**Department of Energy**

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DEC 2 3 2013

DISTRIBUTION LIST

PPPO-03-2125072-14

Dear Madams/Sirs:

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

Two archaeological reports are enclosed for your information: *Phase I Archaeological Survey of Area 2 Located within the Portsmouth Gaseous Diffusion Plant (PORTS), Pike County, Ohio* and the *Phase I Archaeological Survey of Area 6B Located 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 I summary reports for Area 2 and Area 6B are attached.

As indicated above, historic properties were identified in the areas surveyed and documented in the enclosed summary reports 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 and in the February 2013 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 early 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 Historic Preservation Office (OHPO) 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 reports are 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. A Phase II report presenting additional data for selected archaeological sites in Area 2 and Area 6B is nearing completion. The summary Phase II report will also be sent to you once it is finalized.

The OHPO and DOE have discussed the approach of providing these summary reports 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 reports useful and helpful as you participate in the CERCLA process. Maintaining open lines of communication is a priority for DOE and OHPO. We believe that working together, DOE and OHPO 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
Ohio Preservation Office

Enclosures:
1. Phase I Summary Report for the Archaeological Survey of Area 2 Located within the Portsmouth Gaseous Diffusion Plant (PORTS), Pike County, Ohio
2. Phase I Summary Report for the Archaeological Survey of Area 6B Located within the Portsmouth Gaseous Diffusion Plant (PORTS), Pike County, Ohio

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OVAI Contract Report #2012-28PV

# PHASE I ARCHAEOLOGICAL SURVEY OF AREA 2 LOCATED WITHIN THE PORTSMOUTH GASEOUS DIFFUSION PLANT (PORTS), PIKE COUNTY, OHIO

By

Albert M. Pecora, Ph.D.

October 2, 2013

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

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OVAI Contract Report #2012-28PV

# PHASE I ARCHAEOLOGICAL SURVEY OF AREA 2 LOCATED WITHIN THE PORTSMOUTH GASEOUS DIFFUSION PLANT (PORTS), PIKE COUNTY, OHIO

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

## Management Summary

In February of 2012, Ohio Valley Archaeology, Inc., (OVAI) conducted a Phase I archaeological survey (Survey Area 2) within the 3,777-acre Portsmouth Gaseous Diffusion Plant (PORTS) in Pike County, Ohio. The survey work was completed as part of an ongoing effort to document and evaluate archaeological resources within the PORTS reservation. Prior to the current survey effort, various other surveys have been conducted within PORTS. These include a small sample survey that was completed in 1997, Phase II NRHP assessment studies on thirteen historic-era farmstead sites between 2009 and 2011, a reconnaissance level effort designed to locate additional farmstead sites in 2011, and "enhanced" Phase I-level surveys designed to further document selected farmstead sites identified during the reconnaissance surveys. The current survey was designed primarily to locate and document prehistoric archaeological sites, though all sites regardless of age were to be documented as encountered.

Archaeological field methods used in this survey effort are commensurate with the *Archaeology Guidelines* published by the Ohio Historic Preservation Office (OHPO). The methods include a pedestrian survey and systematic shovel testing. Prior to the survey, OVAI developed a scope of work (SOW) that delineated five distinct area types within the PORTS facility. The first two area types (Types 1 & 2) are defined as areas with high archaeological potential and generally refer to all level or nearly level topographic landforms such as ridgetops, saddles, benches, and terraces. Type 3 areas are large expanses of side-slope between ridge tops and stream bottoms. Along the uninhabitable slopes in Type 3 areas, however, are smaller isolated landforms with archaeological potential. The SOW required such areas to be identified and systematically shovel tested. The two remaining area types include developed land with no archaeological potential (Type 4) and areas in which Phase II archaeological surveys have been completed (Type 5).

Previous surveys documented eight archaeological sites (33Pk204, 33Pk212-213, 33Pk215-216, 33Pk218, and 33Pk311-312) and the Holt Cemetery (33Pk214) within Survey Area 2. The current survey documented ten additional archaeological sites (33Pk344-33Pk353). Eleven of the Area 2 sites contain prehistoric temporal components (33Pk204, 33Pk213, 33Pk218, 33Pk311, 33Pk346-351, and 33Pk352), meaning they each contain at least one artifact that is from a prehistoric occupation. Sites 33Pk204 and 33Pk350 are stand-alone prehistoric isolated finds, and sites 33Pk213, 33Pk311, and 33Pk349 are prehistoric isolated finds located within historic-era farmstead sites. Each is represented by a single flint artifact. The prehistoric isolated finds are usually not considered to be significant archaeological sites and should not be considered for further investigation.

Five sites within Survey Area 2 are stand-alone prehistoric lithic scatter sites (33Pk346, 33Pk347, 33Pk348, 33Pk351, and 33Pk352) and one is a lithic scatter located within an historic-era farmstead (33Pk218). Most of these (33Pk346, 33Pk351 and 33Pk352) are small lithic scatters, each represented by three flint flakes. Like isolated finds, small lithic scatters are rarely considered to be eligible for the National Register of Historic Places (NRHP). Sites 33Pk346, 33Pk351, and 33Pk352 should not be considered for further evaluation.

Sites 33Pk347 and 33Pk348 produced much larger prehistoric assemblages, despite the same level of investigation as those sites with few artifacts. Both are located in close proximity to each other, but produced very different assemblages. Site 33Pk347 produced a broken projectile point or preform, nine flint flakes, and a single piece of FCR. Site 33Pk348 produced 43 pieces of FCR, a flint core, two unusual unifacial flake tools, and 13 flint flakes. The lithic debris from 33Pk347 represents the later stages of the lithic reduction process— probably the final stages of tool manufacture and/or tool maintenance. In contrast, the debris from 33Pk348 represents early and later stages within the lithic reduction process. The flake tools in the 33Pk348 assemblage are unusual and appear to be some sort of boring or drilling tool. Sites 33Pk347 and 33Pk348 have the potential to contain intact subsurface features and rich artifact assemblages. Additional fieldwork has the potential to yield information about how prehistoric Native Americans used the uplands in this part of Ohio. Both sites should be considered for further evaluation.

The prehistoric component of 33Pk218, a 19th century farmstead site, also produced a sizeable assemblage containing 15 flint artifacts, including a projectile point that might date to the Late Archaic period, and 57 pieces of FCR. However, this large prehistoric artifact assemblage is exaggerated when compared with other prehistoric sites within Survey Area 2, namely because of the differing densities of shovel testing used at each site: 33Pk218 was tested at a 5-meter interval whereas the current survey used a 15-meter interval on the other sites. With this in consideration, artifact density at 33Pk218 is similar to what was found at sites 33Pk346, 33Pk351 and 33Pk352. As such, the prehistoric component of 33Pk218 does not appear to be archaeologically significant and should not be considered for further evaluation.

Six of the sites within Survey Area 2 are historic-era farmstead sites (33Pk212, 33Pk213, 33Pk218, 33Pk311, 33Pk312, and 33Pk349) and one site is thought to be an early twentieth century recreational cabin. With the exception of 33Pk345 and 33Pk349, all were documented during previous surveys (Schweikart et al. 1997; Klinge 2001; Pecora and Burks 2012; 2013).

Site 33Pk345 is a twentieth century cabin site that appears to be a weekend camp or hunting camp, rather than a residential site. The cabin structure, which is nearly completely collapsed, is very small and does not have evidence of a fireplace or stove, as would be expected for a residential cabin. Moreover, the construction methods do not seem to exhibit the level of craftsmanship that is typical of nineteenth century cabins. The cabin is not indicated on the ca. 1905 and 1906 map resources, but is visible on the later 1938 and 1951 aerial photographs. This information suggests that it was constructed at some point between 1906 and 1938, probably after purchase of the land in 1923. Shovel tests excavated on a 5-meter grid within the cabin site area produced only six artifacts and no ceramics, which is contrary to what is commonly found at historic-era domestic sites. The cabin site does not appear to be eligible for the NRHP and should not be considered for further evaluation.

Site 33Pk349 is an historic-era farmstead. Historic maps reveal a farmstead at this location as late as 1906, but structures are completely absent by 1938. The current survey recovered a fairly sizeable assemblage of artifact types that are consistent with other domestic farmsteads sites within PORTS. Unlike most of the other known PORTS farmstead sites that were operating until the early 1950s, this farmstead was abandoned and razed much earlier. Although the land was reclaimed for cultivation by at least 1938, it is very possible that sub-plowzone shaft features and foundations are still intact. Site 33Pk349 should be considered for further evaluation.

Survey Area 2 also contains the Holt Cemetery (33Pk214), two historic-era dump sites (33Pk215 and 33Pk216), and two small historic-era scatters (33Pk344 and 33Pk353). The Holt Cemetery and the two dump sites were documented by Schweikart et al. (1997), and the cemetery was further investigated by Burks (2011). Of these five sites, only the Holt Cemetery is considered to be eligible for the NRHP.

In summary, Survey Area 2 contains 18 archaeological sites and the Holt Cemetery. Ten of these sites were identified and documented during the current survey effort. Of the ten newly documented sites, three (33Pk347, 33Pk348, and 33Pk349) have the potential to be eligible for inclusion into the NRHP. Phase II assessment studies, in concert with NHPA consultation, should be conducted at these locations. Continued NHPA consultation within regards to five previously documented farmstead sites (33Pk212, 33Pk213, 33Pk218, 33Pk311, and 33Pk312) and the Holt Cemetery (33Pk214) is encouraged.

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# INTRODUCTION

In February of 2012, Ohio Valley Archaeology conducted a Phase I archaeological survey of Survey Area 2, within the 3,777-acre Portsmouth Gaseous Diffusion Plant (PORTS), which is located approximately 3.0 miles south of Piketon in Pike County, Ohio. The work was completed at the request of Fluor B&W Portsmouth, LLC on behalf of the United States Department of Energy (DOE) and is part of an ongoing effort to document and evaluate archaeological resources within the PORTS reservation. The survey methods used in this effort are commensurate with the *Archaeology Guidelines* published by the Ohio Historic Preservation Office (OHPO 1994). While this effort focused on the identification and documentation of prehistoric archaeological sites, all archaeological resources regardless of age were documented when encountered.

## SURVEY AREA DESCRIPTION

Pike County is situated on the deeply dissected part of the Appalachian Plateau physiographic region (USDA-SCS 1990). This area is characterized by broad ridges and steep hills dissected by the numerous small tributaries that make up the Scioto River drainage system within the county. PORTS is located in the uplands adjacent to the east side of the Scioto River floodplain (Figure 1). Elevations in Pike County range from 500-600 feet AMSL in the Scioto River Valley to 1330 feet AMSL on Greenbriar Ridge (USDA-SCS 1990), and PORTS sits at elevations between approximately 640 ft AMSL and 880 ft AMSL. The Scioto River meanders to within 1-2 miles of the facility. Tributaries of the Scioto, including Big Run Creek, Big Beaver Creek, Little Beaver Creek, and numerous unnamed streams, drain the lands inside the PORTS boundary fence.

Survey Area 2 is bound by developed and undeveloped land in the northeast corner of PORTS. The topography of Survey Area 2 is dissected with broad, rolling ridgetops and saddles. The numerous stream channels range from narrow to broad and have steep-sided to gentle slopes.

By the early-to-mid nineteenth century, Survey Area 2 was timbered, cleared and used for cultivation and pasture. Timbering, field clearing, and subsequent cultivation and/or pasture use are damaging to prehistoric archaeological sites, especially in the dissected uplands where soil erosion is exasperated when the landscape is denuded of vegetation and poor cultivation methods are used. Prior to the development of soil conservation efforts in the early-mid twentieth century, farming produced the inevitable effect of soil erosion on narrow ridgetops and slopes.

The establishment and development of farmsteads is also potentially damaging to prehistoric archaeological sites. Historic-era home sites were frequently selected because they were high, dry, and protected from winds and weather patterns, and they had good sunlight exposure or provided a favorable vista. Prehistoric peoples frequently occupied these same landforms for the very same reasons. The historic-era construction of homes, barns, outbuildings, roadways, and other facilities displaced many prehistoric artifacts and excavated out subsurface features. The dense overlay and mixing of historic-era artifacts also makes it difficult to detect spatially coincident prehistoric sites.


Figure 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 the PORTS.

Not yet considered cultural or archaeological resources, the historic-era farmsteads within PORTS and Survey Area 2 were razed in the 1950s, after the Atomic Energy Commission (AEC) purchased the land. The use of bulldozers and graders to aid the demolition process is evident at many of the farmstead sites. This activity no doubt had an impact on the prehistoric archaeological sites where they coexisted with historic-era farmsteads.

More recent surface disturbance is also evident in Survey Area 2. Approximately 57.57 acres within this survey parcel is defined as having been developed and it has no potential for intact prehistoric archaeological sites. Numerous roadways and paths, old and new, traverse the ridges and slopes throughout Area 2. Many of the older roads and paths are probably associated with the historic-era farmsteads, but others may have been developed more recently in the last 60 years. The most recent paths are associated with monitor well installation and observation. The roadways, regardless of age, all potentially affected potential archaeological sites. However, their construction and use should not have been sufficient to completely erase archaeological resources. In fact, some roads provide a means for identifying artifacts in archaeological surveys because they provide good surface visibility.

Vegetation cover within Survey Area 2 at the time of the survey consisted mostly of secondary growth hardwood forest. Scrub growth, briars, and weeds are found along the margins of the woods, in the power line, and in or around the disturbed areas. Several large groves of planted pine trees also are present within Survey Area 2.

Five distinct soil map units occur in Survey Area 2 (USDA-SCS 1990). These include Omulga silt loam (OmB, 3-8% slope) in the lower area along the railroad grade, Rarden silt loam (RdC; 8-15% slopes) along the northern and eastern slopes, Latham-Whaton silt loams (LdD;15-25% slopes) along the south facing slopes, Coolville silt loam (CoB; 1-8% slopes) on the southern ridgetops, and Coolvile silt loam on the northern ridgetops (8-15% slopes). The ridgetops, saddles, and south facing benches and lower ridges contain relatively well-drained soils and have the highest potential to contain artifact-bearing archaeology sites.

## HISTORY OF SURVEY AREA 2

The Pike County property deed records reveal that much of the acreage within Survey Area 2 was transferred to private ownership from the United States Land Office in 1815 and in 1837. The 1859 Plat Map indicates that this portion of PORTS was divided into eleven separate parcels. At least seven houses are indicated on the 1905 Oil and Gas map, which is the earliest known map to depict structure locations. The 1906 Waverly, Ohio 15” USGS topographic map shows nine house locations.

The 1938/9 and 1951 aerial photographs show farmstead locations, farm fields, and wooded areas in Survey Area 2. In the 1938/9 aerial photographs there are at least five farmstead locations; three or four are visible on the 1951 aerial. Approximately two-thirds of Survey Area 2 was open farm field and/or pasture land and approximately one-third was wooded. The 1938 aerial photograph show two groves of planted trees, perhaps, orchards, in the survey area.

The 1952 Atomic Energy Commission (AEC) property map show nine separate property parcels within Survey Area 2. The AEC purchased these properties in the early 1950s.

## THE IDENTIFICATION OF PREHISTORIC ARCHAEOLOGICAL SITES

The purpose of the Survey Area 2 Phase I archaeological survey is to identify and document prehistoric archaeological sites using standard archaeological field methods. Although this survey focused primarily on the documentation of prehistoric archaeological sites, all previously unrecorded historic-era cultural resources were also documented when encountered. In a very general sense, an archaeological site is defined as a place where evidence of past human activity has been preserved. 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. Figure 2 depicts Ohio's prehistoric timeline with periods, sub-periods, and archaeological culture groups. 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, and in some cases multiple family groups appear to have coalesced into large residential groups during certain seasons. Group coalescence 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 be able 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. This settlement pattern was commonly observed by early Euro-American explorers who encountered Native American groups living in the interior of the continent. 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.

Prehistoric peoples engaged in a multitude of activities over the landscape beyond the residential sites. Whether permanently sedentary or residentially mobile, people had needs for various resources that were not locally available. Food and non-food resources are not ubiquitously distributed over the landscape and the procurement of these resources would have required specialized procurement forays by a subset of the group. For example, a group of hunters might leave the residential base camp for a few days to hunt deer. This would require the establishment of a short-term camp site at a location away from the residential base camp.

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, whether sedentary or residentially mobile, daily human activities results in the formation of archaeological sites. The construction of wooden post-supported shelters or houses, cooking and storage facilities, and other kinds of 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.

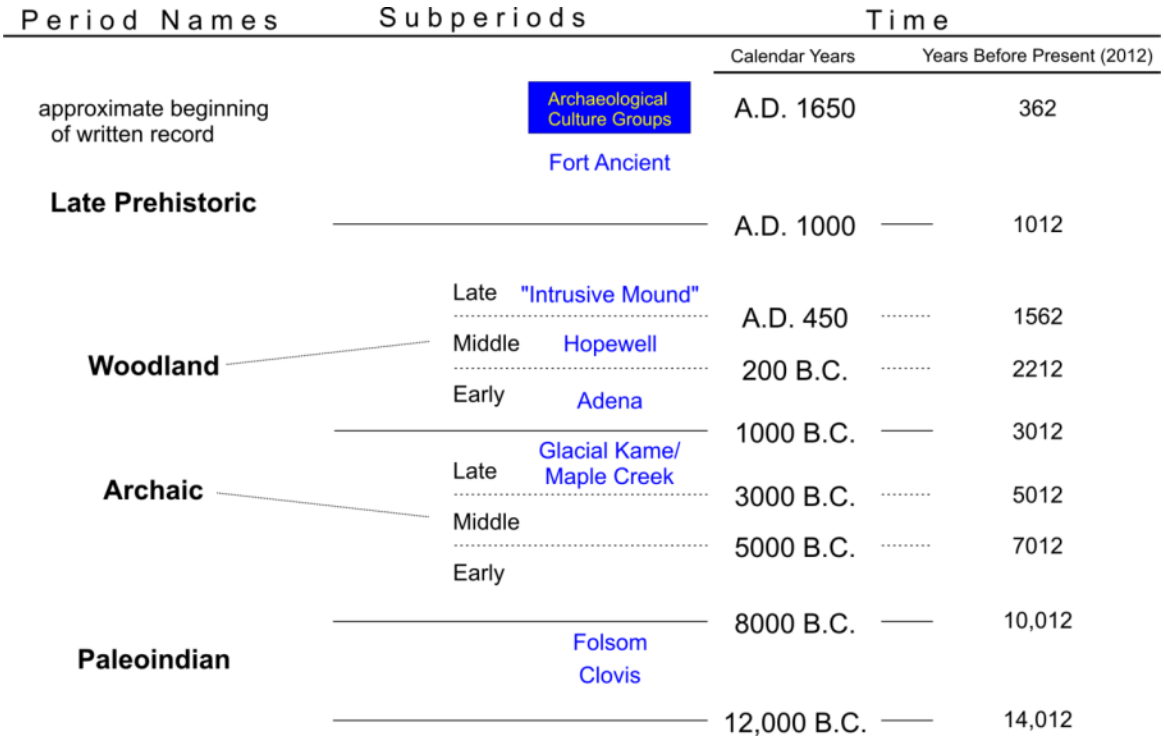


Figure 2. Ohio's prehistoric timeline (modified from Burks 2010).

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 rock, usually sandstone or igneous rock, that was used for cooking and warmth. 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 not as diagnostic as fractured igneous rock, 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, animal 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 of the presence of an archaeological site. These are the things that archaeologists typically seek out when conducting a survey to look for archaeological sites. The archaeological field methods used during such a survey 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 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.

An archaeological site or resource's visibility is directly related to the methods used to look for it. Archaeological sites with abundant quantities of FCR and lithic debris have low visibility when survey methods are limited to a visual inspection of a leaf-covered ground surface in a wooded area, but the same artifacts and sites are highly visible in a recently cultivated farm field that has been left to weather under several heavy rains. The archaeological visibility of a site in a wooded area, however, is improved when the field methods are shifted to systematic screening of the earth beneath the leaf litter. Therefore, archaeologists routinely adapt their field methods to accommodate the local conditions of the survey area and maximize their chances for encountering the archaeological resources that they are trying to locate and document.

Using standard, acceptable archaeological field methods, it is very difficult to locate archaeological sites that contain few artifacts. Prehistoric people often lived and carried on their normal daily activities without leaving behind abundant quantities of lithic debris and FCR. The production of lithic debris, for example, requires access to a useful flint source. Since flint is a relatively heavy stone, ancient stone-workers usually left most of their waste at or near their stone quarries (Pecora 2002). The archaeological effect of this is that stone-tool-making debris is often harder to find away from stone acquisition sites simply because stone tool manufacture, use, and maintenance produce negligible quantities of debris after the flint is transported away from its source.

The following discussion presents ideas about prehistoric stone use and the formation of lithic and FCR assemblages. The purpose of this discussion is to demonstrate how artifacts are created and how the organization of the technologies and different behaviors affect site formation and our ability to identify archaeological sites on various points on the landscape.

## THE FORMATION OF LITHIC ASSEMBLAGES AND ARCHAEOLOGICAL VISIBILITY

Figure 3 depicts an idealized stone tool manufacture, use, and maintenance sequence for a single spear point. 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 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 to make drills, borers, scrapers, and cutting tools. Assuming that a projectile moves through a sequence like that shown in Figure 3, making it all the way to the discard of a thoroughly reworked point, none of the point's intermediate stages would ever end up in the archaeological record. Archaeological evidence, however, reveals that the reduction sequence was frequently interrupted or aborted at several of the stages depicted in Figure 3 and the tools entered the archaeological record without being totally used up.

This dynamic process of making and rejuvenating stone tools such as projectile points can complicate archaeologists' efforts to study the lithic reduction process. The complication is compounded by the spatial disconnect between the quarry 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 the reduction sequence would have been performed at the quarry site to prepare the stone to be transported as flake blanks, biface blanks, or preforms. Removing all of the excess waste materials created during primary reduction would have made it easier to transport more useful stone and 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, 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 lithic reduction sequence depicted in Figure 3 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 affect on the quantity of debris produced at those locations.

Figure 4 visually models the amount of lithic debris created experimentally while replicating the reduction stages presented in Figure 3. Each circular tile represents the quantity of debris generated each successive stage of reduction and excludes all debris generated from previous stages. Debris quantity is important because it is directly related to archaeological visibility. This figure also depicts two size ranges. The larger size range (shown in red) includes pieces 0.5-1 inches in size and the smaller size range (shown in black) are pieces 0.25-0.5 inches in size. All stages of reduction produced abundant quantities of debris smaller than 0.25 inches, but this size range is usually not recovered during archaeological investigations because of the size of the screen mesh used to sift the soil. Nevertheless, the trend depicted in Figure 4 does not change with the inclusion of the smallest size range. The amount of debris produced during the reduction sequence drops off quickly.

Figure 4 illustrates how archaeological visibility, or the ability to identify lithic debris using standard and acceptable survey methods, is affected as the stone tool manufacturing, use, and maintenance sequence is partitioned at various places on the landscape. The first tile in the upper left depicts all debris (>1/4-inch) generated from a complete reduction sequence (Stage 1-12). As the debris from each previous stage is excluded, the quantity of debris decreases substantially. This implies that lithic debris quantity and, hence, archaeological visibility has the potential to decrease considerably with increased distance from the raw tool-stone quarry source. A cursory examination of the current Ohio Archaeological Inventory would support this trend—sites farther away from the quarries have less lithic debris while those closer to the quarries have lots of debris. And consequently, far more prehistoric domestic sites have been documented in counties with abundant primary geological flint sources, such as Licking, Delaware, and Muskingum Counties, than in counties with no primary geological flint sources. The archaeological sites in flint-rich counties are easier to find because they have more artifacts on them. This is important to remember as we consider the research design and results of the survey at PORTS because Pike County is a flint-poor county.

