CONCLUSIONS

The findings of the excavations at the Hockessin Valley Site, 7NC-A-17, have implications for a number of issues including variability of prehistoric house structures in the Middle Atlantic, regional settlement patterns, regional patterns in lithic resource utilization, and regional paleoenvironments. Each of these topics is discussed below.

VARIABILITY OF PREHISTORIC HOUSES

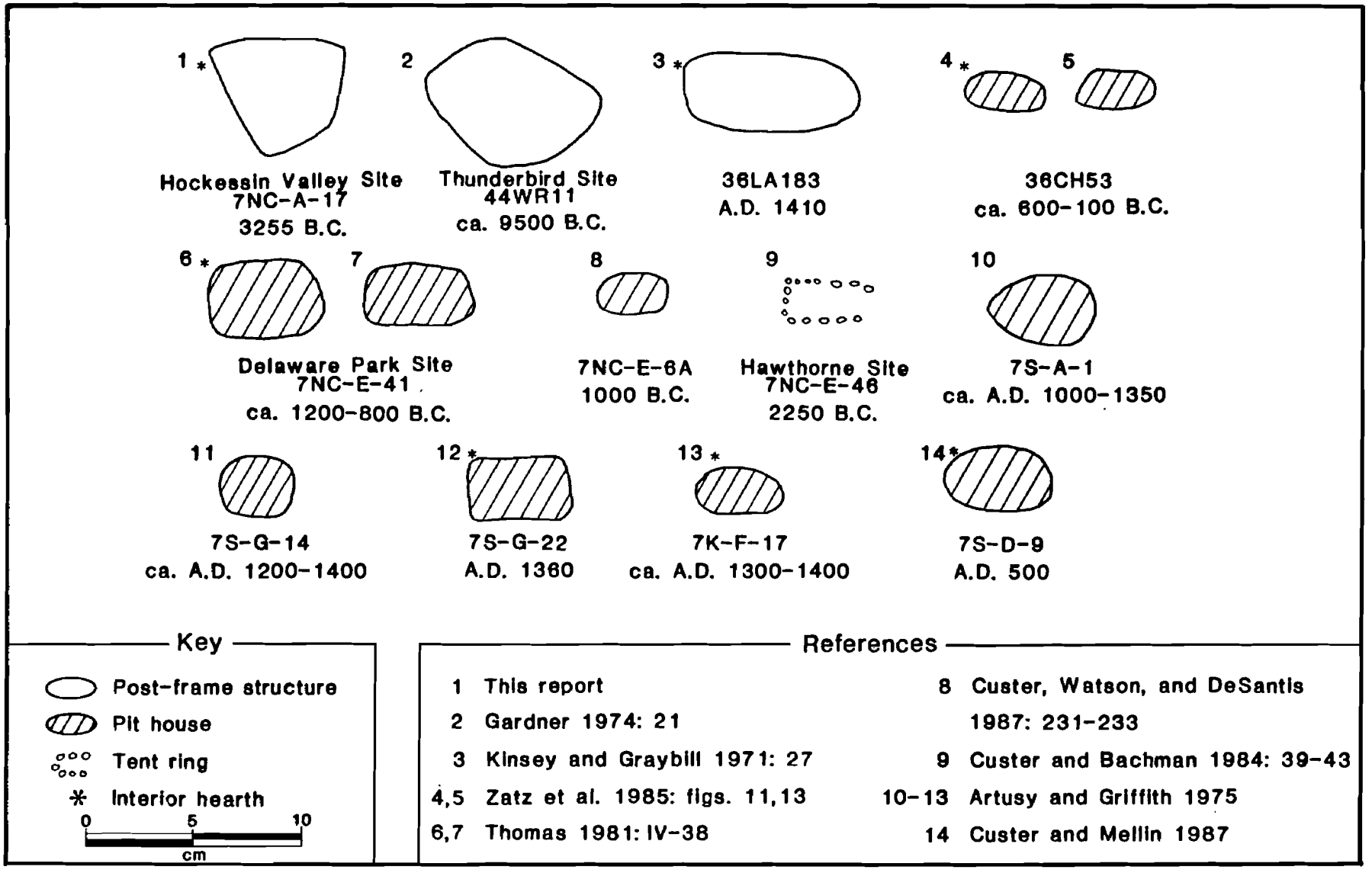
The discovery of a post-frame house structure dating to the Archaic/Woodland I transition at 7NC-A-17 was quite unexpected. Prehistoric post-frame structures have been identified at many sites in the Middle Atlantic Piedmont and these structures range in size from individual family structures (e.g. - Kinsey and

