In sum, three distinct activity areas can be noted at the Hawthorn site:

Area I - a seed/nut processing area with some cryptocrystalline flake production and hearths;

Area II - a butchering area with tools utilized and immediately discarded;

Area III - a habitation area associated with some resharpening, retooling, and discarding of tools.

Figure 37 shows the three areas and Table 14 summarizes their attributes.

Table 14

Activity Area Attributes

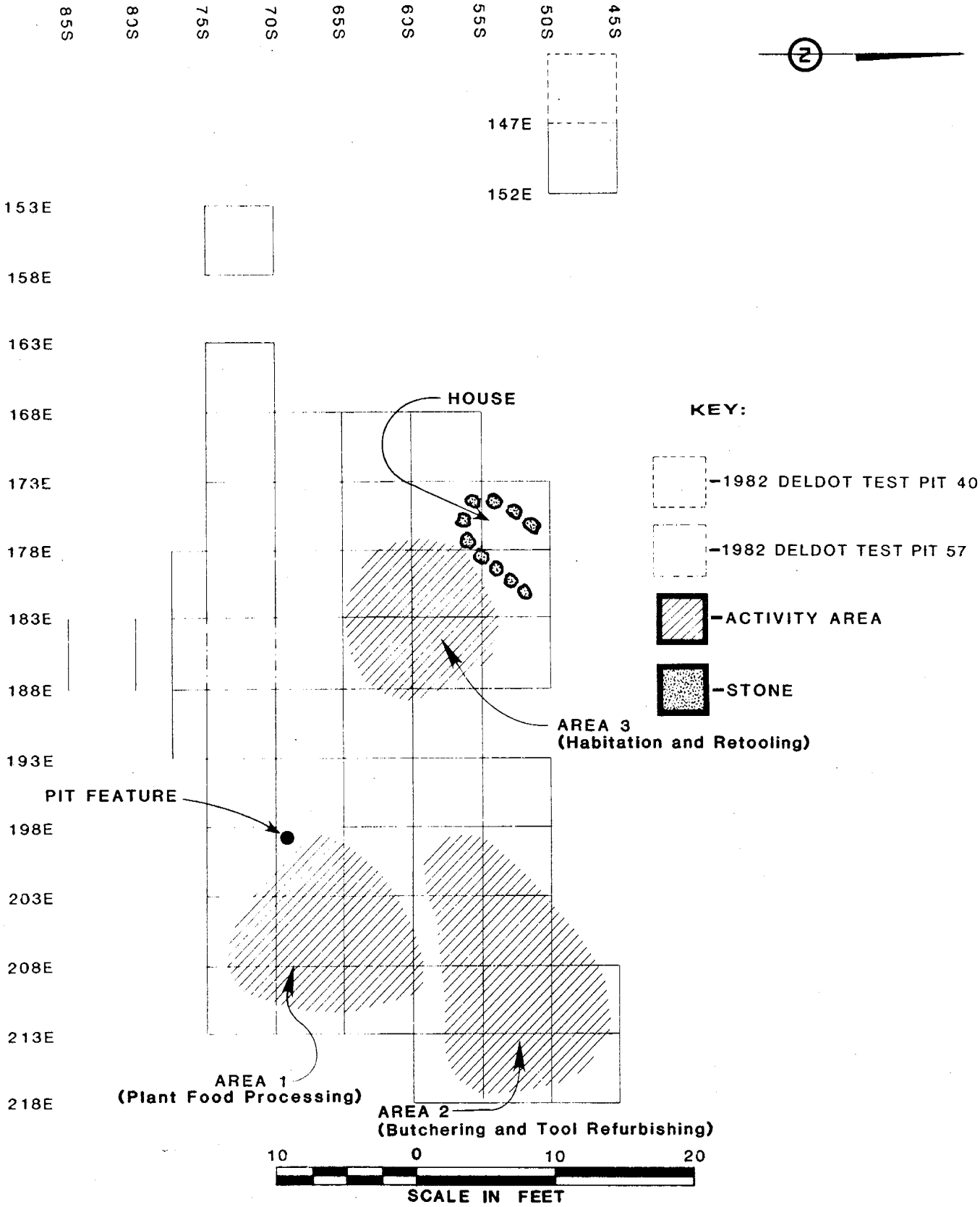
Area 1	Area II
-nut/seed remains	-slicing and cutting tools (butchering)
-hearths	-bone/wood working
-cryptocrystalline flake production	-impact fractured points from game carcass
-processing tools and features	-tools discarded during use
-resharpening debitage	-limited manufacturing of replacements
Area III	
-habitation area (house structure)	-non-local debitage
-"retooling" discards	-resharpening debitage
-flake production for cores	
-ironstone debitage	
-resharpening debitage	