Prehistoric stone workers also had the ability to transport large quantities of partially reduced stone for domestic use and trade (Pecora 2002). The importation of prepared raw flint nodules or even prepared cores would increase the potential for debris accumulation at domestic sites located in flint-poor areas. While this strategy was employed at various places and times throughout Ohio's prehistory, it did not occur frequently enough to create a ubiquitously dense concentration of lithic debris over the entire state. Instead, it appears that most stone workers transported blanks, performs, and finished tools to flint-poor regions and used small secondary geological flint sources (such as streambed gravels) when encountered.

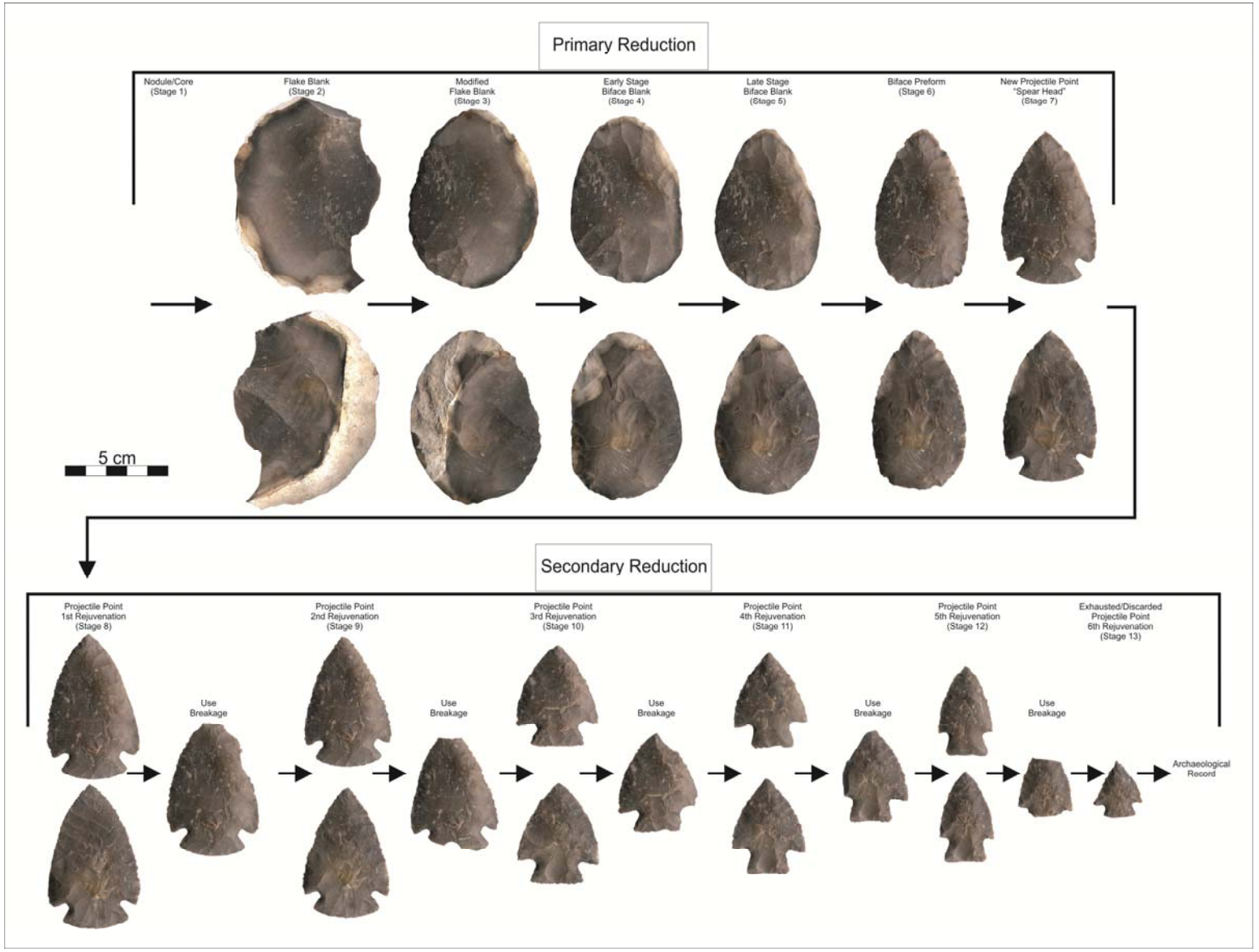


Figure 3. Illustration of replicated lithic tool manufacture, use, and maintenance sequence.

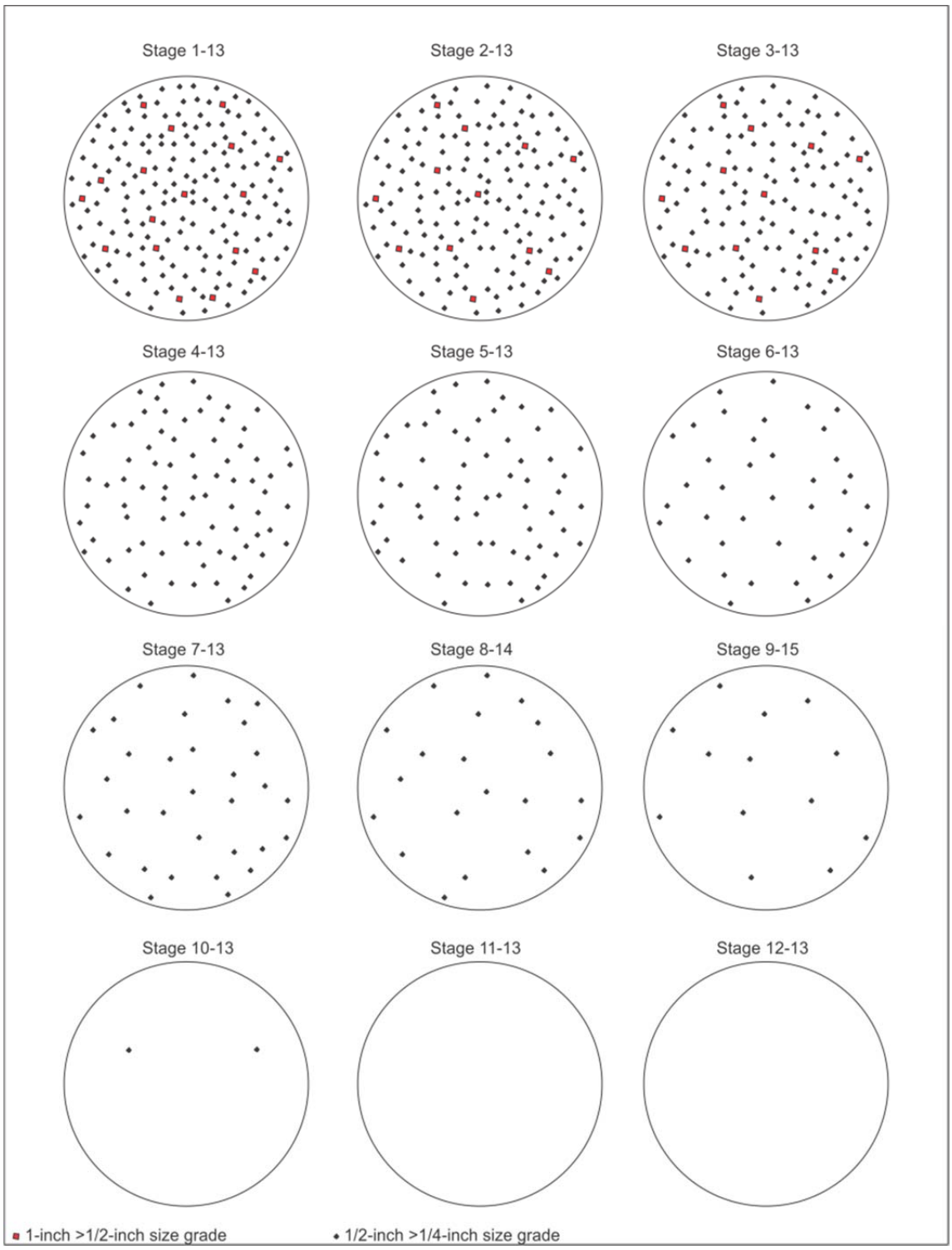


Figure 4. Schematic illustration depicting modeled lithic debris density.

## THE FORMATION OF FIRE-CRACKED ROCK AND ARCHAEOLOGICAL VISIBILITY

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 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 for heating beds (e.g., 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 flint, which tends to occur 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 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.

## ARCHAEOLOGICAL SURVEY IMPLICATIONS FOR PORTS

The ability to identify prehistoric sites is dependent on the presence of sufficiently detectable quantities of lithic debris and/or FCR. Most other artifact types occur in such low frequencies that they are not reliable indicators for most prehistoric domestic sites. Rare or low-frequency items such as tools or other types of formed artifacts (e.g., cores, biface blanks, and preforms) are frequently found using standard survey methods but their discovery is usually happenstance. Likewise, standard archaeological survey methods are not designed to identify

archaeological features, such as hearths, earth ovens, post molds, or storage pits, especially when they occur in low frequencies. The recovery of pottery at the survey level of investigation is important, but is dependent on the age of the archaeology sites since pottery was not widely used until around 1500-1000 B.C.

FCR is a particularly important site indicator because it reveals that the site occupants were creating and using substantial thermal features. These features, especially earth ovens, are important archaeological resources because they often contain carbonized food and wood remains that can be used to obtain radiometric dates and make inferences about diet, seasonality, and the kinds of plants that were growing in the area around the site. Thermal features are also frequently associated with other types of features, such as storage pits and the postholes that once held the wall posts of shelters or houses. Most prehistoric domestic activities, including the construction and use of thermal cooking facilities, food preparation, tool use and maintenance, and other daily life-ways, can occur in the absence of appreciable quantities of lithic debris. FCR, however, is expected at any location where domestic activities occurred. Even a short term hickory nut processing camp might contain FCR, as thermal facilities were frequently used to render nut oil.

The PORTS prehistoric settlement survey was not expected to result in the identification of many prehistoric archaeological sites. If found such sites were expected to be low density lithic debris scatters and isolated finds. This is because this region of Ohio contains very little raw material for tool manufacture, which is the principal source of lithic debris. Because there are no primary geological flint sources in Pike County, Ohio (Stout and Schoenlaub 1945), stone use would have been limited to poor-quality flints from secondary alluvial sources or imported stone from better quality primary sources outside the county. Lithic debris is expected to occur in low frequencies and represent the use of local flints obtained from the Scioto River bed, a secondary geological source for a variety of small flint nodules. Potential flint types from the Scioto River may include Delaware, Upper Mercer, Vanport, Brassfield/Brush Creek, and Zaleski, all of which crop out in the counties surrounding Pike County. If flint artifacts made from non-local materials are found within PORTS, they will likely consist of exhausted and recycled tools, and very little lithic debris. With this in mind, it is important to remember that low-density lithic debris scatters within PORTS are not necessarily an indicator of ephemeral prehistoric activity. Instead, they may indicate that groups living and working in the PORTS area only engaged in the later stages of the lithic reduction process.

FCR may also be rare because sandstone was the primary rock type available for use as thermal stone, and fire-cracked sandstone is not as durable as igneous or metamorphic FCR. If classic igneous or metamorphic FCR is found, it would indicate an unexpected level of effort since this type of stone would have to have been imported into the area from the Scioto floodplain. In the event that a site within PORTS contains an appreciable quantity of FCR, especially if metamorphic or igneous, the site should be considered for further evaluation.

## ARCHAEOLOGICAL SURVEY METHODS

In advance of the PORTS prehistoric archaeology site survey, Ohio Valley Archaeology, Inc. was commissioned by Restoration Services, Inc, to create a methodology that would effectively examine the undeveloped portions of the 3,777-acre facility. This resulted in the identification of five area types (Type 1-5) within PORTS. The definition (location, shape, etc.)

of these areas was derived using high resolution aerial photographs, LiDAR topographic data (which shows areas of obvious topographic disturbance), 7.5 minute and 15 minute USGS topographic quadrangle maps, and Phase II-farmstead archaeology reports. Although the field methods used in this survey follow standard and acceptable methods outlined in the *Archaeology Guidelines* (OHPO 1994), these methods were adjusted to each of the color-coded area types (Type 1-5) based on their archaeological potential.

Type 1 areas within Survey Area 2 have the highest potential for prehistoric archaeology sites and generally include all benches, terraces, edges, and toe-slopes overlooking streams that have not been previously affected by PORTS development.

Type 2 areas are defined as areas that may contain prehistoric archaeological sites and include ridgetops and saddles. While these areas may have experienced varying degrees of erosion, they have the potential to contain the archaeological remains of any prehistoric occupations that might have occurred there. Unless obvious signs of massive disturbance (i.e., entire landforms have been removed or altered, but not already identified as a Type 4 area) were encountered, Type 2 areas were fully surveyed.

Type 3 areas have a moderate to low potential for prehistoric archaeological sites, but these areas contain micro-landforms that have better archaeological potential. Such micro-landforms may include small elevated landforms (ridges and hummocks) in stream valleys or small benches and toe-ridges on side slopes.

Type 4 areas are defined as land that has been heavily modified in modern times. While these areas were visually examined, they were not surveyed. Due to the nature of the surface disturbance in these areas, they were not resurveyed.

Type 5 areas were intensively surveyed during the Phase II historic-era farmstead projects; they were not re-surveyed.

Type 1 and 2 areas were surveyed using traditional 50x50 cm shovel tests (no more than 1 ft deep, per PORTS procedures) on a 15-meter interval. When a small landform was encountered (i.e., one too small to contain shovel tests at a 15-m interval), the shovel test interval was reduced to adequately cover that landform. The goal was to cover the highest probability areas of all high-potential landforms.

Survey work in Type 3 areas began with a pedestrian survey along transects spaced 15 meters apart. The goal of the pedestrian survey was to identify micro-landforms (i.e., small hummocks and terraces in wet floodplains or small benches and toe-ridges on side slopes) and other possible cultural features, such as components of old farmstead sites not yet documented. When micro-landforms were encountered, shovel tests were excavated at an adequate interval (not exceeding 15 meters) to cover the landform.

In groups of positive shovel tests (i.e., a site), radial shovel tests spaced at 7.5-meter intervals were excavated around the perimeter of the positive shovel test group. A minimum of four radial shovel tests were excavated around isolated finds and in instances where only two or three positive units were encountered. Radial shovel tests were not excavated around positive shovel tests with only modern artifacts (e.g., modern beer bottle fragments or shotgun shells).

A GPS unit was used to map all shovel tests, photograph locations, relevant features (e.g., roads, monitoring wells, etc.), disturbed areas, and archaeological sites. The fill from all shovel tests was screened through ¼-inch mesh and the depth, color, and depth of the A-horizon was documented on shovel test forms.

When archaeological sites were found, a *Field Site Form* with site specific information was filled out and a map of the site area was created showing the locations of the shovel tests relative to landscape features, including roads and bluff/terrace edges. When possible, a GPS was used to walk around the approximate edge of the site.

This systematic Phase I survey has the primary goal of locating prehistoric archaeology sites. Integral to adequately documenting such sites is the ability to recognize and record fire-cracked rock and fire-reddened rock (primarily sandstone). The current survey was sensitive to identifying such rock, as well as flint flakes and other prehistoric artifacts. Prior to the current survey, which is primarily oriented towards the identification of prehistoric sites, DOE conducted several other surveys, including a sample Phase I survey of PORTS (Schweikart et al. 1997), and more recently a Farmstead Reconnaissance survey, and Farmstead Phase I and Phase II survey work. All of these survey efforts documented and investigated several archaeological sites within Survey Area 2. The farmstead sites and historic cemetery documented during the previous surveys were found with the aid of historic map resources and aerial photographs, all of which date to about 1900 and later. Any historic farmstead or building locations within Survey Area 2 that were razed prior to 1900 would not be depicted on the map resources. The current survey made an effort to locate and document such sites.

## PREVIOUS SURVEYS

Nine archaeological sites have been recorded in Survey Area 2 during previous archaeological work. Schweikart et al. (1997) documented three farmstead sites (33Pk212, 33Pk213, 33Pk218), the Holt Cemetery (33Pk214), two historic-era dump sites (33Pk215 and 33Pk216), and a prehistoric isolated find (33Pk204) within the acreage that makes up Survey Area 2. Schweikart et al. (1997) concluded that the two historic dump sites and prehistoric isolated find are not eligible for inclusion into the National Register (NRHP), but recommended Phase II NRHP assessment studies at the three farmstead sites and recommended preservation and avoidance for the Holt Cemetery. Subsequent consultation with the Ohio Historic Preservation Office concluded that the Holt Cemetery is eligible for inclusion into the NRHP. A geophysical survey was conducted on the cemetery in an effort to locate unmarked graves (Burks 2011).

Since the original 1997 survey, two additional farmstead sites (33Pk311 and 33Pk312) were documented within Survey Area 2 (Pecora and Burks 2012). To date, Phase II NRHP assessment studies have been completed on three of the farmstead sites (Pecora and Burks 2013; Klinge 2009). Klinge concluded that farmstead sites 33Pk212 and 33Pk213 are not eligible for the NRHP. A Phase II assessment study was also completed on site 33Pk218 (Pecora and Burks 2013) and an "enhanced" Phase I-level documentation on sites 33Pk311 and

33Pk312 (Pecora and Burks 2012). These authors concluded that these sites may not be individually eligible for the NRHP, but they each represent a component of a late nineteenth to mid twentieth century rural farming community in Pike County, Ohio that is uniquely preserved by virtue of being part of PORTS. The PORTS farmstead sites offer a unique opportunity for community-level archaeological and historical research in southern Ohio. Although Pecora and Burks (2012) do not recommend additional archaeological fieldwork, they recommend further consultation with the Ohio Historic Preservation Office and other consulting parties regarding the future treatment of these archaeological resources.

Based on the historic map and aerial review, and recent archaeological work, it is clear that historic-era activity has occurred within Survey Area 2 since at least 1815. Land surveys must have been conducted to divide the original sections into various parcel sizes by at least 1859 (the age of the earliest map investigated for this report), but probably much earlier. Initially the land was probably timbered, but once the several farms were developed, much of the land was put under cultivation until the 1950s when it was purchased by the Atomic Energy Commission. During and after the 1950s, all of the PORTS farmsteads were razed, leaving only foundation remains and associated historic-era archaeological deposits. Several of the farmsteads have been completely erased from the landscape by a large borrow area located in Survey Area 2. Other surface disturbance includes old and recent dirt roadways along the ridgetops and side-slopes and a large power line corridor.

Despite the historic-era activity that has occurred within Survey Area 2 over a period of at least 200 years, the historic-era surface disturbances have not been severe enough to erase prehistoric archaeological remains, with the exception of the large borrow area. The previous archaeological investigations within Survey Area 2 did find a few prehistoric artifacts. The 1997 survey found a single piece of flint shatter at 33Pk204 (Schweikart et al. 1997). The Phase II investigation of the 33Pk218, however, resulted in the recovery of 72 prehistoric artifacts and the intensified Phase I documentation of the 33Pk311 recovered a single prehistoric flint flake. Fifty-seven of the artifacts from 33Pk218 are classified as sandstone FCR and the remaining artifacts include eleven flint flakes, a possible Late Archaic-period beveled projectile point (Lamoka Type?), a modified flake tool, a flint cobble, and a unifacial scraping tool. Considering that 397 shovel tests were excavated at 5-meter intervals over this site, the 33Pk218 prehistoric artifact assemblage is very small. A more thorough discussion of the 33Pk218 and 33Pk311 prehistoric components is presented in the *Archaeological Survey Results* section of this report.

## ARCHAEOLOGICAL SURVEY RESULTS

A total of 1360 shovel tests were excavated on all level and nearly level land, especially along the ridgetops and saddles within Survey Area 2. A pedestrian survey along the slopes was conducted in an effort to locate benches and terraces which, when encountered, were systematically shovel tested. Several shovel tests were also excavated in the borrow area located in the survey area. These verified that the borrow area is void of A-horizon soils and demonstrates that this area has no potential for archaeological resources.

Only 54 (4%) of the 1380 shovel tests excavated Survey Area 2 produced artifacts. These include 82 prehistoric and 66 historic-era artifacts. These artifacts were found in 10 discrete clusters, each of which is defined as an archaeological site.

### SURVEY AREA 2 ARCHAEOLOGICAL SITE DESCRIPTIONS

Past and present surveys documented 18 archaeological sites and the Holt Cemetery within Survey Area 2. Table 1 summarizes all known archaeological sites documented in Survey Area 2 and provides information about site type, temporal components, and level of investigation to date. Seven of these sites (33Pk204, 33Pk212, 33Pk213, 33Pk214, 33Pk215, 33Pk216, and 33Pk218) were originally recorded during a 1996/1997 survey and are described in a report by Schweikart et al. (1997). Three of these sites are historic-era farmstead sites (33Pk212, 33Pk213, and 33Pk218), one is the Holt Cemetery (33Pk214), two are historic-era trash dumps (33Pk215 and 33Pk216), and one is a prehistoric isolated find (33Pk204). Subsequent survey work that was focused on locating historic-era archaeological sites from historic map resources documented two additional farmstead sites (33Pk311 and 33Pk312) in Survey Area 2 (Pecora and Burks 2012). Although 33Pk213, 33Pk218, and 33Pk311 are historic-era farmstead sites, they also contain prehistoric temporal components. The prehistoric components from these sites are described herein.

The current survey recorded 10 additional archaeological sites within Survey Area 2. These include five prehistoric lithic debris scatters (33Pk346, 33Pk347, 33Pk348, 33Pk351, and 33Pk352), two historic-era artifact scatters (33Pk344 and 33Pk353), a historic-era cabin site (33Pk345), and one historic-era farmstead site (33Pk349), and one isolated find (33Pk350). The farmstead site (33Pk349) also contains a prehistoric isolated find. Each of these sites, in addition to the prehistoric components of 33Pk213, 33Pk218, and 33Pk311, are described as follows.

Table 1. Summary of archaeological sites within Survey Area 2.

| Site | Survey | Survey Type | Site Type | Historic-era Temporal Component | Prehistoric Temporal Component |
|---|---|---|---|---|---|
| 33Pk204 | Schweikart et al. 1997 | Phase I | Isolated Find | - | X |
| 33Pk212 | Schweikart et al. 1997<br>Klinge 2009 | Phase I&II | Farmstead | X | - |
| 33Pk213 | Schweikart et al. 1997<br>Klinge 2009 | Phase I&II | Farmstead | X | X |
| 33Pk214 | Schweikart et al. 1997 | Phase I | Holt Cemetery | X | - |
| 33Pk215 | Schweikart et al. 1997 | Phase I | Dump Site | X | - |
| 33Pk216 | Schweikart et al. 1997 | Phase I | Dump Site | X | - |
| 33Pk218 | Schweikart et al. 1997<br>Pecora and Burks 2013 | Phase I &II | Farmstead | X | X |
| 33Pk311 | Pecora and Burks 2012 | Enhanced Phase I | Farmstead | X | X |
| 33Pk312 | Pecora and Burks 2012 | Enhanced Phase I | Farmstead | X | - |
| 33Pk344 | Current | Phase I | Artifact Scatter | X | - |
| 33Pk345 | Current | Phase I | Cabin Site | X | - |
| 33Pk346 | Current | Phase I | Lithic Scatter | - | X |
| 33Pk347 | Current | Phase I | Lithic Scatter | - | X |
| 33Pk348 | Current | Phase I | Lithic Scatter | - | X |
| 33Pk349 | Current | Phase I | Farmstead | X | X |
| 33Pk350 | Current | Phase I | Isolated Find | - | X |
| 33Pk351 | Current | Phase I | Lithic Scatter | - | X |
| 33Pk352 | Current | Phase I | Lithic Scatter | - | X |
| 33Pk353 | Current | Phase I | Artifact Scatter | X | - |

## Site 33Pk213

Site 33Pk213 is an early twentieth century historic-era farmstead that was originally documented by Schweikart et al. (1997). A Phase II NRHP assessment study recently was conducted at site 33Pk213 by Klinge (2009), during which 19 square meters of earth was excavated across sixty 50x50 cm shovel tests on a 7.5 meter grid. The shovel tests covered an area of approximately 3,000 square meters. Four 1x1 meter excavation units were strategically placed to investigate historic-era architectural features. Although the Phase II investigation recovered 1961 artifacts, all but one date to the nineteenth and twentieth centuries and consist of glass, ceramic, nails, and other farmstead-related items.