Graybill 1971:25-27) to very large multi-family "Long-house" structures (e.g. - Kent 1984). However, for the most part, these structures post date A.D. 1000 although a Paleo-Indian (ca. 9500 B.C.) post frame structure has been reported from western Virginia (Gardner 1974). Furthermore, numerous semi-subterranean pit houses are known from both the Piedmont and Coastal Plain in the central Middle Atlantic and these structures range in age between ca. 2000 B.C. and A.D. 1400 (e.g. - Thomas 1981; Artusy and Griffith 1975). The structure identified at the Hockessin Valley Site, 7NC-A-17, therefore, is the second oldest post-frame structure identified in the Middle Atlantic and is dated to a time period when most of the previously identified structures are pit houses.

Figure 23 shows a comparison of the sizes of various types of prehistoric structures from the central Middle Atlantic region. Multifamily "long-house" structures are not included. It can be seen that the structure excavated at 7NC-A-17 is roughly the same size as the other post frame structures found in the Middle Atlantic. The late prehistoric Shenks Ferry houses from the Murry Site also had interior hearths like the structure at 7NC-A-17. The pit house structures are generally smaller than the post-frame structures because the pit features themselves probably represent only a portion of the enclosed area of the structure. A pole framework probably covered these pit house structures with the pit feature representing the central structure area. Stains from these posts are no longer extant due to local soil conditions such as the sandy Coastal Plain soils (Figure 23, Nos. 6-8, 10-14) and rocky shaly Piedmont soils at

FIGURE 23

Comparative House Feature Sizes



36CH53 (Figure 23, Nos. 4 and 5). The stone tent ring structure at the Hawthorn Site (Figure 23, No. 9) is small in size and is thought to represent a temporary structure at a hunting site rather than a dwelling site intended for long-term habitation.

In assessing the variability of the prehistoric structures of the Middle Atlantic a number of observations can be made. For the most part, pit house structures are found at large base camp sites in association with storage features (e.g. - Figure 23, Nos. 6-8, 10-14). The presence of interior hearths in many of the pit houses and associated pit features with stored food remains indicates that these pit houses were occupied through multiple seasons spanning the cold weather months. Gilman (1987), in an analysis of both ethnographic and archaeological examples of pit house structures, notes that societies using pit house structures usually have biseasonal settlement patterns and use stored food as part of cold-weather occupations. Furthermore, Gilman (1987:547-548) notes that:

> "Pit structures, however, are not the only form of habitation that could accompany biseasonal settlement patterns or site use during cold months or dependence on store foods."

The inferred cold-weather occupation of the Hockessin Valley Site, 7NC-A-17, supports Gilman's comment. Further consideration of house structure variability requires a broader view of regional settlement patterns.

