PREHISTORIC COMPONENT RESULTS

Phase I and II testing at the Whitten Road site (7NC-D-100) revealed the presence of prehistoric artifacts dating to the Woodland I time period (ca. 3000 B.C. - A.D. 1000). However, none of these artifacts were found in good context. The small number of prehistoric artifacts recovered and the limited number of tool types represented among them indicated that the site was an ephemerally used procurement site (Custer et al. 1985) and the small size of the site and the absence of in situ artifacts precluded its nomination to the National Register of Historic Places. Therefore, no data recovery plan was implemented for Phase III mitigation of the prehistoric component of 7NC-D-100. The recovery of additional prehistoric material during Phase III mitigation was incidental to the excavation of the extensive historic components of the site and was contained within the extent of the historic site limits. As previously noted in the Phase I and II report, a controlled surface collection of the site had failed to identify any discrete concentrations of prehistoric artifacts except for one cluster which was probably produced by natural processes (Custer et al. 1985:26). Although a research design expressly created for the recovery of prehistoric artifacts might have created a different data set, the relatively even nature of their distribution suggests that a representative sample of prehistoric material was obtained during excavation of the historic component. Because this sample of prehistoric artifacts is small, no spatial analysis of their distribution was undertaken.

Prehistoric artifacts were processed and catalogued following Island Field Museum guidelines. All lithic artifacts were catalogued by raw material and functional categories including projectile point/knifes, early and late stage bifaces, flake tools, debitage and fire-cracked rock (FCR). A total of 348 prehistoric artifacts were recovered from the plowzone excavations and surface collections (Table 1).

Four stemmed and 3 notched projectile points (Figure 10) were recovered from 7NC-D-100, as were 20 bifaces and biface

TABLE 1

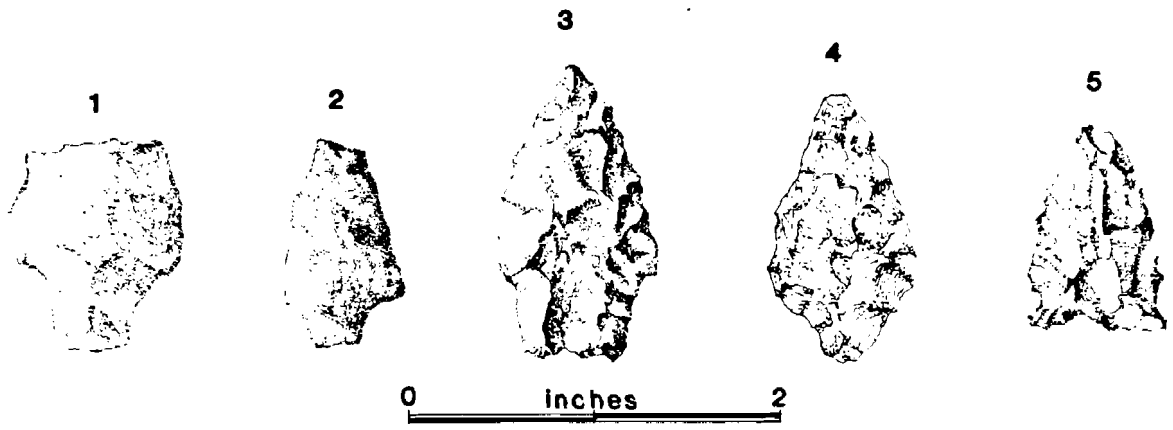
PREHISTORIC ARTIFACTS, SURFACE AND PLOWZONE

Artifact Type	Quartz	Jasper	Chert	Quartzite	Other	Total
Flakes (cortex)	96(19)	83(47)	44(17)	14(8)	6(3)	243(94)
Flake Tools	5(3)	5(4)	1(1)	2(2)	1(1)	14(11)
Early Stage Bifaces	6(2)	-0-	1(1)	1(1)	-0-	8(4)
Late Stage Bifaces	3	1	2	-0-	-0-	6
Biface Fragments	3	2	1	-0-	-0-	6
Stemmed Points	2(1)	1	-0-	-0-	1	4(1)
Notched Points	2	-0-	1	-0-	-0-	3
Cores	1(1)	3(3)	1(1)	-0-	-0-	5(5)
Cobble Tools & Cobble Fragments	-0-	1(1)	3(3)	-0-	-0-	4(4)
Total	118(26)	96(55)	54(23)	17(11)	8(4)	293(119)
Percentage of Total	40%	33%	18%	6%	3%	----

Not Included: 54 FCR
1 Atlatl weight fragment

FIGURE 10

Points Recovered from Plowzone



1. quartz stemmed point. 2. argillite stemmed point.

