCR and two pieces of lithic debris. Although the full plan view of Feature 7 was not exposed, it appears to be similar to Features 2 and 4 but with more densely packed FCR.

Figure 9.17. Photograph of 33Pk372 Feature 7 plan view.

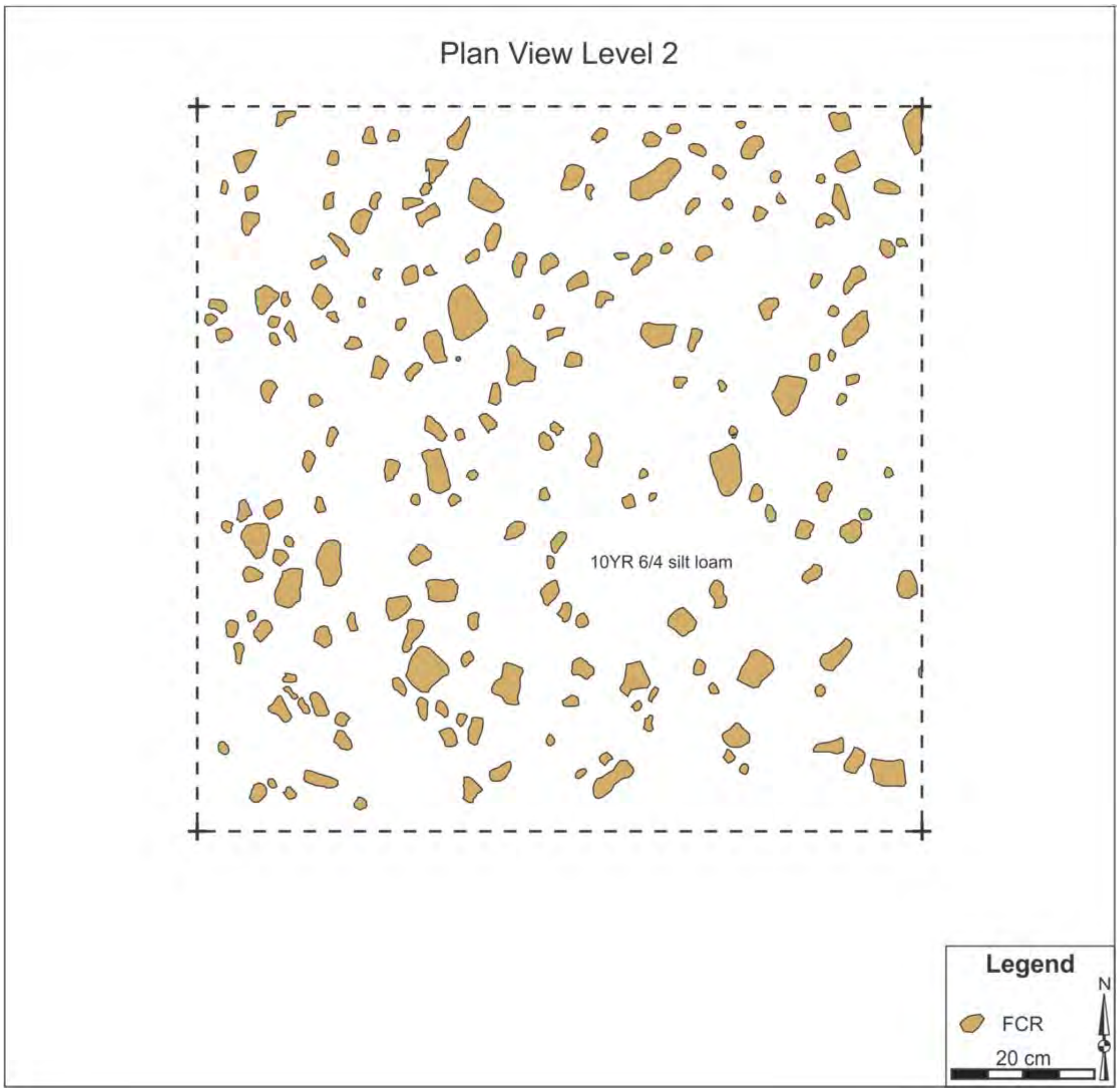

Figure 9.18. Illustration of 33Pk372 Feature 7.

9.2.7. 33Pk372 Feature 8

Feature 8 was initially identified as a magnetic anomaly (A.12) (Figures 9.1, 9.19-9.21). The anomaly is located in the bottom of a large depression that measures about 7 m across. Soil coring across the depression found that the entire bottom is covered with FCR. A single 1x1 m unit was excavated in the south central part of the depression, over Anomaly 12, to get a sense of the structure of the depressions fill and to determine what it contains.

The excavation revealed a deep artifact-bearing fill. The excavation unit profile showed that the artifact-rich fill occurs in three distinct layers, as illustrated in Figure 9.20. The artifact density increases significantly towards the bottom of the fill.

All told the excavation unit produced 2,488 artifacts, including 2,448 pieces (45 kg) of FCR, five formed artifacts, 27 pieces of lithic debris, and four pottery sherds. The formed artifacts include a flint core, a late biface blank fragment, a groundstone celt fragment, a small and somewhat cube-shaped piece of sandstone with a drill-hole, and a small stone ball. The latter two objects are rather unusual to find at prehistoric archaeological sites in Ohio and their functions are unknown, but they may represent toys or game pieces. Feature 8 also produced eight pieces of very thick, grit tempered pottery. Pottery with these attributes is common in archaeological deposits that date to the terminal Late Archaic and Early Woodland periods in the Ohio Valley.

An examination of the artifacts by arbitrary 10 cm levels shows that 53 percent of the FCR by weight is from two excavation levels. The remaining 47 percent is distributed across the other five excavation levels. The celt was found in the uppermost level, and the stone ball and late biface blank are from slightly below. The drilled cube and flint core are from lower levels, and nearly all of the pottery is from the lower levels.

A carbon sample from the upper-middle fill layer produced a radiocarbon date of A.D. 1270-1310 and A.D. 1360-1390 (2-sigma cal.). This Late Prehistoric date is much younger than the pottery sherds found several layers below the dated carbon sample.

In summary, the following is a tentative interpretation of this enigmatic feature. The evidence to date suggests that Feature 8 is a large (7 meter diameter), roughly circular-shaped pit that was significantly deeper than is it today around the end of the Late Archaic period or the beginning of the Early Woodland. This is about the time when the thick pottery was made. At this time, this feature might have been part of a semi-subterranean house feature, such as one might occupy during the winter. While semi-subterranean houses are rare in Ohio before the Late Prehistoric period, they have been found dating back as early as the Early Archaic period (e.g., the Weilnau site in north-central Ohio [Abel 1994]). Once the house was abandoned, the depression began to slowly fill in, a process that may have taken as long as two to three thousand years. The thirteenth to fourteenth century radiocarbon date shows that the depression was 27-37 cm deeper in the Late Prehistoric period than it is today. Since then, the depression has continued to slowly fill in.

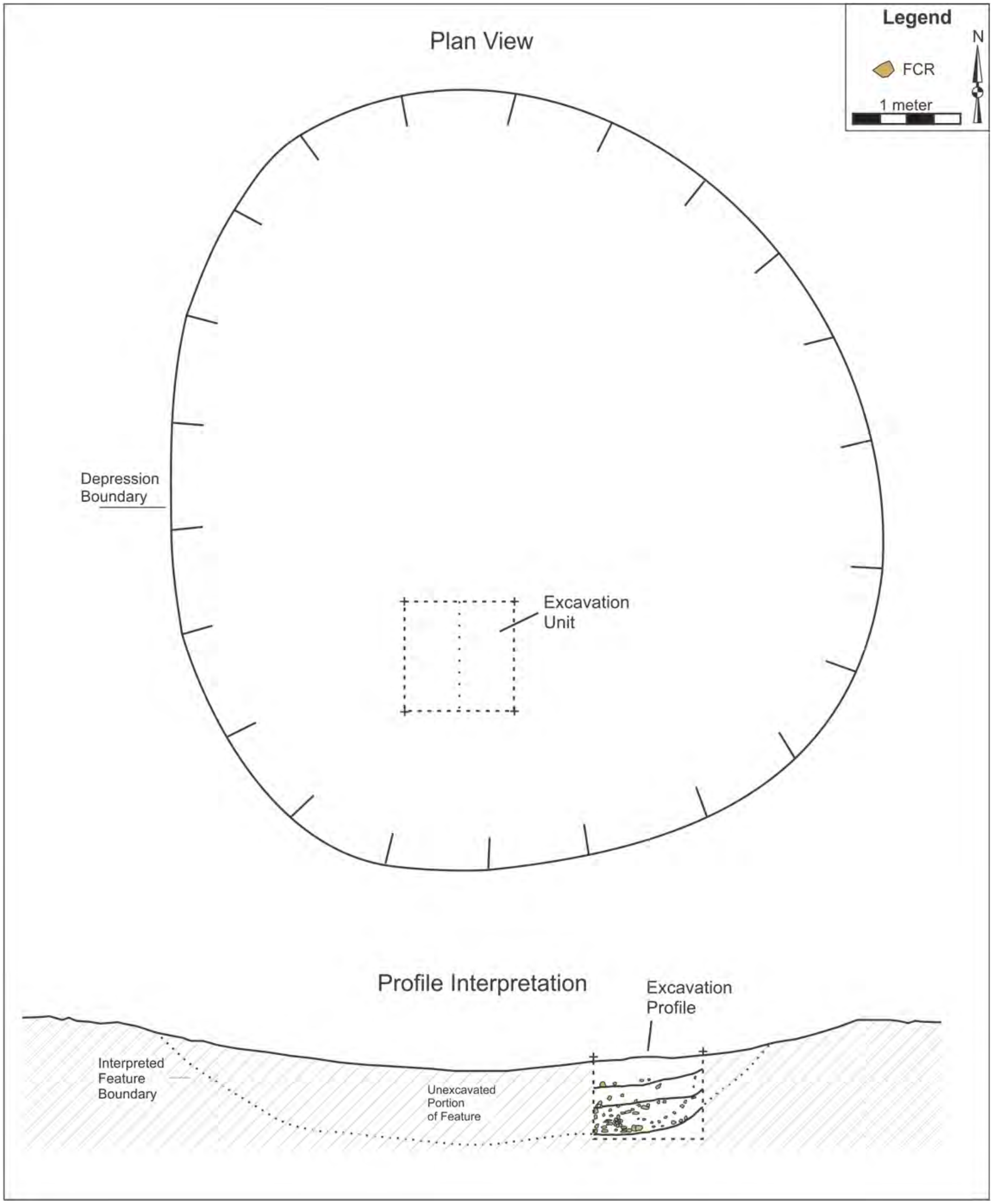

Figure 9.19. Illustration of 33Pk372 Feature 8.

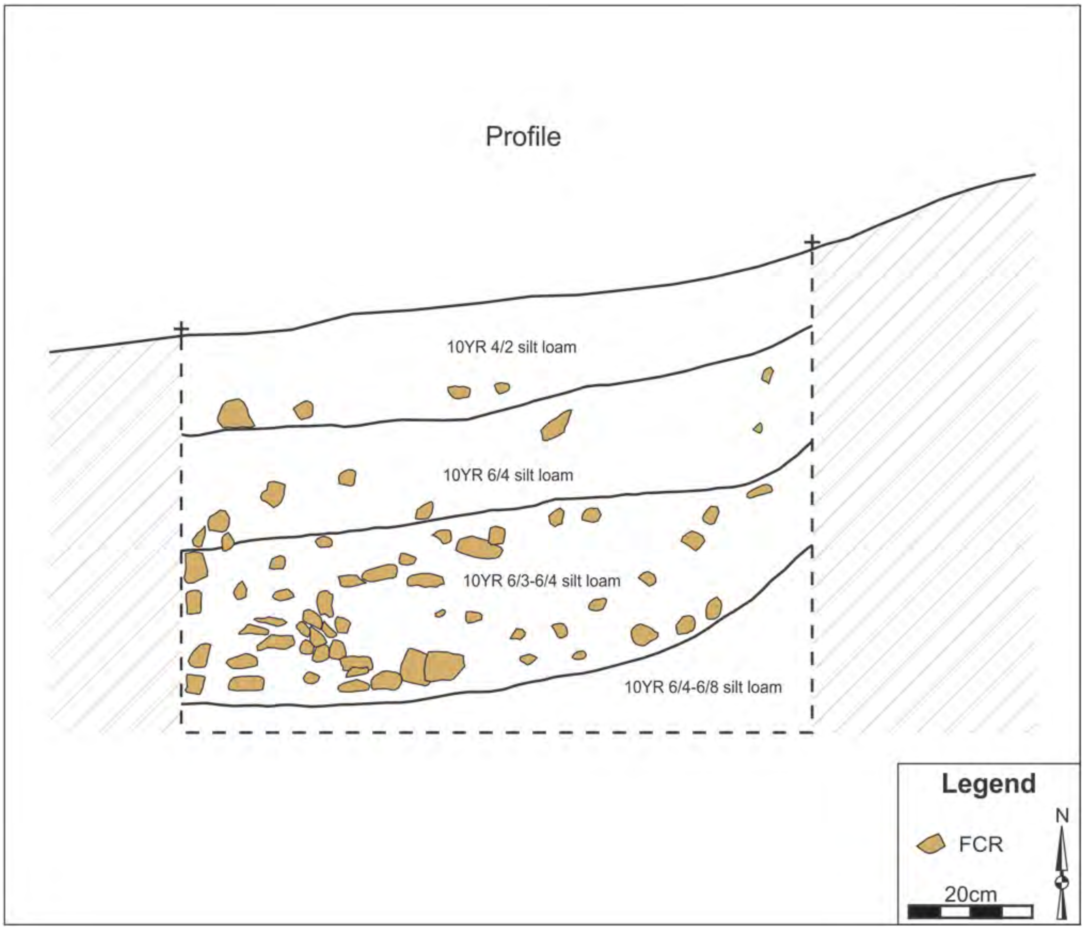

Figure 9.20. Illustration of 33Pk372 Feature 8 profile.

Figure 9.21. Photograph of 33Pk372 Feature 8 profile.

9.2.8. 33Pk372 Feature 9

Feature 9 is a distinctive midden deposit found at site 33Pk372 (Figures 9.1, 9.22-9.23). The midden was initially identified by a large quantity of lithic debris found in a single shovel test excavated in this area. Adjacent shovel tests located five meters away in the cardinal directions produced significantly fewer artifacts, suggesting that this concentration of debris covered an area less than 10 meters across. To further investigate this artifact concentration, three end-to-end 1x1 m units were excavated in arbitrary 10 cm levels. The three units produced 1,395 artifacts, including 842 (20 kg) pieces of FCR, 37 formed artifacts, and 513 pieces of lithic debris. The easternmost unit produced an average of 102 artifacts per 10 cm level, the central unit produced 65 artifacts per 10 cm level, and the westernmost unit produced 126 artifacts per 10 cm level. The easternmost unit, however, produced nearly half (45%) of the lithic debris, whereas the central unit produced 26 percent and western unit produced 28 percent. Only 22 percent of the formed artifacts are from the central unit, with the remaining 88 percent being equally distributed between the eastern and western units. If we look at the distribution of artifacts by depth, slightly over 73 percent are from the mid-upper levels of the excavation. Only nine percent are from the lower two levels.

Feature 9 produced 63 percent of the formed artifacts from 33Pk372, including seven flint cores, two unidentified biface fragments, and early stage biface blank fragment, two projectile point fragments, six modified flake tools, a pitted stone, and 20 micro-drills. Feature 9 is the only source of the micro-drills at 33Pk372, but two similar artifacts were also recovered from 33Pk348.

A soil flotation sample extracted from Feature 9 midden produced 0.39 grams of hickory, oak, and unidentified wood charcoal and 0.2 grams of hickory and walnut nutshell charcoal. Hand-collected charcoal samples from Feature 9 also produced 0.03 grams of oak wood, 0.07 grams of walnut nutshell, and 0.53 grams of hickory nutshell. The walnut nutshell charcoal produced a radiocarbon date that intersects the calibration curve (2-sigma) at B.C. 750-680, B.C. 670-610, and B.C. 600-400. Assuming that the midden deposit is temporally associated with the nutshell sample, the Feature 9 midden dates to the Early Woodland period.

The results of these excavations clearly demonstrate the presence of a small, but artifact rich, concentration of refuse (FCR and lithic artifacts) covering an area under 10 m across. Since the Phase I and Phase II excavations at 33Pk372 show that this site has never been plowed, the Feature 9 midden is likely moved little since it was deposited about 2,400 years ago. While the Feature 9 assemblage is very diverse and represents a broad range of activities, from FCR discard to tool manufacture, the 20 micro-drills indicate the presence of a small-scale drilling operation. If nearby Feature 8 is a house basin, it is likely that the Feature 9 midden is actually a secondary refuse dump related to the house. The circa seventh century B.C. dates related to this refuse dump match the expected age of the thick pottery found at the bottom of the potential house basin (Feature 8).

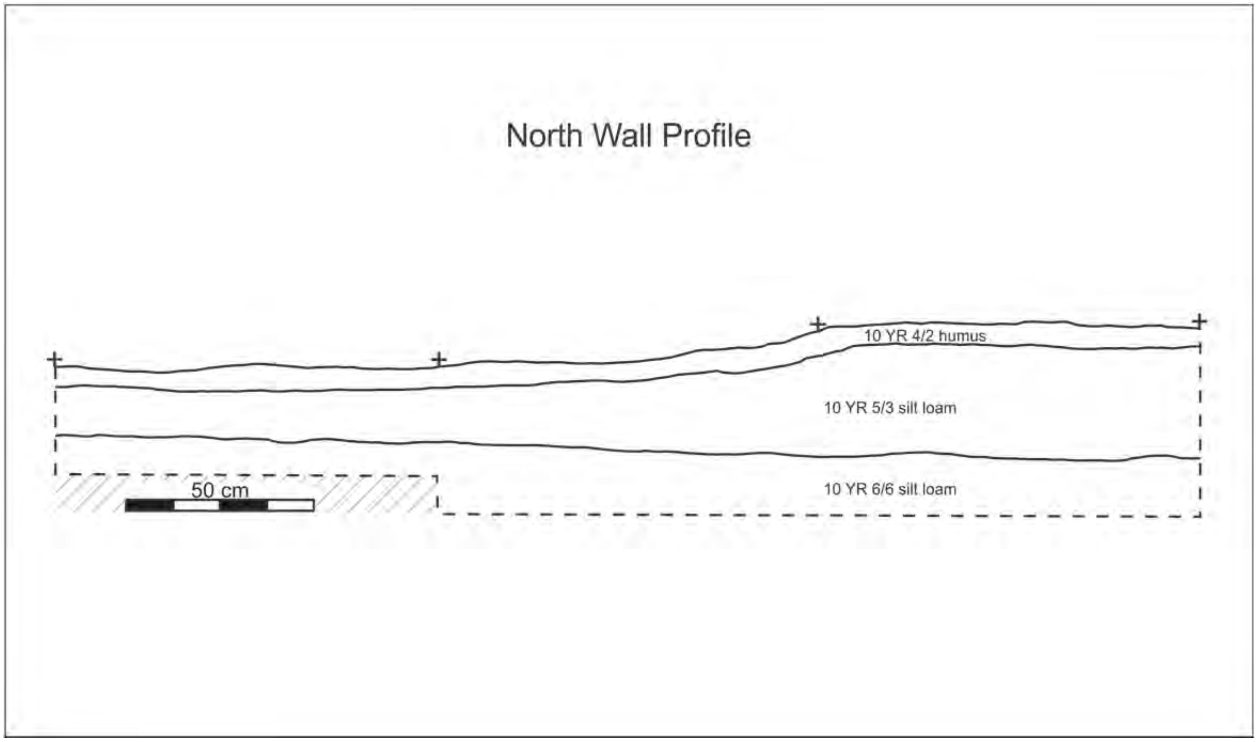

Figure 9.22. Illustration of 33Pk372 Feature 9 (midden profile).

Figure 9.23. Photograph of 33Pk372 Feature 9 (midden profile).

9.2.9. 33Pk372 Feature 10

Feature 10 is another midden deposit found at 33Pk372 (Figures 9.1 and 9.24). This deposit was identified when excavating a 1x1 meter unit placed in this area to further sample a concentration of lithic debris found during the shovel testing. The excavation produced 2,104 pieces (20.7 kg) of FCR, a formed artifact (a flint core), and 55 pieces of lithic debris. Although it is far less rich than the Feature 9 midden in terms of the number of artifact classes found, Feature 10 produced substantially more FCR (three times more by weight and seven times more by count) per excavated area. The majority of the Feature 10 artifacts were found from the middle-lower excavation levels. It is possible that the unexcavated portions of Feature 10 may contain a more diverse artifact assemblage. Given the proximity of the Feature 10 midden to the possible house basin (Feature 8), it is possible that Feature 10 is another formal refuse dump related to the house. It might also represent the refuse from a separate occupation of the site.

Figure 9.24. Photograph of 33Pk372 Feature 10 (midden profile).

9.3. 33PK372 ARTIFACT ASSEMBLAGE

The 33Pk372 Phase II survey produced 13,596 prehistoric artifacts (Table 9.3). As with the three other prehistoric sites examined in this study, FCR (n=12,530, 306.5 kg) is the most abundant artifact type. This assemblage also includes relatively abundant quantities of lithic debris (n=1,002) and formed artifacts (n=60), as well as a small amount of prehistoric pottery (n=4). Of the four sites examined in this study, 33Pk372 produced the largest artifact assemblage.

Table 9.3. 33Pk372 Phase II artifact inventory.

Context	**FCR**	***FCR Weight (g)***	**Formed Artifacts**	**Lithic Debris**	**Pottery**	**Total**
Shovel Tests	2,756	*72,752.0*	10	237	-	3,003
1x1 m Units	398	*6,709.2*	-	6	-	404
Anomaly 5	256	*5,976.3*	-	19	-	275
Anomaly 7	77	*1,851.8*	-	5	-	82
Feature 2	564	*25,043.2*	1	9	-	574
Feature 3	933	*63,963.5*	4	74	-	1,011
Feature 4	1,248	*27,567.0*	2	21	-	1,271
Feature 5	650	*8,928.2*	-	31	-	681
Feature 6	15	*653.4*	-	-	-	15
Feature 7	239	*6,528.5*	-	2	-	241
Feature 8	2,448	*45,164.4*	5	27	4	2,484
Feature 9	842	*20,172.1*	37	516	-	1,395
Feature 10	2,104	*20,748.9*	1	55	-	2,160
Total	**12,530**	***306,058.5***	**60**	**1002**	**4**	**13,596**

9.3.1. 33Pk372 Lithic Debris

The 33Pk372 Phase II assemblage contains 1,002 pieces of lithic debris (Table 9.4). The most abundant flint type is Delaware, followed by unidentified and Brassfield. Very low frequencies of Brush Creek, Upper Mercer/Zaleski, Paoli, and Vanport are also represented. The four prominent flint types were probably found by the site occupants in secondary deposits such as the Scioto River bed or its tributaries in the Scioto floodplain. Paoli flint, which comes from Kentucky, was almost definitely transported by human agency directly to 33Pk372 in the form of biface blanks, preforms, or finished tools. This may also be true for the Vanport flint in this assemblage, though nearly half of the Vanport diagnostic debris is from core reduction. The presence of water worn cortex on some of the debris and cores made from the more abundant flint types demonstrates that it was procured in the form of small cobbles from nearby secondary deposits. Nevertheless, all of the flint in this assemblage was imported to 33Pk372 since none of it occurs naturally in the adjacent uplands.

Seventeen technological debris categories were identified in the 33Pk372 assemblage, and, excluding flake fragments and shatter, all exhibit characteristics that reveal how and when they were created in the reduction process. The lithic reduction model presented above in Figure 3.1 provides guidance on how this process is organized. Nearly all of the debris in this assemblage is *Primary Reduction* debris, which was produced when converting raw stone into a serviceable tool. Slightly over one percent (8 objects) is potentially from tool use and maintenance (*Secondary Reduction*) and tool recycling (*Tertiary Reduction*), and these are classified as biface pressure and notching flakes. This does not mean that tool maintenance and recycling did not occur at 33Pk372. The debris generated from maintaining and recycling tools tends to be very small, fragile, and fragmentary; it is seldom recoverable with the use of ¼-inch mesh screens. It is also produced in very small quantities relative to *Primary Reduction* debris (Pecora 2002).

Most of the 33Pk372 lithic debris (over 76%) was created from initial reduction, which is the process of detaching flake blanks for use as flake tools or blanks for biface reduction. Cores are a well-represented formed artifact type in this assemblage. A relatively large percentage of the core reduction debris (16%) and formed artifacts (57%) have bipolar reduction attributes. Bipolar reduction is a common technique for reducing small flint nodules. Only slightly over 22 percent of the debris assemblage was created from the biface reduction process and most of this is from the late biface reduction stage. This implies that some of the stone was introduced to the site in the form or raw or partially altered nodules, in some cases, but it also came into the site as prepared biface blanks.

Table 9.4. 33Pk372 lithic debris.