REGIONAL SETTLEMENT PATTERNS

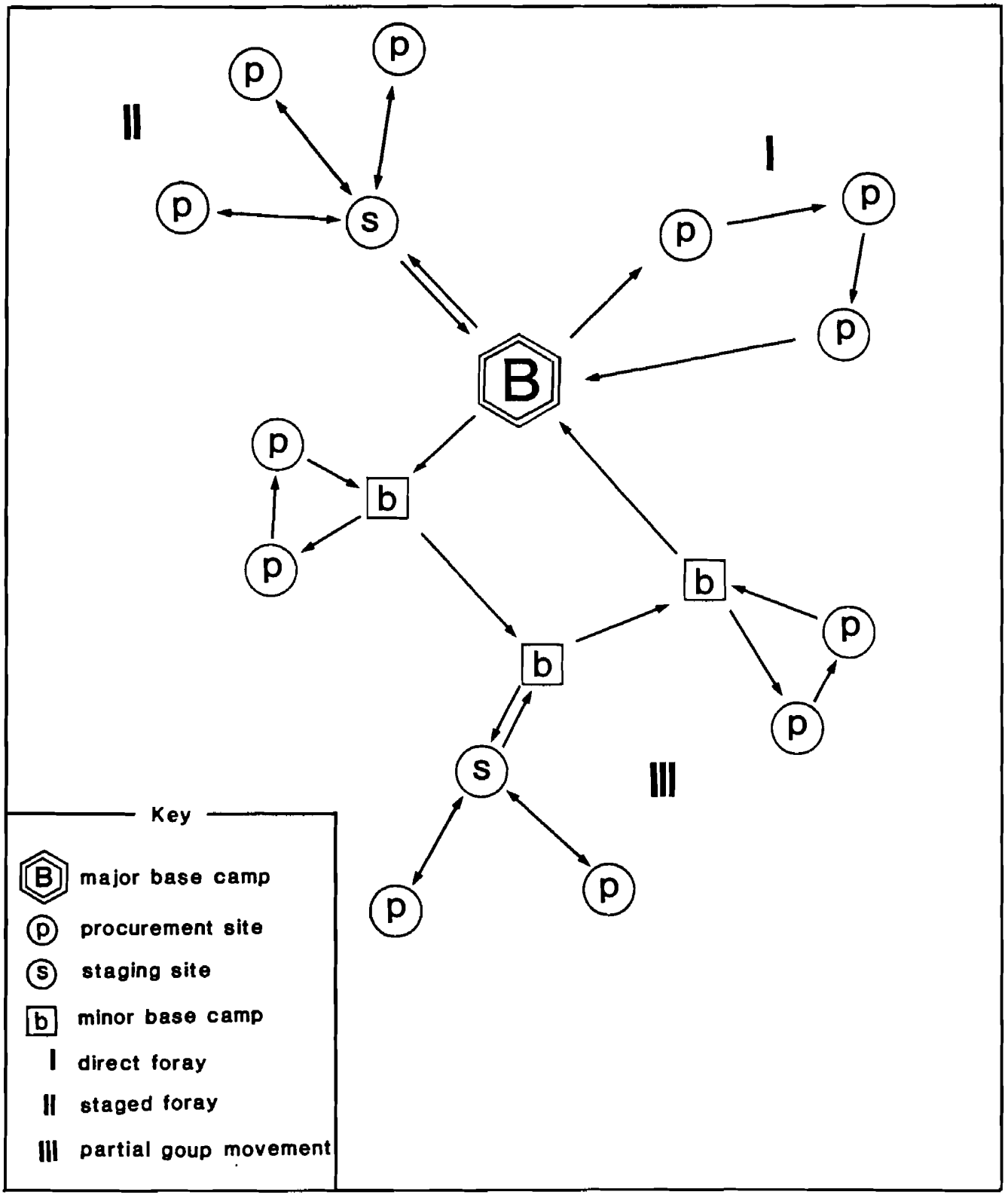
There are several models of regional Woodland I settlement patterns which link areas of the Piedmont Uplands and High

Coastal Plain. Figure 24 shows a general regional settlement model for initial Woodland I times and Figures 5 and 6 show alternative roles for 7NC-A-17 in regional settlement systems. It is suggested here that during initial Woodland I times, multi-seasonal occupation, base camp sites were located in the Fall Line - High Coastal Plain area as indicated by the presence of sites with household structures focused on pit houses. Such sites may also have been found along the major drainages of the Piedmont Uplands and elsewhere in the Hockessin Valley. The short-term, occupation at 7NC-A-17 is seen as a procurement/staging site use which was part of forays from the base camp sites during cold-weather months (Figure 6). From this staging site, upland procurement sites were visited for actual resource procurement (see Custer 1988a). Thus, the Hockessin Valley Site, 7NC-A-17, is seen as part of the foray settlement system described in Custer (1988b:46).

