SECTION 22.0 PROJECT EVALUATION AND FUTURE PROSPECTS

The Hickory Bluff data recovery investigations were conducted under the aegis of Section 106 of the National Historic Preservation Act and the cultural resource guidance framework of the State of Delaware. The archaeological investigations carried out on the Hickory Bluff site represented intensive, systematic research, the results of which have provided diverse sources of information about Native American history. Since the majority of the ground segments described herein no longer exist due to the construction of the road alignment, the value of the site resides in the information embodied in this report and the artifacts and records curated by the State of Delaware. Hickory Bluff was a particularly important archaeological site based on its pivotal location on the St. Jones River watershed, the good preservation state of deposits and features, its large size and aerial extent, and the recovery of a large and diverse sample of artifacts. Destruction of such a significant archaeological resource made it incumbent on the investigators to explore the many lines of its research potential. The Hickory Bluff excavations therefore presented an unparalleled opportunity to learn about past behavior of Delaware's Native inhabitants. A goal in this report was to adequately describe the site and its assemblages, and demonstrate how conclusions were reached about a range of patterns and processes. The research undertaken here was particularly relevant to the Woodland I context, developed as part of the Delaware State planning documentation (Custer 1994). Given the wide-ranging research opportunities as described in this report, DelDOT and the Delaware State Historic Preservation Office (SHPO) requested a synopsis of future research directions. The following review evaluates some of the lessons learned during the Hickory Bluff project and the relative merits and drawbacks of particular approaches and research strategies undertaken as part of the Hickory Bluff investigations. This review also provides avenues for future directions and planning.

PUBLIC OUTREACH

A major component of the Hickory Bluff project was a public outreach program. The outreach program successfully reached many members and segments of the public as demonstrated by direct interaction with several thousand people through participation in the excavations, guided tours, and lectures at schools and at community events. An even larger segment of the population was reached through broad-based advertisement, including the distribution of printed information and widespread media attention in response to a DelDOT press release.

Public safety was a major concern from project inception, and conscious steps were undertaken to ensure that no individual was inadvertently injured during fieldwork and touring. Fortunately, during the course of the public site visits, no personal injuries were reported. A Corporate Health and Safety Officer inspected the site prior to public participation to ensure that all conceivable and practical safety standards were met. To reduce hazards, safety fencing was installed around units and trenches, units were covered, and walking paths were improved. Prior to group visits, a safety talk was given to ensure that people were made aware of potentially dangerous site conditions.

Public access to the site and the recovered information was part of initial planning. Signage to the site, maintenance of the unimproved road, adequate space for parking, exhibits, and lectures were key elements in the implementation of the participation of the public. For those who could not visit the site, printed materials and portable exhibits were developed and brought to organizations, schools, and communities.

From an educational perspective, the public outreach program was decidedly fluid in design, as it was recognized that there was a diversity of interest and a wide range in age groups. Much of the teaching was on basic instruction, such as what was known about the archaeology of Delaware, how to conduct a proper excavation, what could be found on the site, and what could be potentially learned about Native American activities. Public outreach increased consciousness about the archaeological record, raised awareness and enthusiasm about the prehistory of Delaware, and conveyed the need to carefully document fieldwork for proper study of non-renewable resources. The outreach campaign had beneficial effects for public relations, as most people realized that DelDOT had carefully weighed transportation needs against environmental and cultural resource considerations.

In future public outreach efforts similar to the scale conducted at Hickory Bluff, certain improvements can be made in the planning process. At times, the informality of the Hickory Bluff public outreach program was too fluid and not as effective as it could be in articulating the importance of the project to the Delaware State agencies and communicating the value of the archaeology. Improvement would likely be achieved through more focused attention in a formal public outreach plan. The plan would not have to be rigid or lengthy, and it could still incorporate flexibility in the feedback loop between public perceptions and archaeological explanations. The public outreach plan should be goal oriented, specifying the type, level, and detail of information to be provided and the methods for providing the information. Budget estimates should also be provided given that a public outreach plan requires a certain level of commitment in labor and direct expenditures. As a consequence, compromises may have to be reached between the level of outreach and the extent of archeological fieldwork and studies. With regard to implementation of fieldwork, consideration should also be given to how public participation effects work processes and progress of field crews within the constraints of schedules and budgets.

Interaction with members of the professional community during the course of the Hickory Bluff investigations had tangible and positive outcomes prior to the publication of this report. The invitation and attendance of colleagues from surrounding states during the planned open-house event at the site stimulated dialogue about the field findings and provided a forum for some practical advice and information. Visitation of colleagues to the site had long-term benefits, as it increased communication of the progress and direction of the work during subsequent meetings. Individual talks at the Society for American Archaeology symposium, prior to publication of this report, helped to synthesize the most important information and served to facilitate further discussion about the research importance of the site. Meetings and workshops with DelDOT and the Delaware SHPO on the research approach and the analytical studies fostered better communication about the relative merits of particular approaches.

A beneficial aspect of the public discussion of the Hickory Bluff findings was the increased interaction with the Native American community. Intensive discussions developed between the archaeologists and the Nanticoke Indian Association as a result of public talks and press coverage. Initial communication between the two parties indicated some areas of divergent opinion about the interpretation and meaning of the site. The gap in our opinions about Hickory Bluff was narrowed as a result of increased dialogue during the many meetings that ensued in an attempt to build some common ground. An open-door policy of DelDOT and the Federal Highways Administration to project documentation and recognition and respect for the Nanticoke's wish to conduct on-site ceremonies also helped to facilitate communication. The sweat lodge and cleansing ceremonies led by the Nanticoke were of great benefit to those in attendance. Direct participation in the ceremonies and the mutual dialogue helped to shape perspectives about the meaning of the site patterning and directly led to the application of the broader based anthropological approach taken in this report. Participation of Native Americans was of tremendous value in the Hickory Bluff mitigation and the development of a research design.

STAGED FIELDWORK

The Hickory Bluff site was large, covering 5 acres (with nearly 2 acres contained within an unplowed wood line), and provided many opportunities to understand Native American behaviors. Effective mitigation across such a large area presented certain management concerns in the scale of the excavations and challenges to retrieve the desired information. Instead of a proscriptive, formulaic approach to the mitigation, data recovery operations were staged and closely coordinated with DelDOT and the Delaware SHPO. On-site consultation with archaeologists from these agencies over the course of 11 months allowed for effective communication of results and the furthering of appropriate excavation strategies. Staging of the fieldwork helped to ensure that the best available data was retrieved to address research issues and to evaluate whether newly emergent patterns could help to address new questions. In-field decision-making during different stages of the mitigation and flexibility in precise excavation unit placement enhanced the implementation of the treatment strategy.