The prehistoric component of 33Pk213 is represented by a single projectile point tip fragment made from Delaware/Columbus flint (Klinge 2009). Technically, this artifact represents a prehistoric isolated find, as no other prehistoric artifacts were found at this location despite intensive archaeological investigation on a fairly close testing interval. If this single artifact represents a prehistoric domestic site, the occupation did not involve much of any stone tool manufacture, use, or discard. If a significant amount of stone tool reduction did occur at this location, then it is represented by the later stages as represented in Figure 3. Klinge (2009) makes no mention of the presence or absence of FCR. It is also possible that the projectile point tip from 33Pk213 represents breakage from use while hunting. Either the remainder of the projectile point was also lost or discarded at this location but remains unfound or it was retrieved for rejuvenation or recycling. The prehistoric component of 33Pk213, as currently defined, is not a significant archaeological resource.

## Site 33Pk218

The prehistoric component of 33Pk218 is located within an early twentieth century farmstead that was recorded by Schweikart et al. (1997). An intensive Phase II NRHP assessment was conducted on the farmstead component by Pecora and Burks (2013).

The Phase II study involved the excavation of 111 square meters, including (1) 396 shovel tests excavated on a five and ten meter grid covering approximately 15,000 square meters and (2) twelve 1x1 meter units that were excavated in an effort to investigate architectural features associated with the farmstead (Figure 5). The historic-era features include the house foundation walls, a landscape-retaining wall, a pit cellar on the interior of the house foundation, and a privy. These excavations resulted in the recovery of 927 historic-era artifacts consisting of glass, ceramics, nails, metal, and other items.

Sixteen of the shovel tests and 12 of the 1x1 meter units excavated within the farmstead also produced 72 prehistoric artifacts consisting of 15 lithic artifacts and 57 pieces of sandstone FCR. The prehistoric origin of the FCR from this site is questionable, since the historic-era farmstead contains an abundance of sandstone building-stone.

The lithic artifacts include four formed artifacts and eleven pieces of lithic reduction debris made from Vanport, Upper Mercer, Delaware, Brassfield, Paoli, and unknown flints. Excluding the Paoli flint, all of this material was available to prehistoric inhabitants in the region in the form of small nodules along the Scioto River, which is located approximately 5.9 km to the west. The Paoli flint, if accurately identified, would have come from Carter County, Kentucky, which is located approximately 60 km to the south, but would have also been in secondary geological deposits along the Ohio River, approximately 33 km to the south.

The lithic debris includes an interior flake, and early biface thinning flake, two late biface thinning flakes, two pressure flakes, and five flake fragments and shatter. Formed artifacts include a small flint nodule, a uniface scraper-like tool, a modified flake tool, and a projectile point (Figure 6). The projectile point lacks it base, which probably broke from use, but it resembles the Late Archaic period Lamoka type. Lamoka type projectile points are reported to date to 3500-1800 B.C. (Justice 1987).

Excluding the single flint nodule, the absence of flint with cortex in this assemblage reveals that it was produced from the later stages of stone reduction, which is also indicated by a relatively high percentage (67% of the diagnostic lithic debris) of late biface thinning and pressure flakes. The flint nodule, which is probably from the Scioto River, however, indicates that flint was also introduced to the site in an unmodified form. Despite this evidence, none of the flint debris in this assemblage was detached from a raw flint nodule. The lithic reduction process represented in this small assemblage suggests the later stages of stone tool manufacture, use, and maintenance. If so, this would potentially account for the low artifact frequency at this location. If the FCR is true thermal stone used by the prehistoric inhabitants of this site, then its presence indicates the construction and use of thermal features such as earth ovens or hearths.

If stone-lined hearths were used at this site, it is not likely that they have survived as they tend to be very shallow. Natural geological processes followed by nineteenth century land clearing and the early twentieth century farmstead construction and use would have erased shallow hearth features from the landscape. Earth ovens tend to be larger and deeper and have

greater potential for persisting in the archaeological record. It is possible that 33Pk218 contains the remains of one or two earth oven features, assuming that such features were used at this location.

Given the current site data, the prehistoric component of 33Pk218 appears to be a small, low density lithic debris scatter with potentially one or two possible thermal features. It took a tremendous amount of excavation (111 $m^2$) to recover only 15 verifiable prehistoric artifacts. Most of the prehistoric artifacts are from the central part of the farmstead area.

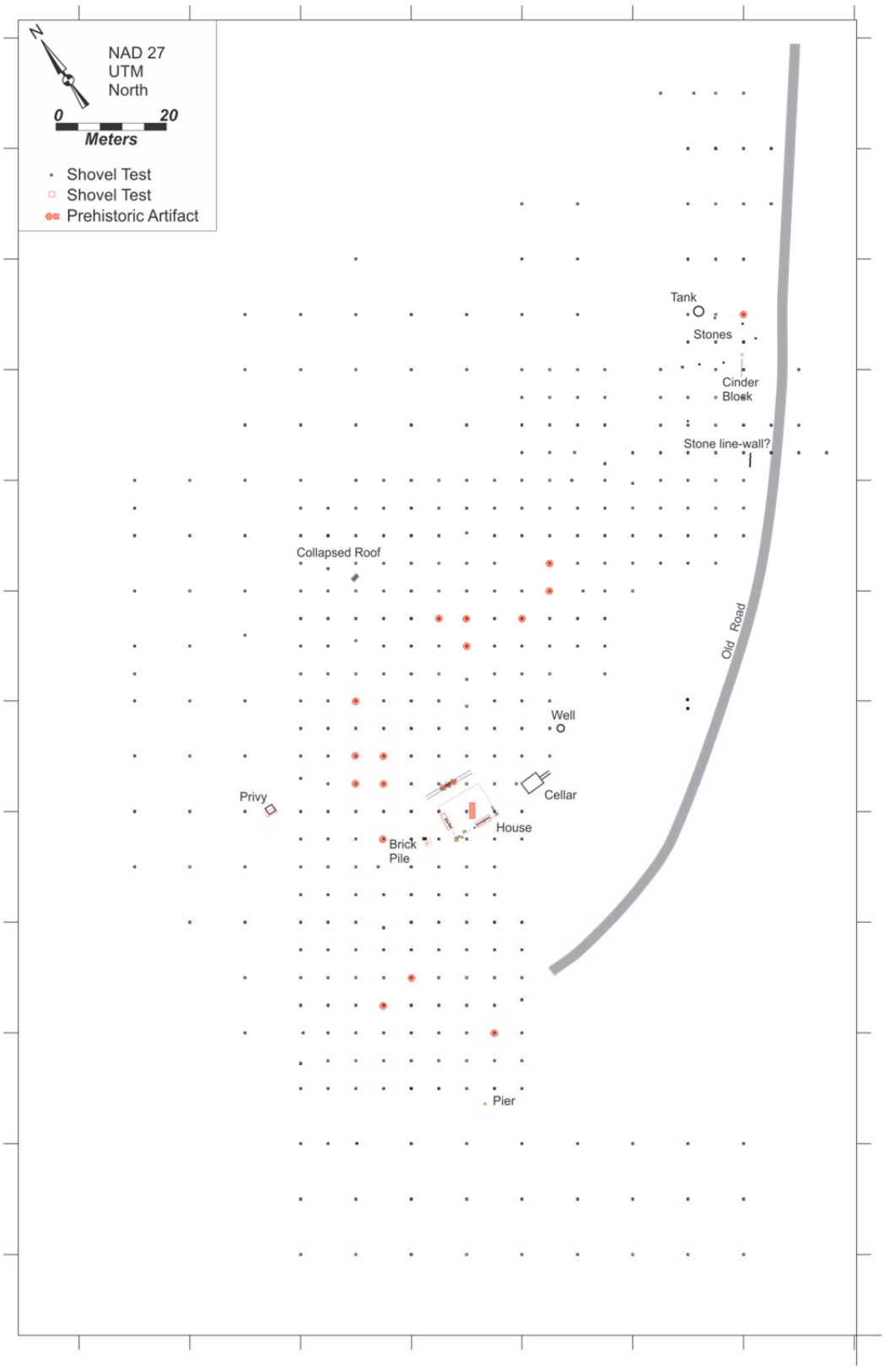


Figure 5. Site map showing prehistoric artifact locations within site 33Pk218.

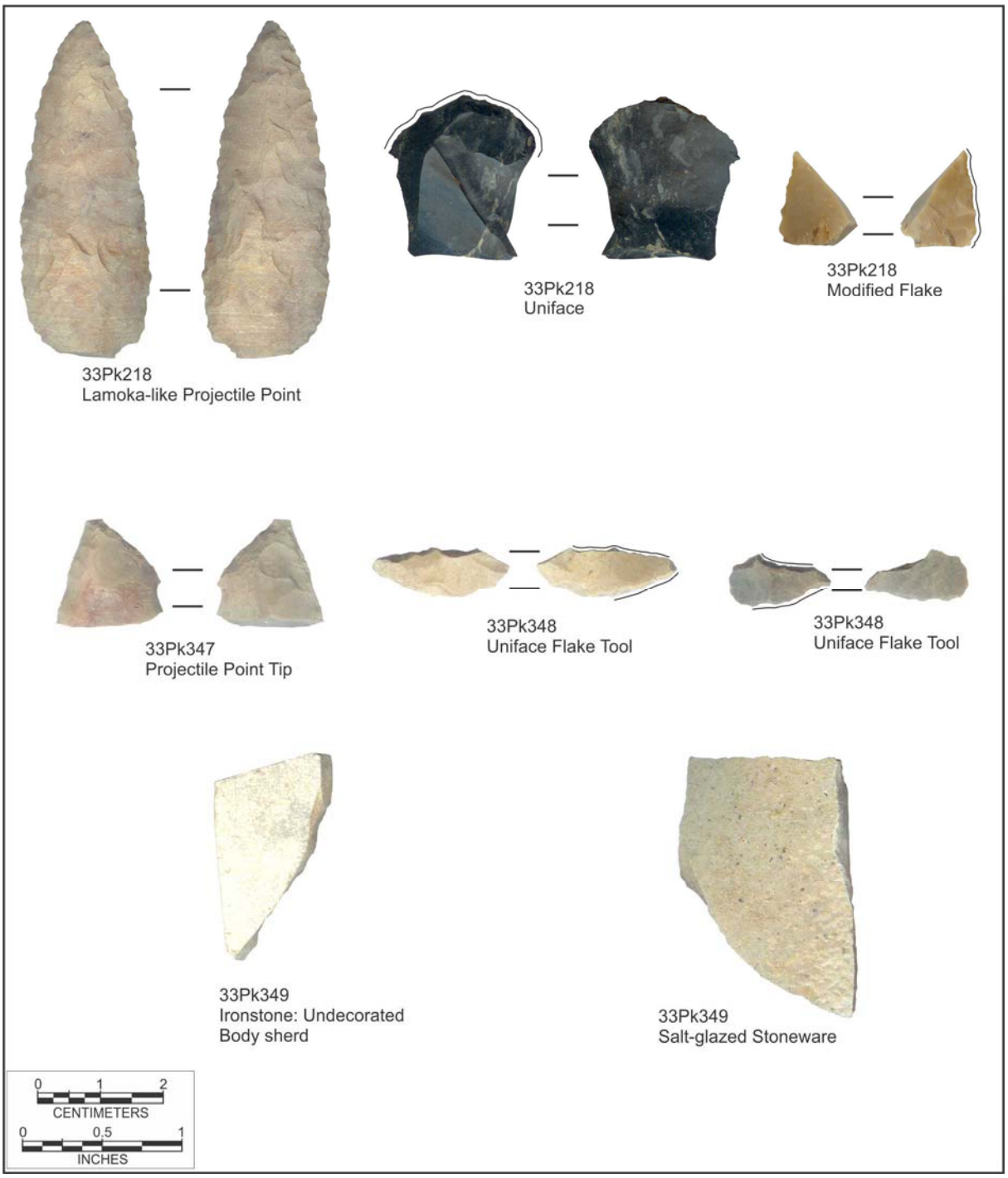


Figure 6. Selected artifacts recovered from Survey Area 2.

## 33Pk311

The prehistoric component of 33Pk311 is located within a late nineteenth to early twentieth century farmstead that was recorded by Pecora and Burks (2012) during an enhanced Phase I-level documentation effort at four of the PORTS farmstead sites (Figure 7).

The Phase I-level study involved the excavation of 142 shovel tests (35.5 $m^2$) on a five and ten meter grid covering an approximately 7,500 square meter area that defines the limits of the farmstead (Figure 7). The purpose of the shovel testing was to sample the historic-era artifact midden associated with the farmstead. This survey resulted in the collection of 372 historic-era artifacts consisting of glass, ceramics, nails, metal, and other items (Pecora and Burks 2012).

A single prehistoric artifact, a flint flake made of Delaware flint, was also recovered during the shovel testing at 33Pk311. This prehistoric artifact was recovered from a shovel test on the southeastern part of the farmstead, east of the house foundation. Technically the prehistoric component at 33Pk311 is an isolated find, as no other prehistoric artifacts were found despite a fairly intensive shovel testing effort. The flint flake from this location is classified as an interior flake, meaning it does not have cortex on its dorsal surface and does not have technological attributes that indicate that it was removed from a biface-shaped object. Interior flakes are created during the earliest stages of the reduction process and can be detached from flint cores or nodules, or from the earliest stages of biface reduction prior to when the biface is formed (see Figure 3). It is nearly impossible for a stone worker to detach just a single flake and it is improbable that a prehistoric stoneworker would do so at a location, such as at 33Pk311, and then move on. Instead, it is more probable that a very small amount of stone working occurred at this location during a brief occupation, probably while one or a few people were out hunting or extracting some seasonally available resource.

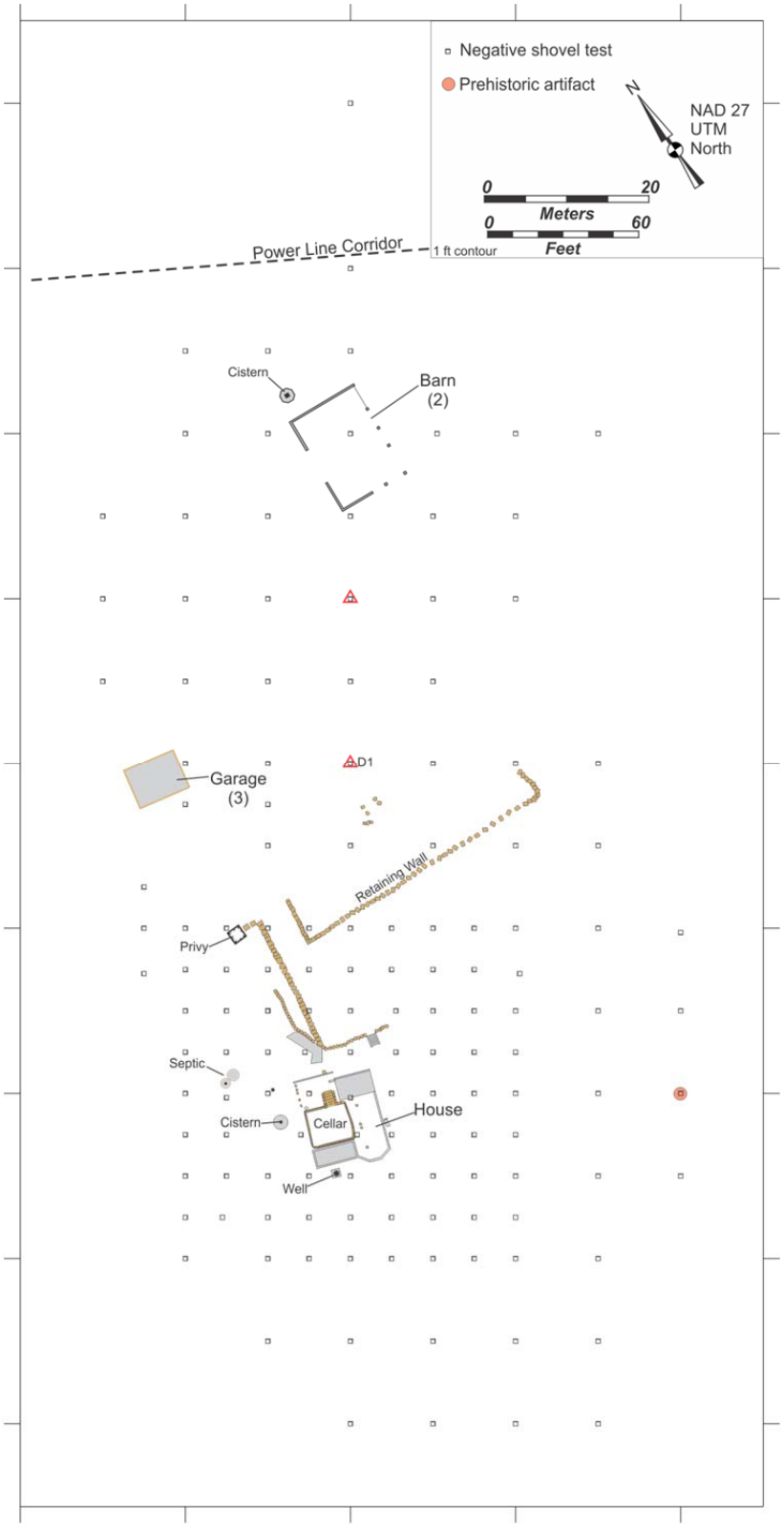


Figure 7. Site map showing prehistoric artifact locations within site 33Pk311.

## 33Pk344

Site 33Pk344 is the first previously unrecorded archaeological site identified in the current survey. It is a small historic-era artifact scatter. This small historic-era artifact scatter is represented by 18 artifacts from four positive shovel tests (Table 2).

Functional artifact groups represented by this assemblage include Architectural (n=7, 39%), Kitchen (n=10, 56%), Miscellaneous metal (n=1, 6%). Ceramic artifacts include a stoneware sherd and six undecorated ironstone sherds. The single grey-bodied stoneware sherd has a salt-glazed exterior and Albany-slip interior. The glass artifacts are classified as window pane sherds (n=3) and container glass sherds (n=3). The metal artifacts include three cut square nails, a corroded nail, and an unidentified metal fragment.

The historic map resources and aerials do not reveal a structure at this location. The site area is obscured by dense tree cover on the 1938 and 1951 aerials. The ca. 1905 Oil and Gas Lease map indicates that 33Pk344 is located on what was the Hunt property. Today the Hunt house location is a large soil borrow area.

Site 33Pk344 appears to be a small household refuse dump with artifacts that date as far back as the mid-nineteenth. It is improbable that this assemblage represents a residential site that was razed prior to when the early twentieth century maps were made, given the small assemblage size. 33Pk344 does not appear to be a significant archaeological site and should not be considered for further evaluation.

Table 2. Artifact inventory from 33Pk344.

| Functional Group | Material | Type | Subtype | Description | Decoration/Comments | n |
|---|---|---|---|---|---|---|
| Architecture | Metal | Iron | Hardware | Cut nail-square | Corroded | 1 |
| Architecture | Metal | Iron | Hardware | Cut nail-square | Corroded | 2 |
| Architecture | Metal | Iron | Hardware | Nail | Corroded | 1 |
| Architecture | Glass | Window pane | Unidentified | Flat | Aqua-tint | 2 |
| Architecture | Glass | Window pane | Unidentified | Flat | Aqua-tint | 1 |
| Kitchen | Glass | Container glass | Unidentified | Body sherd | Clear | 2 |
| Kitchen | Glass | Container glass | Unidentified | Body sherd | Aqua-tint | 1 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Base sherd | Undecorated | 1 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Handle sherd | Undecorated | 1 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Rim sherd | Exfoliated on one side; Undecorated on other side | 1 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Body sherd | Undecorated | 3 |
| Kitchen | Ceramic | Stoneware | Grey-bodied | Body sherd | Salt-glazed exterior; Albany slip interior | 1 |
| Miscellaneous | Metal | Iron | Unidentified | Thin, flat | Corroded | 1 |
| | | | | | **Total** | **18** |

## 33Pk345

Site 33Pk345 is a historic-era cabin site (Figure 8). No structure is indicated in this location on the ca. 1905 Oil and Gas Lease map or on the 1906 Waverly, Ohio USGS quadrangle map or on the 1952 AEC property map. The cabin, along with two other small buildings, is visible, on the 1938 aerial and a single structure is visible on the 1951 aerial.

The cabin sits on what has historically been an 8-acre parcel of land that dates to at least 1878. Prior to this date the property was part of a larger tract. In 1893 the 8-acre parcel was combined with two other parcels to form a 27-acre parcel in 1923. The 8-acre parcel of land was then purchased in 1923 until 1960 when it was sold to the United States government.

Today, the cabin site is represented by a partially collapsed hewn log cabin in a narrow stream bottom surrounded by fairly steep side slopes. The single pen cabin measures approximately 14 feet by 16 feet and sits on stacked sandstone piers at two of the four corners (Figures 9-10). Only two piers are still intact. It had a standing seam metal roof and was sided with vertical board-and-baton. The log structure was connected at the corners with a simple v-notch on each of the hewn logs. The logs were hewn on only two sides, but the tops and bottoms were unmodified and many still retain tree bark. Chinking between the logs is a combination of mud/clay and wood shims of various sizes and shapes. Wire nails were used to fasten the chinking shims, siding and roofing. No square nails were observed. The cabin also lacks evidence of a heating system, such as a fire place or stove.

Adjacent to the cabin is what appears to be a shallow well or an improved spring lined with locally available stone (Figure 8 and 11). The well is approximately four feet in diameter and is situated approximately 23 ft (7 m) southeast of the cabin.