In many ways, the Hockessin Valley Site, 7NC-A-17, plays a role in Piedmont Uplands regional settlement patterns similar to that played by the Hawthorn Site (7NC-E-46) in the High Coastal Plain (Custer and Bachman 1984:113-119). However, there are differences between the two sites. Both sites have structures, but the pole-frame structure at the Hockessin Valley Site, 7NC-A-17, is larger than the stone tent ring at 7NC-E-46. The inferred occupation of the Hockessin Valley Site, 7NC-A-17, is winter while the occupation of 7NC-E-46 probably took place during the late summer and fall. Finally, there were more varied activities at 7NC-E-46 than at 7NC-A-17 including plant food processing and

FIGURE 24

General Regional Settlement Pattern Model



tool manufacturing. Most likely, these differences are due to varied seasons of occupation and regional differences in lithic resource availability. The lithic resources at 7NC-A-17 are limited to vein quartz of variable quality while at 7NC-E-46 there were abundant cobble sources of high quality lithic material. Thus, the inhabitants of 7NC-A-17 had to curate their tool kits while the inhabitants of 7NC-E-46 could be more profligate with their lithic resource use. Further trends in regional lithic resource utilization are discussed below.

REGIONAL LITHIC RESOURCE USE

The lithic resource use at 7NC-A-17 can be compared to the patterns at a number of sites in the Piedmont, Fall Line, and Coastal Plain. Table 10 shows percentage of cortex and raw material use among a variety of Woodland I lithic assemblages and Figure 25 shows the locations of the sites from which these assemblages were derived. A difference-of-proportion test was used to compare percentages of cortex, cryptocrystalline use, and quartz and quartzite use among all of the sites. The difference-of-proportion test was applied to evaluate percentage differences because of the varied sizes of the lithic artifact samples shown in Table 10. Results of the paired comparisons for the three variables are listed in Appendix VII. Table 11 lists the sites in rank order by percentage frequency and sites with no significant differences in percentages are joined by brackets.

With regard to cortex percentage, which is an indicator of cobble resource utilization, the Hockessin Valley Site, 7NC-A-17, falls somewhere in the middle of the sample of sites and shows a

TABLE 10

COMPARATIVE LITHIC RESOURCE USE

Site	Function	Cortex %	Raw Material % Jasper	Quartz	Chert	Qzite	Total Art.	Ref.
7NC-A-17	Hunting/ Staging Camp	9	16	53	7	18	279	
7NC-D-129	Procurement Camp	6	74	20	2	4	1749	5
7NC-E-46	Hunting/ Staging Camp	20	17	60	5	9	10,512	1
7NC-D-54	Cobble Reduction Base Camp	28	29	49	3	10	1288	2
7NC-D-55A	Cobble Reduction Base Camp	45	12	22	4	47	132	2
7NC-D-55B	Cobble Reduction Base Camp	29	5	42	3	46	2304	2
7NC-D-62	Cobble Reduction Base Camp	41	12	33	5	45	475	2
7NC-E-6A Area 2A	Macro-band Base Camp	9	50	16	11	17	5515	3
7NC-E-6A Area 2B	Macro-band Base Camp	8	70	11	10	12	6206	3

TABLE 10 (cont.)

Site	Function	Cortex %	Raw Material % Jasper	Quartz	Chert	Qzite	Total Art.	Ref.
7NC-E-6B	Macro-band Base Camp	13	35	11	14	4	2949	3
7NC-D-5	Primary Quarry Reduction Site	0	60	31	0	1	94	4
7NC-D-3	Primary Quarry Reduction Site	0	51	36	<1	2	368	4
7NC-D-19	Primary Quarry Reduction Site	0	74	26	0	0	653	4
7NC-A-2	Macro-band Base Camp	2	9	53	8	15	845	6
36CH51	Macro-band Base Camp	1	14	22	53	4	850	7

Reference Key:
1 - Custer and Bachman 1984
2 - Custer, Sprinkle, Flora, and Stiner 1981
3 - Custer 1982
4 - Custer, Ward, and Watson 1986
5 - Custer, Watson, Hoseth, and Coleman 1988
6 - Custer and De Santis 1985
7 - Custer 1985