During the course of the data recovery operations performed by Parsons, there were three critical phases in the staging of the fieldwork: a) refinement of the site parameters immediately proceeding to evaluative testing; b) differentiation of major portions of the site for intact deposits and archaeological patterns; and c) differentiation of artifact and feature patterns in the northwest portion of the site.

The initial stages of the mitigation were directed towards achieving a more detailed understanding of site integrity and depositional variability across the 5-acre site. Although the horizontal and vertical site boundaries were adequately delimited during the previous evaluative testing phase, it was recognized that more intensive close-interval shovel testing was warranted to further delimit patterns. The use of additional transects of shovel tests and the infilling of previous lines of shovel tests effectively and rapidly determined variability in artifact density. Since a number of basin features were identified, but not fully excavated, during previous evaluative testing, one of the first goals of the data recovery operations was to re-identify and test these partially excavated features. Re-excavation showed that the previously identified

features were variable in their formation. A proportion of the basins indicated cultural signatures whereas others were determined to be the product of natural processes (e.g., Features 5 and 6 described as "two stratified partial pit features" [Liebeknecht et al. 1997:Figure 8.4] were Columbia Formation [Fm.] fluvial patterns). The coordinated geomorphological investigation at the time of initial block excavations was critical in making decisions about stratigraphy, feature integrity, and the potential of basins as sources of behavioral and environmental information. Better understanding of artifact distributions and the re-identification of features during the initial stages of mitigation helped guide the placement of additional excavations and refine questions about site formation.

The goal of the subsequent stages of fieldwork was to sample and examine the different areas of the site through block excavations. Excavations in different sectors of the site provided information about depositional variability and feature preservation. The investigation of the eastern half of the site identified plow disturbance and feature truncation. Computer-aided mapping of preliminary artifact counts concurrent with the data recovery was a critical and effective strategy for showing the diminishing artifact densities with increasing distance from the river. The placement of block excavations across the site provided key comparative information on features, artifact associations, and overall site structure. Once the nature of the deposits in the eastern zone of the site was clarified and a sufficient plow zone sample of artifacts was obtained, backhoe stripping was employed. Stripping was a viable way to uncover a large sample of features in a short time. The orientation of the backhoe strip in an east-west direction proved to be an effective strategy for identifying and assisting in the interpretation of the range and density of features.

Block excavations demonstrated that the greatest density of artifacts and features were concentrated along the western zone, the east bank of the St. Jones River. Several stages of fieldwork were geared towards fully investigating this area. The wide placement of initial unit excavations in the area indicated low-high artifact counts and isolated and overlapping features. Computer-aided mapping of preliminary artifact counts and types within blocks was a critical and effective strategy for directing further excavations in specific areas of interest. Additionally, an increasing series of contiguous units were placed in blocks where intact feature and artifact concentrations were identified in subsurface contexts. Staging the precise areas for additional unit excavation provided a means of increasing the efficiency of the data recovery process by clarifying site structure during the course of the investigations. The flexible approach in block expansion was a critical factor for isolating behavioral patterns of interest before committing to more intensive excavation in any particular area. Block excavations uncovered many important patterns proving useful for studying site structure and a relatively large sample of the northwestern zone was excavated. While every artifact and feature can be considered an important source of information, providing for an ever increasing confidence in interpretation, an impression was that some (though not all) of the results became increasingly patterned as excavations progressed. Although this impression was not quantified as part of this undertaking, it would be instructive to examine the appended site grid and electronic data sets, and examine how smaller samples would affect specific sources of behavioral data and interpretation.

CHRONOLOGY

Chronological studies consisted of the study of material culture typologies and application of radiocarbon dating. The projectile point and ceramic assemblages were initially sorted and typed into conventional categories and assigned to regionally accepted time ranges. Analyses were employed to show the influence of various factors in point and ceramic manufacture, but no major alterations of the existing typologies and their chronology were warranted from the study. Rather, the stylistic studies showed that general trends held up reasonably well, giving some overall confidence in the typologies. As a result, the plotting of the recovered projectile points and ceramics provided a reasonable indication of the intensity of site occupation through time.

Some methodological issues surrounding the stylistic data sets were apparent, however. While some point types could be fit into conventional typologies, some range of variation in size and blade characteristics occurred. Furthermore, some of the projectile points were not distinct types, but rather they shared some level of commonality in size, shape or technology. Since this was the case, they were not typed into traditional categories, but assigned to a general morphological category that had a wide chronological range (e.g., Woodland I side-notched and stemmed types). While points have been assigned to this wide temporal range, future studies should focus on refining the chronological context of these Delmarva forms. Similar issues were raised for the ceramic assemblage, as certain types consisted of variable forms (e.g., Marcey Creek vessels were flat bottomed or conical). A main issue in the stylistic evaluation of points and ceramics at Hickory Bluff concerned the adequacy of sample sizes. Refinement of typology was difficult, as the numbers of particular forms was limited, and the ceramic assemblage was highly fragmented and did not provide much data on vessel size and shape for comparing types. In retrospect, the most productive appraisal of artifact forms would more likely come from the analysis of larger samples of particular type ranges.

A large sample of radiocarbon dates, totaling 25, was obtained from Hickory Bluff to support the relative age determination of specific portions of the site. Retrieval of a large sample of radiocarbon dates was considered necessary in light of the fact that many sites in Delaware have not been radiometrically dated, and some significant large-scale excavations are associated with few dates (e.g., one at the St. Jones Adena site [Thomas 1976], four at Snapp, and six at Leipsic [Custer and Silber 1995; Custer et al. 1996]). Despite the recovery of 700 features at Carey Farm, and the emphasis on understanding contemporaneity and household clustering, only 10 radiocarbon dates were obtained (Custer et al. 1995b). In contrast, a larger number of radiometric dates at Lums Pond (n=20) (Petraglia et al. 1998b) helped to define and clarify the nature and age range of deposits, material culture and features.

The 25 radiocarbon dates provided key data to indicate cultural activity from 4000 years before present (B.P.) through the historic period (Table 17.3). Radiocarbon dating of particular features with more than one sample provided some reliable temporal overlaps; within a one sigma (e.g., Feature 9) or two sigma range (e.g., Feature 3). Although opportunities for dating associated carbon with diagnostic artifacts were few, some important overlaps were found (e.g., Marcey Creek in Feature 98 at 2660 years B.P.; Marcey Creek in Feature 2 at 2790 years B.P.; Hell Island in Feature 120 at 920 years B.P.). One secure method that proved useful was the

direct dating of residues from ceramic sherds. The dating of two Clay Tempered sherds (30 B.C., A.D. 20) and one Mockley sherd (A.D. 100) produced reliable and interesting age results. The two Clay Tempered residue dates hovered on the late age boundary of the ware (400 B.C. - A.D. 0) and the date for the Mockley sherd residue fit into the early age range of the ware (A.D. 0-600). Because visible charring remained on few sherds from Hickory Bluff, no other opportunities were as clearly presented. It is clear that this method should become an important vehicle for future dating and age correlations and that care must be taken in the processing of ceramic artifacts in order not to remove potentially informative adherent residues.