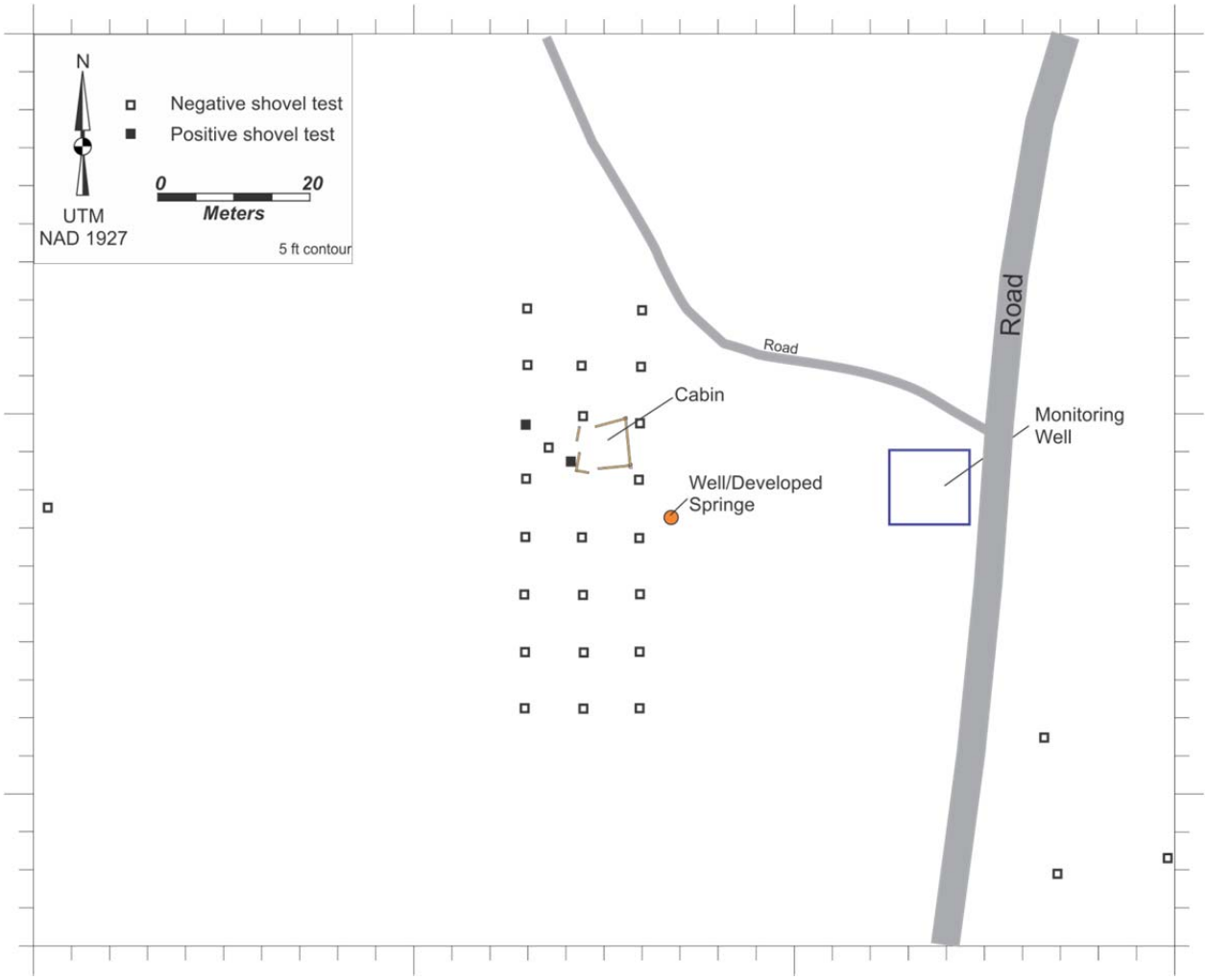


Figure 8. Site map showing the cabin site (33Pk345).

Figure 9. Photograph of the cabin (33Pk345) facing northwest.

Figure 10. Photograph of the cabin (33Pk345) facing southeast.


Figure 11. Photograph of the cabin (33Pk345) well/developed spring.

Shovel tests were excavated on a 5-meter grid within the cabin site area (Figure 8). These produced only six artifacts from two shovel tests consisting of two flat glass (clear) fragments, two wire nails, a brass mechanism component and what appears to be a metal door engine valve.

The relative paucity of historic-era artifacts, especially domestic household debris such as ceramics and appreciable quantities of container glass, suggests that the cabin is not a residential house site. This assertion is also supported by the lack of evidence for outbuildings, or a heating device within the cabin structure. The cabin is also a somewhat crude structure and does not exhibit the craftsmanship of typical nineteenth century residential cabins. Instead, it is likely that this structure was built in the 1920s or 1930s and used as a recreational camp.

## 33Pk346

Site 33Pk346 is a prehistoric lithic scatter. Two shovel tests excavated on a 15 meter grid in this area produced three prehistoric artifacts consisting of an early biface thinning flake and two flake fragments. Radial shovel tests were also excavated at 7.5 meter intervals around the artifact-bearing units. All three flakes are made from a black flint, probably Upper Mercer flint. Although Upper Mercer flint crops out in the counties to the north and east of Pike County, it was also probably available in alluvial deposits along the Scioto River, which is approximately 4.0 km west of 33Pk346. The early biface thinning flake was detached from an early stage biface blank in an effort to shape and thin the biface, the goal of which would have been to create a projectile point (see Figure 3). The flake fragments are not technologically diagnostic. It is improbable that a single biface thinning flake would have been detached at this location. Instead, it is more likely that numerous flakes were deposited at this location, but in such low frequencies that they were not recovered on a 15-meter survey grid. It is also likely that other concurrent prehistoric activities were carried out at this location, but they did not result in the deposition of materials that are detectable with the methods used in this survey. Whatever it was that happened prehistorically at site 33Pk346, it did not result in the creation of a large or artifact-rich archaeological site.

## 33Pk347

Site 33Pk347 is a prehistoric lithic scatter (Figure 12). Ten of the shovel tests excavated in this area produced 12 prehistoric artifacts consisting of a projectile point or biface preform tip (Figure 6), 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. Delaware (n=7), Vanport (n=3), and Brassfield flints are represented in this assemblage. All three types are non-local and are known to crop out a considerable distance from Pike County. All, however, were probably available in secondary deposits along the Scioto River, which approximatley 3.7 km west of 33Pk347.

Although the 33Pk347 lithic assemblage is rather small, nearly all of the debris is from the very late stages in the primary reduction process and early stages of the secondary reduction process (see Figure 3). The earlier discussion of lithic technology and assemblage formation (above) demonstrates that a sizeable number of bifacial tools could have been modified at 33Pk347 without an appreciable amount of archaeologically visible debris. The 33Pk347 assemblage is also unique compared to the other lithic assemblages in Survey Area 2 in the sense that it may represent the later stages of stone use. Site 33Pk348, which is located nearby, produced a very different lithic assemblage, representing the earlier stages of the primary reduction process.

Site 33Pk347 is a potentially significant prehistoric archaeological site and should be considered for further evaluation.

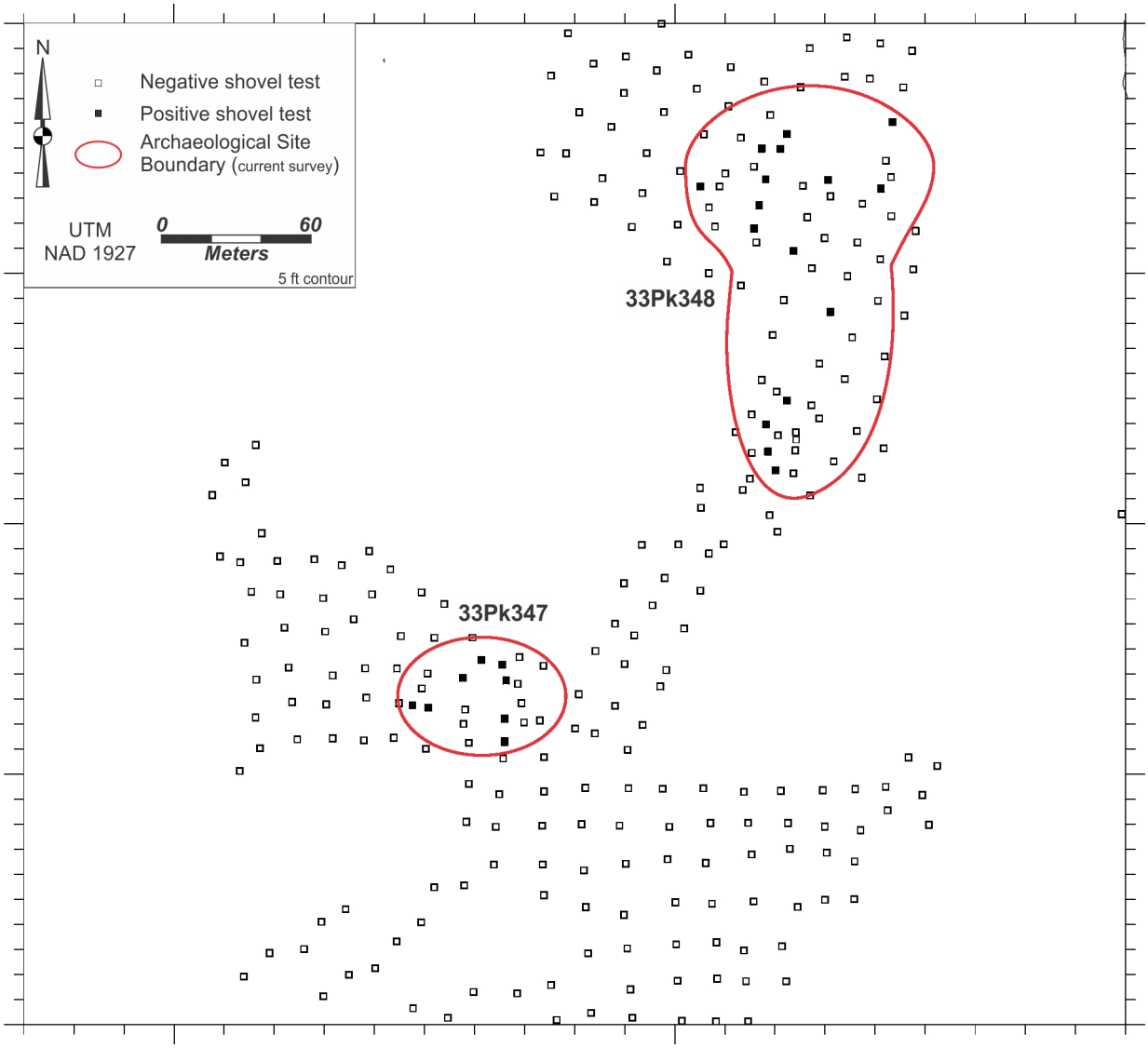


Figure 12. Site map showing 33Pk347 and 33Pk348.

## 33Pk348

Site 33Pk348 is a prehistoric site (Figure 12). Twenty-two shovel tests excavated within the site area produced 59 prehistoric artifacts, including 43 pieces of FCR and 16 flint artifacts. Although the FCR is made of sandstone, it has classic FCR attributes frequently observed in thermal features, such as earth ovens, found throughout Ohio. The flint 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, and a piece of flint shatter.

Flint types represented include Brassfield (n=1), Delaware (n=13), Upper Mercer (n=1), and Vanport (n=1). All are extra-local flint types, but they would have been available in secondary deposits along the Scioto River, which is located approximately 3.8 km west of 33Pk348. Over half of the lithic debris in this assemblage is from the early and middle parts of the primary reduction process and the flake core, which represents the earliest stage of stone reduction, suggests that the stone was procured locally. The water worn cortex on the flake core demonstrates that it is from an alluvial context. The remainder of the flint debris is from either the later stages of the primary reduction process or from the secondary reduction process, suggesting tool use and rejuvenation (see Figure 3).

Unique to 33Pk348 is an unusually high frequency of "classic" FCR and the two small unifacial tools. The FCR demonstrates that the prehistoric inhabitants of this site constructed and used thermal features. The two unifacial flake tools resemble small boring tools or simple drills (Figure 6). Site 33Pk348 is a potentially significant prehistoric site and should be considered for further evaluation.

## 33Pk349

Site 33Pk349 is a historic-era farmstead (Figure 13). A house is indicated in this area on the ca. 1905 Oil and Gas Lease map and on the 1906 15" Waverly, Ohio USGS topographic map. No structures are indicated in this area on the 1938 and 1951 aerials or on the 1952 AEC property map. The map information suggests that a farmstead sat at this location prior to 1905, but was removed at some point prior to 1938. Both aerials show this area to be under cultivation, so it is likely that the farmstead was razed well before 1938.

No architectural remains are visible on the surface at this location (Figure 13). The foundation remains were probably removed and any wells and privy vaults were probably filled-in when the land was reclaimed for cultivation prior to 1951. It is very possible that this farmstead site contains intact foundations and vault features below the plowzone level.

A total of 37 historic-era artifacts were recovered from 11 positive shovel tests (Table 3). Functional artifact groups include architectural (n=17, 46%) and kitchen (n=20, 54%). Architecture group artifacts include brick fragments, window pane glass, cut-square nails, and wire nails. The kitchen group artifact assemblage is made up of various ceramics and a small amount of container glass. The kitchen ceramics are classified as stoneware (n=5, 19%), ironstone (n=7, 26%), redware (n=2, 7%), and whiteware (n=4, 15%). The ceramic artifacts date from around 1800 to the present. Overall, this assemblage is consistent with what is expected from a middle nineteenth to early twentieth century farmstead site.

In addition to the historic-era artifacts, a single prehistoric flint flake was also recovered from 33Pk349. This artifact is classified as an "interior" flake made from Delaware flint. Technically the prehistoric component at 33Pk349 is a prehistoric isolated find, as no other prehistoric artifacts were found despite a fairly intensive shovel testing effort. The flint flake from this location is classified as an interior flake, meaning it does not have cortex on its dorsal surface and does not have technological attributes that indicate that it was removed from a biface-shaped object. Interior flakes can be detached from flint cores or nodules, or from the earliest stages of biface reduction prior to when the biface is formed (see Figure 3). It is nearly impossible for a stone worker to detach a single flake without others being removed as well, and it is improbable that a prehistoric stoneworker would do so at a location, such as at 33Pk349, and then move on. Instead, it is more probable that a very small amount of stone working occurred at this location, leaving behind a sparse and diffuse scatter of lithic debris.

Table 3. Artifact Inventory from 33Pk349.

| Functional Group | Material | Type | Subtype | Description | Decoration/Comments | n |
|---|---|---|---|---|---|---|
| Architecture | Ceramic | Architectural | Brick | Fragment | None | 9 |
| Architecture | Glass | Window pane | Unidentified | Flat | None | 1 |
| Architecture | Metal | Iron | Hardware | Wire nail-round | Corroded | 4 |
| Architecture | Metal | Iron | Hardware | Nail | Corroded | 1 |
| Architecture | Metal | Iron | Hardware | Cut nail-square | Corroded | 2 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Body sherd | Exfoliated on one side; Undecorated on other side | 1 |
| Kitchen | Ceramic | Stoneware | Grey-bodied | Body sherd | Salt-glazed on one side; exfoliated on other side | 1 |
| Kitchen | Ceramic | Stoneware | Buff-bodied | Body sherd | Salt-glazed exterior; Albany slip interior | 1 |
| Kitchen | Ceramic | Coarse earthenware | Redware | Body sherd | Lead glazed exterior and interior | 2 |
| Kitchen | Ceramic | Refined earthenware | Whiteware | Body sherd | Undecorated | 2 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Body sherd | Exfoliated on one side; Undecorated on other side | 3 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Rim sherd | Exfoliated on one side; Undecorated on other side | 1 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Base sherd | Undecorated | 1 |
| Kitchen | Ceramic | Refined earthenware | Ironstone | Body sherd | Undecorated | 1 |
| Kitchen | Ceramic | Refined earthenware | Whiteware | Body sherd | Exfoliated on one side; Undecorated on other side | 1 |
| Kitchen | Ceramic | Stoneware | Grey-bodied | Body sherd | Exterior and interior surface partially burnt | 1 |
| Kitchen | Ceramic | Stoneware | Grey-bodied | Body sherd | Salt-glazed exterior; Albany slip interior | 1 |
| Kitchen | Ceramic | Refined earthenware | Whiteware | Rim sherd | Undecorated | 1 |
| Kitchen | Ceramic | Stoneware | Grey-bodied | Body sherd | Albany slip exterior and interior | 1 |
| Kitchen | Glass | Container glass | Unidentified | Body sherd | Aqua-tint | 1 |
| Kitchen | Glass | Container glass | Unidentified | Rim sherd | Heat damaged; scalloped edge | 1 |
| | | | | | ***TOTAL*** | ***37*** |

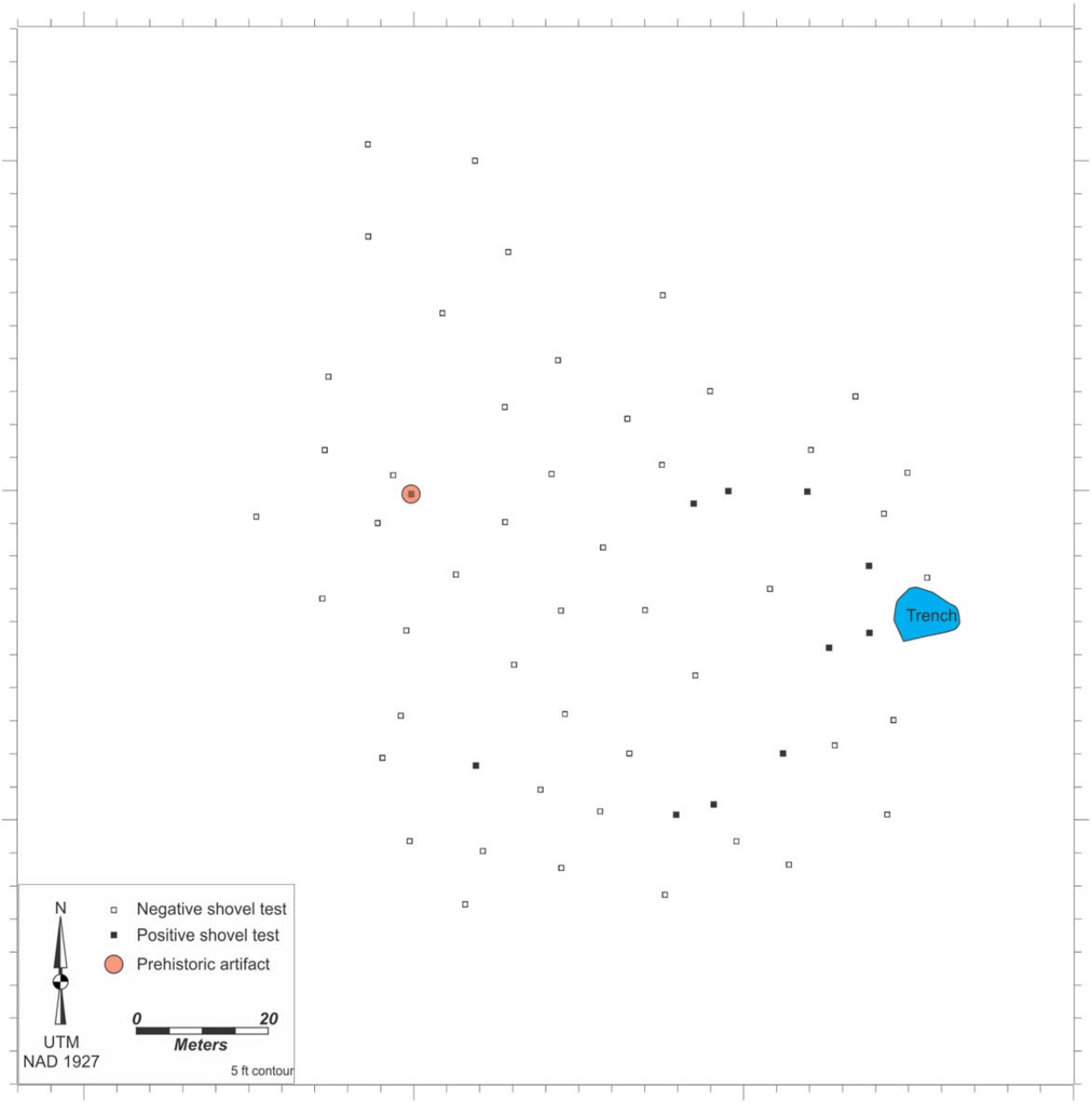


Figure 13. Site map showing 33Pk349.

## 33Pk350

Site 33Pk350 is a prehistoric isolated find. The single prehistoric artifact from this location consists of a late biface thinning flake made from Upper Mercer flint. This artifact reflects the late portions of the primary reduction process, where a biface was in the final stages of biface thinning prior to entering the preform stage (see Figure 3). As with other isolated finds, this artifact is probably associated with other similar flint flakes created from this process. But because so little flint working occurred at this location, the lithic debris assemblage is sparse and diffuse. No FCR was found at 33Pk350, indicating that thermal features involving the use of thermal stone were not used at this location. Site 33Pk350 does not appear to be a significant archaeological site.

## 33Pk351

Site 33Pk351 is a very sparse prehistoric lithic scatter. The three prehistoric artifacts from this site consist of a late biface thinning/early pressure flake and two flake fragments made from Delaware and an unidentified flint. This late biface thinning/early pressure flake, made of Delaware flint, probably represents the later portion of the primary reduction process, where a biface blank was converted into a preform or finished tool, or the secondary reduction process where a bifacial tool was rejuvenated (see Figure 3). The two flake fragments, made from unidentified flint, are not technologically diagnostic. In the absence of early stage reduction debris, the flint fragments were probably created from the later parts of the reduction process. As with low density lithic scatters, the three flint flakes in this assemblage are probably associated with other similar flint flakes created from later stages in the reduction process. But because so little flint working occurred at this location, the lithic debris assemblage is sparse and diffuse. No FCR was found at 33Pk351, indicating that thermal features involving the use of thermal stone were not used at this location. Site 33Pk351 does not appear to be a significant archaeological site.

## 33Pk352

Site 33Pk352 is a diffuse prehistoric lithic scatter represented by three flint flakes from two shovel tests separated by 7.5 meters. The artifact assemblage consists of a large secondary decortication flake, a late biface thinning flake, and a late biface thinning/early pressure flake. All are made from Delaware flint, which would have been available to prehistoric stone workers in the Scioto River gravel beds, approximately 5.0 km to the west.

The large secondary decortication flake from 33Pk352 is from a small flint nodule with water-worn cortex. This artifact demonstrates that raw or slightly modified flint nodules were transported from the Scioto to 33Pk352. The other two artifacts in this assemblage represent the later stages of the primary reduction process, where a biface blank was shaped and thinned and possibly converted into a biface preform or finished tool (see Figure 3). Or, these two flakes could represent the earlier stages of the secondary reduction process where a biface tool was rejuvenated.

The three artifacts in this assemblage were probably created in association with other lithic debris, but it was made in such low frequencies that other artifacts were not detected in this survey. No FCR was found at 33Pk352, indicating that thermal features involving the use of thermal stone were not used at this location. Site 33Pk352 does not appear to be a significant archaeological site.

## 33Pk353

Site 33Pk353 is a small historic artifact scatter. Shovel tests excavated on a 15-meter grid in this portion of the survey area produced two pieces of clear container glass and a single stoneware sherd from two shovel tests.

The sparse historic artifact scatter, consisting of clear container glass, is not consistent with what is expected for a residential site. Instead, these artifacts might represent an isolated incident of refuse disposal, and is possibly related to site 33Pk218. Site 33Pk353 does not appear to be a significant archaeological site.

## SUMMARY AND RECOMMENDATIONS

The PORTS Survey Area 2 archaeological study involved the systematic excavation of shovel tests at 15-meter intervals in all level or nearly level areas that have not been significantly altered by earth moving activities. Prior to the survey, a survey plan was developed to identify areas with archaeological potential, but this plan also required a systematic pedestrian survey to identify small landforms with the potential to contain archaeological sites. Archaeologically important landforms in the area include ridgetops and saddles, finger ridges that extend from the main ridge tops, toe-ridges that tend to extend out from the lower elevations near the bottoms of slopes, benches on side-slopes, stream terraces, and stream bottoms. Each shovel test measured 50 cm by 50 cm in size and extended to no more than 12 inches below surface. Shovel test intervals were reduced in certain areas in an effort to better cover smaller landforms and to define archaeological site locations. The fill from each test was screened through ¼-inch hardware cloth. The ¼-inch hardware cloth is expected to recover all artifacts that are greater than ¼-inch in size.