Technological Type	**Brassfield**	**Brush Creek**	**Delaware**	**Upper Mercer/ Zaleski**	**Paoli?**	**Vanport**	**Unidentified**	**Total**	**Reduction Stage**
Primary Decortication	5	-	30	1	-	-	29	65	Initial Reduction (Core) ***76.4%***
Prim. Decort. Bipolar	-	1	8	-	-	-	1	10	
Secondary Decortication	22	1	93	9	-	2	33	160	
Sec Decort. Bipolar	4	-	29	1	-	1	1	36	
Interior	38	2	118	20	1	5	30	214	
Interior Bipolar	2	-	32	2	-	-	4	40	
Sec Decort. Alt.	-	-	1	-	-	-	1	2	Initial Biface Reduction (Blank Preparation) ***3.6%***
Sec Decort. Edge Prep	1	-	7	-	-	-	1	9	
Interior Edge Prep.	1	-	6	-	-	1	1	9	
Interior Alt.	2	-	3	-	-	-	-	5	
Early Biface Edge Prep.	-	-	2	1	-	-	-	3	Early Biface Reduction (Blank Thinning) ***6.4%***
Early Biface Thinning	6	-	23	4	1	1	6	41	
Late Biface Thinning	13	1	46	12	-	4	9	85	Late Biface Reduction (Blank Thinning) ***12.4%***
Biface Pressure	1	-	4	1	-	-	-	6	Pressure Thinning (Preform, Tool, Tool Maintenance, Recycling) ***1.2%***
Notch	1	-	-	-	-	1	-	2	
Flake Fragment	27	-	106	36	-	4	66	239	Non-Diagnostic Debris
Shatter	9	1	23	5	-	2	36	76	
Total	**132**	**6**	**531**	**92**	**2**	**21**	**218**	**1,002**	
%	***13%***	***0.6%***	***53%***	***9%***	***0.2%***	***2%***	***22%***	***100%***	

9.3.2. 33Pk372 Formed Artifacts

The Phase II investigation recovered 60 formed artifacts from 33Pk372 (Table 9.5; Figures 9.25-9.27). Of the four sites examined in this study, 33Pk372 produced the most diverse formed artifact assemblage with 15 general types. Delaware flint (68%) dominates this assemblage, but also present are artifacts made of Brassfield, Vanport, and unidentified flints, as well as igneous stone and sandstone. The latter two stone types were used to make groundstone tools and objects.

Three general types of formed artifacts are included in this assemblage: (1) cores, blanks, and preforms; (2) chipped-stone tools; and (3) groundstone. Forty percent of the formed artifact assemblage consists of chipped stone objects representing the precursors to tools, such as cores, blanks, and preforms. Chipped stone tools are actual functioning implements, and include projectile points, micro-drills, and modified flake tools. The groundstone assemblage is also fairly diverse, with a chipped and ground hoe-like or digging implement, celt bit fragments, a pitted stone, a small stone ball, and a stone cube with a drilled hole. The Phase I survey also produced a cupstone/nutting stone.

Table 9.5. 33Pk372 formed artifacts.

Provenience	**Brassfield**	**Delaware**	**Vanport**	**Unidentified Flint**	**Igneous**	**Sandstone**	**Total**
Nodule/ Core	1	-	-	3	-	-	**14**
Nodule/Blank	-	10	1	-	-	-	**1**
Biface Fragment	1	1	-	-	-	-	**2**
Early Biface Blank	-	3	-	2	-	-	**5**
Late Biface Blank	-	1	-	-	-	-	**1**
Preform Fragment	-	1	-	-	-	-	**1**
New Projectile Point	-	-	1	-	-	-	**1**
Projectile Point	-	2	-	-	-	-	**2**
Micro-Drill	-	17	1	2	-	-	**20**
Modified Flake	-	6	1	-	-	-	**7**
Groundstone -Hoe?	-	-	-	-	1	-	**1**
Groundstone Celt	-	-	-	-	2	-	**2**
Drilled Cube	-	-	-	-	-	1	**1**
Stone Ball	-	-	-	-	-	1	**1**
Pitted Stone	-	-	-	-	-	1	**1**
Total	**2**	**41**	**4**	**7**	**3**	**3**	**60**
%	***3%***	***68%***	***7%***	***12%***	***5%***	***5%***	***100%***

33Pk372 Flint Nodules/Cores

Nodule/cores and nodule blanks are flint nodules that would have been procured from the Scioto River bed or other nearby exposed gravel beds filled with glacial outwash gravels. All have water worn cortex. The cores were used as sources for flakes or spalls that would have been converted into tools. Finding cores at the site shows that the occupants of 33Pk372 brought in raw stone from elsewhere for use at this location. This is also evident in that cores like those documented here are the source of over 76 percent of the lithic debris collected from 33Pk372. Had raw flint nodules not been brought in to the site, the lithic assemblage would be much smaller.

The cores in this assemblage are rather small, though they would have started out as larger objects before they were reduced to their current size (Table 9.6). Bipolar core reduction techniques, which are useful for working small cores, were probably used to detach useable flakes from cores of the size represented in this assemblage. Sixteen percent of the lithic debris associated with core reduction and 67 percent of the tools (micro-drills) in the 33Pk372 assemblage have bipolar core reduction attributes.

Many of the cores found at 33Pk372 come from the Feature 9 midden, which may be a refuse dump associated with the nearby possible structure (Feature 8). Hauling around a bag full of cores is not typically a behavior archaeologists envision for individuals and groups out on resource extraction missions, which typically had very specific tool requirements (e.g., hunting weaponry). Instead, in many cases cores are most abundant at sites where people have settled in for a longer stay, such as residential base camps. These are the places where small cutting edges are needed for a variety of tasks on a fairly regular basis, and having a cache of small cores around provides expedient raw material to fill these needs. Finding numerous cores at 33Pk372 supports the idea that Feature 8 is a domestic residence.

Table 9.6. 33Pk372 nodule/core metrics.

Context	Type	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Feature 4	Core Nodule	53.3	32.0	20.8	38.3
Feature 4	Core Nodule	83.7	35.5	31.5	68.2
Feature 8	Core Nodule	35.7	23.5	15.0	17.0
Feature 9	Core Nodule	23.1	20	14.3	10.5
Feature 9	Core Nodule	43.5	29.7	20.3	28.3
Feature 9	Core Nodule	33.1	32.8	22.8	24.0
Feature 9	Core Nodule	25.7	13.1	11.6	3.7
Feature 9	Core Nodule	31.4	18.0	11.8	7.5
Feature 9	Core Nodule	31.9	19.5	11.7	7.8
Feature 9	Nodule Blank	68.3	55.4	27.9	122.2
Unit	Core Nodule	53.3	30.3	22.6	52.8
Unit	Core Nodule	35.9	30.7	19.7	21.4
Unit	Core Nodule	37.1	28.1	15.4	15.3
Unit	Core Nodule	38	26.4	17.4	19.2
Unit	Core Nodule	43	30.5	27.7	48.7
Average		**42.5**	**28.4**	**19.4**	**32.3**

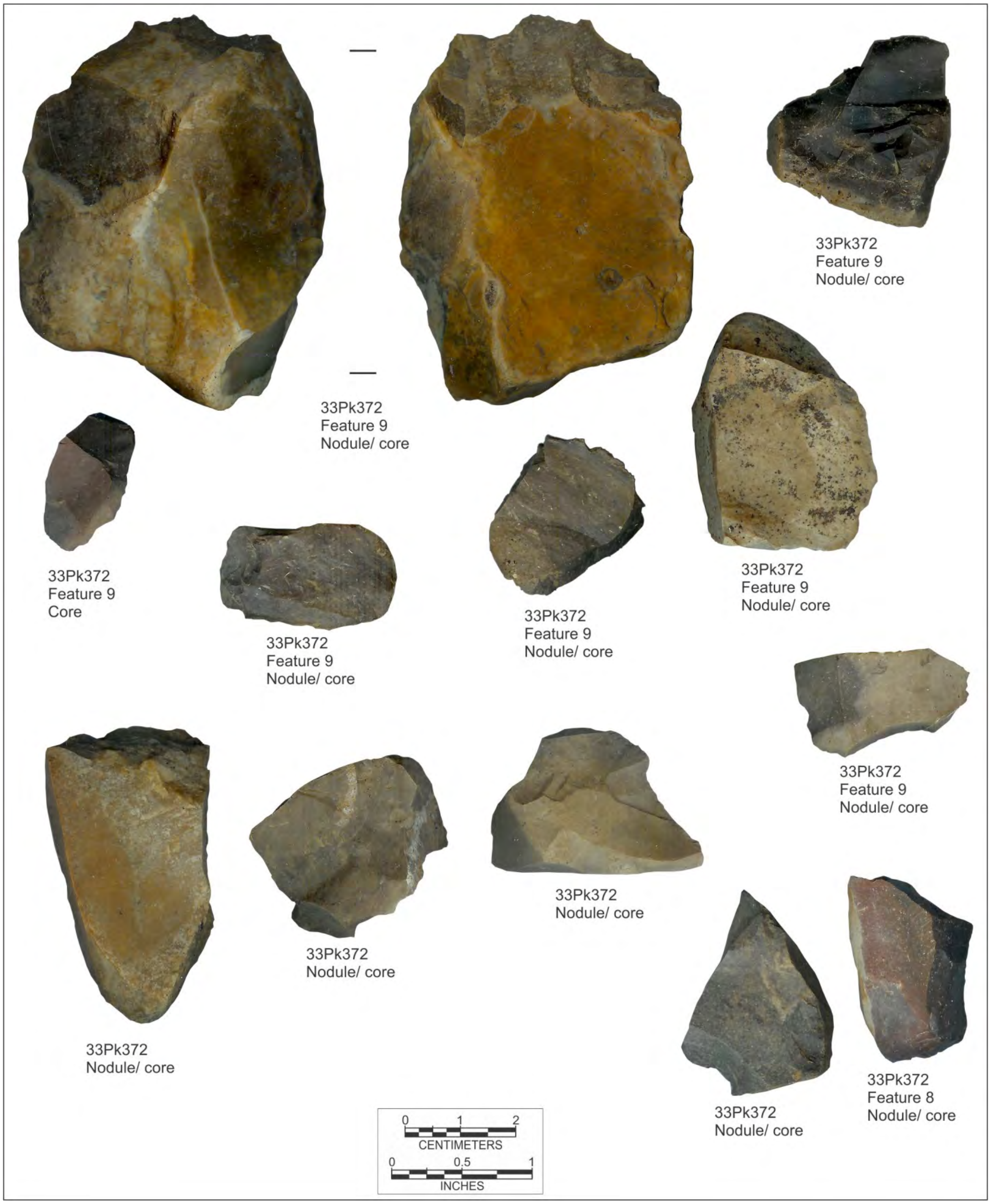

Figure 9.25. Image of cores from 33Pk372.

33Pk372 Biface Blanks and Preforms

Site 33Pk372 produced twelve biface fragments representing the earliest stages of biface tool manufacture. These include two early stage biface blanks, a late stage biface blank, and two biface fragments (Table 9.7; Figure 9.26). Blanks are the precursors to biface preforms, but the fragments found at this site were damaged and discarded during the manufacturing process. Nearly nineteen percent of the technologically diagnostic lithic debris from 33Pk372 was created in the production of early and late stage biface blanks.

Five of the early stage biface blanks are from Feature 3, a large FCR thermal feature that dates to the Late Archaic period. Although the function of Feature 3 is not fully understood (it is likely a cooking feature), the bifaces are not functionally related to the feature and occur in it as trash. Two early stage biface blanks are from Feature 9, one of two refuse-filled surface trash dumps at the site. Feature 9 also produced two biface fragments from an undetermined reduction stage. The single late stage biface blank is from Feature 8, the possible structure located a few meters north of Feature 9.

Table 9.7. 33Pk372 biface metrics.

Context	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Unit	Early Biface Blank	20.8	11.9	6.4	1.6
Unit	Early Biface Blank	31.0	23.8	5.4	3.8
Feature 3	Early Biface Blank	61.5	31.9	15.5	24.9
Feature 3	Early Biface Blank	63.3	40.3	21.2	51.2
Feature 3	Early Biface Blank	57.6	41.3	17.0	34.4
Feature 3	Early Biface Blank	61.8	32.8	18.3	24.9
Feature 3	Early Biface Blank	63.0	40.2	22.1	51.2
Feature 9	Early Biface Blank	23.8	20.8	5.8	2.2
Feature 9	Early Biface Blank	47.7	30.1	9.3	10.2
Feature 8	Late Biface Blank	47.5	30.7	11.5	15.3
Feature 9	Biface Fragment	28.3	27.1	7.0	4.4
Feature 9	Biface Fragment	20.5	18.2	5.1	2.4

33Pk372 Biface Tools

Whereas the cores and blanks identified in the 33Pk372 assemblage are the byproducts of stone tool manufacture, tools are defined as actual implements that were either used or intended for use. This assemblage contains four objects identified as bifacial tools (Table 9.8; Figure 9.26). All are projectile point fragments. The so-called “new” projectile point from Figure 9.26 is the distal end of a well-made biface with a symmetrical triangular-shaped blade. It is broken along a natural fracture plane that was apparently not visible in the stone during the manufacturing process. It is called a “new” point because it does not appear to have ever been used, an inference based on its well-made symmetry and lack of evidence for maintenance and rejuvenation. All of the items identified as projectile point fragments in the 33Pk372 assemblage are too fragmentary to compare with published typologies.

Table 9.8. 33Pk372 biface tool metrics.

Context	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Unit	New Projectile Point	38.7	17.8	6.5	3.9
Feature 2	Projectile Point Fragment	28.6	23.9	8.1	6.8
Feature 4	Projectile Point/Preform	24.7	22.4	7.3	6.2
Feature 9	Projectile Point	23.3	21.9	6.8	2.7

33Pk372 Modified Flake Tools

Site 33Pk372 produced five objects classified as modified flake tools (Table 9.9; Figure 9.26). Four of these objects are from the Feature 9 refuse deposit, which also produced the micro-drills and many of the bifaces. Modified flakes are defined as flint flakes, derived from cores, that have been modified by micro-flaking along one or more edges. The modified edge was probably used as a "backing" whereas the unmodified edge may have been used as a cutting edge for an "expedient" cutting tool. One large specimen from Feature 9 is possibly a modified flake blank that was meant to be converted into a more formal tool.

Table 9.9. 33Pk372 modified flake tool metrics.

Context	Artifact	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Unit	Modified Flake	25.5	12.8	3.1	0.9
Feature 9	Modified Flake	14.5	7.9	1.6	0.2
Feature 9	Modified Flake	30.1	27.4	7.3	5.6
Feature 9	Modified Flake	21.1	19.8	3.8	1.8
Feature 9	Modified Flake	16.3	11.4	3.8	0.7

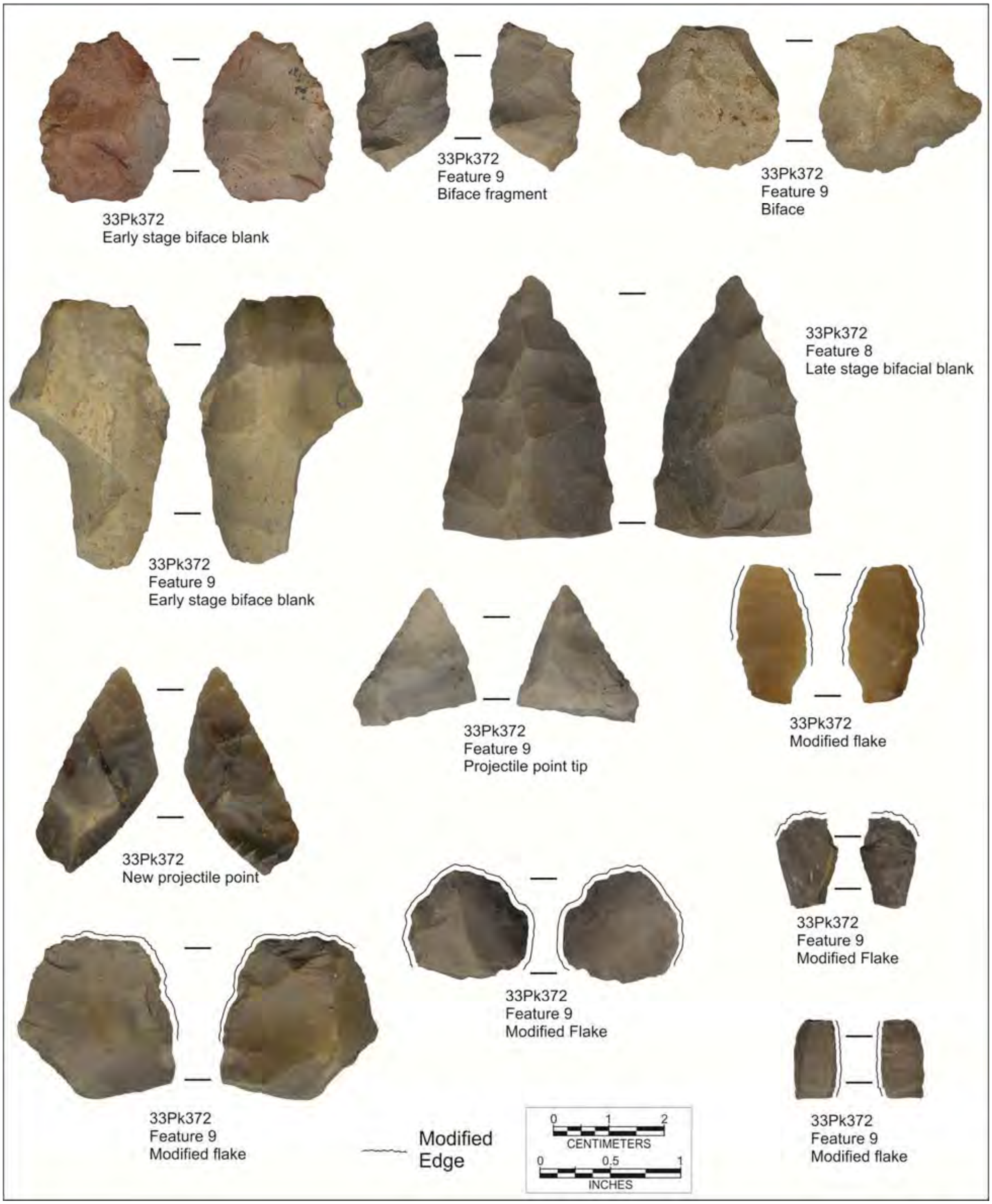

Figure 9.26. Image of bifaces and tools from 33Pk372.

33Pk372 Micro-Drills

Site 33Pk372 produced a unique micro-drill assemblage represented by 20 specimens, all of which are from three contiguous 1x1 m units excavated in the Feature 9 midden. Figure 9.27 provides 25 percent enlarged images of the obverse and reverse sides of all 20 micro-drills. Two similar micro-drills were also recovered from site 33Pk348. Table 9.10 lists the length, width, thickness, and weight of these tools. On average, they are 12.1 mm long, 7.3 mm wide, 4.7 mm thick, and weigh 0.5 grams. Most of the micro-drills are broken and fragmentary. It appears that this breakage is from use. The largest and most complete specimen is 21.7 mm long, 8.9 mm wide, and 4.8 mm thick.

What is particularly striking about these artifacts is the technology or manufacturing techniques used to manufacture them. All appear to have been manufactured from "slivers" of flint that were created using a bipolar core reduction technique. This method involves placing a nodule or core on a hard surface and then striking the top of it with a hammer—probably another rock. In a true bipolar percussive impact will split a core into three-sided sections, resembling orange wedges in cross-section. The 33Pk372 micro-dills are long three-or-four-sided slivers of flint, many of which exhibit the tell-tale production scars consistent with bipolar core reduction.

The flint slivers used to manufacture these drills were then only slightly modified with micro-flaking where needed to create a drill-like bit. Some appear to be nearly completely unmodified. The evidence of their use as drills is heavy polishing and rounding on their distal ends and lateral margins. The intensity of grinding suggests that these tools were used to bore though a hard and abrasive substance, or an abrasive grit was used to facilitate the grinding.

The presence of so many drills within such a small and confined space demonstrates not only evidence for well-defined site structure but also implies that a specialized activity occurred at this location. It is likely that all were used by the same person or a small group of related people carrying out the same activity. A carbon sample collected from the same context as the drills produced an Early Woodland period radiocarbon date (2-sigma cal. B.C. 750-680, B.C. 670-610, and B.C. 600-400). While drilling was performed in many periods of Ohio's past, these little bipolar drills may be diagnostic of this time period.

Table 9.10. 33Pk372 micro-drill metrics.

Context	Max. Length (mm):	Max. Width (mm):	Max. Thick. (mm):	Weight (g):
Feature 9	16.4	6.1	5.6	0.5
Feature 9	19.4	7.6	3.7	0.5
Feature 9	16.9	8.3	5.2	0.6
Feature 9	14.0	7.4	5.1	0.5
Feature 9	19.5	6.4	4.6	0.6
Feature 9	18.4	7.9	4	0.6
Feature 9	13.6	5.1	3.9	0.3
Feature 9	16.4	6.4	3.5	0.5
Feature 9	17.5	8.3	6.3	1.0
Feature 9	17.9	7.2	5.1	0.7
Feature 9	16.2	8.1	4.4	0.8
Feature 9	15	6.5	3.6	0.3
Feature 9	21.7	8.9	4.8	0.8
Feature 9	18.9	6.9	5.8	0.6
Feature 9	19.2	6.9	4.2	0.8
Feature 9	20.0	8.2	3.9	0.5
Feature 9	18.2	9.4	7.1	0.8
Feature 9	14.0	6.9	3.0	0.3
Feature 9	16.4	5.9	5.0	0.3
Feature 9	12.9	7.8	4.8	0.4
Average	**12.1**	**7.3**	**4.7**	**0.5**

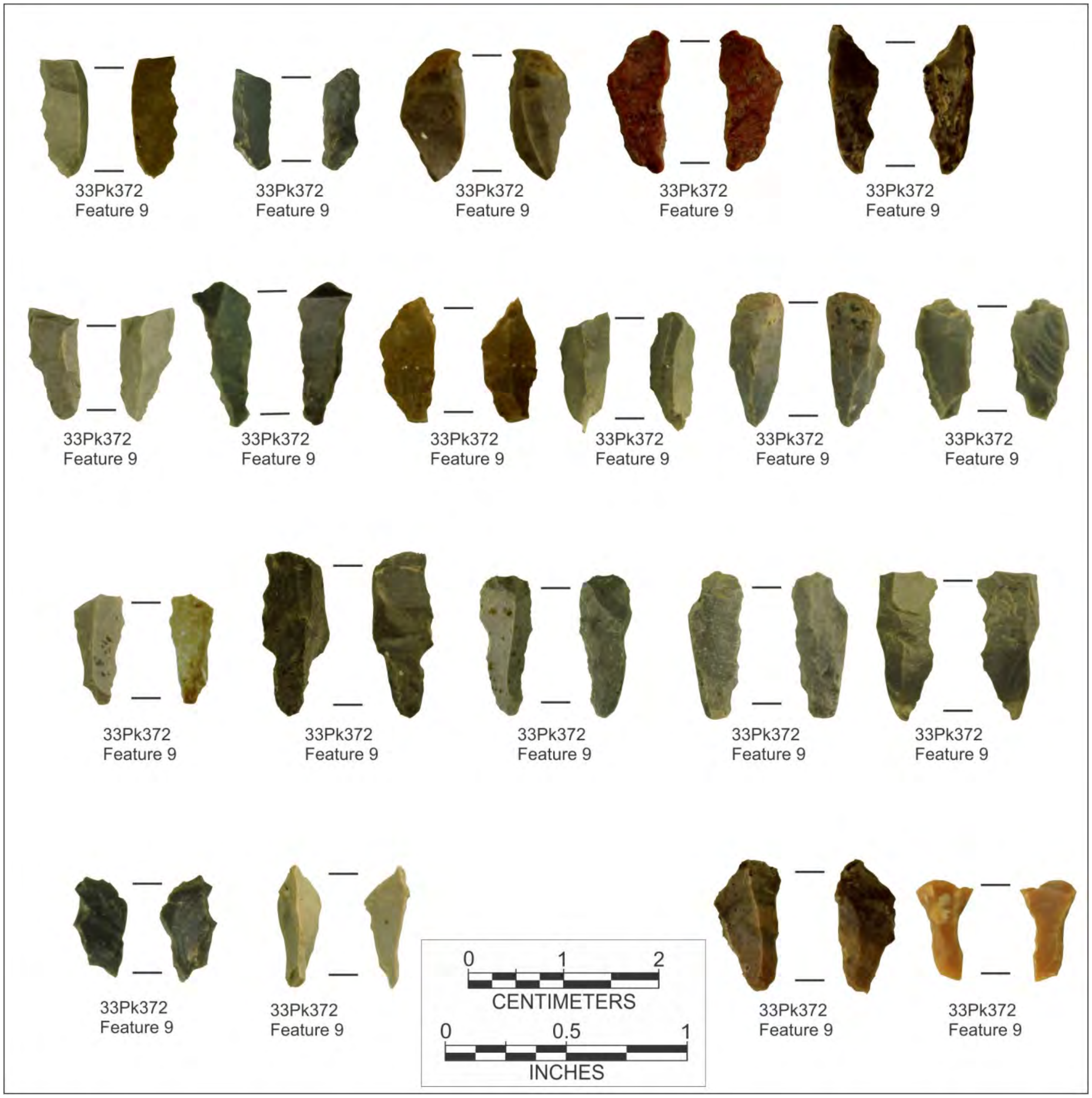

Figure 9.27. Image of micro-drills from 33Pk372.

9.3.3. 33Pk372 Groundstone Artifacts

The 33Pk372 Phase II assemblage contains five groundstone artifacts, including two celt bit fragments, a pitted stone, a hoe-like/digging tool fragment, a small stone ball, and a small block of stone with a drilled hole (Figure 9.28; Table 9.11). The Phase I survey also produced a cupstone or nutting stone from Feature 2.

The celt bit fragments are made from an igneous type rock and resemble fragments from the ground and polished portions of a celt bit. A better example of a celt pit was recovered from 33Pk371. One of the 33Pk372 specimens is from Feature 8, the possible structure, and the other is from a shovel test. Both specimens are “flakes” that fractured off of the faces of the celt bits. The fragments may represent a type of use breakage.

The pitted stone is a large tabular piece of sandstone with a centrally located pit created through repeated pecking or battering. Artifacts like these are not uncommon in Ohio’s prehistoric archaeological sites of all ages. The exact function of this artifact is not known, but it could have served as an anvil stone (the bottom stone) for bipolar flint knapping. The bipolar technique is well represented in the lithic assemblage from 33Pk372.