The radiocarbon data were particularly instructive when compared against the regionally accepted age ranges of temporally diagnostic artifacts. When radiocarbon dates, points and ceramic ranges were compared against each other, general trends emerged to delimit the parameters of occupation history. Spatial plotting of radiocarbon dates and ceramics provided some instances of convergence in block excavations. The overlay of projectile points and ceramics was often more complex, but recurrent patterns between the two were observed (e.g., Lackawaxen points and Early Woodland wares; Woodland I points and Early Woodland ceramics). The comparison of the Hickory Bluff radiocarbon sequence in relation to other sites of the St. Jones River drainage (i.e., St. Jones Adena, Carey Farm, Island Farm, Puncheon Run) was particularly informative, indicating variation and intensity of riverine occupation.

In applying radiocarbon dating at Hickory Bluff, an important methodological issue in age bias came to the forefront. An important realization in conducting radiocarbon analyses at Hickory Bluff was a weighting towards younger dates with increased carbon visibility in the field. Based on visible carbon in profiles or in association with diagnostic artifacts, initial radiocarbon samples were submitted to Beta Analytic. In two cases where radiocarbon samples were submitted to date Stratum B, dates produced were 90 years B.P. (Table 6.1: A.D. 1675-1775 or A.D. 1800-1945) and 150 years B.P. (Table 6.1: A.D. 1655-1950) One attempt at dating a dense concentration of visible carbon associated with a Marcey Creek cluster produced a 320 year B.P. date (Table 6.1: A.D. 1455-1665). It was realized that the more visible and concentrated the carbon, the younger the date. Additionally, in Feature 313, visible carbon was hand-picked and produced two dates that did not overlap within two sigmas. As a consequence of these interpretive problems, the strategy for submitting radiocarbon samples was changed. The revised strategy entailed the systematic analysis of feature fills prior to submission for radiocarbon dating. This strategy indicated the relative proportion of carbon in a feature, determined species for charred elements, and indicated the potential for contamination. Samples for radiocarbon dating were submitted based on review of these data and no weighting was given to samples with higher carbon values. The revised methodology for radiocarbon selection produced more reliable and generally older dates, compared to the visual method for selection. Given an overall assessment of radiocarbon dating, the most secure dates appear to be derived from clearly sealed stratigraphic contexts and in sealed basin contexts. For instance, secure dates have been obtained from organic rich stratigraphic deposits and basins at Lums Pond (Petraglia et al. 1998) and basins with organics and Dames Quarter ceramics at the Blackbird Creek site (unpublished data).

PALEOENVIRONMENTS AND SUBSISTENCE

Reconstruction of Hickory Bluff's paleoenvironmental history was provided by a variety of multidisciplinary studies, including geoarchaeology, macrobotany, and ancillary analyses of vegetative and animal communities. The geoarchaeological team performed a variety of field and laboratory studies that provided key information at various stages of the project. The close working relationship between the geoarchaeologists and the archaeologists in the early stages of archaeological fieldwork was a critical aspect for the interpretation of deposits and features. Field observations of excavation unit profiles provided an improved understanding of stratigraphic development and helped to characterize the pedology of basin features. Sedimentological, pedological, and geochemical studies provided baseline information used to examine deposition, soil weathering, feature formation, and activity area variations. Geoarchaeological research provided the framework for assessing how Hickory Bluff's landform development and natural resource availability related to Delmarva paleoenvironmental models and the drainage history of the St. Jones River. One of the difficulties presented at Hickory Bluff for geoarchaeological interpretation was the compressed nature of the stratigraphic profile. For instance, while eolian deposition was inferred to be an important contribution to the deposits based on observations and sedimentary studies, this process could not be documented with convincing authority. Overall, the geoarchaeological studies provided key sources of information for archaeological interpretation, providing the framework to evaluate landform and depositional history. At the conclusion of the field and laboratory studies, it was felt that an appropriate match had been made between the geoarchaeological goals and the evidence obtained. Therefore, additional in-depth analyses were not considered necessary given the overall findings.

Although Hickory Bluff was not an organically rich site, an effort was put into extracting any information that could be used to assess the ecological setting and the subsistence base. Lines of evidence included geochemical analysis of features and horizontal surfaces, examination of fills for macrobotanical remains, studies of the small and fragmentary faunal remains, and organic and residue studies of artifacts.

The application of inductively coupled plasma-atomic emission spectroscopy (ICP/AES) geochemical assay testing was experimental and designed to test whether elements could determine cultural residues even in depleted strata. Unfortunately, the behavioral information provided from the intensive program of geochemical sampling was of limited value. The most convincing evidence for activity variation was the relatively high amounts of phosphorus (P), calcium (Ca) and strontium (Sr), which may be indicative of organic content, such as weathered bone. Otherwise, the chemistry mostly supported observations and interpretations about the operation of natural processes, postdepositional alterations and soil weathering. The negative chemical results of basin contents were particularly disappointing in extracting activity information; although in retrospect, the findings should not be unexpected given the fact these processes/disturbances enhance water percolation and leeching. With respect to the potential range of elements that may be applied to study activity, the Hickory Bluff findings reinforce the notion that a restricted set of commonly applied elements, such as P, Ca, and Sr, provided the most pertinent results. In terms of depositional contexts, the Hickory Bluff analysis suggested that geochemical analysis would be more productive on sites with better organic preservation as

both a methodological test of certain elements and as an avenue for deciphering behavioral information that may no longer be present.