Although the survey was oriented towards the identification of prehistoric sites, all historic-era sites were also documented when encountered. The ultimate goal of this survey was to locate all archaeological resources that can be reasonably detected with the survey methods used in this study. Archaeological visibility, or detectability, is affected by artifact quantity and density on the landscape. This report attempted to model, in a very simple way, how lithic debris is generated and how the processes involved in the manufacture, use, and maintenance of chipped stone tools affect assemblage formation and archaeological visibility. This model predicts that lithic assemblages in flint-poor regions tend to represent the later stages of the lithic reduction process. This model demonstrates that as the lithic reduction process proceeds through various stages of tool manufacture, use, and maintenance, the amount of debris generated decreases. All things being equal in terms of the quantities and types of chipped stone tools manufactured, used, and maintained at any given location, the amount of debris generated diminishes greatly with omission of previous reduction stages. The result is a decrease in the archaeological detectability of sites represented only by lithic debris scatters.

Pike County is a flint-poor region, meaning it has no primary geological flint outcrops. Prehistoric stone use would have required the importation of flint from elsewhere and/or the use of scarce secondary geological sources. Most of the waste from the imported flint would have been removed prior to entering Pike County. The degree to which this was done would have limited the amount of debris that could have been created from the stone used within Pike County. Secondary flint sources tend offer small nodules, and the transport of unaltered nodules for use away from the source would have occurred infrequently. Lithic assemblages in Pike County, especially in the uplands away from the Scioto River, are expected to be sparse and have poor archaeological visibility.

Past and present archaeological surveys within PORTS reported 18 archaeological sites and the Holt Cemetery within Survey Area 2 (see Table 1). Table 4 summarizes all known archaeological resources within this portion of PORTS. Ten of the sites listed in Table 4 (33Pk344-353) are newly recorded sites found during the recent shovel test survey reported here. All others were recorded at various levels during previous surveys.

Table 4. Summary of archaeological sites and recommendations within Survey Area 2.

| Site | Survey Type | Site Type | Historic-era Temporal Component | Prehistoric Temporal Component | Recommendation |
|---|---|---|---|---|---|
| 33Pk204 | Phase I | Isolated Find | - | X** | No Further Work |
| 33Pk212 | Phase I&II | Farmstead | X | - | Additional Consultation |
| 33Pk213 | Phase I&II | Farmstead | X | X** | Additional Consultation |
| 33Pk214 | Phase I | Holt Cemetery | X | - | Additional Consultation |
| 33Pk215 | Phase I | Dump Site | X | - | No Further Work |
| 33Pk216 | Phase I | Dump Site | X | - | No Further Work |
| 33Pk218 | Phase I &II | Farmstead | X | X | Additional Consultation |
| 33Pk311 | Enhanced Phase I | Farmstead | X | X** | Additional Consultation |
| 33Pk312 | Enhanced Phase I | Farmstead | X | - | Additional Consultation |
| 33Pk344 | *Phase I | Artifact Scatter | X | - | No Further Work |
| 33Pk345 | *Phase I | Cabin Site | X | - | No Further Work |
| 33Pk346 | *Phase I | Lithic Scatter | - | X | No Further Work |
| 33Pk347 | *Phase I | Lithic Scatter | - | X | Phase II with Consultation |
| 33Pk348 | *Phase I | Lithic Scatter | - | X | Phase II with Consultation |
| 33Pk349 | *Phase I | Farmstead | X | X | Phase II with Consultation |
| 33Pk350 | *Phase I | Isolated Find | - | X** | No Further Work |
| 33Pk351 | *Phase I | Lithic Scatter | - | X | No Further Work |
| 33Pk352 | Phase I | Lithic Scatter | - | X | No Further Work |
| 33Pk353 | *Phase I | Artifact Scatter | X | - | No Further Work |

*Current Survey; **Prehistoric Isolated Find

Eleven of the archaeological sites within Survey Area 2 contain prehistoric temporal components (33Pk204, 33Pk213, 33Pk218, 33Pk311, 33Pk346-351, and 33Pk352), meaning they each contain at least one artifact that is from a prehistoric occupation. Sites 33Pk204 and 33Pk350 are stand-alone prehistoric isolated finds, and sites 33Pk213, 33Pk311, and 33Pk349 are prehistoric isolated finds located within historic-era farmstead sites. Each is represented by a single flint flake. The prehistoric isolated finds are usually not considered to be significant archaeological sites and should not be considered for further investigation.

Five sites within Survey Area 2 are stand-alone prehistoric lithic scatter sites (33Pk346, 33Pk347, 33Pk348, 33Pk351, and 33Pk352) and one (33Pk218) is a lithic scatter located within a historic-era farmstead. Most of these (33Pk346, 33Pk351 and 33Pk352) are small lithic scatters, each represented by three flint flakes. All three sites are locations where prehistoric stone working resulted in the deposition of small quantities of lithic debris. The absence of FCR indicates that thermal features with the use of thermal stone were not used at these locations. Like isolated finds, small lithic scatters are rarely eligible for the NRHP. Sites 33Pk346, 33Pk351, and 33Pk352 should not be considered for further evaluation.

Sites 33Pk347 and 33Pk348 produced much larger prehistoric assemblages, despite the same level of investigation as those sites with few artifacts. Both are located in close proximity to each other, but produced very different assemblages. Site 33Pk347 produced a broken projectile point or biface, nine flint flakes, and a single piece of FCR. Site 33Pk348 produced 43 pieces of FCR, a flint core, two unusual flake tools, and 13 flint flakes. The lithic debris from 33Pk347 represents the later stages of the lithic reduction process— probably the final stages of tool manufacture and/or tool maintenance. In contrast, the debris from 33Pk348 represents early and late stages within the lithic reduction process. The flake tools in this assemblage are unusual and appear to be some sort of boring or drilling tool.

A far more intensive survey effort was conducted at 33Pk218 for the purposes of assessing NRHP eligibility of the early twentieth century farmstead. A total of 111

square meters of excavation over the site area produced 15 lithic artifacts and 57 pieces of FCR, in addition to 927 historic-era artifacts. The prehistoric artifacts demonstrate that at least one prehistoric occupation occurred at this site. The possible Lamoka Type projectile point in this assemblage suggests that this occupation took place around 3500-1800 B.C. The sizeable prehistoric artifact assemblage from 33Pk218 is exaggerated when compared with other prehistoric sites within Survey Area 2, namely because of the differing densities of shovel testing used at each site: 33Pk218 was tested at a 5-meter interval whereas the current survey used a 15-meter interval on the other sites. With this in consideration, artifact density at 33Pk218 is similar to what was found at sites 33Pk346, 33Pk351 and 33Pk352.

Six of the sites within Survey Area 2 are historic-era farmstead sites (33Pk212, 33Pk213, 33Pk218, 33Pk311, 33Pk312, and 33Pk349) and one site is thought to be an early twentieth century recreational cabin (33Pk345). With the exception of 33Pk345 and 33Pk349, all were documented during previous surveys (Schweikart et al. 1997; Klinge 2001; Pecora and Burks 2012; 2013).

Site 33Pk345 is a twentieth century cabin site that appears to be a recreational camp, rather than a residential site. The cabin structure, which is nearly completely collapsed, is very small and does not have evidence of a fireplace or stove, as would be expected for a residential cabin. Moreover, the construction methods do not seem to exhibit the level of craftsmanship that is typical of nineteenth century residential cabins. The cabin is not visible on the ca. 1905 or 1906 maps, where residential structures are indicated on neighboring properties. It is visible, however, on the 1938 and 1951 aerial photographs. It seems probable that the cabin was constructed after 1923 when the land was purchased. Shovel tests excavated on a 5-meter grid within the site area produced only six artifacts and no ceramics, which is contrary to what is commonly found at historic-era domestic sites. This site does not appear to be eligible for the NRHP and should not be considered for further evaluation.

Site 33Pk349 is a historic-era farmstead that was subjected to the farmstead reconnaissance survey in 2011 (Location #10) but apparently was not found. Historic maps reveal a farmstead at this location as late as 1906, but structures are completely absent by 1938. The current survey recovered a fairly sizeable assemblage of artifact types that are consistent with other domestic farmstead sites within PORTS. Unlike most of the other known PORTS farmsteads that were operating until the early 1950s, this farmstead fell out of operation as early as 1922 when it was purchased as part of site 33Pk311. The structures were removed from the farmstead when the farm was reclaimed for cultivation, but it is very possible that sub-plowzone shaft features and foundations are still intact. Site 33Pk349 should be considered for further evaluation. Unlike other PORTS farmsteads, this site is not cluttered with later artifact types and therefore provides a clearer look at the material culture of a late nineteenth-early twentieth century upland farmstead in south-central Ohio.

Survey Area 2 also contains the Holt Cemetery (33Pk214), two historic-era dump sites (33Pk215 and 33Pk216), and two small historic-era scatters (33Pk344 and 33Pk353). The Holt Cemetery and the two dump sites were documented by Schweikart et al. (1997), and the cemetery was further investigated by Burks (2011). Of these five sites, only the Holt Cemetery is considered to be eligible for the NRHP. Sites 33Pk344 and 33Pk353 are very small historic-era artifact scatters found during the current survey. Historic map resources show no indication

of historic structures at these locations. Both appear to represent isolated refuse disposal efforts and should not be considered for further evaluation.

In summary, Survey Area 2 contains 18 archaeological sites and the Holt Cemetery. Ten of these sites were identified and documented during the current survey effort. Of the ten newly documented sites, three (33Pk347, 33Pk348, and 33Pk349) have the potential to be eligible for inclusion into the NRHP. Phase II assessment studies, in concert with NHPA consultation, should be conducted at these locations. Sites 33Pk347 and 33Pk348 are prehistoric sites that contain lithic artifacts and FCR. They also have the potential to contain sub-surface features. Any future work at these locations should be centered on the recovery of additional lithic artifacts and FCR and on the identification of subsurface features. The investigations should include high-density shovel testing (on 5x5 meter grids), 1x1 meter unit excavation, a magnetometer survey, and feature documentation and excavation. It is highly recommended that such work be conducted by an expert in prehistoric lithic technology and include a detailed technological analysis following the principles detailed by Pecora (2002). The magnetometer work should be conducted by an archaeologist with expertise in the application of geophysical surveys in archaeology. All magnetic anomalies should be tested under the direction of individuals with expertise in using magnetic data for archaeological evaluations. A sample of features, if found, should be excavated by individuals who have expertise in excavating magnetic anomalies. Features should be properly documented and carbon samples collected for botanical and radiometric analysis.

Any future work at site 33Pk349 should include a high-density shovel testing effort and a ground penetrating radar survey (GPR). The shovel testing effort should makeuse of a 5-meter grid within the site area. A ten meter grid should be used beyond the current site boundaries to better define the horizontal extent of the farmstead. The GPR survey should be designed to identify sub-plowzone features associated with the farmstead. The GPR survey recommended here is meant strictly as an archaeological tool, and cannot be replaced by a utility survey. The GPR survey should be conducted by an archaeologist with expertise in the application of this methodology on historic-era archaeological sites. using the GPR data, a selection of features should be excavated and evaluated.

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OVAI Contract Report #2012-39PV

# PHASE I ARCHAEOLOGICAL SURVEY OF AREA 6B LOCATED WITHIN THE PORTSMOUTH GASEOUS DIFFUSION PLANT (PORTS), PIKE COUNTY, OHIO

By

Albert M. Pecora, Ph.D.

October 3, 2013

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

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## Management Summary

In March of 2012, Ohio Valley Archaeology, Inc., (OVAI) conducted a Phase I archaeological survey (Survey Area 6B) within the 3,777-acre Portsmouth Gaseous Diffusion Plant (PORTS) in Pike County, Ohio. The survey work was completed as part of an ongoing effort to document and evaluate archaeological resources within the PORTS reservation. Prior to the current survey effort, various other surveys have been conducted within PORTS. These include a small sample survey that was completed in 1997, Phase II National Register of Historic Places (NRHP) assessment studies on thirteen historic-era farmstead sites between 2009 and 2011, a reconnaissance level effort designed to locate additional farmsteads in 2011, and an "enhanced" Phase I-level survey designed to document additional farmsteads in 2011. The current survey was designed primarily to locate and document prehistoric archaeological sites, though all sites, regardless of age, were to be documented as encountered.

Archaeological field methods used in this survey effort are commensurate with the *Archaeology Guidelines* published by the Ohio Historic Preservation Office (OHPO). The methods include a pedestrian survey and systematic shovel testing. Prior to the survey, OVAI developed a scope of work (SOW) that delineated five distinct area types within PORTS. Area Types 1 and 2 are defined as areas with high archaeological potential and generally refer to all level or nearly level topographic landforms such as ridgetops, saddles, benches, and terraces. Type 3 areas are large expanses of side-slope between ridgetops and stream bottoms. Along the uninhabitable slopes in Type 3 areas, however, are smaller isolated landforms with archaeological potential. The SOW required such areas to be identified through pedestrian survey and systematically shovel tested. The two remaining area types include developed land with no archaeological potential (Type 4) and areas in which Phase II archaeological surveys have already been completed (Type 5).

Survey Area 6B contains four archaeological sites (33Pk324, 33Pk370, 33Pk371, and 33Pk372). Site 33Pk324 is an early twentieth century farmstead previously documented by Mustain and Klinge (2011, 2012). The current survey identified and documented sites 33Pk370, 33Pk371, and 33Pk372, all of which are prehistoric archaeological sites represented by lithic artifacts and fire-cracked rock (FCR). Large thermal features containing FCR were identified at 33Pk371 and 33Pk372. Two Early Archaic period (ca. 8000-6000 B.C.) projectile points were recovered from 33Pk371, though it is not yet known if the feature found at this site also dates to this period.

Site 33Pk370 does not appear to be a significant archaeological site, as it is a sparse scatter of lithic debris and contains very little FCR. In contrast, sites 33Pk371 and 33Pk372 are larger sites with lithic debris, large quantities of FCR, and at least one cultural feature each. Both sites have the potential to contain important information about how prehistoric populations made use of the uplands overlooking the Scioto River floodplain. Furthermore, Early Archaic period sites in Ohio are relatively rare and if site 33Pk371 does in fact date to this period, then it has the potential to be a significant archaeological resource. Until these sites are evaluated with a well-planned and deliberate Phase II survey effort, they should be treated as if they are eligible for the NRHP. Consultation with the Ohio Historic Preservation Office and other consulting parties regarding the treatment of 33Pk371 and 33Pk372 is recommended.

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# INTRODUCTION

In March of 2012, Ohio Valley Archaeology, Inc. conducted a Phase I archaeological survey of Survey Area 6B, within the 3,777-acre Portsmouth Gaseous Diffusion Plant (PORTS), which is located approximately 3.0 miles (4.8 km) south of Piketon in Pike County, Ohio. The work was completed at the request of Fluor B&W Portsmouth, LLC on behalf of the United States Department of Energy (DOE) and is part of an ongoing effort to document and evaluate archaeological resources within the PORTS reservation. The survey methods used in this effort were commensurate with the *Archaeology Guidelines* published by the Ohio Historic Preservation Office (OHPO 1994). While this effort focused on the identification and documentation of prehistoric archaeological sites, all archaeological resources regardless of age were documented when encountered.

## SURVEY AREA DESCRIPTION

Pike County is situated on the deeply dissected part of the Appalachian Plateau physiographic region (USDA-SCS 1990). This area is characterized by broad ridges and steep hills dissected by numerous small tributaries that flow into the Scioto River. PORTS is located in the uplands adjacent to the east side of the Scioto River floodplain (Figure 1). Elevations in Pike County range from 500-600 feet AMSL in the Scioto River floodplain to 1330 feet AMSL on Greenbriar Ridge (USDA-SCS 1990), with PORTS occupying elevations between approximately 640 ft AMSL and 880 ft AMSL. The Scioto River meanders to within 1-2 miles of the facility's western boundary. Tributaries of the Scioto, including Big Run Creek, Big Beaver Creek, Little Beaver Creek, and numerous unnamed streams, drain the lands with the PORTS boundary fence.

Survey Area 6B is located on the west side of PORTS. The landform is heavily dissected and contains several large ridge tops, smaller toe-ridges, and a narrow stream valley that empties into the Scioto River Floodplain.

By the early-to-mid nineteenth century, Survey Area 6B was timbered, cleared, and used for cultivation and pasture. Timbering, field clearing, and subsequent cultivation and/or pasture use are damaging to prehistoric archaeological sites, especially in the dissected uplands where soil erosion is accelerated when the landscape is denuded of vegetation and when poor cultivation methods are practiced. Prior to the development of soil conservation efforts in the early-to-mid twentieth century, farming produced the inevitable effect of soil erosion on narrow ridge tops and slopes.

The establishment and development of farmsteads is also potentially damaging to prehistoric archaeological sites. Historic-era home sites were frequently selected because they were high, dry, and protected from winds and weather patterns; additional characteristics included good sunlight exposure and a favorable vista. Prehistoric peoples frequently occupied these same landforms for the very same reasons. The historic-era construction of homes, barns, outbuildings, roadways, and other facilities displaced many prehistoric artifacts and damaged subsurface features. The dense overlay and mixing of historic-era artifacts can make it difficult to detect spatially coincident prehistoric sites, which are usually much lower in artifact density. Historic map and aerial photograph resources show two historic-era farmsteads were present in

Survey Area 6B, suggesting that these occupations could complicate the identification of prehistoric sites.

Not yet considered cultural or archaeological resources, the historic-era farmsteads within PORTS and Survey Area 6B were razed in the 1950s, after the Atomic Energy Commission (AEC) purchased the land. The use of bulldozers and graders to aid the demolition process is evident at many of the farmsteads. This activity could have had an impact on the prehistoric archaeological sites where they coexisted with historic-era farmsteads.

More recent surface disturbance is also evident in Survey Area 6B. Prior to the survey, approximately 11 acres along the south side of the survey parcel was defined as developed land associated with road and building construction. Considerably more surface disturbance was encountered during the on-the-ground survey. This disturbance was caused by the installation of several utilities, the construction of two sediment ponds, and other massive earth moving (cutting and filling) activities. One of two farmsteads (33Pk324 [#50]), documented in a previous survey by Mustain and Klinge (2011), is located near Survey Area 6B. Historical map resources depict a second farmstead (#32) on this survey parcel, but no archaeological remains were found in this area during the current Area 6B survey or during a previous effort by Mustain and Klinge (2011).

Survey Area 6B contains several roadways and paths along the ridges and slopes, most of which are recent constructions. Some of the roads and paths are possibly associated with the historic-era farmsteads and may have been appropriated for modern use, while others may have been developed within the last 60 years. The roadways, regardless of age, all potentially affected potential archaeological sites. However, their construction and use should not have been sufficient to completely obliterate archaeological resources. In fact, some unpaved roads provide a means for identifying artifacts in archaeological surveys because they provide good surface visibility.

Vegetation cover within Survey Area 6B, at the time of the survey, consisted mostly of secondary growth hardwood forest. Scrub growth, briars, and weeds were found along the margins of the woods and in or around the disturbed areas. Those areas that have been modified as the result of maintenance activities were covered primarily by low cut grass, while other perhaps older or less active areas consisted of medium to high density scrub growth and briars.

Soils present within Survey Area 6B are part of the Omulga association. This association is described as “deep, nearly level to strongly sloping, moderately well drained soils formed in loess, colluvium, and old alluvium in preglacial valleys” (USDA-SCS 1990:10). Eight specific soil types have been mapped within the project area: Fox loam, 2-6% slopes (FoB); Genesee silt loam, occasionally flooded (Ge); Omulga silt loam, 3-8% slopes (OmB); Princeton fine sandy loam, 2-8% slopes (PrB); Princeton fine sandy loam, 8-15% slopes (PrC); Princeton fine sandy loam, 15-30% slopes (PrC); Shelocta silt loam, 15-20% slopes (ShD); and Urban land-Omulga complex, 0-6% slopes (UoA) (USDA-SCS 1990).

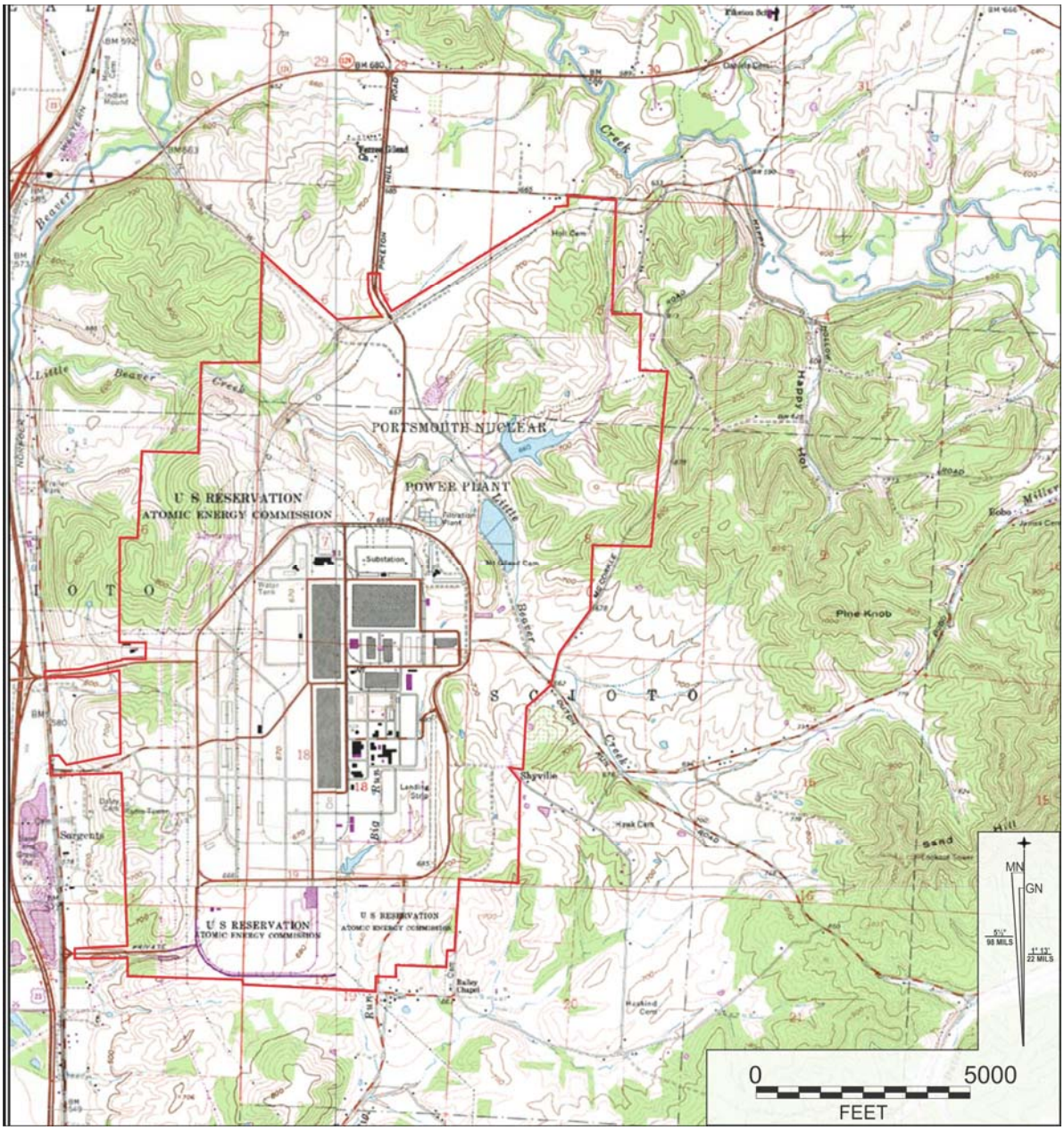


Figure 1. Portions of the 1992 Waverly South, 1961 (PR 1974, PI 1979) Piketon, 1961 (PR 1986) Wakefield, and 1961 (PR 1975) Lucasville, Ohio 7.5" USGS topographic maps showing PORTS.