CONCLUSIONS

This concluding section of the Hawthorn site (7NC-E-46) report will summarize the findings of the excavations, consider the role of the site in the regional settlement pattern, and note

FIGURE 37

ACTIVITY AREAS



the implications of the findings from the excavations for issues of regional chronologies. Finally, additional research issues which could be studied using the Hawthorn site data will be noted.

Generally, the Phase III data recovery program revealed that the Hawthorn site is a small site occupied for a limited period of time during the late summer or fall sometime between 1000 B.C. and 750 B.C. There are three distinct activity areas associated with butchering and processing of animal resources, nut/seed processing, and habitation. Most of the artifacts are directly associated with these activities and there are very few indications of the initial stages of stone tool production.

Role in Regional Settlement Pattern

In the research design section of this report it was noted that a major goal of the research at the Hawthorn site was to determine its placment in regional settlement patterns that were in operation during the Woodland I Period, particularly during the time period of the Clyde Farm and Wolfe Neck Complexes. Of the three main site types recognized for this time period (macro-band base camp, micro-band base camp, procurement site), it was suggested, on the basis of Phase II testing, that the Hawthorn site was either a micro-band base camp or procurement site. In order to determine which of the two site types best characterized the Hawthorn site, a list of attributes of base camps (Table 2) was prepared based on known local base camps of comparable ages. The results of the Hawthorn data recovery excavations can be compared to this list.

A living structure and hearths were present at the Hawthorn site and these features are also present at base camps. However, there is only one hearth at Hawthorn while basecamps have multiple hearths. Also, the Clyde Farm/Wolfe Neck Complex house at the Delaware Park site (Thomas 1981) is a semi-subterranean structure with an interior hearth. This house represents a rather more substantial energy investment than the tent-like structure that was present at the Hawthorn site. Thus, although these attributes are present at the Hawthorn site, they differ in number and in kind from the expectations for base camps. Table 2 also notes that storage features, specialized tool production areas, caches, and ceramics are present at base camps. None of these attributes are present at the Hawthorn site. Base camps should also have abundant late stage bifaces and debitage with lower frequencies of early stage bifaces and debitage (Table 2). At the Hawthorn site, these attributes were also present. Rejected and discarded tools should be relatively scarce at base camps (Table 2). The Hawthorn site has few rejected tools, but has many discards. Specialized ground stone tools should be rare at base camp sites and only one such tool was present at Hawthorn.

Table 2 also noted some attributes of base camps that can be related to spatial distributions of activity areas. Base camps should exhibit spatial segregation of tool production activities and processing features and activity areas should be absent. The Hawthorn site has no tool production areas and exhibits two clearly defined activity areas. Therefore, neither of these attributes are present at Hawthorn. However, it should be noted that the spatial segregation of a retooling area (Area III) shows

a separation of tool kit maintenance activities similar in structure to the separation of manufacturing areas expected for base camps. Nonetheless, the actual activities are quite different. In sum, the Hawthorn site does not have many of the attributes of a base camp and is best characterized as some kind of a procurement-related site.

An interesting feature of the Hawthorn site, in light of its characterization as a procurement site, is the presence of a living structure. The presence of this structure indicates that the users of the site took time to ensure some degree of comfort while they undertook their extractive and processing activities. If the seasonal occupation of the site is truly late summer/fall, as indicated by the ecofacts, the structure was probably not for warmth. Perhaps it was present for protection from rain or for shade. Similar structures are noted at procurement/processing sites of living hunters and gatherers. Yellen (1978:104, Figure 8; also attached site plans) notes several examples at !Kung Bushman sites in Africa and documents the relationship between structures and shade (see Yellen 1978: Site Plan - Camp 2). Binford (1978a; 1983:119, Fig. 56; 132, Fig. 70; 167, Fig. 106) notes similar structures at similar sites of Eskimo and Australian aborigine groups.