TABLE 11

SUMMARY OF LITHIC RESOURCE USE PATTERNS

Cortex		Cryptocrystalline		Quartz & Quartzite	
7NC-D-5	Q-0	7NC-D-55B	CBC-8	7NC-E-6B	15-BC
7NC-D-3	Q-0	7NC-D-55A	CBC-16	7NC-E-6A(2B)	23-BC
7NC-D-19	Q-0	7NC-D-62	CBC-17	7NC-D-129	24-P
36CH51	BC-1	7NC-A-2	BC-17	7NC-D-19	26-Q
7NC-A-2	BC-2	7NC-E-46	H/S-22	36CH51	26-BC
7NC-D-129	P-6	7NC-A-17	H/S-23	7NC-D-5	32-Q
7NC-E-6A(2B)	BC-8	7NC-D-54	CBC-32	7NC-E-6A(2A)	33-BC
7NC-E-6A(2A)	BC-9	7NC-E-6B	BC-49	7NC-D-3	38-Q
7NC-A-17	H/S-9	7NC-D-3	Q-51	7NC-D-54	59-CBC
7NC-E-6B	BC-13				
7NC-E-46	H/S-20	7NC-D-5	Q-60	7NC-A-2	68-BC
7NC-D-54	CBC-28	7NC-E-6A(2A)	BC-61	7NC-E-46	69-H/S
7NC-D-55B	CBC-29	36CH51	BC-67	7NC-D-55A	69-CBC
7NC-D-62	CBC-41	7NC-D-19	Q-74	7NC-A-17	71-H/S
7NC-D-55A	CBC-45	7NC-D-129	P-76	7NC-D-62	78-CBC
		7NC-E-6A(2B)	BC-80	7NC-D-55B	88-CBC

Note: Sites are listed in order from lowest to highest

Key:
Q - quarry
BC - base camp
CBC - cobble reduction base camp
P - procurement
H/S - hunting/staging site

cortex percentage not significantly different from the Clyde Farm Site base camp areas of the Fall Line. The similarities of these sites underscores the notion that the groups who used 7NC-A-17

may have made forays into the Piedmont Uplands from Fall Line or Coastal Plain base camps.

Considering the assemblage of sites as a whole, the quarry sites associated with Delmarva Chalcedony Complex sites, the Piedmont Uplands base camps and the procurement sites of groups using the Delaware Chalcedony Complex quarries (e.g. Dairy Queen Site, 7NC-D-129) have the lowest cortex percentages, as would be expected. The cobble reduction base camps on the Fall Line and hunting/staging sites associated with cobble deposits (e.g. theHawthorn Site, 7NC-E-46) have the highest cortex percentages, also as is expected. The middle group includes base camps and hunting/staging sites. At these sites, the moderate use of cobble sources probably reflects both the manufacturing of expedient cobble tools to augment existing tool kits and the refurbishing of cobble-based tool kits which were transported into the sites. In sum, analysis of cortex percentages shows three main types of cobble utilization among the local sites: 1) little or no cobble use in areas where primary lithic resources are predominant, or at sites where the tool kits transported to a site were dominated by primary lithic materials; 2) moderate cobble reduction to manufacture expedient tools or refurbish transported tool kits based on cobble cores; and 3) intensive cobble utilization at sites where large secondary lithic outcrops were being exploited as the main element of the tool kit.

Analysis of cryptocrystalline lithic raw material utilization shows patterns similar to those for cobble use. The Hockessin Valley Site shows cryptocrystalline material use similar to that at the Hawthorne Site, the only other

hunting/staging site in the sample. The incidence of cryptocrystalline use is somewhat low (22-23%) and reflects the fact that cryptocrystalline materials were not as available for use at these sites as were quartz and quartzite materials. In both cases, cryptocrystalline materials formed the basis of the curated tool assemblages used at the site. Nevertheless, other lithic materials were important components of the expedient tool kit.

