

The Puncheon Run Site: Overview of the Excavations

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ABSTRACT

Extensive Phase II and Phase III investigations were carried out at the Puncheon Run Site, which is located along the St. Jones River in Kent County Delaware. The excavations were guided by a research design that focused on a number of important issues in Delaware prehistory: prehistoric chronology, subsistence, settlement patterns, technology, and environmental adaptation. Although nearly all of the site had been plowed historically and collected by amateurs, numerous subsurface features and activity areas were identified, including lithic workshop areas, fire-cracked rock clusters, and large storage pits. The site is so large that it is best understood as a landscape with a number of discrete activity areas that may or may not have been integrated into a single settlement system. Specialized studies which are being conducted in conjunction with the excavations include a review of ethnographic literature, investigations of tree throws and ground hog dens, a landscape analysis, geomorphological investigations, soil chemistry analyses, soil micromorphology, phytolith analysis, flotation analysis, and analysis of ancient protein residues on stone tools.

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INTRODUCTION

The Puncheon Run Site is a large site or group of sites spread over an area of nearly 24 acres at the confluence of the St. Jones River and Puncheon Run in Dover, Delaware. The site was occupied primarily during Delaware's Woodland I and Woodland II periods, which roughly corresponds to the Late Archaic through Late Woodland in the Middle Atlantic regional chronology. There is also limited evidence of Middle Archaic occupation at the site. The site is represented by a broad lithic scatter, but it also contains a number of subsurface features, including lithic workshop areas, fire-cracked rock clusters, and storage pits. Most, if not all, of the site has been plowed, although some areas are now covered with second-growth forest.

The site is so large that it cannot easily be classified as a single site type, such as a base camp, transient camp, or procurement site. In this case, the term "site" is more of an administrative unit that encompasses a broad landscape with a number of discrete activity areas that may or may not have been integrated into a single settlement system. The site has been divided into four loci to facilitate management of the fieldwork. The best preserved areas of the site, — Loci 1, 2, and 3 — occupy a peninsula formed at the confluence of the St. Jones River and Puncheon Run. Locus 4 is an island in the St. Jones River.

Near the site, the St. Jones River is a tidal stream bordered by marshes and swamps. At the western end of the site, Puncheon Run is a swift-flowing perennial stream, and the site extends to within a few feet of its banks. As it nears the St. Jones, a broad floodplain forms along Puncheon Run, and the site is elevated on bluffs as much as 25 feet above and 400 feet away from, the stream. At the confluence of the Puncheon Run and the St. Jones is a broad marsh. Surface elevations on the site range from 10 to 30 feet (3 to 9 meters) above sea level, and soils are mostly sand and gravel.

The Puncheon Run Site was long known to amateur collectors, and it was formally recorded in 1976 during a study for a proposed Dover By-Pass. Beginning in 1995, the Delaware Department of Transportation has sponsored a series of archaeological investigations of the site in connection with the planned Puncheon Run Connector project. The first well-documented investigation of the site was a Phase I archaeological survey of the Puncheon Run Connector which was carried out by Hunter Research, Inc. in 1995 (Liebknecht et al. 1997).

After a program of Phase II testing, Hunter recommended that the site be considered eligible for listing on the National Register of Historic Places (Liebknecht et al. 1997). However, questions remained about the integrity of the site and its ability to contribute specific information pertinent to Delaware prehistory. Extended Phase II investigations at the site were therefore conducted by Louis Berger & Associates, Inc. in 1997 (LeeDecker, Holt, et al. 1998; LeeDecker, Jacoby, et al. 1998). These extended Phase II investigations were designed to test the integrity of the site and investigate the possible pit houses identified during the earlier Phase II. Although no convincing examples of pit houses were identified during Berger's Phase II testing, the site was determined to be eligible for the National Register of Historic Places.

A Phase III data recovery and preservation plan was initiated in May 1998 and completed in October 1998. Data recovery operations were focused in Loci 1 and 3, while parts of Locus 2 were designated for preservation. In Locus 1, the excavations focused on a large cluster of pit features, and on sampling a lithic procurement area situated on a relict gravel bar and on a buried plowzone deposit that contained the highest concentration of prehistoric ceramics at the site. In Locus 3, data recovery focused on a large excavation block centered on a grinding stone and on a cluster of large pit features.

In addition to block and feature excavations, there were a number of ancillary studies including:

- ▶ investigations of tree-throws and a ground hog den
- ▶ geomorphological investigations
- ▶ soil chemistry analyses
- ▶ ethnographic research focusing on housing, subsistence, mortuary practices, and plant use
- ▶ stone tool replication experiments

RESEARCH DESIGN

The research design was structured to address the primary research issues outlined in the Delaware Woodland I context and other state management plans (Custer 1986, 1994; Custer and De Santis 1986). These issues included:

- chronology
- subsistence
- settlement patterns, (household, community, and regional levels)
- technology
- environmental adaptation.