Comparison of the Hawthorn site to other procurement sites from the local area and region reveals some differences among sites within the procurement site category. Local procurement sites which have been studied archaeologically include five sites depicted in figure 4 - 7NC-D-70, 72, 75; 7NC-E-43, 45 (Custer, et

al 1982; Bachman and Custer 1983). All of these sites are within 2 kilometers of the Hawthorn site and are disturbed by plowing. This disturbance makes a detailed comparison inappropriate; however, a few comparative observations can be made. All of the other procurement sites have many fewer artifacts, less than half, and do not have as many varied processing tool types suggesting a more temporary and ephemeral site utilization. Also, the locational settings are different. The other procurement sites are located adjacent to swampy floodplains of ephermeral streams. The Hawthorn site is located adjacent to a swampy floodplain as well, but it is also close to a springhead which provides a more dependable water source. Although the contemporaneity of these procurement sites is unlikely, and virtually impossible to demonstrate, it is possible to propose some general land use patterns and site location models for procurement sites. The larger procurement-related sites, such as Hawthorn, could represent staging areas from which individual hunting/gathering parties moved to other more ephemerally utilized locales where the actual killing and preliminary butchering of animals took place. These groups would then return to the staging area for final resource processing and butchering. Multiple visits to specific hunting/gathering locales could be staged from a single site like Hawthorn. Using ethnographic models of hunting and gathering subsistence activities, which generally distinguish between males and females, would have been present at the Hawthorn site due to the presence of distinctive butchering/animal processing and seed/nut processing areas.