Among the total assemblage of sites, the cobble reduction base camps, the Piedmont Uplands sites and the hunting/staging sites show the lowest incidence of cryptocrystalline use, as would be expected. Likewise, the sites associated with the Delaware Chalcedony Complex outcrops show the highest incidence of cryptocrystalline use. However, there are several unexpected results of the analysis. The Churchman's Marsh base camp sites (7NC-E-6A - Area 2A, Area 2B, and 7NC-E-6B) show a fairly high incidence of cryptocrystalline use. In fact, Area 2B at 7NC-E-6A shows the highest incidence of cryptocrystalline use, higher even than the sites linked to the Delaware Chalcedony Complex. Also, cobble resource utilization at these sites is quite low, even though there are numerous cobble sources present in the Churchman's Marsh area (Custer 1982). Such a high incidence of cobble utilization at these sites may be due to the fact that groups arrived at the Churchman's Marsh sites with tool kits based primarily on primary cryptocrystalline materials. At the hunting/staging sites, a similar situation occurred, however at these sites local cobble resources were used as expedient tools. In contrast, at the base camp sites, the use of local cobbles for

expedient tools was not as pronounced and there was a greater reliance on the curated tool kits. This difference in lithic resource use was probably related to varied activities between the base camp and hunting/staging sites. Presumably, the base camp sites were the site of more varied maintenance activities while the hunting/processing sites were the sites of more limited processing activities. The observations presented here would indicate that during the Woodland I Period, maintenance activities at base camps in the Fall Line were undertaken using curated tool kits. On the other hand, more limited processing activities at other site types were undertaken using expedient flake tools of both primary and secondary lithic materials.

Analysis of quartz and quartzite utilization shows results complementary to the cryptocrystalline use. The Hockessin Valley Site, 7NC-A-17, is again grouped with the Hawthorn Site, 7NC-E-46, and with the Green Valley Site, 7NC-D-55A, with high percentage of quartz and quartzite. However, at 7NC-A-17 the quartz and quartzite was derived from primary sources while at 7NC-E-46 the quartz and quartzite were derived from secondary cobble sources. The similarity of quartz and quartzite use at the two hunting/staging sites, which have very different sources of these lithic resources, suggests that quartz and quartzite were the preferred sources of expedient tools no matter whether the quartz and quartzite came from primary or secondary sources.

The only sites with an incidence of quartz and quartzite utilization higher than the hunting/staging sites are the cobble reduction base camps. A Piedmont Upland base camp, the Mitchell

Farm Site (7NC-A-2), also shows an intensive use of primary quartz and quartzite. Low incidences of quartz and quartzite utilization are seen at the Churchman's Marsh base camps and at most of the sites associated with the Delaware Chalcedony Complex. However, two Delaware Chalcedony Complex sites (7NC-D-5, 7NC-D-3) show significant quartz utilization. At both of these sites, quarrying of quartz accompanied quarrying and reduction of cryptocrystalline materials.

To summarize the analysis of regional Woodland I lithic resource use, quartz and quartzite were the preferred lithic raw material for expedient tool use at hunting/staging sites, such as the Hockessin Valley Site, 7NC-A-17. These lithic resources could be derived from either primary or secondary sources. At base camps, maintenance activities were accomplished primarily using curated tool kits regardless of the raw material source.

REGIONAL PALEOECOLOGY

Identification of charred wood remains from the Hockessin Valley Site, 7NC-A-17, supplements pollen analysis at the nearby Mitchell Farm Site (7NC-A-2). The charcoal samples from the structure features at 7NC-A-17 date to the same time period as Horizon II at 7NC-A-17. Species identified in the 7NC-A-17 features include hickory (Carya sp.), oak (Quercus, sp.), walnut (Juglans, sp.), and American beech (Fagus grandifolia). Hickory and oak are well represented in the 7NC-A-2 pollen assemblage (Custer and Griffith 1984:9). However, walnut shows only as a minor trace in the pollen samples and beech is absent. Thus, the charcoal identification indicates that mid-Holocene forests of

northern Delaware were more diverse than pollen analysis alone would indicate. Furthermore, because American beech prefers moist soil conditions (Brockman 1986), the site setting of 7NC-A-17 may have supported more mesic forest settings than other parts of the Hockessin Valley and surrounding Piedmont Uplands.

In conclusion, the excavations at the Hockessin Valley Site, 7NC-A-17, recovered significant data on prehistoric lifeways at the time period of the Archaic-Woodland I transition. The discovery of a 5000-year-old post-frame structure was unexpected and the structure highlights the variability of mid-Holocene adaptations and site variability. Future archaeological field studies in the central Middle Atlantic will need to be sensitive to the presence of similar structures. With luck, and careful observation, we will be able to develop a better understanding of the complexity and variability of prehistoric lifeways.