## HISTORY OF SURVEY AREA 6B

The circa 1905 Oil and Gas Lease map shows a structure in Survey Area 6B. Burks (2011) designated this as farmstead Location #32.

The 1906 15 minute Waverly, Ohio USGS topographic map shows two structures within Survey Area 6B. One corresponds to farmstead Location #32 and the other, farmstead Location #50. This location was found to contain the archaeological remains of a farmstead (33Pk324) in the Mustain and Klinge (2011) survey.

The only farmstead visible on the 1938 and 1951 aerial photographs is 33Pk324. These aerials reveal that farmstead Location #32 must have been razed by 1938 and, in part, explains why it was not found by Mustain and Klinge (2011) and current survey efforts. Farmstead Location #50 (33Pk324) is shown on both aerials as a very large and expansive farmstead (Mustain and Klinge 2012).

Corresponding with the 1938 and 1951 aerials, the 1952 AEC Property map shows only one farmstead within Survey Area 6B. This farmstead is in the location of Location #50 (33Pk324).

Farmstead location #32 was razed prior to 1938, but farmstead Location #50 remained intact until the 1950s and was recently documented as an archaeological farmstead site (33Pk324).

## THE IDENTIFICATION OF PREHISTORIC ARCHAEOLOGICAL SITES

The purpose of the Survey Area 6B Phase I archaeological survey is to identify and document prehistoric archaeological sites using standard archaeological field methods. Although this survey focused primarily on the documentation of prehistoric archaeological sites, all previously unrecorded historic-era cultural resources were also recorded when encountered.

In a very general sense, an archaeological site is defined as a place where evidence of past human activity has been preserved. Excluding the mounds and earthworks, which are generally thought to be mortuary and ceremonial sites, most of Ohio's prehistoric archaeological sites are places where people lived and/or carried out a variety of food and resource procurement activities. These occupations could have lasted for just one or several days, or they might have been longer in duration, lasting months or even years. On average, longer occupations would have left behind more refuse (i.e., artifacts) and subsurface facilities (i.e., features), while short occupations could be very hard to detect archaeologically.

Through most of the course of prehistory, Ohio's residents were highly mobile hunter-gatherers. Figure 2 depicts Ohio's prehistoric timeline with periods, sub-periods, and archaeological culture groups. It was not until after about 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. In some cases multiple family groups appear to have coalesced into large residential groups during certain seasons. Group coalescence 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 could share stored food resources collected and preserved during summer and autumn months, and they could pool labor resources for exploiting migrating water fowl, aquatic resources, and wintering deer-yards. This settlement pattern persisted through most of Ohio's prehistory, and it was commonly observed by early Euro-American explorers who encountered Native American groups living in the interior of the continent. Residential sites might be termed "residential base camps" for the earlier mobile hunter-gatherers; for the more sedentary peoples during later periods, the terms "hamlet" and "village" are often used.

Prehistoric peoples engaged in a multitude of activities over the landscape beyond their residential sites. Whether permanently sedentary or residentially mobile, people had needs for various resources that were not locally available. Food and non-food resources were not ubiquitously distributed over the landscape and the procurement of these resources would have required special trips by a subset of the group. For example, a group of hunters might leave the residential base camp for a few days to hunt deer. This would require the establishment of a short-term camp site where the hunting group would sleep, prepare meals, and fix their hunting gear. 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 at least part of the process involved in preparing the nuts for transport and consumption.

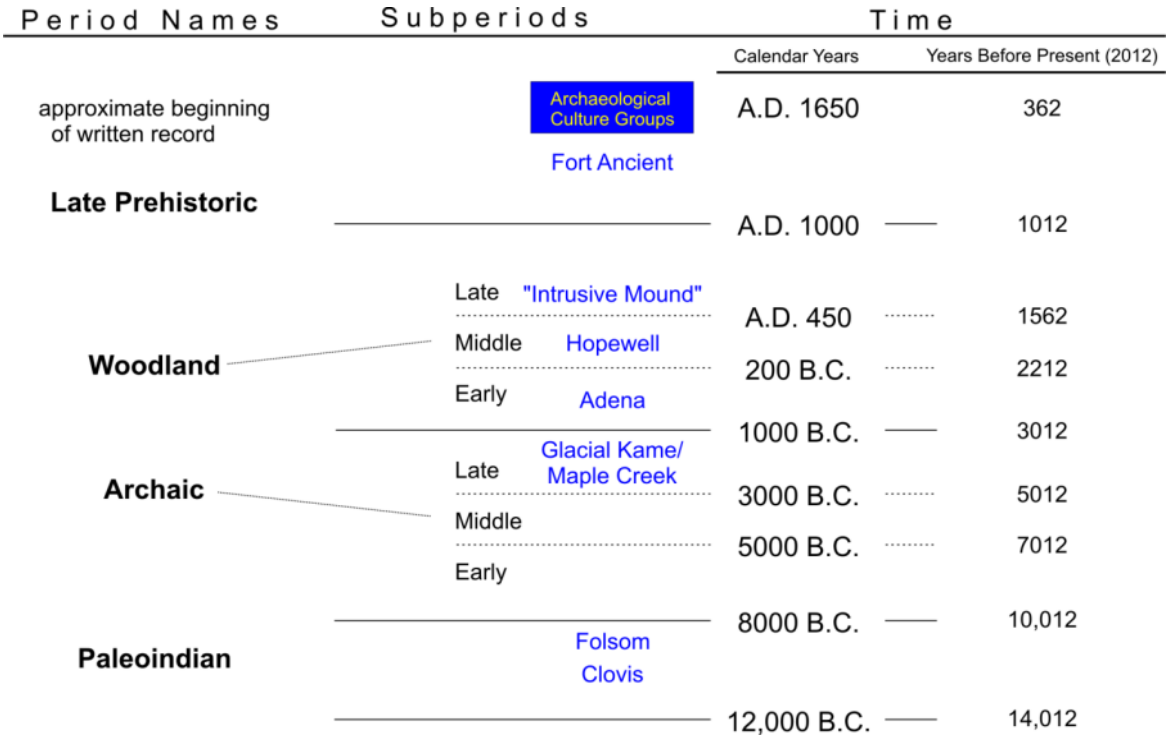


Figure 2. Ohio's prehistoric timeline (modified from Burks 2010).

Regardless of the settlement system, whether sedentary or residentially mobile, 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 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 and fire-cracked rock (FCR) are the most abundant artifact types found at prehistoric archaeology 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 rock, usually sandstone or igneous rock, that was used for cooking and warmth. The rapid changes in temperature experienced by igneous and hard sandstone rocks in cooking fires and other thermal features causes the rock to spall and crack, leaving very distinctive fracture patterns that make it easy to identify the rocks as FCR. Softer sandstone was frequently used when igneous rocks were not available. Fire-cracked sandstone is not as diagnostic as fractured igneous rock, 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, animal 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 of the presence of an archaeological site. These are the things that archaeologists typically seek out when conducting a survey to look for archaeological sites. The archaeological field methods used during such a survey 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 or work within, or travel through, the survey area but they did not engage in activities resulting in the deposition or preservation of the types of things that are detectable in archaeological surveys. Most of the items left behind likely decomposed over time or were deposited in such low frequencies that they are not detectable using traditional and accepted archaeological survey methods.

An archaeological site or resource's visibility is directly related to the methods used to look for it. Archaeological sites with abundant quantities of FCR and lithic debris have low visibility when survey methods are limited to a visual inspection of a leaf-covered ground surface in a wooded area, but the same artifacts and sites are highly visible in a recently cultivated farm field that has been left to weather under several heavy rains. The archaeological visibility of a site in a wooded area, however, is improved when the field methods are shifted to systematic screening of the earth beneath the leaf litter. Therefore, archaeologists routinely adapt their field methods to accommodate the local conditions of the survey area and to maximize their chances for encountering the archaeological resources that they are trying to locate and document.

Using standard, acceptable archaeological field methods, it is very difficult to locate archaeological sites that contain few artifacts. Prehistoric people often lived and carried on their normal daily activities without leaving behind abundant quantities of lithic debris and FCR. The production of lithic debris, for example, requires access to a useful flint source. Since flint is a relatively heavy stone, ancient stone-workers usually left most of their waste at or near their stone quarries (Pecora 2002). The archaeological effect of this is that stone-tool-making debris is often harder to find away from stone acquisition sites simply because the processes involved in stone tool manufacture, use, and maintenance tend to produce negligible quantities of debris after the flint is transported away from its source.

The following discussion presents ideas about prehistoric stone use and the formation of lithic and FCR assemblages. The purpose of this discussion is to demonstrate how artifacts are created and how the organization of the technologies and different behaviors affect site formation and our ability to identify archaeological sites at various points on the landscape.

## THE FORMATION OF LITHIC ASSEMBLAGES AND ARCHAEOLOGICAL VISIBILITY

Stone tools, especially those made from flint, were likely produced and maintained through a very regular process—one that we can identify readily in the archaeological record. Figure 3 depicts an idealized stone tool manufacture, use, and maintenance sequence for a single spear point. 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 also makes a distinction between *Primary* and *Secondary* reduction. *Primary* reduction is defined as the process of manufacturing a "new" tool. *Secondary* reduction is 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 to make drills, borers, scrapers, and cutting tools. Assuming that a projectile moves through a sequence like that shown in Figure 3, making it all the way to the discard of a thoroughly reworked point, none of the point's intermediate stages would ever end up in the archaeological record. The archaeological record, however, reveals that the reduction sequence was frequently interrupted or aborted at each stage depicted in Figure 4 and that objects representing each stage entered the archaeological record.

This dynamic process of making and rejuvenating stone tools such as projectile points can complicate archaeologists' efforts to study the lithic reduction process. The complication is compounded by the spatial disconnect between the quarry 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 the reduction sequence would have been performed at the quarry site to prepare the stone to be transported as flake blanks, biface blanks, or preforms. Removing all of the excess waste materials created during primary reduction would have made it easier to transport more useful stone and less future waste material. Once the stoneworkers returned to their base camp, the reduction process could resume and blanks or preforms could 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, 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 had 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 lithic reduction sequence depicted in Figure 3 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 impact on the quantity of debris produced at those locations.

Figure 4 visually models the amount of lithic debris created experimentally while replicating the reduction stages presented in Figure 3. Each circular tile represents the quantity of debris generated in each successive stage of reduction and excludes all debris generated from previous stages. Debris quantity is important because it is directly related to archaeological visibility. This figure also depicts two size ranges. The larger size range (shown in red) includes pieces 0.5-1 inches (1.3-2.5 cm) in size and the smaller size range (shown in black) are pieces 0.25-0.5 inches (0.6-1.3 cm) in size. All stages of reduction produced abundant quantities of debris smaller than 0.25 inches (0.6 cm), but this size range is usually not recovered during archaeological investigations because of the size of the screen mesh used to sift the soil. Nevertheless, the trend depicted in Figure 4 does not change with the inclusion of the smallest size range. The amount of debris produced during the reduction sequence drops off quickly.

Figure 4 illustrates how archaeological visibility, or the ability to identify lithic debris using standard and acceptable survey methods, is affected as the stone tool manufacturing, use, and maintenance sequence is partitioned at various places on the landscape. The first tile in the upper left depicts all debris (>1/4-inch/0.6 cm) generated from a complete reduction sequence (Stage 1-12). As the debris from each previous stage is excluded, the quantity of debris decreases substantially. This implies that lithic debris quantity and, hence, archaeological visibility has the potential to decrease considerably with increased distance from the raw tool-stone quarry source. A cursory examination of the current Ohio Archaeological Inventory would support this trend—sites farther away from the quarries have less lithic debris while those closer to the quarries have significantly larger amounts of debris. And consequently, far more prehistoric domestic sites have been documented in counties with abundant primary geological flint sources, such as Licking, Delaware, and Muskingum Counties, than in counties with no primary geological flint sources. The archaeological sites in flint-rich counties are easier to find because they have more artifacts. This is important to remember as we consider the research design and results of the survey at PORTS because Pike County is a flint-poor county.

Prehistoric stone workers also had the ability to transport large quantities of partially reduced stone for domestic use and trade (Pecora 2002). The importation of prepared raw flint nodules or even prepared cores would increase the potential for debris accumulation at domestic sites located in flint-poor areas. While this strategy was employed at various places and times throughout Ohio's prehistory, it did not occur frequently enough to create a ubiquitously dense concentration of lithic debris over the entire state. Instead, it appears that most stone workers transported blanks, performs, and finished tools to flint-poor regions and, in addition, used small secondary geological flint sources (such as streambed gravels) when encountered.

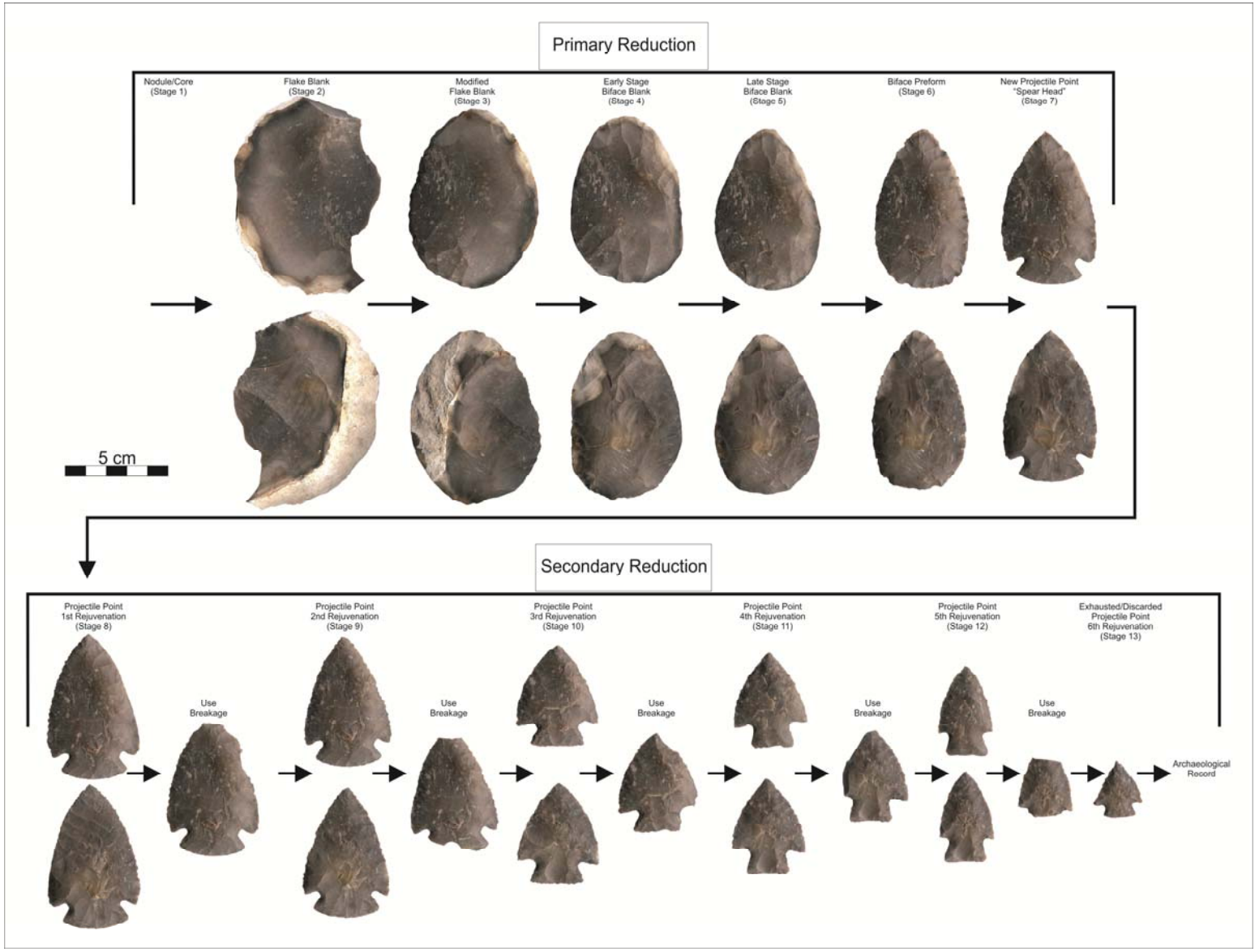


Figure 3. Illustration of replicated lithic tool manufacture, use, and maintenance sequence.

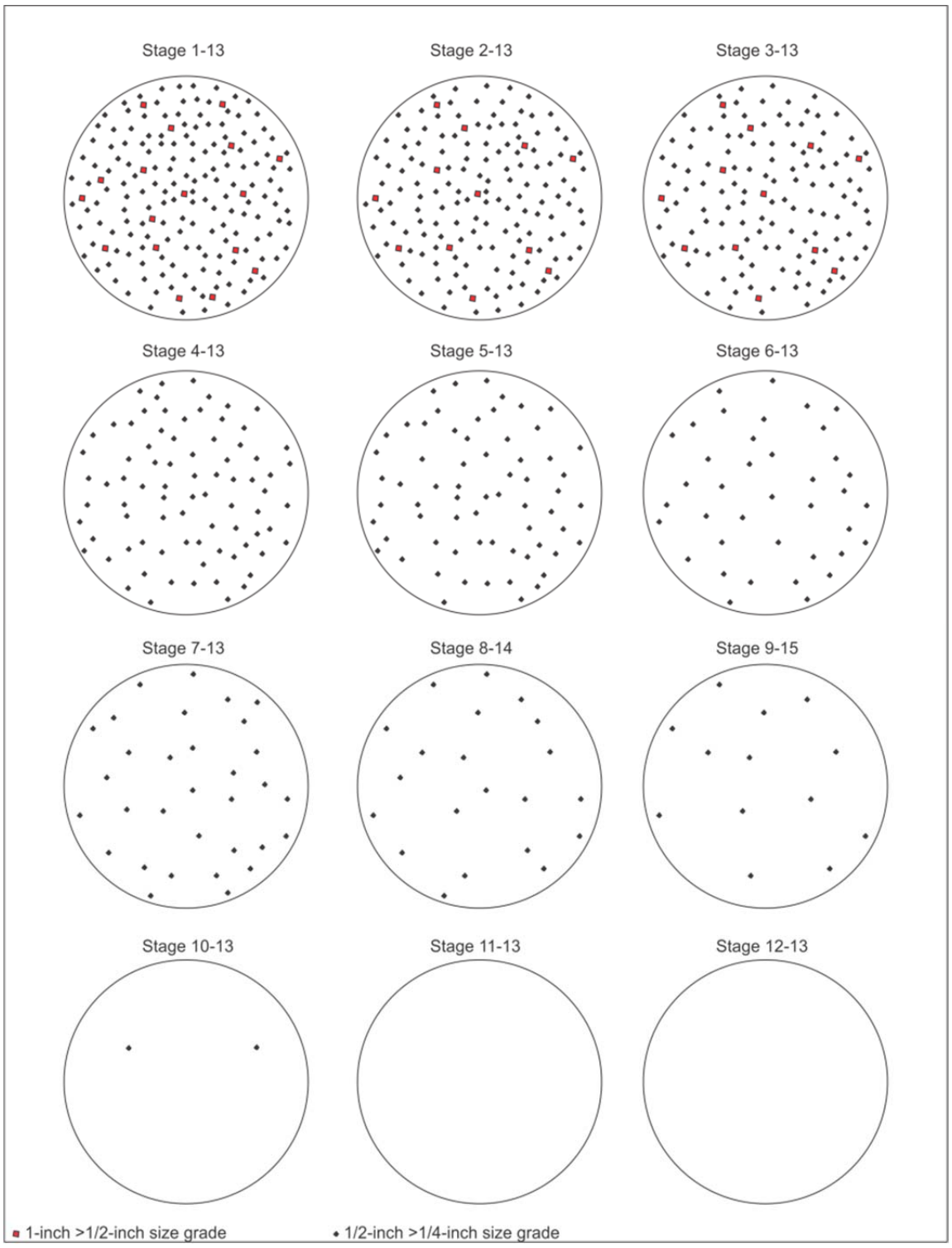


Figure 4. Schematic illustration depicting modeled lithic debris density.

## THE FORMATION OF FIRE-CRACKED ROCK AND ARCHAEOLOGICAL VISIBILITY

Fire-cracked rock (FCR) includes any rock that appears cracked, spalled, or otherwise modified by heat and on archaeology sites we assume that most of this rock was fractured due to human activities. 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 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 involved lining 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 for heating beds (e.g., heat radiators), 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 before being dropped into a container of liquid in order to bring it to a boil. The rapid temperature changes in the rock during stone boiling can cause it to fracture into jagged pieces. FCR was probably recycled and used repeatedly until it was too small to hold and transfer heat efficiently. One way to test this is to compare the size of FCR found in primary features with FCR recovered from midden or plowzone contexts. Midden FCR is more likely to have been used up and discarded, and thus be smaller in size, while 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 flint, which tends to occur 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, especially in the glaciated regions. It appears from their common occurrence on archaeology sites 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 they 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.

## ARCHAEOLOGICAL SURVEY IMPLICATIONS FOR PORTS

The ability to identify prehistoric sites is dependent on the presence of sufficiently detectable quantities of lithic debris and/or FCR. Most other artifact types occur in such low frequencies that they are not reliable indicators for most prehistoric domestic sites. Rare or low-frequency items such as tools or other types of formed artifacts (e.g., cores, biface blanks, and

preforms) are frequently found using standard survey methods but their discovery is usually happenstance. Likewise, standard archaeological survey methods are not designed to identify archaeological features, such as hearths, earth ovens, post molds, or storage pits, especially when they occur in low frequencies. The recovery of pottery at the survey level of investigation is important, but is dependent on the age of the archaeology sites since pottery was not widely used until about 1500-1000 B.C.

FCR is a particularly important site indicator because it reveals that the site occupants were creating and using substantial thermal features. These features, especially earth ovens, are important archaeological resources because they often contain carbonized food and wood remains that can be used to obtain radiometric dates and make inferences about diet, seasonality, and the kinds of plants that were growing in the area around the site. Thermal features are also frequently associated with other types of features, such as storage pits and the postholes that once held the wall posts of shelters or houses. Most prehistoric domestic activities, including the construction and use of thermal cooking facilities, the preparation of food, the use and maintenance of tools, and other daily activities, can occur in the absence of appreciable quantities of lithic debris. FCR, however, is expected at any location where domestic activities occurred. Even a short term hickory nut processing camp might contain FCR, as thermal facilities were frequently used to render nut oil.

The PORTS prehistoric settlement survey was not expected to result in the identification of many prehistoric archaeological sites. However, if found, such sites were expected be low-density lithic debris scatters and isolated finds. This is because this region of Ohio contains very little raw material for tool manufacture, which is the principal source of lithic debris. Because there are no primary geological sources of flint in Pike County, Ohio (Stout and Schoenlaub 1945), stone use would have been limited to poor-quality flints from secondary alluvial sources or imported stone from better quality primary sources outside the county. Lithic debris is expected to occur in low frequencies and represent the use of local flints obtained from the Scioto River bed, a secondary geological source for a variety of small flint nodules. Potential flint types from the Scioto River may include Delaware, Upper Mercer, Vanport, Brassfield/Brush Creek, and Zaleski, all of which crop out in the counties surrounding Pike County. If flint artifacts made from non-local materials are found within PORTS, they will likely consist of exhausted and recycled tools, and very little lithic debris. With this in mind, it is important to remember that low-density lithic debris scatters within PORTS are not necessarily an indicator of ephemeral prehistoric activity. Instead, they may indicate that groups living and working in the PORTS area only engaged in the later stages of the lithic reduction process.