In addition to these issues of broad interest in regional prehistory, research questions of a more site-specific nature were also developed.

Chronology

Culturally diagnostic artifacts from the site indicate occupation or use of the site primarily during the Woodland I and Woodland II periods, with limited evidence of an Archaic period component. We have a few Early to Middle Archaic points, but by far the most common point type is what we call a "pebble point." These are small, stemmed points fashioned from a pebble or small cobble, often with cortex remaining on the basal edge. The collection also includes Wolfe Neck, Hell Island, Minguannan Incised, and Selden Island ceramics, and a number of distinct experimental wares.

Six radiocarbon dates were obtained from various contexts at the site during the Phase II testing,

primarily from feature fills. These dates range from 3440 BP to 1730 BP (Table 1), with a cluster of three dates falling around 1850 BP. These three dates are all from the fill of a single storage pit in Locus 1.

More than 200 additional charcoal samples were obtained during the Phase III fieldwork, but have not yet been processed. In addition to processing some of the carbon samples for dating the occupational episodes and feature filling events, we hope to submit a sample of the ceramics for thermoluminescent dating.

Although the site does not contain clear cut vertical stratigraphy, there is some evidence that an interpretable “horizontal” stratigraphy may be present. One of the greatest challenges to interpreting the site will be to resolve the issue of whether the dispersed activity areas are parts of a single settlement system occupied by one cultural group or whether they represent task-specific occupations events by different groups. We hope to learn more about this issue from dating of charcoal and ceramics.

Subsistence

Subsistence is one of the most important research questions, as it not only addresses basic economic patterns, but it also helps us approach questions of seasonality and settlement, and how Woodland groups used their environment

The current model of Woodland subsistence patterns in Delaware (Custer 1994) indicates the emergence of a more intensive pattern of plant food use, termed *productive intensification*. This is inferred from the presence of artifacts such as heavy woodworking tools, soapstone and ceramic containers, plant processing tools, and pit features employed for food storage. At the Puncheon Run Site, we have clear and abundant evidence for the use of ceramic vessels and storage pits, and one of the most important finds in Locus 3 was a large *metate* or grinding stone.

At this point, we can say very little about the actual specific foods or other resources that would have been associated with the ceramic vessels, storage pits, and grinding stone, which is a common problem at many sites in Delaware and surrounding Middle Atlantic region.

The site contains virtually no dietary bone, but we initiated an aggressive soil flotation recovery program during the extended Phase II investigations. The flotation samples processed to date contained relatively little analytically significant material, as Justine McKnight, our consultant for flotation can tell you. Although the flotation data contribute to a general interpretation of site subsistence and landscape utilization, the data are problematic.

So we are exploring a number of new directions in the pursuit of subsistence information. One of the approaches is to extract and identify protein residues from the surfaces of stone tools. This technique is relatively new and there are doubts about the methods and results (Custer et al. 1988; Dent 1995:173; Eisele et al. 1995; Inashima 1992; Kooyman et al. 1992; Petraglia et al. 1998; Smith

and Wilson 1992), but we believe that we must explore all possible avenues for obtain subsistence information. Rob Jacoby has been leading this effort, and he will provide some of the details in his paper. But one of the most promising approaches we are pursuing is to have protein antisera developed specifically for the Puncheon Run Site and surrounding region. We identified a number of important fish species that inhabit the Delaware Bay and its tributaries and submitted them to an outside laboratory to develop a reagent. When the reagents are developed, other researchers will have also access to them for testing.

Another approach we have been investigating was sparked by some unusually high concentrations of strontium in soil samples taken from features in Locus 3. Based on the high levels of strontium in the soil, we began to look at strontium as a possible indicator of prehistoric fish processing. Strontium ordinarily occurs in very low amounts in terrestrial contexts, but is one of the most abundant elements in sea water. We have no direct evidence of fish processing at the site, but we have been reviewing the literature on strontium and fish physiology and we hope to obtain samples from archaeological sites with that are known to be associated with fish processing. Rob Jacoby and Dan Wagner can tell you more about this study.

We also hope to initiate a program of phytolith analysis that may provide information on questions related to subsistence and environment. Phytolith analysis has not been widely used in this region, and as a result there is lack of suitable type collections and comparative studies. We collected more than 150 samples for phytolith analysis, but as of now, only a half dozen or so have been processed. The preliminary results have been encouraging in the sense that the test samples actually do contain identifiable phytoliths and they are not all grasses. Eventually, we hope to process a number of plants that were identified in the ethnographic research as economically important species. These would then provide a type collection of phytoliths not only for our work at the Puncheon Run Site but will also be available for anyone else working in this region. Irv Rovner from North Carolina State University is working with us on this.