Site 33Pk372 also produced what may be a hoe fragment made from a hard, silica-rich igneous or metamorphic stone (Figure 9.28). Similar “hoes” were also recovered from 33Pk348. This artifact is essentially a large chipped-stone biface, but, unlike those found at 33Pk348, it has heavy grinding and polishing around the bifacial margins. The polishing extends onto the faces of the object. It is unclear if the grinding/polishing was caused from use or is a deliberate manufacturing feature. This object likely functioned as digging tool, being used much like a mattock. Such a tool may have been used to dig some of the pit features at 33Pk372, including the large basin containing Feature 8.

Two unusual groundstone objects, consisting of a small stone “ball” and a nearly cube-shaped piece of sandstone with a drill hole, were recovered in the Feature 8 excavation unit. The function of these objects is not known, but they may be game pieces rather than tools. The drill-hole in the cube-shaped object has a roughly conical shape that is 10 mm in diameter and 6 mm deep.

Table 9.11. 33Pk372 groundstone artifact metrics.

Context	**Artifact**	**Max. Length (mm):**	**Max. Width (mm):**	**Max. Thick. (mm):**	**Weight (g):**
Feature 8	Celt Bit Fragment	19.8	14.2	3.5	1.3
Shovel Test	Celt Bit Fragment	19.6	19.2	7.5	2.8
Feature 9	Pitted Stone	122.8	95.3	46.5	365.2
Unit	Hoe	61.23	32.1	10.8	32.2
Feature 8	Drilled Cube	22.0	20.8	15.8	10.3
Feature 8	Stone Ball	14.0	13.9	9.9	2.7
Feature 2	Cupstone	68.8	45.5	42.6	134.0

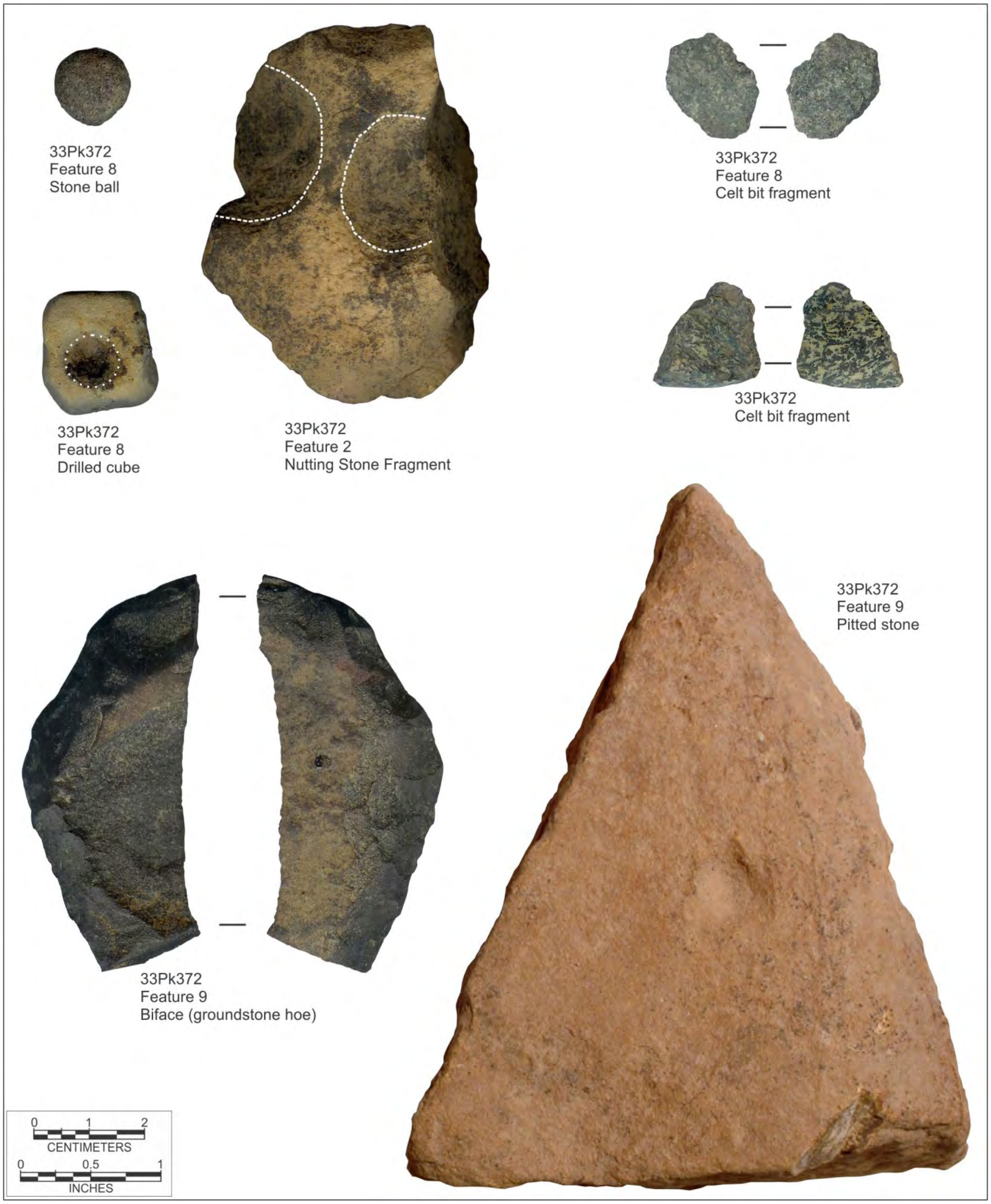

Figure 9.28. Image of groundstone tools and objects from 33Pk372.

A single cupstone/nutting stone was recovered from Feature 2 during the Phase I survey of 33Pk372 (Figure 9.28). Cupstones or nutting stones are defined as rocks with one or more cup-shaped depressions that appear to be formed from deliberate and consistent grinding. They are roughly akin to the shape of the bottom third or quarter of a ping-pong ball (or black walnut), and are typically ground into sandstone. The function of these rocks with depressions is impossible to decisively know, but they are commonly called "nutting-stones" and sometimes "paint-stones." The "nutting-stone" concept is probably derived from the notion that the cups are similar in size to many of the nut types that would have been available in southern Ohio. They are also frequently found on upland sites where nut-bearing trees are common. Experimental work by Rowe (1995) has shown that repeated use of a stone for nut cracking can create similarly-sized depressions.

The 33Pk372 cupstone has two partial pits, each of which is 29.2 mm in diameter; one is 5.1 mm deep and the other is 10 mm deep. This object is fragmentary and was recycled and used as thermal stone, which is likely what caused it to fracture (becoming FCR).

9.3.4. 33Pk372 Pottery

The prehistoric pottery assemblage from 33Pk372 consists of four thick body sherds weighing 94.7 g (Figure 9.29). All four sherds were in Feature 8, a possible semi-subterranean house. Three of the sherds come from the lower excavation levels in this feature, and the fourth sherd was recovered from the middle-lower level.

The four sherds appear to be parts of the same vessel, which had an average wall thickness ranging from 11.9-13.9 mm (12.9 mm average). Each of the sherds has large pieces of granitic grit temper, ranging up to about 4-6 mm across with a density of about 10%. The exterior surface of this vessel likely was plain surfaced, but three of the sherds are so heavily eroded on their exterior surfaces that it is not possible to determine surface treatment on these with any certainty—the fourth sherd, the one from the middle-lower level, has a plain exterior surface. Given how thoroughly oxidized the exterior surfaces are of the three deeper sherds, it is likely that the outside of the vessel was repeatedly subjected to intense heat—so much that it essentially powdered portions of the external surface. This would suggest that this vessel might have been used to cook over a direct flame and that these sherds could be from vessel walls not far above the base. At least two of the sherds (one is actually five refit sherds) exhibit evidence of coil breaks.

While it is not certain just how old Feature 8 may be, it is suggested that the radiocarbon dates from the nearby Feature 9 refuse dump are roughly contemporaneous with its construction. These dates, which range from about 750-400 B.C., are associated with a range of thick-walled vessels common to the Middle Ohio Valley. The central Ohio variant of the thick-walled vessel type is known as Dominion Thick (Cramer 1989, 2008). Dominion Thick vessels are tall, subconoidal jars with small, flattened bases. Their exterior and interior surfaces are plain, though a small number of vessels have incised triangle designs on the exterior, just below the rim (e.g., this design motif was found at the Dominion Land Company site up the Scioto River from PORTS in Franklin County). Vessel thicknesses, as defined by Cramer (1989), range from 5.2 mm to 28 mm. Bases are, on average, the thickest portion of the vessel at 20.4 mm. One of the more distinctive attributes of Dominion Thick vessels are their two lug handles, one on either side of the vessel. While it is not known if all vessels of this type have lug handles, many do.

These are some of the thickest and earliest vessels created by prehistoric potters in Ohio. Without further work in Feature 8 we cannot know for certain if the 33Pk372 sherds date to the earlier or later part of this pottery's time range, though the Feature 9 date suggests the latter.

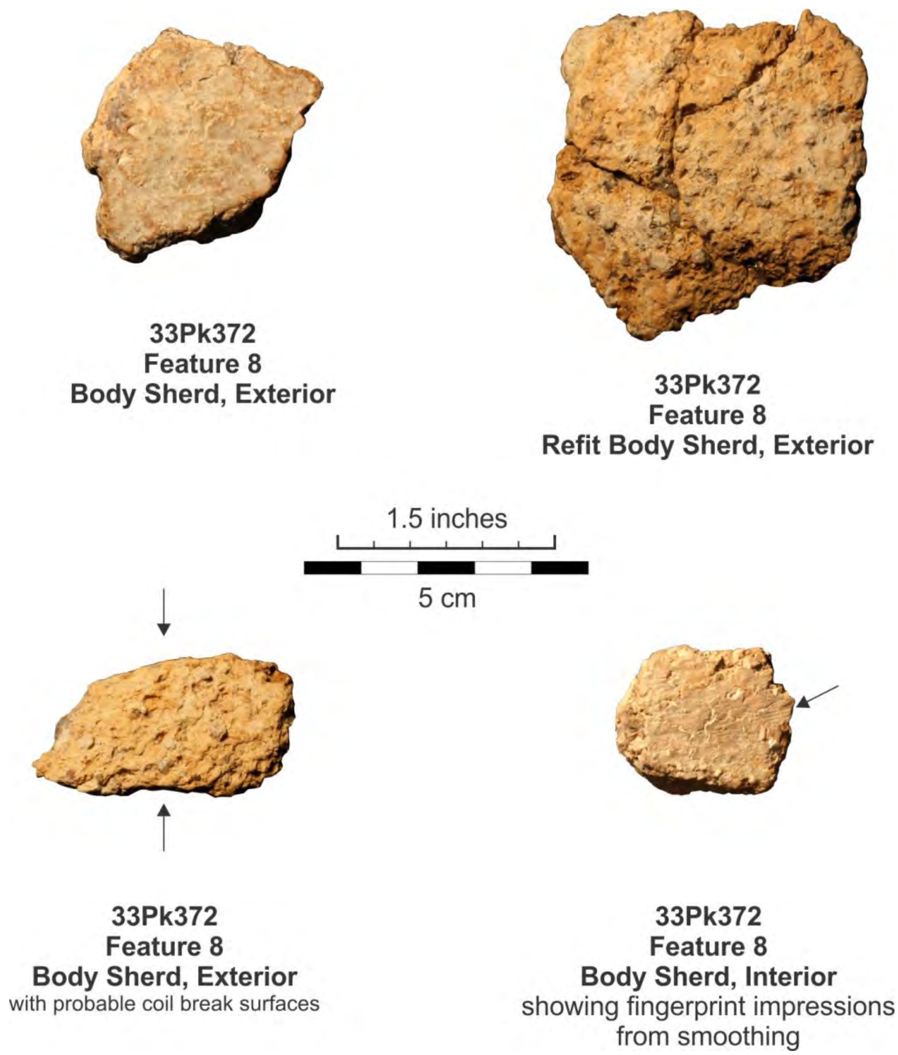

Figure 9.29. Prehistoric pottery sherds from 33Pk372.

9.4. 33PK372 PALEOETHNOBOTANICAL ANALYSIS

(by Karen Leone, M.A.)

Five soil samples were analyzed from site 33Pk372. One sample was taken from each of Features 2, 3, 4, 8, and 9. Feature 2, 3, and 4 are shallow pits filled with FCR, Feature 8 is a possible house basin, and Feature 9 is a refuse dump/midden. A total of 249 fragments (4.4 g) of wood and 18 pieces (0.22 g) of nutshell were recovered from the five soil samples, which had a combined volume of 79 liters of sediment (Table 9.12). The wood assemblage is dominated by oak (*Quercus* sp.; 86%) but also includes hickory (*Carya* sp.; 14%). Oak and hickory were recovered in those same relative frequencies in all five features with the exception of Feature 2, which contained oak, exclusively. Eleven hand-collected charcoal samples were taken and those from Feature 3 (n=1), Feature 8 (n=5), and Feature 9 (n=2) were consistent with the taxonomic identifications on charcoal in the soil samples (oak and hickory wood as well as hickory and walnut shell). Kentucky coffeetree (*Gymnocladus dioicus*) was identified in Feature 4, but the wood fragments embedded in the soil matrix of the hand-collected sample from Feature 2 were too small to taxonomically identify. Hickory dominates (78%) the nut assemblage, which also includes walnut (22%). While just a few fragments (n=3) of hickory nutshell were recovered from Feature 3, 11 pieces of hickory and four pieces of walnut are present in the Feature 9 samples. The walnut pieces are too fragmented to determine if they are butternut (*J. cinerea*) or black walnut (*J. nigra*), so they are simply listed here as belonging to the walnut genus (*Juglans* sp.). The presence of nutshell in Features 3 and 9 may suggest a fall occupation during the use of these features.

Table 9.12. 33Pk372 botanical inventory.

Provenience	Feature 2	Feature 3	Feature 4	Feature 8	Feature 9
Context	?	FCR Pit	?	House Basin?	Midden
Flotation #	011	012	013	014	015
Soil Volume (liters)	12	22	15	10	20
Wood Total (n / g)	**10 / 0.11**	**58 / 1.19**	**9 / 0.13**	**145 / 2.58**	**27 / 0.39**
Black Locust (*Robinia pseudoacacia*)	-	-	-	-	-
Hickory (*Carya* sp.)	-	5	1	2	3
Oak (*Quercus* spp.)	10	15	8	18	17
Pine (*Pinus* sp.)	-	-	-	-	-
Sycamore (*Platanus occidentalis)*	-	-	-	-	-
Walnut (*Juglans* sp.)	-	-	-	-	-
Total Identified	10	20	9	20	20
Total Unidentified / Bark	-	-	-	-	-
Identifications Attempted	10	20	9	20	20
Nut Total (n / g)	**0**	**3 / 0.02**	**0**	**0**	**15 / 0.20**
Acorn (*Quercus* sp.)	-	-	-	-	-
Hickory (*Carya* sp.)	-	3 / 0.02	-	-	11 / 0.14
Walnut (*Juglans* sp.)	-	-	-	-	4 / 0.06
Unidentified Plant Material (n / g)	**0**	**0**	**0**	**0**	**0**
GRAND TOTAL (n / g)	**10 / 0.11**	**61 / 1.21**	**9 / 0.13**	**145 / 2.58**	**42 / 0.59**

9.5. 33PK372 TEMPORAL DATA

The 33Pk372 Phase II investigation recovered artifacts and radiometric dates that define Late Archaic, Late Archaic/Early Woodland, Early Woodland, and Late Prehistoric period temporal components (Table 9.13). The Late Archaic period is represented by a radiocarbon date run on charcoal from Feature 3, a large FCR-filled pit. The calibrated date (2-sigma) intersects two points along the calibration curve, both of which fall within the Late Archaic period: 2460-2270 and 2260-2200 B.C. This is the oldest temporal component identified at the four prehistoric sites examined in this study and it predates the next earliest date by nearly 1000 years.

The Late Archaic/Early Woodland component at 33Pk372 is represented by a small assemblage of thick, grit tempered plain pottery found in the lower layers of the Feature 8 excavation unit (Table 9.13; Figure 9.29). Thick, grit tempered pottery, similar to what was recovered from this site, has been found throughout Ohio in contexts that date from about 2000 B.C. to 100 B.C., however it is much more common after about 1200 B.C. Similar pottery to that found at 33Pk372 was recovered from nearby site 33Pk371, where it is associated with a late Early Woodland period radiocarbon date (380-180 B.C.). Based on their thickness and paste characteristics, it is likely that the 33Pk372 pottery sherds date to before about 500 B.C. In fact, they may be associated with the Feature 9 radiocarbon date.

The Early Woodland component at 33Pk372 is represented by the radiocarbon date from Feature 9, a refuse deposit located just south of the Feature 8 depression (Table 9.13). The two-sigma range for this date intersects the calibration curve at three points: 750-680 B.C., 670-610 B.C., and 600-400 B.C. All fall roughly in the middle of the Early Woodland period and they may in fact be related to the construction and use of Feature 8.

The 33Pk372 Late Prehistoric period component is represented by one radiocarbon date from an upper layer of Feature 8. The two-sigma range of this date intersects the calibration curve at two points: A.D. 1270-1310 and A.D. 1360-1390). Feature 8 is the large depression that has been tentatively interpreted as a semi-subterranean structure that, when abandoned, very slowly filled in. Thick, grit-tempered plain pottery from the lower levels of this feature suggest that this possible structure was built in the Early Woodland period, perhaps even earlier. The Late Prehistoric period radiocarbon date likely is related to a later occupation of the site, of which little evidence has been found beyond this radiocarbon date.

Table 9.13. 33Pk372 temporal data.

Context	AMS C^{14} 2-sigma Cal	Temporal Diagnostic	Temporal Period
Feature 9	BC 750-680 & BC 670-610 BC 600-400	Micro-drills? (n=20)	Early Woodland
Feature 3	BC 2460-2270 & BC 2260-2200		Late Archaic
Feature 8	AD 1270-1310 & AD 1360-1390	Thick, Grit-Tempered Plain Pottery	Late Prehistoric & Late Archaic/Early Woodland

9.6. 33PK372 SITE STRUCTURE

As at the other prehistoric sites, the Phase II work at site 33Pk372 recovered thousands of artifacts and identified numerous pit features, all related to several different occupations. In all, nine prehistoric archaeological features (Features 2-10) were examined (Feature 1 was determined to be a historic-era disturbance), six of which were found during the geophysical survey. One feature, Feature 2, was identified during the original Phase I survey, and two, Features 9 and 10, are refuse/midden deposits found while excavating 1x1 m units to acquire additional lithic artifacts. At least five additional probable features are represented in the magnetic gradient data, as well as five or six more possible features, making site 33Pk372 one of the more feature-rich sites reported here. Like sites 33Pk347 and 33Pk348, the site 33Pk372 features appear to represent a narrow range of feature types. Features 2, 3, and 4 were all partially excavated, revealing shallow basins filled with FCR. Of these three, Feature 2 is the only one that appears to be intact with deliberately placed thermal stone along its bottom—the others were likely cleaned out. Features 5, 6, and 7 were not excavated and were only partially uncovered, but they may in fact be similar to Features 2, 3, and 4. Feature 8 is one of the most unique features found at any of the sites during the Phase II work. This large (7 meters across), partially filled in basin likely contains thousands of artifacts arranged in stratified layers. Feature 8 has tentatively been identified as a semi-subterranean house.

The bulk of the 13,596 artifacts recovered from site 33Pk372, including nearly 72 percent of the FCR (see Table 9.3), were found while uncovering and excavating features. With the exception of Features 8, 9 and 10, FCR appears to be directly related to the function and design of all of the features examined at the site. Of course, this observation may be somewhat biased since most of the excavated features at 33Pk372 were initially located using a magnetometer and FCR-laden features show up quite well in magnetic data.

Going beyond the features, Figure 9.30 shows the distribution of FCR across the site based on the shovel test data. About 22 percent of the site's FCR is from shovel tests and only three percent was recovered from the 1x1 m excavation units meant to sample lithic artifact concentrations. While some of the FCR on the surface is debris discarded from the clean-out and reuse of thermal features, some features are lacking nearby FCR, such as Feature 3. Since Feature 3 seems to be an intact thermal facility, with deliberately placed stones lining the bottom of the feature, it may be that Feature 3 was used only once and was never cleaned out. The map in Figure 9.30 also shows that both refuse deposits, Features 9 and 10, contain large amounts of FCR. If either of these is a household refuse dump, then there may have been one or more thermal features located within the Feature 8 house that used hot rock to radiate heat. Such radiant heat features have been found at Middle Woodland period houses in the Scioto River floodplain not far upstream from PORTS in Ross County (Pacheco et al. 2005).

Tables 9.14 and 9.15 tabulate the distribution of lithic artifacts at 33Pk372. Fifty-one percent of the lithic debris and 63 percent of the formed artifacts were found in the Feature 9 refuse dump, which is quite evident in the Figure 9.31 shovel test distribution map. Over half of the formed artifacts from Feature 9 are the 20 micro-drills, which appear to represent a unique technology and seem to have been discarded *en masse* at this location. Like the FCR, the shovel tests produced about a quarter (24%) of the lithic debris at the site (and 15% of the formed artifacts) while relatively little was found in the 1x1 meter units used to sample the lithic debris concentrations identified in the shovel testing—that is, except for the 1x1 units excavated in Features 9 and 10. Small clusters of lithic debris are also located around the area of Features 2-5 and other areas across the site.

The map in Figure 9.32 summarizes what we know to date about site 33Pk372. There have been at least three different occupations of the site, during the Late Archaic, Early Woodland, and the Late Prehistoric periods. The Late Archaic component of the site dates from about 2460-2200 B.C. and is focused on the Feature 3 area. Feature 3 is an FCR-laden thermal feature that was likely abandoned after just a single use. There are several other nearby features, Features 2, 4, and, 5, that could be cleaned out versions of the Feature 3-type thermal facility. In fact, the rock from these other features could have been scavenged to create Feature 3, in which case these other features would predate Feature 3. This area of the site also produced a small amount of lithic debris, suggesting that heating or cooking was not the only activity going on during this Late Archaic occupation. The Feature 3 radiocarbon date is one of the oldest found on PORTS to date.

The Early Woodland period component at 33Pk372 was identified in two places. It is most directly indicated by the radiocarbon date run on wood charcoal found in the Feature 9 refuse dump. This is a particularly rich refuse dump, filled with lithic debitage from making stone tools, large amounts of FCR, and evidence of a unique drilling operation. Just what was being drilled is not obvious since no drilled objects were found, save for one drilled piece of sandstone that was worked with some other implement than the micro-drills. However, animal bone and shell beads might have been made during this period and certainly stone was being drilled to fashion objects out of slate.

Table 9.14. 33Pk372 lithic debris distribution.

Technological Type	**Shovel Tests**	**1x1 m Unit**	**Anom. 5**	**Anom. 7**	**Feature 2**	**Feature 3**	**Feature 4**	**Feature 5**	**Feature 7**	**Feature 8**	**Feature 9**	**Feature 10**	**Total**	**Reduction Stage**
Primary Decortication	13	0	0	0	1	6	2	0	0	1	41	1	65	Initial Reduction (Core) ***76.4%***
Prim. Decort. Bipolar	2	-	-	-	-	-	-	-	-	-	7	1	10	
Secondary Decortication	40	2	3		2	19	4	4	0	2	75	9	160	
Sec Decort. Bipolar	9	1	1	-	-	-	1	-	-	-	23	1	36	
Interior	50	-	2	1	1	19	5	8	1	7	107	13	214	
Interior Bipolar	6	-	-	-	-	1	-	-	-	-	33	-	40	
Sec Decort. Edge Prep	1	-	-	-	-	1	-	-	-	1	4	2	9	Initial Biface Reduction (Blank Preparation) ***3.6%***
Sec Decort. Alt.	1	-	-	-	-	-	-	-	-	-	1	-	2	
Interior Edge Prep.	2	-	-	-	1	2	-	-	-	-	4	-	9	
Interior Alt	-	-	-	-	-	-	-	-	-	-	5	-	5	
Early Biface Edge Prep.	1	-	-	-	-	-	-	1	-	-	1	-	3	Early Biface Reduction (Blank Thinning) ***6.4%***
Early Biface Thinning	9	-	1	-	-	8	-	6	-	3	14	-	41	
Late Biface Thinning	27	1	2	1	-	9	5	9	-	6	22	3	85	Late Biface Reduction (Blank Thinning) ***12.4%***
Biface Pressure	4	-	-	-	1	-	-	-	-	-	1	-	6	Pressure Thinning (Preform, Tool, Tool Maintenance, Recycling) ***1.2%***
Notch	1	-	-	-	-	-	-	-	-	-	-	1	2	
Flake Fragment	49	2	9	1	3	8	4	2	-	4	143	14	239	Non-Diagnostic Debris
Shatter	22	-	1	2	-	1	-	1	1	3	35	10	76	
Total	**237**	**6**	**19**	**5**	**9**	**74**	**21**	**31**	**2**	**27**	**516**	**55**	**1,002**	
%	***24%***	***0.6%***	***2%***	***0.5%***	***0.9%***	***7%***	***2%***	***3%***	***0.2%***	***3%***	***51%***	***5%***	***100%***	

Table 9.15. 33Pk372 formed artifact distribution.