As has been pointed out in earlier studies, serious methodological issues remain with macrobotanical reconstruction from feature fills (e.g., Custer 1994, LeeDecker et al. 1996). Despite evidence for postdepositional mixing and contamination, it has been argued that feature fills provide information on terrestrial settings and Native American subsistence, although it was recognized that certain methodological evaluations should be performed (Petraglia et al. 1998b). Given this, the procedure for the macrobotanical study at Hickory Bluff consisted of a two-stage sampling procedure. During the first stage, feature fills from 7 basins and 7 thermally altered stone (TAS) features were submitted for analysis. The goal of the first submission was to determine the potential reliability of the flotation samples. The first set of samples was selected from the most reliable feature contexts (i.e., those that showed depositional integrity with minimal signs of disturbance). The first set of samples provided charred specimens, although variation in the level of contamination in European weed species was evident according to feature type. The TAS features showed three to four times as much contamination of European species when compared to the basin features (Section 8.0). This strategy proved to be important in showing variation in the degree to which contamination was operative. While there was variation in the contamination levels, charred samples from each feature type were radiocarbon dated and all occurred within the prehistoric range. The staged and stratified sampling procedure indicated the need to conduct further analysis to bolster the results. The second set of 14 additional samples provided similar information compared to the first selection and some of these were subsequently dated. Although the two-staged approach required additional time for analysis, the strategy was effective, indicating that with careful selection practices, good results may be obtained.

Hickory Bluff preserved a very small sample of fragmentary and charred faunal remains. While limited in size, analysis of this small collection proved to be worthwhile, as it was the only direct evidence for the presence of deer and turtle. Based on the riverine context of the site, it was presumed that the subsistence base and resource extraction was probably large, consisting of the use of a variety of terrestrial plant and wood species, and aquatic resources. While use of waterfowl, fish, and shellfish may be inferred by evidence such as net-impressed and shell-tempered ceramics, direct evidence was entirely missing from the material data set. Consequently, ancillary information on subsistence and natural resource use was expected from organic residue studies on artifacts. The sample of 50 unifaces was intentionally selected from all other tool classes, since it was presumed that these working edges would have the greatest chance for preservation of organic residues. Analysis of the unifaces was successful and indicated scraping and cutting motions on hide and the processing of starchy plants, bone, and antler. A pilot study of organic residues found on ceramic sherds was conducted. Two sherds analyzed indicated the presence of a vascular tissue, likely a vegetative storage organ, such as root or tuber, commonly used as food resources. The organic residue and stone tool and ceramic residue analyses provided evidence that artifacts retain evidence of plants and animals utilized by site inhabitants. While this information was of benefit for extracting the greatest amount of potential information from the site, the small size of the samples, and the limited temporal data for most of the artifacts, precluded additional inferences about Native American resource use. Future studies of this kind should be initiated to learn more about subsistence and site ecology.

The most productive behavioral studies would be from larger samples on diagnostic artifacts or in instances where there is strict chronological control for artifact assemblages.

ARTIFACT ASSEMBLAGES

The recovery of nearly 77,000 Native American artifacts presented an opportunity to explore many aspects of material culture. While all artifacts were cataloged, the recovery of a large data set of diverse types precluded equal analytical treatment. It was surmised that targeted, in-depth study of certain artifact classes would be more productive for behavioral interpretations. The greatest level of attention was placed on diagnostic artifacts (i.e., projectile points and ceramics), artifact classes associated with certain contexts (i.e., TAS), and rare artifact classes that informed on symbolic behavior or specific uses (e.g., gorgets and ulu). While certain classes of artifacts were informative about stone tool reduction (e.g., cores, bifaces, flakes and chips) and other site functions (e.g., hammerstones and cobble tools), in-depth analyses of these artifact classes was not considered as beneficial since they could not be temporally isolated.

Projectile point attributes were described by chronological typing and were further analyzed in detail to evaluate the relative influence of physical and cultural conventions in tool making. A conclusion of the study was that there appeared to be many influences on artifact morphology, including style, function, raw material type, craftsmanship, use and resharpening. Certain patterns were identified such as the close relationship between the size range of the Columbia Fm. gravels and the projectile points. Resharpening also was conducted and different functional and rejuvenation scenarios were suggested based on point size. While patterns such as these provided novel information on how points were formed, the study showed that subjective typing took into consideration a wide range of attributes and was, therefore, a more complicated process than quantifying a series of dimensional attributes. The attribute study conducted for Hickory Bluff was not detailed enough to describe meaningful groups in the data. Some of the criteria used subjectively were probably the very attributes of symmetry and length that were being sought in the analyses. Future study should specifically target a larger sample of particular types and involve a series of dimensional attributes to confidently assess the influences on form.

Given the recovery of over 34,000 pieces of debitage (i.e., cores, flakes and chips), only basic information was collected, including subdivisions of artifact types, raw material, presence or absence of cortex, size and weight. Analysis of these variables provided the necessary information to adequately describe different artifact classes and to address stone tool reduction. While more detailed studies of lithic artifacts (e.g., platform measurement) could be performed to further describe and differentiate flaking methods (e.g., pressure flaking), these were not conducted since it was surmised that more fine-grained analysis would be problematic.

Macroscopic use wear study of chipped stone tools and battered, pecked, and ground stone was conducted (Section 13.0). Study of each of these stone tool types provided functional interpretations often not available in conventional cataloging procedures. Use wear patterns and edge damage indicated the variety of activities and mediums on which the tools were used. The positive results of the study indicate functional information about artifact use is being overlooked because of typical laboratory procedures in morphological typing. The macroscopic

study was conducted in tandem with the analysis of microscopic use wear on the unifaces and the point rejuvenation study. Agreement on the presence of use wear and/or residue occurred for 46 percent of the uniface assemblage (Table 13.47). Polish was recognized during both macroscopic (n=60) and microscopic (n=36) analyses (Table 13.48). Identification of rounding and striations varied by approach, and it was concluded that rounding and striations are two manifestations of the same type of wear, simply viewed from varying levels of detail. Hafting indicators varied between approaches, with a 22 percent agreement. There was convergence between the observations made from the macroscopic study and the rejuvenation analysis of projectile points, such as the co-occurrence of alternate beveling and asymmetrical blades. The independent studies therefore provided corroborating and complementary evidence, thereby strengthening functional interpretations of tool use. However, divergence between the independent studies indicated some difficulties in interpretation and demonstrated the need to more closely examine methodological issues. The macroscopic and microscopic analyses provided important functional results overall, but these interpretations would be most powerful when used in an analysis of site structure and task specific behaviors.

The study of the on-site gravels served as a critical backdrop for assessing raw material selection patterns and stone tool reduction. While a small sample of gravels was collected in the field (eight 5-gallon buckets), the general comparative similarity of the raw materials and size between systematically collected gravel samples indicated the adequacy of the on-site characterization. Comparison of gravels for raw material types and clast sizes showed close parallels with cores, bifaces, and points recovered from Hickory Bluff. Given that a large proportion of Delmarva stone tool assemblages were produced from the Columbia Fm. gravels, further gravel characterization studies should be conducted to better understand procurement patterns and influences on stone tool technology.