One of the big questions in prehistory is related to the ability of hunter-gatherer groups to accumulate surplus foods how these surpluses were related to the emergence of complex, stratified societies. The presence of storage pit features at the Puncheon Run Site is an important physical expression of the ability of Woodland groups to accumulate surplus foods. However, there are important questions as to how these pit features were used.

At the Puncheon Run Site, we identified and excavated nearly 40 pit features, and you will hear more about this in the paper John Bedell is going to give. The pit features at Puncheon Run exhibited a wide variety of forms and sizes, but there were a number of very well preserved cylindrical pits that we called "silos." The best preserved examples are roughly cylindrical in form, particularly at the base of the feature, with a relatively flat bottom. Volumes for these features range from less approximately 0.2 to 2.7 cubic meters, with a mean volume of slightly less than 1.5 cubic meters. Other basin-shaped have ranged up to 5 or 6 cubic meters in volume.

The pit features are perhaps the most intriguing element of the site, and we will be addressing a

number of important questions about the function of these pits, their role in subsistence practices, and the processes of their creation, filling, and abandonment.

The current Delaware model (Custer 1994) posits that storage pits were used for long-term, winter storage, and that storage and consumption took place at the same site. The current model also suggests that small storage pits were located within or immediately adjacent to pit houses; however, this model does not appear to be applicable to the Puncheon Run Site, as we found no convincing evidence of pit houses. Oddly enough, our greatest concentration of storage pits was in an area of the site that contained very little occupational debris.

Roger Moeller has examined a number of questions related to the use of pit features, using data from the Upper Delaware River Valley (Moeller 1992). One of Moeller's most interesting hypotheses is that many of the Woodland pit features found in the Upper Delaware Valley were associated with processing camps occupied during the late summer and fall, and that the storage pits were used only for the temporary caching of processed and preserved foods, which were then taken to the winter camps where they were consumed. A key aspect of this model is that storage pits were used only for temporary caching, and that little consumption actually took place at the storage pit site. If this model applies to the Puncheon Run Site, it could offer an explanation as to why there was very little occupational debris associated with the pit features.

Other investigators (DeBoer 1988; Ward 1985) have pointed out that storage pits are often associated with semi-sedentary groups, and cited both ethnographic and archaeological evidence that storage pits were used to conceal surplus food from enemies or oppressive rulers. DeBoer (1988) has summarized a number of important points about storage pits:

- they are most often associated with semi-sedentary temporary or seasonal settlements
- they are frequently found within a cultural landscape of chronic warfare
- they are usually found in usually aggregated summer settlements, occupied by groups who subsist at least partially on agriculture
- in all cases, subterranean storage plays a role in which fall harvests, either agricultural or wild products such as nuts, may be concealed from scavenging animals or predatory human neighbors.

At this time, we have not yet fully analyzed our data from the excavated pits, but we hope to explore some of these hypotheses as analysis proceeds. John Bedell will be discussing the pit features in more detail in one of the following papers.

Settlement Pattern Studies

In Delaware, settlement pattern studies have been approached at varying scales, ranging from individual households and communities composed of multiple households to regional settlement models. At the level of individual households, the most basic question pertains to the existence of so-called pit houses.

Berger has been investigating this question at the Puncheon Run Site since the inception of the extended Phase II investigations (LeeDecker 1998), but it is unlikely that we will have the final word on this subject. Although numerous pit features have been identified in Delaware, associated post molds are very rare, a phenomenon that has been attributed to the effect of plowing.

As virtually all of the Puncheon Run site has been plowed, it cannot serve as a good test case for this model.

Berger has examined settlement pattern issues throughout the Phase II and Phase III investigations and approached the issue from various scales. At the smallest scale, settlement patterns may be viewed from the perspective of individual households, as mentioned above. We have previously favored an investigative approach based on the work of Binford (1983) and others (e.g., O'Connell 1987; Yellen 1977) who have used ethnographic data from hunter-gatherer societies to examine the use of space in residential and non-residential sites. This approach was anticipated for the work at Locus 3, where a block excavation was centered on an area with a large grinding stone and a number of fire-cracked rock clusters that represent cooking or processing stations.

One of the unique aspects of the work at the Puncheon Run Site is to view the settlement pattern issue from the perspective of the landscape. With a broad variety of activity areas spread over a large area, the site affords a unique opportunity to study Woodland settlement patterns from a different perspective. In the Middle Atlantic region, one typically finds evidence of all these activities compacted into a single acre or less of site, which we would call a base camp. All of the activity areas within the Puncheon Run Site area within easy walking distance of one another, so that they all could have been used by a single community and reached without the need for overnight travel.