Provenience	**Feature 2**	**Feature 3**	**Feature 4**	**Feature 8**	**Feature 9***	**Feature 10**	**Shovel Tests**	**Total**
Nodule/ Core	-	1	1	1	6	1	4	**14**
Nodule/Blank	-	-	-	-	1	-	-	**1**
Biface Fragment	-	-	-	-	2	-	-	**2**
Early Biface Blank	-	3	-	-	1	-	1	**5**
Late Biface Blank	-	-	-	1	-	-	-	**1**
Projectile Point/ Preform	-	-	1	-	-	-	-	**1**
New Projectile Point	-	-	-	-	-	-	1	**1**
Projectile Point	1	-	-	-	1	-	-	**2**
Micro-Drill	-	-	-	-	20	-	-	**20**
Mod. Flake	-	-	-	-	6	-	1	**7**
Groundstone -Hoe?	-	-	-	-	-	-	1	**1**
Celt	-	-	-	1	-	-	1	**2**
Drilled Cube	-	-	-	1	-	-	-	**1**
Stone Ball	-	-	-	1	-	-	-	**1**
Pitted Stone	-	-	-	-	1	-	-	**1**
Total	**1**	**4**	**2**	**5**	**38**	**1**	**9**	**60**
%	**2%**	**7%**	**3%**	**8%**	**63%**	**2%**	**15%**	**100%**

*Feature 9=midden

What is most intriguing about the Early Woodland component at this site is Feature 8 and what it might be. The thick grit-tempered pottery found near the bottom of the Feature 8 excavation may date to the era of this feature's creation. Depressions measuring seven meters across are not common at Ohio archaeological sites, so there is little precedent for assisting in the identification of this feature. While large pits like this were excavated to obtain flint for stone tools or clay for making pottery, neither raw material type occurs naturally at 33Pk372. A good possible match for Feature 8 is semi-subterranean houses. If we assume that the top edges of this pit have slumped in some over the centuries, then we can assume that originally this pit was only perhaps five meters across. Houses measuring around five meters in diameter are not unusual in Ohio, where prehistoric houses can range from 3-14 meters across. Such a robust structure was likely meant to be occupied for a significant amount of time, and generally semi-subterranean houses are thought to be winter residences. If a family did occupy such a structure at this location for most or all of a winter in the Early Woodland period, they likely would have created a distinct trash ring around the house as they kept things tidy inside. We would expect to find trash dumps like Features 9 and 10 to surrounding such a house. The 750-400 B.C. radiocarbon date associated with Feature 9 is a nice fit for the thick pottery found in the bottom of the Feature 8 excavation. This could be the link needed to tie the possible house together with the surrounding refuse dumps.

The age of the possible house and the surrounding refuse dumps is an interesting time in Ohio's past for it is just before the florescence of what archaeologists have called the Adena culture—a group known for living in small, dispersed settlements and constructing many and large burial mounds. Burial mounds were present in Ohio by perhaps 1000 B.C., but the larger ones are known to have been constructed later in the Early Woodland period, starting at about 300-200 B.C. Thus, the Early Woodland occupants of 33Pk372 are the immediate ancestors of those who came to build large burial mounds in the Scioto Valley and initiated what would in several centuries turn into a flurry of earth moving and earthwork construction at a large scale. These earthworks, of course, were made by the Hopewell, and questions of why earth moving at this scale came into vogue during this time have been pondered by archaeologists for over a hundred years. Site 33Pk372 could hold some clues to this and other interesting questions about Ohio's past.

The final temporal component at site 33Pk372, dating to the Late Prehistoric period, is a puzzling one. A small bit of charcoal from one of the upper levels in the Feature 8 excavation produced a radiocarbon date with a calibrated two-sigma range of A.D. 1270-1310 and 1360-1390. This is the time when corn agriculturalists, whom archaeologists call the Fort Ancient, lived in large villages on the floodplains of major streams in the Middle Ohio Valley. Sometimes they ventured into the uplands on resource extraction forays, leaving behind small camps like the one represented at 33Pk347. However, no other Late Prehistoric period artifacts have been found at 33Pk372 and the thick pottery at the bottom of Feature 8 suggests that this large feature dates to a time long before the Late Prehistoric period. More than likely, Feature 8 has been a depression since it was abandoned back in the Early Woodland period. Over the years, soil erosion and organic matter have built up inside the depression, slowly filling it in. Perhaps somebody occupying the site in the Late Prehistoric period dumped trash into the depression before returning to a village on the Scioto floodplain. Unfortunately, without further work on this feature it can only be speculated as to its age. Nevertheless, it is one of the most unique prehistoric constructions found during the survey.

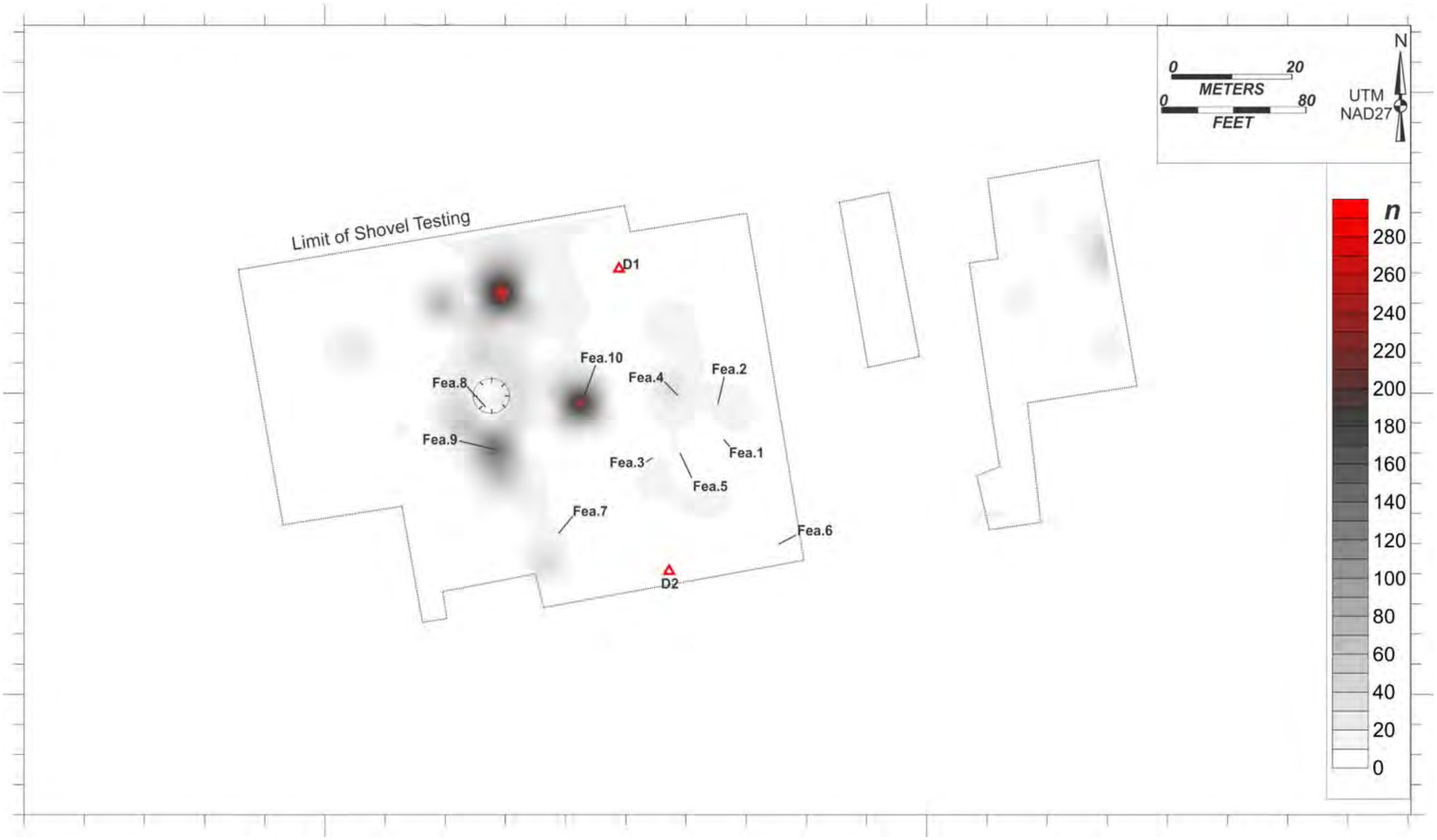

Figure 9.30. Illustration of site 33Pk372 showing the distribution of FCR.

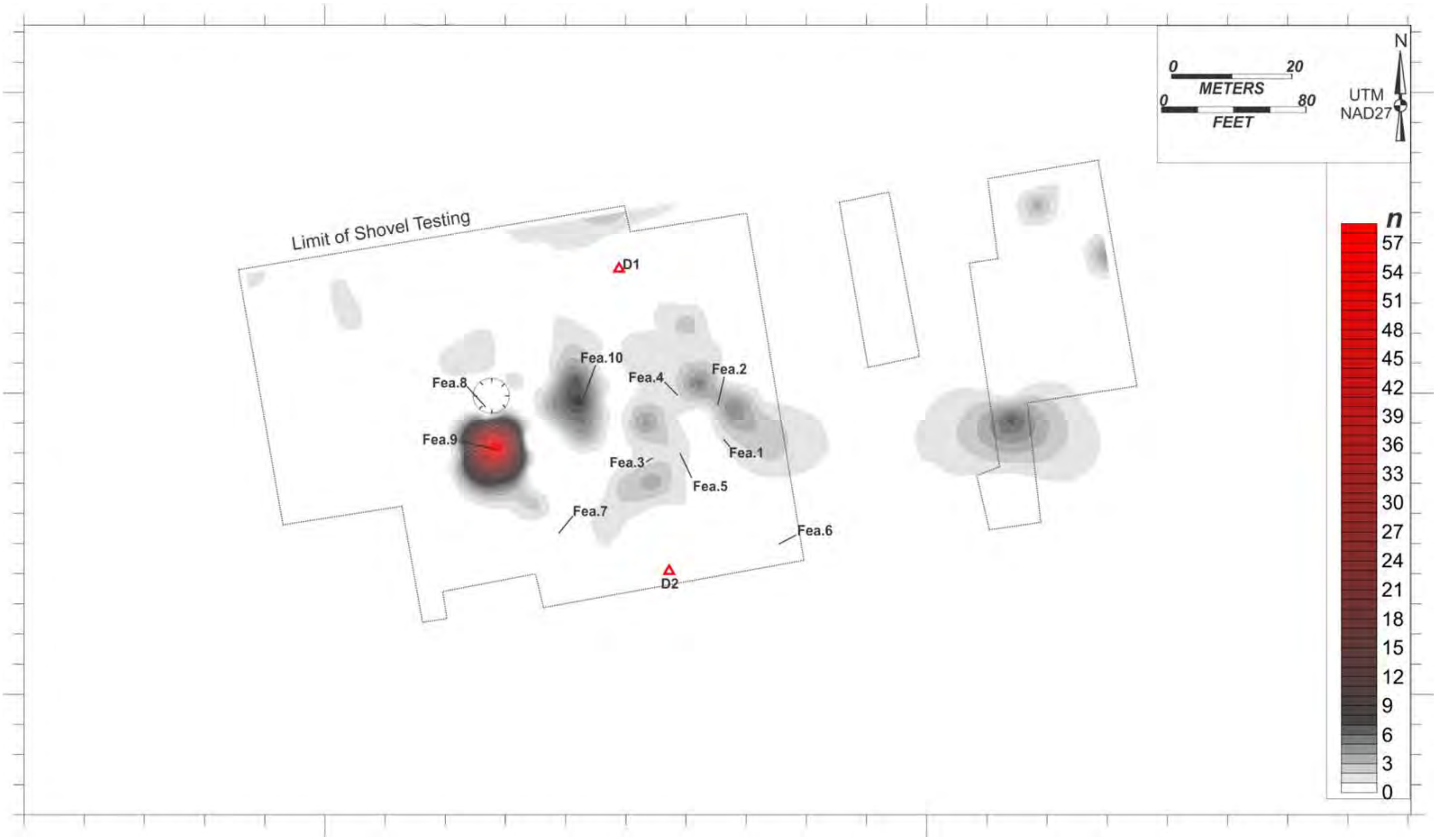

Figure 9.31. Illustration of site 33Pk372 showing the distribution of lithic artifacts.

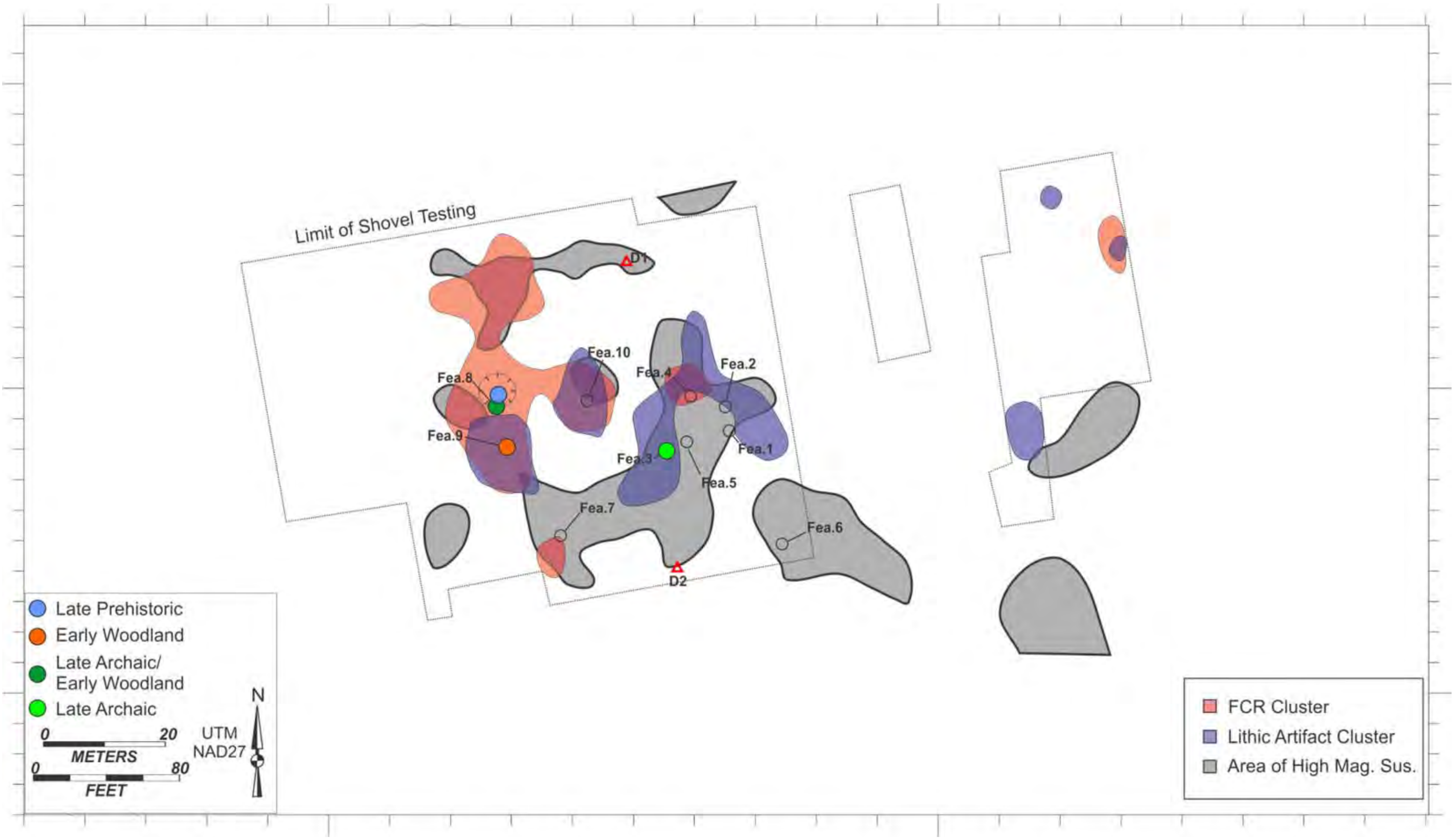

Figure 9.32. Illustration of site 33Pk372 summary map.

10. 33PK349 PHASE II RESULTS

Site 33Pk349 is a historic-era farmstead located in the northeastern side of PORTS (Figure 10.1). A house is indicated in this area on the c.1905 Oil and Gas Lease map and on the 1906 Waverly, Ohio USGS 15” topographic map. No structures appear here on the USDA 1938 and 1951 aerials or on the 1952 AEC property map, suggesting that this house was built some time before 1905 but was gone (removed or demolished) before 1938.

The history of property ownership for this site is difficult to follow, but around 1905 it was part a 40-acre parcel. The western half of the 40-acre parcel was then added to a 65-acre farm assembled in 1918 and 1922 from a 45-acre parcel and a 20-acre parcel. The 20-acre parcel, with the farmstead, was sold in 1922. It appears from this information that the farmstead was in decline by 1922. The house and associated outbuildings must have been razed prior to 1938 (and the USDA aerial photograph) and converted the land over to cultivation—cultivated fields are evident here on the 1938 aerial photo. No architectural remains are today visible on the surface of the farmstead. The foundation remains were probably removed and any shaft features (e.g., wells, cisterns, and privy vaults) were perhaps filled in when the land was reclaimed for cultivation prior to 1938. One of the primary goals of the Phase II work was to identify potential sub-plowzone shaft features and foundations with the aid of geophysical surveys.

The Phase I survey recovered 37 historic-era artifacts from 11 positive shovel tests dug across the site (Pecora 2012a). Architecture (n=17) and kitchen (n=20) group artifacts are well represented in this assemblage. Architecture group artifacts include brick fragments, window pane glass, cut-square nails, and wire nails. The kitchen group artifact assemblage consists of various ceramic sherds and a small amount of container glass. The kitchen ceramics are classified as stoneware (n=5), ironstone (n=7), redware (n=2), and whiteware (n=4). All but the redware sherds indicate a late nineteenth-early twentieth century occupation. In addition to the historic-era artifacts, the Phase I survey also recovered a single prehistoric flint flake classified as an “interior” flake made from Delaware flint. Based on the Phase I survey, the prehistoric component of 33Pk349 was designated a prehistoric isolated find.

Table 10.1 summarizes the Phase II survey effort at 33Pk349 (Figure 10.1). Two geophysical survey instruments were used at 33Pk349, a magnetometer and a ground-penetrating radar. The magnetometer survey covered 3,698 m^2 of the site area; the radar was used to survey a smaller portion of the site in an area where the magnetometer and shovel test data suggested that historic-era features might be located. One-hundred-eighty-two shovel tests were excavated on a 5 meter grid after the geophysical survey was completed. The shovel tests served to (1) acquire a more representative artifact sample from the site, (2) better define the site boundaries, and (3) identify intrasite spatial patterning. In addition to the shovel tests, the Phase II excavation work included uncovering eleven geophysical anomalies with 1x1 m units (n=14.5) in an effort to identify and define archaeological features. In total, the Phase II survey effort resulted in the excavation of 60 m^2, or 1.2% of the defined site area, producing 1744 historic-era artifacts and 800 prehistoric artifacts. Three historic-era features were also identified.

Table 10.1. 33Pk349 Phase II investigation summary.

Description	Value
50x50 cm Shovel Tests (total)	n=182 (45.5 m^2)
50x50 Shovel Tests (historic-era artifact-bearing)	n=123 (30.75 m^2)
50x50 Shovel Tests (prehistoric artifact-bearing)	n=90 (22.5 m^2)
1x1 m Units (anomaly ground-truthing)	n=14.5 (15 m^2)
Percentage of Site Area Excavated	1.2%
Geophysical Survey Area	3,698 m^2
Number of Archaeological Features Identified (historic-era)	n=3
Number of Artifacts Recovered (historic-era)	n=1,744
Number of Artifacts Recovered (prehistoric)	n=800
Number of Artifacts per Excavated Square Meter (historic-era)	n=29.1
Number of Artifacts per Excavated Square Meter (prehistoric)	n=13.3
Average Number of Historic-era Artifacts per Positive Shovel Test (0.25 m^2)	n=6.4
Average Number of Prehistoric Artifacts per Positive Shovel Test (0.25 m^2)	n=5.4

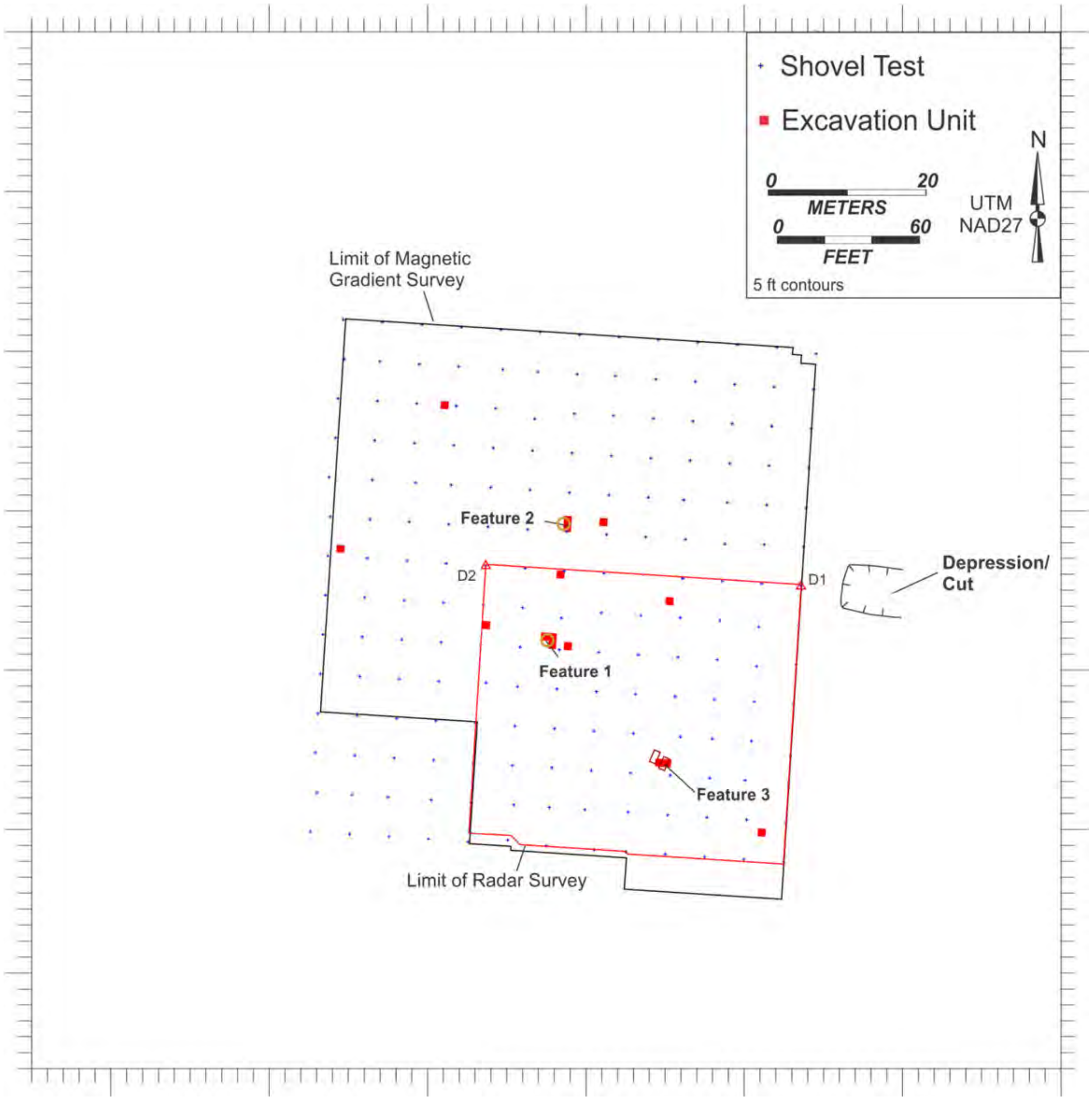

Figure 10.1. Illustration of 33Pk349 showing the Phase II fieldwork.

10.1. 33PK349 GEOPHYSICAL SURVEY RESULTS

The primary goal of the geophysical surveys at 33Pk349 was to locate historic-era features related to the farmstead. To that end, a magnetometer was used to identify burned areas and clusters of iron objects (potential middens and general building locations) and a ground-penetrating radar was used to look for shaft features and building foundations (Figure 10.1).

Figure 10.2 shows the results of the magnetic gradient survey. Clear areas of large anomalies are present in the data. The size and magnetic strength of these anomalies suggests that most are iron objects, but several have the size and shape of potential shaft features, such as a well, cistern, and/or privy. The larger cluster of anomalies suggests the likely house location. This, of course is where the radar survey would have liked to focus, but large amounts of loose brush laying the ground surface forced the radar survey to be pushed a little to south.

Figure 10.3 shows four amplitude depth slices from the radar survey. Several large anomalies of potential interest were identified in the radar survey. The best of these occurred in the northwest quadrant of the radar survey area, including what was clearly the radar signature of a shaft feature (Anomaly 1) that is unmistakable in the radargram (a radar profile of the ground) also presented in Figure 10.3. This shaft type feature was associated with a slight depression at the surface, and despite what is obviously robust buried architecture in the radar data it was somewhat surprising to see that it did not show up in the magnetic data. This, of course, is why it is important to use more than one type of subsurface imaging device on historic-era sites.

The anomalies of potential interest from 33Pk349 are presented in Figure 10.4. Twelve of the more obvious anomalies of potential interest were singled out of the two types of data—more are likely present. Table 10.2 provides details related to each of the numbered anomalies. As mentioned above, Anomaly 1 was clearly a shaft type feature based on the radar data. Several other possible shaft features were detected in the magnetic survey, including Anomalies 5, 6, 7, 8, and 10. All of these are strongly magnetic, dipolar simple-bull's-eye type anomalies. Such anomalies can be associated with shaft-type features, large iron objects, or strongly burned areas. In fact, excavations at two of these anomalies bore this out—Anomaly 8 was found to be a rock-lined shaft feature and Anomaly 5 is a heavily burned thermal facility.

There are many other anomalies of potential interest in the magnetic and radar data that were not tested. For example, the large dipolar complex anomalies at the southern end of the site could be associated with burning (e.g., Anomaly 12) and/or ground disturbance, perhaps related to the time when the site's buildings were razed and returned the ground to cultivation. Because it was undetermined as to which direction the front of the house faced (it might have faced east or south), it was difficult to know where the privies might be located-privies are often behind and sometimes off to the side of the house. It's possible that the farm's privies are located outside of the geophysical survey area.