3. jasper stemmed point. 4. quartz stemmed point.

5. chert notched point.

fragments. Four of the points were broken and two of these show evidence of later resharpening. Eight early and six late stage bifaces were found, as were six fragments of bifaces broken during manufacture or use. Half of the early stage bifaces had cortex and nine cores and cobble fragments, all with cortex, were also found. Other tools recovered included 14 flake tools, a spearthrower or "atlatl" weight fragment, and 3.05 kg (6.7 lbs.) of fire-cracked rock. No prehistoric ceramics were found. It should be noted that the prehistoric ceramics noted in the determination-of-eligibility and the Phase I and II report were small pieces of daub which were initially mistakenly identified as prehistoric ceramics by Jay Custer.

Most of the points and bifaces were made of quartz, the raw material occurring with the greatest frequency among all artifact types except cores and cobble fragments. Table 2 shows summary percentages of raw materials by artifact type. A wide variety of lithic materials are represented, with quartz, jasper and chert being the most prevalent. Small amounts of quartzite, chalcedony, and argillite are also present. Table 3 shows tabulations of artifacts with and without cortex. The percentages of artifacts with cortex for all raw materials is high, with the exception of quartz. Of the 243 flakes recovered from the site, 39% have cortex.

The recovery of additional prehistoric material from the plowzone excavations supports the conclusions drawn from

TABLE 2

SUMMARY PERCENTAGES OF RAW MATERIALS BY ARTIFACT TYPE

Artifact Type	Quartz	Jasper	Chert	Quartzite	Other
Flakes	40%	34%	18%	6%	2%
Flake Tools	36%	36%	7%	14%	7%
Early Stage Bifaces	86%	-0-	14%	-0-	-0-
Late Stage Bifaces	43%	14%	29%	14%	-0-
Biface Fragments	50%	33%	17%	-0-	-0-
Stemmed Points	50%	25%	-0-	-0-	25%
Notched Points	75%	-0-	25%	-0-	-0-
Cores	20%	60%	20%	-0-	-0-
Cobbles and Cobble Fragments	-0-	25%	75%	-0-	-0-

TABLE 3

TABULATIONS OF CORTEX VS. NON-CORTEX ARTIFACTS

	Quartz	Jasper	Chert	Quartzite	Other	Total
Cortex	22%	57%	41%	65%	50%	40%
Non-Cortex	78%	43%	59%	35%	50%	60%

observations of the Phase I/II surface collection. Stemmed and notched projectile points date the occupation to the Woodland I Period (ca. 3000 B.C. to A.D. 1000 - Custer 1984). The presence of cortex on 40% of the artifacts indicates that the reduction of cobbles took place at the site. However, as noted in the Phase I and II report, the amounts of debitage at the site are low, indicating that the site was not a major cobble reduction station (Custer et al. 1985:26). The presence of utilized and reworked flakes, as well as the presence of fire-cracked rock, show that other activities took place at the site as well. However, the absence of ceramics and habitation or processing features indicates that a long-term and intensive use of the site did not take place.