Mineralogical analysis was conducted on a selection of stone tool types (i.e., projectile points, bifaces and unifaces) to examine stone tool material sources and procurement patterns. While inspection of each of these artifact types provided information on site to source distances, the most useful behavioral information was derived from the projectile points since they could be tied to time periods and these could be related to inferred territorial boundaries and exchange networks. The stone tool mineralogy study was conducted through visual inspection of materials using a hand lens, and source identifications were made in comparison to an established reference collection. The advantage of this method was the processing of a large number of samples as opposed to more detailed, but more precise, analytic sourcing studies. Since Delaware materials from various sites are generally poorly documented, future studies should probably be geared towards visual inspection of large samples. In cases where specific sourcing is critical to interpretation, more detailed geological and chemical characterization studies could be undertaken.

Detailed descriptions of rare and extraordinary artifacts, (i.e., gorgets and ulu) were given specialized attention since they could provide information on manufacture and function. The pieces were carefully manufactured, decorated, broken and re-used. Their adornment, breakage and wear patterns provided examples of craftsmanship and ceremony. The analysis of rare, but specialized artifacts indicated that certain artifact categories provide more interpretive potential on certain human behaviors.

Excavations at the Hickory Bluff yielded over 7,600 ceramic sherds, serving as a good sample for addressing a variety of topics such as technology, function, and social relations. Since this was a large collection, with many potential avenues to pursue, the assemblage was necessarily subdivided. To quantify the entire assemblage, a variety of attributes were recorded, including temper, interior surface treatment, exterior surface treatment, decoration, weight and thickness. Since many sherds were small fragments, a limited range of information could be obtained from the entire assemblage. The 1,591 sherds greater than 2 cm were divided from the assemblage, so they could be studied in more detail. The more detailed analysis included comprehensive characterization of paste, temper, treatment attributes and cross-mending that identified 1,101 sherds representing 86 unique vessel lots. The vessel lots became the most sensitive indicators of the range of variation within and between ware types. The vessel lots were classified into traditional wares and types using various formal and technological attributes including paste, temper (amount, type, size and shape), surface treatment (exterior and interior), direction of cordage twist, vessel shape, vessel size, rim form and decoration. Each of these variables was used to the maximum extent possible, and each played a role in assessing vessel manufacture, function, and intra- and inter-group social relations for Delmarva society. Ceramics were an important artifact class that helped to form many of the core discussions presented in several sections. While this was the case, it was the Hickory Bluff vessel lots themselves, which precluded certain interpretations. For instance, the lack of decorative motifs did not allow for a detailed analysis of individual behavior, and the partial reconstruction of vessels was not conducive for exacting measurement of vessel form.

Over 26,000 TAS were recovered and a question arose as to whether these materials could provide behavioral information beyond mere notation as heated stone. Since the assemblage was large, and it was surmised that the most precise functional information would be derived from features, a sample of the assemblage was examined for study. Attributes such as raw material type, weight, visible heat alteration and percent of completeness were recorded on the smaller sample, consisting of nearly 2,000 TAS from 15 features. The pattern recognition analyses showed that the TAS within features retained a great degree of variation. The differences between the features provided specific inferences concerning function and the history of feature use. While TAS has traditionally been treated in a cursory fashion with little analytical attention paid to it, the Hickory Bluff analyses indicated that it is an excellent source of information about behavior. Future site studies should take more account of this ubiquitous artifact class, and experimental studies should be performed to obtain a better understanding of the relationship between stone clasts and heating methods.

FEATURE FORMATION

Over 300 features were uncovered by the conclusion of the Hickory Bluff fieldwork. The features were individually described in Appendix C providing information on their morphology and content. Given the current controversy about the interpretation of features in Delaware, and previous interpretations for the presence of pithouses at a number of key sites including Hickory Bluff, individual feature descriptions were considered a necessary component of site reporting. Given that the full inventory of feature descriptions are currently not available in site reports where there are significant claims for pithouses and household clusters (e.g., Snapp, Leipsic, Wrangle Hill, Carey Farm and Island Farm), it was felt that reporting of primary feature

information was needed to facilitate independent evaluation and comparison by other researchers. While individual feature descriptions were a labor intensive effort, it was a worthwhile exercise as the reviews served as a basic reference source for compilation of other report analyses.

Once fieldwork was concluded at Hickory Bluff, a feature typology was developed, consisting of six main categories (i.e., artifact concentrations, basins, surface anomalies, biotic patterns, geomorphic features and natural discontinuities). For artifact concentrations and basins, the developed terminology was as descriptive as possible without implying function. For example, subsumed under artifact concentrations, the term "thermally altered stone" was utilized to avoid use of the misnomer "fire-cracked rock" and to more accurately describe the range of heated rock that may occur on site. Likewise, the term "basin" was adopted to describe any subsurface anomaly, in a deliberate attempt to avoid one to one interpretations between morphology and function, such as had been done in other studies (e.g., morphological types [Type 1, 2, 2A] were remains of pit houses at Carey Farm [Custer et al. 1995b]). Basins were subdivided into small, medium and large categories based on horizontal plan dimensions. The main typology also considered major disturbances and natural processes that occurred on site, hence four categories were developed (surface anomalies, biotic patterns, geomorphic features and natural discontinuities). This feature typology was found to be an effective way of describing and interpreting features, and it allowed enough flexibility to combine subtypes. For instance, a basin type could be interpreted in a variety of ways, based on its specific collection of attributes indicative of natural and cultural processes; in addition, a feature could have a morphology that combined more than one type (e.g., large basin with animal burrow).

A major problem that was confronted in the field was the accurate recognition and description of basin features. As evidenced through subsequent excavation of anomalies interpreted as pithouses in the previous study (Liebeknecht et al. 1997), mistakes had been made in the interpretation of these features. In the worst instances, typical E-horizon and Columbia Fm. fluvial features were mistaken for cultural features. The lack of replication of observed pithouses in excavations adjacent to Hunter Research's block excavations and their mechanical strip, and subsequent analysis of their material patterning in Locus A, Block 2, gave the impression that the former work was inaccurate in identifying high frequencies of large and overlapping pithouses. Upon initiation of renewed fieldwork by Parsons, it was realized that basin features were difficult to identify. Basin features were often devoid of organic preservation, making plan views difficult to visually recognize. Hence, these features were often delimited by slight color and sedimentary texture changes. The upper surfaces of some basins were so difficult to visually differentiate in the E-horizon that they were entirely missed in this zone; some basins were only recognized at the more distinguishable contact with the red hued C-horizon. While basin detection was often difficult, and subject to some debate in the field, confidence in their recognition increased as a result of geoarchaeological observations. Based on closer scrutiny of feature fills, it was shown that basin sediments could be physically discriminated from natural profiles.