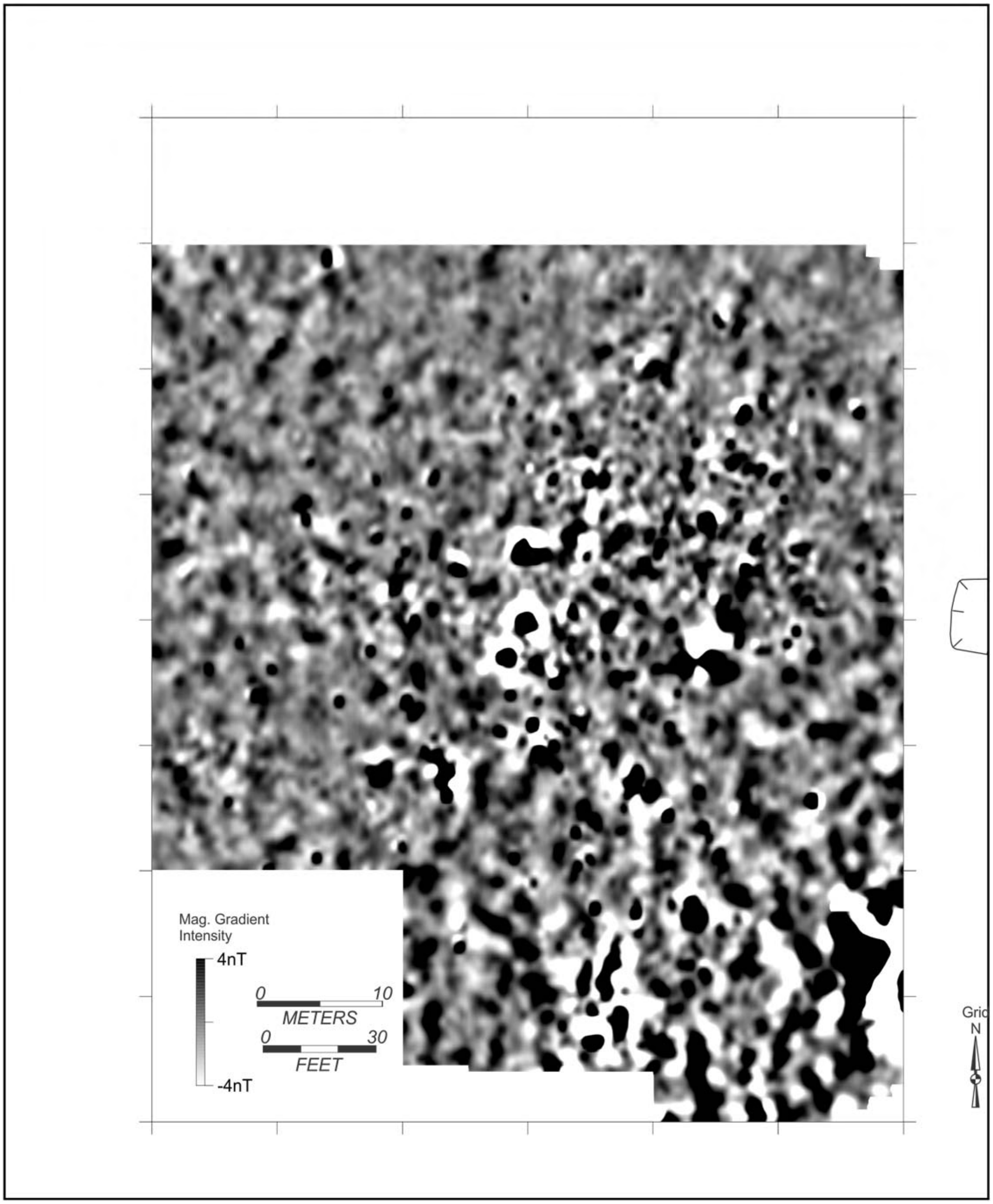

Figure 10.2. Results of the magnetic gradient survey at 33Pk349.

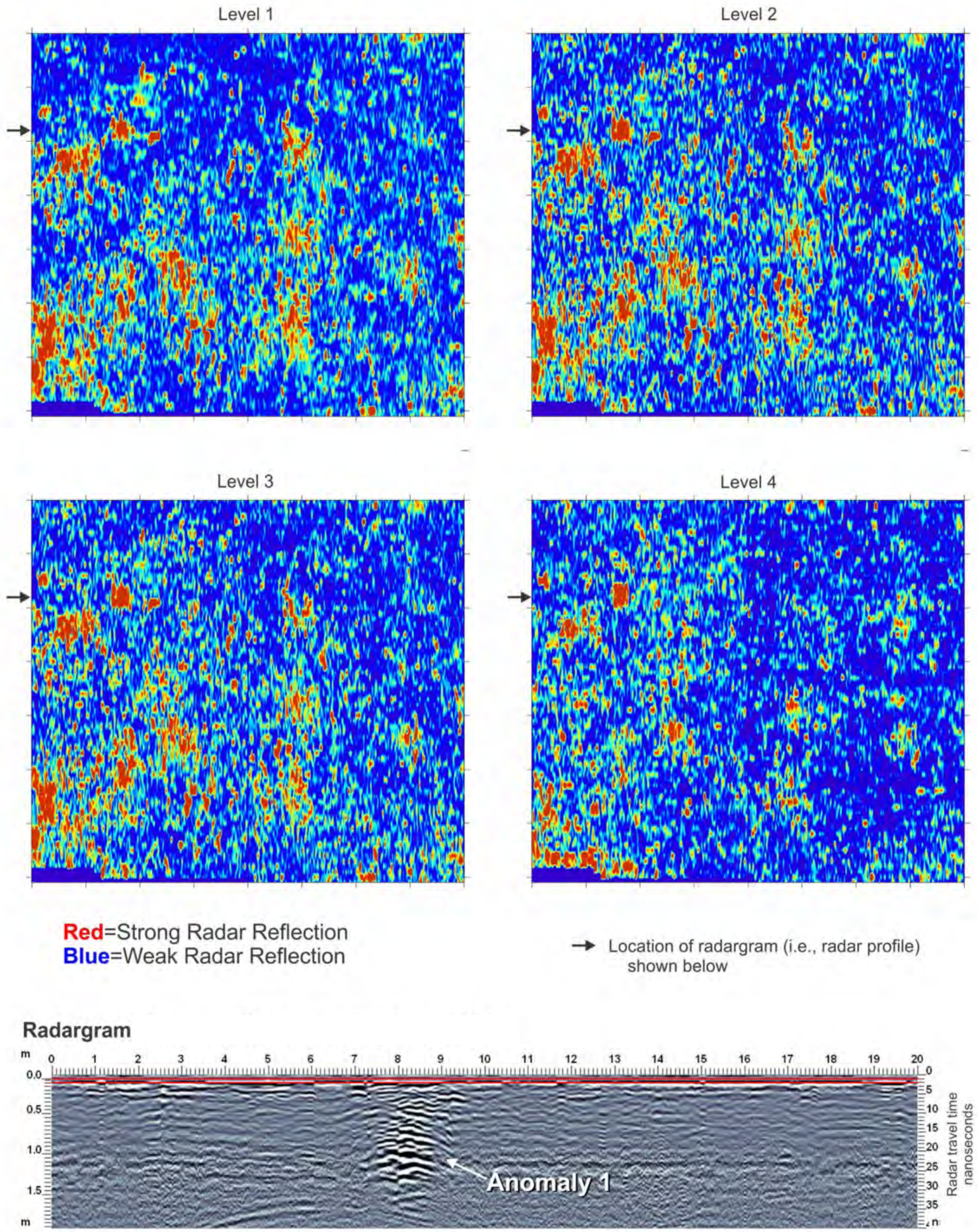

Figure 10.3. A selection of radar amplitude slice maps and an example radargram.

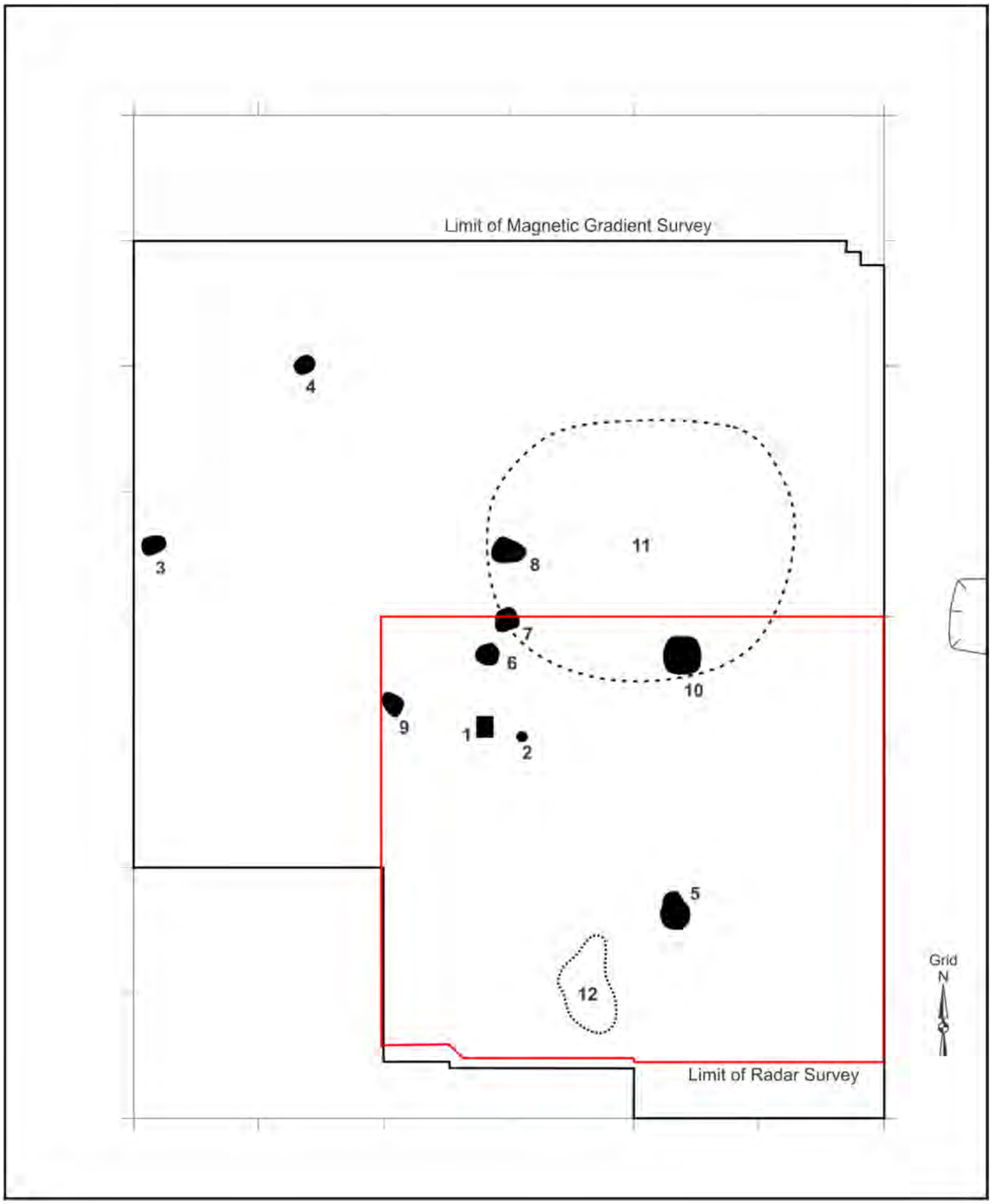

Figure 10.4. Anomalies of potential interest at 33Pk349.

Table 10.2. Anomaly information from the 33Pk349 site.

Anom. #	Peak Intensity (nT)	Anomaly Class[a]	Size[b]	Comments/Interpretation
1	--	Shaft-type	2m	Radar anomaly—well/cistern
2	90.3	DC	3+	Complex mag anomaly associated with radar anomaly
3	13.85	MP	3	Possible pit
4	9.8	MP	3	Possible pit
5	79	DS-B	5	Historic-era feature
6	169.4	DS-B	3	Vertical iron rod; historic shaft-type feature
7	141	DS-B	3	Vertical iron rod; historic shaft-type feature
8	127.5	DS-B	4	Historic shaft-type feature, large iron object(s)
9	43.65	MP	4	Possible historic-era pit; iron object
10	54.1	DC	5	Iron object, possible historic-era feature or burning
11	--	DC	21x25m	Cluster of iron object, possible house location
12	79.35	DC	16-18	Linear historic-era features, possible burning

a – MP=monopolar positive; DS=dipolar simple; DC=dipolar complex; Dipolar Simple-Bull's-eye
b – number of mag transects (50 cm transect spacing); magnetic anomaly edges may not directly match edges of subsurface features.

10.2. 33PK349 FEATURES

The 33Pk349 geophysical survey identified twelve anomalies of potential archaeological interest; ten were selected for further investigation (A.1-A.10). Three of these (A.1, A.5, and A.8) were verified to be historic-era archaeological features (Features 1-3) and all are thought to be parts of site 33Pk349. The sources of the geophysical anomalies at the other seven locations were not identified.

10.2.1. 33Pk349 Feature 1 (A.1)

Feature 1 was initially identified as a shaft-type geophysical anomaly (A.1) in the radar data located near the proposed house area (Anomaly 11) (Figures 10.1, 10.4-10.6). Three 1x1 meter units were excavated over the top of this feature to expose it in plan view and to determine the source of the anomaly. The excavation units, which form an L-shaped block, revealed approximately three-quarters of a substantial, oval-shaped masonry structure. The final excavation was terminated once the feature was better defined. Although Feature 1 was not exposed entirely in plan view, in Figure 10.5 we estimate its full extent and shape.

Feature 1 appears to be either a well or a cistern. The opening of this structure is about 1 meter wide and approximately 1.6 m long with an oval shape rather than the typical circular shape common for wells. This oval shape could be deliberate, though no other oval wells or cisterns have been documented at PORTS; or, it may be that this is a circular masonry feature that has collapsed inwards. The masonry is dry-laid sandstone flagstone and its interior is filled with stone rubble and a variety of historic-era artifacts (n=172). Eighty-three percent of the artifact assemblage associated with Feature 1 consists of architecture (55%) and kitchen (28%) group artifacts. The rest of the objects (15%) can be grouped in the furniture, hardware, personal, auto/transportation, and miscellaneous groups. Overall, the assemblage from Feature 1 is proportionately identical to the entire Phase II assemblage. This implies that the well/cistern was filled in with surrounding site debris, as the land was converted the land to farmland.

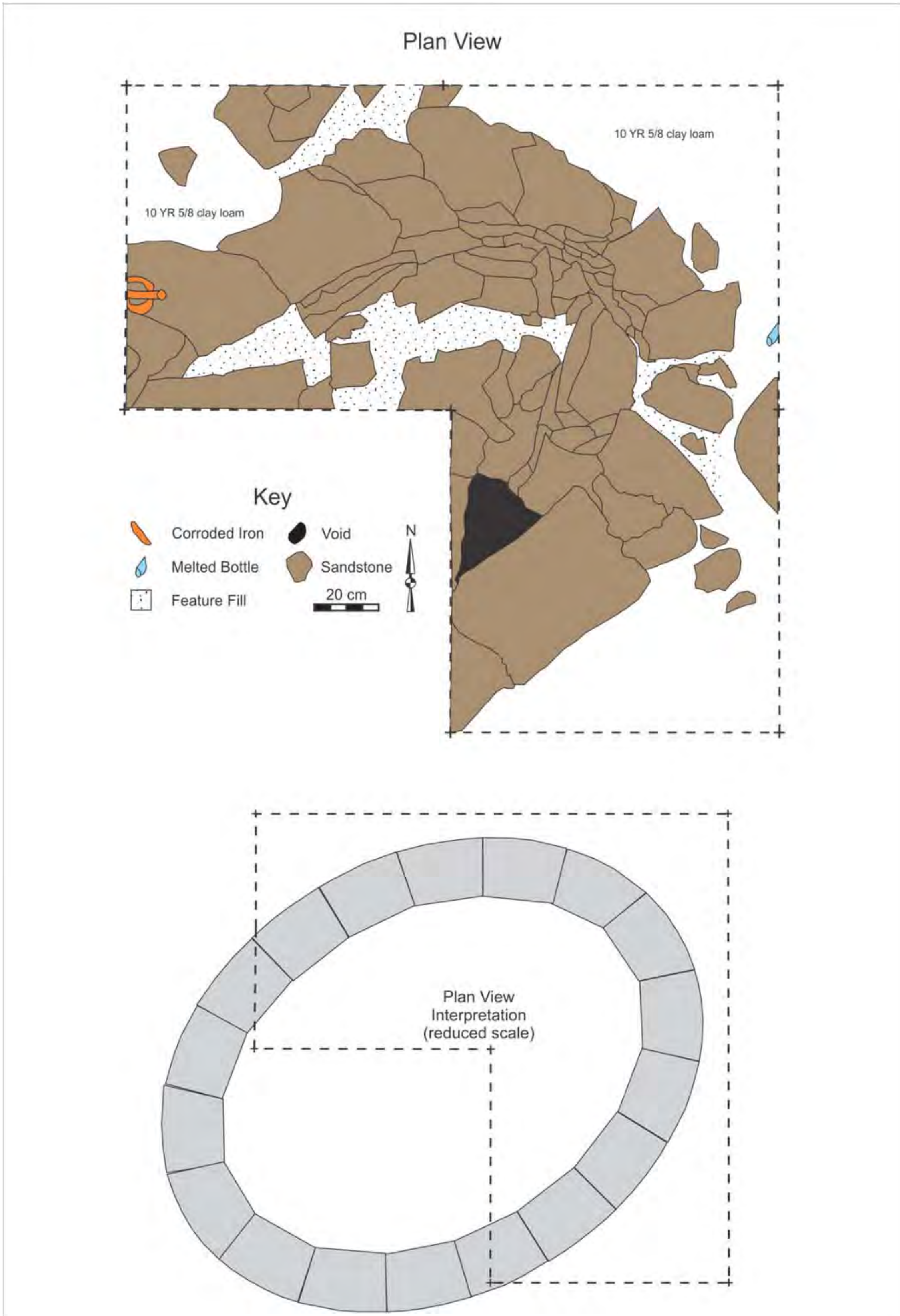

Figure 10.5. Illustration of 33Pk349 Feature 1.

Figure 10.6. Photograph of 33Pk349 Feature 1 plan view.

10.2.2. 33Pk349 Feature 2

Feature 2 is one of ten investigated geophysical anomalies (A.8) within site 33Pk349 (Figures 10.1, 10.7-10.8). Two 1x1 meter units were used to expose a portion of the feature in plan view and found that, like Feature 1, Feature 2 is a circular cluster of building stone that may be a stone-lined well or cistern. Figure 10.8 provides an estimate of the extent of the entire stone masonry structure, which would measure slightly over 2.0 meters in diameter—a common size for a well.

Feature 2 is also filled with rubble and a variety of artifacts (n=277), including architecture (43%), kitchen (14%), and miscellaneous (40%) group artifacts. The rest (3%) are hardware group artifacts. The Feature 2 assemblage is somewhat different from the entire Phase II assemblage, but this is due to the large number of miscellaneous items, all consisting of unidentified and corroded metal. Much of the metal is sheet metal; one piece is a rectangular-shaped grate.

Figure 10.7. Photograph of 33Pk349 Feature 2 plan view.

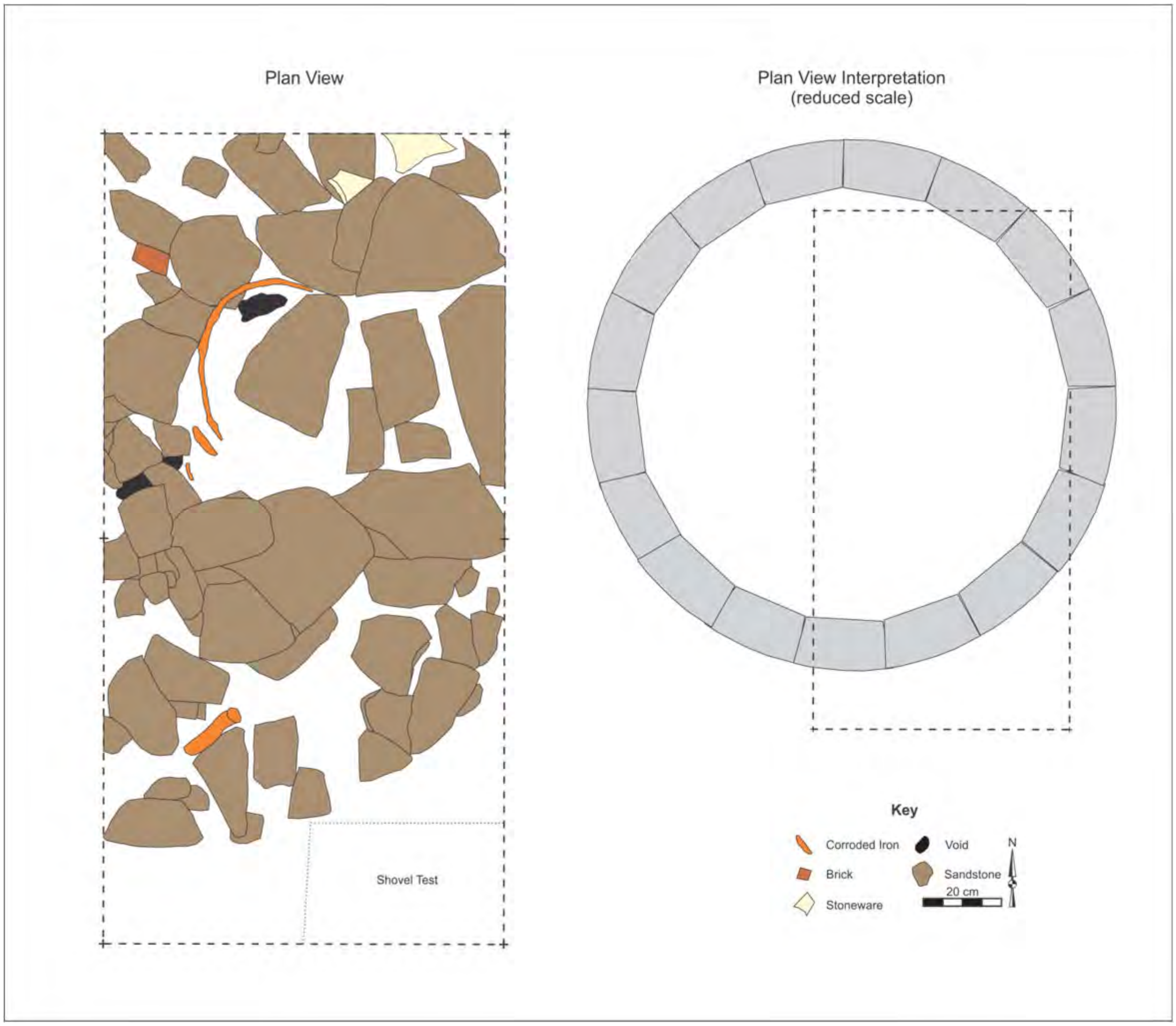

Figure 10.8. Illustration of 33Pk349 Feature 2.

10.2.3. 33Pk349 Feature 3

Feature 3 (A.5) was detected in the magnetic survey as a strong, dipolar simple bull's-eye anomaly with an oval shape, suggesting that it might be a shaft-type feature and/or have evidence of burning. Upon excavation, it was found to be a very unusual set of at least two subsurface, rectangular-shaped pits with layers of intensely burned sediment (Figures 10.1, 10.9-10.11). Two 1x1 meter units were excavated over this anomaly revealing portions of two linear features below the surface. The plan view at this depth suggests that these are portions of parallel-sided pits delineated by a 10 cm thick band of reddened (burnt) earth. On the interior of the eastern pit is an ashy fill with large pieces of burnt rock. Approximately 26 cm west of and parallel to the eastern pit is a similar band of burned earth that likely demarks the eastern side of a second shallow, parallel-sided pit feature. The lengths of these features are unknown, but the eastern pit is approximately 100 cm wide.

In profile both pits have nearly straight-sided walls that extend below the surface, and both have been truncated by plowing. The complete profile cutting across the eastern pit shows that this feature has a very symmetrical, flat-bottomed structure. The regular and well-defined band of burnt earth runs along the pit walls and down across the bottom of the pit. In the floor of the feature, above the band of burnt earth, is a thin layer of ash and charcoal; the interior core of the feature contains a mix of unburned soil, large burned rock, burnt earth, and charcoal. A small portion of the second feature to the west is visible in the same excavation unit profile and it looks to be nearly identical in structure and composition, but it is slightly deeper.

Our general impression of these two features is that they are two side-by-side rectangular trench-like structures related to an in-ground or partially in-ground historic-era facility (i.e., they are not simply trash filled pits). Figure 10.9 provides an interpretation of what the plan view of these two pits might look like if completely exposed. The burnt earth lining suggests that these trenches housed a well-drafted fire fueled by wood. This fire burned at a fairly even temperature all across the pit, producing the even thickness of burned earth along its sides. It may be that these features are furnaces used for large scale cooking/heating, such as required for producing maple sugar.

While the burnt earth lining and ash layer are likely part of the structure of the feature (though the burnt earth is a result of the features' thermal function), the mixed fill inside these rectangular basins appears to be mixed refuse, though the rock may be the remains of an above-ground structure standing over or around these pits. The artifact assemblage consists of 106 items, ninety two percent of which are architecture (65%) and kitchen group (27%) artifacts. The architectural debris includes window glass, wire nails, roofing slate, and brick. Kitchen group artifacts include a variety of ceramics and container glass. Also collected from the interior of Feature 3 are unidentified metal fragments and a Pt. Pleasant tobacco pipe bowl fragment.