The Whitten Road Site is located in a region of extensive secondary lithic resources (Custer and Galasso 1980). Cobble deposits derived from Pleistocene glacial outwash are noted for New Castle County, and consist of large cobble beds related to paleo-channels of the Delaware River. These beds are surrounded by smaller deposits of the same materials (Custer and Galasso 1980:9). Procurement strategies for groups utilizing these resources during the Woodland I Period have been described as "embedded procurement" (Goodyear 1979; Binford 1979) or "serial lithic procurement" (Custer, Cavallo, and Stewart 1983). Using these strategies, lithic procurement would be incorporated with other procurement activities, without special trips to quarries or intensive episodes of tool manufacture. The amounts of debitage at sites falling under this model would be small compared to quarry sites at primary outcrops. In areas where lithic resources are more widely disbursed, the replenishment of tool kits would be on an "as needed" basis, and would be reflected in the archaeological record as small, ephemeral episodes of lithic reduction (Goodyear 1979; Binford 1979). The prehistoric artifact assemblage from 7NC-D-100 reflects such a pattern. The presence of small numbers of flakes and bifaces which show high percentages of cortex indicates the limited reduction of cobbles, as does the wide variety of raw materials present. The fact that quartz artifacts show a much lower percentage of cortex suggests that this raw material may derive from the extensive primary outcrops of quartz located in the nearby Piedmont Uplands. Similar patterns have been noted for other Woodland I cobble reduction sites such as the Green Valley Site Complex (Custer et al. 1981), and the distance to these

primary outcrops from the Whitten Road site falls within the minimum 12 km catchment zone proposed for Woodland I groups (Custer et al. 1981). The fact that three out of the four broken points and both of the two resharpened points are made of quartz may indicate the discarding of these exhausted tools which were obtained earlier at another lithic source.

The characteristics of 7NC-D-100 fit with those observed at other procurement sites, such as the Armor Site (Catts et al. 1986). Procurement sites during the Woodland I Period have been associated with larger macro-band base camps which are located near a fixed critical resource, in this case, surface water (Custer and Wallace 1982). Custer and Wallace suggest that the relationship between these two types of sites is associated with what Binford (1980:8-10) has called a "tethered nomadism" in which groups make occasional forays to resource locations while centering these activities around a fixed critical resource. Several macro-band base camps such as the Clyde Farm site (7NC-E-6) and Delaware Park site (7NC-E-41) are located less than 10 km from 7NC-D-100, well within the previously mentioned 12 km catchment zone proposed for Woodland I groups (Custer et al. 1981). It is probable that the Whitten Road prehistoric procurement site is associated with one of these base camps.

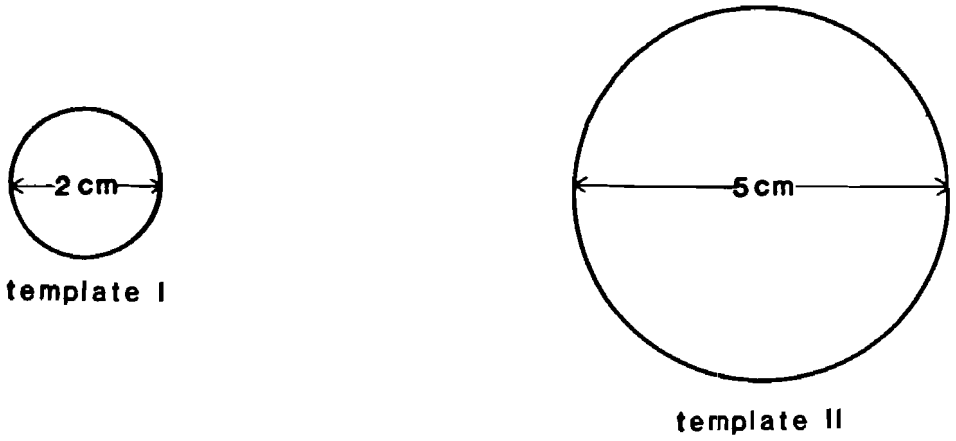
SCREEN MESH SIZE TEST

An additional experiment on prehistoric artifact recovery rates was conducted using a representative sample of prehistoric artifacts recovered at the Whitten Road site. The relative recovery rates of 1/2" vs. 1/4" screen mesh were compared for various classes and categories of artifacts. The questions which we hoped to answer were: 1) In what way would data from a site excavated using 1/2" screen mesh differ from that obtained using 1/4" mesh, and 2) How might these different data sets affect interpretations of site activities and function? These questions are significant because a larger screen mesh size increases the efficiency with which a site may be excavated. The larger the size of the mesh, the faster soil may be moved through the screen. However, this would also result in a loss of some data. It is important to know whether this increase in efficiency would justify the loss of information. To make this determination, we must know what information is being lost and, more importantly, how the loss of that information effects site interpretations.