FCR may also be rare because sandstone was the primary rock type available for use as thermal stone, and fire-cracked sandstone is not as durable as igneous or metamorphic FCR. If classic igneous or metamorphic FCR is found, it would indicate an unexpected level of effort since this type of stone would have to have been imported into the area from the Scioto floodplain. In the event that a site within PORTS contains an appreciable quantity of FCR, especially if metamorphic or igneous, the site should be considered for further NRHP evaluation.

## ARCHAEOLOGICAL SURVEY METHODS

In advance of the PORTS prehistoric archaeology site survey, Ohio Valley Archaeology, Inc. was commissioned by Restoration Services, Inc, to create a methodology that would effectively examine the undeveloped portions of the 3,777-acre facility. This resulted in the identification of five color-coded survey area types (Type 1-5). The definition (location, shape, etc.) of these areas was derived using high resolution aerial photographs, LiDAR topographic data (which shows areas of obvious topographic disturbance), 7.5 minute and 15 minute USGS topographic quadrangle maps, and recent historic-era farmstead archaeology reports. Although the field methods used in this survey follow standard and acceptable methods outlined in the *Archaeology Guidelines* (OHPO 1994), these methods were adjusted to each of the color-coded area types based on their archaeological potential.

Survey Area 6B contains four of the five color-coded survey area types. Type 1 areas within Survey Area 6B have the highest potential for prehistoric archaeological sites and generally include all benches, terraces, edges, and toe-slopes overlooking streams that have not been previously affected by PORTS development.

Type 3 areas have a moderate to low potential for prehistoric archaeological sites, but these areas contain micro-landforms that have better archaeological potential. Such micro-landforms may include small elevated landforms (ridges and hummocks) in stream valleys or small benches and toe-ridges on side slopes.

Type 4 areas are defined as developed land that has been heavily modified in modern times, and these areas have little or no potential for prehistoric archaeological sites. While these areas were visually examined through pedestrian survey, they were not shovel tested.

The Type 5 area, within Survey Area 6B contains a historic farmstead site (33Pk324) that was recently surveyed by ASC Group, Inc. (Mustain and Klinge 2012). Because Mustain and Klinge (2012) surveyed this area on a 5-meter and 10-meter interval grid, it was not re-surveyed in the current effort.

Type 1 areas within Survey Area 6B were surveyed using traditional 50x50 cm shovel tests (no more than 1 ft [30 cm] deep, per PORTS procedure) on a 15-meter interval. When a small landform was encountered (i.e., one too small to contain shovel tests at a 15-m interval), the shovel test interval was reduced to adequately cover that landform. The goal was to cover the highest probability areas of all high-potential landforms.

Survey work in Type 3 areas began with a pedestrian survey along transects spaced 15 meters apart. The goal of the pedestrian survey was to identify micro-landforms (i.e., small hummocks and terraces in wet floodplains or small benches and toe-ridges on side slopes) and other possible cultural features, such as components of old farmsteads not yet documented. When micro-landforms were encountered, shovel tests were excavated at an adequate interval (not exceeding 15 meters) to cover the landform. In areas that appeared to be disturbed, the shovel test interval was expanded to 30 meters for the purposes of verifying surface disturbance.

Radial shovel tests were excavated at 7.5-meter intervals around the perimeter of archaeological sites defined by groups of artifact-bearing shovel tests (positive shovel tests). Four radial shovel tests were excavated around isolated positive shovel tests and in instances

where only two or three positive units were encountered. The fill from all shovel tests was screened through ¼-inch mesh and the color and depth of the A-horizon was documented on shovel test forms.

A GPS unit was used to map all shovel tests, photograph locations, relevant features (e.g., roads, monitoring wells, etc.), disturbed areas, and archaeological sites. When archaeological sites were found, a *Field Site Form* with site specific information was filled out and a map of the site area was created showing the locations of the shovel tests relative to landscape features, including roads and bluff/terrace edges.

This systematic Phase I survey has the primary goal of locating prehistoric archaeology sites. Integral to adequately documenting such sites is the ability to recognize and record fire-cracked rock and fire-reddened rock (primarily sandstone). The current survey was sensitive to identifying such rock, as well as flint flakes and other prehistoric artifacts. Prior to the current survey, which is primarily oriented towards the identification of prehistoric sites, survey efforts were made to document historic farmsteads within Survey Area 6B (Mustain and Klinge 2011; 2012). The Mustain and Klinge (2011) effort was a reconnaissance survey designed to locate two farmsteads (#32 and #50) identified from historic map resources (Burks 2011). The reconnaissance survey identified archaeological remains at farmstead location #50 (33Pk324) but no remains at farmstead location #32. The Mustain and Klinge (2012) survey was an enhanced Phase I-level documentation effort at site 33Pk324 only. Prior to the current survey effort, no prehistoric archaeological sites had been documented in Survey Area 6B.

## ARCHAEOLOGICAL SURVEY RESULTS

A total of 474 shovel tests was excavated in Survey Area 6B on all level and nearly level land, especially along the ridgetops and saddles, within Type 1 and Type 3 areas. A pedestrian survey along the slopes was conducted in an effort to locate benches and terraces which, when encountered, were systematically shovel tested.

Only 44 (9%) of the 474 shovel tests excavated in Survey Area 6B produced artifacts. These artifacts were found in three discrete clusters, each of which is a newly defined prehistoric archaeological site (33Pk370, 33Pk371, and 33Pk372). These three sites are described below in greater detail.

SURVEY AREA 6B ARCHAEOLOGICAL SITE DESCRIPTIONS

## 33Pk370

Site 33Pk370 was identified by the recovery of five lithic artifacts and a single piece of FCR from two of the 66 shovel tests excavated in this portion of Survey Area 6B (Figure 5; Table 1). Brassfield, Delaware, and unidentified flint types are present in this assemblage, which includes a small core/nodule fragment, an interior flake, and three late biface thinning flakes. The interior flake and core/nodule represent the earliest stages of the primary reduction process illustrated in Figure 3. The core/nodule (Figure 6), which is made from Delaware flint, has water-worn cortex and was probably procured from the Scioto River before being transported to 33Pk370. The late biface thinning flakes, which dominated this small assemblage, represent the later stages of the primary reduction process. The single piece of FCR reflects the use of thermal features at this location, and is probably associated with other pieces of FCR thinly scattered in low frequencies over the landform.

Although small, the 33Pk370 survey assemblage demonstrates limited use of flint and thermal stone on this landform. Most of the flint artifacts were created from the later stages of the biface blank manufacturing process (Stages 4 through 5), indicating that biface blanks were brought into the site (see Figure 3). There is no evidence that such bifaces were converted into tools at this location, but this is expected since the later stages of the primary reduction process and the entire secondary reduction process do not generate appreciable quantities of debris that would be detectable at this level of investigation. Nevertheless, site 33Pk370 does not appear to represent a significant archaeological site.

Table 1. Artifact inventory from 33Pk370.

| **Stone** | **FCR** | **Core/ Nodule** | **Interior Flake** | **Late Biface Thinning** | **Total** |
|---|---|---|---|---|---|
| Brassfield | - | - | 1 | - | **1** |
| Sandstone | 1 | - | - | - | **1** |
| Delaware | - | 1 | - | 2 | **3** |
| Unidentified | - | - - | | 1 | **1** |
| **Total** | **1** | **1** | **1** | **3** | **6** |

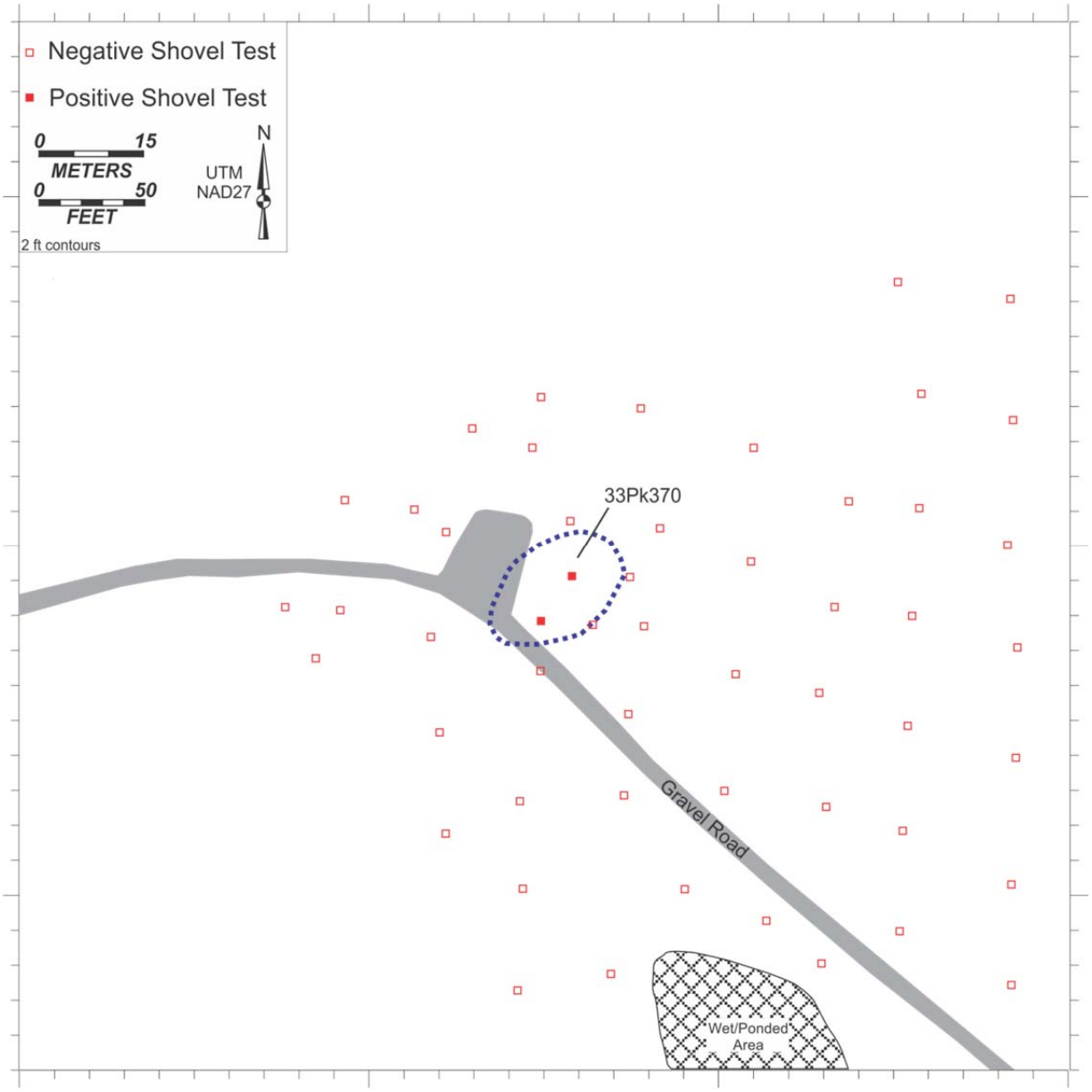


Figure 5. Topographic contour map of 33Pk370.

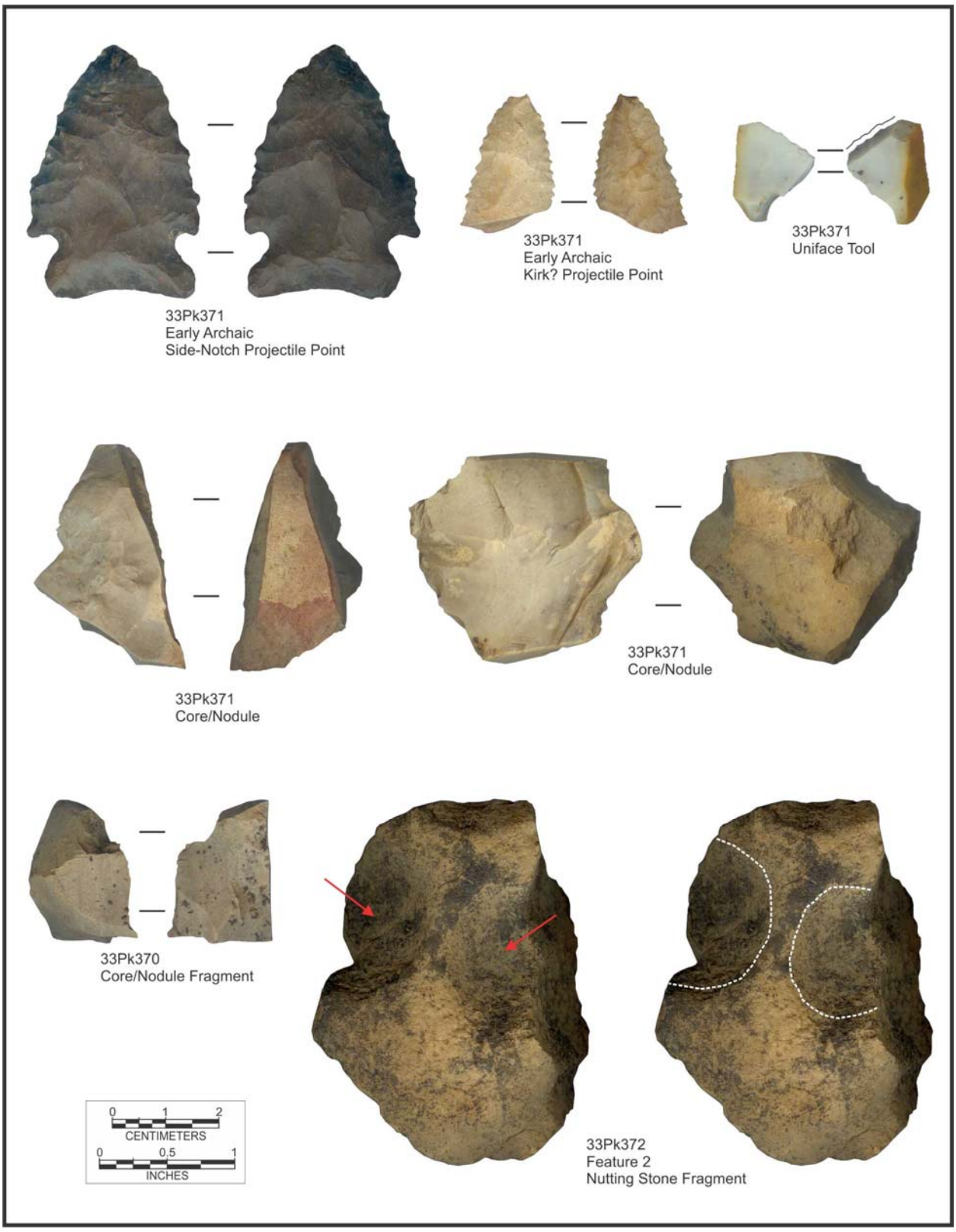


Figure 6. Formed artifacts recovered from Survey Area 6B.

## 33Pk371

Site 33Pk371 was identified by the recovery of 324 artifacts from 27 shovel tests and approximately nine square meters of excavation over a large FCR feature (Feature 1) identified during the shovel testing effort (Table 2) (Figure 7). Most of the artifacts (n=209) were recovered from the fill excavated to expose the plan view of a feature (Feature 1). Shovel testing alone produced 86 artifacts, or an average of 4.3 items per positive unit.

The majority of the artifacts in this assemblage are FCR and all but one is made from local sandstone. One piece of FCR is a type of igneous rock, which would have been found prehistorically in the glacial outwash deposits in the Scioto floodplain. Most of the FCR (n=201) is from the A-horizon surface soil that was sitting above Feature 1, and the balance is from shovel tests distributed across the site area.

The survey also produced 37 lithic (flint) artifacts, of which eight are from the fill excavated above Feature 1. The remaining 28 lithic artifacts are from shovel tests excavated across the site area. Lithic artifacts in this assemblage include two core/nodules, three tools, and 32 flint flakes and shatter. Six flint types are recognized in this assemblage, but all could have been procured from gravel deposits found in the Scioto River floodplain.

The tools include two projectile points and a unifacial scraper-like tool (Figure 6). The two projectile points resemble Early Archaic types. One specimen, made from a dark colored flint (Zaleski?) 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), which overlaps in time with the approximate age of the other spear point. The unifacial tool is fragmentary, but resembles an end-scraper made from heat-treated Vanport flint. Water-worn cortex on a portion of this artifact reveals that the stone to make it was obtained from alluvial or glacial deposits, rather than from a primary geological source.

The 33Pk371 lithic debris assemblage contains a range of technological types representing the entire primary reduction process, from core reduction through the first stage of tool manufacture (see Figure 3). The core/nodule fragments, the quarry-shatter, primary and secondary decortication flakes, and interior flakes, totaling 13 artifacts, are all diagnostic of the very earliest stages of stone reduction. Alternate flakes (n=2) and early biface thinning flakes (n=6) are diagnostic of the early stages of biface blank manufacture, and the late biface thinning (n=6) and early pressure thinning flake (n=1) are diagnostic of the later stages of biface blank production and early stages of biface preform and tool manufacture. Though not a large amount of debris, the 13 pieces of debitage found to date at this site suggest that the site contains more evidence of biface reduction than a short term, resource extraction camp might contain.

While excavating one of the shovel tests near the southwestern part of the 33Pk371 area a dense concentration of FCR was encountered below the surface. The excavation was expanded to over nine square meters to expose an irregular-shaped concentration of *in situ* FCR (Feature 1) that is roughly 9.8 ft by 11.5 ft (3.0 m by 3.5 m) in size. The FCR is concentrated in a higher density on the southern part of the feature. The feature's depth is not known. Characteristic of thermal activity, the feature soil has a slightly reddish hue and contains small carbon flecks in addition to

the FCR. It is likely that this part of the site has never been plowed, otherwise Feature 1 would have been totally destroyed.

Site 33Pk371 has the potential to be a significant archaeological site with at least one thermal feature and two projectile points that date to the Early Archaic period. The temporal relationship between the feature and the projectile points has yet to be confirmed, but Early Archaic features are quite rare in Ohio. It may be possible to procure carbon from Feature 1 for radiometric dating. The presence of a sizeable FCR assemblage over the entire site area suggests that other thermal features were constructed and used at this site. Additional fieldwork should be designed, in part, to locate and document additional features, using, for example, a magnetic gradient geophysical survey.

Table 2. Artifact inventory from 33Pk371.

| **Stone** | **FCR** | **Core-Nodule** | **Tools** | **Quarry Shatter** | **Primary & Secondary Decortication** | **Interior Flake** | **Alternate Flake** | **Early Biface Thinning** | **Late Biface Thinning** | **Early Pressure Thinning** | **Flake Frag./ Shatter** | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Brassfield | - | - | - - | | 1 | 1 | - | 1 | 1 | - | - | 4 |
| Delaware | - | 2 | 1 1 | | 5 | - | 1 | 2 | 4 | 1 | 3 | 20 |
| Unidentified | - | - | - - | | - | - | 1 | 2 | - | - | - | 3 |
| Upper Mercer | - | - | - - | | 2 | 1 | - | 1 | - | - | 2 | 6 |
| Vanport | - | - | 1 - | | - | - | - | - | 1 | - | 1 | 3 |
| Zaleski | - | - | 1 - | | - | - | - | - | - | - | - | 1 |
| Igneous | 1 | - | - - | | - | - | - | - | - | - | - | 1 |
| Sandstone | 286 | - | - - | | - | - | - | - | - | - | - | 286 |
| **Total** | **287** | **2** | **3** | **1** | **8** | **2** | **2** | **6** | **6** | **1** | **6** | **324** |

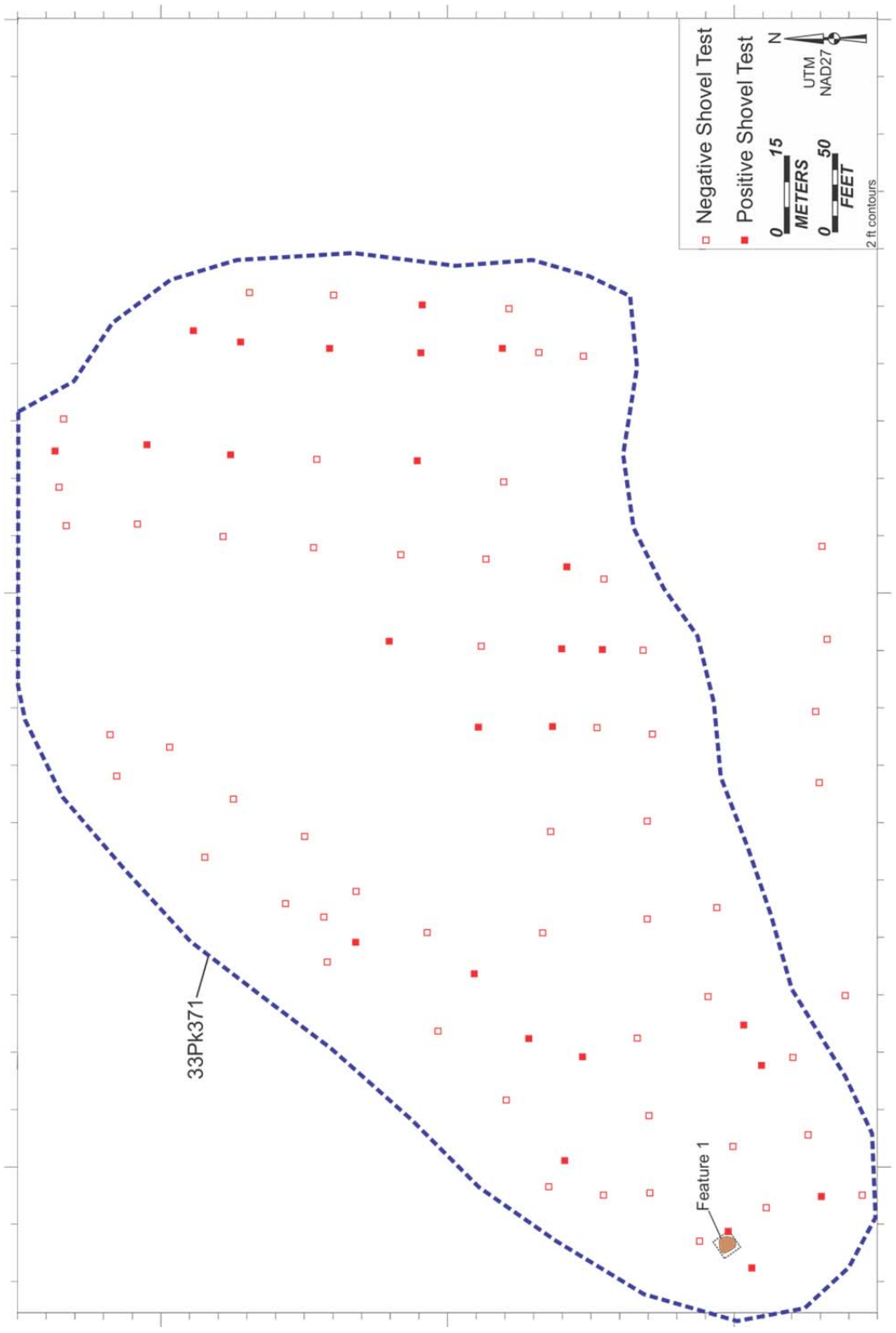


Figure 7. Topographic contour map of 33Pk371.