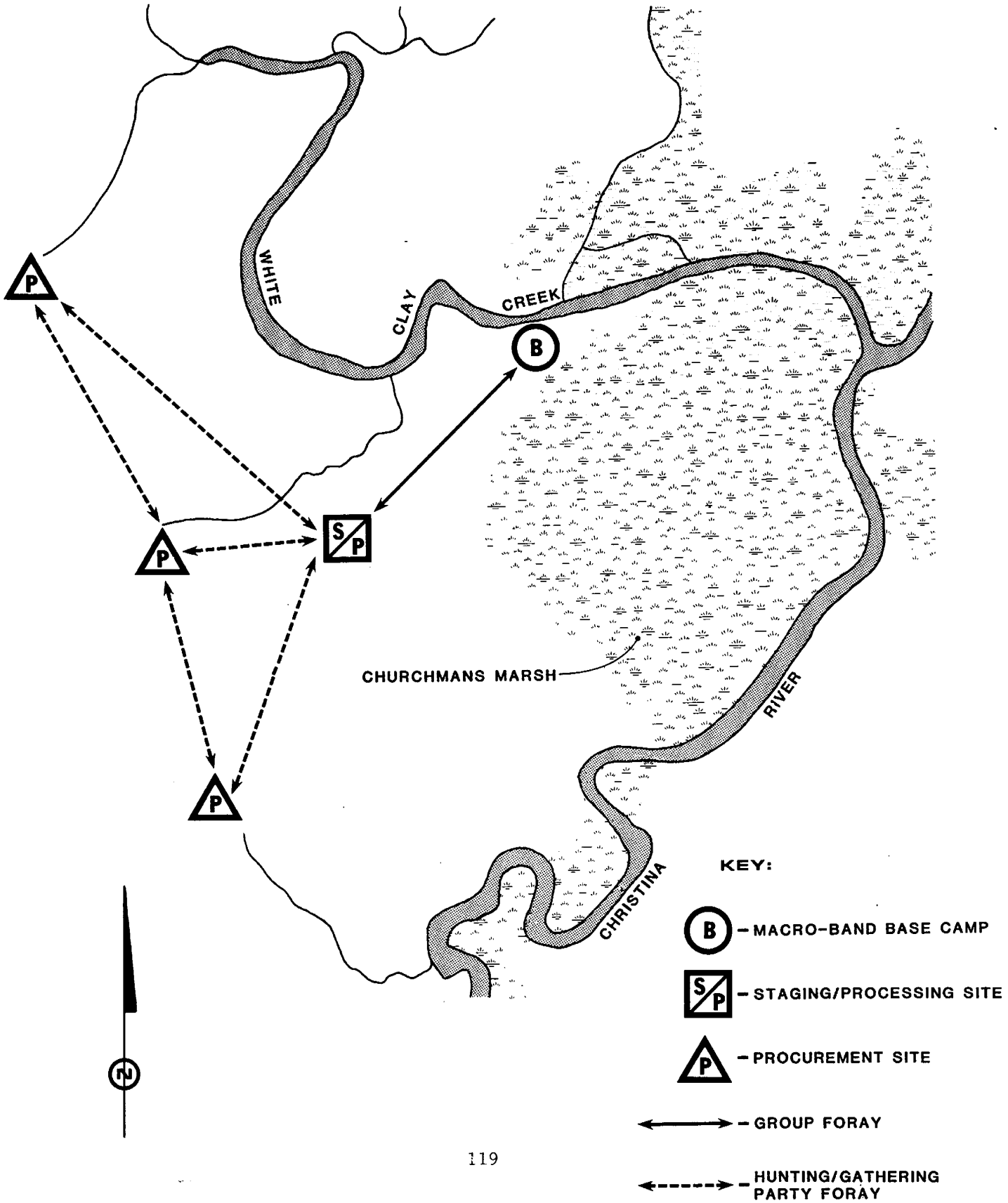
Based on the comparison noted above, a preliminary classification of varied procurement sites can be proposed. The larger procurement-related sites, like Hawthorn, are here categorized as staging/processing sites. Smaller sites are classified simply as procurement sites. The main difference between the categories is the duration of their occupation. Additional differences are the presence of living structures and a wider variety of processing tools at the staging/processing sites. The recognition of these varied procurement-related sites is supported by other archaeological data. A similar site, without structures, is described by House and Wogaman (1978) in the South Carolina Piedmont. Although no structures were encountered, the distributions of tools, raw materials, and inferred tool manufacturing and tool maintenance activities (House and Wogaman 1978:114-121, Figures 19-25) are remarkably similar to those of the Hawthorn site. Judge (1983) also notes a similar category of Paleo-Indian procurement-related sites, termed "armament sites" which are thought to represent locations where tool kits were refurbished and readied for the actual hunting which would take place at another location. A similar variation in procurement sites is noted by Hoffman and Foss (1980) in the Blue Ridge of Western Virginia. Recognition of a staging/processing class of sites also helps to solve some problems encountered when the three-part classification of sites (macro-band base camp, micro-band base camp, procurement site) was applied in the central Middle Atlantic. Galasso (1983; Custer and Galasso 1983:11) and Wise (1983) both note a series of Middle Archaic and early Woodland I (Late Achaic) sites that seem

to be intermediate between the micro-band base camp and procurement site category. It is suggested here that some of these "intermediate" sites may be staging/processing sites.

The relationship between procurement-related sites and the larger base camp sites can also be addressed. Figure 38 shows the inferred local settlement model. This is only a hypothetical model and the model would be repeated many times in the Churchmans Marsh area. From the relatively sedentary macro-band base camps, or micro-band base camps, work groups composed of adult males and females would make forays to staging/processing sites. From staging/processing sites, individual hunting or gathering parties would make forays to specific resource procurement sites. Game and/or plant foods would be gathered and initially processed at the procurement site for transport back to the staging/processing site. Final processing and possibly initial consumption would be accomplished at the staging/processing site. These activities may have taken several days. Finally, the fully processed resources would be transported back to the main base camp site for storage and final consumption. A similar set of relationships is hypothesized by Winters (1969:131-137) for comparably dated sites in the central Wabash Valley of Illinois. Table 15 lists the local sites that fall into the site categories described above and to which the relationships depicted in Figure 38 would apply. In sum, the Hawthorn site represents a staging/processing site probably related to the support of populations living at the larger more sedentary base camp sites.