A total of 137 artifacts representing all of the types found at the site were selected for the experiment. Each artifact was first measured using a size template (Figure 11). All artifacts whose greatest dimension was less than or equal to 2cm were classified as size I, all artifacts whose greatest dimension fell between 2 and 5cm were classified as size II, and those larger than 5cm were classified as size III. After size information was recorded for these artifacts, they were grouped together by excavation unit and placed into screens with 1/2" mesh. The individual artifacts which remained in the 1/2" screen were

FIGURE 11

Size Template



Artifact Size Classification

Size I: Less than or equal to 2 cm in diameter

Size II: Between 2 cm and 5 cm in diameter

Size III: Greater than 5 cm in diameter

recorded, as were those which passed through. Comparisons were then made between the group of artifacts which had remained in the 1/2" screen, representing the artifacts which would have been recovered had the site been excavated using 1/2" screens, and the total group of artifacts originally collected using 1/4" mesh screens. Attributes such as raw material frequency, percentage of artifacts with cortex, artifact size classes, and proportion of tools to non-tools were examined for each group, and the differences between the two data sets were noted.

Tables 4 and 5 show the artifacts recovered in both the 1/4" and 1/2" screens. Out of the 137 artifacts in the sample, 66 were recovered in the 1/2" screen, representing 48% of the total. In other words, over half of the total artifacts were missed using 1/2" screen mesh. As would be expected, the majority of the artifacts missed were of the smaller size, less than or equal to 2 cm [Size I] in diameter. The 1/2" screen recovery rate for these smaller artifacts was only 15% (compared with 96% for size II and 100% for size III). All of the artifacts missed by the 1/2" screen were flakes. Out of the 108 total flakes in the

TABLE 4

1/4" PREHISTORIC ARTIFACTS

Artifact Type	Total	Artifact Size 1	2	3
Flakes	108(41)	79(23)	28(17)	1(1)
Jasper	38(21)	27(12)	11(9)	-0-
Quartz	38(6)	32(4)	6(2)	-0-
Chert	27(12)	18(7)	9(5)	-0-
Quartzite	4(2)	1	2(1)	1(1)
Other	1	1	-0-	-0-
Flake Tools	6(5)	-0-	6(5)	-0-
Jasper	3(2)	-0-	3(2)	-0-
Quartz	1(1)	-0-	1(1)	-0-
Chert	1(1)	-0-	1(1)	-0-
Quartzite	1(1)	-0-	1(1)	-0-
Bifaces	10(1)	1	8	1(1)
Jasper	2	1	1	-0-
Quartz	4	-0-	4	-0-
Chert	3	-0-	3	-0-
Quartzite	1(1)	-0-	-0-	1(1)
Points	3(1)	-0-	3(1)	-0-
Quartz	2(1)	-0-	2(1)	-0-
Other	1	-0-	1	-0-
Cobbles/Cores	5(5)	-0-	4(4)	1(1)
Jasper	1(1)	-0-	1(1)	-0-
Chert	4(4)	-0-	3(3)	1(1)
FCR	5(5)	1(1)	3(3)	1(1)
Total	137(58)	81(24)	52(30)	4(4)

TABLE 5

1/2" PREHISTORIC ARTIFACTS

Artifact Type	Total	Artifact Size 1	2	3
Flakes	38(23)	10(5)	27(17)	1(1)
Jasper	16(12)	5(3)	11(9)	-0-
Quartz	10(3)	4(1)	6(2)	-0-
Chert	9(6)	1(1)	8(5)	-0-
Quartzite	3(2)	-0-	2(1)	1(1)
Flake Tools	5(4)	-0-	5(4)	-0-
Jasper	3(2)	-0-	3(2)	-0-
Quartz	1(1)	-0-	1(1)	-0-
Chert	1(1)	-0-	1(1)	-0-
Bifaces	10(1)	1	8	1(1)
Jasper	2	1	1	
Quartz	4	-0-	4	-0-
Chert	3	-0-	3	-0-
Quartzite	1(1)	-0-	-0-	1(1)
Points	3(1)	-0-	3(1)	-0-
Quartz	2(1)	-0-	2(1)	-0-
Other	1	-0-	1	-0-
Cobbles/Cores	5(5)	-0-	4(4)	1(1)
Jasper	1(1)	-0-	1(1)	-0-
Chert	4(4)	-0-	3(3)	1(1)
FCR	5(5)	1(1)	3(3)	1(1)
Total	66(39)	12(6)	50(29)	4(4)