Once basins were discriminated, certain methodological issues arose during their excavation. Minor disturbances on their surface walls were sometimes noticed, but these were difficult to record, and hence, there was a tendency for field excavators to regularize the wall

shapes. Given this tendency, one of the goals was to record variations within the most visually distinct basins. Where possible, the detailed morphology of a sample of the basins was recorded and displayed using three-dimensional graphic displays (e.g., Figure 10.63). These three dimensional graphics provided the maximum clarity and accuracy for shape, and clearly showed the potential variation between features and the minor disturbances that proved to be of importance in interpretations. Although the methodology for collecting the data that generated the three dimensional graphics was adequate and provided reasonable portrayals of the basins, it was labor intensive and contained several steps that introduced more chances for human error. The process could be both sped up and made more accurate with the use of currently available technology, such as Total Stations and data collectors.

To better understand basin feature formation, two major experimental studies were initiated, consisting of tree excavations and a three-year feature degradation study. While each of these were pilot studies, on-site observations were critical for providing direct evidence for understanding how features formed and how they were altered and interacted with natural processes. The construction of these features in the same context as Hickory Bluff was essential, as a literature search indicated that environmental and sedimentary contexts often conditioned feature forms. The experimental observations showed the complexity of feature formation and the plethora of interacting processes. The observations also provided information about the morphological consequences of certain processes, thereby providing a backdrop for recognition of archaeological features. Some interesting parallels were drawn between the modern observations and the archaeological sample, indicating that natural and cultural formations have patterns that can be distinguished.

Based on field observations and initial analytical studies, which indicated that feature interpretation was both less straightforward and more complicated than typically presumed, it was realized that links had to be made between the range of processes and their material consequences. As a consequence, models were constructed relative to basin and TAS formation, two common feature forms found at Hickory Bluff. These models took account of major natural and cultural processes and were formulated using a diversity of sources including existing literature on feature formation, experimental observations of basin formation, ethnohistoric research, and sweatlodge observations of economic, social and ceremonial behaviors. The modeled scenarios were linked with specific variables that could be used to test site data. Since certain features were more conducive to study than others, and since the data sets were potentially large, a sample of basin and TAS features was necessarily selected.

Formulation of the models helped to clarify thoughts concerning the interaction between processes and material variables, and the link that could be made with archaeological patterns. The modeled situations and the analytical comparisons showed a large range of possibilities and divergences between archaeological features in form and content. The investigation highlighted the complicated nature of cultural and natural processes that accounted for feature formation. The modeled scenarios, consisting of experimental observations, background research and descriptive variables, were effective investigative techniques to study feature formation. The study indicated that the previous dichotomies for feature formation as pithouse elements or as tree throws were overly simplistic. Rigorous field and laboratory observations, recording, and analytical studies are needed to further the site formation approach taken here. While we have

shown that there is much more to study in archaeological feature formation, more work for accurate description and recording is required, and the simplified scenarios presented in the models should be expanded. Since the models and data show a variety of patterns, future research should be dedicated to understanding how these patterns form and how certain variables can be linked with particular functions and processes.

ACTIVITY AND SPATIAL DISTRIBUTIONS

Ethnoarchaeological observations of modern people who inhabit temporary settlements show that occupations often occur over large areas (e.g., O'Connell 1987). Fortunately, horizontally extensive mitigations have been conducted in Delaware to understand landscape use and occupation history (e.g., Custer and Silber 1995; Custer et al. 1996; Petraglia et al. 1998b). The Hickory Bluff fieldwork was likewise conducted over a broad area, allowing for study of artifacts and feature distributions and the interpretation of activity areas and site structure.

An effective tool applied to the Hickory Bluff data set was computer generated mapping employing both GIS and SURFER®. The use of computer aided contour plots was essential in rapidly plotting and analyzing artifact distributions. While spatial plotting techniques have been used with some degree of success at other Delaware sites (e.g., Custer et al. 1996; LeeDecker et al. 1996), a main difference in their recent applications for investigations at Lums Pond (Petraglia et al. 1998) and in this site report, has been the degree and depth to which spatial studies were used. At Lums Pond and Hickory Bluff, both large and small areas were examined in a comprehensive fashion and multiple distribution analyses were conducted in an attempt to discern patterns.

A large number of SURFER® generated plots were produced for Hickory Bluff to illustrate and identify artifact patterning (Section 16.0). The exploratory spatial analyses were especially useful in identifying latent features that were not immediately obvious in fieldwork. The use of SURFER® maps allowed for data processing in a multitude of ways, examining an array of artifact distributions by number, type, and raw material. The patterns recognized and displayed as a result of SURFER® were then used as a basis for more synthetic maps (Section 18.0). Compilation of SURFER® clusters clearly showed that certain patterns could be nicely discriminated and were intact manifestations of cultural activity. In other cases, multiple clusters of different artifact types provided evidence for repeated activity in certain spots. Plotting ceramic vessel lots and cross mends on SURFER® contour distributions was a particularly useful avenue, as the maps supported the relative integrity and postdepositional disturbance of clusters and features. The compilation of artifact clusters and temporal diagnostics clearly showed accumulation through time. While SURFER® was an effective tool for isolating certain patterns in a visually effective manner, GIS mapping was a more powerful analytic technique for analyzing certain complex data relations. GIS was an effective means of illustrating feature distributions and it was the vehicle for showing differential artifact density within and outside of basin features (Section 10.0).

A combined approach to spatial mapping was undertaken as no single technique showed discrete versus overprinted distributions in an effective visual and analytical manner. SURFER® was not a useful means for displaying associations between artifact densities and feature

locations. While associations could be better shown in GIS, artifact contouring was not as visually pleasing as SURFER®. As a consequence, SURFER® clusters drawn from artifact contour maps were imported into GIS and superimposed on feature locations, making for the most accurate and visually effective map renderings.

The spatial analyses and the interpretations of accumulating site structure served as the basis for testing the concept of "micro-band" versus "macro-band" settlements. With recent, large-scale excavations at sites such as Snapp, Leipsic and Pollack, the validity of the concept of a "macro-band" site has been questioned, instead considering the possibility that large sites were repeated occupations that accumulated laterally through time (Custer 1994). Hickory Bluff was ideal for such analysis, as temporally diagnostic material, intact features and radiocarbon dates were spatially plotted over wide areas. Spatial overlays of temporally distinct material and radiocarbon dates showed that the site was, in fact, made up of both temporally discrete and overlapping patterns that occurred over wide areas through time. Spatial distribution of occupations at different times led to the lateral accumulation of the site, not necessarily just large groups of people during specific times as was surmised by the macro-band model.