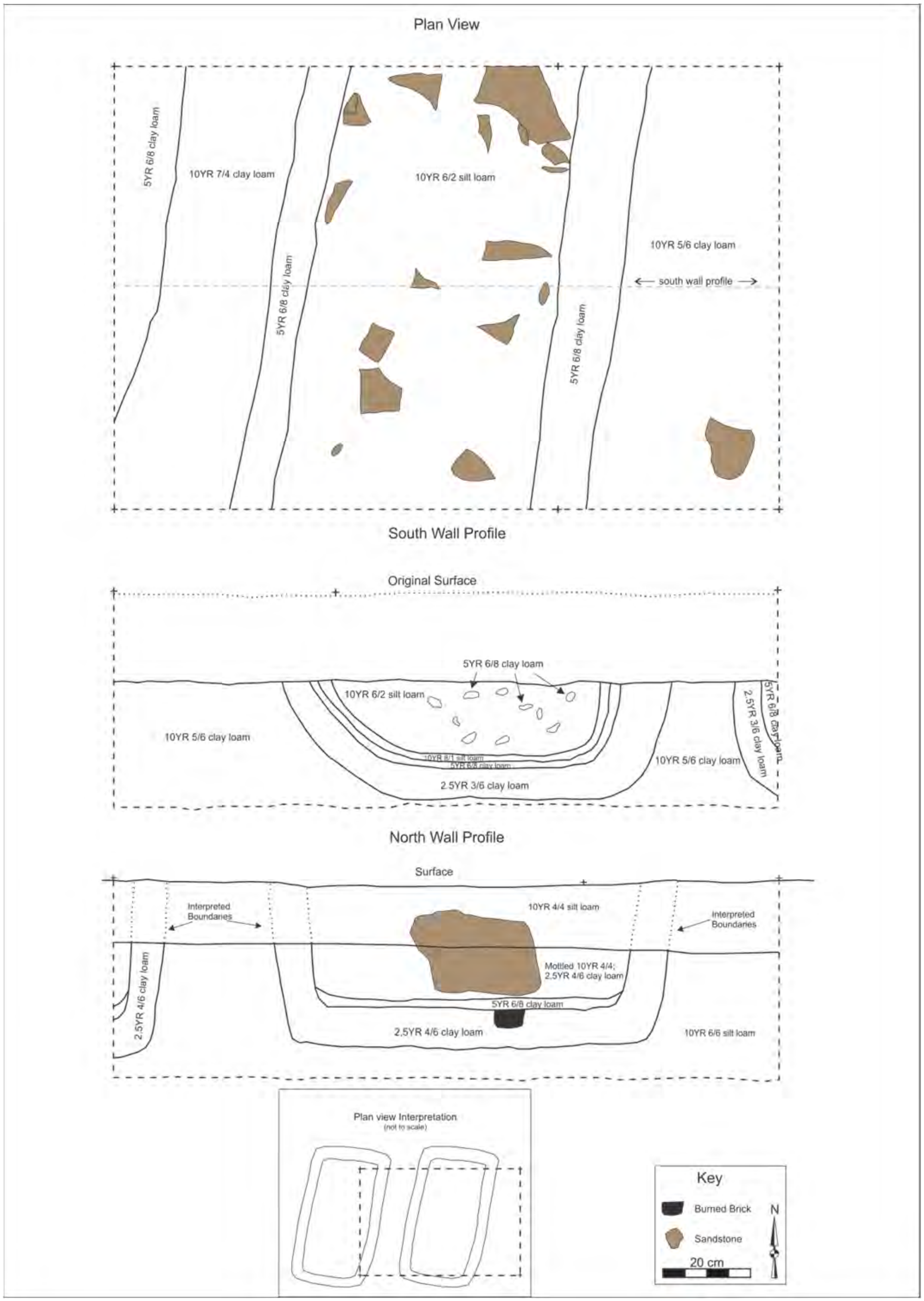

Figure 10.9. Illustration of 33Pk349 Feature 3.

Figure 10.10. Photograph 33Pk349 Feature 3 plan view.

Figure 10.11. Photograph 33Pk349 Feature 3 profile.

10.3. 33PK349 ARTIFACT ASSEMBLAGE

The Phase II investigation of 33Pk349 produced 2,544 artifacts from shovel tests and the investigation of geophysical anomalies and features (Table 10.3). As expected, the majority (69%) are historic-era artifacts associated with the late nineteenth-early twentieth century farmstead. The remaining 31 percent are prehistoric artifacts. Although the number of prehistoric artifacts is sizeable, most are FCR. The emphasis of this study is on the historic-era component of the site, but a discussion of the prehistoric artifacts is also provided below.

Table 10.3. 33Pk349 Phase II artifact inventory.

Context	**Prehistoric FCR**	***FCR Weight (g)***	**Formed Artifacts**	**Lithic Debris**	**Burned Clay/Daub**	**Historic-era Artifacts**	**Total**
Shovel Tests	480	*18,936.6*	1	1	1	785	1,268
Anomaly 2	39	*1,003.8*	-	-	-	289	328
Anomaly 3	-	-	-	-	-	20	20
Anomaly 4	5	*354.9*	-	-	-	13	18
Anomaly 6	9	*506.4*	-	-	-	7	16
Anomaly 7	41	*1,713.7*	-	-	-	29	70
Anomaly 9	9	*374.5*	-	-	-	20	29
Anomaly 10	-	-	-	-	-	26	26
Feature 1	86	*3,424.3*	-	-	-	172	258
Feature 2	26	*1,327*	-	-	-	277	303
Feature 3	102	*1,919.2*	-	-	-	106	208
Total	**797**	***29,560.4***	**1**	**1**	**1**	**1,744**	**2,544**

10.3.1. 33Pk349 Historic-era Artifacts

The Phase II investigation recovered 1,744 historic-era artifacts (Table 10.4). The vast majority of these (83%) fall within the architecture and kitchen functional groups. The balance (17.1%), are distributed among nine other functional groups and most of these fall within the miscellaneous and hardware groups. Very few faunal and transportation group artifacts were recovered. Examples of select artifacts from the farmstead are presented in Figures 10.12 and 10.13.

Table 10.4. 33Pk349 artifact assemblage.

Functional Group	**Count**	**Percentage**
Activity	6	0.3%
Architecture	943	54.1%
Arms	6	0.3%
Faunal	1	0.1%
Fuel	20	1.2%
Furniture	26	1.5%
Hardware	29	1.6%
Kitchen	504	28.9%
Miscellaneous	189	10.8%
Personal	19	1.1%
Transportation	1	0.1%
Total	**1,744**	**100%**

33Pk349 Activity Group Artifacts

The activity group artifacts include five tobacco pipe fragments and a slate pencil fragment (Table 10.5; Figure 10.13). Three of the five pipe fragments are likely of the "Point Pleasant" type while two definitely are of the type. This type of smoking pipe was manufactured from ca. 1840-ca. 1890 (Sudbury 1979). The soft slate (or soapstone) pencil fragment, which is completely worn down, was utilized on both ends. The use of slate pencils and tablets goes back many centuries in the U.S. to some of the first European occupations, such as the early seventeenth century fort at Jamestown, in what today is eastern Virginia. Slate pencils are commonly found on nineteenth century sites in Ohio.

Table 10.5. 33Pk349 activity group artifacts.

Type	Description	Decoration/Comments	Count	Percentage
Pt. Pleasant (?)	Shank portion	Brown glazed surface with raised horizontal ridges (Flutes)	1	16.7%
Pt. Pleasant	Bowl fragment	Raised, straight vertical lines (Flutes)	2	33.3%
Soft slate/soapstone	Pencil	None	1	16.7%
Pt. Pleasant (?)	Bowl fragment	Plain surface, no decoration	2	33.3%
Total			**6**	**100%**

33Pk349 Architecture Group Artifacts

The most common functional group at 33Pk349 is the architecture group (Table 10.6). Brick, window glass, roofing slate, and nails are the most numerous architecture group artifacts. Although brick is the second largest portion of this assemblage, it does not occur in particularly high frequencies, as would be expected if there were large brick foundations on site. Instead, it is likely that brick found during the Phase II work was related to small constructions such as chimneys, chimney tops, or yard-related features.

Most of the window glass (95%) has an aqua tint; the rest is clear. Most of this glass was likely deposited when the house was razed. The nail assemblage makes up the largest proportion of the architecture group, and, like the window glass and brick, was probably deposited when the house was razed. Cut square nails, which are older than wire nails, are only 5% of the nail assemblage (Figure 10.13). The rest are unidentified corroded nails and round-wire nails.

The remainder of the architecture group artifacts includes roofing slate. It's likely that the entire rooftop of the house was clad with slate shingles. The relative paucity of this material in the assemblage suggests that the slate was salvaged when the house was razed.

Table 10.6. 33Pk349 architecture group artifacts.

Type	Count	Percentage
Brick	224	23.8%
Roofing Slate	110	11.7%
Window Glass	165	17.5%
Corroded Unidentified Nail	420	44.5%
Cut nail-square	22	2.3%
Wire nail-round	2	0.2%
Total	**943**	**100%**

33Pk349 Arms Group Artifacts

Four brass .22-caliber shell casings and two brass 12-gauge shotgun shell bases were recovered from the site. These artifacts were probably deposited by post-farmstead hunting activities within PORTS and thus are unassociated with the occupation.

33Pk349 Faunal Group Artifacts

One unidentified calcined animal bone fragment was recovered a shovel test unit. No other animal bone was found, though farmstead sites usually produce numerous pieces of animal bone, often with butchering cut marks, related to kitchen refuse.

33Pk349 Fuel Group Artifacts

Fuel group artifacts from the farmstead are exclusively coal and coal slag (n=20).

33Pk349 Furniture Group Artifacts

Furniture group artifacts (n=26) from the farmstead are few, but those found are dominated by 22 pieces of lamp chimney glass and/or light bulb glass. Three of these are clear rim fragments, exhibiting scalloped edges, and one is a thin milk glass lantern chimney glass fragment (Figure 10.13).

33Pk349 Kitchen Group Artifacts

The Phase II work produced 504 kitchen group artifacts, accounting for 28.9% of the entire Phase II assemblage (Table 10.7). Ceramics dominate this assemblage, followed by container glass and a single milk glass fragment associated with canning (e.g., lid-liner).

Container glass fragments, including the canning jar lid-liner, vary in color and include 72 clear, 56 aqua-tinted, 12 amber-tinted, 10 amethyst, and one milk (opaque white) glass. Many of these items might be from canning jars, especially the aqua-tinted glass. The amber colored container glass is probably from beer bottles. Three bottle closure (mouth/neck) fragments were identified with diagnostic attributes. Two are of the applied (*Extract Lip*), cork-type closure, which dates from c. 1880 to c. 1930 (Lindsey 2012). The third is a crown-type closure, c. 1910 to the present (Lindsey 2012). These two production date ranges post-date the mean ceramic date for the site, suggesting that bottles were commonly used during the latter half of the site occupation.

Table 10.7. 33Pk349 kitchen group artifacts.

Type	**Count**	**Percentage**
Ceramics	353	70.0%
Container Glass	150	29.8%
Canning jar milk glass lid liner	1	0.2%
Total	**504**	**100%**

Figure 10.12. Examples of ceramics from 33Pk349.

Figure 10.13. Examples of tobacco pipes, glass, stone, nail, pencil, and buttons from 33Pk349.

33Pk349 Hardware Group Artifacts

A small number of hardware group artifacts were recovered in the Phase II excavations (Table 10.8). Most of the hardware object classes are represented by one or two items, such as metal bracket fragments, a piece of barbed wire, a horse shoe, pipe fragments, and several other items. Two tools, a possible bastard file (heavily corroded) and a broken whetstone (the latter shown in Figure 10.13), were recovered.

Table 10.8. 33Pk349 hardware group artifacts.

Type	Count	Percentage
Bar/bracket fragment	1	3.4%
Barbed wire	1	3.4%
Bastard file (?)	1	3.4%
Bolt	1	3.4%
Bracket	1	3.4%
Bracket/wire hook	1	3.4%
Chisel plow spike	1	3.4%
Horse shoe	1	3.4%
Hinge (?)	1	3.4%
Large bolt	2	6.9%
Large hook	1	3.4%
Pipe fitting	1	3.4%
Pipe fragment	1	3.4%
Ring/rod	1	3.4%
Rivet	1	3.4%
Rod fragment	2	6.9%
Small, complete bulb	1	3.4%
Spike nail-square	3	10.3%
Square nut	2	6.9%
Staple nail	1	3.4%
Thin band/phalange	1	3.4%
Whetstone	1	3.4%
Wire fragment	2	6.9%
Total	**29**	**100%**

33Pk349 Miscellaneous Group Artifacts

Miscellaneous group artifacts from the farmstead include numerous metal fragments (n=186) and three small pieces of melted glass. The majority (43%) of the metal fragments tend to be thin and corroded and may be metal roofing fragments. The melted glass consists of two aqua-tint and one clear fragment and they may be associated with container glass or window pane glass.

33Pk349 Personal Group Artifacts

Only 19 personal group items were recovered from the farmstead (Table 10.9). The majority of these are clothing related items such as buttons and footwear (Figure 10.13). One of these items is a cufflink that, although corroded, appears to contain the initials HR—which may be related to the brand rather than the owner. One jewelry item, a milk glass bead, was also recovered.

Table 10.9. 33Pk349 personal group artifacts.

Type	Description	Count
Button-Plastic	Impressed stamp on front "Fitwell Elite Make"	1
Bead (half)-Milk glass	Undecorated	1
Button cover-Copper/brass	Corroded	1
Boot sole-Rubber	Some fragments, have small metal rivets	14
Cuff-link/button-Leather/iron	Leather embossed "HR"; Sew-through	1
Shoe/boot lace eyelet-Copper/brass	None	1
Total		**19**

33Pk349 Transportation Group Artifacts

Only one transportation group item was recovered. This item consists of a heavily corroded iron object that resembles the housing for a suspension spring either for an automobile or a tractor.

10.3.2. 33Pk349 Ceramic Assemblage

Ceramic sherds account for nearly 70% of the kitchen group assemblage (Table 10.10; Figure 10.12). This assemblage is dominated by whiteware, followed by stoneware and ironstone. Also recovered are small amounts of redware, porcelain, Rockingham, and yellowware, as well as some unidentified fragments.

Table 10.10. 33Pk349 ceramic assemblage.

Material	Type	Count	Percentage
Coarse Earthenware	Redware	3	0.9%
Porcelain	Semi-vitreous	2	0.6%
Refined Earthenware	Ironstone	46	13.0%
Refined Earthenware	Rockingham	3	0.9%
Refined Earthenware	Unidentified	4	1.1%
Refined Earthenware	Whiteware	212	60.0%
Refined Earthenware	Yellowware	2	0.6%
Stoneware	Stoneware	81	22.9%
Total Ceramics		**353**	**100%**

Redware: Redware contributes to 0.9% of the kitchen group ceramic assemblage (Table 10.10). Of the three sherds identified, one has lead/manganese glazing, one has an unknown glazing, and the third has lead glazing (Figure 10.12). All three sherds are exfoliated on one side, which is not uncommon given how “soft” redware paste tends to be. All of the redware appears to be from utilitarian-type vessels/containers, which were commonly used from about 1800 to about 1900 (Ramsay 1939).

Porcelain: Just two sherds of semi-vitreous porcelain were found at the site (Table 10.10). Both are undecorated and one has an exfoliated side. Porcelain is some of the most expensive pottery a family could own in the nineteenth century and it is often related to vessel types that would have been readily visible in the household, such as special serving containers or tea ware, however, in the late 1800s and early 1900s, porcelain was not nearly as expensive relative to other kinds of ceramics as it was in the early 1800s.

Ironstone: Ironstone contributes to 13% of the ceramic assemblage (Tables 10.11). Most of this material is undecorated, but four sherds have partial maker's marks (Figure 10.12). Two of these maker's marks were diagnostic to a specific manufacturing date range of c. 1878 to c. 1880 and c. 1897 to c. 1904 (Godden 1964; Lehner 1988). The remaining two marks were too fragmentary to positively identify; therefore the general production range for ironstone as a whole was used for these. Ironstone was manufactured from around 1840 to 1930 (FLMNH 2004). Decalware (floral), though heavily faded, was identified on three sherds (two fit together but from different proveniences at the site). Decalware was a surface treatment primarily used from c. 1890 to present (Miller 2000).

Table 10.11. 33Pk349 ironstone assemblage.

Surface Treatment	Count	Date Range	Reference
Exfoliated on one side; Undecorated on other side	11	ca. 1840-ca. 1930	FLMNH 2004
Molded (unidentifiable design)	1	ca. 1840-ca. 1930	FLMNH 2004
Molded laurel/wreath design on interior side only	1	ca. 1840-ca. 1930	FLMNH 2004
Molded laurel/wreath design on interior surface; Decalware-Floral (Faded) on interior surface	1	ca. 1890-present	Miller 2000
Partial makers' mark "[Double Shield] Stone China, …DWARD. CLA…, ONGPORT. ENGL…"	1	ca. 1878-ca. 1880	Godden 1964
Partial makers' mark "[Shield]…MPERIAL…"; Undecorated	1	ca. 1840-ca. 1930	FLMNH 2004
Partial makers' mark "Coat of Arms [lions head/crown only]"	1	ca. 1840-ca. 1930	FLMNH 2004
Partially burnt; Undecorated	1	ca. 1840-ca. 1930	FLMNH 2004
Scalloped (symmetrical) rim; Decalware (floral-faded) on interior; Conjoins with half bowl (Anom. 2)	1	ca. 1897-ca. 1904	Lehner 1988
Scalloped (symmetrical) rim; Decalware (floral-faded) on interior; Partial makers' mark "[Coat of Arms] ACCc, Warranted"	1	ca. 1897-ca. 1904	Lehner 1988
Scalloped; Undecorated	1	ca. 1840-ca. 1930	FLMNH 2004
Small, undecorated cup (?) handle	1	ca. 1840-ca. 1930	FLMNH 2004
Undecorated	24	ca. 1840-ca. 1930	FLMNH 2004
Total	**46**		

Rockingham: Rockingham ceramics are rare in the assemblage. A total of three sherds were identified; all are undecorated on one side and exfoliated on the other side. Production dates for Rockingham ceramics range from c. 1850 to 1950 (FLMNH 2004).

Unidentified Refined Earthenware: A small portion of the ceramic assemblage is classified as unidentified refined earthenware (Table 10.12). Two of the four sherds are partially burnt with one side exfoliated while the remaining two sherds are exfoliated on both sides. All of this material appears to be either whiteware or ironstone.

Table 10.12. 33Pk349 unidentified refined earthenware assemblage.

Surface Treatment	Count	Date Range	Reference
Partially burnt; Exfoliated on one side	2	-	-
Both sides exfoliated	2	-	-
Total	**4**		

Whiteware: Whiteware dominates the ceramic assemblage (Table 10.13). A total of 206 (97%) whiteware sherds are undecorated while the remaining six exhibit some sort of decoration, including spongeware, hand-painting, blue shell-edge, and molded/embossed designs (Figure 10.12). The undecorated sherds have a general production range of c. 1830 to the present (FLMNH 2004) while some of the decorated sherds have a more specific range, such as the hand-painted polychrome-floral, which dates to c. 1830 to c. 1860 (MACL 2003). The spongeware décor has a production range of c. 1860 to c. 1935 (MACL 2003), and vessels with the straight, impressed blue shell-edge rim were produced from c. 1840 to c. 1860 (Hunter and Miller 2009).

Table 10.13. 33Pk349 whiteware assemblage.

Surface Treatment	Count	Date Range	Reference
Exfoliated on one side; Undecorated on other side	124	ca. 1830-present	FLMNH 2004
Hand-painted polychrome-Floral	1	ca. 1830-ca. 1860	MACL 2003
One partially burnt; Undecorated	2	ca. 1830-present	FLMNH 2004
Partially burnt; Undecorated	2	ca. 1830-present	FLMNH 2004
Scalloped (symmetrical) rim; Embossed foliage (vines) on inner rim surface	1	ca. 1830-present	FLMNH 2004
Scalloped edge rim; Undecorated	1	ca. 1830-present	FLMNH 2004
Spongeware (Open Sponge)-Green w/hand painted red line on interior	1	ca. 1860-ca. 1935	MACL 2003
Straight edge rim; Undecorated	2	ca. 1830-present	FLMNH 2004
Straight, blue shell edge rim with impressed lines	1	ca. 1840-ca. 1860	Hunter and Miller 2009
Thin, hand-painted line (Green) on interior and exterior surface	1	ca. 1830-present	FLMNH 2004
Thin, hand-painted line (Green) on interior surface	1	ca. 1830-present	FLMNH 2004
Undecorated	75	ca. 1830-present	FLMNH 2004
Total	**212**		

Yellowware: Very little yellowware was recovered from the farmstead. Just two sherds were identified, and both are undecorated on one side and exfoliated on the other. General production dates for yellowware range from c. 1830 to c. 1940 (Miller 2000; Ramsay 1939).

Stoneware: Next to whiteware, stoneware is the second most common ceramic type from the farmstead, contributing to 22.9% of the ceramic assemblage (Table 10.14). Most of the stoneware (60%) is the grey-bodied variety. Buff-bodied stoneware makes up the remaining 40% of the stoneware assemblage. Surface treatments include Bristol slip, Albany slip, cobalt décor, and salt-glaze (Figure 10.11). Some sherds have at least one unglazed surface. Stoneware has been manufactured for many centuries in Europe, but the varieties found at the farmstead were common from the mid-1800s into the early 1900s.

Table 10.14. 33Pk349 stoneware assemblage.

Surface Treatment	Count	Date Range	Reference
Buff-bodied; Albany slip exterior and interior	6	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Buff-bodied; Bristol slip exterior; Albany slip interior	1	ca. 1835-present	Ketchum 1991; Miller 2000
Buff-bodied; Exfoliated on one side; Albany slip on other side	3	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Buff-bodied; Partially burnt/exfoliated on both sides	2	-	-
Buff-bodied; Partially burnt; Unglazed exterior; Possible Albany slip interior	1	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Buff-bodied; Salt-glazed exterior; Albany slip interior	16	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Buff-bodied; Unglazed exterior; Albany slip interior	2	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Buff-bodied; Wax-sealed closure (rim); Salt-glazed exterior; Albany slip interior	1	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Grey-bodied; Albany slip exterior and interior	3	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Grey-bodied; Exfoliated exterior; Albany slip interior	6	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Grey-bodied; Exfoliated on one side; Unglazed on other side	1	-	-
Grey-bodied; Partially burnt; Albany slip exterior and interior	1	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Grey-bodied; Partially burnt; Exfoliated on one side	2	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Grey-bodied; Partially burnt; Salt-glazed exterior; Albany slip interior	6	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Grey-bodied; Partially burnt; Salt-glazed exterior; Exfoliated interior	1	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Grey-bodied; Salt-glazed exterior; Albany slip interior	27	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Grey-bodied; Unglazed exterior; Albany slip interior	2	ca. 1805-ca. 1920	Ketchum 1991; Miller 2000
Total	**81**		

10.3.3. 33Pk349 Mean Ceramic Dates

The ceramic assemblage has a mean ceramic date of 1882.6 (Table 10.15), following the approach of South (1977). If we exclude unidentified whiteware, which has a c. 1830 to present production range, the mean ceramic date is 1871.6.

Table 10.15. 33Pk349 mean ceramic date.

Count	Production Date Bracket	Mean Product Value
3	1800-1900	5550
77	1805-1920	143412.5
1	1830-1860	1845
2	1830-1940	3770
1	**1835-present	1892.5
1	1840-1860	1850
43	1840-1930	81055
3	1850-1950	5700
1	1860-1935	1897.5
1	1878-1880	1879
1	**1890-present	1920
2	1897-1904	3801
5	*1840-1890	9325
Sub-total=141	**Mean=1871.6**	**263897.5**
208 (non-diagnostic whiteware)	**1830-present	393120
Total=349	**Mean=1882.6**	**657017.5**

*includes Pt. Pleasant Pipe Fragment; **1950 terminal date.

10.3.4. 33Pk349 Prehistoric Artifacts

Although the farmstead 33Pk349 is a historic-era archeological site that was occupied from the mid-late nineteenth century and into early twentieth century, the Phase I survey revealed the presence of a small prehistoric site component represented by a single flint flake that was made during the manufacture or maintenance of a chipped stone tool. It was expected that the Phase II work would recover additional prehistoric artifacts.

The Phase II investigation recovered 800 prehistoric artifacts (Table 10.16). Most of these (99.6%) are sandstone FCR. The additional artifacts include a preform or projectile point fragment, a small flake fragment, and a small, heavily eroded piece of burned clay that superficially resembles a pottery sherd. It is possible that much of this FCR could have a historic-era origin and may have been created by large burning events at the farmstead, such as if/when the house and outbuildings were razed through burning. Sizeable FCR assemblages, however, were not identified at the other PORTS farmsteads examined during Phase II projects, and surely some of these sites also experienced fire-related building reduction. Thus, it is more likely that the FCR in the 33Pk349 assemblage was created during prehistoric era occupations of the site.

Over half (60%) of the FCR in this assemblage is from ninety positive shovel tests excavated over the farmstead site on a 5 meter grid. All other FCR is from the plowzone layer that was excavated and screened when testing eight of the geophysical anomalies, three of which are historic-era features. The sizeable FCR assemblage suggests that thermal features, possibly like the FCR features documented at 33Pk347, 33Pk348, 33Pk371, and 33Pk372, were used by the prehistoric occupants of 33Pk349. Unlike the other four sites, the historic-era cultivation at 33Pk349 would have destroyed these near-surface FCR features and distributed their contents throughout the plowzone layer.

The two lithic artifacts in the 33Pk349 Phase II assemblage include a small flake fragment and a small biface (preform or projectile point) fragment, both of which are made from Upper Mercer or Zaleski flint (Figure 10.14). The biface is very thin (Table 10.17) and is missing its shoulders, tip, and base. The damage that caused these breaks is consistent with use breakage (impact), suggesting that this biface was a functional projectile point rather than a preform. Although most of the temporal diagnostic attributes on this probable projectile point are gone due to breakage, its blade morphology, principally it broad and thin cross-section, suggests that it is a Jack’s Reef Cluster point type. Jack’s Reef types are diagnostic of the Late Woodland period and have been found in contexts dating from A.D. 800 to A.D. 1200 (Justice 1987).

The single small piece of burned clay, which could be daub, from 33Pk349 looks somewhat like a prehistoric pottery sherd but it totally lacks temper and has no evidence of any vessel surfaces. Since many burning events have apparently happened at 33Pk349, including those that created all of the FCR and the fires that burned the insides of the rectangular basins at Feature 3, there were many opportunities at this site for bits of clay to become burned, creating something akin this small object.

Table 10.16. Prehistoric artifact assemblage from 33Pk349.