Technology

Information needs related to technology are being addressed by analysis of the lithic technology, ceramic technology, and features represented at the site. We also expect that the ethnographic research on various Native American technologies will enhance the interpretation of the archaeological data.

The storage pits represent the most intriguing features at the site, and they apparently represent a technology for the management of surplus foods.

We also hope to learn much about the lithic technology represented at the site. We know that locally available cobble deposits were exploited, and that bipolar reduction strategies were commonly used throughout the Delaware Coastal Plain. As part of the analysis, we did some experimental replication of the small stemmed points. All debitage from the manufacture of these replications was retained and it will be analyzed and used as a control for analysis of the site assemblage.

We also hope to learn more about technology from the protein residue study. Antisera from a variety of locally available species, each of which may have required different technologies for exploitation. For example, harvesting of small fish such as anchovies, would have required the use of nets.

Environmental Adaptation

Of course, a knowledge of the local and regional environment is essential to understanding the settlement pattern. Located in the Mid-Drainage zone of Delaware, the site occupants would have had access to one of the richest ecological zones within the state (Custer 1986:15). Existing vegetation surrounding the site today suggests an ecotonal setting with access to both freshwater and tidal species. We are investigating the environmental conditions by detailed geomorphological studies, being conducted by Dan Wagner, and a landscape study, being conducted by Justine McKnight.

Landscape Formation

Questions related to landscape formation are central to interpreting the archaeological record, and we began investigation of this issue during the Phase II investigations. Although previous work (Liebknecht et al. 1997) had suggested that aeolian processes were an important factor in shaping the site landscape, more recent work, including soil particle size analysis, has discounted this idea (LeeDecker, Holt, et al. 1998; LeeDecker, Jacoby, et al. 1998). Instead, the biomantle concept (Johnson 1993) has been proposed to account for the shallow burial of cultural features and deposits. The biomantle concept is one possible model that will be examined in the study of landscape formation, and we have been working closely with other geomorphologists working in the area.

Detailed geomorphological studies are being undertaken not only for the site/landscape as a whole, but also for individual features and soil anomalies. As an adjunct study, a literature review focused on tree-throw activity is underway.

Rodent activity is also quite evident at the site, and a ground hog (*Marmota monax*) den has been investigated through controlled archaeological excavation. The distribution of ground hog dens throughout the site has also been observed, and it may provide additional information on site formation processes at the scale of the landscape. During excavation of the ground hog den, soil samples were taken, we hope that chemical analysis may provide information useful for interpreting some of the anomalous pit features.

This paper has only touched on the major aspects of our work at Puncheon Run, and much of the

analytical work is still ahead. As we move into the data analysis phase of the project, we will also be working very hard to interpret our results to a variety of audiences. In Delaware, public interpretation is an important element of archaeological work, and we've developed a number of new approaches to make our work understandable and appreciated by a wider audience.

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Table 1: Summary of Radiocarbon Dates, Puncheon Run Site

Locus	Block	Unit	Feature	Feat. Stratum	Feat. Level	Remark
1	14	239	3	A	2	16.3 gm; radiocarbon age of 1820+/- 80 years BP (Beta-114670); calibrated results: AD 45 to 410; small sample which required an extended count.
1	14	239	3	A	6	8.1 gm; radiocarbon age of 1870+/- 100 years BP (Beta-114671); calibrated results: 50 BC to AD 405.
1	14	239	3	B	10	8.7 gm; radiocarbon age of 1820+/- 80 years BP (Beta-114672); calibrated results: AD 45 to 410; small sample which required an extended count.
1	14	243	6	C	6	2.5 gm; radiocarbon age of 1980+/- 60 years BP (Beta-114673); calibrated results: 75 BC to AD 160.
3	4	.	1B	A	all	2.0 g. Radiocarbon age of 1730+/- 90 years BP (Beta-112639); small sample which required an extended count.
3	4	139	25	A	3	6.5 g. Radiocarbon age of 3440+/- 110 years BP (Beta-112640); small sample which required an extended count.

SLIDE LIST

1. USGS quad
2. Diagnostic Artifacts
3. Radiocarbon Dates
4. Metate
5. Fish(ing)
6. Pit (Feature 2)
7. Silo Pit Profile (Feature 4)
8. Silo Pit Profile (Feature 3)
9. Pit House (Custer View)
10. Metate Block in Excavation
11. FCR Cluster Feature
12. Acorn Processing Apparatus--mortar&pestle
13. From River--environment
14. Tree Throw
15. Ground Hog (*Marmota monax*)
16. Ground Hog Den During Excavation
17. Ground Hog Den After Excavation