A goal of the Hickory Bluff investigations was to produce a data set that could be made available to and used by other investigators. A frustration often encountered in archaeology is the problem with gaining easy access to artifact data sets collected by other researchers. The Hickory Bluff project was therefore designed to provide all available information to other researchers in electronic format, including the site grid, feature plots and descriptions, and the artifact inventory. Investigators will therefore have better access to the Hickory Bluff data set for conducting their own comparative research.

SOCIETAL PATTERNS

Accumulation of substantial features and material culture assemblages clearly points to the locational importance of Hickory Bluff. One of the most interesting and behaviorally significant aspects of the Hickory Bluff study was the placement of the site in relation to other key sites along the St. Jones River. Inter-site synthesis of location, material culture assemblages and temporal sequences provided novel information about Native American landscape use. Compilation of these data indicated how the history of occupation at Hickory Bluff related to wider use of the St. Jones riverine landscape. The settlement pattern analysis and the radiocarbon data showed variability in the tempo of landscape use through time and shifts in site use intensity. While some important information was derived from the inter-site compilation, it is clear that the settlement data can be investigated at a more intensive level than conducted here, thereby leading to a more refined understanding of landscape behaviors. One issue that will be encountered and must be borne in mind, is data compatibility (i.e., not all information was collected and reported to the same level and degree of detail), thus primary research on site records and collections would be beneficial.

A major aim of the Hickory Bluff investigations was to examine the site in relation to Woodland I territorial models (Custer 1994). To place the site in a geographic framework, technological and mineralogical analyses were conducted on the stone tool and ceramic assemblages. Studies indicated the dependence on local resources, such as the prominence of local gravel use by the Hickory Bluff occupants. Mineralogical study of stone tools supported

the importance of local procurement of gravels, but it also indicated the use of material from distant sources. One major issue that was difficult to resolve was whether these non-local materials were acquired through direct procurement during mobility rounds or if the materials were exchanged between groups. Based on the variety and geographic distances of materials, it is clear that the current Barker's Landing model for the Late Archaic needs to be reconsidered and expanded. The mineralogical analysis of Early Woodland and Adena stone tools provided evidence that a regular level of inter-group contact and exchange was not operative, but rather the use of exotics was a rare event.

Projectile points and ceramic styles were surmised to be useful for appraising social integration and inter-group boundaries. In the end, projectile point styles proved less effective than ceramics. While this study concluded that certain characteristic projectile point forms were likely the products of stylistic norms, other forms appeared to have influences that were more closely related to physical factors. The larger array of processes that influenced the final form of projectiles made the assessment of style and social boundaries somewhat difficult. The ceramic assemblage was a far more sensitive indicator of social integration and boundaries. Mineralogical sourcing was a vital element in determining origin of wares, their geographic movement, and connected social processes. The inter-twined appraisal of clay procurement source and manufacturing conventions provided critical information for appraising social boundaries. While many ceramic vessels share common attributes, closer inspection of the attributes indicated far more diversity in manufacture and flexibility in decisions and choices. The question of shared homogeneity and the level of autonomy between social groups and individuals is clearly an important avenue for research. The stylistic and mineralogical analyses need additional research through larger samples, but its potential for illustrating social contexts is especially significant.

The connection of Hickory Bluff to a regional political and social structure was possible to a certain extent, given a wider evaluation of the site in the context of the St. Jones River landscape and larger scale geographic boundaries. The contextual analysis of Hickory Bluff allowed for an initial appraisal of regional and local systems throughout the course of the Late Archaic to Middle Woodland periods. However, the emphasis on a single site, which did not provide information on relations between group members at any one time, led to some difficulty in evaluating the larger picture of societal relationships and changes. Detailed synthetic studies focused on generation of primary inter-site data would likely provide more fruitful information about social and political change through time and be more useful in addressing questions about dominant society and the role of individuals in shaping group behaviors. Studies of power relations and the influence of certain members of society will likely be most successful when applied to inter-site comparison of internally differentiated locations, in mortuary contexts which show differential treatment of group members, and analysis of certain material classes (e.g., specialized objects and study of "surplus" items).

RITUAL AND SYMBOLISM

The Hickory Bluff research strategy incorporated a study of ritual and symbolism, an approach that is usually ignored in regional site investigations in favor of economic and ecological processes. The attention placed on non-secular aspects of site formation was an

exploratory approach, and as such, it was one of the most difficult aspects of the investigation, although one of the most intellectually satisfying. The exploration helped to realize that far more attention could be paid to human belief systems about the natural world and their connection to material remains and ritual behaviors.

Targeted ethnohistoric research on cosmology, ritual and symbolism, as presented in Section 5.0, was an invaluable approach. Based on the material culture and the site structure recorded at Hickory Bluff, specific questions about non-secular aspects of Native American society were formulated. Research on Algonquian belief systems were a critical component of this investigation and provided the necessary grounding for inferences concerning cosmology and ritual that may have been operative at Hickory Bluff. Based on the invaluable ideas drawn from the ethnohistoric research, a renewed mining of the literature should be productive for formulating new directions for examining belief, ideology and symbolism, and their connection to material culture and expressions that may be established archaeologically.

The investigation of artifact color provided a potentially new avenue to investigate within the archaeological record. A variety of artifact types were investigated (e.g., points, ceramics and TAS) and specific avenues were explored to examine non-secular connections. The point assemblage showed some patterning in color selection and some change through time. The TAS showed a diversity of colors and variations between features. The color patterns set the baseline for exploring certain ideas about non-secular behaviors drawn from the ethnohistoric review. In this sense, color was the only investigative avenue employed to explore certain symbolic expressions. However, as was realized in this study, examination of artifact color does have interpretive limitations and methodological problems. As with all pattern recognition analyses, the most difficult problem was establishing the interpretive connection between behaviors and color patterns, although the ethnohistoric literature suggests an intimate one existed. Color classification and coding for dominant color was sometimes difficult. Nevertheless, since we know so little about color and its connection to human behaviors and symbolism, and whether or not it is archaeologically patterned, further exploratory analysis needs to be conducted on targeted artifact classes.

A study of cognition and human choices was attempted on the projectile point and ceramic assemblages. Since points were part of a reductive process, chipped stone can be viewed as a pliable medium for certain individual expression. However, the final forms as examined in this study were not conducive for this level of interpretation. The *chaine operatoire* approach, as is being applied in many lithic studies, may be the most beneficial avenue for exploring how stone tool types were constructed. This method, however, is best used in situations where single component assemblages can be found and where the sequence of reduction can be reconstructed. Ceramics were a better artifact class within which to examine attribute variability and its connection to individual choices and connections to group behavior. Individual actions in vessel production could be measured through technological attribute variability. Manufacture was evidenced as operating within normative frameworks, whether more confined group expressions as on the Delmarva, or as part of more widespread behaviors occurring over the Mid-Atlantic. While ceramics were the most ideal artifact class, the relative influence of social, technological, and individual expressions is certainly not straightforward. As

a consequence, research designs need to explicitly consider the fit between a potential range of behaviors and the factors that condition ceramic forms.