FIGURE 38

LOCAL SETTLEMENT MODEL



Implications for Regional Chronology

The association of varied point styles within the single buried component of the Hawthorn site has implications for temporal inferences based on regional projectile point typologies. Soils analysis, refitted tools, tool maintenance activities, and spatial segregation of activity areas all indicate that the artifacts found in the undisturbed, buried soils at the Hawthorn site represent a single, very short term use of the site. Without a doubt, the occupation represents less than ten-years of time and it is more likely that the single occupation of the site lasted less than one year. This empirical data on duration of occupation would imply that the varied morphological types depicted in Plates 6 and 7 were used contemporaneously. Such a mixing of point styles contradicts traditional "normative" approaches to culture used by achaeologists in the Middle Atlantic. However, numerous studies from the region (Moeller 1982; Stewart 1981; Snethkamp, Ebright, and Serena 1982; Custer 1982a, 1982b, 1983a) have produced similar findings to those of the Hawthorn site. Many of the sites used to argue for the contemporaneity of various morphological styles are shallow (eg. - Custer 1982) and the anomalous associations have been dismissed by some reactionary critics on the basis of post-depositional disturbances, even though the soils data show such disturbances to be minimal. However, the buried nature of the Hawthorn site precludes dismissal on these grounds. It is now fairly certain that empirical data show the contemporaneity of various projectile point styles and it is up to archaeologists to re-think

traditional notions of how material culture styles change through time.