Context	FCR	*FCR Weight (g)*	Projectile Point/Preform	Flake Fragment	Prehistoric Pottery	Total
Shovel Tests	480	*18,936.6*	1	1	1	483
Anomaly 2	39	*1003.8*	-	-	-	39
Anomaly 4	5	*354.9*	-	-	-	5
Anomaly 6	9	*506.4*	-	-	-	9
Anomaly 7	41	*1713.7*	-	-	-	41
Anomaly 9	9	*374.5*	-	-	-	9
Feature 1	86	*3424.3*	-	-	-	86
Feature 2	26	*1327*	-	-	-	26
Feature 3	102	*1919.2*	-	-	-	102
Total	**797**	***29,560.4***	**1**	**1**	**1**	**800**

Table 10.17. 33Pk349 biface (Jack's Reef) metrics.

Artifact	Maximum Width (mm)	Maximum Length (mm)	Maximum Thickness (mm)
Jack's Reef Projectile Point/Preform	27.2	31.6	4.1

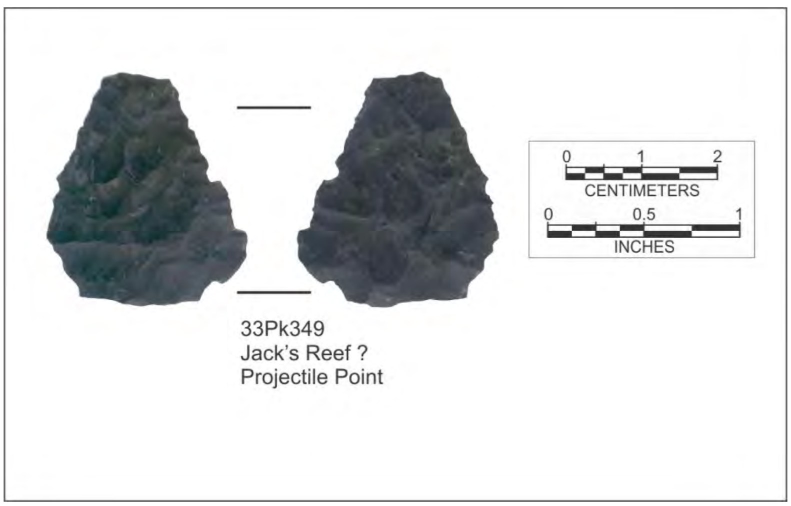

Figure 10.14. Jack's Reef-like projectile point or preform from 33Pk349.

10.4. 33PK349 SITE STRUCTURE

10.4.1. 33Pk349 Historic Feature and Artifact Distribution

Because the farmstead was razed and converted into a cultivated farm field in the 1920s, it no longer contains above ground foundations. Previous archaeological work at other PORTS farmsteads that were abandoned and razed in the 1950s, but never cultivated, were found to contain the visible remains of house, barn, and outbuilding foundations, as well as wells, cisterns, and privies. Foundation types vary among the PORTS farmstead sites and include: (1) light stacked stone support pier foundations; (2) large cut stone block support pier foundations; (3) rough stone (fieldstone) masonry continuous wall foundations and cellar foundations; (4) dressed sandstone block cellar foundations; and (5) poured concrete foundations of various types. It was expected in advance of the farmstead Phase II work that any foundation remains would be truncated and located below the plowzone. If the farmstead contained shallow foundations or support pier foundations, it is unlikely that they were removed prior to cultivation of the site. Deeper foundations, such as cellar foundations, and deep shaft features, such as wells, cisterns, and privies, would have been filled-in and buried beneath the plow layer. It is likely that good quality building stone would have been salvaged, especially the upper courses, for use elsewhere.

The Phase II survey, with the aid of geophysical survey techniques, identified two wells or cisterns (Features 1 and 2) and an unusual set of subsurface thermal features (Feature 3) that have the appearance of being planned, high-heat facilities. All three are located below the plowzone. No evidence for house, barn, or outbuilding foundations was found, so either these buildings (1) are located in areas where we could not conduct radar survey (e.g., in the area of Anomaly 11), (2) are not present in the geophysical data and occur in between the shovel tests, or (3) had shallow support pier foundations that were removed from the site before cultivation began.

Figure 10.15 illustrates the distribution of historic-era artifacts at the site, which occur in a tight cluster on and just south of the topographically highest part of the site. This cluster conforms very closely to the Anomaly 11 area in the magnetic gradient data. Most of the artifacts were recovered from an approximately 10 m by 15 m area adjacent to Feature 2. Smaller artifact concentrations are near the main concentration, near Features 1 and 3. The wells/cisterns were probably located near or adjacent to a house. More than likely, the house stood in the area with the greatest concentration of artifacts, which is the pattern observed at the other PORTS farmsteads where visible house foundations remain.

Figure 10.16 illustrates the distribution of architecture group artifacts, which is the most abundant artifact group in the Phase II assemblage. Consisting of brick fragments, roofing slate, window glass, and nails, most of the architecture group artifacts were probably generated when the house was razed. These objects are located in the Area of Anomaly 11, the projected location of the house from based on the magnetic gradient survey.

The distribution of kitchen groups artifacts is shown in Figure 10.17. This artifact group, which is made up mostly of kitchen ceramics and container glass, shares the same distribution pattern as the architecture group artifacts. While is it likely that some of this material was deposited as refuse during the course of the farmstead’s occupation, a good amount of it could be items and trash that were left within and around the house when it was abandoned.

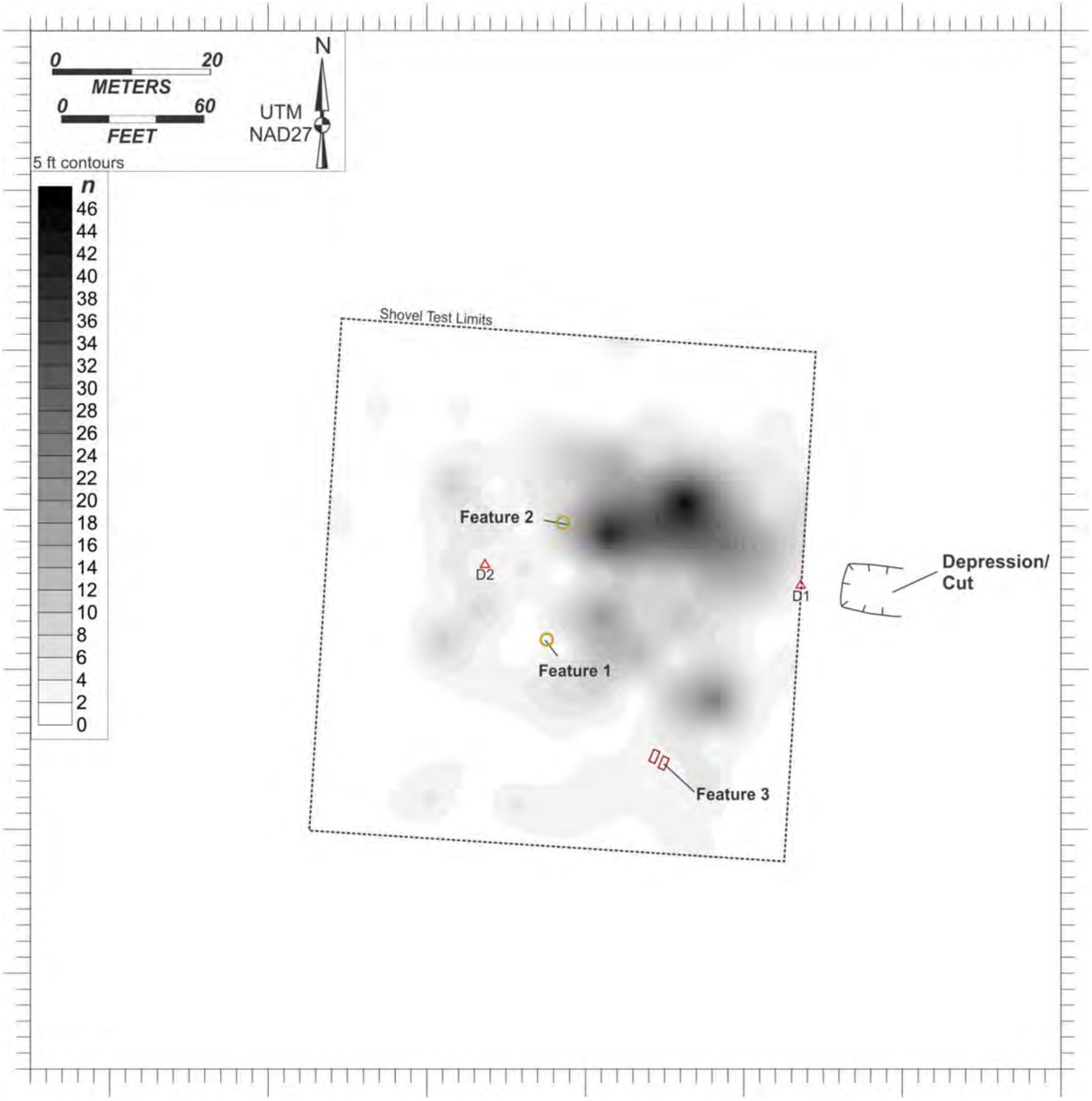

Figure 10.15. Illustration of site 33Pk349 showing the distribution historic-era artifacts.

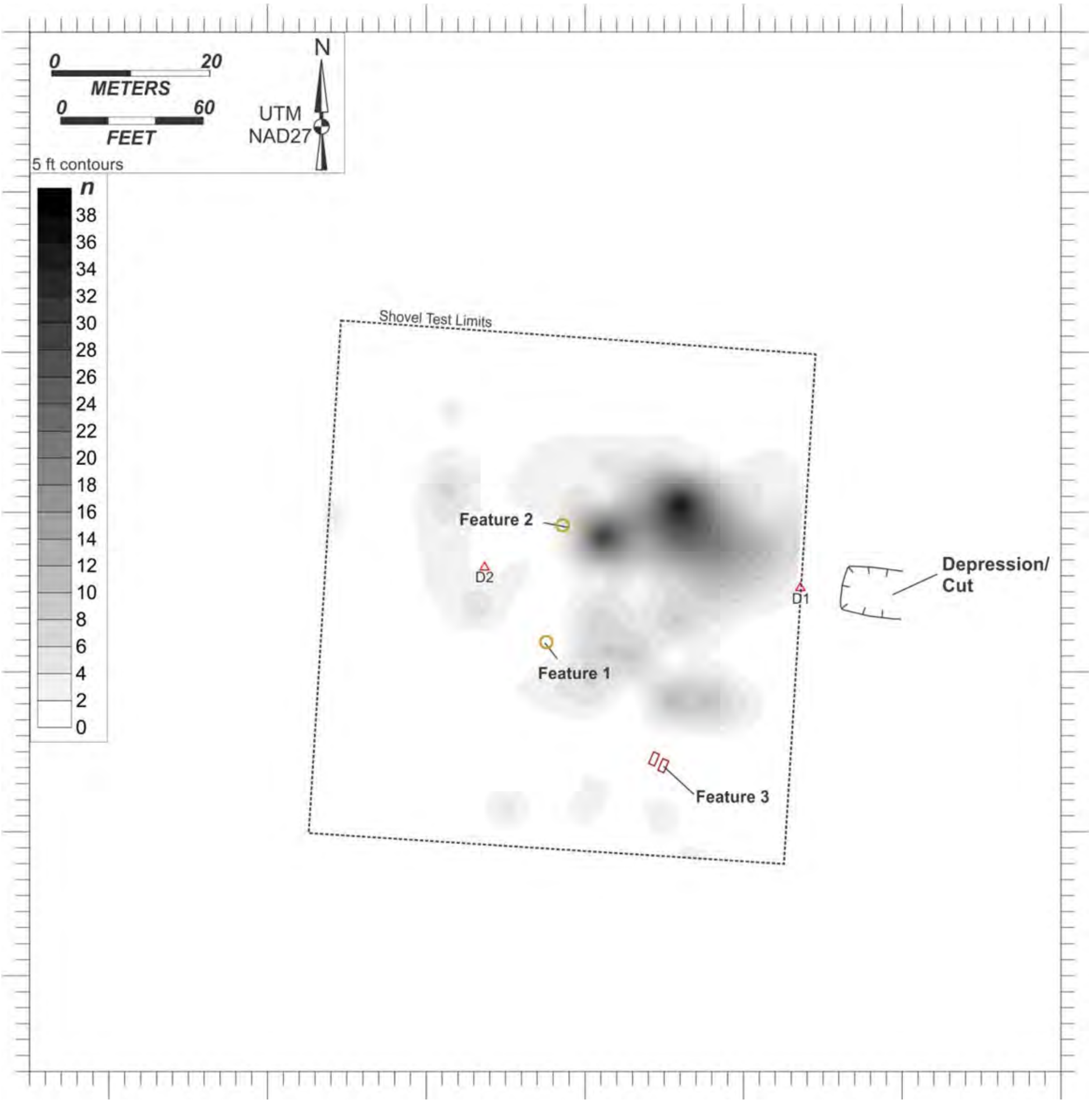

Figure 10.16. Illustration of site 33Pk349 showing the distribution of architecture group artifacts.

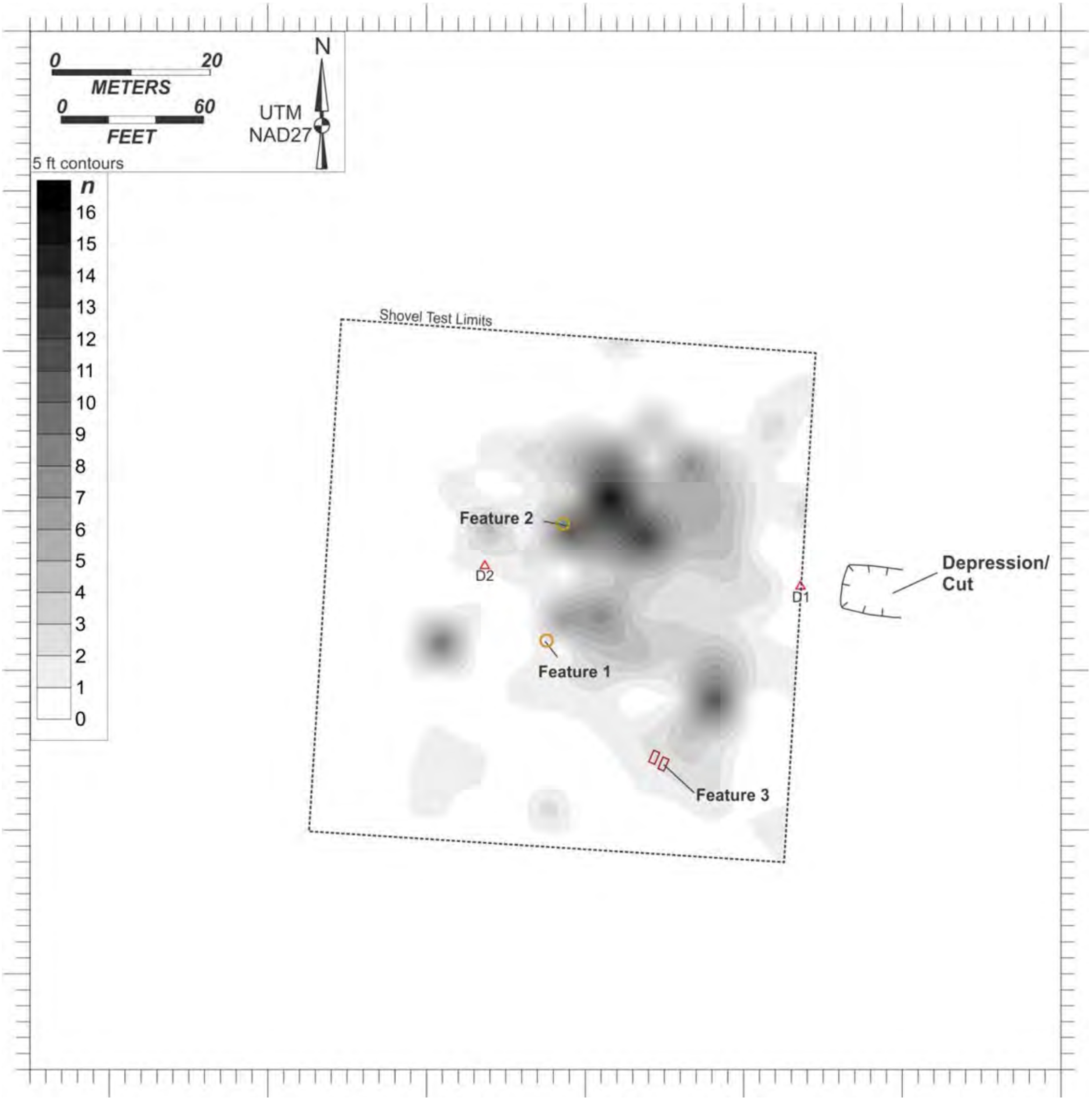

Figure 10.17. Illustration of site 33Pk349 showing the distribution of kitchen group artifacts.

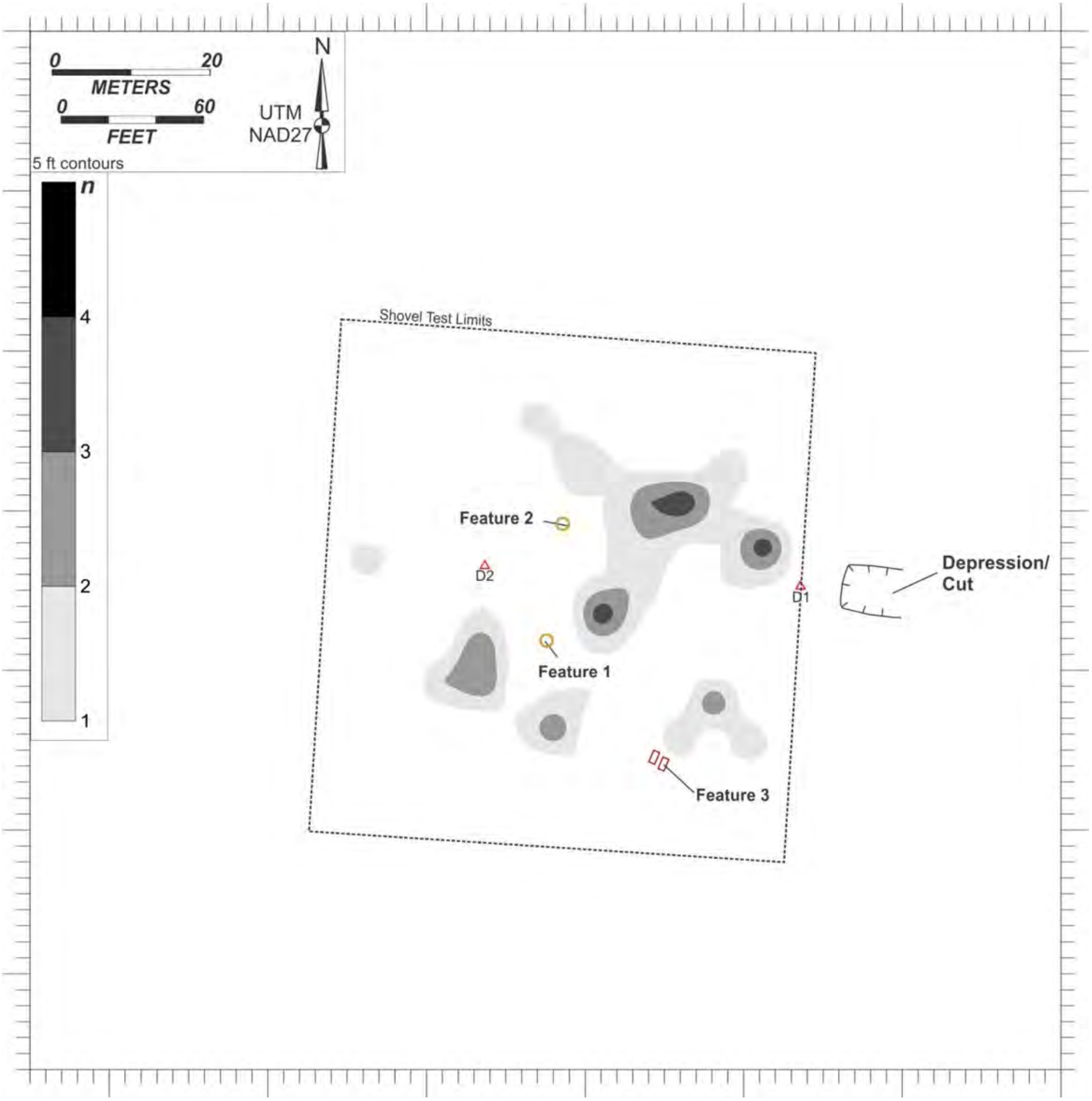

Figure 10.18. Illustration of site 33Pk349 showing the distribution of other artifact groups.

All other artifact groups, which include activity, arms, faunal, furniture, hardware, personal, and transportation groups, occur in low frequencies at farmstead, but their distribution pattern follows that of the two more prominent artifact groups (Figure 10.18).

10.4.2. 33Pk349 Prehistoric Artifact Distribution

The 33Pk349 prehistoric component is represented (tentatively) by 800 artifacts. These include 797 (29.5 kg) pieces of FCR, a Late Woodland period Jack's Reef projectile point fragment, one piece of flint debris, and a small bit of backed clay. The distribution of FCR (shown in Figure 10.19), however, calls into question whether this material is in fact prehistoric era in origin. The largest amounts occur in the area thought to be the location of the house. Since we are not aware of the houses foundation type (i.e., it could have been sandstone), this burned and/or fragmented rock could have been created during the construction, dismantling/razing, and subsequent plowing of the house's foundation.

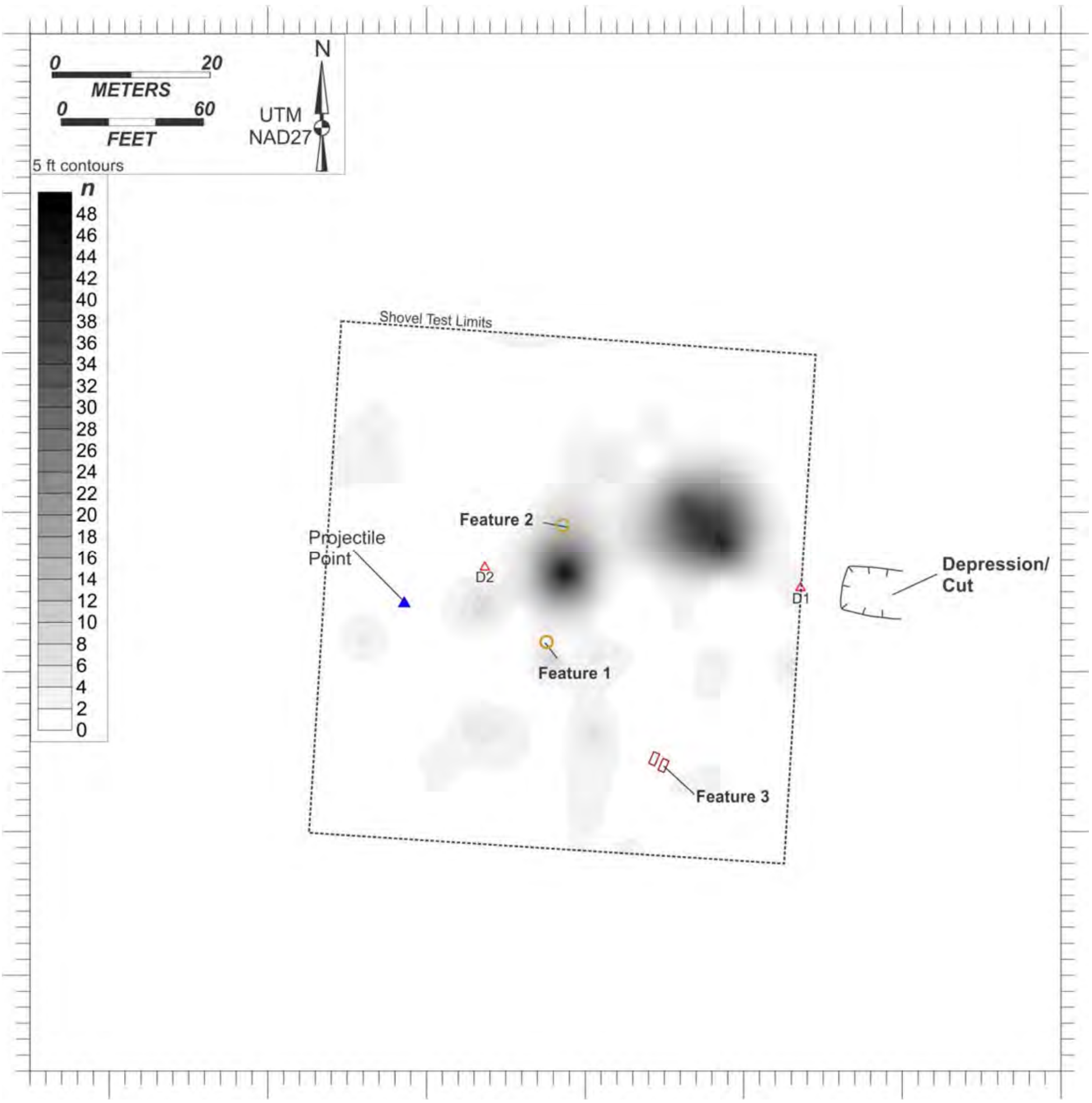

Figure 10.19. Illustration of site 33Pk349 showing the distribution prehistoric artifacts.

11. PHASE II ARCHAEOLOGICAL SUMMARY (33PK347, 33PK348, 33PK371, AND 33PK372)

The fundamental purpose of the Phase II investigation of sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372 was to develop an understanding of the kinds of artifacts they contain, determine how the artifacts are distributed within each site, and get a sense of the number and types of subsurface features present at each. Ultimately, the point of this work was to determine if these sites have the potential to yield information that is important to understanding prehistoric life and settlement practices in the uplands of the Scioto River Valley.