The Hickory Bluff research design took account of the influence of emotive aspects to artifact manufacture. While it can be assumed that human expression, in some form or another, underlies the manufacture of all types of artifacts, it was reasoned that the most success for ascertaining emotive feelings would come from study of the special and rare objects (i.e., gorgets and ulu). In these special cases, manufacturing methods and decorative motifs could be reasonably tied to an unusual sequence of careful production, breakage, use and discard, which was inferred to be connected to ritual and spiritual behavior and the state of mind of the individuals. The analysis of three items at Hickory Bluff suggests that the examination of larger samples of special objects will provide additional and detailed information on individual actions and their meaning.

TAS and basin features were examined for any aspects of non-secular formation. A variety of behaviors was suggested by the great differences in the TAS features and their attributes. While it is plausible that economic, social and ceremonial processes led to their formation, it was difficult to pinpoint the precise process, as a body of information is lacking on cause and effect. Since function could not be assigned with confidence, this report remains conservative in their explicit interpretation. This is a large gap in our understanding of site formation that needs to be rectified by research designs that test certain behaviors and their resultant material residues. The connection between single versus multiple use of TAS features was more successful. While it can not be stated with confidence here, it is possible the use history of these features is related to the prior actions, beliefs, regeneration, and the concept of life and death cycles. In addition to attribute analyses, the spatial layout of the features assisted in their interpretation, as was the case for the three concentrations closest to the bluff edge. With respect to basin formation, their creation and use may be related to certain ritualized behaviors associated with digging into the ground and the placement of material in natural voids of the earth. Caching behavior at Hickory Bluff was inferred for several features and these were related to ritual acts. This inference is likely to be as plausible as any economic inference, and it would be interesting to examine if any similar types of features as found at Hickory Bluff have been overlooked at other sites. Moreover, it would also be instructive to compare these types of features to more spectacular caches of material and examine how these features may relate to symbolic meanings and economic uses.

Beliefs associated with the concept of the natural cycle have material consequences that may be studied archaeologically at various scales of analysis. Hickory Bluff evidenced reuse of the location, rejuvenation of stone tools, and reuse of ceramics and TAS. In each of these cases, the concept of the circle is animated by human actions, which likely reinforced certain traditional belief systems. The investigations at Hickory Bluff should be supplemented with other site and artifact analyses that test this concept and its material applications.

The physical location and the recovery of certain materials at Hickory Bluff implied cosmological and ritual connections. Numerous factors converged to suggest that Hickory Bluff had spiritual and ritual dimensions, including the site setting on a high bluff, the close proximity to water, the viewshed upstream and downstream of the river, the sunset view towards the west,

the close proximity of the St. Jones Adena site, the favored east bank landscape occupation, and the recovery of spiritually-meaningful burned turtle remains. The cosmological and ritual evidence and meanings are as strong as any economic arguments that may be mounted for site occupation. Hickory Bluff may be a traditional place or sacred location or both, but until more comprehensive and comparative settlement studies are initiated incorporating the perspective taken here, we will not be certain about how rare or common this situation was in the past.

The non-secular approach taken here has been a fruitful and stimulating way to examine the archaeological record. The archaeological record of the Mid-Atlantic appears richer than we have heretofore realized, with many more avenues and possibilities to explore. The study of cosmology, ritual and symbolism will be a challenge, and explicit links need to be made between processes and actions and their material manifestations on many levels (i.e., setting, site structure, feature formation and material culture). There is a great need to explore these avenues in future investigations since they surely influenced societal and individual behavior and site formation. Certainly, if this approach is adopted by future researchers, more accurate inferences about Native American behavior will certainly be derived.

REPORTS AND THE NEED FOR SYNTHESIS

The State of Delaware has provided researchers with Management Plans as guidance documents and reference tools. The Hickory Bluff research design took full account of these Management Plans, particularly the Woodland I context (Custer 1994). Many aspects of the Woodland I context, as documented here, were investigated including chronology, technology, settlement and subsistence, providing some novel information with respect to these research themes. However, as was evident during the course of this investigation, the Woodland I context needs some reorientation away from the ecological and economic direction that typifies processual archaeology. While many elements of research on Hickory Bluff fit into a processual paradigm, larger changes in the archaeological discipline, and interaction with Native Americans who shared alternate opinions, necessitated a changed approach. Upon re-evaluation, it was decided that a direction that combined elements of processual and postprocessual agenda would be a viable strategy. The expanded approach taken here was to integrate process, historic conditions, and humanistic meanings without abandoning any particular approach in favor of another. In pursuing this line of reasoning, it was presumed that to be successful in our undertaking, operational linkages had to be made between the most salient aspects of these divergent theories and propositions. The Hickory Bluff site experimented with new lines of reasoning, examining how analyses at different analytical levels could be practically applied to a single site investigation in a cultural resources management (CRM) context. Some degree of difficulty was encountered in producing this report as there were many avenues to pursue, there were not many examples to draw from, some avenues had better results than others, and it was a challenge to summarize information into a synthetic whole. While there were difficulties, the Hickory Bluff report and many of its studies represented a rare opportunity, as most archaeologists working in a CRM context do not have the opportunity to excavate large areas, uncover intact deposits and features, recover large artifact assemblages, conduct experimental studies and public outreach programs, and comprehensively report their results. While this report is an exception to the rule, the broadened research design and aspects of particular studies may be applied to other sites.

To reflect the broad-based research directions operative in archaeology today, archaeologists working in the State of Delaware would benefit from expanded State Management Plans. The historic contexts of the State Plans could incorporate alternate research agendas that could be applied to Native American sites and their material culture. Additionally, great benefit could be derived from data synthesis. The burgeoning field investigations conducted over the past decade as a result of disparate CRM projects need to be compiled by researchers into topical themes. Delaware archaeology could certainly benefit by encouraging M.A. and Ph.D. students to pursue various subjects, such as a study of the St. Jones River landscape and social relations.

The Hickory Bluff report has promoted an intellectual widening of archaeology for the Mid-Atlantic. Diverse, but practical, avenues have been pursued in this report, albeit only in a nascent way. Archaeologists can examine numerous properties of the archaeological record which include economic, social and ceremonial processes, events and meanings. While there are bound to be struggles in pursing this approach, an expanded strategy is a sound one that needs to be pursued with vigor in the future.