Table 15

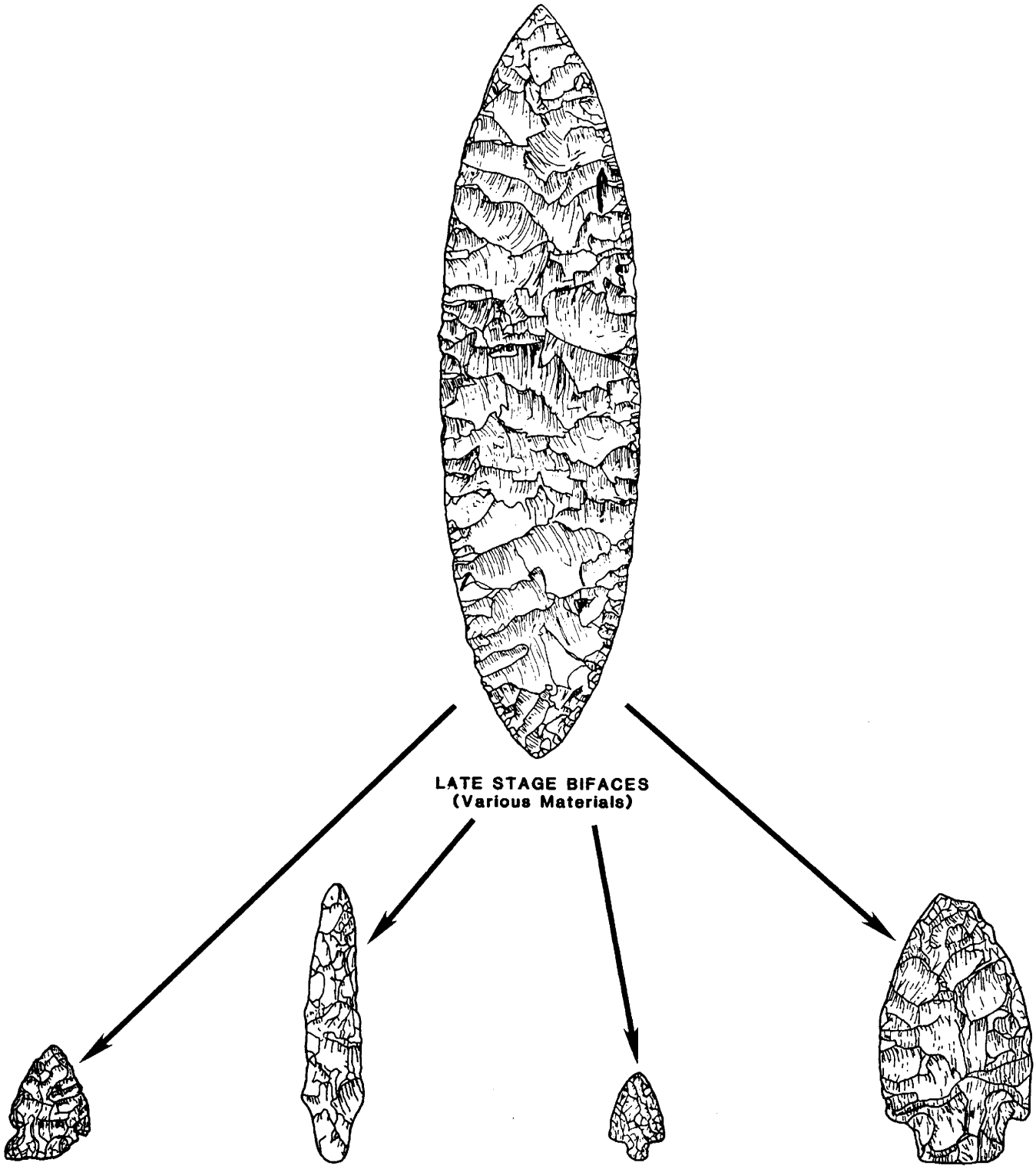
Local Site Categories

Site Type	Examples*	Citation
Macro-band base camp	Clyde Farm (7NC-E-6)	Custer 1982a:9-21
	Newport (7NC-E-1)	Custer 1982a:23-28
	Delaware Park (7NC-E-41)	Thomas 1981
Micro-band base camp	Julian Powerline (7NC-E-42)	Custer 1982a:21-22
	Green Valley Complex 7NC-D-54, 55, 62)	Custer et al 1981
	Woods Complex (7NC-E-35-38)	state site files
Staging/processing site	Hawthorn (7NC-E-46)	
	7NC-D-21(?)	ibid
Procurement	7NC-E-20	ibid
	7NC-E-8	ibid
	7NC-E-32	ibid
	7NC-D-45	ibid
	7NC-D-30	ibid
	7NC-E-43	Bachman and Custer 1983
	7NC-E-45	ibid
	7NC-D-75	ibid
	7NC-D-70	Custer et al 1982
	7NC-D-72	ibid

*see Figure 4 for site locations

A possible alternative explanation may be related to the various point functions seen among the Hawthorn samples. Figure 39 shows the various point styles from within the Hawthorn sample that can be manufactured from the same basic late stage biface shape, no matter what the raw material, and the functional activities associated with each form. It is possible that the point styles which were once viewed as different temporal types are merely contemporaneous varied functional types. Different

FIGURE 39
POINT FORMS AND FUNCTION



ALL CAN ASSUME VARIOUS EDGE CONFIGURATIONS BASED UPON RESHARPENING

distribution of the point types noted in Figure 39 at separate sites could be related to spatial segregation of tool production, use, and maintenance activities. Figure 40 shows the varied steps of stone tool production and use based on the work of Callahan (1979) and Cook (1976b). Varied combinations of these activities can occur at different sites as was shown in the discussion of the Hawthorn site data and different biface and point distributions can thus occur. In sum, the Hawthorn data suggest that varied point styles are contemporaneous and their variety is related to function, not cultural preference of chronology.