The *Historical Context* section of this report presents a very basic outline of our current understanding of Ohio's past and changes that have occurred through time, starting about 14,000 years ago. Through most of prehistory, Ohio was occupied by mobile hunter-gathers who lived in small groups that moved about the landscape in the search for the vital resources necessary for daily life. In particular this would have included food resources that seasonally vary in their location, for example, large nut crops that become available in the uplands during the autumn months. To be in the right place at the right time, most of these hunter-gatherer groups seldom stayed in one place for more than a few weeks or months before they packed up their belongings and moved to the next resource extraction location, or perhaps a communal gathering place.

Through the course of prehistory and as population size grew, the territories within which these people lived became more constricted as the landscape filled-in with people. While still residentially mobile, these people had less area in which to roam and faced more competition for available resources. By the Late Archaic period, small mobile groups were coalescing into larger settlements on major floodplains at certain times of the year—perhaps for the entire length of the winter season. This settlement pattern would have provided security for the larger group, it would have made available a larger work force for group projects, and it would have allowed members of the group to draw on (through exchange) a larger pool of resources accumulated by others during the rest of the year.

It was not until the Early and Middle Woodland periods that Ohio's prehistoric populations began to settle down and live more sedentary lives. Even so, the first permanently settled (i.e., year round) villages did not appear until the early Late Woodland period (c. A.D. 500). By the Late Prehistoric period, not long after A.D. 1000, village life was the norm and a new type of corn allowed families to produce large amounts of grain for storage. But hunting and gathering food and other resources was still necessary, and some of these resources were located some distance from the village. Small groups would have headed out into the countryside, such as into the uplands, for days or weeks at time, establishing small satellite camps where they processed and prepared the more remote resources needed back in the village.

Regardless of the settlement system, whether mobile or sedentary, Ohio's prehistoric occupants established many settlements (temporary or permanent) across the landscape. Some settlements contain the entire range of activities that a group might engage in throughout the year, while other sites contain the remains of just a few specific tasks. These settlements today are represented by archaeology sites such as 33Pk347, 33Pk348, 33Pk371, and 33Pk372. Rarely does an archaeological site contain the remains of just a single occupation. A place that is suitable for a camp or residential base during one period, with dry level ground not far from water, is often attractive to other groups a hundred or a thousand years later. This produces an archaeological record of overlapping occupations that can take some effort to sort out. This has been attempted to some degree with the four prehistoric sites presented in this report.

Table 11.1 summarizes the results of the Phase II investigations of sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372. The field methods used in this study were designed to sample a small percentage of each site (~1-2%). These methods were used at each site to (1) acquire a representative sample of artifacts, (2) identify the locations and nature of subsurface facilities and structures (features), and (3) collect temporal information. By sampling these sites in a systematic fashion, it was possible to develop a reasonable understanding of site structure, which is the arrangement of artifacts and features within a site, and assess site condition and integrity. Establishing the condition of a site and the integrity of its archaeological remains is essential for determining a site's potential for contributing to our understanding of the past in a meaningful way—highly disturbed sites rarely have the integrity to further our understanding of the past. Given the small sizes of the samples collected from each site, however, it is important to understand that all four sites have the potential to contain archaeological information that has yet to be identified, including additional features and types, additional artifact types, and additional temporal data that was not found during the Phase II investigations.

Table 11.1 lists information about site area; percentage of site area sampled; the number of recovered artifacts and features; and the number of identified temporal components. There appears to be a correlation between the number of temporal components and corresponding minimum number of occupations and many of the sites' archaeological attributes, such as the number of identified features, number of artifacts and formed artifact types, and artifact density—the large the number of temporal periods represented at a site, the more and varied features and artifacts it contains. These correlations are expected since more occupations tend to reflect more people and more (and different) activities.

Table 11.1. Prehistoric site summary information.

Description	**33Pk347**	**33Pk348**	**33Pk371**	**33Pk372**
Percentage of site area excavated	2.2%	1.5%	0.9%	1.0%
Historic-era cultivation?	No	No	Yes	No
FCR count/weight	3,723 (*76.2 kg*)	8,874 (*205.5 kg*)	6,931 (*189.5 kg*)	12,530 (*306 kg*)
Lithic debris count	95	532	626	1002
Formed artifact count	8	14	34	60
Pottery count	-	-	30	8
Identified feature count	2	4	10	10
Artifact density per positive shovel test**	8.1	10.41	12.6	21.6
Number of feature types	1	3	7	3-4
Number of formed artifact types	7	7	9-10	15
Temporal components represented	•Late Prehistoric •Middle-Late Archaic	•Early Woodland •Late Archaic-Early Woodland •Late Archaic	•Late Woodland •Early Woodland •Late Archaic-Early Woodland •Late Archaic •Early Archaic	•Late Prehistoric •Early Woodland •Late Archaic
Minimum number of occupations	2	3	5-6	3

**shovel tests were 50x50 cm square

Sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372 each contain evidence of multiple temporal components derived from temporally diagnostic artifacts and radiocarbon dates. This implies that these sites were occupied multiple times by temporally and culturally distinct groups. Considering that only a small percentage of each site (1-2%) has been sampled, the number of temporal components actually present at each site could be higher.

Nonetheless, these sites and their contents are composites of several cultural and temporal components. No single component is necessarily more important than another and sites with fewer temporal components are no more/less important than a site with more components. Sites with many temporal components, however, tend to contain more artifacts and features, making them more visible in the archaeological record. This point is important because each component, being culturally and temporally unrelated, is independent of the other. Additional work at each of these sites, however, might determine that some components contributed less to the formation of these sites than others. That is, some occupations may have been more intensive than others.

Site 33Pk371, for example, has several attributes that are unique compared to the other three sites. First, it is situated on a different type of landform. Whereas sites 33Pk347, 33Pk348, and 33Pk372 are located in open areas some distance from water, 33Pk371 is in a slightly more protected area. This setting may have offered more protection from the elements and would have been closer to water sources, but there may be other factors we are not aware of given that there were five or six different temporal components here.

A very important part of this Phase II work is the geophysical surveys. While shovel tests and 1x1 meter units can sometimes locate subsurface features, geophysical survey provides a systematic technique for locating subsurface features that provides complete and even coverage of the areas surveyed. And on this project, the geophysical surveys located dozens of archaeological features, only some of which were uncovered, and fewer yet excavated.

Excluding site 33Pk371, because of the nature of these undisturbed sites it indicates that these sites have not been historically cultivated. The effects of cultivation are often deleterious to archaeological sites because it tends to completely destroy shallow features and it truncates deeper features. Often all that remains at thoroughly archaeological sites is the lower portions of the deeper features. Plowing and cultivation also have the effect of mixing and redistributing objects that in the past were deposited on the surface. This can make it difficult to identify activity areas and discrete refuse dumps on plowed sites. Archaeological research often depends on inferring refuse disposal patterns from dispersed artifact clusters, so the importance of uncultivated contexts cannot be over emphasized. As unplowed archaeological contexts, sites 33Pk347, 33Pk348, and 33Pk372 all contain intact or relatively intact features and midden (refuse) deposits—very much a rarity in Ohio. Only through the preservation and study of these sites can we know what is missing from the overwhelming number of plowed contexts.

Sites 33Pk347, 33Pk348, and 33Pk372 contain few feature types. Most are large basin-shaped pits completely or partially filled with FCR. The type and degree of burning exhibited by this FCR, especially at 33Pk348, produced unusually strong magnetic anomalies. This indicates that the stone was heated to very high temperatures. What is unusual, however, is that there is very little or no evidence of *in situ* burning in this FCR-laden features, such as reddened/burnt earth or large amounts of ash and charcoal. The excavated features produced very little charcoal and when found, it tended to be scattered and mixed into the matrix of the feature fill. It would seem that these features were created by excavating large but shallow pits and then filling them with very hot rock, which apparently was heated up in nearby surface fires that did not produce obvious magnetic anomalies—or this evidence has been destroyed by weathering and soil formation.

What these large FCR features were used for is not known, but they represent a substantial amount of energy expenditure. To create these facilities, several activities must have taken place. The *first* effort was in the collection of thermal stone. Most of the FCR collected from these sites is locally available sandstone that would have been collected from the side slopes adjacent to the sites. Small percentages of the FCR consists of igneous cobbles that must have been collected from the Scioto River flood plain or its larger tributaries. Although rare, the presence of igneous stone implies a degree of additional effort because the sources for this material are a considerable distance from these sites. The *second* effort was in the collection of fuel to heat up the rock, which was probably locally available wood within and adjacent to the sites. A *third* level of effort was involved in the excavation of large shallow pits. This was probably accomplished with digging tools, such as stone or wood digging implements. Large bifacially chipped stone implements were recovered from 33Pk348 (n=2) and 33Pk372 (n=1). Both resemble hoes or mattocks that would have been lashed onto a handle to be used for digging. A kind of *fourth* effort related to creating these thermal features was heating the stone and transporting the stone to the pits, possibly using wooden or antler lifting devices. A *fifth* effort was involved in gathering up the items that the thermal features were meant to heat up—the actual intended purpose of the these features. Whatever this material was, be it meat or plant materials, it must have been fairly critical to make it through the year for a lot of energy went into its preparation. All four sites contain features that appear to have been cleaned out, so it is evident that a *sixth* potential effort may have been the clean-out for reuse prior to abandonment. Older pits were likely a source for rock that was recycled for use in new pits. Evidence for the clean-out and reuse of thermal features is not uncommon. All four sites contain large volumes of exhausted FCR that is distributed over the site surfaces and/or is concentrated in refuse disposal areas. While some of the features are literally packed with FCR and contain little soil matrix, others are filled with a soil matrix with suspended/displaced FCR.

Although site 33Pk371 has been historically cultivated, it contains a broad variety of features (Table 11.1). Whereas somewhere between only 1-3 or 4 feature types were identified at the other three sites, seven distinct types were identified at 33Pk371. This is possibly an artifact of the number of potential represented occupations and corresponding range of activities that may have been carried out during these occupations. If sites 33Pk347, 33Pk348, and 33Pk372 are short-term and specialized resource processing sites, they might be expected to contain a narrow range of feature types. If, by contrast, site 33Pk371 represents a longer-term and more generalized occupation in a more protected setting, which may be supported by the possible house feature (Feature 8), it would be expected to contain a broader range of feature types, each designed to do something different. One other potential explanation may be the archaeological methodology and effort used at 33Pk371 versus the other sites. Because the site has been plowed, all but one feature required more excavation and screening to reach. The other three sites contain distinct features. Once the magnetic anomalies at these other sites were confirmed to be archaeological features, no additional fieldwork efforts were employed to identify other potential feature types.

The most unusual feature type encountered during the Phase II work was found at site 33Pk372. Feature 8, is a large nearly circular depression measuring approximately seven meters in diameter. At one point in time, probably during the Early Woodland period, this depression was considerably deeper. The depression has accumulated lots of prehistoric debris, including large amounts of FCR, formed artifacts, lithic debris, and pottery. The pottery, which likely dates to the first half of the Early Woodland period, is the only somewhat temporally diagnostic artifact found in the feature to date and it was recovered from the bottom of what would have been an already partially filled in-depression. A Late Prehistoric period radiocarbon date from a charcoal sample collected from upper levels of the depression adds to the complicated nature of this feature. The feature has tentatively been identified as a semi-subterranean house, perhaps originally five meters across. But this is based on the excavation of just one 1x1 meter unit. Further work is needed to determine what exactly this depression represents.

A different type of potential house/structure feature may have been found at 33Pk371. Although it was not fully uncovered or excavated, Feature 8 appears to be quite large and is associated with possible posthole features and a thermal feature. The upper level of Feature 8 produced large amounts of lithic debris, burned biface fragments, celt fragments, other formed artifacts, and pottery. This is an unusually rich assemblage for a limited amount of excavation within a small space, and rich assemblages (that is, those containing many different kinds of artifact classes) are often associated with longer-term residential occupations. The juxtaposition of the artifact rich fill, possible postholes, and associated thermal feature suggests that Feature 8 at 33Pk371 is a house floor.

The lithic technology analysis shows some variability among the four prehistoric sites examined in this study. While all four assemblages are dominated by *Primary Reduction* debris, which is created when converting a raw flint nodule into a serviceable tool, there is very little *Secondary Reduction* and *Tertiary Reduction* debris, which results from tool maintenance and recycling. This is not surprising since *Primary Reduction* tends to produce a lot of debris that can obscure the visibility of the later stages of reduction (Pecora 2002). Nevertheless, *Secondary Reduction* is represented at each site by a small number of exhausted bifacial tools. Site 33Pk372 produced an unusually high frequency of exhausted micro-drills, but these appear to be single-use (expedient) implements that would not have undergone maintenance, rejuvenation, or recycling. Two similar micro-drills were recovered from 33Pk348. If these drills, which are associated with an Early Woodland period radiocarbon date from 33Pk372, are unique to this time period (they are rarely found at other sites, so knowledge of them is limited), they have the potential to be a temporally diagnostic artifact class. They tentatively represent a potentially distinct Early Woodland period occupation at 33Pk348.

Excluding 33Pk347, all the site assemblages contain proportionately higher frequencies of lithic debris that was created from the earliest stage (core reduction) of the *Primary Reduction* process. The cortex on this debris is water worn, and indicates the use of stone procured from glacial outwash gravels. Such stone would have been available in the Scioto River floodplain and the floodplains of some of its larger tributaries. It is not available in the uplands, so the occupants of these sites must have brought in the stone from elsewhere. The cores, which tend to be small water worn flint nodules, would offer little mass for significant numbers of bifacial tools.

Site 33Pk347 has a slightly different lithic assemblage. It is comparably smaller than the other three assemblages, but it is dominated by late stage biface thinning debris created from the manufacture of biface blanks. Very little debris from 33Pk347 represents core reduction. This demonstrates that most of the stone that entered into 33Pk347 came in the form of early stage biface blanks. If this is accurate, the lack of core reduction activities at 33Pk347 accounts for, in part, the smaller lithic assemblage size. Still, assuming that the Phase II shovel testing at all four sites produced representative samples of the site contents, 33Pk347 is likely to contain over

4,000 pieces of lithic debris if it were to be completely excavated. Potentially, this amount of debris might account for the manufacture of 20-25 biface blanks, and this would not be related to any of the tools that may have been brought in to the site in a finished form. The debris related to the earlier reduction stages at the other three sites quite possibly corresponds with a temporal component not represented at 33Pk347. The occupants that created 33Pk347 made no effort to exploit local flint sources, which are limited to the Scioto floodplain. Instead, they brought in extra-local stone that had already been partially reduced elsewhere. This is in contrast to the occupants of sites 33Pk348, 33Pk371, and 33Pk372, who must have travelled back and forth to the Scioto River floodplain, bringing back cobbles for producing sharp-edged flakes and bifaces. If this was the case, this travelling to the Scioto floodplain might imply that at least some of the occupations at sites 33Pk348, 33Pk371, and 33Pk372 lasted long enough to require the replenishment of their tool-stone reserves.

Finding pottery at two of the sites, 33Pk371 and 33Pk372, adds another layer of complexity to our understanding of these sites. Ceramic pots are large, heavy, and fragile. They are not the kind of object that is carried around just in case it might be needed. If pottery is present and broken at a site, this implies that it was used there. Ceramic pots were an important tool for day-to-day cooking and in some periods they have been used for storage. The ceramic sherds found during the Phase II work come from large, thick vessels, especially at 33Pk372. These pots were likely used as containers for boiling liquids with hot rocks—their thick side walls were good at keeping heat in. Because it is somewhat difficult to make, is hard to carry around, and was likely used for day-to-day cooking, finding pottery at 33Pk371 and 33Pk372 suggests that these are residential camps occupied for more than just a few days or a week. These are also the sites where possible structures and artifact rich refuse dumps were found—all signs of extended-stay habitation sites.

Archaeological site literature is replete with "site type" concepts. Examples of these include *residential camps*, *camps*, *resource extraction camps*, *hamlets*, and *villages*, among others. These concepts are, to some degree, temporally dependent. *Hamlets* are generally associated with the Middle Woodland period, and possibly the Early Woodland period. *Village* sites are generally associated with the Late Woodland and Late Prehistoric periods. *Residential camps* might apply to the Paleoindian and Archaic periods. And *resource extraction camps* or *camps*, might apply to all periods. It is possible that all four sites represent short term *resource extraction camps* occupied by each of the identified temporal components. Evidence for potential house features at 33Pk371 and 33Pk372, however, suggest more intensive occupations-of the type that might be expected at a small somewhat permanent settlement, such as a *residential camp* or *hamlet*. None of the four sites can be described as *village* sites, yet 33Pk347, 33Pk371, and 33Pk372 all contain evidence of having been occupied during periods when villages were common. Thus, these sites likely are *resource extraction sites,* where a small subset of a Late Woodland or Late Prehistoric period village, perhaps located in the Scioto River floodplain, came to collect and process specific resources for a short period of time. All four sites contain evidence of Archaic period occupations. It is possible that the Archaic components represent short-term *residential camps* that were occupied by small family groups. Significantly more work and research is needed to better understand how these sites were used and occupied during the various time periods but it is important to understand that all four represent just a small component of a far more expansive settlement system. No amount of research on a single site, or even the four sites examined here, would be sufficient for understanding those complex settlement systems. The four prehistoric sites at PORTS do, however, appear to contain the types of archaeological data that would contribute towards our understanding of the prehistoric use of the uplands overlooking the Scioto River.

12. PHASE II ARCHAEOLOGICAL SUMMARY (33PK349)

Site 33Pk349 was recommended for a Phase II survey because historical map and property deed records revealed that it was abandoned earlier than most of the known PORTS farmsteads and was thought to have the potential to contain an older or at least more pristine mid-late nineteenth century assemblage. Table 12.1 summarizes the results of the Phase II survey effort.

Historical information demonstrates that a farmstead was standing at this site on a 40-acre property parcel by 1905, but not long thereafter (and prior to 1938/39) the farmstead was razed and the land converted to agricultural field. The removal of the farmstead probably occurred after 1922 when the property was purchased. Artifact and historical document information suggests that the farmstead was occupied from the 1880s to the 1920s. There is no evidence that this farmstead was occupied at an earlier date than any of the other PORTS farmsteads.

Because the farmstead is not visible on the 1938/1939 and 1951 aerial photographs, the size and configuration of the farm, or the number and types of buildings it contained is not known. At other archaeologically tested PORTS farmstead sites, at least those that survived until the 1950s, artifacts tend to be most abundant around the farmstead's house, and in some cases 5 meter shovel testing has found very few artifacts near outbuildings. Thus, it is possible that the farmstead extends beyond the defined site area.

No foundation remains were identified at the farmstead, though from the historic-era maps that it once contained a house—and nineteenth century houses were always accompanied by a range of supporting outbuildings. It may be that our excavation units simply missed the locations of the building foundations, or perhaps the farms buildings had light support pier foundations that were removed from the site when the farmstead was razed. In fact, the removal of foundation stone would have been necessary to accommodate cultivation of this land.

With the aid of the geophysical survey, the Phase II work at the site identified two large stone-lined wells or cisterns and a set of unusual rectangular features that must have been part of a high-heat facility, such as might be used for producing maple syrup. The wells/cisterns are situated near the likely location of the house, based on the presence of large magnetic anomalies and concentrations of historic-era artifacts. The function of the furnace feature is not understood, but it would have been located to the south of the house, perhaps in the farm-related portion of the farmstead.

The Phase II artifact assemblage produced 1744 historic-era artifacts, dominated by architecture and kitchen group artifacts. The mean ceramic date for the Phase II assemblage is 1882.6 when all ceramic types are included in the calculations. Excluding undecorated whiteware, which has a broad temporal range, the mean ceramic date is 1871.6. The overall artifact assemblage is very similar to assemblages recovered from many of the other PORTS farmsteads.

The farmstead also contains a small prehistoric component. Initially, it was thought that this site contained a large quantity of prehistoric FCR—in quantities similar to what was documented at sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372. While this material might have a prehistoric origin, it is concentrated in the same location as the historic-era artifacts. It is very possible that this material is burned building stone created when the house was razed. Despite efforts to locate prehistoric thermal features that would have functioned with the use of thermal stone, none were located at the farmstead. The remainder of the prehistoric assemblage is represented by a possible Late Woodland period projectile point fragment or perform and a flint flake. In summary, the prehistoric component of this site appears to be minor. If the prehistoric occupation involved the use of thermal features, most or all must have been destroyed by historic-era agricultural cultivation.

Table 12.1. Phase II archaeological summary information for the 33Pk349 site.

Description	**Phase II Finding**
Farm parcel acreage	40 acres
Position of farmstead on acreage	central
Number of structures on 1939 aerial	none
Number of structures on 1951aerial	none
Total potential structures	unknown
Total structures found	none
Feature types	2 wells/cisterns furnace feature?
Number of residential structures	one?
Dairy component	unknown
Evidence of modernization	none
Architecture Group to Kitchen Group Ratio	2:1 (n=943:504)
Average number of artifacts per positive shovel test	6.4
Period of occupation	1880s-1920s
Mean ceramic date	1882.6
Prehistoric component (minor)	Perhaps Late Woodland

13. PHASE II RECOMMENDATIONS

The Phase II investigations successfully yielded important archaeological information about the condition and contents of four prehistoric sites within the PORTS (33Pk347, 33Pk348, 33Pk371, and 33Pk372). All four sites appear to have excellent site structure measured by evidence for intact archaeological features and spatially discreet artifact deposits. The limited Phase II survey effort also produced a broad range of temporal data in the form of radiocarbon dates and temporally diagnostic artifacts, showing that the sites are the result of multiple prehistoric occupations, some of which were separated by millennia. Although all four sites have yielded important archaeological information regarding the prehistoric use of the uplands along the Scioto River floodplain, they have the potential to contain additional types of information that has yet to be identified. It is important to remember that the Phase II survey work sampled only 1-2 percent of each site, and each has the potential to contain additional features and feature types, as well as additional temporal components. It is also evident that 33Pk347, 33Pk348, and 33Pk372 have not been historically cultivated, so they have the potential to contain features that may be rare in Ohio due to destruction from plowing. Although site 33Pk371 has a plowzone, it also contains a broad variety of other feature types representing several different periods of occupation, including what might be a prehistoric house floor and associated features.

It is recommended that sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372 be considered eligible for the NRHP under Criterion D. Each has yielded and each has the potential to yield additional information that is important to our understanding of prehistory. Consultation with the Ohio Historic Preservation Office and other consulting parties is recommended regarding the future treatment and protection of all four sites. DOE must, in accordance with Section 106 of the National Historic Preservation Act, take into consideration the effects of all undertakings on sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372. In the interim, all four sites have the potential to be affected by DOE or its contractors, including routine maintenance activities.

Any future archaeological work that might be conducted at sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372 should be conducted with great care. Standard field methodology commonly used in Ohio, such as large scale mechanized stripping, would be deleterious to all four sites. Mechanized stripping of the topsoil would effectively destroy many of the identified features and most of the archaeological features at sites 33Pk347, 33Pk348, and 33Pk372. Another important thing to consider is the subsurface visibility of some of the features. As the course of the Phase II fieldwork at these four sites progressed, it was found that some features are very subtle and nearly indistinguishable from the native subsoil, at least to a certain depth. By the time the fieldwork began at site 33Pk371, we were able to overcome this issue by using a magnetic susceptibility meter to assist in the identification of targeted magnetic gradient features. This methodology was found to be indispensable for accurately identifying features at 33Pk371 and may be, in part, the reason that more feature types were found here as compared to the other sites. Since the technique was not used to its fullest potential at sites 33Pk347 and 33Pk348, it is likely that these sites contain additional features that were overlooked during the Phase II work. It is recommended that future work at these sites employ the systematic use of magnetic susceptibility meter when attempting to identify archaeological features at the locations of magnetic gradient anomalies. It might also prove useful for identifying features in other excavation units. All four sites were also found to contain discrete and tightly defined artifact concentrations, which is due, in part, to the lack of plowing at three of the sites. It is apparent that the Phase II shovel testing was too course to accurately define the boundaries of all of the artifact concentrations that may be present at these sites—some concentrations are small enough to fall between the 5 meter shovel testing interval. It is recommended that future work at sites 33Pk347, 33Pk348, 33Pk371, and 33Pk372 include a systematic attempt to identify and sample all artifact concentrations not detected in the Phase II effort.

In addition to containing more features, artifacts, and site structure data, all four sites also have the potential to yield archaeological information not considered in the Phase II effort. Special analyses such as residue analysis of the FCR in the thermal features to determine what was being heated in these features, use-wear studies of the stone tools (especially on the micro-drills from 33Pk348 and 33Pk372), and a battery of soil chemistry analyses, as well as other non-traditional analytical tools should also be explored. While the Phase II surveys produced a fairly large suite of radiocarbon dates, the procurement of additional dates, including from previously dated contexts, is also essential for adequately identifying the temporal components contained within these sites.

The Phase II survey of site 33Pk349 found that it contains historic-era archaeological features and artifacts that were associated with a late nineteenth-early twentieth century farmstead. Other than being in a plowed/cultivated context, the farmstead differs little archaeologically from the other farmsteads that have been intensively investigated within PORTS. However, the site does differ in one important way in that it was not occupied from about 1930-1950, when many site modifications occurred at the other farmsteads. In this way the farmstead might be thought of as representing a less diluted archaeological example of a farmstead dating from the late 1800s to the early 1900s. All foundation remains appear to have been removed from the site to facilitate its cultivation after 1922, but the Phase II work found two stone-lined wells/cisterns below the plowzone level. The site is also archaeologically interesting in that it contains an unusual historic-era thermal feature with design attributes the likes of which we have never encountered in Ohio. In the end, the farmstead does not appear to be unique in terms of its overall context and potential to inform us in significant ways about Ohio’s past. This, as an individual resource, does not appear to be eligible for the NRHP under Criterion D. Although this site may not be considered a historic property, it is potentially important as a contributing source of archaeological data for a PORTS-wide farmstead study. No additional archaeological fieldwork or physical preservation is recommended for site 33Pk349.

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