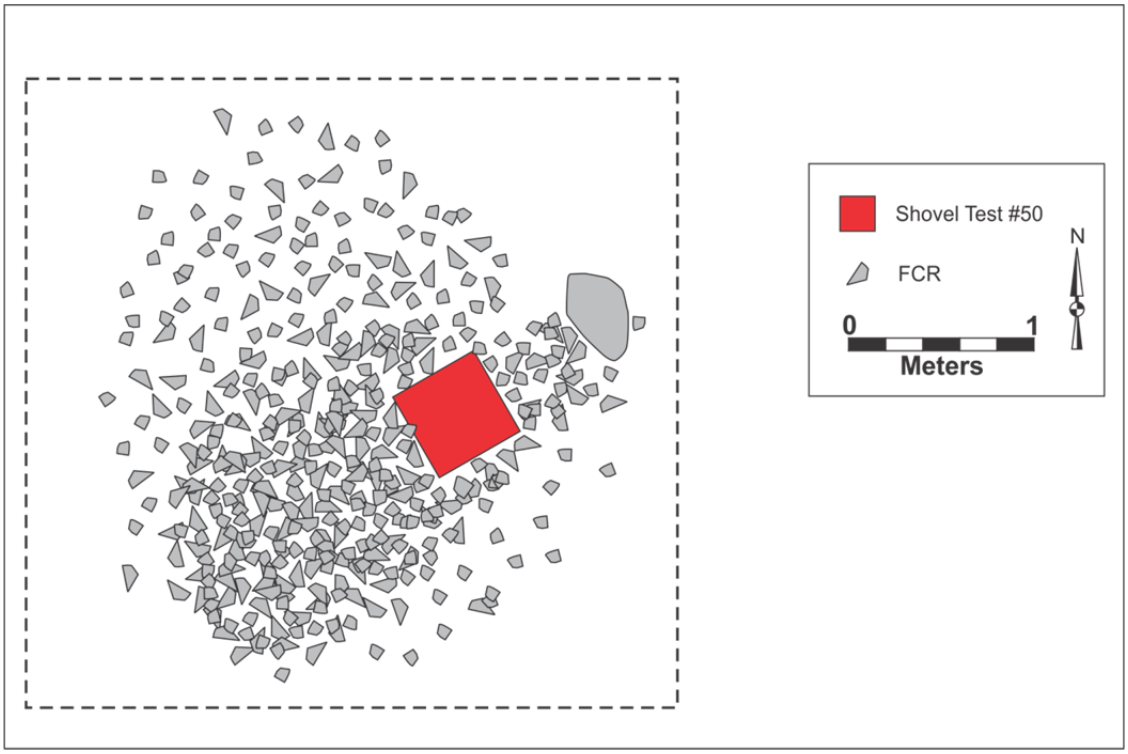


Figure 8. Illustration of Feature 1 at 33Pk371.

Figure 9. Photograph of Feature 1 at 33Pk371.

## 33Pk372

Site 33Pk372 was identified by the recovery of 325 artifacts from 15 positive shovel tests and six square meters of additional excavation centered on two features identified during the shovel testing effort (Figure 10; Table 3). The majority of these artifacts (n=227) are from the additional excavations used to expose Features 1 and 2 in plan view. Independent of the feature excavations, the shovel testing produced 98 artifacts, with an average of 6.5 artifacts per positive shovel test.

FCR dominates the 33Pk372 artifact assemblage and all but two pieces are made from locally outcropping sandstone. Two pieces of FCR are made from igneous rock, which would have been imported to the site. Of the 291 pieces of FCR collected from this site, 106 are from the A-horizon soils above Feature 1 and 120 pieces are from the A-horizon above Feature 2. The remaining 65 pieces are from shovel tests spread all across the site area.

The survey assemblage also includes 32 lithic artifacts, a nutting-stone fragment, and a large animal bone (Table 3). Other than the nutting stone (Figure 6), no stone tools were recovered from 33Pk372. Seven technological classes of lithic debris, all representing the primary reduction process, were identified. Unlike the assemblage from 33Pk371, the 33Pk372 debris assemblage is skewed towards the later stages of this process with only seven flint flakes that are diagnostic of the earliest reduction stages and 16 flakes diagnostic of early and late biface blank thinning. A single flake is classified as a late biface thinning/early pressure thinning flake and was probably produced during the preform thinning stage.

The Feature 1 (Figures 10-12) was initially identified as a dark friable soil and a large animal bone at the base ofthe topsoil (A-horizon) layer. Once uncovered in plan view, it was evident that the feature has an irregular oval shape that measures approximately 3.3 ft by 4.9 ft (1.0 m by 1.5) (Figure 11). Small amounts of FCR and a few small flecks of charcoal were observed in the feature fill. The darker soil appears to be confined to the surface of the feature, as limited soil probing revealed a depth not exceeding 5 cm. Near the center of the feature is a fragment of a large animal bone, which appears to be a scapula fragment, probably from a domestic bovine related to the nearby historic-era farmsteads. If this animal bone is a cow scapula, then Feature 1 is a historic-era anomaly and does not appear to be a significant archaeological feature. In fact, Feature 1 could be an area of animal or tree disturbance that only coincidentally contains an animal bone fragment—probably deposited there by an animal (the scapula has evidence of rodent gnawing).

Feature 2, north of Feature 1 and was identified at the bottom of a radial shovel test excavated at this location (Figures 11, 13-14). Three square meters was excavated in this location in an effort to expose the entire feature in plan view. The result was the exposure of an oval-shaped concentration of FCR that measures approximately 4 ft by 5 ft (1.25 m by 1.6 m) (Figures 13-14). A lower density of FCR was found to extend to the south beyond the edge of the excavation unit. The feature fill, which is a brown silt loam, contains abundant quantities of FCR, a few flint flakes, and few wide spread charcoal flecks. The depth of this feature is not known. The nutting-stone, which had been thermally cracked,was also found in Feature 2 (Figure 6).

Feature 2, coupled with the sizeable FCR assemblage from the site area, demonstrates that thermal features were constructed and used at site 33Pk372. The lithic assemblage is fairly small and contains no tools. It is likely, however, that additional excavations at this location

would produce tools, including temporally diagnostic artifacts. If Feature 2 contains a sufficient quantity of carbon, it should be possible to radiometric date this feature. The nature of the prehistoric occupation(s) at this location is not known at this point, but the nutting stone suggest that at least nut processing activities were happening. The thermal features could also be related to nut processing. Parching the nuts in shallow pits lined on the bottom with hot rocks might have been an important part of preparing them for consumption, transport, and storage. Site 33Pk372 is a potentially significant archaeological site and should be considered for further evaluation. It has good subsurface integrity and potentially contains extensive evidence of nut harvesting.

Table 3. Artifact inventory from 33Pk372.

| **Material/ Stone** | **Animal Bone** | **FCR** | **Nutting Stone** | **Sec- Decortication** | **Interior Flake** | **Int.-Alt.** | **E. Biface Thin.** | **L. Biface Thin.** | **Late Bif./ Early Pressure** | **Flake Frag.** | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Animal Bone | 1 | - | - | - | - | - | - | - | - | - | **1** |
| Brassfield | - | - | - | - | - | - | - | | - | 1 | **1** |
| Delaware | - | - | - | 3 | 2 | 2 | 3 | 5 | - | 3 | **18** |
| Unidentified. | - | - | - | 1 | - | - | - | | - | 2 | **3** |
| Upper Mercer | - | - | - | 1 | - | - | 2 | 1 | 1 | 2 | **7** |
| Zaleski | - | - | - | - | - | - | - | 1 | - | - | **1** |
| Vanport | - | - | - | - | - | - | - | 2 | - | - | **2** |
| Igneous | - | 2 | - | - | - | - | - | - | - | - | **2** |
| Sandstone | - | 289 | 1 | - | - | - | - | - | - | - | **290** |
| **Total** | **1** | **291** | **1** | **5** | **2** | **2** | **5** | **9** | **1** | **8** | **325** |

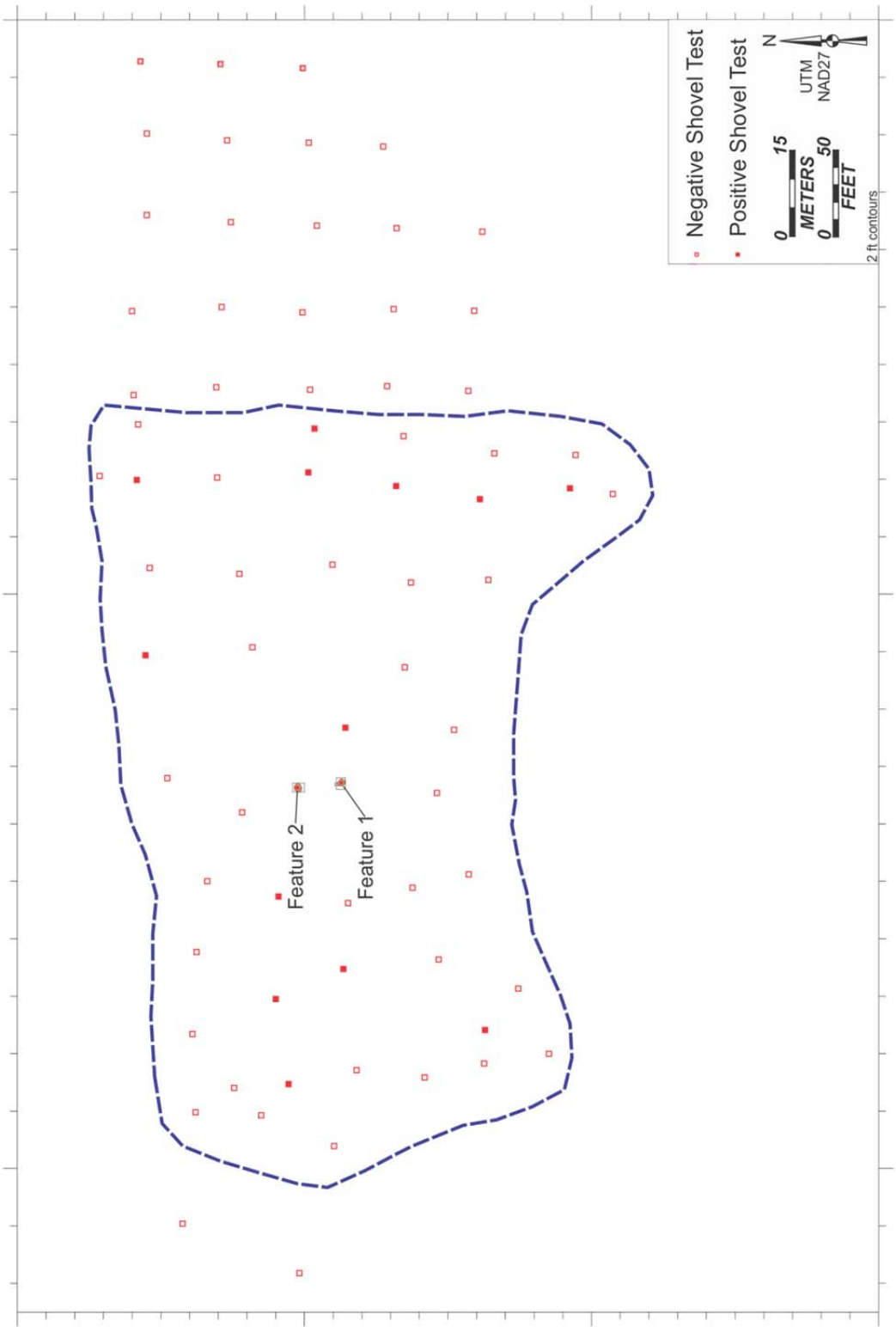


Figure 10. Topographic contour map of 33Pk372.

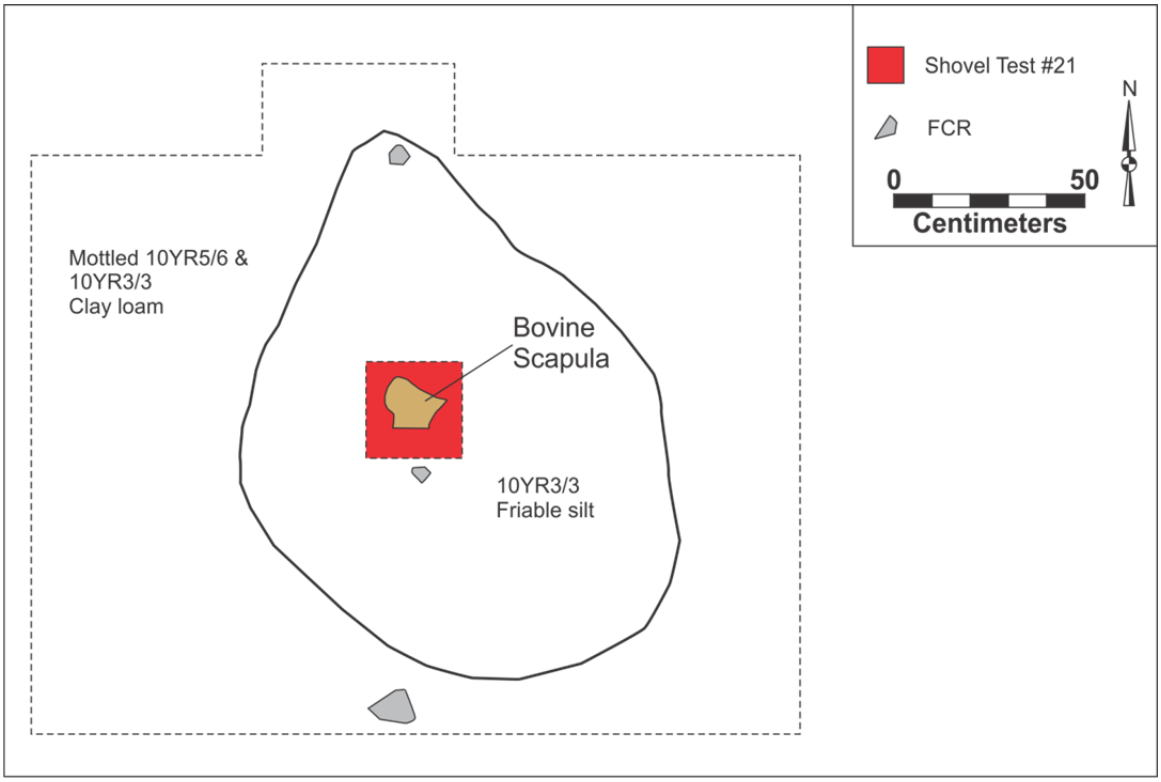


Figure 11. Illustration of Feature 1 at 33Pk372.

Figure 12. Photograph of Feature 1 at 33Pk372.

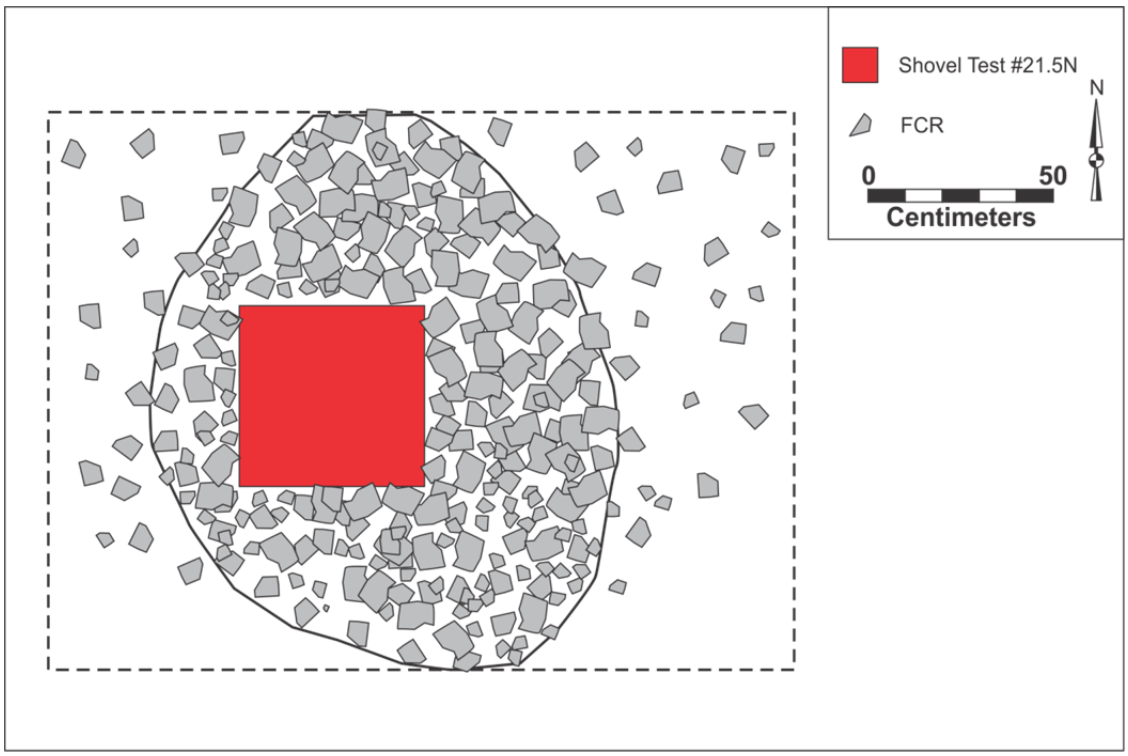


Figure 13. Illustration of Feature 2 at 33Pk372.

Figure 14. Photograph of Feature 2 at 33Pk372.

## SUMMARY AND RECOMMENDATIONS

The PORTS Survey Area 6B archaeological survey involved the systematic excavation of shovel tests at 15-meter intervals in all level or nearly level areas that have not been significantly altered by earth moving activities. Prior to the survey, a survey plan was developed to identify areas with archaeological potential; this plan also required a systematic pedestrian survey to identify small landforms with the potential to contain archaeological sites. Archaeologically important landforms in the area include ridgetops and saddles, finger ridges that extend from the main ridge tops, toe-ridges that tend to extend out from the lower elevations near the bottoms of slopes, benches on side-slopes, stream terraces, and stream bottoms. Each shovel test measured 50 cm by 50 cm in size and extended to no more than 25 cm (12 inches) below surface. Shovel test intervals were reduced in certain areas in an effort to better cover smaller landforms and to define archaeological site locations. The fill from each test was screened through ¼-inch hardware cloth.

Although the survey was oriented towards the identification of prehistoric sites, it was intended that all historic-era sites would be documented if encountered. The ultimate goal of this survey was to locate all archaeological resources that could be reasonably detected with the survey methods used in this study. It was expected that PORTS, including Survey Area 6B, contains numerous prehistoric archaeological sites represented by lithic debris (stone working debris) and FCR. The presence/absence and frequency of these artifact types is dependent upon the types of prehistoric activities that occurred within PORTS. While prehistoric Native Americans may have lived in various places that now make up PORTS, they did not necessarily engage in the types of activities that resulted in the deposition of appreciable quantities of lithic debris or FCR.

Archaeological visibility, or detectability, is affected by artifact quantity and density on the landscape. This report attempted to model, in a very simple way, how lithic debris is generated and how the processes involved in the manufacture, use, and maintenance of chipped stone tools affect assemblage formation and archaeological visibility. This model predicts that lithic assemblages in flint-poor regions tend to represent the later stages of the lithic reduction process. This model demonstrates that as the lithic reduction process proceeds through various stages of tool manufacture, use, and maintenance, the amount of debris generated decreases. All things being equal in terms of the quantities and types of chipped stone tools manufactured, used, and maintained at any given location, the amount of debris generated diminishes greatly with omission of previous reduction stages. The result is a decrease in the archaeological detectability of sites represented only by lithic debris scatters.

Pike County is a flint-poor region, meaning it has no primary geological flint outcrops. Prehistoric stone use would have required the importation of flint from elsewhere and/or the use of scarce secondary geological sources. Most of the waste from the imported flint would have been removed prior to entering Pike County. The degree to which this was done would have limited the amount of debris that could have been created from the stone used within Pike County. Secondary flint sources tend to offer small nodules, and the transport of unaltered nodules for use away from the source would have occurred infrequently. Lithic assemblages in Pike County, especially in the uplands away from the Scioto River, are expected to be sparse and have poor archaeological visibility. Therefore, lithic debris quantity, alone, should not be used to evaluate archaeological significance, as prehistoric peoples carried out many other activities in their daily lives that did not result in the depositions of large amounts of lithic debris.

Table 4 summarizes all known archaeological resources documented within Survey Area 6B. Three of these (33Pk370-372) are newly recorded prehistoric sites identified during the recent shovel test survey reported within these pages. Site 33Pk324 is an early twentieth century farmstead site documented by Mustain and Klinge (2011, 2012).

Table 4. Summary of archaeological sites and recommendations within Survey Area 6B.

| Site | Survey Type | Site Type | Historic-era Temporal Component | Prehistoric Temporal Component | Recommendation |
|---|---|---|---|---|---|
| 33Pk324 | Enhanced Phase I | Farmstead | X | - | No further work |
| 33Pk370* | Phase I | Lithic Scatter | - | X | No further work |
| 33Pk371* | Phase I | Lithic Scatter | - | X | Phase II evaluation |
| 33Pk372* | Phase I | Lithic Scatter | - | X | Phase II evaluation |

*Current Survey;

Site 33Pk370 is a very small prehistoric lithic scatter represented by six lithic artifacts and a single piece of FCR. No stone tools or temporally diagnostic artifacts were found at this location. The lithic artifacts in this assemblage represent segments within the primary reduction process. Per the lithic reduction model presented above, it is evident that a negligible amount of primary reduction stone working occurred at this location. The paucity of FCR also indicates that the occupants of 33Pk370 made little use of thermal stone. Additional work at 33Pk370 would almost certainly result in the collection of additional artifacts, but the potential for subsurface features appears low. Site 33Pk370 does not appear to be a significant archaeological site and should not be considered for further evaluation.

Sites 33Pk371 and 33Pk372 are much larger prehistoric sites with abundant quantities of FCR and moderate quantities of lithic debris. Shovel testing at these locations identified shallow, FCR-laden features at each site. Both features are very large and shallow. They clearly served as some type of thermal facility, perhaps related to cooking and/or nut processing. The feature at 33Pk372 produced a "nutting stone," which is a type of artifact traditionally thought to be associated with nut processing activities. The age of these features is not known, but both contain very small amounts of carbon that could be used for radiocarbon dating. Site 33Pk371 produced two projectile points that resemble published types that date to the Early Archaic period (8000-6000 B.C.). While Ohio was occupied by humans well before this period, few archaeological sites dating to this period have been intensively investigated in the southern part of the state—and in particular, few Early Archaic sites in upland settings are known. Both of these sites have the potential to contain information about how the prehistoric inhabitants of the Scioto River Valley, perhaps during the Early Archaic period, occupied and made use of the uplands. Both sites should be protected and considered for further evaluation.

Any future work at sites 33Pk371 and 33Pk372 should be centered on the recovery of additional lithic artifacts, on the identification of additional subsurface features, and on the procurement of radiometric dates. The investigations should include high-density shovel testing (on 5x5 meter grids), 1x1 meter unit excavations, a magnetometer survey, and feature documentation and excavation. It is highly recommended that such work be conducted by an expert in prehistoric lithic technology and include a detailed technological analysis following the principles detailed by Pecora (2002). The magnetometer work should be conducted by an archaeologist with expertise in the application of geophysical surveys in archaeology. All magnetic anomalies should be tested under the direction of individuals with expertise in using magnetic data for archaeological evaluations. A sample of features, if found, should be

excavated by individuals who have expertise in excavating magnetic anomalies. Features should be properly documented and carbon samples collected for botanical and radiometric analysis.

Until sites 33Pk371 and 33Pk372 are properly evaluated, they should be treated as if they are eligible for inclusion into the National Register of Historic Places. Additional consultation with the Ohio Historic Preservation Office and other consulting parties regarding the future treatment of these archaeological resources is recommended.

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