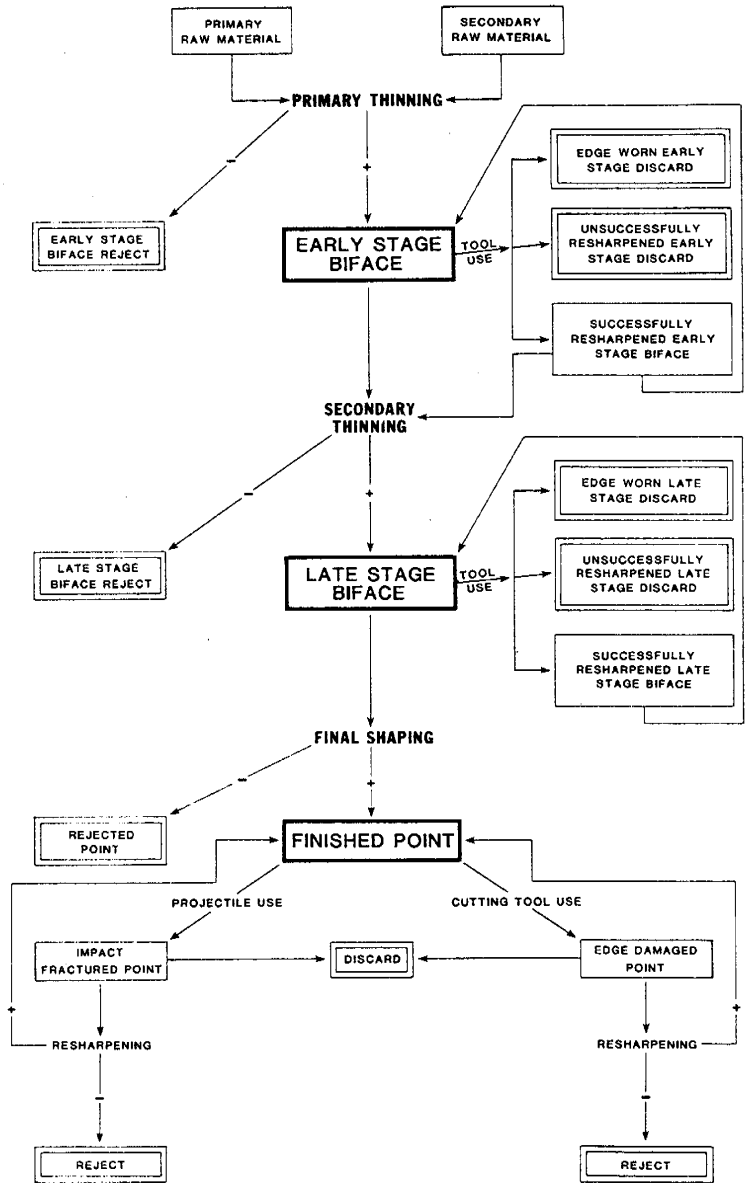
Future Research Directions

As a final note to this report, some additional research directions can be noted. Probably the most useful form of analysis that could be undertaken using artifacts from the Hawthorn site would be a high power magnification inspection (100x or greater) of cryptocrystalline artifacts using the methods suggested by Keely (1980). This kind of research could clarify some functional uncertainties noted earlier. Unfortunately, this kind of study is very expensive and requires the use of a scanning electron microscope.

Several general methodological issues could also be addressed using the Hawthorn site data. One question that is often studied is the relationship between artifact patterns observed in plow disturbed soils and the patterns found in undisturbed soils (e.g. - Ammerman and Feldman 1978). The

FIGURE 40

TOOL PRODUCTION, USE, and MAINTENENCE



KEY:

- -UNSUCCESSFUL

+ -SUCCESSFUL

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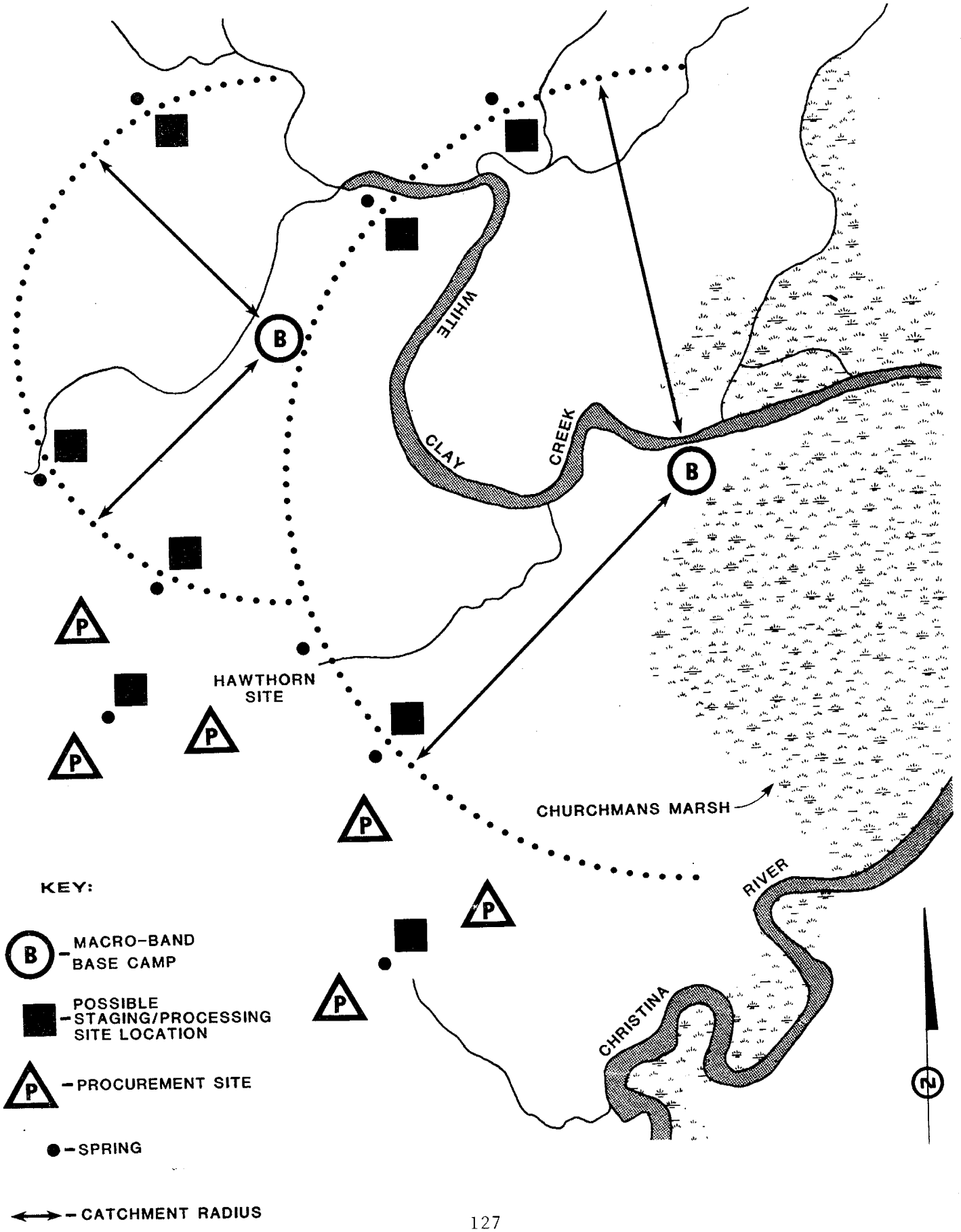
buried plow zone artifact distributions from Hawthorn, which were not studied in this report, could be compared to those seen from analysis of the undisturbed levels. A related methodological issue would be to take the small 1 foot x 1 foot excavation units and combine them into larger units for spatial analysis. The results of these analyses could be compared to the results noted in this report to see how large excavation and analytical units can become before patterning is lost. Empirical data on how much information is lost by increasing the size of analytical and excavation units could be used to determine optimum excavation unit size for contract archaeology projects where time and money constraints are important. A similar set of analyses could be undertaken using dimensional analysis of variance to see if the effects of "dummy" squares, and deleted squares, discussed earlier, alter the determination of activity areas.

The final future research issue to consider is the prediction of locations of sites similar to Hawthorn. The buried nature of the Hawthorn site is unique and preserved its spatial artifact patterning. Therefore, it would be useful to locate similar sites to study and preserve. One possible research program would be to survey the length of the unnamed stream that is fed by the spring adjacent to the Hawthorn site down to its confluence with the White Clay Creek. If there are no similar sites of similar ages in the intervening area, the distance from the Hawthorn site to the Clyde Farm site, or another macro-band base camp, could be viewed as the minimum catchment distance from a base camp site to a staging/processing site. This minimum distance would be necessary to make it worthwhile to establish a

separate staging/processing site. Presumably, any procurement sites closer to the macro-band base camp would be visited on a single trip with the macro-band base camp serving as the staging procurement site. The minimum distance then could be plotted as the radius of a catchment circle, or hexagon (Roper 1979:128) and any springheads close to the plotted circle could be investigated as possible staging/processing site locations. Figure 41 shows how this model might be applied in the vicinity of the Hawthorn site. An alternative model could look for clusters of procurement sites and perhaps staging processing sites may be located at spring-heads which are centrally located with respect to these clusters. Whatever method is utilized, it will be important to look at the foot of slopes for buried landscapes where artifact patterns are preserved.

To conclude, the Hawthorn site has significantly added to our understanding of northern New Castle County prehistoric archaeology. It has also raised new questions for future studies and provided some preliminary answers and research goals.

FIGURE 41

STAGING/PROCESSING PREDICTIVE MODEL