sample, 38 were recovered using 1/2" screen mesh, for a recovery rate of 35%. The 1/2" screen had 100% recovery rates for all other artifact classes, except flake tools where the recovery rate was 83%. As noted before, size I flakes were greatly underrepresented and only 15% of their total were present in the 1/2" screen.

Forty-two percent of the total sample of artifacts had cortex present. Size I artifacts had considerably less cortex than the larger artifacts, and their absence in the 1/2" screen inflated the cortex percentages for that group accordingly. Of the artifacts collected in the 1/2" screen, 59% had cortex, which was an increase of 17% over the total sample.

The prevalence of certain raw materials was also affected by screen mesh size. Using 1/4" mesh, quartz was the most abundant raw material (comprising 34% of the total), followed by jasper with 33%. In the 1/2" screen sample, however, these prevalences were reversed. Jasper became the more prevalent raw material (36%), followed by equal amounts of chert and quartz (28% each). This situation results from the generally smaller size of the quartz artifacts. They made up 40% of size I artifacts from the total sample, compared to 35% for jasper and 23% for chert. In the total sample, the ratio of non-tools to tools is 4.5 to 1. In the 1/2" screen sample, the same ratio is 1.7 to 1.

It can be seen from the preceding information that the use of 1/2" vs. 1/4" screen mesh produces two different data sets from the same sample of artifacts. Interpretations based on these data sets would differ as well. Given the fact that the 1/2" screen failed to recapture over one half of the artifacts recovered when using 1/4" screen mesh, an evaluation of site size or intensity of occupation based on the number of artifacts recovered could be underestimated when using 1/2" screens. Although interpretations of site size are usually based on additional factors, estimations of the density of artifacts at a site are unreliable when using 1/2" screen mesh, as might be expected.

All of the artifacts missed using 1/2" screen mesh were flakes and compared to their total number, they were under-represented by 65%. Since debitage is the primary indicator of stone tool manufacture, an artifact collection method which recovered only 35% of their total might obscure this activity. In addition, the generally small size of the flakes not recovered might disguise the nature of biface reduction taking place. It is highly likely that secondary reduction would be obscured. The relative percentage of artifacts with cortex is also dependent on the size of the screen mesh employed during excavation. The use of 1/2" mesh exaggerated the number of artifacts having cortex by 17%. This inflation might affect conclusions regarding raw material sources.

Lithic raw material percentages also differed depending on screen size. Quartz, the predominate raw material recovered

using 1/4" mesh, was under-represented in favor of jasper when 1/2" mesh was employed. In this case, the larger screen mesh obscured the prevalent raw material while magnifying the use of a less prevalent one. This finding has implications not only for conclusions regarding lithic raw material preferences, but for those regarding lithic sources as well.

The use of 1/2" screen mesh greatly limits the amount of information which can be recovered from a site. More importantly, the 1/2" size necessarily selects for larger artifacts which, as an assemblage, do not have the same attributes as those collected with a smaller mesh screen. Therefore, interpretations based on artifacts recovered from 1/2" screens must be limited. Since attributes such as flake size, raw material, and presence of cortex will differ from site to site, it is impossible to offer any standard corrections to bring the data in line. It should be noted, nonetheless, that in this study, the 1/2" screen did recover at least some of all of the artifact types and attributes represented in the total sample, including all diagnostics. It would therefore seem reasonable to suggest that for excavations where time constraints are exceptional, and a limited amount of information is all that can be expected, 1/2" mesh screens may be preferable. In other cases, the loss of data makes necessary the use of the smaller 1/4" mesh size.